Teimuraz Gochitashvili

GEORGIAN ENERGY SECTOR. MAIN PRIORITIES OF GAS SECTOR DEVELOPMENT

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T. Gochitashvili – GEORGIAN ENERGY SECTOR. MAIN PRIORITIES OF GAS SECTOR DEVELOPMENT

The publication reviews the current situation of the Georgian energy sector, particularly, the natural gas market, forecasts and strategic areas of development. Measures facilitating ensuring the energy security of the country, the market liberalization and integration into regional structures are recommended.

The publication is designed for experts working on the issues of the Georgian energy sector, regional economy and geopolitics, as well as university students.

The information, statements and recommendations contained in the publication reflect only the author's personal opinions and do not express the official position of any state entity.

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BRIEF SUMMARY
As a result of the intensive rehabilitation and construction works and restructuring of the sector during the recent years, as well as, in consequence of putting transnational and local main pipelines and high-voltage power transmission lines into operation, the problem of energy security of Georgia has mostly been resolved already. However, at the current, transition stage of development of the economy it is faced by a serious risk without rational planning of expensive imported fuel supply, consumption and their maximum replacement by local resources, acceleration of processes of further liberalization of the energy markets and integration into regional systems. Accordingly, strategic planning of development of the country's energy, and particularly the gas sector, for the purpose of guaranteed satisfaction of demand of the population and various segments of economy with the quality fuel resources at affordable prices, acquires particular significance and is reviewed in the publication.

The first chapter provides a short overview of development of the Georgian natural gas market, issues of institutional organization of the sector and potential of substitution of imported energy resources; also the main transportation infrastructure are discussed.

The second chapter is dedicated to evaluation of demand on gas, supply sources and price forecasts.

The current challenges of the Georgian energy sector, such as energy security, integration into regional structures and harmonization of the relevant legislation with EU standards, as well as identification of significant investment projects and bringing investments required for their implementation, are reviewed in the third chapter of the publication.

The main development priorities of the Georgian natural gas sector and related sectors of economy are provided in the form of conclusions and recommendations.
The publication is intended for the experts working on strategic issues of development of the Georgian energy, and particularly, the gas sector, as well as university students.

INTRODUCTION

At the current stage of Georgian economy development and country's integration into progressive international political and global economic structures, ensuring energy security and satisfying the increasing demand of population and economy with available resources acquires particular significance.

Due to intensive rehabilitation and construction and restructuring of the sectoral enterprises during the recent years, as well as, as a result of putting transnational and main pipelines and high-voltage power transmission lines into operation, the problem of energy security has mostly been resolved already. However, at the current stage, development of the country in general is faced by a serious risk without rational planning of expensive imported fuel supply and consumption and acceleration of processes of their maximum replacement by local resources, further liberalization of the energy market and integration into regional systems. Accordingly, identification and addressing the critical issues in various areas of country's energy sector, including strategic areas of the gas sector development, for the purpose of satisfaction of demand of the population and various industries with quality fuel resources at competitive prices, represents a pressing issue for today.

1. THE CURRENT SITUATION AND DEVELOPMENT TRENDS

1.1 Energy market

In the early 1990s, residents of Georgia consumed approximately the same amount of energy as the European citizens living in similar geographic-climatic conditions (Italy, Spain, Austria, Portugal, Greece, Turkey averagely). However it spent 3-4 times more specific energy per unit of production and was significantly behind the average European GDP per capita index. Annual energy consumption in Georgia has significantly reduced compared to the early 1990s.

The power system of Georgia was a part of the unified regional system of the Caucasus during the Soviet period. This allowed the country to replenish the seasonal deficit in winter from the neighbor republics and on the other hand, supply them with excessive energy generated at HPPs during the spring-summer period. In addition, the country could receive cheap oil and gas of practically unlimited amounts. Besides, coal produced in local, subsidized fields was mainly sold in other Soviet republics after mixing with relatively high quality fuel. As a result, Georgia inherited energy-consuming economy, for which the competition common for market relations, concern for end markets and introduction of real market prices on imported oil products and natural gas after gaining independence, appeared to be destructive. The process was accelerated the fragile political situation in the region, predetermined by destructive actions of Russia and support of separatist regimes, which was reflected in limitation, sometimes subversive termination of supply of energy resources, or drastic and inadequate increase of prices.

Besides, a significant role in the collapse of the energy supply system of the country is played by non-performance of planned maintenance of infrastructure and preventive-restoration works, lack of proper management and financial control, breaking of inherited, centrally managed economic links. Drastic reduction of industrial and household consumption by energy-wasting technologies under the market economy became a factor preconditioning a serious energy crisis. Sharp reduction of consumption of energy resources started from 1990s continued for 15 years until renewal of the irreversible process of increase of consumption. The chart shows evolution of Total Primary Energy Supply (TPES) in Georgia in 1990-2011.

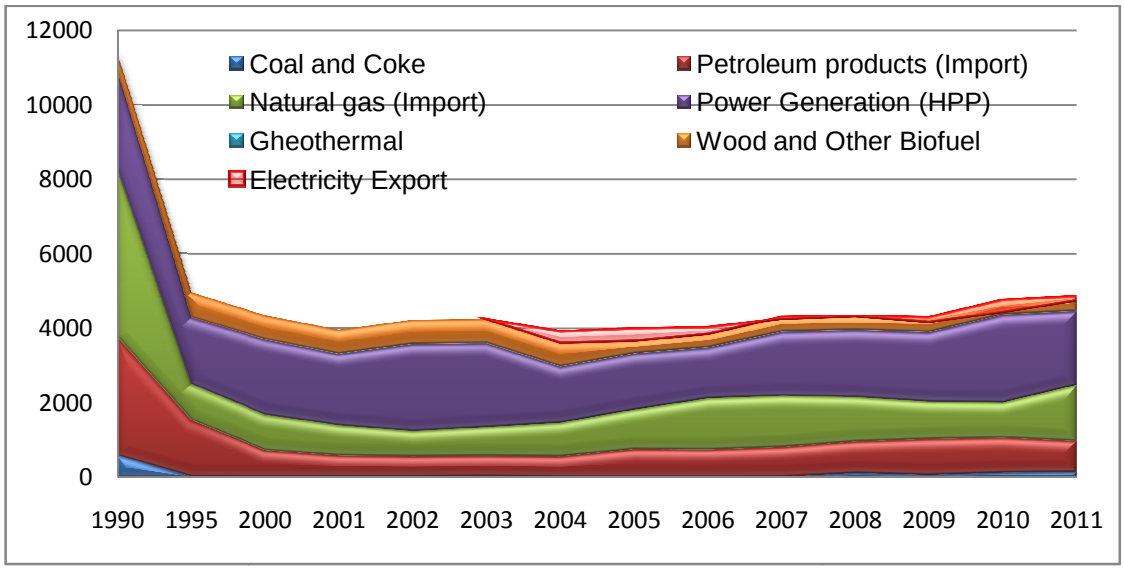

Figure 1. Total Primary Energy Supply, ktoe[1]

Power generation significantly increased during the recent years (up to nearly 10 billion KWh by 2011), as well as consumption, annually increasing by averagely 10% in 2009-2011. Georgia has been a net exporter of power energy since 2007, performing electricity sales or swap operations with Russia, Azerbaijan, Armenia and Turkey, and to Europe via Turkey[2].

Fuel consumption in power generation is minimized, due to preference given to local renewable, particularly, hydropower resources, whose share increased up to 80-85% in 2008-2010 as compared to 55-60% in the 1990s (Figure 2). Achievement of the 90% threshold of the hydropower share was considered in the short-term program of the sector development by 2012[3] , however, the last 2 year practice proved impossibility of achievement of this goal at the current stage, due to dependence of renewable energy sector on climate and necessity of performing planned maintenance on the main hydropower generation facility of the country – Enguri HPP (4-5 times per year), which, accordingly, predetermines the necessity of at least 15% average annual share of the power produced by thermal plants[4].

[1]To converse power energy to the Ton of Oil Equivalent (toe) it is considered that by utilization of one million ton of oil, 4000 GWh power energy can be obtained at a modern TPP. Apart from power energy, the balance does not consider supply of primary energy resources to the temporarily occupied Abkhazia and Tskhinvali regions.

[2] The EU and its Eastern Partners: Energy Needs and Future Prospects, European Parliament, Directorate-General for External Policies, Policy Department, 2012

[3] "Basic Data and Directions for 2009-2012", Government Resolution # 107, 18.04.2008

[4] The share of the power energy actually generated on TPPs in 2011 exceeded 20% in the balance, which will be assumably maintained according to the 2012 forecast, considering the actual figures of the I and II Quarter.

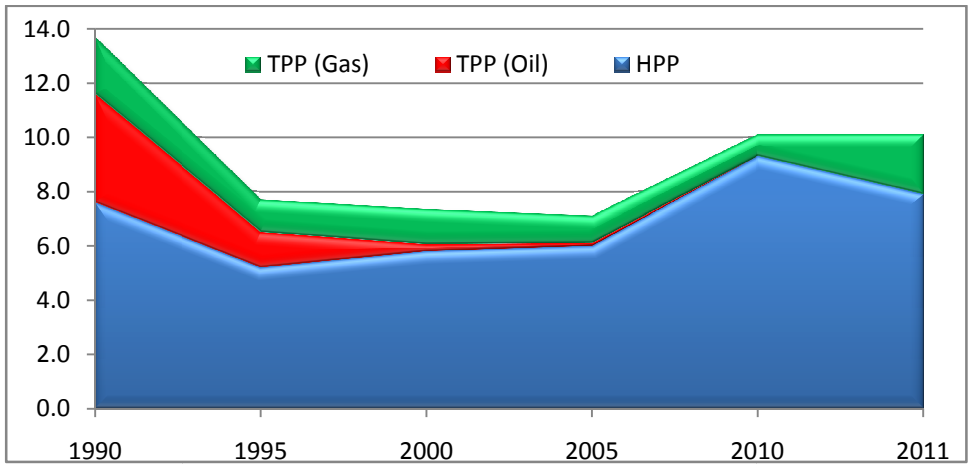

Figure 2. Power energy generation structure (in TWh)

Mainly imported gas, oil products and local bio resources (firewood) are used to meet the demand of industrial, commercial and household sectors.

The supply and consumption of one of the cheapest, easily consumable and ecologically safe energy resource – natural gas – follows an increasing trend from the period of economic revival in the beginning of the last decade, except the crisis period of 2008-2010 (Figure 3), however, the peak consumption of 5-6 billion m3 in the early 1990s is reduced to 1.8-2 billion m3 in 2011-2012.

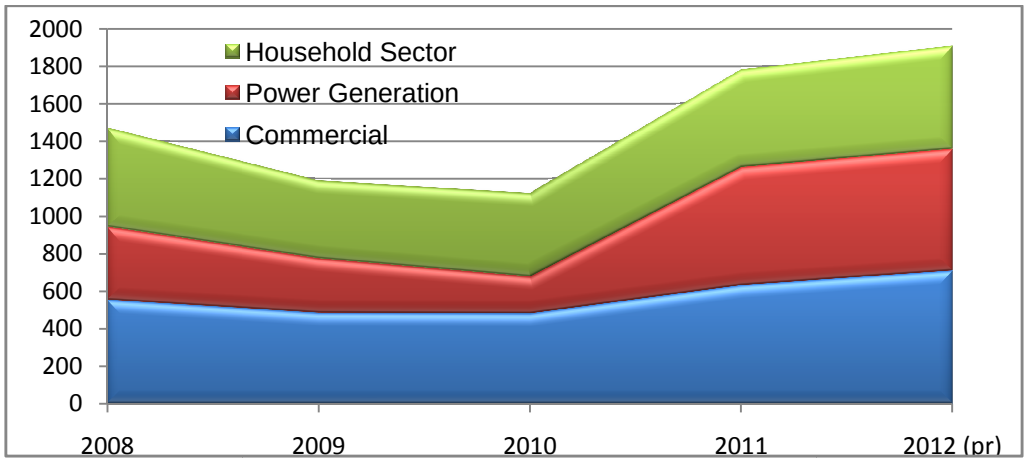

Figure 3. Consumption of natural gas by sectors, million m^3/year (2012, forecast data).

The main reasons for reduction of supply and consumption of gas, along with liquidation of enterprises functioning with energy-saving technologies and introduction of energy-efficient heating systems in the household sector, include significant reduction of the gas consumption share in power generation, due to dominance of power energy produced from local hydro resources. Besides, technological losses of gas during transportation are minimized, which was achieved through rehabilitation-reconstruction of main pipelines and introduction of modern management and accounting systems (losses in the main pipeline system of Georgia are the lowest compared to those in the former Soviet republics and East European countries).

Total annual consumption of oil products in Georgia equaled to 800-950 toe in the recent period. Oil products are not produced in Georgia and demand of the country is completely satisfied by imported resources. The market of crude oil and oil products is fully liberalized and the prices

approximately reflect the international market trends. It should be mentioned that prices on oil products, especially liquefied petroleum gas (LPG) used in the household sector, are rather high in Georgia as compared to the natural gas price, as well as the market price in neighbor countries. This may be a result of unhealthy competition in the local market, including, cartel agreements, division of market segments and exclusive rights, abuse of monopoly power by dominant supplier, mergers and acquisition of assets detrimental for competition[5].

Significant optimization of oil product prices can be achieved through installation of a small-capacity refinery for locally extracted oil (recovery by modern, ecologically clean and completed technological cycle). To achieve this, first of all it is necessary to explicitly define the terms of allowed oil refining and oil products in the law "On Oil and Gas"[6] and to remove the barrier for local oil refining in a healthy competitive environment.

Local bio resources, mainly firewood provide a significant contribution to energy balance of Georgia. According to expert estimates, the actual volume of wood-cutting along with other unaccounted fuel resources, for energy purposes (wastes of timber processing and farming industry, manure, peat etc.) equals to approx. 400 ktoe annually.

Coal consumption in Georgia increased from 23 thousand tons to 360 thousand tons during the last five years, at the same time; imported coal is completely replaced by local products. It is possible to achieve the increase in coal recovery up to 450 thousand tons per year during the next 2-3 years and up to 600 thousand tons per year by the end of decade. [7]

Coal is mainly used in cement production and metallurgy, and in a relatively small amount – for supply of the TPP with installed capacity of 13,5 MW, in the households,, railway and is exported to Armenia. In the long term, the prospects of coal use are primarily related to industrial sector, namely, production of construction materials and metallurgy.

1.2. Institutional system of the sector and gas market

Development and control of implementation of strategy defined by the country's energy policy, including gas sector, is the top priority of the Ministry of Energy of Georgia. The Georgian National Energy and Water Supply Regulatory Commission (GNERC) carries out the sector regulation through relevant legislative acts and rules.

Market Rules developed by the Ministry of Energy define the rules and technical standards of gas supply and connection to the transportation system. The Ministry prepares the annual balance of natural gas at the beginning of each calendar year, performs it and carries out monitoring of technical norms. Until August 2007, tariffs of all primary activities on the gas market (wholesale and retail supply, transportation and distribution) were regulated by GNERC. After partial deregulation of the market since 2007, wholesale gas supply (import, production, as well as transit) are governed by market mechanisms, while the regulatory authority was instructed to establish prices of naturally monopolistic activities of transportation and distribution, as well as retail supply prices for household consumers and the power generation sector. GNERC has also established marginal supply tariffs for some retail consumers which became subject to deregulation.

Transportation and distribution activities in the natural gas sector are allowed only on the basis of licenses issued by the national regulatory authority.

[5]Source: Einar Hope, Optimal Composition and regulation of a liberalized electricity system (Presentation), ISET, November 8, 2012

[6] Georgian Law "On Oil and Gas", Article b, paragraph 2

[7] Source: Management of Tkibuli-Shaori coal mines

State-owned Georgian Oil and Gas Corporation (GOGC), as well as Georgian Gas Transportation Company (GGTC) play a significant role in the gas market. GOGC is the owner of the country's main gas pipeline system. It supplies the optional and supplemental gas received for transit via the South Caucasus Pipeline (SCP) as well as the gas received for the Russian gas transit by GGTC to the household consumers of the regulated segment of the market and power generation facilities, through "Socar Gas Export-Import". GOGC also ensures supply of locally produced gas to the competitive segment of the market.
GGTC is a transportation licensee and it carries out maintenance and operation of main pipelines, as well as transit of the Russian gas to Armenia and supply of the gas received in return for transit to GOGC on the basis of Lease and Sale and Purchase Agreements concluded with it. GGTC ensures transportation of gas from suppliers to the distribution network of the internal market and directly to consumers (thermal power generation facilities of "Mtkvari Energy" and "G-Power").
Gas supply (import) to the local market, both for the regulated segment and commercial consumers, is carried out by State Oil Company of Azerbaijan – "SOCAR", through its subsidiary "SOCAR Gas Export-Imoport".

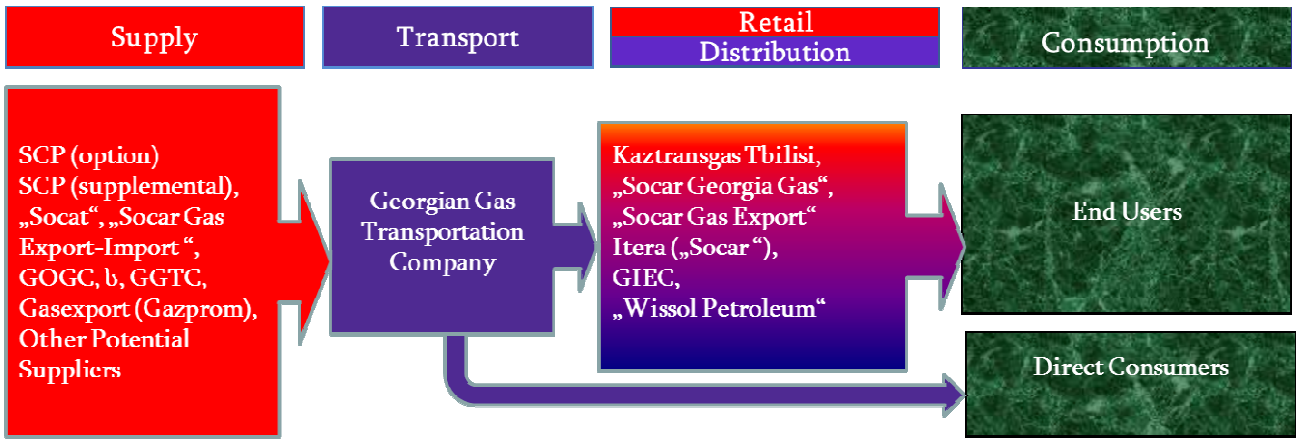

Figure 4. Gas supply chain

Natural gas sector enterprises, except the main gas pipeline system, are practically entirely privatized and controlled by private companies (or companies owned by other states). SOCAR, through its own distribution companies and "KazTransGas-Tbilisi", owned by the State Company of Kazakhstan – "KazTransGas", control the main segment of the domestic retail market and carry out distribution and retail supply of gas to consumers together with other private companies ("Wissol Petroleum", Georgian International Energy Corporation – GIEC).

60-70% of country's total consumption, in particular, demand of the regulated household and power generation sector is entirely covered by the Governmental Memorandum with Azerbaijan. The terms and conditions of the long-term comprehensive Agreement on gas supply concluded on the basis of this Memorandum with SOCAR and its subsidiary, provide that stable tariffs are maintained. Terms and conditions of the Agreement also ensure compensation of the acute seasonal disbalance between gas supply and consumption. The component of wholesale supply in the tariff is determined for entity (ies) (enterprises) jointly nominated by the household sector, power generation facilities and the Georgian-Armenian sides during the current decade.

The remaining, 35% of total consumption of the market is comprised by the commercial sector and prices are deregulated for this segment – the final consumers can select a supplier and agree on the gas tariff.

Relations between suppliers, transportation and distribution licensees and direct consumers are regulated by the Natural Gas Market Rules. Procedural issues sale and purchase activities, transportation and distribution of gas are considered on the basis of bilateral or multilateral agreements concluded between the parties.

Relative characteristics of Georgian energy markets are established on the basis of the comparative analysis carried out by the European Bank for Reconstruction and Development (EBRD)[8]. Examples from the best international practice are taken as a criterion, which is given the score of one. The parameters characteristic for the Georgian gas sector are evaluated as follows: independence and powers of the regulatory authority – approx. 0.85; market structure – 0.37; access to networks – 0,66; tariff structure – 0,91; obligations of public services – 0,52; transparency – 0,57; private sector involvement in investment – 0,55. In total, according to the institutional system of the Georgian gas sector, market structure and third-party access, tariff structure, obligations of public services, transparency and the private sector involvement, the comprehensive assessment index of the country was evaluated as approximately 0.67 scores.

Analyses, as well as comparison with the corresponding indices of the European Energy Community member and observer states show that special efforts are required for drastic improvement of the market structure, obligations of public services and transparency. As for the private sector involvement in the investment activities, the situation is significantly improved in this regard as compared to the situation during the period of conducting surveys (2009).

1.3. Energy resources interchange and imported fuel saving potential

1.3.1. Oil and Gas Products

Development of decentralized economy based on the use of autonomous energy sources the effective means of ensuring economic growth and sustainable functioning of the hardly accessible highland regions of Georgia. One of the possible solutions is the supply of these regions with gas transformation products (liquefied gas – LNG and compressed gas – CNG) or propan-butane (liquefied petroleum gas – LPG) instead of construction of costly and economically unjustified pipelines.

Replacement of costly oil products with compressed natural gas in the transport sector will facilitate deregulation of prices and ensure reduction of harmful emissions by approx. 30 %. A good example of replacement of oil products by compressed gas is Armenia, where about ¾ of the entire vehicle fleet uses relatively cheap compressed gas creating a competitive environment on the market and significantly reducing the fuel expenses.

There is a particularly significant potential of reduction of specific expenses on energy in household consumers in the regions not covered by pipelines with traditional liquefied gas (LPG). Currently, LPG price on the local market is inadequately high (more than 2000 USD/ton) as compared to the market prices in the adjacent regions. For instance, LPG price in Russia and the Central Asian producing countries equals to about 300 USD/ton[9]. For obvious reasons, such price is unachievable in Georgia, but it gives a rough idea of the product cost.

[8] Georgia Country Profile (2009). www.ebrd.com/downloads/legal/irc/countries/georgia.pdf

[9] http:www.karaganda-region.kz/rus/news rk/56429/ (Постановление Правительства РК, 27.06.2012, № 980); (Рост ефрифов на сжиженный газ в России замедлится вдвое).

According to Argus Media Ltd, LPG price on the Mediterranean regional market (Coasters fob Med) fluctuates between 879-917 USD/ton[10]. According to Platts data, wholesale price on propane and butane on the European market in summer, 2011 equaled approx. 800-950 USD/ton[11].

Retail sales price of LPG on the market of Balkan and East European countries (Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia) equals to 1620 USD/ton on average[12]. The highest price is recorded in Estonia and Montenegro, approx. 1820 USD/ton, the lowest – in Latvia and Croatia, 1345 USD/ton on average. According to the International Energy Agency (IEA) [13], relatively large amount of LPG was supplied from Russia and the Caspian region in 2009-2011 to the following EU countries: Czech Republic, Estonia, France, Hungary, Italy, Netherlands, Poland, Slovakia and Slovenia, as well as the Black Sea region countries, partly via the Georgian railway and ports. Average price on LPG for retail consumers of the transportation sector of these countries equaled approx. 1780 USD/ton.

The analysis shows that the price on LPG in Georgia is one of the highest, despite its proximity to the main supplier countries and accordingly, low transportation expenses as compared to the countries of other consumer regions. Presumably, such growth of prices is due to non-competitive market or irrational planning and management of supply. Regulation of prices on LPG by ensuring competition and facilitation of proper supply planning remain among the main functions and responsibilities of the state, despite deregulation of respective market[14]. At the same time, the money needed for construction and operation of transport pipelines to mountainous and hardly accessible regions, in case of correct organization of LPG supply, can be used for funding the population, like in Brazil, where socially vulnerable consumers are financed by the state from assistance fund for purchase of LPG[15].

1.3.2.Energy Efficiency

The efficiency of planning mechanisms, legislative and financial measures for in support of energy efficiency potential utilization is still low in Georgia. At the same time, elimination of the gap compared to the developed European economies in this regard may become one of the most significant instruments of energy saving and increase of competitiveness of local products (it is generally accepted that, expenses on improvement of energy efficiency ensure saving of about 25% of the cost of saved resources[16]). Therefore, by introduction of energy efficient household equipment and heating systems, introduction of mandatory construction standards of thermal insulation in household and commercial sectors[17], significant (about 40%) reduction of gas consumption can be achieved.

1.3.3. Renewable resources

Georgia is rich in non-traditional, renewable energy resources. The main stimulator of their wide scale development is significant reduction in use of fossil fuel, mainly imported gas.

[10] www.argusmedia.com LPG World Prices monthly, March, 2011
[11] Platts, LPGaswire, July, 2011 Issues
[12] www.golpg.eu, LPG prices across Europe
[13] IEA Statistics, Oil Information, 2012
[14] G. Mukhigulashvili, M. Margvelashvili, Competition and monopoly on the domestic energy market
[15] Source: Liquified Petroleum Gas, http://en.wikipedia.org/wiki/Liquefied_petroleum_gas
[16] Energy Strategy of the Energy Community, 2012
[17] G. Sadaghashvili, M. Sadaghashvili. Relation of thermotechnical indicators of residential buildings to the Georgian energy problems, Tbilisi, 2008

The energy potential of wind is practically unused in the country until present. Preliminary estimations show that in case of utilization of the wind energy potential, it will be possible to construct wind power stations with installed capacity of up to 2000 MW only in the most prospective places (Rioni and Mtkvari basins, Sabueti Mountain, Paravani Lake in Samtskhe-Javakheti etc.). At the same time, use of wind energy, which is subject to unstable climatic conditions, requires doubling of energy production. The European experience shows that supplementing the wind energy by gas-fired power energy represents the most practical and flexible means[18]. Such combination allows saving expensive fuel in the most critical period of the year, as the main wind potential is realized during winter months.

Under the Georgian conditions, wind energy is attractive in other respect too. It can fill the deficit of electricity generated on HPPs during the winter season, when HPPs suffer from deficit of water and there is a maximum demand on electric power.

Up to 250 natural and artificial (obtained from wells) springs of geothermal waters are registered on the territory of Georgia[19]. According to estimation, for explored fields of Tbilisi, Kindga-Mokvi-Ozurgeti, Zugdidi-Tsaishi, Khobi, Qvaloni, Vani, Samtredia, the cost of heat obtained from thermal waters is less than the cost of heat obtained by traditional, natural gas combustion[20].

Annual sunshine hours on the most territory of Georgia fluctuate between 1800-2600 hours, while radiation is within the range of 1250-1800 KWh/m2 by regions. Use of solar energy is particularly favorable for generation of low potential heat (<100 oC) by means of collector concentrators, including for, hot water supply of primarily residential, industrial and resort-recreational zones, as well as systems of thermal processing of agricultural products in summer which ensures saving of significant volume of natural gas.

Biomass, namely, firewood, is widely used in rural regions for heating and other household needs. It is necessary to develop measures of legislative and financial support of highly efficient utilization of firewood, including participation of international donor organizations[21]. Apart from firewood, low-calorie bio-gas obtained by recycling of residual biomass can be used for partial supply of rural regions with fuel.

By recycling of biomass and implementation of modern energy-efficient technologies of firewood burning, as well as the use of other non-traditional renewable energy sources, it can be possible to additionally save about 70-100 mln. m3 of imported natural gas and to resolve the acute environmental problems related to uncontrolled wood-cutting in the next several years. By recommendation of the EU, Georgia must ensure the use of energy-efficiency measures and non-traditional renewable energy sources, and implementation of respective policy[22].

The protectionist state policy of development of non-traditional renewable energy sources and implementation of energy-saving measures is a proven method in international practice. Such a policy, as well as the correct planning and replacement of natural gas by alternative fuel under proper conditions, in accordance to the existing potential and international practice, allows to minimize the financial expenses and significantly save fuel resources of the state, namely, the imported natural gas.

[18] Check against delivery. Industry Advisory Panel Communication to the Energy Charter Conference (Draft), Brussels, October, 2012

[19] G.Buachidze, O. Vardigorelli, N.Tsertsvadze. Country Update from Georgia. Proceedings World Geothermal Congress 2000, Tokyo, 2000 and Thermal Waters of Georgia, Georgian Geothermal Association, 1998

[20] G.Buachidze, O. Vardigorelli, N.Tsertsvadze. Country Update from Georgia. Proceedings World Geothermal Congress 2000, Tokyo, 2000 and Thermal Waters of Georgia, Georgian Geothermal Association, 1998

[21] In-depth review of the energy efficiency policy of Georgia 2010, Energy Charter Protocol – PEERA, Brussels, 2011

[22] In-depth review of the energy efficiency policy of Georgia 2010, Energy Charter Protocol – PEERA, Brussels, 2011

1.4. Transport Infrastructure

The main principles of security of energy supply include:

- Availability of special (state or industry-owned) reserves of energy resources[23];
- Diversification of supply sources and routes;
- Construction of new transport infrastructure, including pipelines connecting various systems (interconnectors);
- Preliminarily agreed contracts on continuous supply with suppliers, for gas supply of socially vulnerable consumers;
- Measures ensuring fuel switching in crisis situations;
- Preparation and ensuring execution (if required) of emergency response plan;

Realization of these principles is facilitated by transition to liberal market conditions and integration into regional structures, correct planning of strategy to increase of reliability of infrastructure functioning and implementation of respective works, including:

- Increase of system reliability of transport infrastructure through rehabilitation-development of main gas pipelines and modernization of their operation means and methods;
- Diversification of supply sources by ensuring corresponding technical facilities (trans border pipelines and off-take points) and long-term contracts with suppliers;
- Preparation of the internal market for liberalization and respective adjustment of the governing law;
- planning of strategic facilities, including pipelines connecting various directions and supply sources (interconnectors) and the underground gas storage, as well as diversification of energy types for the purpose of providing the remote and mountainous regions with various products of gas transformation (LPG, CNG) and oil products having compact and high calorific value.

Considering the increasing export potential of Azerbaijani gas and the capacity of transport infrastructure of supply (see the Table), the strategic mutual cooperation established with our country in the area of energy and the existing political-economic realities, Azerbaijan is considered to be the priority source of gas supply to Georgia. Georgia receives the Azerbaijani gas from Shah Deniz field from the South Caucasus Pipeline (SCP), while the gas produced by other fields and owned by "SOCAR" is transported by Azerbaijan-Georgia main gas pipeline system.

Forecast of production, local consumption and export of Azerbaijani gas[24], bcm/y

Source	2012	2015	2017	2020	2025
SOCAR	7	7	7	7	7
ACG (existing)	3	3	3	3	3
ACG (deep horizon)[25]	-	-	-	2 (?)	5-7 (?)
Shah Deniz (Phase I)	8	9	9	9	9
Shah Deniz (Phase II)	-	-	-	11	16
Umid etc.	-	1	3	4	5
Total production	18	20	24	34	40
Total local consumption	9	9,9	10,4	11,4	13,2
Total export	9	10,1	13,6	22,6	26,8
Export via Georgia	4,5	6	8 (9?)	16 (20?)	22 (27?)

[23] It is mandatory in accordance with requirements of the 3rd Energy Package of the European Community

[24] AGRI Feasibility Study, Progress Meeting Presentation by Penspen Group, September 22, 2012 with consideration of SOCAR's Comments by 17.10.2012

[25] According to BP, negotiations for initiation of gas production from this field, as well as Absheron field from 2020 are held at the VI Caspian Oil and Gas Trading and Transportation Conference (Baku, October 2012). Source: http://www.trend.az/capital/energy/2077577.html

Facilitation of significant transit projects and restoration-development of energy links with neighbor countries ensures diversification of supply to Georgia of energy resources from new supply sources and routes.

Significant facilitating factors are established for implementation of new oil and gas main transit pipeline construction projects via the Georgian territory. Various alternative projects of supply of the gas of Azerbaijani and Central Asian fields to Europe via the South Energy Corridor are actively considered and processed, which will ensure the further diversification of the European market and minimize the negative effects of the possible dictate of monopolist producers[26].

It is intended to deliver the natural gas from Shah Deniz field in Azerbaijan and later possibly natural gas of the Central European countries to the Balkans, South and/or Central Europe via the South Corridor (see the drawing), through the South Caucasus Pipeline (SCP) System passing through the territory of Georgia and the planned pipelines (TANAP, NABUCCO West, TAP)[27]. Construction of Trans Caspian pipeline (TCP) is planned for the purpose of delivery of the Turkmen gas via this route.

Figure 5. Southern Gas Corridor

At the initial stage, the increasing export volumes of gas will be connected to these pipelines via the South Caucasus Pipeline System and after the post-supply increase, Expansion of the SCP system is planned on the Azerbaijan-Georgia territory, by construction of a parallel pipeline and additional compressor stations, which will ensure increase of its annual throughput from the current 8-9 to 22-24 billion m3. The managing consortium plans to start the works in 2013 to the intent and effect that by the moment of completion of Shah Deniz field Phase II, the pipeline must be ready for unhindered transportation of increasing volumes of gas.

According to the forecast (see the Table above), after development of Shah Deniz field Phase II and putting the South Gas Corridor into operation, supposedly, from 2018, the volume of gas received for transit through the South Caucasus Pipeline and gas received additionally, at reduced tariffs may be equal to annual 1300-1600 mln. m3.

[26]Dependence of EU on import achieved 90% in case of oil, about 64% in case of natural gas, and 40%i in case of coal

[27]T.Gochitashvili, T.Javakhishvili, Oil and Gas Trunk Pipelines, “Meridiani”, Tbilisi, 2012

Azerbaijan-Georgia-Romania Interconnector (AGRI LNG) project is considered as one of the possible options of delivery of Azerbaijani gas to the European market. It envisages construction of an LNG (Liquefaction

Natural Gas) terminal at the Georgian Black Sea coast and transportation of the produced gas to the coast of Romania by tankers, where off take-regasification and distribution systems will be arranged. For implementation of AGRI LNG project, it is planned to construct a new off-take point connecting the SCP to the Georgian trunk pipeline system and Vale-Vani high-pressure pipeline (interconnector) connecting to the western branch of trunk pipelines on the Georgian territory. Another option is to use the existing East-West trunk pipeline, after rehabilitation-reconstruction from Azerbaijan border to the gas liquefaction plant located on the Black Sea coast.

Transit of Russian gas to Armenia is carried out through the North-South Gas Pipeline (NSGP). The pipeline is operated by GGTC. Rehabilitation works were performed on the pipeline with financial assistance of MCG (Millennium Challenge Georgia Fund) in 2007-2010. The reliability of system functioning increased and technical losses of gas were minimized as a result of rehabilitation. In addition, the pipeline throughput capacity increased from annual 5 billion m3 to about 8 billion m3. 1,609 mln. m3 of gas was transited to Armenia by the pipeline in 2011. The forecasts for 2012 envisage supply of pre-crisis volumes, about 2 billion m3 of gas.

Stage-by-stage restoration-development works of the Georgian trunk pipeline system have begun. Construction of Gardabani-Navtlughi, Navtlughi-Saguramo and Senaki-Poti sections has been completed. Construction of a new, approx. 76 km pipeline from Kutaisi to Senaki, via Baghdati, Vani and Abasha municipalities, is under way. Construction of new sections will facilitate continuous supply of natural gas to the Western Georgian regions, city of Poti and the Free Industrial Zone and resort-recreational zones of the Black Sea coasts.

It is planned to perform restoration-reconstruction works of about 200 km section of Saguramo-Kutaisi main gas pipeline, which envisages replacement of the existing 500 mm sections and use of high-pressure (55 bar design pressure) pipelines (DM = 700 mm) along the entire length. The pipeline represents the only source of gas supply of the western regions of the country connecting the East and West Georgia. Reconstruction of the section will be performed stage-by-stage. Designs of the part of Zestaponi-Kutaisi and Saguramo-Vaka sections (total 72 km) have already been prepared.

Preliminary works to design and construction of Tabatskuri-Bakuriani Interconnector and unserviceable Rustavi-Sagarejo section of Kakheti circular gas supply system have been performed.

Implementation of projects for restoration-development of the east-west route of the Georgian main gas pipeline system, as well as Vale-Vani and other planned interconnectors, will lay the foundation for replacement of the dead-end design of the Georgian gas supply system by highly reliable network gas supply, which allows to switch the gas flows in critical situations for the purpose of ensuring guaranteed gas supply of any consumers and significantly increase the range of functioning and technological reliability of the unified gas supply system of Georgia. Environmental effect of the projects covers elimination of leaks from pipelines with expired operational lifetime and damaged pipelines and replacement of firewood by gas in the household sector . Besides the population will receive the cheapest fuel – natural gas, which may become a factor for significant saving of family budget and implementation of the state program for poverty reduction through stimulation of intensive development of production, and increase of the local employment level.

2. PROJECTIONS

2.1. Demand forecast

Georgian demand on primary energy resources is currently satisfied mainly by import. However the existence of rich hydro- and renewable energy resources, as well as certain prospects of exploration and development of coal, oil and gas fields, considering the priorities of the state energy policy and environmental protection, may become the basis for partial improvement of this situation in the nearest future.

In general, the demand on energy resources is correlated with the economic situation in the country. At the same time, it is significantly influenced by energy intensity per unit of product, consumption structure, population growth, mobility etc. The forecast of consumption of energy resources in Georgia is provided below, which is based on the forecasts of the Ministry of Energy, as well as the results of the surveys financed by the US Agency for International Development (USAID)[28], MCG[29] and OECD[30].

For planning purposes, the forecasted rate of growth of GDP in the country is considered at the level of annual 6%, which, on the basis of data of the International Monetary Fund, can be evaluated as a conservative reflection of actual growth (average annual 5-7% during the last 10 years) [31]. Initially, the average projected rates of energy demand growth were determined considering reduction of energy intensity (approx. 40% increase of energy efficiency) and GDP growth correlation coefficient 0,6, respectively (it should be noted that annual projected 3,6% increase of energy consumption adequately reflects the tendency of recent years (2006-2011) in power energy, when consumption increased from 7,8 billion KWh in 2007 to about 9,2 billion KWh by 2011).

According to the forecast, the cumulative demand of the country on primary energy resources will increase up to about 7 million toe in the current decade (see the Figure 6).

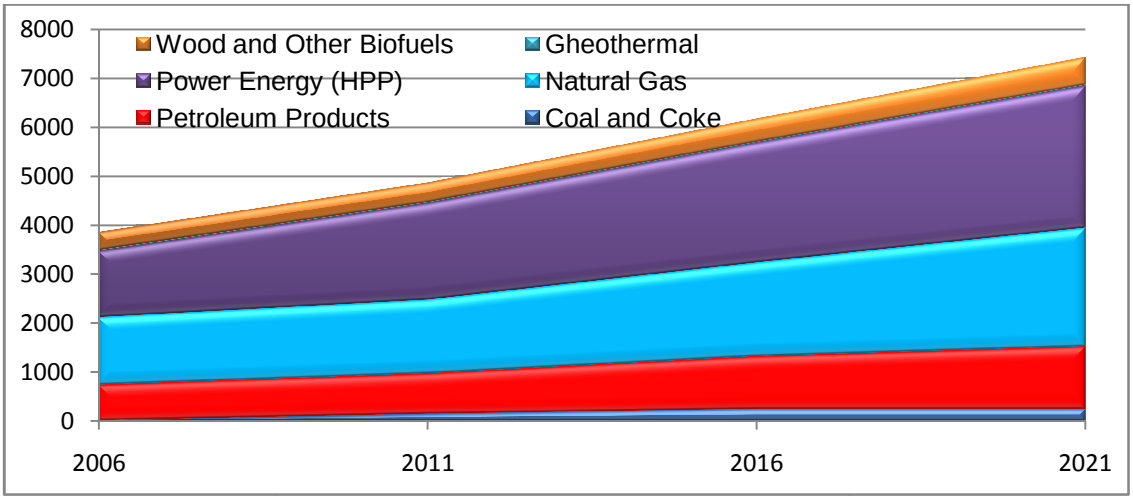

Figure 6. Forecast of growth of demand on primary energy resources, ktoe (*scenario of intensive growth of demand on gas)*

For gas consumption forecast, the so-called “down-up” method of the analysis was used as well, which determined the projected cumulative demand on the basis of forecasted demand of consuming sectors. In this analysis, the planned demand on gas by the industry, including the

[28] Natural gas strategy for Georgia, Part 1: Analyses and proposals, and Part 2: Economic and geopolitical context, USAID, 2006
[29] UGS Preconstruction design Study, Option Study, RAMBOLL, 2010
[30] Regional Power Transmission Extension Plan for Caucasus Countries
[31] Georgia’s Hydropower Potential, BoG, June 28, 2012

Free Industrial Zones and the urea plant under construction was considered. Demand on fuel for the pumping and planned compressor stations of the transit oil- and gas pipelines located on the territory of Georgia and the natural gas liquefaction plant (within the framework of AGRI LNG project) was not considered in the cumulative consumption balance.

Presumably, the dominant share of fossil resources in the entire energy balance, including the 30-33% share of gas, will be maintained in the future. However, the volumes of consumption will significantly increase, owing to comparative cheapness, ecological purity and simplicity of consumption of natural gas as compared to all other available primary energy resources. Relative cheapness of gas in Georgia in comparison with European countries is determined by proximity of supply sources and this tendency will be maintained in the future, which will facilitate the permanent growth of demand on gas.

On the one hand, existence of favorable preconditions for export of generated excessive peak power during the spring-summer flood period and on the other hand, the planned integration of the Georgian power system with the unified regional power system, are considered during preparation of forecasts. To fill the power deficit in winter, within 15-20% of the annual generation, the power can be generated by gas on TPPs. Accordingly, gas consumption in power generation, including the back-up gas turbine(s), will be equal to about 650-700 million m3 by 2020-2021.

Development of distribution networks planned within the state program for gasification of regions and significant increase of the number of consumers, predermine the growth of gas consumption in the household sector. According to the available information, the number of new consumers will be equal to 300,000 by 2021-2025. Also, the forecast of "Ramboll"[32] regarding the increase of the number of consumers by approx. annual 1% in 2013-2025 should be considered reliable, in accordance with the international practice. Considering the above as well as the natural growth rates of gas consumption by consumers, it is expected that gas consumption in the household sector of Georgia will increase from 445 million m3 in 2010 to at least 800 million m3 by 2020-2021. The evaluation made by GOGC in 2012 is more conservative. It considers growth of the household sector consumption by annual 2% until 2016, and by 1,5% thereafter. As a result, the estimated consumption will be equal to approx. 600-650 million m3 by 2020.

The forecast of gas consumption in the industrial and commercial sectors is based on the following considerations:

- Demand of the sector on gas will increase according to GDP growth rate;
- Gas price in Georgia will be maintained at the level lower than the European prices, which will provide an additional basis for production of competitive local products;
- Restoration of industry and development of Free Industrial Zones will be a facilitating factor for increase of gas consumption;
- Energy efficiency of production will be significantly improved, which is currently lower than in countries with developed economy;
- Preferred consumption of gas in comparison with alternative fossil fuel (coal, oil) will be ensured due to its relative ecological safety.

In the view of the above-mentioned, it is expected that during the current decade, gas consumption in the industrial sector of the country, without the demand of new, large industrial capacities, will be increased up to approx. 900 million m3/year. Estimations of GOGC, without considering the estimated consumption of Free Industrial Zones, practically coincide with this forecast and equals to about 1000 million m3.

[32] UGS Preconstruction design Study, Option Study, RAMBOLL, 2011

Accordingly, demand and consumption of gas in Georgia may increase from 1,6 billion m3 in 2006-2010 to about 2,5-3 billion m3 in 2020-2021 (see the Figure 7).

For guaranteed satisfaction of the forecasted demand and ensuring sustainable functioning of various sectors of economy and household sector of the country, under conditions of liberal, competitive market integrated into regional systems, it will be necessary to develop both the supply diversification and transportation-distribution and storage infrastructure, as well as to implement corresponding institutional and legislative changes in the energy sector in general, including the gas sector.

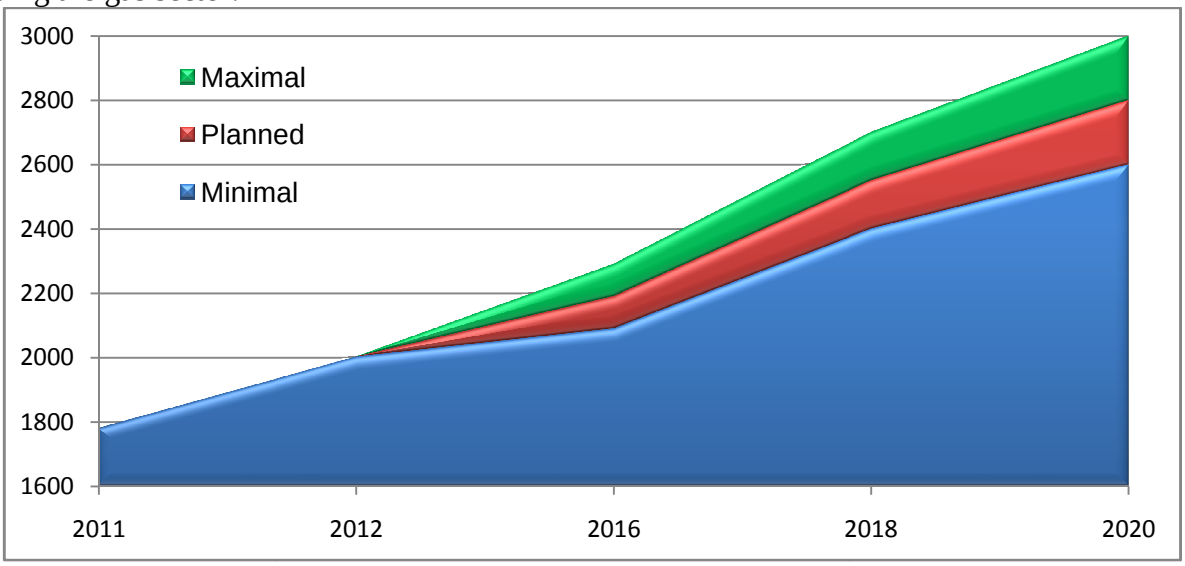

Figure 7. Demand on natural gas (million m^3/y) in case of various development scenarios

2.2. **Supply sources**

Supply of Azerbaijani gas from Shah Deniz field to Georgia is ensured on the basis of long-term contracts signed with the governing consortium, according to which the country can receive the gas as an in-kind payment for transit, proportional to the volume of gas transported by the pipeline (or corresponding monetary compensation) and supplemental gas supplied at preferential prices.

The terms and conditions of supply of natural gas from Shah Deniz by the South Caucasus Pipeline are stipulated by Purchase and Sale Agreements of Option Gas (until 2067) and Supplemental Gas (until 2026), which were executed between the companies established for gas supply (SCP Option Co & AGSC) and JSC “Georgian Oil and Gas Corporation”.

According to the forecast, the option and supplemental gas volumes will be significantly increased after development of Shah Deniz Phase II, up to 1300, and further possibly, up to 1600 mln. m3/year.

The Governmental Memorandum with Azerbaijan and the long-term, commercial agreements of strategic importance signed on its basis between the national oil companies (GOGC and SOCAR) ensure the guaranteed supply of additionally required gas together with the gas received from Shah Deniz field, for socially vulnerable consumers (household sector and power generation), provided that stable tariffs are maintained, during the entire current decade. The terms and conditions of the contract ensure the balancing of sharp seasonal difference between gas supply and consumption, which is problematic currently and is predetermined by absence of

gas storage in Georgia. The terms and conditions of import of additional gas volumes from Azerbaijan in case of existence of appropriate demand of the commercial sector are also stipulated. According to forecasts, cumulative volumes of gas received from Azerbaijan (without Shah Deniz gas and not considering the demand of SOCAR-owned urea plant), will be maintained at a stable level of about 1100 million m3/year, during nearly entire decade, with a significant reduction tendency after implementation of Shah Deniz Phase II (see the Figure).

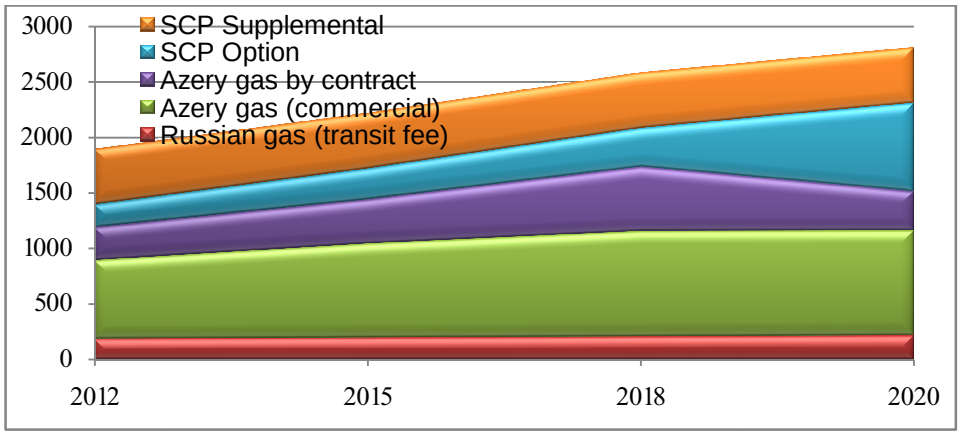

Figure 8. Forecast gas import volumes by supply sources, mln. m^3/year

According to the Agreement signed with the Russian "GasExport" (subsidiary of "GasProm"), the North-South Gas Pipeline operator company – "Georgian Gas Transportation Company" receives the fee for services provided for natural gas transit from Russia to Armenia in-kind on an annual basis. According to the forecast, in the period under consideration, the volume of gas received as a payment for transit of the Russian gas, will be maintained at a stable level of average 200 mln. m3/year.

It is possible to export the Russian gas at a market price, for instance, to satisfy the unforeseen demand of the commercial sector or under Force Majeure circumstances or to stimulate competition at the market. The latter may arise for the purpose of protection of the market from dictate of the monopolist supplier, the risk of which occurs in case of controlling more than 1/3 segment of the market by one economic entity, as shown by the international practice. As the analysis shows, such a risk will exist before the implementation of Shah Deniz Phase II project, when the gas volumes supplied by "SOCAR" will exceed the critical value. However, due to a rather high market price of the Russian gas, as well as against the background of strategic relations with Azerbaijan, neither political nor economic preconditions to import of gas from Russia at a commercial price will exist in a short- and long-term perspective.

Theoretically, the gas can be imported from Kazakhstan, Turkmenistan and Iran, via Russia, Azerbaijan or Armenia. Due to complexity of supply schemes and comparatively high cost, and in some cases, blockading of the transit routes by Russia (for example, for gas supply from Kazakhstan, for the needs of "KazTransGas-Tbilisi"), the possibility of gas supply to the Georgian market from these countries, for the short- and long-term period, is not discussed in this publication.
There is a minor potential of gas supply to the Georgian market, from locally discovered Rustavi and Samgori-Patardzeuli-Ninotsminda fields.

The middle Eocene sediments located at the depth of 3300-3600 m at Rustavi gas field contain gas. The volume of explored reserves (C1 + C2 category) equals to 6,7 billion m3.

2 gas deposits are discovered within Samgori-Patardzeuli-Ninotsminda oil and gas field. Lower Eocene sediments (depth 3600-4000 m) contain gas at Samgori Dome, while at Ninotsminda Dome, free gas in the middle Eocene sediments create a cap above the oil-containing rocks (depth 2450-2600 m). Gas reserves at Samgori Dome (C1) equal to 0.9678 billion m3, while freeing gas reserves in Ninotsminda (2P) equal to 0.4966 billion m3 total, the supply of explored free gas in the country (total of the former Soviet C1, C2 and the western 2P category) equal to 8,166 billion m3, while the forecast resources equal to about 180 billion m3.

In case of annual 1% production of the explored supplies, gas production in the country may be equal to about 82 million m3/year, but actually, due to the lack of investments, the license block operator companies are mainly focused on production of remaining oil from the operating fields and do not provide appropriate attention to exploration and increase of production of gas. According to the forecast, local production of gas, mainly from Samgori-Patardzeuli-Ninotsminda oil and gas field, may increase from the current 10-12 m3/year to 25-28 m3/year by 2015-2020. Gas production at local fields is sold at the market at a commercial price by auction.

There are certain prospects for production of non-traditional shale gas in Georgia[33,34], which is primarily connected with the wrinkled system of the lower Jura of the South Slope of Kavkasioni. Certainly, for the final evaluation, it is required to carry out a detailed survey to identify the possibilities of effective use of geological information and modern technologies, considering the accompanying ecological effects[35]. In the period under consideration, start of shale gas production in Georgia is unlikely.

2.3. Price forecast

Demand on any energy resource, together availability of supply, depends on its affordability for consumers based on the cost of the resource and its supply prices. Demand on energy resources determines significant changeability of prices by regions, which is preconditioned by local conditions, the possibility of fuel switching, availability and proper functioning of transport infrastructure, efficiency of consumption technologies etc. The gas sales price is influenced by its actual heat content and transportation costs, especially in the case of transportation at long distances. At the same time, there is a different situation in various gas importer countries, where sometimes the factor of using the gas as an instrument of political pressure by the dominant supplier influences the fair commercial gas price. Due to this fact, for example, the price of Russian gas in the Baltic states and Ukraine is higher than in the Central European countries located at a much longer distance from these countries, but loyal to the Russian external policy.

Because of the above-, unlike oil, there are no more or less equal market prices on natural gas in the modern world and it is significantly predetermined by regional peculiarities.

According to the forecast, gas price on the European market will remain comparatively high during the current decade[36], however under the conditions of full liberalization of market and increase of competition from 2016 (for the main scenario, or after 2022 – for the high prices scenario), similar to the North American market, the current practice of attaching the gas price to

[33] I.Shekriladze, M. Tevzadze, U. Zviadadze, Georgian shale becomes a strategic energy resource, Tbilisi, 2009
[34] M. Margvelashvili, Shale Gas – Challenge for Georgia, GIOGIE 2011, X International Conference materials, 2011
[35] Study of perspectives of production of oil and gas from shale in Georgia, GOGC, Tbilisi, 2011 (authors: T. Gochitashvili, S. Gudushauri, M. Khukhia, N. Bakradze and T. Lemonjava)
[36] Department of Energy & Climate Change (UK. Gov), Fossil Fuel Price Projections, www.decc.gov.uk, 2011)

oil price will be replaced by spot transactions at spot market price (at the level of about $(380-400)/1000 m3) and this tendency will be maintained in the future.

The forecast dynamics of whosale commercial gas price variation on the Georgian energy market looks promising at the level of preliminary estimations[37]. This is mainly predetermined by favorable geographic location of Georgia in the direct vicinity of producing regions, unlike the main consuming countries of Europe. Accordingly, the gas price will be below international market prices both traditionally and in the long term (at least by 50, as a rule, by 70-100 USD, due to minimal expenses of transportation and transit).

For the purpose of estimation, the average wholesale prices and conditional revenues of Georgia (state or state-owned companies) were determined, considering the volumes of import from the main possible supply sources (Russian "GasExport", Azerbaijanian "SOCAR" and Shah Deniz) to commercial and regulated sectors of the Georgian gas market.

The existing model of gas supply to the market considers providing service to intermediary suppliers, on the basis of contracts currently in force with "GasExpor", GGTC, "SOCAR" and its subsidiaries, BP-controlled Opton Gas Company (Option Co.) and Azerbaijan Gas Supply Company (AGSC).

According to the alternative scenario of direct (without intermediary companies) supply of gas to the market, deficit between the cumulative demand and the state-controlled resources (gas volumes received in payment for transit and purchased at preferential prices from "GasExport", Option Co. And AGCS are implied), is balanced by gas purchased at a comparatively higher market price.

The mean virtual tariff is calculated by subtraction of the possible revenues of the Georgian side (which Georgia will receive for every 1000 m3 of gas by gas supply directly to the wholesale market or through intermediary companies) from the cost.

The analysis shows that the current scheme of wholesale supply of gas, which includes the service of "SOCAR" and its subsidiaries to balance the market deficit, produces practically insignificant negative cumulative commercial effect as compared to the alternative scheme of supply. In turn, the terms and conditions of the long-term contract ensure guaranteed gas supply throughout the year and balancing of inequality between seasonal supply and demand, which is impossible to achieve with own efforts due to absence of the gas storage.

It is possible to reduce the wholesale price share in the final regulated gas tariff for socially vulnerable consumers in case the state (or state companies) revenues are reasonably minimized, by optimizing of the currently existing price markup (taking into consideration reasonable minimal expenses, including international liabilities) for gas volumes received as a payment for transit and gas volumes purchased at preferential prices. Rough estimations confirm the tariff regulation potential in this manner; however, a relevant political decision should be made for that (as such decision will be negatively reflected on the budget of the country and the revenues of the state companies operating in the sector).

Presumably, by the end of the decade, when the production by Shah Deniz Phase II, and corresponding volumes of transit via Georgia and the country's transit incomes will significantly increase, and Georgia will be able to manage the seasonal disbalance arising between demand and supply on its own, by means of an underground gas storage, it will be desirable to revise the

[37]For obvious reasons, only wholesale supply price is reviewed, which is regulated by market relations according to the legislation in force

terms and conditions of the contracts to maintain the tendency of fair distribution of revenues between the partners, considering the changed realias . In particular, as the international practice shows, direct supply of gas received in payment for transit and purchased at preferential prices, as well as gas owned by “SOCAR” (or other wholesale suppliers) to the domestic retail market at a commercial price, without intermediary agent(s) should be considered appropriate and in turn, the cost of gas and power energy should be significantly reduced only for actually socially vulnerable population (instead of comparatively small discounts for a wide range of so-called “social” consumers, whose identification criterion is not justified). In this case, conditions of a competitive market formation and significant increase of the state budget and revenues of the companies operating in the sector (GOGC, GGTC, SOCAR and other potential suppliers) will be ensured by the funds released from financing of consumers which do not need and do not deserve such discounts.

3. CHALLENGES AND PROBLEMS

3.1. Energy security

Georgia, like other developing economies, needs to satisfy the increasing demand on cheap energy resources, which can be ensured by reduction of dependence on imported fuel, use of new technologies based on development of energy-saving and renewable resources, further modernization of the sector structure, liberalization of market and its integration into regional structures.

Transition to the energy based on priority use of energy-efficient technologies and local resources, apart from political will, requires significant investments for proper arrangement of production, transportation and storage (reserve) infrastructure. At the same time, it should be mentioned that the complex and expensive transition process will be carried out under the conditions of deficit of the available capital, high unemployment level and extremely low living conditions of the population within the country, predetermined by the global crisis, which will prioritize mobilization of the state financing mainly in this direction, however, ensuring energy security will be maintained as one of the main goals of the energy policy of Georgia as the net importer of energy resources.

Despite the fact that a certain progress was achieved as a result of institutional and legislative reforms implemented within the recent years for modernization of the country's energy sector, the energy intensity of economy is still much higher as compared to the leading industrial countries, and the process of full liberalization of market and its integration into regional structures is not finalized yet. As a result, the energy security of Georgia may face certain challenges in certain situations, due to fragile political stability of the region and high likelihood of economic sabotage.

Strategic energy priorities of independent Georgia were developed yet in the 1990s, within the framework of the European Community "TACIS" program[38]. The economic situation and ambiguity of the future political orientation of the country of that period resulted in many uncertainties and complicated the correct forecast of future energy development tendencies for the average and long-term period. The recommended policy was mainly oriented at restoration of the existing energy system, inherited from the Soviet period. Besides, naturally, it could not reflect the significant political and economic processes of the following period, which was connected with development of international transit projects in the region and replacement of the dominant north-south vector of the energy transport flows through Georgia by the east-west priority route.

With the assistance of the US International Development Agency (USAID), the Georgian gas sector strategy was prepared in 2006, in which the tendencies and priorities of the current period were included for the purpose of ensuring energy security of the country[39]. The publication focuses on the prospect of providing the country with safe and available energy resources using purely commercial methods, sources of natural gas supply to markets, prices, transit pipelines, strategic storage and other infrastructure, as well as various economic and geopolitical factors affecting reliability of gas supply of Georgia. It is emphasized that as the country is and will remain dependent on supply of expensive imported gas in long term, formation of monopolist structures in the sector by accumulation of the main activities and infrastructure under the control of one company or alienation of strategic infrastructure, should be prevented through

[38] Georgian Energy Policy, EC TACIS/EGE001, 1995

[39] Natural Gas Strategy for Georgia, Part I: Analyses and Proposals by Paul Ballonov, Part II: Economic and Geopolitical Context by Teimuraz Gochitashvili, USAID, 2006

harmonization of the market rules with the international laws and full liberalization of market, but only after achievement of preconditions for competitive market (diversification of sources and routes, supply reliability etc.). Besides, it is recommended to replace the gas by local renewable, namely, rich hydro resources to a maximum extent for the power generation needs.

The main directions of the state policy were developed and approved for the Georgian energy sector in 2006[40], which stipulated the following goals:
a) Providing the industrial, household and commercial consumers of the country with electricity, by maximum utilization of local hydropower resources, initially, replacement of import by local production, and later replacement of produced local thermal power. At the same time, rehabilitation and technical improvement of the existing infrastructure and generation facilities, and further, construction of new ones were considered as priorities at the first stage; b) diversification of supply of imported resources; c) expediency of use of other local renewable resources (wind, solar, geothermal) and d) integration of the country's energy sector into the regional one, by development of the connecting infrastructure, market liberalization, deregulation and introduction of simplified rules.

According to the evaluation of" International Transparency Georgia"[41], the document identifies only a short-term policy. Besides, the cumulative demand of the country on primary energy resources is not established and accordingly, the role of alternative renewable energy resources and traditional biofuel (firewood) in the energy balance remains unclear. There are no standards on maximum limits of hazardous emissions established by the law in the country, which makes the prospects of use of local coal during power generation uncertain. The document generally recognizes the critical importance of increasing the energy efficiency but does not consider it as a priority issue and does not plan relevant legislative changes in the country's legislation.

Besides, due to the global economic crisis, the Russian military aggression and other obstacles, attraction of investments and restoration and development of the industry were significantly restricted, which led to significant reduction of the planned demand on fuel resources (for example, under the main directions of the state policy in 2011, cumulative gas supply to Georgia was planned in the volume of 3.5 billion m3, while according to the gas sector strategy the planned volume was about 3 billion m3, instead of the current 1.8 billion m3) and accordingly, all previous forecast became irrelevant.

After serious deterioration of relations with Russia within the last five years, the situation became significantly complicated in the energy sector of the country. In particular, in winter of 2006, Georgia faced the danger of the strongest social and political catastrophe after explosion of two main feeding pipelines and high voltage power transmission line on the Russian territory. Besides, by imposing the highest price on gas ("political price", which was about 30% higher than the price of gas supplied to Armenia, which receives gas via our territory and logically, the price of gas left to us as payment for transit should be added to the price) in the South Caucasus on Georgia by Russia"greenhouse conditions" were created for the enterprises operating in Armenia, which were governed by Russian companies. This strongly restricted the competitiveness of Georgian companies producing the same products. For example, due to the fact that cement, metallurgical and chemical plants and TPPs of the neighbor countries were receiving fuel and raw materials (gas) much cheaper, foreign products occupied unacceptably large segment of the Georgian consumer market, while the price on imported power became cheaper in comparison with the price of power generated by own TPPs.

[40] Main Directions of State Energy Policy, Resolution of Parliament of Georgia, June 7, 2007
[41] Georgia's Energy Policy, Transparency International Georgia, December 17, 2007

New understanding of energy security and the necessity of adjustments of the policy and action plans to realities were caused by the Russian aggression in Georgia in August 2008 and further developments. Additional risks emerged in regard to energy security of the country and implementations of prospective transit projects were outlined.

It is possible that, Russia will try again blocking the energy transit routes through Georgia to maintain the monopoly over the export of Caspian resources. In such a situation, political decision-making and facilitation of relevant measures for the purpose of integration of the country into regional structures and maximum involvement into international transit projects, including, through harmonization of the existing legislative framework with the international legislation in the energy sector, acquires particular importance.

Besides, the situation developed in the world economy in the recent period, including sharp increase in hydrocarbon prices, natural and technogenic disasters and negative impacts of the global warming required immediate reorientation of production processes and commercial and household sectors to energy-efficient technologies and energy-saving measures.

On the other hand, by completion of construction of high voltage power transmission lines connecting with the neighbor countries and rehabilitation-modernization of significant part of power generation facilities, initiation of local hydropower generation projects[42], providing alternative sources and routes of gas supply from 2007 and arrangement of internal transport infrastructure, existence of long-term and favorable contracts with suppliers, as well as due to necessity of balancing seasonal consumption of fuel resources, preconditions are created for renewal of strategy and ensuring energy security of the country for planning measures.

Energy vulnerability is used internationally practice for assessment of energy security[43]. Energy vulnerability is defined as the level of negative impact of possible exogenous harmful factors affecting the country's energy supply system on welfare of the population and/or territorial integrity of the state or normal functioning of institutions[44]. In this regard, it is important to identify the potential risks and threats affecting energy vulnerability and respectively, energy security in general (see the Table) and particularly, for Georgia.

Table: General classification of risks and threats

	Risks	**Threats**
Short-term	**SR1.** Emergencies and natural disasters	**SR1.** termination of supply (by supplier or transitr country)
	SR2. Insufficient storehouse volumes/stored supplies	**SR2.** blockade/ban (by a rical or hostile countries)
	SR3. Sharp change of prices due to disbalance between supply and consumption	**SR3.** diversion/attack on a critical infrastructure facility
Long-term	**LR1.** Insufficient investment in production or transport activities	**LR1.** Transfer of strategic energy assets to a foreign country
	LR2. Unstable demand in the importer and/or exporter country	**LR2.** Risky cessions (agreements) with foreign partners
	LR3. Insufficient supply in the exporter country of at the global scale	**LR3.** Inadequacy of energy policy

[42]Gas supply from Azerbaijan is ensured from Shah Deniz field by the South Caucasus Pipeline, and from the State Company "SOCAR"-owned fields by Azerbaijan-Georgia main gas pipeline system

[43] Christie, E. "Energy vulnerabilityand EU-Russia energy relations", Journal of Contemprorary European Research, Vol. 5, No. 2, August 2009, pp. 274-292

[44] Energy vulnerability defined as "The extent to which adverse exogenous events with respect to country's energy supply system may detrimentally affect the welfare of population and/or integrity of the State, its territory or its institutions" (Christie, E. 2009)

Results of risk assessment in the Georgian natural gas sector are provided below, using the following conventional five-score system.

Table: Risks and Threats predetermining energy vulnerability

Risk/ Threat	Insignificant (1)	Low (2)	Average (3)	High (4)	Critical (5)
SR1					
SR2					
SR3					
ST1					
ST2					
ST3					
LR1					
LR2					
LR3					
LT1					
LT2					
LT3					

As it seems, occurrence of the most critical situation in gas sector may be related to absence of strategic supply, which predetermined particularly low level of the system elasticity, while the country is almost entirely dependent on imported fuel and gas has the leading role in the energy balance together with imported oil products. Construction of the strategic gas storage and providing solid reserves of oil products are adapted means of mitigation of such risk in the international practice and are stipulated in the EU legislation requirements (the requirement on necessity of strategic supplies for the European Community countries will become effective from January 1, 2023[45], while for the main EU member states, such norm is already in force). Efficient means of mitigation of short-term risks is ensuring replacement of fuel on strategic and socially vulnerable energy facilities (for example, gas by liquid fuel, including from strategic storage).

The likelihood of critical situation is rather high due to emergencies and natural disasters, transfer of strategic infrastructure to foreign companies and long-terms risky agreements concluded with foreign partners. The above-mentioned is predetermined by peculiarities of the Georgian landscape and low reliability of the part of main pipelines (because of their age), concentration of main distribution facilities in hands of foreign state companies (“SOCAR”, “KazTransGas”) and difficulty of foreseeing the consequences of long term agreements concluded with them.

Increasing the systemic reliability of infrastructure by use of interconnectors and on the basis of effective rehabilitation/reconstruction of the existing transport and transborder systems on the one hand, and further liberalization and opening of market by means of legislative initiatives against formation of structures facilitating real competition and monopolist structures, on the other hand, may become the most real instrument for reduction of the above risks and threats.

In the course of elaboration of energy development strategy, priority should be given to development of local, primarily renewable, energy resources and increasing the energy efficiency, as well as further rehabilitation and development of trans border infrastructure, which will ensure diversification of energy types and sources , as well as supply routes. Such strategy

[45] Directive 2009/119/EC 14/09-2009, imposing an obligation on Member States an obligation to maintain minimumn stocks of crude oil and /or petroleum products

will minimize the possibility of negative impact of average and low vulnerability factors (see the Table) on normal functioning of the market. At the same time, it should be necessarily considered that the high likelihood of emergencies connected natural (and not only) disasters contains critical risks and threats for the priority hydropower sector of the country[46], possibility of asymmetric seasonal utilization, possession of significant strategic facilities by foreign companies etc. Accordingly, stabilization of generation and transmission systems by back-up mainly gas fired generation and ensuring parallel operation with the systems of neighbor countries by means of connecting transmission lines should be considered as the priority direction of increasing sustainability of energy systems together with the further deregulation of market.

3.2. Legislation and regional integration

Georgia has chosen the path of integration into the European political and economic structures. Accordingly, one of the primary goals of the energy policy of the country is to achieve similarity to the EU energy policy principles and directions through harmonization of the relevant legislation.

The process of harmonization of legislative and institutional structures intensively began since 2004, after Georgia joined the EU Neighborhood Policy and later the Eastern Partnership Program[47]. In November 2006, the so-called Road Map was adopted within the extended energy cooperation with EU[48]. One of the main reference points of the road map is convergence of energy markets on the basis of domestic energy market principles while considering peculiarities of the partner countries. The long-term objective is to create integrated regional energy markets and their maximum integration into the domestic energy market of EU.

The process of market liberalization and harmonization with the EU energy legislation became particularly important after Georgia joined the Energy Community with the status of an observer in December 2007[49]. The main purpose of joining the Community is to implement the EU standards and regulations and connect Georgia to its unified energy network which will contribute to increase of the country's energy security and maximum development of its transit potential.

The integration process entered the new phase from 2010, after starting negotiations on association with the EU whose one of the main objectives is consistent convergence and harmonization of Georgia with the principles of establishing and regulation of internal markets of the EU energy sector.

The third platform of the Eastern Partnership Program "Environment, Climate Change and Energy Security" is focused on the 4 main directions of relations with partner countries[50]:

1. Basic structures and solidarity[51];
2. Facilitation of diversification of infrastructure, interconnectors and supply;

[46]Such disasters are especially risky for large-scale hydro power facilities, which are distinguished by high potential of possible harmful influence on environment during construction

[47]The Eastern Partnership Program unites 27 EU member states and 6 neighbour countries to the east: Belorussia, Ukraine, Moldova, Georgia, Armenia and Azerbaijan.

[48] Road map for the energy co-operation between the EU, the Littoral States of the Black and Caspian Seas and their neighboring countries, Annex 1, Astana, 30th November, 2006.

[49]The Eastern Partnership Program unites 27 EU member states and 6 neighbour countries to the east: Belorussia, Ukraine, Moldova, Georgia, Armenia and Azerbaijan (In January 2012 Georgia has been applied for full membership of Energy Community).

[50] The EU and its Eastern Partners: Energy Needs and Future Prospects, European Parliament, Directorate-General for External Policies, Policy Department, 2012

[51]Due to the position of Armenia and Belorussia, work has been postponed in this direction.

3. Facilitation of increasing energy efficiency and use of renewable resources;
4. Approximation of the legislative framework and energy policy.

600 million EUR are allocated for implementation of the program by the period of until 2014, including 175 million EUR for institutional arrangement, 75 million EUR for pilot projects, and the remaining amount for implementation of projects of 350 million EUR value within the framework of the Eastern Partnership Program.

Apart from the above, at the 2011 Summit of the Eastern Partnership held in Warsaw, it was decided to allocate additional funds within the framework of the European Neighborhood and Partnership Instrument (ENPI)[52], mainly through support of projects envisaged by INOGATE program, whose primary task is harmonization of regulatory frameworks, energy standards and legislation, support of energy efficiency and renewable energy.

Each partner country (except Armenia), despite its specific nature, plays an important role in ensuring the EU and international energy security (Georgia is considered to be one of the main routes of supply of oil and gas from Azerbaijani and Central Asian fields to Europe, which predetermined the particular interest of EU towards the country). Accordingly, a wide range of bilateral partnership is offered – from practically full integration of the market to comparatively "mild" relations on the basis of independent bilateral agreements. Despite the above, the EU wishes that all partner countries, without an exception, to ensure reflection of legal obligations related to the EU energy markets in the national legislation. Approximation and harmonization of the legislative energy relations with the European Community are considered as one of the main criteria for assessment of cooperation and reforms.

Georgia, together with the remaining partner countries, has an opportunity to obtain financing from multi-million support funds for strategic projects related to the country's energy security and formation of unrestricted and transparent conditions for market competition, which is allowed by implementation of the main principles of approximation-integration with the European energy market, considering the proper adaptation mechanisms predetermined by local specific nature.

Possible control of some key facilities of the energy sector by oligopolic structures and absence of direct land geographic border with the EU are the main barriers in successful resolution of the problem. Without political will and active support of the government of the country, which can be influenced by Georgia's geostrategic location and destructive actions of some neighbour countries due to this fact, the urgent process of integration with the regional and European energy markets may be unjustifiably prolonged.

The legal framework of the Georgian energy market and its comparison with the principles and legislation of the EU market, including the energy legislation package requirements are analyzed below[53].

The Law on Electric Power and Natural Gas is the main legal document governing the activities in the power and gas sector of Georgia. As compared to the laws on electricity and gas applicable in the EU member states, the Georgian law attached rather significant importance to definition of the roles and functions of the Ministry of Energy and especially, the Regulatory Commission, but does not describe the rules and conditions of electric power and gas markets. However, such approach can be considered more acceptable, since if the responsibilities of various state

[52] EuropeAid. Update on Eastern Partnership Implementation. EaP Summit, 29-30 September, 2011, Warsaw. http://eeas.europa.eu/easten/docs/2011 eap implementation en.pdf

[53] V.Jankauskas, T.Gochitashvili, G.Abulashvili, Development of Georgian Electricity and Gas Markets in Line with the EU Energy Policy, Georgian Economic Trends, GEPLAC, Quartelry Review, February, 2008

institutions are clearly defined, they can develop and/or approve the implementing provisions that will ensure sustainability and flexibility of market operation on the basis of clear and transparent principles[54].

Another main factor distinguishing the Law from European Directives can be specified as follows: the obligation of consumer protection and providing social services to socially vulnerable population by the state is not properly defined; the category of socially vulnerable consumers is not defined; specific target obligations of energy-saving are not defined; the supply activity is not properly specified and accordingly, competitive activities in Georgia are mixed with the monopolistic distribution activities; the requirement of unbundling of various regulated activities should include not only separation of accounting but also unbundling of management and operation (legal and functional unbundling) which may be followed by a requirement of ownership unbundling recommended by the European legislation at a certain stage. In general, the European legislation does not require mandatory ownership unbundling for distribution companies in gas sector, however, in case of division (financial, managerial, legal), it recommends introduction of such additional regulatory mechanisms, which exclude possible market abuse.

"The main directions of Georgia' state policy in the energy sector" (2006) identifies the main objectives of the long-term energy policy. The document also defines the schedule of consistent market opening for competition, which is desirable to consider the relevant provisions of the 3rd Energy Package of the European Community, which may become mandatory in case of compliance with the requirements of the European Union Association Agreement and/or joining the Energy Community. At the same time, it is desirable to reflect the terms and principles of energy market opening in a corresponding law, similar to the EU directives, which ensures more guarantees for potential investors.

Formally, various types of activities are unbundled on the Georgian energy market (except retail supply and distribution). As a rule, operational activities and financial accounting of companies providing different services are separated from each other. However, they may have the same owners (state agency and companies, "Telasi", "SOCAR" and subsidiaries), unlike the recommended European model.

For example, in case of "KazTransGas-Tbilisi" and other distribution companies, the same company controls both the distribution and supply activities, which may be considered as gross deviation from competitive market principles. The European legislation, for instance, identifies independent licensed suppliers who have a right to purchase power from any supplier and sell it to any authorized consumer but they are not involved in distribution, which allows differentiating the competitive (supply) and monopolist (distribution) activities and avoiding cross-subsidization of these two activities. Therefore, legal and functional separation is necessary in this case. However, it should be necessarily mentioned that the activities covered by law on the Georgian market include the obligation of transit of a third-party-owned gas through the network of the distribution licensee and govern the technical, commercial and financial issues related to it, partially compensating for the existing inconsistency.

Only the actual separation of retail supply and distribution activities will create favorable conditions for most retail consumers to conclude direct contracts with any suppliers and take care of optimization of retail supply and distribution tariffs.

[54] T.Gochitashvili, M.Krakauskas, G.Abulashvili, Georgia in the context of EU energy policy, GEPLAC, Georgian Economic Trends, Quarterly review, June 2006

Significant role will be played by proceeding with the policy of reasonable privatization of state-owned power facilities and facilitation of formation of the private ownership institute in the sector. At the same time, it is required to make balanced and transparent decisions in the process of privatization of energy infrastructure facilities of strategic importance.

Elaboration of a clear guidance (Instructions) on change (selection) of a supplier by consumers, quality of service and procedures of review of consumer claims should become mandatory by legislative requirements, as accepted in the international practice.

On the basis of comparison of the European energy market legislation with the Georgian energy legislation, their implementation possibilities on the local market can be identified. Generally, the main purpose of EU Energy Directives and Regulations are to establish a competitive energy market, with agreed tariffs, which will facilitate the cross-boarded energy flows, free trade under conditions of maximum transparency, continuous and non-discriminated third party access to infrastructure, energy security of each country and the entire Energy Community.

The analysis shows that current Georgian legislation does not fully correspond to the main provisions of the Directives, some of which are completely new to the Georgian legislation and require detailed and comprehensive study for preparation of final recommendation for their introduction.

In case of association/integration of Georgia with the relevant structures of the European Community, the country must necessarily consider such possibility as well as exemption from several requirements of the Regulation for earlier signed international (e.g. transit) agreements and the right of non-application of this norm to such projects whose regulation is beyond its competence (for example, SCP, BTC etc.).

In addition, it is important for Georgia to reserve the right negotiate with stakeholders and the types and amounts of transit tariffs (including, in-kind compensation) separately, for each new project, as the European legislation practically annuls the concept of transit payment and does not consider the political consequences of implementation of new transnational projects for Georgia.

Probably, Georgia will continue the process of harmonization with the EU energy legislation and achieve the positive results brought to Europe by market liberalization. But as the analysis shows, there are certain inconsistencies in the institutional arrangement and the governing legislation of the energy sector of the country in comparison with the requirements of the corresponding European regulations and their preparation for painless adaptation is a rather serious and urgent task. The problem mainly concerns the identification of legal mechanisms for maintaining beneficial conditions of the existing transit projects, issues of effective differentiation of competitive and monopolist activities on the energy market etc.

3.3. Major investment projects

Under the conditions of supply diversification, particular importance is attached to the maximum development of potential of various sources and ensuring independent receipt of gas of different quality by all main large consumers and increasing the structural reliability of the system. For this purpose, it is necessary to continue stage-by-stage reconstruction and development works on the main pipelines of Georgia. Short term, priority projects include interconnectors for interconnection of different routes of the main pipelines of Georgia and rehabilitation of critical sections of the East-West routes (see the Table).

According to the contract, receipt of gas from the South Caucasus Pipeline is almost equally distributed throughout the year. Therefore the optimal utilization of the received gas represents a complicated technical-economic problem, due to acute imbalance of consumption during the winter-summer seasons and lack of storage capacity for seasonal excess or deficient gas. Currently the problem is resolved by the Governmental Memorandum signed with Azerbaijan and the long-term agreements signed between "SOCAR" and GOGC on the basis of the Memorandum on guaranteed supply of required amount of gas for socially important consumers (household sector and power energy).

In the long-term, after completion of Azerbaijanian Shah Deniz Phase II development, the transit flows through Georgia and the volumes of gas of the respective countries will be significantly increased (up to about 1,3-1,6 billion m3 in 2018-2025), provided that they are supplied practically equally during a year.

Provided that the country is largely dependent on import of the main fuel resources, an underground gas storage is one of the integral attributes of storing strategic volumes of energy resources and ensuring energy security. Besides, the use of storage is the best and the cheapest means of regulating the seasonal disbalance between gas supply and consumption. Under the conditions of liberalized market, when a certain segment of consumption is satisfied by gas received on the basis of spot transactions, the gas storage acquires the function of a commercial facility and allows to receive significant additional revenues from commercial activities, when any supplier or consumer can purchase and store gas any suitable time and use (or sell it at a higher price) as appropriate.

Besides, providing strategic supplies of fuel is necessary for TPPs, as well as any energy facilities operating on gas and consumers for their unhindered use in critical situations, and for more efficient planning of rational use of water stored on HPPs with water reservoirs (despite the fact that the obligation of ensuring 10% of reserve, annual consumption for large suppliers and consumers is introduced at the legislative level).

Priority investment project includes construction of reserve generation means of renewable energy facilities operating on gas, which ensure compensation of inequality related to climatic seasonal changeability of hydro- and further, wind energy.

Estimations of recommended investment projects provided below, include strategic infrastructure expenses, which should be covered by the state, or state-owned companies (with own funds or funds attracted under various programs). It should be mentioned that the proposed investment priorities, namely, development and improvement of strategic reserves, transboundary and internal transport systems, mainly interconnector projects (together with facilitation of measures of formation of a competitive and integrated market based on the 3rd Energy Package), are recognized as priorities according to the EU foreign energy policy, which significantly simplifies their coverage from international preferential funds.

The Table shows the budget of the gas sector and related significant investment projects. For obvious reasons, the budget of particularly large projects specifies only direct costs, which include the cost of purchase and construction (installation) of equipment only. The investments required for construction and development of infrastructure envisaged by large international projects planned on the territory of Georgia are not included as well. These investments will be mainly provided by consortiums established for implementation of the project.

Table. Assessed valuation of investment projects, mln. USD[55]

Investment project	2013-2016	2017-2021
Interconnectors		
Tabatskuri-Bakuriani (300 mm, approx. 20 km)	15-16	
RusTavi-Sagarejo (300 mm, approx. 25 km)		
Vale-Vani (700 mm, approx. 70 km)		20 (80:4)[56]
Rehabilitation and development of main pipelines		
Saguramo-Gori-Vaka (700 mm, approx.100 km)	160-165	
Vaka-Kutaisi (700 mm, approx.100 km)		
Azerbaijan border - Gardabani (700 mm, approx.18 km)		
Sujuna - Batumi (300 mm, approx. 95 km)		
Tsiteli Khidi – Marneuli (500 mm, approx. 22 km)		
Compressor station		43
Underground Gas Storage (preparatory works and the I stage of construction)		200-250
TPPs (reserve renewable energy 100-125 and/or 200-250 MW gas tourbines)	100-120	
Total investment	175-180	363-433
Average annual investment	55-60	60-75

[55] For large investment projects, only "net" cost of equipment and construction ("overnight erected" costs) is used and the specific variable expenses of the project implementation are not considered, such as: cost of land, management, financing, insurance, escalation expenses and loan interest during construction, expenses of connecting pipelines and high voltage power transmission lines, substations etc.

[56] The Table shows the ¼ of the estimated cost of the pipeline construction, as the issue of its construction will be actually raised in case of AGRI LNG project implementation and within its framework, which is planned to be implemented by joint efforts of the companies of 4 participant countries

4. MAIN PRIORITIES OF DEVELOPMENT

Natural gas is the cheapest, easily consumed and ecologically clean fossil-energy resource for Georgia. It is the cheapest and most flexible means of supplementing the renewable resources. Possibility of diversified supply of gas from various sources, including perspectives of liquefied and compressed gas, the existing and planned transport infrastructure potential for diversification of routes, ensure the high level of energy security of the country. Accordingly, the use of gas as the main fuel resource in the energy sector of Georgia of the transition period should be considered as one of the main strategic priorities of the state until implementation of costly investment projects based on local renewable resources.

As the analysis shows, demand and consumption of gas in Georgia may increase from average 1.6 billion m3 billion m3 to about 2,4-3,1 billion m3 in 2020-2021. For ensuring guaranteed satisfaction of the forecast demand and sustainable functioning of various economy sectors, energy and household sectors of the country, under conditions of liberal, competitive market relations (and market integrated into regional systems) further diversification of supply sources and routes as well as development of transportation-distribution and storage infrastructure, and implementation of institutional and legislative changes in the energy sector, including gas sector will be needed.

In the view of the global financial-economic crisis, significant and sharp increase of prices on energy resources, real hazards entailed by global warming and increasing demands of the Georgian transition economy, it is expedient to implement the following recommendations contributing to increase of the energy safety and sustainable development of the country:

- Preferential development of local energy, including rich hydro resources and formation of a stable and competitive market on their basis, should remain the main priorities of the energy policy of Georgia. At the same time, the high share of renewable resources dependent on climatic conditions in the energy balance will necessarily require formation of reliable systems of their back-up, for which the gas fired generation is most appropriate, together with infrastructural means of energy exchange with neighbour countries.

Maximum increase of energy efficiency in the consumer sector and the share of renewable energy resources in the energy sector, together with back-up systems based on the use of natural gas, is a direction of a significant potential, which is insufficiently developed currently. In case of adequate protectionist policy and information availability, foundation should be laid for development of secure and economically viable energy sector of the country on the basis of renewable resources, and in parallel, resolution of environmental, employment and generally, sustainable development problems should be ensured.

In general, support of protectionist state policy of development of renewable energy resources and implementation of energy-saving measures, approved in the international practice, , allows to minimize the country’s energy expenses and significantly save fuel resources, namely, expensive imported natural gas.

- significant means of increase of reliability of energy systems and commercial competitiveness is restoration/modernization of the existing transit and exchange energy systems and support of new projects connecting to the neighbour countries , which will resolve the problems of integration with regional energy systems in general and sustainable energy supply of Georgia in particular.

Facilitation of diversification of imported fuel supply, including through implementation of projects of oil and gas pipelines planned on the territory of the country, should remain as one of

the main priorities of the state policy for increasing the energy security of the country and the region and facilitation of the common economic rise.

Implementation of projects of restoration-development of the east-west route of the Georgian main gas pipeline system, as well as projects of planned interconnectors, will lay a foundation for replacement of the dead-end design of the Georgian gas supply system by highly reliable circular gas supply, which allows to switch the gas flows in critical situations for the purpose of ensuring guaranteed gas supply of any consumers and significantly increase the range of functioning and technological reliability of the unified gas supply system of Georgia.

- creation and rational planning of utilization of strategic reserves of energy resources will balance the possible inequality between the seasonal supply and consumption, significantly increase the energy security of the country and ensure significant mitigation of harmful influence of critical situations.

As a rule, response to the critical situations created in the Georgian energy sector was carried out immediately, which predetermined necessity of mobilization of unjustifiably high material and human resources and in some cases made it impossible to carry out absolutely adequate mitigating measures, which is more or less common for all countries with transition economy and is caused by deficit of free financial resources on the one hand and lack of experience in independent management of complex energy systems. At the current stage, together with providing strategic reserves, development of risk assessment and crisis management plans, considering the best international practice, and their implementation in case of occurrence of possible critical situations, should be considered necessary.

- Development of decentralized economy based on exploitation of autonomous sources of energy is an effective tool of ensuring economic growth and sustainable functioning in the mountainous, hardly accessible regions of Georgia. One of the options facilitating such solution may consider ensuring of supply of the regions not covered by the gas pipeline system (about 30% of the entire territory), with relatively cheaper, easily consumable and ecologically pure fuel – propan-butan (Liquefied Petroleum Gas – LPG), as well as gas conversion products (compressed gas – CNG for the transport sector consumers) instead of construction of expensive and economically unviable pipelines.

As the analysis shows, price of LPG in Georgia is among the highest prices, despite its proximity to the main supplier countries and accordingly, low transportation costs, as compared to other countries of consumer regions of the world. Regulation of prices on energy resources, including liquefied gas, is one of the functions and responsibilities of the state, by ensuring competition and planning of correct supply organization, despite deregulation of the respective market. At the same time, the expenses required for construction and operation of transport pipelines designed for supply of fuel to mountainous and hardly accessible regions, may be used for financing the population in case of correct organization of LPG supply.

- Construction of a small refinery for processing the locally produced oil (with modern, ecologically clean technological cycle) has a significant potential for optimization of prices on oil products. This requires relevant amendments to the applicable legislation for realization of local oil processing potential in a healthy competitive environment. According to the opinion of experts country's market of oil products, which is completely deregulated, requires certain initiatives, including legislative, by the state, for the purpose of prevention of cartel and other transactions restricting competition.

- For effective technological and financial management of gas flows of different origins and ownership under the conditions of diversification of supply sources, which creates a threat of

arising of certain legal risks together with significant difficulties of commercial nature, it becomes necessary to plan and implement works for improvement of relevant regulatory framework and their harmonization with the norms accepted in the international practice.

Clear and transparent legislative amendments for supply-distribution of energy resources and the market deregulation, harmonized with the institutional and international legislation facilitating healthy competition, ensure improvement of the investment climate and interest of investors, stimulation of wide participation of the private sector in energy sector, for the purpose of significant increase of the country's energy security. For this reason, it is required to actually separate the retail supply and distribution functions, which will be the best means of prevention of monopoly formation and facilitation of competition in the sector.

Besides, as the analysis shows, special efforts are required for drastic improvement of the market structure, obligations of public service and transparency.
Transparency of the political initiatives and decision-making process on the issues of import and transit of the main fuel resources, privatization or other forms of alienation of the state-owned assets, market liberalization and other strategically important issues under the conditions of wide publicity is one of the necessary conditions for sustainable development of the country, including ensuring energy and political security.

Georgia has taken a firm direction to European and Euro-Atlantic integration, which implies integration into regional structures as well. To achieve this goal, the main priorities after diversification of supply sources and routes should be infrastructure development, providing strategic reserves and harmonization of the legislation, with the final objective to establish an open and competitive market, similar to the EU market. Implementation of a European model of market liberalization and the main principles of the 3rd Energy Package in the energy sector with final aim of the successful implementation of the complex process of integration of local economy into Euro-Atlantic structures is vital.