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ENERGY SECURITY STRATEGIES IN THE WIDER BLACK SEA REGION

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CUPRINS

Energy security strategies in the Wider Black Sea Region. The most probable crisis.

Foreword

Project on Energy Security Strategies

This project aims to investigate, evaluate and compare the existing energy security strategies and equivalent documents at the level of the countries situated in the Wider Black Sea Area. It also looks into the capacity of those countries to face the four most probable crisis in the area linked to energy security, at what respect they do have the perception about those possible crisis, they've made the planning and prepare to cope with such crisis.

The problem of energy security is in the forefront of the research and concerns of the states in the region and the approaches are debated inside the European Union and NATO. Two schools of addressing energy security are the basic ones, with several nuances in different states: one is referring to the **alternative sources and alternative routes**, of delivering the supplies of oil and gas, meaning the network of pipelines in the region, alternative projects and support for those projects.

On the other hand, the second approach is considering **the interdependence** of the suppliers and consumers in both the upstream – with participations in the production of the consumers – and in the downstream - with equal participations in the distribution of the suppliers.

In order to avoid this conflicting approach, the current study focuses on the **existing Black Sea Region countries strategies**, and we did try to look, in the cases of crisis with an impact, and look at what level the crisis could

harm a country, meaning basically considering if the particular crisis affects the Economic Welfare, of has reach the moment of harming the Domestic Safety – urban services of utilities and day to day life of the citizens – or it is far more complicated and could harm the Security of the state - affecting its capacity to defend itself - or even the very existence of this particular state.

Through this angle of approach, we want to convert the existing strategies – result of the perception of those states of the threats to their energy security – in this paradigm who sees the Primary Energy Security in Ensuring military and security functionality, the Secondary Security in supporting the Critical domestic services and the third one in maintaining the economic vitality.

Our study wants to focus also on the sources and rational of the formulation of those policies, if they exist, than on the planning and feasibility of those strategies, on the correctness of the result to the perceived and designed problem for each country. This individual studies allows a comprehensive comparative study of those strategies.

The final result will evaluate the capacity of facing **four types of crisis** noted in the form of **general threats and challenges** in the respective strategies:

- short run catastrophic effects on **disruption of supplies**
- **disproportionate price effects**
- **sustainable raised of the energy product prices** for a long period of time and
- **reduced investment** or **the cut of the FDI-Foreign Direct Investment**.

Focusing on general **defined approaches to energy security** is a matter of evaluating the sustainability of the states from the region but we also look into the **level of preparedness, realism in the strategies and capacity to react effectively to those problems**.

Methodology

We did made the full study through an investigative approach using sociological methodologies. Basically we did use a full analysis on the documents of those countries, and we did use people on the ground to check

on the functionality of those strategies, meaning their relevance as well as the way the provisions are applied by the nine countries from the Wider Black Sea Region in practice.

Than, the second stage included interviews organized in every country by the local experts together with the experts of the Conflict Prevention and Early Warning Center Bucharest, in order to have first the real perception of those issues as well as to evaluate the capacities of all those countries to elaborate and apply those strategies.

The third level of our program involved an international conference held in Bucharest, 8-9 of November, debating the main findings of the country reports by involving all the team and some eminent international experts in energy security and a large expert public. The result of this debates proved the viability of the research on those countries from the Wider Black Sea Region, gave added inputs and integrated the results in a regional approach, as well as in a common format, maintaining the particularities of each country. The last stage was reserved to the unified texts, editing and integrated the reports in the current book.

The book is structured in two parts, the first dealing with the main findings and the whole study and the core issues as well as the way that institutions like NATO and the EU see energy security and are involved in those issues, an important fact since in the region we do have member countries and all the Wider Black Sea Region states have relations with both of the organizations. The second part is aimed at making the countries assessment, but we choose to do it also making the insertions at a sub-regional level, in the Caucasian Region, NATO countries and the Region of the New Europe's East.

The main findings of the book are underlining the vulnerabilities of all the nine state, at different stages, to the most probable four crisis, their interdependence and the relevance of the Caucasian Knot that is proving the real major role that Georgia holds on the Wider Black Sea Region relations, balance and regional cohesion. It is also important that this balance could be brake if there will be no external actors – the EU, NATO, the US – being also involved in the region and bearing important interests in the region.

The equilibrium, stability and sustainable security of the region, in both energy security and hard traditional security means, could not be ensure if Georgia as an actor would not be in place, the Southern Corridor maintained for transporting energy resources from the Caspian Region and External actors being maintained interested and involved in the region.

For the current books worked some dozen people, the most important contributors assuming the different chapters. The integrative effort involved first and foremost the team of three coordinators, editors and co-authors that I had the privileged to lead. We also had the support of an English language editor for our book.

Let me thank all those contributors, the Conflict Prevention and Early Warning Team as well as the Black Sea Trust of the German Marshall Found that supported this huge and extensive work, hoping that the result could support a clear involvement of the EU and NATO in supporting the energy security of those countries since the security of the countries from the Wider Black Sea Region is intertwined and interdependent with the security of the NATO and EU countries.

Iulian Chifu
Director CPCEW

Part One

THE FUNDAMENTS OF ENERGY SECURITY AT THE GEOPOLITICAL, REGIONAL AND INSTITUTIONAL LEVEL

1. ENERGY SECURITY AND THE CAUCASUS KNOT

Iulian Chifu

Energy Security in the Wider Black Sea Region is defined according to the two main schools of thinking that exist at the international level: the first approach is about **alternative routes and alternative sources of supply** – or alternative clients for those resources – and the second one involves **the interdependence theory**, concerning the capacity of involving in the upstream the distribution owner and the customer country and in the downstream the producer country. If the transit countries are also involved in the interdependence, a good energy security arrangement is likely, according to this school of thinking.

In the region there are major producers – Russia, Azerbaijan, important transit countries – Georgia, Turkey, Romania, Bulgaria, Russia also and consumer countries – Georgia, Turkey, Armenia, Ukraine, Republic of Moldova, Bulgaria and Romania. Some countries do have energy security strategies, some have pieces of such strategies or elements of it in various laws, plans and strategies, some do not perceive at all energy security as a problem, so they have an uneven way of addressing this issue.

Except for the EU/NATO countries, better prepared for facing crises but different in their capacity to react, Russia does not have any idea of energy security or any perception of problems linked to it, no planning, no preparedness, no capacity to react. It is less the problem of Azerbaijan, but here the perception of security is linked rather to physical security of the pipelines and the FDI, where Baku authorities are considering the issue solved through a kind of Stabilization Fund, according to the example of Russia.

Among the EU/NATO countries, Turkey has less internal energy capacities, it is relying on its relation with Russia, but also on the alternatives of supply coming from the Middle East. Romania is far better equipped than Bulgaria to face crises, through its internal production and interconnection to the EU network, while Georgia relies on Azerbaijan and Armenia on Russia. Iran, an important producer facing serious problems with the nuclear program, radical Islamism and tensed relations with the international community has to be included here, although it does not constitute an alternative or a part of the solution for the time being.

For all these countries, as well as for the European ones – except for Russia – the so-called **Southern Corridor** is of tremendous importance for energy security. This means alternative sources and alternative routes of supply, but they are linked to the very existence of the Southern Corridor, meaning a way out for the Caspian energy other than Russia's monopolistic route or Iran's sanctioned routes.

Therefore, the Caucasus is the key of the energy security equation in the region. And there are two major issues linked to the energy security dilemma in the region that are influencing the whole **Caucasus Knot**:

- **The big Security Dilemma**, which has been created by Russia, a producer and supplier country for all the rest – except Azerbaijan – which defined its energy security through dependence, also linked to the former position of dominant and hegemonic country in the region and the heir of the Soviet Empire.
  The profile of those policies involve the "right to preemption" of the energy products from the former Soviet Countries – including

those in Central Asia and Azerbaijan - meaning no free access to its pipelines on competitive basis, but cheap oil and gas, delivered on political basis for Moscow to Russia's companies, that buy all the gas, and the resale to all the customers – at the imposed prices also driven through political reasons and motifs.

The distribution to the former Soviet countries is done acording to their behavior linked to the access of Russian Gazprom and other companies to their energy companies, transport companies for pipelines and lucrative industries based on those products – especially steel, aluminum and chemistry first – and the energy leverage is used in order to obtain the control of those industries, "re-integrating" the former Soviet economic system according to the new, capitalist rules. The treatment of the Russian minority, Russian language and closeness to Russia's geopolitical projects is also a criteria for the price of oil and gas, as well for the sustainability of supplies.

For the former socialist countries, the recipe is the same, except for the Russian elements. The use of those leverages for advantages in the organizations where those countries belong is a good added value, followed by Russia's strategies.

The second term of the security dilemma comes from the other countries, which are looking to diversify their imports and routes in order to have alternatives and to be in a position of real competitiveness, with the capacity to decide on their own choices of foreign, defense and security policies. So as long as other countries are trying to break Russian monopoly, Russia is trying to enforce it, so that's the first security dilemma, where Turkey and, at some respect, Azerbaijan have somehow a different treatment and more alternatives.

- **The little Security Dilemma** is also directly linked to the Caucasus knot, and defines Georgia's policy: since Georgia remains a transit country for Azeri gas and oil to Turkey and the West and since Armenia is dependent on Russia's gas, every such transit is granting Georgia a percentage of the gas and also gives it some type of geopolitical guarantees of survival. Georgia is here a crucial

country for the West for maintaining the Southern Corridor in the defined conditions and things develop the right way.

The little dilemma involves those four countries - Russia and Armenia, Turkey and Azerbaijan. Increasing the energy security of those countries through alternative means and reducing the interdependence makes Georgia lose its security, and this fact because energy security is defined, in the case of Georgia, especially through this interdependence.

The most important case is that of Armenia: if Armenia increases its energy security by the alternative sources from Iran and lowering the dependence from Russia, Georgia will feel less secure, and not only in the sense of energy security, but also in terms of hard security as well. Russia will have a motif less to care about the cut of supplies to Georgia or invading its territory.

At a less respect, but still important for hard security, the Little security dilemma plays on Turkey, but it counts, since the alternatives in the Middle East and Iran are not reliable and the price of the gas from Azerbaijan is more convenient. Moreover, the definition of the geopolitical profile and of the strategic relevance of Turkey is dependent on this alternative route for the energy to Europe and the West.

The case of Azerbaijan is a different one: it supports Georgia's solution since this grants the alternative route of supplies to Turkey and the West, an important part of its definition of energy security. If Georgia falls or its energy transportation routes fall in Russia's hands, an improvement of the relations Russia-Georgia and a possible deal between the two countries could harm the true alternative roads Azerbaijan needs.

Even Russia has a huge problem, since maintaining Armenia close to it means offering the needed gas and oil, and this is maintaining the transit route via Georgia, thus giving Georgia leverage. On the contrary, losing Armenia as a reliable consumer to Iran, but especially as an unconditional ally in its geopolitical projects in the post/soviet space means finding itself with the hands free to deal with Georgia the hard way and then, to press Azerbaijan to fulfill its own means of energy security.

The dilemmas could also be replaced and changed fundamentally, as **Alexander the Great dealt with the mythic Gordian Knot**. Alexander cut the Knot and solved the problem without falling in the trap of solving a complicated practical problem, so there is an actor who could do the same: Russia. The Caucasian Knot could be solved easily if Russia cut the Knot and blocked the alternative East-West Caucasian Southern Corridor through Georgia.

Some attempts and warnings have been made during the Russian Georgian war. Some missiles fell close to the BTC-BTE pipeline, some ports as the Black Sea were occupied and the military facilities linked to the maritime police were destroyed, and the East-West route and railways were also blocked and the transit disrupted.

Cutting the East-West Route, railway and pipelines and cutting Georgia in two solve the dilemmas Alexander Macedon's way. So if Russia has the opportunity of occupying the Black Sea Georgian Shore of Adjaria, or alternatively to regain control through a proxy in the separatist autonomous republic, like in Aslan Abashidze's times, it can control the full export routes to Turkey and the West and block or control the Southern corridor, the way we know it.

Here a new element enters the scene and we need to address this issue with external actors, such as the West, EU and the US alike. We could see this type of debate in some chancelleries during the Russian - Georgian war, then the debates about "resetting the relation" between Russia and EU, then US, and all those efforts are linked also to the effort of avoiding and rejecting Alexander the Great's option for Russia with the Caucasus Knot. But **this solution involves external actors**, since the existing ones in the region are not enough for balancing such a game.

NATO Lisbon Summit and the relations with Russia

Zbignew Brzezinski call it "The Big Chessboard", the world of interdependencies and the game of the mind where, for a specific reason, Russians were holding the champions trophy several times. It is not as complicated, strategically elaborated, time consuming and sophisticated as

the Chinese game Go, but it trains the minds of strategist as no other Western game.

In this World Big Chessboard, the Lisbon Summit came with three very important documents involving also the relations between Russia and The West. We did not find, as proposed by senator Lugar – see NATO and Energy Security Chapter – the application of article 5 of the Washington treaty for energy security purposes, and not for a moment somebody thought about defining energy security the American way – free access to resources, if not the military means will ensure this imperative of economic and security survival of the state.

But the careful wording and the thorough choice of the pieces to be put in all those documents help us decide that those documents were altogether a diplomatic masterpiece. We are talking about the three documents – NATO Strategic Concept, the Final Declaration of the Lisbon Summit and the NATO-Russia Council common declaration that leaves no doubt about the content of the realities discussed behind close doors.

Let's take the basic Russian interests as well as NATO ones to see how they are addressed in the recent NATO Summit documents. It is clear that the first concern of Russia would be to have a veto or a saying, anyway, on issues that it sees as "affecting the Russian Federation security", first and foremost NATO further enlargement closer to its borders. In this respect, The New Strategic Concept – the document addressing issues on the medium term – settled the issue in a theoretical manner, reaffirming the provisions of Article 10 of the Washington Treaty about enlargement and conditions to join the Alliance, but moving all the relations with third actors, involved in the process, in the partnership area, far below the Partnership with Russia:

> *"27. NATO's enlargement has contributed substantially to the security of Allies; the prospect of further enlargement and the spirit of cooperative security have advanced stability in Europe more broadly. Our goal of a Europe whole and free, and sharing common values, would be best served by the eventual integration of all European countries that so desire into Euro-Atlantic structures.*

- *The door to NATO membership remains fully open to all European democracies which share the values of our Alliance, which are willing and able to assume the responsibilities and obligations of membership, and whose inclusion can contribute to common security and stability."*

As we can see, the goal of a Europe whole and free, sharing common values is still there, as the statement that this could be best served by the eventual integration of all European countries in the Euro-Atlantic structures, a statement aimed at calming potential concerns of the new democracies as well of the member states who could see in the way of addressing enlargement a concession made to Russia, in spite of the previous commitments that no non-member state could affect NATO's activity.

Related to Georgia's and Ukraine's possible membership of the Alliance, the Strategic Concept places this point in the middle of the partnerships chapter, after the relations with EU, UN and Russia, and states only indirectly the commitment that both countries will become members of NATO, through the reference to the Bucharest summit provisions. It is an essential set back and concession to Russia as well:

"(NATO will) • continue and develop the partnerships with Ukraine and Georgia within the NATO-Ukraine and NATO-Georgia Commissions, based on the NATO decision at the Bucharest summit 2008, and taking into account the Euro-Atlantic orientation or aspiration of each of the countries;"

The final declaration of the NATO summit in Lisbon is far more thorough, being a document of short term purpose. It gives to Georgia and Ukraine the benefit of all their achievements meanwhile, beginning to separate the two countries. In the case of Georgia future membership is formally stated, while Ukraine is in the framework of mentioning the Bucharest summit commitments. This gives an important boost to Tbilisi since it puts back Georgia in the framework of enlargement, after Macedonia – already invited but blocked by the name issue – and Montenegro, with an unanimously appreciated first year national plan from the MAP.

Talking about the "uni-polarity" of the decisions involving the US and NATO, Russia gets important advantages through Article 2 of the core principles, restating the primary role of the UN Security Council – but not an exclusive one, if the conditions of article 5 of the Washington Treaty and those of the self defense in a collective way are met:

> *"2. NATO member states form a unique community of values, committed to the principles of individual liberty, democracy, human rights and the rule of law. The Alliance is firmly committed to the purposes and principles of the Charter of the United Nations, and to the Washington Treaty, which affirms the primary responsibility of the Security Council for the maintenance of international peace and security."*

At the same time, interesting diplomatic and wording solutions have been found in the context of the NATO-Russia Council final declaration, stating at the same time the will to have a "real strategic partnership with Russia" in the "fields of common interests" but also moving into an NRC "at 29 equal parts", when the next phrase states that it is just a forum for consultations. Moreover, in the next paragraph, issues of common interest are discussed in the NRC and even "common decisions and common actions" could be envisaged.

> "The NRC member states are committed to working as **29 equal partners in order to fulfill the tremendous potential of the NATO-Russia Council** through the continued development of their political dialogue and practical cooperation based on their shared interests. We underscore that the **NRC is a forum for political dialogue** at all times and on all issues, including where we disagree.
>
> We are determined to make full use of the NRC mechanism for consultation, consensus-building, cooperation, **joint decision and joint action on a wide spectrum of security issues in the Euro-Atlantic region**."

This would be the biggest achievement Russia gets through the provisions of the three documents approved at the Lisbon NATO summit. In that area, NATO made huge steps of openness, by reversing the suspension of the NATO-Russia relations even though Russia didn't observe the commitments in the cease fire agreement; moreover, it recognized the two

separatist regions of Georgia, South Ossetia and Abkhazia, as independent states.. It is true, at the same time that the allies are expecting from Russia confidence building measures and facts after this openness.

It is true, on the other hand - and this is to be noted in the context of the possible cut of the Caucasian Knot by Russia – that hard provisions have been put in place, in all three documents, as **basic principles and guarantees** for all the countries in the Euro-Atlantic area, not only from the Alliance. The list would comprise 7 main points:

- Article 5 plus commitment
- Principle of not using the force or threatening to use force
- Principles of sovereignty, territorial integrity and political independence
- CFE Treaty, OSCE provisions and basic principles of the relations with Russia
- Formulation for Georgia's separatist regions
- Operations "beyond the borders" and mission of crisis management, involving NATO in crisis beyond the borders "when it is possible".
- Formulation linked to nuclear missile balance – weapons in Europe and stock piles of short range nuclear missiles - and commitment for a world without nuclear weapons

About the **Article 5**, the Strategic Concept did find a strong format, which is supposed to calm down the concerns of the Allies about the possibility to alter the understanding or to subordinate even the core missions of the alliance to the reset of the relations with Russia and to the preeminence of the strategic partnership with Russia over the Alliance's main tasks.

> *"a.* ***Collective defence****. NATO members will always assist each other against attack, in accordance with Article 5 of the Washington Treaty. That commitment remains firm and binding. NATO will deter and defend against any threat of aggression, and against emerging security challenges where they threaten the fundamental security of individual Allies or the Alliance as a whole."*

Another important guarantees are included in the framework of the principles of the bilateral relation with Russia, in the NRC, and are situated

before the ones dealing with bilateral cooperation. The most important is the **commitment not to use force** and threatening with the use of force in the whole Euro-Atlantic area.

> *"The NRC member states will refrain from **the threat or use of force** against each other as well as against any other state, its **sovereignty, territorial integrity or political independence** in any manner inconsistent with the United Nations Charter and with the Declaration of Principles Guiding Relations Between Participating States contained in the Helsinki Final Act."*

Reciprocity is invoked also, as is the need of bridging gaps in confidence building and to compensate the previous acts going in a different direction by deeds and not only in words, confirming the openness and commitments assumed by Russia in this relation. As we can see, in the very article it is stated also the support of all members of the NRC for the **territorial integrity, sovereignty and political independence** of all states, not only the allies.

We have here also the issue of reaffirming the **basic values and principles**, as well as provisions of several documents, that are standing as fundaments to the NATO-Russia relation, including those infringed by Russia when occupying Georgia's separatist regions, waging war for changing the borders and recognizing the independence of the two regions of Georgia. The NRC common declaration states:

> *"We reaffirmed all the goals, principles and commitments set forth in the Founding Act, the Rome Declaration and the OSCE 1999 Charter for European Security, including the 'Platform for Cooperative Security', and recognised that the security of all states in the Euro-Atlantic community is indivisible, and that the security of NATO and Russia is intertwined."*

In the final declaration of the NATO Lisbon summit, OSCE principles and CFE future agreements are mentioned as targets as well as the basic principles of "country consent" for stationing of the foreign troops on the territory of a Euro-Atlantic country:

> *"12. The Organisation for Security and Cooperation in Europe (OSCE) is an important regional security organisation and a forum for dialogue on issues relevant to Euro Atlantic security, as*

demonstrated by the Corfu Process. Encompassing the political/military, economic/environmental, and human dimensions, the OSCE plays an important role in promoting security and cooperation. We aim to further enhance the Alliance's cooperation with the OSCE, both at the political and operational level, in particular in areas such as conflict prevention and resolution, post-conflict rehabilitation, and in addressing new security threats. As we celebrate the 20th anniversary of the Paris Charter, we look forward to the OSCE Summit in Astana, Kazakhstan, on 1-2 December 2010."

"23. (...) We want to see a true strategic partnership between NATO and Russia, and we will act accordingly, with the expectation of reciprocity from Russia. We recommit ourselves to the goals, principles and commitments which underpin the NRC."

31. (...) We are committed to conventional arms control, which provides predictability, transparency, and a means to keep armaments at the lowest possible level for security. We will work to strengthen the conventional arms control regime in Europe on the basis of reciprocity, transparency, and host nation consent."

If the issue is mentioned only in principle in the Strategic Concept and **the Russian-Georgian war**, the same final Declaration offers the position towards Georgia's concerns in the aftermath of the conflict:

"21. We reiterate our continued support for the territorial integrity and sovereignty of Georgia within its internationally recognised borders. We encourage all participants in the Geneva talks to play a constructive role as well as to continue working closely with the OSCE, UN and the EU to pursue peaceful conflict resolution in the internationally-recognised territory of Georgia. We continue to call on Russia to reverse its recognition of the South Ossetia and Abkhazia regions of Georgia as independent states."

"23. (...) On this firm basis, we urge Russia to meet its commitments with respect to Georgia, as mediated by the European Union on 12 August and 8 September 2008."

Another important step further of the Alliance is the acceptance of another type of missions, Crisis management ones, concerning involvement **"beyond the borders"** and even the possibility of involving NATO in

conflicts in the vicinity **"when it is possible"**. For instance, in the Strategic Concept, at the title on Core missions, it is stated:

> *"4. b.* ***Crisis management****. NATO has a unique and robust set of political and military capabilities to address the full spectrum of crises – before, during and after conflicts. NATO will actively employ an appropriate mix of those political and military tools to help manage developing crises that have the potential to affect Alliance security, before they escalate into conflicts; to stop ongoing conflicts where they affect Alliance security; and to help consolidate stability in post-conflict situations where that contributes to Euro-Atlantic security."*
>
> *"c.* ***Cooperative security.*** *The Alliance is affected by, and can affect, political and security developments beyond its borders."*
>
> *"11. Instability or conflict beyond NATO borders can directly threaten Alliance security, including by fostering extremism, terrorism, and trans-national illegal activities such as trafficking in arms, narcotics and people."*
>
> *"20. Crises and conflicts beyond NATO's borders can pose a direct threat to the security of Alliance territory and populations. NATO will therefore engage, where possible and when necessary, to prevent crises, manage crises, stabilize post-conflict situations and support reconstruction."*

Linking these new missions and expected new **involvement of NATO in conflicts beyond the border**, that threatens Alliance citizens, "where possible" with the provisions of the Final Declaration could open the door for the first commitment of NATO to be involved in such conflicts, even though it will support the existent formats of negotiating the settlement of those conflicts:

> *"35. With our vision of a Euro-Atlantic area at peace, the persistence of protracted regional conflicts in South Caucasus and the Republic of Moldova continues to be a matter of great concern for the Alliance. We urge all parties to engage constructively and with reinforced political will in peaceful conflict resolution, and to respect the current negotiation formats. We call on them all to avoid steps that undermine regional security and stability. We remain committed in our support of the territorial integrity, independence and sovereignty of Armenia,*

Azerbaijan, Georgia and the Republic of Moldova, and will also continue to support efforts towards a peaceful settlement of these regional conflicts, taking into account these principles."

Another interesting formulation is related to the **nuclear dimension**, the will of going towards a world without nuclear weapons, though maintaining those weapons for deterrence as long as these weapons exist in the world, but also discussing the movement of those long range Russian missiles from Europe and the reduction if not destruction of the short range missile deposits of Russia's nuclear weapons. In the new Strategic Concept it is stated that:

"17. Deterrence, based on an appropriate mix of nuclear and conventional capabilities, remains a core element of our overall strategy. The circumstances in which any use of nuclear weapons might have to be contemplated are extremely remote. As long as nuclear weapons exist, NATO will remain a nuclear alliance."

"26. (...) • We are resolved to seek a safer world for all and to create the conditions for a world without nuclear weapons in accordance with the goals of the Nuclear Non-Proliferation Treaty, in a way that promotes international stability, and is based on the principle of undiminished security for all."

"• With the changes in the security environment since the end of the Cold War, we have dramatically reduced the number of nuclear weapons stationed in Europe and our reliance on nuclear weapons in NATO strategy. We will seek to create the conditions for further reductions in the future.

• In any future reductions, our aim should be to seek Russian agreement to increase transparency on its nuclear weapons in Europe and relocate these weapons away from the territory of NATO members. Any further steps must take into account the disparity with the greater Russian stockpiles of short-range nuclear weapons."

When the NATO-Russia final common declaration states:

"We strongly support the revitalisation and modernisation of the conventional arms control regime in Europe and are ready to continue dialogue on arms control, disarmament and non-proliferation issues of interest to the NRC. We welcome the conclusion

of the New START Treaty and look forward to its early ratification and entry into force.
The NRC member states are resolved to seek a safer world for all and to create the conditions for a world without nuclear weapons, in accordance with the goals of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), in a way that promotes international stability, and based on the principle of undiminished security for all."

And if there were issues of concern related to **NATO-Russia's cooperation on the missile defense**, the framework of this cooperation has been drawn through the provisions of the final Declaration of the summit:

"38. We will continue to explore opportunities for missile defence co-operation with Russia in a spirit of reciprocity, maximum transparency and mutual confidence. We reaffirm the Alliance's readiness to invite Russia to explore jointly the potential for linking current and planned missile defence systems at an appropriate time in mutually beneficial ways. NATO missile defence efforts and the United States European Phased Adaptive Approach provide enhanced possibilities to do this. We are also prepared to engage with other relevant states, on a case by case basis, to enhance transparency and confidence and to increase missile defence mission effectiveness."

So it is about exchange of information, confidence building measures, visits and inspections based on reciprocity, but not about the access to technology or transfer of such technology to Russia, a veto right of Russia related to the places where components would be put in place and neither a place in the decision making for using this defensive weapon for Moscow – due first to effectiveness reasons regarding the small window of opportunity offered to react to a missile fired against one of the Allied countries, for the use of such a weapon.

Countries energy security assessment

Romania

The constant raise of prices for a long period and cut of foreign direct investments are the most challenging. But those issues are not able to hit the security or the very existence of the state or its citizens, at most they could cause huge economic problems.

The energy sector has been constantly neglected during the last 20 years which witnessed a continuous production decrease at the same time with an increase of import dependency. The outdated technology, inadequate infrastructure and the lack of new exploitable reserves are seriously affecting the performance of this sector on the short, medium and long term. Nevertheless, Romania has adopted the necessary legislative framework, including an investor-friendly one so that the sector is carefully regulated by the competent authorities. The Energy Strategy for 2007-2010 offers some of the solutions to the sector's issues, but it has to be pursued and eventually revised with a view on long term developments.

The re-structuring of the state-owned components of the energy sector is uncertain for the time being, but the current Government still has to find solutions for the increase of energy efficiency and security of supply. The gas crises of the last years have proved that Romania's dependency on a single import source has to be dealt with seriously and the conclusion of the AGRI agreement is one of the viable options. Romania remains committed to the Nabucco project and a fierce supporter of pursuing a common energy policy at the level of the European Union, while tackling the more delicate energy security issues within the North-Atlantic Alliance.

The four types of crises taken into consideration pose various degrees of threats to Romania's energy security and welfare, but none of them has the potential of threatening the state's very existence. They can cause serious damage to the economy and life standard of the population, increasing already high social tensions because of the Government's austerity measures which can further lead to the fall of the Government in a worst-case scenario. Nevertheless, the state's capacity to deal with this kind of crises has improved during the last years and any particularly difficult situation could benefit from activating the European solidarity clause among member states, thus helping Bucharest to tackle more efficiently even very complex challenges.

Bulgaria

Bulgaria is highly dependent and vulnerable to all types of cut in energy supplies that can hit directly the citizens, if not also the security of the state. The combination of low prices and low incomes and the lack of savings and internal investments make it vulnerable to all the

four crises and the solution is alternative lines of supply and alternative sources and, especially, a common energy policy of the EU.

Bulgaria's energy dependency is substantial as 70% of the country's net energy consumption comes from imports and reaches about 75% when nuclear fuel is taken into account. The country is practically fully dependent on imports of gas, oil and nuclear fuel. These imports come from a single country – Russia. In the case of natural gas there is also a single route and pipeline of delivery.

Bulgaria's main premise for energy security is building a common EU policy to which Bulgaria is a major participant. In that regard the country supports EU plans for securing Europe's energy supplies and achieving greater energy independence. In regard to the broader European energy policy, Bulgaria is committed to active participation in the Nabucco project and similar projects that concern the country.

The responsibility of maintaining supplies is actually regulated by two state bodies: the Ministry of Economy and Energy as well as the State Agency State Reserve and War-Time Stocks. The respective laws and regulations oblige also state and private energy companies to maintain certain volumes of fuel as an emergency supply.

As for the natural gas sector the situation is far more complicated. The complete dependency on a single gas supplier became possible only late, since the internal distribution infrastructure was build after 1991, as Bulgaria did not have any household consumption of gas prior to that. The cut of gas supplies affects, in short time even, the household, if not the entire population of Bulgaria.

Prices charged to the final energy consumer in Bulgaria remain among the cheapest in Europe when compared on a market exchange rates basis. So in that respect, the sudden raise of prices can hit directly Bulgaria, and make it more vulnerable than all the other states, as well as the sustainable raise of price which could put down its entire economy in a matter of years.

The system struggles to get out of this vicious circle, but the combination of low electricity prices and low incomes of consumers deters investment in rehabilitation of old generating plants, construction of new capacity and improvement of the grids. And in the investment field, Bulgaria is dependent, at a large respect, from sources abroad, since the level of internal savings of the population and investments of the local companies is

insignificant and could not sustain the necessary investment on the short and medium term.

Turkey

Energy security is seen in Turkey especially in term of critical infrastructure protection, of the pipelines, an on the issues of the straits, where a terrorist attack on a tanker could blow up Istanbul or where the capacity of transit of the tankers reached the limits. Disruption of energy supply may occur at any point in the energy supply chain and it can create an energy crisis in the country or in its region or in the whole EU. FDI cut is also an important problem for Turkey, where the means to compensate are insignificant.

There are some factors that cause energy supply disruptions among which we can mention political reasons, economic reasons, export restrictions or any embargo from producers and war, terrorist attack or political instability of energy producing countries. The Kurdish question and the crisis in the Caucasus are at the forefront.

Turkey has the ambition of becoming a major energy hub. Quite clearly Turkey is already a major physical hub, in the sense that a host of major oil and gas pipelines already transit the country. But Turkey wants to become an **energy trading hub**, a place where energy is bought and sold, a place where a spot market can emerge in gas, since a true hub is a trading hub, an arena in which ideally multiple suppliers meet multiple customers in an open and transparent marketplace.

Although Turkey is not a major oil producer, its emerging role as an important oil transit country and its ambition of becoming an energy hub make it increasingly important to world oil markets. An important aspect, according to studies on natural gas supply-demand balance, is that there won't be a problem in meeting the annual gas demand until 2011. However, during winter months, when the demand is high, disruptions in source or route countries may create seasonal imbalances of supply and demand. Turkey has diversification problems for natural gas, unlike oil. However, diversification of sources is a priority. With most of the natural gas coming from Russia, Turkey is not worried about this aspect since Turkey-Russia relations are based on interdependency – energy is part of the bilateral relations – and Russia has proven to be a very reliable source for this so far.

However, Turkey has no storage facility for natural gas and it doesn't have a minimum 90 days oil stock as a necessary condition laid down by the IEA.
If the prices issue is less costly for Turkey, since it has the transit fees proportional and the 15% selling agreement on the quantity of gas transiting its pipelines, the cut of FDI is of tremendous impact for Turkey. Ankara already experienced it this year when, despite optimistic predictions at the beginning of the year, foreign direct investment inflows to Turkey fell by 25 percent in the first half, compared with the same period last year. Electricity, gas and water supplies attracted the highest amount of foreign investment, $424 million, but still fell over $1 billion short from last year's first-half figures.

Republic of Moldova

According to some estimations and reports, the Republic of Moldova is one of those nine countries from a worldwide classification rated as "extreme risk" for short term vulnerability to energy imbalances with direct influence over national security. The analysis should be carried out from a dual perspective. First of all, the Republic of Moldova has a poor infrastructure, not in terms of kilometers, but in terms of age. Secondly, Chisinau is confronted with a frozen conflict in Transnistria marked by geopolitical tensions with the Russian Federation that can always use the price of natural gas as a political weapon.

The Republic of Moldova elaborated an important document which serves as a strategy for future governmental actions and an effort to increase the system efficiency in order to meet European standards - The strategy of the Sustainable Development of Energy Sector of the Republic of Moldova valid up to the year 2020. But the Republic of Moldova is 99% dependant on gas deliveries from Gazprom, and a viable alternative to this company's product will not exist earlier than 2015 or 2020.
Specific to the Republic of Moldova is the absence of its own energy resources. Around 97 percent of the total consumption of energy resources in the country comes from import sources. The diminution of energy dependence represents a key goal of energy security and to achieve this goal a diversification of import resources has to be ensured.

An aspect that is strictly related to national security and subsequent to the energy security issue consists of supply and alternatives. The general picture looks quite disturbing considering that almost all natural gas is imported, and more than that, the operation is carried out through the Russian state-owned gas monopoly Gazprom.
The lack of foreign investments in the Republic of Moldova is a chronic problem and the energy sector suffers from the same syndrome. This is a very complex issue for this country, because on the one hand it needs major infrastructure investments, but on the other hand it is very important to dismantle the Russian monopoly. So foreign investment is a concept through which the Republic of Moldova understands European involvement. The excessive and unilateral dependency of the Republic of Moldova on foreign monopolistic energy systems represents a major internal vulnerability.

Ukraine

Ukraine is a country which is under the obvious risk determined by high energy consumption and low energy efficiency which makes it vibrant and sensitive towards energy security challenges. Ukraine was ranked among the biggest energy consumers in Europe. The biggest challenge to Ukraine's energy security is losing control on its pipelines to Russia's Gazprom or losing the quantity of gas transiting the system to Europe by the construction of South Stream and the divert of the transit away from its pipelines.

For 1USD of its GDP, Ukraine consumes energy twice as much as Germany. Ukraine's dependence on Russian gas became threatening not that much because of the Russian monopoly on gas and its routes to Ukraine, but due to excessive energy consumption of the Ukrainian economy and many years of opaque commercial relations, leading to the emergence of specific pricing both for gas supplies and transit fees.
Energy security is one of the most challenging issues concerning Ukraine's national and international security which strongly affects the political and economic agenda of the country, as well as its international standing. According to Ukraine's Energy Strategy till the year 2030, adopted by the government, energy sector development has a crucial impact on the country's economic situation, on the resolution of problems in the social

sector, and on the standard of living. The energy sector should switch from focusing only on energy supply for the extensive development purposes, which have been pursued for decades, to energy supply for sustainable economic development.

European concerns about energy security in regard to Ukraine have become the main issue of discussion in the current EU-Ukraine agenda. To strengthen Ukraine's energy sector, most of western experts and politicians expect from the new Ukrainian president to abandon domestic subsidies for oil and gas prices and to let the price reach global market levels.

Ukraine has got some leverage over Russia, as more than 80% of Russian gas exports to Europe go through Ukrainian territory. However, Russia has been making steady and concerted effort to bypass its „unreliable" Ukrainian partner by promoting new pipelines under the Baltic and Black Seas. Russian-Ukrainian energy relations, especially in terms of natural gas supply and transit, can be described as consistently conflict prone.

Within recent years Ukraine experienced **short run catastrophic effects or sudden cut of supplies** twice; the first case was in January 2006 when Russia suspended gas delivery to Ukraine between January 1 and 4, 2006; the second case, a more severe crisis, happened when deliveries were fully interrupted for 14 days, from January 7 to 20, 2009, which led to unprecedented cuts of energy supplies to all of Gazprom's customers in Europe.

Ukraine passed through all the crises discussed in our paper and the impact was major. The most critical impact would be the raise of prices or cut of gas who will affect the hard core of the steel and chemical industries, one of the cornerstones of Ukraine's economy. The foreign direct investments are also critical since the deficit, balance of payments and debts are situating Ukraine in the most critical economies of the world, exposed to bankruptcy.

Russian Federation

In spite of its image of energy power, Russia faces huge problems due to internal consumption, old system of pipelines with low level of energy efficiency and disruption of the internal supplies, poor maintenance and no investments in its domestic system and commitments that overstretch its production resources and the quantities it could get from Central Asia, at high prices. In the investment field, Russia is highly vulnerable to such cuts of FDI since its own reserves are used in mega-

projects outside its borders and not in the internal development of sources and energy efficiency.

Named an "energy superpower", the Russian Federation is a blessed country. In a period when every state sets out to undergo important economic developments, Russia has the largest natural gas reserve in the world, the second largest coal reserves and the 8th largest oil reserve. With so many energy resources, in the past years, Russia became the world's leading natural gas exporter and leading natural gas producer, while also and , though Russia interchanges the latter status with from time to time. Regarding the electricity sector, the Russian Federation is the world's 4th largest generator and the , the latter due to the well-developed production in the country. Being the 4th largest nuclear energy producer, Russia was the first state to develop nuclear power and the first constructor of a nuclear power plant.

Russia is not crossing an easy period and this is because of its obligations regarding the supply of natural gas and oil to buyers from Europe or Asia. Being involved in so many projects, some of them quite impressive, even a country like the Russian Federation may face difficulties. Many specialists in energy security talk about the incapacity of Moscow to respects all contractual terms while supplying natural gas to its own population. Like in many other countries the boom that characterized the economy of Russia in the years before the financial crisis, requested a bigger consumption of energy and inevitably energy resources.

The growing prices of energy resources from Central Asia put Gazprom in a difficult situation. Exporting the contracted gas to its buyers, it was almost impossible for the Russian energy giant to ensure the total amount for internal market. But in the 2007 – 2008 winter, because of the higher price on Central Asian market, Gazprom was forced to use the underground gas reserves and almost totally exhausted its gas reservoirs located underground.

The lack of the FDI in Russia also affects the Russian energy sector. There are signs that Russia is very close to overstreching itself, and Moscow is moving very slowly on to investing in its energy infrastructure. But despite the needs for investment from abroad, Russian policies seem to favor closed domestic monopolies, repealing foreign capital and technology. Furthermore, the risks for investors in doing business with Russia are huge.

They can buy minority stakes in Russian energy firms, but the concept of shareholder is still undeveloped. In this case, the investors from outside must face a notoriously corrupt system with a non-transparent policy.

Georgia

Georgia changed its dependence on Russian oil to Azeri oil, considered to be a more reliable source of supply. In spite of its links to the US, the definition of energy security in Georgia is more a German-oriented one, meaning interdependence between transit and producer countries. Basically, its security stands on the interdependence of Azerbaijan and Turkey, as well as on the one of Armenia and Russia. Both are offering enough supplies for its gas consumption.

Liberalizing completely the energy market came with huge dividends for Georgia and basically it ensures the investment needs. The internal energy market was unbalanced between different parts of the country and had a unique line, a problem that was solved in 2010. This and the internal energy production basically turned Georgia in one of the safest, though still dependent, country in the region.

Georgia has significant domestic energy resources relative to its own needs, notably in hydropower, but it is still highly dependent on imported oil and gas. Energy infrastructure is in a generally poor state, following years of under-investment and the effects of civil strife. To address these issues, the Georgian government has embarked on a major restructuring and liberalisation programme, with emphasis on creating a strong market foundation for the energy sector.

Georgia hugely benefited from the construction of the Baku-Tbilisi-Ceyhan pipeline. Due to this project Georgia obtained a transit function with all of its implications (the Western financial and political interests) and got an opportunity to intensify ties with the West and get rid of the Russian influence. The pipeline has never worked in its full capacity (it transported mainly Azeri oil) but still its importance for Georgia (and Azerbaijan) can hardly be underestimated.

The same is true about Baku-Tbilisi-Erzerum pipeline. It was also very significant for Georgia since it allowed the country to replace the Russian gas by the Azeri one. Due to that Georgia secured itself against Gazprom's notorious price manipulations – another tool of Russian political pressure.

But Baku-Tbilisi-Erzerum has not reached its full capacity either – it has been limited to Georgia and Turkey whereas the construction of Nabucco would allow it to transport gas to Europe too – something that Georgia would more than welcome since it would increase the country's transit function thus making it more important for Europe (where Georgia strives to integrate).

Armenia

Armenia is completely dependent of one supplier, the Russian Federation, which is at the same time owner of 80% of its energy capacities and transit pipelines, as well as the owner of the most lucrative industries linked to gas consumption. Russian Federation is considered to be a good supplier, and the energy security threats are coming from a Georgian- Russian conflict that could cut the pipeline – it didn't happen however during the Russian-Georgian war - or on an Azeri shut in the pipelines. The only real solution would be clarifying the situation with nuclear Iran and lifting the embargo and ending the war with Azerbaijan, entering in the regional projects.

The document entitled "Energy Sector Development Strategies in the Context of Economic Development in Armenia", adopted by the Government of the Republic of Armenia at June 23, 2005 defines **energy security** "as a guarantee of stable and reliable fuel and energy resources at affordable prices sufficient to completely meet the demand of the country and its citizens, the society and economy and to provide electric generation, adequate to preserve the public's health and Armenian's environmental in normal conditions as well as in emergencies".

If under the Soviet Union influence, Armenia had developed it's industrial sector by supplying manufactured goods, machine tools, textiles and other products to Soviet republics in exchange for energy resources, today, after nineteen years of independence, Armenia is facing a weak economy. Armenia has limited energy resources to satisfy its needs. But the country's domestic consumption is not the only problem regarding the energy sector of Armenia. The economy of the Armenian state plus the technologies used in Armenia are a real problem, because they are characterized by a high consumption of energy.

Armenia is almost completely dependent of the energy resources form outside. Because the country has no natural reserves – neither gas, nor oil, all the energy resources that Armenia is using for satisfying the population and economic needs are imported from the Russian Federation, Iran and Georgia.

At present, it is estimated that almost 80% of Armenian energy system is controlled by the Russian Federation, the main supplier of natural gas and oil for Armenia. In this case, with an almost completely dependent in energy sector – no oil or gas wells, no refineries, no coal production, Armenia has only one domestically produced primary energy and this is electricity. This is produced by hydroelectric plants and the Armenian nuclear plant.

Armenia has good relations with Iran, the neighbour which has became more and more isolated because of its controversial nuclear program. For the gas exported in Armenia, Iran wants in exchange electricity. In this situation, Armenia reduces its dependence of the Russian Federation. Iran is interested not only in Armenian, but also in Georgian electricity. In the case of a tied cooperation between Iran and Georgia, the Republic of Armenia will become a transit country.

The Energy Strategy of the Republic of Armenia does not contain suggestions on what the country should do in case of a sudden increase of energy resources or consistently high costs. However, it may be supposed that in such a situation general population would have to bear the burden of additional costs. In 2006, Russian Federation increased the price for Georgia and Armenia from 80 dollars, to 125 dollars. In April 2010, Gazprom decided to rise the gas price by 7%. The Armenian Government measures at this situation were reflected over the population, as the Armenian governmental body regulating the prices for energy (electricity and natural gas) decided to increase the price for gas used by households by approximately 38%, while industrial companies (owners of those are mostly politically affiliated) continued to enjoy cheaper gas supply.

Azerbaijan

Azerbaijan is supposed to be on of the countries without any problems, but dependence from a customer or another, of a route or another, a limited capacity of a pipeline create a headache. Therefore it must go around a lot of constraints since it is a land-locked country that faces

problems in shipping energy products outside in the world. Moreover, the critical infrastructure protection is of first concern, especially the entrance point – Baku terminal – and the exit terminals – in Novorossisk, Poti, Soupsa, Bathumi and, in the future, Kulevi (LNG terminal and liquefying factory) - where a terrorist attack could cost up to years of blockage of supplies.

Although the Republic of Azerbaijan does not have a National Energy Security Strategy *per se,* the National Security Concept incorporates certain aspects of energy security. The most important ones are the physical attack to the pipelines, so critical infrastructure protection, terrorism linked to the Armenians and the War in Nagorno-Karabakh, alternative routes of energy supplies and alternative and sustainable clients for the energy.

The Republic of Azerbaijan benefits from an important strategic position and due to its own energy resources it developed and pursues successfully a diversified energy security strategy. This diversified energy security strategy mainly refers to Azerbaijan's efforts to develop alternatives for delivering its gas to Russia and Iran along with an alternative route transporting gas to Europe through the Black Sea ports. By doing this, in other words by diversifying its own energy routes and markets, Azerbaijan is increasingly contributing to global energy security.

An over-view on energy security in this context justifies the fact that Azerbaijan finds itself at the center of gas diplomatic maneuvering these days. Its hydrocarbon reserves make it not only a strategic transit state but also a reliable supplier. A successfully implemented diversification of its energy security strategy will increase Azerbaijan's role as a stabilizer in the region. It already contributes considerably to the energy security of neighbor states, especially Georgia and Turkey. However, by diversifying its own export routes and markets, Azerbaijan increases its role in both regional and global energy security.

Foreign direct investments are very important in the Republic of Azerbaijan, especially in the energy sector. FDI reached 3.8 billion dollars in 2008. It dropped with the financial crisis, reaching 1.4 billion dollars in the first quarter of 2009, of which 75% was in the energy sector alone.

When talking about FDI in the Republic of Azerbaijan one must evaluate the strengths and weaknesses of the country, especially the poor quality of its infrastructures, the high rate of corruption within the administration, the

slowness of procedures, the destabilization risks due to the conflict in Karabakh, few alternative sectors developed except energy field, a certain level of insecurity.

Although it may seem, due to the impressive volume of FDI, that the Republic of Azerbaijan totally depends on it, the Ministry of Energy and Industry states that if there were to be a cut of FDI it will not affect them. This is mostly because Azerbaijan has a State Oil Fund. This is not credible to cover Azerbaijan's needs and the level of needed investments already launched.

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2. NATO AND ENERGY SECURITY

Iulian Chifu, Sergiu Medar

Energy security emerged as a concern for NATO after some disruptions in the supplies especially in oil supply – 2005, during a fight for prices and debts between Russia and Belarus, and especially gas supplies – 2006 the same type of prices versus debts dispute between Russia and Ukraine, and then back in 2009, the same dispute with the longest 14 days period of cut of supplies.

The first Reference to a role for NATO in energy security was mentioned in the margins of the NATO summit in Riga, at the German Marshall Fund conference, by Senator Richard Lugar, who came as a main speaker. In this framework, Sen. Lugar stated, about the "Centrality of Energy" as he put it:

> *"In the coming decades, the most likely source of armed conflict in the European theater and the surrounding regions will be energy scarcity and manipulation. It would be irresponsible for NATO to decline involvement in energy security, when it is abundantly apparent that the jobs, health, and security of our modern economies and societies depend on the sufficiency and timely availability of diverse energy resources."*

He underlined that, in spite of the hope that the economics of supply and pricing surrounding energy transactions will be rational and transparent, experience provides little reason to be confident that market rationality will be the governing force behind energy policy and transactions.

> *"The majority of oil and natural gas supplies and reserves in the world are not controlled by efficient, privately owned companies. Geology and politics have created oil and natural gas superpowers*

> *that nearly monopolize the world's oil supply. According to PFC Energy, foreign governments control up to 79 percent of the world's oil reserves through their national oil companies. These governments set prices through their investment and production decisions, and they have wide latitude to shut off the taps for political reasons"*

Senator Lugar proved that, under worst case scenarios, oil and natural gas will be the currency through which energy-rich countries leverage their interests against import dependent nations. He stated that Russia's shut off of energy deliveries to Ukraine demonstrated how tempting it is to use energy to achieve political aims and underscored the vulnerability of consumer nations to their energy suppliers.
He was the first prominent personality to state openly, in that particular situation, near the NATO summit reunions, that energy could become the weapon of choice for those who possess it. It may seem to be a less lethal weapon than military force, but a natural gas shutdown to a European country in the middle of winter could cause death and economic loss on the scale of a military attack. Moreover, in such circumstances, nations would become desperate, increasing the chances of armed conflict and terrorism. That's why, Senator Lugar advocated that the potential use of energy as a weapon requires NATO to review what Alliance obligations would be in such cases.

In a special part of his speech, he even refers to the extended means of Article 5 and that these provisions of the Washington Treaty should be used even in the cases related to energy security.

> *"Because an attack using energy as a weapon can devastate a nation's economy and yield hundreds or even thousands of casualties, the Alliance must avow that defending against such attacks is an Article Five commitment. This does not mean that attempts to manipulate energy for international political gain would require a NATO military response. Rather, it means that the Alliance must commit itself to preparing for and responding to attempts to use the energy weapon against its fellow members."*

And according to the statement, the preparation would look into the re-supply of a victim of an aggressive energy suspension, alternatives to existing pipeline routes must be identified and financial and political

support for the development of alternative energy sources, engaging Russia and energy rich nations, on a regular basis, high level consultations on energy security.

The line launched by Senator Lugar was embraced by the Alliance at the same Riga Summit, Riga Summit Declaration, issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Riga on 29 November 2006:

> *"45. As underscored in NATO's Strategic Concept, Alliance security interests can also be affected by the disruption of the flow of vital resources. We support a coordinated, international effort to assess risks to energy infrastructures and to promote energy infrastructure security. With this in mind, we direct the Council in Permanent Session to consult on the most immediate risks in the field of energy security, in order to define those areas where NATO may add value to safeguard the security interests of the Allies and, upon request, assist national and international efforts."*

It was a first step, assuming energy security as an issue, showing concern for this type of new challenges and trying to find the role of the Alliance in this field, keeping energy infrastructures at the forefront of this commitment. The subject was further developed in the Final Declaration of the Bucharest Summit, 3 April 2008:

> *"We have noted a report "NATO's Role in Energy Security", prepared in response to the tasking of the Riga Summit. Allies have identified principles which will govern NATO's approach in this field, and outlined options and recommendations for further activities.*
> *Based on these principles, NATO will engage in the following fields:*
> - *information and intelligence fusion and sharing;*
> - *projecting stability;*
> - *advancing international and regional cooperation;*
> - *supporting consequence management;*
> - *and supporting the protection of critical energy infrastructure.*
>
> *The Alliance will continue to consult on the most immediate risks in the field of energy security. We will ensure that NATO's endeavours*

add value and are fully coordinated and embedded within those of the international community, which features a number of organisations that are specialised in energy security.
We have tasked the Council in Permanent Session to prepare a consolidated report on the progress achieved in the area of energy security for our consideration at the 2009 Summit."

Moving to the Strasburg and Kehl summit, the concern was more on the jubilee of the 60s anniversary than the general issues related to threats, risks and challenges. In the final declaration of the summit, 4-th of April 2009, allies had the benefit of the last experience of the Russian-Ukrainian gas crisis and the Russian Georgian war in August 2008. In spite of these very visible events that were in position of forging a tougher answer toward Russia, after the break of NATO-Russia relations, the declaration was rather mild. We were subject to the influence of the anniversary as well as of the strong will of the hosts, who advocate for resetting relations with Russia.

"59. The Alliance will continue to consult on the most immediate risks in the field of energy security. In we agreed principles which govern NATO's approach in the field of energy security, and options and recommendations for further activities. The Alliance has continued to implement these recommendations.
Today we have noted a "Report on Progress Achieved in the Area of Energy Security". The disruption of the flow of natural gas in January 2009 seriously affected a number of Allies and Partner countries. The issues of a stable and reliable energy supply, diversification of routes, suppliers and energy sources, and the interconnectivity of energy networks, remain of critical importance. Today we have declared our continuing support for efforts aimed at promoting energy infrastructure security. In accordance with the Bucharest decisions, we will continue to ensure that NATO's endeavours add value and are fully coordinated and embedded within those of the international community, which features a number of organisations that are specialised in energy security.
We task the Council in Permanent Session to prepare an interim report for the Foreign Ministers' meeting in December 2009 and a

further report on the progress achieved in the area of energy security for our consideration at our next Summit."

The gas disruption was barely mentioned, without any fingers being pointed at those responsible. However, it stated some ways and directions for countering energy security threats through diversification of suppliers, routes and energy sources, as well as interconnections. Basically, it turned back to the rules of energy security in Europe, the way Central and Eastern European countries defined it, not the interdependence solution of suppliers and consumers in the upstream and downstream, as the alternative definition of a solution in Europe was designed.

Critical energy infrastructure protection was still at the forefront of the concerns, but no Article 5 commitment or any type of other solidarity envisaged for the perspective of energy threats, as proposed in the original assessment that launched the process of reflection and finding solutions and ways for NATO to be involved in those matters. Moreover, the postponement, for the third time, of any consideration of the recommendations of the report proved the lack of political will of the Alliance as a whole to address those issues.

The fact is that, on the same summit, the heads of states adopted the Declaration of Alliance Security, a document aimed at preparing the basics for the next NATO Security Concept that was supposed to be adopted in Lisbon, in 2010. In this framework, energy security finds a place, in the following paragraph:

"Today, our nations and the world are facing new, increasingly global threats, such as terrorism, the proliferation of weapons of mass destruction, their means of delivery and cyber attacks. Other challenges such as energy security, climate change, as well as instability emanating from fragile and failed states, may also have a negative impact on Allied and international security. Our security is increasingly tied to that of other regions."

With this, energy security was extracted from the mainstream of the threats and moved to the chapter of challenges that may have a negative impact, though the marginalization of this particular concern of the states, with the

clear events happening in 2009, affecting a large number of member states, being completely ignored.

In 2010, the Lisbon summit was supposed to be a major reunion of the Alliance, once it was schedule for the approval of the New Strategic Concept. The Group of Experts appointed to assist the new Secretary General in preparing the final form of the New Strategic Concept was rather balanced in its "NATO 2020: assured security. Dynamic engagement analysis and recommendations of the group of experts on a new strategic concept for NATO" paper from 17 May 2010.

The document mentioned energy security 8 times under different forms, including the climate change perspective and the energy infrastructure protection. It also mentioned the article 5 address and the article 4 types of mechanisms linked to energy security. First, energy security is labeled as a new vulnerability, a degree less than the Declaration of Alliance security, who finds it necessary to associate risks to energy security issues. In the hazards section, the group of experts included the sabotage of energy pipelines, and the disruption of critical maritime supply routes.

When presenting, in the Chapter 2, the security environment, the document noted that the most probable threats to the Alliance were unconventional, and at this stage, included the energy security in the part reserved to the risks coming from unconventional sources:

> *"A host of other threats also pose a risk, including disruptions to energy and maritime supply lines, the harmful consequences of global climate change, and financial crisis"*

As we could see, in the risk chapter only the issues related to disruptions of **energy supply lines** in general, pointing more to the **critical infrastructure protection** than to the original **energy as a weapon** used by supplying states, are included.

Energy, in general, is defined in all the documents as vulnerability, and the way of handling it is through cooperation with EU, where we have the next reference, as well as in the partnership section, where Ukraine and Georgia are quoted as countries that could be subject to energy insecurity.

> *"Georgia and Ukraine have tailored partnership structures in the form of the NATO-Ukraine and NATO-Georgia Commissions. Channels of communication are excellent and both countries have contributed as partners to NATO missions. For geographic reasons, the two are touched by issues of longstanding regional concern including ethnic disputes and* ***energy insecurity.*** *One of the major failures of NATO's partnership structure was the 2008 conflict between Russia and Georgia, in which two Alliance partners engaged in hostilities over issues that remain unresolved"*

Talking about ways and means to respond to unconventional dangers, NATO's Expert Group only noted that the response to terrorism, cyber vulnerabilities, **energy security**, and climate change may need some new capabilities. So here, energy security is situated on the same page as terrorism and cyber defense, which are both labeled as unconventional dangers – even though the whole paper finds the first two as threats to the Alliance's security.

Energy security is officially becoming subject to the Article 4 consultation process and mechanism, except for the risk of a "**large-scale attack on NATO's command and control systems** or **energy grids"** who could possibly lead to "**collective defense measures under Article 5".** A concern would be considered "**the sabotage of energy infrastructure or by unlawful interference with maritime commerce"**, so issues of direct, deliberate and aggressive action against the critical infrastructure as well. Such an occurrence, "if **prolonged"**, could lead to consultations under Article 4 of the North Atlantic Treaty and "**to a determination by the Allies of an appropriate response"**.

So energy security is considered more of a **domestic issue** and other institutions, including the EU, are welcomed and designed to deal with this type of problems. But the Expert Group finds it necessary to recommend the issues linked to energy security to be included in **NATO strategic assessment** and that the **contingency plans** should refer to it, including "how the Alliance might work with partners in an emergency situation to mitigate harm to its members and to find alternative sources of supply".

Climate change and global warming were also included in the assessment, but the terms were rather unbinding, recommending some vague elements in the contingency plans:

> *"As an Alliance, NATO does not have a formal role in regulating the greenhouse gas emissions that experts believe lead to global warming. NATO could, however, be called upon to help cope with security challenges stemming from such consequences of climate change as a melting polar ice cap or an increase in catastrophic storms and other natural disasters. The Alliance should keep this possibility in mind when preparing for future contingencies."*

On the 19-th of November, NATO Heads of State approved the final version of the Strategic Concept proposed by the Secretary General. This document also has several references to the energy security that take into consideration the recommendations of the NATO Group of Experts, but concentrated into less visible and direct references. Energy security is mentioned twice as such. The first reference is in the part reserved to the security environment:

> *"13. All countries are increasingly reliant on the vital communication, transport and transit routes on which international trade, energy security and prosperity depend. They require greater international efforts to ensure their resilience against attack or disruption. Some NATO countries will become more dependent on foreign energy suppliers and in some cases, on foreign energy supply and distribution networks for their energy needs. As a larger share of world consumption is transported across the globe, energy supplies are increasingly exposed to disruption."*

The reference advises more the resilience against "attack or disruption", basically transferring to the states the burden to deal with those issues. As a consequence, in the chapter reserved to defense and deterrence, the commitment refers directly to critical infrastructure protection, transit areas and lines linked to the threat of piracy, sending the issue in the Article 4 consultation process and commiting to strategic assessment and contingency planning related to this issue.

> *"19. We will ensure that NATO has the full range of capabilities necessary to deter and defend against any threat to the safety and security of our populations. Therefore, we will:*
> • *develop the capacity to contribute to energy security, including protection of critical energy infrastructure and transit areas and lines, cooperation with partners, and consultations among Allies on the basis of strategic assessments and contingency planning;"*

It is noticeable, even though energy security finds itself somewhere at the bottom of the line, that it is included in the commitment to create Alliance capabilities to defend and deter against "threats to the safety and security of our populations".

The general provisions are somehow more optimistic for the energy security threats in case of an attack. The reference to article 5 is still there if the new challenge threatens the "fundamental security" of an individual state or the Alliance as a whole:

> *"NATO will deter and defend against any threat of aggression, and against emerging security challenges where they threaten the fundamental security of individual Allies or the Alliance as a whole."*

Moreover, the general provisions linked to Article 4 and consultation mechanisms also maintain the window of opportunity for discussing potential threats and obtaining political support from the allies on matters linked to energy security:

> *"5. NATO remains the unique and essential transatlantic forum for consultations on all matters that affect the territorial integrity, political independence and security of its members, as set out in Article 4 of the Washington Treaty. Any security issue of interest to any Ally can be brought to the NATO table, to share information, exchange views and, where appropriate, forge common approaches."*

Saturday, November 20th , the Heads of State approved the final declaration of the Lisbon NATO Summit, where energy security was seen on the same trend as in the New Strategic Concept. Energy security is seen as a matter of cooperation with the partner countries in paragraph 24 as follows:

> *"24. Partnerships enhance Euro-Atlantic and wider international security and stability; can provide frameworks for political dialogue*

and regional cooperation in the field of security and defence; contribute to strengthening our common values; and are essential to the success of many of our operations and missions. They enable us to share expertise; support broader reform; promote transparency, accountability and integrity in the defence sector; train and assist our partners in developing their own capabilities; and prepare interested nations for membership in NATO. They are also important in addressing emerging, and continuing, trans-national challenges such as proliferation, terrorism, maritime-, cyber- and energy security."

The most important part was the one reaffirming the lines and commitment of the NATO summit in Bucharest related to energy security, without repeating or focusing on the matter, and postponing again the final assessment on what share and parts NATO will have on energy security for December 2011.

41. A stable and reliable energy supply, diversification of routes, suppliers and energy resources, and the interconnectivity of energy networks, remain of critical importance. The Alliance will continue to consult on the most immediate risks in the field of energy security in accordance with decisions at previous Summits and in line with our new Strategic Concept. We will further develop the capacity to contribute to energy security, concentrating on areas, agreed at Bucharest, where NATO can add value. In advancing our work, we will enhance consultations and cooperation with partners and other international actors, as agreed, and integrate, as appropriate, energy security considerations in NATO's policies and activities. We task the Council to prepare an interim report on the progress achieved in the area of energy security for the Foreign Ministers' meeting in December 2011, and a further report for consideration at our next Summit.

Seeing how the NATO Strategic Concept is neglecting **energy security as a weapon** and **deliberate and aggressive disruption** by the supplier or transit states of the energy flow for obtaining illegitimate advantages from those countries we remember Senator Lugar words in the conference mentioned before:

> *"If this does not happen, the Alliance is likely to become badly divided as vulnerable members seek to placate their energy suppliers. In fact, no issue in the history of NATO is so likely to divide the alliance in the absence of concerted action".*

Ignoring the concern of a part of the allies on proved facts and grounds for this concern by the states that do not feel those concerns, using the arguments that those positions did not reach the consensus of the Alliance, could be seen as a weakness of the Alliance in front of a very possible energy blackmail with political and even security purposes and is not a proof of solidarity and indivisibility of NATO's defense.

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3. ENERGY SECURITY AND THE EU

Monica Oproiu

Even if energy comes within the scope of Community action, energy policy is still widely regarded as the responsibility of member states according to the principle of subsidiarity. Nevertheless, because of the EU's overall dependence on gas and oil imports and recurring supply crises in the last years, the Commission has taken the initiative of launching various guiding documents and action plans in order to ensure a common response to these challenges.

Basically, the EU's general aim in the field of energy is to ensure competitiveness on the market, to ensure security of supply for its imports and the protection of the environment, all on the long term, entailing the sustainability of its energy policy for years to come. A set of sectorial objectives add to this general aim, including maintaining the percentage of solid fuel (coal) in total energy consumption (in particular by making the production capacity more competitive); increasing the ratio of natural gas in the energy balance; establishing maximum safety conditions as a prerequisite for planning, construction and operation of nuclear power stations; increasing the share of renewable sources of energy[1].

Because of the great differences between the member states concerning production, consumption and degree of dependence on energy imports, the EU is still working on developing a common platform for approaching energy security and enhancing solidarity in times of crisis. One of the main concerns is the interconnectivity of national systems of energy transmission networks and the continuous development of infrastructure, especially for the gas and electricity sectors.

[1] *Energy Policy*, European Parliament Factsheet, page 2, available online at http://www.europarl.europa.eu/ftu/pdf/en/FTU_4.13.1.pdf

In 2006 the European Commission launched a Green Paper called "A European Strategy for Sustainable, Competitive and Secure Energy" in the aftermath of the first Russian-Ukrainian gas crisis, assessing the energy landscape of the 21st century and pointing out 6 priority areas where action was needed in order to ensure a sound energy policy. According to this document, the main challenges in the energy field for the 21st century were identified as the following:

- the urgent need for investment in Europe to meet expected energy demand and to replace ageing infrastructure;
- the rising of Europe's import dependency with the possibility of attaining around 70% of its energy requirements in the next 20-30 years;
- the concentration of reserves in few countries (Europe having basically only 3 sources of gas supply – Russia, Norway, Algeria);
- the increase of global demand for energy and also of the CO2 emissions;
- the rising prices of oil and gas;
- climate change;
- the fact that Europe has yet to develop a fully competitive energy market[2].

Consequently, 6 priority areas for action at EU and member states level were identified:

- competitiveness and the internal energy market;
- diversification of the energy mix;
- solidarity;
- sustainable development;
- innovation and technology and external policy[3].

As far as external policy was concerned, the Commission advocated for clearly identifying priorities for upgrading and building new infrastructure, enhancing EU's partnerships with producers, transit countries and other international actors (big energy consumers like the US, China, India), renewing its dialogue with Russia and developing a pan-European Energy Community to include Ukraine, Turkey, the Caspian and Mediterranean

[2] Green Paper - *A European Strategy for Sustainable, Competitive and Secure Energy*, the European Commssion, Brussels, 8.3.2006 COM(2006) 105 final, page 3, available online at http://www.energy.eu/directives/2006_03_08_gp_document_en.pdf

[3] *Ibidem,* pages 4-5

countries, Norway and Algeria, too[4]; all these would be possible if the EU really managed to "speak with one voice" on the external front, thus giving the second largest energy market in the world a unitary approach to energy affairs.

The Commission also invited the member states to reflect about the ways to enhance the security of supply (bearing in mind the fresh experience of gas being cut off in the middle of the winter because of the Russian-Ukrainian quarrel), including the physical security of infrastructure. It proposed that the energy market should be completely liberalized, competitive, transparent and predictable in order to attract investors and that the network security be improved through increased cooperation and exchange of information between transmission system operators in defining and agreeing common European security and reliability standards. As far as the protection of critical infrastructure is concerned, the Commission considered developing a mechanism to prepare for and ensure rapid solidarity and possible assistance to a country facing difficulties following damage to its essential infrastructure and the setting of common standards or measures to protect infrastructure[5].

Last, but not least, the European Commission suggested the rethinking of the EU's approach to emergency oil and gas stocks and preventing disruptions, including a reexamination of the existing directives on gas and electricity security of supply to ensure they can deal with potential supply disruptions. As of 1968, member states were required to maintain 90 days worth of reserves of the main petroleum products, while the 2005-2006 gas crisis raised questions whether the EU's gas stocks could face the challenge of short-term supply disruptions. The Commission was envisaging at that time a reexamination of the legislation concerning energy stocks in Europe and drafting a new legislative proposal concerning gas stocks in the light of its recent experience and with due consideration given to the different potential for storage in different parts of the EU.

At the end of 2006 the European Commission issued a communication at the request of the European Council regarding a European Programme for Critical Infrastructure Protection in the light of the terrorist attacks in Madrid (2004) and London (2005). The Programme emphasized that

[4] *Ibidem,* pages 15-17

[5] *Ibidem,* page 8

protection of critical infrastructure was first and foremost a *national* responsibility, but there was also a certain number of critical infrastructure elements which, if disrupted, would have a serious impact on the entire community. Consequently, the Programme was aimed at identifying, in a coherent manner, the critical infrastructure and assessing if it needs additional protection measures at a European level. The critical infrastructure was labeled at EU level as the infrastructure which, if disrupted, would significantly affect two or more member states or a single member state if it is located in another member state[6].

The criteria for identifying the European Critical Infrastructure were to be agreed by the member states together with the Commission and other relevant stakeholders and developed on the basis of the severity of the disruption or destruction of the CI, taking into consideration the following indicators:

a. Public effect (number of population affected);
b. Economic effect (significance of economic loss and/or degradation of products or services);
c. Environmental effect;
d. Political effects;
e. Psychological effects.

Member states would identify the infrastructure that meets these criteria at the national level and then notify the Commission, which would prepare after that a draft list for the critical infrastructure at European level. The document designated 11 critical infrastructure sectors at national and European level:

1. Energy
2. Nuclear industry
3. Information, Communication Technologies, ICT
4. Water
5. Food
6. Health
7. Financial
8. Transport
9. Chemical industry

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[6] *The European Programme for Critical Infrastructure Protection (EPCIP)*, MEMO/06/477 Brussels, 12 December 2006, page 3, online at http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/477&format=HTML&aged=0&language=EN&guiLanguage=en

10. Space
11. Research facilities[7].

The owners/operators of the infrastructures designated as critical as European CI would then be responsible for identifying the important assets, drafting risk analyses based on major threat scenarios, vulnerability of each asset, and potential impact and the identification, selection and prioritization of counter-measures and procedures with a distinction between **permanent** and **graduated** security measures[8].
In 2007 the European Commission issued a new communique to the European Council and the European Parliament called "An Energy Policy for Europe" the focus of which was security of supply, solidarity between member states and the basis for a European (that is *common*) energy policy. The document listed once more the challenges faced by all EU members such as climate change, increasing import dependence and higher energy prices, adding to the their increasing interdependence which underpinned the necessity of a common approach in this field[9].
The document reiterated the EU's main concerns from the previous document in 2006- **security of supply** (because of the dark previsions for energy dependence levels for 2030), **solidarity** (due to the different levels of dependence on a sole supplier- that is Russia, without being singled out as such) and **competitiveness** (because of price volatility/rises and concentration of reserves in few hands). It also highlighted the EU's role as a global leader in renewable technologies.
The European Commission identified as basis for a common energy policy the necessity of combating climate change, of limiting of the Union's vulnerability to imported hydrocarbons and the promoting of growth and jobs in Europe[10]. It also emphasized that a social dimension of this new European energy policy should be taken into account throughout all stages of designing and implementing the individual and joint measures. After all, energy can and should be regarded as a public service and therefore the consumers have the right to secure and affordable supplies.

[7] *Ibidem,* page 6
[8] *Ibidem*
[9] Communication from the Commission to the European Council – *An Energy Policy for Europe*, Brussels, 10.1.2007 COM(2007) 1 final, page 3, online at http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf
[10] *Ibidem,* page 5

Basically, the internal energy market would have to meet 3 main challenges: sustainability, competitiveness and security of supply. As far as energy security is concerned, the document pleads for assisting those member states highly dependent on a single supplier to diversify; developing projects to bring gas from new regions, to set up new gas hubs in central Europe and the Baltic countries, to make better use of strategic storage possibilities, and to facilitate the construction of new liquid natural gas terminals; strengthening the existing crisis solidarity mechanisms such as the Energy Correspondents Network and the Gas Coordination Group; maintaining the strategic oil stocks mechanism and developing the similar one for strategic gas stocks; enhancing the electricity interconnections and exploring the nuclear alternative[11]. The main priorities would remain the diversity of sources, suppliers, transport routes and methods together with the setting up of a mechanism to ensure member states solidarity in crisis. All in all, energy must become a central part of all external EU relations based on trust, cooperation and interdependence, especially with its traditional partners Russia, Norway and Algeria.

A year later, the Commission announced an EU Action Plan for Security and Solidarity in the field of Energy representing the second strategic review of the EU's energy policy. The main focus of this new document was to emphasize EU's 20-20-20 initiative regarding the reduction with 20% of all greenhouse effect gas emissions, the increase up to 20% of the share of renewable sources of energy in the total consumption and the improvement of the energy efficiency with 20 %, all until 2020[12]. The Action Plan reiterated the 3 strategic objectives of the EU - competitiveness, sustainability and security of supply, highlighting 5 points of interest in attaining these goals:

- diversifying EU's sources of supply and assessing its infrastructure necessities;
- external relations in the field of energy;
- the oil and gas strategic stocks and designing a crisis response mechanism;
- energy efficiency;

[11] *Ibidem,* page 11

[12] Communication from the Commission to the European Parliament and the European Council, the Economic and Social Committee and the Committee of the Regions - *EU's Action Plan for Security and Solidarity in the Field of Energy*, Brussels, 13.11.2008, COM(2008) 781 final, page 5, online at http://www.energy.eu/ directives/ com2008_0030en01.pdf

- full capitalization of the indigenous energy resources[13].

The document identified the vulnerabilities regarding gas supply as being the dependence of a single supplier, the political incidents in supply or transit countries, natural calamities, climate change and price volatility. In light of the estimates that the overall European gas imports will raise from 61% to 73% until 2020, the Commission proposed a set of 6 directions for action regarding the infrastructure at the European level:

- the Southern Gas Corridor;
- a diverse and adequate offer of LNG for Europe;
- an efficient interconnection of the Balkan Region;
- the Mediterranean energy ring;
- the need for gas and electricity interconnections in Central and Eastern Europe from North to South and of the networks in the Nordic Sea[14].

The 2008 first European Security Strategy devoted little attention to energy security, stating only that "energy dependence is a special concern for Europe", the more so because it represents the largest importer of oil and gas, with imports accounting for 50% of total consumption[15].

The 2009 "Report on the Implementation of the European Security Strategy- Providing Security in a Changing World" reiterated that the EU needed a more unified energy market, with greater interconnection, particular attention to the most isolated countries and crisis mechanisms to deal with temporary disruptions to supply[16]. In addition to these, greater diversification of fuels, sources of supply and transit routes were considered essential, as were good governance and investment in source countries, objectives to be attained through engagement with all relevant stakeholders[17].

In July 2009 the Commission issued a proposal regarding the replacement of the Directive 2004/67/CE on the measures for guaranteeing the security

[13] *Ibidem,* page 5

[14] *Ibidem,* page 20

[15] *A Secure Europe in a Better World- European Security Strategy,* Brussels, 12 December 2003, page 3, online at http://www.consilium.europa.eu/uedocs/cmsUpload/78367.pdf

[16] *The European Security Strategy 2003-2008: Building on Common Interests*, the EU Institute for Security Studies, Paris, February 2009, page 66

[17] *Ibidem*

of gas supply as the Council and the European Parliament asked for a comprehensive review of the document in the aftermath of the Russian-Ukrainian gas crisis in January 2009. Since a new gas crisis could not be excluded, the European Union had to put in place the necessary mechanisms in order to ensure a swift response to it. The lessons learned from the 2009 gas crisis pointed to the necessity of clearer roles played by the gas sector, the Member States and the EU institutions both on the short term – regarding the response to such crises - and on the long term, in providing the adequate infrastructure of this sector. Moreover, one of the main lessons learned from that crisis was that in order for the measures taken to be effective and coherent, they had to be well prepared in advance and coordinated at EU level.

The proposal also emphasized that in a situation representing an emergency at community level, it is the Commission that holds the best position to coordinate the actions taken by national authorities in the member states and to communicate with the third parties involved. Last but not least, the best guarantee for security of supply was a grand scale internal market, very well interconnected and competitive and also able to distribute (evenly) the impact of a shortage or cut off in gas supply[18] .

The importance of gas supply security resided in the fact that natural gas consumption represents one quarter of the total primary energy consumption in Europe and it is being used for purposes as diverse as electricity production, heating, providing raw material for the industry sector and as fuel.

The 2004 Directive had set up the Gas Coordination Group which dealt with the exchange of information and coordination of various common actions among the member states and NESCO (a network of correspondents in the energy security field) which helped improve the capacity to collect information and issue early warnings regarding the security of gas supply. The new regulation aimed at providing the necessary legal framework for a more coordinated response at community level since the individual reaction of a member state could compromise the functioning of the internal market as was demonstrated during the recent crises.

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[18] *Proposal for a Council and EP Regulation regarding the measures for guaranteeing the security of gas supply and for repelling the Directive 2004/67/CE,* Bruxelles, 16.7.2009 COM(2009) 363 final, 2009/ 0108 (COD), page 4, online at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0363:FIN:RO:PDF

The document stated clearly that, in the future, security of supply would depend on the evolution of the fuel mix, the development of the production, both in the community and the third states that provide the gas supply, of investments in stocking facilities and the transport routes, including the LNG installations[19].

A major gas cut off could affect all member states and have serious consequences over the community economy, but also a strong social dimension; therefore, in the event of a crisis, the household consumers and other special category consumers like hospitals and schools would be prioritized, but the measures to be taken during a gas crisis have to be well prepared in advance. This level of preparedness cannot be attained without setting up emergency plans by the gas sector enterprises and the national authorities, which have to be joined by solidarity measures taken at regional level.

The Commission will coordinate all actions and measures taken with third states involved in a supply crisis, while at national level each member state will designate the responsible authorities for implementing the security measures envisaged in the proposed regulation, including a risk evaluation twice a year, the setting up of preventive and emergency plans and the continuous monitoring of the gas supply at national level. The member states had to notify the Commission regarding the designated national authority until the 30th of June 2010[20]. The Commission would coordinate all actions at community level, including the activity of the Gas Coordination Group.

At national level, each member state has to take preventive action and make emergency plans, while at regional level consultation plans are required regarding the interconnecting of the energy networks, transnational supply, stocking and reverse flow capacities.

Last, but not least, the emergency plans set the 3 levels of crisis: early warning, warning and emergency[21]. If a member state declares a state of emergency at national level, it must notify the Commission which has to verify within a week if the measure is justified. At community level, only the Commission can declare the state of emergency at the request of a

[19] *Ibidem,* page 7
[20] *Ibidem,* page 11
[21] *Ibidem,* page 16

national authority or if the Community loses more than 10 % of its daily gas import from third states. In that case, the Commission will convene the Gas Coordination Group immediately and will coordinate the actions of all responsible authorities.

Finally, the proposal provides a common indicator called N-1 for defining a serious disruption of gas supply; N-1 corresponds to the closing of a major infrastructure or a similar facility such as a pipeline for gas imports or a production facility.

The European Commission also proposed a draft Council Regulation for informing the Commission regarding the investment projects in the energy infrastructure undertaken throughout the EU in Juky 2009. According to this document, there is a strong need for a harmonized framework of reporting the data regarding investments in energy infrastructure in order for the Commission to benefit from a coherent perspective over the evolution of the EU's energy system as a whole[22].

In other words, member states have to report to the Commission all relevant data concerning investment projects in the field of energy production, transport and stocking in a coherent manner, on a regular basis so that the Commission can formulate an accurate perspective of the energy system at European level and its future evolution. The document provides a useful set of definitions regarding the infrastructure and the energy sector – sources, production, transport and stocking[23]. It also states that the Commission will have to provide each 2 years a trans-sectorial analysis of the energy sector perspectives on the basis of all the available data from member states or other sources with a focus on identifying future potential imbalances of demand and supply, the obstacles in the energy sector and the best practices to overcome them and on raising the transparency for the stakeholders on the market[24]. It also includes a detailed annex with relevant investment projects in each field of the energy sector – oil, gas, electricity, bio-fuel.

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[22] *Proposal for a Council Regulation concerning the informing of the Commission with regards to the investment projects for energy infrastructure in the European Community and for the repelling of the EC Regulation 736/96*, Brussels, 16.7.2009, COM(2009) 361 final, 2009/0106 (CNS), page 10, online at http://www.europarl.europa.eu/meetdocs/2009_2014/documents/com/com_com%282009%290361_/com_com%282009%290361_ro.pdf

[23] *Ibidem,* pages 11-12

[24] *Ibidem,* page 15

In March 2010 the European Commission approved the financing of 43 major energy projects (31 in the gas sector and 12 in the electricity sector) worth 2.3 billion Euro and designed to contribute to the economic recovery of the EU and to strengthen its energy security. The projects which received grants were for gas interconnectors, including Nabucco, 4 main pipelines (SKANLED, Baltic Pipeline, GALSI, ITGI) and the development of infrastructure to permit a reverse in fuel flow in the event of a short term supply disruption and for electricity interconnectors, together with a small isolated island initiatives. The 2 things that these projects have in common are the fact that they are intended to alleviate European dependency on Russian energy and that they are designed to allow the EU – particularly Central Europe – to receive emergency natural gas supplies in times of crisis (through reverse flow interconnectors, for example)[25]. These projects will not end the Russian dominance in Central European energy networks, but they would help diversify and integrate the existing networks away from Russia, making the countries here less isolated and providing them more non-Russian gas. The idea behind the funding of these projects is that the EU energy system lacks diversity, flexibility and resilience to crises and that the member states in the East or at the periphery have to be better connected to the rest of Europe.

The 2006 and 2009 gas crises served as catalysts for the launching at the EU level of a series of initiatives designed on the one hand to harmonize the legal and conceptual framework concerning the energy sector (critical infrastructure, competitiveness and standards on the internal market, information flow to the Commission, setting up preventive mechanisms and contingency planning for crises of supply disruption, distribution of roles, enhancing solidarity) and on the other hand to give a new impetus to the much claimed goal of ensuring diversity and security of supply (and transport) though various infrastructure projects.

All in all, the decision-makers at EU level have understood the importance of a coherent approach towards the energy sector not only as far as the internal market is concerned, but also when it comes to crisis preparedness and crisis response, while the main difficulty remains that of having 27 specific supply needs and still speaking with only one voice.

[25] EU: Funding Energy Independence, Stratfor, 9 March 2010, online at http://www.stratfor.com/ memberships/156366/analysis/ 20100308_eu_funding_energy_independence

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Part Two

ENERGY SECURITY STRATEGIES IN THE WIDER BLACK SEA REGION

ENERGY SECURITY STRATEGIES IN NATO'S COUNTRIES

1. Energy Security in Romania

Monica Oproiu

I. General country overview

I.1 Geographic position

Romania is situated in South Eastern Europe, in the North of the Balkan Peninsula, at half the distance between the Atlantic Coast and the Ural Mountains and within the Danube's lower basin. It has an Eastern Black Sea coastline 245 km long and about one third of its surface is covered by the Carpathian Mountains. Romania has a surface of 238 391 km² and a population of 21 469 959 inhabitants (2009), being the largest country in South Eastern Europe[1]. It shares borders with Bulgaria (in the South), Hungary (in the West), the Republic of Moldova (in the North-East), Serbia (in the South-West) and Ukraine (in the North). The Danube runs in the South of Romania (for 1 075 km) and completes its 2 850 km course through 8 countries in the Danube Delta, flowing into the Black Sea.

[1] *Romania in figures* , the National Statistics Institute, 2010, pp. 5-6, online at http://www.insse.ro/cms/files%5Cpublicatii%5CRomania%20in%20cifre%202010.pdf

II.2 Political and economic profile

According to the Constitution amended in 2003**,** Romania is a republic based on the rule of law, constitutional democracy, separation of powers and welfare state, which guarantee respect for human rights and freedoms, human dignity and political pluralism[2]. The official language is Romanian. The president's term is 5-year long, while the bicameral Parliament has a 4-year term.

Romania aims at maintaining and developing peaceful relations with all states and, within this framework, good neighbourly relations too, based on the principles and norms of international law[3].

Romania has been a member of NATO since 2004 and a member of the EU since 2007; it also has membership in various regional organizations such as the Organization of Economic Cooperation at the Black Sea (OCEMN), the Danube Cooperation Process (PCD), the Central European Initiative (CEI), the Regional Cooperation Council (RCC), the South-Eastern European States' Cooperation Process (SEECP) and the Regional SECI Center for Fighting Trans-border Crime[4].

Starting with 2001. Romania had a dynamic economy and an annual increase in its Gross Domestic Product (GDP). Between 2005-2008 Romania had a GDP growth of around 6% annually, a trend which faded in the last quarter of 2008 as the country began to feel the effects of the global downturn in financial markets and trade, soon followed by the worst and most complex recession in history. Inflation rose from 4,9% in 2006 to 6,6% in 2007 and 6,3% in 2008, driven in part by strong consumer demand and high wage growth, rising energy costs, a nation-wide drought affecting food prices and a relaxation of fiscal discipline[5]. The National Bank of Romania forecasts a 7,8% inflation rate for the end of 2010[6].

According to the National Institute of Statistics, during 2006-2009, value indicators of turnover and industrial production indicators have been on an

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[2] *The Constitution of Romania* (pocket edition), the National Gazette, Bucharest, 2003, page 7

[3] *Ibidem,* page 8

[4] http://www.mae.ro/node/1434/2 (Romanian Ministry of Foreign Affairs website)

[5] *Energy View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, pp. 286-287

[6] http://www.bnr.ro/Raportul-asupra-inflatiei-3342.aspx (National Bank of Romania website)

upward trend, with the manufacturing industry as the main driver, followed by the energy industry and heat production and the mining industry[7].

Foreign investment has increased significantly since 2007, when Romania became a member of the EU. In 2008, the volume of Foreign Direct Investments (FDI) reached 9,1 billion Euro, registering a 24,4% increase compared to the previous year. In 2008 a high concentration of investments was seen in the industrial branch of the economy, with electricity and heat production, gas and water and services as the main beneficiaries[8].

Until now, Romania has privatized most natural monopolies (such as power and natural gas distribution) and to a lower extent the competitive sub-sectors like power generation.

Five of the country's eight regional electricity distributors have been privatized: Electrica Oltenia to CEZ, Electrica Banat, Electria Dobrogea and Electrica Muntenia Sud to ENEL and Electrica Moldova to E.ON.

Romania privatized two of its regional gas distributors also, Distrigaz Nord to E.ON Ruhrgas and Distrigaz Sud to Gaz de France.

In 2004 Romania concluded the privatization of its major oil company – Petrom - which is currently owned by OMV (51% of its share), other stakeholders being the Romanian Government (40,75%), the European Bank for Reconstruction and Development (2,03%) and some minority shareholders (6,22%)[9].

Further progress in the privatization of the energy sector has been delayed because the government is currently reconsidering its strategy for the energy complexes Rovinari, Turceni and Craiova, envisaging the creation of an integrated, major state-owned energy producer.

Romania's attractiveness for foreign investors has increased during the last years due to its accession to the EU, the main investing countries being the Netherlands, Austria, France, Germany, Italy, the USA, Cyprus, UK and Greece. The Romanian Agency for Foreign Investments (ARIS) provides assistance to foreign investors and facilitates the development of FDI.

The behaviour of the economic agents is regulated by the Competition Law no. 21/1996, further amended by the Government Emergency Ordinance no.

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[7] *Romania in figures ,* the National Statistics Institute, 2010, page 54

[8] *Ibidem,* page 48

[9] *Energy View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 287

121/2003 and approved by Law no. 184/2004, the aim of which is to protect, maintain and stimulate competition for the benefit of the end-consumers, while creating the conditions necessary to assess this behaviour on the basis of uniform principles. The legislation in the field of competition is aligned to that of the EU. The Competition Law created the Competition Council, whose task is to protect and stimulate competition in order to ensure a normal competitive environment, while also taking into account the consumers' interests. It plays a two-fold role: a corrective one, related to its interventions to restore and maintain a normal competitive environment and a preventive one, related to monitoring markets and the behaviour of the actors participating in such markets.

II. Energy sector

II.1 Main regulations

II.1.a Legal framework

In Romania, energy security is perceived at the decision-making level as an integral part of the internal security of the state, as it is written in the National Security Strategy, in force since 2007. Interest for this field is rather recent and has to do with the first Russian-Ukrainian gas crisis during the winter of 2005-2006 and with Romania's accession to the European Union in January 2007. Romania's first Energy Strategy was approved by the Government in November 2007 and it stated the main priorities on the medium and long term, which remained unchanged to this day.
It is necessary to point out from the beginning that in 2010, due to his reelection last year, the administration of president Traian Băsescu issued a new National Defense Strategy, with an entire chapter dedicated to energy security, but the document is still pending Parliament's approval. Moreover, the Government's Programme for 2009-2012 stipulated in chapter 17 – Energy and mineral resources – that the Energy Strategy had to be updated during this mandate, thus leaving a period of 2 years for this goal to be accomplished[10].

The **National Security Strategy** adopted in 2007 for a "European and Euro-Atlantic Romania" provided for a secondary place energy security

[10] Government Programme 2009-2012, chapter 17 – Energy and mineral resources, online at http://www.gov.ro/capitolul-17-energie-si-resurse-minerale_l1a2074.html

among concerns regarding the elements of the state's and the Romanian citizens' security and it had only been taken into consideration in the context of the accession to the EU, thus connecting to its priorities and fulfilling the obligation of adopting the *acquis communautaire.* The document stated that Romania had to model its Energy Security Strategy after the EU's objectives since it had become a member of the Union and the new document was adopted by the Government a few months later, in November[11].

The Romanian perception of internal security "in a systemic and comprehensive approach" encompasses, among other things, the security of energy, transportation and supply systems for vital resources, as well as protection of the critical infrastructure[12]. Energy security was attributed "an important role in guaranteeing national security" from a socio-economical perspective, the means for accomplishing this task being the operational adaptation and the optimization of the structure of the consumption of primary resources, as well as increasing energy efficiency[13]. The main guidelines set by the Strategy in this field were the following:

- the reduction of the dependence on the supply from unstable regions or from those which used energy as an instrument of political pressure;
- the acceleration of programs for generating energy in nuclear plants;
- the return of the concerns for an increase in the production of hydroelectric energy and energy based on the modern technologies for using coal;
- energy production from renewable resources;
- increase of consumption efficiency for both industries and households[14].

In addition to this, it is acknowledged that Romania has to modernize and develop its infrastructure, especially for transportation (road transport and railway transport), energy, communications, prevention of floods, etc. The document also highlights the need for developing, securing and ensuring

[11] *National Security Strategy*, Bucharest, 2007, page 18, online at http://www.presidency.ro/static/ordine/SSNR/SSNR.pdf
[12] *Ibidem,* page 39
[13] *Ibidem,* page 46
[14] *Ibidem,* pp. 46-47

new networks of energy supply, "according to the EU's strategic projects and Romania's interests in the Black Sea region"[15].

The guidelines for energy security are general and repetitive, illustrating an interest that was only in its initial phase and also an attempt to align to European perceptions, but includes some particular elements due to Romania's geographical position and its socio-economic stage of development.

A much more detailed approach to energy security can be found in the new **National Defense Strategy** issued by the presidency in 2010, after Traian Băsescu won a second term. The Strategy acknowledges that energy security is one of the main national objectives, its contribution to the national security being that of adapting and optimizing the structure of primary energy resources consumption and of increasing energy efficiency[16]. The ways and means for achieving energy security will be correlated with the level of economic and social development of the country and with the EU's strategies in this domain. Consequently, the main courses of action will be the following:

- promoting multinational projects aimed at ensuring the diversification of access to energy resources as raw materials, especially oil and gas;
- increasing the capacity and the production of hydroelectricity;
- increasing the proportion of energy production from renewable or alternative resources in the energy balance of Romania;
- intensifying concerns regarding the upgrade and consolidation of the legal framework, the conditions for the normal technological functioning concerning the security of installations, the storage capacities, the energy infrastructure and networks, including the nuclear installations, according to the European standards;
- encouraging projects aimed at ensuring the capacity of interconnection of the electric and natural gas system with those of other countries;
- improving the competitiveness of the electrical energy and gas markets, their correlation to, and the active participation at the forming of, the internal energy market of the EU, together with the participation to the development of trans-border exchanges, according to the Romanian consumers' interests.[17]

[15] *Ibidem,* page 52
[16] *Romania's National Defense Strategy*, Bucharest, 2010, page 25, online at http://www.presidency.ro/static/ordine/SNAp/SNAp.pdf
[17] *Ibidem,* pag 25

All measures taken and all these projects and programs have to ensure the promotion of energy efficiency and of energy from renewable resources, with a minimal environmental impact, the increase of security regarding the energy supply and a decrease in Romania's dependence on imports.

The Strategy reiterates Romania's interest in a stable and secure wider Black Sea region, the more so because of its economical importance as a region of energy transit and also because of its geopolitical one as a link between Europe, the Middle East and Central Asia[18].

Last but not least, the perception is that energy security has more and more become an issue related to good governance, being acknowledged as such within NATO and the EU.

This new approach reiterates some of the main provisions of the Energy Security Strategy of 2007, but it also draws on the lessons learned from the 2008-2009 gas crisis, with a special emphasis on the decision by NATO to tackle in a unitary manner the vulnerability of its member states when it comes to interruption of supply for the European states. The inclusion in the Strategy of a whole chapter dedicated to energy security is a normal consequence of the gas crises that affected Romania also in the last years, but it also proves a certain degree of maturity when it comes to assessing the contemporary security risks and vulnerabilities, signaling that Romania is taking seriously the issue of energy security.

During the last 3 years, Romania's energy policy has been conducted on the basis of the **Energy Strategy** adopted by the Government in November 2007. This document set the fundamental long-term goal and the strategic ones, advanced an assessment of the available resources and of the way they were used, including the current state of the existing infrastructure and the deficiencies in the Romanian energy sector; it also analyzed the opportunities, risks and vulnerabilities, setting guidelines for action, specific measures for each component of the energy sector (hydrocarbons, hydroelectric energy, nuclear energy, renewable energy) and offered a brief presentation of the existing legal framework and the European projects in this field.

According to this document, Romania's **main goal** is **to obtain its energy requirement at present, on the medium and long-term at low prices, in**

[18] *Ibidem,* page 6

accordance with the principles of sustainable development. The strategic objectives envisage 3 different directions:

- energy security (that is ensuring the energy requirement, limiting the dependence on imports, diversifying the sources of import, increasing the level of efficiency of the national transportation system, protecting critical infrastructure);
- sustainable development;
- competitiveness[19].

The document highlights the fact that Romania benefits from a diversified range of primary energy resources, but which are scarce and from a significant theoretical potential of renewable resources. In this context, the challenges stem mainly from the physical and moral tear of transport installations. Although the legislative framework has been continuously improved (in part due to EU accession) and the energy markets have been set and liberalized in the second half of the '90s, there are still some major deficiencies of the energy sector – inadequate infrastructure, high level of natural gas imports, low level of financing and investment and non-compliance of some energy complexes with the European norms concerning pollution.

Under these circumstances, three courses of action have been set, according to the strategic objectives: security of supply, competitiveness and sustainable development.

The Strategy acknowledges energy security as a part of national security and because of that it reiterates the perspective and the instruments highlighted by the 2007 presidential document, while it offers details regarding the process of securing the transport framework according to European legislation and the development projects which are still being negotiated and implemented (multinational projects like Nabucco, PEOP-the Constanta-Trieste oil pipeline; regional projects – the interconnection with the national energy systems of Romania's neighbours). It also identifies critical infrastructure in accordance with European documents (Green Paper for a European Programme concerning the protection of critical infrastructure) and sets the needed courses of action for Government for its protection, based on the existing national legislation and the strategic objectives.

[19] *Romania's Energy Strategy for 2007-2020*, chapter I – Strategic objectives, page 2, online at http://www.minind.ro/anunturi/strategia_energetica_a_romaniei_2007_2020.pdf

The conclusions of this document reiterate the assumptions of the best possible scenario for the development of the national energy system in the 2007-2020 period, as well as the main courses of action set according to the strategic objectives, including the restructuring of the big energy producers of which the government is a major stakeholder.

The basic legislation in the energy sector is composed of:

- Governmental Decree (GD) 365/1998 - establishes the re-organization of the RENEL Autonomous Regia into 3 major companies in accordance with the EU Directive 92/96 regarding the creation of the electricity market;
- Governmental Emergency Ordinance (GEO) 29/1998 to set up and organize the National Regulatory Authority for Heat and Power (approved by Law no. 99/200) – establishes and extends the competence of this regulatory body as follows: it issues licenses and authorizations; it concludes framework contracts; it sets criteria for eligible consumers and for safe and efficient use of the national power system;
- Energy efficiency law no. 199/2000 – establishes the general background of the national policy regarding the efficient use of energy according to the Protocol of the European Charter on Energy Efficiency and the environment-related aspects. It also establishes obligations and incentives for energy producers and consumers to use the energy efficiently;
- GD 627/2000 – re-organizes the National Electricity Company;
- GEO 60/2000 regarding the regulation of activities with natural gas (Official Gazette no. 46, 31 January 2001)– establishes the legal framework for activities performed in the natural gas sector. Its aim is to promote competition on this market by stimulating private initiative and to protect consumers by increasing transparency and efficiency in the sector;
- GEO 73/2002 – it has to do with the organization and operation of public utilities for supplying heat generated in district heating;
- Law no. 325/2002 regarding the thermal rehabilitation of the existent locative base and stimulation of heat savings – establishes the legal framework for thermal rehabilitation and modernization of buildings and related equipment, aiming to improve the comfort and to reduce heat losses, energy and fuel consumption,

maintaining costs for heating and hot water supply and to reduce pollution emissions generated by the production, transport and consumption of energy;

- Electricity Law no. 318/2003 (OG no. 511, 6 July 2003) – creates the regulation framework for activities in the sector of electricity and heat produced in co-generation, taking into account the security of supply, the optimal use of primary energy resources and environmental protection;
- Mining Law no. 85/2003 (OG no. 197, 27 March 2003) – establishes the legal framework for the activities performed in the natural mining sector. It was amended by Law no. 284/2005 (OG no. 917, 13 October 2005);
- GD 443/2003 regarding the promotion of electricity production from renewable energy sources (OG no. 288, 24 April 2003) – establishes the legal framework for the promotion of the program for increasing the RES contribution to the electricity production considering the real potential of these sources. It was adopted in order to comply with EU RES Directive 2001/77/EC. It was amended by GD 958/2005;
- Petroleum Law no. 238/2004 (OG no. 535, 15 June 2004) – creates the regulatory framework for activities in the petroleum sector;
- GD 1535/2004 approving the strategy for capitalization of renewable energy sources (OG no. 8, 7 January 2004) – identifies the renewable energy potential in Romania and defines the strategy for the use of renewable energy sources until 2015;
- Natural Gas Law no. 351/2004 (OG no. 679, 28 July 2004) – establishes the legal framework for activities performed in the natural gas sector in terms of efficiency and transparency. It was amended by Law no. 208/2005 (OG no. 922, 17 October 2004) and by GO 33/2007 (OG no. 357, 18 May 2007);
- GD 1892/2004 regarding the establishment of the promotion system for electricity production from renewable resources (OG no. 1056, 15 November 2004) – The provisions of this GD are applied to electricity produced from the following RES: wind, solar, biomass, as well as hydro energy produced in plants with an installed power up to 10 MW, commissioned or modernized since 2004. It was completed by GD 958/2005;

- Electricity Law no. 13/2007 (OG no. 51, 23 January 2007) – Establishes the regulatory framework for carrying out activities in the field of electricity and heat produced from co-generation. It was amended and completed by GO 33/2007 (OG no. 337, 18 May 2007) and GO 172/2008 (OG no. 787, 25 November 2008);
- GD 219/2007 (OG no. 200, 23 March 2007) – transposes in the Romanian legislation the provisions of EU Directive 2004/8/CE regarding the promotion of co-generation based on thermal energy demand on the internal energy market;
- GD 410/2007 (OG no. 337, 18 May 2007) – includes the operating rules for the National Energy Regulatory Agency (ANRE) through which ANRE takes up the responsibilities of the former Natural Gas Regulatory authority (ANRGN) and becomes the only regulatory authority for the energy and gas sectors;
- GD 638/2007 (OG no. 427, 27 June 2007) – decides the full liberalization of the electricity and gas markets starting July 1st 2007;
- GD 1069/2007 (OG no. 781, 19 November 2007) – approves the Energy Strategy of Romania for the period 2007-2020;
- GD 1461/2008 (OG no. 813, 4 December 2008) – approves the procedure for issuing the guarantees of origin for electricity produced in high-efficiency co-generation.[20]

II.2.b. Competent institutions

According to the national legislation in force, the main prerogatives for elaborating the strategy and the energy policy of Romania belong to the competent ministry and to the Government; the strategy is adopted by the competent minister and adopted by Governmental decisions, while the energy policy is elaborated by the same minister on the basis of the Governing Programme and the previous strategy, not before consulting the relevant NGOs, social partners and representatives of the business sector[21]. Moreover, the competent ministry – at present called the **Ministry of Economy, Commerce and the Business Sector** – has to implement this

[20] *Energy View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, pp. 289-290

[21] *Electrical energy law* (no. 13/2007), chapter II- Authorities and competencies, online at http://www.dreptonline.ro/legislatie/legea_energiei_electrice_13_2007.php

policy through a series of **legislative** (such as elaborating bills), **administrative** (setting up safety stocks, monitoring of the energy transport systems, in accordance with environment protection regulation and the commitments stipulated in the Accession Treaty to the EU), **organizational** (defining the critical infrastructure at national level) and **economical** (granting concessions, signing treaties of cooperation with third states) measures.

The **Ministry of Environment** is responsible for the implementation of the Romanian environmental policy.

The **Ministry of Public Finances** is responsible for the management of public finances and also coordinates the fiscal policy and foreign trade of Romania.

An important role is assigned to the **Ministry of Foreign Affairs** through the so-called "energy diplomacy", defined as the "ensemble of initiatives for facilitating, promoting and identifying new opportunities, taken externally, whose goal is to attain the objective of national security energy of Romania"[22]. The main activities performed by the ministry in this field are the following:

- monitoring and promoting energy security issue;
- supporting the attainment of national energy goals through all means and instruments at the disposal of the MFA, in cooperation with other competent institutions and governmental structures;
- promoting the concept of energy diplomacy through various initiatives regarding the facilitation, support and identification of external opportunities;
- supporting the objectives and projects of the EU in this filed towards ensuring European energy security and the development of a stable economic environment, with a special focus on limiting the effects of climate change;
- promoting the provisions of the European Energy Strategy concerning the security of supply, an increase in the competitiveness on the internal markets and support for renewable energy;
- promoting the enforcement of the provisions of the Declaration of the Prague Southern Corridor Summit;

[22] http://www.mae.ro/

- playing an active role in the materialization of the major energy projects for Central and Southeastern Europe – Nabucco, PEOP – and in promoting alternative ones such as the construction of a LPG terminal in the Constanta port and the interconnection of the Romanian natural gas transportation system with that of its neighbours[23].

The Romanian Energy Regulatory Authority (ANRE) functions under the authority of the prime-minister, its task being that of "creating and implementing the regulation system needed for the functioning of the energy sector and the markets of electrical, heat and gas, in a way that is efficient, competitive, transparent and ensures the consumer's protection"[24]. In order to fulfill this task, ANRE collaborates with public authorities, the economic agents who activate in the sectors of electrical energy, natural gas and heat, with the civil society and various international organizations in this field.

The Romanian National Agency for Mineral Resources (ANRM) functions under government subordination and represents the regulatory authority for the administration of mineral resources. It is the competent authority for coordinating the mining sector under the Petroleum and Mining Laws.

The Romanian Agency for Energy Conservation (ARCE) is in charge of promoting energy efficiency at national level. Its responsibilities include energy efficiency policy-making and program implementation. It is subordinated to the Ministry of Economy, but enjoys organizational, operational and financial autonomy since the funding of its activities comes both from the state budget and its own incomes and revenues.

Last, but not least, within the presidential administration there is a **Department of National Security** which focuses, among other things, on the analysis of the "prognosis studies and draft programs elaborated by the ministries or other competent institutions concerning the general topic of national security and societal security (energy, economic, food safety, social, environmental, transportation, communication systems, financial) and the protection of critical infrastructure[25].

[23] http://www.mae.ro/node/1416
[24] http://www.anre.ro/
[25] http://www.presidency.ro/

II.3.c. Critical infrastructure regulations

Although in the Energy strategy the protection of critical infrastructure is depicted as an integral part of energy security, there is no particular strategy dedicated to it. Concern for protection of the energy infrastructure was triggered by the 9/11 terrorist attacks, the United States being today the only country that elaborated a specific strategy for this. But this concern is shared by the EU, which launched the European Programme for the Protection of Critical Infrastructure in 2006 after the terrorist attacks in Madrid and London.

At European level, **critical infrastructure** is considered to be those elements of infrastructure whose destruction or disruption of functioning will affect significantly two or more member states or only one member state if they are situated on another one's territory[26].

Generally, the infrastructure that is considered critical at the European level is also perceived as such at the national one, but the reverse is not always true. According to the above mentioned document, the EU takes into consideration 11 sectors of critical infrastructure, whose protection is mainly a national prerogative and duty, with a possible contribution by the EU institutions only respecting the principle of subsidiarity. The 11 sectors are:

- energy;
- nuclear industry;
- Information technology and communication;
- water;
- food;
- health
- financial;
- transportation;
- chemical industry;
- space;
- research facilities.

Once it has adopted this classification at national level, Romania should elaborate its own strategy for the protection of critical infrastructure, possibly

[26] *The European Programme for Critical Infrastructure Protection (EPCIP),* Brussels, 12 December 2006, pag 3, online at http://europa.eu/rapid/pressReleasesAction.do?reference =MEMO/06/477&format=HTML&aged=0&language=EN&guiLanguage=en

in the context of the updating of the Energy strategy and with the involvement of the ministries of Economy, Transportation, Interior, Communications and Informational Society and of Defense.

According to a classification promoted in papers at the National Defense College, the national energy system represents critical infrastructure for the country, comprising of the energy facilities, electrical grids, the monitoring and regulation installations and systems, the dams, the nuclear power plants and their infrastructure, as well as those of the hydroelectric power plants, thermoelectric power stations, heavy water facilities, stocks of raw, dangerous or strategic materials[27].

The new National Defense Strategy, issued by the presidency in 2010 but still pending Parliament approval dedicates a whole chapter to the protection of critical infrastructure and offers some definitions and clarifications, highlighting the priorities of state institutions in this field. According to the presidential document, critical infrastructure can be understood as "*any functional economical entity which provides products, goods and services of public utility, which are vital for the entire society and the destruction, degradation or malfunctioning of which has a major impact on the population and the economy at national or regional level"*[28]. Moreover, it can encompass both complex systems- network type and singular targets of national importance, with examples including material elements such as equipments, installations or transport capacities; organizational elements like transport networks, energy systems, the production and distribution of oil products and natural gas and informational elements such as flows and networks for transferring data, techniques and procedures; they all belong to a socio-economic macro-system to which they provide functionality and viability[29].

In addition to this, the state and the society have to pay attention to two major threat categories: the terrorist threat and the vulnerabilities triggered by natural phenomena, while also taking into account cyber and sabotage risks. Consequently, state institutions have to cooperate with private partners

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[27] Grigore Alexandrescu, Gheorge Văduva, *Critical infrastructures. Risks, vulnerabilities and threats. Protection systems*, National Defense College "Carol I" Publishing House, 2006, page 25, online at http://cssas.unap.ro/ro/pdf_studii/infrastructuri_critice.pdf

[28] *Romania's National Defense Strategy*, Bucharest, 2010, page 26, online at http://www.presidency.ro/static/ordine/SNAp/SNAp.pdf

[29] *Ibidem,* page 27

towards an integrated approach for the protection of the critical infrastructure, focusing on:

- the adoption of a national strategy for the protection of critical infrastructure;
- the implementation of a mechanism for identifying and designating the critical infrastructure at the national and European levels;
- setting up of a early warning national system through the operationalization of the informational flow;
- setting up adequate measures for achieving the protection of the identified critical infrastructure elements and of the measures for preventive intervention;
- developing cooperation relations at national, regional and international level[30].

To sum up, the energy sector in Romania benefits from comprehensive regulation, which is aligned to European priorities and orientations, but the massive restructuring envisaged by the Government in the near future can offer the opportunity for significant improvements at the planning and mostly functional level, although there are some risks of concerning balance and disagreements against the background of a more and more unstable world energy market.

II.2 Resources and infrastructure

II.2.a Overview

According to the 2007-2020 Energy Strategy, Romania benefits from a wide, yet quantitatively reduced range of primary energy resources, such as oil, natural gas, coal and uranium, but also from a significant potential for renewable energy that can be capitalized[31]. It is also successfully developing a nuclear power technology based on the natural uranium reserves and heavy water produced locally, while its hydro-power generation covers more than 25 % of the country's energy demand. However, Romania imports oil and gas from Russia and other countries which amount for 30% of the primary energy supply. In the sector of electrical power, the national production covers fully the internal consumption

[30] *Ibidem*

[31] *Romania's Energy Strategy for 2007-2020*, chapter 3 – The current status of the energy sector, page 4

and there is also a small quantity left for exports; the oil requirement is mainly ensured through internal production, but the estimated reserves are sufficient only for another 15 years, making it necessary to find long-term alternative options, such as new sites of exploitation, viable and sustainable sources of import. The geographic position of Romania recommends it as an important transit point for Russian gas and oil, while the possession of substantial oil refining capacities enables it to promote important trans-European projects.

II.2.b Oil sector

Industry structure

The beginning of the Romanian oil industry history goes as far back in time as 1857, when the first well was drilled in Ploiesti. In 1938 "The Science of Petroleum" magazine certified the fact that Romania was the first country in the world with an oil production of 275 tones officially registered in the international statistics (1857)[32]. Since then, Romania has proved to be an important oil producer in the region, but its production has constantly decreased during the last 15 years. In 2009 oil production amounted to 4 349 thousand tones compared to 6 894 thousand tones of imported oil; oil accounts for 62,5 % of the total amount of energy imports[33].

The major oil market player is **Petrom,** currently owned by OMV, which also exploits international crude reserves located in Kazahstan, India, Hungary, some former Yugoslav Countries and the Republic of Moldova through its subsidiaries and joint ventures concluded with other companies. The second private player is **Rompetrol**, focused on refining oil and with adjacent interests in oil exploration and production. In August 2007, Kazakhstan's state-controlled oil and gas company KazMunayGas took over 75% of the company's shares, an acquisition approved by the European Commission in November 2007. The third private player is **Petrotel-Lukoil**, focused on refining activities which became a subsidiary of the Russian group Lukoil owning over 90% of this company in 1998. Another significant competitor on the distribution market is the Romanian

[32] *View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 291

[33] *Romania in figures ,* the National Statistics Institute, 2010, page 56

subsidiary of the Hungarian group **MOL** which took over the Shell network of gas stations in 2005. Last, but not least, the Italian group **AGIP** is also active in the downstream sector together with Petrom, OMV, Lukoil, MOL, Rafo and others.

Oil supply and exploration

The current oil reserves are estimated at 73,7 million tones, with the annual production decreasing constantly since 1997 without new deposits being identified[34]. However, in February 2009, after a dispute with Ukraine on maritime delineation of border in the Black Sea, the International Court of Justice awarded Romania around 80% of the disputed sea floor which is estimated to contain about 70 billion cubic meters of gas and 12 million tons of oil[35]. Major foreign oil companies have expressed interest in exploring this area and investing in extraction activities.

Petrom is basically the sole producer of crude oil in Romania, extracting annually about 4,7 million tones. The peak of production was reached in 1976 with an amount of 14,7 million tones. It ensures 99% of Romanian oil production and 50% of gas production. A June 2010 public report showed that the 2009 production was of 4,4 million tones of oil and 5,3 cubic meters of gas, with Petrom sales accounting for 2,6% of the Romanian GDP; moreover, it has contributed 6,7 billion RON to the state budget and it accounts for 0,6% of Romania's employment[36]. It currently owns exploration licenses for 15 onshore and 2 offshore blocks and 256 production licenses for oil and gas fields; it operates 9 100 oil and gas producing wells and 7 offshore production platforms in the Black Sea[37]. It is the number one player on the local LPG market and holds a 40% share of the retail market for oil products. As of 2011, it aims at becoming a player on the electrical energy market through the Brazi power plant and the Dorobantu wind park. Last, but not least, Petrom represents the largest

[34] *Romania's Energy Strategy for 2007-2020*, chapter 3 – The current status of the energy sector, page 4

[35] *View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 292

[36] *Petrom on its way to becoming a leading integrated energy player in SEE*, January-June 2010, pp. 8-9, online at http://www.petrom.com/SecurityServlet/secure?cid=1255729792755&lang=ro&swa_id=970671267558.548&swa_site=wps.vp.petromcom

[37] *Ibidem,* page 10

investor in the energy sector with approximately 1 billion Euro annually since 2005[38].

Oil consumption and prices

In Romania crude oil is used 100% in the refining sector, with oil consumption for the period 2003-2007 being presented in Table 1[39]:

Table 1 – Oil consumption (million tones)

Year	2003	2004	2005	2006	2007
Oil consumption (including oil products)	9.087	10.092	9.163	9.394	10.8

Consumption is mainly driven by the transportation sector and to a lesser degree by the industrial, residential, agricultural and other sectors. The current level of crude oil processed in Romania largely covers the domestic consumption of gasoline, diesel oil and LPG.

According to current legislation, the oil price is set freely, based on the ratio between demand and supply on the internal and international market respectively. The tariffs for oil transportation on the internal transportation system are established by ANRM. Currently, taxes amount for 70% of the final prices of fuels sold in Romania, this level of taxation being similar to that in the EU countries, but lower in absolute terms[40].

Oil trade and transit

Romania has a 3 800 km-long network of oil pipelines which are under the control of CONPET, a natural monopoly on the crude oil pipeline transport national market. It consists of four large sub-systems for:

- domestic oil transportation, with a total length of 1 450 km and 10 million tons/year capacity;
- imported oil transportation with a total length of 1 200 km and 18 million tons/year capacity;
- rich gas and ethane transportation with a total length of 1 150 km and 314 thousand tons/year capacity for rich gas and 72 thousand tones/year capacity for ethane;
- railway transport.

[38] *Ibidem,* page 14

[39] *View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 294

[40] *Ibidem,* page 296

The Constanta Port, which is connected to the national pipeline network, has the biggest oil terminal in South-Eastern Europe, being specialized for the import of crude oil and other oil products and for the export of refined oil products. The oil terminal is operated by the Oil Terminal Company and has a maximum capacity of 24 million tons/year and a crude oil storage capacity of 550 000 tons.

The projected Constanta-Trieste pipeline would represent the most direct route from the Caspian basin to Europe and its potential to link up with the South Caucasus transit corridor for Caspian oil highlights the added value encompassed by this initiative. In April 2008 the Shareholders Agreement was signed in Bucharest for the establishment of the PEOP Project Development Company by the representatives of JANAF (Croatia), CONPET and Oil Terminal (Romania) and TRANSNAFTA (Serbia), the company being registered in London in July 2008.

II.2.c Natural gas sector

Industry structure

In 1909 the first natural gas discovery was made in Sarmasel, Mures county, marking the beginning of the Romanian gas industry, which reached a record in size during the communist era, as a result of the application of governmental policies aimed at the elimination of import dependency. These policies triggered an intensive exploitation of the internal resources which led to the depletion of resources and a decline in the internal production after 1990. Currently, natural gas reserves are estimated at 184,9 billion cubic meters. The production of gas in 2006 was of 12,3 billion cubic meters, amounting for 69% of total national consumption for that year[41].

The sector has undergone a deep restructuring process after 1989. In 1998 ANRE was created, followed by ANRGN in 2000; in 2007 ANRE undertook ANRGN's responsibilities and became the only regulatory authority for the energy and natural gas sectors. The natural gas market has been gradually liberalized since 2001 and since July 1st 2007 it has become fully open to all consumers.

[41] *Romania's Energy Strategy for 2007-2020*, chapter 3 – The current status of the energy sector, page 4

The main actors on the Romanian gas market are the following:

- 7 producers: Romgaz, Petrom, Amromco, Aurelian Oil &Gas, etc;
- 1 single operator for transport, dispatch and transit: Transgaz Medias;
- 3 operators of storage systems: Romgaz, Depomures, Amgaz;
- 35 distributors: E.ON Gaz Romania, GDF Suez Romania, Petrom, etc;
- 69 suppliers: E.ON Gaz Romania, Transgaz, Petrom, etc;
- various importers: E.ON Gaz Romania, Romgaz, etc.

Gas supply and exploitation

Romgaz is the main producer and supplier of natural gas in Romania with a supplying share of 38,5% of the internal gas market. It operates over 150 active gas fields and six underground natural gas deposits, its main stakeholder being the Ministry of Economy.

Petrom is the second largest natural gas producer and supplier, its output consisting of both methane gas (22% of total) extracted from gas fields and associated gas (78%) that is co-produced with crude oil from the oil fields. There are some other several foreign companies that are currently undertaking exploration works, too.

The national gas transmission system is operated by the state-owned Transgaz which enjoys a monopolistic position, with no perspectives of being privatized on the medium term. The transmission system consists of 13 110 km of transmission pipelines and gas supply joints, while the transit capacity is of 30 Gm^3/year. The natural gas distribution system consists of over 20 000 km of pipelines and it is used by 35 companies carrying out distribution activities, most of which were formerly state-owned.

Gas consumption and prices

In 2006 the total gas consumption was of 17 264 million cubic meters, of which 2 657 million cubic meters represented household consumption, amounting for 15,8%[42]. The main destinations for gas consumption are the industrial sector (40,4%), the energy production sector (29,5%), households (15,7%) and others (14,38%)[43].

[42] *Ibidem,* page 9

[43] *View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 299

In 2008 gas demand was covered by domestic production (72%) and imports from Russia (28%). The most recent report by ANRE (February 2010) shows that these figures remain constant for the time being, with the internal gas production accounting for 72,71% of the total quantity of resources, the rest of 27,29% being covered by imports.
The pricing methodologies used for calculating gas regulated prices and tariffs were approved by the former ANRGN, being inspired by European ones. Gas transmission and underground storage tariffs are set as per a "revenue-cap" methodology, while gas distribution and regulated supply tariffs are set as per a "price-cap" methodology. The final regulated price is calculated based on the cost of acquisition, which is calculated as a weighted mean between the domestic gas price and the import price; these regulated prices and tariffs are set for a 3-5 year period, but adjusted annually in relation with the inflation index and the efficiency factor[44].
A new pricing system was introduced in 2005 which differentiated among the distribution operators and categories of consumers so that the costs would be assigned to cost generators. The categories of consumers were defined in relation to the annual amount of consumed gas, resulting in 5 categories of consumers connected to the national transmission system and 6 categories of consumers connected to the distribution systems.

Gas trade and transit

There are two main trading companies in charge of Romania's natural gas imports: WIEE (with Wintershall and Gazprom having each 50% of shares) and Wirom Gas (51% WIEE and 49% Distrigaz Sud).
The gas transportation is being operated by Transgaz, which uses three international transit pipelines with a total capacity of 28 Gm^3/year. Its interconnection strategy is focused on the interconnection of the Romanian gas transmission system with the similar ones from the neighbouring countries in order to diversify import supply sources and on the development of the gas transit activity.
In July 2008 Transgaz signed with FGSZ Natural Gas Ltd. from Hungary an agreement on the interconnection of natural gas systems between Romania and Hungary by constructing the 109 km-long Arad-Szeged pipeline, of which 62 km would be built on Romanian territory. The transit capacity of the pipeline would be of 4,4 bcm/year, allocated among 4 Romanian

[44] *Ibidem,* page 299

companies (E.ON Gaz Romania, Distrigaz Sud SA, Petrom Gas SRL and MOL Energy Trade SRL) and 5 Hungarian ones.
Romania is also a strong advocate of the EU Nabucco project aiming at connecting the Caspian region, Middle East and Egypt via Turkey, Bulgaria, Romania and Hungary with Austria and further on with Central and Western European gas markets.

II.2.d Coal sector

Industry structure

The coal industry has undergone a large restructuring process, especially since 1998, in order to fulfill the requirements of the energy sector; during this process, 550 mines have been closed. Nevertheless, solid fuels will remain a key domestic energy source for Romania, accounting at present for 40% of electricity production.
The companies that operate in this sector are the following: National Lignite Company Oltenia Targu-Jiu, National Hard Coal Company Petrosani, Commercial Company Energy Complex Rovinari, Commercial Company Energy Complex Turceni and Commercial Company Energy Complex Craiova and National Coal Company Ploiesti.
The Government's strategy for the mining industry for the 2008-2020 period aims at rehabilitating, upgrading and privatizing viable mines, promoting environmental protection standards and mitigating the social consequences of the closure of non-viable mines[45]. The National Agency for the development of the mining areas is in charge of the implementation of programs for economic regeneration and local development in the areas mostly affected by the restructuring process of the mining sector.

Coal production and reserves

Romania has mineral coal reserves of 755 million tons, of which 105 million tons can be exploited in leased perimeters; it also has 1 490 million tons of lignite, of which 445 million tons can be exploited in leased perimeters[46]. In 2006 coal production in Romania was of 35,1 million tones, 99% of which was used for generating electrical power and heat[47]. The

[45] *Ibidem,* page 301
[46] *Romania's Energy Strategy for 2007-2020*, chapter 3 – The current status of the energy sector, page 4
[47] *Ibidem,* page 10

forecast of coal production for 2010 is of 39,4 million tons and 37,1 million tons for 2015.
The National Lignite Company Oltenia Targu-Jiu owns a share of 80% of the coal market, operating 5 main coal fields: Rovinari, Jilt, Motru, Berbesti and Husnicioara.

II.2.e Electricity sector

Industry structure

The Romanian energy system has gone a long way from the vertically integrated model to a decentralized system based on the unbundling of electricity production, transport and distribution activities. The evolution of the power market, the restructuring of the energy sector and the need for adapting to EU practices are all factors which have led to this transformation. At present, on the Romanian electricity markets we find one transport and system operator, 21 producers, 8 distribution network operators and 63 suppliers, together with 2 703 eligible customers[48]. As of July 2007, the electricity market is fully open to consumers in the sense that the domestic consumers are free to change their supplier.
Romania enjoys a good electricity production mix, with power being generated by coal (43%), hydro sources (26%), hydrocarbons (14%) and nuclear activity (17%). Power plants are mainly state-owned as Romania has refrained from privatizing the generation sector. But the majority of the power units have been built using the technologies from the 1970's-1980's, with around 37% of their total having exceeded their lifetime. The 2007-2020 Energy Strategy mentions provisions for the construction of power units with an installed capacity of 3 000 MW while an installed capacity of 2 900 will be retired during the same period.

Electricity production and consumption

The values for the electricity production by fuel, imports and exports, together with electricity consumption are presented in Table 2[49].

[48] *View of the Black Sea European Countries 2008*, chapter X – Romania, prepared by the Institute of Power Studies and Design, Promitheas The Energy and Climate Change Policy Network, Athens, 2009, page 302
[49] *Ibidem,* page 303

Table 2 – Electricity generation and Consumption (GWh)

	2007	2008	Change (%)
Annual production			
Fossil fuel fired thermoelectric	37, 991	36,320	-4,4
Nuclear	7,709	11,226	45,6
Hydroelectric	15,996	17,105	7,1
Wind	7	11	57,1
Total	61,673	64,662	4,8
Imports	1,269	921	-27,4
Exports	3,359	5,169	53,9
Consumption (GWh)	52,809	53,031	0,4

Electricity network and interconnections

Romania has an extensive power transmission network with an overall length of approximately 10 000 km of which 400 km are interconnection lines. The HV power transmission network is owned by the TSO-Transelectrica and consists of 77 electric substations, 8 950 km of overhead lines and 135 main transformer units totaling 34 525 MVA.

The Romanian power system is interconnected to the neighbouring countries' power systems through the following lines:

- Rosiori to Mukacevo, Isaccea to Vulkanesti in Ukraine;
- Portile de Fier I to Djerdap, Jimbolia to Kikinda, Gura Vaii to Sip and Ostrovul Mare to Kuskak in Serbia;
- Tintareni to Kozloduy, Isaccea to Dobrudja, Isalnita to Kozloduy in Bulgaria;
- Arad to Sandorfalva in Hungary;
- Stanca to Costesti, Tutora to Ungheni and Husi to Ciora in the Republic of Moldova[50].

There are also plans for developing the HV network through several interconnection lines projects with the Republic of Moldova, Serbia and Turkey, the latter through an undersea cable.

II.2.f Nuclear power sector

Structure of the nuclear sector

Romania has two nuclear reactors – Cernavoda NPP units 1 and 2 – with an installed capacity generating 18% of the country's electricity. The Cernavoda

[50] *Ibidem,* page 305

nuclear power plant is operated by the state-owned Nuclearelectrica, with its two branches: Cernavoda NPP Division operating the Units 1 and 2 and performing the preservation of units 3, 4 and 5 until completion and commissioning and Nuclear Fuel Plant Pitesti which manufactures nuclear fuel for Cernavoda NPP units 1 and 2. Both units of the power plant have been built using Canadian technology, the first being operational since 1996 and the second one since 2007.

- The completion of Units 3&4 is to be performed by creating a joint venture between the state through Nuclearelectrica and private investors. In 2008 the Investment Agreement and Association Documents were signed between Nuclearelectrica (51% of the project), Enel, CEZ, GDF-Suez, RWE Power (9,15% each), Iberdrola and ArcelorMittal Galati (6,2%) and the project company was created – EnergoNuclear SA. The construction cost is estimated at 4 billion Euro and each unit will have an installed capacity of 720 MW. Both units are expected to become operational in 2016.

Nuclear safety

Nuclearelectrica is under the authority of the Ministry of Economy, while the National Commission for Nuclear Activities Control is the regulatory authority ensuring nuclear safety and licensing nuclear sites and operations. The document regarding the nuclear safety policy of Nuclearelectrica guarantees outstanding performances in all major activities aimed at ensuring safety in the nuclear installations, acknowledging that nuclear safety is given priority among other activities such as production and investments deadlines.

II.3 Current projects for the restructuring of the energy sector

The 2007-2020 Energy Strategy has several provisions regarding short term measures aimed at re-structuring of the energy sector, with a special emphasis on maintaining state control over the main units of electrical power production comprising a sufficient power so as to ensure the country's energy security. The Strategy points out that the authorities would take into consideration integrating these producers with state-owned distribution agents, the result of which could be the creation of new companies that are strong at regional level[51]. The Strategy envisaged the

[51] *Romania's Energy Strategy for 2007-2020*, page 35

privatization of the energy complexes Rovinari, Turceni and Craiova, but only if the virtual private investors committed to continue their activity in accordance with the national legislation for environmental protection or the integration of these complexes in an integrated state-owned company. As far as Hidroelectrica was concerned, the Strategy pointed to the need for continuing the privatization of micro hydropower plants, the listing of the company on the stock market and the extension of its field of activity so as to develop new production capacities using renewable resources like wind and biomass; but it also stated that the state has to maintain control over this company since it is a producer of strategic interest. For Termoelectrica, the Government envisaged the closure of non-viable units and the privatization of the heat plants by creating join ventures with private partners who would own the majority of shares. For Electrocentrale Bucuresti, the goal was to create joint ventures with private partners so as to develop new energy units. Last, but not least, the Strategy mentioned several investment projects in some new and old power plants in the country[52].

On January 29, 2010, Prime-Minister Emil Boc announced at the end of the Government meeting the decision to re-organize the electrical power and heat producers under the authority of the Ministry of Economy by creating two national energy companies – Electra and Hidroenergetica. Adrian Videanu, the Minister of Economy highlighted during the same press briefing that the decision was taken following a consistent public debate and on the basis of feasibility studies and professional consultancy. He added that the main goal of this initiative was to capitalize in accordance with the national interest the basic energy resources of Romania – coal, uranium, water, natural gas and oil – in order to ensure the country's energy security and energy independence[53]. He pointed out the fact that Romania needs two major national energy companies which could compare with similar ones from the region when it comes to both structure and dimension. Another argument was that of ensuring the necessary financial resources for investments in the energy sector and of creating the conditions for real competition on the energy market. The finality of this initiative would be that the energy mix will be traded on the free market instead of hydro energy, heat or nuclear energy, which is the case at present and consequently,the market will be the only one which sets the energy price.

[52] *Ibidem,* page 36

[53] http://www.gov.ro/infiintarea-companiilor-energetice-nationale-electra-si-hidroenergetica__l1a107920.html (the Government of Romania's website)

According to the Government's plan, the two national energy companies are to comprise smaller units as follows:
- ELECTRA SA: Turceni Energy Complex with its subsidiaries, Rovinari Energy Complex with its subsidiaries, Craiova Energy Complex with its subsidiaries, Nuclearelectrica SA, Hidroelectrica Râmnicu Vâlcea, Hidroelectrica Sibiu, Hidroelectrica Târgu Jiu, SC Hidroserv branch of SA Râmnicu Vâlcea, the National Lignite Company Oltenia;
- HIDROENERGETICA SA: SC Elcen Deva, SC Elcen Bucuresti with its subsidiaries, Paroseni Elcen branch, Bistrita Hidroelectrica branch, Buzau Hidroelectrica branch, Cluj Hidroelectrica branch, Curtea de Arges Hidroelectrica branch, Hateg Hidroelectrica branch, Portile de Fier Hidroelectrica branch, Oradea Hidroelectrica branch, Sebes Hidroelectrica branch, Slatina Hidroelectrica branch, SC Hidroserv Bistrița, SC Hidroserv Slatina, SC Hidroserv Porțile de Fier, SC Hidroserv Curtea de Argeș, SC Hidroserv Sebeș, SC Hidroserv Hațeg, SC Hidroserv Cluj and some parts of the National Hard Coal Company SA[54].

In interviews conducted after the announcement of this decision, Adriean Videanu gave assurances that the price of energy would not go up as a consequence of the proposed re-structuring because the structure of the companies will not have an influence over it, the fluctuations on the market being the sole responsible for the price[55]. He also insisted that no plants would be closed as a result of the re-organization and that this is aimed particularly at increasing the competition within the energy sector, as both companies would have from the beginning similar market shares. Last, but not least, he reminded that the decision represents the result of a year-long public debate and of careful considering of feasibility studies provided by Hampton & Williams from the US and BP Power from Great Britain, together with professional consultancy by the Bucharest Institute for Energy Studies and Projects.

The Romanian Academic Society has been actively involved in the public debate regarding the re-structuring of the energy sector and has produced several memos and papers highlighting both the advantages and disadvantages of this initiative, concluding that it would actually represent a threat to the country's energy security.

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[54] *Ibidem*

[55] http://www.gov.ro/declaratii-de-presa-sustinute-de-ministrul-economiei-comertului-si-mediului-de-afaceri-adriean-videanu-la-finalul-sedintei-de-guvern__l1a107925.html

The advantages of creating an integrated electricity company would be the following:

- Romania needs a major player on the regional electricity market who could also attract the necessary investments in this sector; Hidroelectrica already has investment projects that cannot be supported by the state budget, the Turceni and Rovinari heat plants desperately need investments to comply with the EU environmental protection standards, but they cannot take loans by themselves on the capital market; the state budget cannot contribute to investment project because of the legislation against state subsidies, while the various independent companies could not get loans in conditions as advantageous as a major, integrated company;
- the integrated company could then be listed on the London stock market, thus attracting private capital and foreign investments, which would add to the money gained through the privatization of the five distribution companies;
- the concentration of the production capacities on the energy market, while reaching 60-70%, will still be under the European average of 75% and new competitors will show up on the medium term, taking into account the intentions of Petrom, Enel and E.ON to invest in generating power, together with Nuclearelectrica;
- the re-grouping of the production capacities will also offer the opportunity for revising some of the existing contracts with fixed prices, but below the market price, concluded by Hidroelectrica with several private partners which further export the energy[57].

The disadvantages would be the following:

- there are several alternatives for re-structuring the energy sector which can attain the same goals without having the same disadvantages as an integrated company (high concentration on the market, the lack of transparency);
- the creation of an integrated company would not solve the 2 main problems: de-capitalization and the loss of competent personnel;
- the integrated company would do nothing but re-organize the energy sector, since all existing plants will be included in it without improving in any way the technological potential *per se*[57].

[56] Points of view expressed by the experts at the debate on 17 September 2009, Romanian Academic Society, pp. 1-2, online at http://www.sar.org.ro/files/Puncte%20de%20vedere.pdf
[57] *Ibidem,* pages 2-3

On the 12th of April, on the website of the Ministry Of Economy a draft Governmental decision was posted stating that the Ministry of Economy gave up the idea of dissolving the energy producer Hidroelectrica as a step needed for the creation of the major integrated company Hidroenergetica. Hidroelectrica was to be kept as an entity after some of its branches would be absorbed by the new company, maintaining its patrimony and licenses and in the same time simplyfying the process of creating Hidroenergetica. Nevertheless, it would change its name into CN Hidroenergetica SA. The main argument for this decision was that if Hidroenergetica had been dissolved, the creation of Hidroenergetica and Electra, would have also been seriously delayed by the issuing of all the necessary authorizations, licenses and approvals for the activity of the two new companies[58].

But the process of creating the two major companies reached a dead end in the beginning of August, when the National Competition Council decided to postpone the decision regarding the creation of the two energy giants because of appeals handed in at the Trade Register by some unions and shareholders at the "Proprietatea" Fund[59]. The Competition Council started a series of investigations at the end of April before giving its approval concerning the economic concentration triggered by the proposed creation of the two companies. The investigations were justified by the need to analyze the compatibility between the existence of the two major companies and a normal competitive environment because the restructuring of the energy production sector would trigger the creation or consolidation of dominant positions on the market for them; moreover, the functioning of the two companies could lead to restraining, eliminating or distorting significantly the competition on the electrical power market, according to a press communiqué issued by the Competition Council on the 26th of April[60].

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[58] *The Ministry of Economy gives up the dissolving Hidroelectrica and changes its name into Hidroenergetica*, 12 April 2010, online at http://www.money.ro/energie/ministerul-economiei-renunta-la-desfiintarea-hidroelectrica-si-ii-schimba-numele-in-hidroenergetica.html#

[59] *Videanu is forced to postpone for an unspecified date the creation of the companies Electra and Hidroenergetica*, 9 August 2010, online at http://www.euractiv.ro/uniunea-europeana/articles|displayArticle/articleID_20801/Videanu-obligat-sa-amane-pentru-o-data-incerta-infiintarea-companiilor-Electra-si-Hidroenergetica.html

[60] *Competition Council investigates the creation of Electrica and Hidroenergetica,* 26 April 2010, Mediafax, online at http://www.money.ro/energie/consiliul-concurentei-investigatie-infiintarea-electra-si-hidroenergetica.html

The result of those investigations was scheduled to be made public at the end of August, but in the mean time the energy sector unions opposed the Governmental initiative and handed in their appeal to the Trade Register. That appeal blocked the investigations of the Competition Council and the Ministry of Economy had to solve the issues at the Trade Register, then notify the Competition Council regarding the result of its dealings with the Trade Register and then wait for a new analysis to be provided by the Competition Council. In other words, the deadline for creating the two companies in the summer of 2010 was missed and the whole initiative is now under question as to when it will be put into practice and whether this will happen as was originally planned.

II.4 Current projects for diversifying supply sources and routes

According to the Energy strategy 2007-2020, as energy security has a "major impact" on national security, the Government will give priority to diversifying supply sources and routes and limiting the dependency on supply from import sources[61]. Currently, Romania is supporting the Nabucco project, the regional gas interconnector AGRI and PEOP oil transit pipeline.

II.4.a The Nabucco Project

The Nabucco Project is aimed at building a gas pipeline connecting Turkey with Bulgaria, Romania, Hungary and Austria, with a total length of 3 296 km, of which 460 km on Romanian territory, thus making this section the second longest after the Turkish one[62]. The initial capacity of the pipeline is of 8 billion cubic meters a year, reaching some 31 billion cubic meters in 2020. Nabucco has become a top priority among EU energy projects following the March 2007 Council decision and a part of the G3 gas transit corridor connecting the Caspian and Middle East regions with Europe. The companies participating this project are Botas (Turkey), Bulgargaz (Bulgaria), Transgaz (Romania), MOL (Ungaria), OMV (Austria) and RWE Gas Midstream GmbH (Germany). The beginning of the construction of the pipeline is scheduled for the end of 2011 so as to become functional in 2014.

[61] *Romania's Energy Strategy for 2007-2020*, page 33

[62] Robert Uzună, *Learn how to live with the Bear at the door.Romania and European energy security,* the Romanian Centre for European Policies, Policy Memo no. 10, April 2010, page 26, online at http://www.crpe.ro/library/files/crpe_policy_memo_10_ro.pdf

The necessary Intergovernmental Agreement was signed in Ankara on the 13th of July 2010 by the participating countries, but two major difficulties remain: identifying the supply sources and concluding a transit agreement with Azerbaijan in the context of its political troubles with Turkey[63].

The main supply sources taken into consideration are those in the Caspian region, especially in Azerbaijan; other alternatives would be Turkmenistan (but there is no pipeline connecting Azerbaijan with it, so a trans-Caspian connector should be built), Egypt (through the pan-Arabian pipeline), even Iran (but the current developments regarding its nuclear dossier make this option non-viable) or Iraq (using the gas in the Kurdish region). Nabucco needs at least two of these options, the difficulty of choosing them adding to that related to the conclusion of a transit agreement as Azerbaijan is more and more disturbed by the Turkish-Armenian rapprochement and Turkey's emergence as a regional energy hub. In the end, it will be the investors who will decide on the most convenient option, but the project is already being highly politicized in the EU as the main solution for reducing the dependency on imports from Russia on the long term.

According to Romania's Energy Strategy, Nabucco will determine "an increase in the security of natural gas supply for Europe, the diversification of gas supply sources and the granting of access to significant natural gas reserves in the Caspian Sea region and the Middle East for the European markets"[64]. Its advantages for the EU and Romania are clear[65]:

- it ensures the diversification of supply sources and routes, which is a basic prerequisite for an increase in energy security;
- Nabucco is acknowledged as a priority project by the EU, benefiting from the support of four EU member states and prestigious companies like OMV and RWE;
- the main advantage as far as the construction of the pipeline is concerned is that its large terrestrial sections make it cheaper than other projects using undersea pipelines;
- taking into consideration the current patterns of consumption and future estimations, it will represent a perfect solution for Romania's and the EU's increasing demands.

[63] *Ibidem,* page 27

[64] *Romania's Energy Strategy for 2007-2020*, page 33

[635] Robert Uzună, *Learn how to live with the Bear at the door.Romania and European energy security,* pp. 28-31

There are also some disadvantages and weak points:

- the Chinese offensive in Central Asia combined with Russia's strategies for maintaining its control over this region and the unstable situation in the South Caucasus could have a negative influence over the project and its total failure in a worst case scenario;
- as a participating country, Romania is not in anyway exempted from the project's difficulties (mainly the supply sources), the more so because it has been its staunch supporter during the last years and it cannot afford its further delay up to the point where the project becomes less feasible;
- the participation of some of the 5 countries in rival projects and the competition for the Azeri gas;
- the financing of the projects- while 70% of the necessary investments are to be obtained through credits by Nabucco Gas pipeline International GmbH, the rest of 30% will have to be provided by the participating countries, of which Romania, Bulgaria and Hungary suffer from serious economical problems;
- as Turkmenistan seems to be the key of the project, the evolution of the Turkmenistan-Kazahstan-Russia pipeline is of very much concern, and so it is the delineation of maritime frontiers in the Caspian Sea which may engender Turkmenistan's participation to the project.

2010 is crucial for Nabucco, as the final decision for the investment should be taken until the end of the year.

II.4.b The PEOP Project

The Pan European Oil Pipeline (PEOP) concerns the building of an oil pipeline between Constanta in Romania and Trieste in Italy, with a total length of 1 360 km, of which 649 on Romanian territory, transiting also Serbia, Croatia and Slovenia[66]. The feasibility study proved that there is oil available for export in the Caspian region estimated at 170 million tones in 2010 and 344 million tons in 2020, while the estimated increase in the quantities of Caspian and Russian oil directed towards the Black Sea

[66] *Romania's Energy Strategy for 2007-2020*, page 34

signaled that there is a deficit of transport capacities in the Black Sea area, thus making the PEOP project very useful[67].
The projected transport capacity has 3 options – 40, 60 or 90 million tones/year, the main advantage of this initiative being that of providing a safe and commercially viable transport route on long distances, the more so because Romania-Serbia-Croatia is the most direct way for bringing oil from the Eastern coast of the Black Sea to the European markets.

II.4.c The AGRI Project

The Azerbaijan-Georgia-Romania Interconnector was not even taken into consideration at the time when the Romanian Energy Strategy was conceived and adopted by the Government (2007), but lately it has become Romania's most dynamic initiative as far as energy supply is concerned. The project provides for the construction of a pipeline for bringing gas from Azerbaijan to the Georgian port of Batumi and the construction of a liquefied gas terminals system in Kulevi and Constanta, with the gas being transported on the Black Sea; once it reaches Constanta, the gas will be pumped through existing pipelines to other European states.
Romania attaches great importance to this project, the more so because it already shares a strategic partnership with Azerbaijan and is a traditional supporter of Georgia, but it has also acknowledged that AGRI is only complementary to Nabucco, which remains the main priority.
The three countries signed the Memorandum of Understanding for finalizing the project on the 13th of April, the cost of which is estimated at 6 billion Euro. In the mean time, Hungary became the fourth participant in the project, being invited by Romania at the beginning of the autumn and on the 14th of September the 4 chiefs of state/Government signed the Baku Declaration, which provides the necessary political impetus and support and clearly states the roles: Azerbaijan as the producer, Georgia as the transit country, Romania as the country ensuring access for the Azeri gas to the European markets and Hungary for providing the link to the Central European gas markets and for using its storage capacity.
The main issue is that the financing sources have not been established yet and consequently, there is no date set for the beginning of the construction, although it has already been estimated that it would take four years.

[67] *Ibidem,* page 34

Romania and Hungary plan to obtain EU funding for this project, but there are some voices saying that it could represent a competitor for Nabucco, the more so because it relies on the same Azeri supply sources and thus Bruxelles will be reluctant to provide funding. Other difficulties stem from the unstable situation in the South Caucasus, affecting Georgia especially, which is to host AGRI's most important piece of infrastructure – the LNG terminal – in Kulevi, that is 75 kilometers from the Russian-controlled breakaway republic of Abkhazia (where thousands of Russian troops are stationed). In addition to this, the natural gas that is intended for the proposed LNG project would come from Azerbaijan's Shah Deniz II natural gas project, which is already contracted by Turkey and Russia and it remains to be seen if Baku is willing to shift these supplies to AGRI and thus risk discontenting Ankara and Moscow.

III. Analysis of effects and reactions for 4 given crises

The aim of this paper is to assess Romania's capacity of facing four types of crises, according to the existing strategies and regulations of the energy sector: short run catastrophic effects, disproportionate price effects (sudden rise of prices), consistently high costs and the reduction of foreign direct investments. The assessment will take into account the level of fulfilling, in each case, three basic security requirements: state existence, domestic safety and economic welfare. The final goal is to evaluate Romania's potential for ensuring its energy security in case of a crisis.

According to the Romanian Energy Strategy 2007-2020, the energy sector has to be a dynamic one in order to support the economic development of Romania and to reduce the lagging behind the EU countries. Consequently, the general goal of the strategy for this sector is to ensure the needed amount of energy at present, on the medium and long term, at the lowest price, in accordance with the requirements of a modern market economy and a civilized life standard, while ensuring the conditions for safety of supply, high standards of quality and the respect for the principles of sustainable development[68]. As far as energy security is concerned, a widely accepted definition is that of ensuring the adequate energy supply at affordable and stable prices in order to support economic performance and growth[69]. According to this

[68] *Romania's Energy Strategy for 2007-2020*, page 16

[69] Robert Uzună, *Learn how to live with the Bear at the door. Romania and European energy security,* page 4

definition, the main elements to be taken into consideration when assessing the energy security of a specific entity are: the demand and consumption for each type of resource, the primary production of that entity and the biggest reserves holders and the dependency on imports[70].

To begin with, according to official data provided by the International Energy Agency in 2007, Romania's energy consumption is structured as follows: natural gas 33,2%, coal 24,9%, oil 24,4%, nuclear 5,1%, hydro 3,5%, combined renewables and waste 8,9%, solar/wind 0,1%. Romania is still capable of producing a reasonable amount of solid fuel, natural gas and oil, although the global production has been reduced with almost a third since 1989; nevertheless, production using renewable resources has increased with almost 80% during the same period. Romania has proven reserves of gas for another 15 years and of oil for another 20 years, at the current level of consumption. Romania's dependency on gas imports is of 54% and that on oil imports is of 42%. Oil is mainly imported from the Russian Federation and Kazahstan, while natural gas is imported from the Russian Federation; Romania does not import any kind of nuclear, hydro, solar energy or heat, a possible explanation being that its neighbours, with which is interconnected, are not big producers of these types of energy products.

In 2007, final stage energy consumption in Romania was distributed as follows: 35% by the industrial sector, 33% by the households, 20% for transportation, 9% by public and commercial services, 1% by the agriculture and forestry and some 2% by unspecified sectors[71].

III.1 Short run catastrophic effects

Short run catastrophic effects refer to events pertaining to man-made or natural disasters, various kinds of accidents which could prevent energy distribution or import for a short period of time, together with the disruption of supply due to a political decision as seen in the 2005-2006 and 2008-2009 gas crises. Romania is particularly vulnerable in the oil and gas sector, while in the electricity sector it can be considered self-sufficient.

The competent authorities have developed contingency plans for gas and oil disruptions, and possible crises are to be managed at the level of the Ministry

[70] *Ibidem,* page 4
[71] *Ibidem,* page 16

of Economy, the Government and of the President, the only one allowed to enact the state of emergency. If a EU member state declares a state of emergency at national level, it must notify the Commission which has to verify within a week if the measure is justified.

Moreover, according to European legislation with which Romania had to comply, EU member states have the obligation to own on a permanent stock of oil and gas enough for 90 days at the average level of consumption. Due to the application of this safety measure, which has been enacted following the Russo-Ukrainian gas crisis in the winter of 2006, all EU member states, including Romania, are able to deal with shortages and disruptions of supply for a short period.

Romanian contingency planning provides for the disconnection of the main industrial consumers, especially the steel industry, aluminum industry, chemical industry so that the domestic consumers would not be affected. The specific laws regulating the gas, oil and electrical energy sectors state as main priority the safety and continuity of supply for the consumers, with a special focus on households for the gas and electricity sectors.

The recent gas crises have provided Romania with the opportunity to learn some lessons and to improve its response capacity to this kind of events. The most important lesson is that gas supply can be cut or disrupted at any moment. Consequently, Romania's plans for capitalizing on its storage potential will have to be pursued with a sense of emergency, taking also into account the possibility to deal directly with Russia for the development of various gas storage projects which will eventually provide a privileged position to negotiate future gas prices.

In addition to this, the physical and moral tear of the majority of equipments used for energy distribution within the country represents a serious vulnerability, further development and modernization being needed as highlighted in the Energy Strategy. The disruption in supply caused by the potential malfunctioning of these equipments could have negative effects on the long term and could be accompanied by the loss of human life and civil emergencies. Thus, it is absolutely necessary that the competent authorities monitor carefully the status of the equipments, as well as their maintaining by the distribution operators and to accelerate the process of modernization and replacement of the outdated equipment.

By the same token, Romania should increase its efforts to develop legislation and strategies regarding the protection of critical infrastructure,

in accordance with the EU provisions in this domain, taking into account even the slightest possibility, for example of a terrorist attack on one or more of the elements comprising the national critical infrastructure.
All in all, due mainly to its obligation under EU law to store gas and oil for 90 days, Romania is able to deal with short run disruption of supply which would not call into question neither the existence of the state, nor domestic safety, but could have a significant impact on economic welfare because of the losses registered by the industrial sector as a result of the possible reduction of energy supply for the benefit of the household consumers. On the long term, however, Romania is carefully considering the diversification of its supply sources and is a fierce promoter of the Nabucco project and several other regional ones like AGRI and PEOP. In addition to this, the Romanian authorities encourage the development of energy production from renewable resources, which has witnessed a significant growth during the last years, thus increasing the share of this kind of energy in the country's total production with strong possibilities of further developments especially due to the wind energy potential in Dobrogea region.

III.2 Disproportionate price effects and consistently high costs

One of Romania's key-problems in the energy sector is the high level of energy intensity, the main energy efficiency indicator which takes into account the energy consumption required for the production of a unity of GDP. The primary energy intensity has decreased during the last years as a result of the structural adjustment of the economy and a gradual increase in energy efficiency, but Romania still has the highest energy intensity among EU countries. Basically, in order to produce 1000 Euro GDP, Romania consumes four times more energy than the EU average[72]. Consequently, any increase in energy prices would have a serious impact on the Romanian economy and especially on household consumers. Due to the liberalization of the gas and oil markets and the consistent share of imports of those two (20-30%), Romania is vulnerable to the price fluctuations on the international markets and to the use of gas prices as political instruments. For example, the fact that Romania pays one of the highest prices in Europe

[72] *Ibidem,* page 17

for Russian gas cannot be considered a coincidence as the relationship between the two failed to improve during the last years.

An increase in gas and oil prices would automatically trigger further costs within the economy, soon to be reflected in a cascade of rising prices for basic commodities and goods which would seriously affect the population, in parallel with its negative impact on the industrial sector and exports. The electricity and gas prices for final consumers are partially regulated taking into account the purchase power of the population, the prices of other utilities and the economic macro-indicators, but a great share of these markets remains open to price fluctuations, which actually represent the essence of a liberalized market. The European Commission sent a letter to the Romanian Government last year concerning the practice of supplying gas and electrical energy for the non-household consumers at regulated prices, a practice that Romania was supposed to end some time ago[73]. The Ministry of Economy and ANRE were considering initiating an assessment procedure of the possible impact and effects of such a decision, but most likely some legislative improvements would be required also in view of the elimination of regulated energy prices for non-household consumers.

Nevertheless, any rise in energy prices would hit the household consumers the hardest which could lead to social tensions like protests, strikes and heavy political pressure for the Government to interfere in the economy. There are no mitigating strategies for this kind of crises, only a National Strategy for Energy Efficiency aimed at developing new energy production capacities and making more efficient use of the existing ones[74].

III.3 Reduced Foreign Direct Investments

According to the Energy Strategy for 2007-2020, Romania needs investments worth 34,6 billion Euro for the energy sector, with the biggest share being needed in the electricity sector – 20,8 billion Euros. The sub-sectors of the electricity sector that require investments are: hydropower (4,7 billion Euro), thermal power (5,8 billion Euro), nuclear power (2,2 billion Euro – in order to finalize units 3 and 4 of NPP Cernavoda until

[73] *ANRE: we don't have to align gas prices,* 12 March 2010, online at http://www.bursa.ro/on-line/s=materii_prime&articol=78102.html

[74] Government decision no. 163/12 February 2004 concerning the approval of the National strategy for Energy Efficiency, online at http://www.minind.ro/domenii_sectoare/H163-04.html (website of the Ministry of Economy)

2015), electricity transmission (2 billion Euro). Many companies have announced their intention to invest in power plant construction and other electricity generation projects, among them being actors that are already active on the Romanian market like PETROM (electricity from natural gas), ENEL (clean-coal technology), Gaz de France and Electrabel (coal) and CEZ Group (wind energy). Termoelectrica, the state-owned electricity producer has intentions to make private-public partnerships for new green/brown field projects and according to the same Strategy and the state has to further privatize some of the smaller power plants.

The renewable energy market is under development, but its great potential has already been acknowledged, especially as far as wind energy is concerned, which seems to represent the most attractive renewable source for investors. There are a number of options available for doing business and developing partnerships within this sub-sector. During the last years Romania has adopted the primary legislative framework for promoting renewable energy sector and according to the Energy Strategy, investments worth 1,8 billion Euro are needed for new power capacities based on renewable sources until 2015. In addition to wind energy, Romania is encouraging foreign investments in hydropower, the more so because Hydroelectrica has to modernize its infrastructure and to privatize some 150 small hydro-power plants in order to comply with the EU requirements imposed during accession negotiations.

Taking all these into consideration, the reduction of foreign direct investments on the medium and long term would have negative effects on the Romanian energy sector mainly because development and modernization of the existing infrastructure is vital for the functioning of the economy and the supply for internal consumption. More than half of the distribution infrastructure and related equipment is outdated, the same is true for production technology, to which the need to comply with EU environmental protection standards adds further strees. Romania's energy production industry is highly pollutant and huge investments are required for its modernization. The lack or reduction in the needed investments would trigger the closure of numerous plants with a serious impact on the unemployment figures and the quality of services provided to the population and economic agents, the lagging behind in the development of the non-pollutant sub-sectors like renewables, possible EU sanctions for not

complying with the environmental standards, etc. Romania could lose its capacity of being self-sufficient in the electricity sector on the long term and become more and more dependent on import supply in the other sub-sectors.

Conclusions

The energy sector has been constantly neglected during the last 20 years which witnessed a continuous production decrease at the same time with an increase of import dependency. The outdated technology, inadequate infrastructure and the lack of new exploitable reserves are seriously affecting the performance of this sector on the short, medium and long term. Nevertheless, Romania has adopted the necessary legislative framework, including an investor-friendly one so that the sector is carefully regulated by the competent authorities. The Energy Strategy for 2007-2010 offers some of the solutions to the sector's issues, but it has to be pursued and eventually revised with a view on long term developments.

The re-structuring of the state-owned components of the energy sector is uncertain for the time being, but the current Government still has to find solutions for the increase of energy efficiency and security of supply. The gas crises of the last years have proved that Romania's dependency on a single import source has to be dealt with seriously and the conclusion of the AGRI agreement is one of the viable options. Romania remains committed to the Nabucco project and a fierce supporter of pursuing a common energy policy at the level of the European Union, while tackling the more delicate energy security issues within the North-Atlantic Alliance.

The four types of crises taken into consideration pose various degrees of threats to Romania's energy security and welfare, but none of them has the potential of threatening the state's very existence. They can cause serious damage to the economy and life standard of the population, increasing already high social tensions because of the Government's austerity measures which can further lead to the fall of the Government in a worst-case scenario. Nevertheless, the state's capacity to deal with this kind of crises has improved during the last years and any particularly difficult situation could benefit from activating the European solidarity clause among member states, thus helping Bucharest to tackle more efficiently even very complex challenges.

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2. ENERGY SECURITY IN BULGARIA

Marin Lessenski, Narciz Bălășoiu

I. Country Overview

The Republic of Bulgaria is situated on the Balkan Peninsula in South-Eastern Europe. To the East it borders the Black Sea, to the south Turkey and Greece, to the west The Former Yugoslav Republic of Macedonia and Serbia, and in the north the River Danube forms the border with Romania. Bulgaria functions as a parliamentary democracy. The country is governed under the constitution of 1991. The President, who is the head of state, is popularly elected for a five-year term and is eligible for a second term. The Prime Minister, who is the head of government, is elected by the legislature, as is the cabinet. The 240 members of the unicameral National Assembly are popularly elected for a four year term.
Bulgaria has been a member of the European Union since 2007 and of NATO since 2004. It has a strategic geographical location and it is the EU's Eastern border.

I.1. General Perspectives

Bulgaria's energy dependency is substantial as 70% of the country's net energy consumption comes from imports and reaches about 75% when nuclear fuel is taken into account. The country is practically fully dependent on imports of gas, oil and nuclear fuel. These imports come from a single country of origin – Russia. In the case of natural gas there is also a single route and pipeline of delivery.
These factors put the goal of energy security very high on the agenda of Bulgaria's energy sector development, the economy and national security. Bulgaria's energy security is also closely related to European security for at

least two reasons: (a) the country is a EU and NATO member and (b) it is an important transit hub for energy deliveries in the East to West direction. In fact, Bulgaria has managed to build a diverse and well-rounded energy sector, using gas, oil, coal, nuclear power. Electricity generation is done by various sources – nuclear, hydroelectric, coal, co-generation and increasingly wind parks and photovoltaic facilities. The country covers its own electricity needs and is a major exporter to neighbouring states. Bulgaria is a major transit route for natural gas, delivering some 17 billion cubic metres of gas annually to neighboring Greece, Turkey and Macedonia. The oil refining industry is considerable, with the Lukoil Neftohim plant in Burgas being a major producer of oil products in the region.

Bulgaria is aware of the need for security of energy supply and increasing energy independence has been identified as a major goal. However, this has not been easy in view of the enormous investments necessary – in terms of finances, but also of foreign policy and diplomatic efforts as the issues face complex and powerful geopolitical considerations. Such a policy needs a broad and coordinated action on behalf of a considerable number of states. Bulgaria's main premise for energy security is building a common EU policy of which Bulgaria is a major participant. In that regard the country supports EU plans for securing Europe's energy supplies and achieving greater energy independence. In regard to the broader European energy policy, Bulgaria is committed to active participation in the Nabucco project and similar projects that concern the country.

There are two sets of national policies that deal with energy security: firstly, the broader framework of national security policy and secondly, the energy strategy of the country. Both documents pay plenty of attention to energy security issues and pursuing greater energy independence.

I.2. The current political situation in Bulgaria and its influence over the energy sector

The summer of 2009 marked a new political configuration in the Bulgarian Parliament, which will probably last no less than four years. The previous ruling coalition, formed by three political parties (NDSV, BSP and DPS) managed to complete a full term of four years, during which its energy strategy were qualified as pro-Russian. This perception was created by the governmental support that the Bulgarian officials had given to major pro-

Russian energy projects: the development of the new nuclear plant Belene (with companies like Atomstroyexport, Areva, and Siemens as its main contractors), the contract signed for the *South Stream* gasoduct with an equal Bulgarian and Russian ownership, as well as agreements for the Burgas-Alexandroupolis oil pipeline with 51 percent Russian ownership, 24.5 percent Bulgarian, and 24.5 percent Greek. The previous government was established on the principle of political quotas with a ratio 8-5-3. In this context several ministries were headed by different political parties from the coalition and sometimes the controversies were so difficult to surmount that economic and social issues (like major energy projects) failed to come into being because there was no consensus within Government.

The new Minister of energy and economy, Traicho Traikov, brought to the helm of the minister by the fresh governmental majority, is in fact the former manager of EVN Bulgaria and an energy expert. All this time he pledged for a revision of all energy deals in economic terms. The explanation for such a perspective was, according to the new government, the expected budget deficit for Bulgaria in 2009. The economic crisis, which is expected to have its deepest effects on Bulgaria in 2010 and probably in the first semester of the 2011, is the new government's main concern, as the budgetary resources may not cover the expenses of some of the major energy projects, especially if the deals made by the former government prove to be disadvantageous. The new government has only 116 seats in the Parliament, which represents less than half of the total of 240 seats. Stability is ensured with the help of the right-wing parties that support the government, but without making a coalition with the ruling party GERB. Prime Minister Boiko Borisov, former Mayor of Sofia, decided to take the risk and form the government alone to provide a clear political vision about its activities.

The Belene nuclear plant construction costs were estimated to more than 400 million, mainly in consulting, preparation works and of course, engineering. The project is undertaken by the national electric company – NEK, which is 100 percent controlled by the Bulgarian Energy Holding. After an international tender, 49 percent of the project was attributed to RWE, one of the leading German companies in the energy sector, but still no financing for the project has been secured – either through direct financing or bank loans.

Russian officials have proposed that Atomstroyexport could finance almost 4 billion Euro of the expenses through leasing contracts. The Minister for energy backed by the Prime Minister have repeatedly expressed concerns regarding the financial aspects of the project and promised an extensive audit of all contracts. Bulgaria owns 24.5 percent of the Trans Balkan Pipeline's Burgas-Alexandroupolis project through companies that are under the control of the Bulgarian economy and energy ministry, like Bulgarian Energy Holding and Technoexportstroy, each of them owning an equal share of 12.25 percent of the project. On May 2009, Bulgarian Energy Holding decided to redraw from the project and transfer its shares to Technoexportstroy. The company is at this moment under the control of the Bulgarian regional development and public works ministry. According to the new Minister, Rosen Plevneliev, former manager of Lindner in Bulgaria and a construction entrepreneur, the project has no economic sense. Currently it is unclear whether Bulgaria will maintain the previous level of implication in the project or will take a step back. Moreover, many of the municipalities on the pipeline route have expressed their concerns about the project's environmental risks. Under European Union regulations pressure it is expected that Bulgaria will make an in-depth analysis of all such risks. According to several press articles appeared in the Russian media, the new government's actions have raised questions in Moscow regarding Bulgaria's pro-Russian orientation and its energy initiatives, especially South Stream. Despite the fact that no final decisions were taken by the new government regarding this contract, the approach is no doubt, a different one. Even before the elections, the leader of the current ruling party GERB, while still a member of the opposition, urged the previous government not to sign any energy deals in July 2009, as all contracts would have to be implemented by the new government, which did not want to be excluded from any negotiations. Though, one exception was made when the leading party of the coalition agreed to sign the Nabucco inter-governmental contract in Turkey on 13th July, 2009. The negotiations between Gazprom and the new government started in order to close a deal on gas supplies as the current contract expires until the end of 2012.

If the new leaders will manage to correlate the internal energy policies with those of the European Union, it is reasonable to assume that projects such as Nabucco or South Stream will become reality in a reasonable time frame. At the moment there is a large perception inside Europe that both Nabucco

and South Stream have the ability to consolidate the Union's energy security. However, according to EU energy policy, Nabucco should have priority. While South Stream is diversifying routes for supplying Russian gas, Nabucco is expected to support diversification of routes, suppliers and sources of natural gas – by providing access to the gas-rich Caucasian region and Middle Eastern countries. This approach has become more than a theoretical concept after the 2008 NATO summit held in Bucharest, when "energy security" was officially mentioned as a concern of the Allies. The US military base that is currently under construction in Bulgaria proves that the political climate between the two countries has improved. This can also be an opportunity for Bulgarian officials to encourage the American energy companies to invest in this sector, taking into account the multitude of projects that can be implemented on a regional scale.

II. Policy and Institutions

1. The New Energy Strategy valid until 2020 attempts to offer answers to a series of challenges that need fast treatment in order to stop any problems from deepening. The Energy Security concept plays an important role in this document so a distinct chapter treats the major approaches. The policy paper stipulates that Energy security means supply that meets the demand under the conditions of a sustainable, environmentally friendly environment with price levels that don't hinder economic development. Security risks can be managed by diversification of the energy resources by types, sources, suppliers and routes, taking into account the regional and world trends of the energy markets. Thus considered, energy supply diversification will contribute to the establishment of competition among the main energy suppliers and price sustainability of the primary energy sources. The strategic document also suggests an approach for solidarity, aimed at higher degree of supply security:

- New investments in gas infrastructure, storages and LNG terminals.
- Improving the mechanism for liquid fuels strategic reserves and increasing the requirements to the EU Member states in that respect.
- Priority plan for interconnection power lines development, as well as introducing of common minimal and binding network security standards.

2. The main energy institutions in Bulgaria are:

Ministry of energy and energy resources

The Ministry of Energy and Energy Resources was established in December 2001 on the basis of the latest amendments to EEEA. Through help from its administration the Minister of energy and energy resources develops and carries out the country's energy policy. Certain amendments have been proposed in the draft Energy Act in order to ensure enhanced competencies of the Minister.

State Energy Efficiency Agency

The state policy on promoting energy efficiency and generation of electricity and heat from renewable energy sources as part of the country's energy policy is carried out by the Minister of Energy and Energy Resources. The activities concerning improving the energy efficiency and the use of RES are supported by projects under energy efficiency programs, the implementation of which is supervised and coordinated by the Executive director of the Energy Efficiency Agency. The Energy Efficiency Agency has the status of an executive agency under the Minister of Energy and Energy Resources.

State Energy Regulatory Commission

SERC is a constantly acting collective body (comprised of 7 members) that provides state regulation in the energy sector. The Commission is supported in its activities by an administration. SERC's competence is related to:

- issuing and withdrawing permits and licenses;
- regulating prices and tariffs;
- developing and proposing secondary legislation concerning the order and conditions for issuing permits and licenses for the Council of Ministers and determining the rules for setting electricity, heat and natural gas prices.

III.1. The National Security Policy of Bulgaria and its Energy Security Component

"The high level of dependence on energy resources creates economic and political vulnerability. The projects for diversification of resources and routes of delivery for energy resources have a big impact on the geopolitical

situation on the Balkans and in Europe and direct projection on the national security of Bulgaria."- Draft National Security Strategy of Bulgaria, 2010, III.2. Internal Security Environment

Energy and energy security are a component of the overall concepts of national security, emphasizing at the same time the connection to regional and European security. This has been reflected in the national strategic documents – the National Security Concept of 1998 and then the 2010 draft National Security Strategy.

Bulgaria's last official security concept was adopted in 1998, which was still dominated by the 1990s context and concerns. Still, the 1998 Concept admitted the significance of energy and energy security for the country. It stated that the Balkans retain their geopolitical importance and significance as a transport, infrastructure and energy crossroad and will be growing with the then-expected enlargement of the EU and NATO as well as the linking of the Caucasus and Central Asia countries with the European countries. Furthermore, the concept states that "national and European security depends on a number of strategic intercontinental transport, communication and energy corridors". Guaranteeing "energy security" is also mentioned as a major goal that will establish Bulgaria as a main component of European and regional security.

And while the 1998 Concept had three paragraphs about energy and national security, the new 2010 draft security strategy has dedicated a special chapter to it. The chapter – IV.7 - is tellingly entitled "Policy for Energy Security" emphasizing the need of pursuing a coherent policy to guarantee energy security and thus the overall national security. As the draft says (83) "The improvement of energy security as an element of national security is a long term process, demanding investments and a long term state policy".

Main energy indicators for Bulgaria	**Metrics**	**2004**	**2005**	**2006**	**2007**	**2008**
Net domestic energy consumption	1000 Toe	19017	20137	20637	20163	19889
Primary energy production	1000 Toe	10271	10539	11011	9738	9953
Energy dependence	%	48.3	47.3	46	51.8	52.5
End energy consumption	1000 Toe	8907	9276	9722	9528	9419
Ministry of economy and energy estimates, March 2010						

The quotation from the 2010 draft Security Strategy in the beginning of the section is very indicative about the frame of mind in Sofia. Energy security is in fact taken very seriously as a major vulnerability that might threaten the economic and political regime in the country. In fact, energy security and related issues have been identified in the list of national vital and strategic interests of the country. The vital interests refer to "protection of the population and critical infrastructure in crisis, disasters, accidents, catastrophes and other risks and threats".

The strategic interests explicitly include "securing diversified access to different sources and types of energy resources and other strategic resources". The draft energy strategy explicitly states that energy security is an element of national security and a precondition for economic stability. The growing energy dependence is seen as one of major risks for emergence out of the crisis.

Energy security is placed as a major topic among six areas of national security: external security policy, defense policy, justice and home affairs, financial and economic security policy and environmental security.

Energy dependence of Bulgaria	**Metrics**	**2004**	**2005**	**2006**	**2007**	**2008**
Total, energy dependence	%	48.3	47.3	46.0	51.8	52.5
Coal, energy dependence	%	40.2	36.1	34.0	37.6	42.0
Crude oil, energy dependence	%	100.1	97.7	99.8	100.2	101.0
Natural gas, energy dependence	%	95.9	87.4	89.8	91.5	96.3
Ministry of economy and energy estimates, March 2010						

But the draft while hinting at solutions of the problems is at the same time realistic of the limitations of some of the measures. For example, further in the section assessing the "External Security Environment", the draft Security Strategy specifies the implementation of strategic international transport and energy projects towards increasing the level of certainty in the security environment. However, this does not guarantee an increase in the level of security and demands building up capabilities for protection of critical infrastructure.

The external security policy, i.e. the **foreign policy dimension** also dwells on energy security, by stating that the goal is to decrease its unilateral dependency and to overcome vulnerability during a future energy crisis. In this section, the document also underlines the key importance of

coordination with two broader communities Bulgaria belongs to – the EU and its member states and the transatlantic component – placing an emphasis on the need to engage this community of nations.

Chapter IV of Energy Security Policy, dedicated to this, outlines the major components of such a policy. It states that national energy security will be guaranteed by the balanced and complex usage of renewable energy sources, nuclear energy, natural gas, coal technologies and hydropower plants. Furthermore, Bulgaria has a stake in building a common European energy policy and supports the implementation of EU's strategic initiatives for building the infrastructure and the diversification of supply, especially the Southern Gas Corridor, access to LNG and the North-South axis.

Bulgaria also counts on the new financial instrument – the Energy Security and Infrastructure Instrument, underling the significance of this mechanism for the country and its neighbors from Southeastern Europe in view of the high level of dependency on gas imports from one source and the insufficient energy infrastructure.

Concerning large scale energy projects, the draft strategy puts an emphasis on Nabucco as a priority of the EU. The support for South Stream comes second.

Nuclear energy is clearly spelled out as a component of energy security and its strategic significance, thus receiving the support of the State.

There is also an array of measures that place relatively new concerns and goals. The **energy intensity and increasing efficiency** of the Bulgarian economy is a top concern. In fact, according to data from Eurostat, the economy of the country is about 4 times more intensive than the EU average: 944.16 vs 167.11 of EU 27 measured as kilogram of oil equivalent per 1000 Euro.

Energy security is also seen as directly related to the improvement of the environment meaning increasing the share of renewable energy sources, alternative sources, substituting electricity consumption where possible with gas (Bulgaria's households have less than 2% gasification), cleaner coal technologies, and general high expertise in the energy sector to provide for higher standards of environmental protection.

Finally, the draft strategy pledges to fulfill the commitments to the directive for protection of European and national critical infrastructure, including public-public partnerships in the area.

III.2. Bulgaria's Energy Policy and Its Energy Security Component

Bulgaria has a very well developed, and considerable in size, energy sector. Despite the fact that it lacks any sizable gas and oil deposits, the country has electricity generation capacities for domestic consumption and exports from a nuclear power plant, several coal and hydro power plants.

The recently(spring of 2010) announced draft "Energy Strategy of the Republic of Bulgaria until 2020" contains an entire chapter on the country's energy security.

Energy security tops the list of the draft Energy Strategy that is the following:

- Guaranteeing the delivery of energy supply;
- Meeting the goals of renewable energy;
- Increasing energy efficiency;
- Development a competitive energy market and
- Enhanced social protection for the vulnerable groups.

The elements set in the Energy Strategy for decreasing energy dependence are the following:

- Decreasing the dependence on imports of energy resources, especially those with unstable and unmanageable prices
- Diversification of routes
- Diversification of suppliers and sources

Gas as a priority

Natural gas deliveries are at the forefront of goals of the Energy Strategy and its energy security component. Gas is a major concern not only because of its significance for Bulgaria's economy (the household consumption is not that important, being minimal at less than 2%) that is used in various industry and generation of electricity and central heating. The other reason for concern is the specific and very limited ways of sales and delivery of gas. Unlike oil, there is no global market and the main means of delivery is through pipelines from the closest sources. Currently, Bulgaria has to import almost 100% of its gas from Russia (after the 2009 local production stopped and will be resumed in 2010) and only through the Ukraine route. There was also the gas crisis of 2008 as a waking up call for politicians that changed the existing complacency that the supplies would hardly ever be disrupted on this scale.

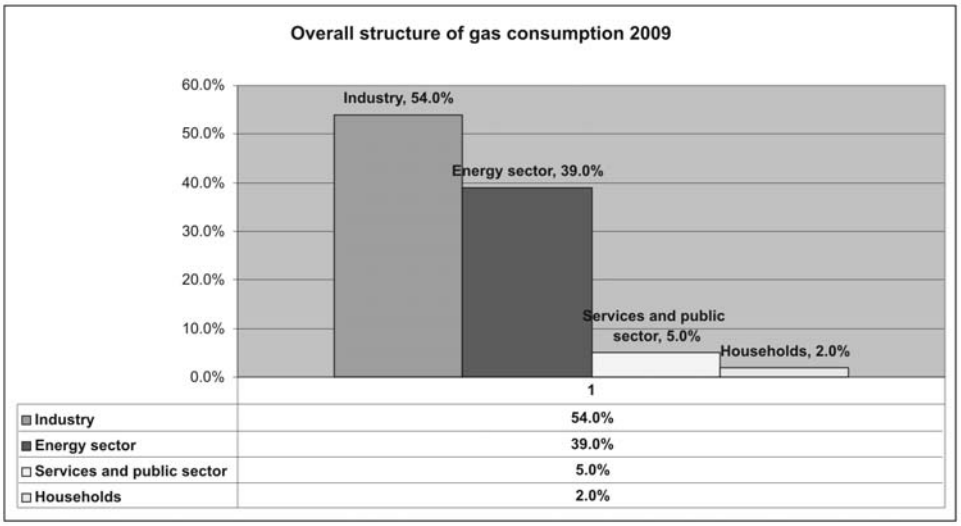
One of the the most important issues of the Bulgarian gas sector is that Sofia imports natural gas using a single public supplier, Bulgargaz EAD, a subsidiary of the Bulgarian Energy Holding, which in turn is fully-owned by the government. As the only licensed company, Bulgargaz has a monopoly over the public provision of natural gas. Under long-term contracts which will expire at the end of 2010 and 2012, Bulgargaz imports gas from subsidiaries of Gazprom and intermediaries like Overgas Inc., Wintershall, and Gasexport.

Bulgartransgaz is the owner and operator of the high pressure gas pipelines and the Chiren UGS. Bulgaria has repeatedly expressed its intensions to construct interconnections to Greece, Romania, Turkey, and Serbia, which would improve system flexibility and gas supply security, and has injected more gas in UGS during the summer of 2009. This is in fact an approach that is fully backed by the European Union countries in their concerted efforts to ensure supply alternatives, as an energy security dimension. For the time being, however, supply is still precariously hooked entirely to the two parallel lines that come from Russia via Ukraine, republic of Moldova, and Romania. All these issues were clearly identified by the Bulgarian government, but addressing them is a very complex process:

- Critical lack of supply alternatives. Extremely high concentration of natural gas imports, all of which are via a single route;
- Monopolistic environment. Extremely high concentration of market power in the oil and gas sectors. Just a few big companies have control over supply and distribution;
- Monopsonic environment. Complete domination of the transit natural gas pipeline system by a single customer which is also significantly present on the domestic market in gas distribution;
- Absence of leverage in negotiating adequate terms of trade in the gas business with the dominant foreign supplier who is also the only user of the transit pipelines

Thus, the new draft strategy of the new Bulgarian government stated that the "The diversification of sources and routes for natural gas delivery is important for national security and the energy independence of the country." There are several ways to achieve these goals.

The first two mechanisms are intended to troubleshoot crisis situations, while the rest of the measures have a longer term and wider-scale effect.

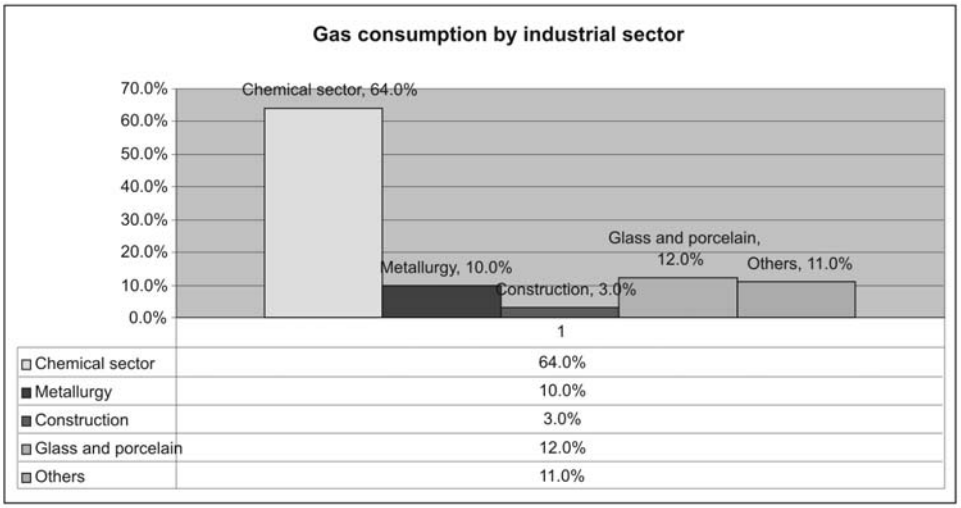


The first mechanism that is relatively easy and inexpensive to do is to construct reverse links with neighboring states – Greece, Turkey, Serbia and Romania – and receive gas from its partners. These will be small capacity pipelines intended exactly for crisis situations when the main gas supply is interrupted. They will be built in line with the EU energy policy.

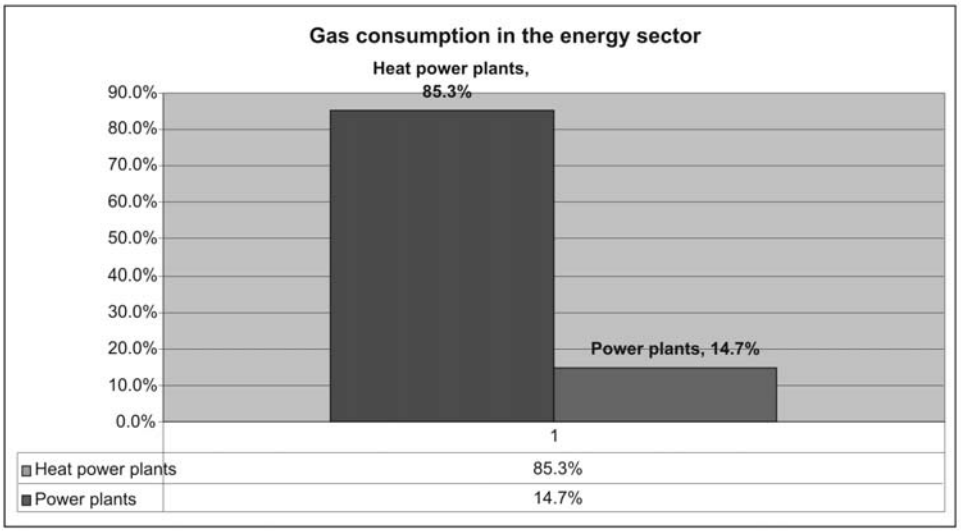
The second way is to make sure there are adequate national reserves in the country to cover for deficits in times of crisis. The Energy Strategy specifies the enlargement of the existing Chiren gas storage facility and mentions about one or two additional storage facilities. Most likely, this will be the Galata gas storage along the Black Sea shelf, which will be in fact transformed from the just depleted gas field. These storages will have enough holding ***capacity and enough capacity for daily output*** in order to secure the domestic consumption for a prolonged period of time. In addition, there is the existing rule under EU regulations that central heating companies should maintain a 90 days reserve in case of an emergency.

The third way is to enhance local production, which by some estimates may reach 20% of the domestic consumption. The state is committed to helping boost alternative sources: both existing deep drilling in the Black Sea, some inland sources and shale gas extraction.

The fourth way is to bring gas by tankers to LNG and CNG terminals. This will allow for more flexibility and freedom to buy from international markets at competitive prices as compared to the fixed long term contracts



with Gazprom now. The CNG terminal is planned to carry Caspian gas via Georgia and the Black Sea to the port of Burgas. The plans for LNG terminals include cooperative efforts for a Bulgarian-Greek terminal at the Greek Ageanean coast and one or two joint terminals with Turkey on the Marmara Sea coast.



The fifth way, that is probably the most massive as scale and impact would be the construction of additional main pipelines. In the first place, there is the Nabucco project backed by the EU that will be the main artery of the

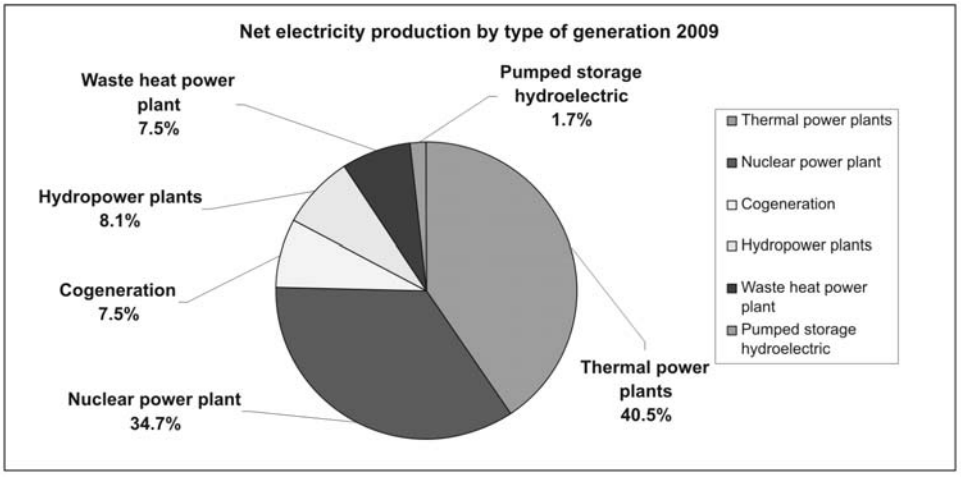
Southern Corridor bringing gas to Europe. Bulgaria is also part of the South Stream project, initiated by Russia, which will bypass Ukraine and go on the Black Sea bed from Russia to Bulgaria and then go further westward. There is of course the debate whether and how these projects will enhance energy security and independence as to many, they are competitive if not mutually exclusive projects. The arguments of Nabucco are that it will free Bulgaria and Europe from overt dependence on Russia. The arguments for South Stream is that it will eliminate the political risks of discords between Russia and Ukraine and will secure cheaper gas to the European markets. There are additional, though different strategies to put gas to use for energy security. This would be the sixth measure that introduces a certain novelty by the stated support for new gas power stations, which has to balance the usage of the wind parks as they are considered not sufficiently reliable in terms of expected output.

A seventh measure would be the increase of gas usage by households, which is currently at 1.5% or 2% at most, while the European average is 55%. The government wants to replace the current high level of electricity consumption – 40% of the total energy consumed by household vs 11% for the EU average. The stated goal is to have a wide internal network throughout the country to balance these deficits, as directly using gas would be much cheaper that producing and then using electricity. But in terms of energy security, there is an upside of the small number of households using gas. In times of gas crisis, very few will be directly affected. As experience demonstrated in the 2008 gas crisis, the general population was only indirectly affected by the decreased work or halting of the central heating plants.

Electricity production and energy security

Bulgaria's dependence on imports in electricity generation is much lower of up to 54%, because there is a significant local production of different types of coal. In addition, the national electricity production mix (as shown in the graph) manages to provide for stable prices that do not depend so much on the unmanageable changes of liquid fuels and natural gas. The mix includes a considerable portion of thermo (coal) power plants, local hydroelectric generation, waste heat and co-generation facilities. The nuclear power plant in Kozloduy provides for over a third of the electricity production. In terms of energy dependency, the nuclear power plant is counted as a local source, but as the fuel comes from Russia, it may increase dependency.

Nuclear power generation



The Bulgarian state will continue to support nuclear power generation because of economic (cost effective) and environmental considerations as it is a low (or non) emission technology. The Government is also aware of the advantages of quality technical expertise that comes with nuclear technologies and the difficulties to sustain it or renew it in case nuclear projects are scrapped from the national policy.

The Kozlodui NPP on the Danube River has six units, of which four WWER-440/V-230 reactors and two newer WWER- 1000/V-320 units. By 2006, all four WWER-440 units were permanently shut down in line with Bulgaria's commitments regarding accession to the European Union. The newly constructed units 5 and 6, are fully operational. The plant is owned and operated by NPP Kozlodui EAD, a 100% owned affiliate of the National Electric Co. (NEC).

Belene is a place located on the Danube River, where in 1987 the construction of a brand new Nuclear Power Plant started. The first unit, out of four initially planned WWER-1000/V-320 reactors, was partially built by 1990 when construction was suspended due to lack of funds and public support. In 2002, the government commissioned a feasibility study and in 2005 decided to restart construction on a scaled-down plant with NEC acting as the project developer. Due to financial problems and political divergences the project was "dropped" and revitalized several times. The Bulgarian government is expected to make a final decision on Belene in the near future, but the implications are so complex that no one is eager to assume a final decision. Another important issue that adds to the layers of

uncertainty that surrounds Belene is the wide margin of variation in estimates of generation capacity that would adequately serve Bulgaria's electricity market. It is unclear, taking into account the actual consumption growth rate, if Belene's 2 GW capacity will be needed before the closure of units 5 and 6 at the existing Nuclear Power Plant Kozlodui. At this moment reports talk about decommissioning somewhere around years 2017-2019, but the process could be suspended until 2030 if the safety requirements will be met by authorities.

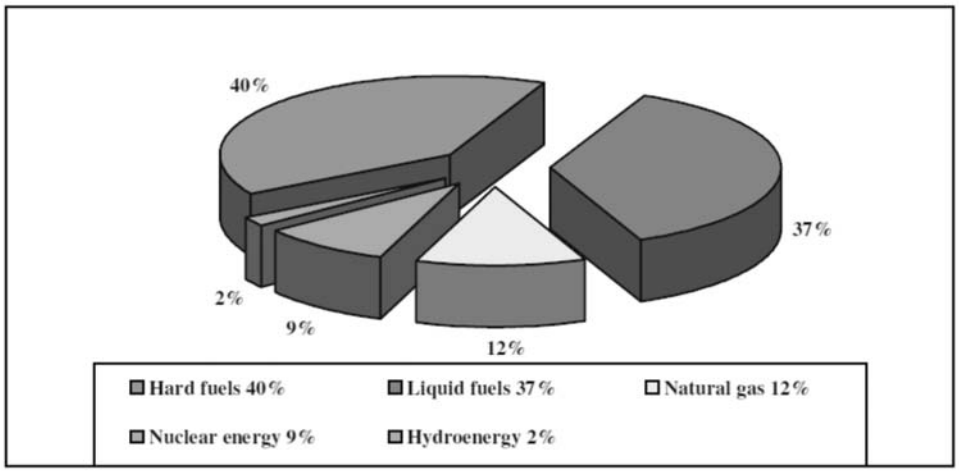
Central heating

The strategy also dwells on central heating as a environmentally friendly and efficient energy usage. However, due to declining levels of services the number of citizens using central heating is diminishing and as a result the companies suffer losses and unsure future. As many of them use gas, this is reflected in the gas market and gas project plans.

The policy and regulatory dimension

In addition to concrete energy projects, the general policy and regulatory dimension is also very important. This includes solidarity among EU members and at more technical level a EU regulatory frameworks in the energy sector that will provide greater transparency, an open market and the competitive approach that would help enhance energy security by mitigating the influence of vested and/or adverse geopolitical interests. But again, if there isn't sufficient infrastructure in place - that is pipelines - the EU members cannot make use of the solidarity principle.

The primary energy balance structure – 70% import



IV.1. Ensuring Energy Security through supply alternatives

As stipulated in the Energy Security Strategy and also in the latest National Security Strategy, ensuring alternative routes has become a desideratum and a critical condition in order to reduce the overwhelming dependence on the Russian resources. In this respect Bulgaria has to take into account its role in the European Energy Strategy, so it has to coordinate its own strategy in close connection with the larger European architecture. The issues of access to the energy resources of the Caspian region and Central Asia and the transit of these resources through the Black Sea region to the European market are matters of paramount importance for the EU. In this context Bulgaria considers that it is of crucial importance to include measures aimed at strengthening the partnerships between the key suppliers (Russia, Caspian region and Central Asia), major energy importers (EU) and transit countries such as Ukraine, Turkey and South Caucasian states. Bulgaria attributes

specific importance to the following strategic energy projects included in its Operative Programme for Cross-Border Cooperation in the Black Sea Basin and in the National Strategy for Integrated Infrastructural Development:

IV.2. The planned major energy projects and their effects for the energy security of Bulgaria

Planned projects/measure	*Technical and financial parameters*	*Short description*	*Pros and cons in terms of Bulgaria's energy security*
Oil projects			
Burgas-Alexandroupolis oil pipeline	A 279 km pipeline with a cost of 1 billion dollars. Russia has 50% share and Bulgaria and Greece 25% each.	The Russian-Greek-Bulgarian project is planned to carry oil from Russia to the Greek coast	The project will have a neutral effect on the energy security as it is mainly a transit project for other markets
Gas projects			
Nabucco	1422 mm capacity of the pipe. The Bulgaria section will be about 410 km and will cost about 600 million Euro. It will have a maximum capacity of 31 billion cubic metres annually.	Bulgaria's section of the EU-backed Nabucco is about 410 km, going from the Turkish border in the South to the Romanian border in the North	This would be the most beneficial project in terms of energy security as it will mitigate the negative impact of the current model of only one supplier and one route.
South Stream	63 billion cubic metres annually	Bulgaria is part of the Russian-Italian project. The Bulgarian section of the pipeline will run from the Black Sea coast near Varna in the East-West directions and then take two directions: continue to Serbia and further West and then another link to Greece in the South.	The proponents of the project say that it will add another major route of supply for the country, which will mitigate the political effects of Russia's disputes with intermediary transit countries such as Ukraine. The opponents of the project say that this will enhance the already full dependence on Russian gas.
Interlink/reverse links to Romania	Rouse-Giurgiu connection, with 500 mm capacity, 7-15 km length, 1.5 billion cubic metres annually; the cost will be about 27 mn. Euro	This will be a small capacity pipeline that will serve in times of energy crisis to supply limited volumes of gas. It is based on the "solidarity" principle within the EU between Bulgaria and its neighbors.	The effect for energy security will be very beneficial. Though it will be a small capacity pipeline, its combined effect with the rest of such interlinks with neighboring states will be substantial.
Interlink/reverse links to Turkey	Edirne-Dimitrovgrad connection, with 700 mm capacity, planned to be part of Nabucco, 5.5 bn. Cubic metres annual capacity; 75 mn. Euro investment from Bulgaria	This will be a small capacity pipeline that will serve in times of energy crisis to supply limited volumes of gas. It is based on the "solidarity" principle within the EU between Bulgaria and its neighbors.	The effect for energy security will be very beneficial. Though it will be a small capacity pipeline, its combined effect with the rest such interlinks with neighboring states will be substantial.
Interlink/reverse links to Greece	Komotini-Dimitrovgrad/Stara Zagora link, with 700 mm capacity; 1.4 b m3 to 6 b m3 annually; 170 km length; 150 m euro investment	This will be a small capacity pipeline that will serve in times of energy crisis to supply limited volumes of gas. This based on the "solidarity" principle within the EU and Bulgaria and its neighbors.	The effect for energy security will be very beneficial. Though it will be a small capacity pipeline, its combined effect with the rest such interlinks with neighboring states will be substantial.

Interlink/reverse links to Serbia	Sofia – Nis connection, with 700 mm capacity, 1.8 bn cubic metres to 5 bn. cubic metres annual capacity; 150 km length, 150 m euro investment	This will be a small capacity pipeline that will serve in times of energy crisis to supply limited volumes of gas. It is based on the "solidarity" principle within the EU between Bulgaria and its neighbours.	The effect for energy security will be very beneficial. Though it will be a small capacity pipeline, its combined effect with the rest such interlinks with neighboring states will be substantial.
LNG Terminal with Greece	Not clear, may cost up to 1 b euro	The project envisages a joint terminal at the Greek Aegean coast that will enable gas delivery from diverse producers all over the world.	The effect will be very beneficial as it will be a feasible alternative as a route and a source of gas.
LNG Terminal(s) with Turkey	Not clear	The project envisages a joint terminal or two terminals at the Turkish Marmara coast that will enable gas delivery from diverse producers all over the world.	The effect will be very beneficial as it will be a feasible alternative as a route and a source of gas.
CNG Terminal in Burgas	1160 km route from Azerbaijan	The project will bring CNG from the Caspian via Georgia and the Black Sea.	The effect will be very beneficial as it will be a feasible alternative as a route and a source of gas.
Chiren gas storage	650 mn. cubic metres annual capacity, enhanced to 850 mn. cubic metres, with a daily output of 4.3 mn. cubic metres to 10 mn. cubic metres 100-250 mn. Euro	The existing Chiren gas storage will be enlarged in terms of overall capacity and potential for daily output.	The project is indispensable for energy security as it will ensure the necessary local supply in times of emergency for a prolonged period of time.
Galata gas storage	Capacity between 250 mn. cubic metres to reach 800 mn. cubic metres	There are plans underway to transform the Galata gas field in the Black Sea shelf into a storage, which will be built and enlarged in three stages.	It will serve in conjunction with the Chiren gas storage, adding extra security to the supply. The project is indispensable for energy security as it will ensure the necessary local supply in times of emergency for a prolonged period of time.
Domestic gas production	Shelf, inland and shale gas deposits extraction with 3 bn. cubic metres in the shelf and 25 bn. cubic metres shale gas	Plans for Black Sea shelf extraction that may resume in 2010 and long term and more complex plans for shale gas extraction in the Dobridzha region	Domestic production, carried out by UK's Melrose and US Chevron, would be highly beneficial. It is expected to provide for up to 20% of domestic annual consumption and substantially reduce the dependency on imports and its higher prices.
Nuclear energy			
Belene Nuclear Power Plant	Two blocks with 1000 MW each; The total cost may rise to 10 bn. Euro;	The Belene power plant planned and promoted in cooperation with Russia, is intended to add to the electricity generation capacity of the country and envisaged exports.	The proponents of the project say that it will add to the energy security of the country and its export potential. The opponents of the project say that this will enhance the already full dependence on Russian resources and technologies. There may be also financial dependence if Bulgaria does not find major investors other than Russia.
Kozloduy new blocks	Plans for one or two additional blocks by Western or Russian technology and investment	There are plans to add one or two more blocks on the existing Kozloduy site.	The proponents of the project say that it will add to the energy security of the country and its export potential. The opponents of the project say that if Bulgaria does not find Western investors and technologies this will enhance the already full dependence on Russian resources and technologies.

V. Crisis scenarios

Supply Disruption

The responsibility of maintaining supplies is actually regulated by two state bodies: the Ministry of Economy and Energy as well as the State Agency State Reserve and War-Time Stocks. The respective laws and regulations oblige also state and private energy companies to maintain certain volumes of fuel as an emergency supply.

The main responsibility for emergency supplies lies with the "State Reserve and War-Time Stocks" Agency, which is a state agency to the Council of Ministers. The agency's main responsibilities are as follows:

- Pursues the state policy in the field of the accumulation, maintenance and use of the country's state reserves and war-time stocks in accordance with the national security's interests;
- Organizes and controls the accumulation, maintenance, refreshing and accounting of the state reserves and war-time stocks;
- Proposes the state reserves' nomenclature and norms to the Council of Ministers;
- Reports its activities to the Council of Ministers and to the Interdepartmental Council in the matter of the military-industrial complex and mobilization training of the country;
- Takes part in the international cooperation, European and Euro Atlantic integration activities;
- The main stocks pilled into the system of state reserves are: fuels; chemicals; foodstuffs; ferrous and non-ferrous metals; spare parts; timbers and paper; medical goods, hospital goods, appliances and tools.

However, in the area of energy supplies the agency has the responsibility only for the oil and oil products reserves of the country. This is stipulated by the special law regulating the agency and particularly in the special Law on the Mandatory Reserves of Oil and Oil Products, adopted in 2003 and amended in 2007. The law says that the agency is responsible for the following types of fuel: auto and aviation fuel, industrial fuels, kerosene and diesel, fuel oil and propane. As stipulated in the law, the agency shall maintain fuel reserves for a specified necessary term, starting gradually from 10 days reserves in the first year after its establishment (2003) to a

maximum of 90 days. The required norm in 2010 would be 70 days, of which 30 are for the agency. There was a European Commission check of the state of reserves in July 2010 as stipulated also in Bulgaria's accession treaty to the EU.

However, it is not responsible for natural gas and the reserves of energy companies. These responsibilities lie with other bodies and respective companies as laid down in the Energy Law. The Energy Law deals with the matter in two articles of – Ch. II, Art. 85 (2006) and Art.128.

Article 85 is within the "Electricity Generation" part and says that "The producers of electric energy are obliged to maintain reserves of fuel, including of local hard fuels in volumes that would guarantee continuing and secure production.

Article 128 is within the "Heat energy production" states that "The producers of heat energy in waste heat electricity or central heating plants are obliged to maintain reserves of fuel in volumes, which would guarantee secure production as stipulated in the terms and order of the regulation in Article. 85, 2.

The specified Article 85.2 (2006, amended 2009) states that the "conditions and order for supplying, maintaining of reserves are defined by order of the minister of economy, energy and tourism".

The ministry regulation is in line with the stipulation of the Accession Treaty of Bulgaria to the EU. The Order No 11 (State Gazette 75, 2004) further specifies the required volumes that will allow for uninterrupted electricity and heat generation depending on the type of generation facilities and the type of fuel they use and in general the level of security of the energy system. The stipulations are as follows: (1) the producers submit on 15 month basis their proposals for the required volumes; (2) 7 days of interrupted work of facilities with local hard fuels; (3) 30 days in the winter and 20 days for the summer season of facilities with imported hard fuel; (4) 5 days for facilities that use dried or enriched fuel, produced in the country; (5) the nuclear power plant maintains reserves of fresh fuel necessary until the next refilling of reactors as well as reserves of fuels necessary for defrosting, diesel generators, etc.

The episode that created so many concerns about the energy security of the European countries as for the EU as a whole, was the Russia- Ukraine gas dispute in January 2009. This was actually the critical moment when the West realized the importance of alternative natural gas supplies. The

incident was somehow foreseen by the Westerners taking into account the decision adopted at the NATO summit in the spring of 2008, when the Allies stipulated in the final document that the concept of "energy security" will become a major concern for the organization.

Left without energy resources, Bulgaria was forced to resort to its strategic back-ups of gas from its storage facility "Chiren". However, as its current capacity could cover less than half of the daily consumption in winter, gas supplies for industrial consumers as well as for district heating companies was diminished or stopped during the crisis. This unpleasant episode seriously affected large consumers compared with the smaller ones. Large consumers used their previously constituted reserve fuel such as gas oil or coal, so they did not experience a great discomfort, but the less prepared small companies from the industrial sector had to stop their activity, so the shock translated into financial loses which had quite an impact. The gas crisis in January gave additional impetus to the Government in seeking new energy infrastructure opportunities. Bulgarian Energy Holding, which detains the monopoly on the Bulgarian natural gas market in terms of supply, transport and distribution, started several initiatives in the post-conflictual period. Some of the main actions taken during the crisis and immediately after were:

- Sofia managed to immediately negotiate an agreement consisting of gas imports from Greece by reversing the flow and using the same pipeline, which supplied Russian gas to the Greek network. This action was taken just before the gas flow through Ukraine was restarted. The quantity negotiated was around 2.5 million cubic meters daily, which in fact represented roughly 20% of the daily consumption in winter time. In the same time in the Austrian capital a meeting took place which has resulted in an agreement between Bulgaria and Azerbaijan. The deal enhanced the access of the EU member to 1 billion cubic meters of natural gas from the Caucasian country, when the needed infrastructure allow such an opportunity, or, when there is a transit contract with Russia or Turkey, to use their transportation routes.
- In April 2009 the Bulgarian president, Georgi Parvanov organized a summit, called "Natural Gas for Europe. Security and Partnership", which was attended by political figures from the EU and energy-exporting countries. The Bulgarian Energy Holding also used the

opportunity to organize a conference entitled "Sofia Energy Business Forum", which managed to place at the same table representatives of major energy companies.

- Two weeks later in Sofia, the executive director of Bulgarian Energy Holding signed the agreement with Gazprom on South Stream. On April 28, 2009 in Moscow the document was countersigned by the Russian partners. The document provides that the two companies will create a new entity and will initiate a feasibility study of the project.
- In a short period of time another important step was made by the Bulgarian officials who managed to sign the inter-governmental contract for Nabucco with Turkey. This was considered at the time, a critical step in the way of starting the project.
- At the same time Bulgarian Energy Holding signed two agreements on natural gas. The first memorandum was with two companies: DEPA S.A., Greece, and Edison International Holding BV, Italy. BEH signed for a 50% participation in a common venture, which will build, own and operate a gas connection between Greece and Bulgaria. The second contract is between BEH and the Greek company Hellenic Gas Transmission System Operator (DESFA S.A.) and involves partial use of the capacity of the Revithoussa LNG terminal in Greece.
- The Bulgarian state gas company made an announcement expressing its intentions to increase the capacity of the Chiren gas storage facility. To make the project happen Bulgarian Energy Holding started looking for financing, so the company officials stated that Holding could guarantee a loan of up to 250 million Euro for its subsidiary company Bulgartransgaz, which operates the storage facility.

Prices

The situation on the Bulgarian oil market is quite homogenous considering the fact that in this sector there is no monopoly or even a so called market leader. The environment is healthy from a competitive point of view as an effect of the diversity of companies that compete on the Bulgarian oil market: Eko Bulgaria (owned by Hellenic Petroleum), Lukoil, OMV, Petrol, Rompetrol and Shell. Despite the apparent serenity, it is worth mentioning

that Russian Federation controls the largest refinery in Bulgaria through Lukoil Company, which is also heavily investing in a local distribution chain. Thus, the Bulgarian oil sector is exposed to price volatility rather than to supply disruptions. The current analysis does not indicates any signs of major instability on this market in the forseeable future, so the international market and the price resulted from the demand/offer balance represents, for the moment, the only parameter that can alter what appears to be a normal state.

As for the natural gas sector the situation is far more complicated. The two major challenges are related to both, supply sources and transportation routes. The entire quantity of natural gas imported by Bulgaria originates from Russian Federation, as for the route, there is no alternative but via Ukraine. One of the companies supplying gas to Bulgaria is Overgas (50 percent owned by Gazprom), which also operates most of the gas distribution network in the country. The internal distribution infrastructure was build after 1991, as Bulgaria did not have any household consumption of gas prior to that.

Prices charged to the final energy consumer in Bulgaria remain among the cheapest in Europe when compared on a market exchange rates basis. For example in the second semester of 2009 electricity had a price tag of 8.18 Euros per 100 kWh, which is the lowest rate in the European Union. In the same period the average price for natural gas was around 9.67 Euros per Gigajoule, also one of the best deals in the EU. However, when it comes to Purchasing Power Parity rates, Bulgaria's gas is the most expensive in EU and electricity ranks near the top. So even though Sofia managed to negotiate a good price for its energy imports, the poor income of the population "compensates" for what could have been an important advantage. Gas and electricity consumer prices are set by the national regulator. On the regulated electricity market companies are often in the position to sell at sub-cost prices. All of this has to do with the low level of living, so the companies are trying to restore part of their profits selling at unregulated prices, but again the majority of transactions are made on the regulated market. The statistics offer a relevant example: in 2008, NEC sales on liberalized markets were less than a quarter of total revenues. The situation is extremely complicated because the companies are adding pressure to obtain a price increase, but at the same time the population has major problems in paying its bills at current prices. Of course this has to do

mostly with the ongoing economic crisis which has transformed into a social one. Continuous decreases in wages corroborated with the growing unemployment rate transformed many of Bulgaria's consumers in "energy poor". Households spend approximately 14% of their income on water and energy bills. Approximately 360,000 households, from the total number of about 2.9 million, depend on social support in order to satisfy their basic energy needs. Other financial challenged consumers who do not fall into the energy poverty bracket and are not supported by the government appear on the growing "bad accounts receivables" lists of power distribution companies. Collection rates have been deteriorating and are dismal at some companies. The most critical situation can be found in Sofia where Toplofikacia Sofia EAD (the capital's cogeneration district heating company) registered a collection rate that has at times been as low as 50%. The current situation can be mainly explained through a multitude of reasons but there are some levels that need urgent governmental actions:

- The system struggles to get out of this vicious circle but the combination of low electricity prices and low incomes of consumers deters investment in rehabilitation of old generating plants, construction of new capacity, and improvement of the grid;
- The balance between low prices/low incomes is very thin, and actually keeps the system blocked, but what politician would have the courage to tackle such a sensitive issue during crisis period. However the time for addressing this matter is closer so the government will actually be forced to adopt some kind of policy aiming to regulate the issue;
- The level of subsidies provided for RES-E generators is too high, so the risk of creating a bubble with extremely negative effects increases.

Investments issue

Consistent with its Energy Strategy, Bulgaria, like any other Central or Eastern European country in transition, needs large-scale investments in the energy sector. Only from an investment perspective, real and pragmatic changes would become possible, in order to implement the necessary reconstruction, replacement, upgrading and expansion of the existing capacities and the construction of new capacities, thus compensating for the inertia typical of the investment policy for the past 10 years. Regardless of

the angle in which the problem is viewed it is absolutely clear that if there are not internal financial sources strong enough to sustain such an investment process, the only leverage available is to look over the border. The government seems to have a vision suitable for that, which is also mentioned in the Bulgarian Energy Strategy – Privatization. In this respect the government prepares to press the accelerator pedal and to start the privatization process in every part of the energy sector. At this point we can talk about the early stages of privatization, because the process has been carried out in a superficial manner, at the level of providing secondary or ancillary activities. The issue of privatization needs a very special approach, because selling segments of the energy sector proved to be a complicated step. The State wants a good price for the companies in its patrimony but on the other side the investors ask for efficiency. But then again the lack of efficiency is the main reason why the State wants to sell, so for a mutual advantageous deal to happen a deep reform of the system delivered by the government is required.

VI. Final considerations

Bulgaria's overall energy dependence of 52.5% (2008) is roughly at the level of the EU average. However, the country's net energy consumption is made up of 70% or even more from imports. The country is almost hundred percent dependent on Russia for its oil, gas and nuclear fuel. Even under the best of political circumstances, this situation raises the stakes for national security. The gas crisis of 2008 clearly showed that there is an urgent need for action to remedy the energy security situation of the country.

In terms of strategic thinking and basic documents, the energy security and energy independence receive more than adequate understanding and attention. The two very important documents that were released for public discussion: the draft National Security Strategy and the draft Energy Strategy of Bulgaria until 2020 pose many of the right questions and many of the right answers to address the issue of energy security. Bulgaria is aware that only common EU policies, political will, action and investment can remedy the situation. There is also an emphasis on the transatlantic dimension of energy security and Bulgaria's role in it.

But to make use of the solidarity and instruments at EU level, Bulgaria has to have in place two major elements: first, the national emergency capacity

with regulations, agencies and practices and second, the adequate energy infrastructure to mitigate or completely cope with a potential energy crisis. Looking at the level of emergency policies, Bulgaria has the basic regulations and agencies in place in order to meet initial shocks from a potential energy crisis. However, as experience has shown, these have to be raised to higher standards and furthermore backed by the respective energy infrastructure and emergency responses which can last for a limited period of time.

In terms of infrastructure, Bulgaria has made a long list of large and mid scale energy projects. If these are carried out, Bulgaria's energy security will be sufficiently guaranteed. For example, the current gas consumption of the country is about 3.35 bn cubic metres annually in the pre-crisis 2008 and may return soon to these levels; it is expected to reach some 6.3 bn cubic metres in six to ten years. In case the transit, import and domestic production plans are carried out properly, the country's gas supplies will be sufficiently covered.

Taking into account the present economic and social harsh realities, we may assume that only a few of these costly and complex projects have realistic chances to be implemented, considering the financial challenges or the time necessary for implementation. There is the related concern of the costs and benefits – some of the projects may prove too costly for the country and the expenditures may offset the benefits for having a more secure supply.

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3. ENERGY SECURITY IN TURKEY

Burcu Gültekin Punsmann, Şeila Abdişa

1. General energetic aspects

When talking about national security in our days, one should also have in mind the crucial component of energy security which in rough terms refers to reliable, affordable, and sustainable flow of energy. However, the subject not only implies multiple definitions on different levels, but it also stands for a complexity that produces many challenges to be faced and considered, such as: major consumers increasingly rely on energy imports; many producer countries are politically and economically unstable; there is a dependency on a limited number of oil and gas pipelines; the risk of sabotage or terrorist attacks; the market power of exporting countries is increasing; price volatility; demand in developing countries is on the rise; there are geopolitical problems and then there is climate change.

Turkey benefits from a strategic location that makes it a natural "Energy Bridge" between the major oil producing areas in the Middle East and Caspian Sea regions on one hand, and consumer markets in Europe on the other hand. Turkey's port of Ceyhan is an important outlet both for current Iraqi oil exports, for the Caspian oil (BTC) and potentially for Russian and Kazakh oil, as well as for potential future Caspian oil exports. Turkey's Bosphorus Straits are a major shipping "choke points"[1] between the Black and Mediterranean Seas.

The most important aspect in energy terms is that, Turkey has a rapidly growing energy market and has thus become a centre for international and

[1] Devlet Nadir, *Turkey's Energy Paper in the Next Decade*, Policy Paper, p.1.

regional energy co-operation. Referring to regional cooperation, Turkey has close economical, political, and military links with Azerbaijan and Georgia. The good relations between Turkey and these two countries, and those between Turkey and Kazakhstan, can be an important asset not only for consolidating its position in the region, but also for the EU's external energy policy.

Within Turkey, all parties related to energy are responsible for coordinating their efforts to assure a sustainable, affordable and reliable flow of energy. In this way, necessary expertise can be developed, and institutionalization of standards can emerge—both of which are key to the development of a sustainable system for energy security. By doing this, Turkey will help itself immensely in advancing its position as an energy hub and in serving as a role model for other parts of the world on energy infrastructure security.

2. Resources, infrastructure and institutions

2.1. Oil

Although Turkey is not a major oil producer, its emerging role as an important oil transit country and its ambition of becoming an energy hub, makes it increasingly important to world oil markets.

According to calculations, Turkey has 954.5 million tons of oil reserves, but only 168 million tons of these reserves are extractable. The majority of the oil reserves are located in the south-eastern part of the country and in the European Turkish region in the northwest. The oil fields in the South Eastern Hakkari Basin, Turkey's main oil producing region have reached their peak and output has declined over the last decade.

Production and consumption

Domestic oil production in Turkey has been fairly small and has fluctuated between 2 and 3 million tons. In 2007, for instance, oil production reached 2.134 million tons and was mostly done in the Southeast of Turkey.

In terms of refined petroleum products, Turkey's consumption is now leveled to about 610,000 barrels per day (b/d) of crude oil equivalent, due to the country's shift to natural gas and use of coal in power generation.

As already mentioned, Turkey is an increasing energy consumer market and because of this, domestic oil demand is projected to exceed 700,000 b/d by 2015 and 800,000 b/d by 2020. To strengthen the upward trend mentioned

we should consider that since 1990, Turkey's oil consumption has been growing roughly by 2.2% per year (8.3 million tons in 1990 to 26 million tons in 2007).

If this calculation is to be extrapolated to the future, Turkey will need 69 million tons of oil in 2020. Turkey produced only 2.1 million tons of oil (~8%) and imported 23.5 million tons (92%) of its oil consumption in 2007, mainly from the Gulf region, the Caspian Sea area, Iran, Iraq, Saudi Arabia, Russia and Libya. In 2007 the amount of imported crude oil and oil products had a 46.5% share in Turkish energy imports.

The figures for oil production and consumption in Turkey between 1990 - 2001 can be found in table 1:

Table 1

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Production (total)[2]	77	92	88	80	76	71	71	72	69	63	57	52
Production (Crude Oil only)	73	88	84	76	72	67	67	68	65	59	53	48
Consumption	476	468	492	564	540	601	633	634	627	625	663	619

Source: DOE/EIA

Sector organization

Turkish Petroleum Corporation (TPAO) – the state owned company produces almost 70% of oil demand and therefore dominates oil production in Turkey, but there are also national and foreign private companies as well as consortiums in this sector.

The **Ministry of Energy and Natural Resources (MENR)** is the main governmental body with responsibilities in monitoring the sector and it also represents the key decision-making body which approves new projects along with the **State Planning Organization (DPT).**

The Petroleum Market Law (2005) stipulates competition in the sector by abolishing price ceilings and removing import quotas on petroleum products and because of its content the oil sector suffered some important changes. For instance, TUPRAS - a petroleum refinery corporation and POAS - a major petroleum product retailer have been privatized.

[2] includes crude oil, natural gas plant liquids, other liquids, and refinery processing gain.

The **Energy Market Regulatory Authority (EMRA)** is responsible with issuing secondary regulations and licenses. Also, it approves certain tariffs and carries out investigations concerning market activities.

TUPRAS (a former state-owned enterprise) carries out 85% of the refining activities in Turkey. The Koc-Shell Joint Venture Group purchases 51% of TUPRAS in 2005. The oil pipe line network is under control of **BOTAS**.

Oil trade and transit

As already mentioned, Turkey is a bridge between the energy-rich countries of the Caspian Sea and Persian Gulf regions and net energy importing countries in continental Europe. Turkey is working on many pipeline projects for both oil and natural gas avoiding the crowded Bosphorus Straits. Once the projects are completed energy security will be increased for both Turkey and Europe.

The oil infrastructure consists of the following pipelines:

- **Baku-Tbilisi-Ceyhan (BTC) Pipeline** – The BTC pipeline was officially inaugurated on July, 13th, 2006 at a ceremony held in Ceyhan with extensive press coverage. The day was depicted as an historical one[3]. It is the first direct pipeline to transport crude oil from the Caspian Sea to the Mediterranean without crossing Russian ground or the crowded Bosporus and Dardanelles Straits. The BTC line stretches 1,776 km (1,076 km are in Turkey) and it is owned and operated by a consortium of 14 companies led by British Petroleum (BP). In May 2006 Kazakhstan formally joined the BTC project and now delivers 5 million tons of Kazakh crude oil per year in tankers to Baku. Oil from BTC, excepted on the long run to reach 2 million barrels a day, is viewed as enhancing the diversity of non-OPEC supply sources. The transit and exploitation revenues will depend on the volume of oil that will be transported. Between the 1st and 16th year, revenues will range between 140-200 million USD, between 17th and 40th year between 200-300 million USD. The revenues are not expected to be higher than those of the Turkish-Iraqi oil pipeline before the BTC reaches its maximum capacity of 1 million b/d.
- **Turkey-Iraq Crude Oil Pipeline** (Kerkuk – Ceyhan Pipeline) – It stretches from Kerkuk and other production sites to the Ceyhan-

[3] Turkish Daily News, July, 13, 2006, « Silk Road of the Century ready to be welcomed », « Ceyhan to host senior guests from around the world », « BTC marks an era against the monopolization of Caspian energy resources ».

Yumurtalik plant with a total length of 1,876km (1,297 km of which is in Turkey) and an annual capacity of 70.9 million tones. The Ceyhan marine terminal has been indeed a major outlet for Iraqi oil exports, with optimal pipeline capacity from Iraq of around 1.5-1.6 million bbl/d. It has been connected to the Kerkuk oil fields in Northern Iraq via the Iraqi-Turkish crude oil pipeline system since 1977. Thanks to expansion projects and the completion of a second line in the 1980's, the system had a capacity of 1,65 million b/d before the first Gulf War. However oil flows have been only sporadic since late March 2003, following the outbreak of the Iraq war. On March 8, 2004, Iraq issued a tender for Kerkuk oil via the Turkish port of Ceyhan, the first such sale from Iraq's Northern oil fields in a year. Since then, flows through Ceyhan have been erratic as the Baku-Ceyhan line has been subject to frequent attacks. 5.9 million tons (43.7 million barrels) of oil were transported in 2007 by this pipeline.

- **The Ceyhan-Kirikkale Crude Oil Pipeline –** responds to the crude oil supply requirement of the Kirikkale Refinery. The length of the pipeline is 448 km with an annual capacity of 3.5 million tons per year.
- **The Batman-Dortyol Crude Oil Pipeline** – carries oil produced in the Batman Basin to the Dortyol Marine Port. The total length of the line is 511 km, with a capacity of 3.5 million tones per year.
- **The Selmo-Batman Crude Oil Pipeline** – transports oil from the Selmo Basin to Batman. The total length of the line is 42 km with a capacity of 800,000 tones per year.
- **Bosphorus Bypass Options** – The Turkish Straits are of particular importance as around 3.7% of the world's daily oil consumption is shipped through them. Every year some 10,000 tankers pass through the Bosphorus Strait. Today a tanker maneuvers through these narrow, busy waterways every 20 minutes during daytime. It is anticipated that 6-7% of global oil will transit Turkey by 2012. The question of a bypass of the Bosphorus is a key issue. The Montreux Convention, which has been regulating traffic through the Turkish Straits since 1936, guarantees free circulation for all trading ships. This Convention lays down the rules of passage for the warships, subjected to a preliminary declaration and several restrictions, and stipulates, in its first article that the signatories parts „*recognize and affirm the principle of freedom of passage and navigation in the straits*" and in its second article that „*in peacetime, the trading ships of all states have the complete freedom of navigation in the*

straits, day and night, and that pilot and tug remain optional". According to the international law, the Bosphorus is an international waterway, being the continuation of open sea. However it is narrower than many rivers and splits in two a city of 11 million inhabitants. The Bosphorus is 32 km long and only 700 meters large at its narrowest point.

The geography of the strait, has become extremely dangerous with the increase of the traffic. The number of ships transiting via the Bosphorus was 4,500 in 1938. Furthermore the average size of the ships was 100 meters, but today that figure can reach 400 meters. Their capacities increased from 10,000 tons to 400,000 tons. Simultaneously, the population of Istanbul increased tremendously: 700,000 inhabitants were living in Istanbul in 1936. The population of the city is today more than 11 million. Roughly 1.5 million people crossing the Bosphorus in both way using 1300 ferries. Many small fishery boats are also sailing on the waterway. Since the end of the Cold War, the volume of oil shipped from Novorossisk has more than doubled. In average 160 millions tons of hydrocarbons transit through the Straits: the volume has increased by two thirds in the last five years. Several factors are behind this trend: the opening up to international trade of the former Soviet countries, the opening of the Main-Danube channel in 1992, which links Rotterdam and Constanta, and the traffic coming from the Volga-Baltic Sea and Volga-Don channels.

- **Samsun-Ceyhan Pipeline (Trans-Anatolian Pipeline)** - This line has become the Turkish option for the bypass of the Bosphorus. The construction of the pipeline was launched on 24 april 2007. The 550 km pipeline will link the Turkish Black Sea port of Samsun to the Mediterranean terminal of Ceyhan. The oil terminal of Ceyhan is already been supplied with the Azerbaijani oil through the Baku-Tbilisi-Ceyhan and with the Iraqi oil. The total cost of the pipeline is expected to reach USD 1.5 billion. The capacity of the Samsun-Ceyhan pipeline is 70 mt/y and is expected to become operational by 2010. The Turkish Çarlik group and the Italian company ENI, partners in the project, established a consortium called TransAnatolien, TAPCO.
- Other Bosphorus bypass projects: Odessa-Brody, Adria-Druzhba integration, Constanta-Pancevo-Omisalj-Trieste, Albania-Macedonia-Bulgaria oil (AMBO) pipeline, Burgas-Alexandropolis (Trans-Balkan Oil Pipeline).

Downstream/Refining and oil products

The refining capacity of Turkey in 2006 was 714,275 b/d at six refineries. In 2007 almost 26 million tons of crude oil was processed in Turkish refineries, of which 2.06 million tons was a domestic product and 23.53 million tons were imported.

The most important company in the sector is TUPRAS, which operates three large refining complexes at Aliaga near Izmir (226,440 b/d capacity), Izmit (251,600 b/d) and Kirikkale (113,220 b/d) and one small refinery in Batman (22,015 b/d).

The largest privately-owned refinery in Turkey belongs to ExxonMobile (51%); others are Shell (27%), BP (17%) and Marmara Petrol (5%) and they are operated by Anadolu Tasfiyehanesi AS (Atas) with a capacity of 95,000 b/d.

In the distribution, marketing and storage of refined petroleum products in Turkey, POAS has the major role. This company was privatized in July 2000. Dogan Holding holds a 52.7% share with 34% of its shares purchased by the company, with an initial 51% of the shares purchased by Austria-based OMV in March 2006. Besides POAS several other companies also have a sizeable market share as petroleum product distributors and retailers in Turkey, including BP, ExxonMobil, Shell, Total and Turkish company Opet.

Forecasts

The latest *Turkey Oil & Gas Report* from BMI[4] forecasts that the country will account for 11.06% of Central and Eastern European (CEE) regional oil demand by 2014, while making no meaningful contribution to supply. CEE regional oil use of 5.42mn barrels per day (b/d) in 2001 rose to an estimated 5.81mn b/d in 2009. It should average 6.03mn b/d in 2010 and then rise to around 6.69mn b/d by 2014. Regional oil production was 8.88mn b/d in 2001, and in 2009 averaged an estimated 13.35mn b/d. It is set to rise to 14.57mn b/d by 2014. Oil exports are growing steadily, because demand growth is lagging the pace of supply expansion. In 2001, the region was exporting an average of 3.46mn b/d. This total had risen to an estimated 7.54mn b/d in 2009 and is forecast to reach 7.88mn b/d by 2014. Azerbaijan and Kazakhstan have the greatest growth potential in terms of production, although Russia will remain the key exporter.

[4] BMI, *Turkey Oil and Gas Report Q3 2010 - preview*, http://www.youroilandgasnews.com.

Between 2010 and 2019 the BMI report forecasts an increase in Turkish oil consumption of 23.1%, with demand rising steadily from an estimated 669,000b/d to 825,000b/d by the end of the 10-year forecast period. Refining capacity between 2010 and 2019 is set to increase by 90.9%, reaching 1.36mn b/d by 2018.

2.2. Natural gas

Found in subterranean settings, and typically in close proximity to petroleum, natural gas is extracted in the same way as petroleum, and later transmitted via large pipelines.

Out of the natural gas reserves of the world, 73 trillion cubic meters (41%) are in Middle Eastern countries, 59 trillion cubic meters (33%) in Russia and CIS, and 28 trillion cubic meters (16%) in Africa/Asia Pacific countries.

Production and consumption

Turkey's natural gas potential amounts to 21,86 billion cubic meters (bcm). By the end of 2008, natural gas consumption increased by 5,5% compared to the previous year, reaching 33,6 million TEP. Turkey's installed power in natural gas is 13.337 MW, which corresponds to 31,8% of total installed power.

An important aspect, according to studies on natural gas supply-demand balance, is that there won't be a problem in meeting the annual gas demand until 2011. However, during winter months, when the demand is high, disruptions in source or route countries may create seasonal imbalances of supply and demand. Because of the existence of this risk, the commissioning in 2007 of Silivri natural gas depot, which has a capacity of 1,6 billion m^3, has been very beneficial for ensuring availability of seasonal supply.

As it was already mentioned Turkey is also developing as a consumer, and because of this the gas consumption in this country is expected to rise exponentially in the coming years. In 2007, the total import volume of natural gas reached 36,450 million cubic meters (mcm) and came from the following sources: 13,799 mcm were provided by the Russian Federation through Gazexport and Turugas; 346 mcm were imported via the Blue Stream Pipeline; Nigeria and Algeria provided 1,420 mcm and 4,277 mcm respectively; Turkey bought 170 mcm LNG from the spot market and

another 6,158 mcm of natural gas were imported from Iran and 1,279 mcm from Azerbaijan.

Sector organization

In 1990 monopoly rights on natural gas import, distribution, sales and pricing was given to **BOTAŞ**; however, in May 2001 this monopoly was abolished by the Natural Gas Market Law. Since then, efforts have been made to set up a path towards a free market where the private sector will create a competitive environment and at the same time will decrease influence of the government and encourage investors in the gas sector. But until 2009, BOTAŞ covered 98% of domestic activities and acted as a major market player pursuant to the Natural Gas Market Law No. 4646. After this year, BOTAŞ was restructured into a horizontally integrated legal entity.

Gas trade and transit

Turkey is an important natural gas transit country and is also a fast growing consumer. Because of this there has been a significant effort to develop the quality and quantity of the natural gas pipelines across Turkey. By the end of 2007 a total of 9,798 km of natural gas pipelines (international and inland) were in operation. The current natural gas pipelines can be summarized as:

- **The Russian Federation – Turkey Natural Gas Main Transmission Line:** came into operation on June 23th, 1987. The pipeline enters Turkey at Malkoçlar at the Bulgarian border and connects to Hamitabat at European Turkey.
- **Eastern Anatolia Natural Gas Main Transmission Line:** came into operation on December 10th, 2001. The line starts from Dogubayazit and reaches Ankara through Erzurum, Sivas and Kayseri. Another branch reaches Seydisehir through Kayseri and Konya. This line carries natural gas produced mainly in Iran and other countries east of Turkey.
- **The Russian Federation-Black Sea-Turkey Natural Gas Pipeline (Blue Stream):** Russia plays a critical role in Turkey's energy supply security as it provides around 68% of its natural gas supply and 50% of crude oil imports. In natural gas, Turkey is Gazprom's second largest market after the EU. Russia is Turkey's single largest supplier of natural gas. Turkey has signed six gas agreements[5], three of them have been

[5] Turkey has signed agreements with Russia, Iran (10 bcm), Algeria (4 bcm) and Nigeria (1,2 bcm).

signed by the Russian Federation. Russia is Turkey's largest supplier in natural gas; taking into account the annual 14 bcm Russian gas supply across the Balkans and the 16 bcm planned through the Blue Stream[6], over the next decade Russian gas will comprise 70-75% of Turkey's domestic consumption. The Blue Stream project, negotiated in December 1997, will increase the annual amount to 30 billion cubic metres (bcm) by 2010. Russian media estimates that total earnings from natural gas exports to Turkey will reach at least $7 bn annually by 2020. This direct link beneath the Black Sea to Russia has indeed increased Turkey's energy security. Turkey hasn't been affected by transit disputes and the direct flow of gas has never been disrupted (Russia even increased the volume when the gas flow from Iran was suspended). Today, Blue Stream is expected to contribute to the development of the Ceyhan energy terminal. Turkey has therefore become a link between the Black Sea and the Mediterranean/Middle East on energy related issues.

- **Baku-Tbilisi-Erzurum (BTE) - (Shah Deniz) Natural Gas Pipeline**: After months of negotiation and delay, Azerbaijan and Turkey signed a long-term natural gas purchase and supply contract on March 12, 2001 (granted final approval on the Turkish side in February 2003). Starting in 2006, two years later than the original target date, Azerbaijan was to deliver 70 Bcf of natural gas to Turkey, rising to 177 Bcf in 2007 and around 223 Bcf per year from 2009 through 2020. Natural gas for the deal is to come mainly from Azerbaijan's $3.2 billion, Shah Deniz Phase I field development project (given the financial green light in February 2003). To transport the gas, the $900 million South Caucasus (Baku-Tbilisi-Erzurum) pipeline would stretch some 630 miles, including 290 miles in Azerbaijan and approximately 170 miles in both Georgia and Turkey. This is the first pipeline ever built by Azerbaijan.
- **Turkey – Greece pipeline project:** is developed as a result of the studies undertaken for the interconnection of Turkey's natural gas grid and Greece and creation of South Eastern Gas Ring. The Turkey-Greece pipeline is a 296 km long natural gas pipeline, which will connect Turkish and Greek gas grids. The pipeline begins in Karatchabep in Turkey and runs to Komotini in Greece. The length of the Turkish section is 210 km, of which 17 km are under the Marmara Sea. The length of the

[6] 1st Blue Stream pipeline completed on March, 1st , 2002

Greek section is 86 km. The annual capacity is 7 bcm. In 2012 the capacity will be expanded to 11 bcm, of which 8 bcm will be delivered to Italy when a Greece-Italy pipeline will become operational. Also proposed is the West Balkan pipeline, planned to supply by the Turkey-Greece pipeline. The agreement between Turkish gas company BOTAŞ and Greek gas company DEPA was signed on 28 March 2002. The intergovernmental agreement to build a natural gas pipeline between the two countries was signed on 23 December 2003 in Ankara. The foundation for the pipeline was laid on 3 July 2005 by Prime Ministers Kostas Karamanlis and Recep Tayyip Erdoðan. It was expected to begin operating in May 2007, but it was announced that the launch of pipeline will be delayed until 15 September 2007.

- **ITGI (Interconnection Turkey-Greece-Italy):** Natural gas delivery to Italy after Greece by an off-shore interconnection line became an important agenda item. The Italian gas company Edison-Gas and DEPA has signed a memorandum and BOTAŞ became involved in this agreement upon the invitation received. The pre-feasibility study of the project was completed and the application for feasibility funding from the EU TEN8 Program was approved. DEPA and Edison-Gas have launched a tender for the feasibility study of the project.
- **Nabbuco Pipeline Project:** The pipeline length is approximately 3,300 km, starting at the Georgian/Turkish and/or Iranian/Turkish border respectively, leading to Baumgarten in Austria. According to market studies the pipeline has been designed to transport a maximum amount of 31 bcm/y. Estimated investment costs including financing costs for a complete new pipeline system amount to approximately 5 billion Euro. In November 2002 five companies signed an agreement to carry out a joint feasibility study on the construction of a natural gas pipeline from Turkey to Austria via Bulgaria, Romania, and Hungary. Participants in the project are BOTAS¸ (Turkey),Bulgargaz (Bulgaria),Transgaz (Romania), MOL (Hungary), and OMV Erdgas (Austria). The study received approval from the EU in July 2003. The TEN Program of EU has accepted to fund a part of the feasibility study. Natural gas is planned to be supplied by the planned pipeline to the countries with emerging markets like Bulgaria, Romania, Hungary, Slovakia, Czech Rep. and later on to the other European markets through Austria. On June 2004, Project partners

founded the Nabucco Company Pipeline Study GmBH in order to engage in project finance and pipeline capacity marketing studies. According to a preliminary time schedule the development phase is foreseen to last until end of 2008, when financial close is expected. The construction of the Nabucco Pipeline is planned for 2009 with an envisaged start up of transportation of gas in 2012. The Turkish government is proactively supporting the Nabucco project, but has been stressing the importance of the issue of the bankability of the project.

Forecasts

In terms of natural gas, the region consumed an estimated 668.5bn cubic metres (bcm) in 2009, with demand of 780.0 bcm targeted for 2014, representing 13.7% growth. Production of an estimated 830.3 bcm in 2009 should reach 1,025.7 bcm in 2014, which implies net exports rising from an estimated 162 bcm in 2009 to 246 bcm by the end of the period. Turkey's share of gas consumption in 2009 was an estimated 5.24%, while it made no meaningful contribution to production. By 2014, its share of demand is forecast to be 6.21%.

Gas consumption is expected to climb from an estimated 35 bcm to 60 bcm, depending largely on imports. LNG imports are expected to more than double from an estimated 6.5 bcm to 12.0 bcm during the forecast period.

2.3. Electricity

Production and consumption

Stimulated by Turkey's economic growth and rising standards of living, the demand for all type of energy and particularly for electricity, has been growing rapidly for the past five decades.

Electricity demand in Turkey has grown spectacularly, from less than 50 GWh in 1923 when the Turkish Republic was founded, to approximately 200 000 GWh today. Installed electricity generation capacity over the same period increased from less than 33 MW to about 45 000 MW. Currently three quarters of the electricity generated in Turkey comes from burning fossil fuels, almost half of which is from natural gas alone. Nearly half of the total electricity consumption occurs in the industry sector. The residential and services sectors follow the industry sector with a quarter share each. Hard coal production decreased more 60% between 1970 and

2009. Reporting to 2008, the installed power in Turkey is 41.987 MW and the electricity consumption is 198,4 billion kWh.

In 2004, the amount of electricity generated by hydroelectric power plants was 46 billion kWh. Although a new 600 MW hydroelectric power plant was commissioned between 2004 and 2008, the hydroelectric generation in 2008 remained at the level of 33 billion kWh. In 2008, electricity generation came from three main sources: natural gas - 48,17%, coal - 28,98%, and hydroelectric power - 16,77%. In other words, recent droughts have restricted the expected contribution of hydroelectric power plants. In order to meet the increasing demand for electricity, Turkey needs to at least double the existing installed power by 2020.

From early 2003 until the end of 2008, 10.561 MW of installed power has been commissioned, 2.636 MW of which is in the public sector, 3.809 MW under Build-Operate and Build-Operate-Transfer models, and 4.116 MW in the private sector. In line with the target of liberalising the electricity market, Law No. 4628 provided for new production investments by private sector.

Of the projects licensed from 2002 to 2008, which correspond to a total power of 36000 MW, a substantial number has gone into the investment stage. With these licensed investments, a new capacity of roughly 15000 MW power is expected to be commissioned by 2015. These initiatives aim at creating a transparent and competition-driven market in the electricity sector, and thus to help improve the investment environment.

2.4. Energy fact sheet

Data		2008					2009
	30 Year History	Turkey	Europe	OECD	World	Rank	Turkey
Petroleum (Thousand Barrels per Day)							
Total Oil Production		48.36	5,218	20,945	85,507	64	52.98
Crude Oil Production		41.58	4,296	15,037	73,671	56	46.21
Consumption		677.69	16,129	47,857	85,255	26	579.48
Net Export/Imports(-)		-629.33	-10,911	-26,912	--	15	-526.50
Total Oil Exports to U.S.		8	871	NA	12,915	44	3
Refinery Capacity		714	17,015	45,778	85,460	28	714
Proved Reserves (Billion Barrels)		0.30	14	227	1,332	48	0.30

	29 Year History	Turkey	Europe	2008 World	Rank	2009 Turkey
Natural Gas (Billion Cubic Feet)						
Production		36	11,110	109,921	63	25
Consumption		1,294	20,455	110,915	23	1,238
Net Export/Imports(-)		-1,297	-9,410	--	9	-1,238
Proved Reserves (Trillion Cubic Feet)		NA	172	6,212	72	NA
				2008		2009
Coal (Million Short Tons)						
Production		87.526	788	7,505	11	79.774
Consumption		108.837	1,028	7,346	11	102.527
Net Export/Imports(-)		-21.721	-263	--	9	-22.753
				2007		2008
Electricity (Billion Kilowatthours)						
Net Generation		182.05	3,581	18,795	20	188.84
Net Consumption		153.85	3,334	17,139	19	161.03
Installed Capacity (GWe)		40.84	894	4,468	19	41.82
				2007		2008
Total Primary Energy (Quadrillion Btu)						
Production		1.179	46	475	47	1.208
Consumption		4.398	86	481	22	0.000
Energy Intensity (Btu per 2005 U.S. Dollars)		5,451	5,580	7,588	103	5,281

Source: U.S. Energy Information Administration www.eia.doe.gov

3. Energy security aspects in Turkey

The importance of energy in human life is probably immeasurable and is perhaps one of the most important factors in economic growth. Looking back in history, until 1970, energy was cheap and easily obtained if compared with today's situation. However, the turning point in this reality is

the 1973 oil crisis that had a dramatic impact on energy procurement. Since then, energy security became the main foreign policy issue for many countries, like the USA and countries in EU.

Talking about Turkey, it seems that it is not a self-sufficient country in respect to oil and natural gas according to recent data and because of this it has to import from other countries. Therefore, energy security should be the main problem in Turkey's energy policies. But there are some problems for securing energy in reality.

First of all, Turkey has diversification problems for natural gas, unlike oil. However, diversification of sources is a priority. With most of the natural gas coming from Russia, Turkey is not worried about this aspect since Turkey-Russia relations are based on interdependency – energy is part of the bilateral relations – and Russia has proven to be a very reliable source so for this. Secondly, Turkey has no storage facility for natural gas and doesn't have a minimum 90 days oil stock as a necessary condition laid down by the IEA.

3.1. Energy Security Strategy

Although there are several strategy documents to guide national energy sector development in Turkey, almost all have either a relatively short term focus or no time horizon at all. Systematic thinking about energy in terms of integrated application of available means to accomplish the desired objective is still missing. There is a need for formulating long term energy policy goals that are precise, comprehensive, measurable, concrete, coherent.

The energy strategy papers prepared by the MFA in 2006 and 2009 can hardly be called strategy papers at all, since they do not go beyond describing the existing and planned oil and gas pipelines in the context of Turkey's potential East-West energy corridor role. The 2010 MENR concentrates on establishing the desired ends to be attained but not on the ways and means of getting there.

Targets

Taner Yýldýz, the Minister of Energy has defined the goals for energy policy as follow: '*future energy policy will be driven by a triple challenge of achieving substantial reductions in emissions of greenhouse gases while*

ensuring a secure supply of energy, all at a reasonable cost'. The three main priorities are:

1. Minimizing energy dependence
2. Preparing a low carbon age
3 Enhancing Turkey's position in global energy diplomacy and geoeconomics

Other officials documents:

- Presentation of the Ministry's budget for 2010 at the Parliament on December, 18, 2009:
  - Diversification of energy resources, import sources and routes;
  - Minimization of import dependency by increasing of local, new and renewable energy resources;
  - Increasing energy efficiency;
  - Protection of public benefits and consumers' rights;
  - Activation of public and private sector opportunities within the framework of free market applications.
- Specific policy targets for some of these goals are provided in the Energy Ministry's Electricity Energy Market and Supply Security Strategy Paper ratified by the High Planning Council on 21 May 2009:
  - Turkey's proven lignite deposits and hard coal resources will be put to use for electricity generation activities by 2023;
  - The share of nuclear power in energy supply will be at least 5% by the year 2023;
  - The share of natural gas in electricity generation will be reduced to 30%;
  - The share of renewable energy sources will be increased to at least 30% by 2023.
- The new Strategic Plan put forth by the Energy Ministry (MENR) for the 2010-2014 period, has similar priorities.

The main target of both documents is to '*develop the market structure and applications'*.

The tools to be used are listed as:

- Improvement of the existing market;
- Building capacity mechanisms and capacity/energy procurement through contests;
- Activating transitional contracts;
- Enhancing market openness;
- Developing tariffs and pricing and the separation of market activies.

3.2. Defining energy security in Turkey and institutions with responsibilities in the area

Turkey has the ambition of becoming a major energy hub. Quite clearly Turkey is already a major physical hub, in the sense that a host of major oil and gas pipelines aleady transit the country, with gas supplies further by LNG regasification facilities. Turkey is blessed with the supreme geographical position which makes Turkey a phenomenal crossroads, but does it make a hub?

Turkey wants to become an energy trading hub, a place where energy is bought and sold, a place where a spot market can emerge in gas. A true hub is a trading hub, an arena in which ideally multiple suppliers meet multiple customers in an open and transparent marketplace. In oil Turkey is already transforming its role from being simply a place pipelines meets. Ceyhan, a terminus for both lines from Iraq and Azerbaijan, is already becoming a price formation center. Ceyhan may yet succeed in developing an Anatolian brand – in which potential crude supplies from Russia, Kazakhstan and Iran are added to those from Azerbaijan and Iran.

Turkey understands that in oil, it is already largely operating in an open international market environment in which if it wishes to increase its earnings from the purchase and sale of crude, it has to do so by adding value to the product, in the form of refined products or petrochemicals, rather than simply attempting to purchase oil at one price and then re-sell it with a guaranteed markup. That is why it is actively pursuing the development of both refining and petrochemical facilities at Ceyhan and even as much longer term option of LNG liquefaction facilities.

Hubs require market liberalization. As far back as April 2001, when Law 4646 on the gas market was adopted, market liberalization was an official goal. The Law specifically provides for free entry into the market by private entities, the abolition of the state-owned Botaş's monopoly in natural gas provision, protection of end users by virtue of competing prices, limits to market shares and a free consumer structure and liberalization of distribution grids. However, 9 years on, Botaş still controls 80% and 90% of the market. Botaş can't use its power as an importing monopoly to buy and re-sell gas: Turkey's gas market has to evolve into an open market in which suppliers are free to strike their own deals with consumers – unthinkable. Harnessing its geographical position to extract one specific advantage from

suppliers, the right to purchase their gas at certain price and to re-sell it for substantially more. (ie gas negotiations between Turkey and Azerbaijan). The market can be changed by changing the business model of Botaş, with Botaş made responsible for external supply and leaving the internal market free for different players. Pipeline diplomacy should serve the aim of achieving energy interdependence thus contributing to Security rather than becoming a leverage to increase its power thus leading to its recognition as a regional hegemon.

When discussing Turkey's energy security one should not only have in mind alternative routes and diversification, although these are indeed important for assuring an uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers. Another important aspect is about assuring security of supply, security of demand and most importantly in Turkey's case, security of transit, understood as security of the energy infrastructure.

All activities related to energy are conducted in close cooperation with the listed public institutions and other public and private entities.

The Ministry of Energy and Natural Resources (MENR) was re-organized in 1985 by Law No. 3154. Its main duties are: determining the energy and natural resources requirements of Turkey, developing and implementing national energy policies, plans and programs, and conducting surveys to improve energy and natural resources use. The **General Directorate of Energy Affairs (EIGM)** is the main policy making body within the MENR and is in charge of carrying out all studies of MENR related to Energy Policies and Coordination. The **General Directorate of Electrical Power Resources Survey and Development Administration (EIE)** is responsible for the implementation and coordination of energy efficiency and renewable energy programs. The **Energy Efficiency Co-ordination Board (EECB)** is a central body established by the Energy Efficiency Law of May 2008. It consists of high level representatives from all ministries concerned with energy efficiency, as well as representatives from NGO's and the private sector.

The Ministry of Environment and Forests (MoEF) was established in 1991 with the aim to protect the environment. It issues environmental licenses and is responsible for the enforcement of environmental legislation. Within the MoEF there are departments related to the energy sector responsible for emission control and environmental impact assessment.

The Ministry of Public Works and Settlement (MPWS) has the following directorates within its body: *DG Measurement & Standards* which is responsible for implementation of standards. *DG Protection of Consumers* is responsible for information on labeling and other EE-related issues for consumers. MIT is also responsible for the regulation of the minimum efficiency standards for boilers, burners, individual heaters, electrical motors, etc.

The State Planning Organization (DPT) is an advisory body of the Government, under the Prime Minister. The DPT is responsible for the development of a 5-year national development program, decisions on public investments, decisions on macro level policy and indicators and the approval of foreign credit.

The State Hydraulic Works (DSI) is the state water agency responsible for the development of all water resources in the country. DSI implements surface and ground water projects and plans, designs, constructs and operates dams and hydroelectric power plants for multi-purpose use.

Among the energy related organizations the following can be mentioned: Competition Authority, Energy Market Regulatory Authority, World Energy Council Turkish National Committee, Clean Energy Foundation, Geothermal Association of Turkey, etc.

4. A geopolitical overview of energy security in Turkey: the importance of Middle Eastern gas for the sustainability of the Southern Gas corridor

Officials in Ankara have committed themselves to import 16 bcm/y of gas from Turkmenistan once this gas reaches the Turkish border. This will not be possible in the foreseeable future, though, because of the collapse of the Trans-Caspian Gas Pipeline Project, which had planned to lay a pipeline under the Caspian Sea. Turkey has started looking towards its South in order to contract gas for the Southern Gas corridor.

Iran

Despite difficulties in sustainable supply, Turkey is the only market for Iranian gas exports to date. Energy has been an important driver behind Turkey's rapprochement with Iran, which is the second largest supplier of gas to Turkey after Russia. In July 2007, Turkey and Iran signed a memorandum of understanding to transport 30 bn cubic meters of Iranian

and Turkmen gas to Europe. TPAO has also been granted licences to develop three different sections of Iran's South Pars gas field, which has estimated total recoverable reserves of 14 trillion cubic meters. Ankara and Tehran signed a 1.5 billion USD in agreements providing for the joint construction of three 2000 megawatt thermal power plants.

In August 1996, Turkey and Iran signed a 25-year natural gas sale and purchase agreement that called for the delivery of natural gas to start at a volume of 3 billion cubic meters per year, to reach 10 billion cubic meters per year in the plateau period in 2007.The agreement was then amended in August 2000. A dedicated pipeline, the Eastern Anatolia Natural Gas Main Transmission Line, running between Dogubayazit on the Turkish-Iranian border and Ankara/Seydisehir (Konya) was completed at the end of 2001 after some delay. On December 2001, the delivery of natural gas began through the Eastern Anatolia line. In April 2002 the construction works of the Karacabey-Izmir Natural Gas Transmission Line were completed, and the line became operational.

Iran is interested in using the Nabucco pipeline to pump gas through Turkey towards EU. 30 to 50 percent of the capacity of the pipeline might be allocated to Iran for its gas exports. The Iranian Oil Minister Kazem Vaziri-Hamaneh during his visit to Ankara in August, 2006, announced his country's intention to increase the capacity of Iran's pipeline, which is connected to the Turkish pipeline, and export gas to Europe jointly with Turkey. Iran and Turkey agreed on a joint scheme to export Iran's natural gas to Europe via Turkish pipelines. Measured in terms of its reserves, Iran occupies second place behind Saudi Arabia, with 11.5% of world oil reserves and second place behind Russia, with 15% of world natural gas reserves. Iran is geographically closer to Europe than the West Siberian gas fields and will share a common border with the EU with the accession of Turkey.

Turkey today is still looking at Iran as a source of energy. However the U.S. has made clear that the Iranian gas will not be part of the Southern corridor in the foreseeable future. In paralel, access to Iraqi gas has become a high ranking priority for both Turkey and the U.S. today.

Linkage with Iraq

On December 26, 1996, a framework agreement was signed between Iraq and Turkey to pipe 10 billion cubic meters of Iraqi gas per year to Turkey

after development of the gas fields in Iraq. On the Turkish side, BOTAS¸, TPAO, and TEKFEN have been involved in this project. ENI was designated as coordinator of the upstream activities. Finally, a natural gas sale and purchase agreement was initialed on March 31, 2001, by BOTAS¸ and EMG (Eastern Mediterranean Gas Company) of Egypt to supply Turkey with 4 billion cubic meters per year of natural gas.

The MoU that was signed between the Turkish Ministry of Energy and the Iraqi Ministries of Oil and Electricity on August 7, 2007 constitutes an important basis for Turkey's energy relations with Iraq. On July, 10, 2008 PM Erdogan Erdogan became the first Turkish PM to visit in 18 years: agreed to upgrade and expand the existing capacity of the Kirkuk-Yumurtalik oil pipeline and to build a pipeline network to transport natural gas from Iraq to internationa markets via Turkey.

Turkish private companies have already made huge investments in Northern Iraq, specifically in the Kurdistan Regional Government (KRG) areas and the fields of Tak Tak, Khor Mor and Chemchemal.

Mr Maliki, during last year's visit to Ankara, has agreed that Iraq will supply 15 bcm to the Southern gas corridor. It is planned that the Iraqi gas pipeline will reach Turkey's borders in 9 months. Turkey has made it clear that it will seek an agreeement with Bagdad and not broker a separate deal with KRG.

Integrating Turkey into the Energy Community of South Eastern Europe

The development of an appropriate legal and financial framework permitting fair and transparent gas transit conditions will enable Turkey to play a major role as a gas transit country to the EU. Turkey has to actively participate in all initiatives that the EU may take in view of a stronger security in the energy sector. Turkey's strategic position and its role as key country for energy transit would need a correct implementation of the internal market *acquis* on gas and electricity.

The Energy Community is a process that aims to extend the EU internal energy market to the South Eastern Europe region. For this purpose the "Treaty Establishing the Energy Community" was signed on the 25th of October in Athens. The task of the Energy Community shall be to organise relations between the parties and create a legal and economic framework in relation to Network Energy. The main goals are to create a stable and regulatory market framework capable of attracting investment; to create a

single regulatory space for trade; to enhance security of supply; to improve the environmental situation and to develop electricity and gas market competition on a broader geographical scale.
Turkey's participation in the Regional Energy Market for South-East Europe (REMSEE), covering also Western Balkans, Romania and Bulgaria, should ensure that its legislation will be in line with the relevant *acquis* well in advance of its accession. The aim is to achieve an operational regional wholesale market by the end of 2007. European Union officials are calling to Turkish government to join the recently signed new energy treaty aiming to strengthen the security of energy supply in the region and to create ultimately an "energy community" with a common regulatory space, which includes Albania, Bulgaria, Croatia, Romania, Serbia, Montenegro, the former Yugoslav Republic of Macedonia (FYROM), Bosnia Herzegovina, the breakaway province of Kosovo and the EU.
Turkey's participation in the Regional Energy Market for South-East Europe (REMSEE), covering also Western Balkans, Romania and Bulgaria, should ensure that its legislation will be in line with the relevant *acquis* well in advance of its accession. However, the Turkish government has been reluctant in joining the Energy Community Treaty. The construction of the South East Energy community has gone indeed hand in hand with the EU enlargement process. The size of the Turkish energy market, its strategic geographical location and the fact that Ankara had not yet begun negotiations on energy policy as part of its EU accession talks are among the reasons for holding back. Turkey has refused to join the Energy Community Treaty in reaction to the Greek-Cypriot veto on the opening of the energy chapter.

5. Effects and reactions analyze for 4 given crises

This part of the paper is due to analyze the way in which Turkey would react in case it would be confronted with the following four crises:
1. short run catastrophic effects;
2. disproportionate price effects;
3. consistently high costs;
4. a drop in foreign direct investments (FDI).
For each of the four crises we will make an assessment regarding the level of fulfilling the three basic requirements of the security in a given crisis situation, that is: state existence, domestic safety and economic welfare.

4.1. Short run catastrophic effects

Disruption of energy supply may occur at any point in the energy supply chain and it can create an energy crisis in a country, in a region or in the whole world. There are some factors that cause energy supply disruptions among which we can mention political reasons, economic reasons, export restrictions or any embargo from producers and war, terrorist attack or political instability of energy producing country.

Kurdish Question

The main threat for Turkey with short run catastrophic effects is represented by the possibility of terrorist attacks due to the conflict with PKK. It is indeed true that nowadays the government is carrying negotiations with the Kurdish Workers Party and there is a cease-fire agreement; however, the complex structure of the terrorist organization makes it a difficult subject for negotiations and because of this, attacks still occur.

Turkey's main concern is the future of Iraqi Kurds and Turkmens. Certainly the political stability in the country and neighboring countries is very important for Turkey. But we know that Kurds in Northern Iraq have de facto created their own state.

In addition to stepping up its attacks on security forces in the mountains of southeast Turkey, the PKK has carried out bombings in the west of the country and has started targeting energy infrastructure, particularly oil and natural gas pipelines. These have been hit repeatedly since July, with the most recent attack striking the Kerkük-Ceyhan pipeline on August 10th. In other words if the terror continues in the future, transport of Middle East energy to Turkey could stop. This then raises the question of whether Turkey will seek a military solution to the terrorist problem rather than accept the cessation of energy transportation.

Problems in the Caucasus

In the Caucasus there are serious problems between neighboring countries, which need immediate solutions. For example, the Armenian-Azeri conflict over Nagorno-Karabakh could represent a problem for the energy reserves coming from Azerbaijan. In Georgia two autonomous republics, namely Southern Ossetia and Abkhazia declared their independence from the centre and received Russian support, after the Russian-Georgia war in august 2008. Georgia also has problems with its Armenian minority. Armenians of

Meskhetia (or Javahatti) are asking for more rights. There is also the Turkish-Armenian conflict over the recognition of the Turkish genocide, because of which the borders between these countries are closed. This issue is closely linked with Nagorno-Karabakh conflict's resolution.
In the North Caucasus, which has six republics and belongs to the Russian Federation, there are serious political problems. In particular, Chechen guerrillas are causing serious problems with their terror attacks. Also in Dagestan and Ingushetia, peace is in danger. As it can be noticed, for the time being there will not be much security and stability in the region and it can be mentioned that security in the Caucasus is going to be a serious problem over the next decade. For Turkey, stability in the Southern Caucasus is very important because of the BTC pipeline and future East-West projects.

4.2 Disproportionate price effects

Turkey has limited oil and gas reserves which cover only a small proportion of its rapidly rising demand. So, as global oil prices have risen, Turkey's bill for energy imports has gone up, to more than $30 billion in 2007. While Turkey gets oil from a variety of sources, 60 per cent of its gas needs are met by just one supplier: Russia's Gcazprom. So Turkey is keen to maintain good relations with Russia. But at the same time it is exploring ways of lessening its dependence on Gazprom[7]. Turkey allowed Russia's Gazprom to use its sector of the Black Sea for the South Stream pipeline to pump Russian and Central Asian gas to Europe bypassing Ukraine. And Russia agreed to join the Turkish-Italian consortium to build the Samsun-Ceyhan oil pipeline-and to provide crude for it - from the Black Sea to the Mediterranean supporting Turkey's drive to become a regional hub for gas and oil transits.
Demand for natural gas in Turkey has grown more than three-fold in the last decade. In recent years power stations were forced to rely more on gas rather than hydropower, of which Turkey usually has plenty. At the moment, Turkey is not short of gas. But Turkey needs to build infrastructure for storing gas, for re-exporting surpluses to the EU and, most importantly, to distribute gas imports around the country so that factories and households can use it.

[7] Igor Torbakov, *Making sense of the current phase of Turkish-Russian relations*, Jamestown Foundation OccasionalPapers, October 2007.

But, Botaş, the state-owned gas company, has little money for investment. On the contrary, it summed up more than $8 billion in debt, as gas import bills have risen. At the same time, electricity price caps have made state-owned power stations and municipalities unwilling or unable to pay for the gas they use. The cash crisis has made the government reluctant to follow through on pledges to subject Botaş to more competition at home. In principle, Botaş was obliged to reduce its domestic market share to 20 per cent in 2009. In practice, it keeps a tight grip on imports and distribution[8]. Following its re-election in July 2007, the government of Recep Tayyip Erdogan has been making encouraging noises about energy market reform. At first investors were cautious after so many years of delays and reversals, but nowadays Turkey has become an attractive energy market. In order to consolidate this position as an attractive market, Turkey needs to put in place the EU's energy market laws before it can join and this action will create an ideal framework to give investors much-needed certainty.

4.3. Consistently high costs

In order to reduce costs Turkey also focuses on alternative energy.
As we know Turkey has almost 63% of world reserves of mineral boron. If Turkey receives the technology, it could also be used in the energy sector. To produce energy from boron fusion, or boron batteries is at the present time, rather complicated. Turkey has other alternative resources such as solar, wind and hydraulic energies[9].

Solar Energy

Being a natural source of energy, solar energy is the most popular one among sources of renewable energy.
Having a high potential for solar energy due to its geographical position, Turkey's average annual total sunshine duration is calculated as 2.640 hours (daily total is 7,2 hours), and average total radiation pressure as 1.311 kWh/m²-year (daily total is 3,6 kWh/m²)[10]. Solar energy potential is calculated as 380 billion kWh/year.

[8] Energy Charter Secretariat, *Turkey: Review of the investment climate and market structure*, 2007. David Tonge, 'Turkey'ş energy sector under stress', IBS Research, March 2007.
[9] Dr. Prof. Nadir Devlet, *Turkey's Energy Policy in the Next Decade,* 2005, p.9, http://www.sam.gov.tr/perceptions/Volume9/Winter/Nadir%20Devlet.pdf.
[10] http://www.enerji.gov.tr

The amount of solar collectors installed in Turkey is roughly 12 million m² with a technical solar energy potential of 76 TEP, and annual generation volume is 750.000 m², part of which is exported. Such an amount indicates that 0,15 m² of solar collectors are used per capita. Annual amount of solar-based heat generation is around 420.000 TEP. This data suggests that Turkey is a significant manufacturer and user of solar collectors among world countries.

In Turkey, installed solar cell capacity, which is used mostly in public bodies for supplying small amounts of power and for research purposes, has reached 1 MW. Work in the area of solar and hydrogen energy holds a great importance for the energy future of Turkey including its defense industry and military use.

Wind

Wind energy is created when masses of air with differing temperatures switch places. From the energy that reaches the earth from the sun, 1 to 2% is transformed to wind energy.

Wind turbines transform air current, which is of a renewable nature, to electricity energy. Since operations of wind turbines do not cause emission of any environmentally harmful gases, they play a very significant role in preventing climate change.

It is a domestic and ever-available resource which, unlike conventional power plants, eliminates fuel costs and fuel price related long-term risks from an energy safety perspective, and reduces dependency on other countries in terms of economic, political and supply-related risks.

But the fact that wind turbines occupy very large spaces, that they cause noise pollution, and quality issues about the energy produced by them are among their disadvantages.

With Turkey Wind Energy Potential Atlas (REPA), which was realized in 2007, calculated that Turkey has a minimum wind energy potential of 5.000 MW in regions with annual wind speed of 8,5 m/s and higher, and 48.000 MW with wind speed higher than 7,0 m/s[11].

Progress has been made in efforts for increasing installed wind energy power, which was at the level of 18 MW in 2004. The installed power for

[11] *Ibidem.*

wind energy reached 354,7 MW at the beginning of 2008. Upon taking effect of the Renewable Energy Law, licenses were granted to 93 new wind projects which deliver a total installed power of 3.363 MW. Out of these projects, powers plants which correspond to an installed power of 1.100 MW are presently under construction.

TABLE 3: Outlook of domestic wind energy potential in 2008

Type of Source	Domestic Potential
Wind	Very Efficient: 8.000 MW,
	Moderately Efficient: 40.000 MW

Geothermal

Geothermal energy is the heat energy obtained from hot water, steam and dry steam and hot dry rocks, which is formed when heat accumulated in deep subterranean rocks is carried by fluids and stored in reservoirs. Geothermal resources mainly form around active fault systems and volcanic and magmatic units.

Modern geothermal power plants based on geothermal energy are also regarded as a clean source of energy since emission of CO2, NOx and SOx gases are considerably low here.

Geothermal energy covers all direct and indirect modes of geothermal utilizations. Low-temperature (20 to 70°C) fields are used in industrial applications for the production of chemical substances, and particularly for heating. Medium-temperature (70 to 150°C) and high-temperature (above 150°C) fields can be used, next to electricity generation, for integrated heating applications depending on re-injection conditions.

Since Turkey is located on the Alpine-Himalayan belt, it holds a substantially high geothermal potential of 31.500 MW. Areas with potential are concentrated in Western Anatolia (77,9%). 55% of the geothermal areas in Turkey are suitable for heating practices. In Turkey, 1200 hectares of greenhouses are heated using geothermal energy, and 100.000 households in 15 settlements are also heated with geothermal energy.

Prospecting for geothermal energy was revived recently, and starting from 2003, prospecting works by MTA General Directorate of Ministry of Energy yielded to a geothermal energy source of 840 MW.

While 1.500 MW of the geothermal energy potential is assessed to be suitable for electricity generation, finalized data is so far 600 MW. 39 MW

is being used for electricity generation. A 55 MW geothermal power plant is currently under construction.

Bio Fuel

Bio-fuel defines all kind of fuels whose content in volume is at least 80% obtained from living organisms harvested within the last ten years. It is used in the form of bio diesel, bio-ethanol, biogas and biomass.

Having a total fuel-oil consumption of 22 million tons, 3 million tons of which is benzene, Turkey has an installed bio-ethanol capacity of 160 thousand tons.

Reserving of arable lands for bio diesel and bio-ethanol production, which poses a global threat against food security, is the strongest criticism against bio-fuel oriented agriculture.

Biogas is mainly methane and carbon dioxide gas which is a product of biological decomposition (of animal wastes, vegetable wastes, urban and industrial wastes) under anaerobic conditions (i.e. anaerobic fermentation). The amount of biogas that can be produced in Turkey, considering its animal waste potential, is reported as 1,5 to 2 MTEP (million tons equivalent of petroleum).

Turkey's biomass sources include agriculture, forests, animals, organic urban waste, etc. While the waste potential is around 8,6 million tons equivalent of petroleum (TEP), 6 million TEP is used for heating. In 2007, the total amount of energy obtained from biomass sources was 11 thousand TEP.

Hydraulic

Among various sources of energy, hydroelectric power plants are preferred because they are environment-friendly and have a low risk potential. Hydroelectric power plants are a clean, renewable, lasting and efficient domestic resource with low operational costs and no fuel cost, which is not externally dependent and also serve as a fuse for energy prices.

Turkey's technically feasible hydroelectric potential is 36,000 MW. 150 hydroelectric power plants (HEPP) that are presently in operation correspond to an installed power of 13.830 MW and 38% of the total potential. 16.77% of electricity generated in 2008 came from hydroelectric power plants. Recent droughts have substantially limited the contribution of hydroelectric power plants to electricity generation.

In 2004, hydroelectric power plants generated 46 billion kWh of energy. Although a new 600 MW hydroelectric power plant was commissioned

between 2004 and 2008, our hydroelectric production for 2008 remained at the level of 33 billion kWh[12].

Due to reasons like failures, maintenance/repair works, operational policy, draughts, etc., overall capacity utilization in energy generation is around 73%. Capacity utilization is 68% in thermal power plants, and 94% in hydroelectric power plants.

Turkey aims at using all hydroelectric potential that is technically possible and economically viable by the year 2023.

Nuclear Energy

Breaking up atomic nuclei yields a huge amount of energy. Obtained through fission and fusion reactions, this energy is called the „nucleus energy" or „nuclear energy."

Nuclear reactors are systems that transform nuclear energy to electricity. Fundamentally speaking, nuclear energy released as a result of fission is transformed to thermal energy within nuclear fuel and other materials, which thermal energy is in turn converted into kinetic energy and then into electricity within the generator system.

Fuels used in nuclear power plants will be stored on-site for 10 to 20 years, during which time they will lose over 98% of their active properties. And the long lived radioactive substances, which are the real problem, will be vitrified and will, according to principles of gradual preservation, be placed in lead, concrete and corrosion-resistant containers where they will be stored in shielded concrete underground galleries to be built 1.000 m under surface in geologically stable areas. A 1.000 MWe nuclear reactor produces about 27 tons (7 m^3) of used fuel in a year.

Environmental impact of fossil fuel powered (especially coal powered) power plants is too negative to be even compared to nuclear power plants. On the contrary, nuclear power plants must be preferred for their environmental qualities. Maximum radiation from nuclear reactors under normal operational conditions is limited to 0,1 to 1 of the natural radiation level, and the situation in practice is even below these limits.

For the continuity of electricity generation, nuclear power plants are safer and have higher availability compared to thermal and hydraulic power plants. Next to global developments that make renewable energy sources more

[12] *Idem.*

common spread, nuclear energy investment projects are also gaining impetus worldwide.

Hydrogen Energy

It is hydrogen that fuels the heat emitted by Sun and other stars to thermonuclear reaction, which is the main energy source of the universe. Among all fuels known to man, hydrogen has the highest energy content per unit mass (higher heating value is 140,9 MJ/kg, and lower heating value is 120,7 MJ/kg). 1 kg of hydrogen contains an amount of energy that is equal to that of 2,1 kg of natural gas or 2,8 kg of petroleum. But its volume per unit energy is high.

In energy systems where hydrogen is used as a clean and easy-to-use fuel wherever heat and explosion energy is required, the only emission to the atmosphere is water and/or water vapor. As a fuel, hydrogen is averagely 33% more efficient compared to petroleum-based fuels. During energy generation using hydrogen, no gas or harmful chemical substances with the potential to pollute the environment or to aggravate the greenhouse effect is produced. Research shows that hydrogen is presently three times more expensive that other fuels, and that common spread used of hydrogen as a source of energy will depend on technological advances that can reduce the cost of hydrogen production. On the other hand, it could still be a viable alternative, under present conditions, to store excess electricity generated over daily or seasonal periods as hydrogen. Common spread use of such stored energy -say, for mass transportation purposes- will depend on advances in fuel cell based automobile technologies.

Presently, an annual amount of 50 million tons of hydrogen is produced, stored, transported and used around the world. The highest number of users is to be found in chemical industry, particularly in the petrochemical industry.

TABLE 4: Amounts of hydrogen used annually across sectors around the world

Sector	Annual amount used
Artificial Fertilizer Industry	25.000 m^3
Vegetable Oil (margarine) Production	16.000 m^3
Refineries	1.200 m^3
Petrochemical Industry	30.000 m^3
Hydrogenated Animal Fat Production	200-300 m^3
Gas or Liquid Hydrogen Production	6.000 m^3

The main obstacles impending the development of renewalable energy are: economic and financial barries, weak inter sectoral coordination and the lack of a clear legal and regulatory framework. However Turkey's five year clean energy investment growth rate in 2004-2009 period is the highest in the G20. Its 1.6 billion dolar investment in 2009 earned it the 12th place in the G20 according to Bloomberg New Energy Finance.

4.4. Drop in Foreign Direct Investments

Despite optimistic predictions at the beginning of the year, foreign direct investment, or FDI, inflows to Turkey fell by 25 percent in the first half, compared with the same period last year. Electricity, gas and water supplies attracted the highest amount of foreign investment, $424 million, but still fell over $1 billion short from last year's first-half figures[13].

With figures totaling only 75 percent of the same period last year, foreign direct investment inflows to Turkey totaled only $3.2 billion in the first half of 2010, according to a report by the International Investors Association of Turkey, or YASED.

The energy sector, specifically electricity, gas and water, attracted the largest share of FDI inflows in the first half of 2010, taking 25.8 percent, while manufacturing ranked second, taking 22.8 percent.

Foreign direct investment (FDI) has innumerable effects on the economy of a host country. It influences the production, employment, income, prices, exports, imports, economic growth, balance of payments, and general welfare of the recipient country. It is also probably one of the most significant factors leading to the globalization of the international economy.

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[13] *Turkey receives 25 percent less FDI in the first half,* August 18, 2010, Hurriyet Daily News, *http://www.hurriyetdailynews.com/n.php?n=turkey-receives-25-percent-less-foreign-investment-in-first-half-2010-08-18.*

ENERGY SECURITY IN EUROPE'S EAST

4. ENERGY SECURITY IN REPUBLIC OF MOLDOVA

Oazu Nantoi, Narciz Bălăşoiu

I. Country Profile

The Republic of Moldova is a European state situated in the South-East part of the continent, having as neighbors Romania in the West and Ukraine in the East. Total land boundaries are 1389 km out of which 450 km are with Romania and 939 km with Ukraine. Republic of Moldova is a small and densely populated country. It covers an area of 33.8 thousand square kilometers. Although very close to the Black Sea, Republic of Moldova is a landlocked country, located between Romania and Ukraine. About two-thirds its 3,6 million people live in the rural area. The only significant urban area, the capital city of Chisinau is home to about 22% of the population. Republic of Moldova is one of the poorest countries in Europe, with a gross national income per capita of $2500 in 2008.

In the Republic of Moldova the Head of State is the President and the Prime Minister is the Head of Government. The President is directly elected by the Parliament for a four-year term. In turn the President appoints the Prime Minister with the approval of the Parliament. The Parliament comprises 101 seats, to which members are elected from party lists on a proportional representation basis.

Republic of Moldova has actively participated in the EU's European Neighborhood Policy, and also requested a new agreement to replace the EU- Republic of Moldova Partnership and Cooperation Agreement which entered into force in 1998. On December 3rd 2008, the European Union announced an Eastern Partnership proposal to build on the ENP with its

Eastern Partners, including Republic of Moldova, and confirmed with that its funding for bilateral programs to Republic of Moldova between 2007 and 2010 would amount to approximately 210 million Euros. The Republic of Moldova is also member of the GUAM initiative for cooperation between pro-western former Soviet Union states along with Georgia, Ukraine and Azerbaijan.

From a political perspective Republic of Moldova is facing serious challenges. A parliamentary election is expected to be held in Republic of Moldova on 28 November 2010 after indirect presidential elections failed for the second time in late 2009. After the constitutional referendum failed to meet the 33% turnout required to validate the results, the Constitutional Court of Republic of Moldova ruled that acting president of Republic of Moldova, had to dissolve the parliament and hold new elections. Thus, the acting President announced that the parliament will be dissolved on 28 September 2010 and new elections will be held on 28 November 2010. Like any other state in the world, the Republic of Moldova was deeply affected by the world economic crisis, not because it's economy is strongly connected to the global architecture, but rather because of a mix consisting of external resources dependence combined with an severe internal fragility.

The sharp decline of exports, remittances, and FDI, led to domestic demand and imports collapse, which meant a 6.5 percent GDP fall. Although the "leu" depreciated significantly, deflation pressures persisted. Despite the fact that current account deficit almost halved to 9 percent of GDP the country is still struggling to cover its external financing need. It was ultimately met by cutting down the reserves of the National Bank of Republic of Moldova and financing from international financial institutions. Credit to the economy declined, and the share of nonperforming loans in the banking sector tripled since last trimester of 2008, while one medium-size bank failed. Real GDP rebounded strongly in the 4th quarter 2009, led by industry, transport, and trade. Recent data suggest that the recovery gained further speed in early 2010. However, energy tariff hikes, the depreciation of the leu, and increases in excises have pushed inflation to 8% in April 2010, with core inflation at 5.5%. The rise in energy prices and the gradually recovering domestic demand would widen the current account deficit to 10 – 11% of GDP in 2010-11 as rising imports outweigh the rebound in exports and remittances. The remittances issue is very important because this continues to be a powerful anchor for the Republic of Moldovan economy. This segment of revenues represents about 36% of GDP (2007), meaning more than 2 billion USD earned abroad by RM citizens (2008). The total number of Republic of Moldovans working abroad while still belonging to a household in the Republic of Moldova is estimated to be around 340.000 (during the 3rd quarter of 2008), with Commonwealth of Independent States countries accounting for approximately 75% of all migrants. It is predicted that the Republic of Moldova will experience an increasing return of migrants, following further contraction in the economy of recipient states, mainly Russian Federation and EU countries.

II. Energy Sector Radiography

From the economic perspective the Republic of Moldova faces great challenges. In this complicated economic context the energy sector plays a strategic role, representing without a doubt a branch of critical importance in the national economy architecture. The overall economic dynamics of the country as well as the concept of energy security depend on the level of development of the energy sector. This includes thermal energy, electrical energy and the gas sector. Specific to Republic of Moldova is the absence of

its own energy resources. Around 97 percent of the total consumption of energy resources in the country comes from import sources. The diminution of energy dependence represents a key goal of energy security and to achieve this goal a diversification of import resources has to be ensured. Autonomous energy resources could play an important role in this effort that aims to increase the energy security level of the Republic. Very important can be for instance, a greater use of Renewable Energy Sources (RES) like wind, solar energy, river hydraulic sources and the use of biomass. In addition, greater implementation of the use of energy efficiency measures throughout all sectors of the economy is necessary.

At this moment the most important energy generating power plants in Republic of Moldova are: CHP-1 and CHP-2 Chisinau, CHP Balti and TPP Moldavian in Dnestrovsc town, and two hydroelectric power plants in Dubasari and Costesti. The installed capacity of the country's power stations constitutes about 3,000 MW, but only about 1,600 MW are used. The available capacity of hydroelectric power plants constitutes 30 MW. The total thermal energy production capacity is about 1,300 Gcal/h. The cities of Chisinau and Balti have developed centralized heating systems. The national gas supply system contains about 4,400 km of pipelines (including, 1,700 km of high-pressure pipelines) and 165 distribution stations. Gas is supplied to only 25% of the total number of locations within the country.

In 2006, total primary energy supply (TEPS) reached 3.4 Mtoe, or almost 35% of the 1990 level. This 16-year period was characterized by an important change in the country's energy mix, as well as in the sectoral breakdown of consumption at end-uses. Natural gas now dominates the energy balance, with 67% of TEPS, followed by petroleum products (19%), electricity (9%), and minor quantities of coal (2.5%) and renewable (2.2%). Republic of Moldova's total final energy consumption (TFC) was 2.2 Mtoe in 2006, about one third of the 1990 level. Between 1993 and 2006, the largest consumer in the country was the residential sector, which increased its share of TFC from 26% to about 39%, respectively.

During the same period, the agriculture's sector share dropped precipitously from 13% to 4%, along with the decline in production and export of food and agricultural products. Industry and transport's share of TFC remained relatively modest, between 20% and 15%.

II.1 Electricity sector overview

Electricity consumption

After a significant drop in demand between 1992 and 2001 that followed the country's long economic recession, electricity consumption has been recovering by a very strong growth rate of 6% per year. It increased from 2.2 TWh in 2001 to 3.2 TWh in 2008. Demand growth has been fuelled by a significant increase of residential and commercial consumption. It should be noted however, that residential consumption grew from a very low level. Between 1997 and 2003, monthly household electricity consumption averaged 61–84 KWh. (Sixty KWh a month was enough to run only a refrigerator for 5.5 hours a day and three 75-watt light bulbs for 4 hours a day.) In the early 2000's, many Republic of Moldovans –especially the poor– were extremely restricted in their electricity consumption and had to cope by consumption reducing measures, such as unplugging appliances. From 2004, substantial income growth and improved electricity supply, particularly to rural areas, led to an increase of household's consumption by nearly 50%. In 2008, the structure of electricity demand shows that residential and industrial consumers are the largest categories, with 42% and 32% of total consumption. The commercial sector constituted only 13%, the government 9% and other sectors the remaining 4%.

Power generation and supply

Of a total installed capacity of 496.5 MW in 2005, two Heat and Power Cogeneration (CHP) plants located in Chisinau accounted for 62% of total, two hydropower plants for 13%, one CHP plant in the city of Balti for 5% and 10 CHP plants within sugar factories for the remaining 2%. All generation companies are state-owned and supply electricity only to the domestic market.

Due to their lack of effectiveness the current CHP facilities register a very low capacity use. Other important plants like CHP 1 and CHP 2 have been in operation for more than 55 years, and CHP1 for more than 35 years. The age of these installations is not a problem itself but the lack of major upgrades and reconditioning creates real concerns.

Electricity is produced by CHPs plants simultaneously with heat, which supplies the centralized district heating systems in the cities of Chisinau and Balti. The main fuel of electricity generation is natural gas. Heavy fuel oil is only used occasionally, as for example during gas supply disruptions.

Domestic electricity production stood at 0.9 TWh in 2008. It declined by 25% from its 1997 level of 1.2 TWh. During the past year, it covered only 23,4% of electricity demand, compared to 37.6% in 1999. The declining share of internal production in total electricity consumption is explained by a decrease in available generation capacity due to the worn-out conditions of CHP plants. In addition, the recent increase in the cost of power production from CHPs (about 10 USDcents/KWh in 2008) has also reduced the competitiveness of CHP plants production vis-a vis low cost imports from Ukraine (3.9 US cents/kWh in April 2008).

The most important quantity of domestic energy is produced at Heat and Power Cogeneration plants located in Chisinau area. In 2008, the share of domestic electricity generation from CHP 2 and CHP 1 was of 71%, and 13%, respectively. Hydropower plant's share stood at 9%, or 82 GWh. However, depending on annual hydrology, hydropower generation can vary greatly: from 33 GWh (2007) to 121 GWh (2002). The CHP plant Nord accounts for about 5% of domestic production and sugar factories power plants are operated mostly seasonally to cover energy needs at the stage of processing sugar beet. (They account for about 1% of total domestic generation.)

All electricity demand in excess of domestic production is met by imports. These represent today about 80% of the electricity supplied at the wholesale electricity market. Electricity is brought essentially from Ukraine, and some minor quantities from Romania. Imported electricity reached a maximum of 3,54 TWh in 1997. During 2000-2005, electricity supply from Republic of Moldova Regional State Power Station (MRPS) situated in the Left Bank of the Nister river, and imports from Ukraine, stabilized around 2,5 TWh/year. Since November 2005, MRPS has not been supplying electricity to the Republic of Moldova (Right Bank).

Electricity network

The electricity infrastructure of the country is composed from more than 4000 Km of 400KV-35 lines. The Republic of Moldova has an electricity system that is fully synchronized with its neighbor system, Ukraine. The two countries interoperability is ensured by a system that permits electricity transit at a level of 4-5 TerraWh per year. They include six high voltage electric lines of 330 kV with Ukraine, one 400 kV overhead power line with Romania and Bulgaria and three overhead power lines of 110 kV with

Romania. Transmission losses of 3.8% in 2006 are considered reasonable, since the system also includes 35KV lines.

Concerning the distribution infrastructure the situation was continuously improved, so the present network consists of 58,763 Km of low voltage lines. This extensive electric web makes possible the access to electricity for more than 98% of the population. Distribution losses have been reduced considerably over the past five years. At the beginning of 2000s the reports were indicating loses of 25 to 35 percent. While perhaps about 12-15% was technical, the remaining losses resulted mainly of theft through meter tampering and illegal connections bypassing meters. Significant efforts of strengthening payment discipline and upgrading physical infrastructure have brought total losses down. In 2008, distribution losses, both technical and commercial stood at about 15%

Despite the financial problems which are closely connected with the overall economic country status, the electricity infrastructure is actually close to European standards. This can be translated using recent statistics showing that system losses were reduced from 40 percent in the early 2000 to about 20 percent in the recent years. This last figure is rather high compared with the European standards, which are indicating no more than 10 percent in terms of losses.

Electricity market

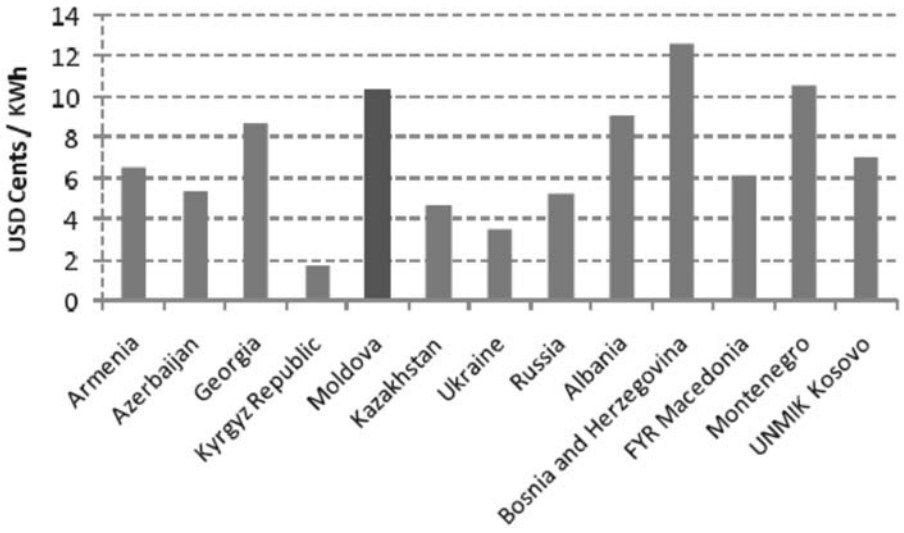
Along with the energy sector reform, the electricity sector in Republic of Moldova has been functioning on the basis of a bilateral contracts model since 1999. Under this trading regime, distribution companies are responsible to buy electricity needed for their regional franchise from domestic generators, foreign generators or import agencies. They are also obliged to absorb domestic electricity production.

Electricity is transported under a non-discriminatory open access regime by the Independent Transmission System Operator, Moldelectrica, which owns and operates the transmission network. Republic of Moldova's electricity market has been partially liberalized since 2003. Eligible customers have the right to contract electricity directly with any supplier, including from abroad. In a first stage, power market has been liberalized up to 10 % of domestic electricity consumption.

Eligible customers are those consumers connected to the transmission network of 35-110 kV years. However the liberalized market is very small. In 2008, it accounted for only 3.6% of electricity demand.

The main participants in the electricity market are:
- The four Heat and Power Cogeneration plants: CHP1, CHP2, CHP Nord, and one thermal power producer MRPS. All these facilities are owned by the state.
- The only company of transmission and dispatch which is also owned by the state and acts as a system operator - Moldelectrica. It owns and operates the transmission network;
- Three distribution companies. One owned by Spanish company RED Union Fenosa (UF), operating the three regional distribution networks - Chisinau, Center and South - which cover 70% of the population. Two are state-owned: RED Nord and RED Nord-West. All companies hold licenses for distribution and supply of electricity at regulated tariffs, and have exclusive rights to supply power to all non eligible customers within their authorized territory;
- 12 companies hold licenses for supply of electricity at non-regulated tariffs.

The electricity market is regulated by an independent energy regulator, ANRE, which is responsible for licensing, establishing quality of service standards, and consumer protection. The regulator also develops the methodology and sets tariffs of electricity and heat produced by CHPs as well as tariffs for end-consumers supplied by distribution companies.
Tariffs for CHPs are composed of four main elements: allowed normalized production cost, profit element, return on investments and adjustments from deviations of past period. In August 2008, tariffs were adjusted as a result of a significant increase in gas prices. Electricity tariffs grew on average by 22%, while tariffs for heat sold increased on average by 36.4%.
Taking into account the latest tariff adjustments it can be stated that the prices are relatively high not only compared with those in the region but also in juxtaposition with the population incomes. In 2008, the average residential tariff was of 10.3 USD cents/KWh, compared to 3.5 USD cents/KWh in Ukraine, and 12.5 USD cents/KWh in Romania (see the above figure).



End user electricity tariffs are set according to a cost-plus methodology for customers supplied by RED Union Fenosa and a single tariff for RED Nord and RED Nor-West. After a long debate on the new tariff methodology, which was adopted by ANRE in August 2007, Union Fenosa (UF) and ANRE reached a "Conciliation Agreement" on June 20, 2008. The agreement resolved main outstanding issues related to:

- the rate of return on investments (about 15% for 2008). This compares to RoR of 23%, which was agreed in the privatization agreement for the period 2000-2007, and the RoR of 13% which ANRE adopted in August 2007;
- the applicable capital base and the value of new assets (investments) put into operation after the privatization.

As for the tariffs, they vary depending on the supplier. In 2008, prices for electricity supplied to consumers by the Spanish owned company Union Fenosa are 0.79 Lei/kWh for consumers connected to 110 kV networks and 0.110 Lei/kWh, for all other categories of consumers. RED Nord and RED Nord-West apply a unified tariff – 0.12 Lei/kWh for all categories of consumers. Application of unified tariffs for electricity supply is motivated by the fact that it is necessary to remove the cross-subsidization for household consumers using electric cookers.

II.2 Natural gas sector overview

Gas consumption and uses

The 2008 and 2009 reports for the Republic of Moldova indicate an average of 1.1-1.2 billion cubic meters of natural gas consumption. The Heat and Power Cogeneration plants as well as the thermal stations are the largest gas consumer, with about 43% meaning 0.4 billion cubic meters of the total demand. The second consumer is represented by the domestic sector with more than 28 percent, equivalent of 0.31 billion cubic meters. Difference to 100 percent is represented by the industrial and commercial sectors along with public services.

Due to economic crisis translated into a lower purchase power of the residential sector and overall energy system the gas consumption registered a decline for two consecutive years in 2007 and 2008, by 8.6% and 6.5%. Their cumulated drop in demand was of 13% and 9% for households and thermal utilities. Besides climatic factors (warm winter) the gas price increase was obviously a major factor for this reduction. At the time being it is not clear whether this will have a lasting effect on gas consumption.

In the residential sector gas is mostly used for cooking. The share of gas used for heating purposes is relatively small, but increasing. The major bottleneck to its development is insufficient distribution capacities. In the public sector, gas is mostly used for heating produced by building boilers, which are typically outdated and have low efficiency. In the industrial sector gas is used for industrial process and heating.

There is a big discrepancy concerning the gas supply during the year. This is due to uneven consumption during the cold season compared to summer season, which can be up to 10 times higher. However, Republic of Moldova does not have any storage facility. In order to ensure the necessary quantity of natural gas during the period when the consumption reaches the highest level, an underground facility was established on Ukrainian territory at Bogorodceni.

Gas supply

An aspect that is strictly related to national security and subsequent to the energy security issue consists of supply and alternatives. The general picture looks quite disturbing considering that almost entirely all natural gas is imported, and more than that, the operation is carried out through the

Russian state-owned gas monopoly Gazprom. The national natural gas system is pretty extensive. Two major upstream gas pipelines supply Russian gas for Republic of Moldova through Ukraine. Total high-pressure network length is about 1,400 km, there are four compressor stations, 74 distribution stations and several low pressure distribution networks. The pipeline web is quite extensive as well, so that the 2006 statistics show a total length of high, medium and low pressure gas pipelines of about 14,400 km. It is also worth mentioning that a very large quantity of gas transits the country on his way to several Balkan countries. This quantity represents approximately 18 times the country's domestic consumption, which in absolute value means roughly 20 billion cubic meters of natural gas. In 2008, transit fees were of about 2,5 USD per thousand cubic meters per 100 Km, compared to 1.7 USD per thousand cubic meters per 100 Km in Ukraine in 2009. Natural gas supply infrastructure has developed significantly over the past years with important state support. The Republic of Moldovan government managed to conduct great investment projects such as the National Program for the Gasification of the Republic, through which the state financed the construction of gas networks of over 8000 km length with an approximate value of 100 million dollars. The project was implemented between 2000 and 2007. These networks are state property, though this has not increased the state share (36.6%) in the "Republic of Moldovagaz" JSC. The main investments were the following:

- Connexion of all towns and over 500 rural settlements to the gas system in 2007
- Commissioning of the Tocuz-Cainari-Mereni (TCM) pipeline, with a transport capacity of 1.8 bcm. It enhances supply security by increasing delivery capacity to Chisinau, where electricity production facilities are located. This pipeline has been financed by the state budget (65%) and "Republic of Moldovagaz" (35%).

Gas market

The company that operates natural gas imports is a joint venture in which the Russian state company, Gazprom, plays a leading role. The structure through which the gas is brought on Moldavian territory is called JSC and is owned in proportion of 50 percent by Gazprom, 36,6 percent by the Republic of Moldova owned company Republic of Moldovagaz and 13,4 percent by the Transnistria region. Republic of Moldovagaz is the sole

importer of natural gas and the owner and operator of: the transit upstream pipelines that deliver gas to Balkan countries, the transmission network, as well as of most of the distribution network.

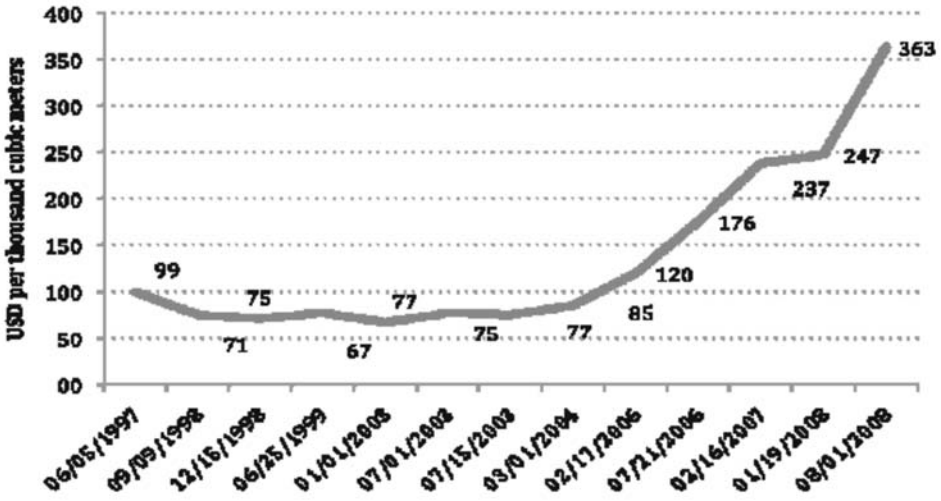
According to the public information regarding the corporate structure, Republic of Moldovagaz includes several companies, which are registered as Limited Liability Companies (LLC) and perform different activities:

- The first two companies are operating on the right and on the left bank of Nister River. Both Republic of Moldovatransgaz and Tiraspoltransgaz are transmission companies:
- Distribution companies on the Right Bank, with branches in every regional centre and 6 distribution companies in the Transnistrian region, which operate distribution networks and supply natural gas to end consumers on a contract basis;
- This corporate structure also contains a company specialized in importing and distributing liquefied gas.

There are several other distribution license holders, which build and operate their own networks. However, their market share is very modest (only about 1% of total gas supplied in the country). Republic of Moldovagaz is the de-facto gas monopoly in the country.

Republic of Moldovaz and the other distribution companies supply natural gas to consumers at regulated prices. ANRE sets the methodology and tariffs for gas consumers according to a cost-plus methodology. Prices are linked to the long-term gas supply agreement with Gazprom. During several years, gas tariffs in Republic of Moldova were relatively low, compared to other countries in South East Europe, reflecting a significant discount at which Republic of Moldova was able to secure gas supplies relative to the European parity price. Natural gas import prices remained unchanged (at $80/mcm) for ten years until 2005, compared to an European parity price in the order of $230/mcm (World Bank 2006). However, at the end of 2005, Gazprom announced that it was going to increase the price of natural gas supplied to Republic of Moldova. Following several months of discussion, an agreement between Republic of Moldova and Russia was finally reached about a gradual introduction of pricing principles used by Gazprom for exports to the EU. According to the agreement, the price of natural gas in Republic of Moldova will reach the EU parity level by 2011. Between 2005 and 2008, gas prices passed from $80/mcm to $253/mcm.

Evolution of average gas tariff for end-consumers 2001-2008



The segment that is most sensitive to tariffs rising, like in most of the cases, is the population. The second segment that finally reverberates also in the population pockets is represented by the CHP plants. In these conditions the shock is amplified, firstly by the domestic gas consumption and secondly in the thermal energy bill which also uses natural gas in the process. In 2008, ANRE approved a significant increase in gas tariffs. The average tariff for end–consumers doubled in nominal terms from 1,553 Lei/mcm in 2006 (120 USD/mcm) to 3523 Lei/mcm (363 USD/mcm) in august 2008.

III.3 Oil Sector Overview

Because of the specific of the Republic of Moldova market, crude oil is not directly imported. This is mainly due to the country's liquids fuel market reduced dimensions, meaning that a refinery will never be competitive or profitable in this binomial report consisting of production capacity and demand. Consequently the entire oil quantity needed for internal consumption is imported from Ukraine and Russia.

In 2008 the main oil products, consisting of petrol and diesel oil, were imported by 19 companies authorized for the import and wholesale of such products, whereas liquefied gas was imported by 11 companies also having an wholesale import authorization.

Oil Consumption

The oil products and solid fuel sub-sector is represented by enterprises which import, transport and distribute various oil products (fuel oil, diesel, petrol, kerosene, lubricants). Integrally, in terms of imported oil products, three companies are predominant in the national market: Lukoil Republic of Moldova, Petrom Republic of Moldova and Tirex Petrol. The three companies account for the 76.3% of petrol import and 72.4 % of diesel oil import.

The amount of oil imported by Republic of Moldova in 2008 was estimated at 279,710 thousands liters, an increase by 0,7 compared to previous year. The import of liquefied gas in 2008 increased by 19% and was estimated at 60, 141 tons compared to 50,493 tons in 2007.

Oil industry

The Oil refining industry does not exist in Republic of Moldova. In October 2004, the Republic of Moldovan Government announced plans to build a 220 million USD refinery linked to the Ukrainian 180,000 b/day Odessa – Brody oil pipeline. The refinery will allow Republic of Moldova to import crude oil and process it domestically.

The port in Giurgiulesti is at the final stage of construction and will allow the import of oil products from other countries. Crude oil imports are available at world market prices through the international the international oil market or through Russia at a discount of 5% of the international market price. Even though this is more a symbolic success, in 2008, for the first time, Republic of Moldova produced diesel oil – a total of 2,077 tons, representing 0,6 of the total of diesel oil acquired for national needs. Oil trade and transit pipelines do not exist on the territory of Republic of Moldova.

IV. Legislation and Institutions

Besides of the policy paper called “Energy Strategy until 2020”, which is the most important document indicating priority directions for developing energy sectors, there is a complex legislative framework which stays at the bottom of the energy sector. The main documents are:

- Electricity Law no 137 – XIV from 17.09.98
- Energy Law no 1525 – XIII from 19.02.1998

- The Energy Strategy of Republic of Moldova until 2010, approved by the Government Resolution No. 360 of 11.04.2000
- The resolution of the Government of the Republic of Moldova No.1092 of 31.10.2000, concerning Utilization of the Renewable Energy Sources (RES)
- The Law of Energy Conservation no. 1136-XIV of 13.07.2000
- Law "On Investments in Entrepreneurial Activity" No. 81 – XV, March 18, 2004
- Law on Renewable Energy Sources no 160 – XVI of 12.07.2007
- "Energy Strategy till 2020", approved by Governmental Decision No. 958, on August 21st , 2007
- "National Strategy for Sustainable Development" , Rep Republic of Moldova XXI
- First National Communique of the Republic of Moldova for UNFCCC, 2002
- National Program on Energy Conservation for the period 2003-2010.

Institutions

Republic of Moldova's state energy institutions have been undergoing substantial restructuring in the period between 2000 and 2005. The institutions responsible for elaborating and promoting energy policies in the Republic of Moldova are as follows:

1. The Government elaborates proposal for legislative acts, adopts strategies, programs and energy related plans. In 2000, the Industry and Energy Ministries were one entity, while in 2001 they became two separate Ministries and in 2005 they merged again. In 2008 the Ministry of Industry and Infrastructure was restructured and in the current government the Ministry of Economy deals with energy issues.
2. The Ministry of Economy was appointed in 2008 in charge of the energy policy. It supervises the public energy companies. The Energy Department of the Ministry is responsible for energy policy in the following context:

- Development and monitoring of concepts and strategies, and program implementation in the sector at national and regional level;
- Participation in the elaboration and implementation of measures on energy security;

- Elaboration of technical regulations;
- Organization and coordination of legislative drafts and normative acts;
- Elaboration of medium and long term programs and investment projects for the energy sector development and its departments in cooperation with energy enterprises and other stakeholders;
- Definition of policies for gas pipeline development;
- Definition of general import, export and transit of electric energy , gas, oil products and other fuels;
- Coordination of activities for energy efficiency and supervision of the responsible bodies;
- Establishing international cooperation for the energy sector.

3. The Ministry of Ecology and Natural Resources handles climate change issues.
4. The National Agency for Energy Regulation (NAER) was established in 1997, as an independent body responsible for the forming and operation of the national energy market. More specifically, it regulates electricity, natural gas, and district heating sub-sectors and promotes competition in the energy market. It oversees the application of the energy tariffs, and its Tariff calculation Methodology (TCM) was adopted in June 1999, using a cost-plus system. Its responsibilities include: licensing, tariff setting, establishing quality of service standards, consumer protection and promotion of competition and energy efficiency.
5. The National Agency for Energy Conservation (NAEC) was created in 1994 and its task is to elaborate strategies, programs, plans, as well as normative documents in the area of energy efficiency and energy and energy conservation. However it had to stop its activities in 2006 due to its restructuring. In July 2007, the agency was relaunched and renamed as the Agency for Energy Efficiency according to the Law on Renewable Energy Sources.
6. The institute of Power Engineering of the Academy of Sciences of Republic of Moldova. The institute carries out research in fields such as electric energy, renewable energy sources, small wind farms, solar energy installations and heat storage. The Institute has also established a Research Laboratory for non-conventional sources of energy. It also advises the government on specific energy issues, provides energy auditing and is involved in promotion of energy efficiency in buildings.

7. The State Energy Inspectorate has the technical oversight of all power and heat companies, irrespective of their ownership and production capacity, to assure reliable, efficient and safe power and heat supply. The Inspectorate is a separate entity within the structure of the Ministry of Economy and Commerce, but receives its budget from the state electricity enterprises Moldelectrica.
8. The Spanish company "Union Fenosa" S.A privatized 60% of the country's electricity distribution network, electricity transmission network operator.

V. Sustainable Development

The Republic of Moldova elaborated an important document which serves as a strategy for future governmental actions an effort to increase the system efficiency in order to meet European standards - The strategy of the Sustainable Development of Energy Sector of the Republic of Moldova valid up to the year 2020.

Republic of Moldova is 99% dependant on gas deliveries from Gazprom, and a viable alternative to this company's product will not exist earlier than 2015 or 2020. The authors of Republic of Moldova's energy strategy until 2020, already adopted, stressed that Republic of Moldova's biggest problems in this regard were the lack of domestic energy resources (97% of energy needed is imported), excessive dependence on natural gas imported from one single supplier, a low level of use of renewable sources of energy, and the inability to generate adequate energy on the right shore of the Nistru. Republic of Moldova has five electricity distribution networks, three of which were bought in 2000 by Spanish company Union Fenosa.

In the last decade, the government from Chisinau announced no less than five construction projects of electrical plants, but from several reasons the projects never went past the paper stage. Last year, Republic of Moldovan-Romanian-British Company MoldItera Energy made an announcement regarding the possibility of building a 450 MW power plant in the village of Burlaceni in the Cahul district, having a work execution period of 5 years. Another major project announced this time by the Czech company J&T, in the early 2009, consisted in developing a 400-mw mega-plant based on coal in the free economic area of Ungheni. Experts have said at the time that the two projects are vital for Republic of Moldova's energy security and that

they will eliminate the country's dependence on the Tiraspol-controlled Cuciurgan plant.
In order to meet these objectives of strategic importance the document outlines not only the main goals but also the steps that Republic of Moldova need to follow:
- Restructure the power sector, complete the privatization of enterprises and create a competitive power market, aligned to the European standards and norms
- Increase power efficiency through the promotion of a consistent policy of energy conservation, including the use of regenerating resources
- Ensure power security in the country through meeting the power and power resource demands in the required quantity.

Implementation of these objectives is planned to be carried out via the following activities:
- Power efficiency of output, transport, distribution and power supply
- Renovation and increase in the competitive capacities for the production of electric power, evidence of modern transport network, systems and equipment
- Increase the power efficiency of consumers, train consumers in energy conservation at all levels
- Diversify the import sources of energy resources

The main actions taken in the reform process also include:
- the development of a new, market-oriented legal framework;
- establishment of an independent energy regulatory agency (ANRE) in 1997;
- restructuring of companies in the energy sector.

An intense privatization process was carried out so that three electricity distribution companies out of five were passed to private sector. The state sold its majority stake in Republic of Moldovagaz to Grazprom, and the district heating networks entered in a decentralization process at the end of which the management of those facilities was transferred to the municipal governments. As a result of these reforms, payment collections increased – collection rates reached 92% for gas and 98% for electricity in 2005 and service quality improved, especially in areas outside the capital of Chisinau.

VI. Renewable Energy potential – a viable alternative

The renewable energy sources (RES) comprise: the solar (thermal and photovoltaic PV), wind energy, hydraulic, biomass and geothermal energies.

The solar energy

There is a certain preoccupation in the Republic of Moldova towards renewable energy sources; for instance the use of solar energy is documented to have started more than 50 years ago. It may appear surprising but solar thermal installations were elaborated, set up and tested even half a century ago. Despite these efforts in reality just a few of the installations and systems were implemented, mostly due to the absence of a comprehensive approach of the RES phenomenon. After a stagnation period, the RES implementation was once again resumed in the 80's and since 1999 till today solar installations for water heating have been produced in Republic of Moldova. 140 installations with solar collectors having the surface of 1.4 and 2.2 square meters have already been implemented. Due to the fact that the whole population of Republic of Moldova has access to public electric networks, the photovoltaic solar energy has a relatively limited area of use in the Republic of Moldova; only a few experimental photovoltaic installations for water pumping, communication systems and meteorological stations have been implemented. There are however many reasons why these systems cannot be implemented to a mass scale. It is also worth mentioning specific natural features like: small irrigation, low electricity consumption rural consumers, dispersed on the territory, anti-hail protection stations or sylvan enclosures.

Wind energy

Similar to the solar one, the wind energy segment goes back in the history of the Republic of Moldova. Consulting the statistics some interesting facts come to the surface, namely that 6,208 windmills were registered on the territory of the Republic of Moldova in 1901. Many of them were in operation during the inter-war period as well. In the 1950s over 350 mechanical wind- power installations, meant to be used exclusively for pumping water systems and for fodder processing in the collective agricultural farms, were found. These have worked efficiently until the

years 1960-1964 when they were replaced with cheaper and more convenient electric systems. The available information shows at this moment that several experimental wind power installations are in operation in Republic of Moldova, but the purpose is for domestic use only, so none of these devices is pumping electric energy in the national system. There is however a major interest towards this kind of renewable resources, so in the near future it is reasonable to assume that greater attention will be paid.

Hydroelectricity

Hydroelectricity can be a massive source of renewable energy, and equally important a profitable way of producing energy. In many countries, like Romania for instance, hydropower is one of the most efficient sources of electricity, taking into account the very low costs and subsequently the selling price. It is is also true that in the absence of natural resources (rivers or other major watercourses) it is impossible to "speculate" such an opportunity like the kinetic force of the water. The two hydroelectric facilities, one of 48 MW HEP is placed on the Nister River, and another one of 16 MW HEP work in Costesti on the river Prut. At present a special interest is paid to small rivers. Unlike large HEPs, the smaller ones on the small rivers are not of a great interest for large companies, however these may be of great use for small farms.

The HEPs with a capacity of 5 MW do not damage the environment as these are complementary to the traditional systems. In many cases the small rivers may provide an essential energy supply to agriculture (small irrigation) and to the small-scale industry (of canned goods, wine, sugar etc.); at the same time this is an advantage for the public electric networks, especially in the rush-hours. Unlike large HEPs, that require tanks for water accumulation, complex control systems, a great volume of organizational work and maintenance, the small HEPs are easier to handle and have the payback period of one year at the most.

Biogas energy

The Republic of Moldova has an important experience in biogas technology dating back to the 1950's. For instance, at the Technical University of Republic of Moldova there have been elaborated and tested new biogas installations for processing the liquid organic remainders with the fixed micro flora. The most encouraging data was obtained at the satellite stations

for processing the animal breeding remainders and the industrial water used to produce wine, sugar, spirits, fodder dregs etc. At present only five plants of cleaning the used up water are provided with installations for mud anaerobic processing and for biogas recuperation: Chişinău, Tiraspol, Bălți, Tighina, and Cupcini.

According to some projections, the share of RES in the total energy consumption might constitute 10%. By the year 2010 the total consumption of fuel and electric power will constitute 6.5 mil. t.c.e., from which the RES will cover 0.65 mil. t.c.e., including:

- Wind power energy-130 thousand t.c.e.
- Thermal solar energy - 120 thousand t.c.e.
- Photovoltaic solar energy - 13 thousand t.c.e.
- Biogas - 62 thousand t.c.e.
- Wood and agricultural residues - 260 thousand t.c.e.
- Hydroelectricity - 65 thousand t.c.e.

VII. Energy Security Risks

- **Price**
- **Lack of investments**
- **Supply disruption**
- **Short run disasters**

In the National Security Strategy of The Republic of Moldova, Energy Security has become a distinct concept of highly importance that needs a comprehensive approach from the state institutions. It is also clear from the document issued by the Republic of Moldovan officials that economic security and energy security are in fact facets of the same coin and that addressing these issues in a coherent manner is imperative.

The National Security Strategy states that "regulation of the energy market and the development of an adequate infrastructure have to ensure sufficient electric power supply for consumers, as well as an appropriate exercise of the essential state functions. On the gas market, the activities of gas suppliers must be carefully monitored. It is essential to identify opportunities for a diversification of gas supply sources for the country."

Supply disruption

In the case of supply shortages the National Security Strategy mentions very clearly that on the thermal agents market, all the necessary measures

will be adopted in order ensure the basic heating conditions for the population. The same approach is used for bunker oil market as well, so that a minimum quantity of fuel will be stored in accordance with European Union directives. That means that even in case of disruption the companies have to ensure a certain quantity of fuel for domestic use, so that on the short term the normal activities shouldn't be paralyzed by such a disturbing event. The possibility to be confronted with such a negative event is rather in terms of "when" not "if". History has shown to us that cyclicity occurs when it comes to catastrophic events, regardless if we are referring to natural hazards or man as a protagonist. This means that a country needs to take all the prophylactic measures in order to reduce the impact of such a disruptive scenario. Among the above mentioned measures the Republic of Moldova needs to take into account the possibility of creating reserves in the neighboring countries, like Romania. With the liberalization of the energy industry market, which implies joining a common European energy and oil market, ensuring security of the supply system should be one of the major requirements. The use of local energy resources and an increase of their efficiency, creation of new energy capacities built on advanced technologies are regarded as priority goals aimed at reducing the country's dependency on imported resources.

Implementing the Energy Strategy has become a fundamental objective not only in a conceptual manner but in very pragmatic terms, because its success is now symbiotically linked to the idea of national security. Gradual integration of the Republic of Moldova's energy system in the South-East European Energy Community will increase, primarily, integration in the Pan-European energy system while contributing simultaneously to reducing the country's unilateral energy dependency as energy issue is being examined on the regional level.

An opportunity called AGRI

In this context the Republic of Moldova needs to be implicated in every major regional project that opens the door for an alternative to the Russian monopoly. Such a major initiative that deserves Chisinau's attention is the project for liquefied natural gas transport known as LNG between Romania, Georgia and Azerbaijan. This project seems to benefit from a dynamic perspective, despite the fact that Nabbuco is considered Europe's priority

within the Southern Corridor. The project is designated as the Azerbaijan-Georgia-Romania interconnector (AGRI) and the cost has been estimated at between 4 and 6 billion Euro. The necessary infrastructure will be developed by private companies form the countries involved in the project in cooperation with a consortium of businesses and financial institutions. The AGRI had drawn the attention to the Republic of Moldovan authorities as a real prospect of improvement of the energy potential and reducing of dependence on Russian natural gas. Taking in advance the potential of the project that assures a stable and reliable route of LNG supplies,

It might be an advantage for Republic of Moldova to be involved in the project. The stake is high for Chisinau who urgently needs to start the construction of a liquefied gas terminal in the Giurgiulesti port. By playing its cards wisely the Republic of Moldova can place itself on the map that represents exactly the alternative that it desperately needs.

According to the AGRI project, the natural gas produced by Azerbaijan will be transported via Georgia and Romania before being delivered to EU consumers, so in this context, the port of Giurgiulesti could be one of the main stops for the ships carrying the resourced. Republic of Moldova should examine accurately if it has a potential role in the project, due to the facts that AGRI project involves the construction of a liquefaction plant and LNG export terminal for Azeri gas in Georgia, as well as an import terminal with re-gasification plant in Romania.

So for the moment AGRI represents a realistic and opportune project, for the Republic of Moldova and EU countries can provide shelter for political disputes. In this context, Republic of Moldova has to initiate negotiations with Azerbaijan, Georgia and Romania in order to establish the instruments allowing Republic of Moldova to be part of the project.

Foreign investments

The lack of foreign investments in the Republic of Moldova is chronic problem and the energy sector suffers from the same syndrome. This is a very complex issue for this country, because on the one hand it needs major infrastructure investments but on the other hand it is very important to dismantle the Russian monopoly. So foreign investment is a concept through which Republic of Moldova understands European involvement. The excessive and unilateral dependency of the Republic of Moldova on

foreign monopolistic energy systems represents a major internal vulnerability. This vulnerability may easily grow into a threat to national security. This also includes the broad possibilities of accumulation of the foreign capital coming from economic systems where market economy rules are not secured or underdeveloped in the national economic sectors of major importance.

The last policy document states that an essential factor for the implementation of this "2020 strategy" is the financial component, meaning capital investment, which was estimated at 2-3 billion, or 150-220 mil Euro per year. It has become clear that without the allocation of external funds, the 2020 Energy Strategy is doomed to failure. The funds are thus needed to start a major process of technical rehabilitation of CET-1 in Chisinau, Balti North CET, CET-2 expansion in Chisinau and modernization of thermal power plant Cuciurgan in order to to ensure over 80% internal consumption. In terms of planning the Republic of Moldova is very active, but the problem is that there was virtually nothing done to ensure energy security and diversification of energy resources in the country. In fact nowadays RM is even more dependent of the Russian Federation on energy resources than before the crisis. This is due to the deplorable economic and financial situation of energy sector enterprises and lack of financial resources for the acquisition of primary resources, whose cost remains a big problem for this country.

However Republic of Moldovan experts have already prepared 17 projects for restructuring and modernizing the energy sector, which authorities believe investors will definitely show interest in.

The price effect and the Russian factor

According to some estimations and reports the Republic of Moldova is one of those nine countries from a worldwide classification rated as "extreme risk" for short term vulnerability to energy imbalances with direct influence over national security. The analysis should be carried out from a dual perspective. First of all Republic of Moldova has an poor infrastructure, not in terms of kilometers but in terms of oldness. Secondly Chisinau is confronted with a frozen conflict in Transnistria marked by geopolitical tensions with Russian Federation that can always use the price of natural gas as a weapon. Moscow has done it before with Ukraine and just recently

banned the import of several products from Republic of Moldova to Russia only based on political reasons. The relations are tensed now more than ever due to the political outcome in the recent years, not to mention the Transnistria issue that has the power to trouble the gas deliveries via pipelines to Republic of Moldova. Gazprom has jeopardized several times the natural gas supplies to Republic of Moldova if it didn't agree to pay higher prices. The Russian government has control over the country's energy resources, structuring the control to put forth influence in the former Soviet Union. The influence is exerted by Russian companies linked to the Moscow administration that use power to purchase energy companies and to gain control over gas delivery.

Until now Chisinau has managed to keep a steady relation with Moscow on energy issues, but the continuously raising gas price sowed discord among the two countries. The national economy is dependent on the energy supply and constrained by the Russian gas monopoly and the Ukrainian electricity monopoly, providing about 70% of the consumption. The Moldavian government is right to be nervous considering that not earlier than 2007 Ukraine stopped the deliveries to Republic of Moldova, while the Russian Gazprom cut the gas supply for a couple of days in the late 90's following a late payment.

Short run catastrophic effects

In case of a natural hazard or any other factor that would completely interrupt the energy flux, the data available shows quite a disturbing truth. On December 31, 2008 the stocks of oil products in the importers storage facilities and filling stations were estimated at 30.7 million liters of petrol, an average for 48 consumption days, 29.000 tons diesel oil (31 consumption days) and approximately 6000 tons liquefied gas (37 consumption days). In that case the Republic of Moldova would depend on direct assistance from its neighbors Romania and Ukraine, but again the variety of scenarios closely relay on the magnitude of the disaster, which may affect the entire area.

The fact is that the overall picture looks very disturbing in terms of energy security for the Republic of Moldova, of course with direct implication to its national security. The equation actually has two main unknown components: the Russian Federation and Ukraine. These two countries

totally control the Republic of Moldovan energy sector. Even if the relation between Chisinau and the two states would be on a different level (with an emphasis on Russia), depending in such a proportion by one single external supplier, without any alternative, is unacceptable.

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5. ENERGY SECURITY IN UKRAINE

Oleksandr Sushko, Bogdan Nedea

I. Country Overview

Ukraine is a country which is under the obvious risk determined by high energy consumption and low energy efficiency which makes it vibrant and sensitive towards energy security challenges. Ukraine consumes about 3% of total global consumption of natural gas, thus being among the top ten biggest gas consumers (ranked 6-7th). In the meantime a share of Ukraine's economy is almost 5 times lower than this indicator (a little bit over 0,6% of the world's economy).

According to the American Energy Administration report 2006, Ukraine was ranked among the biggest energy consumers in Europe. For 1USD of its GDP, Ukraine consumes energy twice as much as Germany[1]. In the total energy composition in 2005 natural gas has almost a 50% share and 75% of it was imported from the Russian Federation.

Ukraine's dependence on Russian gas became threatening not that much because of the Russian monopoly on gas and its routes to Ukraine, but due to excessive energy consumption of the Ukrainian economy and many years of opaque commercial relations, leading to emergence of specific pricing both for gas supplies and transit fees.

II. ENERGY SECTOR OVERVIEW

General Legal and Regulatory Framework

Legislative Power: the Verkhovna Rada

The highest legislative body of Ukraine is the unicameral parliament, known as the Verkhovna Rada (Supreme Council). Its 450 members are

[1] Is Ukraine - the World's Monster of Gas Consumption? http://www.unian.net/ukr/news/news-209361.html

elected by a national vote for a five-year term. The seats are allocated proportionally based on the parties that gain 3% or more in the national parliamentary elections. The Verkhovna Rada adopts laws and approves the state budget, national economic, social and environmental programs, and the principles of domestic and foreign policy. It has several committees relevant to the energy sector:

- The Committee for Fuel and Energy, Nuclear and Nuclear Safety prepares

legislative proposals in the energy sector.

- The Committee for Environmental Policy, Nature Protection and Liquidation of Consequences of the Chernobyl Accident is responsible for developing legislation on the natural resources, environmental safety and pollution (including nuclear).

The Ministry of Fuel and Energy is the key administrative body for Ukraine's energy sector. It develops the energy sector's strategy and regulatory framework, and contributes to the development of the state budget and targeted economic and social programs. It also plays a role in the development of local renewable energy sources. The Ministry is an important economic actor in the energy sector. It has authority over the state-owned companies Naftohaz of Ukraine and Energy Company of Ukraine and thus controls major assets in the oil, gas, electricity and district heating sectors. Until recently, it also controlled the coal sector. When there are fuel shortages, the Ministry also allocates fuel to thermal power stations. The Ministry of Fuel and Energy participates in preparing international contracts for fuel supply and international energy agreements, including on nuclear safety and civilian use of nuclear technologies. It also helps develop proposals to adapt Ukrainian energy legislation to EU directives. The Ministry was founded by presidential decree on 14 April 2000 by merging the Ministry of Coal Industry, the Ministry of Energy, the State Committee for the Power Industry, the State Committee for Oil, Gas and Oil-refining Industries, and the State Committee for Nuclear Power.[2] The Ministry of Fuel and Energy now comprises the: Department of oil-and-gas industry; Department of energy industry; Department of strategic policy and prospective development of FEC; NJC "Naphtobaz of Ukraine"; Department of FEC economic and financial regulation; State Department of

[2] The Ministry of Fuel and Energy of Ukraine - http://www.mpe.energy.gov.ua/

coal industry; Main Office of Chornobyl AES (Nuclear Power Station) and social working relations; Main Office of international cooperation.[3]

The **Ministry of Coal Industry** is responsible for the on-going management, restructuring and privatization of the coal industry, including closing unprofitable mines. It manages budget allocations directed to coal companies and implements social programs related to mines closures. The Ministry of Coal Industry was re-established through the re-organization of the Ministry of Fuel and Energy on 25 July 2005 by the presidential *Decree on Measures of Improving the State Management of Coal Industry.*[4]

*The **National Electricity Regulatory Commission** (NERC) plays a very important role in the energy sector through licensing and price regulation. The Commission was founded on 8 December 1994 to regulate the electricity sector, but since then its authority and functions have been extended to other energy sub-sectors. NERC issues licenses for the following activities:*

- *Power generation, transmission, wholesale sales, distribution and supply to end-users.*
- *Combined heat and power generation; heat generation from renewable energy sources.*
- *Oil and oil product transportation.*
- Gas transportation, storage, distribution and supply.[5]

NERC sets the wholesale price of electricity from nuclear, hydro, wind and cogeneration plants, and establishes retail electricity tariffs. In 2005, NERC also gained the authority to regulate tariffs for heat generated from cogeneration, nuclear energy, and renewable and non-conventional sources. These tariffs were previously regulated by municipalities. NERC sets natural gas price caps for all customers, establishes tariffs for transportation of natural gas via main pipelines and distribution networks, and determines tariffs for supply and storage of natural gas. In the oil sector, NERC sets tariffs for oil and oil product transportation.

NERC is independent from the Ministry of Fuel and Energy. However, the Ministry of Justice must approve and register NERC's decisions, which

[3] The Ministry of Fuel and Energy of Ukraine - http://www.mpe.energy.gov.ua/

[4] IEA – Ukraine Energy Policy Review 2006

[5] NERC - http://www.nerc.gov.ua/control/en/publish/article/main?art_id=32988&cat_id=32987

limits its independence. The Cabinet of Ministers appoints the chairman of NERC and its four commissioners for six-year terms that can be renewed only once. NERC does not control its own budget. Initially it was funded from license fees and could afford to offer competitive salaries to attract highly qualified staff. Since 2000, it has received its budget from the government and must follow civil servant regulations for salaries. This means that salaries are lower than
in many of the companies it regulates (Gochenour, 2004). The Verkhovna Rada has prepared draft legislation that would grant NERC budgetary and administrative independence, and reduce the ability of the Verkhovna Rada or the government to overrule its decisions.[6]

The **State Nuclear Regulatory Committee** (SNRC) was created by presidential decree on 5 December 2000. The Committee sets criteria, requirements and conditions for nuclear safety (*e.g.* normative documents, standards); issues permits and licenses for activities in this area; and supervises implementation of legislation, norms, rules and standards on nuclear and radiation safety. It also oversees the Chernobyl decommissioning and the management and transport of nuclear waste. SNRC is an independent body, but like NERC, it receives its budget from the government.[7]

A presidential decree on 31 December 2005 created the **National Agency on Questions of Providing Efficient Use of Energy Resources (National Agency on Efficient Energy Use).** The Agency replaced the State Committee for Energy Conservation, which operated from 1995 and was officially closed in April 2005[8] with a plan to transfer its functions to the Ministry of Fuel and Energy. A vigorous public debate followed this decision: many institutions and individual experts supported the idea of an independent energy-efficiency body in Ukraine. The debate led to the creation of a new institution with wider authorities than those held by the previous committee. The responsibilities of the new Agency include state policy on energy use, energy efficiency, renewable and alternative energy sources, as well as energy metering and monitoring.[9]

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[6] Idem 3

[7] State Nuclear Regulatory Committee of Ukraine - http://www.snrc.gov.ua/nuclear/en/index

[8] IEA – Ukraine Energy Policy Review 2006

[9] National Agency of Ukraine for Efficient Use of Energy Resources - http://www.kmu.gov.ua/control/en/publish/article?art_id=70808036&cat_id=73048

The **National Security and Defense Council** is a very powerful body made up of the heads of relevant military and civil institutions, including most ministers and the head of the Verkhovna Rada. The formal head of the Council is the president of Ukraine, but day-to-day management is in the hands of the
Secretary of the National Security and Defense Council. The Council plays an important role in developing Ukraine's energy security policy.[10]
The **State Committee on Material Reserves** (Derzhkomreserv) manages the formation, distribution, maintenance, use, replenishment and renovation of commodities in the state reserve. It may manage the strategic oil stocks as well, although Ukraine is considering an option to place these stocks under the control of the National Security and Defense Council.[11]
The **Antimonopoly Committee**, of Ukraine is the state authority with special status, aimed at providing the state protection to competition in the field of entrepreneurial activity. Peculiarities of the special status of the Antimonopoly Committee of Ukraine are conditioned by its tasks and authority, including it's role in the competition policy formation, and are determined by the Law of Ukraine "On the Status of the Antimonopoly Committee of Ukraine" and other legislative acts. In particular the above-mentioned peculiarities consist in special order of designation and dismissal of the Chairman of the Antimonopoly Committee of Ukraine, its deputies, state commissioners, chiefs of the territorial offices as well as in special procedural principles of the activities of the Antimonopoly Committee of Ukraine, pledging of social security, protection of personal rights and interests of the employees of the Antimonopoly Committee of Ukraine on equal level with the employees of the law machinery. It was established in November 1993.[12]
Regional and local authorities can influence energy companies by setting local taxes and levies (for example, environmental taxes) and by issuing certain licenses or permits (such as site permits for oil and gas drilling). Local administrations continue to regulate district heating companies and tariff s for heat from local heat-only boilers. Most regional administrations

[10] National Security and Defense Council of Ukraine - http://www.president.gov.ua/en/content/nsdc.html
[11] Official web-site of the State Committee of Ukraine for State Material Reserve - http://www.kmu.gov.ua/control/en/publish/article?art_id=10263335&cat_id=73035
[12] The Antimonopoly Committee, of Ukraine - http://www.amc.gov.ua/amc/control/en/publish/article?art_id=44798

have an energy-efficiency department that monitors energy consumption and manages energy-efficiency programs in the region. Various other bodies that hold executive power oversee a broad range of areas that are less directly related to the energy sector but still underpin elements important to the sector's structure or operation.

The **State Statistics Committee**[13] (Derzhkomstat) collects and publishes energy supply and consumption data.

ENERGY SECURITY

Energy security is one of the most challenging issues concerning Ukraine's national and international security which strongly affects the political and economic agenda of the country, as well as its international standing[14]. According to Ukraine's Energy Strategy till the year 2030, adopted by the government, energy sector development has a crucial impact on the country's economic situation, on the resolution of problems in the social sector, and on the standard of living. The energy sector should switch from focusing only on energy supply for the extensive development purposes, which have been pursuing for decades, to energy supply for sustainable economic development. European concerns about energy security in regard to Ukraine have become the main issue of discussion in the current EU-Ukraine agenda. To strengthen Ukraine's energy sector, most of western experts and politicians expect from the new Ukrainian president to abandon domestic subsidies for oil and gas prices and to let the price reach global market levels. The energy sector is also expected to improve significantly its business transparency in order to attract foreign capital investment[15]. The year 2009 has relaunched the debates about Ukraine's and regional energy security due to the unprecedented crisis between Ukraine and Russian Federation over the conditions of natural gas supply to Ukraine for 2009, including transit costs and dept issues (real or virtual), which in January deprived 18 European countries of a vital energy resource – a

[13] Official web-site of the State Committee of Statistics of Ukraine - http://www.ukrstat.gov.ua/

[14] Elements of IEAC comprehensive study „Ukraine-Russia 2009 Gas Crisis: a Comparative view from Kyiv, Bucharest and Chisinau" (authors: Oleksandr Sushko, Iulian Chifu, Oazu Nantoi) have been used in this chapter

[15] Jorg Himmelreich. Energy Security for Ukraine and Europe. The German Marshall Fund http://www.gmfus.org/publications/article.cfm?id=778

confrontation unbelievable even at the times of the Cold War. The recurrence risk of a crisis is embedded in the formula of gas agreement signed between Ukraine and the Russian Federation in January 2006. It should be reminded that then, despite obvious needs to ensure transparency and accountability in the gas sector, a scheme involving intermediary companies (RosUkrEnergo), inherited from the previous leadership, was not only preserved but even enhanced. Gas pricing mechanisms were not actually established in case of Ukraine, meaning that the price remained to be subject to politics. Instead, the transit rate was set for 10 years, even if the gas price for Ukraine must be systematically correlated with global trends, however without a peg to clear formulas. In such a way, gas prices, which were the most sensitive issue for Ukraine, could trigger an extensive turmoil probable to occur every year, due to inevitable gas price hike initiated by the supplier.

Ukraine's Energy Strategy to 2030

Ukraine's key energy policy and priorities are defined in its own Energy Strategy to 2030, which was approved by the Cabinet of Ministers in 2006. The strategy proceeds from the understanding that Ukraine has a limited endowment of conventional energy resources and also lacks diverse sources of primary energy sources, such as oil, natural gas, and nuclear fuel. Therefore, in order not to rely on imports, the strategy highlights the importance of rational energy use, the promotion of domestic energy production, and switching to alternative energy sources. Obviously, the strategy also recognises the significance of (and threats to) Ukraine's position as a key transit route for predominantly Russian oil and gas and, therefore, a basic premise of the strategy is to maintain and enhance this transit role.

The 2030 Energy Strategy represents a significant milestone as it provides an all-encompassing overview and comprehensive strategy of the energy sector, by building upon the various state programmes developed mostly in the 1990s for the various sub-sectors. Nevertheless, some of the projections in the strategy are contentious as they were not developed on the basis of detailed statistical data and models. There also appears to be too strong an emphasis on supply measures at the expense of energy demand and efficiency. More importantly, the strategy lacks specific measures to meet its stated objectives and it is therefore difficult to assess likely

developments and the probability of realising its targets (and over which timeframe).

The Energy Strategy of Ukraine for the period until 2030 (hereinafter the Energy Strategy) was completed by the Work Commission set up by the Ministry of Fuel and Energy and is based on the draft 'Energy Strategy of Ukraine for the Period until 2030 and thereafter' developed by the Institute of Energy of the National Academy of Sciences of Ukraine. The completion was carried out by orders of the President of Ukraine and the Government of Ukraine, taking into account the results of the Parliamentary hearings, public discussions, suggestions from the Verkhovna Rada of Ukraine deputies, ministries and departments, scientific organizations, and energy companies.

The Strategy was developed by taking into consideration geopolitical, macroeconomic, social, scientific-and-technical development trends in the country and allowing for certain risks in identification of these factors. Therefore, it is necessary that a continuous monitoring of the Energy Strategy be provided for regularly adjusting the scope of and timeframes for the works envisaged by the Strategy, taking into account changes in prices for fuel and energy resources both in Ukraine and elsewhere, state economic development programs, scientific and technical progress, and other factors.

Energy Strategy Objectives:[16]

The Energy Strategy has the following objectives:

- to create favorable conditions to provide for the national demand for energy products being satisfied by a stable and high-quality supply;
- to develop policies and to establish a favorable environment for safe, reliable and sustainable functioning of the energy sector and its development on a most efficient basis;
- to improve national energy security;
- to scale down the negative technogenic burden on the environment and provide public protection in the field of FEC technogenic safety;
- to reduce specificities in the process of production and use of energy based on improved energy efficiency, implementation of energy-saving processes and equipment, enhanced public production structure, and reduced share of energy-intensive technologies;

[16] Energy Strategy of Ukraine for the Period until 2030

- to integrate the United Power System of Ukraine into the European power system, with an emphasis on gradual increase in electric power exports, and strengthen Ukraine's position as an oil-and-gas transit country.

The attainment of the above objectives will form conditions for an intensive development of the economy and, consequently, for the improvement of living standards in the country.

Goals & Areas of the Energy Strategy[17]:

Energy Strategy goals and areas are as follows:

1. To establish an integrated and efficient management and regulation system within the fuel-and-energy sector, to promote competition on the national energy markets.
2. To create conditions for a radical reduction of the energy content of domestic products through implementation of modern technologies, good standards and advanced control, management and accounting systems at every stage of energy production, transportation and consumption processes; and to develop adequate market mechanisms to encourage energy savings in every sector of economy.
3. To develop the export potential of the energy sector with an emphasis on electric power by upgrading and rehabilitating the existing generation capacities and power transmission lines, including trans-border lines.
4. To develop the national energy machine-building industry, instruments manufacturing and integrated energy-system engineering-and-construction capacities as a necessary prerequisite for strengthening competitive positions of Ukrainian companies with regard to participation in energy projects, including foreign ones.
5. To optimize the domestic energy production system with consideration for their supply at foreign markets, pricing policies and geopolitical situation, increase energy produced by alternative and renewable energy sources.
6. To diversify both foreign energy sources and transportation routes.
7. To establish an integrated national statistics/ strategic planning/ monitoring system to control energy production/consumption processes and form adequate energy supply-and demand budgets.

[17] Energy Strategy of Ukraine for the Period until 2030

8. To balance pricing policies in the energy sector so as to ensure that the energy production costs are covered, and create proper conditions for stable operation and sustainable development of the FEC companies.
9. To provide legal-and-regulatory support to ensure implementation of the Energy Strategy with consideration for the relevant international commitments, provided for by the Agreement to the Energy Charter; the Kyoto Protocol; multiple bilateral covenants; and requirements of the European energy legislation.

1. Electricity

a) Industry Structure and Ownership

In the mid-1990s, the government re-structured the power sector to allow for competition between electricity producers. It split the ownership and management of the sector into generation assets, the transmission network, distribution assets and the power market (Energorynok). In principle, this split was a wise move. However, blurring of roles (for example distribution companies' ownership of significant generation assets) limits its effectiveness. The sector was unbundled in the mid-1990s as part of broad power sector reform that included establishment of an independent regulator and steps toward privatisation. At present, most of the Ukrainian power sector is still in state hands, as privatisation did not proceed as quickly as initially anticipated. In 2004, most of the non-nuclear generation and distribution assets were consolidated into a single state company. The wholesale power market still exists and operates, but it is even less clear than before how much competition the sector supports, particularly given the dominance of the Fuel and Energy Complex[18].

b) System structure

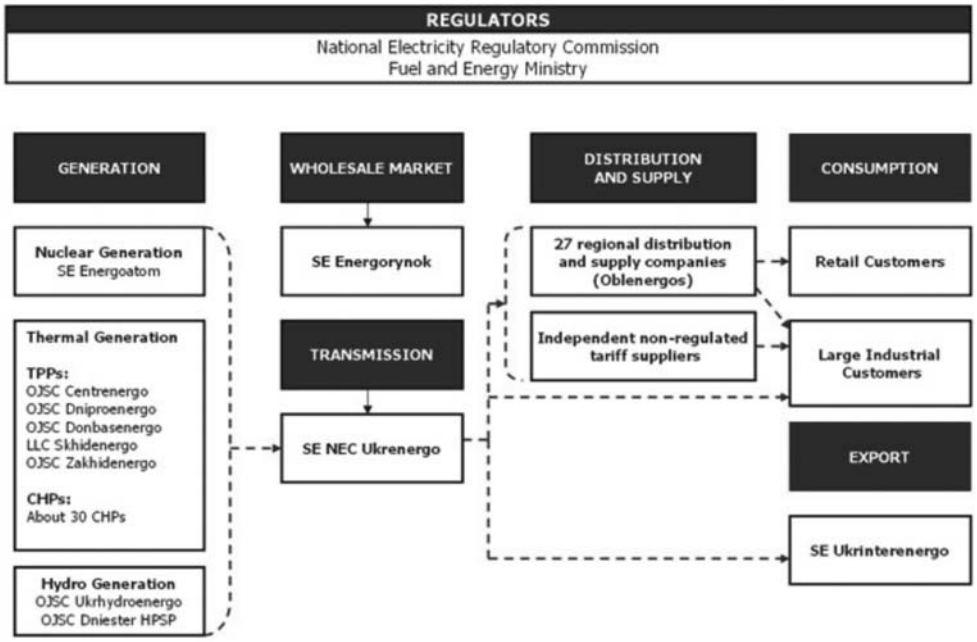
Ukraine's power sector is structured along the major business activities: generation, transmission, distribution and supply of electricity.

Electricity **generation** is mainly presented by the nuclear power plants of Energoatom and thermal power plants.

The Ukrainian electricity market is currently organized under a **single-buyer model**. A competitive **wholesale electricity market** (WEM) was established in 1996, with the state enterprise Energorynok functioning as market administrator.

[18] The Ministry of Fuel and Energy of Ukraine - http://www.mpe.energy.gov.ua/

Transmission is organized within NEC Ukrenergo, which owns and operates the high voltage network.
Distribution is carried out via 27 regional distribution and supply companies (so-called Oblenergos).
Supply is conducted by Oblenergos (suppliers at regulated tariff) and independent (non-regulated tariff) suppliers. Currently there are no eligible customers, however, **large industrial consumers** can acquire non-regulated supply licenses and supply electricity to themselves.
The sector's **regulation** is performed by the National Electricity Regulatory Commission (NERC) and the Ministry of Fuel and Energy.



Source: Imepower Consulting

c) Generation

Generation is divided into three categories. Thermal power plants are owned by regional generation companies, known as "gencos". Ukrhydroenergo owns the 11 hydro power plants. The Energy Company of Ukraine holds the government's shares of both the gencos and Ukrhydroenergo. In contrast, the four nuclear power plants are owned by the state company Energoatom. Initially after the reforms, there were four

regional gencos: Zakhidenergo, Centrenergo, Dniproenergo and Donbasenergo. These companies managed 14 large thermal power stations. A new genco, Skhidenergo, emerged out of a debt restructuring process through which Donbasenergo transferred three of its five power plants to settle unpaid claims[19]
. This transfer of shares has been very controversial because of complaints about asset stripping and what was effectively a non-competitive privatization of state assets. While Skhidenergo is privately held, the Energy Company of Ukraine owns the majority of shares in the other companies. Still, even the majority state-owned gencos have significant volumes of shares traded on the stock market: all four are among the top ten companies by market capitalization on the Ukrainian stock exchange. The gencos theoretically compete on the power market, called Energorynok. Energoatom and Ukrhydroenergo also sell power to Energorynok at regulated prices representing about 60% of traded volumes. Skhidenergo had profit margins of 12% in 2005 and of 28% in the fi rest half of 2006, compared to Energy Company of Ukraine's margins of 4 and 8%, respectively.

The following major power generation companies exist in Ukraine at present:

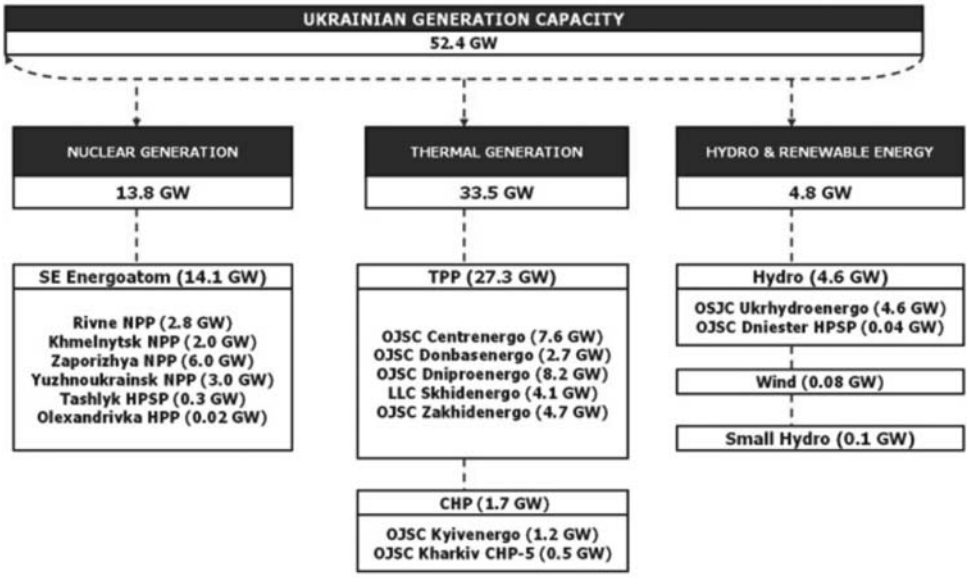
- 5 thermal power generation companies – Centrenergo, Donbasenergo, Dniproenergo, Skhidenergo and Zahidenergo comprising 14 powerful thermal power plants with total installed capacity of 27.3 GW;
- 4 nuclear power plants with total installed capacity of 13.8 GW united in the State Enterprise Energoatom;
- 2 hydro power generation companies - Ukrhydroenergo and Dniester HPSP comprising cascades of hydro power plants at Dnieper and Dniester rivers with total installed capacity of 4.6 GW.

Ukraine also has a number of combined heat & power plants (CHPs). Some of them are being operated by local power distribution companies and other institutions while others became separate enterprises. In addition, small electricity producers (small hydro and wind power plants) operate in Ukraine, but their share of total electricity production is insignificant.

As of 2009, total installed capacity amounts to some 52.2 GW with around 66% being installed in thermal power plants, 26% in nuclear power plans

[19] IEA – Ukraine Energy Policy Review 2006

and 9% in hydro power plants. Nuclear plants account for the largest share in electricity generation with 47% of the total electricity production of around 192 TWh in 2008 produced in nuclear power plants and 47% in thermal power plants and CHPs with the remaining 6% produced by hydro and renewable energy sources.

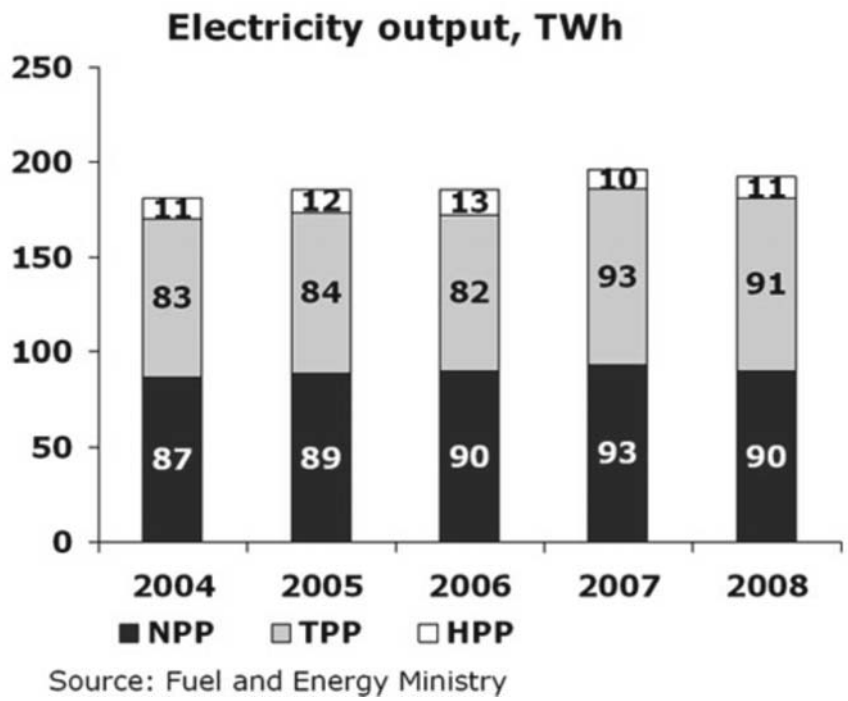


Source: Imepower Consulting

Source: IMEPOWER Consulting
http://www.imepower.com/index.php?lang_id=3&menu_id=17&parentmenu_id=2

d) Distribution

There is a distribution company in each of Ukraine's 25 regions, plus one each in the cities of Kyiv and Sevastopol. Among these 27 regional distribution companies, there is a mix of state and private ownership. The distribution companies, called oblenergos, also own small cogeneration assets, mainly to produce heat for district heating. Kyivenergo is somewhat unique in that it is a vertically integrated joint stock utility, which both generates and distributes power and heat to the capital, Kyiv. In general, the distribution companies buy power from Energorynok and sell it to all but the largest consumers in their service territory. Thus, they each have a monopoly on electricity supply to end users.



Source: Fuel and Energy Ministry

The National Electricity Regulatory Commission (NERC) sets distribution tariffs on a cost-plus basis. It also reviews investment proposals of each oblenergo. Since September 2005, while NERC still reviewed and approved costs regionally, it also set a unified distribution tariff for the whole country. Local authorities also play an important role in that they determine whether customers in arrears are disconnected. In the past, they have often tried to delay disconnections for social reasons, which contributed to growing debts in the electricity sector. Collection levels have significantly improved in recent years; in 2005, they stood at an impressive 99.3%. The government privatized six distribution companies in two privatization rounds; the first round was criticized because of the lack of transparent criteria for bidders; the second round brought in two international investors (AES and the Slovak/Dutch company VS Energy). The remaining distribution companies are partially privatized, with a mix of free floating shares, state owned shares and shares owned by other major shareholders. Companies in the Surkis Group are the largest in this last category, owning up to 75% of the shares in ten distribution companies.

Overall, the private distribution companies have a better track record than the state-owned ones with reducing losses from electric power lines. Private companies have also invested more on average.

Source: Fuel and Energy Ministry

e) Consumption

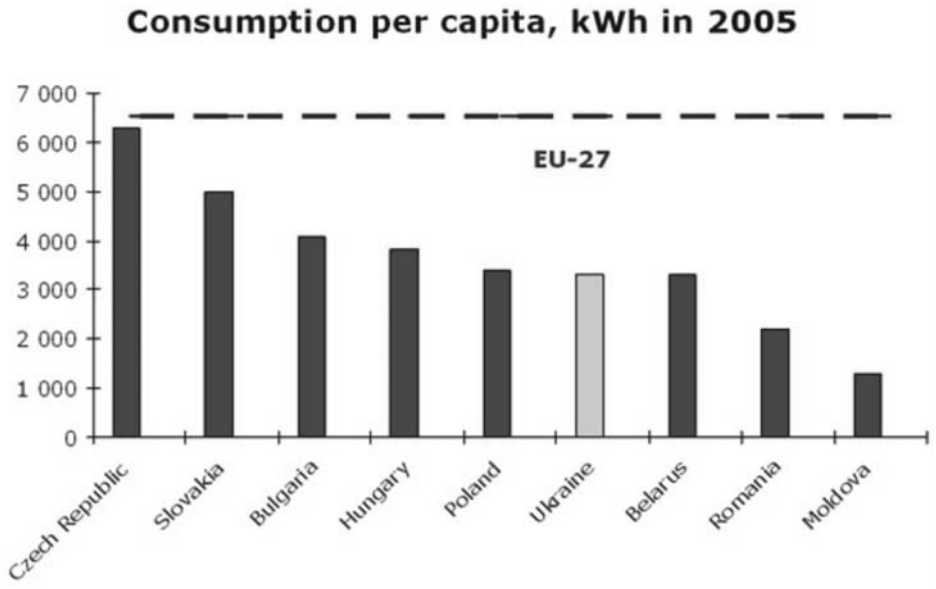
Some 97% of electricity produced in Ukraine is consumed domestically. Industry remains the largest consumer, comprising 52% of consumption, while households account for 22%. As of 2008, domestic electricity consumption decreased 0.5% due to GDP growth slowdown to 2.1%. Consumption per capita in Ukraine is more or less in line with that of neighboring countries (3,300 kWh) like Poland, but still does not reach the EU average of 6,500 kWh.

f) Capabilities

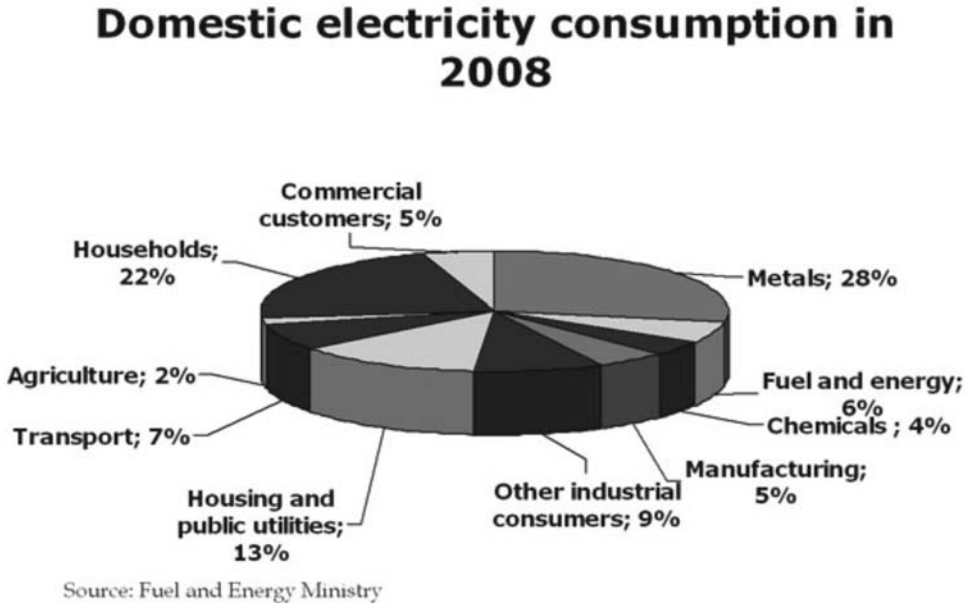
Transmission

NEC Ukrenergo is the system and network operator that owns high voltage transmission network and cross-border lines of Ukraine. Total length of the transmission lines is more than 22.000 km:

- 4,115 km 750 kV lines
- 375 km 500 kV lines



Source: IEA



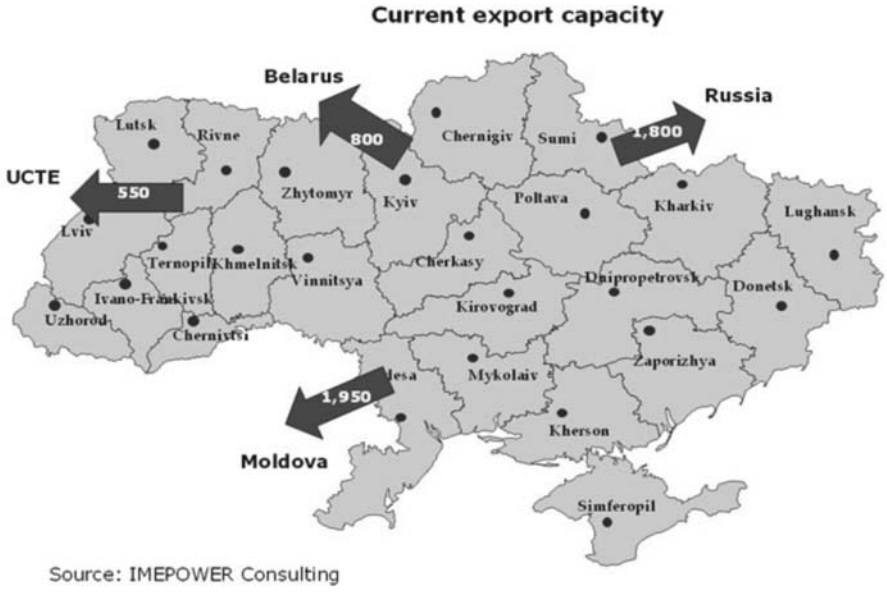
Source: Fuel and Energy Ministry

- 340 km 400 kV lines
- 13,000 km 330 kV lines
- 4,170 km 220 kV lines[20]

Export/Import

Ukraine's power grid has **interconnections** with its neighboring countries, including Russia, Republic of Moldova, Belarus, Poland, Slovakia, Hungary and Romania. With the European **UCTE grid** only the power plants on **Burshtyn Island** in Western Ukraine are connected. The export capacity of the island is 550 MW. As a net exporter of electricity Ukraine sold 7.7 TWh, in 2008 which is 15% less than the 9.2 TWh it exported in 2006. Ukraine imported 0.6 TWh from Russia in 2008.

Electricity export is carried by **State Enperprise Ukrinterenergo** which is de-facto monopoly taking benefit of technically limited cross border capacity. The NERC approves tariffs for electricity purchased by SE Ukrinterenergo from the WEM. Export from Ukraine can be liberalized in the nearest future if NEC Ukrenergo starts competitive allocation of cross border capacity, which has been allocated to date to serve only Ukrinterenergo's contracts.



Source: IMEPOWER Consulting http://www.imepower.com/ index.php?lang_id=3&menu_id=17&parentmenu_id=2

[20] IMEPOWER Consulting - http://www.imepower.com/index.php?lang_id=3&menu_id=17&parentmenu_id=2

Wholesale Electricity Market

Ukraine's Wholesale Electricity Market (WEM) began operating in 1997. The state company Energorynok (or "power market") operates the market, serving as a single buyer of power. In principle, the large thermal gencos compete to sell power to Energorynok. Energoatom and Ukrhydroenergo also sell power (nuclear and hydro) to Energorynok, but at prices set by NERC. Thus, the competitive wholesale supply accounts for only about 35-40% of the power sold to Energorynok. Energorynok then sells power to the oblenergos and large industrial fi rms. NERC sets the regulated prices for transmission and distribution services (Kalchenko, 2004). In turn, the oblenergos sell to customers at rates that are based on the wholesale price plus the transmission and distribution tariff.

National wholesale electricity market operator **State Enterprise Energorynok** is the **single buyer** of electricity in Ukraine. SE Energorynok buys all electricity from the generation companies, averages the prices and sells the electricity to electricity distribution companies and independent suppliers at a blended rate. Apart from this function Energorynok administers WEM's settlements and funds.

Each member of the WEM must sell all electricity produced and imported for sale in Ukraine exclusively on WEM except of:

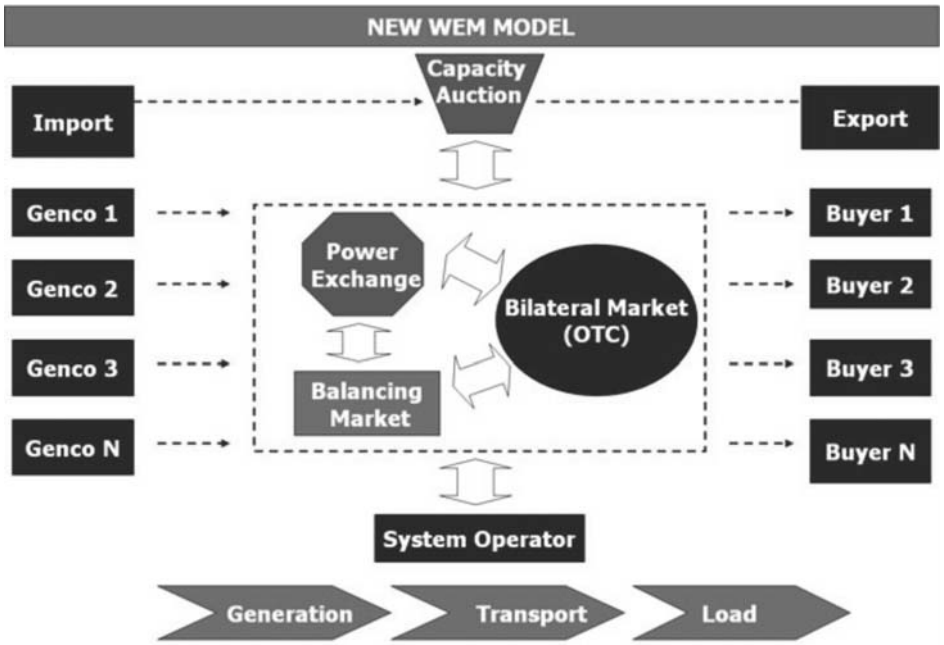
- electricity used for own needs by each electricity producer;
- electricity produced at CHPs and supplied to consumers of the region (territory) where they are located;
- electricity produced at power stations with installed capacity and annual electricity output lower than determined limit indices - 20 MW and 100 GWh correspondingly.

The WEM is divided into two parts with TPPs and few large CHPs functioning on the competitive segment and the remaining generation plants (nuclear, hydro, wind, CHP) working on the fixed tariffs segment (with the tariffs approved by the NERC).

Reform of the WEM

On September 29, 2008 the Ukrainian Government held the First Ukrainian Electricity Market Reform conference, outlining core directions for the WEM reform. The market should be divided into several parts according to how generation companies will sell their output: bilateral contracts, day-ahead market, balancing market, system/ancillary services market and

export/import electricity auctions. This is done in compliance with the WEM Concept approved by the Government in 2002 and re-confirmed in 2007.



Source: KEMA

2. Oil and Gas

a) Legislation, Institutions and Policy

The most important laws regulating the oil and gas sector in Ukraine include: the *Law on Oil and Gas* (July 2001); the *Law on Concessions* (July 1999); the *Law on Pipeline Transport* (May 1996); the *Law on Subsoil* (July 1994); and the *Law on Production Sharing Agreements* (September 1999). Additional laws that influence activities in the oil and gas sectors include: the *Law on Licensing Certain Types of Economic Activities* (2000), the *Law on Natural Monopolies* (2000) and the *Law on Protecting Economic Competition* (2001). In addition, international agreements regulate some legal aspects of the oil and gas sector (Chapter 6: Energy Transit). Ukraine announced its objective of acceding to the *Energy Community Treaty,* which extends the EU *acquis* on electricity and gas markets to non- member countries in South East Europe. In early 2006, the Ministry of Fuel and Energy was drafting a proposal of a law on the natural

gas market. This bill focused on transitioning to a competitive gas market and harmonizing Ukrainian legislation with major EU directives - in particular, the EU Gas Directive 2003/55.

The 1999 *Law on Production Sharing Agreements* (PSA) introduced some benefits for investors such as exemptions from the profit repatriation tax, value-added tax (VAT) and customs duties for exported PSA products. However, up to the end of 2005, no PSAs were signed. This is an indication that the law did not create a framework sufficiently attractive to investors. In particular, the ownership of oil and gas produced under PSAs is not straightforward.

Ukraine adopted a *Law on Rental Payments on Oil, Natural Gas and Gas Condensate* in 2004, which was expected to stimulate domestic production of hydrocarbons through improved price and tax mechanisms. As of early 2006, the law was not yet implemented. In 2004, Ukraine also adopted modifications to the *Law on Oil and Gas,* aiming to improve the competitive bidding mechanism for hydrocarbon exploration and production in the Black and Azov Seas.

In early 2006, the government held a competitive tender for the right to conclude a Production Sharing Agreement for the 12 900 square km Prykerchensky Block in the Black Sea, off shore of Kerch (Crimea). Vanco International Ltd, a subsidiary of Houston-based Vanco Energy Company, won the tender and investments of over 2 bln USD have been made.

The state holding company Naftohaz of Ukraine ("oil and gas of Ukraine") plays a dominant role in many aspects of the oil and gas business in Ukraine, including oil and gas production, management of trunk pipelines, oil and gas transit, and natural gas processing and distribution in Ukraine. Another state joint-stock company, Nadra of Ukraine ("subsoil of Ukraine"), deals with most of the exploration of hydrocarbon reserves. Several other private and public companies explore and produce hydrocarbons, but their collective share of total oil and gas production is less than 3% and 4%, respectively.

Naftohaz of Ukraine has several affiliate companies including Ukrtransnafta, Ukrtransgaz, ChornomorNaftohaz and Gas of Ukraine. Ukrtransnafta operates all main oil pipelines in Ukraine. Ukrtransgaz is in charge of the gas transmission system (GTS) and gas storage in most of Ukraine, while ChornomorNaftohaz operates transmission lines and a storage facility in Crimea. Gas of Ukraine is a wholesale gas company and,

as such, sells gas to regional distribution companies (oblgaz). Most of the 42 gas distribution companies are partially privatized, but Naftohaz of Ukraine holds shares in most of them.

The government has liberalized the processing and distribution of petroleum products in Ukraine. Russian companies control four out of six Ukrainian refineries. Several foreign (mostly Russian) companies operate filling stations in various parts of the country. Since 2003, Ukrnafta, an oil company affiliated to Naftohaz of Ukraine, has purchased many filling stations across the country.

b) System structure

Ukraine's Naftohaz[21]

Ukraine's Naftohaz was created in 1998 as a holding company and is 100% owned by the state. Via its affiliates, it produces, transports and trades oil and natural gas, processes gas and condensate, distributes some oil products and holds shares in gas distribution companies. It also handles oil and gas transit, exports and imports. Natural gas operations far outweigh other company business: until 2005, some 51% of the company's revenues were from the sale of gas, and about 20% from gas transportation (primarily transit). In 2004, Naftohaz of Ukraine accounted for some 13% Ukraine's GDP and approximately 10% of the state budget. As a consequence, any change in the terms of gas business has a large-scale and immediate impact on Naftohaz of Ukraine's finances and on the economy at large. As an example is the year 2009 when the company's external and internal debt was at an impressive 14 billion USD.

The structure of the holding company is very complex, organised generally around technical aspects of the work and not around customer types. Various affiliates handle the business, but overall operational and especially financial decision-making is largely vested in the holding company, as are asset management functions. International experience shows that the decision-making process in such large state-owned companies is often inefficient and politically driven; costs and benefits are not always adequately identified and allocated. In Naftohaz, political considerations often take a prominent position in business decisions. Business operations at Naftohaz are not particularly transparent: the company has never been

[21] Naftohaz Ukraine - http://www.naftogaz.com/www/2/nakweb.nsf?Open

subject to a consolidated, financial audit by an independent auditor, though independent auditors have reviewed some aspects of its business. Although Ukrainian legislation prohibits government officials from holding positions in business entities, such overlapping of political and commercial functions has happened in the past. For example, the former head of Naftohaz, Olexiy Ivchenko, simultaneously acted as deputy minister of fuel and energy. Encouragingly, in December 2005, a presidential decree liquidated the position of Deputy Minister-Head of Naftohaz of Ukraine, and dismissed Ivchenko from his ministerial functions.

Naftohaz of Ukraine owns 100% of its three subsidiary companies, five subsidiary enterprises, two state joint-stock companies and one open joint-stock company. It also owns 50+1% share in another open joint-stock company, Ukrnafta. Naftohaz of Ukraine has majority holdings in 19 regional gas distribution companies and several industrial and service companies. It has minority holdings in several other companies. Naftohaz of Ukraine is actively borrowing abroad. The credits are used, at least partially, for operational purposes, such as paying taxes and debts in arrears. Some in the government fear that Naftohaz of Ukraine, overextended with debt, would not be able to repay these loans and would technically go bankrupt. This raises a concern that Ukraine might be forced to sell oil and gas assets, in particular its gas pipelines, to repay the debt, or face an expensive bail out.

In 2009 debt level was at 14 billion USD and rising due to high gas price negotiated with the Russian Federation (one of the highest of all gas importers of Europe) by the Tymoshenko government (following the gas-crisis in January 2009) transforming it from almost profitable into a heavy weight. Although Ukraine benefits from major gas imports, the country's regulatory system is lacking in reform, comprehensive legislation and mainly corrupt, allowing great resource waste.

Domestic Market Structure

Ukraine's gas transmission system (GTS) operated by Naftohaz NJSC (Ukrtransgaz SC) is closely connected with gas transportation systems of Russia, Belarus, Poland, Slovakia, Hungary, Romania and Republic of Moldova, and integrated via these systems into the Europe-wide gas network. Owning to its favorable geographical position, the system acts as a sort of "gas bridge" between gas production regions of Russia and Central

Asia and European consumers. Input capacity of the GTS is 290 billion m3 of natural gas, while its output capacity is 178,5 billion m3 including 142,5 billion m3 of natural gas transported to West and Central European countries. More than 80% of Russian natural gas is transited to European countries through the territory of Ukraine.[22]

In recent years, the company provided transport for 70-76 billion m3 of natural gas to Ukrainian consumers and transit for more than 120 billion m3 of natural gas to West and Central European countries.

An important process link of the gas transmission system is the underground gas storage network consisting of 13 underground gas storage facilities with the total working capacity of 34.5 billion m3 and the total daily productivity, subject to their complete filling, of 250 million m3. In terms of this index, the system takes second place in Europe after the Russian one. Due to its favorable geographical position in the pass-through area of the most important transit gas pipelines, the gas storage network is an important gas supply regulator for the European continent. The network provides reliable gas supply to Ukrainian consumers and transit of Russian gas to third countries.

The country's oil pipeline system operated by NJSC Naftohaz of Ukraine (OJSC Ukrtransnafta) serves to deliver oil supplies from Russia and Kazakhstan to oil refineries of Ukraine as well as to pump oil for export to the countries of Central and Eastern Europe. Annual input capacity of the system is 114 million tons and the transit output capacity is 56,3 million tons. The sea oil terminal at Pivdennyi, equipped with a crude storage system of 200,000 cubic metres, can receive oil tankers with the deadweight of 100,000 tons. According to the actual oil pumping volumes in 2008 there are input capacity reserves of 73 million tons, output (transit) capacity reserves of 23,5 million tons, and output (oil refinery) capacity reserves of 49,5 million tons. The average load level of the oil and gas transmission system is 37%.[23]

Ukrspetstransgaz SJSC, as a participant of Naftohaz NJSC, provides services for the transportation of liquefied petroleum gas (propane - butane) in special gas tank cars from its producers to consumers within Ukraine and

[22] Naftohaz Ukraini - http://www.naftogaz.com/www/2/nakweben.nsf/0/06B18C47585BBC06C225710F0046F481?OpenDocument&Expand=1&

[23] Idem 22

abroad (Romania, Hungary, Republic of Moldova, Slovakia, Poland, Bulgaria). The enterprise has on its balance 1,860 rail tank cars. The enterprise annually carries hundreds of thousand tons of liquefied gas.

c) Capabilities

Transportation and Distribution

The *Law on Pipeline Transport* (1996) prohibits privatization of main pipelines and main oil and gas storage facilities. It also prohibits a change of ownership of the government-owned enterprises in the sector. However, the *Law on Oil and Gas* (2001) allows private and municipal ownership of new main pipelines and trans-shipment terminals for gas and oil. If a private or municipal entity builds a pipeline or a terminal subsequent to the enactment of the *Law on Pipeline Transport,* the facility can be retained in private or municipal ownership.

The *Law on Concessions* (1999) allows both main and distribution gas pipelines (but not oil pipelines) to be contracted out on concession terms to Ukrainian and foreign entities. The granting of a concession does not lead automatically to the granting of a license. If a license is needed for the specific activity in question, the concessionary must apply for a license separately. The term of a concession is minimum 10, and maximum 50, years. Licenses are required for the storage of natural gas in volumes exceeding 5 Mcm (million cubic meters), as well as for other aspects such as: the supply of natural gas; repairs, upgrades and rehabilitation of oil and gas pipeline systems; transportation of crude oil and refined products by main pipelines; and transportation of natural gas by pipelines.

The *Law on Oil and Gas* (2001) introduced the notion of a "Unified Gas Transportation System of Ukraine" and directed the development and implementation of a common set of technical and safety regulations within the system. Dispatch was entrusted to a state-owned body, a department of Ukrtransgaz. A NERC decree[24] requires holders of gas transportation licences to assure non-discriminatory access to pipelines for all gas supply companies. A Naftohaz order[25] defines technical requirements, procedures and terms of access to the company's pipelines. These regulations contain few details on congestion management, which is a key issue in fair access. One of the reasons may be the available excess capacity throughout almost the entire system of pipelines.

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[24] *Decree No. 856, 30 September 2005. The previous decree of 13 September 1999 also had such a provision*

[25] *Order No. 79, 26 March 2001.*

Imports

Natural gas imports play a vital role for the Ukrainian economy, accounting for 75-78% of the country's gas consumption. (domestic production supplies the remaining 22-25%.) Until 2001, Ukraine imports most of its gas from Russia. With a deal signed in May 2001, Turkmenistan became the largest gas supplier to Ukraine. In 2004-05, Turkmenistan supplied about 44% of Ukraine's gas needs; Russia supplied another 30-33%. In the first half of 2006,

Ukraine reportedly received no gas directly from Turkmenistan. Even with these shifts in suppliers, all imports pass through Russia. Thus, Russia's gas monopoly, Gazprom, maintain effective control over gas imports to Ukraine.

The January 2006 Gas Agreement has significantly changed Ukraine's gas imports arrangements. The sharp increase in import price in 2006 has raised concerns that the competitiveness of Ukrainian industries may be put at risk. Ukraine's economy has seen strong growth in 2006, though domestic gas prices are likely to rise further. More importantly, uncertainty about gas supplies and gas prices in the second half of 2006, destabilised the political and economic situation in Ukraine. Signs of gas supply troubles were already evident during the first half of 2006: by June, Naftohaz had injected less gas in the underground storage facilities than planned, reportedly because Ukraine did not receive gas from Turkmenistan directly. In July 2006, Prime Minister Yekhanurov publicly stated that Ukraine may potentially have an 11 bcm deficit of gas in the second half of the year.

Domestic Production

Ukrainian gas production in the last 15 years was approximately 18-20 bcm per year, compared with its record of 68.7 bcm in 1975. Three Naftohaz of Ukraine affiliate companies produce the vast majority of Ukrainian domestic gas: Ukrgazvydobuvannia produces about 75%, Ukrnafta more than 17% and ChornomorNaftohaz another 4.2%. Domestic production started growing in 2001; almost half of the increase in production has been from independent producers. This is an important point as it indicates the role private investors can play in increasing gas production in Ukraine. In its basic scenario, the *Energy Strategy to 2030* suggests that domestic gas production will reach 23.2 bcm in 2010, 26.1 bcm in 2020 and 28.5 bcm in 2030. The *Energy Strategy's* optimistic scenario projects domestic

production of 30.1 bcm in 2030. The World Bank estimates that a production increase of 10 bcm per year from proven reserves would require capital investment of USD 1.5 billion. If gas production grows at the optimistic rate, Ukraine will have produced more than 630 bcm from 2005-30. This is more than half of the official estimates of the actual proven reserves, which are estimated at 1 030 bcm.

Crude Oil Imports

Ukraine is a net oil importer. Domestic production covers only 16-20% of the country's crude oil demand. Ukraine receives the vast majority (more than 96%) of its crude oil imports from Russia. A small amount (less than 4%) comes from Kazakhstan, although in 2005, Ukraine did not receive any Kazakh oil. Ukraine is seeking to diversify its oil sources, but Russia will likely remain the main supplier. Naftohaz of Ukraine plans to buy 2-4 Mt of Kazakh oil per year out of the volumes transited through Ukraine's territory, and up to 2 Mt of Libyan oil per year. Naftohaz of Ukraine also plans to produce oil abroad. It has signed Production Sharing Agreements with the United Arab Emirates (UAE) and with Libya. It has also been looking for exploration and production opportunities in Iraq, Syria and several other countries. In addition, Ukraine has signed initial agreements to produce oil and gas in Central Asia, although it is not clear that it will have the financing to invest without other partners. There is also the question of transit through Russia, which has been difficult to negotiate with in the past. Ukraine's refineries were designed to process the Russian Urals grade of crude for a high yield of fuel oil. This low degree of sophistication of the refineries is now a major impediment to the diversification of oil supply. Oil from potential suppliers outside of Russia is of better quality (lighter and less sour) compared to the Urals. It makes no economic sense to process oil of this higher quality at refineries that turn out mostly low value products: the operation would result in a substantial loss on a netback basis.

Domestic Production

Ukraine annually produces about 4.2-4.3 Mt of light, sweet crude oil and gas condensate, 97% of which is produced by Naftohaz. As of 2005, Naftohaz of Ukraine operated 225 oil and gas fields with 2 393 producing oil wells. The major oil production company is Ukrnafta, which produces about 2.9 Mt. The *Energy Strategy to 2030* expects that domestic oil production will reach 5.1 Mt in 2010 and 5.4 Mt in 2030. Companies that

produce oil and gas condensate in Ukraine must sell them at oil auctions, operated by the Auction Committee.

Strategic Storage

In the autumn of 2004, the government, under former president Kuchma, launched the idea of building strategic oil stocks in Ukraine. Under President Yushchenko, the Cabinet of Ministers included the creation of a 90-day strategic oil reserve in its *Towards the People* program. As such, Ukraine has significant gas storage capacity at 13 facilities grouped in four large areas: Carpathian in the West, Kyiv, Donetsk and South Ukrainian, the Western one being the largest. According to Naftohaz, Ukraine accounts for 21% of gas storage capacity in Europe (Russia has 45%).[26] Ukrtransgaz operates 12 of the underground gas storage (UGS) facilities (ten in depleted gas fields and two in aquifers); ChornomorNaftohaz operates another facility. On several occasions, Gazprom has indicated its interest in acquiring equity in underground gas storage facilities, but Naftohaz of Ukraine declined. The storage facilities can contain up to 33 bcm of active gas. In recent years, Naftogaz has injected some 15-18 bcm of gas into storage every summer and has pumped it out in winter, when demand is at its peak. In 2005, for example, Naftohaz of Ukraine pumped in 15.5 bcm and pumped out 17.9 bcm of gas. When the storage facilities are full, it is possible to pump out up to 240-255 Mcm per day (for comparison, the daily demand in winter is around 400-500 Mcm). At the end of the winter season, a significant amount of "cushion gas" remains in storage (this is technically unavoidable). The *Energy Strategy to 2030* states that the gas storage capacity can be increased by 7 bcm per year by reconstructing and modernizing three storage facilities: Solokhivske, Proletarske and Bilche-Volynsko-Uherske. The storage facilities situated in Western Ukraine are used almost exclusively for servicing export; the one in Crimea is used only for servicing nmarkets in the peninsula. Therefore Ukraine cannot use much of its vacant storage capacity for the domestic market.

Naftohaz has been trying to sell storage services in Western Ukraine to customers in France, Poland and Germany, but with little success. Gazprom previously stored some gas in Ukraine, which was intended for export to Europe. According to the National Gas Union of Ukraine, Gazprom injected,

[26] Naftogaz of Ukraine - www.naftogaz.com

stored and withdrew nearly 73 bcm of gas to and from the Ukrainian storage facilities between 1993 and 2005 (National Gas Union, 2006); this is equal to about 6 bcm of storage on an average annual basis. However, in the first half of 2006, Gazprom reportedly did not have any gas in Ukrainian storage facilities. According to preliminary Naftohaz of Ukraine data, the 8.8 bcm injected into Ukrainian storage facilities by the end of July 2006 included 2.6 bcm belonging to Naftogaz, 1.6 bcm to RosUkrEnergo, 4.3 bcm to UkrGaz-Energo and the rest to Chornomornaftogaz and other owners.

Energy Consumption and Energy Efficiency

Ukraine consumed and continues to consume an disproportionate share of energy in terms of GDP. Consumption of gas in one of the most obvious examples of this reality. Ukraine consumes about 3% of total global consumption of natural gas, thus being among the top ten biggest gas consumers (ranked 6-7th). In the meantime, a share of Ukraine's economy is almost 5 times lower than this indicator (a little bit over 0,6% of the world's economy). Ukraine's dependence on Russian gas became threatening not that much because of Russian monopoly on gas and its routes to Ukraine, but due to excessive energy consumption of the Ukrainian economy and to many years of opaque commercial relations, leading to the emergence of specific pricing, both for gas supplies and transit fees. For instance, statistics of the pre-crisis year 2005 could be used as an evaluation tool, when Ukraine's gas consumption skyrocketed, while the energy efficiency and energy-saving technology failed to become a national priority policy, just remaining on discussion agendas. In 2005 Ukraine consumed 76.4 billions cubic meters of gas, including the population share of 18.0 billion cubic meters, and the volume of 7.5 billion cubic meters for technological service of gas extraction and gas transportation enterprises. As reported in the balance of natural gas supply and distribution, of 2005 Ukraine imported 55.9 billions cubic meters from Russian Federation and countries of Central Asia. According to the 2006 American Energy Administration report, Ukraine was ranked among the biggest energy consumers in Europe. In the total energy composition of 2005 the natural gas has almost 50% share and 75% of it was imported from the Russian Federation. Since the end of 2008, the economic crisis caused a decrease in gas consumption in Ukraine, primarily through

significant contraction of industrial output that is a traditional source of enormous gas consumption in Ukraine.

According to calculations provided by Naftogaz, Ukraine's total consumption of natural gas in 2009 was 55.9 billions cubic meters, where:

- 33 billions cubic meters imported,
- 20.6 billions cubic meters extracted,
- 2.3 billions cubic meters from underground storages.

Domestic consumption structure:

- 17.8 billions cubic meters private consumption
- 10.5 billions cubic meters heating utilities enterprises
- 1.05 billions cubic meters state budget organizations
- 19.3 billions cubic meters industrial consumption

As for the internal sources of natural gas according to Energy Strategy of Ukraine till 2030, approved by the Cabinet of Ministers on March 15, 2006, more than 75% of gas fields have initial recoverable reserves less than 10 billion cubic meters. Only 4 gas fields had initial recoverable gas reserves over 100 bcm (Yablunivske, Yefremivske, Zahidno-Khrestyshchenske, and Shebelynske). It is still important today; these 4 gas fields provide more than 25% of current natural gas production[27].

Ukraine has rich gas reserves; the total is estimated to be 1.12 trillion cubic meters. Onshore gas fields are located primarily in central Ukraine (Dnipro-Donetsk Basin), although smaller deposits can be found in western Ukraine's Carpathian region. Additionally, offshore reserves in the Black Sea and the Sea of Azov are estimated at approximately 73 billion cubic meters (bcm)[28]. Ukraine's gas production is facing problems also due to the fact that more than 15% of its gas reserves fall under the 'hard-to-recover' category by such criteria as reserves depletion degree and reservoir properties of the rock. They are categorized as low-permeable reservoirs, multipay fields, with high lithologic heterogeneity, both in terms of area and pay zone thickness. Virtually all reserves in the Precarpathian fields are hard to recover. The development of hard-to-extract reserves require specific, scientific-intensive and high-cost processes and technology are employed. Based on data regarding forecast changes in efficiency of geological-geophysical studies and prospect drilling, a preliminary estimate

[27] Energy Strategy of Ukraine for the Period until 2030

[28] Baran, Z., Tuohy E. Energy Security: Ukraine's Existential Challenge ttp://www. hudson. org/files/publications/EnergySecurity. pdf

of the possible increment of explored gas reserves was made for the forecast period. It was assumed that gas-well prospect drilling will achieve the levels provided for under the National Program 'Oil and Gas of Ukraine until 2010', i. e. 415,000 meters/year, which is 2.5 times more than the actual scope of gas-well prospect drilling operations in 2004. The calculations show that given such conditions over the forecast period (2006-2030), the explored reserves can be incremented up to 1,022.7 bcm based on the best-case scenario, and up to 670 bcm based on the pessimistic scenario. According to the above mentioned Energy Strategy of Ukraine till 2030, gas production levels over the short- and long-term period will be determined by the following factors:

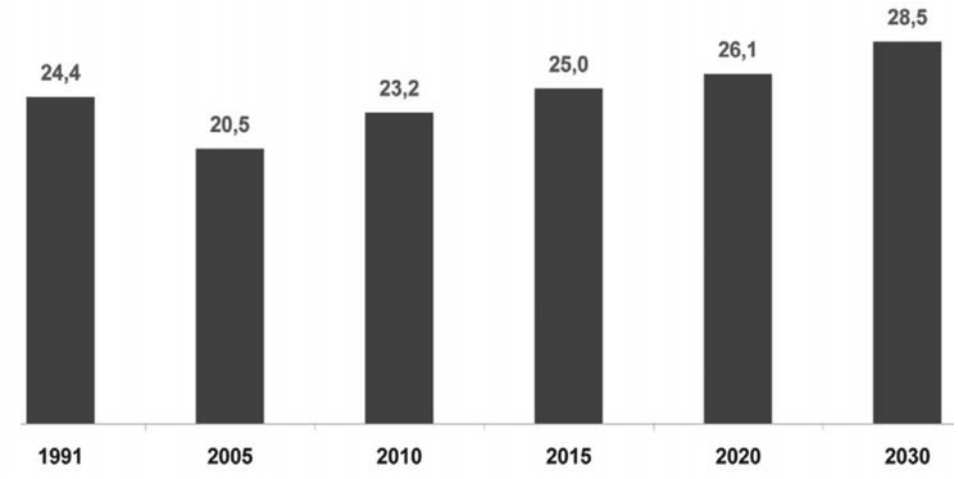
- Enhancement of the efficiency of hydrocarbon production from fields currently under operation;
- Acceleration of the development of new reserves;
- bringing gas prices to economically justified level for all consumer categories[29].

Given the gas production history of fields brought into development, and forecast changes in explored hydrocarbon resources, gas production volumes over the forecast period have been calculated (internal sources, base-case scenario).

Gas Production in Ukraine, bcm (according to Energy Strategy of Ukraine till the year 2030)

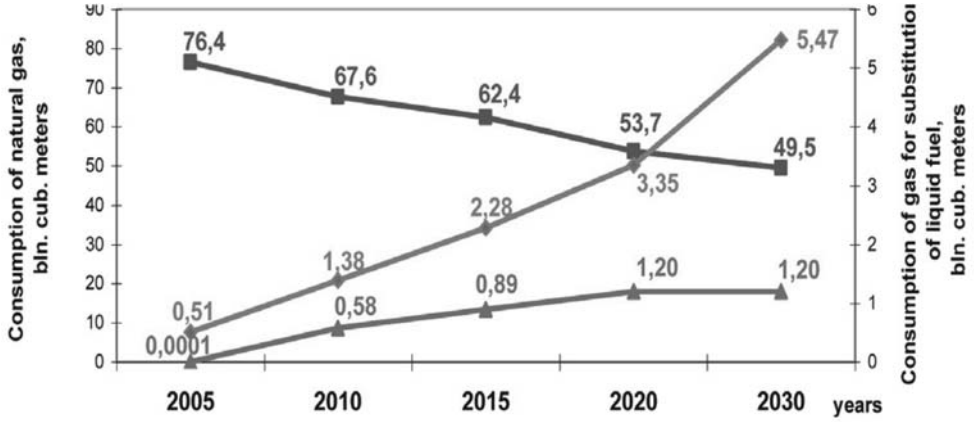
Based on the best-case scenario, natural gas production in Ukraine is expected at 23.5 bcm in 2010, 25.5 bcm in 2015, 26.6 bcm in 2020, and 30.1 bcm in 2030; and based on the worth-case scenario, 20.8 bcm in 2010, 23.0 bcm in 2015, 24.6 bcm in 2020, and 26.9 bcm in 2030[30]. Obviously such forecast allows to hope that in case of a coherent policy of increasing energy efficiency and energy-saving, Ukraine has a chance to lower its gas dependency on Russia in the midterm perspective, as the forecast provides for reduction of the share of imported gas from75% of consumption to relatively secure level of 30-35%. Authors of Ukraine's Energy Strategy however consider such a possibility to be achieved only up to 2030.

[29] Idem 27
[30] Ibidem 27



Source: Ukraine 2009 Raport on Transformation - 4th EUROPE-UKRAINE FORUM

Forecast of Gas Consumption Dynamics in Ukraine, billion cubic meters (according to Energy Strategy of Ukraine till the year 2030)



Source: Ukraine 2009 Raport on Transformation - 4th EUROPE-UKRAINE FORUM

III. RISK ASSESSMENT AND MITIGATION

Assessment of the existing energy security strategies of the Wider Black Sea Region. Realism, feasibility, capacity of adapting those plans to the evolution of the situation in the region.

Assessment of the level of fulfilling the three basic requirements of the security in a given crisis situation, for each country.

Ukraine has some leverage over Russia, as more than 80% of Russian gas exports to Europe go through Ukrainian territory[31]. However, Russia has been making steady and concerted effort to bypass its „unreliable" Ukrainian partner by promoting new pipelines under the Baltic and Black Seas. Russian-Ukrainian energy relations, especially in terms of natural gas supply and transit can be described as consistently conflict provoking. It should be mentioned that, during the first years of Ukraine's independence, there was a stiff dependence on Russian energy supplies that caused a systemic Kyiv's dependence on its northern neighbor. Ukraine's insolvency at the time of the transformation crisis, which occurred at the beginning and in the mid-nineties, coupled with a lack of political will to reduce energy dependence and to raise the sector's efficiency, torpedoed accumulation of gas debts. The raising debt, was used by the Russian Federation to make constant pressure through gas or energy means, or even economic or commercial matters. Ukraine's gas transportation system consists of a range of main and supplementary gas pipelines, representing four out of five existing routes for transporting Russian gas to EU's member states (the fifth goes through Belarus), thus providing 80% of Russian gas transit to the EU. For a long time, gas relations between Ukraine and Russia were based on specific, non-transparent and ambiguous for the western partners' preferential approaches. These relations envisaged bilateral discounts both for gas consumers in Ukraine and for Russian supplier for the gas transit though the Ukrainian territory. Such a situation enabled Russia to talk about alleged subsidizing of Ukraine through relatively low gas prices. The situation has only changed in 2009-2010, after the crisis, as a result of the establishment of a formula for calculating the price and by abandoning the practice of „special relations" in the gas dimension.

Recent history demonstrates the level of the state's capacity to react on the certain crisis challenges, which is described below accompanied by the analysis of anti-crisis implications of the recent Ukraine's accession to Energy Community treaty (ECT).

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[31] Baran, Z., Tuohy E. Energy Security: Ukraine's Existential Challenge http://www.hudson.org/files/publications/EnergySecurity.pdf

Short run catastrophic effects

Within recent years Ukraine experienced **short run catastrophic effects or sudden cut of supplies** twice; the first case was in January 2006 when Russia suspended gas delivery to Ukraine between January 1 and 4, 2006; the second case, a more severe crisis, happened when deliveries were fully interrupted for 14 days, from January 7 to 20, 2009, which led to unprecedented cuts of energy supplies to all of Gazprom's customers in Europe.

The first crisis, that of January 2006, was solved through gas agreements, signed by Prime-Minister Yekhanurov in Moscow on January 4, 2006. According to official opinion of the government, the agreement provided guarantees for an immunity of the Ukrainian gas transportation system, a gas balance for the Ukrainian consumers and transit to Europe, among other. But mainly, the agreement set a transition period, which Ukraine should use as efficiently as possible in order to modernize its industries and install energy-saving technologies. As of the PM Yury Yekhanurov's statements, in the beginning of 2006, further confrontation could have caused disruption in gas transportation as well as a possible anthropogenic disaster. The agreements signed on January 4 enshrined establishment of a joint venture Ukrgazenergo with an intermediary company RosUkrEnergo and set a gas price for Ukraine at the level of $95 per a thousand cubic meters until 2010.

The agreement's content was highly charged in Ukraine and became subject to tough criticism from the opponents. The former Deputy Minister for Foreign Affairs of Ukraine Oleksandr Chaly referring to the agreement as "Pearl Harbor of Ukraine's energy diplomacy" lamented that the gas agreement violates the Ukrainian legislation and pursues a goal that obviously contradicts to interests of the state and society.

One of the key elements in the legal rationale for this conclusion is that Oleksiy Ivchenko, Naftogas Chairman of the Board, signed the gas agreement in the absence of the annual intergovernmental gas protocol for 2006. The latter, according to Article 2 of the Agreement between the Cabinet of Ministers of Ukraine and the Government of the Russian Federation on Additional Measures to Ensure Transporting Russian Natural Gas via the Territory of Ukraine, dated 4 October 2001, was to adjust the volumes of transited gas and transit dues (set either in monetary terms or in terms of gas volume to be supplied as payment for transporting services) to

the 2006 levels. The signed gas agreement is at odds with the terms of cooperation laid down in the 2005 Protocol between the Cabinet of Ministers of Ukraine and the Government of the Russian Federation, supplementing the 2001 Intergovernmental Agreement and signed on 2 July 2004, as well as in Addendum #4 to the effective contract between the National Joint Stock Company Naftohaz Ukrainy and Public Joint Stock Company Gazprom on Volumes and Terms of Russian Natural Gas Transit via the Territory of Ukraine for 2003-2013, dated 21 June 2002.

Meanwhile, the Ukrainian-Russian gas agreements mentioned above stipulated that these terms should apply if there was no annual intergovernmental protocol in place. Naftohaz and Gazprom were not entitled to amend those agreements independently, with no previous authorization from their respective governments.

Adoption of the agreement triggered a governmental crisis, when in 10 days after the agreement, the Parliament with a majority of 250 votes expressed no confidence in Yekhanurov's government on January 10, 2006. Nonetheless, the bilateral agreement was active until 2009[32].

This case has proved that Ukraine's government has been inclined to the decisions, not transparent enough (providing preference to intermediary company with unclear ownership) and not sustainable enough, which gives Russians a chance to skip from obligations, when political circumstances changed.

The lack of political consensus in Ukraine, on the other hand, provided constant risk that any new government of Ukraine would try to change the agreement. That exactly happened after Yulia Tymoshenko returned to government in late 2007.

The second crisis, of January 2009, was solved by agreements signed by Prime-Ministers Putin and Tymoshenko in Moscow. The two parties agreed that Ukraine would start paying "European prices" for its natural gas, less a 20 percent discount for 2009, and would pay the full European market starting from 2010. In return for the discounts Ukraine agreed to keep its transit fee for Russian gas unchanged in 2009.

The two sides had also agreed not to use intermediaries therefore to remove RosUkrEnergo from the market. Naftohaz agreed to make payments for monthly supplies by the seventh of the following month.

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[32] Russia-Ukraine 2009 Gas Crisis**:** Comparative view from Kyiv, Bucharest and Chisinau / by Oleksandr Sushko, Iulian Chifu, Oazu Nantoi, Kyiv, Institute for Euro-Atlantic Cooperation, 2010.

That crisis disclosed the fragile nature of Ukraine's decision-making process, in particular, it revitalized a conflict between Yushchenko and Tymoshenko which accompanied the largest part of president's Yushchenko stay in power. On February 10 Ukraine's National Security and Defense Council (NSDC) under supervision of President Yushchenko adopted a decision „On urgent measures to ensure energy security of Ukraine", which criticizes Russian-Ukrainian gas agreements signed in January 2009.

The NSDC states that the government implemented only 72 (47.7%) out of 151 gas sector objectives defined by the NSDC decisions in 2008-2009 and failed to implement other 79 (52,3%). With regards to the NSDC evaluation, all these objectives where aimed at enhancement of the governmental policy in the energy security of Ukraine and had to prevent crisis escalation in this sector.

In spite of obvious institutional challenges mentioned above, the Ukrainian side had made several moves on technical level which allowed for a significant minimization of possible technological or even humanitarian catastrophe caused by interrupted gas supply during winter.

First, already during June-September had pumped into underground gas storages a quantity of gas sufficient for uninterrupted gas transit in a regular mode as well as for three months strategic reserves in case the gas supplies were entirely cut off. This had placed Ukraine in a much more advantageous situation comparing to a number of European customers as Slovakia, Bulgaria or Serbia. Second, Ukrainian technocrats learned the lesson of 2006 crisis and created a technical scheme of temporary reverse of major gas pipelines which allowed transporting gas from underground gas storages located manly in Western Ukraine to the Central and Eastern regions with the major mass of consumers. The scheme worked during the gas crisis surprising the Russian side by the fact that no Ukrainian households were affected by the crisis[33].

The effect of the 2009 gas crisis and decisions taken by Ukrainian government as well as the economic crisis on Naftohaz Ukrainy, was the collapse of the cross-subsidisation scheme it had been operating in its gas

[33] Russia-Ukraine 2009 Gas Crisis**:** Comparative view from Kyiv, Bucharest and Chisinau / by Oleksandr Sushko, Iulian Chifu, Oazu Nantoi, Kyiv, Institute for Euro-Atlantic Cooperation, 2010.

business. It had been using income from industrial customers, and state subsidies, to offset both the effect of non-payment, mainly by district heating companies, and prices both for those district heating companies and residential customers that were far below cost recovery. In previous years, with the budget in relatively healthy condition, governments had been able to avoid dealing with Naftohaz's unsustainable business model. They provided substantial subsidies to compensate Naftohaz for below-cost gas tariffs, while at the same time Naftohaz paid a large tax bill. For example Naftohaz, according to its financial statements, received 1.295 billion hyrvnas (uah) (USD 253 million) in tariff subsidy from the state budget in 2007, and 7.384 billion uah (USD 1,393 million) in 2008[34].

Disproportionate price effects and consistently high costs

For several times Ukraine was under the risk of **disproportionate price effects - sudden raise of prices**; especially taking into account that during the entire period of independence prices of natural gas were essentially lower than the European average. For instance, in 2003-2005 the price of natural gas was at USD 50, whereas average European level was USD 150-200. On the other hand such pricing was not a pure unilateral discount by Russia, as Gazprom paid obviously discounted prices for gas transit and storage.

Despite substantial prices rise within the period 2005-2010 from $50 to current $250 it has never been "sudden". Statistics show the following dynamics of prices on gas and transit fees:

2005: - $50, transit rate $1,09
2006: - $95, transit rate $1,6
2007: gas price $130, transit rate $1,6
2008: gas price $179,5, transit rate $1,7
2009: gas price (year average) $259, transit rate $1,7
2010: gas price in the first quarter $305, transit rate $2,78, 2-3 quarters gas price was $230-240 average.

Therefore, despite continuous price challenges, and numerous cases of blackmailing by the price rise on the side of delivery actor, Ukraine newer experienced really sudden (fully unexpected) rise of prices, not compensated by the rise of transit fees.

[34] The April 2010 Russo-Ukrainian gas agreement and its implications for Europe / by Simon Pirani, Jonathan Stern and Katja Yafimava, The Oxford Institute for Energy studies, June 2010.

In practice, gas prices were growing all the time (including economic crisis culmination when gas prices fallen down in the entire world) but rather sustainable raise of prices for a long period, which described below. As a result, Ukraine now pays a price more or less comparable to Central European average (see European Border price in the table 1).

Since 2009 Ukraine was supposed to experience **consistently high costs - sustainable raise of prices for a long period**; as according to the formula set by January 2009 the basic price was established on the level of USD 450, which was higher than basic price in any agreement signed by Gazprom with European Consumers.

As a result, the average price for the year 2009 was as much as USD 259, which was higher than in Poland, other CEE, Turkey and Baltic states. In the first quarter of 2010 the price achieved USD 305, higher than that for Germany and the most other consumers. The prognosis for average 2010 price in the beginning of the year was 330-350. Under these circumstances substantial challenges were faced by Ukraine in terms of budget planning and overall financial sustainability of the government taking into account absence of IMF loans and lack of the other credit resources.

During the year 2009, and till March 2010 the government solved this problem via loans from commercial banks which were de-facto credits provided by the National Bank via some commercial banks. This policy was obviously risky as it added pressure over public finances and stability of the national currency.

The situation rapidly changed after the 2010 Presidential election. After the change of government in February-March 2010 the new leadership by President Victor Yanukovych signed so-called Kharkiv agreement provided Russian lease on naval facilities in Crimea would be extended beyond 2017 by 25 years with an additional 5 year renewal option (to 2042-47) in exchange for a multiyear discounted contract to provide Ukraine with Russian natural gas. The agreement, signed on 21 April 2010 in Kharkiv by Ukrainian President Viktor Yanukovych and Russian President Dimitry Medvedev and ratified by the parliaments of the two countries on 27 April 2010, did arouse controversy in Ukraine.

Table 1. Some Comparative CIS Gas Prices (according to Simon Pirani and others[35])

$/mcm	2005	2006	2007	2008	2009 (est.)	2010 (proj.)
Russia industry	35.5	40.6	53	65.9	70	89
Russia households	25.6	31.7	41.6	52	51	63
Ukraine import prices	**77**	**95**	**130**	**179.5**	**232.54**	**255.15**
Ukraine industry (state regulated)	69.1	107.3	142.6	192.4	306.8	299.6
Ukraine households	30.5	67.2	87.5	79.3	67.2	66.4
Belarus import prices	**55.1**	**55.1**	**118**	**126.5**	**151**	**171.5**
Belarus wholesale (Beltransgaz)	59.54	58.87	n/a	n/a	n/a	n/a
Belarus industry (Beltopgaz)	72.3	75.16	141.7	171.3	205.5	261.3
Belarus households	82.7	84.4	101.7	214.9	174.5	159.0
Moldova import prices	**80**	**160**	**170**	**232**	**245**	**242**
European border price	**213.7**	**285.2**	**294.1**	**418.9**	**307.8**	**323.7**

Russia agreed to a 30 percent drop in the price of natural gas sold to Ukraine, in exchange for permission to extend Russia's lease of a major naval base in in Sevastopol for an additional 25 years with an additional 5 year renewal option (to 2042-47). As of June 2010 Ukraine pays Gazprom around $234 per thousand cubic meters which USD100 less than was foreseen before the agreement.

For the Ukrainian opposition as well as for the most of Western observers Kharkiv agreements were perceived as a move away from western-oriented source of previous years, which was reflected in a number of articles in media named such as “Russia Taking Ukraine Back to its Sphere of Influence,” “Russia Regaining Clout on Ukraine,” etc.

Ukrainian officials argued that such a move keeps Ukraine within a “pragmatic” approach towards foreign policy and business, without any

[35] The April 2010 Russo-Ukrainian gas agreement and its implications for Europe / by Simon Pirani, Jonathan Stern and Katja Yafimava, The Oxford Institute for Energy studies, June 2010

change of strategic direction. Foreign minister Kostyantyn Hryshchenko said, in particular, being asked about Western reaction that "Any decisions that overstep the limits of a long-established view always trigger a mixed reaction. Actually, there is nothing unexpected in this. On the official level, everybody expressed satisfaction over the fact that Ukraine-Russia relations were stabilizing and becoming mutually beneficial for both partners. Nobody, including Ukraine, wants tension in relations with Russia because this may prevent our partners from conducting a normal dialogue with Moscow"[36].

Independent experts consistently stress the political nature of Kharkiv agreements as well as on the risks which Ukraine will likely to face in the foreseeable future.

The essentially political nature of the agreement is profoundly described in Pirani, Stern and Yafimava's analysis[37]: by reducing the price for gas in exchange for extension of the Fleet lease, which was only to expire in 2017 at the earliest and 2020 at the latest, Russia has effectively made a pre-payment for the future lease of the naval base. Both sides have gone back to mixing commercial gas issues with political, non-gas issues and, from the Russian perspective, giving up price increases so painfully achieved – and at such a high reputational cost – during 2006-09.

On the other hand, while some of the clauses in the 2009 contracts that were most disadvantageous to Ukraine (such as the additional penalties for failing to take monthly volumes, and the 52 bcm ACQ for 2010) have been removed, other "fault lines" remain, including: the relatively high base price for gas imports; the unfeasibly high ACQ; the combination of "take or pay" provisions for Ukraine and the lack of any "ship or pay" provisions in the transit contract.

Experts also mentioned the lack of clarity on storage provisions leaves room for opaque practices, which in the past have obstructed the normalisation of commercial relationships and put transit arrangements at risk[38].

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[36] "Kharkiv agreements": in search of logic, June 3, 2010, http://ukraine.world-countries.net/archives/915

[37] The April 2010 Russo-Ukrainian gas agreement and its implications for Europe / by Simon Pirani, Jonathan Stern and Katja Yafimava, The Oxford Institute for Energy studies, June 2010

[38] The April 2010 Russo-Ukrainian gas agreement and its implications for Europe / by Simon Pirani, Jonathan Stern and Katja Yafimava, The Oxford Institute for Energy studies, June 2010

Reduced FDI

As the crisis determined **reduced foreign direct investment,** Ukraine has experienced such a situation in the year 2009 in the context of global economic crisis which strongly affected Ukraine. Losses in the Ukrainian economy in the year 2009 were the highest in Europe which is indicated by the GDP negative growth – 15%. At the same time FDI inflow was the smallest in 2009 since 2004 (See table 2).

From the data provided below it becomes clear that there is an interconnection between decrease of FDI and similar trends in GDP statistics as well as export-import operations, international reserves, external state debt and other fundamental economic indicators.

Table 2. FDI in the context of other economic statistics of Ukraine, 2000-2009, according to the Institute for Economic Research and Political Consultations

FDI (net)	*USD billion*	2000 0,6	2001 0,8	2002 0,7	2003 1,4	2004 1,7	2005 6,5	2006 5,3	2007 9,2	2008 9,9	2009 4,5
Real GDP	*% year-on-year*	5,9	9,2	5,2	9,6	12,1	2,7	7,3	7,9	2,1	-15,0
Exports (goods and services, USD)	*% year-on-year*	17,9	9,5	10,7	24,0	42,6	7,5	13,2	27,5	33,8	-36,7
Imports (goods and services, USD)	*% year-on-year*	18,9	14,1	4,9	28,7	31,3	20,4	22,0	35,5	38,6	-43,1
International reserves	*USD billion*	1,5	3,1	4,4	6,9	9,7	19,4	22,4	32,5	31,5	26,5
External state debt	*% GDP, end of the year*	33,0	26,3	24,1	21,4	18,6	13,4	11,7	9,8	15,0	21,5
Consumer price index	*% year-on-year, average*	28,2	12,0	0,8	5,2	9,0	13,5	9,1	12,8	25,2	15,9

Chart 1. FDI according State Statistics Committee (2009)[39]

It can be hardly said that Yulia Tymoshenko's government economic (and energy in particular) policy was adequate enough to the challenges emerged during the global economic crisis.

The policy was determined by the dilemma between the large budget deficit caused by economic decline, on one hand, and the logic of forthcoming presidential election which made government unable to cut social expenditures and subsidies, on another hand. Dependence on the IMF credits forced the Cabinet of Ministers to accept formally Fund's severe requirements; however some of them were in practice ignored.

[39] State Statistics Committee www.ukrstat.gov.ua

The national economy is suffering a form rather chaotic governmental interference. According to the Heritage Foundation and The Wall Street Journal's 2010 annual Rating of Economic Freedom Ukraine's economic freedom score is 46.4, making its economy the 162nd freest among 179 ranked countries in the world. Its score is 2.4 points lower than the year before, reflecting reduced scores in six of the 10 economic freedoms. Ukraine is ranked 43rd out of 43 countries in the Europe region.

According to complete 2009 annual statistics published by State Statistics Committee in March 2010, the rating of the main foreign investors to Ukrainian economy looks the following (Table 3):

Table 3. Direct foreign investment in Ukraine in 2010[40]

	Volume of direct investment as of 01.07.2010 (mln.USD)	In % to the total
Total	**40402,1**	**100,0**
of which		
Cyprus	9079,2	22,5
Germany	6618,6	16,4
The Netherlands	3929,0	9,7
Russian Federation	2877,2	7,1
Austria	2591,1	6,4
United Kingdom	2228,1	5,5
France	1708,9	4,2
Virgin Islands, British	1333,9	3,3
Sweden	1298,6	3,2
United States of America	1214,6	3,0
Italy	976,4	2,4
Poland	873,6	2,2
Switzerland	795,3	2,0
Other countries	4877,6	12,1

Foreign investors continued to express little confidence in the Ukrainian investment climate which in the number of sensitive parameters does not fit international standards.

The court system is among top problems. In a noticeable number of cases, predatory minority shareholders have been able to procure dubious court decisions in an effort to wrest control of companies away from the majority investors. Researchers claim that thousands of Ukrainian enterprises have suffered so-called corporate hijacking attempts in the last several years, and foreign investors have been among those targeted. Ukrainian courts have a long record of striking down or ignoring contractual provisions that assign

[40] State Statistics Committee www.ukrstat.gov.ua

legal responsibility for dispute resolution to a foreign court or arbitrator. In September 2008, however, Parliament adopted a new law „On Joint Stock Companies," considered by most experts as a major step forward in improving corporate governance and stopping corporate hijacking[41].

Many investor complaints over the years have involved the State Tax Administration's (STA) selective enforcement of tax policy. Businesses have claimed that STA local and regional branches use investigative authority to advance favored political or business interests. Arrears in the payment of VAT refunds to exporters have also been a problem, particularly for agricultural exporters, who tend to run up especially large VAT arrears. In the spring of 2008, the Ukrainian government temporarily increased the pace of VAT refunds, but later during 2008-2009 arrears again became a serious probleml. Some exporters reported that the Ukrainian tax authorities cited a cash shortage resulting from the economic crisis when justifying their inability to refund VAT in a timely manner.

Ukraine's VAT regime is poorly managed and plagued by non-transparency and corruption. In late 2008 the government announced plans to issue bonds in lieu of cash refunds, but announced no further steps by the time of this writing. The government also intends to introduce a comprehensive electronic system to ensure speedy refunds continue in the future. In the meantime, Ukraine's VAT regime remains poorly managed, non-transparent and subject to corruption, while delays in reimbursement have become an important cost factor for many foreign companies. Improvements to the system would have an important, positive impact on the investment climate.

The new Law „On Joint Stock Companies" (2008) represents, represents, according to Inna Dmitrieva's analysis, a major improvement over the Law „On Business Associations" which was vague and did not support basic shareholders rights and facilitates a large number of corporate governance abuses (including share dilution, asset stripping, and dubious transfer pricing). The new law aims to define critical conditions and standards for establishing, governing and closing of joint stock companies, while also significantly improving legal protections for minority shareholders and filling numerous loopholes/gaps in the legal framework. It is largely in compliance with EU Directives on corporate governance and incorporates OECD Principles for Corporate Governance.

[41] Ina Dimireva. Ukraine Investment Climate 2009 http://www.eubusiness.com/europe/ukraine/invest

Therefore, the overall decrease (almost twice) of FDI inflow into Ukrainian economy in 2009 emerged as an element of economic crisis which strongly damaged Ukrainian economy providing severe (15%) GDP fall. One can't say, however, that FDI fall determined GDP decrease as it was a part of the whole crisis picture. On the other hand, there is an evident connection between non-friendly investment climate and specific deepness of economic crisis in Ukraine in comparison to other countries of the region, where crisis outcomes were not so frustrating for national economies[42].

IV. Ukraine`s accession to the Energy Community and its potential effects for government's capacities

On 24 of September 2010 Ukraine signed a protocol on joining Energy Community treaty (ECT). Signature of the protocol on accession to the ECT finalized quite a lengthy process of negotiations, informal consultations, implementation of additional EU conditions and prerequisites by Ukraine.

The process of both sides` preparation to the ECT accession proved significance of adoption and implementation of the EU energy acquis by Ukraine not only for the country itself, but also for the EU, its potential influence on the stakes of main Ukrainian, EU and Russian players in the energy area.

An analysis of the consequences of ECT implementation allows, assuming that there is a potential for both, for new positive momentum for investments and growth in the energy area as well as for some conflicts in case not all the main stakeholders would accept the new "rules of game" established by the ECT. Under the stakeholders we understand the public authorities of Ukraine, EU and ECT member states, Russia, the companies working in the energy area, in particularly existing state monopolies in gas and electricity market like Naftohaz or Gasprom as well as companies dependent of Russian gas like Ukrainian heavy industry or combustion plants, EU energy operators and finally consumers in Ukraine, who will be the most vulnerable target group for application of new regulations.

Taking into account the whole complexity of political, financial, economic and other interests and factors possible conflict potential must be carefully examined and followed up.

[42] Ibid

The ECT is based on EU energy packages (the second package created the main features of the EU energy acquis, which was strengthened by recently elaborated third energy package), a number of significant EC directives defining energy market functioning in the EU and in general - on a new liberal approach to energy market regulation.

The most visible results of implementation of this liberal regulation approach in Ukraine might be separation of energy transportation and distribution, introduction of equal access for all the companies to energy networks, introduction of new rather strict and financially expensive environmental legislation etc.

Just introduction of the principle of unbundling of functions in gas market following implementation of the Law of Ukraine On functioning of gas market in Ukraine, which was the main precondition for Ukraine`s accession to the ECT, would mean division of National stock exchange company Naftohaz to 3 administratively, legally and financially independent companies. This might have a serious influence on trade in natural gas in Ukraine and the region as far as it is exactly Naftohaz, which signed agreements on purchase and transit of Russian gas to Europe.

All the agreements are interdependent and present to one or another extent a balance of concessions and compromises. Unbundling of Naftohaz would inevitably mean that this balance would no longer be maintained and Gazprom will have to have to separate and independent agreements with two different and not linked Ukrainian companies – one for transit of Russian gas to EU consumers and another for supply of Russian gas to Ukrainian consumers. This will demand at least a legal review of the existing agreements of this Ukrainian state company with Gazprom. The price for transit will not be anymore an argument for discussing price for Ukrainian consumers.

One can easily assume that the very proposal to review the agreements on gas supply and gas transit, which by EC Directive 2003\55 must be concluded exclusively with two separate companies not linked legally between themselves, would go in line with Ukrainian demands to review the substance of the agreements between Gazprom and Naftohaz from January 19, 2009, but might strongly contradict to Russian point of view on these agreements. Current agreements are probably the best ever concluded by the Russian side with a foreign partner and provide Russia with the all necessary leverages to influence pricing and delivery policy (and not only

this) as much and as long as they want, keeping another side basically disarmed and fully dependent on good or bad will of Russian side. Having these agreements signed and being not obliged under any international agreement to change them any request to review the agreements would fail. Moreover, in the negotiations process one could refer to agreements, which exist between Gazprom and German or some other EU operators, were the mentioned Directive has been not fully applied, and use this example as an excuse to not make changes to the agreements and avoid review of them in the future.

Nevertheless, applicability of this experience to Ukraine is questionable and disputable; without a good will from both sides to start reviewing of the agreements might be very difficult, even if they clearly contradict to the Directive 2003\55.

Another element of new regulations is a non-discriminatory treatment and equal access to the energy transportation network by all operators. This would have a number of significant consequences.

Legally there will be a possibility for any European company to buy Russian gas on Ukrainian – Russian border. In other words the export contracts between Russia and the Ukraine, which are now signed only with Naftohaz, and which exercise a certain type of state monopoly of gas import and delivery to Ukrainian consumers, will become open to any qualified operator from any ECT country. If for example a Polish or a German company would apply to Gazprom to buy gas on Ukrainian-Russian border on the same conditions as Naftohaz does, it would be legally impossible to reject this application. However practical implementation of this legal right is very far from clear. Gazprom can easily refuse even discussions about this point as far as, again, Russia has no legal framework or obligations to do it.

Of course, in the negotiations process with Russians, one can appeal to the fact that from a commercial or a security point of view new rules of gas trade in this respect might be profitable to all the sides involved, especially to the seller, they will bring a market competition spirit in gas trade. However, there might be some technical or political problems, especially if gas trade will be considered not as purely business, but also as a political influence tool.

For example, the gas measurement infrastructure was created to make all the necessary checking procedures only on Ukrainian – EU borders and it is

an open questions whether Gazprom will allow to make all the necessary measurements on Ukraine – Russia border.

Moreover it is absolutely unclear what kind of pricing policy in practice will be applied by the Gazprom to other operators on the market, whether they would benefit from any discount as for example those applicable to Naftohaz after the Kharkiv agreements in April this year, which provided for 30% discount for Russian gas imported to Ukraine.

Also the ECT will prohibit any limitation of rights for any of Ukrainian operators to sell gas exported from Russia to any European consumer. In other words the current state of trade in gas and any of existing contracts should be reviewed in order to remove provisions violating EU directives on functioning of gas market – such as so called prohibition of "gas re-export".

In legal terms any gas which entered Ukrainian territory will enter the territory of the Energy Community and its processing can not anymore be regulated by any terms contradicting to the EU acquis.

Any qualified EU or Russian company or any of their EU subsidiaries will be able to sell Russian gas directly to Ukrainian consumers bypassing Naftogaz of Ukraine. However, there will be a question whether Gazprom itself or any of its direct subsidiaries will be interpreted as qualified majority. Gazprom in its current shape keeping in one company functions of extracting, transiting and selling gas is clearly not in line with the EC demand for qualified operators and can not function independently within the ECT member states.

These are only a few examples which prove that the results of Ukraine accession to the ECT will be tremendous not only for the country but also for the entire region including Russia and the EU. Consequences of the accession can be both positive and negative.

Positive consequences are easier to define. Certainly, Ukrainian consumers might be the first one to win from the situation, at least in medium to long term prospect. Openness within the Ukrainian market will inevitably attract leading EU operators, will instigate new projects like LNG terminals and diversify sources and roots of gas transit to Ukraine. Of course, implementation of EC directives will introduce market price for energy for all consumers and will be strongly felt after reception of bills by households. But this is the only way how Ukraine can break the vicious circle of energy inefficiency.

Unbundling of Naftogaz will increase energy security, will enable it to receive serious investments into the gas transportation system and remove untransparency in this sector, which successfully survived under different governments and presidents in this country.

Politically, Ukraine will ultimately win. It will first of all prove that president Yanukovich despite of all the allegations was finally the only one able to make radical revolutionary reforms in the energy sector. Ukraine will be practically integrated into the EU Internal market in two areas – trade in gas and electricity. Challenge of lack of investments for modernization of these two branches of national economy might be overcome by involvement of international financial organizations. They will be happy to participate in projects in these areas, which are the most "bankable" ones. New huge investments will be also a political and economic success for Ukraine.

However, there are a number of issues, where conflict potential would have to be resolved. To sum-up they are the following:

- Whether the Russian side will agree to review the agreements from 19 of January 2009 and conclude new ones in line with the EC demands;
- Whether the Russian side would agree to apply the same treatment to all the operators in Ukrainian market, including non Ukrainian ones
- Whether the Russian side will agree with removal of "prohibition of re-export" clause in agreements with Ukraine;
- Whether the EU will decide to be involved into negotiations with Russia to demand its respect to the provisions of the ECT.

For the moment it is basically impossible to give answer to all these questions and what will be different scenarios when the situation will develop on one way or another. It will depend on the political and economic situation in Russia, Ukraine and in the EU as well, on the way Russia will plan the future of its energy area, on the ability of Ukrainian and the EU negotiators to convince the Russian side in profitability of introduction of the ECT rules in the energy market. Finally, it will also depend on the success of Ukrainian introduction of relevant EU directives as well as ability of the EU and international donors to support financially existing political will in Ukraine to implement EU rules of energy trade.

Ukraine's blatant energy dependency on Russia, together with the government's inability to take a strong policy stance on energy issues, further complicates an already difficult relationship. In the context of

Ukraine's currently strained relationships with other foreign partners, this dependency leads to increased pressure for closer economic and political integration with Russia, as evidenced by Ukraine's signing of the treaty on a Common Economic Space with Russia, Belarus, and Kazakhstan in September 2003. It also increases Ukraine's weakness in negotiations with Russia and its vulnerability vis-à-vis its largest trading partner.

Abbreviations

BP – British Petroleum
CHP – Combined Heat and Power
CIS – Commonwealth of Independent States
CJSC – Close Joint Stok Company
DC – Distribution Company
ESCO – Electricity System Commercial Operator
EU – European Union
FDI – Foreign Direct Investment
FEC – Fuel and Energy Company
FTA – Free Trade Agreement
GDP – Gross Domestic Product
GSP – Gas Control Points
GTS – Gas Transmission System
HPP – Hydro Power Plant
MFE – Ministry of Fuel and Energy
NERC – National Electricity Regulatory Comission
NJSC – National Joint Stock Company
NPP – Nuclra Power Plant
SOCAR – State Oil Company of Azerbaijan Republic
UAH – Hryvnia, national currency
USD – United States Dollar
VAT – Vallue Added Tax
WEM – Wholesale Electricity Market

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6. ENERGY SECURITY IN RUSSIAN FEDERATION

Marina Luzhikova, Adriana Sauliuc, Sergii Tolstov

Russian Federation
Part 1

I. Introduction

Country profile:

Formal name: **Russian Federation**
Short Form: **Russia**
Capital: Moscow
Date of independence: August, 24, 1991 (from the Soviet Union)
Government: federation
Size: 17,098,242 square kilometers (water 720,500 sq km)
Population: 140,041,247 (estimated for 2010)

The Russian Federation is the largest of the 21 republics of the Commonwealth of Independent States, and also the world's largest country. The biggest part of the country is located in the Northern Asia and the west area of the Urals and a part of Europe. Russia is bordering the Atlantic Ocean, between Europe and the North Pacific Ocean. From North West to South East, the Russian state borders with Norway, Finland, Estonia, Latvia, Lithuania and Poland (both via the Kaliningrad Oblast), Belarus, Ukraine, Georgia, Azerbaijan, Kazakhstan, China, Mongolia and North Korea. The Russian Federation has also maritime borders with Japan by the Sea of Okhotsk and United States of American, by the Bering Strait. Being the biggest country in the world, the Russian state covers more than a ninth of the Earth's land area and is spanning 9 time zones. In 1991, the Russian Federation became the successor of the Soviet Union.

II. Economic situation

After the dissolution of the Soviet Union, the Russian Federation faced real problems in the economy. As a part of the the Russian Federation effort to develop a market economy and achieve consistent economic growth, in October 1991, president Yeltsin decided to proceed with radical, market-oriented reform, a kind of "shock therapy" as it is known in economic science. But the result was negative, because the Russian state entered a period of economic collapse, with a big part of the population plunged into poverty. Also, crime and corruption spread rapidly.

The dramatic economic reforms embarked by Russia at the beginning of 1992, including the freeing of prices on most goods, led to an immediate downturn. The economic reforms adopted in the '90s privatized most industries, lest the energy and military sector.

Despite the Russian government's efforts to move from a centrally planned economy to a free market system, the difficulties in implementing fiscal reforms led to a serious financial crisis in 1998. A low price for oil and minerals which were the major export earners as well as the loss of the investors confidence, intensified the financial problems of the country. The results were inevitable: a rapid decline in the value of the ruble, a breakdown of commercial transactions through the banking system, delayed payments on sovereign and private debts with a flight of foreign investment.

Despite this difficult situation, Russia appears to have weathered the crisis relatively well. In 2007, the World Bank declared that the economy of the Russian state had achieved "unprecedented macroeconomic stability"[1], and in 2009, real GDP touched a value of 8.1%, the highest percentage since the collapse of the Soviet Union. But the world Economic crisis of 2008 affected the Russian Federation as well, so the country began to have problems in financial markets area, and an economic recession was impossible to avoid.

Even so, the economy of the Russian Federation is the twelfth largest economy in the world. With a long way from a global-isolated, centrally-planned economy to a globally integrated economy, the growth of the Russian economy was primarily driven by goods and non-traded services for the domestic market. The beginning of the 21st century revealed a world wide economy thirst for energy resources, and the Russian Federation understood that this situation is in its favor. Since 2003, Russian exports of natural resources decreased and the internal market strengthened considerably. In this period, despite higher energy prices, natural gas and oil contributed to 5.7% of Russia's GDP. Even though Russian authorities predicted that this value will drop to 3.7% by 2011. But the earnings from oil exports allowed Russia to increase its foreign reserves for an amount of 12 billion dollars in 1999, to 597.3 billion dollars in August 2008, the third largest reserve in the world. In 2009, the Russian Federation became the world's largest exporter of natural gas, the second largest exporter of oil and the third of steel and primary aluminum.

Investments

The Russian federation considered that privatization is the essence of a restructuring process concerning the economy, and the first stage of the program began in 1992 – 1995. Only in the fist year, more than 85% of small enterprises were embraced by the privatization program, that is more than 82.000 state enterprises. In that period, almost one-third of them were privatized.

Regarding the oil sector, the first privatization was made in November 1992, when SurgutNefteGaz, Yukos and Lukoil became integrated companies.

[1] Russia attracts investors despite its image, BBC News Retrieved on March 2008, http://news.bbc.co.uk/2/hi/business/7096426.stm

Because of the increased request on the energy market, and with big reserves of oil and gas, in the mid-90s, in Russia the view that oil and natural gas sector was the appropriate target for the Foreign Direct Investments became more and more common and in 1994, these sectors accounted for about 38% of the total FDI. The total input was about 1.4 billion dollars, a small amount in comparison with the importance of the energy field. In 1999, investments increased by 4.5%. After the growth in 1999 – 2000, FDI, which includes contributions to starting capital and credits extended by foreign co-owners of enterprises, decreased in 2001, being with about 10% lower. In 2001, the amount of foreign investments reached the value of 451 million dollars, more than twice the investments the year before.

Regarding the legal framework for the Foreign Direct Investment, the Russian Federation is still working on this aspect. Some real progress was made in some energy-related fields, like the electricity sector. Even so, the natural gas sector remains impenetrable, being dominated by the state-controlled company Gazprom.

The law that regulates Foreign Direct Investment is the Law on Foreign Investments – N. 89-FZ adopted on June, 19, 1995 and the statute and activities of the foreign investors in Russia, are regulated by legislative acts emitted by the Russian executive and legislative bodies. The most important of this documents are:

- Civil Code of the Russian Federation – Law No. 1545-1 of the Russian Soviet Federal Socialist Republic of July 4, 1991;
- "Concerning Foreign Investment in the RSFSR", Decree No. 715 of the Government of July 23, 1993;
- "Concerning Outputs of Own Production for Export by Foreign Investment Enterprises", Decree No. 1077 of the Russian Federation President – November 6, 1996;
- "Concerning Implementation of Investment Agreements", Decree No. 225-FZ - December 30, 1995;
- "On production Sharing Agreement", Law No. 54-FZ – November 17, 1997;
- "On Changes in Clause 5 of the Russian Federation Law on VAT".

In February 2010, Finance Minister Alexei Kudrin forecasted that the Russian Federation "could see a pre-economic crisis level of foreign direct

investment of $60 billion to $70 billion by 2013".[2] Despite this, FDI in the Russian economy decreased 11%, to "$5.423 billion in January-June 2010, year-on-year, while foreign investment edged down 5.5 percent to $30.384 billion, according to the Federal Statistics Service".[3]

Part 2

Energy Sector of the Russian Federation

1. Overview

Named an "energy superpower", the Russian Federation is a blessed country. In a period when every state set out to undergo important economic developments, Russia has the largest natural gas reserve in the world, the second largest coal reserve and the 8th largest oil reserve. With so many energy resources, in the past years, Russia became the world's leading natural gas exporter and leading natural gas producer, while also the second largest oil exporter and largest oil producer, though Russia interchanges the latter status with Saudi Arabia from time to time. Regarding the electricity sector, the Russian Federation is the world's 4th largest generator and the 5th largest renewable energy producer, the latter due to the well-developed hydroelectricity production in the country.

Being the 4th largest nuclear energy producer, Russia was the first state to develop nuclear power and the first constructor of a nuclear power plant. The nuclear power of the Russian Federation is managed by State Corporation. Being an important sector, it is rapidly developing, so Moscow intends to increase the total share of nuclear energy from current 16.9% to 23% by 2020. For this, the Russian government wants to allocate 127 billion rubles ($5.42 billion) to a federal program for nuclear energy technology of the next generation. Only before 2015, about 1 trillion rubles ($42.7 billion) is to be allocated from the federal budget towards nuclear power and industry development. With these numbers, the Russian Federation remains one of the world leaders in nuclear technology. It is also a member of ITER international fusion reactor project.

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[2] Foreign direct investment in Russia 'to hit $60-70 bln by 2013', Finance Minister Alexei Kudrin, in Ria Novosti, February 3, 2010.

[3] Foreign direct investment in Russia down 11 pct in H1 - statistics service, in Ria Novosti, August 19, 2010.

2. Institutions

The main state institutions that are involved in the energy sector of the Russian Federation are:

- The **Ministry of Energy**, a federal executive authority responsible for "drafting and implementing national policy and legal regulation in the oil and fuel sector, including issues related to the electric power industry, oil production, oil processing, gas, fuel, peat and slate industries, major oil and gas pipelines, renewable energy sources, development of hydrocarbon fields based on production-sharing agreements, and the petrochemical industry"[4]. It also provides state services and manages state property in the production and use of oil and fuel resources;
- the **Ministry of Natural Resources of the Russian Federation**, "a federal executive body performing the functions related to state policy formulation and normative and legal regulation in the sphere of the study, renewal, and conservation of natural resources, including management of the State subsoil stock and forestry; the use and conservation of the inventory of water resources; the use, conservation, and protection of the stock of wooded forests and reproduction; operation and safety of multipurpose reservoirs and water-resources systems, protecting and other hydraulic structures (except navigation hydraulic facilities); the use of wildlife resources and their habitat (except wildlife resources assigned to hunting resources); specially protected natural areas, as well as in the sphere of environmental conservation (except the sphere of ecological supervision)".[5]
- The **Ministry of Economic Development**, the main federal executive body responsible for developing state policy and providing regulation in the sphere of analysis and forecasting of socioeconomic and business development.
- The **Ministry of Finance,** the federal executive authority with responsibility in the financial policy of the Russian Federation.

[4] Ministry of Energy of the Russian Federation, http://www.government.ru/eng/power/85/.
[5] Ministry of Natural Resources of the the Russian Federation, http://www.mnr.gov.ru/part/?pid=398.

3. Legislation

For the long-term view, the strategic goals of the Russian Federation in the energy area are energy safety, ecological energy security, energy and budget effectiveness. From the beginning, for this goals to be realized, energy policy set two different phases. First, between 2009 and 2010, the Russian Federation is interested to achieve the following strategic guidelines:

- formation of an integral and approved normative and legislative base, removing all the barriers on the path to transparent highly competitive, energy markets with fair trade principles;
- completion of transformations in the adjacent sectors of economy, placing them at a new level of energy effectiveness;
- reaching the export potential of oil and gas complex and attainment of stable positions of energy companies on the internal and external fuel and energy markets;
- transition from the impellent role of the fuel and energy complex in Russian economy to the role of an effective and stable supplier of fuel and energy resources for the economy's and the population's needs[6]

The second phase forecasts the formation of a new fuel and energy complex in the Russian Federation. This new complex will be characterized by:

- further growth of openness and competitiveness of energy markets in the framework of market infrastructure (first of all, energy and transport one), formed during the previous phase;
- rapid use of the existing odds in nuclear power and hydro energy sectors, coal industry, development of petrochemistry and gas chemistry; creating the necessary basis for implementing prospective projects (including development of new provinces in the Eastern Siberia, Far East, Yamal and offshore) along with the corresponding growth of annual investments into the fuel and energy complex (no less than 1,5 times more compared to the previous period);
- abrupt increase of contribution of the scientific and technical and innovation potential to the Russian energy sector;
- creating the basis for a substantial increase of the renewable share in the forthcoming period and transition to the energy of the future.[7]

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[6] Ministry of Energy of the Russian Federation, *The Summary of the Energy Strategy of Russia for the Period of up to 2020,* Moscow 2003, p. 3, http://ec.europa.eu/energy/russia/events/doc/2003_strategy_2020_en.pdf.

[7] *Ibidem.,* p. 4.

3.1 Energy policy of the Russian Federation – Energy Strategy of Russia for the Period up to 2030

The Russian energy policy is not just one of the priorities of government action but the basis for the federal budget formation and the main source of both domestic and foreign investment inflow. At present the energy sector is perhaps the only sustainably operating industry of the Russian economics which provides about 1/4 of the GDP and half of the federal budget income and currency receipts.

It should be immediately noted that at first the Russian national interests were interpreted by the legislation as more than just domestic needs. These internal needs predetermine the behavioral harshness of the Russian representatives on foreign markets. Moreover, the new national security strategy explains explicitly the changed behavior of Russia by the consequences of the world crisis which brought many economies including Russia and its nearest neighbours to the brink of catastrophe. In "The Russian energy strategy for the period till 2030" dated November 13, 2009 it is directly stated that its adoption is connected with the necessity to adjust the strategy to the harsh conditions due to changing internal and external factors determining major parameters of the Russian Federation energy sector operation (3); and the major threat of the energy sector development is said to be the instability of the global energy markets and the volatility of the world market prices for energy resources (3).

The Energy policy of the Russian Federation is contained in an Energy Strategy, a document that sets the policy in energy field up to year 2030. The main provisions of the Russian energy strategy to 2030, were approved in 2000, and in 2003, the government confirmed the new energy strategy. It was approved on May 23, 2003 and confirmed by the government on 28 August 2003. The Russian Federation Energy Strategy's main objective is defined to be determining ways to reach a better quality of fuel and energy mix, as well as enhancing the competitive ability of energy production and service in the world market of Russia. In this case, the long-term energy policy should concentrate on energy effectiveness, energy safety, budget effectiveness, but also ecological energy security. The energy strategy document talks about an increase in energy efficiency as the main priority of Russian energy strategy. That means a decrease of energy intensity in production area and energy supply expenditures. Reducing impact on the environment is equally important; energy development and technological

development; sustainable development; and an improvement of effectiveness and competitiveness.

For all these objectives to be achieved, the energy policy speak about a few measures that must be applied:

- economic stimulation of highly ecological productions, ecologically ocean low-waste and wasteless technologies of production and consumption of energy resources by means of rigid ecological requirements for the fuel and energy complex activity, creation of a system of compensation payments for breaching these requirements
- strengthening control regarding ecological requirements during the implementation of investments projects, the perfection of the system of the state ecological expert commission;
- structural rebuilding of the economy in favor of low power consuming manufacturing industries, knowledge industry and human services, carried out by means of purposeful industrial policy;
- employing the potential in the field of technological energy saving;
- changing the existing norms, rules and regulations.[8]

An absolutely new trend stated explicitly in the "Energy strategy" is the search for solutions to the existing problems and the settlement of crisis conditions on the regional basis without the involvement of the non-regional forces. The question in this context is most likely to be the efforts to force other global actors out of the regions of national interest for Russia according to the so-called "Ukrainian" scenario. This couples well with the provision of the Security strategy on the politics of transition from the block opposition to the multivector diplomacy principles and pragmatic policy of the Russian resource potential use (1).

The reasons for the aforementioned are determined by the National Security strategy by outer threats caused by:

- deficit of energy resources necessary for the implementation of the contractual obligations of the Russian extracting companies;
- adoption of discriminatory measures and reinforcement of unfair competition regarding Russia;
- decrease of demand and reduction of prices for energy carriers as a result of the world economic crisis;

[8] *Ibidem,* p. 5, 7.

- low diversification of the Russian energy resource target markets and export patterns;
- remaining dependence of the Russian export on transit countries;
- politicization of the Russian relations with foreign countries regarding energy.

Regarding geostrategic priorities of the Russian Federation energy policy, from the point of view of the short-term perspective the Caspian, Arctic and South-Asian vectors are said to be the main ones, the latter being most beneficial in the longer term. In addition, the European share in the overall volume of the Russian energy carrier export will fall at the expense of the export energy market diversification to the East (China, Japan, South Korea, Southeast Asia countries). Moreover, by the end of 2030 the relative weight of exporting liquid hydrocarbons (oil and oil products) to the East will grow from 6% to 22-25%, of gas export – from 0 to 19-20%. According to the main strategic documents, the implementation of the state energy policy is provided to be fulfilled in 3 steps.

The first step (ends in 2013 - 2015) — is the stage of recovery from the crisis and formation of the new economic principles, development, renewal and modernization of the Russian energy sector.

The time limits of the first step will be determined by the scale of the crisis consequences and the rate of recovery of the economics and energy sector.

The second step is the stage of transition to the innovative development and new economics infrastructure formation. The major risks of the second step are connected with the possible lagging of the Russian energy sector behind competing countries with the accelerated post-crisis development, the necessary conditions for the upcoming transition to the future innovative power economy being absent by the end of the stage. Under such conditions direct state participation in the energy sector development will gradually decline and be replaced by different forms of the public-private partnership.

The third step (2020 – 2030) is the stage of the innovative economics development. Accordingly the main contents of this stage will become the transition to the future power economy with radically new technological possibilities for further development based on the high efficient use of traditional energy resources and new non-hydrocarbon sources of energy and technologies of its acquisition. It should be noted that the strategic

documents suggested have significant deficiencies. First, they do not take into consideration the growing foreign competition to the pipeline gas supply. The issue concerns the shale gas technologies and construction of gas liquefaction facilities.

The Russian opponents of the 2030 Strategy explain their position by the fact that pipeline projects are outdated. Having refused the liquefied gas technology development Russia fell behind the global trends by a quarter of a century.

Anyway, if Russian corporations invest billions dollars into the pipeline projects, it will be difficult to abandon them by switching over to modern technologies. As for Europe, the question is how fast European consumers can change to a more flexible liquefied gas system. Or can Russia make them forget about modernization for another 10 years? Having ignored new gas transportation technologies development we lost 25 years at a minimum.

At the global scale shale gas can compete with the Russian natural gas. The best example for it is the USA where its exploration has developed considerably, as the state has created preferences. In the Russian energy policy innovation and modernization have become commonplace. But their implementation is likely to be postponed for the middle term perspective.

3.2 Legislation

The Energy Strategy of the Russian Federation is not the only document that regulates the energy sector. The Russian energy legislation, based on the Federal Laws is composed of the following laws:

- Law no. 7746 "On hydrocarbons (exploration and production)" – 28.07.1993;
- Law no. 7811 "On the fiscal system of hydrocarbons sector" – 1994;
- Law no. 8450 "On processing, transportation and trading of oil, gas and their by-products" – 24.02.1999;
- Law no. 8637 "On electrical police" – 06.07.2000;
- Decree no. 171 "The Power Sector Policy Statement" – 19.04.2002;
- Law no. 8937 "On heat conservation in buildings" – 12.09.2002;
- Law no. 9072 "On Power Sector" – 22.05.2003;
- Law no. 9663 "On concessions" – 18.12.2006;
- Law "On electric Power Industry" – 2003;
- Law "On Gas Supply" – 22.08.2004.

5. Natural resources

The Russian Federation is one of the few countries that can supply energy on the basis of their own natural resources. As in many states, the Russian power sector belongs to state monopolies, controlled by Russian Joined Stock Company "General Energy System (GES)". Russian GES supplies electricity for both households and economic activity, covering a territory over 10 mil. square km with a population over 200 mil. people. It combines 82 of 97 energy systems of Russian state, providing about 90% of all electricity production in Russia. The General Energy System is build on a model of concentration of electricity generation at number of very big regional plants and centralized supply and distribution system through a general network of high-voltage. Because of the scale of the power sector in the Russian Federation, this model would remain the major concept of its development for a long time. Enabling electrification for such a vast territory like the Russian state, this gigantic energy system leads to high risks of environmental pollution and accidents, which is why substantial investments for its development and related environmental clean-up are required.

In Russia, because of the transition to the market economy, the energy sector and its development suffered some changes, but even if the state faced a period of economic stagnation and political restructuring cased by the process of transition, in some economists' opinion, we could be faces with favorable conditions on the way to sustainable development. And this can happen, in first place, because Russia is very rich in energy resources. It has the largest known reserves of natural gas in the world, the second largest coal reserves and the eighth largest oil reserves. This means 32% of proven natural gas reserves on earth, 12% of proven oil reserves and 10% of explored coal reserves. Regarding the uranium reserves, the Russian Federation is estimated to have 8% of the proven reserves of the world.

5.1 Fossils resources

5.1.1 Oil

The Russian Federation is the biggest non OPEC oil producer and the second largest in the world after Saudi Arabia, which it overtakes as the world's number one from time to time. In 2006, the Russian Federation contributed to global oil production with 12.1% and at global oil exports

with 11.6%. If in 2000 crude oil and condensate production touched the level of 3.2 million barrels per day, six years later, in June 2006, crude oil and condensate production reached the maximum value of the post-Soviet era – 9.7 million barrels per day (b/d). Russian exports contain more than 5 million of barrels per day of oil, and about 2 million barrels per day of refined products. The biggest part of these exports are destined for the European market. Regarding the domestic demand, in 2005 this reached a value of 2.6 million barrels per day. Also, the Russian Federation is the main transit country for Kazakhstan's oil. For example, the Caspian Pipeline Consortium (CPC), "oil pipeline was commissioned in 2001 and runs 980 miles from the Tengiz oil field to the Russian Black Sea port of Novorossiysk" and "Kazakhstan's other major oil export pipeline, from Atyrau to Samara, is a northbound link to the Russian distribution system".[9]

In Russia, the biggest oil company is Rosneft, "one of the last vertically integrated oil companies to emerge from the reorganization and large-scale privatization of Russia's oil industry in the years following the dissolution of the Soviet Union"[10], followed by Luckoil, TNK-BP, Surgutneftegaz, Gazprom Neft and Tatneft. Transneft, a state/owned monopoly company, operates all oil trunk pipelines, except the Caspian Pipeline Consortium, which is a Russia - Kazakhstan joint project. Oil products pipelines are operated and owned by Transnefteproduct, an operator of oil products pipelines in the Russian Federation. The company operates more than 19.300 kilometres of pipelines and in April 2007, as a result of a decree signed by president Vladimir Putin, Transnefteproduct became a subsidiary of Transneft, an oil pipeline operator. Currently, Transneft is constructing an oil pipeline that will allow Russian oil to arrive in states like China, Korea and Japan. This pipeline, named Eastern Siberia - Pacific Ocean oil pipeline, will open the entrance for Russian oil on Asian - Pacific markets. Because of global warming, the Arctic ice cap is shrinking, so the prospects of oil exploration in the Arctic Ocean are increasing. The Russian Federation submitted documents to the United Nation Commission on the Limits of the Continental Shelf on December 20, 2001, claiming expanded

[9] Kazakhstan, U.S. Energy Information Administration, http://www.eia.doe.gov/cabs/Kazakhstan/Oil.html.
[10] Rosneft, History, http://www.rosneft.com/about/history/.

limits to state continental shelf beyond the 200 mile zone within the Russian Arctic sector. One year later, in 2002, the UN Commission recommended that Russian state should make supplementary researches, commenced in 2007 by Russia. It is estimated that this area contains about 10 billion tones of oil and gas reserves.

Oil reserves

In 2008, an Oil and Gas Journal's survey estimated that the Russian Federation has 60 billion barrels of oil, most of them located in the Western Siberia region framed by the Central Siberian Plateau and Ural Mountains. Regarding the proven oil reserves of the Russian Federation, there are several different estimates. Most of the surveys refer only at Western Siberia, where the reserves, exploited since the 1970s, represent two-thirds of Russian oil. Regarding other areas, some estimates do not mention any potentially huge reserves elsewhere. But there are opinions that there are oil reserves in the Eastern Siberia, a land where little exploration was made. In 2005, the Russian Ministry of Natural Resources estimated that the total value of oil reserves in Eastern Siberian provinces, meaning roughly equivalent to proven plus probable reserves, are about 4.7 billion barrels.

Production

In the '80s, the reserves located in the Western Siberian region, also named the Russian Core, transformed the Soviet Union into a major world oil producer. In 1988, the Russian Federation reached the peak of 12.5 million barrels per day in total liquids. After the dissolution of Soviet Union, Russian petroleum output fell sharply, and the rebound was possible only after several years. The production reached a low of approximately 6 Mbbl/d in mid '90s, meaning about one-half of the peak reached in the Soviet-era. According to experts in energy field, the decline was caused by several factors like the lack of investments in the maintenance area and the depletion of the country's largest fields due to state-mandated production surge. Beginning with 1999, Russian oil output increased, mostly because of the privatization of the industry, which offered the occasion of clear incentives and increased production so as to make it less expensive; higher world oil prices, mostly beginning with 2002; the rejuvenation of old oil fields and the use of Japanese technology. Other experts, say the growth in 1999 is partially due to the increase of after-effects of the financial crisis that affected the Russian state in 1998, which inevitably caused the subsequent devaluation of the ruble; and on the fall of oil price.

In 2007, Russian production reached to 9.8 Mbbl/d, but the rate of growth was slower than in the 2002 – 2004 period. Even so, the editor in chief of the Russian Petroleum Investor, Mikhail Kroutikhin, considered that Russian production had reached a secondary peak in 2007.
One year later, in the early 2008, Russian officials expressed their concern regarding oil production which knew a new decline in 2008, after rising only 2% in 2007.
Russian output fell 1% in the first quarter of the year, and at that moment, the vice-president of Lukoil company said that "$1 trillion would have to be spent on developing new reserves if current output levels were to be maintained".[11]
Also, the Government of the Russian Federation proposed some measures to help the growth of the production, taking in consideration the tax cuts on oil.

Russia's Oil Balance

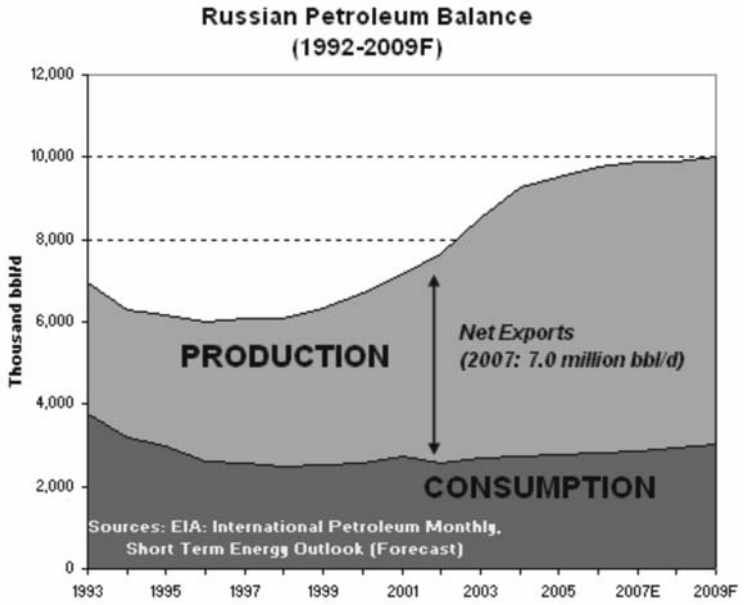
For 2009, the Russian Federation "produced an estimated 9.9 million barrels per day of oil, and consumed roughly 2.9 million barrel per day"[12]. in the same year, the exports touched the value of about 7 million barrel per day, including roughly 4.0 million barrels per day of crude oil and the remainder in production.
According to official statistics of Russian state, approximately 4.4 million barrels per day of this total is crude oil and more than 70% of crude oil production is exported. The quantity remaining, meaning 30%, is refined locally. The state-owned monopoly company, Transneft, has the exclusive jurisdiction over the exports via pipelines.

Oil exports

Destinations of Russian Oil Exports

During 2007, crude oil exports reached approximately 4.4 million barrels per day, and more than 2 million barrels per day of oil products. Almost 1.3 million barrels per day were transported to Belarus, Poland, Ukraine, Germany and other countries in Central and Eastren Europe, like Czech Republic, Hungary and Slovakia via Druzhba pipeline, approximately 1.3

[11] *"Threat" to future of Russia oil,* BBC, April 15, 2008, http://news.bbc.co.uk/2/hi/business/7348463.stm.
[12] *Russia Energy Profile: Surpassed Saudi Arabia in 2009,* Eurasia Review. News & Analysis, November 6, 2010, http://www.eurasiareview.com/201011069493/russia-energy-profile-surpassed-saudi-arabia-in-2009.html.



Russian Crude Oil Exports by Export Outlet (2006-2007)
(in thousand bbl/d)

Outlet	2006	2007
Novorossiysk	768	885
Other Black Sea	217	476
Primorsk	1,255	1,484
Druzhba Pipeline	**1,261**	**1,269**
Germany	437	420
Poland	466	516
Hungary	136	160
Czech Republic	104	92
Slovakia	118	111
Other Baltic Sea (Butinge, Lithuania)	158	0
Total Transneft Crude Oil Exports	**3,660**	**4,114**
Non-Transneft Sea	170	307
China (Rail)	178	179
Murmansk (Rail)	47	48
Other Non-Transneft Rail	47	45
Caspian Pipeline Consortium (CPC)	53	72
Total Crude Oil Exports (includes non-Russian exports)*	**4,155**	**4,764**
of which Russian Crude Oil Exports	**3,953**	**3,947**

*Reprinted by Permission: Energy Intelligence (*Nefte Compass, *January 2007, 2008)*
**Includes trans-shipped oil from Azerbaijan, Kazakhstan, and Belarus*

million barrels per day via the new flagship Primorsk port near Sankt Petersburg and around 900.000 barrels per day via Black Sea. Most of the Russian oil exported to Europe arrived at destination via Transneft-controlled pipelines, and only about 300.000 barrels per day of oil via other non-Transneft-controlled sea routes or via rail. Today, because of the growth of the oil price, almost 170,000 barrels per day are transported via railroad.

Oil Product Exports and Balance

The Petroleum industry in the Russian Federation is one of the largest in the world. Most of the amount of Russian oil products exports contain fuel oil and diesel fuel, both used for heating in countries in Europe, while the United States of America uses this type of fuel for heating only at a small scale. Even so, since 2004, Russian oil exports to the U.S. have almost doubled and in 2007, they exceed 400,000 barrels per day of crude oil and products. The growth of the product exports can be considered a result of the political pressures regarding the maintaining of the refinery operations as well as the higher international oil product prices. The development of the sector was approached in a draft plan elaborated for 2005 – 2008, which foresees continued increased in the production of high quality light oil products, raw materials for the petrochemical industry and catalysis. Even so, the production of fuel oil is reduced and local refineries are only ensuring half of the country's needs for high octane gasoline. In this case, Russia must import the necessary part uncovered by its production. The oil industry in the Russian Federation needs huge investments, especially as the growth of Russian economy means that internal demand for energy of all types like oil, gas, nuclear, coal, hydro, electricity is growing continuously.

Russia's oil and gas companies

The biggest Russian oil company is Rosneft followed by Lukoil, TNK-BP, Surgutneftegaz, Gazprom Neft and Tatneft.

All oil trunk pipelines (except Caspian Pipeline Consortium) are owned and operated by the state-owned monopoly Transneft and oil products pipeline are owned and operated by its subsidiary Transnefteproduct.

- Gazprom (Russia's state-run natural gas monopoly; world's biggest gas exploration and production company)
- Lukoil (Russia's largest oil producer)
- Rosneft (State-owned Russian oil and gas exploration company)

- TNK-BP (created via 2003 merger of British Petroleum (BP) with Russian oil company Tyumen Oil Company)
- Surgutneftegas
- Nortgas
- Transneft (Russia's pipeline monopoly)
- Itera (International Group of Companies)
- Novatek.

5.1.2 Natural gas

In a time when every country in the world proposed to reach a higher level of development, and natural resources are so important, the Russian Federation realized that the country sits on a "gold mine" – the world biggest natural gas reserve and in this context, Moscow identified the gas sector as a key strategic sector.

Gas reserves are mainly owned and operated by Russian monopoly company - Gazprom, which produces 94% of Russia's natural gas production and holds 25% of the natural gas reserves known over the world, producing 16% of global output. In 2006, the Russian Federation became the biggest natural gas producer with 22% of total natural gas production and the biggest exporter with 22.9% of global natural gas export. With a natural gas reserve of 1,680 trillion cubic feet (Tcf), the Russian state has approximately double the reserves of the next country in line, with the biggest reserves in the world, namely Iran. The monopoly over the natural gas pipelines belongs to Gazprom, which has the exclusive right, granted by Federal Law "On Gas Export" (July 20, 2006), to export it. Gazprom also control all gas pipelines leading out of Central Asia, a situation that allows the Russian Federation to control the access to the European market. An example of how this mechanism works is the Russian decision in 2000 to use Central Asia's gas, most of the quantity from Turkmenistan, for a limited time when it found itself unable to fulfill all its delivery obligations from its own production. At the time, Gazprom allowed Turkmenistan, by using its pipelines, to ensure the necessary amount of natural gas for Russian domestic market. In this case, the Russian Federation was able to keep its delivery obligations towards European customers.

Gazprom is not the only natural gas producer in the Russian Federation. Other main natural gas producers are the following companies: Novatek,

TNK-BP, Itera, Northgas and Rospan, and vertically integrated oil companies Surgutneftegaz, Rosneft and Lukoil.

Regarding the export markets, Russian natural gas is delivered in the European Union and CIS. This way a quarter of the Russian gas to Europe passes through Ukraine via two important pipelines. One, Soyuz pipeline, "one of the main gas trunkline systems delivering gas from Russia to western Europe"[13] , and Brotherhood pipeline. "Around 20% of the EU's gas consumption and 80% of all gas form Russia destined for Europe transits Ukraine mainly through the Brotherhood" pipeline[14]. Among the European countries that import natural gas from the Russian Federation, Germany is the main importer, followed by Belarus, Italy, France, Hungary, Ukraine and Turkey.

Gas reserves

Discovered in 1988 in the central part of Russian sector of the Barents Sea, at 600 kilometres North of the Kola Peninsula, the Shtokhman field is one of the world's largest natural gas fields. According to Gazprom, "the reserves of the Barents Sea offshore field were estimated at 3.8 trillion cubic meters (tcm) of gas and about 37 million tones of gas condensate, up form an earlier estimate of 3.7 tcm and over 31 million tones, respectively"[15], the equivalent of 19 billion barrels of oil. Because of the field location, at approximately 540 kilometer northeast of the Russian mainland and 300 meters deep, the exploration is a true challenge. At that moment, International Oil Companies hopped to participate in the field's development, but in 2006, the Russian Federation announced that it will develop the field alone. Initially, Gazprom planed to export all the gas for the Shtokhman field, but in time it became interested to pipe some of the gas via North Stream pipeline. In May 2008, Alexander Medvedev, the Deputy Gazprom Chairman, announced that half of the quantity of natural gas exported form the field would arrive in Canada, at Rabaska facility.

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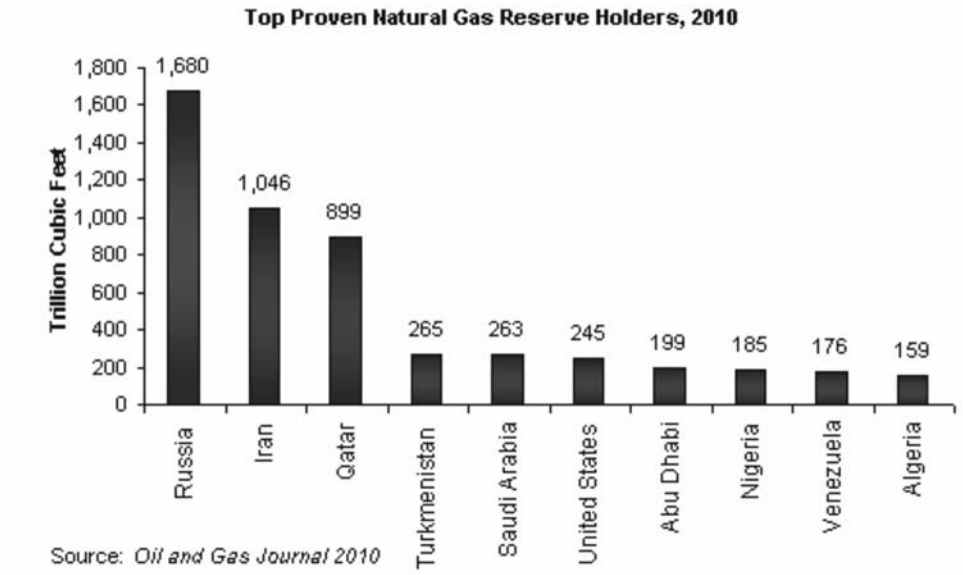
[13] *JKX Oil & Gas Announces Gas Pipeline Tie-in Approval,* Oil Voice, June 30, 2006, http://www.oilvoice.com/n/JKX_Oil_Gas_Announces_Gas_Pipeline_Tiein_Approval/ff53f80c.aspx.

[14] *Market Observer for Energy – Country file: Ukraine*, April 2010, http://ec.europa.eu/energy/observatory/doc/country/2010_04_ukraine.pdf.

[15] *Russia's Gazprom ups Shtokman reserves to 3.8 tcm*, Reuters, Nov 15, 2007, http://www.reuters.com/article/idUSL1589543420071115.



Production

But the Shtokhman field is not the only source of natural gas for the Russian Federation. Endowed with significant natural gas resources, proved to reach 47.6 trillion cubic meters, meaning more than 30% of the world's proved reserves[16]. In 2001, the Russian Federation exported about 127 billion cubic meters to European countries and Turkey, divided this way with approximation: 75 billion cubic meters to Western Europe, 40 billion cubic meters to Eastern Europe and 12 billion cubic meters to Turkey. The quantity exported in CSI countries and the Baltics reached the value of about 40 billion cubic meters.

In 2009, the Russian Federation lost the first position in the top of the natural gas producers, passing under United States of America. But even if last year, in 2009, Russia produced 19.3 trillion cubic meters, an amount smaller than the U.S.A. which produced 21 trillion cubic meters, "Russia was the world's largest exporter (7.3 Tcf)".[17] In the same period, Russia's production of natural gas decreased, falling maybe more than 17% over the

[16] The source for the data in this paragraph is British Petroleum (2001).

[17] Russia, Natural gas, U.S. Energy Information Administration, November 2010, http://205.254.135.24/emeu/cabs/Russia/NaturalGas.html.

year, with consequences over the exports in 2009. With a production of 19.3 trillion cubic meters, Russian production of natural gas touched the lowest level from 1992 to 2009.

Because of the concentration of the resources in the Siberian area, most of the natural gas production is located in this part of the country, where almost 95% of the total Russian natural comes from. Gazprom is the owner of most of the prolific fields in the Siberian region. But in last years, three of this, Yamburg, Urengoy, and Medvezh'ye have seen output declines, so the company decided to start, in late 2008, the Yamal Megaproject. "11 gas and 15 oil, gas and condensate fields with approximately 16 trillion cubic meters of explored and preliminary estimated gas reserves and nearly 22 trillion cubic meters of in-place and forecast gas reserves have been discovered on the Yamal Peninsula and in its adjacent offshore areas". Also, "reserves of condensate are estimated at 230.7 mln t and those of oil – 291.8 mln t".[18]

Domestic Gas Prices

Gazprom is not only the biggest energy company in the Russian Federation, but also Russia's largest earner of hard currency. The company's tax payments account for about 25% of federal tax revenues, but even if Gazprom is so big, with a enormous significance, the energy giant is facing domestic regulation. Russian law sets that the company must provide natural gas for heat and power on internal vast domestic market at government-regulated prices, which, in 2008 was somewhere between $50 and $70 per thousand cubic meters, regardless of profitability.

Only in 2006, Gazprom lost approximately $420 million on domestic natural gas sales, because the Russian price was around 15 – 20% of the market rate at which Russian gas was sold to Germany, for example.

But the European Union is not very happy with the Russian policy regarding domestic prices, because "it thinks that its member states act as donors for Russian consumers, and has long demanded that gas prices in Russia be raised to European standards. Russian gas monopoly Gazprom would also benefit from the increase, because it sells more than half of its

[18] Yamal Megaproject, Gazprom, http://www.gazprom.com/production/projects/mega-yamal/.

output on the domestic market - currently at dumping prices".[19] In this case, all the companies in the gas sector, are hopping that the national gas market will be liberalized.

In May 2008, the Russian government approved a plan to rise prices for natural gas, railway services and power. The plan involves a gradual increase for local gas prices until next year, in 2011 in order to achieve a level of equal profitability of sales on both export and local markets. At that time, Russian gas prices for domestic prices reached $52.84 per thousand cubic meters, in a time when Gazprom estimated the price for Europe at $500 per thousand cubic meters. Low prices have an important impact on the gas industry's ability to finance capital spending and have hurt incentives to increase efficiency. In this case rising internal prices towards parity of rates on European markets represents a major component of the the Russian Federation energy strategy, with an important role regarding the avoidance of the supply shortfalls in the future.

The prices for 2009 have been introduced by the December 24, 2008 Order No. 413-e/11 of the Russian Federation Federal Service for Tariffs. These prices are differentiated by 60 price zones. The Order provides for the following schedule of quarterly gas price increase in 2009: by 5% from January 1, by 7% from April 1; by 7% from July 1 and by 6.2% from October 1, all of which will provide an average annual increase in prices of 15.9 %. In 2010 regulated wholesale natural gas prices are scheduled to be increased by 13% from January 1 and by another 13% from July 1. From 2011 and onwards, natural gas prices are to be determined based on equal yield of gas supplies to the foreign and domestic markets. However, prices may be increased by not more than 40% in 2011.[20]

Import and Export Markets

The the Russian Federation exports a significant quantity of natural gas to its customers form Commonwealth of Independent States – CIS. also, Gazexport, the subsidiary of Gazprom, has shifted a large part of its exports of natural gas, so it can ensure the rising demand form the European Union

[19] *Should Russia raise domestic gas price?,* Ria Novosti, May 8, 2008, http://en.rian.ru/analysis/20080508/106906943.html.

[20] *At what prices does Gazprom sell gas to Russian consumers? How are these prices set?* Gazprom. In Questions and Answers, http://eng.gazpromquestions.ru/?id=5.

Planned Natural Gas and Electricity Price Increases (2008-2011) *Annual Percentage Change*				
	2008	**2009**	**2010**	**2011**
Natural gas				
Wholesale market	28.6	19.9	28	40
Regulated prices	25	20.3	28	--
For households	25	25	30	40
For all others	25	19.6	27.7	--
Electricity				
For households	14	25	25	25
For all others	16.7	26	22	18

Source: EIA

countries, Turkey, Japan and another few countries from Asia. In the table below, the values of the exports towards European countries for the period 2006 – 2007 are shown.

Russia's Federal Customs Service and Ministry of Industry and Energy data recorded that the Russian state exported 6.75 trillion cubic feet (Tcf) of natural gas in 2007, divided like this: 5.4 trillion cubic feet (Tcf) to outside of Former Soviet Union and to Baltic States and an amount of 1.3 trillion cubic feet (Tcf) to CIS states. In the Commonwealth of Independent States, natural gas was delivered through intermediaries - RosUkrEnergo and ZMB from Switzerland and was mixed with the volumes of the gas form Central Asia.

In 2008, the giant company Gazprom sold an amount of 184.4 billion cubic meters only to the Western Europe, and the main buyers remain Germany, Italy and Turkey. Regarding the CIS and Baltic states, in 2008, the natural gas sales accounted 96.5 billion cubic meters. The table below ranges the volume of the natural gas sales in 2008.

In 2009, the global economic crisis and recession challenged the world and changed the global community's perspective in many fields. It was a difficult year and for many countries, the crisis hasn't passed yet. With serious effects over the economy, it had a negative impact at all levels of the markets. In 2009, Gazprom reduced natural gas exports by 13.4%, and the crisis pulled the Russian state into economic turmoil. The global economic crisis hit hard the Russian Federation, with consequences over the natural gas sector. According to Rosstat (Information & Publishing Center –

TABLE 4: Major Recipients of Russian Natural Gas Exports, 2006-2007

Rank	Country	2006 Exports (bcf/y)	2007 Exports (bcf/y)	2006 % of Domestic NG Consumption
1	Germany	1,300	1,378	36%
2	Turkey	703	827	64%
3	Italy	756	742	25%
4	France	353	346	20%
5	Czech Republic	261	247	79%
6	Poland	272	247	47%
7	Hungary	272	226	54%
8	Slovakia	240	223	100%
9	Austria	233	191	74%
10	Finland	173	166	100%
11	Romania	180	138	28%
12	Bulgaria	113	120	96%
13	Greece	95	113	82%
14	Serbia & Montenegro	74	74	87%
15	Croatia	35	35	37%
16	Slovenia	25	18	64%
17	Switzerland	14	11	12%
18	Macedonia	4	4	100%
	Sales to Baltic & CIS States			
1	Ukraine	2,085	2,240	66%
2	Belarus	724	763	98%
3	Baltic States	173	243	78%
4	Azerbaijan	141	0	35%
5	Georgia	67	36	100%

Sources: "Domestic Consumption" EIA International Energy Annual, 2007; "Exports 2006 and 2007" Gazexport as cited by Energy Intelligence, March 2008; "Sales to Baltic and CIS States 2007", CIS and E. European Databook. 2006 from Gazprom Annual Report.

Country	Sales volume	Country	Sales volume
Germany	38.0	Finland	4.8
Turkey	23.8	Romania	4.2
Italy	22.4	Bulgaria	2.9
UK	20.9	Greece	2.8
France	10.9	Serbia	2.2
Hungary	8.9	Croatia	1.2
Czech Republic	8.0	Slovenia	0.6
Poland	7.9	Bosnia and Herzegovina	0.3
Netherlands	6.7	Switzerland	0.3
Slovakia	6.2	Macedonia	0.1
Austria	5.8		
Belgium	4.9	Others	0.6

Source: Gazprom.

Statistics of Russia), total gas production was down 20%, while Gazprom produced 25% less gas during the first half of 2009 compared to the first half of 2008.

For 2010, Gazprom expects an increase of natural gas exports, especially as the amount exported in the first four months of 2010, were higher that the same period of 2009. "Naturally, we are expecting positive dynamics compared with 2009. The economy has begun to recover after the crisis but we do not expect a sharp increase in exports"[21], declared Mikhail Malgin, head of the Gazprom Export department for North Western markets on May 30, 2010. According to him, "The first quarter [of 2010] was somewhere at the level 2008 or maybe slightly less".[22]

Major Natural Gas Pipelines

There is no doubt that Gazprom dominates the Russian natural gas pipeline system. At the present time, there are nine major pipelines, and seven of them are part of the export transportation. Russian gas to Eastern and Western Europe via Ukraine and/or Belarus is carried by the following pipelines: Bratrstvo, Northern Lights, Yamal-Europe I and Soyuz. Together, all these four pipelines have a capacity of 4 trillion cubic feet (Tcf). Turkey and the former Soviet Union republics located in the east of the continent are connected to Russia by three pipelines: Blue Stream, North Caucasus, Mozdok-Gazi-Magomed.

Proposed Natural Gas Pipelines

Yamal Europe II – a "transit gas pipeline with a total length of approximately 4,000 km will connect Western Europe with rich natural gas deposits on the Yamal peninsula".
(http://www.europolgaz.com.pl/english/gazociag_zakres.htm). Yamal - Europe I, with a capacity of 1 trillion cubic feet already carries Russian natural gas to Poland and Germany. The project Yamal Europe II, one of the largest development projects would expend another 1 trillion cubic feet of the capacity of Yamal – Europe I. At this moment, Poland and Gazprom disagree in the exact route of this second branch of the pipeline as it travels to Poland. The two parts have different positions regarding the route for

[21] Ilya Pitalev, *Gazprom expects larger natural gas exports in 2010,* Rianovosti, May 30, 2010, http://en.rian.ru/business/20100530/159218456.html.
[22] Ibidem.

Yamal – Europe II. While Gazprom proposed the pipeline to cross South Eastern Poland to Slovakia and onwards to Central Europe, Poland disagreed with this direction and wants the new brunch to travel its own territory and then to pass to Germany.

South Stream – represents an important step towards executing the Gazprom strategy of diversify the routes for the Russian natural gas. The first component of the project is supposed to transport natural gas "from the same starting point as the Blue Stream pipeline at Beregovaya for 560 miles under the Black Sea, achieving a maximum water depth of over 6,500 feet".[23]

Also, the project would partly replace the planned extension of Blue Stream from Turkey through Bulgaria and Serbia to Hungary and Austria, and is seen as rival to the planned Nabucco pipeline. The completion is due by 2015.

But there are doubts regarding the feasibility of South Stream project, because it may cost twice as much as Nabucco pipeline, expected to cost somewhere at €7.9 billion. Some experts claim that the project for the South Stream pipeline represents a political move to counter Nabucco and to expand and strengthen the presence of the Russian Federation in the region.

North Stream Pipeline – the project for the pipeline was initially approved in 2005. The pipeline will link the Russian Federation with Germany via the Baltic Sea and will represent an important factor for energy security of European continent. Designed with a capacity of 55 billion cubic meters of natural gas per year, the pipeline represents more than a part of energy infrastructure. North Stream "is a new channel for Russian natural gas exports, and a major infrastructure project which sets a new benchmark in EU-Russia cooperation".[24] North Stream will have 1.224 kilometres long and will be formed by two parallel lines. The first scheduled to be finished in 2011, will have a transport capacity of approximately 27.5 billion cubic meters. The second one, that will be completed in 2012, will double the capacity to 55 billion cubic meters. Such a significant amount of natural gas

[23] Russia - Natural Gas, U.S. Energy Information Administration, http://www.eia.doe.gov/cabs/Russia/NaturalGas.html.

[24] North Stream, 2010, http://www.nord-stream.com/en/.

exported to Europe is enough to supply 26 million households. With these technical characteristics, the North Stream pipeline "will be the longest sub-sea pipeline, with a capacity to transport 1.9 Tcf of natural gas".[25]

5.1.3 Coal

Russian reserves of coal are very dispersed. The biggest coal deposits are located in the Kuznetsk and Pechora basins. A huge deposit of brown coal is located in Kansk-Achinsk basin. Tunguska and Siberian Lena basins contain largely unexplored coal resources, so the commercial exploitation would be probably difficult to establish.

From a peak of approximately 425 million tones of coal in 1988, "Russia's total coal production declined dramatically following the disintegration of the USSR, reaching a low point of around 232 million tones in 1998".[26] Today, the Russian Federation, with 173 billion short tons holds the worlds largest recoverable coal reserves, following United States Of America, which holds about 274 billion short tons. Russia produced 321 million tons in 2006, almost a quarter of American coal production, making it the fifth largest in the world. The government's energy strategy stipulates that the Russian state should produce a quantity somewhere between 441 and 496 million tones by 2020.

Because of the restructuring in the coal sector that took place in last few years in Russia, about 80% of domestic coal production comes from independent producers. After an easy decline earlier in the decade, production of coal has increased noticeably in recent years. Moscow intends to develop the coal sector much more, because an increased coal production and more coal-fired plants, will help reduce the internal natural gas demand, allowing in this case to export a bigger quantity of natural gas. The largest Russian coal trading company is ZAO Rosuglesbyt, and the second one is SUEK.

5.2 Power generation industry – electricity

The Russian Federation "is the fourth largest generator of electricity, after the USA, China and Japan". [27] For a long time, Russian electricity industry

[25] Natural Gas, U.S. Energy Information Administration, http://www.eia.doe.gov/cabs/Russia/NaturalGas.html.

[26] World Energy Council, *2010 Survey of Energy Resources,* World Energy Council, London, 2010, p.34.

[27] *Russia: Energy overview,* BBC, February 13, 2006, http://news.bbc.co.uk/2/hi/europe/4699942.stm.

faced negative effects of underinvestment, but after a industry-wide reform, the energy sector of the Russian Federation "has emerged in its liberalised state with numerous opportunities for strategic and portfolio investors, equipment manufacturers, and service providers".[28]
In 2005, the Russian Federation produced 951 TWh and exported 23 TWh of electricity. In Russia, almost 63% of the electricity is generated by power plants, 21% by hydropower and 16% is the result of nuclear reactors. Regarding the exports of Russian electricity, the buyers are CIS countries, China, Finland, Latvia, Lithuania, Poland and Turkey. Unified Energy System, an industry-wide holding company with many responsibilities established in 1992 by Presidential Decree no. 932, dominates Russian energy market. While production and sale of the electricity will be opened up to competition, the transmission and distribution services remain under the control of Russian state.

Transmission and Distribution Sector

The Russian electricity sector divides Russia in eight separate regional power systems, and these are: Northwest, Center, South, Volga, Urals, Western Siberia, Siberia, and Far East. Seven of them are connected to an integrated power system, the only region not connected being the Far East. The Federal Grid Company (FGC), controls most of the transmission and distribution of electricity in the Russian Federation. More than 70 % of FGC is owned by Russian government. From 2 million miles of power lines that the Russian electricity network comprises, 73,000 miles are high-voltage cables over 220 kilovolts (Kv).

Electricity Exports

The Russian Federation exports significant amounts of electricity to the states in the region like countries from ex-Soviet Union, China, Finland, Poland and Turkey. Russian company UES, also plans to export electricity to Iran and possibly Afghanistan from two hydroelectric stations it is currently building in Tajikistan. Also, Pakistan is on Russia's list of possible buyers, after Moscow's decision to consider participating in the project to deliver Russian electricity from Tajikistan to Pakistan. The project named CASA-1000, costs $680 million and envisages "the construction of a power

[28] *Strategic Analysis of the Russian Electricity Industry,* mynewsdesk, November 8, 2010, http://www.mynewsdesk.com/us/view/pressrelease/strategic-analysis-of-the-russian-electricity-industry-514407.

transmission line to transfer surplus electricity from Tajikistan to Kabul and northwestern regions of Pakistan".[29]

China is an important buyer of Russian electricity. In 2009, it imported 316 times more than in 2008, reaching at 738 million kilowatt-hours. Northern China Province Heilongjiang, imported in 2009, 100% of the electricity produced the Russian Federation, estimated at a value of $29 million. For 2010, the Heilongjiang Electric Power Company "estimated that about 1 billion kilowatt-hours of electricity would be imported by the end of 2010, with a total economic value of over 40 million U.S. dollars".[30]

Also, in the present time there are two efforts underway to integrate Russian and Western electricity grids. UES is participating in the Bartel program - The Baltic Ring Electricity Co-operation Committee, a body that plays an important role in the interaction that it is necessary for developing a common electricity market in the Baltic Sea Region. The other is the participation of the Russian Federation to the Union for the Co-ordination of Transmission of Electricity (UCTE), an association of 20 European states, has opened the dialogue with the Russian Federation over the technical and operational of interconnecting their systems.

Privatization and Electricity Market Reform

The Russian power sector was recently restructured and the biggest part of it was privatized. the process of restructuring was completed on July 1st , 2008, when state monopoly RAO UES was dissolved. The Russian government electricity reform is a highly ambitious program. The reform began in 2004 and under the new provisions, "tariff rates on the domestic market are to be made more universal instead of geographically-specific".[31] Also, the provisions stipulate that the country's transmission grid will remain under state control. The reform created a new generating sector in Russia, divided into multiple wholesale electricity companies called OGKs, that activate in a new competitive wholesale market. The creation of all 6 OGKs was finished in September 2006.

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[29] Dmitry Astakhov, *Russia may join Tajik-Pakistani electricity project,* August 18, 2010, http://en.rian.ru/world/20100818/160251189.html.

[30] Li Xianzhi, *China imports 300 times more Russian electricity in 2009 than in 2008,* March 24, 2010, Chinese Government's Official Web Portal, http://www.gov.cn/english/chinatoday/2010-03/24/content_1564115.htm.

[31] Langdon D. Clough, *Energy profile of Russia,* October 30, 2008, http://www.eoearth.org/article/Energy_profile_of_Russia#gen33.

The distribution sector in Russia will remain divided into regional monopolies and the new regional companies will function as guaranteed suppliers to all customers. Also, bilateral contracts signed by generators and customers, will continue to be mandatory at some fixed prices set by the Russian government. The main goal is for the market to become completely liberalized by 2011.

Gazprom and UES

The giant company Gazprom wishes to obtain a key role in the electricity sector after the deregulation process, with interest in influence decision-making process on the fuel mix and also to benefit from electricity and natural gas tariff liberalization. In 2006, Gazprom expressed its interest in acquiring strategically important foreign assets from the UES electricity monopoly body, as part of its desire and plan to become a global energy player.

As a result, in March 2007, Gazprom and UES signed a long term, take-or-pay agreement for gas supplies for Russian electricity generation through 2010 where UES will receive around 3.6 Tcf per year of gas directly from Gazprom. Independent gas producers will meet the remainder of UES's fuel needs.[32]

5.2.1. Hydropower

Most of the potential of hydropower is located in Siberian region and in the Far East. In 2005, hydro generation (including pumped-storage output) reached the value of 175 TWh, meaning 5.8% of world hydroelectricity generation. The Russian Federation is ranked as the fifth largest hydroelectricity producer in the world. At the end of 2005 installed hydroelectric generating capacity was 45.7 GW. The gross theoretical potential of Russian hydro resources base is estimated at 2,295 TWh per year, of which 852 TWh is regarded as economically feasible.

5.2.2 Nuclear Power Plant

The first state that developed civil nuclear power was Russia, who also constructed the first nuclear power plant in the world. Today, the Russian Federation is the forth largest nuclear energy producer. In 2001, an order

[32] *Russia – The ElectricPower Sector,* August 11, 2008, AllBusiness, http://www.allbusiness.com/energy-utilities/utilities-industry-electric-powerity/11486148-1.html.

from government established that all Russian civil reactors will be operated by Rosenergoatom. After 6 years, on 19 January 2007, the law was adopted by the Parliament, which created Atomenergoprom, a holding company to control all Russian civil nuclear industry. Rosenergoatom, the nuclear fuel producer and supplier, TVEL, the uranium trader Tekhsnabexport (Tenex) and nuclear facilities constructor Atomstroyexport, also entered under the control of Atomenergoprom.

Present Nuclear Capacity

Russia's nuclear plants, with 31 operating reactors totalling 21,743 MWe, comprise:

- 4 first generation VVER-440/230 or similar pressurised water reactors,
- 2 second generation VVER-440/213 pressurised water reactors,
- 9 third generation VVER-1000 pressurised water reactors with a full containment structure, mostly V-320 types,
- 11 RBMK light water graphite reactors now unique to Russia. The four oldest of these were commissioned in the 1970s at Kursk and Leningrad and are of some concern to the Western world. A further Kursk unit is under construction.
- 4 small graphite-moderated BWR reactors in eastern Siberia, constructed in the 1970s for cogeneration (EGP-6 models on linked map).
- One BN-600 fast-breeder reactor.

Apart from Bilibino, several reactors supply district heating - a total of over 11 PJ/yr.[33]

The sector is in a developing process, with the aim of growing the total share of nuclear energy from current figures (16.9%) to 23% by 2020.

In October 2006 the goal-oriented-program "*The Development of Nuclear Power Complex of Russia for the Period of 2007 – 2010 and for the outlook until 2015*" was approved. The Russian government plans to allocate 127 billion rubles, meaning $5.42 billion, for a program dedicated to the next generation of nuclear energy technology. Before 2015, 1 trillion rubles ($42.7 billion) is to be allocated from the federal budget for industry development and nuclear power. Also, according to this strategy, 26 new nuclear power units in the Russian Federation and 12 units abroad will open until 2020.

[33] *Nuclear Power in Russia,* World Nuclear Association, http://www.world-nuclear.org/info/inf45.html.

Power reactors in operation

Reactor	Type V=PWR	MWe net, each	Commercial operation	Scheduled close
Balakovo 1	V-320	988	5/86	2015
Balakovo 2	V-320	988	1/88	2017
Balakovo 3-4	V-320	988	4/89, 12/93	2018, 2023
Beloyarsk 3	BN600 FBR	560	11/81	2025
Bilibino 1-4	LWGR EGP-6	11	4/74-1/77	2019-21
Kalinin 1-2	V-338	950	6/85, 3/87	2014, 2016
Kalinin 3	V-320	950	12/04	2034
Kola 1-2	V-230	432, 411	12/73, 2/75	2018, 2019
Kola 3-4	V-213	411	12/82, 12/84	2026, 2014
Kursk 1-2	RBMK	971	10/77, 8/79	2021, 2024
Kursk 3-4	RBMK	925	3/84, 2/86	2013, 2015
Leningrad 1-2	RBMK	925, 971	11/74, 2/76	2019, 2022
Leningrad 3-4	RBMK	925	6/80, 8/81	2025, 2026
Novovoronezh 3-4	V-179	385	6/72, 3/73	2016, 2017
Novovoronezh 5	V-187	950	2/81	2035 after upgrade
Smolensk 1-3	RBMK	925	9/83, 7/85,1/90	2028, 2015, 2020
Rostov 1	V-320	990	3/01	2030
Rostov 2	V-320	990	(Oct 2010)	

V-320 is the base model of what is generically VVER-1000, V-230 and V-213 are generically VVER-440, V-179 & V-187 are prototypes. Rostov was formerly sometimes known as Volgodonsk.

The intention of developing the nuclear power sector is based on the concept of expanding the role of nuclear and hydropower generation in next years allowing Russia to export bigger amounts of fossil fuels and resources.

Russian nuclear facilities are ageing and this represents a real problem for Russia. Almost half of the reactors are using the the RBMK design employed in Ukraine's ill-fated Chernobyl plant. The estimated working life of a reactor is 30 years, and at this moment nine of Russia's facilities are between 26 and 30 years old, and six of them are between 21 and 25 years old. Before the financial crises to heat the Russian Federation, investment in nuclear sector was expected to be double in 2008, and to reach the value of $960 million.

Energy giant Gazprom also expressed its interest in building nuclear stations, as a measure of saving more gas for exports.

7. Most probable crisis

7.1 Short run catastrophic effects (supply disruption)

Being so rich in energy resources, the Russian Federation is not in the situation of many other countries. Having a significant quantity of fossil resources, Moscow does not have to worry about the supply disruption, because a big part of world's sources are in Russian lands. Despite all these advantages, Russia is not crossing an easy period and this is because of its obligations regarding the supply of natural gas and oil to buyers from Europe or Asia. Being involved in so many projects, some of them quite impressive, even a country like the Russian Federation may face difficulties. Many specialists in energy security talk about the incapacity of Moscow to respects all contractual terms while supplying natural gas to its own population. Like in many other countries the boom that characterized the economy of Russia in the years before the financial crisis, requested a bigger consumption of energy and inevitably energy resources. Before 2000, domestic gas production stagnated for almost seven years. In 1999, it reached the value of 546 billion cubic meters, and starting with the beginning of the millennium, the internal consumption knew a significant growth. In 2007, the value touched the level of 548 billion cubic meters, with a peak in 2006 of 556 billion cubic meters.

In this situation, Gazprom was forced to increase the supplies for domestic customers by 2% for 2001 to 2007, in a period when internal demand has increased by 18%.

In 2007, the value of internal supplies from Gazprom amounted to 307 billion cubic meters, while the unsatisfied demand was of 132 billion cubic meters. With an increase of 72 billion cubic meters a year since 2001, a quantity of one third of internal consumption has to be covered by other sources, not Gazprom. In 2001, for internal consumption Gazprom supplied 301 billion cubic meters, and the quantity for next years was generally progressive. In 2003, the gasification level touched the high level of 309,1 billion cubic meters, in 2005 and in 2007, the value of 307,0 billion cubic meters. [34]

In the same period, domestic demand which in 2001 was of 373 billion cubic meters increased to the value of 439 billion cubic meters in 2007. This situation created a dangerous gap between demand and supply and

[34] Gazprom on Russian Market, Gazprom, http://eng.gazpromquestions.ru/?id=5#top.

destabilized Gazprom's planning regarding the exports of natural gas resources to Europe and CIS countries. In 2000, the Russian Federation faced problems in supplying natural gas to its contractors and for the internal market, so it had to import gas from Central Asia, more precisely from Turkmenistan. According to the Energy Information Administration, Turkmenistan has 2.86 trillion cubic meters of proven reserves and 1.4 billion barrels of proven oil reserves (International Energy Outlook, April 2004, Appendix A on Turkemnistan). Being in a difficult situation, Gazprom allowed Turkmenistan to supply natural gas to Russian market, while Russia ensured the promised amount to the European and ex-Soviet countries. In 2008, the Russian Federation imported from Turkmenistan 42.3 billion cubic meters, but Gazprom halted the imports in April 2009, after an explosion on a pipeline. The imports were resumed in January 2010, and in approximately nine months, an amount of 7.9 billion cubic meters of natural gas arrived from Turkmenistan to Russian domestic market. According to Deputy Prime Minister Igor Sechin, Gazprom intends to buy 10 to 12 billion cubic meters of Turkmen natural gas a year. The price paid by Russian Gazprom from Central Asia was cheaper, while Moscow sold it's own natural gas to Europe and other countries with a higher price. It was a profitable business, but after Central Asian nations raised the price of fossil resources, the Russian Federation diminished the quantity imported from Turkmenistan. An example is the intention of buying 10 to 12 billion cubic meters of natural gas in 2010, a quantity smaller than the one it bought previously, of 40 billion cubic meters.

The growing prices of energy resources from Central Asia, put Gazprom in a difficult situation. Exporting the contracted gas to it's buyers, it was almost impossible for the Russian energy giant to ensure the total amount for internal market. But in the 2007 – 2008 winter, because of the higher price on Central Asian market, Gazprom was forced to use the underground gas reserves and almost totally exhausted it's gas reservoirs located underground.

7.2 Disproportionate price effects/consistently high cost (prices)

In the Russian Federation, wholesale prices of natural gas supplied by giant energy company Gazprom and it's affiliates are set by the Federal Service for Tariffs, an operation that is made every year. The final price for gas includes three components: wholesale gas price; the tariffs for gas delivery

by the gas distribution networks; and other fees for supply and sales services.

The Russian Federation practices the policy of dual prices, meaning that the export prices and domestic prices are different. This is a common feature of the energy-exporting states. No doubt, in Russia natural gas prices are suppressed domestically. Russian government claims that the state has given Gazprom a total control over the natural gas resources, because of a so-called "social obligation". Through the giant energy company, Russian power subsidizes the inefficient domestic industries with natural gas at o low price. In 2007, the wholesale price of 1,000 cubic meters of gas for a Russian household is around $15.90 (about $0.45 per Mscf). For industrial users, gas costs around $24.20 ($0.69 per Mscf). By comparison, in the E.U., household tariffs range from Finland's $159 ($4.50 per Mscf) to Denmark's $735 ($20.82 per Mscf).[35]

In this situation, Gazprom lost a lot of money because of the prices set for the internal market, but for Russia, the arguments that sustain this policy are strong. First of all, there is the humanitarian cause that refers at providing inexpensive heating and energy in a cold climate. The economic argument refers at Russia's resource endowment represents a comparative advantage to energy-intensive Russian industries. Regarding the environmental issue, supplying people with low-cost natural gas, reduces the usage of dirtier energy resources. As it happens in many cases, there are arguments against practicing a lower price for domestic consumption. The first one refers to the fact that such a policy provides a trade-distorting subsidy to a high consumer of energy resources. Then, a dual policy that advanced the internal consumption will encourage excessive use of natural gas on internal market. and, of course, the opposition regarding the small prices practiced in Russia and bigger prices set for European Union and CIS states. Moreover, these states expressed their disapproval regarding the big difference between internal and external natural gas prices, feeling that they are are donors for Russian consumers as the states that covers the loss of money for Gazprom. Indeed, the difference between what the buyers must pay for Russian gas and the Russians is huge. Gazprom realized that the

[35] E.O. Ndefo, P. Geng, S. Laskar, L. Tawofaing, and Michael J. Economides, *Russia: A Critical Evaluation of its Natural Gas Resources,* Energy Tribune, February 13, 2007, http://www.energytribune.com/articles.cfm/379/Russia-A-Critical-Evaluation-of-its-Natural-Gas-Resources.

losses cannot be covered for a long time, so it was decided that is time for a policy change. The giant energy company is considering that the best solution for the moment is to raise price for it's potentially vulnerable consumers: Russian people. In 2008, Russian authorities talked about a price rising for the first quarter of 2009 for domestic market at $65 per thousand cubic meters, and for European countries at somewhere between $260 and $300 per thousand cubic meters. But the beginning of the year was full of events (dispute with Ukraine and Turkmenistan), so on April 27, 2009, Russian Energy Minister announced a new development program for the country for 2009 – 2012, that stipulates that gas prices for companies will be bigger with 5%, and for population with 20.8%.

According to the Russian Federation Federal Service for Tariffs, the prices for natural gas in Russia were set to be differentiated by 60 price zones. The schedules for prices to get higher in 2009 was the following: by 5% from January 1, by 7% from April 1; by 7% from July 1 and by 6.2% from October 1, all of which will provide for an average annual increase in prices of 15.9 %. In 2010 regulated wholesale natural gas prices are scheduled to be increased by 13% from January 1 and by another 13% from July 1. From 2011 and onwards, natural gas prices are to be determined based on equal yield of gas supplies to the foreign and domestic markets. However, prices may be increased by not more than 40% in 2011.[36]

According to a study prepared for the Russian Ministry of Fuel and Energy and commissioned by Hermitage Capital Management, "the current low gas prices are counterproductive for the Russian economy as they lead to excessive gas consumption and do not encourage energy saving". [37] But the study made in 2003 might not please the Russians. The proposal regarding the increase of prices for domestic market can represent a political risk for Moscow, because subsidized energy prices represent one of the last fiscal ways of absorbing the shocks of a society whose population has been sensitively affected by the collapse of communism regime. The only two actors who will win from this situation are: Gazprom and the buyers of Russian natural gas (European and CIS states).

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[36] *At what prices does Gazprom sell gas to Russian consumers? How are these prices set?*, Gazprom in Questions and Answers, http://eng.gazpromquestions.ru/?id=5#c520.

[37] Hermitage Capital Management, Press Release, October 31, 2003, http://hermitagefund.com/newsandmedia/audioandvideo/index.php?ELEMENT_ID=167.

7.3 Reduce investments (FDI)

In the year 2007, Russia's international investment flows reached a very high level, the highest level recorded till that moment. With a value of $52 billion worth of Foreign Direct Investment (FDI) inflows and a value of $46 billion invested by Russian enterprises out of the country, Russia became one of the world largest recipients and sources of FDI. In this situation, the considerably increased FDI stock transformed the degree of FDI penetration into one comparable to other emerging market economies. But the economic global crisis affected the economy of Russia and inevitable the amount of Foreign Direct Investment. In 2009, FDI slipped an annual 17.6 percent reaching the value of $2.6 billion in the first quarter on an uneven economic recovery that Russia knew from the worst contraction since the collapse of Soviet Union in 1991. The Russian Federation, the world's biggest energy supplier suffered a plunge in long-terms Foreign Investment. This was possible even if its currency and stock market benefited at that moment from speculative capital inflows. In 2009, the Gross domestic product fell to 7.9 percent, recording the biggest decline since the dissolution of former Soviet Union.

In 2010, FDI into Russia fell 11% in the first half of the year, a negative sign regarding the strength of the economic recovery. "FDI fell to $5.4 billion, while overall foreign investment, including in securities, slipped 5.5 per cent to $30.4 billion, the state statistics service said."[38] The biggest investor was Cyprus, a traditional tax haven for Russian businesses, followed by the Netherlands, Luxembourg and Germany. As a consequence of the low level of the investment in Russia, BRIC rivals outperformed the Russian state. this year. China is expected to grow in 2010 approximately 8%, and FDI into Asiatic state grew at 29.2% in first seven mounts of this year.

In August 2010, Prime Minister Vladimir Putin announced that investment activity indicators for 2010 were quite "favorable". This didn't help too much the recovery of economy in the Russian Federation. This situation is threatening to damper the return of investors from abroad. At the present time, Russia has a fairly poor success in attracting Foreign Direct Investment.

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[38] Ed Bentley, *FDI falls 11%,* themoscownews, August 23, 2010, http://themoscownews.com/finance/20100823/188000276.html?referfrommn.

With a total value of $15.9 billion of FDI in 2009, meaning 68% below 2008 when FDI was of $49 billion, Russia faces real problems in a time when competition for securing a share of the international investment flows – particularly from fellow BRICS, Brazil, China and India, is so tough. In the BRICs group, the Russian Federation's economy was the hardest hit. As a consequence, according to finance minister Alexei Kudrin "it could take until 2013 for FDI to return to the level seen in 2008".[39]

The lack of the FDI in Russia, also affects Russian energy sector. There are signs that Russia is very close to overextending itself, and Moscow is moving very slowly on to investing in its energy infrastructure. But despite the needs for investment from abroad, Russian policies seem to favor closed domestic monopolies, repealing foreign capital and technology. Furthermore, the risk for investors in doing business with Russia are huge. They can buy minority stakes in Russian energy firms, but the concept of shareholder is still undeveloped. In this case, the investors from outside must face a notoriously corrupt system with a non-transparent policy.

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39 Tim Golsing, Going for growth: race to recapture FDI, Russia Beyond the Headlines, March 30, 2010, http://rbth.ru/articles/2010/03/30/going_for_growth_race_to_recapture_FDI.html.

ENERGY SECURITY IN THE CAUCASUS

7. Energy Security in Georgia

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I. Country Overview

Situated in the Caucasus region of Eurasia, with a population of a little more than 4,6 million inhabitants, Georgia is one of the oldest states in the region. Situated at the juncture of Eastern Europe and Western Asia, it is bounded to the West by the Black Sea, to the North by Russia, to the South by Turkey and Armenia, and to the East by Azerbaijan. Georgia covers a territory of 69,700 km². Georgia's constitution is that of a representative democracy, organized as a unitary, semi-presidential republic. At the beginning of the 19th century, Georgia was annexed by the Russian Empire. After a brief period of independence following the Russian Revolution of 1917, Georgia was annexed by the Soviet Red Army in 1921 and in 1922 Georgia was incorporated into the Soviet Union, which lasted until the breakup of the Soviet Union in 1991. Like many post-communist countries, Georgia suffered from the economic crisis and civil unrest during the 1990s. In 1995, after almost five years of civil war, Eduard Shevardnadze, ex-minister of foreign policy of the USSR between 1985 and 1991 was officially elected as president of Georgia. At the same time, simmering disputes within two regions of Georgia, Abkhazia and South Ossetia, between local separatists and the majority Georgian populations, erupted into widespread inter-ethnic violence and wars. Supported by Russia, Abkhazia and South Ossetia, with the exception of some „pockets" of territory, achieved de facto independence from Georgia. The 1990s was a

period of distress for Georgia due to economic and political lack of direction in the wakening of the USSR dissolution.

In 2003, Shevardnadze (who won reelection in 2000) was deposed by the Rose Revolution, after Georgian opposition and international monitors asserted that the November 2 parliamentary elections were marred by fraud. The revolution was led by Mikheil Saakashvili, Zurab Zhvania and Nino Burjanadze, former members and leaders of Shevardnadze's ruling party. Mikheil Saakashvili was elected as President of Georgia in 2004. Following the Rose Revolution, a series of reforms was launched to strengthen the country's military and economic capabilities. The new government's efforts to reassert Georgian authority in the South Western autonomous republic of Adjaria led to a major crisis early in 2004. Success in Adjaria encouraged Saakashvili to intensify his efforts, but without success, in the breakaway South Ossetia.

Since the fall of the USSR in 1991, Georgia embarked on a major structural reform designed to make the transition to a free market economy. As with all other post-Soviet states, Georgia faced a severe economic collapse. The civil war and military conflicts in South Ossetia and Abkhazia aggravated the crisis. The agriculture and industry output diminished. By 1994 the gross domestic product had shrunk to a quarter of that of 1989. The first financial help from the West came in 1995, when the World Bank and International Monetary Fund granted Georgia a credit of USD 206 million and Germany granted DM 50 million. As of 2001 54% of the population lived below the national poverty line but by 2006 poverty decreased to 34%. In 2005 average monthly income of a household was GEL 347 (about 200 USD).[1]

Georgia hugely benefited from the construction of the Baku-Tbilisi-Ceyhan. Thanks to this project Georgia obtained a transit function with all of its implications (the Western financial and political interests) and got an opportunity to intensify ties with the West and get rid of the Russian influence. The pipeline has never worked in its full capacity (it transported mainly Azeri oil) but still its importance for Georgia (and Azerbaijan) can hardly be underestimated. The same is true about Baku-Tbilisi-Erzerum. It was also very significant for Georgia since it allowed the country to replace the Russian gas by the Azeri one. Thanks to that Georgia secured itself

[1] The World Bank's Economic Development and Poverty Reduction Program progress report

against Gazprom's notorious price manipulations – another tool of Russian political pressure. But Baku-Tbilisi-Erzerum has not reached its full capacity either – it has been limited to Georgia and Turkey whereas the construction of Nabucco would allow it to transport gas to Europe too – something that Georgia would more than welcome since it would increase the country's transit function thus making it more important for Europe (where Georgia strives to integrate).

Unlike Ukraine, Georgia has viewed the close cooperation with the West not only as a means for further development but also as securing its sovereignty. For the last couple of years Georgia has struggled to re-ascertain itself as a regional hub but the rising Russian influence has killed off (or at least suspended) both Nabucco and the White Stream. After the fall of the Ukrainian Orange Coalition Georgia is struggling almost alone against the Russian influence and that is true about the energy markets as well. Recently, Georgia stuck a deal with Romania on transporting oil to Constanta by a ferry. As insignificant (compared to Baku-Tbilisi-Ceyhan)as it may look it is still a great achievement for a country that has struggled after the war with Russia and that does not enjoy significant political support from Ukraine. Georgia greatly depends on Azerbaijan and this dependence is not only about energy supplies – Georgia depends on Azeri political orientation, much more than it depended on Ukraine's orientation. Under President Ilham Alyev Azerbaijan now pursues a more balanced foreign policy than under Alyev senior (under his leadership Azerbaijan was more pro-Western) but Azerbaijan still needs access to the international market and this is something that the Georgian corridor can offer. Besides, by supporting Armenia (that has become Azerbaijan's major foe because of the Karabagh problem) Russia kills off chances of turning Azerbaijan into its ally.

IMF 2007 estimates place Georgia's nominal GDP at US$10.3 billion. Georgia's economy is becoming more devoted to services (now representing 65% of GDP), moving away from the agricultural sector (10.9%).[2]

Since coming to power, the Saakashvili administration accomplished a series of reforms aimed at improving tax collection. Among other things a flat income tax was introduced in 2004. As a result budget revenues have

[2] World Development Indicators 2008, The World Bank. www..worldbank.org

increased fourfold and a once large budget deficit has turned into surplus. Tourism is an increasingly significant part of the Georgian economy. About a million tourists brought US$313 million to the country in 2006. According to the government, there are 103 resorts in different climatic zones in Georgia. Tourist attractions include more than 2000 mineral springs, over 12,000 historical and cultural monuments, four of which are recognized as UNESCO World Heritage Sites (Bagrati Cathedral in Kutaisi and Gelati Monastery, historical monuments of Mtskheta, and Upper Svaneti).

Russian military aggression in late 2008 and global economic crisis negatively impacted the country's economy, as GDP dropped 2%. The economic situation was stabilized mainly due to involvement of external sources and government stimulus packages:

- an IMF stand-by program was signed in September 2008 for 750 mn. USD of which 250 mn. USD was received at the end of the same month
- 4.5 bn. USD donor funding was pledged in late October 2008 at the International Donors Conference for Georgia's economy stabilization programs
- 2.2 bn. GEL (1.35 bn. USD) fiscal stimulus package issued by the Government of Georgia.

Georgia has significant domestic energy resources relative to its own needs, notably in hydropower, but it is still highly dependent on imported oil and gas. Energy infrastructure is in a generally poor state, following years of under-investment and the effects of civil strife. To address these issues, the Georgian government has embarked on a major restructuring and liberalisation programme, with emphasis on creating a strong market foundation for the energy sector.

A priority for the Georgian government has been to secure adequate and diverse sources of energy supply, and the Review encouraged the government to take a balanced approach between energy supply and demand measures. The development of a comprehensive energy efficiency strategy and legislation will need to be accompanied by efforts to strengthen the institutional capacity to implement energy efficiency policies.

II. ENERGY SECTOR OVERVIEW

Legal foundations of the Ministry of Energy of Georgia

The Ministry of Energy of Georgia is the State institution implementing executive authority and state policy in the Georgian energy sector. The Ministry of Energy exists in accordance with the Law of Georgia on "The Structure of the Government of Georgia" (11.02.04). The Ministry's activities are governed by the Georgian Constitution, International Agreements, other Standard Acts and the 'Charter of the Ministry of Energy of Georgia' most recently approved by the Government of Georgia in March 17, 2005. The Ministry with its entire system ensures implementation of State policy in the energy sector Under the law on "Electricity and Natural Gas" the Ministry of Energy relinquishes ownership, and operational rights in the electricity and natural gas sectors, and has only specified regulatory rights. That is, the Ministry is not an operational body that delivers energy commodity and services to the population. It is a policy body. Thus, as we outline in more detail below, a main tool of the Ministry is its ability to propose energy policy to the Parliament (and thus its ability for leadership even when it has no direct authority).

Similarly the Ministry has the ability to approve **Natural Gas Market Rules**, subject to public hearings, which govern commercial relations for trade of natural gas within Georgia for the Georgian market; and its ability to set Market Rules for electricity (also subject to public hearing), which thus strongly affect a principal market for natural gas, as a fuel for electric generation. Closely related to the Market Rules for electricity, is the ability to approve the "energy balance" for expected dispatch of electric generation in a coming period. Within the general ability to propose policy, the Ministry can also propose tariff policy for internal markets (retail and wholesale tariff policies for natural gas and electricity) which would be followed by the regulator if approved by Parliament. Such tariff policies affect not only price per se, but also requirements for capital. Thus, it is appropriate that this study discusses both issues of pricing policy and also, concepts for the market structures affecting trade in natural gas in and through Georgia.

The Law on Electricity and Natural Gas (June 27, 1997, as amended) gives the Ministry of Energy the function of establishing main directions of

state policy in the electricity and natural gas sector, securing their implementation and creating and adopting the legal framework for the sector. The Ministry "sets" those policies by proposing a state energy policy to the Parliament; if approved, then the Ministry has the obligation to secure their implementation.

Although the Ministry can only "set policy" with approval from the Parliament, there are certain critical normative-administrative legal acts which have policy content, which the Ministry can approve (indeed, must issue) on its own authority, under the Law on Electricity and Natural Gas. These are:

1. Electricity (Capacity) Balance;
2. Natural Gas Balance;
3. Electricity (Capacity) Market Rules;
4. Natural Gas Market Rules;
5. The Rules of Installation and Operation of Energy Facilities and other Technical Equipment

Also, the Ministry of Energy is authorized to make decisions on deregulation, based on state energy policy.

The Ministry of Energy has elaborated „**Main Directions of State Policy in Georgian Power Sector**"[3] on the basis of the Resolution of the Parliament of Georgia 25/37 of 27 December of 2005. The Georgian Parliament approved the document prepared by the Ministry of Energy on 7 June of 2006 and determined the main directions of energy policy. The main goal of the „Main Directions of State Policy in Georgian Power Sector" is the full satisfaction of the demand of industrial and domestic communal sector concerning energy resources on the basis of full use of energy resources existing in the country and diversification of imported energy carriers. As well as, achievement of economic independence and sustainability of the sector, provision of energy security (technical, economic and political factors).

The main task of the long term policy in the power sector of Georgia is full and gradual satisfaction of the demand on electricity resources on the basis of its own hydro resources: first with the help of import, then by its substitution with thermal generation. Before resolution of these tasks rehabilitation of infrastructure of thermal hydroelectric stations, equipment

[3] Resolution of the Parliament of Georgia, Main Directions of State Policy in the Power Sector of Georgia, Tbilisi, June 7, 2006

of power generating units with modern aero turbines combined cycle technologies should create a solid and reliable foundation for the base power. Provision of energy safety first of all envisages parallel solution of several tasks. To this end it is necessary to carry out:

- *Full re-equipment of technologically outdated and physically obsolete technical basis;*
- *Construction of new power plants, transmission infrastructure for electric energy and natural gas;*
- *Diversification of imported energy carriers (natural gas, oil, electric energy);*
- *Setting up of the commercially profitable economic model of the sector.*

Effective development of rich hydro resources of the country shall become the main direction for development of the power sector of Georgia. At the same time construction of hydro energy complexes shall be conducted in all possible directions-represented by small and average size hydro energy stations as well as with powerful complexes.

A number of important strategic goals as set out in the strategy:

- *Privatization: Power and gas distribution companies, as well as generation, plants need to be privatized in order to commercialize the sector, improve its economic viability, attract investment and develop competition.*
- *Simplification: The most important goal of the state energy policy is to maximize support for local and foreign companies working in the sector and reduce the bureaucratic procedures to a minimum. Optimisation and simplification of the licensing procedures are therefore of the highest priority.*
- *Third party access to transmission and distribution network: The government is committed to reducing the threshold for third-party access to the transmission and distribution network. A plan has been created for the gradual liberalization of third-party access to the grid.*

Means

According to the Parliament's Resolution, achieving the main objectives set out in Georgia's energy sector requires the development of a commercially profitable economic model of this sector. One important stage of

transformation for this model is the privatization of existing electricity generation and electricity and gas distribution companies, which should facilitate healthy competition in the energy sector and attract investments. The following are the necessary preconditions for attracting private investments in the energy sector:

- *By simplifying licensing and other bureaucratic procedures, creating a favorable business environment for local and foreign companies that are interested in investing in the sector;*
- *Gradual liberalization and deregulation of the electrical energy market, which ultimately will be reflected in direct contracting between wholesale electricity producers and wholesale buyers;*
- *Introduction of new market rules insuring the separation of rights and obligations and responsibilities among actors in the sector;*

The Resolution additionally explains that achieving the main objectives of Georgia's state energy policy requires an appropriate legal foundation with relevant laws, legal acts, resolutions, and ordinances.[4]

Energy Security

According to the Parliament's Resolution, another priority of the state energy policy is to insure the country's energy security. The following measures are foreseen in this regard:

2.2.1. **Rehabilitation of existing hydro and thermal power stations**; rehabilitation of existing transmission lines, central and distribution pipelines; restoring transmission lines connecting country's energy systems with those of neighboring countries and pipelines; maximum support to expanding consumption of natural gas (including in cars);
2.2.2. **Construction of new hydropower stations,** internal lines, and transmission lines connecting to neighboring countries and gas pipelines, and high voltage transmission lines connecting to the West-East parts; functioning of Georgia's energy systems in parallel regime with the systems in neighboring countries; substitution of imported electricity and electricity generated at heat generating power stations (on the basis of imported

[4] Transparency International Georgia - Georgia's Energy Policy Overview of Main Directions

natural gas) with locally produced resources and usage of alternative energy sources (if traditional and alternative energy sources are put in equal conditions);

2.2.3. **Expansion of Trans Caspian energy corridor**;

2.2.4. **Construction of aboveground and underground** storage facilities (natural gas storage);

2.2.5. **Geological research and studying of local oil and gas beds**; increasing exploitation rates from existing beds; exploitation of economically profitable coal beds and researching possibilities for generating electricity from coal resources using new technologies;

2.2.6. **Imposing the obligation on existence of reserve capacities**;[5] All wholesale vendors will be obliged to have reserve capacities of no less than a specific amount of its consumption and in several years (gradually) to move toward using locally produced resources (for example, in 2006-2009 a wholesale vendor should have a reserve capacity of no less than 10% of its consumption and it can be using locally produced, as well as imported resources; however, in 2016-2019 a wholesale vendor should have a reserve capacity of no less than 15% of its consumption and it should entirely rely on locally produced resources).

1 – Electricity

Water and water resources are the primary ones among the natural riches of Georgia. Georgia's h**ydro-energetic potential** (rivers, lakes, water reservoirs, ices, underground waters, bogs) is on one of best in the world. Hydro resources take the first place among the natural riches of Georgia. There are 26 000 rivers on the territory of the country. Their total length is approximately 60 000 km. The entire fresh water supply of Georgia, which is made up of ice, lakes and water reservoirs, is 96.5 km3. Around 300 rivers are significant in terms of energy production; their total annual potential capacity is equivalent to 15000 MW, while the average annual production equals to 50 mln KWh.[6] Considering peculiarities of Georgian rivers, which are characterized by distinct seasonality, these resources can be distributed only by building hydro power stations with regulating water reservoir in the short and long term perspectives. However, from the ecological point of view, such a construction is difficult. That is why hydro

[5] Having reserve capacity is necessary for insuring the country's energy security

[6] Ministry of Energy of Georgia - http://www.minenergy.gov.ge/index.php?m=249

power stations with small reservoirs are more common. The Government of Georgia has approved the State Program – "Renewable Energy 2008" which includes the list of potential greenfield projects and rules for construction of new renewable energy sources.

In the scope of the above-mentioned program memorandums of understanding are signed between the Government of Georgia and investors on the following projects such as: Khudoni HPP – with the installed capacity of 750 MW and generation of 1,5 bn KWh; Cascade of Namakhvani HPPs - with the installed capacity of 450 MW and generation of 1 670 mln KWh; Faravani HPP - with the installed capacity of 78 MW and generation of 425 mln KWh; Cascade of HPPs on the rivers: Chorokhistkali, Lukhuni, Tekhura, Gubazeuli, Mtkvari, Bakhvistskali da etc. totally 21 HPPs (total installed capacity of 1 583 MW and generation of 5,5 bn.KWh) are under construction agreements.[7] The amount of investments to be intended for the construction of HPPs equals to USD2,4 bln. Against the background of the reduction of the fossil fuel energy resources the utilization of the wind, Solar and geothermal waters, bio-gas and various environmentally clean energy sources has become very actual for electricity generation and other practical reasons.

Demand for electricity in a country with a restructured electricity sector and sustainable electricity prices, is broadly a function of economic growth and the energy efficiency potential in the economy. As a legacy of the communist era, the Georgian economy was very energy inefficient throughout the 1990s. Thus, as electricity prices have increased, much of the anticipated growing demand, in the wake of strong economic growth, has been met by increased energy efficiency. A comparison of the development in electricity generation in Georgia with a group of representative countries in Central and Eastern Europe (Poland, Czech Republic, Romania, Azerbaijan, Russia) and Turkey in the period 1999-2006 indicates that the elasticity of electricity production (as a proxy for electricity demand assuming no electricity trade) per unit of additional GDP varies widely between the countries. Electricity production has increased faster than the GDP in Turkey (1.35 times faster), partly reflecting that there is limited scope for energy efficiency improvements in an economy which is already relatively energy efficient. The average for the sample group is

[7] Ministry of Energy of Georgia- http://www.minenergy.gov.ge/index.php?m=249

0.59 times GDP growth, while in Georgia the figure was 0.07 in the period 1999-2006. Only Russia had a lower ratio at 0,04.[8]

a)Legislation Institutions and policy

Since 2004 the Ministry of Energy has overseen a radical restructuring of the electricity sector, resulting in dramatically improved performance. Improvements over the last few years include a more regular supply of electricity to most parts of the country, rehabilitation of Enguri HPP and other HPPs, rapid reduction in transmission losses, and a much improved collection rate for the distribution companies. Many of these improvements have been made possible by theMinister and the Ministry's commitment to a radical reform agenda.[9]

Georgian National Electricity Regulatory Commission (GNERC)

The National Electricity Regulatory Commission in Georgia has responsibility for regulation of the power sector as well as the natural gas sector. GNERC is set up as an independent legal body with the Commission Chairman appointed by the President of Georgia. The Commission has the authority to grant Licenses and regulate Licensees within the Electricity and Natural Gas Sectors of Georgia. The mandate of the commission is to:

- *Establish rules and conditions for granting generation, transmission, dispatch, distribution, as well as natural gas transportation and distribution licenses, also grant, modify and revoke licenses in compliance with the Law of Georgia on Licenses and Permits, Georgian Law on Electricity and Natural Gas and Licensing Rules;*
- *Setting and regulation of tariffs for electricity generation, transmission, dispatch, distribution, import, export and consumption, as well as for natural gas transportation, distribution, import, export, supply and consumption according to the main directions of the state energy policy legal acts issued based on this policy and established methodology;*
- *Within its competence, resolve arguments between Licensees, Importers, Exporters, suppliers and consumers and between Licensees and consumers:*

[8] The electricity sector in Georgia –A risk assessment Commissioned by The Ministry of Energy Georgia

[9] The electricity sector in Georgia –A risk assessment Commissioned by The Ministry of Energy Georgia

- *Establish control over the conditions of the Licensing within the Electricity and Natural Gas Sectors of Georgia, and for violation of the conditions, shall combine the relevant administrative sanctions, which are determined by the existing Georgian Legislation.*
- *Organization and coordination of activities, with regard to mandatory certification within the energy sector;*[10]

b) System structure

Transmission

The transmission network in Georgia has been one of the major weaknesses of the electricity system. Much of the capacity is already used, and construction of the larger planned HPPs (Khodoni and Namakhvani) will require significant investments in new transmission capacity,especially for eventual exports to the Turkish market. There are currently two companies providing electricity transmission services in Georgia, the state owned Georgian State Electrosystem (GSE), which operates the 300, 220, and 110 networks, and some of the 35 kV lines, and JSC Sakrusenergo (50% owned by RAO UES and 50% by the Georgian State), which owns the 500-kV line running across the country from West to East.

The transmission network in Georgia consists of 500, 300, 220, 110, 35, 10 and 6-kV lines. The main transmission network is the 500-kV line, which transports electricity from the generation centers in the Northwest of Georgia (notably Enguri HPP) to the main load centers in the West. There is also a 220-kV line system, which is reasonably well developed, connecting the main HPPs to the grid.

The export capacity using the Georgian transmission network is limited, and a new high voltage line would need to be constructed to facilitate substantial exports to Turkey.

Sakrusenergo

"Sakrusenergo" JSC-united energy system was established" on 27 May, 1996 by the Georgian Government in cooperation with "Russian United Energy System". The company`s start-up capital is distributed between the founders on a 50-50 % basis. The company arranges electricity transmission through the 500 KV electricity transmission lines together with

[10] GNERC - http://www.gnerc.org/index.php

maintenance of lines providing the interconnection between national and neighboring countries energy systems. The overall length of the company`s assets is 908 km. The line section passing through the Georgian territory makes up 600 km and the one available on the territory of Russia-308 km.

Georgia State Electrosystem

GSE assets include the major part of transmission facilities. The company was set up in November of 2000 on the basis of "Electrodispecherizacia 2000" LLC and "Electrogadacema" JSC. From 2003 to 2007 the management of the company was transferred under the 5 year management contract to the affiliate company "ESBI Georgia" LLC of the Irish "ESBI International".

Distribution

Three companies are carrying out the distribution of electric energy in Georgia: „Energo-Pro Georgia", „Telasi" and „Kakheti Energy Distribution".

Energo-Pro Georgia

Joint-Stock Company Energo-Pro Georgia is one of the largest transmission companies in the Georgian energy market that, except Tbilisi and Kakheti regions, owns high (110kv) voltage, the medium (35-10kv) voltage and the low (6-0,4kv) voltage networks on the whole territory of Georgia.
Energo-Pro Georgia provides 2.150 billion electric energy in a year and distributes to 850.000 subscribers. Thus, companies' sales amount of electric energy is equal to 40 percent of electric energy use in Georgia.[11]

Telasi

Joint-Stock Company Telasi is one of the largest distribution companies on Georgia energy market which owns high (110kv) voltage the medium (35-10kv) voltage and the low (6-0,4kv) voltage networks in Tbilisi and its near areas. Joint-Stock Company Telasi with 2 billion kilowatt-hour energy distributes to 416 500 subscribers in a year.[12]

Kakheti Energy Distribution

Joint-Stock Company Kakheti Energy Distribution is the only distribution company in Kakheti region established on Joint-Stock Company Sinatle

[11] Energo-Pro Georgia - http://www.energo-pro.ge/index.php?lang_id=ENG
[12] JSC Telasi - http://www.telasi.ge/eng/index.php

base on April 15, 2003.The consumer's service and bill collection is carried in 8 service-centers of Kakheti Energy Distribution located in every administrative region in Kakheti. Joint-Stock Company Kakheti Energy Distribution serves 117 058 subscribers. Its average use in a year use is 200 million kilovolt per hour.

The Commercial Operator of Electric Power System

When the electricity market in Georgia was deregulated in the 1990s, the Georgian Wholesale Electricity Market (GWEM) was set up to be the sole market maker in the system. GWEM purchased and sold electricity. The lack of payment discipline in the sector made GWEM file for bankruptcy in 2004, and the company was closed down in 2006 and replaced by ESCO. **The Electricity System Commercial Operator (ESCO)** has been functioning since September 1. ESCO was established on August 7, 2006, on the base of an amendment (July 9, 2006) to the law on „Electricity and Natural Gas" . ESCO is a legal entity subject to private law. The legal form of ESCO is Limited Liability Company. The government (the Ministry of Economic Development in particular) is the sole owner of ESCO. ESCO shares will thereafter be distributed among the energy sector licensees.[13]

ESCO functions

When ESCO was established in September 2006, it was assigned a number of responsibilities:

- *sell and buy the balance electricity and capacity (including through signing medium and long-term import/export contracts);*
- *provide the electricity system with the reserve capacity in conformity with the law and regulations established by the "Market Rules";*
- *supply the Dispatch Licensee with the relevant information in order to carry out the supply/consumption planning;*
- *create and manage unified data (including the unified metering register) on the wholesale trade;*
- *identify the volume of electricity sold and purchased by the electricity sellers and buyers and submit the information for settlement purposes;*

Direct contracting of electricity between generator and purchaser was allowed in 2006. Since then, ESCO has been trading with a much smaller

[13] ESCO - http://www.esco.ge/

share of the total electricity in Georgia (around 15% in the first six months of 2007) than its predecessor GWEM.

2. Oil and Gas

a) Legislation Institutions and policy

According to the Parliament's Resolution adopted in June 2006, the following are the priorities of the Georgian state policy in the gas and energy sector:
a) rehabilitation of gas units,
b) release of such units from debts and their privatization,
c) diversification of gas supply,
d) formation of a transparent and liberal energy market.

By February 2008, Georgia's entire natural gas sector, with the exception of the main pipeline system and gas generation units of Gardabani (except for those which belong to Inter-Rao), had been privatized. Currently, Georgia receives natural gas from three suppliers. A long-term contract is concluded with only one of them – the south Caucasian pipeline consortium.

Georgian Oil and Gas Corporation (GOGC)

Georgian Oil and Gas Corporation LLC was established on 21, March 2006 by the decree of Minister of Economic Development of Georgia with its 100% shares fully owned by the government. The government owned shares of JSC Georgian International Oil Corporation, JSC Georgian International Gas Corporation and JSC Saknavtobi were accumulated in GOGC authorized capital.[14] The Corporation represents the Georgian government in the production sharing agreements (with foreign companies) on Georgian gas and oil fields as well as the negotiations conducted with respect to the gas supply (together with the Ministry of Energy of Georgia).[15]
GOGC's activity is mainly focused on exploration and production of oil and gas resources and respective design planning; providing transit, export, import as well as storing, preparing, refining, recycling and realizing of oil and gas materials and end-products both within and outside the Georgian

[14] GOGC - http://www.gogc.ge/index.php?m=185
[15] Transparency International Georgia - Georgia's State Energy Policy in the Natural Gas Sector

territory along with conducting marketing operations. Georgian Oil and Gas Corporation oversees the operation of Gas Main Pipeline System in line with oil and gas pipelines. One of the primary points in GOGC's activity lies in rehabilitation and replacement of Main Gas Pipeline System; design and construction of oil and gas pipelines; creation, development and operation of proper infrastructure.

GOGC is supervising Gas Main Pipeline System through its subsidiary Gas Transportation Company. GTC is given an exclusive license for gas transportation. GTC operates and maintains the high pressure gas pipeline system. Its main activity comprises of transporting natural gas through the territory of Georgia as well as providing consumers with a stable natural gas supply. It also ensures transportation of natural gas to the Republic of Armenia. GTC is responsible for estimating gas consumption, maintaining and overseeing the delivery schedule, evaluating gas losses reasons and providing pipeline security.

b) System structure

Currently there are five large private gas consumer companies on the Georgian gas market.

These are:

1) KazTransGas Tbilisi – distribution in the capital;
2) Itera-Georgia – supplier in the regions, which owns 10 distribution companies in economically active Kvemo Kartli and Shida Kartli regions;
3) Mtkvari-Energy, which owns the ninth and tenth energy blocks of Gardabani;
4) Energy-Invest, which owns Rustavi Azoti and Gardabani gas turbine;
5) Georgian Industrial Group, which owns Rustavi and Kaspi Cement Works with the equity participation of the German company HeidelbergCement.

From the above listed companies, Itera and Rustavi and Kaspi Cement Works (which are large consumers of natural gas) are the oldest private companies on the gas market. Both companies were privatized between 1998-1999.

The Gas Transportation Company operates major gas pipelines and their offtakes with a total length of 1939.52 km, 85 gas distribution stations and 5 gas metering stations. Total gas pipelines design capacity amounts to

55mcm per day, correspondingly 20bcm annually. Total gas pipelines geometric range is 551.151 m3.[16]

Georgian Main Gas pipeline System comprises 9 gas pipelines: North-South, Kazakh-Saguramo, Karadag-Tbilisi, Vladikavkaz-Tbilisi, Saguramo-Kutaisi, Kutaisi-Sukhumi, Rustavi-Telavi-Djinvali, Tsiteli Kxidi-Tsalka-Alastani and Gomi-Khashuri-Bakuriani.

c) Capabilities

Oil Extraction

Given the fact that Georgia is not rich in oil and gas reserves, oil and gas industries are not separated in the fields of exploration and extraction. At the moment there are sixteen oil and one oil-gas fields being jointly developed in Georgia. The current upstream oil and gas activities can be divided into two types: extraction from the existing oil wells and exploration of new fields. The national territory is divided into 29 potential areas for oil and gas exploration onshore and offshore license blocks. For 21 of these of these blocks licenses have already been issued, managed by seven companies that conduct oil and gas operations in Georgia: Iori Valley - Oil and Gas Ltd, CanArgo, Frontera, Anadarko, Strait Oil and Gas, Global Oil and Energy, Aksai BMC.

Iori Valley - Oil and Gas Ltd

Iori Valley - Oil and Gas Ltd. is one of the major Georgian oil companies, with 100 % of its shares fully owned by the State. It was established in July, 1995 jointly by Georgian and Swiss sides: Georgian Oil Company Saknavtobi and National Petroleum Ltd (NPL). Since April 2007 Iori Valley - Oil and Gas Ltd. is owned by Georgian Oil and Gas Corporation. The company operates at Samgori-Patardzeuli, Samgori south dome and Krtsanisi fields including Teleti field since August, 2007 with total licensed territory of 367.395 square kilometres out of which 133,27 square kilometres already developed and -234,125 yet unexplored. The license of the company is valid until 2021.

CanArgo

CanArgo Energy Corporation is an American New York based oil and gas exploration and production company. It has been conducting exploration

[16] Georgian Oil and Gas Company - http://www.gogc.ge/index.php?m=2&lang=geo

and extraction operations in Georgia since 1996. CanArgo is operating on the bases of Production Sharing Agreement, provided that the profitable oil is shared among the government, comprising 70% and the CanArgo 30%, subject to export by the company itself. CanArgo provided drilling operations on the 6 wells in Manavi, Norio and Ninotsminda.[17]

Frontera

Frontera Resources is a US based company that was founded in 1996. It has been operating at the License Block 12 (Dedoflistskaro region) since 1997. Frontera's activity is exclusively focused on exploration, extracting and exploitation of oil and gas volumes. It has already extracted 32 thousand tons of crude oil. Frontera has carried out drilling operations of one well already and is planning to drill up one more test hole located at the Tariban valley. It has discovered about 20 sections potential reserves. After concluding the 25 years Production Sharing Agreement with Ministry of Energy of Georgia and Georgian National Oil Company, Frontera acquired the exclusive right of exploring and extracting of crude oil reserves on the 5,500 sq meters of the Eastern part of Georgia. On the basis of this agreement the company has the right to undertake exploration and extracting operations and to cover all the expenses with the income accrued from processing oil products. The rest of the income amount resulted from realized oil products are shared among Georgian Oil and Gas Corporation (GOGC) 51% and Frontera Eastern Georgia 49%. Frontera has invested $ 75 million USD in Georgia.[18]

Anadarko

On the basis of Product Sharing Agreement between Anadarko and Government of Georgia, dated June, 2000 Anadarko was granted the right to initiate exploration works on three Blocks (IIa, IIb and III) of Georgian section of the Black Sea Shelf. After signing the agreement, the company has been conducting a seismic survey of the given fields. For the exploration purpose it is scheduled to launch initial drilling operations at the first test hole at approximately 3200m from sea bottom. The cost of exploration works is estimated for to be 100 million USD. Currently, Production Sharing Agreement is signed between Anadarko (48%), BP

[17] CanArgo - http://www.energo-pro.ge/index.php?lang_id=ENG
[18] Frontera - http://www.fronteraresources.com/

(28.5%), Turkish Petroleum Overseas Company (13.5%) and Unocal (10%). Hydrocarbon proven reserves per each field is estimated between 10 and 200 million tones. Oil shares between the government and the investors are determined by drilling depth, incurred costs and relative income. The company set forth in the three most promising areas. Estimated nonhazardous hydrocarbon reserves for each area range between 70 million and 1,3 billion barrels.[19]

Strait Oil and Gas

The Cooperation Agreement with Strait Oil and Gas was concluded in 2007. The company has the right to undertake exploration and extracting operations at Block VI and Block VI-B (western Georgia). Strait Oil and Gas is responsible for carrying out geophysical and geological investigations, rehabilitation of old wells and conducting well drilling operations at the license blocks.

Global Oil and Energy

The Cooperation Agreement with Global Oil and Energy was concluded in April, 2007. Company has the right to undertake exploration and extracting operations at Block VII-B (western Georgia) and Block VIII (eastern Georgia). Global Oil and Energy is responsible for carrying out geophysical and geological investigations, rehabilitation of old wells and conducting well drilling operations at the license blocks.

Aksai BMC

The Cooperation Agreement with Aksai BMC was concluded in April, 2007. The company has the right to undertake exploration and extracting operations at License Block V (western Georgia). Aksai BMC is responsible for carrying out geophysical and geological investigations, rehabilitation of old wells and conducting well drilling operations at the license blocks.

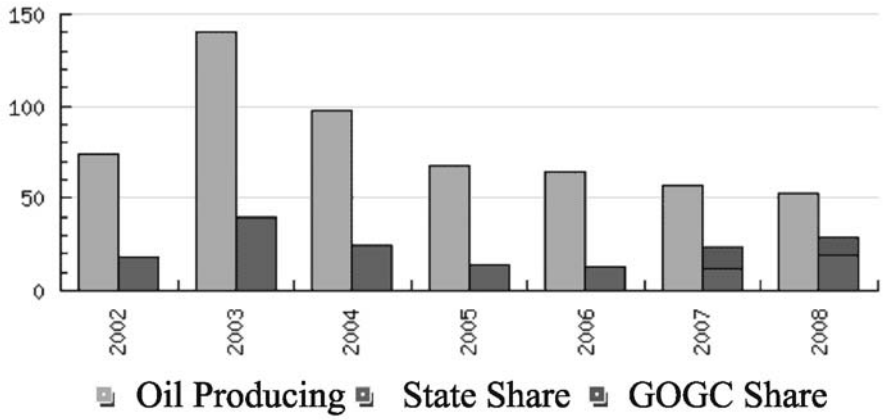
Oil Production

2008 evaluations of Georgia's oil resources reveal hydrocarbon deposits estimated at about 850 Mt.[20] The primary focus of the upstream industry is on the exploitation of the existing gas fields, some of which have been producing since the early 1930's. The majority of the existing oil and gas

[19] Andarko - http://www.anadarko.com/Home/Pages/Home.aspx
[20] Energy view of the BSEC Countries 2008

fields in Georgia are in their late development stage meaning that the prospects of increasing hydrocarbon production from these wells are rather limited. In late 2008 Frontera announced the discovery of a new extension of Mirzaani Field within its Shallow Fields Production Unit, Block 12. A previous study that took place in 2007 indicated that the capacity of this extension was as high as 5 million barrels of recoverable oil reserves.[21]

Oil Production (Yearly) 1 thousand tons



Source: GOGC - http://www.gogc.ge/index.php?m=248

Oil Transportation

The strategic location is one of Georgia's most important economic assets. The Georgian territory is being used as a transit corridor for pipelines that bring gas and oil products from the shores of the Caspian Sea to Western markets. Four major, and of utmost importance, pipelines transit the Georgian territory: Baku-Supsa (WREP), owned by BP with a maximum capacity of 7 million tons per year, Baku-Tbilisi-Ceyhan (BTC) also owned by BP with a total maximum capacity of 50 million tons per year, South Caucasian Pipeline (SCP), also owned by BP with a total maximum capacity of 20bcm per year but currently transporting only 8bcm and the North-South Gas Pipeline (NSCP) owned by GOGC with a total capacity of 16bcm per year.

[21] Energy view of the BSEC Countries 2008

West Route Export Pipeline (Baku-Supsa)

West Route Export Pipeline (WREP), otherwise known as Baku-Supsa Early Oil Pipeline is the first BP-led project in Georgia that has been successfully and safely operating since 1999. The Georgian Government receives significant tariff revenues from WREP project. The construction of Baku-Supsa Early Oil Pipeline was financed by Azerbaijan International Operation Company (AIOC). The Supsa Onshore Terminal was also constructed within the framework of the pipeline project's construction. The overall length of the Baku-Supsa Early Oil Pipeline is 830 km (Georgian section 375 km). The capacity of the Supsa Terminal is 1 million barrels. Crude oil produced from oil filed Chirag in the Caspian Sea is carried from the Sangachal oil terminal through WREP and ultimately to the Supsa Onshore Terminal. The transportation of the first volumes of crude oil from Sangachal oil terminal through WREP began in December, 1998 and reached Georgia in January, 1999. Currently 150 000 barrels of oil is transported through Baku-Supsa Early Oil Pipeline.[22]

Baku-Tbilisi-Ceyhan Oil Pipeline

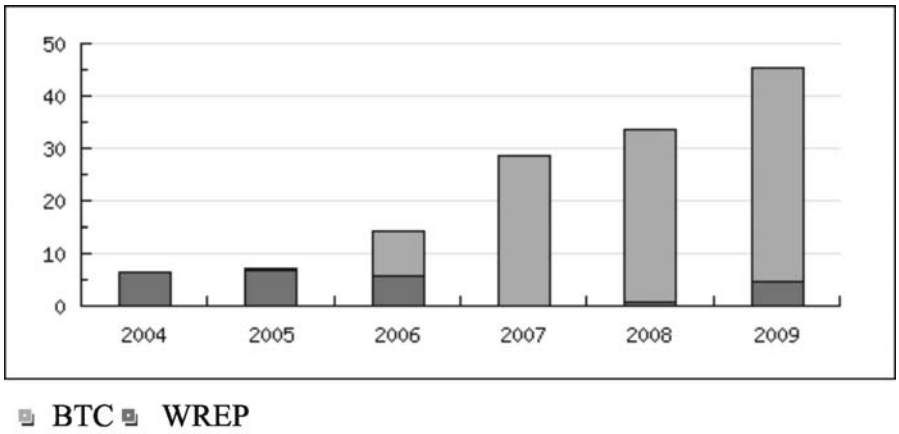
Baku-Tbilisi-Ceyhan Main Export Pipeline is transporting crude oil from Azeri-Chirag-Gunashli oil field in the Caspian Sea. BTC pipeline is the first direct transportation link between Caspian and Mediterranean Seas. The construction costs of BTC exceeded 4 million USD. The overall length of Baku-Tbilisi-Ceyhan Pipeline is 1768 km. The Georgian section of the pipeline is 249km, the Azeri section is 443 km and the Turkish section is 1076 km. The pipeline comprises 8 pumping stations (2 in Azerbaijan, 2 in Georgia and 4 in Turkey) and its extended height from the sea level is 2800 meters. As a result of its operation, the tariff revenues from BTC pipeline project will flow directly into Georgia's budget and will amount $ 50 million USD annually.[23] The total capacity of the pipeline will amount to 50 million tons of oil per annum. The pipeline was commissioned by a consortium of energy companies led by BP, which has a 30.1 percernt stake and the status of operator. The other members of the BTC consortium are: SOCAR (State Oil Company of Azerbaidjan Republic) 25%, TPAO (Turkish Petroleum Corporation) 6.53%, Statoil (National Company of Norway) 8.71%, Unocal (USA) 8.9%, Itochu (Japan) 3.4%, Amerada Hess

[22] GOGC - http://www.gogc.ge/index.php?m=306

[23] Ministry of Energy of Georgia - http://www.minenergy.gov.ge/index.php?m=309

(USA) 2.36%, ENI (Italy) 5%, TotalFinaElf (France) 5%, INPEX (Japan) 2.5% and ConocoPhillips (USA) 2.5%.[24]

Oil Transportation (Yearly) mln. Tons



Source: Ministry of Energy of Georgia - http://www.minenergy.gov.ge/index.php?m=334

Georgian Oil and Gas Corporation (GOGC) intends to study feasibility of a design and construction of a large-scale **Oil Refinery plant in Georgia**. Georgia is completely dependent on imported oil products and there is no refinery plant operating in the country at the moment. Increasing demand for oil products on the local and regional market together with the infrastructure expansion in progress serves as a sound basis for Oil Refinery Project Development. At the same time, implementation of the refinery project will considerably improve the level of energy security of the country and create export potential for domestic production. If such a plan would be put in action the result would be a refinery with a capacity of half a million tons, built by the Georgian government and, later on, privatized. The main advantage of such a facility would be the import of crude oil from other countries (like Azerbaijan) in order to be processed, although the intercession for obtaining a license would be difficult due to the desired high standards of the product.

Gas Transit

Georgia does not receive monetary transit fees from the two major gas transit pipelines crossing its territory. The Georgian government has opted for

[24] Energy view of the BSEC Countries 2008

receiving a percentage of the total transported gas volume as transit fee (5-10%). The decision of accepting resources over money was made accordingly to the energy strategy of the country that promotes the diversification of sources. The volume of the "Gas Option" is based on 5% of the previous year's throughput in the case of the South Caucasus Pipeline (SCP). Georgia also receives 10% of the gas supplied to Armenia via North-South Caucasus Pipeline (NSCP) as a transit fee, which, according to energy expert Archil Mamatelashvili[25], represents 12% of the amount necessary for the country. Therefore, a total amount of almost 80% of Georgia's required gas is received as a fee or bought for a discounted price, a privilege for being a transit country.

Baku-Tbilisi-Erzurum Trans-Caucasus Gas Pipeline

Done through the Baku-Tbilisi-Erzurum Trans-Caucasus Gas Pipeline (a project worth 1 billion dollars USD) in the markets of Georgia, Turkey and then all Europe executes transportation of natural gas from deposit Shah-Deniz and other deposits of the Caspian basin. In the projects agreements stipulate that Georgia is not only the transit country, but also one of the consumers of natural gas. There also is recorded that investors have to provide the montage of a special system to receive gas from the gas pipeline; through this system Georgia receives Azeri natural gas. In the form of the transit duty/tax, Georgia has an option to receive 5 percent of all volume of Shah Deniz gas transported from Azerbaijan to Turkey through Georgia. Besides, from the beginning of functioning of the project, in 20 years Georgia will buy additional volumes of natural gas (0,5 billion cubic meters per year) under the special price (USD 55 per 1 000 cubic meters and with the 1,5 % of annual escalation). The Baku-Tbilisi-Erzurum Trans-Caucasus Gas Pipeline has a length of 691 kilometers on Azerbaijan and 249 kilometers on the Georgia sections[26] At full capacity, and after additional stages of development, it is envisaged that the pipeline will export up to 20 billion cubic metres of gas a year. At the border the pipeline links up the Turkish-built extension joining SCP to the domestic supply grid at Erzurum. Construction of the SCP pipeline, built in the same corridor of land as the BTC pipeline through its passage in Georgia, was completed in 2006.[27]

[25] Archil Mamatelashvili is former Deputy Energy Minister in 2005-2007, Interviewed June 2010

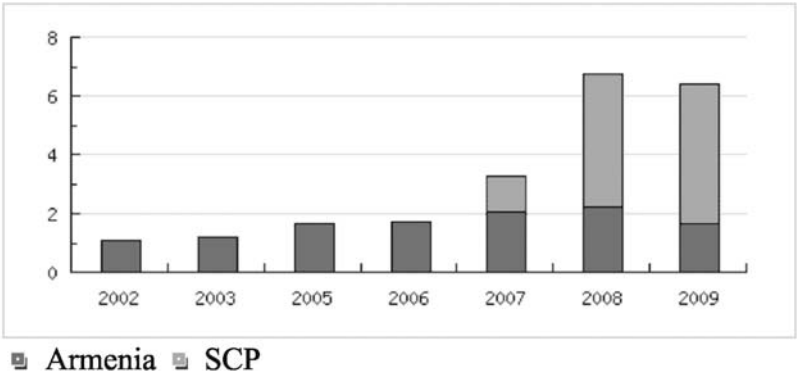
[26] GOGC - http://www.gogc.ge/index.php?m=304

[27] GOGC - http://www.bpgeorgia.ge/go/doc/1339/150568/

North-South Caucasus Pipeline

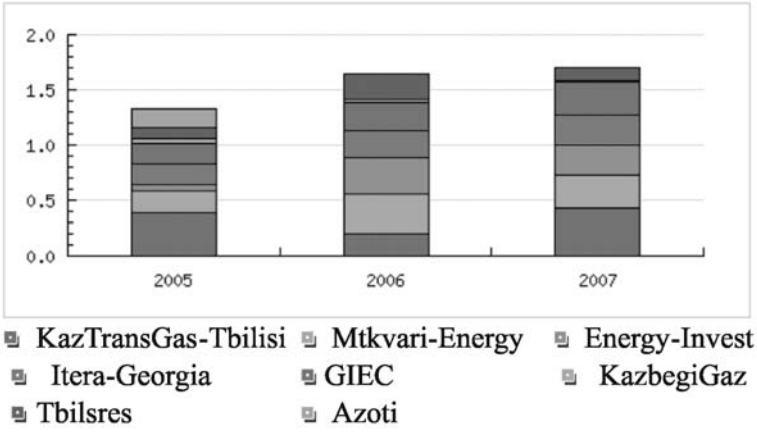
The state-owned NSCP system reaches from the Georgian-Russian border in the north to the Georgian-Armenian border in the south with a total length of 235 km.[28] This pipeline was built for supplying Armenia with the amount of natural gas needed, this being the only gas supply that Armenia has. The design capacity of the pipeline is approximately 16bcm/ year, at the moment functioning at a capacity of 6bcm/year. The operator of the pipeline system is the subsidiary of GOGC, Georgian Gas Transportation Company (GTC).

Gas Transit (Yearly) billion.m^3



Source: Ministry of Energy of Georgia – http://www.minenergy.gov.ge/index.php?m=331

Gas Distribution (Yearly) billion.m^3



Source: Ministry of Energy of Georgia http://www.minenergy.gov.ge/index.php?m=330

[28] Energy view of the BSEC Countries 2008

Gas storage

The energy sector and economical situation of Georgia mainly depends on import of natural gas that from its side requires the implementation of specific actions for maintaining of energy security in the country. Unpredictable stoppage of gas supply that can be caused by technogeneous disaster, technological accident or acts of sabotage from third parties may result in development of crisis in energy, in the country's industrial and economic sectors. Such a situation arose in Georgia twice during last 10 years - on January 18-24, 2003 and on January 21-23, 2006, when gas import was delayed after explosions on the main gas pipeline sectors on the territory of Russia. Underground gas storage facilities are one of the most effective mean for maintaining gas reserves, balance of seasonal gas supply and operative management of gas pressure. It should be mentioned that the critical situation management strategy considers the obligation of making reserves of energy resources for 90 days normal usage for the countries that depend on import of energy resources. There also are no restrictions on making the reserves on the territory of another country. The liberalization of the international gas market will become a more supportive factor for intensive constructions of gas storages, as its use gives the possibility of excessive gas absorption in summer and its distribution during winter overload period at more reasonable prices. In Georgia gas usage seasonal difference is very obvious. Gas usage in winter period is twice bigger than in summer. As a rule all long term contracts practically implies equal gas supply during the year. So gas storage can be used for balancing of gas supply in winter overload period with accumulated gas during summer excessive gas supply. At the moment Georgia does not possess such a gas storage but according to Mrs. Mariam Valishvili, First Deputy Minister of Energy of Georgia[29], a plan for such a structure is being developed due to be finished by the end of 2010. The main goal is the creation of a gas storage, on the territory of Georgia, with a capacity of half a billion cubic meters of gas, that would suffice for a period of 60 days in the winter.

[29] Mariam Valishvili , First Deputy Minister of Energy of Georgia, Interviewed June 2010

III. RISK ASSESSMENT AND MITIGATION

Assessment of the existing energy security strategies of the Wider Black Sea Region. Realism, feasibility, capacity of adapting those plans to the evolution of the situation in the region. Assessment of the level of fulfilling the three basic requirements of the security in a given crisis situation.

Georgia stands on a crossroads between an ever-mindful yet energy absorbent Europe, an ex-soviet Asian territory striving to gain recognition of its new stance and a all-controlling, ever-expanding Russia. Although many languages are spoken in the attempt of a dialogue between these entities, the most common, most effective and generally agreed upon appears to be the language of energy and all that it implies. Even if, at times, the voice of political reason seems to surpass all others, most of the times, reason is abandoned and the cold reality of "billion cubic meters" and "barrels per day" takeover once more.

The Caucasus area appears to be a never-ending struggle for creating dependences and monopolies. In this harsh, barely democratic environment, Georgia, lacking in resources, strives to remain independent both political and energy wise. Ever since the Rose Revolution in 2003 major steps have been taken towards achieving these goals, the energy security tasks of the incumbent leadership of Georgia are far from being solved.

Although possessing a comprehensive energy policy, Tbilisi still lingers upon developing a coherent energy security policy. Although an energy security document was released in 2005, a document which according to Irakli Porchkhidze[30], Deputy Secretary of National Security Council, represented a turning point of the energy strategic thinking of Georgia. The NSC is the main institution from the Georgian hierarchy that is the most able to emit strategies.

This young institution was created in 2007 which can be a reasonable explanation for why it has failed to sketch a coherent energy strategy so far. Steps in this direction have been made nevertheless, and in 2009 the institution emitted the "Threats Assessment Document "(TAD) a paper that lists all the threats to Georgia. According to Porchkhidze the TAD represents the basis for the multi-institutional developed "National Security

[30] Irakli Porchkidze, Deputy Secretary of National Security Council of Georgia, Interviewed June 2010, Tbilisi

Document" which will be ready in the next two to three years. The term the NSC has given to the document is far beyond any reasonable limit if we take into consideration two things: first, the presidential elections in 2012 that could oust the existing government, given the fact that actual president Saakashvili can no longer run for another term, according to the constitution, therefore the NSD may not be amended or further delayed, and secondly, the dire need that Georgia has for such a document. The existing strategy is mainly based upon swapping rather than commercial imports. This may suffice for the moment but in the long run it may turn out to be dangerous.

For the time being Georgia is still "on the map" due to its transit country status and to the fact that its immediate neighbours represent too much of a risk to replace it from this task. The future projects (like the Southern Corridor), in which Georgia wants to be involved in, are the key to not only keeping the country "on the map" but represent the means to its own energy security, while the absence of such routes could decrease interest for the country. An important role in this future development is played by Georgia's relation with the EU. In the opinion of George Vashakmadze, Director of Corporate Development for White Stream, Georgia's energy security is closely linked to that of the EU. If this is true then we might assess that the role Tbilisi has assumed after the 2008 war with Russia plays to its advantage. Backed by US support and developing a fast growing relation with Brussels, Georgia became an unofficial emissary of European interests with countries such as Azerbaijan or even Turkey. Countries like Turkmenistan, Kazakhstan and Azerbaijan do not lack the will of collaborating with the EU but the motivation, due to the Russian influence still very strong in the region.

We should take into consideration the fact that these countries' gas reserves combined, are allegedly greater than the ones of Russia, a position also shared by Mr. Vashakmadze. Considering the fact that Russia is still an important regional player and observing the recent events of regime-change in Kazakhstan we can safely presume that both Ashgabat and Astana aren't very close to supplying western lines. Azerbaijan on the other hand has grown more detached from Russia's influence while expanding its cooperation and showing more interest towards European projects.

Although Baku takes its time in "choosing a side" its close partnership with Georgia might be useful in more than one way. First, Georgia's relation to

the west and close energy partnership with Azerbaijan may prove to be a liaison in the azeri-european future relation and energy projects. Secondly, the relation with Baku could be a strongpoint for the future of the internal Georgian projects the Tbilisi government wants to implement, for example the oil refinery, who's success is based on imports of crude oil, most likely from Azerbaijan. As stated above, Georgia's energy security is linked to the stability of energy security in the region and not only, and another important actor has to be taken into consideration: Turkey. Gas in countries like Azerbaijan or Turkmenistan is extracted at lower prices than Russia for example, the real problem being transport and transport infrastructure. This is the area where Turkey has a say in and could pose problems like it did in the past. A good example to support these statements is the early and sudden death of the Transcaspica pipeline, a project terminated by Turkey's lack of cooperation. Another relevant example is the difficulties in the implementation of the BTC pipeline, a project of great importance for Georgia. Turkey has grown closer to Russia in the last years, an aspect which appears to expand constantly. Taking this relation into consideration and considering the fact that the future Southern Corridor, of which Turkey is an important part of, is a real threat to Russia we might see a shift in the geopolitical an energetic balance of the region in the near future. This could be dangerous for Georgia given its partial energy dependence.

Due to extended levels of FDI and heavy privatization in the last years Georgia managed to attain a energy balance based on its (now) vast electric capabilities. In 2010 85% of the total produced energy by Georgia came from HPP's and 15% based on gas. The current government pursues the goal of replacing the 15% with energy produced by HPP's , although there is no developed strategy in this matter. The privatization of the energy sector is almost over and the Georgian market is saturated, surpluses being available for export. Also, in 2010, 8% of the energy produced in the country was based on gas, an improvement from past years when the percentage was 25. These figures represent a decreasing dependence on gas. Even so, when it comes to gas, the country is totally dependent on imports as it has no resources of its own. In the case of oil, there is a small local production but not enough to sustain the needs of the country so oil from Azerbaijan is being imported. According to Mrs. Miriam Valishvili, gas dependency is an acute problem of the current leadership of Georgia, route diversification being considered the first priority. The Multitude of sources

of import is another top-of-the-list problem for Tbilisi. In this matter, according to Mrs. Valishvili, upgrading the infrastructure is important in order to prevent loses and temporary shortages emanated by technical aspects.

These aspects of a energy strategy are not comprised in a document and lack the official administrative acceptance of a policy. The lack of a policy also makes it difficult to foresee risks. Georgian officials believe that the energy future of the country resides in alternative sources and regenerating energies (like hydro) but the means to attain total energy independence are still an open topic. FDI has turned out to be, so far, a major source for development and consolidation of the Georgian energy sector but a forecasted decrease of interest for Georgia is yet to be taken into consideration as a major risk. FDI's are a bless but they could also be a curse given Georgia's emphatic neighbor, Russia. Although the 2008 war did not affect the ongoing energy projects significantly, Russia still has the power to scare away or "persuade" future investors. Moreover, as a part of the Russian policy to isolate Georgia on the international stage attempts by Russian investors to take over parts of the Georgian energy industry have been made. Before 2008 the Georgian government did not verify the buyers involved in privatizations. In the late 2008 a market liberalization stance was adopted followed by a thorough check of all buyers to prevent monopole, fraud and inequities. At the moment Georgia lacks an anti-monopoly policy but has envisage the creation of one in the near future. The only "contingency plan" of the authorities is relying on competition without a market, meaning, the attraction of investors aims also to create a solid market.

Short run catastrophic effects

Before depicting the aspects of the Georgian authorities' crisis management capabilities it is important to explain each type of crisis presented and the effects it might have. The first crisis is "Short run catastrophic effects" envisages events that would prevent energy distribution or imports for a short period of time. In order to produce a complete and comprehensive assessment of the crisis management of Georgia in this given crisis we need to look into every sector of the energy system.

In the electricity sector, according to energy expert Archil Mamatelashvili, Georgia produces enough power in order to be safe from any shortages. The

electricity import dependency of Georgia is zero and the means through which energy is produced (HPP) are durable and renewable (water) therefore the production is safe. Also, Georgia produces more energy than it consumes so, in case of a natural catastrophic event (like flooding) that might damage installations the country would not be faced with an electricity shortage. Georgia also possesses electricity reserves, for extraordinary cases (like war), totaling 600 MW – 33% of the total internal production.

One of the problems of the electricity sector is distribution. Western Georgia produces more electricity than the east, mainly due to the power plant in Gori. The biggest city in the country – the capital Tbilisi – along with other eastern parts of Georgia are in fact the biggest consumers, and this fact is prone to create regional imbalances. There is only one 500kw power line from west to east and at times, especially in the summer the balance is difficult to maintain. However, the Georgian government plans the construction of another 220KV power line in order to maintain a balance between the two regions. The weakness of this scheme is the absence of a back-up line that could be used, in case of a catastrophic event that would occur on the two main power lines, and thus creating shortages in the east.

Georgia's main energy problem is represented by gas. Notwithstanding the fact that Georgia is an important transit country and an intentional cease of gas delivery from its main supplier, Azerbaijan, is highly unlikely given the good relations between the two countries and the fact that Georgia is only a transit country and a cut of gas deliveries would damage other states. Even so, Black Swan Theory type of events can occur any moment and stop gas distribution. For this situation, the Georgian authorities do not possess a crisis management scheme. Although the country is completely dependent on gas imports plans for a gas storage facility began only late 2009. The contracts with SOCAR (State Oil Company of Azerbaijan Republic) are based upon the transit status of Georgia resulting in special tariffs. The cut of gas from Azerbaijan is a possibility that none of the government officials take into consideration, and that could be the explanation for the lack of a contingency plan, explains Liana Jervalidze[31], Independent Analyst at GFSIS.

[31] Liana Jervalidze, Independent Analyst, Interviewed June 2010

Georgia also receives gas from Russia also as a fee for transit. The cease of gas deliveries from Russia is also highly unlikely due to the destination of the Russian pipeline that supplies the total dependent Armenia, a strategic partner of Moscow. This part of the natural gas import was aimed by the authorities when developing the electric sector and reducing the gas dependency of the country. The pipeline importing Russian gas into Georgia has a capacity of 6 mn. cm of gas of which the Georgian side now consumes only 1.7 mns as a result of an efficient electricity policy. In the foreseeable future the dependency on Russian gas is planned to be eliminated, not only because of economic reasons, but political ones as well.

Considering the case in which both gas suppliers are unwilling or for some reason unable to deliver gas to Georgia, there is an alternative route of gas imports which the authorities can mainly rely on. Imports from Iran are a real possibility but due to political reasons this option would be used only a back-up in extreme cases. The route of the pipeline transits Armenia, and according to Georgian officials, Iran is willing to deliver gas to Georgia. This option however was never studied closely and the implications never assessed. Price ranges and feasibility issues have not been explored and this makes this option a less than safe one.

Although Georgian officials are not prepared and do not possess comprehensive mitigation plans to face short run catastrophic events, the Georgian Parliament is currently working on a law that would regulate procedures in emergency situations. This law, if passed amended, could represent the basis for a coherent Energy Policy.

Disproportionate price effects and consistently high costs

This particular crisis focuses on elements of high costs and maintained high costs to import energy products. In the particular case of Georgia high costs and maintained high costs could represent a problem especially in the problematic gas sector.

Regarding the electric energy sector, the safest one in Georgia so far, due to massive FDI in the last few years the country has turned from an importer into an exporter. In 2010 Georgia has exported a little over 10% of its entire production, mainly to Russia and Turkey. Considering that the surplus of electricity is bound to grow in 2011 and there is a line through which

exports to Armenia will be made, so, the prospects of this industry are positive.

On the other hand the prospects for the gas sector don't appear as bright. Georgia imports gas from two different suppliers: Russia and Azerbaijan. In the case of Azerbaijan, Georgia is important to this country's export as two of the main Azeri export lines transit the country. In this regard Tbilisi has pre-determined five year contracts with SOCAR and seven year contracts with BP. Given the fact that gas prices have not risen from 2007, none of the Georgian authorities take into consideration a sudden price raise or a sustained high-price situation, therefore no mitigation or containment plan was developed. The only reliance in this case is the solidity of the contracts. The basis for assuming the fact that the Azeri will not rise the price of gas is the transit country status of Georgia. But that assumption may be faulted. Both parties are subject to an international contract with concealed details so none of the assumptions we may have could be correct. Given the fact that we are talking about an international contract of the utmost importance we can presume that the supplier could have the benefit of a price-raising clause under certain extraordinary circumstances, which puts pressure on the Georgian government for developing contingency plans to mitigate the effects of those circumstances.

The same certainty cannot be expressed in the case of imports from the Russian Federation. If we take into consideration the political strain between the two countries we may find that import liability is not only possible but very likely. A sudden rise in prices is possible and Georgia has such an experience from 2008 when gas prices escalated and were maintained at that level for a number of weeks. The explanation for that is the season the price rise was made and the fact that the main quantity of needed gas is not imported from Russia but Azerbaijan. If the price rise would have happened during the winter when gas consumption reaches a peak the situation would have been different. In Georgia the industry is not subsidized so the effect of a price growth or sustained high prices would affect this part of the society. The countries' biggest consumers are the nitro and chemicals factories, burning more than 10% of the national necessary capacity. Most of the gas that Georgia receives from Russia comes from the fee for the transiting north-south pipeline for which the prices are pre-determined. The surplus of gas that Georgia imports from Russia is in the form of an exchange. The southern part of Russia, mainly the Caucasus

region is poorly supplied with electric power therefore, Georgia supplies 1.2 to 1.5GW in exchange for about 1.7bln CM of natural gas. In recent years due to FDI and HPP development the quantities of the imported gas have diminished from almost 6bln MC to 1.7 bn MC. A contingency plan for the price rising from Russia is not yet available, not even the alternative to import it from Azerbaijan.

Regarding the price rise crisis scenarios, Georgia does not have even an unofficial policy of mitigation or contingency available. Given the fact that more than 30% of the national produced or imported energy is directed to the industry, increase of prices or sustained costs would affect both the industry and the domestic users. The lack of gas reserves makes it difficult if not impossible to maintain for a long period of time a high price especially in the winter months when gas is necessary.

Reduced Foreign Direct Investment

FDI is a delicate subject for Georgia. The main sector where we can see investments paying off is electricity, mainly HPP's. Until 2005 Georgia agonized with a tremendous commercial deficit. Between 2005 and 2008 the FDI began increasing considerably and along with it development capacity. Following the FDI, the energy market grew spectacular in just one year. In 2009 we find the Georgian market saturated with electricity and amid a full scale privatization process. By the end of 2009 most of Georgia's HPP's were privatized and private companies began selling electricity to Armenia which in its turn sells it to Iran. According to Mrs. Miriam Valishvili, First Deputy Minister of Energy of Georgia the privatization of the electricity sector is finished and new projects mainly in the field of HPP's became the major goal of the Ministry of Energy. The majority of these investors are Chinese even though the main part of the investments so far have been made by Azeri companies. Commitments amounting 3 bn. Euro have been made by private investors for the 2010-2012 period for developing new HPP projects.

It is very clear that FDI is an important part of Georgia's economy considering that this was the main source through which the country's energy balance was achieved. FDI also stabilized the macroeconomics balance of the country and after the 2008 war with Russia it became indispensable. Georgia has no monetary reserves and relies heavily on FDI which is why a sudden drop in these types of investments would have a

catastrophic effect on the economy and on the future of development programs and projects.

Abbreviations

AIOC – Azerbaijan International Operating Company
BP – British Petroleum
BTC – Baku-Tbilis-Ceyhan Pipeline
DC – Distribution Company
ESCO – Electricity System Commercial Operator
EU – European Union
FDI – Foreign Direct Investment
FTA – Free Trade Agreement
GDP – Gross Domestic Product
GEL – Georgian Lari – national currency
GNERC – Georgian National Energy Regulatory Commission
GOGC – Georgian Oil and Gas Corporation
GTC – [Georgian] Gas Transportation Company
HPP – Hydro Power Plant
NAOG – National Oil and Gas Company
NSCP – North-South Caucasus Gas Pipeline System
SCP – South Caucasian Pipeline
SOCAR – State Oil Company of Azerbaijan Republic
WREP – Western Route Export Pipeline: Baku-Supsa

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8. Energy Security in Armenia

Stepan Grigoryan, Adriana Sauliuc

Part 1

1. Introduction

Country profile

Formal name: **Republic of Armenia**
Short Form: **Armenia**
Capital: Yerevan
Date of independence: September 23, 1991
Government: republic
Size: 29,800 square kilometers (water 4,71%)
Population: 2.966.802 (estimated for 2010)

Armenia, the first nation to adopt Christianity in the early 4th century, is the smallest of three republics of the Transcaucasian region. Located in the southern Caucasus, at the juncture of the Eastern Europe and Western Asia, Armenia is surrounded by three Muslim countries: Iran and the Azerbaijani enclave of Nakhchivan on the south; Azerbaijan and the *de facto* independent Nagorno - Karabakh Republic on the East and Turkey on the West. At the north, the country is bounded by Georgia. Officially known as the Republic of Armenia, this former republic of the Soviet Union, a landlocked mountainous country, is a multiparty, unitary, democratic nation-state with a strong cultural heritage. The Armenian state is the smallest of the former Soviet republics, the second most densely populated and the most ethnically homogenous nations of all this republics.

2. Economic situation

If under the Soviet Union influence, Armenia had developed it's industrial sector by supplying manufactured goods, machine tools, textiles and other products to soviet republics in exchange for energy resources, today, after nineteen years of independence, Armenia is facing a weak economy. Based on manufacturing, remittances, services and agriculture, most of the sectors of the Armenian economy are in recession, with more severe consequences because of the international economic and financial crisis. Even in the current situation, when the authorities are relying on the financial assistance and other loans obtained from the International Monetary Found, the World Bank or the Russian Federation, Armenia is facing a large budget deficit. After 1991, when the Republic of Armenia became independent, the state suffered a difficult and long transition to a market economy. Already weakened by the earthquakes, droughts and Nagorno - Karabakh conflict (1989 - 1994), the economic situation of Armenia was strongly affected by all these aspects. The war with Azerbaijan over the enclave of Nagorno – Karabah and the economic blockade imposed by this state and Turkey, affected the socio – economic situation of Armenia. Because of the fact that the longest border of the Armenian territory with Azerbaijan and Turkey is closed, it has a direct effect over the trade and economic development.

At present, after 12 years of double-digit rates of growth in GDP, amidst low inflation, small fiscal deficits and a prudent monetary policy, the economy of the Republic of Armenia is highly open to trade, capital, and technological innovation. Even so, the high growth of economy in Armenia,

was driven by a small number of sectors and this are: construction, some services and mining. The severe global crisis that affected all the countries in the world, transmitted its negative effects over the small country in Caucasus, so Armenia is now facing a loss of export demand, a collapse of the commodity export prices, and no less important, a sharp decline in remittances and private capital flows. Dealing with this situation, the Armenian Government had no chance but to implement counter-cyclical policies and offset unfavorable developments. It used the room for fiscal maneuver due to the low level of public debt and besides this, it borrowed money from its multilateral and bilateral partners.

Part 2

Energy Sector of Republic of Armenia

1. Overview

With a population of about 2,966.802 people, Armenia has limited energy resources to satisfy their needs. But the country's domestic consumption is not the only problem regarding the energy sector of Armenia. The economy of the Armenian state plus the technologies used in Armenia are a real problem, because they are characterized by a high consumption of energy. Armenia is almost completely dependent of the energy resources form outside. Because the country has no natural reserves – neither gas, nor oil, all the energy resources that Armenia is using for satisfying the population and economic needs are imported from Russian Federation, Iran and Georgia. At present, it is estimated that almost 80% of Armenian energy system is controlled by the Russian Federation, the main supplier of natural gas and oil for Armenia. In this case, with an almost completely dependent in energy sector – no oil or gas wells, no refineries, no coal production, Armenia has only one domestically produced primary energy and this is electricity. This is produced by hydroelectric plants and the Armenian nuclear plant.

2. Institutions

The main Armenian authorities that are involved in the energy sector of the Republic of Armenia are:

- The **Ministry of Energy and Natural Resources of Republic of Armenia** – "a republican body of executive authority, which elaborates

and implements the policies of the Republic of Armenia Government in the energy sector".[1]

- The **Ministry of Economy of the Republic of Armenia** – a republican body of executive authority . It elaborates the economic development policies of the Republic of Armenia;
- The **Ministry of Nature Protection –** "a republican body of executive authority, which elaborates and implements the policies of the Republic of Armenia Government in the areas of environmental protection and sustainable use of natural resources"[2];
- The **Public Services Regulatory Commission (PSRC) –** an independent authority in the field of energy market: tariff forming and licensing activities.

Three companies owned by state are providing market services and this are:

- the **Power System Operator –** is ensuring the suspend mode of operation and technically feasible regimes;
- the **High Voltage Electrical Network** – responsible for transmission electricity from power plants to the distribution network. Also, is responsible for the import/export of the electricity abroad.

3. Regulation and legislation of Energy Sector in Armenia

3.1 Regulation

In article 10, the Constitution of the Republic of Armenia stipulates that "the State shall ensure the protection and reproducing of the environment and the reasonable utilization of natural resources". Another important article is number 48, which disposes that "one of the basic tasks of the State is to pursue the environmental security policy for present and the future generations". According to the law of Republic of Armenia, more accurately the Licensing Act, there are some energy-related activities that need a license. This is emitted by the Government (for nuclear power sector), or Public Services Regulatory Commision (for power engineering sector).

Nuclear power sector:

- Works on selection, construction, putting into operation, operation, usage, maintenance and removing away from operation of nuclear and radioactive waste stations, sources and storages of ionization radiation;

[1] *The Government of the Republic of Armenia*, http://www.gov.am/en/structure/7/.
[2] *Idem*, http://www.gov.am/en/structure/5/.

- Works with radioactive wastes of nuclear and radioactive materials, including transportation, usage, storage, reprocessing and burial of such materials;
- Design and preparation of materials, equipment and systems for projects using atomic energy;
- Import and export of nuclear, radioactive and special materials, radioactive wastes, special equipment and technologies.

Power engineering sector:

- Production, import and export, transport, distribution and trade in/of natural gas;
- Production, import, transmission, export, distribution and trade in/of electrical energy;
- Construction of new capacities in the fields of electrical and thermal powers;
- Production, import and export, transport, distribution and trade in/of thermal energy;
- Rendering services on transmission and centralized dispatch of electrical energy.[3].

Regarding the **economic entities in the energy sector**, a license is required for activities like:

- generation of electricity and thermal energy;
- transmission (transportation) and distribution of electricity;
- implementation of system operator services in the electric energy and natural gas sectors;
- thermal energy, and natural gas;
- power market services provision, electric and thermal power and natural gas sale/purchase activities;
- electricity and natural gas import and export activities;
- construction or reconstruction of new generating capacities in addition to associated transmission and distribution networks in the electric/thermal energy or natural gas sectors.[4]

The **Subsoil Utilization Code** establishes that the subsoil is the State property with no exception. This granted any right to use, and cannot be

[3] Regulation of Energy Sector in Armenia, GPartners, iunie 2010, http://gpartners.am/pdf/Energy_Client_Note.pdf, p.2.
[4] Ibidem, p.3.

privatized. Republic of Armenia has also the **Law on Allocation for Subsoil Exploration and Commercial Production of the Purpose of Mineral Resources Development.** It sets forth the procedure for subsoil allocation, that can be use for the purposes of exploration and/or commercial production of mineral resources on the territory of the Armenian state and it regulates the mining rights too.

Regarding the international regulation of energy sector, on 18 December 1997, the Republic of Armenia has ratified the Energy Charter Treaty, which entered into force on April 19, 1998. The document's provisions focus on four important areas:

- the protection of foreign investments;
- non-discriminatory conditions for trade in energy materials, products and energy-related equipment;
- the resolution of disputes between participating states (and in the case of investments, between investors and host states);
- the promotion of energy efficiency, and attempts to minimize the environmental impact of energy production in use.

3.2 Legislation

As any other country, the Republic of Armenia is interested in having a strong security in the energy field, because for it, loss of energy security is a big problem, considering that Armenia is situated in a delicate geopolitical zone. In this situation, Yerevan is interested in some issued that can provide the energy security for short, but most important long term, and this are:

- the ability to draw on foreign energy resources and products that can be freely imported through ports or other transport channels and through cross-boundary energy grids (pipelines and electricity network);
- the mix of energy that should be selected, targeted or encouraged, to meet the country's long-term concerns regarding energy supply and consumption;
- the level of fuel stocks, particularly strategic petroleum reserves, that should be maintained to respond optimally to possible supply disruptions;
- the new energy technologies that should be pursued, supported or promoted, to ensure efficient, sound and safe energy supply;
- improvement of energy efficiency;
- interregional cooperation and joint actions;
- adequate attention to environment, health and safety;

- promotion of the local (national) supplies establishment.[5]

All of this data can and should be applied by all the countries in the world, because they can ensure a strong and healthy energy security. In this case, the Ministry of Energy of Armenia, sets the main objectives for the Armenian energy policy and this are:

- achieving sustainable economic development in Armenia;
- ensuring safety in the energy sector;
- enhancing the energy sector and independence of the country;
- diversification of the ways for delivery of primary energy sources and their types;
- ensuring maximum utilization of renewable energy resources;
- determining the best combination of resources with which to replace the Armenian Nuclear Power Plant electricity, including considering constructing safer nuclear power units whose size is more suitable for Armenia;
- ensuring efficient use of domestic energy resources and alternative sources of energy and implementation of economic and legal mechanism for that purpose;
- promotion of energy saving policies;
- development of initiatives and actions for environmental protection[6]

The Armenian laws in the energy field are created to ensure a healthy and strong energy security for the state, and they are a part of the Armenian Government effort to ensure a stability in this field. These are the following:

1. The Law of the Republic of Armenia "On the Safe Utilization of atomic Energy for peaceful proposes" (1999);
2. The Law of the Republic of Armenia "On the Energy" (2001) – second edition;
3. The Law of the Republic of Armenia "On Energy Saving and Renewable Energy" (2004);
4. The Law of the Republic of Armenia "On State Technical Supervision in the Energy Sphere and the Power of Consumption" (2004);

[5] Hossein, R., Economic, Security and Environmental Aspects of Energy Supply: A Conceptual Framework for Strategic Analysis of Fossil Fuels, 1997, World Bank; UNDP, World Energy Assessment, Energy and the Challenge of Sustainability, 2000; International Energy Agency , Towards Solutions, Sustainable Development in the Energy Sector, 2002, OSCD/IEA Paris, France

[6] Carte energie, p. 91.

5. "Energy Sector Development Strategic in the Context of Economic Development in Armenia" (adopted June 23, 2005);
6. "National Program on Energy Saving and Renewable Energy of the Republic of Armenia" (adopted January 18, 2007);
7. "Program of Activities of the Ministry of Energy RA envisaged by the Concepts of RA National Security Strategy" (adopted November 1, 2007);
8. The law on Construction of New NPPs, adopted by the National Assembly in December 2009.

The Development Strategies and the Action Plan are studied. These documents set the main priorities for Armenia's energy sector development and set the programme of action for the Government and the Ministry of Energy, which are in accordance with Armenia's National Security Strategy, adopted by the President's decree of 7 February 2007.
The Action Plan set the following priorities for the Government and the Ministry of Energy:

- Provision of reliable energy supply at low rates to satisfy the fundamental needs of all customers, enhancing, in the meantime, energy conservation;
- Avoiding such methods of energy import that may expose the security and economy of Armenia to events and political impacts beyond its control, ensuring maximum use of domestic energy resources and nuclear energy;
- Ensuring safe operation of the Armenian Nuclear Power Plant (henceforth referred to as NPP) till 2016 or until the moment when it will be possible to replace NPP's energy production by other energy resources, and proceeding with decommissioning of the NPP without any unacceptable economic, ecological and energy security impact;
- Ensuring an ecologically sustainable energy supply, based on the principles of sustainable development and in compliance with the international environmental commitments of the Republic of Armenia (chapter 1, section 3, clauses 1-4).
- Providing reliable supply and fuel storage (chapter 2, sections 5-6).
- Reducing of energy consumption and the dependence on imported fuel (chapter 2, section 7).
- Using domestic renewable energy resources and nuclear power (chapter 2, section 8).

- Construction of a new NPP (chapter 3, section 18, clause 7).
- Providing attractive conditions for foreign investors (chapter 4, section 22).
- Storing natural gas in order to ensure reliable supply to the residential and industrial sectors (chapter 4, section 24).
- Providing conditions for transfer of energy resources, particularly from Iran to Europe (chapter 4, section 27).
- Development of the energy market, completion of the privatisation process and prohibiting concentration of all energy capacities with one owner (chapter 5, section 33, clauses 1-2).
- Creation of favourable legal and economic environment for investments and compliance with the EU legislation (chapter 5, section 33, clause 3).

The Development Strategies also set priorities for the Government and the Ministry of Energy:

- Building a market culture, restructuring the basic branches of the economy and enforcement of anti-monopoly policies (chapter 1, clause 1.2).
- Creation of favourable conditions for domestic investments and FDI; it is mentioned that in 2003, the volume of gross domestic investments versus GDP amounted to 24.3% and the volume of net FDI versus GDP to 5.7% (chapter 1, clause 1.4).
- Ensuring transition to a competitive knowledge-based economy, with such priorities as enhancement of economic competition, development of small- and middle-sized business; development of export-oriented branches; focusing on human and financial resources for an expansion of scientific potential and efficient use of innovations in economy; ensuring increased investments especially in export-oriented branches; ensuring proportionate social and economic development for the regions (chapter 1, clause 1.5).
- Replacement and technical modernisation of the electric energy and natural gas transportation and distribution networks, as well as underground gas storages (chapter 1, clause 1.13).
- Taking into account the absence of domestic fossil fuel resources of industrial significance and the dependence of the energy sector on supplies from one country (chapter 1, clause 1.14).
- Providing reliable energy supply at low rates to satisfy the fundamental needs of all customers, while enhancing energy conservation;

- Avoiding methods of energy import that might expose the security and economy of Armenia to events beyond the control of the Republic of Armenia;
- Ensuring energy independence, particularly, by means of diversification of domestic and imported resources;
- Creation of an export-oriented energy sector capable to produce high added value;
- Ensuring safe operation of the Armenian NPP till 2016 or until the moment when it will be possible to replace NPP's energy production by other energy resources, and proceeding with decommissioning of the NPP without any unacceptable economic, ecological and energy security impact;
- Ensuring an ecologically sustainable energy supply, based on the principles of sustainable development and in compliance with the international environmental commitments of the Republic of Armenia (chapter 2, clause 2.4).
- Development of domestic renewable energy sources in the next 15-20 years, including hydroelectric power – up to 3,600 gigawatt-hours a year, and wind energy – up to 1,500 gigawatt-hours a year (chapter 2, clause 2.7.1).
- Meeting other energy needs by means of a new NPP and thermal power plants, including combined-cycle generation (chapter 2, clause 2.7.2).
- Fuel supply diversification and storage (chapter 4, clauses 4.2-4.4).
- Promoting efficient energy consumption that may let to reduce dependence on imported fuel (chapter 4, clause 4.5).
- Bringing the ratio of energy to the GDP closer to international averages (chapter 5, clause 5.2).
- Performing activities to determine the economic efficiency of exploration and extraction of domestic fossil fuels (oil, gas, and solid fuels) (chapter 5, clause 5.3).
- Encouraging investments in local cost-efficient resources, particularly renewable, with consideration of such advantages as energy security, favourable environmental impact and creation of jobs in the regions;
- Supporting the Energy Conservation and Renewable Resources Fund for development of local projects;
- Continuing the research into the possibilities for using solid fossil fuels for heating, hot water supply purposes and for possible energy generation

in emergency situations caused by long-term interruptions of natural gas imports (chapter 5, clause 5.4).

The Development Strategies estimate that closing the NPP in 2016 will reduce Armenia's power sector independence from 70% to 40%. Replacing the NPP capacity by thermal power plants will result in generation of 60% of the country's electricity consumption by imported fuel (mainly natural gas), bringing forth new ecological and social problems stemming from the increase of greenhouse gas emissions and of payments to foreign suppliers payments, as well as increased tariff: It is estimated that at current consumption volumes, the tariffs would increase by 2.2 US cents (chapter 6, clause 6.2). So, the Development Strategies set further priorities:

- Preparation for the NPP decommissioning, including development of storage of used nuclear fuel and creation of a special decommissioning fund, as well as seeking additional international support for replacement of the NPP (chapter 6, clause 6.5).
- Construction of the Iran-Armenia gas pipeline; expansion and modernisation of underground gas storage; construction of a hydroelectric plant on the River Arax; construction of additional high-voltage transmission lines (chapter 7, clause 7.9).

Besides, it is mentioned in the Development Strategies that 38% of the installed capacity had been in operation for more than 30 years, the primary equipment of thermal power plants reached 200,000 hours of exploitation level and did not correspond to international standards in terms of technical, economic and ecological criteria, and 70 % of the installed equipment at hydropower plants had been in operation for more than 30 years (chapter 1, clause 1.12).

It may be summarised that the Development Strategies and the Action Plan reflect the main challenges and tasks of the country's energy sector quite thoroughly. Both documents take into account the crucial issues connected to stable and safe functioning of the energy sector. We shall also analyse to what extent the Government and the Ministry of Energy have been fulfilling the goals set for them.

4. Sustainable Development and Energy

When we say **Sustainable Development,** we mean "maintaining or improving the integrity of the life support system of the Earth. Sustaining the biosphere with adequate provisions for maximizing future options includes enabling current and future generations to achieve economic and social

improvement within a framework of cultural diversity while maintaining (a) biological diversity and (b) the biogeochemical integrity of the biosphere by means of conservation and proper use of air, water, and land resources".[7]
In 2002, The Nongovernmental Sector of National Council of Sustainable Development of the Republic of Armenia gave a definition for the concept mentioned above. Sustainable Development "is a development, which guarantees adequate, possibly equal starting conditions for the representatives of the present and future generations for displaying their abilities and satisfying living needs. SD is based on economics, which is combined with the principles of environmental security and social justice in democratic society with respect of human rights".[8] In a brief form, Sustainable development is regarding three important fields: economic sustainability, natural sustainability and social sustainability.

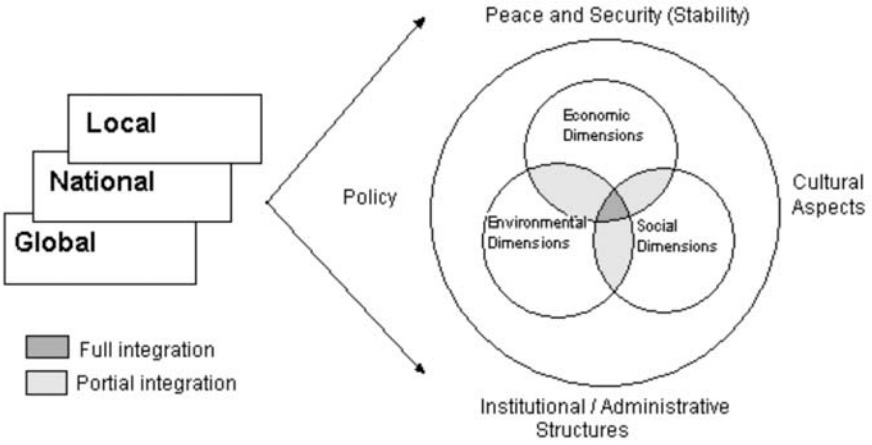

Figure 1. The system of Sustainable Development

Source: "Concept of Sustainable Development of the Republic of Armenia" by Association "For sustainable Human Development"/National Comity of UNEP RA / Nongovernmental Sector of National Council of Sustainable Development of the Republic of Armenia.

[7] Holdren, J.P.;Daily, G.C.;Ehrlich, P.R., The Meaning of Sustainability: Biogeophysical Aspects, 1995, Edited by Munasinghe, M. and Shearer, W., Distributed for the United Nations University by The World Bank Washington, D.C.
[8] Association "For sustainable Human Development"/National Comity of UNEP RA/ Nongovernmental Sector of National Council of Sustainable Development of the Republic of Armenia, Concept of Sustainable Development of the Republic of Armenia, 2002, Yerevan, Armenia

Economic sustainability means strong and sustainable economic growth, that can ensure a financial stability and a low and stable inflationary environment. Natural or environmental sustainability means the stability of biological and physical systems and preserving a healthy environmental. Regarding social sustainability, it refers to the well functioning labour markets and high employment, to the adaptability to major demographic changes, the stability in cultural and social systems and the equity of democratic participation in decision making.

Today, because of the factors that affect all kind of aspects of life, sustainably allowing the integration of dimensions where it is possible, and compromises between the dimensions where the conditions for integration are impossible to be achieved. Because of this, we can say that "only in the presence of such integral conditions like peace and existence of energy, sustainable development can be achievable".[9]

Energy is very important, because it has deep and strong relations with each of the three aspects of the sustainability development, because the concept requires a supply of energy resources, that must be use as efficiently as possible, because a SD suppose to use natural resources with moderation and let enough for the next generations. In the present day, energy is very important for the economic growth and socio-economic development. Almost nothing can't be done without energy, because it produces power, heat and mobility. A modern society cannot function normal without energy resources, that's why over the globe, the demand for energy is in a continuous growth. In this case, because of the production and use of energy natural degradation can affect the environmental. More than this, economic growth requires a stable and secure energy supply and here occurs the obligation for every state in the world to ensure for itself, a high level of energy security.

Energy Security of Armenia in the context of Sustainable Development

The document entitled "Energy Sector Development Strategies in the Context of Economic Development in Armenia", adopted by the

[9] The Principle 25 of Rio Declaration on Environment and Development (The United Nations Conference on Environment and Development, Rio de Janeiro, 1992) read as follows "Peace, development and environmental protection are interdependent and indivisible", which was the base for the Statement on Peace and Sustainable Development for the Johannesburg World Summit in 2002, where mentioned that "Peace is a prerequisite and component of sustainable development, and for a sustainable society that solves fundamental global social and ecological problems and strives for worldwide justice."

Government of the Republic of Armenia at June 23, 2005, defines the **energy security** "as a guarantee of stable and reliable fuel and energy resources at affordable prices sufficient to completely meet the demand of the country and its citizens, the society and economy and to provide electric generation, adequate to preserve the public's health and Armenian's environmental in normal conditions as well as in emergencies".[10]

Between 1991 and 1995, Armenia suffered a critical energy crisis that affected all the levels of its society: social, economical and environmental. This part of history demonstrated the vulnerability of the Armenian state regarding energy security and had an important impact over the population and the leadership of the country. As Areg Galstyan, the deputy of the minister of Energy said, "Armenia is one of the few countries in the world to know what it means to lose its energy security".[11] In this case, the Armenian Government took important steps to avoid situations like this and improve the energy security of Armenia. Regarding the "Energy Sector Development Strategies in the Context of Economic Development in Armenia" adopted in 2005, "The primary objective of Armenia's energy sector development strategy is to formulate strategic goals for the development of the energy system in Armenia and identify the ways to achieve those goals, based on the principles adopted by the international community for sustainable development, particularly in the energy sector, and guided by the directions of economic development in the Republic of Armenia and past energy sector experience".[12] The document also states that the Republic of Armenia should be interested in developing the economy of the country and achieving international competitiveness. The Strategy refers to the following goals for the Armenian state:

- Achieving sustainable economic development in Armenia;
- Ensuring safety in the energy sector;
- Enhancing the energy independence of the country, including diversification of imported and domestic energy resources and ensuring maximum utilization of generating capacity;

[10] Energy Sector Development Strategy in the Context of Economic Development in Armenia, June 23, 2005.

[11] A citation of Areg Galstyan used by Fred Pearce in the Power Vacuum,2001, Leadership for Environment and Development (LEAD) International, Annual Review 2001.

[12] Energy Sector Development Strategy in the Context of Economic Development in Armenia, June 23, 2005, p. 8???

- Ensuring efficient use of domestic energy resources and alternative sources of energy and implementation of economic and legal mechanisms for this purpose.

In Dr. Levon Yegiazaryan's opinion, as the general director of the Institute of Energy in Armenia, the country can ensure its own needs in energy field by three ways:

1. Three-level energy diversification policy:
o Generation side – hydro, thermal, nuclear, wind etc. power plants;
o Fuel supply side - natural gas, oil, nuclear fuel;
o Fuel transportation side - gas pipelines, oil product delivery;
2. priority development of domestic energy resources, including fuel resource exploration, energy conservation and renewable energy utilization,
3.regional co-operation.[13]

5. Natural resources

During Soviet occupation, the Armenian energy sector was one of the most developed parts of the economy. At that time, Armenia received energy supplies form Soviet Union (oil, gas and nuclear fuel) and Turkmenistan (only gas). In the same period, being in good relations with its neighbors, Armenia operated an electricity system with Georgia and Azerbaijan, and in the '80s the Armenian state was a exporter of electrical power to its neighbors. Closing the Armenian Nuclear Power Plant at the beginning of the '90s, Armenia transformed from exporter to importer. In this context, more than 14% of its electricity was imported from abroad and from that moment, Armenia became depended form the foreign suppliers.

During 1993 – 1995, Armenia crossed a tough period. Because of the energy crisis, energy consumption experienced a significant decline, dropping form 12-13 millions tons of oil per year between 1985-1988, to 3 million tons per year during the energy crisis (1993-1995).

Beginning with 1995, the situation in Armenia became more stable. The cease-fire with Azerbaijan raised the importance of fuel. Also, the situation in Armenia improved in 1995 and from that year to the present, because of the reopening of the Armenian Nuclear Power Plant.

[13] Interview with Dr. Levon Yegiazaryan, General Director of the Institute of Energy in Armenia, 05-Sep-2002, Yerevan, Armenia.

Today, the components of the energy system of the Republic of Armenia are old and not in a good condition. That is why Armenia should be interested in replacement and modernization of the natural gas and electric energy transportation and distribution networks. This must be a priority for the underground storage of natural gas. All of these measures will ensure a reduction of technical and commercial losses.

5.1 Fossils resources

5.1.1 Oil

Armenia is a 100% dependent of the oil form abroad, because the country has no proven oil reserves. In this situation, Armenia has no oil production or refineries, making the country completely dependent of all kinds of refined oil products. Without oil, there's no oil pipelines in the Armenian country and all the petroleum products imported from other countries arrive in Armenia by train. Armenia has three important rail lines – two from Azerbaijan and one from Georgia.

If in the past, most of the Armenian imports in the sector of petroleum products were from refineries in Grozny (Checenya, Russia) and Baku (Azerbaijan), today almost all of the oil needs are ensured through imports from Russian Federation, the only supplier in the region for Armenia.

Before the collapse of the Soviet Union, when oil supplies for Armenia were subsidized, Armenian oil consumption was of 48.400 barrels per day.[14] But starting with 1992, oil imports were shrinking because of the economic embargo maintained by Turkey to the west and Azerbaijan to the east. The Azeri blockade is a consequence of conflict over Nagorno – Karabakh and it began shortly after the secession of the separatist republic and held despite the cease fire established in 1994.

With azeri oil already lost, Armenia had only one supplier left: the refinery in Chechnya. But war broke out in this republic eliminated the last oil supplier, so with no azeri or chechyn oil, the consumption of oil in Armenia decreased to only 4.000 barrels per day, most of them imported from Batumi, western Georgia. Today, fuel produced from oil is also imported from Bulgaria, Romania and some countries in the Middle East.

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[14] US Energy Information Agency, Countries Analysis Briefs, Caucasus Region, March 2002, available online http://www.eia.doe.gov/emeu/cabs/caucasus.html accessed on 22-Nov-2002

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production (total)*	0	0	0	0	0	0	0	0	0
Production (Crude Oil only)	0	0	0	0	0	0	0	0	0
Consumption	48	25	8	6	3	3	3	4	4

* includes crude oil, natural gas plant liquids, other liquids, and refinery processing gain. Source: DOE/EIA

During a press conference on 14 July 2010, Armenia's Minister of Energy Armen Movsisyan stated that in October 2010 construction of an oil pipeline between Iran and Armenia would begin. The project cost is estimated $180 million. According to the agreement, each country will finance 50% of the project costs; Iran is investing in the project now, and Armenia will have to pay off in parts, from the dividends received. The new pipeline should make possible transportation of petrol and diesel fuel by low prices set in the Persian Gulf countries, so oil products transportation costs may be decreased almost fourfold. It is projected that the pipeline will be operated by private companies chosen by means of a tender. On October 23, 2010, deputy energy minister of Armenia, Ara Simonian stated that the construction of the pipeline that will link Iran and Armenia will be finished in 2 years. The oil pipeline will cover 110 km of Iranian territory and 265 will be in Armenia. "The 8 inch wide pipe should satisfy Armenia's demand for oil through until 2037".[15] Certainly, buying oil products for Iran, can be very economically advantageous for Armenia who can minimize its dependence on the Russian Federation.

5.1.2 Natural gas

As in the case of oil, geological exploration activities ongoing in the Republic of Armenia beginning with 1947, have not discovered any natural gas resources and produces no natural gas. This is why Armenia imports gas from the United Gas Supplying System of Russian Federation. Today, all the natural gas consumed by the Armenian state comes from Russia, via the territories of the Northern Caucasus – Georgia and Azerbaijan. First connected to the gas network of the Soviet Union in 1959, most of the quantity supplied was from Central Asia through the Azeri and Georgian

[15] *Iran – Armenia pipeline to be built in two years,* The Messenger Online, October 26, 2010, http://www.messenger.com.ge/issues/2221_october_26_2010/2221_econ_one.html.

territory. Before the dissolution of the Soviet Union, Armenia was one of the most gasified republics in the region and at its peak, in the '89 year, gas consumption was about 6.5 billion cubic meters per year and since 1992, annual gas consumption stayed below the value of 2 billion cubic metric.

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Production	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Consumption	0.066	0.049	0.057	0.057	0.064	0.046	0.049	0.046	0.050

Dry Natural Gas Production and Consumption in Armenia, 1992-2000 (in trillion cubic feet [Tcf]) note: „dry" gas means gas with condensates removed. Source: DOE/EIA.

Today, even if Armenia's territory is relatively small, the pipelines network has about 2.000 km. Three trunklines enter Armenia. One is from Georgia and two of them are from Azerbaijan.

Even so, because of the dissolution of the Soviet Union and the situation change in the Caucasian region, both gas pipelines that connect Armenia with Azerbaijan are shutdown, being currently inoperable because of the blockade. Even if there is one pipeline left (via Georgia), the gas supply was frequently disrupted due sabotage between 1992 and 1994, because of the fact that the pipeline is situated near the Azeri border. One of the causes of these disruptions is the Georgian-Abkhaz conflict. The gas crisis left the country with no gas supply. The entire population suffered and the impact over the industry was big. In this period, only 15-20% of the industrial capacity was used.

The gas transmission and the distribution system are operated in Armenia by Armrosgazprom, a closed joint-stock company, founded in 1997 as a joint Armenian – Russian natural gas pipeline project. At the moment the company was founded the Russian company Gazprom owned 45% of stock, the Armenian Energy Ministry 45% and Itera Holdings Ltd. (a holding company with investments in Russian natural gas) 10%. This structure is active from July 2001, and since then Armenia has continued to have problems keeping current in its payments of gas deliveries. As a result of this situation, Itera reduced the amount of gas supplied to Armenian state because of the tardy payments.

Armrosgazprom buys the gas from a company named Gazexport – an export unit of Gazprom and distributed most of it to the domestic market

through the ARG pipelines. The company is responsible with the transportation, supply, storage of gas in Armenia and it also controlling the imports of gas for the country.
Armenia has a storage facility near the capital Yerevan – Abrovian Underground Gas Storage that occupies an area of 140 hectares. According to Armrosgazprom, the capacity of the facility, whose construction began in 1962, is of about 190 millions cubic meter.

Russian – Armenian pipeline

In Armenia, natural gas represents a big part of the total energy consumption, and all the gas received is from Russian Federation, the country that poses the largest reserve of natural gas in the world. The Russian gas arrives in Armenia through the pipeline via Georgia, and as a transit fee, Armenia pays to the Georgian state approximately 10% of the gas destined to reach Armenia.
Armenia is facing today a big problem, because Georgia decided to exclude the pipeline section going via Georgia's territory from the list of strategic objects and is considering to sell its share to Russian – Armenian pipeline, known as Mozdok-Tbilisi-Armenia Gas Pipeline, and Azerbaijan is interested in buying it. Although Georgia's Prime Minister Nika Gilauri stated that just 10-15% of shares might be sold within the next few years, and that the state would have to retain the control package, the perspective of privatisation raised serious concern in Armenia. Among potential buyers of the Georgian pipeline, Gazprom, Kazakhstan's Kazmunaigas and the State Oil Company of Azerbaijan (SOCAR) have been listed. The relations between Yerevan and Baku are not good, as a result of the occupation of 20% of the Azeri territory by Armenia (1993). In this case, a deal between Georgia and Azerbaijan that can pass the control of a part of the Russian – Armenian pipeline to the Azers, can be a real problem for Yerevan, because Baku may close it to choke the Armenian economy. This information appeared in August 2010. But the authorities in Tbilisi deny the possibility of a privatized gas pipeline. "Fifty-one percent of the controlling block will not be sold. Five to fifteen percent of the shares may be put on sale on the London stock market. Nevertheless, such a thing will surely not happen this year. A certain period of time is necessary for that"[16], declared Nika Gilauri,

[16] Adonia Agayan, *Discussions on Mozdok-Tbilisi-Armenia Gas Pipeline Continue,* in Yerevan Report, July 6th, 2010, http://www.yerevanreport.com/8041/discussions-mozdok-tbilisi-armenia-gas-pipeline/.

the Prime Minister of Georgia in July 2010. Even so, there are experts that consider that the pipeline can be privatized. One of them is Tbilisi State University Economics Professor Nodar Khaduri thinks that the privatization can be done, because the controlling block is not at the disposal of the government. The same source considers that most likely the Azerbaijani State Oil Company will become the owner of the pipeline that supplies natural gas to Armenia.

Iran – Armenia pipeline

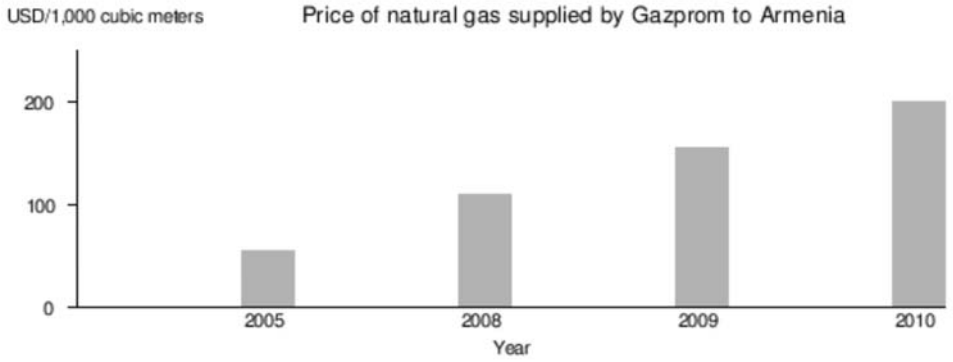
Depending almost 80% on the Russian Federation in the field of energy resources, Armenia tried to reduce this dependence and after talks with Iran, the two countries decided to build a gas pipeline through the Iranian gas to arrive in Armenia. Iranian-Armenia Natural Gas Pipeline was completed in October 2008, and has a length of 140 km from Iran to Armenia. One hundred km are located in the Iranian territory, from Tabiz to the Iranian/Armenian border. In Armenia, the pipeline runs from the Meghri region to Sardarian. The first 40 km of the Armenian sections were inaugurated by the two presidents of the states Mahmoud Ahmadinejad (Iran) and Robert Kocharyan (Armenia) on 19 March 2007. Another 197 km part of the pipeline is planned to reach the central part of the country where it will be linked up to the existing distribution network.

The pipeline was created to "bring 81 billion cubic feet of natural gas from Iran per year, about the same amount Armenia imports from Russia via Georgia".[17] With a diameter of 700 mm and a cost of 220 million of dollars, the Iranian – Armenian pipeline has a capacity of 1.1 billion cubic meters per year, capacity that can be increased up to 2.3 billion cubic meters per year by 2019. This is a little bit more than the volume of the Armenian gas import form Russian Federation in 2007, a quantity that is enough for meeting the energy need of the Republic of Armenia. The Iranian-Armenia Natural Gas Pipeline offers Armenia an viable alternative to the Russian gas. The contract between Iran and Armenia was signed for a period of 20 years, and for each cubic meter of the Iranian gas, the Armenian state is supposed to return to Iran, 3 kwm of electric energy. But the opportunity to import gas from Iran is not that simple, because it has repercussions over

[17] Energy Resources, *Iran – Armenia pipeline expected online soon,* UPI.com, May 19, 2009, http://www.upi.com/Science_News/Resource-Wars/2009/05/19/Iran-Armenia-pipeline-expected-online-soon/UPI-40571242740949/.

relations with Moscow. The construction of the Iranian – Armenian pipeline may bring difficulties in the price negotiations with Russian company Gazprom, in a period when plans for a gradual raise of the gas prices for Armenia were already announced. Through an agreement signed by Armenian company Armrosgazprom and Russian company Gazprom in September 2008, the price for gas was set to rise at 154 dollars per thousand cubic meters in April 2009, and in the next year, in April 2010, the price was negotiated for 200 dollars per thousand cubic meters.

Some experts consider that as the tariffs for Russian gas and the tariffs for transit via Georgia will continue to grow (in 2006 Georgia increased the transfer tariff fivefold, from $6 to $30 per thousand cubic metres), Iran may become the main supplier of natural gas for Armenia.



Source: Wikipedia

Many suspect that under the pressure of the Russian company Gazprom, the pipeline's diameter was reduced from 1,420 to 700 mm. If the pipeline would have the initial dimension, it would have allowed Iran to export gas to European markets, and would mean an important competition for Russian gas that is supplied to Europe.

5.1.3 Coal

Coal resources in Armenia, besides the fact that they are very scarce, were never seriously exploited, because the geological studies indicated that they did not have significant industrial value, having a low caloric content. That's why, the Armenian coal can only be used to satisfy a limited demand. The total quantity of the proven reserves of low quality lignite are somewhere between three and five mega tons. For Armenia, industrial

mining is not profitable, first of all because of the geographic spread and second because of the geological conditions of the reserves. In the mid-1980's the Armenian state imported 300 – 500,000 tons of coal per year from Ukraine (Donbass basin), which was used for domestic heating. From that moment, the coal imports were going down to less than 5,000 tons per year.

Armenia also has shale oil resources that can be found in Ijevan, Shamut and Jermanis and can reach the amount of 17 – 18 millions of tones, as well as the 6 million tons of studied shale oil and 128 million of prospective shale oil resources in Dilijan area and about 100 million tons of prospective coal resources in Ijevan area. Final decision on the use of these fossil fuels cannot be made in the absence of data and economic justifications as to the environmental impacts including deterioration of soil, dehydration and consequent deforestation.

These fossil fuels can be considered strategic reserves until the environmental research associated with their exploration is completed and their extraction for heating and hot water supply purposes becomes economically competitive with natural gas.

Today, because of the disruption of the main communications routes, the prices for the transportation is too big. Also, Armenian power plants do not have coal-burning units, that's why it is very unlikely that coal will be widely use in Armenia.

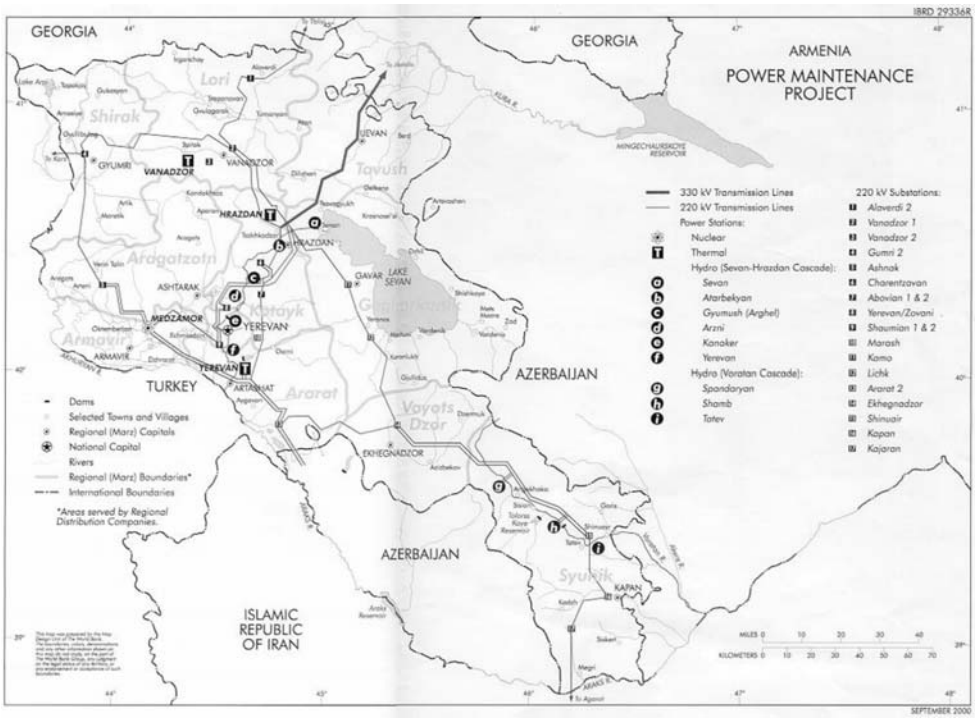
5.2 Power generation industry – electricity

Even if it has a lack of fossil resources and fuel, Armenia had significant domestic electricity generation resources. Armenia has a number of 11 power stations. The map below presents the Armenian's National Electricity Transmission Grid. 70% of the Electricity Networks of Armenia, the company that owns and manages Armenian's electricity grid is owned by United Energy Systems of Russia.

The Armenian electricity market regime is based mainly on the Energy Law of the Republic of Armenia and the Government of the Republic of Armenia in face of the Ministry of Energy and Natural Resources which is responsible for developing and implementing state policy in the area of energy and natural resources.

In Armenia, the market is divided into three sectors: production, transportation and supply/distribution. The country has a couple of major actors in the electricity area and this are:

- Generation companies like: Armenian Nuclear Power Plant (owned by state); Hrazdan TTP (privat company); Vorotan cascade of HPP's (owned by state); Small HPP's (privat companie); Yerevan TPP (owned by state); Sevan-Hrasdan cascade of HPP's (private company).
- Transportation Company of High Voltage Electrical Network – a company owned by the Armenian state and responsible of transmission electricity from the power plants to the distribution network. TCHVEN also organizes the import/export of electricity with neighboring countries.



Source: Global Energy Network Institute

5.2.1 Thermal power plants

The three thermal power plants of Armenia are located at Yerevan, Hrazdan and Vanadzor. On April 21th, 2010, the plant in Yerevan was inaugurated,

which "will allow Armenia to considerably cut back on use of natural gas for electricity production".[18] Modernisation of the Yerevan power plant was made possible by an Armenian-Japanese intergovernmental agreement and financing from the Japanese International Development Bank. The contract was signed on 29 March 2005 and ratified by the National Assembly of Armenia on 26 May 2005, with the loan amounting to over $150 million. The plant in Yerevan will be able to generate almost one-quarter of the Armenian current electricity output. This project is important for Armenia from economic, social and ecological points of view, and also because the Yerevan plant is participating in the 'gas for electricity' supply scheme. In May 2004, during the visit of Iran's Minister of Oil and Gas to Armenia, two agreements between the Yerevan plant and Iran's National Gas Export Company were signed, concerning the supply of gas from Iran and payment by means of exporting electricity generated by the Yerevan plant.

All of thermal power plants are designed as combined heat and power plants, with steam extractions for industrial and/or district heat supply. This three power plants are also designed to run on two types of fuel: natural gas or heavy fuel oil. The second is the reserve for the situation when the natural gas supplies are interrupted. The installed capacity of the plants in Armenia is: Hrazdan TPP – 1100 MW, Yerevan TPP – 550 MW and Vanadzor TTP – 94 MW, a total amount of 1,744 MW. The plan for the construction of a fifth unit at the Hrazdan with a capacity of 300 MW was suspended because of the lack of funds and mismanagement. Anyway, in 2002, the thermal power plant for Hrazdan was given to Russian Federation by the Armenian government, as a cover for its external debts. In 2004 Armenian government declared its intention to also sell the fifth, unfinished unit of the Hrazdan plant (with 300 Megawatts capability) in order to attract investors and modernise the country's energy sector. The fifth unit was sold to Gazprom in April 2006. It is planned to use the fifth unit for production of electricity for export to Iran as part the 'gas for electricity' supply scheme. The unit is being equipped with contemporary combined-cycle generation technology.

Before the crisis in Armenia, almost 63% of the population was provided with centralized heat supply. During the hard time of crisis, because of the

[18] *Armenia Opens New Thermal Power Plant,* in Asbarez |com, April 21th, 2010, http://asbarez.com/79598/armenia-opens-new-thermal-power-plant/.

lack of fuel and collapse of the industrial production, the steam and heat production sharply decreased. The district heating broke down and the population was forced to switched on other fuels like wood, kerosene and electricity.

But the limited energy resources are not the only cause of the limited work of thermo power plants in Armenia. Because in the summer the temperature is very high, the work of thermo power plants must be suspended for almost 50%, so the electricity needs are covered by hydro power plants and nuclear power plant. Also, Armenian thermal power plants need reconstruction and modernisation.

5.2.2 Nuclear Power Plant

In the 1970s the electricity generation capacity did not match the demand, so it was decided to build an NPP. The first unit of the Armenian NPP began operating in 1976 and second unit – in 1980.

After the disastrous earthquake on 7 December 1988, it was decided to shut down the NPP because of security concerns. In 1989 both units were shut down. After the breakdown of the USSR in 1991, Armenia experienced severe shortage of electricity, so in November 1995 the second unit of NPP with 407.5 Megawatts capacity was launched and has been producing near 40% of Armenia's aggregate energy production. Launching the NPP let to restore the 24-hour electricity supply for all consumers.

The Armenian government promised to decommission the NPP when the European Neighbourhood Policy Action Plan was signed in November 2006. The NPP issue was the sixth of priorities set by the Action Plan; the Armenian government had to set the terms for decommissioning of the NPP in 2007. The government adopted an action plan and committed itself to decommission of the NPP in 2016.

During the recent 15 years, IAEA and Russian experts assisted in NPP safety improvement, and near $80 million was spent on reconstruction works. From September 2003 the NPP has been given to concession management of Russia's Inter RAO EES Company.

Presently, there is another important issue related to the NPP – storage of nuclear waste. In September 2005 the NPP management signed an agreement with French company Cogema Logistics about expansion of the waste storage on the NPP premises. The storage had been built by Framatom in 2000, and now it is full. The new storage construction is

financed by the Armenian budget. The storage will be equipped for keeping of dry waste.

We consider that in the next few years the NPP capacity may not be substituted by alternative sources. It will not be possible to have enough hydroelectric plants and windmills by 2016. Another problem is compatibility of modes of exploitation. The NPP may work stably for several months with one load of fuel, generating enough energy to cover all basic needs. There are other arguments in favour of construction of a new power plant, such as ecological aspects and economic aspect: forecasts show that in the next decades the price of nuclear fuel will increase slower than the price of natural gas.

It is therefore quite logical than in 2006 the Armenian government stated its intention to construct a new NPP. Practical steps in that direction began in 2009. In December 2009 the National Assembly adopted the law on Construction of New NPPs, and the government adopted a decision to establish a joint Armenian-Russian company Metsamorenergoatom with the purpose of building a new NPP. By government decision, the joint venture will be owned on the principle of parity, the basic capital will be $60 million, and Armenia's share of the basic capital ($30 million) will be paid from the revenues of Armenian energy generating companies. In spring 2010 the Ministry of Energy and Russian state corporation Rosatom signed an agreement about anticipated supply of equipment for the new NPP. It is planned that the NPP will be equipped with a pressurised water reactor having 1060 Megawatts capacity and 60 years lifetime. Project cost is estimated 4-5 billion dollars. In August 2010, IAEA experts visited Armenia and studied the future location of the new NPP. Remarkably, in 2006 the National Assembly of Armenia waived the state monopoly on ownership of nuclear NPPs in order to attract foreign investments.

During Russian President Dmitry Medvedev's official visit to Armenia in August 2010, an agreement about construction of a new NPP by the Rosatom state corporation was signed. Construction is scheduled to begin in 2011.

From the moment it was reopened and "although Armenia has only one operating nuclear reactor, this unit supplied 39.4% of the total electricity

produced in 2008 – 2.27 billion kWh net".[19] Today, it supplies 40 – 45% of the country's electricity.

Regarding the Armenian authorities pledge to decommission the plant, this has not happened so far. It was an unrealistic plan, because Armenia does not possess any supplementary energy-generating facilities, so it cannot afford to close the NPP.

5.3 Local and alternative energy sources

There have been some attempts to develop the hydroelectric sources, alternative sources and energy conservation. The most visible results have been reached in the field of small hydroelectric plants. As the state agreed to buy electricity produced by such plants, their aggregate production reached 90-95 Megawatts. Presently, 32 small hydropower plants with aggregate capacity of 200-250 Megawatts are being constructed and 43 others are planned.

The Armenian hydropower plants have a capacity of 1,038 MW and the hydropower is the only indigenous source of electricity in Armenia. With an important role in the electric energy, Armenian hydroelectric power plants supply about 30% of the country's electricity. The biggest quantity of the hydropower is generated by the Hrazdan and Vorotan Rivers. There are six HPPs in the Sevan-Hrazdan Cascade and three in the Vorotan Cascade and a number of small HPPs generating a total of 1500 GWh/year. The total capacity of all this hydropower plants in Armenia is 1022 MW.

5.3.1 Armenia and Iran two hydroelectric power plants

Armenia has good relations with Iran, the neighbour which has became more and more isolated because of its controversial nuclear program. For the gas exported in Armenia, Iran wants in exchange electricity. In this situation, Armenia reduces its dependence of the Russian Federation. Iran is interested not only in Armenian, but also in Georgian electricity. In the case of a tied cooperation between Iran and Georgia, the Republic of Armenia will become a transit country. Until that moment, the Iranian and Armenian representatives are talking about a common project. On September 16, 2010, Armenian Energy Minister Armen Movsisian, announced that Armenia and Iran will start building two major hydroelectric powers stations located on their borders, on the Arax River. The project envisages

[19] *Nuclear Power Plant in Armenia*, World Nuclear Association, uodated 21 August 2010, http://www.world-nuclear.org/info/inf113.html.

the construction of two power plants on either side of the Armenian – Iranian border, with 130 megawatts each. The both plants will be build by the Iranian company Farad – Separad within the next five years. Armenia will finance a part of the project estimated to cost 323 million of dollars with future electricity supplies to Iran. Designed to "generate 793 million kilowatt electricity per annum", the Armenian minister of Energy said, Armenia will need 15 years to pay back the Iranian investments with electricity supplies, and after this period, "of exploitation the Iranian side will hand the HPP over to Armenia".[20]

This joint project proves that Armenia and Iran have strong interests in deepening political and economic ties. This summer, Armenian Energy Minister Armen Movsisian announced that the two countries plan to build a third high-voltage transmission line to connect the Iranian and Armenian power grids. The official also announced the plan for a new Armenian – Iranian fuel pipeline, that will get underway by the end of this year.

Importantly, new high-voltage transmission lines would allow Armenia to export electricity to the neighbour countries and, potentially, also to the Central Asia. Presently, Armenian and Iranian distribution networks are synchronised, and for few hours a day they may also be synchronised with Azerbaijan's network. Central Asian countries, in turn, have joint projects on cooperation in energy sphere with Iran. If Armenian distribution network is synchronised with the Georgian network as well, there will be an opportunity to connect also with Russia, and such a perspective is quite promising.

There have been negotiations about export of electricity from Armenia to Turkey. Through the contract signed on 4 September 2008 by the Ministry of Energy of Armenia, a closed joint-stock company Bardzravolt Elektratsantser (operator of Armenia's high-voltage electric networks) and Belgian company UNIT, which operates Turkish high-voltage transmission lines and deals with import of electricity in Turkey, Armenia has to supply Turkey with 1.5 billion kilowatts a year, with a perspective of increasing the supply up to 3.5 billion kilowatts, and the tariff was set at $57 per 1000 kilowatts. But the "obstacle to the issue has a political character"[21], as stated Minister of Energy of Armenia Armen Movsisyan. By normalizeing

[20] *Armenia and Iran to build 2 hydroelectric power plants,* Tert.am, September 16th, 2010, http://www.tert.am/en/news/2010/09/16/hpp/.

[21] *Armenia to Sell Electricity to Turkey,* armtown.com, July 14th, 2010, http://www.armtown.com/news/en/lra/20100714/18560/.

the ties with Turkey, Armenia can achieve the opening of the only closer border of Europe that will contribute to settle energy and economic ties with regional countries. In this case, Armenia could become a potential electricity supplier for Turkey and other countries from the Middle East. Also, some foreign companies have been interested in developing wind energy in Armenia. Iranian companies constructed four windmills with aggregate capacity of 2.8 Megawatts on Pushkin peak. American, Dutch and Italian companies have also done monitoring of possible use of wind energy. It has been planned to build windmills with aggregate capacity of 200-250 Megawatts in the next 15-20 years.

Biogas production is also planned to start. The tariff for electricity produced from biogas has been set at 7 US cents per kilowatt. Such a tariff is quite attractive for investors. It should be noted, however, that alternative energy sources have rather high cost and require large investments.

It may be concluded that some work towards modernisation of generating capacities and building of new ones has been done, and there have been some attempts to find alternative sources and routes of transportation. Electricity generation and gas supply sectors were restructured, as it had been planned by the Development Strategies (chapter 1, clause 1.13); electricity and gas distribution networks, as well as the Sevan-Hrazdan Cascade hydropower plants and small hydropower plants were privatised; the NPP was given to concession management of Russia's Inter RAO EES Company (chapter 2, clause 2.4); reliability of electricity supply improved; collection of payments for electricity and gas improved; the equipment of the Kanaker hydropower plant (chapter 2, clause 2.4); second part of high-voltage transmission line connecting Armenia with Iran was built (chapter 7, clause 7.9); within the framework of Armenia-EU cooperation, gas distribution cluster in Koghb was built and underground gas storage in Abovian was reconstructed (chapter 7, clause 7.8); Yerevan thermal power plant is being renovated with support of the Japanese government (chapter 2, clauses 2.4 and 2.7.2); Iran-Armenia gas pipeline is ready for exploitation (chapter 1 clause 1.14 and chapter 7, clause 7.9); Iranian companies constructed four windmills with aggregate capacity of 2.8 Megawatts on Pushkin peak (chapter 2, clauses 2.4 and 2.7.1); construction works at the Meghri hydropower plant on the River Arax are conducted in cooperation with Iran (chapter 2, clause 2.4). These examples show that some of the

provisions set by the Development Strategies have been fulfilled completely or in part.

However, it is a matter of concern that Armenia's energy sector is too dependent on one country. Currently, Russia owns near 80% of Armenia's generating capacities. The Sevan-Hrazdan Cascade of hydropower plants was transferred to Russia as part of payment of Armenia's national debt, so was the Hrazdan thermal power plant (the largest in the South Caucasus). In April 2006, the government also sold the fifth, unfinished unit of the Hrazdan plant to Gazprom for $248.8 million. The Armenian section of the Iran-Armenia gas pipeline (Meghri-Kajaran) is also controlled by Gazprom. Therefore, Armenia's energy sector is extensively dependent on Russia. This situation diminishes Armenia's energy security and contradicts the goals set by the Development Strategies (chapter 1, clause 1.14) and the Action Plan (chapter 1, section 3, clause 2).

Another issue of concern is that many actions of the government and of the state commission regulating public services are not transparent and often contradict the provisions of the Development Strategies (chapter 8, clause 8.1).

For instance, how was it that from 2006 Gazprom got the ownership of 58% of ArmRosGazprom shares, although at the moment when ArmRosGazprom had been established, Gazprom and Armenian Ministry of Energy owned 45% each? Why the fifth unit of Hrazdan thermal power plant was sold to Gazprom, although the European Union and, at a later stage, Iran had provided financial means required for finishing construction? The most recent example: Why didn't the Armenian government organise a tender for construction of new NPP and instead dealt with a Russian company without considering alternative opportunities? Recently, there have been even more surprising events. The Minister of Energy stated that most likely the construction of the new NPP would be finished in 2018-2020 (previously it had been planned for 2017) and, most importantly, that the project would cost up to $7.2 billion (in 2009, the costs were estimated $4-5 billion). Besides, the government officials have started to talk about possible extension of exploitation of the existing NPP for another two or three years, beyond the projected lifetime. This approach contradicts the obligations adopted in accordance with the European Neighbourhood Policy Action Plan.

We consider that Armenia could have offered Georgia the chance to build a new NPP in cooperation. That would have made the task more feasible, as finding appropriate financial means could be easier; the project could be supported by the EU and USA. In that case, Armenia would be involved in regional cooperation. There would also be a tender for construction of the NPP and the process would be more transparent.

There are also other provisions set by the Development Strategies and the Action Plan that have not been fulfilled. Contradictory to the Development Strategies (chapter 1, clause 1.2), enforcement of anti-monopoly policies is practically absent; in spite of the declared intention to create favourable conditions for investors (chapter 1, clause 1.4), there are no such conditions, so it has not been possible to attract investments and the energy sector is dependent on loans; reconstruction of the hydropower plants and thermal plants, as well as construction of new ones is very slow; increasing prices for fuel on international markets result in excessive burden on the population, contradictory to the Development Strategies (chapter 2, clause 2.4 and chapter 8, clause 8.5) and the Action Plan (chapter 5, section 33), for instance, in case of the most recent price increase, Gazprom increased the gas price from April 2010 by 7%, but Armenian governmental body regulating the prices for energy (electricity and natural gas) decided to increase the price for gas used by households by approximately 38%, while industrial companies (owners of those are mostly politically affiliated) continued to enjoy cheaper gas supply (in Armenia there is a two-tier pricing system: industrial plants pay lower price than households).

On 3 September 2010 vice president of Gazprom Andrei Kruglov declared that from 2011 the tariff for gas supplied to Armenia, Belarus and Moldova will be increased. The new tariff may reach $250 per 1000 cubic metres (currently, Armenia pays $156 per 1000 cubic metres). We expect that the main burden will again fall on the general population.

Armenia's possibilities to participate in regional energy projects, diversification of energy sources and routes for transportation.

It may be noted that currently energy security of the South Caucasian countries is strongly dependent on Russian policies. The latter in the recent few years has become staunchly pragmatic and often results in abandonment of international agreements. For instance, in May 2007 Russia refused to ratify the Energy Charter Treaty. So, Russia may set any price for oil and gas and change the transit agreements at its own discretion. That is

why the Russo-Ukrainian and Russo-Belarusian relations have been troubled in the recent years (although after election of Viktor Yanukovich as the President of Ukraine, confrontation between Russia and Ukraine may decrease).

Russia, for instance, increased the prices and changed the transit conditions in winter time (in 2005-2006, 2006-2007 and 2008-2009) without preliminary agreements with Ukrainian and Belarusian governments. In fact, Russia ignored the agreement with Ukraine concerning gas transfer and price set for Ukraine (valid until 2013) and the intergovernmental agreement with Belarus of April 2002. Simultaneously, Armenia, Azerbaijan, Georgia and Moldova were also forced to buy Russian gas at the increased price. Armenia was not treated favourably even in spite of selling its pipeline network to Gazprom (unlike Belarus and Georgia).

The deterioration of Russo-Georgian relations, especially since autumn 2006, when Russian spies were arrested in Georgia, had serious consequences for entire South Caucasus. For instance, the Armenian economy suffered from closure of the Verkhny Lars checkpoint on the Russo-Georgian border, as that checkpoint was the only overland connection between Armenia and Russia. Azerbaijan could not afford buying Russian gas anymore because it became too expensive. Before that, Azerbaijan already had stopped exporting oil to Europe via Russian pipeline because Russia had changed the transit conditions.

Russia's policy of changing the conditions for gas supply to the CIS member states during winters is disturbing for the international community, mainly the EU members, as they import Russian oil and gas via Ukraine and Belarus (80% of Russian gas export to Europe is transported via Ukraine, while 80% of oil is transported via Belarus).

6. Alternative sources of energy and transfer routes

The EU and USA pay special attention to possible alternative sources of energy and transfer routes. Projects for transportation of oil and gas from the Caspian seabed, North Africa and the Middle East are being developed. Georgia, Moldova, Ukraine and, more recently, also Belarus are also trying to secure their energy supplies.

Azerbaijan, having built the Baku-Tbilisi-Ceyhan, Baku-Tbilisi-Erzurum and Baku-Supsa pipelines, became capable of exporting oil and gas independently from Russia. Part of oil exported by Kazakhstan is

transported by tankers to Azerbaijan and then delivered to international markets via the Baku-Tbilisi-Ceyhan pipeline. Azerbaijan considers it possible to provide transit for up to 20 million tonnes of oil a year from Kazakhstan when the Kashagan wells will be operational. Azerbaijan is also interested in construction of a transcaspian pipeline Aktau-Baku. The latter would secure the workload of the Baku-Tbilisi-Ceyhan pipeline for several decades.

During the summit of presidents of Azerbaijan, Georgia, Lithuania, Poland and Ukraine in Krakow on 11 May 2007, President of Azerbaijan Ilham Aliyev stated that Azerbaijan might join the Odessa-Brody pipeline project, so it would be possible to transport oil from Azerbaijan to Europe via Ukraine. The summit resulted in establishing of a joint venture for operation of the projected Odessa-Brody-Gdansk pipeline. The summit participants considered that the route via Ukraine and Poland would present an alternative to the Russian project, which includes Tengiz-Novorossiysk and Burgas-Alexandrupolis pipelines connected by tankers.

In 2008-2009, the global economic crisis, seemingly, made some of the mentioned projects less important. However, as economic recovery in Europe and USA began, importance of energy projects grew again. Construction of the Nabucco pipeline again became an important issue for the EU and USA.

Nabucco's main task is to transfer natural gas from the Caspian seabed to Europe without transit via Russia. Nabucco is planned to go from Azerbaijan to Austria via Georgia, Turkey, Bulgaria, Romania and Hungary; the existing Baku-Tbilisi-Erzurum pipeline will be a part of Nabucco. As Nabucco's route will go via Romania, it will also be possible to supply gas to Moldova and Ukraine. The workload for Nabucco has to be provided by gas produced in Azerbaijan, Kazakhstan, Turkmenistan and, possibly, also Iran. Nabucco's significance may become even larger if a transcaspian pipeline between Turkmenistan and Azerbaijan is constructed.

To make Nabucco economically feasible, the EU and USA have been trying to include Kazakhstan and Turkmenistan in the project. Kazakhstan may export gas to Europe, particularly to Germany. An agreement about that was reached in June 2010 during the negotiations between Kazakh President Nursultan Nazarbayev and Germen Chancellor Angela Merkel. Nazarbayev mentioned two conditions for Kazakhstan's participation in the project:

construction of a transcaspian pipeline and construction of gas liquefying plants on the Caspian seashore.

Turkmenistan, having the fifth largest gas supply in the world, is also eager to cooperate within the Nabucco project, as the capacity of Russian pipelines is not enough for transportation of the entire gas produced in Turkmenistan. Besides, the absence of an alternative caused serious economic losses for Turkmenistan, when in 2009 Russia refused to buy gas from Turkmenistan using the fall of price due to the economic crisis as a pretext. In 2009 Turkmenistan and EU signed a memorandum about supplying of 10 billion cubic metres of gas a year via Nabucco, but the suggested 30-year contract has not been signed yet as there are some issues to be settled. It may also be mentioned that from 2009 gas from Turkmenistan is exported to China by a pipeline going from Turkmenistan via Uzbekistan and Kazakhstan.

The EU and USA policies on energy were amended after the Russo-Georgian war in August 2008, when the Baku-Tbilisi-Ceyhan, Baku-Tbilisi-Erzurum and Baku-Supsa pipelines, as well as other East-West communication projects stopped working. Russian projects of the Caspian pipeline and South Stream also questioned the feasibility of construction of a transcaspian pipeline and Nabucco. So, the possibility to include Iran and Armenia in the Nabucco project is being considered, as it would lead to circumventing the Caspian Sea – gas from Turkmenistan could be delivered to the South Caucasus via Iran, and then it could be possible either to construct an Armenia-Turkey pipeline or to connect the Iran-Armenia pipeline to Baku-Tbilisi-Erzurum.

Unfortunately, as there are unsolved problems between Iran and the West because of Iran's nuclear programme, the mentioned possibilities may not yet be transformed into practical plans. Maybe after launching of the Busher NPP in Iran built by Russia on 21 August 2010, the West may believe in the peaceful goals of Iran's nuclear programme, so cooperation in the energy sphere would become possible.

If Iran normalises relations with the EU and USA and agrees to export gas to Europe, Armenia may get a chance for inclusion in transfer projects, as gas from Iran could be transported to Europe via Armenia and Georgia. There is already a functioning Iran-Armenia pipeline, and its diameter may be increased.

Another unused possibility for Armenia's participation in regional energy projects is presented by normalisation of Armenian-Turkish relations. Opening of the border could in a short-term perspective create conditions for trilateral cooperation in the South Caucasus. So, Armenian-Turkish rapprochement also suits Azerbaijan's and Georgia's interests.

Armenian-Turkish rapprochement seemed hopeful in 2008-2009. On 6 September 2009 President of Turkey Abdullah Gul visited Armenia, and in April 2009 it was declared that ministries of foreign affairs of two countries had prepared a roadmap. On 1 September 2009 two protocols – about establishment of diplomatic relations and development of cooperation – were made public, and could be discussed by civil societies. The protocols were signed by ministers of foreign affairs on 10 October 2009.

Such developments were logical, as the Russo-Georgian war had interrupted the economic cooperation in the South Caucasus. Armenia's economy suffered, as it is extremely dependent on Georgia for transit of goods from Europe and Russia. The Armenian government estimated that the flow of goods reduced fivefold during the war.

Azerbaijan and Turkey also experienced some problems, as the war interrupted operation of the Baku-Tbilisi-Ceyhan, Baku-Tbilisi-Erzurum and Baku-Supsa pipelines, as well as other communication routes between Azerbaijan, Georgia and Turkey.

Armenia could have played an important role if it were not isolated from pipelines; it is well-known that Azerbaijan is opposing any possibility to include Armenia in regional projects before solving the Nagorno-Karabakh conflict. However, when Georgian railroad was not operating, it could be partially substituted by the currently unused Kars-Gyumri railroad.

Importantly, Turkey's leadership evaluated the situation well. So, the Turkish initiatives for the South Caucasus and partial avoidance of preconditions for normalisation of relations with Armenia were logical. The Armenian-Turkish protocols are awaiting ratification by two countries' parliaments. Regrettably, ratification has been postponed in Turkey; statements made by Turkish officials show that ratification would depend on progress in Nagorno-Karabakh conflict resolution. It may also be noted that after the Russo-Georgian war Turkey accepted Russia's proposal for participation in the South Stream pipeline project; in October 2009 Turkey agreed to passage of the South Stream, Nabucco's competitor, via Turkish territorial waters in the Black Sea.

It is also important that presently the main international actors – the EU, USA and Russia – seem to have reached consensus on the Armenian-Turkish rapprochement. For the EU and USA normalisation of Armenian-Turkish relations is an important issue, as it could secure uninterrupted operation of the pipelines and other communication projects in the region. Quite interesting is that Russia also became interested in Armenian-Turkish rapprochement. Opening of the border could reduce Armenia's dependence on transit via Georgia, and that suits Russia's interests. The latter were also outlined by Russian Minister of Foreign Affairs Sergey Lavrov, who stated that the Russian Federation was ready to support the process by means of further projects of cooperation between Armenia and Turkey, first of all in electricity generation and transport communication spheres, that Inter RAO EES could supply electricity from Armenia to Turkey and that the Russian Railways would be ready to secure functioning of the railroad connecting Armenia with Turkey via the Dogukapi-Akhurian border checkpoint.

Progress in Armenian-Turkish relations could bring about a new reality for the South Caucasus. Unfortunately, the sides (mainly, Turkish authorities) have not showed political will to finalise the process and ratify the protocols, so the normalisation of relations have stalled.

Considering the situation in the region, Armenia accelerates the plans for importing oil and gas from Iran. In early 2007, 140-kilometre pipeline connecting Tebriz (Iran) with Meghri (Armenia) was launched, the construction cost was $220 million. That pipeline supplies 1.1 billion cubic metres of gas a year, Armenia pays by exporting electricity to Iran. Beginning of construction of the second Iran-Armenia gas pipeline, as well as an oil pipeline is planned for autumn 2010, so when it is ready, the amount of gas supplied to Armenia may reach 2.3 billion cubic metres a year.

In late 2010, construction of an oil pipeline will begin. As Armenia's ministry of energy stated, construction would cost $160-180 million, Armenia and Iran would have equal shares (in fact, investments would be done by Iran, and Armenia would return the loan from the dividends). So, two problems would be solved: First, Armenia would by oil at price set in the Persian Gulf region, cost per barrel could be approximately $15-20 less that for oil supplied by others; second, transportation costs would be 3-4 times less that now.

Iran is also going to provide a loan of $400 million for construction of a 470-kilometre long railway that will connect two countries (of which only

60 kilometres should be constructed on Iran's territory). The railway will give Armenia a possibility of access to the Persian Gulf.
In October 2010 Armenia and Iran are going to sign a free trade agreement that is expected to increase the amount of trade about 2.5 times. Simultaneously, Iran is planning to invest $4.5 million for building a trade centre in Armenia.
Besides, Armenia and Iran started constructing two hydropower plants on the River Arax. The project cost is $200 million and the plants will have a capacity of 140 Megawatts each. The construction works are financed by the Iranian government, and Armenia will pay the loan by supplying electricity to Iran.

Part 3

7. Most probable crisis

1. If gas supply is interrupted, can the state deal with this situation (how long is possible to provide gas to the consumers, how dependent is the energy sector from external resources)? Does Armenia have a planning for this situation?
2. If case of a situation when prices rise sudden, is Armenia able to handle this situation, does Armenia have a plan for this?
3. How do foreign direct investments (FDI) influence Armenia's balance of payments? If the investors withdraw, will Armenia be able to manage this situation?

7.1 Short run catastrophic effects (supply disruption)

Because of the lack of energy resources, Armenia is dependent on external energy supplies and this makes it vulnerable. The National Security Strategy of the Republic of Armenia defines this dependence as a risk to the state security. The same document consider that one of the Armenian state goals is to obtain energy independence, but is hard to believe that it can happen in a near future. In this case, National Strategy identified the needs to implement reforms and set priorities such as "to pursue greater energy independence through a diversification of energy supplies and production, the creation of new sources of energy, including nuclear energy, and to develop a stable and reliable export-oriented energy system".[22] Anyhow, at this moment, Armenia is almost 100% dependent of the energy resources from abroad.

[22] National Security Strategy

Armenia's vulnerability to disruptions in energy supplies was most clearly demonstrated during the initial stages of the blockade imposed by Azerbaijan and Turkey, when energy consumption fell by 90 percent. Although the Soviet network of pipelines and energy links was designed to foster interdependence on the center by the republics along the periphery of the Soviet Union, the core Armenian vulnerability and energy insecurity is due to its serious lack of natural resources and dependence on foreign energy sources. It is this structural dependence that has elevated the strategic necessity of operating the country's Medzamor nuclear power plant and has spurred the development of hydroelectricity.

In case gas supply from Russia via Georgia is stopped, the Iran-Armenia pipeline, having enough capacity to cover Armenia's demand for natural gas, can be used as a substitute. This is the main guarantee that Armenia will not suffer from an energy shortage.

Besides the fact that Armenia's main southern transit route passes through Iran as does Armenia's strategic access to Asia and Middle East, the two countries have significant interests in energy cooperation and are currently implementing several joint projects aimed at providing Armenia with important alternative sources of energy. With two energy sources providers, and in case one of them is interrupting the supplying of energy resources, Armenia can count on the other provider.

However, in case both pipelines are temporarily out of operation, Armenia will have to use gas from the underground storage. According to the Development Strategies, the economic benefits of gas storage in Armenia during normal operations are relatively low, but storage is important to avoid emergencies: The gas storage is to be used as a strategic gas reserve as a safeguard against supply interruptions. The Development Strategies mention an EU directive, stating that "according to the 98/93/EC Directive, all Member States must maintain a strategic reserve of crude oil and/or of petroleum products for 90 day consumption. Armenia's geopolitical surroundings and conditions require that we secure such reserves, including natural gas" (chapter 4, clause 4.4).

In the Development Strategies it is also stated that solid fossil fuels may be considered as a strategic reserve (chapter 5, clause 5.4). The estimated fossil fuel resources in Armenia include 23-24 million tonnes of studied shale oil

resources and 128 million tonnes of prospective shale oil resources, and about 100 million tonnes of prospective coal resources. It is noted, however, that those resources do not have significant industrial value, have low energy efficiency and can be used only to satisfy limited demand (chapter 3, clause 3.7).

The decision to build a new NPP was adopted in order to reduce dependence on imported fuel. In December 2009 the law on Construction of New NPPs was adopted by the National Assembly, and the government adopted a decision to establish a joint Armenian-Russian company for construction of a new NPP.

In addition, construction of the Meghri hydroelectric plant on the River Arax and several small hydroelectric plants may also reduce Armenia's dependence on imported fuel.

An interesting option for lessening Armenia's vulnerability to external energy shocks may be the establishment of a secure petroleum reserve. Such an option is especially important in the event of a disruption of energy supplies from Russia or Iran, as well as in the event of a possible renewed war with Azerbaijan. The role of strategic petroleum reserves in energy security has long been recognized as a crucial step to protect against the effects of unexpected shortages or disruptions of energy supplies. But adequate stockpiles have been difficult to create and maintain, as the most vulnerable import-dependent economies are most often unable to handle the prohibitive cost. However, modernisation of storages of fuel oil is going on, so it will be possible to store enough fuel oil for several months.

7.2 Disproportionate price effects/consistently high cost (prices)

The Energy Strategy of the Republic of Armenia does not contain suggestions on what the country should do in case of a sudden increase of energy resources or consistently high costs. However, it may be supposed that in such a situation general population would have to bear the burden of additional costs. In 2006, Russian Federation increased the price for Georgia and Armenia from 80 dollars, to 125 dollars. In April 2010, Gazprom decided to rise the gas price by 7%. The Armenian Government measures at this situation were reflected over the population, as the Armenian governmental body regulating the prices for energy (electricity

and natural gas) decided to increase the price for gas used by households by approximately 38%, while industrial companies (owners of those are mostly politically affiliated) continued to enjoy cheaper gas supply.

7.3 Reduce/cut of foreign direct investments (FDI)

Officially, foreign and domestic investors are treated equally and have the same right to establish businesses in nearly all sectors. Privatization, though generally successful and legally open to all bidders, has not been transparent, and some sectors are uncompetitive, dominated by a few domestic firms. There are no restrictions or controls on foreign exchange accounts, invisible transactions, or current transfers, and there are no repatriation requirements. Investment regulations can be burdensome and lack transparency, and their administration is inefficient and prone to corruption. Non-residents may lease but not own land. By law, foreign investments cannot be expropriated except in extreme cases of a natural or state emergency, upon a decision by the courts, and with compensation. The impact of FDI inflows in Armenia on economic growth, and on improvements in trade balance and balance of payments has been positive. FDI has had some impact on the development of exports, although mainly in terms of products heavily reliant on raw materials. In this case, a drop in FDI levels would have negative effects on the Armenian economy and its balance of payments.

With a big need of investment, Armenia improved its business climate, and the Armenian economy became more attractive. So, only from January – September 2009 the total inflow of Foreign Direct Investment (FDI) to Armenia was $384 million. France was the largest investor in the country, followed by Russia. Total American FDI in Armenia for January – September 2009 was approximately $11 million, down 19 percent compared to the same period of 2008. Main sectors of the Armenian economy that attracted foreign investment have been telecommunications, power and utilities, real estate and air transportation.

But the global financial crisis showed up in Armenia through reduction of foreign investments and private transfers. Export volumes also decreased due to abrupt fall in prices for raw products. In this case, Armenian authorities are trying the best they can to stimulate the flow of foreign investments in the country.

Armenia's balance of payments is highly dependent on foreign credits. Politically affiliated businesses are not taxed and the amount of taxes paid by medium- and small-sized enterprises is insufficient, so the government borrows heavily from international financial institutions and foreign governments in order to be able to pay the interest rates on previously borrowed credits. Foreign direct investments as such are insignificant. Russian investments constitute about 60% of FDI, amounting to 2.4 billion dollars since 1991.

In case of an energy crisis, how can Armenia sustain the three levels of impact: national security sector, industrial supply and civil supply?

In case of an energy crisis caused by cutting of gas supply, combined production capacity of the NPP and hydroelectric plants may cover almost two-thirds of the electric power demand. National security sector may be supplied normally; industrial supply would likely be preferred to civil supply, as the most profitable branches of industry are owned by politically affiliated businessmen. So, in case of an energy crisis general population would probably suffer from so-called 'fan blackouts' (supplying electricity to different housing blocks in different hours). In addition, the population would have to bear the additional costs, especially in winter, because presently most of households use natural gas for cooking and heating; if natural gas supply is cut, there will be a need to use more expensive electricity or liquefied petroleum gas.

Armenia's ability to manage energy crises may be decreased sharply after 2016, when the NPP, which produces near 40% of electricity used in Armenia, must be decommissioned according to Armenia's international obligations.

The Development Strategies provide estimates of available renewable energy resources as well (chapter 3). The estimated combined potential of small hydropower plants is 800-850 million kilowatt-hours a year, of which about 200 million kilowatt-hours is already being explored. Technically available potential of wind energy is estimated 1,100 gigawatt-hours a year, biogas production capacity is estimated up to 100,000 cubic metres a day, and solar energy potential is also rather high. It may however be noted that although the estimates were made in 2005, and reached estimated production capacity in 15 years, within past five years solar energy, wind

energy and biogas production have developed insignificantly, due to lack of investments.

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9. Energy Security in Azerbaijan

Sabit A. Bagirov, Şeila Abdişa

1. General energetic aspects

Azerbaijan is an important actor in the Caucasus due to the fact that since gaining its independence it has held a key role in re-shaping Eurasia. There are three aspects that allow Azerbaijan to play this role[1]: the first of them is autonomy and it refers to Azerbaijan's capacity to free its territory from Soviet military bases as early as 1993. The second aspect is about challenging Moscow's energy monopoly in the North West of Caspian by signing the "contract of the century" in 1994 with 11 foreign oil companies. And last but not least, Azerbaijan made a crucial commitment with the construction of the alternative energy transportation route of Baku-Tbilisi-Ceyhan (BTC) in order to deliver oil from Caspian to the Western markets. Not only did Azerbaijan find its path in oil matters, but when in 1999 it was certain that the off-shore Shah Deniz field had the largest gas reserves in the country, it turned itself from a predominantly oil exporter into oil and gas exporter. As a natural consequence, by 2007 the gas from Shah Deniz field begun to supply all its customers: Turkey, Georgia and Greece and the outcome of this action was without any doubt giving Azerbaijan another asset of "energy diplomacy", boosting the country's role and strategic significance as an actor not only in the region, but beyond it.

Due to geopolitical issues and in a post Cold War context it is very important for a new actor on the scene as Azerbaijan to have control of the pipelines and to participate in oil and gas field development. These two measures assure Azerbaijan's protection over its main politic and economic way of influence in the region that is its richness in resources.

[1] *The Government of the Republic of Armenia*, http://www.gov.am/en/structure/7/

Energy security became of even greater importance since two recent events in the wider Black Sea region: one of them refers to the Russia-Ukraine gas dispute and the other is about the Russia-Georgia war in August 2008. The two events were to demonstrate that the energy geopolitics in the Caspian region is at high stakes and they also show the risks associated with attempts of changing the power balance in Russia's proximity. It is in such a complex context that natural resources have become an important tool in international relations, in the battle for survival and strategic position.

2. Resources, infrastructure and institutions

2.1. Oil

Azerbaijan's proven crude oil reserves were estimated at 7 billion barrels in January 2009 by the *Oil and Gas Journal*[2]. *The country's largest hydrocarbon basins, which accounted for over 80 percent of Azerbaijan's total oil output in 2008, are located offshore in the Caspian Sea, particularly in the Azeri Chirag Guneshli (ACG) fields.*

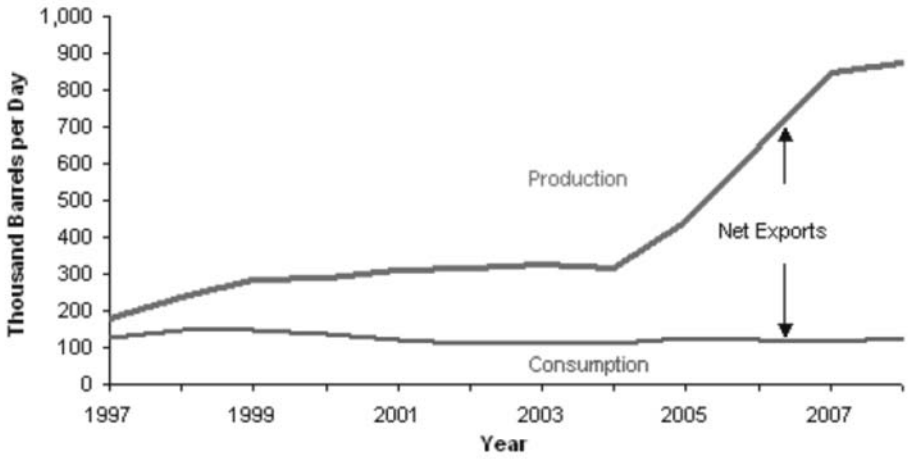
Production and Consumption

In 1997 oil production in Azerbaijan was leveled at 180,000 barrels per day (b/d) and it has increased to 875,000 b/d in 2008. During this development an important peak is represented by the startup of the Azeri fields that made production climb in late 2005 and in 2006, amounting to about 207,000 b/d additional production in 2006 compared with 2005. Then in 2008 following the startup of the Guneshli field, expected to produce 320,000 b/d, another 228,000 b/d leap in production was gained. One important aspect concerning the production-consumption balance is that while production has been increasing, domestic consumption has been generally decreasing, from 203,000 b/d in 1992 to 128,000 b/d in 2008 as shown in Table 1. Consequently, this has led to a significant increase in oil exports.

Azerbaijan's largest fields are the Azeri Chirag Gunesli fileds (ACG) which are located 62 miles east of Baku in the Caspian Sea; in 2009 the total production capacity of these fields reached over 1 million b/d. ACG is operated by British Petroleum (BP) on behalf of Azerbaijan International Operating Company (AIOC). The fields have five offshore production platforms and a sixth one, the Chirag Oil Project, is under construction and

[2] http://www.eia.doe.gov/cabs/Azerbaijan/pdf.pdf

Table 1: Azerbaijan's Oil Production and Consumption 1997-2008



Source: Energy Information Administration www.eia.doe.gov

it is expected to become totally functional in 2013. The Chirag Oil Project is designed to drill new wells in the reservoir for enhanced recovery tying into the existing system. The new platform's production was forecasted at 185,000 b/d at startup, in the first half of 2010. In order to double the output from Chirag field by 2013, the AIOC consortium and the Azeri government are expected to approve a $10 billion project.

Sector organization

The State Oil Company of Azerbaijan Republic (SOCAR) is Azerbaijan's state-owned oil and natural gas company and is responsible for producing oil and natural gas in Azerbaijan, operating the country's two refineries, running the country's pipeline system, and managing the country's oil and natural gas imports and exports. Although the **Ministry of Industry and Energy** handles exports as well as exploration and production agreements with foreign companies, SOCAR is party to all of the international consortia developing oil and gas projects in Azerbaijan. The **Azerbaijan International Operating Company** (AIOC) is a consortium of 10 petroleum companies that have signed extraction contracts with Azerbaijan. AIOC includes: British Petroleum (BP), Chevron, Devon Energy, StatoilHydro, Turkiye Petrolleri, Amerada Hess, ExxonMobil, Inpex, Itochu, and SOCAR. AIOC has made significant direct investments

in the development of the ACG fields, as well as the construction of the South Caucasus Pipeline (SCP) and the Baku-Tbilisi- Ceyhan (BTC) pipelines. BP is the largest foreign investor and has been involved in Azerbaijan since 1992.

Oil Exports

Azerbaijan had estimated net oil exports in 2008 of 749,000 b/d, according to EIA, more than double 2005 exports. Also according to EIA, the United States imported more than 62,430 b/d between January and June 2009, compared with 44,505 b/d during the same period of 2008. Most of Azerbaijan's oil is exported via pipeline, but small amounts are shipped by truck and railway. During the January-August 2009 period, Azeri sources reported that 16,240 b/d of oil products were exported by rail to the port of Batumi, Georgia on the Black Sea.

Azerbaijan has 3 major export pipelines:

- **The BTC pipeline system** - is 1,110 miles long and it goes from the ACG fields in the Caspian Sea, via Georgia, to the Mediterranean port of Ceyhan in Turkey. This pipeline carries out most of the Azeri oil. From Ceyhan the oil is shipped by tanker to European markets from which Italy was the largest importer of Azeri crude in 2008 with about 40% of crude exported. This pipeline began exporting in July 2006, being operated by BP, the largest shareholder, and owned by AIOC members. BTC has a capacity of 1 million b/d, but in 2008 the exports reached about 653,300 b/d. The BTC pipeline is also used to export Kazakhstan oil, which travels by tanker across the Caspian to the pipeline head at Sangachal Terminal, near Baku. It was reported that Kazakh crude oil exports from the Tengiz field began in October 2008 at 350 b/d and had increased to 4,800 b/d by February 2009[3].
- **The Baku-Novorossiysk pipeline** – is 830-mile long and has a capacity of 100,000 b/d, going from the Sangachal Terminal to Novorossiysk, Russia on the Black Sea. SOCAR operates the Azeri section and Transneft operates the Russian section. The exports through this pipeline in 2008 were estimated at 29,000 b/d. However in April 2009, SOCAR announced its plans of increasing the exports to 50,000 b/d due to the fact that the BTC is close to capacity because of production growth in the ACG oil fields as well as increasing throughput from Kazakhstan.

[3] http://www.eia.doe.gov/cabs/Azerbaijan/Oil.html.

- The **Baku-Supsa pipeline** - has an estimated capacity of 145,000 b/d and runs 520 miles from Baku to Supsa, Georgia on the Black Sea. It is also being operated by BP and owned by AIOC members. Between October 2006 and August 2008, the pipeline was shut down for repairs, and it was only restarted in November 2008, because of the Russia-Georgia conflict. Because of this, in 2008 only 13,000 b/d were exported to Supsa. However the export through this pipeline came back to normal and in January-August 2009 it carried out 55,000 b/d. The pipeline is used by ExxonMobil Company to export its share of oil from the ACG fields because ExxonMobil, although it is a participant in AIOC, is not a participant in the BTC pipeline.

Downstream/Refining and oil products

According to the *Oil and Gas Journal,* in January 2009 Azerbaijan had a crude oil refining capacity of 399.000 b/d. Azeri crude oil is refined at two refineries: the Azerineftyag (Baku) refinery, that has a capacity of 239.000 b/d, and the Heydar Aliyev refinery, with a capacity of 160,000 b/d.
The majority of Azeri refinery output consists of middle distillates like diesel fuel, kerosene and the Heydar Aliev refinery also produces liquefied petroleum gases (LPGs)
Azerbaijan supplies entirely the domestic demand for main petroleum products through its internal production; except for lubricating, semi-synthetic and synthetic motor oil and more than that the products also have a great demand both on external markets. About 35% of produced oil products are exported to CIS countries, Iran, Turkey, Middle Asia countries as well as by transiting through Black Sea ports to Mediterranean market - Italy, France, Greece[4]. The petroleum products which are mostly exported are Gas oil L-62, Jet fuel and Fuel Oil. Due to the poor quality some of the European countries import the oil products for further refining processes and foe obtaining a more qualitative product.

Forecasts

The latest *Azerbaijan Oil & Gas Report from BMI*[5] forecasts that the country will account for 1.47% of the Central and Eastern European (CEE) regional oil demand by 2014, while providing 9.58% of supply. CEE

[4] Rashid Ziyadli, *Transportation of Energy Resources (Oil&Gas) from Caspian Region to Euro-Mediterranean Countries, Current Situation and Plans For*, 2009, p.4.
[5] BMI, *Azerbaijan Oil and Gas Report Q3 2010 - preview*, http://www.youroilandgasnews.com.

regional oil use of 5.42mn b/d in 2001 rose to an estimated 5.81mn b/d in 2009. It should average 6.03mn b/d in 2010 and then rise to around 6.69mn b/d by 2014. Regional oil production was 8.88mn b/d in 2001, and in 2009 averaged an estimated 13.35mn b/d. It is set to rise to 14.57mn b/d by 2014. Oil exports are growing steadily, because demand growth is lagging the pace of supply expansion. In 2001, the region was exporting an average 3.46mn b/d. This total had risen to an estimated 7.54mn b/d in 2009 and is forecast to reach 7.88mn b/d by 2014. Azerbaijan and Kazakhstan have the greatest production growth potential, although Russia will remain the key exporter.

2.2. Natural gas

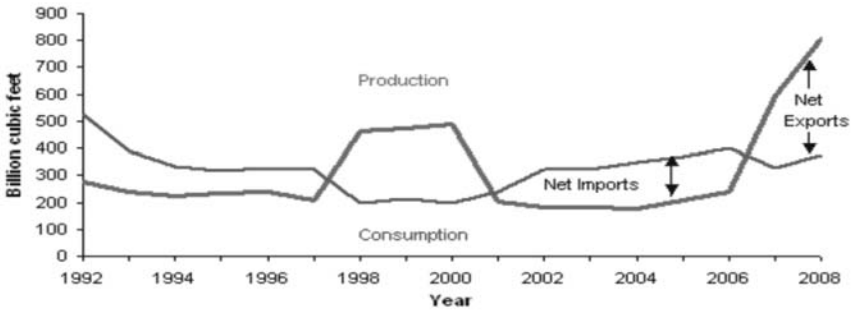
According to the *Oil and Gas Journal*, Azerbaijan has proven natural gas reserves of roughly 30 trillion cubic meters (Tcm) in January 2009.

Production and Consumption

In 2008, Azerbaijan produced 572 billion cubic meters (bcm) of natural gas and consumed 376 bcm, the biggest amount of natural gas being produced in offshore fields. The country's leading natural gas fields are ACG and Shah Deniz natural gas and condensate field, which started up in 2007. The Guneshli field, part of the ACG oil and gas fields system, provides associated gas to the Azerigaz system for domestic use via an undersea gas pipeline to Sangachal Terminal at Baku[6]. The Sangachal Terminal, located south of Baku, is one of the world's largest integrated oil and gas processing terminals and it receives, stores, and processes both crude oil and natural gas from the ACG fields and from Shah Deniz, then ships these hydrocarbons through the BTU and SCP pipelines for export. Table 2 shows the evolution of production and consumption of natural gas in Azerbaijan. Azerbaijan's major natural gas production increases in the future are expected to come from the continuing development of the Shah Deniz field. Industry analysts estimate that Shah Deniz is one of the world's largest natural gas field discoveries of the last 20 years. According to the project's technical operator, BP, the field contains potential recoverable resources of roughly 15 tcm of natural gas and 600 million barrels of condensate. Shah Deniz is located offshore in the Caspian Sea, approximately 60 miles South East of Baku.

[6] http://www.eia.doe.gov/cabs/Azerbaijan/NaturalGas.html

Table 2: Azerbaijan's natural gas production and consumption 1992 – 2008



Source: Energy Information Administration Administration www.eia.doe.gov

Phase 1 of the Shah Deniz field's development was completed in 2007 and includes a fixed offshore platform, two sub-sea pipelines to bring the hydrocarbons ashore, and a new onshore gas-processing terminal adjacent to the existing oil terminal at Sangachal, near Baku. The field produced 110 bcm in 2008 and it continued to increase the production to 270 bcm in 2009. Phase 1 output is expected to peak at 304 bcm as well as 45,000 b/d of condensate in 2010. Phase 2 of the Shah Deniz development is expected to peak its capacity of 700 bcm but its completion is being delayed from 2013-2014 to 2016 due to lack of a transit agreement between Turkey and Azerbaijan, according to statements by StatoilHydro in May 2009.

Sector organization

Azerigaz, a SOCAR subsidiary, is responsible for natural gas processing, transport, distribution, and storage, mainly in the domestic market. **Azneft**, another SOCAR subsidiary, is responsible for exploration, development and production from the older onshore and offshore natural gas fields owned directly by SOCAR. **AIOC** is the largest foreign joint venture in association with SOCAR, and is involved in the development of the ACG oil and gas fields and the Shah Deniz gas field.

Shareholders in the Shah Deniz consortium are: BP (25.5%), StatoilHydro (25.5%), Total, Lukoil, SOCAR, Naftiran each hold 10%, and TPAO (9%)[7] . StatoilHydro and BP are the operators, responsible for commercial and technical operations, respectively.

[7] *Ibidem*

Gas export

The startup of Shah Deniz natural gas field made Azerbaijan a net exporter of natural gas in 2007; before this moment, Azerbaijan had been importing natural gas from Russia. In 2008, Azerbaijan exported an estimated 196 bcm, shipping it via the South Caucasus Pipeline (SCP).

South Caucasus Pipeline (SCP) represents the main conduit for Azerbaijan's natural gas exports. The 429-mile long pipeline is also known as the **Baku-Tbilisi-Erzurum pipeline (BTE)**, which runs parallel to the BTC oil pipeline for most of its route, before connecting to the Turkish gas pipeline network at Horasan. The pipeline began exporting in 2007 with an initial capacity of 233 bcm per year, which is to be increased in the future to 700 bcm with the addition of compression stations. The Shah Deniz consortium owns and operates the pipeline.

Azerbaijan has been involved in negotiations with both Turkey and Russia in 2009 over two competing export pipeline proposals for its Shah Deniz Phase 2 natural gas output. These pipelines, Nabucco and South Stream, are both still in planning stages.

The proposed **Nabucco** pipeline would run for 2,050 miles from Erzurum, Turkey to Baumgarten, Austria, passing through Bulgaria, Romania, and Hungary. The pipeline's feasibility rests on its ability to tap into the large natural gas resources of the Caspian area. An agreement between the European countries involved was signed July 13, 2009 in Ankara.

The **South Stream** pipeline is another proposal to transport Russian and Caspian natural gas to Europe via a pipeline running under the Black Sea, through Turkish territorial waters, with terminals ending in Italy and Austria. It is widely seen as a rival to Nabucco. On June 29, 2009 Azerbaijan and Russia signed a contract for Azerbaijan to export natural gas into southwestern Russia starting in January 2010. The amount of gas agreed, 17.6 bcm per year, is modest but could be increased. A Soviet-era gas pipeline between Baku and southern Russia that runs 200 km along the Caspian coast is being modernized, according to both Russian and Azeri press reports.

There has also been international discussion of a **Trans-Caspian subsea gas pipeline**. However, this would require an agreement among the 5 littoral states of the Caspian Sea, which is not expected to happen in the near future.

The **Azerbaijan-Georgia-Romania Interconnector (AGRI)** is another project of gas transportation in progress. AGRI will transport Azeri gas via pipelines to the Black Sea coast of Georgia, where the gas will be liquefied at an LNG terminal and then shipped to the terminal in the Romanian port of Constanta by tankers. The LNG will then be re-gasified and enter Romania's transmission system. The project will be developed by a private company formed by Romanian gas producer Romgaz Medias, Azerbaijan's State Oil Company, SOCAR, and a Georgian oil company, as well as by a consortium of businesses and financial institutions. Hungary also agreed to participate in the AGRI in a separate agreement. The AGRI project is expected to supply up to eight billion cubic meters of gas a year. AGRI, like Nabucco, is a step towards achieving greater energy security by decreasing the European Union's dependence on Russian supplied gas.

Due to tensions between Azerbaijan and Armenia, Azerbaijan in late 2006 began a swap deal with Iran that provides natural gas to Azerbaijan's geographically separate Nakhchivan enclave. Azerbaijan ships natural gas into Iran via the **Baku-Astara Pipeline** and Iran then delivers the gas via a new 30-mile pipeline into the enclave. Iran receives a 15 percent commission on transit fees. Transit levels started at 2.47 bcm/y in 2006 and rised to 12.4 bcm/y by 2009.

Forecasts

According to *Azerbaijan Oil & Gas Report* from BMI, in terms of natural gas, the region in 2009 consumed an estimated 668.5 bcm, with demand of 780.0 bcm targeted for 2014, representing 13.7% growth. Production of an estimated 830.3bcm in 2009 should reach 1,025.7bcm in 2014, which implies net exports rising from an estimated 162bcm in 2009 to 246 bcm by the end of the period. Azerbaijans share of gas consumption in 2009 was an estimated 1.65%, while its share of production is put at 1.93%. By 2014, its share of gas consumption is forecast to be 1.98%, with the country accounting for 3.02% of supply.

2.3. Electricity

Azerbaijan's power sector has an installed generating capacity of approximately 5.5 gigawatts (GW). There are eight state-owned thermal plants which account for roughly 80% of generating capacity. More than that, the country has six hydroelectric plants, all of which are owned by the state. Both electric generation and consumption have been relatively flat since independence, with generation totaling 20.4 billion kilowatt-hours (Bkwh) in 2004 (85 percent of which is conventional thermal generation), and consumption of 20.6 Bkwh[8]. Due to the startup of the BTC pipeline, power demand in Azerbaijan grew during 2006 and 2007.

Electricity Sector Structure

Although state electric company AzerEnergy has a monopoly on power generation, the country's national electricity network is divided into five regional grids–Baku; Nakhchivan; North (Sumqayit); South (Ali Bayramli); and West (Ganja)–each of which has been opened to foreign investors via open joint stock companies. Built during the Soviet era, Azerbaijan's power infrastructure is in generally poor condition, with minimal public investment and maintenance since independence.

The international donor community has undertaken several projects to restore and add new capacity to Azerbaijan's power sector. These include a $53 million loan by the World Bank to build the 4,000 megawatt (MW) Yenikand hydroelectric plant (completed in May 2000), and the European Bank for Reconstruction and Development's (EBRD) roughly $21 million loan (in conjunction with the Islamic Development Bank and the European Union) for reconstruction of the 360-MW Mingechaur hydroelectric station on the Kura River (completed in 2001).

Restructuring

In May 2004 Russia's dominant electricity group, UES, signed an agreement with AzerEnergy to construct new networking infrastructure to help bolster Russia's electricity exports to Azerbaijan and to neighboring Iran. Also, in May 2005 the World Bank announced a $48 million program to improve transmission performance. Plans entail upgrading the electricity dispatch system that would facilitate financial settlements in a future wholesale electricity market.

[8] http://www.eoearth.org/article/Energy_profile_of_Azerbaijan.

2.4 Energy fact sheet

Proven Oil Reserves (January 1st, 2009)	7 billion barrels
Oil Production (2008E)	875.000 b/d, of which 99% crude oil
Oil Consumption (2008E)	126.000 b/d
Crude Oil Distillation Capacity (2009E)	399.000 b/d
Proven Natural Gas Reserves (January 1st, 2009)	30 trillion cubic meters
Natural Gas Production (2008E)	572 bcm
Natural Gas Consumption (2008E)	376 bcm
Recoverable Coal Reserves (2007E)	None
Coal Production (2007E)	None
Coal Consumption (2007E)	None
Electricity Installed Capacity (2006E)	5.2 gigawatts
Electricity Production (2007E)	19.2 billion kilowatts per hour
Electricity Consumption (2007E)	19.6 billion kilowatts per hour
Total Energy Consumption (2006E)	0.7 quadrillion Btus[9], of which Natural Gas (60%), Oil (37%), Hydroelectricity (3%)
Total Per Capita Energy Consumption (2006E)	86.7 million Btus
Major Oil/Gas Ports	Baku, Sangachal (BTC)
Foreign Company Involvement	Agip, Chevron, ExxonMobil, Lukoil, Statoil, TotalFinaElf
Major Oil Fields (Production b/d)	ACG (400.000 b/d)
Major Natural Gas Fields (Production bcm/y)	Shah Deniz (350 bcm/y)
Major Pipelines (Capacity b/d)	BTC Pipeline (1 million b/d), Western Early Oil (155.000 b/d), Northern Early Oil (95.000 b/d)
Major Refineries (Capacity b/d)	Azneftyag – Baku (238.978 b/d); Azneftyanajag – New Baku (160.000 b/d).

3. Energy Security Aspects in the Republic of Azerbaijan

3.1. Energy Security Strategy

Although the Republic of Azerbaijan does not have a National Energy Security Strategy *per se,* the National Security Concept[10] incorporates certain aspects of energy security. First of all, in the "Threats to National Security of the Republic of Azerbaijan" chapter the threat or similar actions against security infrastructure is mentioned. The document suggests that: *"Revenues generated from the development and transportation of the*

[9] The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power.
[10] The National Security Concept of the Republic of Azerbaijan, May 2007 available at http://www.un.int/azerbaijan/pdf/National_security.pdf.

energy resources constitutes a valuable asset for the economy of the Republic of Azerbaijan. Therefore, attempts to undermine this sector of the industry through political means or by inflicting physical damage to the related infrastructure are among potential threats".

More than that, the National Security Concept mentions some of the key activities aimed at ensuring the national security of the Republic as being:

- Development and exploitation of the existing and prospective oil and gas reserves in the Azerbaijani sector of the Caspian Sea;
- Construction and installation of modern oil and gas platforms;
- Identification and assessment of the threats to the main oil and gas pipelines and terminals and taking appropriate countermeasures.

Also among the key tasks of the national security of the Republic of Azerbaijan are ensuring the security of energy transportation between the Caspian Sea, the Black Sea and the Mediterranean Sea via the Heydar Aliyev Baku-Tbilisi-Ceyhan main export oil pipeline and the South Caucasus gas pipeline, as well as of the crucial facilities which ensure the geo-strategic and economic interests of the Caspian littoral States, and to this end managing and diminishing the growing risks.

With the Heydar Aliyev Baku-Tbilisi-Ceyhan main export pipeline becoming operational in 2006, the Azerbaijani oil became an important factor in the world market. The geography of the pipelines delivering the Azerbaijani oil to the Turkish port of Ceyhan and the gas to the Turkish Erzurum gas terminal creates certain security risks.

The Republic of Azerbaijan implements integrated measures to prevent constructed and used energy production and transportation infrastructure from exposure to natural disasters, human induced technological accidents and sabotage.

Due to the anticipated global energy supply crisis in the 21st century it was decided to develop alternative energy sources in the Republic of Azerbaijan. Given that Azerbaijan has a favorable number of sunny and windy days annually; energy needs of the country can be partially met by making use of power stations generating energy from wind, sun, biomass, lower mountain waters and by hydroelectric power stations.

While stimulating steadfast and rapid economic growth, the rich energy resources of the Republic of Azerbaijan have turned into one of the major factors that determine the interests of various countries in the region and generate frictions in their relations.

After gaining independence, the Republic of Azerbaijan further developed its energy sector and created various transportation networks. Ensuring security for these transportation networks is one of the main tasks for the state.

In order to ensure security of the international transport corridors and the pipelines the Republic of Azerbaijan pursues the following objectives[11]:

- Ensuring transport and transportation security;
- Providing mobilization capabilities of the transportation system;
- Strengthening security measures with a view to increase effective functioning and competitiveness of the Europe-Caucasus-Asia and North-South international transportation corridors;
- Ensuring the reliability of the transport infrastructures protection system;
- Identifying and eliminating external threats to the security of the transportation infrastructures;
- Banning or controlling the circulation of the devices, which can be used in terrorist attacks against the transportation means and the infrastructure, including pipelines;
- Preventing damage to the social and ecological environment during the construction and exploitation of the transportation facilities.

The document implies that these objectives should be reflected in the activities of the Armed Forces of the Republic of Azerbaijan, other security structures as well as relevant governmental bodies and necessary conditions for their implementation should be established.

3.2. Defining energy security and institutions with responsibilities in the area

At this point an important, and yet difficult to answer, question rises: what is energy security? Since we cannot find consensus regarding energy security there are a few aspects that together may give us an insight into one of the most debated problems of our days. First of all, energy security refers to an adequate, affordable and reliable energy supply. Secondly, energy security refers to an uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers. More than that, energy security consists in security of supply, security of demand andsecurity of transit. In other words, energy security can be defined as set of measures to achieve optimized and based on mutual compromises balance

[11] *Ibidem,* p. 20

between supply and demand of energy resources on the market addressing concerns and interests of producer, consumer and transit country[12].

In order to ensure the economical security of the Republic of Azerbaijan it is very important to ensure the protection and effective use of hydrocarbon deposits and energy resources, and also to ensure the security of the appropriate facilities. For this purpose an interagency commission was established, that includes related state agencies and the Ministry of National Security; the necessary legislative base has been created and practical measures have been taken for ensuring security of export pipelines.

The responsibilities of the **Ministry of National Security** include the following actions[13]:

- Ensuring security of the fuel-energy infrastructures;
- Determination of possible technical insufficiencies (defects);
- Penetration attempts of foreign special services, possible risks and vulnerable targets for the terror and intelligence activity;
- Control and forecast of developments and dynamics of operative environment.

More than that, among the MNS's priorities there can be mentioned the establishments of close cooperation with neighboring countries that are part in relevant projects, as well as with special services of the partner states due to the fact that the projects implemented in the fuel-energy sector of Azerbaijan have international importance.

SOCAR has in its structure a security department which organizes the protection of property or non-property (rights) belongs to enterprises and organizations which composed the State Company, and other institutions using the SOCAR's services, uninterrupted activity and safeguard of information and communication systems, control over safety of headway of the ships and floating rigs related to SOCAR as well as mine rescue operations[14].

Another organism with responsibilities in the energy security is the **Security Council** of the Republic of Azerbaijan. The Security Council is the body under the **President** and he organizes it according to the Article 109 (section 27) of the Constitution of the Republic of Azerbaijan. The

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[12] Rashad Novruzov, *Azerbaijan's Perspective on Energy Security & Energy Trade & Investment*, December 2009, .

[13] Ministry of National Security, http://mns.gov.az

[14] http://www.socar.az/28-establishments-view-en.html

Security Council provides the conditions for the acting towards the constitutional authorities of the President on the protection of people rights and freedoms, independence and territorial integrity of the Republic of Azerbaijan.

The Security Council was established on 10 April, 1997 according to the decree of the President. According to the Decree the following officials have been appointed to the Council[15]:

- The Chairman of the Milli Majlis (the legislative institution of the Republic of Azerbaijan);
- The Prime-minister;
- The Head of the Office of the President;
- The State Adviser on the foreign policy;
- The State Adviser on the military issues;
- The Prosecutor General;
- The Defense Minister;
- The National Security Minister;
- The Internal Affairs Minister;

The President presides at the sessions of the Security Council. The Head of the Office of the President acts as the Secretary of the Security Council. The Head of the Office provides the activity of the Security Council, manages the preparation of sessions. The President determines the agenda and order of the discussion of issues at the session of Security Council according to the submission of the Head of the Office.

4. A geopolitical overview of energy security in the Republic of Azerbaijan: diversifying routes

The Republic of Azerbaijan benefits from an important strategic position and due to its own energy resources it developed and pursues successfully a diversified energy security strategy. This diversified energy security strategy mainly refers to Azerbaijan's efforts to develop alternatives for delivering its gas to Russia and Iran along with an alternative route transporting gas to Europe through the Black Sea ports. By doing this, in other words by diversifying its own energy routes and markets, Azerbaijan is increasingly contributing to global energy security.

It is a well-known fact that over-dependence on any country for oil and gas supplies comes along with risks of disturbances to national energy security.

[15] http://www.president.az/administration/security_council?locale=en

And this is the case for many European countries that depend heavily on gas imports from Russia. Therefore, diversified gas supply sources are usually viewed as key to achieving energy security and the same logic can be applied to supplier states, as is Azerbaijan, in terms of need for reliable, solid, and stable markets and transit states to deliver their gas safely. And from this point of view, Azerbaijan has been pursuing its own diversified energy policy to secure its gas and oil exports in case of unexpected problems with the existing pipelines[16]

An over-view on energy security in this context justifies the fact that Azerbaijan finds itself at the center of gas diplomatic maneuvering these days. Its hydrocarbon reserves make it not only a strategic transit state but also a reliable supplier. A successfully implemented diversification of its energy security strategy will increase Azerbaijan's role as a stabilizer in the region. It already contributes considerably to the energy security of neighbor states, especially Georgia and Turkey. However, by diversifying its own export routes and markets, Azerbaijan increases its role in both regional and global energy security.

5. Effects and reactions analyze for 4 given crises

This part of the paper will analyze the way in which the Republic of Azerbaijan would react in case he would be confronted with the following four crises:

1. short run catastrophic effects;
2. disproportionate price effects;
3. consistently high costs;
4. cut of foreign direct investments (FDI).

For each of the four crises we will make an assessment regarding the level of fulfilling the three basic requirements of the security in a given crises situation, that is: state existence, domestic safety and economic welfare.

5.1. Short run catastrophic effects

Energy security can be defined, as already discussed earlier, as the availability of energy sources in sufficient quantities and the reasonable

[16] Gulmira Rzaeva, *Azerbaijan's Diversified Energy Security Strategy*, Central Asia-Caucasus Institute, 2009, http://www.cacianalyst.org/?q=node/5222

prices at the proper time. The first of the four crises we take into discussion refers to short run catastrophic effects induced by the sudden cut of supplies.

Disruption of energy supply may occur at any point in the energy supply chain and it can create energy crisis in a country, in a region or in the whole world. There are some factors that cause energy supply disruptions[17]:

- *Political reasons*: Due to the fact that nowadays energy is considered a high political issue, conflicts between energy producing countries and energy consuming countries (or energy transit countries) can cause some supply disruptions.
- *Economic reasons*: Sudden increase of energy price can lead to the supply disruption. For example, the last natural gas conflict between Ukraine and Russia was grounded on the disagreement between two countries on the price of natural gas.
- *Export restrictions or any embargo from producers*. For example, the oil crisis in 1973 was caused by export restrictions that were made by OPEC.
- *War, terrorist attack or political instability of energy producing country*: These factors may disrupt exploration, production, processing or transportation of energy. One of the vivid examples in that respect is terrorist attacks on pipeline infrastructures in Iraq.
- *Natural disasters, accidents or technical reasons*: For example, hurricane Katherina, gave rise to fundamental damages to energy infrastructure and caused some disruptions of energy supply in USA.

Energy security policies can be divided into two main parts namely "short" and "long" term energy security policies. The short term energy security policies can be classified into two groups: "diversification" and "storage"[18]. These can be analyzed in the following way:

a. *Diversification*: The most important policy to ensure security of energy supply is the diversification of energy source, supply countries and supply routes. Since world economy seems to be entirely dependent on oil, other sources like coal and natural gas are considered as diversification tools for reducing oil dependency.

b. *Storage*: The second short term tool for securing the energy supply is the storage policy. After the first oil crisis, International Energy Agency (IEA)

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[17] See Hava Çaha, *Energy Security of Turkey,* International Conference on Human and Economic Resources, Izmir, 2006, p.84.

[18] *Idem*

put some minimum storage policies to reduce influences of unexpected rising of oil price or disruption of oil supply. The minimum quantity required for the oil stock, in time scale, is 90 days.

Due to the fact that the Republic of Azerbaijan is a producer, it does not confront itself with the first three causes of sudden energy supply disruption earlier described (political reasons, economic reasons and export restrictions or any embargo for producers). However, the main threat to energy supply not only inside borders of the Republic, but also to exports is the possibility of terrorist attack. This possibility is taken into account especially due to the Armenian-Azeri conflict over Nagorno-Karabah.

Also according to SOCAR's Security Department the direct physical danger of the infrastructure is represented by terrorist attacks (the Armenian issue) and the rate of criminality. SOCAR's responsibilities in security matters are protection of the platforms, pipelines in the country and protection of SOCAR's buildings. In other words, the possibility of terrorist attacks on the infrastructure is the most actual threat. This requires preparation for counter-terrorism and after terrorist measures.

Azerbaijan adopted a package of legislative measures aimed at bringing the relevant legislation of Azerbaijan into the line with international legal instruments in the field of preventing and suppressing acts of terrorism. As for the executive machinery, counter-terrorism activities are carried out through bilateral and multilateral cooperation among various national agencies. The law-enforcement and intelligence bodies, namely the Ministry of National Security, Ministry of Interior and State Border Control have the leading role in combating terrorism derived from their primary responsibility to ensure security and stability within the country. In particular, they are engaged in implementing necessary measures to[19]:

- Identify, arrest and prosecute persons suspected of organizing, financing, supporting and committing terrorist acts;
- To monitor and protect Azerbaijan's frontiers;
- To suppress the transnational organized crime linked to terrorism (illegal migration, trafficking in small arms and light weapons, drugs) etc.

5.2. Disproportionate price effect

Rising energy prices affects first of all transport costs; secondly, trade and competitiveness and in the third place, global transportation strategies,

[1] See http://mfa.gov.az.

production plant locations and trade patterns. However, the magnitude and long-term implications of such trends will depend on whether, when and how far and continuously economic prices rise and remain high, notwithstanding the current economic downturn[20].

The long-term implications of rising oil or gas prices for transportation costs and trade are yet to be fully understood; however, sustained higher energy prices would likely affect relative prices and export competitiveness. A change in relative trading costs is likely to affect existing comparative advantages and could lead to major changes in global transportation strategies and production plant locations, and realignment in trade patterns. Again, due to the fact that the Republic of Azerbaijan is a producing country it does not face a difficult situation since it does not encounter disproportionate prices. To take this statement on the ground, the case for electricity prices will be given as example[21].

As it is known, tarrifs of electricity in Azerbaidjan are considered by the State Tariff of Azerbaijan Republic and confirmed by the Cabinet of Ministers. This Assembly determined for all consumer groups a rate of 0.06 AZN/kWh. While Azerbaijan may be able to afford lower tariffs than net energy importers, it must still take into account when calculating the prices to cover generation, transmission, and distribution costs if the network is to be financially viable.

Also, as the mentioned report shows, an important aspect in energy consumption in Azerbaijan is that there is little difference in consumption patterns between the poor and the non-poor. It is unusual that shares are similar across per capita income quintiles taking into consideration the fact that in most countries, the bottom quintile spends a larger share of income on electricity than the top. The explanation for this unusual pattern in Azerbaijan is that collections are lower for the poor, which means that they face a lower effective tariff and consume proportionally more than they would if they faced the full tariff.

A sudden rise in electricity price will not have a great impact on the consumption and this is because demand has the tendency of getting more

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[20] *Energy-related issues from the trade and development perspective,* United Nations Conference on Trade and Development, March 2009, p.15.

[21] See *Azerbaijan Raising Rates: Short-Term Implications of Residential Electricity Tariff Rebalancing*, Report No. 30749-AZ, Document of the World Bank, available at http://siteresources.worldbank.org/INTPSIA/Resources/490023-1120841262639/Azerbaijan_PSIA_Energy.pdf.

inelastic (less sensitive to tariff changes) as consumption approaches basic minimum needs. Also, the price elasticity of demand may change over time, with less elastic behavior over the short-run than long run.

5.3. Consistently high costs

The Republic of Azerbaijan, due to its position as a producer and exporter, is not substantially affected by high costs. Anyhow, one of the biggest priorities in energy issues for Azerbaijan is developing alternative energy, which also after implementation reduces costs.

Because of its convenient geographical location and the climate condition, the Republic of Azerbaijan benefits of the possibility of developing renewable energy sources. By doing this, it would save large amount of fuel combusted in thermal power plants, as well as significantly reduce hazardous substances. Production of electric and heat energy using alternative energy sources would be incentive for progressive changes in future development of energy sector.

The Institute of Physics of National Academy of Sciences, Institute of Radiation Problems, Scientific-Research and Power Design Institute and Baku Hydro Design Institute have undertaken expedient scientific activities towards utilization of renewable energy sources[22].

The objective of this State Program is to promote the power generation from renewable and environmentally sound sources and to more efficiently utilize hydrocarbon energy sources.

The major tasks of State Program include:

- define the potential of alternative (renewable) energy sources for electric power generation;
- rise the efficiency of usage concerning the country's energy sources by developing renewable energy sources;
- ensure the opening of additional jobs with creation of new energy production sites;
- Given the existing total capacity of traditional energy sources in Azerbaijan, increase the energy capacities at the expense of alternative energy sources and therefore, achieve the country's energy security.

[22] See *The State Program on Use of Alternative and Renewable Energy Sources in Azerbaijan Republic,* approved with Presidential Decree N462, available at http://www.carecinstitute.org/uploads/docs/AZE-Renewable-Energy-Strategy-en.pdf.

According to the State Program, *wind power* is a more preferable energy source than solar, hydro, geothermal and biomass because of its cost, environmental soundness and unlimited availability. Practice shows that many regions in Azerbaijan have great perspectives for applying wind power facilities. Calculations suggest that the Azerbaijan Republic has about 800 MW annual wind power capacities due to its geographical location, nature and economic infrastructure. This reserve means 2.4 billion kWh of electricity, according to rough calculations. This would means the saving of 1 million tons of conditional fuel, more importantly, prevention of emitting large quantity of wastes including ozone cracking carbon dioxide. The climate condition of Azerbaijan opens great opportunities for production of electric and heat energy using *solar power*. The annual number of sunshine hours in Azerbaijan is 2400-3200 hours.

Rapid development of industry, agriculture and social service in Azerbaijan Republic opens new opportunities for electricity generation from *biomass*. The sources of bio substances in the country include the following[23]:

- combustive industrial wastes;
- wastes of forestry and wood-working;
- agricultural and organic wastes;
- domestic and communal wastes;
- wastes processed from areas polluted with oil and petroleum products.

Studies have shown that much of the composition of production wastes in all industrial sites is biomass substances; therefore it is feasible to produce biogas, bio-liquid and solid bio substance that can be used for electricity generation.

Another renewable source of energy comes from the heat of earth depth which is already widely used in industry, agriculture, domestic, communal and health sector in many countries. The advantage of using *geothermal power* in energy production and consumption is that their application does not require large amount of funding. Azerbaijan Republic is rich with thermal waters. They are usually found in Great and Small Caucasus, Absheron Peninsula, Talish mountain-row zone, Kur lowland and Caspian-Guba area. Exploitation of thermal waters in noted areas would partially cover the domestic and other heat energy needs.

[23] *Ibidem,* p.4

Attracting private investments in connection with implementation of actions envisaged under State Program and maximum use of alternative (renewable) energy sources can be conductive for connection additional capacities to power system.

5.4. Cut of Foreign Direct Investments (FDI)

Foreign direct investments are very important in the Republic of Azerbaijan, especially in the energy sector. FDI reached 3.8 billion dollars in 2008. It dropped with the financial crisis, reaching 1.4 billion dollars in the first quarter of 2009, of which 75% was in the energy sector alone.
When talking about FDI in the Republic of Azerbaijan one must evaluate the strengths and weaknesses of the country, as follows:

Strong Points	Weak Points
Fast economic growth	The poor quality of its infrastructures
An interesting geographic location	The high rate of corruption within the administration
Competitive production costs	The slowness of procedures
Cheap and qualified labor	The destabilization risks due to the conflict in Karabakh
The size of its energy sector	Other than the oil industry, there are few developed sectors
The signing of numerous bilateral treaties aimed at promoting trade	A certain level of insecurity

Source: http://www.interex.gr/uk/countries-trading-profiles/Azerbaijan

Although it may seem, due to the impressive volume of FDI, that the Republic of Azerbaijan totally depends on it, the Ministry of Energy and Industry states that if there were to be a cut of FDI it will not affect them. This is mostly because Azerbaijan has a State Oil Fund.
A number of agreements on joint development of oil and gas resources were signed with foreign investors in the frame of Oil Strategy, created by national leader Heydar Aliyev, which has being done since 1994[24]. When the issue of an effective management of revenues from implementation of these agreements was brought to agenda, that was the moment the State Oil Fund of the Republic of Azerbaijan (SOFAZ) was established in accordance

[24] See http://www.oilfund.az.

with the Decree of the President of the Republic of Azerbaijan nr. 240 dated December 29, 1999 for the purpose of formation such mechanism.
According to SOFAZ's website, the fund's activity is directed to the achievement of the following objectives:

- Preservation of macroeconomic stability, ensuring fiscal-tax discipline, decreasing dependence on oil revenues and stimulating development of the non-oil sector;
- Taking into account that oil and gas are depletable resources ensuring intergenerational equality with regard to the country's oil wealth and accumulate and preserve oil revenues for future generations;
- Financing major national scale projects to support socio-economic progress.

As it can be noticed, the cornerstone of the philosophy behind the Oil Fund is to ensure intergenerational equality of benefit with regard to the country's oil wealth, whilst improving the economic well-being of the population today and safeguarding economic security for future generations.

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