Socio-Economical Effectiveness of the Structural Adjustments in Energy Sector of Georgia

Tbilisi
2003

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The report was prepared by the members of the Georgian Association of Energy Engineers: T. Miqiashvili, T. Jishkariani, B. Chkhaidze, O. Kiguradze
&
Sociological Research Center SRC

Table of Contents

Introduction

Report - "Social - Economical Effectiveness of the Structural Adjustments in Energy Sector of Georgia", represents one of the first attempts to identify rights and wrongs of the above mentioned adjustments for the different social layers and elaborate recommendations that will facilitate poverty reduction in Georgia.

The authors realize the difficulty of the subject which on one hand is determined by the multiple interlinked issues covered by the structural adjustments in energy sector of Georgia: changes in institutional arrangements of the Energy sector; changes in the management of the elements of the sector; changes in property forms and new legislation for the energy sector. To ensure critical assessment of the results of each adjustment permanent monitoring of the processes is necessary, which nowadays does not take place in Georgia. On the other hand the on going social-economical processes do not depend only on changes in energy sector but are the result of complex impact developed by the changes in different sectors. Therefore it is rather difficult to single out the social-economical impact of the above mentioned sector. Though taking into account the fact that majority of the Georgian population live below the poverty line and are unemployed, any change carried out in energy sector which resulted the price deviation on energy resources has direct and maximal impact on human living conditions. Therefore, it could be assumed, that the prices on energy resources and energy services most of all determines living standard and social-economical conditions of majority of the Georgian population, rather then other branches of industry operated nowadays in Georgia. Based on the above mentioned the report mostly stresses the structural adjustments implemented in energy sector of Georgia from the price deviation on energy resources and energy services point of view.

The report is based on the results of the researches of socio-economical conditions of Georgian population provided at various time by different experts as well as on official statistic data. The accuracy of the data given in the project complies with the general requirements for the statistics researches.

The deductive method of analyses used by the authors in the report takes into account (as far as possible) the identification of the reasons of the events based on their results. The authors think that such approach insures maximal objectivity in conditions of poor information.

The aim of the research provided under this project is to assess, as far as possible, the impacts of structural adjustments in energy sector performed in 1996-2000 – did these changes have positive affect on socio-economical conditions of the population, or not. To achieve this aim the following questions should be answered:

1. Were the structural adjustments performed in the energy sector optimal and sequential;

2. Have the structural adjustments influenced the accessibility of the energy for the population.
3. Have the tariffs and demand on electricity, natural gas and other energy sources changed, after the structural adjustments;
4. Have the technical conditions of the energy resources supply for the population improved;
5. Does the income degenerated by the population correspond with the tariffs they have to pay to satisfy their immediate (minimal) need in energy resources; how the family budget is distributed according the priorities (food, health care, energy supply, recreation); whether the population is forced to avoid energy service payment;
6. The energy indebtedness of the population after the structural adjustments;
7. To what extent has changed the level of the energy supply of the population. To what extend is the population guaranteed to satisfy the immediate energetic needs;
8. How the state budget revenues from the energy sector has changed after the structural adjustments and has the social security of the population improved/worsen.

Addressing these as well as the other similar questions the authors tried to sequentially analyze the collected data together with the results which are given below.

1. Country Demand on Energy Resources (electricity, natural gas, mazut, firewood, oil, liquid gas, coal)

This chapter aims to determine the sensitivity of the Georgian population socio-economical conditions with respect to structural adjustments performed in energy sector and how strong is the feedback – the impact of economical conditions of the population on the energy sector conditions. Research of this type has not been performed in Georgia yet. Correspondingly, there is no statistic and sociological data. That is why assessment of the above mentioned interdependence is possible only from qualitative point of view. First of all the country demand on energy resources and the household share in general energy consumption should be determined.

There are different data about the energy resources demand in Georgia received in diverse time in the framework of different international projects. But all these data is rough, as previously as well as nowadays it is practically impossible to determine exact demand on energy resources in Georgia. Firstly because there is no strict payment regime between the supplier and the consumer, that is why most consumers do not calculate the exact energy resources consumed by them and secondly there is no balanced energy market in Georgia: the supply do not correspond with demand; the consumption do not correspond with necessity, etc. The situation is especially complicated in the regional household sector, which potentially is a large-scale consumer of the energy resources. The energy resources supply is limited here and the correct calculation of the energy demand in this sector is principally impossible. It is identified with the consumed amount of the energy resources. In the existing situation even the consumer has no sequential and correct viewpoint about its own need in energy resources.

Notwithstanding the above mentioned, we can assume that period of new, more or less natural scale demands development has started in 1995-1996. By this time the country has reached certain political stability and has started the new stage of economical development.

The Charts 1.1 a-e) show the dynamics of change of existing demand of energy resources in Georgia according the above mentioned accuracy.

The Chart 1.1 a) indicates that the household sector has become the main consumer of the electricity in the recent years. Its share in electricity consumption has become equal to aggregate consumption of the industry. It is caused by two reasons: the sharp cut of industrial activities in 90-s and disruption of the centralized heating and gas supply which increased the electricity consumption in household sector.

In such conditions the interdependence level between household and power industry has increased – the conditions of one has become determinant for the conditions of the other. Though the power industry sector influence is stronger and it is natural as the living functions of the population of the less developed country like Georgia is governed only by the power industry while the power industry get its revenues from two sources –household and industry sectors.

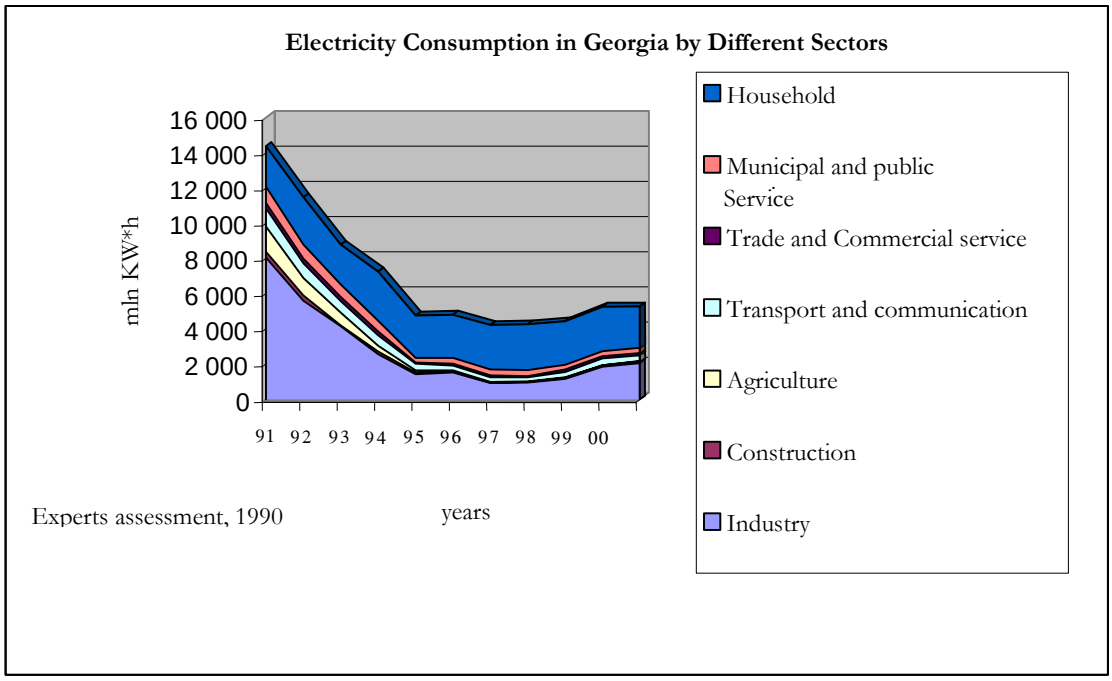


Chart 1.1, a) The Electricity Consumption in Georgia According the Separate Branches and Sectors (the marks should be read from top to bottom)

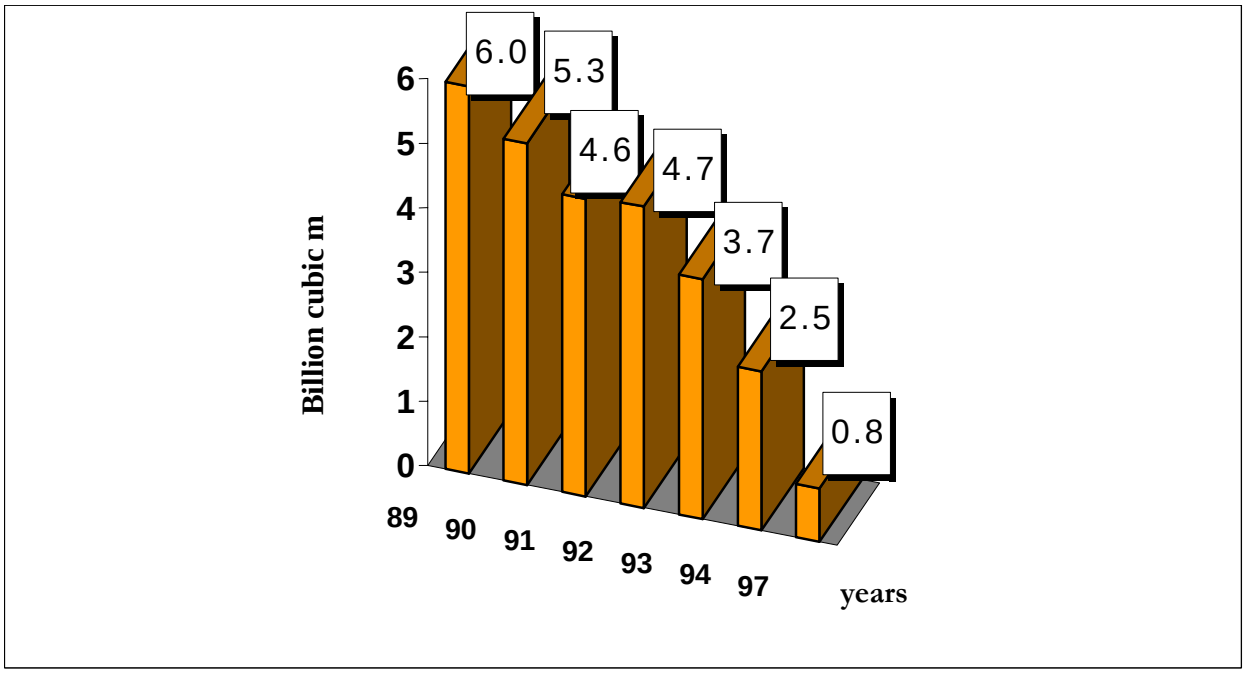


Chart 1.1, b) Natural Gas Consumption in Georgia

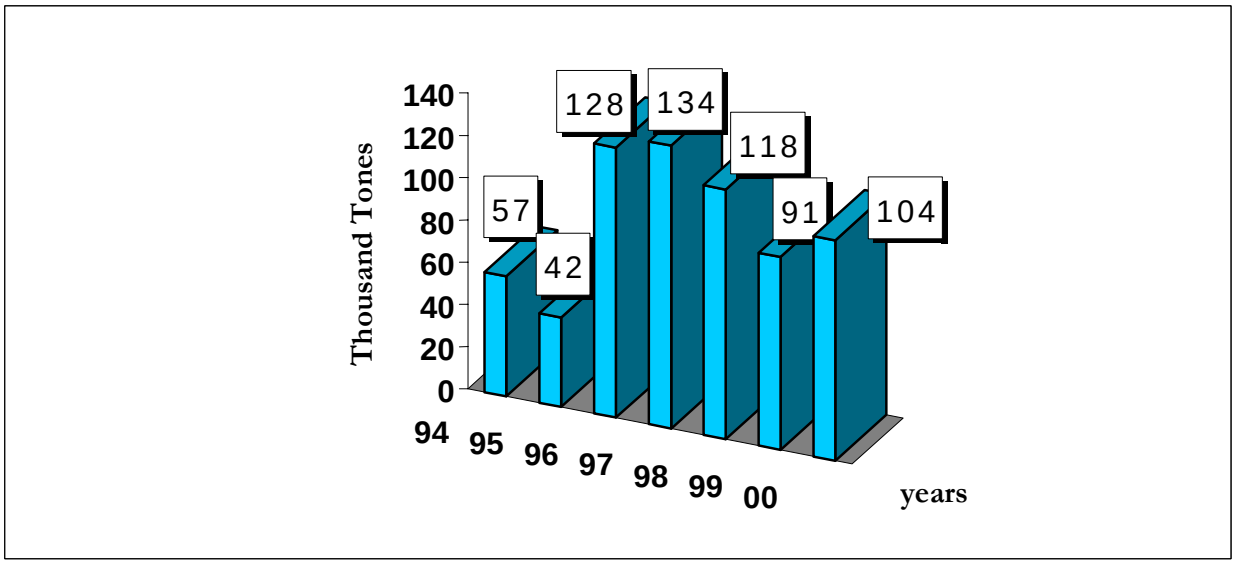


Chart1.1, c) Oil Production in Georgia

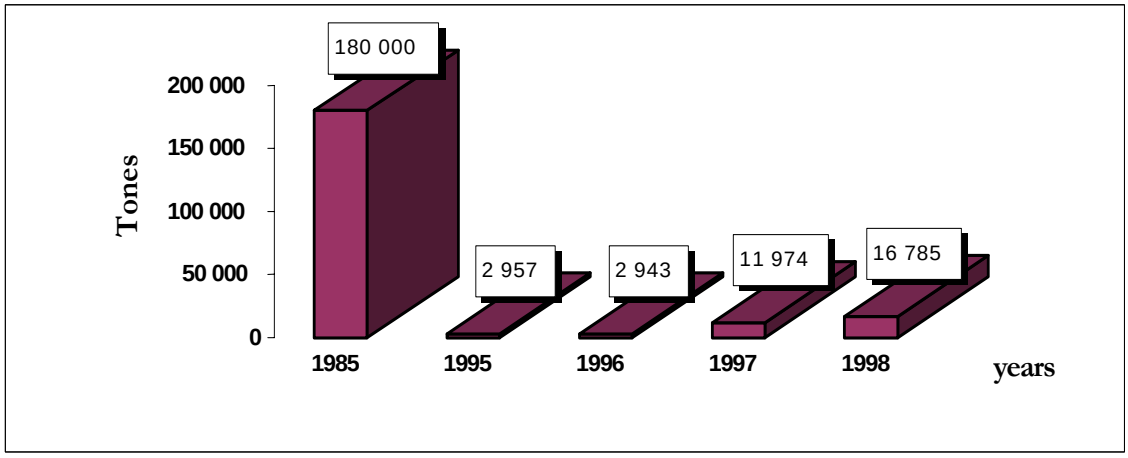


Chart 1.1, d) Liquid Gas Consumption in Georgia

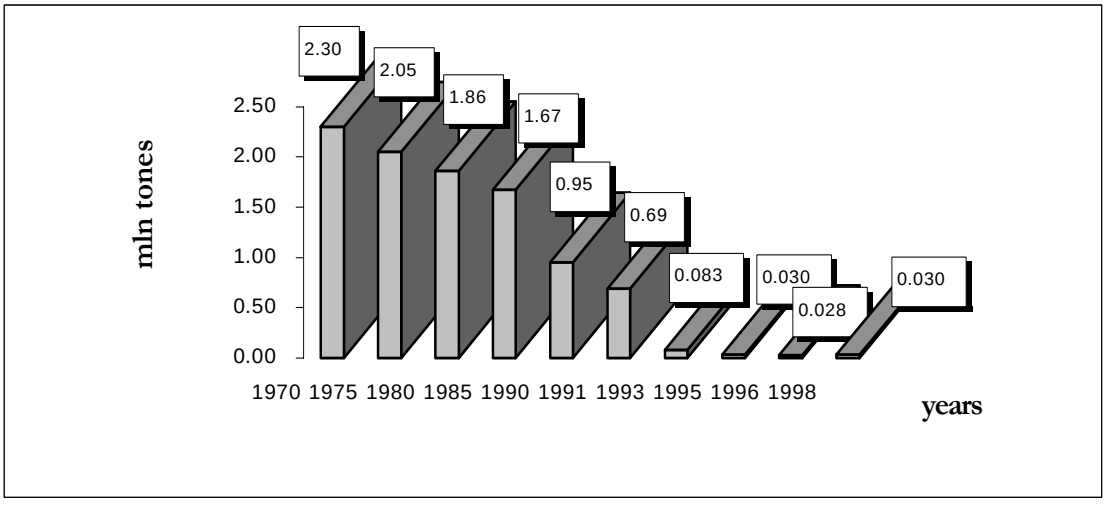


Chart 1.1, e) Cole mining/consuming in Georgia

Nevertheless the role of the household sector for the power industry in the conditions of poor employment of the population and unstable and scanty incomes which quite often lead their paying capacity to zero could not be exaggerated.

The above mentioned refers not only to the power industry but to energy sector in whole.

2. Power Industry Balance

Is it possible to satisfy the electricity demands by the electricity generated within the country. At least it would increase the level of energy independence. It is the main issue discussed below.

The Georgian energy system along with the Armenian and Azerbaijani energy systems was the part of the Trans-Caucasian power grid in the former Soviet Union. The Trans-Caucasian power grid was connected with Southern Russia power grid. Such connections eased the energy supply of the Trans-Caucasian republics as well as the Southern Russia region by means of purposeful exchange of the peak capacity. After collapse of the former Soviet Union the connections between the energy systems was broken. As a result the republics of the former Soviet Union have to depend on their own energy resources.

The electric power generation system of Georgia consists of hydro- and thermal electric power plants. The total capacity installed generated 4,700 MW of which 2,700 MW was generated by hydropower plants and 2,000 MW by thermal power plants. Throughout the past 12 years, due to the deterioration of technical conditions of plants and equipment, it became practically impossible to achieve maximum installed capacity levels of power plants. Nowadays (January 2003) operational capacities have been significantly reduced and generation amounts only to 1,700 MW. (this value as well as the values given in the table 2.1 could be changed in any moment of current period). The table given below shows the installed as well as the current generating capacity of the thermal and large hydropower plants (table 2.1).

Table 2.1

Large Hydro Power Plants			**Thermal Power Plants**		
Installed capacity MW		**Generating capacity MW**	**Installed capacity MW**		**Generating capacity MW**
Enguri	1300	800	Tbilsresi (Gardabani)	1250	0
Vardnili I	220	110	AES-mtkvari (Gardabani)	600	250 *)
Jinvali	130	70	Tbiltetsi (Tbilisi)	18 70(Tb)	5.5 14 (Tb)
Khrami I	113	113	metal. plant's thermal plant (Rustavi)	149 590(Tb)	0 0 (Tb)
Lajanur i	112	30	Tkvarcheli therm. plant (Tkvarcheli)	200	0
Khrami II	110	35	car manufacturing plant's thermal plant (Kutaisi)	15	0
Tkibuli	80	50			
Rioni	49	35			
VartsikheI-IV	184	145			
Gumati I	44	27			
Shaori	38	27			
Vardnili II	40	0			

Vardnili III	40	0		
Vardnili IV	40	0		
Zahesi	44	44		
Gumati II	23	23		

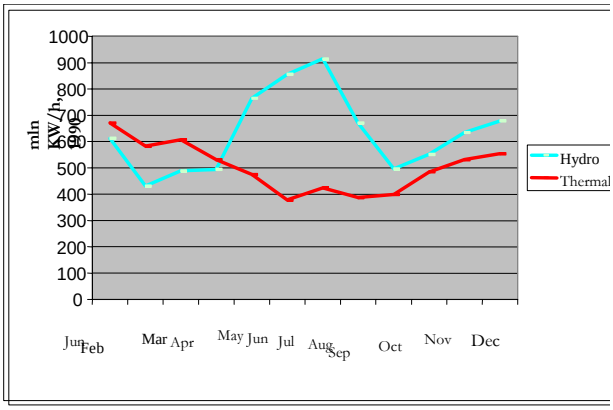
*) Since the AES-Mtkvari plant failure in 22 December 2001 its exploitation capacity reduced to 300 MW, and currently only 250 MW-s are ready to use.

According to the official version technical conditions of the existing power generating objects as well as transmission and distribution systems in Georgia, despite the sharp decrease in energy consumption (from 14 billion kw/h to 6-8 billion kw/h a year), can not supply enough electric power in winter. It is hard to consider the above mentioned as the only reason of the annual problems in energy supply in winter (table 2.1). The seasonal energy generation diagrams in Georgia show that most likely the main reason is annual decrease of the thermal power plants' share and increase of hydro power plants' share in the base electric power generation (see Chart 2.1 a, b). Such conditions (Chart 2.1) make impossible for regulating hydro power stations to reserve power to cover the winter peaks and therefore expensive electric power is imported from the neighboring countries. And it deals more with the irrational management rather then with worsening technical conditions of the equipment.

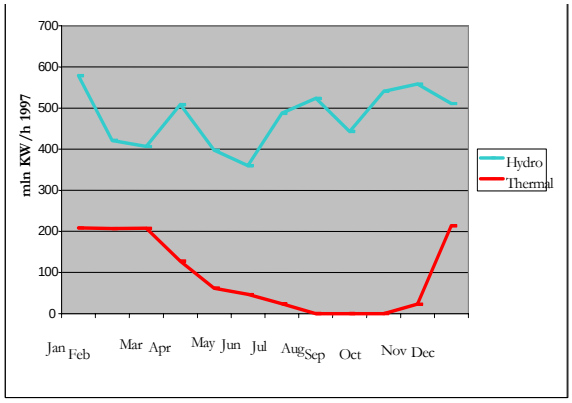
The arguable results of the analyses made by Georgian National Energy Regulating Commission (GNERC) proved that optimal variant of electric power distribution between hydro power plants and thermal power plants generated locally is proportionally 85%/15%[1]. GNERC alleges that if the thermal plants' share in annual electric power production is more then 15%, they would not be able to cover plant exploitation expenses. And if their share is less then 15%, then regulating hydro power stations would not be able to reserve capacities sufficient, together with the imported electric power, for winter demands. Evidently, the power generating diagrams for the years 1999 and 2002 (Chart 2.1, c, d) were planed in compliance with the above mentioned attitude and failed to be realized as the generating objects were not properly ready for the winter. The assumption that power generated only by AES-Mtkvari, together with the hydro generation would guarantee electric power stability in the country was truly exaggerated.

The previous as well as the latest winter seasons showed that present level of mobilization of the local power generation objects is not enough to ensure the country with stable power supply. Tblisi thermal power plant power generating units should be prepared and rationally used in base part of the load. The authors think that it is the only alternative of the stable power supply for Georgia in the nearest future.

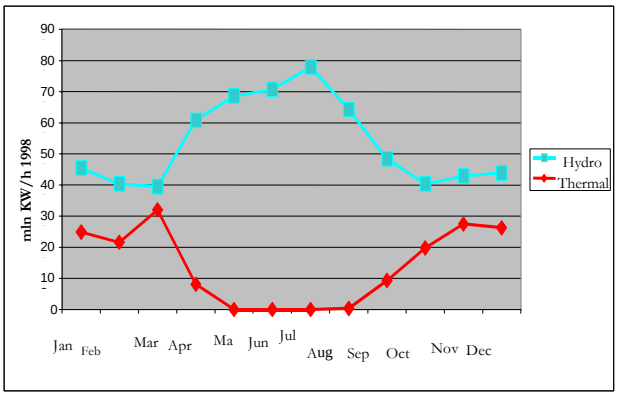
[1] Georgian National Energy Regulatory Commission, Basics of Energy Regulation, Chapter I, p.53



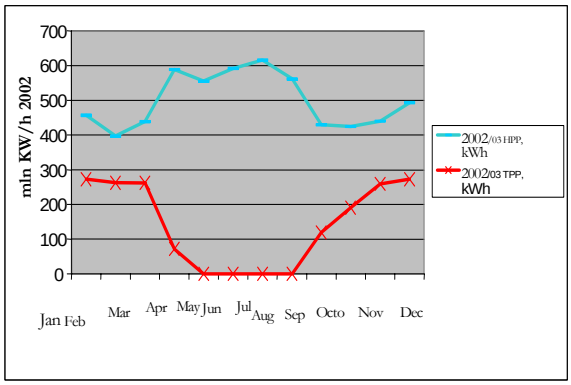
a) year 1990



b) year 1997



c) year 1998



d)year 2002

In conclusion we want to add that Georgia has the potential to satisfy its needs in electric power by the power generated within the country. The easiest way for this is to rehabilitate two energy generating units (130-140 mgwt. each) of Tbilisi thermal power plant. The research provided last year[2] indicated that it needs approximately 2 million USD.

3. Structural Changes in Georgian Energy sector (Institutional and Legislative Changes, Privatization)

Georgia, till it announced its independence, represented the part of the Soviet Union power grid. It was managed directly by the state in compliance with the socialistic planning principles. It was totally different from the market management principles. The current expenditures of the power plants as well as the funds for their development were provided by the state budget. Thus the system was subsidized by the state and did not depend on the effective work of its constituent objects.

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[2] Volume and Timescale of Reparing #3, #4 and #8 Energy Generating Units of Tbilsresi, Ltd Geoengineering, Project Report, Tbilisi, 2002

Georgian energy system included several structural elements: "Saqenergo"(power), "Saqgazi"(gas), "Saqnavtobi"(oil), "Saqnavtobprodukti"(oil products), "Saqnakhshiri"(cole), heating system municipal offices.

"Saqenergo" included power generation, transmission, dispatching, distribution objects and daughter enterprises. It was responsible for financial arrangements; tariffs of the energy resources were regulated by the Ministry of Economics.

The structures of "Saqnavtobi", "Saqgazi" and "Saqnakhshiri" were arranged in similar way. All these organizations were governed by the Cabinet of Ministers. Arrangment of the sector was vertical.

From the very first stage of the market relations that were established after the destruction of the former Soviet Union, it has become evident that existing working and managing principles would not ensure the reliable functioning of the power industry: widespread corruption, resulting in bad management, non-payment of consumed energy, irrational use of funds allocated for capital repair works, paralysis of the industry and so forth; the industry was at the edge of total paralyses.

In 1992 based on the resolution of Cabinet of Ministers[3], the Ministry of Fuel and Energy was established, which joined up "Saqnavtobi", "Saqenergo", "Saqgazi", "Saqnakhshiri", and their daughter enterprises.

Since 1993 The International Financial Institutions started their activities in Georgia[4]. Their aim was to study the current situation in the energy sector; develop the legislative bases for sequential privatization and prepare specific recommendations for the Government about providing the mandatory structural changes in the energy sector.

In 1994 the Ministry of Fuel and Energy has been abolished. Its branches were established as independent departments, and were controlled by the specially created service established by the Government – Energy Coordinating Service. At this period the municipal heating agencies were cancelled.

In 1995 the Energy Coordinating Service was cancelled and power enterprises were governed by the newly established Fuel and Energy Corporation.

In 1996, based on Georgian Law[5], the Ministry of Fuel and Energy was established which joined up the same departments and a new one – "Saqnavtobprodukti". The Ministry was responsible for:

- Performing the energy policy in the country;
- Determining development strategy and priorities of the field;

[3] Resolutions of Cabinet of Ministers 14/12/92 #1105 and 10/02/93 #78

[4] The World Bank Group, the International Monetary Fund, the European Bank for Reconstruction and Development

[5] Law of Georgia on Establishment of Ministry of Fuel and Energy of Georgia, adopted 26th of June 1996

- Determine the investment policy in the energy sector and strategy of raising the energy effectiveness in the other fields of economics;
- Ensure the HR policy and rational performance of the reforms in the field;
- Normative and legislative bases development;
- Technical and financial monitoring;
- Determining the state policy in energy emergency situations.

The main goals of upcoming structural reorganization of the energy sector were [7]:

1. Provide rational state policy, separate regulatory functions and commercial activities;
2. step-by-step liquidation of the state monopoly; establish different forms of property; create the competitive environment; develop transparent market; attract the foreign investments;
3. improve the power supply; reduce the power deficit in the energy sector;
4. increase the production volume in the energy sector; increase its effectiveness; keep the financial discipline; improve the consumer service quality;
5. provide the continuous power supply; increase the company revenues; improve the energy system technical conditions and management.

In 1996 according to presidential decree #437 on "Restructuring the Power Energy Sector" signed on 4 July:

- On the bases of "Saqenergo" it was established three financially independent sectors – generation, transmission-dispatching and distribution. [6]

- Within generation sector it was established several joint-stock companies, they are managed by the Ministry of Fuel and Energy and the owner of the shares is the government. They are joined in joint-stock company "Saqenergogeneratsia", with the function of the power generation;
- Transmission-dispatching structure firstly was transformed into commercially and financially independent budget enterprise – "Saqenergo", which, in its turn transformed into "Saqartvelos Saxelmtsifo Eleqtrosistema" Ltd. (Georgian State Power Systems), and at the end broke up into joint-stock "Eleqtrogadatsema" (responsible for high-voltage transmission network) and "Eleqtrodispecherizatsia" Ltd. (responsible for dispatching). Currently merging process of these two companies is in progress. As a joined company it will provide the power system management, stable working regimes, effective use of high-

6 D. Chomakhidze, Economic and Ecological Problems of Use of Energy Potential of Georgia, Tbilisi, 2001, p.276

voltage (35, 110, 220, 300, 500 KW) transmission network and corresponding sub-stations.

- Distribution sector has completely separated from "Saqenergo", at first it has divided into joint-stock companies according the territorial principles and moved under jurisdiction of local authorities. Later they jointed as regional energy companies;
- Power energy regulating commission, established under the Ministry of Economics, at the beginning was responsible for regulating the wholesale and retail energy tariffs.

In 1997 Georgian Parliament adopted the law on "Power Energy", which separated the Power Energy Regulating Commission from the Ministry of Economics and established it as an independent service Georgian National Power Energy Regulating Commission.

In April,1999 Georgian Parliament adopted the law on "Power Energy and Natural Gas". Based on the above mentioned law the Georgian National Energy Regulating Commission was established (GNERC), as a legal body of public law. Creation of such commission was based on general motivations, such as[7]:

- The regulation process is strengthening, general public becomes maximally privileged, under conditions of monopoly of the energy field the minimal tariffs have been set and it growth the faith in justice within general public;
- Increasing positive influence on the energy sector development rate and scale, power supply level of the country, scientific-technical progress, etc.;
- The risk for the investors is reducing, private investments to the sector are stimulated, the amount of the investments is increasing, and investments get low taxation and thus the low tariffs for the consumer;
- The possibility of paying the consumed electricity and natural gas would rise; it would create bases for the self financing;
- It would improve the electricity quality and increase its volume.

Energy Regulating Commission had wider rage of functions comparing to Power Energy Regulating Commission, namely:

- Establish wholesale and retail tariffs on power and natural gas;
- Granting, renewal, stoppage, and withdrawal of licenses for exploited power objects and natural gas sector;
- consideration and solving the disputable issues concerning the power and natural gas sector;
- supporting the competition in power and natural gas sector, balance the interests of the power producers, supplier and consumer;
- Supervision of power wholesale market activity;
- Organizing and coordinating certification in the power energy sector;
- Regulate power import and export;
- control the licensing conditions in the power and natural gas sector and provide appropriate legislative measures in case of violation.

[7] Georgian National Energy Regulatory Commission, Basics of Energy Regulation, Chapter I, p.49

The power wholesale market was established in July 1999 (Legal body of private law). Its main function is power wholesale purchase and sale management and step-by-step development of competition.

The Georgian power sector executive structure and its relations after restructuring are shown on Chart 3.1.

At the same period fuel industry has undergone organizational changes. On the bases of "Saqgazi" department and joint-stock company "Transgaz" it was established budget enterprise "Saqtransgazmretsvi". "Georgian International Gas Corporation" has been created later on, which was delegated with the gas main pipelines previously delegated to "Saqtransmretsvi" (as a result "Saqtransmretsvi" has started a legal action, which is continuing up to present). The "Saqnavtobi" and "Saqnaxshiri" departments were also reorganized.

The privatization process of Georgian energy sector started in 1992 .

In compliance with the resolution #829 of the Georgian Cabinet of Ministers dated 11 August 1992 hydropower plants with aggregate capacity about 10 MW were entered into the list of power objects that were to be privatized.

According to the resolution #809 issued in 17 December 1993 the hydropower plants with aggregate capacity about 30 MW were added to this list.

By the resolution #916 adopted in December 31,1994 the capacity limit for the privatized hydropower plants was canceled.

As for July 1,1995 14 small hydropower plants were privatized. Their aggregate capacity comprised 2% of total power system capacity, output - 1,85% and production assets – 1%.

The following forms of privatization have been used: competitive sale, auction, direct sale and establishment of joint-stock companies.

Based on the recommendations and financial support of International Financial Institutions[8], in 1997-1999 Georgian Parliament developed the legislative base, which had to ensure achievement of the above mentioned goals and large-scale privatization of the energy sector. This legislative base has covered the following:

- The "Law on State Property Privatization" adopted in 1997, which delegated all rights of state property disposal to the Ministry of Property Management and introduced the new forms of privatization;
- The "Law on Power Energy" adopted in 1997, which was amended[9] and finally named the "Law on Power Energy and Natural Gas";

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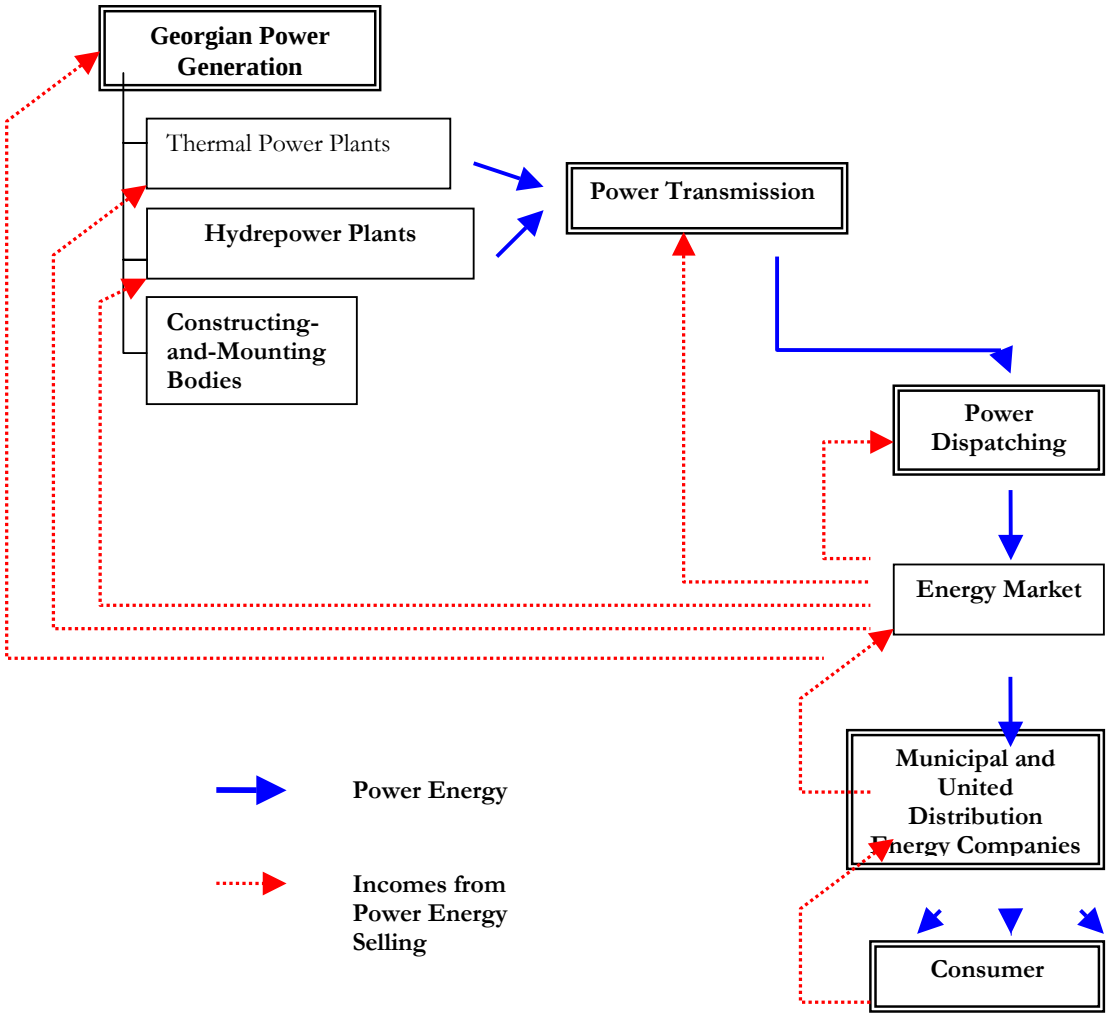
8 WB, Report No. 17152GE, December 16, 1997

9 By the laws of Georgia of 10/17/97 #984, 04/30/99 #1934

Chart 3.1 Executive-Organizational Structure of the Georgian Power Energy Sector After Restructuring



- The amendments of the "Law on State Property Privatization" adopted in 1998, which had created the legal bases for privatization of the distribution companies;
- The "Law on Oil and Gas" adopted in 1999, which established the Oil and Gas State Regulation Agency (the legal body of public law), it performs the licensing activities connected with oil and gas resources and operations in Georgia. It had been also determined the functions of the Georgian National Oil Company (joint-stock company "Saqnaftobi").

Apart from the above mentioned in 1997 and 1998 the president has issued decrees on "Privatization Strategy of Georgian Power System Companies" and "Unified Plan of Privatization of Georgian National Industry Branches", which determined the list of power sector enterprises to be privatized.

Thus by the end of 1999 the following institutions had been established in the Georgian energy sector:

- Ministry of fuel, which is responsible for determining and developing the state energy policy. It also provides power production object collocation licensing;
- Georgian National Energy Regulation Commission, independent department, legal body of public law, which regulates tariffs on electricity and natural gas for generation, transmission, dispatching, distribution, import and export licensing;
- Georgian power wholesale market, legal body of private law, which regulates trade relationships in power sector;
- State Oil and Gas Resources Regulating Agency (legal body of public law), which provides licensing of the activities connected with the oil and gas resources in Georgia;
- Georgian National Oil Company (joint-stock company), with main function of managing the state share of the oil and gas produced in Georgia;
- Georgian International Oil Corporation (joint-stock company), responsible for oil and gas transportation from Caspian region;
- Georgian International Natural Gas transportation Corporation (joint-stock company), responsible for main gas pipelines and gas transportation (except the Caspian Sea region).

In addition to the above mentioned enterprises, a number of limited liability and joint-stock companies (with not less then 51% state share) of power generation, transmission, distribution, natural gas production, transportation, oil production, transportation profiles was established that has to be privatized;

In 1998 according to the presidential decree #403 issued on 5 July it was adopted the Privatization Strategy of Georgian Energy System Companies and large-scale privatization in energy sector has begun.

The International tender for privatization of "Telasi" took place at the end of 1998. 75% of Tbilisi distribution company "Telasi" was bought by "AES" company. It has also received the right to increase the tariff gradually in the course of 4 years and its long-term adoption (10 years).

In 1999 the local Investors bought the Kakheti distribution network.

In 2000 "AES" bought 80% of shares of "Tbilsresi" power units #9 and #10 by direct purchase. The purchase contract was signed in April 2000. The investor has paid 5 mln. US dollar; assumed the obligations to pay the credits spent on rehabilitation of these power units, which, together with the interests, comprises 135 mln. US dollar; to invest 28.7 mln. US dollars in the course of 6 years (by the year 2000 it had already invested 11.2 mln. US dollars). At the same period "AES" bought 100% of shares of hydropower plants Khrami-1 and Khrami-2 with right to control. It cost "AES" correspondingly 2.5 and 3.5 mln. US dollars; had took obligations to pay their debts – 1.5 mln US dollars and during 10 years invest correspondingly 9.65 and 18.2 mln. US dollars.

At the same year the joint-stock company "Saqgazi" the shares of which belonged to the Russian company "Itera" and was providing the natural gas supply from Russia, bought 90% of shares of joint-stock company "TETS" by direct purchase.

Following the World Bank recommendations[10] it was decided to delegate "Georgian Wholesale Power Market", Joint-stock "Power Transmission" and "Power Dispatching" Ltd to foreign companies to manage for five years[11] starting the year 2001.

As for the 1 June 2001, 35 large and small power plants had been privatized in Georgia. 48 joint-stock companies had been established in natural gas sector. "Telavgazi" and "Tkibulgazi" shares had been completely sold. "Kaspigazi", "Bolnisgazi", "Gorigazi", "Tetritskarogazi", "Kutaisigazi" and "Rustavigazi" control packets of shares had been sold. 38 joint-stock companies had been left for privatization.

Among the ongoing processes especially important is enlargement of the distribution companies and the fact that all power generation objects of Georgia (except Enguri hydropower plant), as well as distribution, transmission and dispatching companies and natural gas distribution companies are engaged in privatization process.

Up to the present "AES", viewed as a strategic investor, is recognized as the main achievement of the privatization. The company had purchased 16% of the power capacities, 23%[12] of the distribution network and it had established distribution company "AES Telasi" and generation company "AES Mtkvari".

Less truthful and insufficiently sever is the assessment made by some leading specialists of GERC. They think that by means of privatization the following important results had been reached:[13]

- The corruption had been practically exterminated on the privatized objects;
- Part of the debts had been paid by the investors; the payment of the other part had been stopped.
- Consumed power cost collection issue is regulated by the investor;
- The issue of power saving is gradually settling;
- The usage of foreign credits and state liabilities are practically delegated to the investors;
- To some extend the tax payment and the state revenues had been increased;
- The purchase of the energy resources and rehabilitation of the branch is provided by the investor;
- Complete payment of the consumed power had a positive influence on the other energy branches;
- The export potential usage of the branch had increased.

Such results of the privatization indicate that the state declined duties and responsibilities connected with the energy sector functioning and development, before it created social guarantees for the population. In fact it had deregulated the energy sector and that needs much higher level of industry and social layers readiness. At the same time, currently we have not bases to think that the National Energy Regulation Commission adequately controls, regulates and manages the situation.

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10 Energy Sector Adjustment Credit Project, WB, 6/29/99; Electricity Market Support Project, WB, 05/03/2001

11 Decree of president of Georgia, 28/06/2001, #254

12 based on the population number and 21 % based on the energy supply

The analyses shows that as a result of privatization by the year 2000 comparing to year 1990 production volume of Khrami-1 and Khrami-2 hydropower plants had reduced by 13%, production volume of Tbilsresi power units #9 and #10 had increased by 21%, though after the "AES Mtkvari" power unit #10 failure in 2001 its production volume significantly reduced; power production of "Tbiltetsi" had reduced by 20% and then completely stopped. It should be mentioned that after the privatization power production volume had increased on several small hydropower plants.

There is certain discrepancy between current problems of the energy sector and "significant results" of privatization and structural changes mentioned above. The authorities of the branch recognize:

- Consumed power charges are not fully collected;
- The power plants are not supplied with spare parts and they can not provide repair works;
- Provision of the Thermal Power Plants with fuel is not managed;
- The plants have to pay state taxes as well as fines taking into account the amount transmitted from the plants. Though the amount factually delivered to the buyer is significantly less while the plants are paid only for the delivered amount and it is quite difficult to prove the technical causes, such as disordered or abusive relationship between producers, distributors, consumers and tax collectors. Such cases force producers to stop unprofitable power production, as they can not improve the situation alone;
- The situation of the main funds in the branch remains difficult. The debts of the sector are gradually increasing.

In conclusion it should be mentioned that first results of structural changes performed in the Georgian energy sector do not fully justify the hopes:

- results of the sociological research show that the general public does not consider itself privileged in current power supply situation;
- development and growth rate, as well as power supply reliability, of the energy sector does not seem to rise;
- In fact the private investments and investors participation process has stopped at the level reached in the year 2000;
- the self financing potential of enterprises of the branch had not risen. It is proved by the arrears of wages and existence of state subsidies, as well as by the reduction of power production (e.g. stoppage of TETSI and power units owned by Tbilsresi) and power supply quality.

Thus the changes in the energy sector do not have appropriate results and this process needs to be corrected by means of monitoring and critical analyses of the phased results.

4. Social Conditions in Georgia (Family Income Analyses)

The current socio-economical conditions are extremely difficult in Georgia. The standards and quality of living of 90% of the population are one of the worst in the world. For years the majority of the population lives below the poverty line. By December 2000 the minimal monthly

salary of one employed out of four member family was 45.5 Lari, while subsistence wage was 114.5 Lari per month – Table 4.1

Table 4.1 Subsistence Wage and Incomes in Georgia 1996-2000, Lari/month [14]

Years	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Subsistence wage for one employee	-	105.3	101.6	115.8	114.5	115.8	123.6
Subsistence wage for average family (4 members)	199.3	191.6	182.9	-	199.2	201.3	215.0
Nominal average salary	29.0	42.5	55.4	67.5	72.3	90.1	-
Average family income		149.0					

In 1999 it fell 622.5 US dollars per head out of Georgian GDP. It is 53 times less then in the US and 15 times less then average level in the world (table 4.2).

Table 4.1 Gross Domestic Product (GDP) Per Person in 1999 (US dollars)

NP structure	USA	Austria	Belgium	Dane	Finland	Irland	Luxembourg
NP per head	32 800	26 800	25 100	32 500	25 200	19 700	41 500

The dynamics of the Georgian GDP in 1995-2002 is given in the table 4.3 [15].

According the official statistics (State Department of Statistics) the families could be divided into five groups (according to the income)[16]:

beggary- below -100 Lari		~ 42%
poor	- 100-300 Lari	~45%
middle class	- 300-800 Lari	~7.2%
well-to-do	- 800-1500 Lari	~4.9%
rich	- more then 1500 Lari	~0.9%

Table 4.3 Dynamics of GDP in 1995-2002

NP structure/years	1995	1996	1997	1998	1999	2000	2001	2002
NP, total (mln. US dollar)	2 866.0	3 071.6	3 603.8	3 645.6	2 869.5	3 222.4	3 350.0	2....,0
NP per head (US dollar)	623.0	665.9	784.5	791.4	622.5	676.5	2....…0	2....…0
NP growth, %		+6.9	+17.4	+1.2	-21.5	+9.7	....	....

Structural analyses of the population shows, that 42% of the families should not exist even if they spend 100% of their income on food. Such families do not pay any communal-general service charges and the state does not have any tools and moral bases to force the families with such income to pay the above mentioned charges.

The middle class, the basement of the social stability and economical development of the country, comprised only 7.2%, in other words it practically does not exist (the same category reaches 70-80% in the democratic countries).

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[14] Georgian Centre for Strategic Research and Development, Bulletin # 58, August 2001, p.p. 22-35

[15] Georgian Centre for Strategic Research and Development, Bulletin # 62, October 2001, p.p. 3-26

[16] Georgian Centre for Strategic Research and Development, Bulletin # 1, June 1997, p.p. 57-63

The asymmetry between the income distributions among the different social layers is catastrophic. Decile coefficient, which shows the discrepancy between incomes of 10% of the richest population and 10% of the poorest population, is 85 while in the developed countries this coefficient is about 6-8 [17]. As we mentioned above it is an official data, the independent experts clime that the real situation is even worse.

According the official data in 1999-2000 the power and fuel expenses of the population had increased from 14.2 mln. Lari to 17.5 mln. Lari (from 7.8 to 9.9 mln. lari in cities and from 6.4 to 7.6 mln. Lari in country side); the average monthly income of one household had increased from 12.5 to 15.8 Lari (from 12.7 to 16.6 lari in cities and from 12.2 to 14.8 Lari in country side); the average monthly expenses per person had also increased from 3.6 to 4.2 lari (from 3.6 to 4.5 lari in cities and from 3.5 to 3.9 Lari in country side).

The table 4.4 shows the communal-general and fuel monthly expenses of the families with various income in the resent years.

Table 4.4 The Communal-general Service and Fuel Monthly Expenses of the Families with Various Income

	Income below 100 lari	Income 100-300 lari	Income 300-800 lari	Income 800-1500 lari	Income more then1500 lari
Communal-general service and fuel	2% (2lari)	3% (9lari)	4%(32lari)	3% (45lari)	3% (60lari)

The figures given above show that current socio-economical situation, as well as emotional-psychological conditions in Georgia do not have bases to ensure complete payment of the energy resources and electricity charges. Is the income generated by the population enough to pay for the minimum required energy consumption? It could be figured out by comparing the parameters given above with the energy requirement values. Latter is discussed in the following chapter.

5. Energy Demands, Paying Capacity and Energy Comfort of the Population. Psychological Environment and Paying Culture

Basically the energy demand[18] and paying capacity are interdependent parameters. When the paying capacity is high the energy demand is rising and vice versa. The correspondence between energy demand and paying capacity fails if the population is inconsistent to pay for the minimum required energy resources. In that case it is forced to reduce the energy consumption below the required minimum and thus puts his health in danger or it uses the required energy but bilks to pay the charges. Both cases are presented in Georgia. It is caused mainly by the low level of income.

The existing energy/energy resources standards of use represent the projected values and are figured out according the human living conditions and sanitary-hygienic requirements. These requirements, according the construction regulations, were obligatory for all types of household

[17] Georgian Centre for Strategic Research and Development, Bulletin # 64, January 2002, p.p. 33-59

[18] following definitions are introduced: energy demand – demanded level of comfort energy; comfort energy – level of satisfaction of energy demand

sector objects. The strict changes of the living conditions in the recent years have brought the necessity of revision of the above mentioned standards. This issue is even more important as it deals with inevitable reduction of demand on energy to the consumer paying capacity on one hand and with keeping the nominal living standards of the population on the other hand.

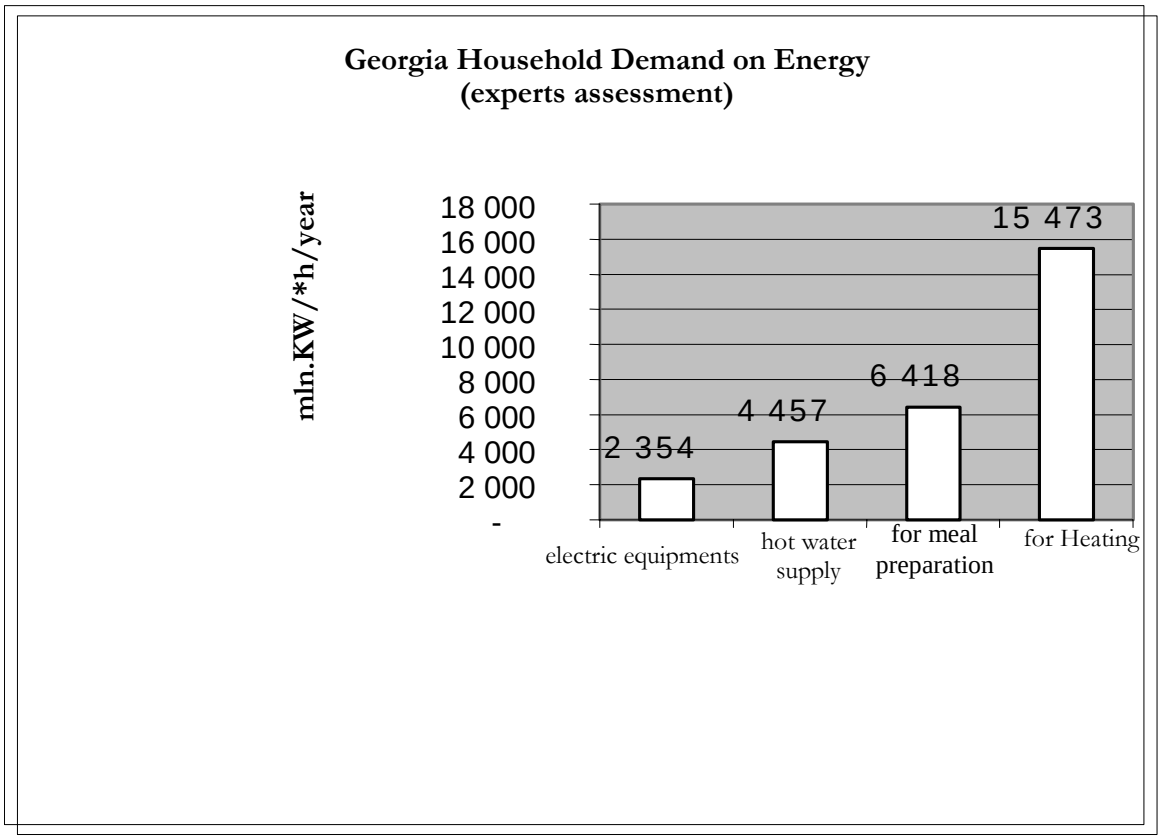
The household energy demand of the average Georgian family (4 members) is given in table 5.1. The values are based on different experts assessment, social survey results conducted by the Sociological Research Center SRC, also comparing the previous standards and current statistic data.

Table 5.1. The household energy demand of the average Georgian family (4 members) experts assessment

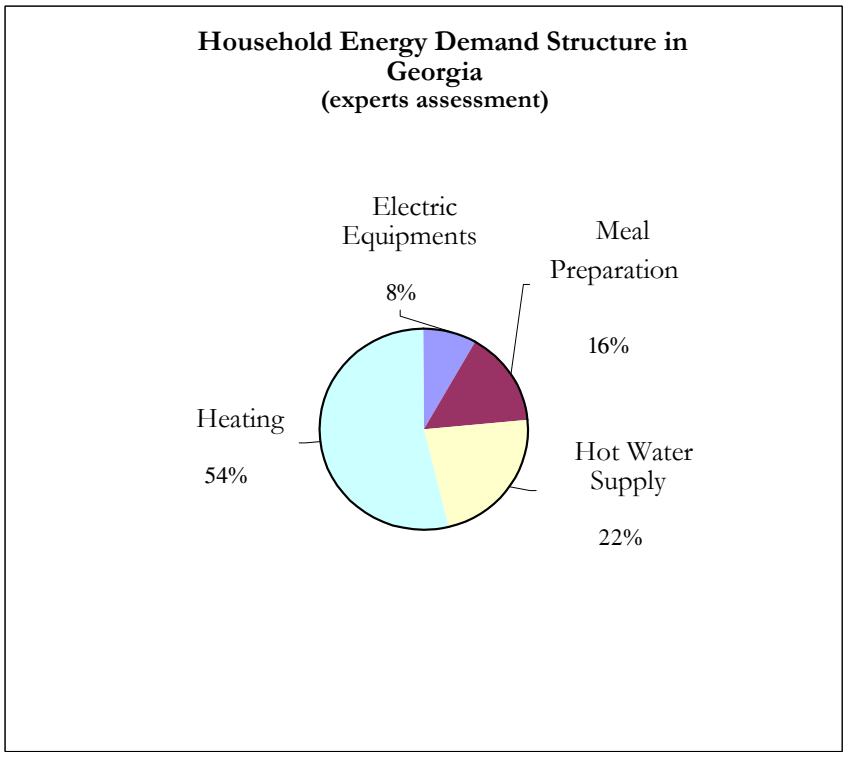
Electricity Consumption by Household Equipments

KW*hour/year./family		1930
Meal preparation		
energy demand for meal preparation	KW/family	2
average time needed for meal preparation	hour/day	5
energy demand for meal preparation for 1 family	KW*h/year/family	3650
	KW*h/day/family	10
energy demand for meal preparation for 1 person	KW*h/year/person	830
	KW*h/day/person	2.3
Water Supply		
capacity	KW/family	1.2
Coefficient of capacity using hours	-	0.5
Water Supply Session Duration	Day/year	365
energy demand for 1 family water heating	KW*h/year/family	5 256
	KW*h/day/family	14.4
energy demand for 1 person water heating	KW*h/year/person	1 195
	KW*h/day/person	3

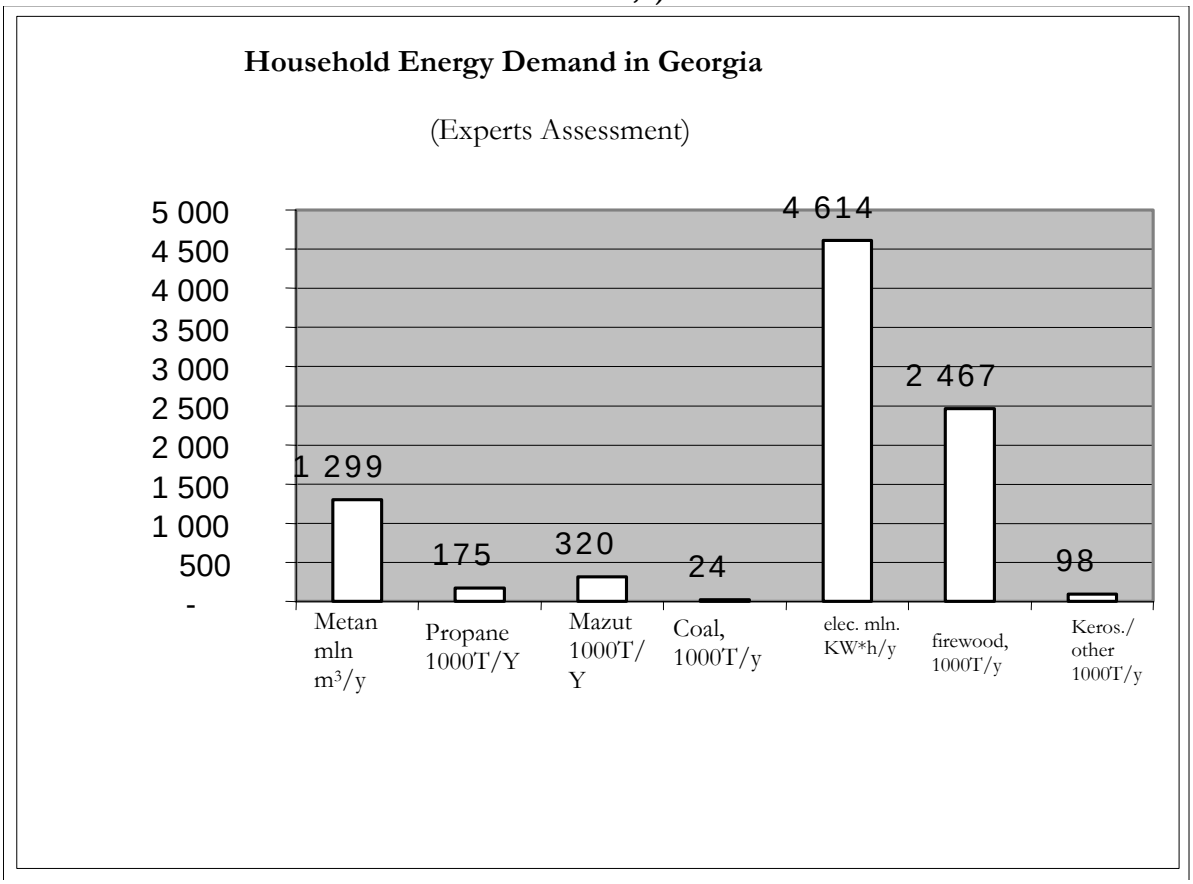
Heating		
heating capacity needed for living space heating	W/m^2	80
heating capacity needed for 1 family living space heating	KW/family	3.52
Heating season duration	day/year	150
Thermal Energy needed for 1 family living space	KW*h/y/family	12 672
	KW*h/day/family	84.5
Thermal Energy needed for 1 person	KW*h/year/person	2 880
	KW*h/day/person	19



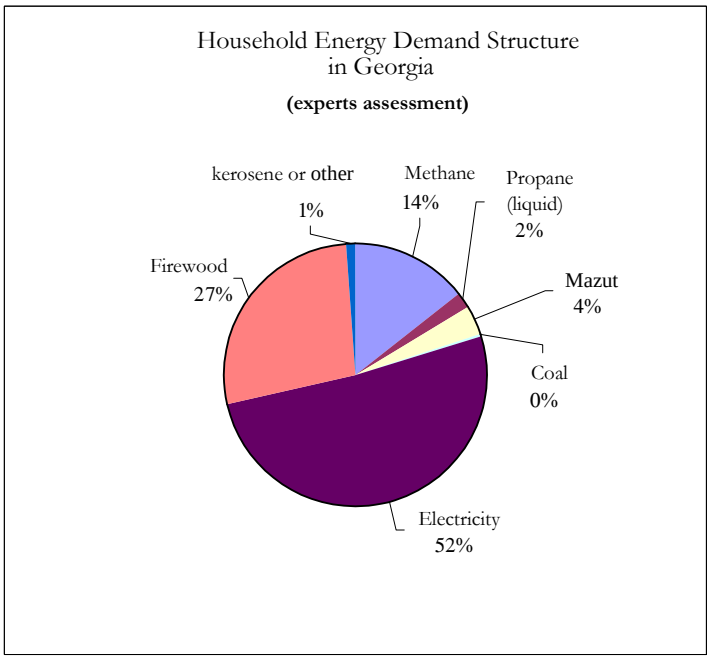
Picture. 5.1, a)


Household Energy Demand Structure in Georgia
(experts assessment)
Electric Equipments
8%
Meal Preparation
16%
Heating
54%
Hot Water Supply
22%

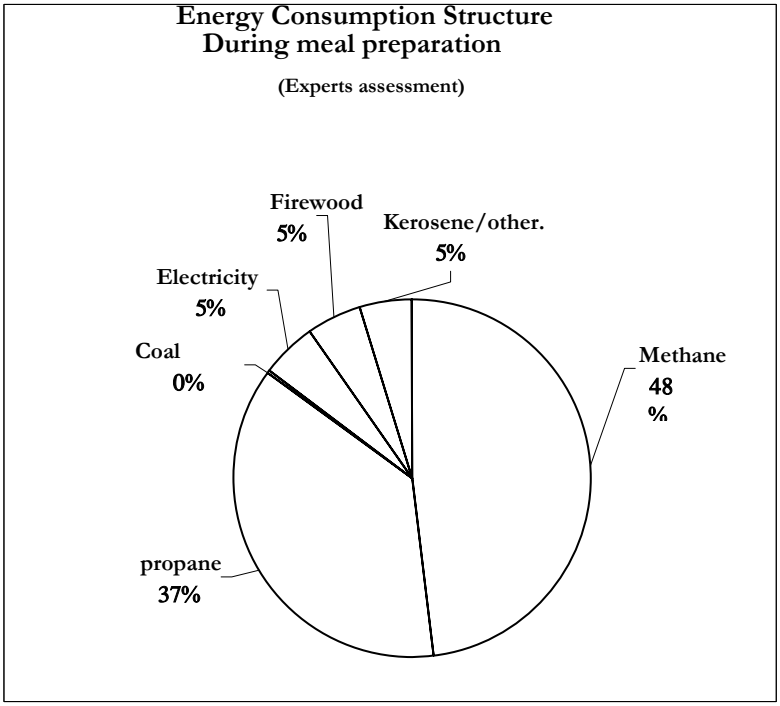
Picture 5.1,b)


Household Energy Demand in Georgia
(Experts Assessment)
5 000
4 500
4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
-
1 299
175
320
24
4 614
2 467
98
Metan mln m³/y
Propane 1000T/Y
Mazut 1000T/Y
Coal, 1000T/y
elec. mln. KW*h/y
firewood, 1000T/y
Keros./ other 1000T/y

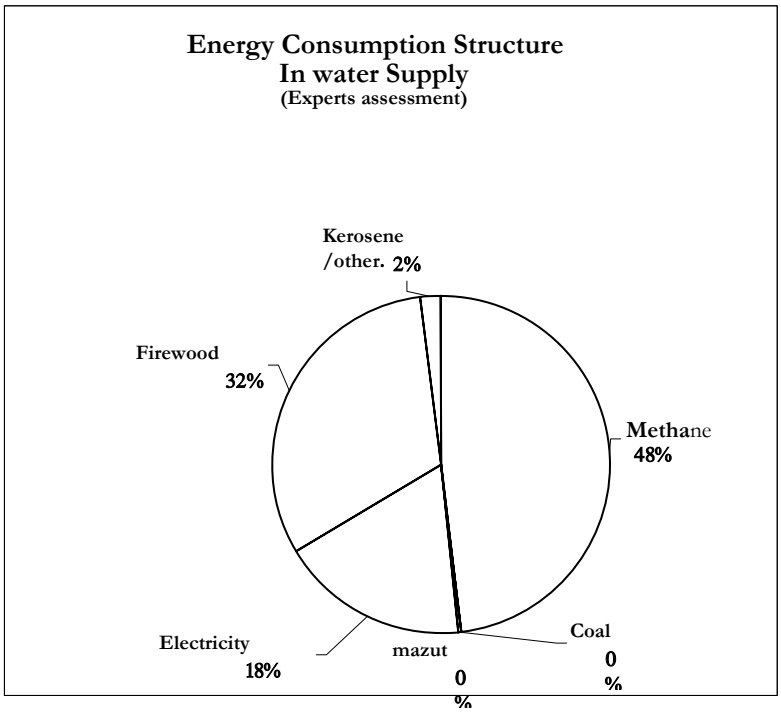
Picture 5.1,c)



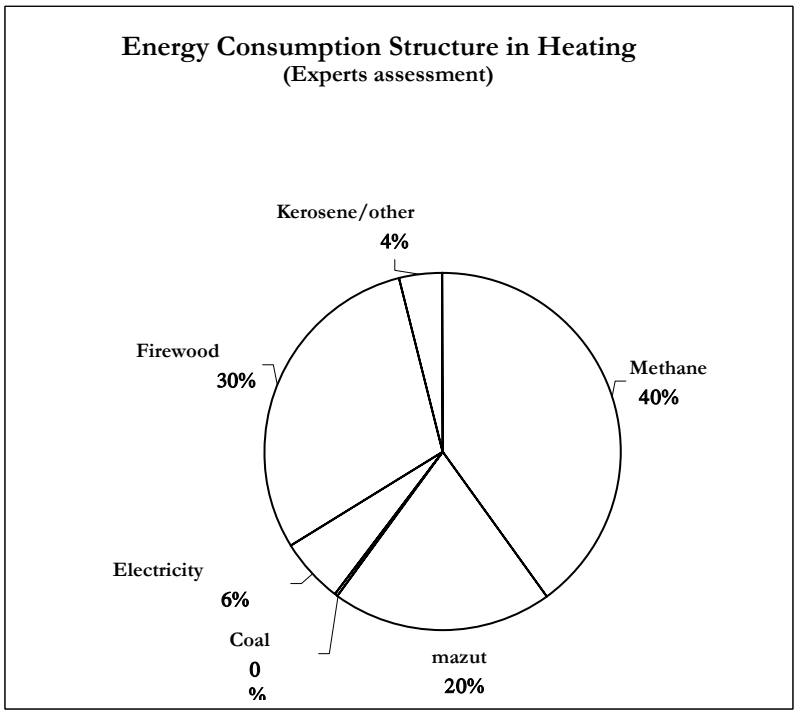
Picture 5.1,d)



Picture 5.1,e)



Picture 5.1,f)



Picture 5.1,g)

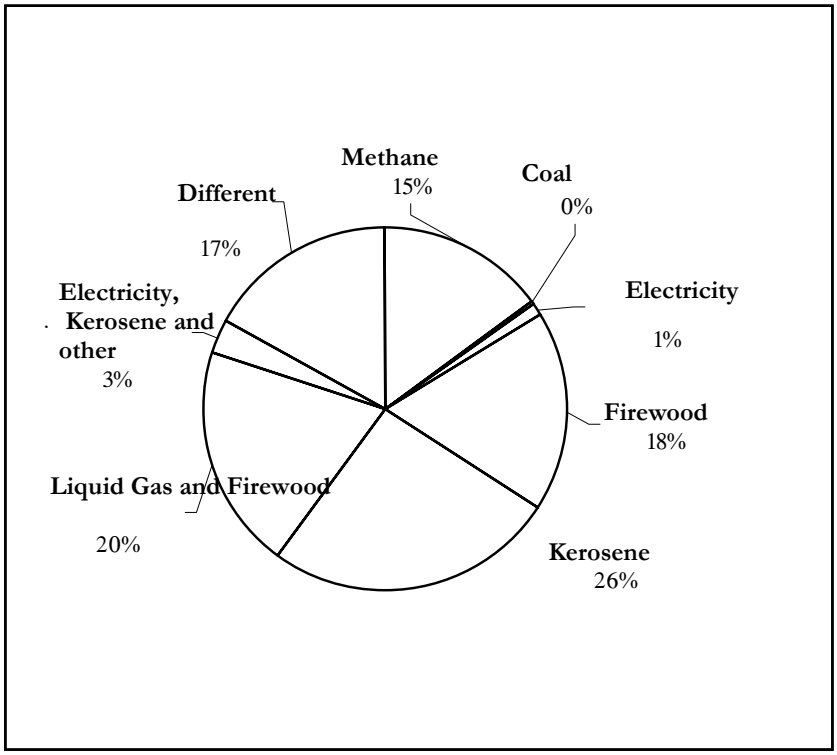
Table 5.2 shows average charges, adjusted in 1998-2001, for different energy resources in Georgia.

In the recent years the energy resources accessibility of the population has significantly reduced. It is caused by numerous reasons including worsening of the supplying systems and management as well as drastic increase of charges on energy resources.

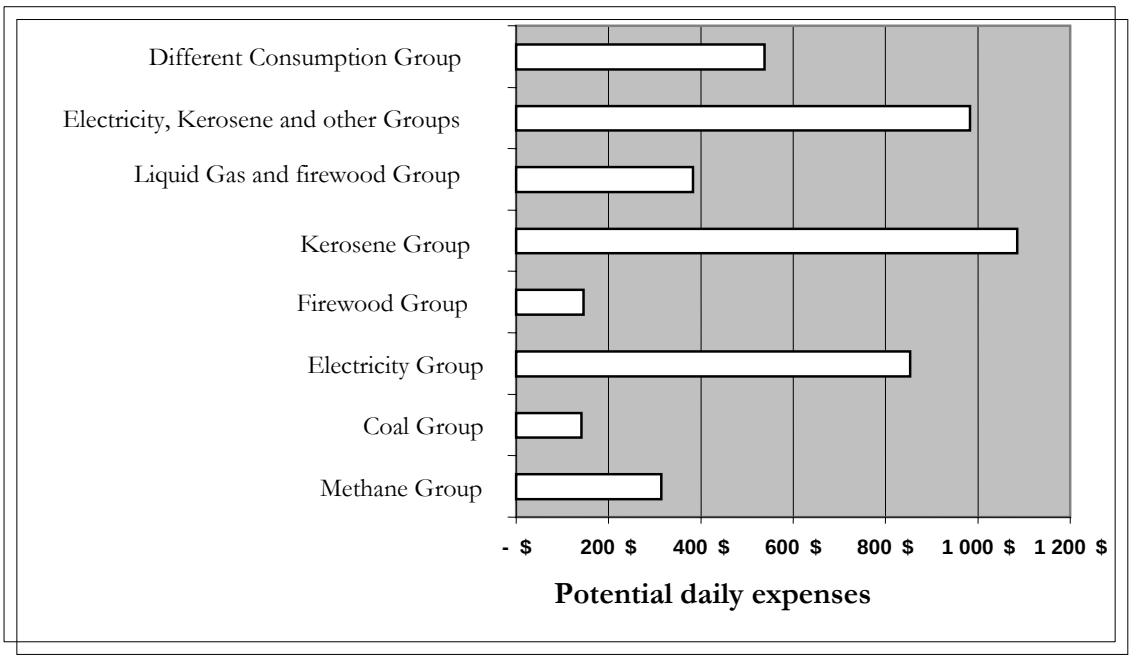
Nowadays, according to the use of energy resources, the population could be divided into following categories: I category – the families who use for heating cooking and water heating only natural gas (so called methane group); II category – the families who use for the same purposes only coal (coal group); III category – the families that use only electricity (electricity group); IV group – only firewood (firewood group); V category – only kerosene or other (kerosene group); VI category – The families that use liquid gas for the cooking and firewood for water heating and heating (liquid gas and firewood group); VII category – The families that use electricity for cooking and water heating and kerosene for heating (electricity, kerosene and other alternative sources group); VIII category – the families that use mixed resources (mixed sources group). The percentage of each category and cost of energy sources consumed annually by each group are shown correspondingly in the charts 5.2 and 5.3

Table 5.2 average charges, adjusted in 1998-2001, for different energy resources in Georgia.

Kind of energy Resource	Purchasing Price	Measure
Narural Gas	0.27	lari/m^3
propane (liquid)	1.40	lari/kg
mazut	0.14	lari/L
Kerosene	1.00	lari/L
Light oil products.	1.00	lari/L
Petrol	1.00	lari/L
Diesel Fuel	0.80	lari/L
Firewood	15-25	lari/m^3
Coal	15-35	lari/t



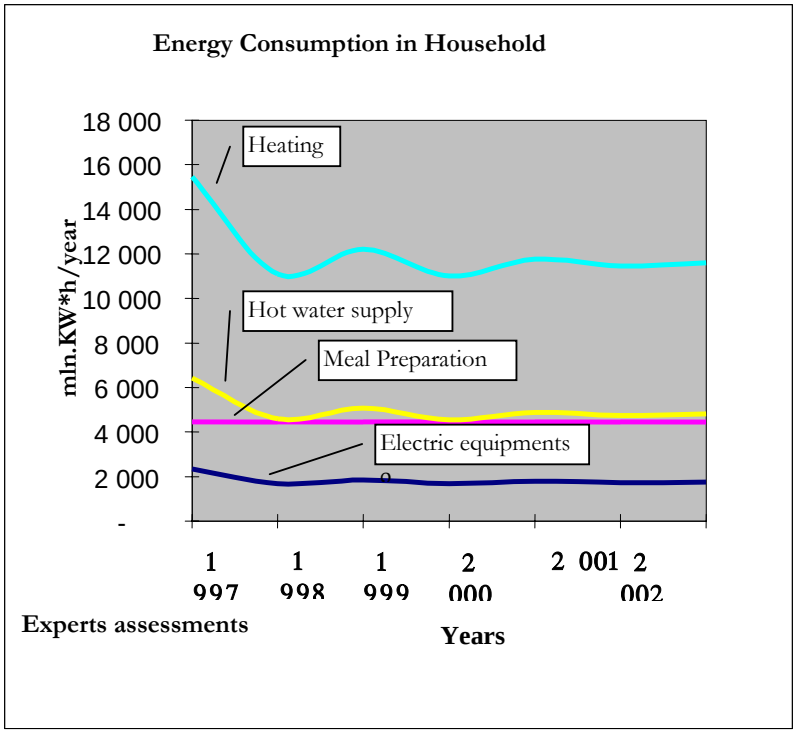
Picture 5.2 The percentage of consumers using different energy sources in 2001-2002 (experts assessment)



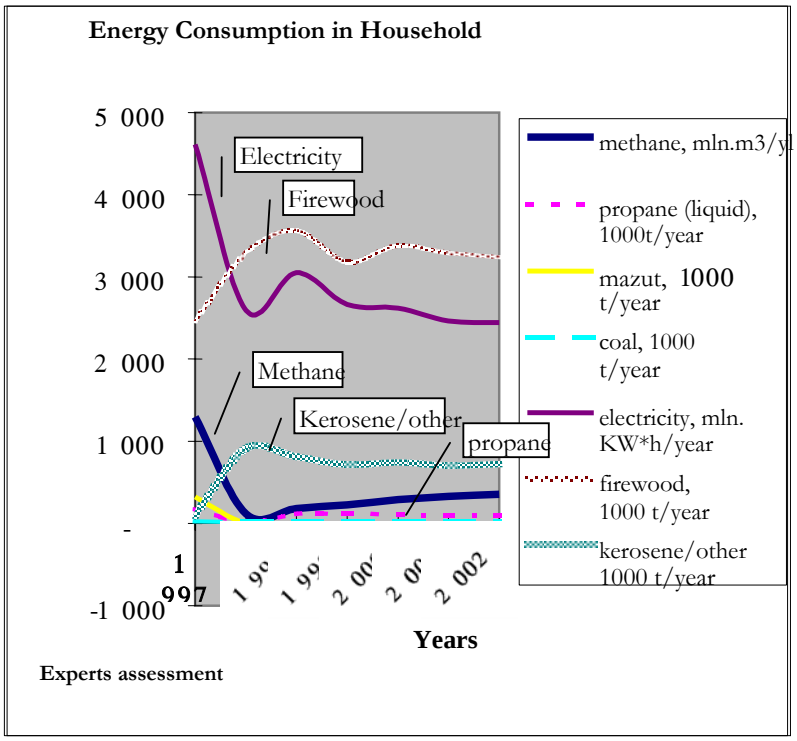
Picture 5.3 cost of energy sources (including electricity) consumed by different category of consumers in 2001-2002 (experts assessment)

According the official data subsistence wage for one able-bodied man in 1998 constitute 96.7 lari per month (545 US dollars a year), in 1999 - 127.3 lari per month (720 US dollars), though the average annual income of 65-80% of the families is less then 230-600 US dollars. If we compare these figures to the data given in the chart 5.3 it becomes evident that even in case of the cheapest energy use (coal and firewood groups) the majority of the population would spend 25-50% of their income. Together with the expenditures of vital necessity (subsistence wage) it exceeds the annual income of the families. The above mentioned indicates the extremely low paying capacity of the population.

The Chart 5.4 shows the dynamics of energy and energy resources consumption changes in Georgian household sector in 1997-2002. The abscise column according "the experts' assessment" corresponds to the energy demand/consumption standards. It is clear that energy consumption decrease in the household sector in 1997-2002 took place at the cost of water heating and power tools usage intensity reduction. The power usage for cooking purposes remains more or less constant.



picture 5.4, a)



picture 5.4, b)

Picture. 5.4 dynamics of energy and energy resources consumption changes in Georgian household sector in 1997-2002.(experts assessment)

The chart 5.4 shows that energy comfort level of the population is 30-50% less then required. It negatively influenced the human health.

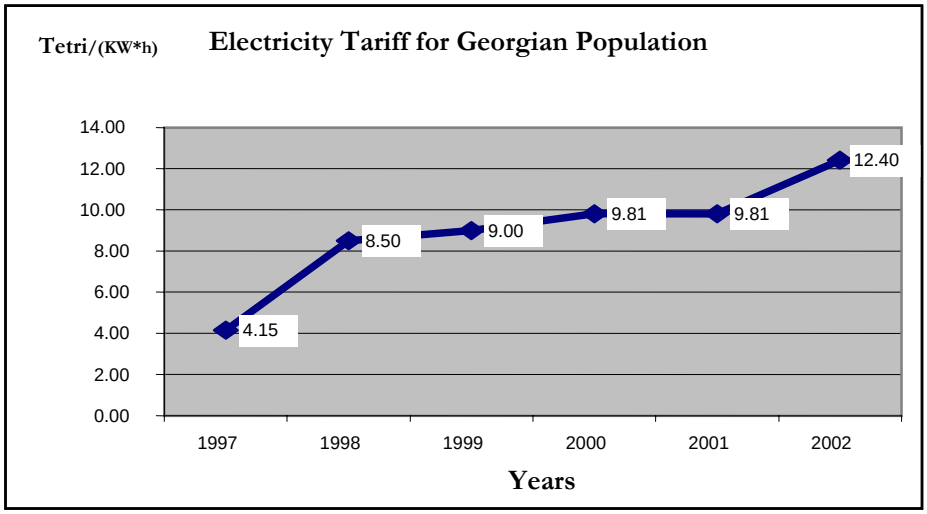
The low level of professionalism and high level of corruption in management system as well as leveling of the moral standards causes distrust among the population and makes any reforms inconsistent. The population does not believe that paid power charges would go to the state budget and cause the rise of overall standards of living.

On the other hand, scanty or no incomes do not mean the absence of needs (including power needs). A person with 35 lari salary per month needs the same energy comfort (heating, light, hot water, etc.) as any top official.

That is why, the unwritten market law "if there is a demand – it should be satisfied" forces the citizens to get rid of the power charges by all means (deals with the power company representatives, spoiling the power meters, etc.). Currently only 35-40% (based on the different sources) of the total consumed power cost is collected in Georgia; 65-72% from the household sector of Tbilisi and about 12-15% - throughout the country side, according the data collected in 2003 (the source: United Power Distribution Company). It should be stressed that in country side only 2-3% is collected in monetary form. The rest is paid by various forms – debt set offs, etc.

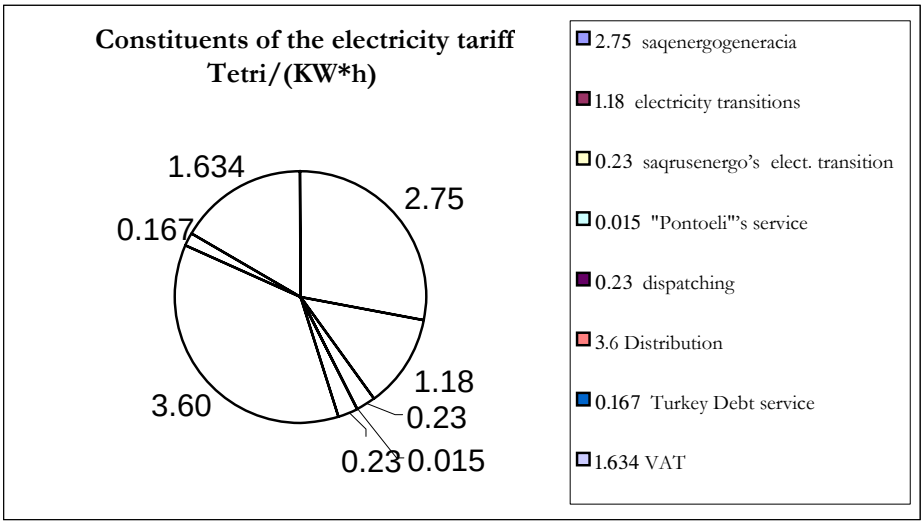
6. Change of the Tariffs Resulted by the Structural Changes

The introduction to the above mentioned facts shows that any changes in Georgian energy sector that causes the tariff deviation would have maximum and direct influence on the living conditions of the population. As a result of recent structural changes of the sector the energy tariffs have significantly raised. The good example of it is power tariff rise in Tbilisi – Chart 6.1.



picture 6.1 Dynamic of electricity tariff change for Georgian (Tbilisi) population in 1997-2002

The extremely sharp rise took place in 1998, when the strategic investor – AES entered the Power sector and started to implement the tariffs based on the complete cost of the power. Each Institution established during this and the following period of the restructuring has made its contribution to the tariff structure – Chart 6.2



picture 6.2 constituents of the electricity tariff for population of Tbilisi in accordance with energy system institutional bodies in 2000-01

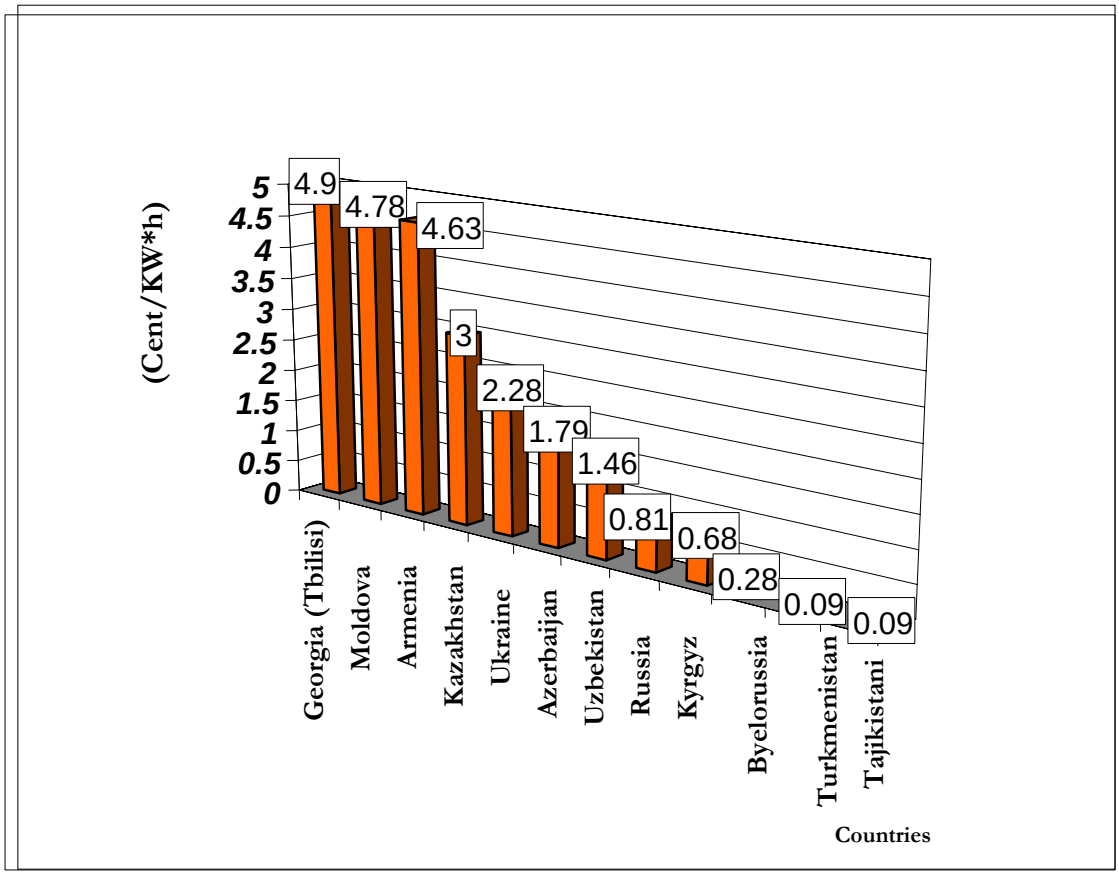
As a result Georgia maintained the highest power tariff among the countries of Commonwealth of Independent States (Chart 6.3), notwithstanding the fact the hydropower plants' share in the country power production comprised 80-85%.

Was such sharp power tariff rise so inevitable and were there objective bases for it in Georgia? There are lots of different opinions about this issue. Below we brought some of them accompanied with our comments.

According to GNERC (Georgian National Energy Regulation Commission) the causes of tariff rise are as follows:

- The fund-profit component was added to the electricity tariff - annual accrued interest to the funds assuming that the cost of the funds is a set up bank account. The fund-profit accrued interest deviates from 10 to 20% a year;
- The market cost of the funds had raised and was determined as final revaluation result;
- Amortization accrued interests have increased from 2-3% to 7-8% per year;
- Repair materials have raised in price;
- Repair expenses have been added to the electricity cost, they comprise 5% of the main funds cost.

We think, the specified reasons are of general character and cannot serve as complete (exact) argumentation to explain the reasons for increasing the rates. By present the method to establish the rates, the rate for electricity could have been fixed even at higher extent, for the freedom of determining the market cost of funds is great, not mentioning the interest rates on amortization extra charges, repairs expenditures, etc. It is supposed that the role of "GNERC" in establishing the rates is minimal. As it seems, it is deprived of possibility of carrying out expert judgment and auditing and is confined to the approval of the rates, presented by the licensees.



Picture 6.3 average retail tariff for electricity in countries of Commonwealth of Independent States in 1999-2000 .

Under Article 12 of Tariff Methodology, use of tariff, based on total value is advisable at the first stage of formation of wholesale market and takes as the first objective to attract investments at maximum extent. After the principle round of privatization, since the strategic investor was established in Georgia, the process of privatization has in fact been stopped, and the tariff, based on the total value of electricity converted into the product of "Identified Need". This is at present used for the state power enterprises, with the result that tariff methodology may well correspond to the main principles of economics and power engineering, however, does not tally with the present situation. For instance, theoretical consumptions of electric industry throughout the second half of 1999 was 14,058,000 GEL, and the output constituted 3,106,400,000[19] KW*hour, i.e. the theoretical cost of electric generation was 4.6 Tetri/(KW/hour). At thermoelectric power stations the cost of fuel, necessary to generate 3, 800,000,000 KW*hour/year electricity, was 200,000,000 GEL[20], i.e. the cost of electrical generation was 5.2 Tetri/(KW*hour). Accordingly, it is difficult to explain why the final tariff is twice as more (as minimum) as that of the electricity, generated through thermoelectric power stations, even more

[19] Georgian National Energy Regulatory Commission, Basics of Energy Regulation, Chapter I, p.165
[20] Georgian National Energy Regulatory Commission, Basics of Energy Regulation, Chapter I, p.54

so that the share of hydroelectric power plants in electric power generation much exceeds the share of thermoelectric power stations.

In opinion of some independent experts[21], the tariff based on total value, has lost its significance for most of the enterprises of the sector, for under present surroundings, real fees are impossibly far from the total value, which serves as a basis for determining the tariff. At the same time, the level of tariff has no affect on the amount of sum of money, in fact received by the enterprises. This is caused by the fact that credit and debit debts of the state power enterprises balance each other and settlement is effected by means of offsetting. At the given time, those misery amounts, transferred on the enterprise accounts, are not used for covering their operational costs and is transmitted to the accounts of tax services.

It can be assumed form the mentioned, that the tariff methodology, as well as tariff policy in general, needs to be subjected to serious changes and is to be made more accurate. We think, in respect of the methodology, it is necessary to carry out auditing of components of fund gain and amortization extra charge within the tariff for electricity. They should be determined and re-estimated on a periodic basis, and this should be executed by using of Western methodology, which requires an indisputable envisaging of common market conditions. This method will ensure correct estimation of present and future costs of the mentioned parameters, and lays the foundation for impartial determination of tariffs.

In respect of policy, today it is quite hard to define the basis, on which the country's tariff policy throughout the electrical power sector depends – foreign commerce with electricity or provision of meeting the consumer's needs, attraction of additional investments or the effort to realize the present resources more effectively, privatization or establishment of social enterprises, etc. The situation, established today, demonstrates that the power policy, pursued throughout the country is oriented towards the import of electricity rather than towards rehabilitation and realization of internal resources. If this is the state, named just the stage and is purposefully directed towards the effort to help foreigners render maximum assistance in respect of energetic sector, to carry out its thorough rehabilitation within the period of time, envisaged in advance, and there is the established forecast about the fact that during the given period in our neighboring countries the tariff for electricity will considerably increase and at the conclusion of the mentioned stage, our country will turn out to be competitive throughout the broadened power market, having in addition, "Technically reliable power engineering" – in such a case, the established situation may be estimated as a strategically necessary stage. However, there seems not to be fair basis for this kind of estimation, for on one hand, there cannot be seen the results, which should have been benefited long ago throughout the power sector and, on the other hand, there are no guarantees for social (as well as national) safety as a result of executed reforms.

One of the reasons for increasing the tariff for electricity is connected with the requirement of the International Monetary Fund, under which, as far as we are aware of, the debt of the population, accumulated throughout the current year is to be necessarily paid to the tariff of the next year. The Fund considers that by this measure the payment to the state budget will increase the possibility for social security of vulnerable groups of population. Namely, through the additional amounts of money paid to the budget, the projects to assist the defenseless groups of the population should become possible.

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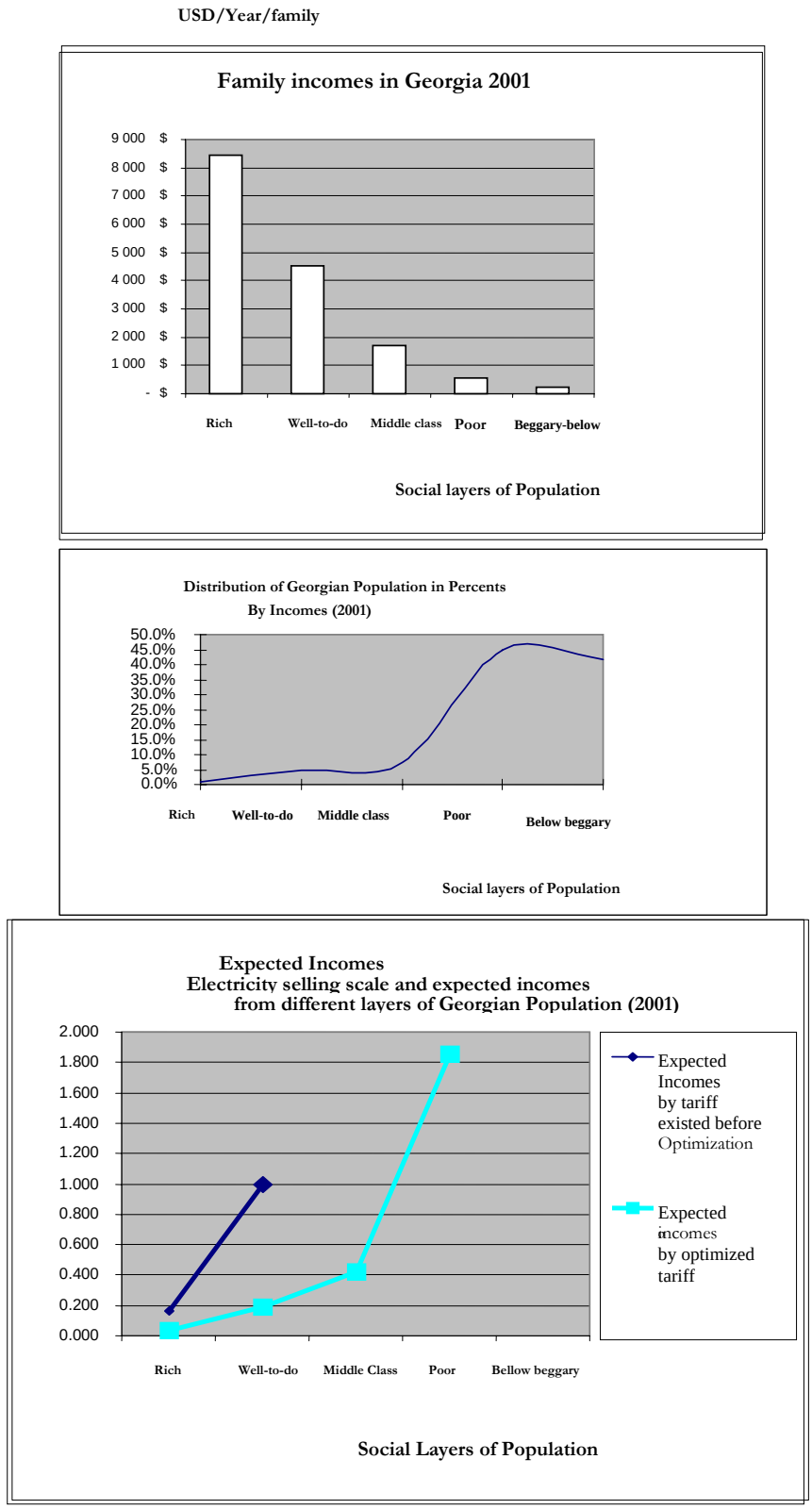
[21] M. Margvelashvili, Some Issues of Tariff Methodology, Tbilisi, 2002

We think that under the surroundings established nowadays, when the income from the population is considerably little compared with the growth of the tariff, this kind of approach will entail continuous process of the tariff growth. Namely, the increase of the tariff will cause the increase of the number of insolvent population. The extent of charging the value of electricity will accordingly decrease, and the debt of population will increase. Paying the "new" debts to the next year tariff of electricity will increase the latter; the above-described cycle of the tariff growth will repeatedly take place and spiral endlessly.

It may be supposed that the final result of all the mentioned will be not only the growth of tariff, but also the reduction of budgetary income. Due to this, welfare allowance to the vulnerable groups of Georgian population will become possible, provided the employment rate of population increases in parallel with the tariff growth process, and therefore the population's income, too. Alternatively, it is worth paying attention to the following formula: production value decreases, its consumption extent increases so that the total income from the production realization increases. Application of the given formula is possible within the electrical power sector by the following diagram: tariff optimization (reduction) takes place; therefore, the number of solvent population increases (much more people are able to pay the tariff for electricity if compared with their number in case of higher tariff); the income from electricity increases.
Evaluative calculations, carried out, demonstrated that as a result of the tariff optimization (reduction) for electricity throughout Georgia, the groups of population, able to pay the tariff will be added by two other solvent groups – middle and poor. As a result, the sums of money paid for the electricity will be more (Picture. 6.4).

As a conclusion, it can be mentioned that there are several reasons for increasing the energy supply service. Among them are irrational state economic policy, bulk of institutional rings within the power sector, faulty tariff methodology, and absence of active mechanisms directed towards the protection of the population.



Picture 6.4. Expected results of energy tariff optimisation in Georgia

7. Practice and perspectives for establishment the energy efficient technologies and energy saving measures in Georgia

At the very outset of reforms in Georgian power sector, the question of applying energy efficient technologies and energy saving measures became urgent. In this direction, the estimation of the potential, available in the country was first carried out within the limits of the project for optimal development of Georgian power engineering sector[22]. The evaluation activities included the block of energy saving and energy efficient technologies. For the industrial sector this represented the application of multi-speed electric engines, optimization of transformer power and working mode, exploitation of reactive jacks and anti-overload safety device for engines, establishment of metering systems for power consumption of power resources, economic decentralized systems of energy-saving illumination and power generation. The evaluations demonstrated that by systematic introduction of the mentioned systems it would become possible throughout the industrial sector for the year of 2005, to save at least 200 Million K Wt h/year electricity.

For the domestic sector there have been estimated the potential of such technologies and measures, as the reduction of heat waste by means of double glazing or so-called warming, and usage of compact fluorescence bulbs aiming to save energy, application of A/C provision systems based on heat pumps and high-efficient electric device, application of sun collectors for hot water provision.

Lately the agency-type service has been established in Georgia – "Energy Efficiency Center", which undertook important activities in direction of the energy auditing of the industrial enterprises. This service also worked out and established the methods for energy auditing.

Practical implementation of the first energy efficiency projects began in 1988. The pioneers of this activity were so-called "The Green Brigades", who implemented energy saving demonstrative projects in different regions of Georgia.

The process of implementation of large-scale energy efficiency projects began in 2000 within the limits of program"S1" by the company "Consulting". The Association of Engineers and Power Engineering Specialists, as a sub-contractor, is managing the activities. At the first stage of the mentioned program, 42 demonstrative projects were carried out. The projects were implemented throughout domestic, educational-enlightening, industrial and commercial sectors and were envisaging the following:

a) Warming activity for the purpose of reducing infiltration-and-exfiltration waste in the buildings;
b) Installation of heating systems, operable on natural-gas radiators;
c) Installation of heating system based on natural-gas and liquid-fuel boiler and standard water radiators;

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22 Least Cost Plan for Energy Sector in Georgia, Final Report, Energy Efficiency and Market Reform Project, 1998

d) Substitution of the present system for fluorescence bulbs, which save energy;

e) Repairing of roofs of buildings and roof warming.

Economic efficiency indicators gained through energy saving measures, implemented in respect of various objects are referred to in Table 7.1.

Table 7.1. Economic efficiency indicators gained through energy saving measures, implemented in respect of various objects.

Object	Power saving activity	Annual Saving		Initial investment	Simple feedback	S/i*
		Heat consump. MW*h/y	Amount USD/y	USD	year	
mini-market	a, b, d	7	1637	3496	2.1	1.86
Secondary school #56	a, b, d, e	11	5506	22740	4.1	1.01
Restaurant "Aragvi"	a, b, d	65	2752	9183	3.3	1.2
Fashion house	a, b, d	7	1526	4220.5	2.8	1.45

*) s/i – saving divided on the investment in entire exploitation cycle

During the period of 2001-2002, the second stage of the program was implemented. During the given period, 34 demonstrative projects for energy efficiency were implemented mainly throughout industrial sector. The projects included: optimization of the operational modes of transformer and water-pumping stations, introduction of automatically controlled illumination systems at hotels, hospitals and arrangement of complex energy supply systems at clinics, construction of micro hydro power stations, manufacturing of bio-gas generators and their installation throughout farm economy; assembly of sun collectors at hotel service objects, implementation of energy saving measures in Tbilisi Metropolitan, arranging stabile and efficient energy supply systems at food-stuff enterprises, etc.

Evaluative calculations demonstrate that there is a significant potential for saving of energy in Georgia. Namely, by way of optimization of power and operational modes of transformer assemblies there can be saved 4 Million KW*h electricity annually; by using the energy-effective bulbs for outdoor illumination of big cities there may be saved 6-7 Million KW*h electricity annually; by waste reduction throughout drinking water supply system - 30 Million KW*h electricity, and by the optimization of operational modes of water pumping stations – 40 Million KW*h electricity.

As a conclusion, it should be mentioned that further realization and employment of energy efficient potentials is necessary in Georgia. This deems to be a significant resource for future improvement of power engineering state and the living conditions of each single citizen in the country.

8. Energy supply security for the population, Economic criteria for living standards and social security programs

Energy supply reliability for Georgian population is connected with two different – technical and economic factors. Effect of the technical factor depends on the technical condition and degree of readiness of power engineering system. In this direction, by the end of 2002 and at the beginning of 2003, the official reason for frequent obstacles within the energy supply was often named to be the technical fault of power system. The economic factor of energy supply reliability is dependant on the state of population's income and social security.

General picture for economic situation of Georgia in the years of 1996-2001 is demonstrated below. During the referred period, not once was the state budget implemented (Table 8.1.)[23]. The Table also demonstrates the annual energy consumption per person (See Picture 8.1.).

One of the reasons of budgetary crisis was named to be so-called "Traditional seasonal factor, taking place in economy" or fall of industrial production during the wintertime due to obstacles throughout energy supply field[24].

Table 8.1. Indicators of implementation of state budgetary income plan for the years of 1996-2001.

Budget/Years	1996	1997	1998	1999	2000	2001
Plan, mln. lari	562.8	680.4	752.2	922.5	695.1	845.2
Factual, mln. lari	518.1	593.2	621.9	650.2	640.3	758.3
discrepancy, mln. lari	-44.7	-87.2	-130.3	-272.3	-54.8	-86.9
Plan fulfillment, %	92.0	87.2	82.7	70.5	92.1	89.7

Production fall, if compared with private sectors, more rapidly takes place throughout state sectors, where tax collection to certain extent is always possible. Non-payment of taxes within the private sectors is not an impossibly difficult task. Most of the production, manufactured here, is not registered. According to the data of Corruption Research Center, 75-80% of the entrepreneurs do not show their real profit in accounting. Under the present large-scale corruption, neither do the effective tax tariffs lay basis for payment stimulus. Within the present operational mode of tax system there seem not to be the benefits for legal financial approach towards the entrepreneurs and transparent accounting with them. Accordingly, the present taxation system and its apparatus of Georgia are considered to be the impedimental factors for the growth of legal economy, and therefore, incentive factors for corruption and shade economy. According to approximate evaluation, by means of payment of 72 million USD as a bribe in 1999, the private entrepreneurs gained the right to conceal half a milliard USD tax[25].

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[23] Georgian Centre for Strategic Research and Development, Bulletin # 73, 2002, p.p. 26-37

[24] Georgia Economy Trends, GEPLAC, Quarterly Review, #1, 2001, p. 14

[25] Georgian Centre for Strategic Research and Development, Bulletin # 44, September 2002, p.p. 3-10

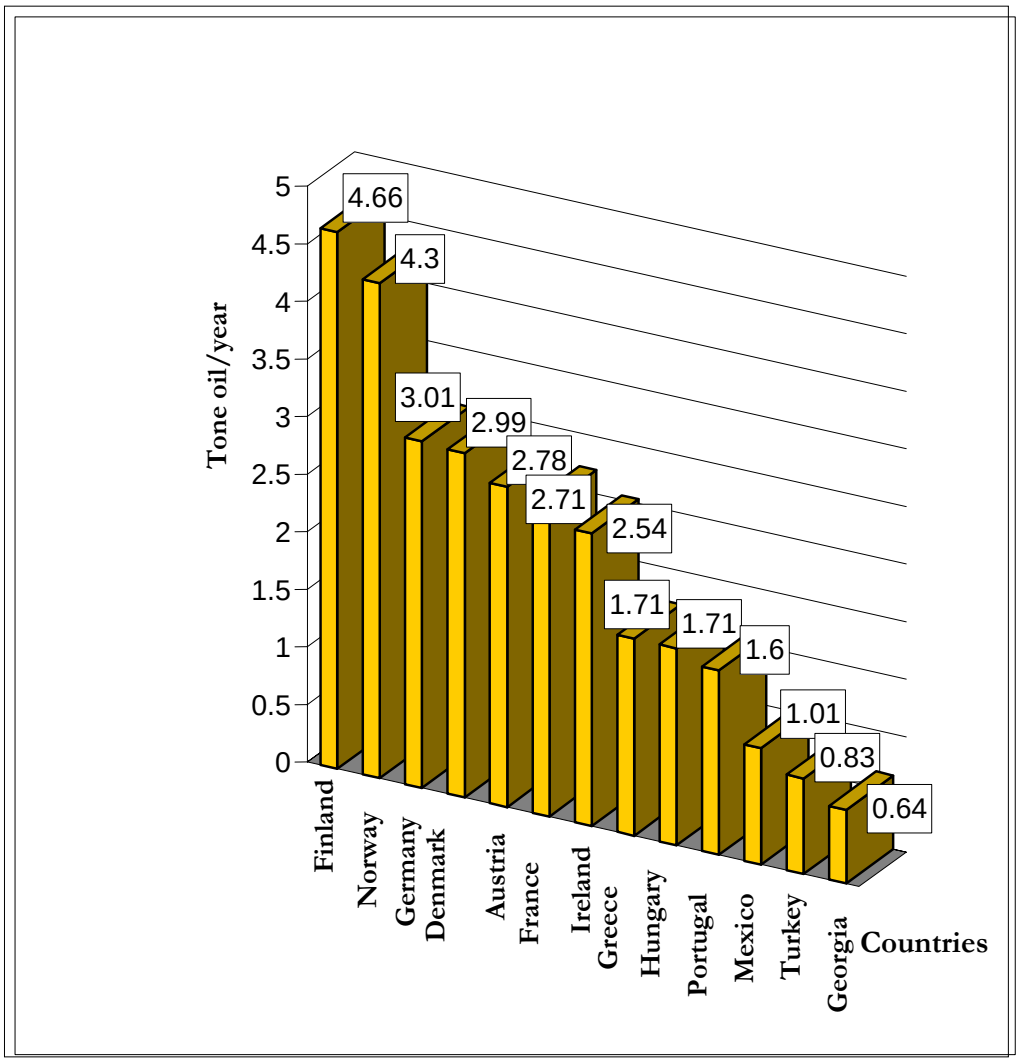

Chart. 8.1. Annual energy consumption per citizen in various countries.

The result of the above-mentioned is that the growth rates of budgetary costs are much more than the rates of income growth, and as a result – there is a budgetary crisis in the country.

The budgetary crisis itself results in an acute social issue, for it seems to be inevitable to cut the cost portion of budget, where as it is natural, social transfers are as well included, or the indexation of wages and welfare allowances is not implemented according to inflation rate. Due to this, in spite of preserving of rated income rate or its minor increase, the real income of population decreases. Accordingly, the state budget is deprived of one of its functions, which is: the insurance of fair income distribution, social impartiality and improvement of living standards of the population.

During the recent years, the costs for social insurance and social security measures, envisaged by the plan, constituted 3,8% of GDP. According to this index, Georgia stays far aback not only of developed, but developing countries as well. (Table 8.2.)

Table 8.2. Share of welfare allowance in GDP.

Country	Austria	Byelorussia	Latvia	Finland	Romania	Singapore	Georgia	Turkey	Hungary
Share,%	24.5	12	9.1	30.5	16.9	7.2	3.8	4.9	14.8

One of the most important points of social costs is the pension costs. Today there are about 1 million pensioners in Georgia. Their monthly pension is 14 GEL (Table 8.3.)

Table 8.3. Registered number of pensioners and pension tariff in Georgia.

Years	1996	1997	1998	1999	2000
Quantity of pensioner, head	1022.0	979.4	967.4	927.7	900.4
Amount of pension, lari/month	10.2	11.1	14.0	14.0	14.0

According to the data of the year of 2000, the share of pensions in living minimum of the average consumer constituted 14%, and by March 2001, this figure was 13, 7%. On the background of misery sums of money, the fact of non-payment of pensions for 3-4 months' time, cases of pension misappropriation and overpayment, lays the firm foundation for acute crisis, experienced by the pension system today.

As for the state welfare allowance, this is envisaged for the families, constituting of orphans and/or lone unemployed pensioners, having no official breadwinner. This is in fact, certain kind of additive, which together with symbolic pensions, should be rendered to the most defenseless layer of pensioners, and is also a minor assistance for orphan children. By the Presidential Decree of August 21, 2000, the rate of state welfare allowance for appropriate one-person family or for each orphan child under guardianship is 20GEL, and for appropriate two- or more-person families this rate is 29GEL. At present under the Presidential Decree of February 10, 2001, the state welfare allowance for appropriate one-person family is up to 22GEL, and for appropriate two- or more-person families it is up to 35 GEL.

Like the pensions and state welfare allowances, unemployment allowance is of a symbolic character, as well. (Table 8.4.). In order to be granted this kind of allowance, an unemployed should undertake registration and should accordingly have certificate to work at state sector. Due to this fact, the unemployed, who bothered themselves to be registered, are less than the real number of them. Accordingly, the number of unemployed, being granted the allowance is lower, than the factual number of unemployed. (By the first quarter of 2001, 2% of the registered unemployed).

Table 8.4. Number of registered unemployed and unemployment allowance.

Years	**1991**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Registered unemployed, thousand	3.5	61.1	57.7	142.5	98.7	100.4	117.3
Number of unemployed, who receive dole, thousand	1.8	2.6	8.0	4.9	2.0	1.9	2.8
Average amout of dole per person/ a month, lari	129.6	4.2	7.9	9.2	9.5	10.3	11.8

There were about 22 kinds of allowances in Georgia for electricity consumers. These allowances on December 24, 1999, were limited to certain extent, namely, for the consumers, being relieved from electricity tax, free-of-charge electricity was limited to 50 KW*h/month; for the families with two or more such members, free electricity was limited to 75 KW*h/month; for the persons, half of the electricity, consumed by whom was paid by the state body, the free electricity

was limited to 30 KW*h/month; and for the families with two or more such members, the rate of free electricity was limited to 45 KW*.h/month.

Conclusions

⇒ Currently it is impossible to determine the real energy demand (electricity, natural gas, mazut, firewood, liquid gas, coal, etc.) in Georgia: There are no strict, documented payments between energy consumers and suppliers, as well as objective calculations of the consumed energy in majority of the regions; for majority of the consumers the supply of the energy is limited; the energy consumption do not correspond to necessity. According to the official data the energy consumption is identified as energy demand, though while energy supply as well as paying capacity is limited it does not show the real energy demand.

⇒ The existing power generating objects as well as transmission and distribution systems in Georgia, despite the sharp decrease in energy consumption (from 14 billion kw/h to 6-8 billion kw/h a year).

⇒ Thermal power plants' share of the base electric power generation is sharply decreasing while hydro power plants' share is increasing yearly. Such conditions make impossible for regulating hydro power stations to reserve power to cover the winter peaks and therefore expensive electric power is imported from the neighboring countries.

⇒ Established conditions show that energy policy of the country is directed to the power import instead of rehabilitation and activation of the home resources.

⇒ The household sector has become the main energy consumer. Correspondingly the consumed energy cost collected in this sector comprises the important revenue source for the energy sector and is used to cover the annual expenses necessary for functioning of the branch and to provide the uninterruptible income to the state budget. But this is not the case.

⇒ The management of the energy enterprises controlled by the state is unqualified – employee turnover is high; the strikes of the staff took place quite often; the working ability of the enterprises are maintained artificially; as soon as the law on bankruptcy will be activated these enterprises will be bankrupt at that very moment.

⇒ Existing energy resources and energy services price formation methodology as well as tariff regulation methods, existing paying capacity and paying relationship regimes, limited liabilities and technical abilities of working under direct contracts, management of the separate energy units and entire interrelationship quality do not provide development of mutually acceptable and productive relations between energy subjects in the most regions of the country. That causes permanent non-payment, increase of

the company debts, production decrease, permanent arrears of wages of the branch employees, permanent interruptions in the power supply, etc.

⇒ Results of the privatization indicate that the state declined duties and responsibilities connected with the energy sector functioning and development, before it created social guarantees for the population. In fact it had deregulated the energy sector and that needs much higher level of industry and social layers readiness.

⇒ It is evident that the state financial and economical services have not studied the country energy market. They do not know the real paying capacity of the population and have formal attitude towards the tariff formation issue, or knowingly rely on shady revenues of the population, thus they contribute to shady business and corruption and from the very start provoke distrust among the population.

⇒ The low level of professionalism and high level of corruption of management system as well as leveling of the moral standards causes distrust among the population and makes any reforms inconsistent.

⇒ The power and other energy resources' tariff growth during the last fife years is connected with the beginning of privatization and restructuring processes in Georgian energy sector. It is also connected with the IMF demand to include the population energy debts accumulated during the year into the next year's tariff.

⇒ Georgian National Energy Regulation Commission (GNERC) role in tariff determination is insignificant. It has no possibility to provide qualified expertise and revisions and is limited by tariff adoption presented by the license-holders. At this stage Georgian National Energy Regulation Commission does not sufficiently control, regulate and manage the situation.

⇒ Nowadays the tariff based on total value, has lost its significance for most of the enterprises of the sector, for under present surroundings, real fees are impossibly far from the total value, which serves as a basis for determining the tariff.

⇒ Evaluative calculations, carried out, demonstrated that as a result of the tariff optimization (reduction) for electricity throughout Georgia, the groups of population, able to pay the tariff could be increased by 1.5-2 times added by two other solvent groups – middle and poor.

Assessment

The assessment given below could be rather strict, but it can not be considered as exaggerated strictness. In the interest of business we intentionally pay less concern to the positive changes of the energy sector, which surely exist. From our point of view it is more important to draw attention to the negative issues that should be solved on the next stages.

To what extent are reached the goals planed by the energy sector restructuring at the current stage. Table A1 shows the authors' assessment concerning the above mentioned.

Table A2 shows the assessment of the results that should be received in the energy sector with support of the Independent National Energy Regulating Commission, as well as by implementation of the restructuring and privatization.

Table A3 shows the answers to the questions by which, as we proposed in the beginning of this report, should be determined the socio-economical effectiveness of the structural changes provided in the Georgian energy sector in 1996-2002.

Table A1. Goals of the Structural Reorganization of the Energy Sector and Assessment of the Results Reached at the Current Stage

Goal	**Assessment of the Result**
▪ Provide rational state policy, delimit regulating functions and commercial activities	▪ If we judge by the results the state could not provide rational policy regulating functions and commercial activities had been delimited
▪ Step by step liquidation of the state monopoly ▪ property diversity adoption ▪ Create competitive environment, establish transparent market ▪ Attract foreign investments	▪ The State monopoly liquidation has performed partially ▪ Property diversity has been established but property of the joint-stock companies is still under state control ▪ Competitive environment as well as transparent market has not been created; ▪ Strategic investor AES corporation has entered the power market; other investments has not been provided

▪ Improvement of the power supply ▪ Deficit reduction in the energy sector	▪ The power supply has improved in Tbilisi but it is not sufficient; power supply improvement in the regions is insignificant ▪ The deficit of the energy sector still persists
▪ Power production volume increase ▪ Raise its effectiveness ▪ Preserve financial discipline ▪ Improve power service for the consumer	▪ The power production has reduced ▪ The power production effectiveness has not increased ▪ Appropriate discipline has not been reached in the financial sector ▪ Power service has improved partially (Tbilisi)
▪ Provide permanent power supply ▪ Profit growth of the companies ▪ Improve technical conditions and management of the power system	▪ Permanent power supply has not been reached. The situation got worse significantly in 2003 ▪ The companies were unable to switch to profitable working regime ▪ Technical conditions as well as company management has not been improved; arrears of wages and strikes still take place

Table A2. Assessment of the Results that Should be Received in the Energy Sector with Support of the Independent National Energy Regulating Commission, as well as by Implementation of the Restructuring and Privatization

Expected Result	**Assessment of the Factual Results**
▪ The regulation process is getting stronger; the society becomes privileged to the maximum; the energy charges are set to minimum – under conditions of natural monopoly of the energy sector; the trust of the society is increasing	▪ The sociological researches show that the general public do not consider itself as the privileged from the power supply point of view
▪ The positive influence on energy development rates and scales, country power supply, the scientific-technical	▪ There is no tendency of growth of energy development rates and scale, as well as the country power supply

progress of the branch, etc.	
▪ The investor risk is reducing; the private investments to the sector are stimulated; The investment volume is rising; The low taxes for the invested capital as well as low charges for the consumers are established	▪ In fact private investors and investments entrance process to the energy sector has stopped at the level of the year 2000
▪ The paying capacity of power and natural gas charges is growing; self financing of the branch is initiated	▪ The power plants are not supplied with the spare parts and repair works do not take place ▪ The thermal power plants are not supplied with fuel ▪ The situation of the existing funds of the branch remains complicated. The debts are growing ▪ The self financing potential of the branch enterprises could not be raised, thus the arrears of wages and state subsidies still take place
▪ The power quality and its volume is rising	▪ The power production volume is reducing – Tbilsresi power units and Tbilisi Tets has entirely stopped. The power quality has not improved
▪ Wholly collected energy charges stimulated the other energy branches	▪ The power charges are not wholly collected

Table A3. Influence of the Energy Sector Structural Changes Performed in the 1996-2002 on the Socio-Economical Conditions

Question	**Assessment**
▪ How optimal and sequential were the structural changes of the energy sector	▪The chronology of the structural changes performed in the energy sector shows that the changes had not sequential nature especially at the starting stage (1992-96). During the restructuring process departmental

	interests have prevailed. None from the "new" steps have based on the critical analyses of the "old" ones, thus they were far from the optimal
▪ How has the power accessibility of the population has changed after the structural changes	▪ Recent price raise has significantly reduces energy accessibility of the population. As a result the energy comfort rate has reduced by 30-50% and negatively influence human health
▪ To what extent the energy consumption as well as power, natural gas and other energy resources tariffs have changed	▪ The power consumption has reduced by 2-3 times comparing to 1990; the tariff has increased by 3 times comparing to 1997 ▪ The natural gas consumption has reduced by 3-5 times comparing to 1989; the tariff has increased by 2 times comparing to 1997 ▪ The liquid gas consumption has reduced by 10 times comparing to 1985; the tariff has increased by 12 times comparing to 1985
▪ To what extent the technical conditions of the energy resources supply to the population have improved	▪ The technical conditions of the energy resources supply have become worse (failure of high-voltage transmission lines is quite frequent; AES - Mtkvari power unit #9 frequent failure (technical and other reasons); according the official data natural gas distribution network is in emergency condition, etc.)
▪ Does the population income correspond to the charges it has to pay to satisfy its immediate (minimal) power needs ▪ The priorities of family budget distribution (food, health care, power supply, recreation) ▪ Was the population forced to get rid of power charges	▪ The majority of the Georgian population earn 2-5 times less then subsistence wage ▪ even in case of the cheapest energy the majority of the population would spend 25-50% of their income. Together with the expenditures of vital necessity (subsistence wage) it exceeds the annual income of the families.

	Current socio-economical conditions as well as psychological-moral environment does not give bases for complete payment of power as well as other energy sources' charges
▪ What is the level of the population power debts after the structural changes	▪ There is no objective data about the power debts of the population (presumably it does not exist)
▪ How the population power supply level has changed. Is the population ensured to receive at least minimum required power	▪ Consumed power of 80-85% of the Georgian population is equal or less then subsistence wage. At the same time the power supply guarantees are minimal. The population living conditions are close to social explosion
▪ How has the state revenues from the energy sector changed after the structural changes and has the population social security improved/worsened	▪ such data is not collected yet

Recommendations

⇒ To assess effectiveness of the performed as well as ongoing changes of the Georgian energy sector it is necessary to carry out permanent and objective observation of the processes followed by analyses of the results. Thus it is necessary to provide appropriate conditions by means of accessibility of the official information.

⇒ Tbilisi thermal power plant power generating units should be prepared and rationally used in base part of the load. The authors think that it is the only alternative of the stable power supply for Georgia in the nearest future.

⇒ By means of rehabilitation works of insignificant cost Georgia has the potential to satisfy its needs in electric power by the power generated within the country. It would raise the energy independence and safety level of the Country.

⇒ The cost price of the power produced locally should be made more precise, which would create bases for optimal decision making for modernization and long-term use of the generation objects, as well as for power import-export scale. It is especially important for employment of the branch specialists and correspondingly it solves their social problems positively.

⇒ The tariff setting methodology as well as tariff policy in general should need serious changes and adjustment. From the methodology point of view the fund-profit and amortization interest rates' share of the tariff should be revised. As from the tariff policy point of view country policy should be sharply defined – export of the power or satisfying domestic needs, attract new investments to the sector or more effective use of the existing resources, privatization or establishment of public enterprises, etc.

⇒ It is necessary to continue revealing and use of energy effectiveness potential. It is an important resource to improve the country energy conditions as well as the living standards of the population.

⇒ The energy enterprises' funds should be audited according the western standards, debt payment should be deferred, start the new relationship between energy system subjects from the zero financial point and adopt the law on bankruptcy.

For Comments or Additional Information
Please Contact
Association "Green Alternative"

visiting address: 1 Rustaveli ave. I entrance, IV floor
mailing address: 62 Chavchavadze ave.,380062, Tbilisi, Georgia
Tel: +995 32 93 24 03 / 99 04 72; Fax: + 995 22 38 74