Georgia's State Policy of Georgia on the Effective Utilization and Preservation of Energy

April 22, 2008

General overview

The share of energy in the Gross Domestic Product of Georgia is three times greater than in the developed countries of Europe. This means that energy costs per unit of product produced in Georgia are three times more than in the developed countries of Europe.[1] The current price structure on the international energy market further aggravates this indicator since Georgia is a net importer of energy. As a result of the high prices on energy, the expenditures of Georgian enterprises increase significantly, putting them in a very uncompetitive position vis-à-vis imported products on the domestic market as well as vis-à-vis potential exports.

The developed countries of Western Europe, which, like Georgia, are net importers of energy, have pursued strict energy efficiency and energy saving policies since the 1973 oil crisis. Such policies have greatly benefited European economies – these countries' GDPs have tripled since 1973, while their energy consumption has only risen by a third.

On June 7, 2006 the parliament adopted a resolution on the Main Directions of Georgia's State Policy in the Energy Sector, which defines the essence of the state energy policy and the ways and means of its implementation. In the main part of the document, energy policy objectives are prioritized. According to this document, energy efficiency and energy saving (e.g. the economical use of energy resources) are the major priorities of Georgia's state energy policy.[2]

The following are determined as the main goals of policy on energy efficiency and saving: 1. the reduction of energy consumption and loss in industrial and communal areas and 2. the examination and implementation of the measures necessary for creating cogeneration[3] systems and for the utilization of the renewable energy sources.

However, currently on the web page of the ministry, in the section of main directions of its activity (mission of the ministry), nothing is mentioned about the energy efficiency and saving. Omitting energy efficiency as an energy policy priority means that the ministry has not precisely ascertained what kind of energy efficiency policy should be pursued (or does not consider its implementation necessary).

Seventy-one percent of the energy consumed by Georgia today is imported. Natural gas comprises 47% of this figure and oil products another 24%. The high dependence on imported energy should constitute a natural incentive for the country to implement energy efficiency and saving policy and in

[1] This indicator is different for different types of enterprises. For example, 40% of the prime cost of a unit of glass produced by the JSC Mina falls to the energy component.
[2] The resolution outlines that the creation of the corresponding legislative and institutional framework is necessary for carrying out the energy efficiency policy.
[3] Cogeneration is the utilization of the heat generated during the production of electricity on the basis of natural gas for the purpose of warming the water, which is used for heating nearby buildings.

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doing so reduce its dependence on imports.[4] However the government is not yet paying attention to energy efficiency and energy saving, which can be explained by the fact the Georgian economy is still weak and the main part of budget revenues comes from sales of imported as well domestically produced energy in the form of various taxes: VAT, excise, and others.

At this stage it can be assumed that both the government and private domestic distributors are satisfied with the current energy consumption rate, which provides both the state budget and distributors with anticipated income from energy sales.[5] Such an assumption is based on another reality which was revealed as a result of this research: the main consumer of energy in Georgia is not industry, agriculture, or services, but the residential sector.

Energy efficiency and energy saving is one of four main directions of the EU energy policy, which is implemented by introducing new less energy intensive technologies and energy saving measures. Georgia, as part of the EU neighborhood, is step by step already harmonizing its energy policy with the EU member countries' energy policy. Thus the Georgian government has both foreign as well as domestic incentives to adopt and implement an energy efficiency and energy saving policy.

Foreign support in raising energy efficiency

Currently, there are two internationally financed projects focused on drawing the Georgian government's attention to the issue of energy efficiency. The first one is the Energy Efficiency Center, which has been functioning since 1998. It was created as a sub-project of TACIS through the financial support of the EU. Nevertheless, provided that a corresponding institutional and legislative basis does not exist thus far and the level of interest in this question is generally low, the Center merely offers recommendations and does not have real impact on energy policymaking.

The second one is Winrock International (a USAID subcontractor), which, since the end of 2007, has actively cooperated with Georgia's Ministry of Energy in the design and ways and means of implementing energy efficiency policy. Winrock International, together with the Georgian non-governmental organization World Experience for Georgia, has studied the current status of energy efficiency in Georgia. At present they work on the Law on Energy Efficiency for Georgia, which is to be submitted to the parliament in fall 2008.

Winrock International is also involved in the advisory work on the elaboration of new building standards for construction companies. The new standards will oblige the construction companies to use energy efficiency and energy saving technologies in their business.

In the end of 2007 the European Bank for Reconstruction and Development opened a 35 million USD credit line in TBC Bank independently from the state policy. The transition of Georgian

[4] The fact that nowadays the state receives considerable income from selling the imported, as well as domestically produced energy through added value taxes, excise and other taxes, impedes the development of the policy in this direction. Accordingly, the state is less interested in reducing the energy consumption index. The importing and distribution companies also have little interest in this.

[5] Georgia consumes exactly as much electricity as much it produces. The country would not be able to meet increased demand unless new hydropower stations were built or unless the country increased its imports. Currently the consumption is controlled by high tariffs – for last three years the demand on energy has not increased.

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industrial companies, among them, bakeries, breweries, bottling companies, among others, to energy efficient technologies has been financed by this credit line. Loans became available for construction companies and homeowners to build and furnish buildings and apartments according to the new standards meant to reduce the expenses on heating and cooling for owners through the thermal isolation of windows, walls, floors, and ceilings.

In addition, for the purpose of furnishing apartments through energy efficient technologies, a new micro credit line has been launched in the Microfinance Bank. The co-financer of this credit line is BP, which covers 15% of the credit given to each consumer.

The fact that EBRD and BP have been involved in promoting energy efficiency and energy saving in Georgia points out how important this topic is. In parallel to the credit lines it is expedient to undertake special campaigns meant for increasing public awareness of energy efficiency and energy saving in (the capital and in the regions), and the medium- and long-term benefits of such a policy to individual households and to the state budget.

Short background

In the Soviet Union attention was not at all paid to energy efficiency and energy saving. Prices on energy were subsidized, which stipulated practices of wasteful use of energy. During this period, maximum consumption of electricity reached 18 billion kilowatt/hr. The maximum consumption of natural gas was 6.5 billion cubic meters annually. The consumption of oil products amounted to app. 2 million tons.

At that time, the main consumers of energy were such energy and capital intensive heavy industries as Zestaponi Ferroalloy Factory, Rustavi Metallurgical Factory, Rustavi Chemical Factory, and the railway station among others. Since Georgia's declaration of independence its energy consumption has substantially reduced. In 2007 Georgia consumed 8 billion kilowatt/hr. of electricity, 1.8 billion cubic meters of gas, and app. 750 thousand tons of oil products. Currently, the per capita consumption of electricity and gas in Georgia lags considerably behind that of many developed countries, as well as some of the former Soviet countries. In 2007, 1,863 kilowatt/hr. of electricity and 427 cubic meters of natural gas were consumed per capita in the country. Such a drop in consumption was conditioned on the one hand by the halt of many old Soviet heavy industries and on the other hand by the drop in purchase power of the population.

During the last three years, the demand on electricity and natural gas has not increased, which some experts attribute to the existing high tariffs. Nowadays, the high tariff is the only means which limits energy consumption and thus the increase of demand on imported energy.

In the subsequent chapters, the energy efficiency and energy saving potential for Georgia are discussed based on the aggregate energy balances compiled by the Georgian think tank World Experience for Georgia, which uses data from the Statistics Department of Georgia.[6]

[6] This balance is approximate and may contain some inaccuracies.

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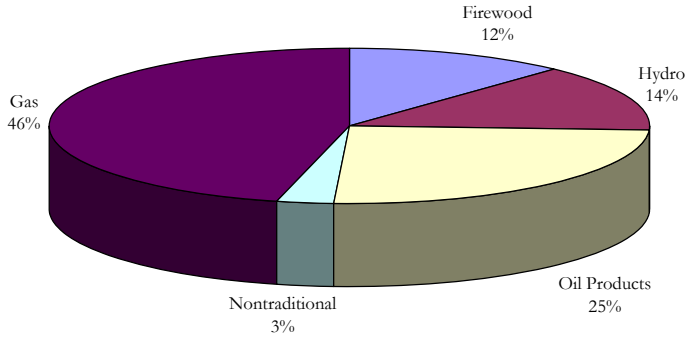
Energy consumption in Georgia in 2006

The Georgian NGO World Experience for Georgia compiled aggregate energy balance of 2006 by summing up the energy consumed by separate consumers.[7] This is the first attempt to set up an aggregate energy balance since independence. This balance is based on the data of the Department of Statistics and, correspondingly, its accuracy depends on how accurate the figures of the department are.

Graph 1: Supply of Primary Energy in 2006

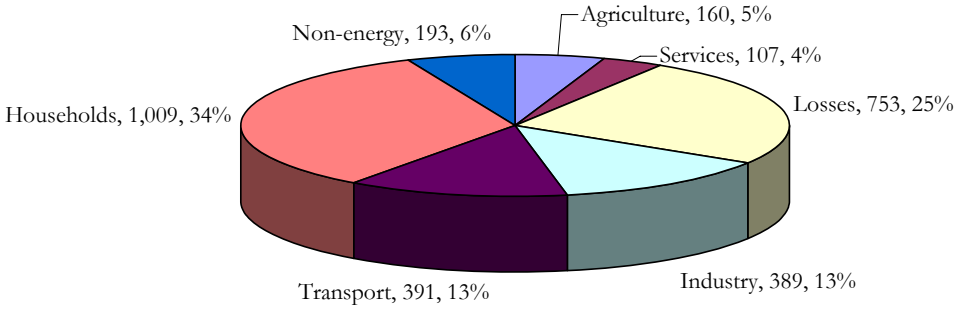


Source: World Experience for Georgia

Seventy-one percent of supplied primary energy in 2006 came to imported energy, out of which 47% was natural gas and 24% oil products.[8] The consumption of local firewood is approximately the same as the consumption of electricity produced through the hydropower stations. The consumption of firewood by the Georgian population is particularly inefficient, which is further exacerbated by the widespread practice of using very low efficient (20-25%) wood stoves.

According to World Experience for Georgia's research, in 2006 Georgia consumed energy equivalent to 3.3 million tons of oil. The structure of the consumption of this energy looks the following way:

Graph 2: Total energy consumption in 2006 (in thousand tons of oil)



Source: World Experience for Georgia

[7] The summing up of the data received by the department f Statistics has taken place.
[8] Such proportion of the expensive import, naturally, should facilitate the reduction of consumption.

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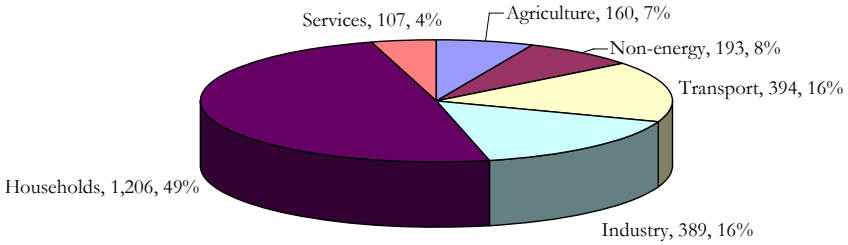
The consumption of energy by the residential sector (including personal transport) amounted to 53% of the total consumption, which was three times higher than in the industrial sector and ten times higher than the sectors of economy and service. The high losses, including the technical and commercial losses,[9] require particular attention. High level of technical losses is most likely caused by the outdated technologies and equipment, whereas the high level of commercial losses is more difficult to explain. The actors working on the energy market of Georgia are commercial entities established by joint Georgian/Kazakh, Georgian/Czech, and Georgian/Russian capital. Formerly, the privatization of these companies was justified by the need to improve their management and make them profitable. If these companies still bear such high commercial losses either they have serious shortcomings in the management or they are somehow interested in having such losses. Otherwise it is difficult to explain the rationale for this state of affairs in these private entities.

Graph 3: Structure of energy consumption without losses (in thousand tons of oil)

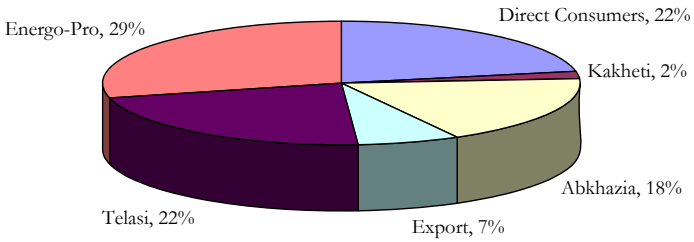


Source: World Experience for Georgia

Households consumed 49% of the total energy used (without losses). Taking into account that the majority of transport is in the ownership of the population, the consumption by the residential sector is even higher than 49%. The consumption in the agricultural, service, and industrial sectors is much lower.

Electricity consumption in 2006

Graph 4: Structure of electricity consumption in 2006



Source: World Experience for Georgia

[9] Allowed technical losses are individual for each energy company and constitute 10-15% of the total losses. Other losses are commercial.

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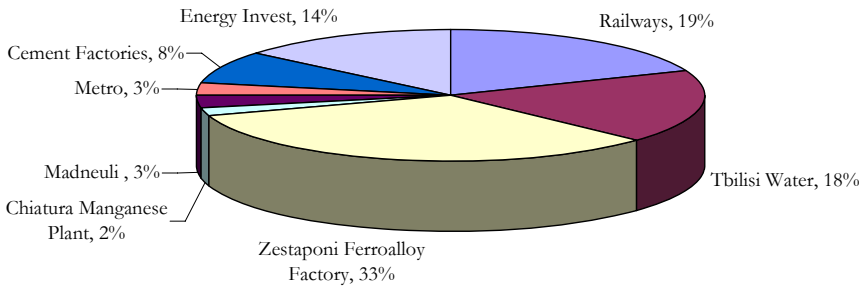
The largest consumers of electricity are:

- Energy-Pro Georgia – 29% (company distributing in the regions)
- Telasi – 22% (company distributing in Tbilisi)
- Direct consumers – 22% (industrial consumers)

Such a low proportion of the direct consumers in the total consumption indicates that the share of the industrial sector in the energy consumption is low and lags behind the consumption by the residential sector.[10]

Graph 5: Electricity consumption by direct consumers

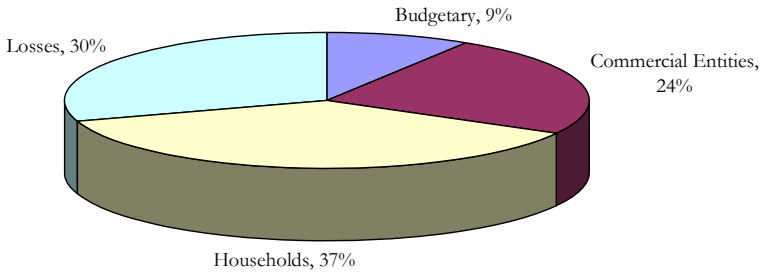


Source: World Experience for Georgia

Zestaponi Ferroalloy is the single largest consumer with Railways and Tbilisi Water coming next. Neither of these large consumers has been equipped with modern energy efficient technologies. Their equipment with new energy efficient technologies would reveal significant potential for energy efficiency and contribute to the more balanced energy consumption in the country.

The graphs below show how high are the losses of energy in Telasi and Energo-Pro, which, if reduced, would offer another potential for energy efficiency and saving.

Graph 6: Telasi electricity consumption in 2006



Source: World Experience for Georgia

[10] Zestaponi Ferroalloy Factory is the largest direct consumer. Next are the railway and Tbilisi Water. The rearmament of none of these factories has occurred through energy efficient technologies. They still work with the technology of the Soviet era. In case of the rearmament or stopping of these factories (except for the railway and the Tbilisi water) the energy audit may reveal very important potential for the preservation of energy.

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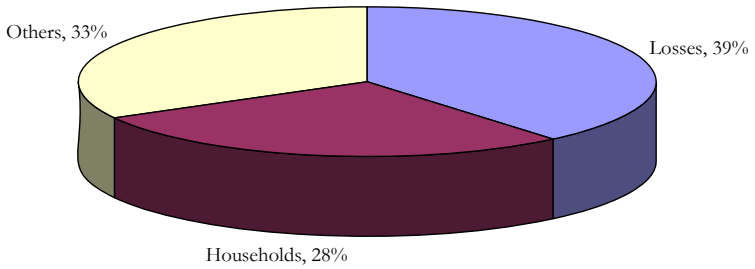
Graph 7: Electricity consumption by Energo–Pro in 2006



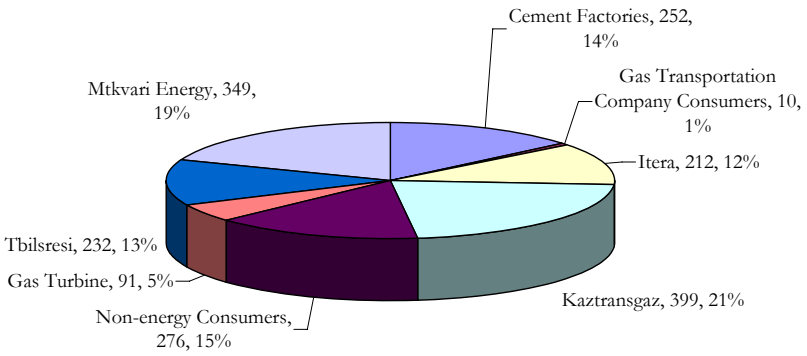
Source: World Experience for Georgia

These graphs show that households are the main consumers of electricity in the capital city as well as in the regions. This means that there is a significant potential of a more efficient use of energy among the population. For this purpose grassroots campaigns and explanatory work should be organized in order to increase the awareness of the benefits that they would get from using more efficient equipment and appliances. The government on its part should encourage importer companies to import efficient electrical appliances and the banks to provide loans to the population for the purchase of these appliances.

Gas consumption in 2006

In 2006 Georgia consumed app. 1.8 billion cubic meters of natural gas.

Graph 8: Structure of gas consumption in 2006 (in million cubic meters)



Source: World Experience for Georgia

The largest consumers of gas are Kaztransgaz Tbilisi and Mtkvari Energy. Next to them are Itera Georgia, Tbilsresi, non-energy consumers, and the International Energy Corporation of Georgia. In total, the electric generational units – Mtkvari with 19% (belongs to the Russian company Inter-Rao), Tbilsresi with 13% (in state ownership), and the gas turbine with 5% (owned by the Russian-Georgian business group – Energy-Invest) – remain the largest consumers of natural gas (totally

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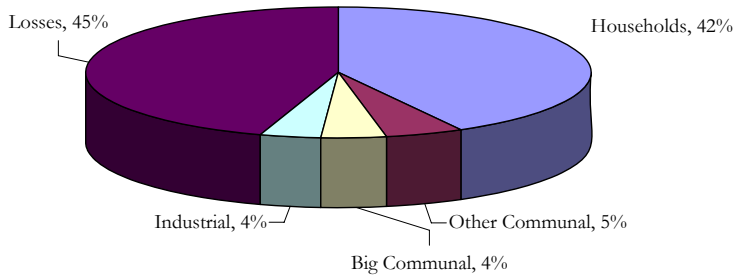
37%). As for household consumption, if it is assumed that the main consumer of Kaztransgaz (21%) and Itera (12) is the population then the total consumption of the population would amount to 33%.

The high consumption of gas in electricity generation is caused by the fact that a part of the above-mentioned units are outdated, while the other part is not working at full technological capability. The state-owned Tbilsresi was constructed in the mid-70s and Mtkvari Energy – in the 80s. Consequently, their energy efficiency falls below the initial 40%. The thermal effect of the gas turbine belonging to the Russian-Georgian business group – Energy-Invest – is not used at all. In case of its utilization the efficiency of the air turbine would increase by 40%. The Rustavi Chemical Factory ("Azot") also works with Soviet technologies. If the factory worked at full capacity it would be the largest consumer of both gas and electricity. Converting this factory into one with modern energy efficient technologies requires investing hundreds of millions of USD, which has not yet been accomplished by the private owner.

Among the individual companies consuming natural gas, the largest consumer is Kaztransgaz (distributing in Tbilisi).

Graph 9: Structure of gas consumption in Tbilisi annually



Source: World Experience for Georgia

Energy losses and consumption are particularly high during the winter months during the heating season. During this period, the majority of the population in the capital, as well as in the regions, uses unsustainable means for heating. There is thus a significant potential for energy efficiency by terminating unjustified losses and increased usage of energy efficient heating appliances.

The enhancement of energy efficiency in construction

Currently, the construction business is the fastest developing industry in Georgia. The housing fund is rapidly increasing in the capital and on the sea shore. The construction of the hotel network is also proceeding quickly. The share of heating of buildings is high in the annual energy balance. However there are no strict building standards which would obligate companies to use energy efficient technologies in their business.[11] As the graph below shows, 19% of the total gas consumed (without losses) in 2006 was spent on heating of apartments.

[11] Except double-paned metal-plastic windows.

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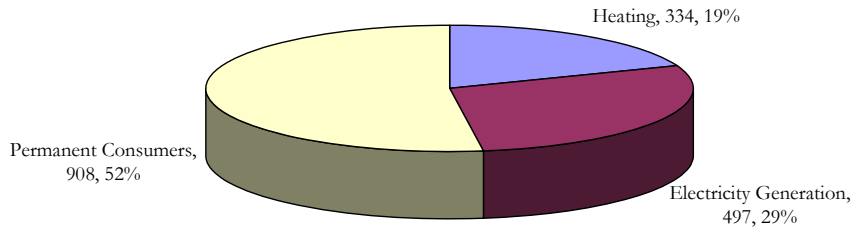
Graph 10: General structure of gas consumption in 2006



Source: World Experience for Georgia

Currently, only 40% of the new housing fund is used at full capacity. After reaching full capacity, the demand on energy (for the purpose of heating and cooling) will probably double. Taking this into consideration, the adoption of a strict construction code that would obligate construction companies to observe the norms of energy efficiency and saving (thermal isolation of walls, ceiling, floors, and windows) is necessary.[12]

Oil products[13]

Oil products are Georgia's single largest import item. Correspondingly, the import of oil products in terms of different taxes is the largest source of budgetary income. In 2007 the importers of oil products brought 360 million GEL to the budget.

The consumption of the service sector constitutes only 4% of the total balance, which means that the population remains the main consumer of oil products. A significant potential for the more efficient use of oil products is the substitution of old and low efficient cars (old Soviet cars or high consumer cars imported from Germany) by comparatively new, low capacity cars.[14]

In Europe, there are different mechanisms in place for stimulating the purchase of low capacity, small cars which produce low emissions. Familiarization with them and taking them into consideration would be profitable for state institutions (which regulate this sphere), as well as for Georgian importers and consumers.

Conclusion

As it has been revealed through the analysis of the aggregate energy balance of Georgia there are obvious incentives and potential for more efficient energy consumption and energy saving. The use of this potential would on the one hand reduce the country's dependence on expensive imports and on the other hand increase energy security. It would also be instrumental for improving Georgia's existing import-export balance. Areas identified for more efficient use of energy and energy saving are:

[12] The work on the construction code is underway.
[13] This subchapter is based on data delivered by the Association of the Importers of Oil Products.
[14] Typically, used cars are imported from Germany. German Mercedes and BMWs consume the largest amount of resources among the cars produced in the EU countries.

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- Losses are 739,000 TEO[15] annually: The existence of high commercial losses in the electricity and natural gas sectors (which have been transferred to private owners) points either to shortages in the management of these companies or their interest in having such losses. Individuals and companies that use stolen electricity and gas obviously would not be interested in reducing their consumption by installing energy efficient equipment and appliances. The eradication of losses is the most important potential for energy efficiency and energy saving. Until terminating such losses in the system there can be no question about Georgia having a modern civilized energy market.

- Residential consumption is 1,009,000 TEO annually: In this sector, the implementation of energy efficiency and energy saving will depend not only on the purchase capacity of households but also on their awareness of the benefits they would get from it and their motivation. The authorities have a significant role to play in this regard by encouraging importers to import energy efficient appliances and equipment, experts and NGOs by organizing campaigns with a view to increase public awareness of the issue, and financial institutions to create low interest credit lines for the purchase of these appliances by the population.

- Transport uses 591,000 TEO annually: Reforming the auto supply by replacing the existing cars with low capacity cars would be the most effective way of reducing the amount of imported oil products. From this viewpoint, taking the experience of the EU member states into consideration is important.

- The generation of electricity constitutes 37% of the natural gas consumed annually. Two of the gas generation units (Mtkvari Energy and Tbilsresi) existing today were constructed in the Soviet period and are already outdated, while the new gas turbine, which belongs to the Russian-Georgian business group Energy-Invest, does not use the steam effect at all (which reduces the importance of this high technology unit). Introducing the new high technology gas turbines would lead to significant savings for energy efficiency in electricity generation. The parliamentary resolution on the state policy in the energy sector directly indicates the necessity of introducing the energy efficient cogeneration systems.

- The new construction standards compelling construction companies to carry out the norms of energy efficiency should be speedily elaborated and adopted. Otherwise, a considerable increase in the demand on imported energy for heating and cooling is inevitable.

- Given that the consumption of energy in the industrial sector is modest and constitutes some 16% of the total energy consumed (without losses), the reduction of energy consumption in this segment should take place in the most painless way. Private companies themselves are interested in reducing energy consumption per unit of their product. The European Bank for Reconstruction and Development credit line will provide them with considerable assistance in equipping their companies with modern energy efficient technologies.

[15] Tons equivalent of oil – TEO

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- The Government should consider energy production and import of energy not as the most important source of budgetary income, but rather as one of the most important preconditions for the economic development of the country. Pursuing a policy of energy efficiency and savings by the government will be possible only if such an approach prevails.

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