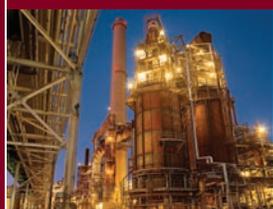


ENERGY CHARTER PROTOCOL ON ENERGY EFFICIENCY
AND RELATED ENVIRONMENTAL ASPECTS (PEEREA)

IN-DEPTH REVIEW OF ENERGY EFFICIENCY POLICIES AND PROGRAMMES



REPUBLIC of GEORGIA

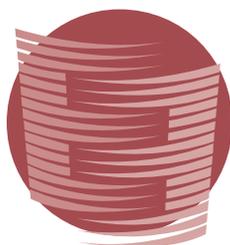


ENERGY CHARTER SECRETARIAT

In-depth Review of Energy Efficiency Policies and Programmes of

The Republic of Georgia

Energy Charter Protocol on Energy Efficiency
and Related Environmental Aspects (PEEREA)



ENERGY CHARTER SECRETARIAT

INTRODUCTION

The Energy Charter Treaty was signed in December 1994 and entered into legal force in April 1998. To date the Treaty has been signed or acceded to by fifty-one states.¹ The Treaty was developed on the basis of the European Energy Charter of 1991. Whereas the latter document was drawn up as a declaration of political intent to promote East West energy co-operation, the Energy Charter Treaty is a legally binding multilateral instrument covering investment protection, liberalisation of trade, freedom of transit, dispute settlement and environmental aspects in the energy sector.

The Energy Charter Conference, the governing and decision making body for the Energy Charter Treaty, meets on a regular basis - normally twice a year - to discuss policy issues affecting East West energy co-operation, review implementation of the provisions of the Treaty, and consider possible new instruments and projects on energy issues. All states who have signed or acceded to the Treaty are members of the Conference. Regular meetings of the Conference's subsidiary groups on transit, trade, investment and energy efficiency and environment are held in between Conference meetings.

THE ENERGY CHARTER PROTOCOL ON ENERGY EFFICIENCY AND RELATED ENVIRONMENTAL ASPECTS

The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) is a legally binding instrument that was signed together with the Energy Charter Treaty in December 1994 by the same fifty-one states that signed the Treaty itself. It requires its Signatories to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.

Implementation of PEEREA is kept under review and discussion by the Energy Charter Working Group on Energy Efficiency and Related Environmental Aspects. A key feature of the Working Group's activities is the development of a series of in depth reviews of individual states' energy efficiency policies and programmes. Recommendations to the authorities of the states concerned resulting from these in depth reviews are presented to the Energy Charter Conference for discussion and endorsement.

For further information on PEEREA and the in depth energy efficiency review series, contact Mr Tudorel Constantinescu at the Energy Charter Secretariat in Brussels (Tel: +322 775 9854).

¹ *Albania, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The Former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan.*

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EXECUTIVE SUMMARY

BACKGROUND

Georgia is a small mountainous country located in the southern part of the Caucasus region. It is situated on the eastern end of the Black Sea and it borders Turkey, the Russian Federation, Azerbaijan and Armenia. The country covers an area of about 70,000 square kilometres and has a population of about 5 million. Its capital is Tbilisi, with a population of 1.25 million.

Georgia has had a difficult time since declaring independence in 1991 following the break-up of the former Soviet Union. After independence, output fell by 70% and exports by 90%, the worst decline suffered by any transition economy. In November 2003, the "rose" revolution led to a change in government in March 2004. The new Government has taken additional steps to introduce market reforms. This has included reforms and restructuring in the energy sector.

Despite of significant hydropower resources, Georgia is highly dependent on imports for its energy supply. The infrastructure suffers from years of under-investment and power plants (mainly hydro electric) have lost a significant amount of their capacity. The metering systems are in extremely poor condition. Transmission losses are high and local distribution systems are poor. Natural gas pipelines have major problems due to corrosion, poor quality and no maintenance. District heating systems have been totally dismantled. To address these problems the Government has embarked on a major restructuring and liberalisation process that includes privatisation and some private management of government-owned energy companies. There is an emphasis on creating a market foundation, where consumers are required to pay for their correctly metered energy use.

ENERGY POLICY

Energy policy has been evolving since the mid 1990s. Current energy policy has four main goals: diversification of the sources of energy supply; fully meeting energy demand; independence and sustainability of the power sector; and energy security. The government-approved Georgia Energy Sector Strategic Action Plan 2004-2005 states that obtaining self-sustainability and energy security have the highest priority.

An independent regulator, the Georgian National Energy Regulatory Commission (GNERC), created as part of the reform process for the electricity and natural gas markets, has been instrumental in improving the tariff system. The approach is to move towards tariffs reflecting all costs. No cross-subsidising is allowed.

ENERGY EFFICIENCY POLICIES AND PROGRAMMES

Available analysis points to an important potential for cost-effective investments in energy efficiency, particularly in buildings and in small and medium-sized enterprises. While there have been many drafts prepared, there is no energy efficiency strategy, action plan or legislation. Thus there is no co-ordinated, comprehensive approach. The actions in energy efficiency on the demand side are mainly driven by bilateral and multilateral technical assistance programmes and by increased consumer awareness through the installation of meters. Energy efficiency activities are not initiated nationally. There is only limited institutional capability and experience within the Government administration on energy efficiency policy development. Furthermore, the emphasis in energy efficiency policies has almost entirely been on generation and transmission, with little activity at the consumer end.

Of concern is the little end-use data collection and analysis that could provide a foundation for future activities in energy efficiency.

An independent regulator, the Georgian National Energy Regulatory Commission (GNERC), created as part of the reform process for the electricity and natural gas markets, has been instrumental in improving the tariff system. The approach is to move towards tariffs reflecting all costs. No cross-subsidising is allowed.

RENEWABLE ENERGY

It is part of the Government's energy strategy to promote renewable energy (RES). Hydropower represents the most readily available RES that is currently exploited and there is still significant potential for further exploitation.

ENERGY EFFICIENCY AND THE ENVIRONMENT

Environmental protection does not appear to be a priority for the Government which is focussed on stimulating economic development and creating a more business-friendly climate. All environmental taxes were removed in 2004.

Georgia ratified the Kyoto Protocol as a non-Annex 1 member and thus is not required to meet specific GHG targets. It can participate by encouraging investments through the Clean Development Mechanism (CDM) and the necessary administrative system has been created. There has been some foreign interest, but only in developing renewable energy. Energy efficiency projects have not attracted so far the interest of potential investors in CDM projects.

IN-DEPTH REVIEW OF ENERGY EFFICIENCY POLICIES AND PROGRAMMES OF GEORGIA

1. INTRODUCTION

In September 2005, a team of representatives from the Working Group of the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects reviewed the energy efficiency policies and programmes of Georgia.

The role of the in-depth energy efficiency review undertaken on a peer basis by the Working Group is to enhance the level of co-operation amongst contracting parties (Article 3.1). The in-depth review is also being used to assess progress, promote continuous dialogue and transfer information.

The Review Team, representing four Energy Charter Member States, consisted of Mr. Johan Vetlesen of Norway, who chaired the review team, Ms. Lene Nielsen of Denmark, Ms. Violeta Keckarovska of the Former Yugoslav Republic of Macedonia and Ms. Karolina Petersson of Sweden. Professional support was provided by Mr. Tudor Constantinescu of the Energy Charter Secretariat and Mr. Rod Janssen, consultant to the Secretariat.

Organisations visited are included in Annex 3 of this report.

The Review Team wishes to express its thanks to all Georgian organisations and their representatives who participated in meetings for the period of the review.

Special thanks go to the Ministry of Energy and experts of the Committee on Economic Sectors of the Parliament of Georgia and the Energy Efficiency Centre, who undertook all the preparation of the mission, organising the completion of the PEEREA questionnaire and providing background papers and other information as requested.

The report is based on material provided by Georgia as well as data and analyses from various other sources, including the International Energy Agency, the First National Communication to the United Nations Framework Convention on Climate Change and other related materials. Statistical data are presented according to the most current data available.

2. OVERVIEW

Georgia is a small mountainous country located in the southern part of the Caucasus region. It is situated on the eastern end of the Black Sea and it borders Turkey, the Russian Federation, Azerbaijan and Armenia. This makes Georgia well situated as a transit route for the entire region, a role it has played for centuries. The country covers an area of about 70,000 square kilometres and has a population of about 5 million, which is still declining. Its capital is Tbilisi, with a population of 1.25 million. There are four other cities with populations greater than 100,000 – Kutaisi, Rustavi, Batumi and Zugdidi. The population is split about 56% urban and 44% rural.

Georgia is a republic with a President as head of state who also acts as head of government for the power ministries, state security and defence. The Prime Minister is head of government for the remaining ministries. The country is divided administratively into nine districts, 65 regions and five towns of Republic Dependence.

Figure 1: Map of Georgia



Georgia has had a difficult time since declaring independence in 1991 following the break-up of the former Soviet Union. It has had civil strife leading to regions of Georgia acting autonomously and as a result of the situation about 300,000 people were displaced, causing serious problems. The disruptions also led to changes in trade routes and had a major effect on the power sector since much of the hydro-electric capacity was situated in disputed territory.

After independence, the economy collapsed under the impact of civil war and the loss of Georgia's preferential access to the markets of the former Soviet Union. Output fell by 70% and exports by 90%, the worst decline suffered by any transition economy.

Corruption is considered high and difficult to overcome. Over 50% of the population live below the poverty line according to some estimates and in 2005, Georgia ranked 100th out of 177 on the United Nations Development Programme Human

Development Index. The average gross national income in 2003 was \$830 per capita, placing Georgia in the lower-income category of countries¹. The currency is the Georgian lari².

In November 2003, the “rose” revolution took place, leading to a change in government in March 2004³ and bringing hope that the transition to a modern economy and society was truly underway. The new Government has taken new steps to deal with the corruption and to bring market-based reforms to public policy. This has included reforms to education, reorganised government structures and reduced red tape for businesses. Nevertheless, the commitment to poverty reduction is still strong. The reforms have included a significantly new approach to the energy sector and that transformation is still underway. The new government has also given more attention to stabilising the economy and focussing on robust economic growth.

The economy is largely based on agriculture products such as citrus fruits, tea, nuts and grapes (over 500 varieties are cultivated); the mining of manganese and copper; and a relatively small industrial base comprising alcoholic and non-alcoholic beverages, metals, machinery and chemicals. The transit of natural gas and oil will be of growing importance with new pipelines either completed or under construction. The construction of the Baku-Tbilisi-Ceyhan (BTC) oil pipeline brought an important boost to the economy in 2003-2004. Tourism has also been an important component of the economy, particularly during Soviet times, and there are plans for it to increase, particularly along the Black Sea.

Over 50% of the workforce is currently in agriculture according to some estimates. The latest estimate of unemployment is 21%, although many experts believe this is underestimating the true figure.

Economic growth has started to recover and there have been impressive gains in the past two years. 2004 saw GDP growth of 6.2%, following 8.6% in 2003, and World Bank projects show an increase of 8.5% in 2005. Government revenues rose from 14% of GDP in 2003 to 18.5% in 2004. It is now about 20% according to Government officials.

The Government is expecting an economic growth rate of 7.5% in 2006 and between 6.5-7% for the following three years. Industry is expected to grow at a rate of about 11-12% per year for the next five years.

Georgia has significant domestic energy resources, particularly hydro power, but is still highly dependent on imports for its energy supply. There is 2800 MW of installed hydropower capacity. The largest facility has an installed capacity of 1300 MW. Most of the capacity is in the west of the country where there are issues arising from the separatist region of Abkhazia. While Georgia has reasonable capacity,

¹ *The UNDP Human Development Report states that Georgia's GDP per capita in 2003 using purchasing power parity was \$2588. See <http://hdr.undp.org/reports/global/2005>.*

² *1 USD = 1.8 lari.*

³ *Following the election of a new President in January 2004.*

there is a need to import electricity in winter when water flows are lower. There is some domestic oil and natural gas that can be exploited, but the amounts are relatively insignificant compared with domestic needs.

Energy infrastructure is a major priority for the government. The infrastructure has suffered from years of neglect, vandalism, the civil strife and under-investment. Existing electricity generation facilities (mainly hydro electric) have lost a significant amount of their capacity due, in part, to poor maintenance and financing. Transmission losses are unnecessarily high and local distribution systems are poor. Natural gas pipelines have major problems due to corrosion, poor quality and theft. District heating systems have been totally dismantled and individuals now provide their own heating.

To address these problems the Government has embarked on a major restructuring and deregulation path that includes privatisation and some private management of government-owned where deemed appropriate. There is a great emphasis on setting a strong market foundation, where consumers are required to pay for their correctly metered energy use.

In electricity, generators feed into a Wholesale Electricity Market which then again sells to the five distribution companies (two of which cover most of the country) and some large individual consumers. The Wholesale Electricity Market is managed by the Spanish company, Iberdrola Consortium.

Distribution is divided into Tbilisi (JSC Telasi – 75% owned by RAO UES of Russia), Ajara, Apkhazeti, Kakheti and the United Energy Distribution Company (UEDC). UEDC covers the most of Georgia outside of Tbilisi and is managed by PA Government Services of the United States.

JSC Telasi has 411,739 customers, of which 394,950 are individuals, 14,260 are commercial customers and 2,529 are public sector customers. UEDC has about 650,000 customers.

Transmission and dispatch is provided by the Georgian State Electrosystem, under the management of the Irish firm, ESBI.

There is an independent regulator, the Georgian National Energy Regulatory Commission (GNERC), to oversee the entire system (also that for natural gas). The GNERC was established under the Electricity and Natural Gas Law of 21 May 1999. The GNERC is set up as an independent regulator, which implies both a relative independence from the Government as well as from economic actors and interests in the sector.

In natural gas, the Georgian Gas International Corporation (GGIC), established in 1997, is the exclusive operator, owner, user, and manager for main gas pipelines of Georgia, for natural gas imports to Georgia and is responsible for the transit of natural gas throughout the country. GGIC transports about 2.5 bcm per year, of which 1 bcm is for Georgia and the rest goes to Armenia. Currently all the natural gas comes through the Russian Federation but there are plans underway to have gas piped from from Kazakhstan (through Russian Federation) and from Azerbaijan

through the South Caucasus Pipeline Project (the Baku-Tbilisi-Erzrum gas pipeline). It is expected that consumption of gas in Georgia will increase from the current 1 bcm per year to 3.5 bcm in 2009, according to GGIC forecasts.

Within Georgia's borders, the Millennium Challenge Corporation of the United States is providing about \$40 million to repair existing pipelines. There is no discussion of privatising the pipelines since they are considered strategic to Government policy objectives.

Georgia does have some domestic resources of oil, natural gas and coal. Oil reserves are estimated to be almost 600 Mtoe (including 200 Mtoe offshore). Natural gas reserves are at 129.7 Mtoe or 161.4 bcm and coal reserves are at 500 Mtce. There is activity underway to start exploiting the domestic resources more effectively.

Georgia overall is strongly dependent on imports of petroleum products, natural gas and electricity. In 2002, imports represented about 46% of TPES.

3. MAIN ENERGY POLICY HIGHLIGHTS

Energy policy has evolved significantly over the past few years as the new Government develops a more business-friendly approach which includes restructuring, deregulation, while at the same time tackling the rampant corruption. Energy policy has evolved because of what the Government calls the “crisis” in the energy sector. The crisis is a combination of still reacting to a supply system that was fully integrated in to the Soviet Union system before independence; the civil problems in Abkhazia; the shutdown of much of the capacity of the Tbilisres power plant; and the change in structure of consumption of electricity compared to the Soviet period. Earlier about 70% of electricity consumption was by industry and 30% by the population and now the shares have reversed.

Energy policy has been evolving since the mid 1990s when the EU’s TACIS programme was first supporting the development of Georgia’s energy policy. That project led to the creation of a Ministry of Energy, restructuring of energy enterprises, improving heat and electricity supply and developing the use of local fuels but no energy policy was formally announced.

In following years there was a development of a legislative foundation for the electricity and gas sectors as well as the creation of the regulatory commission.

The current energy policy has four main goals:

- Diversification of the supply sources of power carriers;
- Fully meet energy demand of industry and the population;
- Achievement of independence and sustainability of the power sector;
- Provision of energy security (technical, economic and policy factors).

The Government approved the Georgia Energy Sector Strategic Action Plan 2004-2005 in June 2004. The Action Plan states that two of the four main goals have the highest priority: self-sustainability and energy security. The action plan states: “. . . the goal is to create a profitable industry that in future will not depend on further funding from neither the central budget nor IFIs⁴. Also, the government’s objective is to ensure the most efficient use of internal resources and diversification of possible supply points of energy into the country, using its geo-political location for transit arrangements and for import/export arrangements, hence ensuring the secured energy supply into the country.” These objectives can be supported also through increased cooperation in the energy sector with neighbouring countries.

Self-sustainability is amongst the highest priorities because the wholesale electricity market is losing about \$70 million annually because of poor cash collection at all levels of the power chain. Also, domestic electricity production is incapable of meeting winter demand and this requires imports from Armenia and Russia. In 2004 and 2005, the energy shortfall was to be met by consumption restrictions (e.g. brownouts or blackouts) and funding from the government budget to pay for the imports. Self-sustainability in part would be improved through rehabilitation

⁴ *International Financial Institutions.*

projects funded by the central budget, by IFIs and other donor programmes. In the medium-term, Georgian authorities are trying to find new investors to expand the hydro power capacity.

To meet technical energy security, the Government wants to utilise the hydropower potential, construct thermal power plants operating on solid fuels with new technologies; greater utilisation of renewable energy resources; the development of systems of heat supply; extracting and refining oil and gas; adding underground gas storage; improving bilateral and regional co-operation; rehabilitating the existing high voltage transmission system; and develop the oil and gas transit potential.

Improved energy security through economic means includes the full re-metering of the power sector, improving tariff policy and solving the old debt issue (including debts to neighbouring countries).

The Government is currently preparing a new energy policy concept and a new action plan for 2005-2008. While they are only in draft form, they tend to continue the main themes. To date there has been little emphasis on energy efficiency but the Government has shown more interest in it of late. It is uncertain at the moment which role improved energy efficiency policy could play in this new policy concept. The energy policy concept and new action plan should go to Parliament soon.

The current draft action plan envisages specific short-term activities to achieve the long-term goals of the sector development:

- maximum support to production of the local energy resources and reduction of dependence on imported resources to the minimum;
- improving metering and accountability of the system;
- diversifying import sources for electricity as well as for gas;
- rehabilitation of the existing infrastructure and start-up of new capacities;
- improvement of the legal framework in the energy sector;
- improvement of standards regulations;
- optimisation of licenses and permits in the energy sector, improvement and simplification of procedures for granting licenses and permits; and
- start of step-by-step liberalisation of the energy sector.

The review team took also note of the preparatory work for the elaboration of an Energy Efficiency Law. While the process is under way since a few years, the current draft appears to include provisions related to the establishment of a governmental body in charge of developing and implementing energy efficiency policy as well as the establishment of a special fund for promoting energy efficiency activities. It not clear, however how long it will take to have such a law passed through the Parliament.

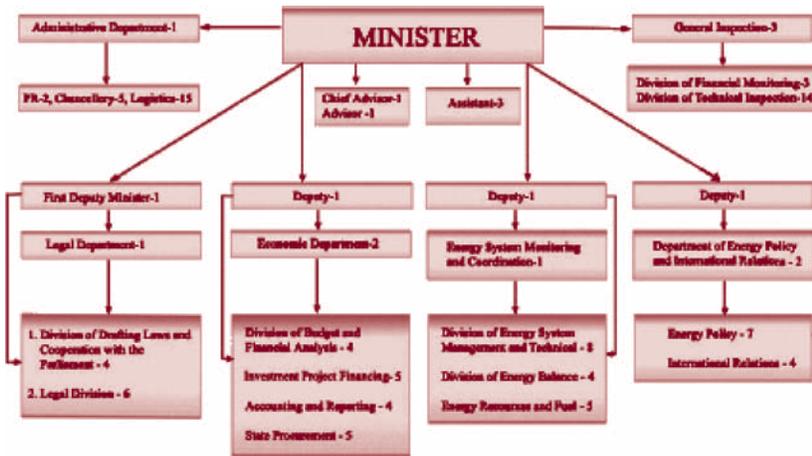
ENERGY POLICY INSTITUTIONS

The Ministry of Energy elaborates the main directions of State energy policy and then, upon approval by the Parliament, co-ordinates the implementation of the policy. The Ministry states seven main functions:

- Elaboration of electricity and natural gas programmes based on the short, medium and long-term strategy and priorities; and co-ordinates their implementation;
- Promotion to attract investments in electricity and natural gas sectors for the short, medium and long term;
- Promotion of the development of State strategies for electricity and natural gas sectors' emergency situations;
- Elaboration of the policy on Georgia's energy security;
- Promotion and organisation of the processes on restructuring and privatisation of State enterprises in the electricity and natural gas sectors; promotion of competition in the electricity and natural gas markets; establishment of strategies for the conservation or liquidation of State owned electricity and natural gas sectors' facilities;
- Participation in elaboration and development of legal and regulatory framework, monitoring of the technical and economic condition of the sectors; and
- Promotion of environmental protection of all energy activities and optimally incorporate environmental protection goals in the formulation and implementation of energy programmes.

As shown in the figure below, the Ministry of Energy has a Minister, one First Deputy Minister and three Deputy Ministers, one of whom is responsible for Energy Policy and International Relations. The Department of Energy Policy and International Relations is small, with between 6 and 7 staff. One staff member works on energy efficiency, at least part of the time.

Figure 2: Organisation Chart of the Ministry of Energy



Source: www.minergy.ge

The other main Ministries involved in energy policy to any extent are the Ministry of Finance, the Ministry of Economic Development and the Ministry of Environment.

There is also the Georgian National Energy Regulatory Commission, as mentioned above. The President appoints the Chairman and two Commissioners. The GNERC has the status of a legal public entity and is not subordinated in any way to any other governmental agency or institution in its day-to-day regulatory and monitoring functions. It is also independent of economic interests in the sector.

The GNERC, however, gives careful consideration to the main directions of the state energy policy, national security, economic, environmental and other policies of the Government. The Charter, structure and personnel schedule of the Commission is elaborated and approved by the Commission.

Resolutions and decisions are made in public sessions by the rule of a majority vote. Resolutions and decisions are mandatory for licensees and consumers and are published according to set rules.

The GNERC:

- sets the rules and requirements for electricity generation, transmission, dispatch, distribution, import and export;
- sets the rules and requirements for natural gas supply, transportation, and distribution licenses;
- sets and regulates wholesale and retail tariffs for electricity generation, transmission, dispatch, distribution, import, export and consumption;
- sets and regulates wholesale and retail tariffs for natural gas supply, transportation, distribution and consumption;
- resolves arguments between electricity generation, transmission, dispatch, distribution, import and export;
- resolves arguments for natural gas supply, transportation, distribution and consumption.
- establishes control over the conditions of the Licensing within the Electricity and Natural Gas sectors; and for violation of the conditions, shall combine the relevant administrative sanctions which are determined by existing Georgian legislation;
- organises and co-ordinates activities with regard to mandatory certification within the energy sector;
- regulates electricity import and export activities; and
- supervises over the operation of the Wholesale Market and approves the Market Rules.

4. ENERGY PRICING AND TAXATION

Energy pricing and taxation policies have changed recently as part of the Government's overall economic policy. The emphasis is on deregulation, simplification of the tax code and full costs built into pricing in order to remove any subsidies.

In terms of tariffs, the approach is to move towards "real" tariffs to reflect all costs. There has been no revision of tariff setting methodologies since 2001 and the GNERC is considering new approaches to tariffs and tariffication of the grid-bound services. No cross-subsidising is allowed in tariffs and the principle in effect now is full cost recovery. The GNERC is obliged to consider environmental issues when they set tariffs. The GNERC encourages licensees to consider the environment in their investments. The calculation of the tariff is geared to maximise payment collection. An important challenge at the moment is to give guidelines and advise to energy companies on the effective payment collection.

The objective of the electricity tariff is to increase efficiency in generation, transmission, dispatch, distribution and consumption; to attract foreign investment for rehabilitation and development purposes; and to ensure competition within the Georgian electricity market.

Calculation of the Retail Tariffs for Electricity

1. Based on GNERC decision the retail tariff will be either a single or two part tariff. The retail tariff can be divided by voltage level.
2. To calculate a single retail tariff, the cost of energy purchased by distribution company, capacity charge, and the distribution tariff, will be combined. The tariff will be adjusted for allowable losses. The tariff will be calculated for kWh energy consumed.
3. To calculate a two-part tariff, the energy cost will be adjusted for allowable average losses. Similarly to energy charge, the capacity charge will be adjusted for allowable average losses. The capacity part of retail tariff equals capacity charge adjusted for allowable average losses, plus distribution tariff. Resulting retail tariff will be two-part tariff comprising of capacity and energy charge.
4. Calculation of separate tariffs for low voltage and medium voltage customers will depend on the available data. If data is available on costs, the distribution tariff can be calculated separately for low and medium voltage customers, the tariff will be calculated separately. If data is available on losses, tariffs can be adjusted for each voltage. Medium voltage customers should pay less in comparison with low voltage consumers to reflect the lower cost of supplying them with distribution services.

Source: GNERC, www.gnerc.org

The following table shows the selected consumer prices in 2005.

Table 1: Average Price of Selected Energy Products in 2005 (USD per unit)

Sectors	Un-leaded gasoline 95 RON (Litre)	Light fuel oil ('000 litres)	Diesel (litre)	Heavy fuel oil (tonne)	Nat. Gas (107kcal GCV*)	Steam Coal (tonne)	Electricity (KWh)
Industry	0.85	n.a	0.7	87	70	20	0.05/0.07
Households (incl. VAT)	0.85	n.a	0.7	n.a	150	20	0.05/0.07
Electricity generation	--	--	--	65	65	--	--

**Gross Calorific Value*

Exchange rate 06.2005-1USD=1.8GEL (Georgian Lari)

Especially with respect to electricity, what is almost more important than the evolution of prices, is the rate of collection. According to the GNERC, the collection rate has changed from 25% in 1996 to 65% in 1997 with further reduction to 20-25% in 2002-2004. Now (September, 2005) UDC has raised this parameter to 70%.

There have been significant changes in the tax code. There were 21 different taxes and now there are only seven. As well, tax rates have been reduced. For example, VAT has been reduced from 20% to 18%. They have also been reduced for income tax. The reasons for these changes are to boost domestic demand through more disposable income, hopefully leading to greater economic growth and higher employment.

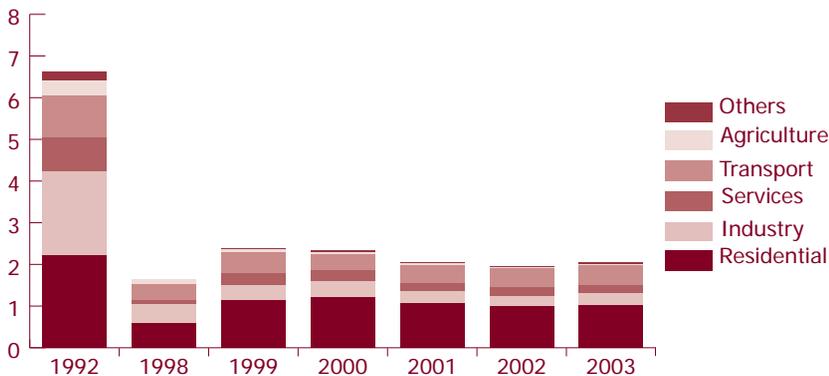
All environmental taxes were abolished in 2004. More on the environment will be discussed later in the report.

5. END-USE SECTORS

After independence, the economy collapsed, as it did in many transition countries, affecting all end-use sectors. Both the residential and industrial sectors were badly affected, but all sectors were hurt. In the industrial sector, entire industries closed and the structure of the sector has been seriously affected. In the residential sector, people have had to contend with less available. And in winter, for example, there are serious shortages of electricity in many regions. Many regions have seen the population use wood, often obtaining it illegally, and that consumption has not been captured in the end-use data.

As shown below in Figure 3, final energy consumption has stabilised since 2001, rising by a small amount between 2002 and 2003, but still significantly below historical levels. But the graph also shows some important changes. The industry sector represents about 14% of TFC, significantly less in most other PEEREA countries. The industrial sector “collapse”, however, makes it very difficult to make any well-founded benchmarking analysis of the consumption developments in the end-use energy efficiency in the industrial sector. The residential sector represents about half of TFC, again much different than most PEEREA countries. These have implications for the provision of energy supply as well as on the revenue that energy companies than receive.

Figure 3: Final Energy Consumption in Georgia, 1992-2003 (Mtoe)



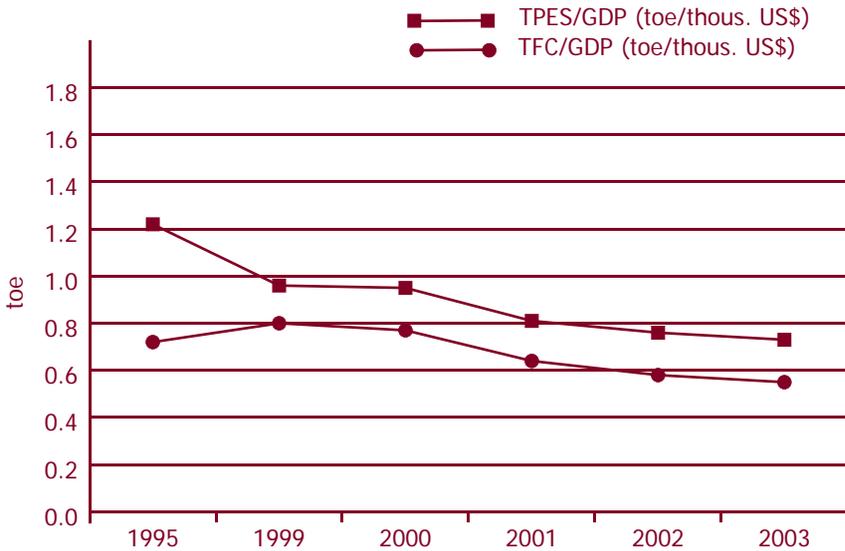
Source: IEA

Even with the significantly reduced demand, however, the infrastructure (due to constraints on energy supply) is having difficulty coping with the energy demand. As described above, the electricity generating capacity is insufficient and seasonal. Also, the government is highly dependent on imports. But this is a legacy from the pre-independence period when Georgia was fully integrated within the Soviet Union energy system.

The following graph shows how energy intensity for both primary energy supply and final consumption has evolved since the mid-1990s. In stable economies, this trend downwards would normally reflect a combination of structural changes in the economy, possibly some fuel switching, but also a significant amount of progress

in improvements in energy efficiency. Such cannot be said for Georgia other than structural changes. However, in many countries, structural change means, for example, a gradual switch from energy-intensive industries to less energy-intensive industry or a move from a strong emphasis on industry to the provision of service. For Georgia, this is a reflection of the collapse of the economy. Unfortunately, Georgia was one of the hardest hit of any of the transition economies and it is still trying to recover and make constructive steps towards a market economy.

Figure 4: Evolution of Energy Intensity Indicators 1995-2003



Source: IEA

RESIDENTIAL SECTOR

There were 1,070,000 households in Georgia in 2002, with an average size of household of 3.7 inhabitants. The average area is 95.8 sq.m, although that is an average of 67.3 sq.m. in urban areas and 114.2 sq.m. in rural areas. For the country as a whole, 61% of dwellings are individual houses and the rest are apartments. Most of the apartments (representing 25.5% of all dwellings) are in buildings with more than five storeys).

Almost 68% of all dwellings were built between 1960 and 1990. This was the period in almost all transition economies when pre-fabricated apartment buildings were built to a standard that is causing problems today. There is every indication that the same situation is true in Georgia.

The following table provides some important indicators for the residential sector. It is to be noted the small percentage of central systems for heating or for hot water supply. Since independence the district heating system has completely collapsed. This means that individuals are providing their own heating and hot water. The concern is that many of the buildings were not designed for individual heating.

Table 2: Provision of Dwellings with Water and Energy in 2002 (per cent)

Sectors	Tbilisi	Other Cities	Urban Area, total	Rural area	The whole country
Central system of hot water supply	1.4	0.6	1.0	0.1	0.6
Individual system of hot water supply	23.2	11.6	17.5	3.5	10.8
Electricity supply network	99.9	98.4	99.2	97.8	98.5
Central system of gas supply	49.7	15.1	32.7	3.9	18.9
Individual system of gas supply	26.2	40.3	33.1	27.1	30.2
Central system of heating	0.5	0.9	0.7	0.4	0.5
Individual system of heating	14.4	25.3	19.8	17.6	18.7

Source: State Department of Statistics for Georgia, www.statistics.ge

The residential sector in particular has suffered from serious non-payment of electricity bills. This has been detrimental to the entire electricity sector and has required the Government to step in to ensure that the system functions.

Recently both major distributors, JSC Telasi and UEDC, have been re-metering their clients, using new meters that automatically send readings to the company. The main problems have been theft and non-payment. But, re-metering also offers the opportunity to reduce overall demand. In Tbilisi, with the meter, consumption has dropped to 150 kWh per month from 200-300 kWh per month per customer. Also, now non-payers can be cut off from electricity supply. There was some support, funded by the US government, for helping the vulnerable but that has come to an end. JSC Telasi says that the poor are now supported through lower electricity bills because of lower consumption. JSC Telasi still has about 50,000 customers who do not have the new meters.

UEDC is mainly installing communal metering in non-urban areas. Communal meters often service about 40-70 homes. One of the approaches for payment is for the group of homes to choose a representative that collects payment that they decide how is split. The representative then takes the total receipts to a payment centre. There is a separate formula where all grouped houses are surveyed on their appliances in their homes and they pay according to their assets. UEDC representatives said that there had been demonstrations against the use of these communal meters but more and more they have been accepted. These communal meters have led to the reduction in theft, since the total group has to pay. UEDC has 20 million GEL for installing individual meters in urban areas. It is expected that consumer awareness will improve as a result of the gradual improvements in the metering systems.

INDUSTRY

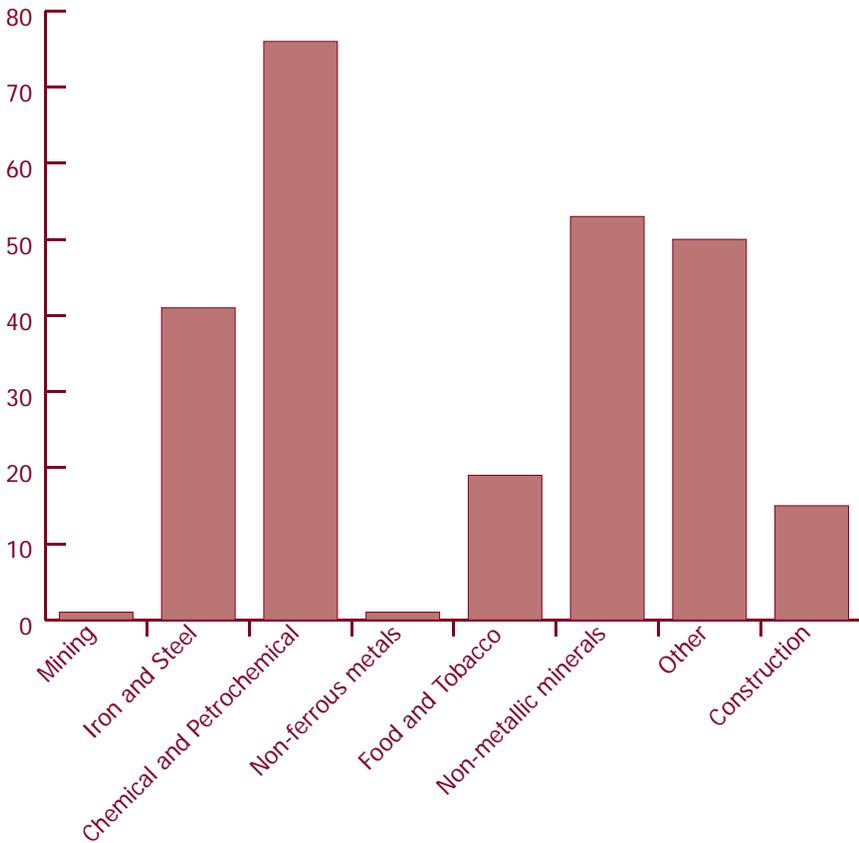
As stated above, industry has significantly suffered since independence. Today, industrial production is small and the government is doing all it can to boost economic growth through making it easier to do business. This has included simplifying the tax code and lowering taxes.

Since 1999 the number of industrial enterprises has dropped from 3457 to 3181, although the lowest level was 3034 in 2001. Nevertheless the volume of industrial output in millions of lari has increased from 1753.1 in 1999 to 2533.6⁵. Using 1995 as the base year (1995 =100), the index of industrial output has increased from 123.7 in 1999 to 159.9 in 2003. These numbers go only until the period before the current government, and indications that they will improve even more in the most recent years.

As stated above, there are a number of important activities in the industrial sector. These include mining, iron and steel, chemicals and food processing. In terms of energy consumption, the chemical and petrochemical sub-sector is the largest consumer of energy, and most of its consumption is natural gas. Actually, in 2002, natural gas represented almost half of total final consumption, in industry followed by electricity with 22%, renewables & waste at 14%, petroleum products at 10.2% and coal at 3.9%.

⁵ This includes an estimate of both hidden and informal production as well according to the State Department of Statistics.

Figure 5: Final Consumption by Industrial Sub-sector, 2002 (Ktoe)



Source: PEEREA questionnaire.

There is little information available about how efficient industry is and what potential there is for energy efficiency improvements. Informal information from the European Bank for Reconstruction and Development (EBRD) states that there is significant potential for energy efficiency improvements in SMEs and the Bank intends to soon undertake more thorough market research to develop specific projects.

Priorities for the sector development include mining, food processing, construction and tourism. Some of the priorities are in energy-intensive sub-sectors.

SERVICES

The services sector consumes 10.2% of TFC. It is a sector that includes government services and a growing private sector. As shown in Table A.1.3 in Annex 1, total consumption in the services sector dropped after 1992 from 0.815 Mtoe to 0.107 Mtoe in 1995. Since then it has increased, although in 2003, consumption at 0.208 Mtoe was still down from the peak in 1999 (0.275 Mtoe).

To date, there has been little analysis undertaken of the sector. While the State Department of Statistics provides employment data (energy use per employee is a useful indicator), it is difficult to disaggregate the data to get a true indication for this sector. In 2003, approximately 745,000 worked in the service sector. This compares with a total of 1.79 million in the workforce. It is fairly safe to assume, however, that there have been few energy efficiency improvements that would have made a major impact.

TRANSPORT

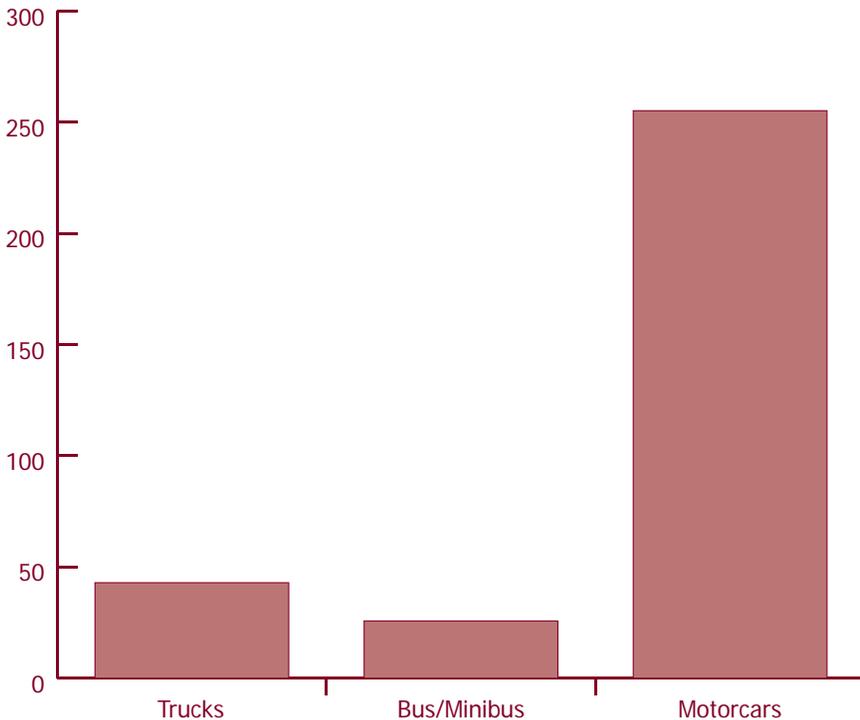
The transport sector consumed 23.1% of TFC in 2003, making it the second largest sub-sector, after the residential sector. Transportation is an important sector because Georgia is an important transit route in the Caucasus region. It has a fully developed rail system and a good road system. There is shipping out of the Black Sea ports and aviation has increased in recent years as Georgia expands its contacts throughout Europe and Asia.

There is a total of 1245.6 kilometres of rail lines and the Georgian Railway is the largest individual consumer of electricity in the country – about 344.5 million kWh (in 2001 it was 222 million kWh according to the State Department of Statistics). Yet, the rail system is affected by the abovementioned problems with electricity supply and the company has invested heavily in rehabilitating the power supply situation. This is accomplished by improved management/monitoring systems using satellites to feed data from sub-stations, more powerful inverters, building small hydro power plants to supplement their needs, improved insulators and replacement of electricity towers.

There is approximately 19,000 km of paved roads and a further 1247 km of unpaved roads. Paved roads have decreased by about one thousand kilometres since 1990 but have been quite constant since 2000. The stock of vehicles has decreased from 604,000 in 1990 to 325,000 in 2003⁶. Figure 6 shows the distribution by type of vehicle in 2003.

⁶ According to the State Department of Statistics, the number of cars has dropped from 481,900 in 1990 to 255,200 in 2003.

Figure 6: Number of Vehicles by Type, 2003 (in thousands)



Source: State Department of Statistics of Georgia.

There are no data on the average fuel consumption of the vehicle parc. Unscientific surveys show that there is significant potential for improvements.

Table 3 shows the evolution of passenger traffic by mode of public transportation, since 1980. It can be seen that the trend since 2000 is for a regular upward trend. As stated above, the railway system is the largest electricity consumer in the country. The metro system in Tbilisi is also a high energy consumer and the subway operator is developing a modernisation and rehabilitation project. The potential is also high. For example, the chief engineer states that 4 million kWh could be saved annually only by improved lighting throughout the metro system.

Table 3: Turnover of passengers by selected types of transport, million passenger-km

Year	Total	Railway	Bus	Trolleybus	Metro	Tram	Air
1980	15,500.6	3,622.0	6,134.0	606.1	912.0	208.8	3,981.0
1985	18,349.6	3,724.0	8,169.0	552.2	926.7	250.7	4,686.0
1990	17,823.0	2,457.0	8,335.0	379.8	1,173.8	156.4	5,297.0
1995	4,035.6	371.1	1,907.3	47.5	910.1	32.9	766.7
2000	6,002.0	452.9	4,500.0	90.5	674.6	46.2	237.8
2001	6,189.8	400.9	4,764.3	106.0	622.7	55.4	240.5
2002	6,413.1	400.6	4,920.0	145.1	114.6	35.7	297.3
2003	6,708.6	395.5	5,150.0	114.6	622.8	25.4	400.3

Source: State Department of Statistics of Georgia

State policy on transport includes reducing the number of sources of GHG emissions by means of co-ordinated and harmonious development of all types of transport; developing the motor highway network (1996 Presidential decree No. 338); technical examination of motor vehicles, creation of a GHG exhaust monitoring system which corresponds to international standards; and creation of a legislative basis for limits on GHG emissions in aviation⁷.

⁷ See www.ccna.caucasus.net/legislat/policy.htm

6. ENERGY EFFICIENCY POLICIES AND PROGRAMMES

To date the emphasis on energy efficiency in Georgia has almost entirely been at the generation and transmission end of the fuel cycle, with little activity at the consumer end. The Ministry of Energy has some priorities for energy efficiency but they have not been formally adopted by the Government or by Parliament. These include:

- Improving the utilisation of energy resources in production and in the residential sector, in part through linking the price mechanism with real economic expenditures;
- Ensuring an economically-efficient structure of the utilisation of electricity and natural gas, first of all, through the deployment of efficient heat supply systems and devices;
- Conducting energy audits in energy-intensive enterprises and the elaboration and implementation of the programmes to increase their energy efficiency, based on those audits;
- Revision of the building standards with the goal of having the thermal efficiency levels at cost-effective levels;
- Elaborating and implementing a programme for the primary improvement of the thermal efficiency of existing buildings; and
- Implementation of modern methods of energy management in the sphere of energy consumption.

At the time of drafting this report it remained uncertain if a new Energy Efficiency Act could pass through the Georgian decision-making system including the Government and the Parliament and which elements would be included in the final law.

The energy efficiency activities in the end-use sectors are a result of bilateral and multilateral support or triggered by the improved information on consumer use of electricity through the installation of a new generation of meters. This has resulted in improved consumer awareness as well.

As shown in the previous section, there are signs of good potential for energy efficiency gains. The Energy Efficiency Centre estimates that the potential is in the range of 30-50%. The Government, acknowledging that it must give the subject a higher priority, has been working on various drafts of an Energy Conservation Law since the 1990s but to date there has been nothing formally presented to Parliament.

The European Union, through its TACIS Programme, has funded a number of studies and projects. Most recently, it supported the project on cleaner production. TACIS was instrumental in creating the Energy Efficiency Centre (EEC) (see below under institutions) in 1999, an NGO with the primary goal to enhance and promote energy efficiency in the principal branches of the Georgian economy.

INDUSTRY

Cleaner Production refers to those technologies that can be implemented in an environmentally appropriate manner. Norway started a project on energy efficiency and cleaner production in May 2003 that is to continue for five years. The project was to develop a cleaner production strategy for Georgia as one of the key points for building a sustainable energy policy. The technologies considered almost always improve energy efficiency. The project actually implemented technologies in a wood processing company and a paper producer. This specific project terminates in 2005. As part of this programme the Energy Efficiency and Cleaner Production Centre was established in May 2003. The objectives are

- To promote Energy Efficiency and Cleaner Production principles in industrial enterprises and other sectors of economy of Georgia by the execution of energy efficiency improvement projects, introduction of technologies for saving of energy resources and increasing the level of profitability.
- To steer the activity of Georgian enterprises in the direction of saving resources and, as a result, to reduce waste and decrease environmental pollution.
- To introduce market economy principles and to draw up business plans for projects in various branches of the Georgian economy according to the requirements of international finance institutions.

The Norwegian donors have several local partners including the Energy Efficiency Centre, the Georgian Energy Carbon Fund, the Caucasian Regional Centre of Ecology, and Energy Efficiency 21 Georgia. The Centre offers training, energy audits, energy monitoring and project implementation.

The experience so far demonstrates a good potential. For example, in the industrial mill, "Progress" a reactive energy compensator was installed at a total investment of US\$9,000. The savings were \$17,500 per year, giving a payback of 0.5 years. A milk factory upgraded the power supply system with the installation of a new HV transformer. The total investment was \$12,000. The electricity savings were 134,550 kWh per year and the raw materials saved were 5 tonnes per year. This meant the payback was one year. The problem is getting those initial investments. The savings are proven.

BUILDINGS

There are building regulations in force, but they have not been updated since independence. The Research Institute, Buildings Physics Department has been involved in the development of new standards. In 2004, the Ministry of Economic Development called for new building standards using the requirements of Europe. The proposed standards would only be for new construction. There is no support or programmes for existing buildings.

TRANSPORT

Transport is a vital sub-sector for Georgia since it is a transit way for the Caucasus region. Good rail, road, and air services are all vital for the economic development of Georgia and it is essential that they are as efficient as possible to maximise the benefits to the country. The rail system, for example, has embarked on a major modernisation and rehabilitation programme, as described in Section 5. This is important since the railway is the largest single energy consumer in Georgia. This is an on-going effort and has been supported by a combination of international and national funding.

Public transport is also important to Georgia and, for example, the metro system has identified a high potential of savings and has been developing a programme for on-going rehabilitation.

A Review of the Main Barriers for improving energy efficiency in Georgia

Following completion of several projects for TACIS and others, the European Commission has identified several barriers that are seriously affecting the uptake of energy efficiency in Georgia. The major ones are.

Investment barriers: The main barrier identified is corruption, which leads to the low level of energy bill collection. Owners of industrial units also use patronage of high government level officials so that they are not subject to payment.

Financial barriers: Commercial financing is not available for energy efficiency projects. This is compounded by the fact that loans have high commercial interest rates and short re-payment periods. Also, the low level of energy bill collection affects the financial analysis. There is also no local specialised non-government funding institution in Georgia.

Legal, regulatory and political barriers: The prolonged period of liberalising the economy has had an impact on energy efficiency projects. There are no regulatory incentives that will stimulate energy efficiency measures. There is no national energy efficiency strategy, policy, action plan or regulations.

Consumer level barriers: There is a lack of managerial skills needed to operate well in a market economy. Senior management does not understand what energy efficiency potential exists. There is no interest in energy auditing and there is a lack of monitoring and targeting experience.

Information/Education barriers: There is a low level of transparency and the lack of a real understanding by authorities of the energy efficiency potential that can help in socio-economic stabilisation. There are no energy efficiency awareness campaigns and only limited availability of information on new technological developments. There is a poor understanding of no and low-cost energy efficiency measures, no dissemination of best practice and a lack of "success stories."

7. RENEWABLE ENERGY

Renewable energy is an important priority for the energy sector because there is good potential and better exploitation will improve the level of security of supply while reducing the need for imported energy. Hydropower represents the most readily available RES that is currently exploited and there is still significant potential for further exploitation. There are also other important renewable energy resources that show good promise. These include biomass, geothermal, wind and solar.

The Government has a Renewable Energy Development Programme which is incorporated in the Decree of the President of Georgia "On the Development of the Utilisation of Non-traditional Energy Sources in Georgia", signed March 3, 1998. The Programme includes:

- Provision of a 10-12% subsidy by the Government to the producers of "environmentally clean" energy;
- Guarantee by the Government to producers to purchase energy at favourable prices;
- Carrying out reduced tax policy for environmentally clean energy producers.

The UNDP/GEF fund mentioned below helps fulfil those objectives.

Hydro is by far the most important RES. There are 26,000 rivers in Georgia and only 12% are used. The potential is an annual production of 135.8 billion kWh. Currently, about 80% of electricity generated comes from hydro. The largest hydro plant, Enguri, has a capacity of 1300 MW but, as stated above, it is in Abkhazia and that raises energy security concerns. About 85% of hydro capacity is in western Georgia. The Enguri plant is in need of refurbishment to improve its efficiency. Investments are supported by the EBRD. There is growing interest in small hydro power plants (less than 10 MW)

The potential for exploiting wind is considered 2,300 MW. Currently there are only a couple of small 6 kW units. A wind atlas has been prepared. This, in itself, will help the future exploitation of the resource. Four main regions have been identified for best potential: the high mountain zone of the Caucasus, the Mtkvari river valley, the South Georgian highland and the southern part of the Black Sea region. These four regions have average annual wind speeds of more than 6 m/second at 30 m height.

Georgia has considerable potential of middle and low temperature thermal water (33-108 degrees C). To date, 350 MW of geothermal is used for heat supply and there is a further proven potential of 465 MW. The theoretical resources amount to 1800-2000 MW, making it very attractive for future exploitation.

Bio-energy is important in rural areas where there is good potential to use farm waste. Between 1993-2005, over 250 biogas digesters were installed and there potential for expansion is greater. Using crops as a resources, there are some regions of Georgia where two yields per year are possible. There is some support

from multilateral donors. There are some NGOs working in this area and the National High Technology Centre of Georgia, Laboratory of Renewable Energy is focusing on biofuels and biogas.

There are two main ways that renewables are being promoted in Georgia. One is through the Clean Development Mechanism of the Kyoto Protocol, which will be described in the next section. The other is through a UNDP project to promote the use of renewable energy resources for local energy supply. This UNDP/GEF project started in April 2004 and will last for four years. It also includes funding from the German public development bank, KfW. The objective of the project is to remove the key barriers to the increased utilisation of renewables for local energy supply. It will address the legal and regulatory barriers to provide fair and competitive access to the market for renewables, to ensure the collection of payments and to encourage investments in renewable energy. It will introduce leveraged financing for a pilot renewable energy fund/credit line to overcome financial barriers and it will address public awareness and capacity barriers. The project is expected to enhance the capacity of local entrepreneurs to develop bankable investment proposals, to structure financing for the projects and to management development and implementation of the projects. The project, implemented by the Ministry of Environment and Natural Resources, has already undertaken 10 feasibility studies, one on the use of geothermal in Tbilisi. The fund will have a total of €5.11 million (from KfW) plus US\$2.0 million (from GEF).

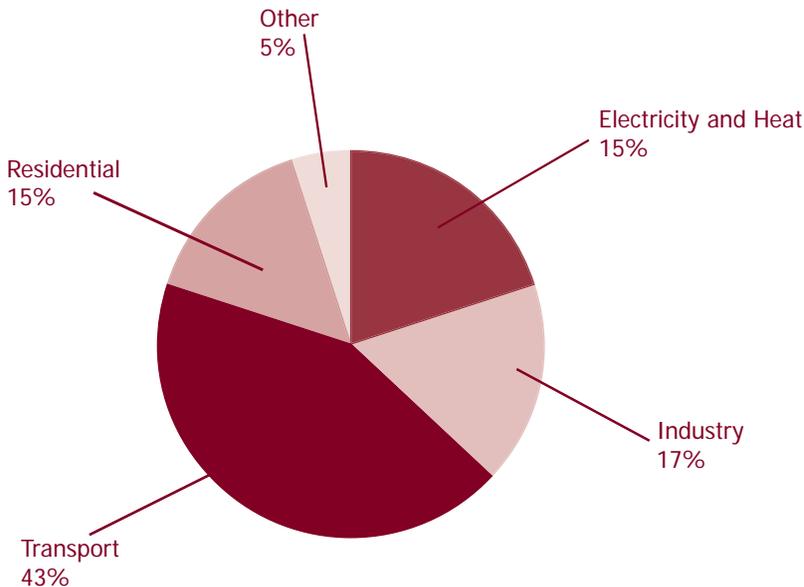
8. ENERGY EFFICIENCY AND THE ENVIRONMENT

The Environmental Protection Law was adopted by Parliament in 1996 and a National Environmental Action Plan was prepared in 1998. In 1999 Georgia ratified the Kyoto Protocol and is a non-Annex 1 country, meaning that it does not have targets for GHG emissions reductions. Environmental concerns have a relatively low policy priority according to senior Ministry officials who do not foresee them becoming a priority until the country has made important headway on economic growth. The most recent environmental policy plan expired in 2004 and a new one has not been approved.

In 2003 Georgia emitted 2.88 Mt of CO₂ using the sectoral approach. This is down from 7.10 Mt in 1995 and 4.42 Mt in 2000. In 2003, the CO₂ per capita was 0.56 tonnes. Comparing this to IEA countries, only one IEA country (Turkey) has a per capita level less than five tonnes and the emissions in the US and Luxembourg are at or above 20 tonnes per capita .

Figure 7 shows the CO₂ emissions by sector in 2003. Transport is by far the largest contributor. The electricity and heat sector is next followed by industry and then residential.

Figure 7: CO₂ Emissions by Sector, 2003



Source: IEA

There have been some important changes in environmental policy. In 2004, all environmental taxes were removed, as discussed above. Yet, at the same time, the GNERC does provide for environmental protection in the development of tariffs.

There are fines for exceeding emissions allowed under the environmental licenses. Licensing procedures have been streamlined and the Ministry now has only 20 days to review a request. A new Environmental Inspectorate, however, was approved in June 2005 and it is currently being staffed. This is to help overcome one of the problems of lack of good enforcement of environmental laws.

Under the UNFCCC, Georgia prepared its first national communication in 1999. It has now received funding from GEF to start work on the second national communication. The next communication is to be completed in three years.

Georgia sees promise in the Clean Development Mechanism (CDM) of the Kyoto Protocol as a means of funding potential energy efficiency and renewable energy projects. Georgian officials are on the Executive Board and the methodology panel giving the country some influence over the general implementation of the Protocol. The EU's TACIS programme has provided support for regional capacity building of CDM. Other countries participating include Moldova, Armenia and Azerbaijan. The Ministry is already the Designated National Authority (DNA) since 2003. The Ministry also has the National Climate Change Office that handles all climate change policies and activities.

To date there are no PDDs (Project Design Documents) under CDM. However, two projects – both related to landfill – are practically finished. There has so far been no progress in funding energy efficiency projects under the CDM flexible mechanism in Georgia, but this has been a general problem that has plagued many countries.

9. ORGANISATION OF ENERGY EFFICIENCY ACTIVITIES

The Ministry of Energy and its Department of Energy Policy and International Relations are responsible for the development of energy efficiency policies and legislation. As stated above, the Ministry has an objective of promoting environmental protection of all energy activities and optimally incorporating environmental protection goals in the formulation and implementation of energy programmes. This objective is a strong mandate for energy efficiency. The Ministry has no formal agency within its responsibility and budget that implements energy efficiency programmes.

The Ministry of Economic Development has policy responsibility for buildings, industry and transport. It appears that the Ministry lacks staff responsible for energy efficiency in those sectors.

GNERC is responsible for tariff policy that affects energy efficiency and it also regulates eligible costs by electricity and natural gas companies. Demand-side management projects would be eligible expenses.

The State Department of Statistics of Georgia provides all the sectoral data used for end-use sectoral analysis.

The Parliamentary Committee on Economic Sectors has a sub-group on energy and a permanent energy expert who advises the committee. The Parliamentary Committee reviews all legislation and policies sent to the Parliament for approval.

Because there is so little happening at the government level in terms of promoting and implementing energy efficiency measures, non-government organisations play an important role. The main non-governmental actor in energy efficiency is the Energy Efficiency Centre (EEC) that was set up through the EU's TACIS programme in 1999 and also gained support from the Norwegian government. While it resides within the building of the Ministry of Energy, it is independent. The Centre's goals are⁸:

- Popularisation of energy efficiency principles and raising energy efficiency in different sectors of the national economy;
- Study and analysis of the technical and economic potential of the renewable energy resources available in the country;
- Preparation of investment proposals on the basis of new energy saving technologies and renewables;
- Organisation of training courses; and
- Energy audits.

The EEC, with a staff of six, undertakes many studies and projects. Recently, it has worked on the UNFCCC 2nd National Communication, did a market assessment of SME activities in energy efficiency and renewables for the International Finance Corporation of the World Bank, worked on solar projects for the World Bank, has been involved in community development and energy for USAID, as well as being involved in the Cleaner Production project, described above.

There are several other NGOs involved in energy efficiency, renewable energy and related environmental issues. Some are involved in small-scale project implementation. Others are involved in broader policy issues. The Caucasus Environmental NGO Network (CENN) has been involved in increasing public participation in energy sector government, amongst other environmental responsibilities in a project supported by USAID. Increasing public participation has included working closely with schools and community-based organisations. The Association of Energy Engineers, financed by USAID, has been involved in about 80 projects in the buildings and industry sectors. This includes improving insulation in multi-storey buildings, installing energy-efficient lighting and replacing electric hot water heaters with natural gas.

The Centre for Strategic Research and Development of Georgia promotes building up civil society in Georgia by increasing the awareness of the population and actively involving citizens in decision-making, advocacy of their interests and support of civil society initiatives. The Centre works in all areas of the economy, including energy and environmental protection.

One of the newest NGOs is Eco-Alliance, a group of four people with little funding, that promotes a demand-side approach to energy policy.

For renewables, there are groups such as "Sun and Earth," "Bio-energy," the Georgian Energy Academy and Energy Faculty of the Georgian Technical University, amongst others, that are promoting renewables through advocacy or project implementation.

10. ASSESSMENT OF PROGRESS

OVERALL ASSESSMENT

For Georgia, improving the energy infrastructure is a high priority. Following independence, the deficiencies in the quality of the infrastructure became apparent as the new country had to determine its needs through its own means. The entire energy system had been integrated within the Soviet system and disentangling that was complicated. This was compounded by civil strife in large parts of the country, and the western conflict area has most of the hydropower capacity and potential.

The chosen policy strategy of the Government is to only consider supply-side options as it has embarked on the rehabilitation and restructuring process. Energy demand collapsed as industry and the economy as a whole collapsed. To develop new supply capacity, it looked at massive restructuring based on a free market approach that has brought many benefits. It has also been working on better regional integration with neighbouring countries, exploiting the possible benefits of being once part of the same integrated energy system. Yet what is needed is a more balanced approach between energy supply and demand measures.

The Government has made international commitments through the Energy Charter Treaty and PEEREA and is actively participating in the PEEREA activities. However, the broad obligations have not been always followed. The Government has not developed a balanced energy policy and there has been no attempt to supplement policies on energy supply with those directed at the energy demand. The energy action plan and the draft main directions for energy policy available at the time of the review give no attention to energy efficiency and many very cost-effective energy efficiency policy options might be lost in the overall policy formulation.

In most PEEREA countries, the link between energy efficiency and the environment is well developed, and energy efficiency measures are often undertaken as part of environmental policies. In Georgia, this is a double problem given that environmental protection is not a governmental priority.

All this said, Georgia has weathered difficult times since independence and many steps have been taken that will have a positive effect on energy efficiency. Energy metering, tariff restructuring and effective energy bill collection are all steps that will create the preconditions for increased consumer awareness of energy efficiency. Getting people in all sectors to understand how energy is used and that energy is a commodity that has to be paid for are important steps that will have long-term benefits.

Unfortunately, there is so far very little awareness in government of what energy efficiency can do to support other priority areas. The Energy Efficiency Centre has prepared a good analysis of the barriers to improvements of energy efficiency. But, there is no end-use analysis to understand in detail what the options are in the individual end-use sectors. The lack of good statistics and indicators are aggravating this situation. There is consequently a lack of good monitoring of energy use in the sectors.

LEGAL FRAMEWORK AND POLICY MEASURES TO PROMOTE ENERGY EFFICIENCY

While there have been drafts of an energy conservation law for years, nothing has been approved by the Government and the Parliament. There is still no energy efficiency policy framework and this has led to a lack of policy focus and cost-effective implementation of policies in the area of energy efficiency.

There are no programmes to promote energy efficiency. Rather, there are specific projects funded by multilateral or bilateral donors. Distribution companies are installing new meters for customers, which will have some energy efficiency benefits in the medium to long-term. Distribution companies should be encouraged to undertake demand-side management measures, which according to GNERC are eligible expenses.

There are efforts within the Ministry of Economic Development to approve a new building code, meeting European levels of thermal efficiency. The code needs to be approved and implemented since, the code in place dates from the pre-independence period. The proposed code is only for new buildings. In addition are needed regulations and a programme that includes major renovations of existing buildings. This is particularly acute for buildings built in the 1960s and 1970s when standards were often most lax. In Georgia, those buildings represent over 50% of the building stock. However, the adoption of any code needs to have a strong emphasis put on enforcement if it is to have any impact at all.

Lack of awareness of opportunities to undertake energy efficiency measures is cited by the Energy Efficiency Centre as a major barrier in all end-use sectors. That can be overcome by a number of options including information campaigns, conferences for senior managers, disseminating the results of existing pilot projects and other information campaigns. These steps do not have to be expensive. What is important is that energy efficiency has to be seen as a positive component in modernising the economy and supporting economic development.

FINANCING ENERGY EFFICIENCY

Currently, all significant funding of energy efficiency projects is made through international sources. The government is funding some of the new meter installation. There is a need for other financial support, such as a revolving fund, which could be set up with international support and hopefully bringing in local banks for the expertise on about energy efficiency investments. The example of the UNDP fund for renewables is an excellent one to use as a model.

Many countries have experimented with energy service companies with varying degrees of success. At a minimum the Government should explore this option, discussing with local companies about how such a service industry could be undertaken. One of the important steps of energy service companies is energy audits and some organisations such as the Energy Efficiency Centre do offer them. However the Centre also states that there is no interest in having such companies. That interest can be developed through targeted information and using examples in other PEEREA countries.

INSTITUTIONAL ARRANGEMENTS

The Ministry of Energy is responsible for energy efficiency policy which requires setting a strategy and action plan so that other relevant ministries understand and can play a part within it. However, the overall strategy formulation is lacking. The institutional arrangements will improve once the strategy (and possibly the energy conservation law) is adopted.

The Ministry of Energy has only a small group of staff responsible for energy policy and international relations. This is often the situation but it only works when there is a unit in the government administration that undertakes the necessary analyses, co-ordinates with other ministries, develops programmes, and co-ordinates with international donors. While the Energy Efficiency Centre operates quite effectively, it has neither the political mandate nor the capability to implement governmental programmes or to use a subordinate body outside the Ministry to undertake proactive implementation of policies and programmes.

Co-ordination with the Ministry of Economic Development is handicapped by a lack of focus on or interest in energy efficiency. Linkages with the energy regulator appear much better.

ENERGY PRICING AND TAXATION

The key element in energy pricing was to get the consumer to pay, since non-collection rates were unsustainable if the energy infrastructure was to be brought up to modern standards. Through the use of modern meters, this has improved significantly.

Electricity and natural gas tariffs are set through methodology developed by the energy regulator. While this has proven successful, the regulator admits that more work on the methodology is required. The goal of the tariffs policy is to obtain self-financing. That has not been achieved yet, but progress is being made.

The government in 2004 removed taxes on emissions which could provide a wrong signal to consumers. However, this has to be seen together with the fact that consumers are now paying for their energy use to a much larger extent than earlier. It is understandable that the government is trying to provide all incentives possible to kick-start the economy but there is a need to balance that with environmental and other energy objectives.

ENERGY EFFICIENCY AND THE ENVIRONMENT

The environment is not considered a government priority and this can adversely affect energy efficiency policy development since the two areas are closely linked. Furthermore, as Georgia continues its restructuring and economic development, it is important that the environmental impacts are taken into account.

Climate change is an important element of the Government's environmental policies. Georgia has taken the necessary steps to implement the Kyoto Protocol and, in particular, the flexible mechanism of the Clean Development Mechanism. There has been some international interest in investing in CDM projects but, to date, they have been focussing on renewables. Energy efficiency projects (often through bundling of small projects) can be promoted through CDM but it has so far proven difficult. Georgia could be a good candidate for more extensive investments in CDM projects.

RENEWABLE ENERGY

Renewable energy is important to Georgia, since about 80% of its electricity generating capacity is hydropower and very little of the potential has been tapped. The Government and other interested parties have identified important potential for wind, biomass, geothermal and solar energy. Renewables show promise in rural areas where they can be used locally to substitute for more expensive or more environmentally damaging fuels. The opportunities are definitely there but care must be taken to ensure that there are not misplaced investments in relatively expensive renewable energy technologies where more cost-effective energy-efficiency technologies could achieve the same policy goals.

The UNDP/GEF fund for financing renewable energy is a good model that could be used for other forms of sustainable energy technologies.

11. RECOMMENDATIONS

GENERAL

- The Government's energy policy should reflect the potential contribution of energy efficiency in improving the security of supply and supporting economic growth and the environment.
- In preparing for a new direction in energy policy, it would be a timely opportunity for the Government to underline the importance of energy efficiency and its integration into a comprehensive strategy throughout the whole energy chain.
- While liberalising the grid-bound energy market contributes to increased economic efficiency and more transparent and market-oriented price formation, energy efficiency measures should accompany the process in order to achieve more of the cost-effective potential.

ENERGY EFFICIENCY POLICIES, LEGISLATION AND PROGRAMMES

- Taking into account the fact that energy efficiency policies are not yet well and transparently defined, steps should be taken by the Government to prepare and implement legislation, policies, measures and programmes to promote energy efficiency within the market-oriented framework of energy policy.
- In the process of developing energy efficiency strategies and measures, the Government should use the technical and financial assistance of various and relevant national and international institutions and programmes.
- The Government should develop specific programmes for improving energy efficiency in the various sectors of the economy which should include specific targets and monitoring systems for continuous evaluation of their implementation.
- Governmental objectives and priorities should to the extent feasible be supported by appropriate resources for energy efficiency.
- The Government should adopt and ensure enforcement of building standards for new and existing buildings taking into consideration cost-effective thermal efficiency levels.
- The Government should take action to modernise the existing building stock, energy efficiency improvements going hand in hand with other objectives such as better comfort and safety.
- Initiatives should be taken to enhance all consumers' knowledge and awareness about energy consumption and how to make it more efficient.
- Energy efficiency should be considered in the various stages of the education process as well as in professional training.

- Restructuring, privatisation, renovation and rebuilding of industry provide a good opportunity to promote energy efficiency. The Government should ensure that any strategy for restructuring and development of the industrial sector includes an appropriate energy efficiency component reflected in objectives and concrete measures.
- The Government should benefit from the experience and knowledge accumulated from various energy efficiency projects funded from external sources.
- The Government should take action to integrate a strategy for the transport sector focusing on energy efficiency and environmental impacts.

INSTITUTIONAL FRAMEWORK

- The Government should strengthen the capacity of the Ministry of Energy to develop and implement energy efficiency and renewable energy strategies and programmes.
- The Government should ensure better co-ordination between the various governmental institutions acting in the area of energy efficiency.
- The Government should ensure that appropriate institutions are in place empowered with the necessary mandate and resources to secure implementation of energy efficiency policies and programmes; the valuable experience of the Energy Efficiency Centre should support this capacity building process.

ENERGY PRICING

- The Government should support the active steps being taken to come to terms with and facilitate solutions to the technical challenges of installing metering systems since this is the fundamental pre-condition for solving problems for collecting payment and avoiding non-payment. It would also be a prerequisite for giving correct incentives for any active energy efficiency policy towards end consumers.
- The Government should continue the energy pricing regulatory reform with a view to eliminate any remaining subsidies and at the same time to create conditions for promoting energy efficiency and renewables without distorting the energy markets.

FINANCING ENERGY EFFICIENCY

- The Government should analyse the opportunity for developing a revolving fund for financing prioritised energy efficiency projects, making use of the resources made available by different international donors.

- The Government should continue to work towards the active operation of the Kyoto Protocol flexible mechanism, CDM, and consider how this mechanism could become an effective vehicle for bundling potential cost-effective energy efficiency projects and make them feasible for financing within the CDM context.

PROMOTION OF RENEWABLE ENERGY

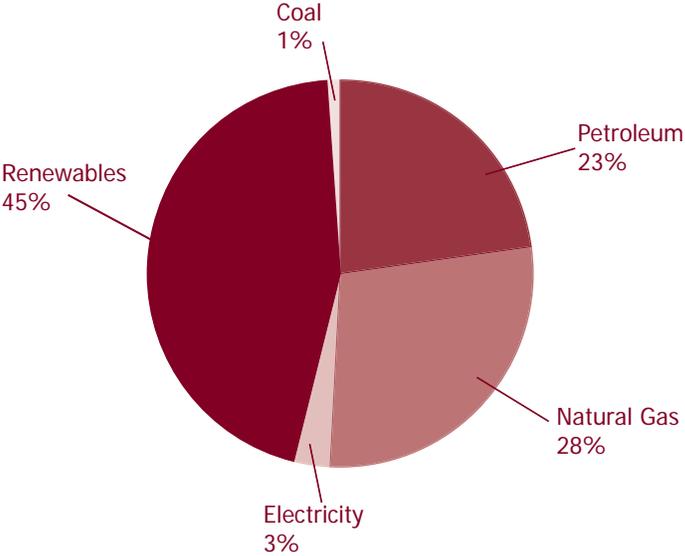
- The Government should, according to an economic assessment, encourage the most effective solutions for heating, including central heating and the local use of renewable energy resources.
- The Government should analyse the opportunities for long-term cost-effective use of renewable energy sources in the process of diversifying the energy supply to meet national policy objectives.

DATA COLLECTION, MONITORING AND FORECASTING

- The Government should strengthen the work on energy statistics and energy efficiency indicators since this is a basis for end-use policy analysis which is necessary for the development and implementation of energy efficiency policies.

ANNEX 1 ENERGY SITUATION IN GEORGIA

Fig: TPES structure in 2003



Source: IEA

Table A.1.1 Selected energy production, supply and consumption statistics (Mtoe)

Indicators	1992	1995	1999	2000	2001	2002	2003
Total Primary Energy Production	1.470	0.750	1.326	1.325	1.265	1.325	1.376
Net Imports	7.380	2.588	1.607	1.569	1.306	1.194	1.328
Total Primary Energy Supply (TPES)	8.757	3.135	2.882	2.895	2.594	2.559	2.727
Total Final Consumption (TFC)	6.625	1.648	2.393	2.328	2.042	1.965	2.048
Total Electricity Consumption (Mtoe)	0.836	0.568	0.547	0.541	0.453	0.460	0.487
GDP (billion 2000 US\$)	8.11*	2.29	2.99	3.04	3.19	3.36	3.74
TPES/GDP (toe/ thous US\$)	n.a.	1.22	0.96	0.95	0.81	0.76	0.73
TFC/GDP (toe/ thous.US\$)	n.a.	0.72	0.80	0.77	0.64	0.58	0.55
Population (millions)	5.437	5.352	5.289	5.262	5.224	5.177	5.130

Source: IEA

* 1990

Table A.1.2 Total Primary Energy Supply (TPES) (Mtoe)

	1992	1995	1999	2000	2001	2002	2003
Crude, NGL, Petroleum products	3.229	1.576	0.946	0.754	0.615	0.593	0.634
Gas	3.957	0.964	0.690	0.953	0.812	0.679	0.771
Coal	0.234	0.020	0.012	0.012	0.013	0.013	0.028
Nuclear	--	--	--	--	--	--	--
Hydro	0.559	0.447	0.554	0.504	0.477	0.582	0.561
Combustible Renewables & Waste	0.674	0.067	0.674	0.645	0.645	0.645	0.645
Geothermal	-	-	-	0.006	0.010	0.010	0.010
Electricity	0.103	0.060	0.005	0.021	0.023	0.039	0.078
Total Primary Energy Supply (TPES)	8.757	3.135	2.882	2.895	2.594	2.561	2.727
Energy production/TPES	0.168	0.239	0.460	0.458	0.488	0.518	0.505
TPES/capita (toe/capita)	1.611	0.586	0.545	0.550	0.497	0.494	0.532

Source: IEA

Table A.1.3 Total Final Energy Consumption (TFC) by End-use Sector (Mtoe)

Sectors	1992	1995	1999	2000	2001	2002	2003
Residential	2.205	0.595	1.138	1.213	1.060	0.984	1.011
Industry	2.023	0.432	0.363	0.375	0.289	0.256	0.292
Services	0.815	0.107	0.275	0.270	0.192	0.198	0.208
Transport	1.008	0.382	0.508	0.380	0.442	0.463	0.473
Agriculture	0.344	0.121	0.077	0.060	0.025	0.027	0.021
Others*	0.230	0.013	0.032	0.032	0.034	0.036	0.043
Total (TFC)	6.625	1.648	2.393	2.328	2.042	1.965	2.048

Source: IEA

* Others include Non-specified other sectors and Non-energy use

ANNEX 2 SELECTED END—USE DATA TABLES

Table A.2.1 Energy Efficiency Indicators for Households: Final Consumption of the Residential Sector by Energy Source (Mtoe)

Indicators	1992	1995	1999	2000	2001	2002	2003
Total Final Consumption	2.205	0.595	1.138	1.213	1.060	0.984	1.011
a) Electricity	0.232	0.396	0.238	0.229	0.222	0.212	0.229
b) Heat	0.084	0.001	0.000	0.000	0.000	0.000	0.000
c) Oil Products	0.232	0.101	0.163	0.133	0.095	0.054	0.046
d) Gas	1.036	0.057	0.104	0.240	0.133	0.111	0.126
e) Coal	0.019	0.000	0.000	0.008	0.003	0.000	0.003
f) Combust. Renew. & Waste	0.602	0.039	0.633	0.597	0.597	0.597	0.597
g) Others	0.000	0.000	0.000	0.005*	0.010*	0.010*	0.010*

Source: IEA

*geothermal

Table A.2.2 Final Consumption of the Industry Sector by Energy Source in 2003 (ktoe)

Indicators	Mining	Manufacturing							Construction	Total
		Iron and Steel	Chemical and petrochemical	Non-ferrous metals	Food and tobacco	Paper pulp and print	Non-metallic minerals	Other		
Coal		22						3		25
Petroleum Products					4		2	9	13	28
Gas		2	78		8		53	2	1	144
Electricity	1	30	8	1	8		5	5	1	59
Heat										0
Combust. Renew. & Waste								36		
Total	1	54	86	1	20		60	56	15	293

Source: IEA

Table A.2.3 Energy Efficiency Indicators for Services (commercial and non-commercial): Final Energy Consumption of Services by Energy Source (Mtoe)

Indicators	1992	1995	1999	2000	2001	2002	2003
Total Final Consumption	0.815	0.107	0.275	0.270	0.192	0.198	0.208
a) Electricity	0.266	0.049	0.203	0.190	0.152	0.163	0.170
b) Heat	0.203	0.017	0.000	0.000	0.000	0.000	0.000
c) Oil Products	0.144	0.008	0.064	0.047	0.001	0.001	0.001
d) Gas	0.143	0.000	0.000	0.016	0.026	0.022	0.025
e) Coal	0.022	0.005	0.000	0.004	0.000	0.000	0.000
f) Combust. Renew. & Waste	0.036	0.028	0.009	0.012	0.012	0.012	0.012
g) Others	-	-	-	-	-	-	-

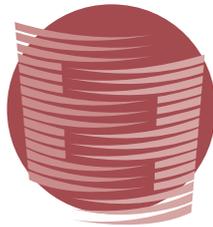
Source: IEA

ANNEX 3 ORGANISATIONS VISITED BY THE REVIEW TEAM

- Ministry of Energy (ME)
- Committee of Economic Sectors of Parliament of Georgia (CESPG)
- Ministry of Economical Development of Georgia (MED)
- Ministry of Environment and Natural Resources (MENR)
- Georgian National Energy Regulatory Commission (GNERC)
- Georgian Wholesale Electricity Market (GWEM)
- Georgian International Gas Corporation (GIGC)
- Georgian Energy Academy
- Georgian Railway
- Energy Efficiency Centre (EEC)
- Caucasus Environmental NGO Network (CENN) (NGO)
- Centre for Strategic Research and Development of Georgia (NGO)
- Association Ecoalliance (NGO)
- The Research Institute, Buildings Physics Department
- JSC Telasi
- United Energy Distribution Company
- "Sun and Earth" (an NGO)
- Tbilisi municipality
- "Bio-energy" (NGO)

GLOSSARY

bcm	Billion cubic metres
CDM	Clean Development Mechanism, a flexible mechanism of the Kyoto Protocol
CO ₂	Carbon dioxide
DNA	Designated National Authority
EBRD	European Bank for Reconstruction and Development
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEL	Georgian lari
GHG	Greenhouse gases
HV	High voltage
IEA	International Energy Agency
IFI	International financial institution
Km	kilometre
kWh	kilo-watt hour
m	metre
Mtce	Million tonnes of coal equivalent
Mtoe	Million tonnes of oil equivalent
MW	Megawatt
NGO	Non-government organisation
PEEREA	Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects
RES	Renewable energy sources
SME	Small and medium-sized enterprise
sq.m.	Square metres
TACIS	The EU's grant-based technical assistance programme for 12 countries of Eastern European and Central Asia, including Georgia
TFC	Total Final Consumption
TPER	Total Primary Energy Requirements
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VAT	Value added tax



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