In-Depth Review of Energy Efficiency Policies and Programmes:

GEORGIA

Energy Charter Secretariat 2012

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INTRODUCTION

Georgia ratified the Energy Charter Treaty (ECT) in 1995 and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 2004. By ratifying the PEEREA, countries commit themselves to formulating and implementing policies for improving energy efficiency and reducing the negative environmental impacts of the energy cycle (Art. 5). The guiding principle of the Protocol is that contracting parties shall cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations (Art. 3).

The country review process is a core activity in monitoring and facilitating the implementation of the Protocol. The in-depth energy efficiency reviews, implemented under the PEEREA, have proven to be an important tool in assessing the progress of member countries in fulfilling their commitments under the Protocol. They also provide peer guidance to governments in developing and implementing energy efficiency policies.

At the Energy Charter Conference meeting in 2009 in Rome, it was discussed among member states that to effectively monitor the progress made by the contracting parties in implementing the PEEREA obligations, in-depth reviews should be carried out every five years with the completion of regular reviews in between. The Conference also adopted an indicative schedule of reviews for 2010-2012, focusing on countries that are not covered by other international organisations. Fully respecting the criteria discussed by the Conference, an in-depth review of the energy efficiency policy of Georgia was carried out in 2010, following the previous review in 2005.

The review team was comprised of officials from three countries that are parties to the Protocol: Mr. Johan Vetlesen from the Ministry of Petroleum and Energy, Norway; Mr. Madis Laaniste from the Ministry of Economic Affairs and Communication, Estonia; and Mr. Levon Vardanyan from the Ministry of Energy, Armenia. The team also included Ms. Bilyana Chobanova and Mr. Boris Petkov from the Energy Charter Secretariat and was supported by Mr. David Taylor, consultant to the Secretariat. The team visited Tbilisi between 18 and 21 October 2010 and discussed a range of issues with government agencies and other stakeholders (listed in Annex V).

Key sources of information on the energy efficiency policies and programmes included the previous Energy Charter Regular Review of Georgia (considered by the PEEREA Working Group in 2006), national policies as posted on ministry websites and information provided by institutions in Georgia during the country visit, and other relevant publications of the Government of Georgia, international financial institutions such as the European Bank for Reconstruction and Development (EBRD), International Monetary Fund (IMF), World Bank and International Energy Agency (IEA), Transparency International and the institutions of the EU.

The in-depth review report was discussed and approved by the PEEREA Working Group in 2011 and recommendations are submitted for endorsement by the Energy Charter Conference.

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EXECUTIVE SUMMARY

Georgia ratified the Energy Charter Treaty (ECT) in 1995 and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 2004. By ratifying the PEEREA, countries commit to implementing policies to improve energy efficiency and reduce the environmental impacts of the energy cycle (Art. 5).

An international team visited Tbilisi from 18 to 21 October 2010 and discussed a range of issues with government agencies, industries and other stakeholders for the purposes of completing this in-depth review.

Background

Georgia's macroeconomic performance and general progress with reforms in the past years have been strong. Economic growth has been mainly driven by large foreign capital inflows and the resulting investments across different sectors of the economy have contributed to broadening the economic base. The ultimate aim of the Government of Georgia is integration into the wider regional and EU economy.

The country's achievements are widely recognised and have been the subject of favourable mention in international commentaries. They range from improvements in the legal and regulatory framework for carrying out business, including liberalisation of the customs regime, to reduced corruption, simplification of the tax system and the completion of large-scale privatisation across different sectors of the economy.

In 2008 Georgia faced external shocks and challenges: the Russian-Georgian conflict in August and the influence of the global financial crisis. However, the Georgian economy demonstrated a resilience to these challenges, which was the result of previously conducted reforms, the financial stimulus package proposed by the Government of Georgia and the substantial aid of foreign partners. The recovery process started shortly afterwards and in 2010 economic growth reached 6.4% after the 2009 slowdown. The banking sector of Georgia showed exceptional resilience, while in other countries it faced serious problems.

Enhancing economic development is essential for employment generation and job creation in order to overcome the unemployment challenges that still exist and eliminate poverty.

Overall, there is evident progress and a strong sense of new-found confidence that was severely tested by the outbreak of hostilities in 2008, the global financial crisis and the ensuing world economic downturn.

Energy and Energy Efficiency Policy

The energy system, having once been closely integrated into a planned regional energy system that effectively collapsed, is the subject of ongoing reform and

essential redevelopment. The state is continuing to face and deal with a wide range of legacy issues.

The current emphasis in energy policy is on national energy security and to this end on the rehabilitation of the power system and the promotion of much needed investment in new electricity generation plants, gas and electricity transmission and distribution infrastructures. For example, the rehabilitation and upgrading of hydropower plants could bring over 2,000 GWh of additional hydroelectricity online. This is the least costly way to expand the generation capacity and is a priority for the government.

In the longer term, the policy goal for the power sector is to satisfy the demand for electricity from indigenous hydro resources, initially with the help of imports and, eventually, by their substitution with thermal generation.

Georgia depends on imports for the bulk of its primary energy requirements. Low carbon energy sources such as hydropower and gas are important for electricity, while the bulk of heating requirements are met by gas and biomass. The potential for hydropower development is good and the prospects for further gas and oil discoveries are positive. Much depends on establishing a favourable and stable investment climate with good regional relationships and stable politics.

Under the "European Union – Georgia Action Plan", which was concluded as part of the European Neighbourhood Policy, Georgia is to continue cooperation on Caspian and Black Sea regional energy issues and enable an infrastructure to facilitate the transit and development of Caspian energy resources.

Within the energy and transport priority area of the action plan there are specific commitments to energy policy convergence towards EU energy policy objectives, expressed as i) a gradual convergence towards the principles of the EU internal electricity and gas markets and ii) progress regarding energy networks. Of particular relevance to this review is the commitment to progress in energy efficiency and the use of renewable energy (RE) sources.

Over the previous decade, the electricity sector in Georgia has been transformed. The sector is deregulated and unbundled into generation, transmission and distribution companies. An independent regulator sets tariffs, and the Ministry of Energy is largely confined to policy-related matters. Power generation assets are totally privatised with the exception of Enguri hydropower plant, which is still in state ownership.

Energy Efficiency Programmes

The Ministry of Energy is responsible for the development of energy efficiency policies and legislation.

The policy for the efficient utilisation of the power resource is defined in the Resolution of the Parliament of Georgia (2006) on "Main Directions of State

Policy in the Power Sector of Georgia" (MDSPPS) as i) the improvement of energy efficiency in industrial and domestic spheres, creating a sound legislative basis and institutional framework for the improvement of energy efficiency in the country and ii) the study, and putting into operation, of measures necessary for the use of thermal and co-generation systems, and renewable sources of energy.

The explicit intent of the resolution was that the Georgian policy and executive bodies and power, oil and gas national regulatory commissions should ensure the support of these activities through legislation, the implementation of state programmes and state-funded projects, participation in international activities and privatisation.

An energy efficiency centre (EEC) has been in operation in Georgia since 1998, when it was funded by the EU through the TACIS programme. So far it has not seen any significant allocation of resources or action on the basis of its analysis and policy recommendations.

The most active body on the ground in Georgia appears to be USAID-sponsored Winrock International, which runs a range of RE and energy efficiency programmes. Another USAID-sponsored firm, Advanced Engineering Associates International (AEAI), is running (2008-2011) an energy capacity initiative to further enhance energy policy analysis capacity within Georgia, promote stakeholder dialogue on policy issues and support higher education programmes in energy.

At the end of 2007 the European Bank for Reconstruction and Development (EBRD) opened a $35-million credit line to TBC Bank for energy efficiency measures to small and medium-sized industries and to builders and homeowners (mainly insulation) from 2009 onwards. The take-up in this latter category has been low to date. Credits under this facility are now available from Cartu Bank, Bank Republic and Bank of Georgia.

Renewable Energy Policy

The government is committed to the further development of Georgia's renewable energy resources in the interests of energy security, short- and medium-term economic development and long-term energy and environmental sustainability. The aim is to gradually reduce Georgia's reliance on fossil fuels and meet the total requirement for electricity from indigenous RE resources.

Considerable effort has been expended in putting into place a framework of RE law, regulation and information and other incentives to facilitate the investment necessary to develop Georgia's abundant hydro resources.

Hydropower is for now the most important RE resource in Georgia and in 2010 hydropower satisfied more than 90% of the electricity demand. The Government of Georgia has invited prospective investors to open discussions on the terms and conditions for investing in several small, medium and large greenfield hydropower

plant sites with prospective capacities ranging from 1 MW to 700 MW. Short-listed bidders will be assessed in line with the criteria set down. Prefeasibility studies and relevant financial models for potential small and medium hydropower plants have been published with conditions with access to Clean Development Mechanism (CDM) credits for investors.

Biomass is an important source of heat in rural areas while geothermal energy makes a few significant local contributions. Geothermal and solar energies are the subject of ongoing research, investigation and assessment for their potential applications. The scope for and the value of improving existing biomass utilisation and long-term sustainability have been documented in several studies.

The identification and removal of the key barriers to the increased utilisation of RE in local energy supply is the explicit objective of a project financed under the United Nations Development Programme (UNDP), the Global Environment Facility. Winrock International, under the USAID programme, has conducted a number of energy studies on biogas, wood-heating stoves and other energy related development initiatives including the umbrella Rural Energy Programme.

The possibilities for consumer and business development where energy efficiency and RE combine to improve resource utilisation and service delivery, and make a contribution to local development, are well researched and set out in Winrock International's review of wood stoves for heating and cooking in Georgia.

Overall Assessment of Progress

Two gross indicators of progress are the improvements in the reliability of power supplies and the flow of funds in the power sector in Georgia with 95% of electricity bills being successfully collected, after many years of significant problems where dysfunctional transmission and distribution companies were unable to collect bills and consequently had insufficient funds to pay for the generated electricity.

At the time of writing, the Ministry of Energy has no formal sustainable energy or energy efficiency executive agency for the implementation of sustainable energy programmes under its responsibility or as part of its budget. Nor is there any provision for such in the "Priorities for Government 2009-2012".

An EEC was established with support from the EU in 1998. However, according to a report by the German development agency GTZ, due to the lack of an adequate institutional and legal framework, studies produced by the EEC are treated as recommendations and do not have a real influence on Georgia's energy efficiency policy.

Notwithstanding the merits of, and the absolute requirements for, investment in the refurbishment of large electricity generation facilities, there are concerns that other valuable resources and worthwhile courses of RE development are being neglected. The resources in the ministry committed to energy efficiency are in

the international affairs department, reflecting funding priorities and obligations. Work on the drafting of an energy efficiency law was well advanced before it was abandoned by government direction in 2008.

Transparency International has said that the government is not yet paying attention to energy efficiency and energy saving because the Georgian economy is still weak and the main part of budget revenues comes from sales of imported as well domestically produced energy in the form of various taxes: VAT, excise and others. Much of the activity that is underway is with the help of finance provided by donor countries and international finance and aid agencies.

Georgia's relatively high dependence on imported oil and gas should, in itself, provide a sufficient incentive for the Georgian authorities to implement strong energy efficiency policies and reduce exposure to inevitably more expensive sources of power as the economy expands.

International donors, the EU and the Energy Charter are strongly supportive of Georgia and its energy efficiency efforts; with a view to complying with concluded agreements the administration should take a more explicit and structured approach to capturing the benefits of energy efficiency for all.

Recommendations

General Recommendations

- The Government of Georgia should formalise and strengthen its approach to the making, delivery and review of an energy efficiency policy in line with Energy Charter obligations.
- Energy policy goals should respect and fully reflect the potential of energy efficiency and RE to contribute to wider economic and environmental policies and goals as well as ensuring security of supply.
- Future energy strategies and policies should be transparent and consistent with long-term goals and should consider initiating programmes for energy efficiency and set objectives for key sectors.
- Future energy strategies and policies should be the subject of public consultation and be supported by a robust analysis of their economic, energy efficiency and emission abatement potentials.
- The government should take full account of the barriers impeding the realisation of these potentials and, where market failure or other barriers exist, take remedial measures such as regulation, standards and information provision.

Institutional Framework

- The drafting, putting into place and delivery of a more coherent energy efficiency policy will require adequate resources in the Ministry of Energy and any associated delivery agency.
- The government should create an energy efficiency unit within the Ministry of Energy to lead the development of legislation, secure a budget line and promote sustainable energy within the government.
- The economic value and administrative implications of meeting EU energy efficiency directives should be regularly assessed to capture best international practice.
- Coordination of state and municipal governments and their agencies' efforts should be explicitly provided to promote effective action on energy efficiency.
- The government should continue to facilitate and, as far as is practicable, ensure the ongoing involvement of private stakeholders, business associations and non-governmental organisations (NGOs) in the implementation of energy efficiency policies and supporting activities.
- The Ministry of Energy should, with other ministries and governmental bodies, advance the integration of energy efficiency considerations into all relevant state policies.

Energy Market and Pricing

- The government should continue its efforts in the reform of gas and electricity markets in line with principles of efficient pricing.
- Where concerns arise over the social impacts of increased pricing, consideration should be given to methods other than pricing to address the concerns (such as fuel aid).
- Continued development of energy market regulation should support the development of effective energy services.
- The government should facilitate effective disclosure of pricing and consumption information directly to consumers, to facilitate a more competitive energy market.

Energy Efficiency Funding

- Energy efficiency incentive programmes should be considered by the Georgian government and consideration should be given to drawing resources through existing utilities.

- The government should ensure that its policies and actions leverage the substantial international financing available with domestic budget financing to the best overall effect.
- Continued dialogue with IFIs and the donor community should be ensured in order to strengthen the focus on energy efficiency and RE.
- EU neighbourhood funding for energy efficiency should be directed at achieving market transformation towards investments in energy efficiency in ways that are sustainable in the context of ongoing energy policies.
- The government should accelerate the identification and removal of any barriers to the use of energy service companies.

Specific Energy Efficiency Programmes and Measures

- The government should develop, in consultation with industry and other interested parties, a series of consistent short-, medium- and long-term strategies to enhance the energy performance of building stock.
- Building regulations should be a priority for action by the government in the light of the recent and projected high levels of activity in the renewal and expansion of the building stock.
- Given the existence of common building types in each of the distinct climate regions, suitable low-cost packages of efficiency upgrades for residences should be developed.
- Municipal governments should be encouraged to manage regionally relevant demonstration programmes for rehabilitating and constructing high-efficiency buildings in advance of setting new building codes.
- Energy efficiency must feature in any integrated approach to transport planning and provision.
- Consideration should be given to introducing energy efficiency measures in transport in parallel with the completion of a major new transport infrastructure.
- The government should continue to encourage those municipalities that adopt IT management and information solutions to improving the traffic flow.
- The government should promote measures to raise awareness of energy efficiency in local communities and citizens and to move towards a more commercial environment for improving energy efficiency in industry.
- The government should develop and implement framework policies that promote and support energy efficiency so as to improve the competitiveness of industry and secure sustainable growth.

Renewable Energy Sources

- The government should continue to promote the development of RE with an emphasis on cost effectiveness.
- The government should evaluate the benefits of the complementary seasonal variations in hydropower and wind power resources.
- The effectiveness of various support measures in stimulating investment should be regularly assessed.
- The government should develop a robust strategy to make biomass a more efficient form of heating in homes with an eye to meeting the needs of the disadvantaged and to achieve long-term RE objectives, for example through the deployment of high-efficiency wood burning stoves on the basis of the existing analysis, supplemented by several regional trials with the aid of donors.
- A biomass strategy should be developed in consultation with relevant market and government stakeholders to ensure an integrated policy approach to the production and use of biomass.
- The barriers to the development and application of the geothermal resource should be addressed to facilitate entrepreneurial activity in this niche area in Georgia.

Data Collection and Monitoring

- The government should facilitate the collection of the statistical data required for forward planning, investment appraisal and, crucially, indicators for energy efficiency.
- The Ministry of Energy should improve its capacity to analyse and assess energy efficiency as a basis for future policy development, including decisions on financing.
- The establishment of an independent monitoring/statistical gathering agency provides the opportunity for better coordination in the production of energy statistics and will ensure the accuracy, independence and robustness of all economic and energy data.

BACKGROUND

Overview

This brief overview sets out the geographical, human, climate change, political and economic context for the in-depth review.

Geographical

Georgia is located in the Caucasus region. Its northern border with Russia runs along the crest of the Greater Caucasus mountain range and it is bounded to the west by the Black Sea, to the south by Turkey and Armenia and to the east by Azerbaijan. Georgia covers a territory of 69,700km^2. Located on the "Silk Route" between Europe and Asia it has always been an important north-south and east-west transit route.

Georgia's population is approximately 4.4 million and this has been declining in recent years. The capital, Tbilisi, has a population of about 1.15 million. There are four other cities with populations greater than 100,000 – Kutaisi, Rustavi, Batumi and Zugdidi. The population is split between those who live in urban areas (53%) and those who live in rural areas (47%).

Georgia's landscape is varied and is combined with a rich cultural history. Although the dominant feature is undoubtedly its mountains, its landscapes range from coast to low-land marsh forests and swamps and from moderate rain forests to eternal snows and glaciers, including semi-arid plains (more characteristic of Central Asia) in the east.

Dense forests account for over one third of the territory while alpine and sub-alpine zones cover roughly 10%. Georgia's highest peak is Mount Shkhara at 5,201m above sea level. The Likhi Range divides the country into eastern and western halves and the Greater Caucasus mountain range separates Georgia from the Russian republics of the North Caucasus, while the Lesser Caucasus Mountains form its southern borders.

Western Georgia has a humid subtropical, maritime climate while that of eastern Georgia ranges from moderately humid to a dry subtropical type with marked elevation zones. In eastern Georgia, farther inland, temperatures are lower than in the western portions at the same altitude.

Western Georgia has heavy rainfall throughout the year, totalling 1,000 to 2,500mm and reaching a maximum in autumn and winter. Fast-flowing rivers offer good hydropower potential, the two major rivers being the Rioni and the Mtkvari. Recent exploration activities have indicated oil and gas potential. Other resources include metal ores, gold, marble and mineral waters.

Georgia has a natural resource base that offers strong economic growth potential. Fertile land and a favourable climate enable diverse agricultural production that includes fruits and vegetables, livestock, dairy products, nuts and tea. The country has a history of viticulture with around 500 varieties of grapes, and significant potential for export.

Its biodiversity is rich, with a large number of animal species, reflecting the variety in the landscape and elevation. Much of the natural habitat in the lowlands of western Georgia has disappeared over the last 100 years due to urbanisation and agricultural development.

Human

Ethnic Georgians form the majority (83.8%) of Georgia's population of about 4.4 million (2001 Census). Other ethnic groups include Azeris (6.5%), Armenians (5.7%), Russians (1.5%), Abkhazians and Ossetians. Numerous smaller groups include Assyrians, Chechens, Chinese, Georgian Jews, Greeks, Kabardins, Kurds, Tatars, Turks and Ukrainians. Georgia's Jewish community is one of the oldest Jewish communities in the world. Key demographic indicators are set out in Table 1 below.

Table 1: Key Demographic Indicators

Population, total (millions)	4.4
Population growth (annual %)	1.2
Life expectancy at birth, female (years)	77.7
Life expectancy at birth, male (years)	69.2

Source: Geo Stat, 2010

Georgia's literacy rate is close to 100% but, since 1990, it is estimated that 1.5 million Georgian nationals left the country, with about one million legally or illegally residing in Russia.

In the early 1990s, after the dissolution of the Soviet Union, violent separatist conflicts broke out in the autonomous regions of Abkhazia and South Ossetia and a large number of ethnic Ossetians left Georgia, mainly to go to Russia's North Ossetia. Thousands of ethnic Georgians left Abkhazia and are now categorised as internally displaced persons in Georgia.

The incidence of poverty was reportedly very high in Georgia in 2003 and, while being mainly attributable to unemployment, other factors such as educational attainment played an important role. During the last few years, however, the level of poverty has been decreasing.

While gender inequality is generally low, emigration, labour market requirements and the poor social infrastructure have increased social and female labour discrimination. Traditional gender roles also create inequality and the opportunities for career and professional growth for women are restricted. Being responsible for their families places a heavy burden on women, while social compensation mechanisms such as free kindergartens and antenatal assistance are insufficient to meet demand.

Climate Change

Considering its relatively small territory, Georgia's climate is extremely diverse with two main climatic zones roughly splitting it into east and west. Climate change scenarios for Georgia involve rising average temperatures, increased risk of heat waves, random heavy downpours, reduced rates of annual average precipitation and a reduction in water resources.

The sectors most exposed to climate change are water resources, tourism, agriculture and energy and Georgia needs to find ways to mitigate and adapt to climate change.

Georgia joined the United Nations Framework Convention on Climate Change (UNFCCC) in the category of a non-Annex I country, and is also a signatory to other international agreements on climate change such as the Kyoto Protocol. Its Climate Change Programme (CCP) projects focus on three main areas: the greenhouse gas (GHG) inventory, vulnerability and adaptation, and GHG mitigation and carbon financing.

Political

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

For much of the first decade of transition after the break-up of the former Soviet Union, Georgia was one of the poorest performing economies in Europe and the region of Central Asia. In 2003, the real GDP was at about 40% of its 1989 level and Georgia was a weak state, with accumulating unpaid pensions and wages, the electricity service limited to a few hours per day and mostly to the capital city, weak public finances and pervasive corruption.

The basis for the current political system in Georgia was established by the Rose Revolution of November 2003. Successive post-revolutionary governments have pursued wide-ranging reform programmes aimed at reviving the national economy, improving living standards and reducing poverty. The fight against corruption has been put at the centre of the reform agenda.

Since then, the Georgian authorities have continued to adhere to their declared goals of combating corruption, improving governance and alleviating poverty. Georgia seems committed to the principles of multi-party democracy, pluralism and market economics but the application of these principles has been uneven.

Further development of democratic institutions, the reinforcement of checks and balances between the branches of power, the strengthening of the rule of law, the independence of the judiciary and the protection of human rights are essential to overcome the multiple challenges faced by Georgia today.

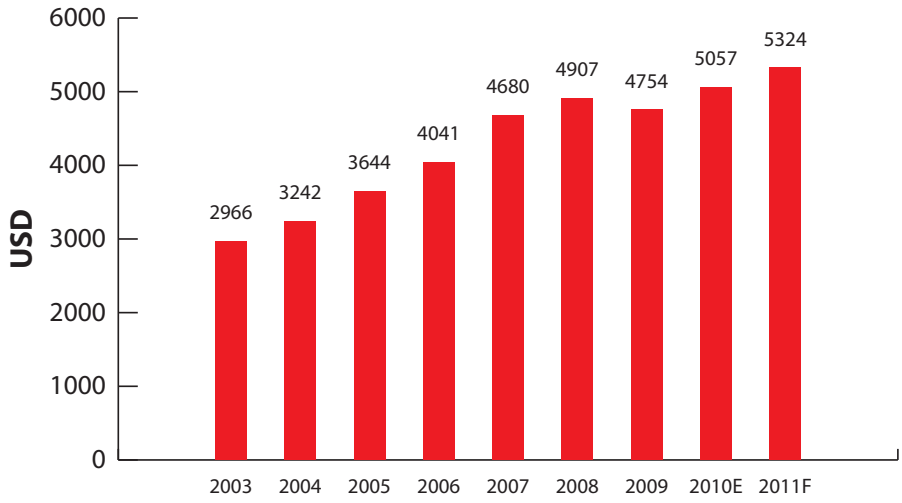
Economic

Georgia's macroeconomic performance and general progress with reforms in the past years have been strong. Georgia has achieved significant economic growth, mainly driven by large foreign capital inflows. Foreign investments across different sectors of the economy have contributed to broadening the economic base.

Domestic credit has grown rapidly, supported by increased confidence in the banking sector and access to international financial markets. The level of dollarisation in the sector has gradually decreased and progress with structural reforms has been significant.

The following table shows the historical, estimated (E) and projected (F) GDP/capita of Georgia for the period 2003-2010.

Figure 1: GDP per Capita (PPP)



Source: IMF

Reforms include the regulatory framework for business, free industrial zones, reduced corruption, a simpler tax system and large-scale privatisation in critical sectors of the economy.

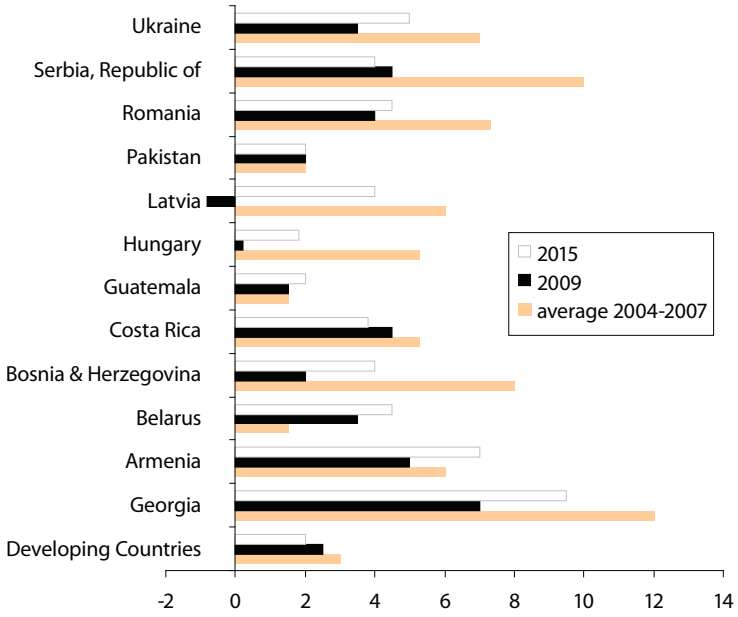
However, the Georgian economy was greatly affected by both the Russian - Georgian conflict in August 2008 and the international financial crisis. The August conflict undermined investor and consumer confidence, put stress on public finances and damaged the physical and other infrastructures.

The intensification of the international financial crisis has put further pressure on Georgia's currency and foreign investments and affected the quality of its loan portfolios and the recovery of bank deposits.

Remittances from workers living abroad have declined since the beginning of 2009 due to the global economic slowdown, in particular those from Russia, which is the source of two-thirds of remittances. This negative impact has been partly offset by large-scale international financial support, amounting to about $4.55 billion over three years, pledged in October 2008.

The IMF emergency 18-month stand-by programme of $750 million that started in mid-September 2008 (augmented by an additional $424 million and extended by 14 months in August 2009) also helped with the stabilisation process. Ongoing internal political uncertainty has had an impact on investor confidence.

Figure 2: Georgia and Comparator Countries: FDI Inflows



Source: IMF, 2010

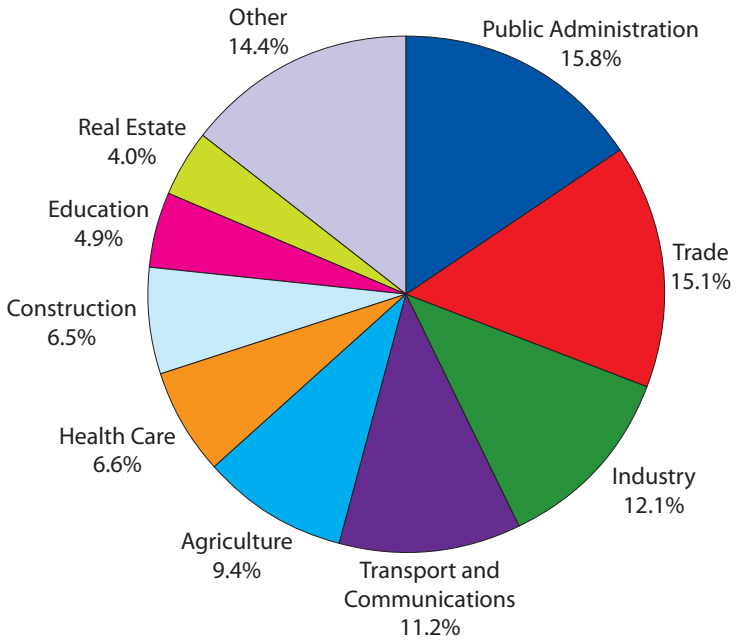
Georgia's economy has undergone a painful transition since independence from the old Soviet Union. It has struggled to move from an economy that was geared for exports to a large Russian market and large-scale energy imports from its largest neighbour, to one that has seen its biggest export market shut off, and its connection to a large grid that balanced its seasonal energy deficit disconnected.

Before independence in 1991, the country had a relatively stable economy and a developed agricultural sector that specialised in the export of agricultural products (almost exclusively to other Soviet republics). Its manufacturing base and industrial products were energy intensive.

Since then, the relative contributions of the economic sectors to the GDP have oscillated widely. The industry contribution fell from 26% in 1990 to just 10% in 1994 before rising to between 10% and 15% of the GDP from 1995 to 2008. As industry collapsed, agriculture's share rose to almost 70% of the GDP in 1994 before falling rapidly to 30% in 1996, and declining steadily since.

In 2009, agriculture accounted for only 9% of the GDP but accounted for 55% of employment. The components of the GDP by sector in 2009 are illustrated below.

Figure 3: Components of Nominal GDP 2009



Source: National Statistics Office of Georgia (GEOSTAT)

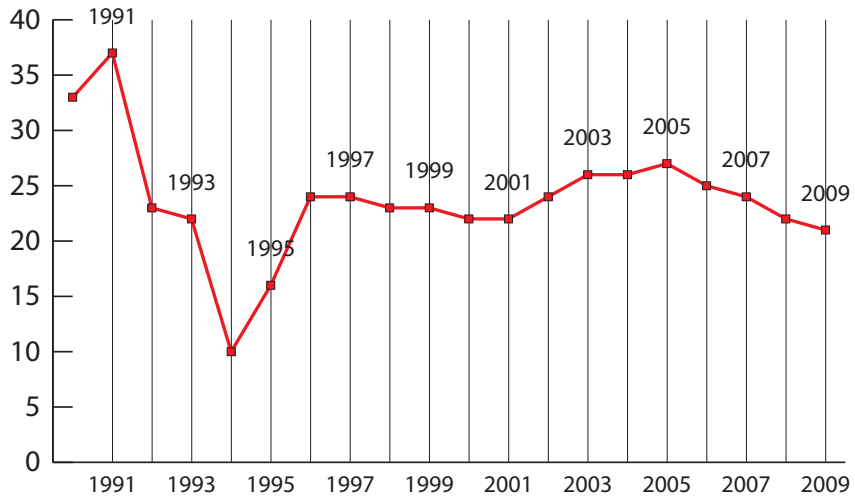
The services sector has grown spectacularly in relative importance, accounting for 30% of the GDP in 1990 to nearly 70% of the value added of the economy in 2008. This may reflect increased spin-off services from those industries that increasingly use the country as a key transit point.

Georgia suffered a massive collapse of its industrial base immediately following independence. The chart below illustrates the rapid collapse and slower recovery of added value in the industrial sector.

The IMF believes economic recovery is now taking hold in Georgia, with real GDP growth bouncing back to a projected 6.4% in 2010 after an economic contraction of 3.9% in 2009. It predicts continuing strong growth up to 2014.

The importance of capital inflows for the various economic sectors and the scale of donor and other aid are clearly illustrated in the table below.

Figure 4: World Development Indicators: Industry, Value Added (% of GDP)



Source: World Bank

Table 2: Aid from Donor Countries and International Organisations

Aid by Donors	
Donor	US$ mln
World Bank	530
EBRD	927
Asian Development Bank	300
IFC	350
European Investment Bank	330
US	1000
EC	638
EU Members	174
Japan	200
Other states	88
Total	4535

Aid by Sectors	
Sector	US$ mln
IDPs support, e.g., IDPs housing	350
Transport infrastructure	682
Energy Infrastructure	381
Urban and municipal infrastructure	210
Finance and banking	1105
Non-sectoral support	586
Unallocated	1221
Total	4535

Source: Invest in Georgia, 2010

Although the economic base of Georgia has broadened in recent years, recent growth has mainly been driven by financial services and the construction sector. Developing the tradable sector, by supporting exports and improving competitiveness, especially in manufacturing and import substitution, in particular in agribusiness, are important for long-term sustainable growth, according to the EBRD. In spite of sustained economic growth, high poverty levels still represent a serious challenge. There are also wide regional differences in living standards.

Energy Supply

Overview

Georgia is a net importer of natural gas and petroleum products, which are, with hydropower and biomass for residential heating, the main energy sources.

The Georgian power system was once part of an integrated regional system of the South Caucasus that allowed for the balancing of the seasonal deficit in hydropower in winter with power imports, and the export of surplus power in spring and summer due to the seasonal nature of production from Georgian hydropower plants.

Deficits in management, financial control, maintenance and timely rehabilitation works on the energy infrastructure played a significant role in the near collapse of the power and gas systems. The disintegration of the centralised economic system and the drastic increase in prices for energy resources after the collapse of the former Soviet Union were followed by a serious energy crisis in Georgia.

Much of its electricity and gas infrastructure is scheduled for refurbishment but the costs of the necessary rehabilitation are large, considering the timeframe available. Acute situations have developed over the high rates of electricity losses and gas leakage and the non-collection of bills precipitated a crisis in the power supply.

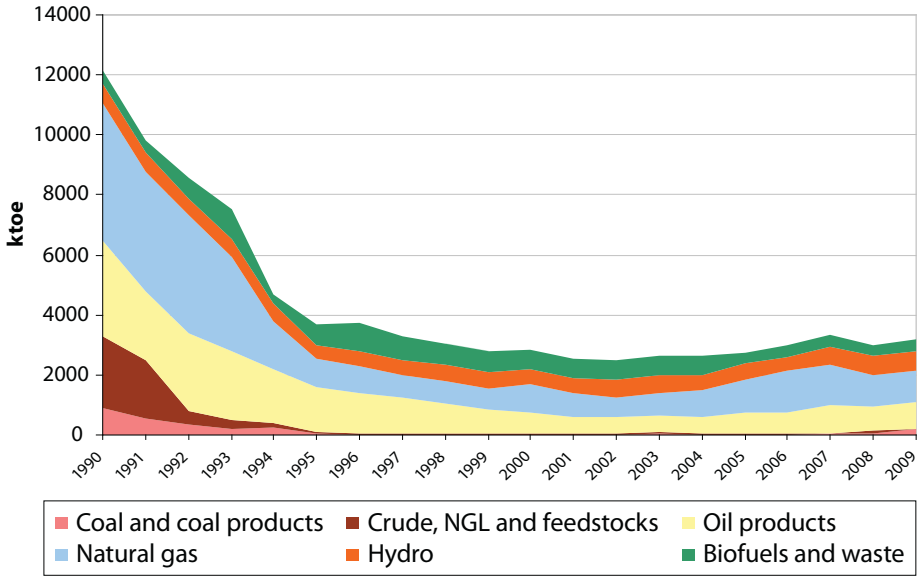
Reform efforts in power sector regulation and governance are well underway and large-scale refurbishment and the renewal of critical infrastructure are high on the government's list of priorities.

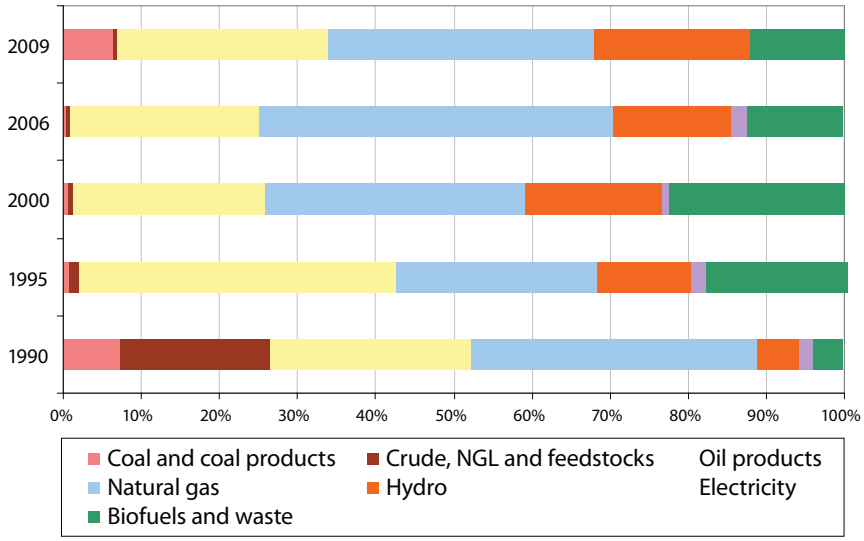
From the early 1990s through to 1996 primary energy demand was in free fall. This is illustrated in the figure below, where by 1996 energy demand was at one third of that at the beginning of the decade. Primary energy demand broadly reflects the fortunes of the economy and it only resumed growth in 2002, having bottomed out at 25% of the demand 12 years earlier.

Oil and Gas

Georgia imports 98% of its primary energy requirements of natural gas and oil products, which together meet about two thirds of the primary energy supply. Because of this and the relatively high energy intensity of its GDP, the competitiveness of Georgia's economy is particularly affected at times of high energy prices.

Figure 5: Total Primary Energy Supply





Source: IEA statistics, electronic database, 2011

Georgia's proven oil and gas resources are modest. The country's 15 oilfields have confirmed reserves of about 8.3 million tons but larger oil reserves are assumed to exist. The oil potential of the Black Sea shelf is estimated at 70 million to 1.3 billion barrels (GTZ, 2009).

Although Georgia has no proven large-scale oil and gas resources or production, it can generate revenues from oil and gas transit because of its geo-strategic location. Despite its lucrative location, Georgia has struggled to secure a basic energy supply for its citizens since independence.

Table 3: Oil and Gas Statistics 2005-2010

		2005	2006	2007	2008	2009	2010
Natural gas							
Local Production	Mln m³	17.2	23.5	24.3	19.5	15.7	11.1
Total imported gas to Georgia	Mln m³	1,335	1,808.8	1,702	1,473.2	1,180.9	1,113.3
Totally consumed Gas in Georgia *Including:*	Mln m³	1,332	1,806.4	1,700	1,471.2	1,188.8	1,121.14
Commercial Sector	Mln m³	n.a.	n.a.	n.a.	552.4	482.5	478.8
Household Sector	Mln m³	n.a.	n.a.	n.a.	528.1	415.6	445.5
Power Generation	Mln m³	317.6	674.2	455.4	390.7	290.8	196.9
Transit to Armenia	Mln m³	1,685.1	1,715.7	2,054.3	2,254.3	1,628.7	1,440.1
Transit to Turkey	Mln m³	0	0	1,212.5	4,488.2	4,787.9	4,355.7
Oil							
Local Production	Tons	66,700.3	63,500.7	56,635	52,814.5	52,867	51,444.1
Baku-Tbilisi-Ceyhan (Transit)	Mln Barrel	1.8	64.9	212.2	246.6	285.8	286.3
Western Route Export Pipeline (Transit)	Mln Barrel	51.5	41.6	0.04	5.2	31.4	29.6

Source: Ministry of Energy of Georgia

Renewable Energy

Georgia has vast resources of almost all types of RE: solar, wind, geothermal, hydro and biomass. Currently, according to USAID (2010), less than 25% of economically viable hydropower resources are being exploited. The achievable annual potential of all RE sources is estimated at 15,000 GWh.

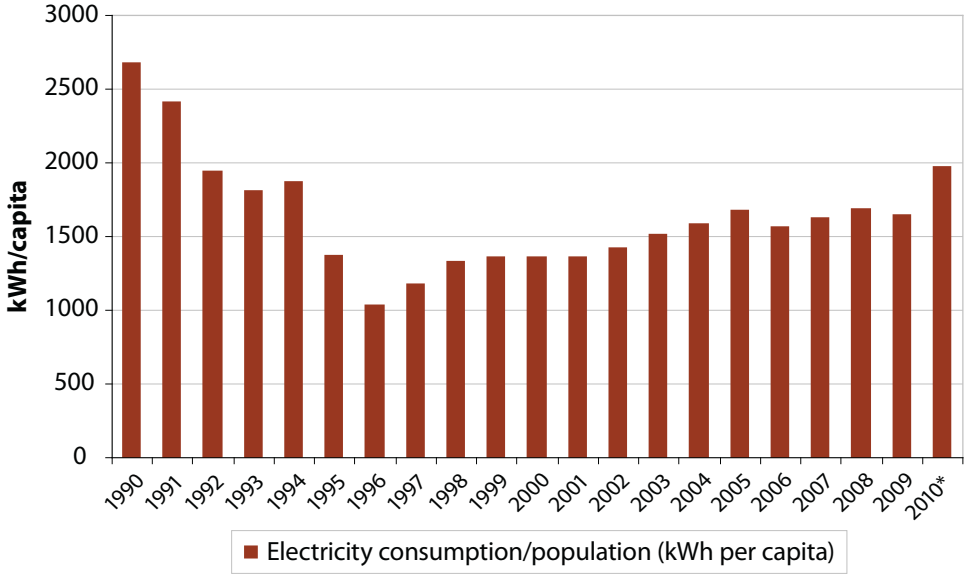
Electricity

The state of the repair, flexibility and capacity of the transmission network in Georgia has been one of the major weaknesses of the electricity system. The construction of the larger planned HPPs (Khodoni and Namakhvani) will require large investments in additional transmission capacity, especially for eventual exports to the Turkish market.

The potential for hydro generation is in regions where exports to Turkey are feasible and the stream of earnings should more than offset the cost of developing greenfield power plants. This export capacity will enhance trading and facilitate support among countries in the region (EBRD, 2009).

The year-on-year changes in electricity consumption per capita illustrate the rapidity of the collapse, the slow return to growth and, with higher growth since 2003, the improvements in the overall efficiency of energy use in Georgia since 2003. According to information provided by the Georgian Ministry of Energy the electricity consumption per capita in 2010 was 1,970 kWh.

Figure 6: Electricity Consumption per Capita, 1998-2009



*Source: IEA statistics, electronic database, 2011; *2010 figure provided by the Ministry of Energy of Georgia*

Energy Balances

Oil and Gas

Georgia is 98% dependent on imports of oil and gas, which together accounted for about 70% of primary energy requirements in 2007. Oil extraction and exploration works are conducted by Georgian and foreign companies. The total crude oil production in Georgia was 51,393 tons, while natural gas production totalled 7.8 mln m^3 in 2010.

Electricity

Arising from the combined seasonality of hydropower production and electricity demand, Georgia is a net exporter of electricity in summer and an importer in winter. Electricity exports have been growing since 2004 and imports have been decreasing since 2005.

In 2005 imports totalled 1,399 GWh and exports were 122 GWh, while in 2010 exports increased more than ten times, reaching 1,524 GWh, and the import significantly decreased to 222 GWh.

Given the scope for the rehabilitation of existing installations and with new hydropower plants in the planning stage, it is expected that Georgia will continue to grow in terms of its electricity exports. While Georgia has approximately 1,600 MW of hydropower capacity actually generating electricity at the moment, the installed capacity is around 2,700 MW.

The rehabilitation and upgrading of HPPs could bring as much as an additional 2,200-2,500 GWh of hydroelectricity on-stream. This is the most cost-effective and lowest capital-cost route to expand the generation capacity and is being given priority by the government. The total installed capacity of ongoing rehabilitation projects is 2,085 MW and the annual generation could be 7 billion kWh. The generation of electricity from HPPs in 2010 was almost 30% higher than the generated power in 2009.

Table 4: Electricity Statistics for 2005-2010

		2005	2006	2007	2008	2009	2010
Total Generation *Including:*	GWh	7,061.00	7,621.90	8218.4	8,441.00	8,402.30	10,046.30
HPPs	GWh	6,030.40	5,401.60	6746.3	7,161.00	7,411.62	9,367.70
Thermal Power plants	GWh	1030.6	2,220.30	1472.1	1280	990.68	678.6
Losses	GWh	495.3	423.2	333.8	343.3	273.01	315.3
Import of electricity	GWh	1398.6	777.00	433.5	649.1	254.98	222.1
Electricity export	GWh	121.8	96.40	633.94	679.4	749.36	1,524.30
Electricity consumption	GWh	-	-	-	-	7,907.9.	8,744.20

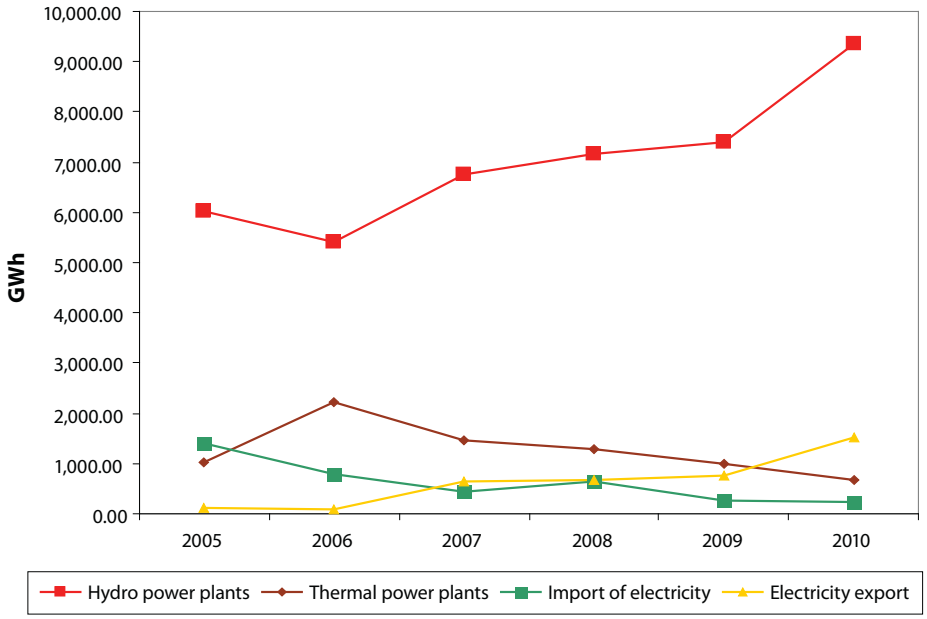
Source: Ministry of Energy of Georgia

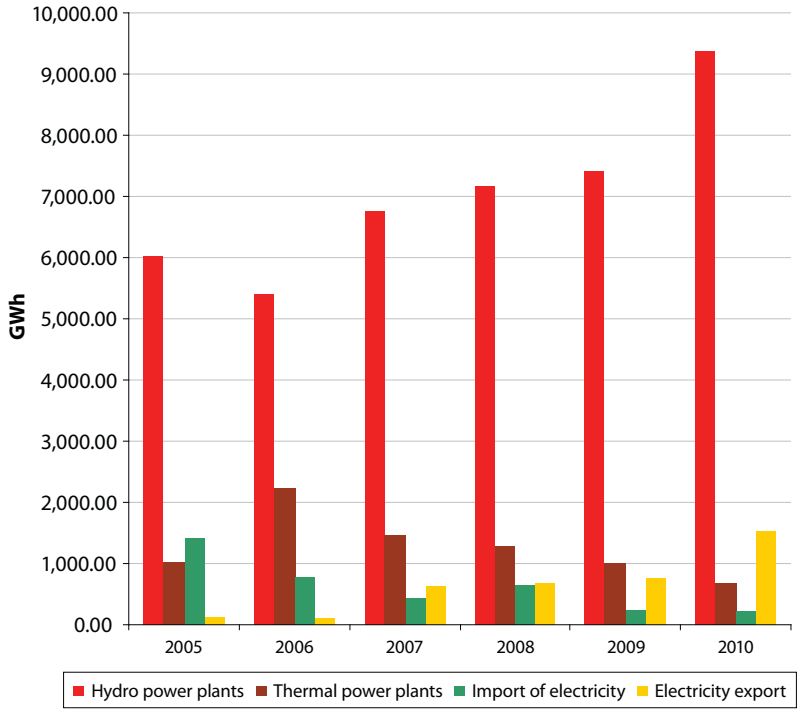
Specialists estimate the amount of excessive energy to be approximately 700-800 GWh annually, or about 10% of in-country electricity generation. The main reason for this situation is that Georgian power plants were planned and constructed for peak operation in the united energy system of the Soviet Union (GTZ, 2009).

After the breakdown of the Soviet Union and the isolation of the Georgian energy system, some of the capacity remained unused in the summer. This was a serious problem, which generally hindered the development of energy generation in Georgia, to say nothing about the generation from new prospective small or big hydropower plants.

Until recently, Georgia's electricity sector suffered from a surplus of hydropower, compared to system demand during and after the spring melt when the water discharge in rivers strongly increased and electricity usage decreased considerably.

Figure 7: Electricity Balances 2005-2010





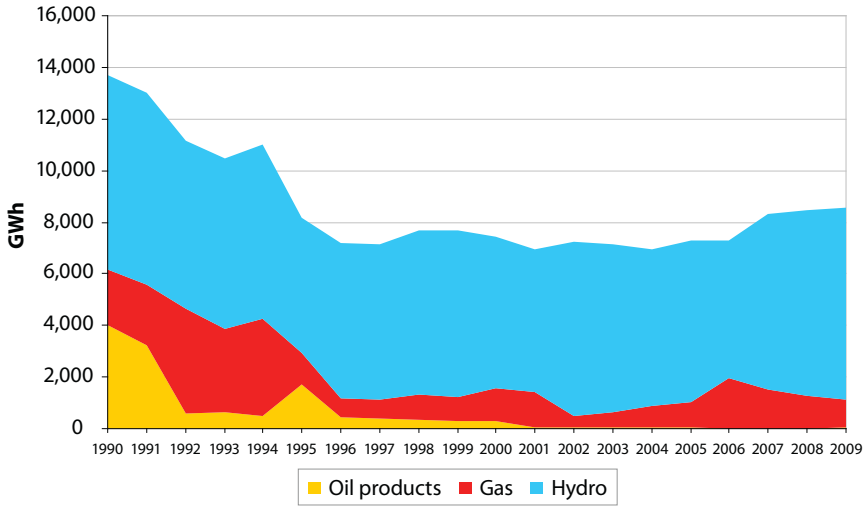
Source: Ministry of Energy of Georgia

Annual electricity generation has grown from 7,424 GWh in 2000 to 10,001 GWh in 2010. This increase was largely due to hydropower. Thus the increase in electricity demand has been met from Georgia's hydro resources; the contribution of gas was

the same as in 2000 and a small net quantity of power was exported. About 92% of Georgia's power needs were met by hydropower in 2010.

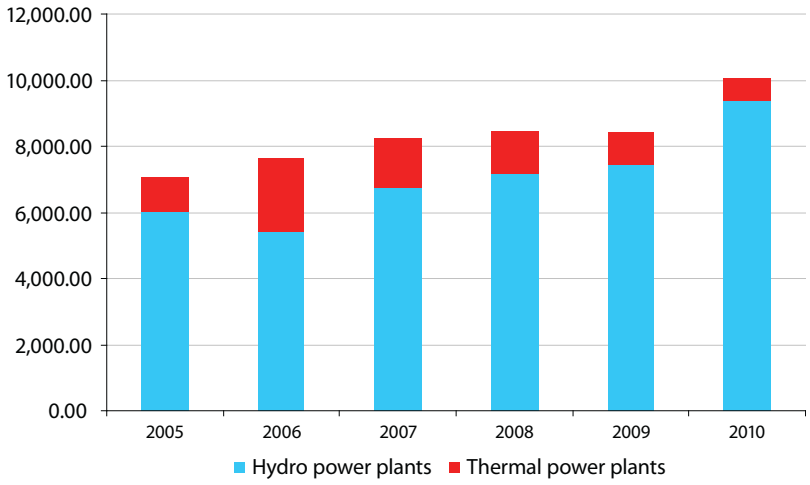
This situation changed in 2007, when the newly created market maker the Electricity System Commercial Operator (ESCO) managed to develop an export market by arranging seasonal energy swaps with neighbouring countries. Today, almost all surplus hydroelectricity can be sold and this will positively influence the development of small hydropower and other grid-connected RE solutions in the future.

Figure 8: Electricity Generation by Fuel



Source: IEA statistics, electronic database, 2011

Figure 9: Electricity Generation by Power Plant Type in 2005-2010



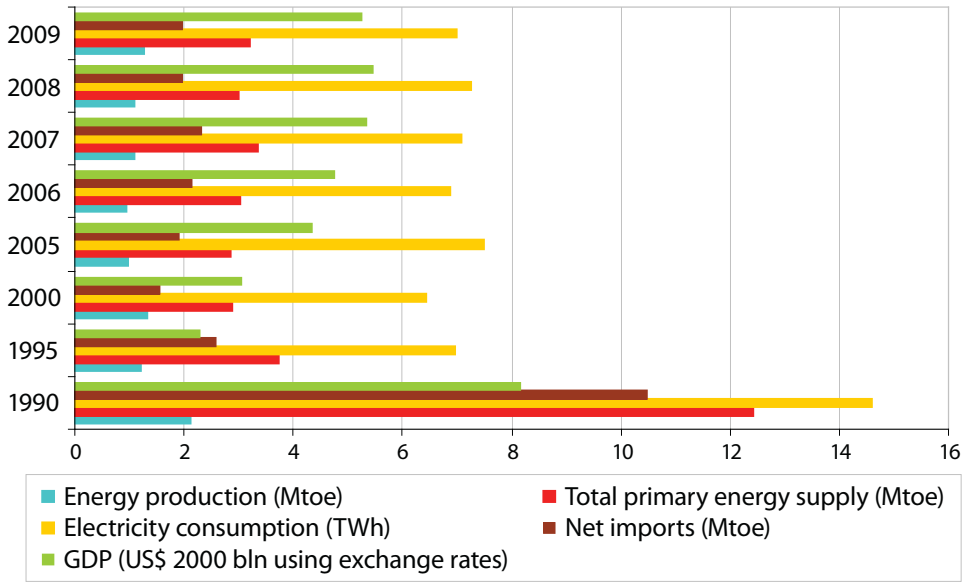
Source: Ministry of Energy of Georgia

With the phasing out of oil, the current portfolio of electricity generation plants comprises hydro and gas as illustrated in the figure above. The costs of production are very different as with hydro much of the plant is fully depreciated, and gas is sourced at market prices. As demand expands in the future, additional power will be procured at a much higher marginal cost than is reflected in average prices today.

Evolution of Energy Production Imports and Supply

The evolution of energy production, imports and supply over the 18-year period since 1990 is illustrated below. The bottoming out of the total primary energy supply in 2002 and the slow recovery until it accelerated upwards under the pressure of economic growth in 2004 is very evident.

Figure 10: Energy Production, Net Imports and Total Primary Energy Supply



Source: IEA statistics, electronic database, 2011

Georgia's total primary energy supply at 3 million tonnes of oil equivalent (toe) in 2008 is modest for the size of the population and reflects the state of the economy and the widespread economic rationing of energy more than anything else.

A composite set of additional indicators including the GDP is presented in the figure, where the recovery of GDP growth can be seen to have commenced well ahead of the resumed growth in primary energy supply.

After a precipitous decline in the GDP up until 1993, economic growth, as measured by the GDP, resumed strongly from 1995 and continued to grow unabated, accelerating in the latter years, until 2007 when it peaked. By then it had recovered

to a little over 60% of its 1990 level and is illustrative of the depth of prolonged deprivation suffered by the Georgian economy.

The electricity supply was slower to recover and the course of its recovery was less directly upwards, reflecting the complexity and variety of impacts on the structure of the sector and its overall reliability at the time. The first inflection point for this indicator was 1996 – a sharp recovery – but was followed by further inflections in 2001, 2005 and 2006, all indicative of other issues at play.

While the GDP has grown at a faster pace than energy supply over the seven years since 2001, electricity demand growth has, for four of those years from 2001-2005, correlated quite closely with the growth in the GDP. This is a reflection of the restructuring of the economy, partly in terms of services but also of the growing electricity intensity of the GDP, which Georgia needs to anticipate and prepare for in the future.

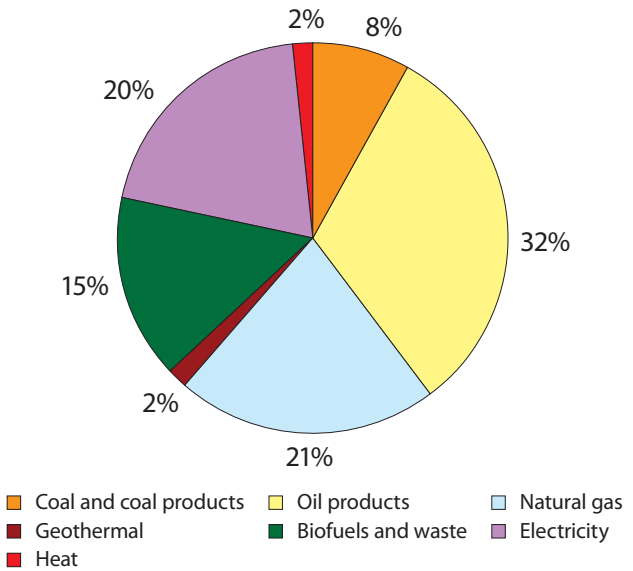
Without doubt energy efficiency has played a part. How and by how much, remains to be established.

Energy Demand

Total Final Energy Consumption

The total final consumption (TFC) by energy source is illustrated in the chart below, which shows the dominance of oil and gas in the total final energy consumption.

Figure 11: Final Energy Consumption in Georgia



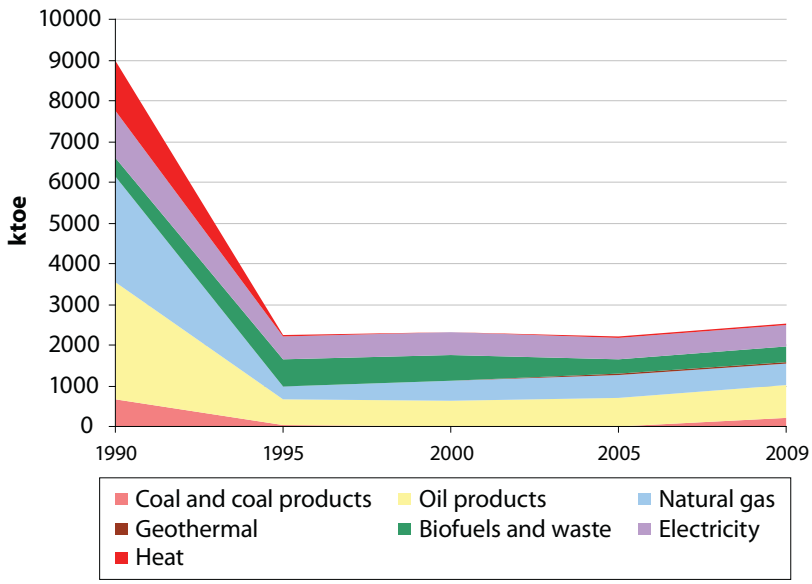
Source: IEA statistics, electronic database, 2011

Following the initial collapse in 1991/1992, the structure of the total final energy consumption did not change very much until 2004, when gas and oil demand surged and the use of wood fuel for heat production abated. The total final energy consumption grew by 22% between 2004 and 2008. Over the same period gas consumption increased by 64% and oil consumption grew by 59%.

The TFC of heat produced from combustible renewable sources and waste reduced to below its pre-1990 level for the first time in 18 years in 2008, when it accounted for 15% of the total final energy consumption. The contribution from the use of coal declined from 5% of the total final energy consumption in 1990 to about 1% in 2008.

The TFC of heat delivered as heat in district and other heating systems, which had declined from 14% of the total final energy consumption in 1990 to zero in 1996, staged a modest recovery in 2002 and contributed to almost 2% of the TFC in 2009. Geothermal heat also accounted for 2% of the TFC in 2009.

Figure 12: Trends in Final Energy Consumption in Georgia



Source: IEA statistics, electronic database, 2011

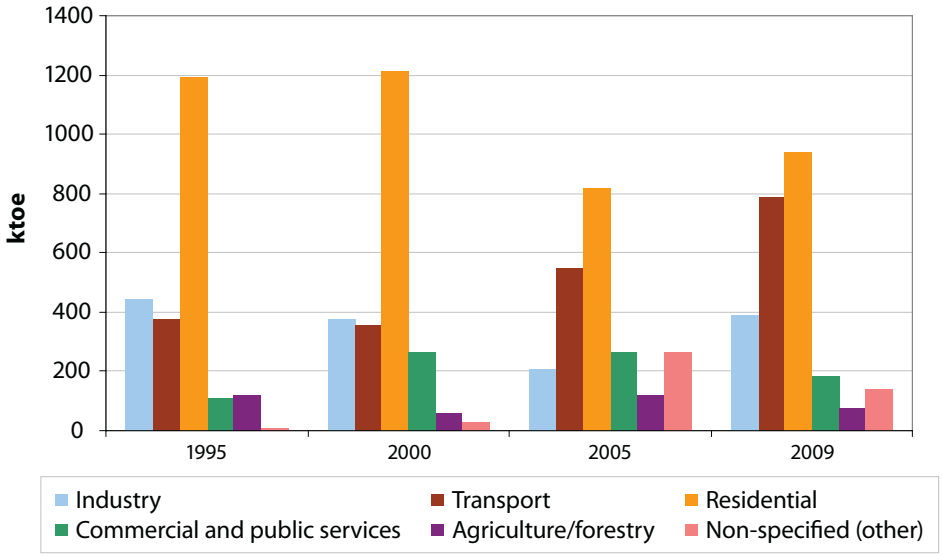
Final Energy Consumption by Sector

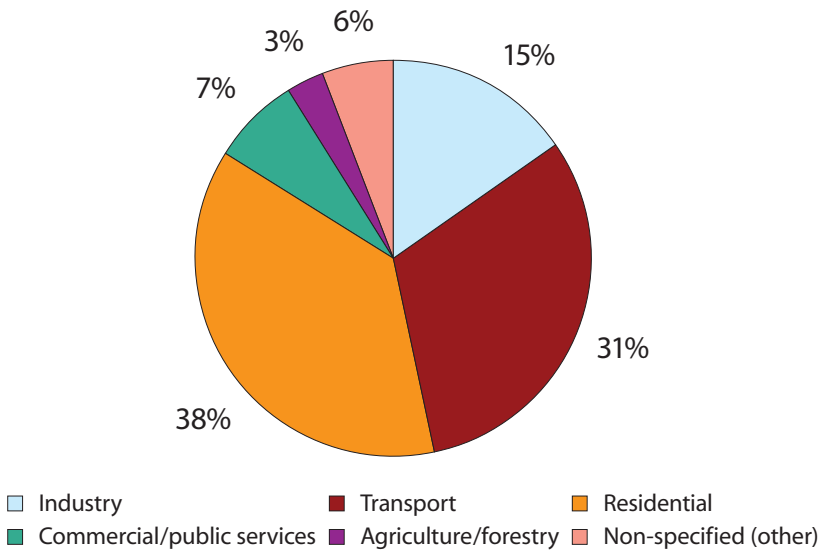
The charts for 1998 and 2008 illustrate the changes in energy use by sector over the period 1998-2008. The growth in services (commercial and public) is striking as is the decline in the residential share.

Industry

The figure below shows the final energy consumption trend in each industry sector by fuel over past years. Industry began to stabilise its energy consumption in about 2001 and thereafter grew by a modest amount before accelerating in 2005.

Figure 13: Final Consumption by Sector



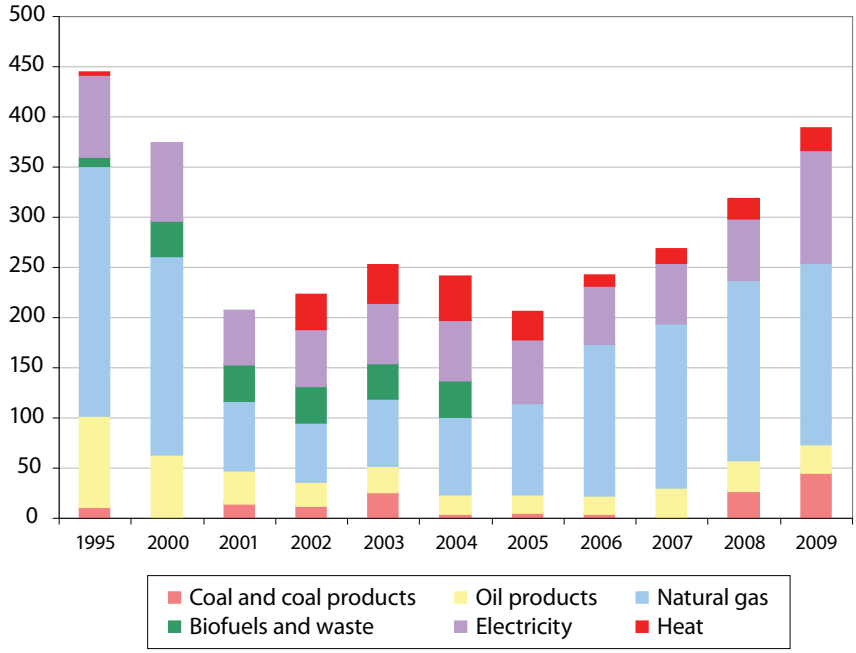


Source: IEA statistics, electronic database, 2011

Gas is clearly the preferred fuel and it contributes the bulk of energy used in industry, having a share of six times that of oil in 2009. Coal use was about half that of oil in

2008. Electricity use in industry was more or less stable for the period 2001-2008 and in 2009 its consumption almost doubled compared to in 2008.

Figure 14: Final Energy Consumption of Georgia's Industrial Sector, ktoe



Source: IEA statistics, electronic database, 2011

Residential

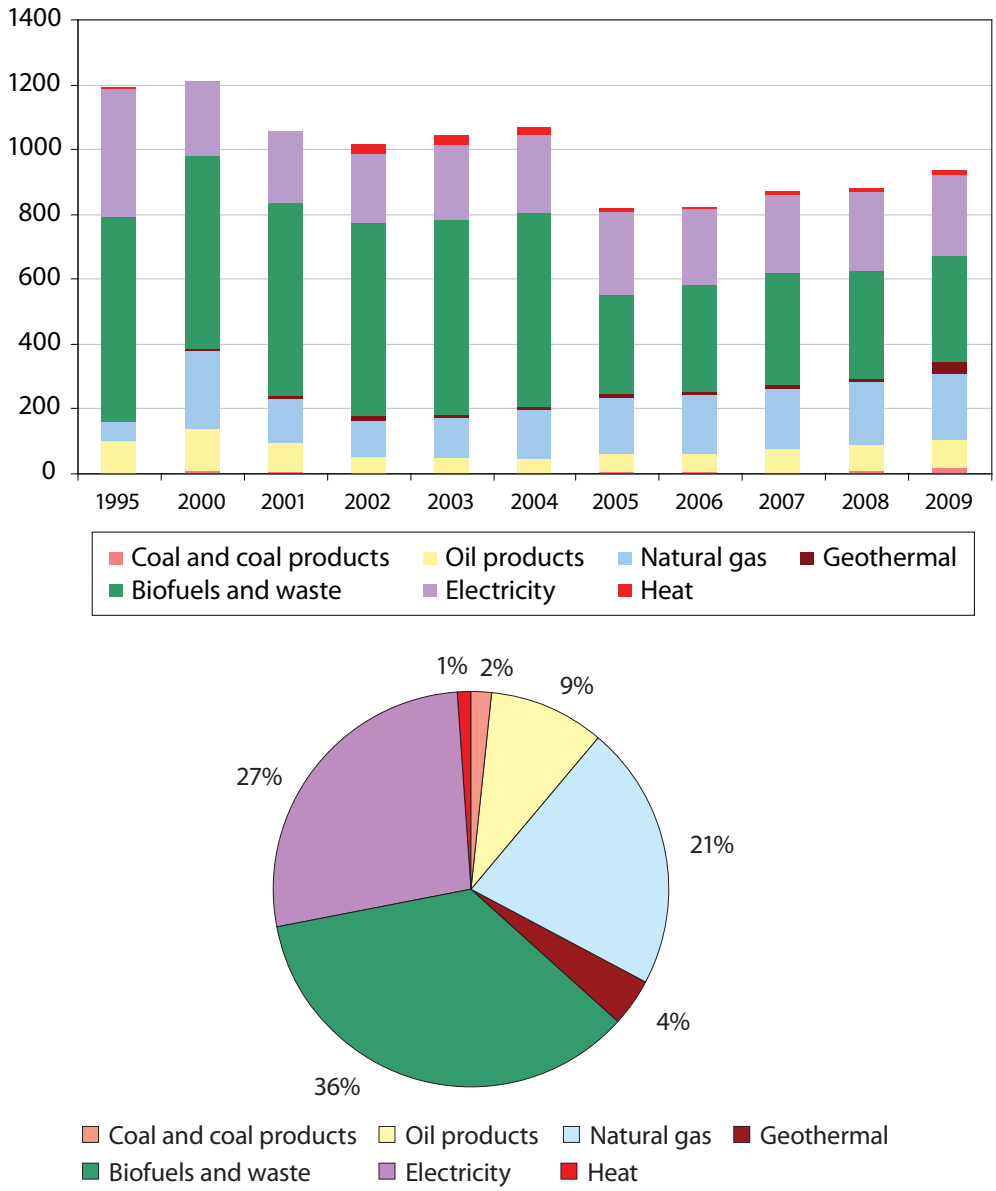
The pattern of final energy consumption in the residential sector, as illustrated below, reflects the traumatic developments in gas, heat, electricity and oil supplies and affordability in the sector since 1990 and continuing through to 2003, when the situation began to stabilise.

Following its initial collapse, the consumption of gas has exhibited steady growth since 2002 and was at its highest level since 1994, accounting for 21% of the residential final energy consumption, in 2008.

Electricity consumption has been relatively stable over the whole 18-year period. The modest growth of about 10% since 2001 to 2009 is against a background of population decline and masks a stronger growth in per capita electricity consumption since 2002.

The biggest source of heat in the residential sector over the whole of the period is from biofuels and waste sources. The contribution of about 600 ktoe per annum dropped dramatically after 2004 to stabilise around 330 ktoe to meet about 40% of the final energy consumption in the residential sector in 2008.

Figure 15: Final Energy Consumption of Georgia's Residential Sector

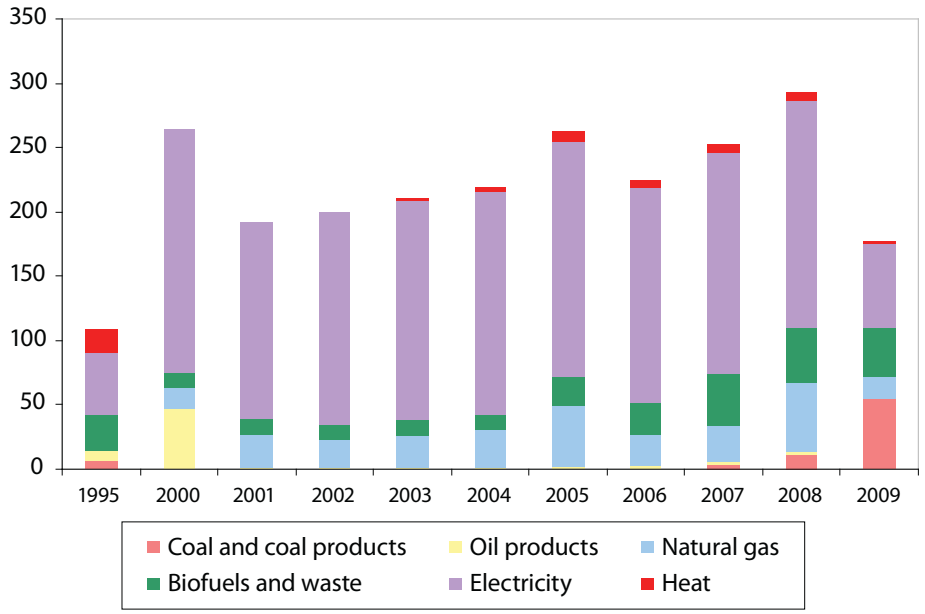


Source: IEA statistics, electronic database, 2011

Services

Services comprise the commercial and public sectors and electricity makes by far the biggest contribution to the total final energy consumption in the sector. Demand has grown since 2001 but at a slower rate than that of the sector's growing contribution to the GDP.

Figure 16: Final Energy Consumption in Georgia's Services Sector



Source: IEA statistics, electronic database, 2011

Other Sectors

The final energy consumption of the agriculture and forestry sector was met by equal shares of oil and gas in 2008. The TFC in the sector is less than half that of the services sector.

Energy use in transport is a growth area and, aside from the contribution of electricity, which has remained stable at about 29 ktoe, the major growth is in oil consumption, which accounted for 90% of the total final energy consumption in the sector in 2008. Gas is making a small but growing contribution and tripled its contribution in the seven years to 2008 and now ranks almost equal in contribution to that of electricity at a little over 4%.

ENERGY POLICY

Background

Georgia is pursuing market-orientated policies to promote its economic development and where possible to better align its prospects for trade with neighbouring markets. The potential for regional trade in electricity is real and current efforts are designed to secure the necessary generation and infrastructure to access markets in Turkey and earn revenue from sales. The ultimate aim and overarching consideration is to integrate into the wider regional and EU economy.

Georgia's location in terms of oil and gas transit and trading routes has important regional and national implications. The security of its transit route arrangements is critical to meeting demand for gas supplies in EU markets.

The country hosts three new independent oil and gas pipeline outlets to western markets from the Caspian basin. In addition, it provides rail transport links to Black Sea ports such as Batumi Poti and Kulevi. In some instances Georgia has arrangements in place whereby transit payments are in kind and, as a result, are partially shielded from the price uncertainty associated with recently volatile oil and gas prices.

Energy self-sufficiency and energy market liberalisation are combining to drive several related priority action lines. The current emphasis is on the rehabilitation of the power system and the promotion of much-needed investment in new and existing electricity generation plants, transmission lines, the national grid, inter-connection and the distribution infrastructure.

Having once been closely integrated into a planned regional energy system that effectively collapsed and is now obsolete, the state is continuing to face and deal with a wide range of legacy issues. They have arisen from technical, market and infrastructural deficits and each is the subject of an ongoing reform effort that has won international recognition.

The Government of Georgia has displayed a strong commitment to the creation of a business-friendly environment. The simplification of the tax code, the permitting of energy projects and the alignment and integration of support measures are all well underway, as is the putting in place of an appropriate regulatory and governance framework. Measurable results have been achieved in reducing electricity losses and in fully accounting for electricity deliveries and sales.

Georgia's commitment to reform and its outward-looking policies have resulted in a number of important energy strategies and framework agreements that are integral to its energy policy development and implementation.

Under the European Union Georgia Action Plan, concluded as part of the European Neighbourhood Policy, Georgia is to continue cooperation on Caspian and Black Sea regional energy issues and to encourage the development of a diversified infrastructure connected to facilitating transit and the development of Caspian

energy resources. Within the Energy and Transport Priority area of the plan there are specific commitments to the following:

- Energy policy convergence towards EU energy policy objectives
- Gradual convergence towards the principles of the EU internal and electricity gas markets
- Progress regarding energy networks
- Progress on energy efficiency and the use of RE sources.

The EBRD approved a strategy for Georgia at its meeting of 9 February 2010. The strategy has five strategic directions relating to the following: i) financial institutions, ii) infrastructure iii) energy security and efficiency and natural resources, iv) the corporate sector and v) policy dialogue and investment climate. The strategic orientations reflect the integrated nature of successful economic development, of which energy security, energy efficiency and exploiting indigenous natural resources is a key part.

Legal Basis

The principal energy sector's primary legislation is the "Law on Electricity and Natural Gas" (1997), which incorporates elements of energy regulation and market rules in line with EU principles. This law also stipulates the establishment and functioning of the energy regulator. The law has been amended many times (over the last three years) to include regulations and decrees improving the market rules, etc. in line with the EU model.

The law prescribes the roles and functions of the two main state institutions responsible for the development and operation of the electricity and gas markets: the Ministry of Energy and the National Energy Regulatory Commission.

The Law of Oil and Gas that was passed in 1999 and later amended is the legal basis for the development of the oil and gas resources of Georgia. The main objectives are to:

- support and promote investments in the oil and gas sector of Georgia
- protect the legal interests of the investors engaged in oil and gas operations (exploration and production) in Georgia
- create an effective legal basis for the state supervision and control of oil and gas operations in Georgia (Georgian Oil and Gas Regulatory Agency) with the inter alia establishment of a relevant state body and the determination of functions of the National Oil Company of Georgia.

The Parliament of Georgia, by resolution on June 2006, approved the MDSPPS, which sets out clear directions and priorities for the rehabilitation, extension, governance and regulation of the power sector.

The policy directions are addressed to Georgian legislative and executive bodies, and power, oil and gas national regulatory commissions. They are to be given expression through legislative and normative acts, the implementation of state programmes and state-funded projects, participation in international actions, privatisation and other actions foreseen by Georgian legislation.

The intent is to provide for the efficient utilisation of power resources and energy security as well as third-party access to the electricity transmission and distribution networks. Wider goals include i) attracting local and foreign investments and privatisation, ii) the economic sustainability of the sector, iii) bilateral and regional cooperation and iv) the liberalisation of the energy markets. Key to sustainability is provision for a tariff policy and metering.

Secondary legislation comprises different statutory acts, such as government resolutions, ministerial orders and the GNEWRC (Georgian National Energy and Water Supply Regulatory Commission) resolutions. The latest include the methodology for electricity and natural gas tariff approval and setting (1998, 1999), various amendments in the period 2002-2010 and also supply and consumption rules that determine the retail market and power supply conditions for consumers.

Energy Policy Goals

According to the resolution of the parliament (MDSPPS) the principal energy policy goal is to meet the energy needs of final customers securely through the diversification of energy sources, the achievement of economic independence and ensuring the sustainability of the sector, taking into account technical, economic and political realities.

In the longer term, the policy goal for the power sector is to satisfy the demand for electricity from indigenous hydro resources, initially and seasonally with the help of imports and, eventually, by substituting them with thermal generation.

The energy priorities of the Georgian government for 2009-2012 as set out in the "Basic Data and Directions for 2009-2012" are summarised in Annex IV. The priorities include i) additional hydropower capacity, ii) improving the sustainability of the energy system, iii) the exporting of electric power, iv) the diversification of fuel sources for the rural population, v) the implementation of the gasification programme and vi) more settlements serviced with gas by regulating the gas sector and attracting capital investment.

The principal tasks identified by the government include the planned rehabilitation of the infrastructure and of thermal and hydroelectric stations and the addition of modern combined cycle technologies. The accomplishment of these tasks is intended to create a solid foundation for the reliable supply of electricity. The

ensuing plan is to provide for the reliability of electricity supplies by addressing a number of tasks in parallel:

- fully re-equip technologically outdated and physically obsolete equipment
- construct new power plants and a new transmission infrastructure for electricity and natural gas
- diversify imported energy carriers (natural gas, oil, electric energy)
- set up a commercially profitable economic model for the sector.

According to the MDSPPS, tariffs are to be set to protect consumers from monopoly prices and at the same time ensure the long-term sustainable, financial and technical development of the energy system.

With this aim, the directions envisage that the tariff policies for different types of consumers might foresee a) seasonal tariffs, b) peak magnitude tariffs, c) step tariffs (based on consumed volumes). d) long-term preliminary fixed (including marginal) tariffs and e) marginal tariffs. The directions assert the following.

- Seasonal and peak magnitude (24-hour) tariffs should be based on the principle of neutrality; their application should not be obligatory for electricity sellers and consumers and their application should be on the basis of mutual agreements between sellers and consumers
- The application of step tariffs (based on consumption volumes and neutral principles), long-term preliminary fixed tariffs and marginal tariffs should be obligatory for electricity sellers and consumers (but not for communal meters)
- It is necessary to deregulate power generation tariffs step by step
- Tariffs shall reflect differences in the cost of the service for different groups of consumers.

Licensed companies set tariffs on the basis of calculations of presented capital, production, transportation, dispatch service, transfer and distribution costs plus the marginal profit with ascending tariffs for electricity and marginal tariffs for natural gas as of 2007 (TI, 2009).

Liberalisation

Over the last decade, the electricity sector in Georgia has been transformed. The sector has been deregulated and unbundled into generation, transmission and distribution companies. An independent regulator sets tariffs, and the Ministry of Energy is largely confined to policy related matters. Generation assets are owned in part by the Georgian state and municipalities, but by private interests as well, with more privatisation deals in the pipeline.

Significant changes have recently (2006-2010) been introduced into the organisation of the wholesale electricity market, contributing to more transparency and competitiveness. The sale and purchasing of electricity are based on direct contracts. Furthermore, amendments have been made to the "Regulations of the Electricity Wholesale Market", whereby special conditions for small capacity power plants (up to 13 MW) have been set.

Any third party can enter the energy market (including consumers using a minimum 8 GWH) if they meet the requirements set under the "Law on Electricity and Natural Gas", the state policy in the sector and the relevant regulations issued by the G NEWRC.

Flow of Funds in the Power Sector

The flow of funds in the power sector in Georgia has improved after many difficult years where dysfunctional transmission and distribution companies were unable to collect bills and consequently had insufficient funds to pay generators. The bill collection rate has improved, most dramatically in transmission, where the losses have fallen from 16% in 2002 to 2% today and in the distribution of electricity the losses were reported to be only 5% in 2010.

The share of consumer tariffs allocated to generation, transmission and distribution is different than in many electricity systems, with a high percentage of total revenues allocated to distribution. This is partly due to the historically very high "commercial losses" in the distribution system.

The regulator (GNEWRC) has allowed distribution companies to finance an expensive upgrading of the distribution network, including re-metering customers through relatively high tariffs. The low percentage of consumer tariffs passed on to the generation companies is because generation costs are low, as most of the HPP assets were built over 30 years ago and have fully depreciated.

Electricity and Gas Transmission

Three companies provide electricity transmission services in Georgia: the state owned Georgian State Electrosystem (GSE), Energotrans Ltd (100% of GSE – for Georgia-Turkey 500/400 kV only, under construction) and SACRUSENRGO, owned by the Georgian government 50/50 with Russia. The latter transmission operator only operates the 500 kV line crossing the country from the north. Although all the above-mentioned companies ensure a transmission service, GSE is the only body responsible for the dispatch service that owns a dispatch licence and it operates the whole of the Georgian electricity system.

GSE has responsibility for the dispatching of electricity and has recently introduced SCADA (the System for Supervisory Control and Data Acquisition) as part of the modernisation of the dispatch system. More than $100 million has been invested

by GSE in the transmission system from 2005-2008, which has greatly improved the reliability of the network.

In the gas sector the Georgian Oil and Gas Corporation (GOGC), a 100% state-owned corporation, deals with the transmission of gas, with its subsidiary Georgian Transportation Corporation (GGTC) being in charge of high pressure transmission. GOGC is in effect a TSO. GGTC has a transportation licence and ensures a transportation and operating service, but it does not cover supply services.

Electricity and Gas Distribution

There are two main customer groups for distributed energy in Georgia. Three distribution companies and around 30 companies operate as direct customers with annual electricity consumption in excess of 30 million kWh.

The distribution tariffs vary between Tbilisi and the areas outside the capital. Higher tariffs are allocated to Telasi, although the cost of maintaining the distribution network in the regions is higher than in Tbilisi. There is also a very significant spread in the distribution of tariffs between voltage levels, with the greatest tariff jump from 35 kV to 10 kV in Tbilisi, while normal retail customers pay a far higher distribution tariff (220 kV) in the regions than higher-voltage customers do.

The distribution of electricity in Georgia has become much more efficient in recent years. The technical and commercial losses in the sector have come down substantially. The collection rates were increased from 20% in 2003 to 95% in 2008.

There are many gas distributors in Georgia, the biggest being Kaztransgas (owned by state and Kazakh investors), which is in charge of gas distribution in Tbilisi. The distribution licence covers gas network operation and transportation through the distribution network, but this does not include the supply. The gas supply activity (gas sale-purchase) does not need a licence in Georgia and any interested party is allowed to carry out this activity, even the GGTC and DSOs.

Institutional Development

The Ministry of Energy has a duty to provide the policy framework and legal means for the institutional development of the energy sector of Georgia. It has brought forward legislation for the regulation, ownership and accountability of a range of bodies as set out in the following sections.

Georgian National Energy and Water Supply Regulatory Commission

The GNEWRC is a legal entity defined under the Law of Georgia on Independent Regulatory Bodies. The commission has the authority to grant licences and to regulate the activities of licensees, importers, exporters, commercial system operators and suppliers within the electricity and natural gas sectors of Georgia.

The main functions of the commission are to:

- establish rules and conditions for granting electricity generation, transmission, dispatch and distribution, as well as natural gas transportation and distribution licences and also grant, modify and revoke licences
- set and regulate tariffs for electricity generation, transmission, dispatch, distribution, transit, import and consumption, services provided by a commercial operator of the system, the system reserve of the capacity to be purchased under the mandatory rule by the commercial operator of the system, and also setting and regulating tariffs on natural gas transportation, distribution delivery and consumption, excluding tariffs on natural gas sold in auto gas stations
- within its competence, resolve disputes between licensees, importers, exporters, suppliers and consumers, and the commercial system operator
- establish control over the conditions of the licensing within the electricity and natural gas sectors of Georgia
- organise and coordinate activities, with regard to mandatory certification within the energy sector.

In conformity with the applicable law and policy and as determined and overseen by the GNEWRC, the structure of the electricity market in Georgia allows for:

- direct contracts between power producers and consumers
- sales in a balancing market through ESCO
- power purchase agreements between hydropower developers and ESCO
- deregulated or unrestricted operation of exports and plants less than 13 MW.

ESCO

The newly created market maker, ESCO, is a commercial entity owned by the Georgian state and is responsible for ensuring the contracting for electricity exporting and importing. When the electricity market in Georgia was deregulated in the 1990s, the Georgian Wholesale Electricity Market (GWEM) was set up as the sole market maker in the system. GWEM purchased and sold electricity. The lack of payment discipline in the sector caused GWEM to file for bankruptcy in 2004, and the company was closed down in 2006 and replaced by ESCO.

Energy Pricing

The GNEWRC sets tariffs for the generation, transmission dispatch, distribution, import and consumption of electricity and for the transport, distribution and consumption of natural gas.

Electricity Tariffs

Electricity consumption tariffs for electricity in Georgia are regulated by the GNEWRC. Large consumers can be supplied through direct contracts with generators in the bi-lateral market. The tariff policy methodology is based on a full cost recovery principle for production and supply, stipulated by the law and tariff methodology. According to the law, the GNEWRC sets the marginal reserve capacity and transmission tariffs, and also establishes connection charges for new consumers. The tariff methodology includes (depending on the type of customers) seasonal tariffs, peak-load (day and night) tariffs, step tariffs (based on the consumption volume), long-term pre-set tariffs and marginal tariffs. Electricity generation tariffs are to be gradually deregulated. The tariff structure also considers investors' interests.

The metering system is based on individual meters installed in each household or commercial entity, though in some rural areas there are still communal meters. The system for electricity bill payment includes service centre payment points: dedicated bank branches or post offices.

Generation

The tariffs for power producers in Georgia are set by the independent regulator, the GNEWRC, which has a commitment to facilitate private sector investments in the sector.

In line with the long-term goal of a liberalised power sector, tariffs for small hydro-generation enterprises and other renewable sources are deregulated.

The average regulated tariff for generation amounts roughly to US$3 Cent/kWh, while tariffs for the different types and various sources of generation vary greatly, as illustrated below.

The average regulated generation tariff in Georgia is relatively low at approximately US$2.8 Cent/kWh. Generation tariffs, however, fluctuate widely between different power plants.

Consumers

Regulated tariffs for consumers are based on supply-distribution costs and total approximately US$8-9Cents/kWh for 6/10 kV consumers and US$9-11Cents/kWh for consumers supplied with 380/220 V electricity.

In order to create additional guarantees for social protection and for the promotion of the rational consumption of electricity, rigid step tariffs were introduced: for the consumption of up to 100 kWh and 101-300 kWh, and for more than 301 kWh.

Implementation

In practice, retail tariffs for residential customers are set close to full cost recovery but significant cross-subsidies persist and prices do not include environmental costs, and further progress in this regard is to be encouraged. Since 2006, there has been a marked reduction in network losses, but these remain high by international standards.

ENERGY EFFICIENCY POLICY

Background

Over 70% of the energy consumed in Georgia is imported. In 2006 natural gas accounted for 47% of energy imports and oil products for 24%. This relatively high dependence on imported energy should, in line with the Government of Georgia's current policy objectives, provide the rationale for strong energy efficiency and saving policy measures.

Furthermore, and related to economic development potential, according to the IEA (2008), the share of energy efficiency in the GDP of Georgia is about 0.7%, while the world average is 0.31%.

Strategic and Legal Basis

The Ministry of Energy is responsible for the development of energy efficiency policies and legislation.

In drafting the MDSPPS the ministry provided powers for the promotion of energy efficiency by bodies under its supervision. As set out in the Resolution of the Parliament of Georgia, on one of the key policy directions is the efficient utilisation of the power resource defined in the directions as:

- the improvement of energy efficiency in industrial and domestic spheres, creating a sound legislative basis and institutional framework for the improvement of energy efficiency in the country
- the study and putting into operation of measures necessary for the use of thermal and co-generation systems, and renewable sources of energy.

The explicit intent of the policy direction is that Georgian legislative and executive bodies and power, oil and gas national regulatory commissions support these activities through the following:

- working out legislative and normative acts
- implementation of state programmes and state-funded projects
- participation in international actions
- privatisation and other actions foreseen by Georgian legislation.

Thus the ministry and other executive bodies have a mandate, and a recent policy direction, to improve energy efficiency and optimally incorporate environmental protection goals in the formulation and implementation of energy programmes.

Draft Legislation

Work on the drafting of an energy efficiency law was well-advanced before it was abandoned by government direction in 2008. At the time of writing the Ministry of Energy has no formal sustainable energy or energy efficiency executive agency

within its responsibility or budget provision for the implementation of sustainable energy programmes. Nor is there any provision for such in the "Priorities for Government 2009-2012".

Winrock International – a USAID subcontractor – has worked with the government authorities since 2007 and a draft for an Energy Efficiency Law was developed with the cooperation of the Ministry of Energy and the NGO, "World Experience for Georgia" (WEG). The law was to go before the Parliament of Georgia in the autumn of 2008.

Institutional Capacity

An EEC has been in operation in Georgia since 1998. However, according to a report by the German development agency GTZ, without an institutional and legal framework, studies produced by the EEC are recommendations and do not influence Georgia's energy efficiency policy.

The Georgian Policy and Legal Advice Centre (GEPLAC), financed by the EU, has assisted the government on energy policy and legislation, most recently in the preparation of a law on energy efficiency.

Another USAID-sponsored firm, AEAI, is running an Energy Capacity Initiative from 2008-2011, which is designed to enhance the energy policy analysis and formulation capacity within Georgia, promote stakeholder dialogue on policy issues and support higher education programmes in energy. The initiative focuses on identifying information and data gaps that are barriers to policy analysis and encouraging NGOs, think tanks and universities to address policy issues including energy efficiency. AEAI is also developing energy education and training programmes (USAID, 2010).

Enabled Measures

At the end of 2007 the EBRD opened a $35 million credit line to TBC Bank for energy efficiency measures to small and medium-sized industries, and to builders and home-owners (mainly insulation) from 2009 onwards. However, to date, only around 100 households have taken advantage of the credit line.

A new micro-credit line was also launched by the Microfinance Bank with British Petroleum (BP) as a co-financer, covering 15% of the credit given to each consumer to furnish his or her apartment with energy efficient technologies.

The body most active on the ground in Georgia appears to be USAID-sponsored Winrock International, which runs a wide range of RE and energy efficiency programmes.

However, Transparency International has stated that the government is not yet paying attention to energy efficiency and energy saving because the Georgian

economy is still weak and, in addition, that the main part of budget revenues comes from sales of imported as well domestically produced energy in the form of various taxes: VAT, excise and others.

Built Environment

The New Applied Technology Efficiency and Lighting Initiative (NATELI) has been running since 2009. A USAID-funded programme, it has been conducting energy audits in public areas of Tbilisi's residential buildings. The project aims to help educational, hospital and residential sectors acquire an insight into possible energy saving opportunities.

Between 2009 and 2011, Winrock International, via NATELI, is aiming to conduct energy audits and train its first group of auditors, identify an initial hospital energy efficiency demonstration project and replication projects, and go on to facilitate financing and fund sourcing. It will also provide support to the Georgian Technical University and run a number of residential and higher education energy efficiency pilot projects.

Winrock is also operating the energy bus, originally funded by BP, which travels around Georgia showcasing small-scale energy efficiency equipment and building materials. It distributes promotional information on energy efficiency and RE with details of suppliers and financing options.

There are small exemplar projects such as the Georgian EEC's audit of two nine-story buildings in Tbilisi's Gldani district. The centre installed a spring on the entrance door of the building to ensure it was always closed and glazed the whole area, resulting in a 15% reduction in energy consumption for each household. The whole project cost 3,500 lari (Georgia Today, 2010).

Anecdotal evidence from developers suggests there is little interest in energy efficiency measures on the part of those who are building new houses, with most only aware of the potential of energy efficient bulbs (Georgia Today, 2010).

With cooking and heating in the residential sector, GTZ found that the consumption of firewood was in the same range as the consumption of electricity produced through hydropower stations. Firewood is mainly consumed in rural areas for cooking and heating purposes and is very inefficient due to the widespread practice of using woodstoves of very low efficiency (35-40%).

USAID has had an active rural energy programme and has conducted feasibility studies into increasing the efficiency and improving the standard of performance of stoves in Georgia. It held a seminar on energy efficient stove design techniques in 2008, inviting stove makers from all over the country.

The Georgian EEC is running a programme funded by the Dutch and British governments to promote energy efficiency in government buildings. It includes building audits and promotional material and targets representatives of government

ministries, government agencies and departments responsible for energy related issues and the employees of these agencies.

The initiative includes a "Be Energy Saver at Work and Home to Save Environment" posters and PSAs, with the main message being that low-cost/no-cost do-it yourself energy efficiency measures and behavioural change can reduce energy usage and contribute to the reduction of emissions into the atmosphere and environmental protection.

The EEC is also organising energy efficiency information seminars for energy managers from various ministries and state agencies to provide them with information on cost-efficient and environmentally sound energy saving technologies, including presenting case studies of the energy audits of government buildings. The project's results and findings will be presented to the representatives of the Ministry of Energy and other governmental entities, the donor community and the media at a round table.

Industry

The EBRD recently approved (12 August 2010) a financing package for the Bank of Georgia, consisting of a $10 million energy efficiency credit line and a $20 million SME lending credit line.

The line will enable the Bank of Georgia to develop its lending programmes countrywide for businesses, providing essential support for the longer-term financing of corporate and micro enterprises and SMEs. The project is also expected to transfer and build energy efficiency expertise among banks, commercial companies and households.

A number of CDM projects are under consideration to increase and secure energy efficiency in the industry sector; this includes using waste heat for power generation at the Zestaponi ferroalloy works at Heidelberg, Georgia.

There is an EnergoCredit-sponsored project in preparation at the Koda Biogas Plant for methane capture and combustion from poultry manure treatment as part of the Georgian Energy Efficiency Programme.

Services

The EEC and Winrock International are working together on a project that will look to expand and modify the centre's Eco-Building Marketplace website. The aim of the project is to increase the number of suppliers and products listed on the Eco-Building Marketplace website with priority being given to suppliers or distributors of energy efficient building materials, equipment and appliances as well as RE production equipment (biogas, mini-hydro, solar photo voltaic and thermal) and efficient stoves.

It also aims to establish an interactive voice response system to deliver information from the website to customers who do not have access to the internet or who prefer to do business via telephone-based services. Finally, it will develop a business model for ensuring the financial viability of the Eco-Building Marketplace website.

Winrock has committed to implement at least 70 RE and 130 energy efficient projects in rural communities. Projects may include those on solar thermal energy, biogas and improved cooking stoves, as well as efficient lighting and the weatherisation of dwellings.

The company has already managed 20 grants for renewable resources, energy efficiency and natural resource management (NRM) projects in ten rural communities. 100 school teachers received RE, energy efficiency and environmental training.

Winrock also trained eight heating stove manufacturers, improved stove combustion efficiency from 35-45% to 75-80% and procured and distributed 499 energy efficient stoves to internally displaced persons.

Transport

Energy (35%) and transportation (11%) are the largest sources of emissions in Georgia and yet in 2008 there were still no energy efficiency/emission standards in relation to transport vehicles.

Organisation of Energy Efficiency Activities

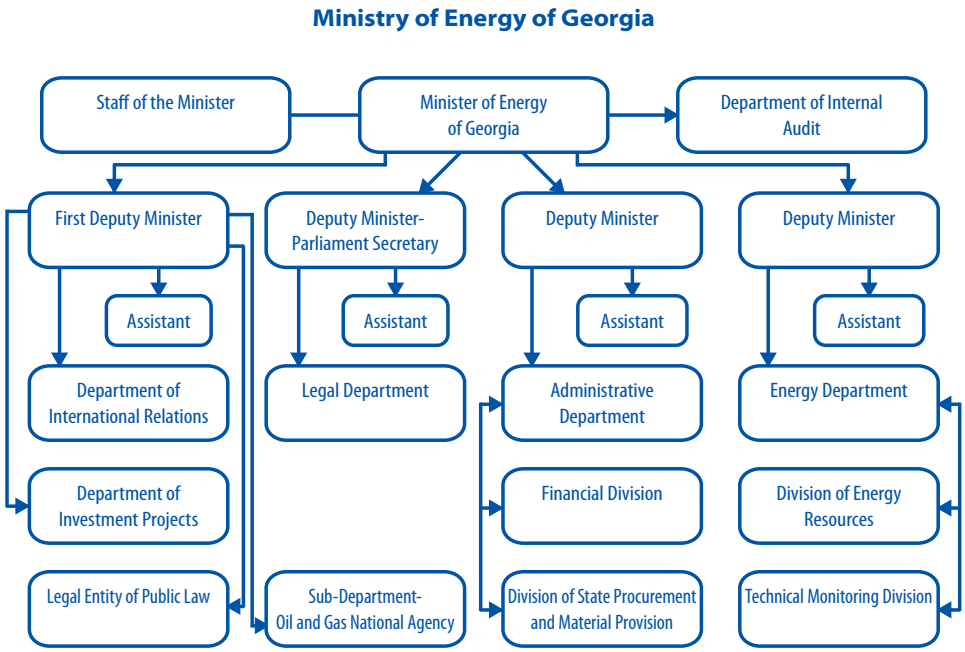
Ministry of Energy

The Ministry of Energy is responsible for drafting legislation such as the main directions of the energy sector policy for overseeing its implementation; among other things it carries out the following activities:

- elaborates programmes for the development of the energy sector
- promotes the restructuring and privatisation of the state energy enterprises
- develops emergency measures for the sector
- promotes the utilisation of RE resources
- approves various rules and standards in the energy sector.

The ministry has full responsibility for energy efficiency policy development and implementation, which it delivers through its Department of International Relations.

Figure 17: Organisation of Activities



Source: Ministry of Energy, www.minenergy.ge (2010)

Ministry of Economy and Sustainable Development

The Ministry of Economy and Sustainable Development is responsible for and has priorities relating to the following:

- economic policy and the coordination of its implementation
- development and coordination of the transport policy
- national quality infrastructure as it applies to trade and related technical regulations and standards
- foreign trade, foreign investments, tourism and quality infrastructure
- promotion of the private business sector and privatisation of state property.

National Statistics Office (GEOSTAT)

GEOSTAT provides all the sector-specific data used for end-use sector energy analysis.

Ministry of Environment Protection and Natural Resources (MoEP)

MoEP is responsible for establishing, promoting and implementing the policies and strategies for environment protection, including nature protection and forest management.

The process of assessing the environmental impact and the procedures for granting approval for projects are regulated by law and energy companies are required to submit plans to the MoEP's EIA before getting a licence.

It is the Designated National Authority (DNA) for the CDM of the Kyoto Protocol and has responsibility for the preparation of the Second National Communication (SNC) under the UNFCC.

Parliamentary Committee on Economy and Economic Policy

The Parliamentary Committee on Economy and Economic Policy has a sub-group for energy and a permanent energy expert to provide advice to the committee.

The parliamentary committee reviews all legislation and policies sent to the parliament for approval.

GEWSRC

The GNEWSRC has powers to:

- establish control over the conditions of the licensing within the electricity and natural gas sectors of Georgia, and to facilitate the
- organisation and coordination of activities, with regard to mandatory certification within the energy sector.

With respect to its powers and duties generally the commission is obligated by law to give careful consideration to the main directions of the state energy policy, national security and economic, environmental and other state policies.

The GNEWRC 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.

Non-Governmental Agencies and Resources

In the absence of direct government promotion and implementation of energy efficiency measures, non-government organisations play an important role.

Energy Efficiency Centre

The main non-governmental actor in energy efficiency is the EEC, set up through an EU TACIS project in 1999 with additional support from the Norwegian government. While it resides within the building of the Ministry of Energy, it is independent.

The centre's goals are as follows:

- 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 RE resources available in the country
- preparation of investment proposals for new energy saving technologies in the RE sphere
- 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 SNC and carried out a market assessment of SME activities in energy efficiency and RE for the International Finance Corporation of the World Bank. It has also worked on solar projects for the World Bank and has been involved in community development and energy for USAID and a Cleaner Production project.

World Experience for Georgia

WEG is an independent think tank established to support Georgian society's progress to democracy based on the free market and adoption of European Community standards. Its stated objective is to facilitate access to specialised conceptual and practical knowledge, in particular in the fields of energy and the environment, for different parts of Georgian society, including professionals, policy makers and the general public.

The guiding principles are as follows:

- adherence to high professional standards
- neutrality and absence of institutional bias
- openness to cooperation.

WEG believes that, while Georgian society shares the values of democracy, believes in the merits of a fair and free market economy and is achieving significant reform, Georgia can strongly benefit from more in-depth knowledge of the best world practices and experience of the implementation of these values. Filling this gap is an important condition for assuring that the reforms are successful.

Many of the problems faced by Georgia in the transformation process are not unique and can be resolved by applying the experience of other countries that have successfully addressed similar challenges. WEG believes that Georgia's potential to absorb such knowledge gives it the opportunity to become a success story, and a unique example of rapid development as an advanced democratic society.

Its international team of experts is committed to contributing to this process by applying the experience accumulated while working on a broad range of challenging projects in Georgia and worldwide. WEG welcomes collaboration with all parties who share similar views and are willing to contribute to the advancement of Georgia, especially through the promotion of world experience and professional knowledge.

Other NGOs

There are several other NGOs involved in energy efficiency, RE and related environmental issues, small-scale project implementation and broader policy issues. The Caucasus Environmental NGO Network (CENN) has been involved in increasing public participation in energy sector government 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 building and industry sectors. It has improved insulation in multi-storey buildings and installed energy efficient lighting and natural gas water heaters in place of electric appliances. The Centre for Strategic Research and Development of Georgia promotes the building up of civil society in Georgia by increasing awareness and actively involving citizens in decision making, advocacy of their interests and support of civil society initiatives.

For RE, 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 RE through advocacy or project implementation.

RENEWABLE ENERGY POLICY

Background

Georgia's physical geography, high rainfall, forest cover, climate and proximity to neighbouring power markets are among the many factors driving RE redevelopment and expansion to meet the growing demand for energy in Georgia and the region. RE has always been important in Georgia. The bulk of its power needs are met by hydropower but the use of wood for home heating and cooking is widespread in rural areas.

The government is committed to the further development of Georgia's RE resources in the interests of energy security, short- and medium-term economic development and long-term sustainability. Considerable effort has been expended in putting into place a framework of law, regulation, information and other incentives to facilitate the investment necessary for the development of the hydropower resource. The economically exploitable hydropower resource is estimated to be five times the current production and the figure for wind is somewhat less than that for current hydro production. A set of estimates of achievable potential is set out below.

Table 5: Estimate of Achievable Renewables Potential

Source	Achievable Potential GWh
Small hydro	5,000
Wind	5,000
Biofuels	3,000-4,000
Solar	60-120
Geothermal	3,000

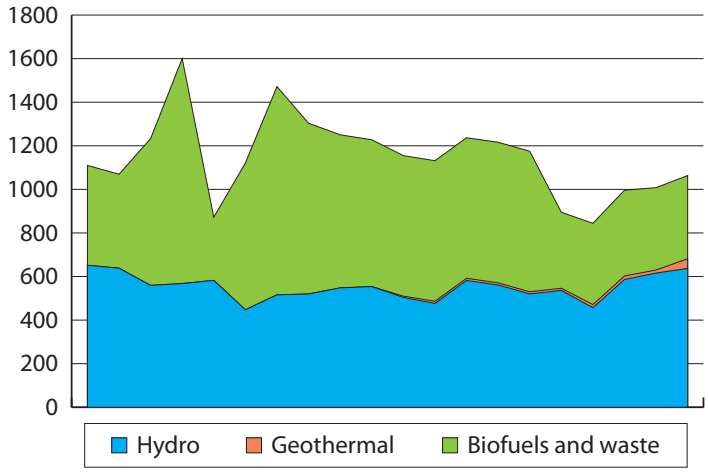
Source: Government of Georgia

Biomass is already an important source of heat in rural areas, while geothermal and solar energy potentials are the subject of ongoing investigation and assessment. The scope to improve existing biomass utilisation and long-term sustainability has been documented in several studies. These additional RE resources could, with sustainable management, contribute to the long-term security of heat supply and help mitigate the growing dependence on imported gas.

Hydropower

Hydro is the main renewable resource contributing to energy supply in Georgia and accounts for the major part of electricity generation. Hydro resources occupy the first place out of the natural riches of Georgia. There are 26,000 rivers in the territory of the country. Around 300 rivers are significant in terms of energy production; their total annual potential capacity is equivalent to 15,000 MW.

Figure 18: Renewable Sources in Primary Energy Supply



Source: IEA statistics, electronic database, 2011

The bedrock of the government's approach is the creation of the conditions that will attract capital and facilitate the large-scale investment required to:

- refurbish existing hydro generation plants
- renew and extend the electricity infrastructure
- develop the small and medium-sized hydro resources
- secure access to markets in contiguous countries for power exchange
- eventually enable Georgia to be a net electricity exporter.

Hydroelectric power plants provide almost 92% of Georgia's electricity with natural gas combustion generating the remaining 8%. Georgia has been the main exporter country in the region from 2007 and delivers the electricity to all neighbouring countries throughout the year.

The recently rehabilitated 1,300 MW Enguri large hydro facility is the backbone of the country's electricity generation system. A number of medium and small hydro facilities totalling approximately 1,540 MW are also providing domestic power, either on a regular basis or seasonally. In general, the main objective for the long-term policy of the country has been to fully satisfy the country's overall demand for electricity with domestic hydro resources. Besides tendering a number of new large HPPs, the Ministry of Energy has sought foreign investments for the development of new small and medium HPPs. As a result of rehabilitation activities carried out on large HPPs, the hydro generation of electricity increased up to 9.7 Tw/h. In addition, the Georgian government plans to facilitate further development of new renewable sources by creating favourable conditions for the development of micro electric power plants up to 100 MW. In this direction the GNEWRC under the "Electricity supply and consumption rules" set out the obligations for the distribution companies

to ensure free access of micro power plants to the network and obligatory purchase of electricity produced by micro power plants with a fixed rate ("Electricity Supply and Consumption Rules", GNEWRG Resolution #20, Art.25. 18/09/2008).

Large-Scale Greenfield Hydropower Plants (>100 MW)

The Government of Georgia has invited prospective investors to open discussions on the terms and conditions for investing in several large greenfield hydropower plant sites with prospective capacities ranging from 100 MW to 700 MW. Short-listed bidders will be selected in accordance with the conditions per the invitation.

There is provision for a memorandum of understanding (MOU) whereby the government supports the winner throughout the period of investment. Land purchase will be for a nominal price following the execution of a land sale and purchase agreement (SPA) with the Ministry of Economic Development.

Small- and Medium-Scale Greenfield Hydropower Plants (<100 MW)

The Government of Georgia has approved the standard terms and conditions for greenfield investments in small and medium hydropower plants. The Ministry of Energy is open to expressions of interest by investors in these and other qualifying RE plants.

A list of 78 prospective, mostly run-of-river greenfield sites has been published. Investors are invited to submit a standard application form, which when submitted will result in an "under offer notice" valid for 30 days, during which other investors may submit competing applications. If no other offer is received the applicant has automatic preference subject to conditions.

Where there are competing offers they will be adjudicated on the basis of a transparent formula. An SPA will be concluded at a nominal cost with the Ministry of Economic Development.

Necessary Permits, Licences and Rights to Construct HPPs in Georgia

Large hydropower plants are permitted or licensed under four regimes whereas for smaller plants only three of these are required as set out in the table below.

Table 6: Licensing Regimes for Hydropower Plants

Permit or Licence	Issuing Authority
Acquisition or rent agreement of land	Local authorities
Water usage permit	Not required
Construction permit	Ministry of Economy and Sustainable Development
Generation licence (13 MW and above)	GNEWRC

Source: Government of Georgia

Hydropower Plant Investment

The pace of reform and RE deployment is accelerating, as evidenced by the levels of interest of the international funding community, the conclusion of loan and financing facilities for RE and their linkage to related infrastructure development.

For example, the European Investment Bank (EIB) announced a loan of €80 million to Georgia to finance the extension and upgrading of the country's high voltage transmission network and its interconnection with the electricity grid in neighbouring Turkey. The project will be co-financed by KfW bank, the EBRD, a grant from the EU Neighbourhood Investment Facility and one from the budgetary resources of Georgia.

It covers the construction of a 246km 500-kV link from Gardbani, close to Tbilisi, to Zestaponi, central-western Georgia, the construction of a 700-MW back-to-back converter station near Akhaltsikhe on the Turkish border and of a 165km 400-kV interconnection line from Akhaltsikhe to the Turkish electricity grid.

The project is a key element in the government's energy sector strategy as it will provide the capacity required for power exports to Turkey. The implementation of the project is expected to have a signalling effect to attract private hydropower plant investors to Georgia.

Producer Support

The ministry believes that it has created an attractive investment environment by reason of the following:

- easy, transparent, fast evaluation and approval of the procedure
- BOO-based offer with a ten-year PPA and free third-party access to the grid
- government support through the whole process of project development
- direct contracts allowed, unregulated market price and licence-free export.

Investors in new HPPs are allowed to negotiate the rate of return on equity with the GNEWRC before committing to a project. This could ensure acceptable returns, especially when CDM credits are factored in.

Wind Power

The wind power potential of Georgia has been estimated by the Scientific Wind Energy Centre – KARENERGO – according to an indicative list of wind farms to have a total capacity of about 2,000 MW and to deliver an estimated 5,000 GWh of power annually. The nominal rating and estimated output of some of the potential wind farms are set out in the following table.

Table 7: Nominal Rating and Estimated Output of Several Potential Wind Farms

Location	Capacity (MW)	Annual Output (GWh)
Likh	630	2,000
Kutais	150	340
Gori	200	480
Tskhratskar	100	260
Djvar	30	75

Source: Government of Georgia

Areas and sites for wind farms of 30-630 MW have been identified. Many of these sites have seasonal wind patterns yielding maximum output in winter. This would match winter domestic energy demand increases and offset the drop in hydropower. Seasonal import dependence in winter would be reduced.

The most recent information indicates there is no wind energy capacity used in Georgia apart from some small units.

Renewable Energy Resources for Local Energy Supply

Notwithstanding the merits of, and the absolute requirements for, investment in the refurbishment of large-scale electricity generation facilities, there are concerns that other valuable resources and options for RE development are being neglected.

The identification and removal of the key barriers to the increased utilisation of RE in local energy supply is the explicit objective of a project financed under the UNDP's Global Environment Facility entitled "Georgia-Promoting the Use of Renewable Energy Resources for Local Energy Supply". The project, which is supported by the German bank KfW, has been underway for some time and focuses on small hydropower and geothermal heat.

Its aim is to address the legal and regulatory barriers to fair and competitive access to the market for renewables, to ensure the collection of payments and to encourage investments in RE. It provides leveraging financing for a pilot RE fund/ credit line to overcome financial barriers and it aims to address public awareness and capacity barriers.

The project is expecting to enhance the capacity of local entrepreneurs to develop bankable investment proposals, to structure financing for the projects and to manage the development and implementation of the projects.

The project, which was implemented by the MoEP, has already undertaken ten feasibility studies, one on the use of geothermal energy in Tbilisi. The fund will have a total of €5.11 million (from KfW) plus US$2.0 million (from the Global Environment Facility (GEF)).

Georgia has considerable RE resources of middle- and low-temperature thermal water at 33-108 degrees centigrade. To date, 350 MWth of geothermal is used for heat supply and there is a further proven potential of 465 MWth. Beyond this estimates of the realisable potential vary in the range of several thousand MWth.

Bio-energy is important in rural areas where there is good potential to use farm waste. Between 1993 and 2005, over 250 small farm-scale biogas digesters were installed, albeit with mainly environmental objectives, and the potential for further expansion is great. There are some regions of Georgia where two yields per year are possible if crops are used as a resource.

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

Winrock International under the USAID programme has conducted a number of energy studies on biogas, wood heating stoves and other energy related development initiatives including its Rural Energy Programme.

The Rural Energy Programme is a four-year effort that builds on the success of the Georgia Energy Security Initiative. It aims to increase the supply of grid and off-grid energy in rural areas, build the local capacity for energy production, promote energy efficiency and the use of alternative energy resources and improve sustainable NRM. The main areas of activity relate to:

- increasing the energy supply
- rural energy project financing
- improving the capacity in rural energy and alternative energy applications
- supporting institutional capacity and a legal, policy and regulatory environment conducive to the promotion of rural access to clean efficient energy resources.

Beyond these, there are two further lines of activity designed to engage directly affected communities and beyond that reach out to the wider community to emphasise the importance and show the possibilities and benefits of business development in Georgia.

Capacity Building

It is evident from the business-like efficiency and transparent approach to the development of small- and medium-scale hydropower plants that the energy ministry is closely involved in the lessons learnt from these practical studies and other donor supported initiatives.

The publicity that has attended the commissioning of the Lopota small hydro plant in March 2009 and the earlier grand opening of the Misaktsieli hydro plant in March 2009 is testimony to a commitment to achieve results and promote an appetite for replication though appropriate publicity and awareness-raising programmes.

However, the costs of entry and the available rewards are critical determinants for inward investment. According to GTZ, the expected average generation cost for new hydro plants in the first seven years of operation would be in the range of 6-8 US Cent/kWh, falling to 2-3 US Cent/kWh after seven years (GTZ, 2009).

The possibilities for consumer and business development are well illustrated where energy efficiency and RE combine to improve resource utilisation, service delivery and local development as set out in the review of wood stoves for heating and cooking in Georgia.

Policy Framework

A state programme, "RE 2008", with the rules of construction of new renewables, particularly HPP, has been in force since 2008. This programme regulates and supports the construction of new renewables projects of a total capacity of under 100 MW. On the basis of this programme progress has been recorded in the field of new small and medium hydro plants. At present the Government of Georgia has signed 15 MOUs on the construction, operation and ownership of HPPs with a total installed capacity of 2,050 MW. Several IFIs have been active in the support of energy efficiency and renewables development. USAID, UNDP, KfW, GEF, EBRD, the Norwegian Government, EIB, NIF, and others have been funding a great number of activities including pilot projects, policy analysis, rehabilitation works, training, and more.

ENVIRONMENTAL POLICY RELATED TO ENERGY

Background

The national GHG inventory for the years 2000-2006 in Georgia's SNC to the UNFCCC states that the energy sector, including transportation, is the biggest emitter of GHGs in Georgia.

Since 1991, the share of the energy sector in total GHG emissions has decreased almost continuously. In 2006, its share comprised 45.6%, whereas in 1990 it comprised 76.3%. The share of emissions from industrial processes in 2006 was approximately the same as in 1987, though the actual emissions decreased by about four times.

The power needs of the economy are met in the main by hydropower. Georgia is also rich in other RE resources, such as wind, solar, geothermal and biomass. However, with the exception of biomass and some geothermal, they are scarcely used.

Forests are one of Georgia's most important energy resources for heating. They cover 43% of the area of the country. The practice of uncontrolled wood-cutting common in the 1990s is now rare, due to the increased availability of other energy sources. In addition, the forestry sector is undergoing reforms, aimed at optimising the protection, development and use of the forests.

The potential of energy efficiency and RE to mitigate GHG emissions to 2025 has been estimated at 6% and 12% compared with business as usual under two alternative policy scenarios modelled in the preparation of the SNC under the UNFCCC.

Administrative Structure

The MoEP is the national body responsible for establishing, promoting and implementing the policies and strategies for environmental protection, including wildlife protection and forest management. Its Environmental Inspectorate was Created in 2005 to improve the enforcement of environmental laws and regulations.

The ministry is responsible for the implementation of the Law on Environmental Protection (1996), including the monitoring and regulation of environmental pollution, regulation of the use of land and protection of natural resources, including forestry and ecosystems. Through its General Inspectorate, it oversees the activities of an array of state organisations with competence in areas such as biodiversity, climate change, waste management, ownership and use of land, air, water and soil protection.

The process of assessing environmental impacts and the procedures for granting approval for projects are regulated by law (the Law on Licenses and Permissions and the Law on Environmental Impact) and energy companies and other manufacturers are required to submit plans to the MoEP's EIA before getting a licences (TI, 2008).

In 2003 the National Agency on Climate Change (NACC) was appointed as the DNA in accordance with the Modalities and Procedures of the CDM. In January 2005, a governmental resolution on the DNA delegated this authority to the MoEP of Georgia. The new structure and sphere of responsibilities for the DNA have been approved.

Policy

The first National Environmental Action Plan (NEAP) was adopted in the year 2000 and had a five-year time span. However, according to the EU, only a small part of the NEAP recommendations was implemented, mainly due to a shortage of resources.

The MoEP has issued an action plan for 2009 where four priority areas are identified:

(i) improvement of the legislative base

(ii) institutional optimisation

(iii) long-term strategy for environmental protection and the management of natural resources

(iv) raising public awareness of the need for environmental protection. The intent is to action these priorities through the development of an Environmental Code on which it is intended to consult widely (EBRD, 2009). Completion was slated for 1 March 2010.

The action plan includes the consolidation of Georgian laws, compilation of existing standards, preparation of a list of unregulated areas, establishment of an inventory of obligations assumed through international agreements together with an analysis on compliance and presentation of the draft code by 2010 (EBRD, 2009).

Among the energy-environment priorities of the Georgian government for 2009-2012, set out in the Basic Data and Directions for 2009-2012 referred to under the heading Energy Policy above, are commitments to 500 MW of additional hydropower, increasing the sustainability of the energy system, growing power exports and the diversification of fuel sources for the rural population.

The National GHG Mitigation Strategy for the years 2010-2025 discusses measures to abate GHG emissions, the creation of an enabling environment in the electricity generation sector and fuel switching in energy demand as well as in heat provision and in energy consumption.

Environmental Legislation and Implementation

The Constitution of Georgia establishes basic rules on environment protection and natural resource use. It also grants the right to everyone to have access to complete, objective and timely information on his or her working and living conditions.

The law on environmental protection was adopted in 1996. It establishes the general legal framework and covers a wide range of issues including keeping state registers of environmental information and monitoring. The issue of environmental impact assessments is governed by legislation and Georgia has published summary reports on the state of its environment.

Provision is also made for establishing tax privileges to those who use best available techniques and low-waste technologies or produce environmentally sound products.

The main constraint identified in the process of preparing Georgia's SNC was reported in the SNC as being environmental protection but this is not yet a priority for the country and, therefore:

- integration of climate change issues into sector development programmes and concepts is almost impossible
- there is a lack of national experts on climate change and an absence of relevant scientific assessments and surveys
- coordination and information-sharing is lacking between relevant projects and programmes being implemented in the country and
- there is low awareness among decision makers in the private sector and consumers.

The main barriers to the implementation of the CDM process are reported as being:

- a weak market infrastructure
- inaccessibility of data to construct baseline scenarios and
- the low potential of CDM projects.

The country's capacity-building needs are stated as follows: re-training of local experts in cross-cutting issues, involving young experts with international programmes and improving the accessibility of national statistics.

The tentative financial needs of the country to cope with the adverse impact of climate change are considered in the relevant chapters of the communication.

International and Regional Agreements/Protocols

Georgia has ratified the relevant international and regional conventions to which it is signatory, with the exception of the Strategic Environmental Assessment Protocol of the UN-ECE Convention on Environmental Impact Assessment in a Trans-boundary Context.

Georgia fully supports and is committed to implementing the principles of the UNFCCC and *inter alia* to prepare and launch appropriate legislation and

to incorporate climate change concerns into the country's development plans, including emission abatement as well as adaptations to climate change.

The responsibility for implementing the UNFCCC lies with the Government of Georgia through the appropriate structures of the MoEP.

In 1999 the Georgian parliament ratified the Kyoto Protocol and the country requested assistance from international donors and developed countries for CDM capacity building.

Kyoto Protocol

Recourse to the CDM of the Kyoto Protocol is a key element in the implementation of Georgia's GHG Mitigation Strategy. The MoEP is the DNA and four CDM Project Idea Notes (PINs) have been prepared for submission to the DNA.

In November 2004, an MOU on cooperation in the area of CDM projects was signed by the Government of Georgia (Ministry of Environment) and the Government of Denmark (Ministry of Environment). Several proposals aimed at reducing GHG emissions were selected for implementation within the framework of this memorandum.

The MoEP of Georgia has been, since 2003, the DNA for Kyoto Protocol purposes. As of December 2010, two CDM projects have been registered (a landfill gas and a gas leaks reduction project) within the mechanism and three more (two HPPs and one gas leak reduction) are at the validation stage. During 2009 the SNC to the UNFCCC was prepared.

Other Activities

Georgia participates in the "Environment for Europe" process, a multilateral framework created in 1989 to steer the creation of environmental awareness in the countries of Central and Eastern Europe, which are emerging from the old regimes and moving closer to the EU. Core activities are by a task force co-chaired by the EU Commission and an NIS environment minister.

Georgia is a co-founder with Armenia, Azerbaijan and the European Commission, and is the host country of the Caucasus Regional Environmental Centre (REC Caucasus) in Tbilisi. The REC Caucasus aims to address environmental issues in the South Caucasus through the promotion of regional cooperation between stakeholders at all levels, involving members of civil society, governmental bodies, local communities and the business sector. The REC Caucasus also aims to promote public participation in environmental decision making.

Georgia is active in implementing a number of regional projects in the following areas: (i) decreasing trans-boundary degradation in the Kura-Araks basin; (ii) improving water problems in the South Caucasus and Moldova; (iii) improving the

GHG inventory; (iv) developing environment networks and information systems; (v) monitoring floods; (vi) enhancing the energy efficiency in different sectors of the economy; and (vii) promoting sustainable development in mountain regions.

In 2004-2006, two regional capacity-building projects were implemented: the EuropeAid CDM capacity-building project aimed at preparing the ground for the implementation of CDM projects in the South Caucasus and Moldova; and the UNDP/GEF project for improving the quality of the national GHG inventory.

In 2010 Tbilisi hosted the Covenant of Mayors Conference, which was organised in an Eastern Partnership country for the first time. The Covenant of Mayors initiative was launched in 2008, as a priority for action at local and regional level within the EU Energy Efficiency Action Plan. It consists of the formal commitment by City Councils to go beyond the EU objective of 20% reduction of CO_2 emissions through energy efficiency and renewable energy actions. Georgia's capital city Tbilisi officially joined the initiative during the Conference. A sustainable energy action plan has been approved by the Government of Tbilisi city in March 2011 setting a target to reduce CO_2 emissions by 25% by 2020.

OVERALL ASSESSMENT OF PROGRESS

Overall Assessment

The government, in framing its three-year budget outlook, reported on its achievements including rehabilitation works accomplished on the Vardnilhes N2, Lajanurhes N2 and hydro aggregates N2 of Khramhes N2, the completion of construction of Sakinihes, which fully supplies the Kodori Gorge villages, and the rehabilitation of the Kekhvi hydropower station, which supplies the Liakhvi Gorge villages with electricity. It specifically noted that:

> *The State budget financed measures for provision of gas and electricity will help to balance [the] energy deficit of the country.*

This brief budgetary assessment illustrates the prominence of energy supply and security in current policy and spending priorities. The government remains fully fixed on meeting the demand for electricity and gas in ways that will enhance security of supply and by exploiting indigenous hydropower resources help meet its environmental obligations.

While this sharp focus is essential, it seems that there is an understandable but nevertheless regrettable lack of attention paid to the related issue of energy efficiency. Nowhere in actionable government policy is the ability of energy efficiency policy to significantly contribute to wider energy, environmental and social goals adequately recognised or reflected in resource allocation.

It is possible that such neglect is the result of an under-appreciation of the benefits from energy efficiency that the Energy Charter's Energy Efficiency Protocol was designed to promote. While the all-pervasive nature of energy efficiency poses challenges to formulating and delivering effective policies, the impacts in terms of the benefits and risks that are mitigated are very substantial and worth the effort. The in-depth review PEEREA process is designed to assist this outcome.

Georgia's inclusion in the EU Neighbourhood Policy is a step in aligning its policies and administrative and trade systems with contiguous countries and, eventually, with the EU. In this and in ratifying the Energy Charter, Georgia has signalled the importance it attaches to good international relations to further common goals and its willingness to address issues on the way.

Energy efficiency is not an option for Georgia; it is an imperative. All of the international finance institutions, donor countries and aid agencies accord a high priority to energy efficiency that is intended to serve the common interest as well as the interests of Georgia.

Without doubt Georgia's economic, political and social situation and recent experience is a very challenging background against which to develop a vibrant energy efficiency policy. Nevertheless, the level of capital stock replacement that must inevitably take place across the economy is such that it cannot be effectively achieved without a positive commitment to an energy efficiency policy.

This policy Is best delivered through well-crafted energy efficiency programmes and measures that meet the priority needs of Georgia.

Over half the people of Georgia are subject to the privations of poverty and have a vital interest in the effective management of the available resources. Some of the resources available to the Georgian authorities are contingent on energy efficiency commitments being honoured.

Policy and Measures to Promote Energy Efficiency

Among injunctions in the MDSPPS is efficient utilisation of the power resource and provision for sustainable energies as follows:

- improving energy efficiency in industrial and domestic spheres and creating a sound legislative basis and institutional framework for the improvement of energy efficiency in the country
- studying and putting into operation measures necessary for the use of thermal and co-generation systems and also renewable sources of energy.

The explicit intent of the policy direction was that government and executive bodies and power, oil and gas national regulatory commissions should ensure the support of these activities through:

- proposing legislative and normative acts
- implementing state programmes and state-funded projects
- participating in international actions
- privatisation and other actions foreseen by Georgian legislation.

Thus the ministry and other executive bodies have a mandate and a recent policy direction to improve energy efficiency and optimally incorporate environmental protection goals in the formulation and implementation of energy programmes.

However, the ministry has no formal sustainable energy or energy efficiency executive agency within its responsibility or budget for the implementation of sustainable energy programmes. Nor is there any provision for such in the formal statement Priorities for Government 2009-2012.

The ministry can pay particular regard to the possible energy efficiency impact of other policies, for example electricity privatisation and gasification of towns, for which it has responsibility.

The current level of reliance on voluntary, not-for-profit and other international donors and IFIs, despite the best efforts of those involved, appears to be sub-optimal. A well-crafted energy efficiency policy could change all this and secure multiple current benefits in the ordering of priorities and the early delivery of practical measures.

For example, the chronic inefficiencies of wood fuel use in rural homes is a source of social and environmental ills and yet with the right public support there are immediately affordable solutions that could contribute to welfare and economic development.

Financing Energy Efficiency

International organisations are very active in Georgia with the EBRD publishing a Strategy for Georgia on 9 February 2010 that includes an assessment of the transition challenges facing key sectors of the Georgian economy and lays out initiatives planned by international organisations in Georgia.

The EBRD has lead the effort in establishing the Georgian Energy Efficiency Project (GEEP), which is a technical assistance project to help industrial and residential clients reduce their energy intensity and make greater use of RE sources.

GEEP started in December 2007 and was scheduled to last until at least the end of year 2010. It is jointly financed by the Early Transition Countries Fund, the Canadian International Development Agency/EBRD 2006-09 Fund and the United Kingdom Sustainable Energy Initiatives Fund.

The credit line is being disbursed through four Georgian participating banks in loans of any size up to $2.5 million per project. The GEEP project helps the banks to promote the credit facility and to identify, audit and approve suitable projects.

The IFC is focusing its efforts on investments in RE, infrastructure, manufacturing and agribusiness while the EIB Framework Agreement with Georgia is already bearing fruit with a first project, the 500 kV Transmission Lines Project, nearing the end of the due diligence process. Further projects in the energy sector are at various stages of preparation.

The IMF has provided technical assistance in eight or so areas, of which statistics is one. Energy statistics merit inclusion in such capacity-building measures. The Interim Operational Strategy for 2008-2009 of the ADB in Georgia has identified three priority areas including energy infrastructure upgrading and development. These investments will also address energy waste that is associated with a decrepit infrastructure and, in the process, help secure future energy supplies.

However, this supply-side approach does not address or adequately recognise the power of the energy efficiency action lines agreed in priority 4.6.2 Energy of the EU-Georgia Action Plan, which called for the development of an action plan including a financial plan for improving energy efficiency and enhancing the use of RE.

While there are commendable loan packages and microfinance lines available to individual companies and householders who can provide matching finance or business opportunities, there is no large-scale finance for a structured programme such as that proposed by Winrock and others for wood stoves.

To let such an opportunity pass without intervention would be reprehensible and it is crucially important for Georgia to have the capacity to identify and act on such strategic opportunities.

Notwithstanding the current lack of dedicated resources the ministry is in a position to insist that other executive bodies with discretionary resources or revenue raising

powers follow the policy direction of the parliament and legislature. An Energy Efficiency Fund with appropriate guidelines and governance is a prerequisite.

Institutional Arrangements

The institutional arrangements for energy efficiency are at a very early stage of development in Georgia. Institutional development should be informed by an understanding of the short-, medium- and long-term tasks to be accomplished and to which the Georgian authorities need to give early and high level consideration.

Several bodies including the Ministry of Energy, the EEC and WEG as well as other international donors and agencies have indicated priorities they have in Georgia's best interests.

While there is broad agreement on the generalities there are important differences of emphasis and only the Government of Georgia can arbitrate and determine what is politically and economically feasible. Standards and their enforcement need to be given early consideration.

Standards

Having regard to the recent and projected growth rates for the economy of Georgia there is an urgent need to efficiently enforce the appropriate technical and energy efficiency standards, in particular those relating to long-lived assets.

There is a prima facie case for building energy performance standards and for certain classes of appliance and transport standards. Establishing standards and ensuring their implementation is a public good activity and must be politically motivated. To be effective in practice and evolution they must be supported by sound policy analysis and technical underpinning.

Enforcement

The enforcement of standards is relatively straightforward for new investments and buildings. However, where consumer goods and appliances are concerned, in many cases the most effective approach is to rely on consumer information.

Fit-for-purpose and reliable labelling does not need be expensive if there is industry support for the concept; this support will be forthcoming where there is confidence among the industry players that enforcement will follow. Establishing a level playing field in the interests of consumers and suppliers alike is the responsibility of the government.

Good standards are, in the main, easy to enforce. When they reflect the balance of societal need and operate for the benefit of the consumer they are self-promoting. On the other hand unrealistic or inappropriate standards are self-defeating. It follows that the greatest of care and attention is warranted in the formulation, testing and early amendment of standards as and if necessary.

Carelessness, over-ambition and inexperience can result in the production of standards or regulations that require amendment and the authorities should be aware at all times of this form of regulatory risk and ensure that regulation is well grounded.

Institutions

None of this work, nor the opportunity for identification as discussed in the preceding section, can take place in a timely fashion in the absence of a critical mass of competent institutions and related services

The assembly of information for this in-depth review process was greatly aided by those institutions that promoted understanding through publications and their websites. On the other hand, the limited statistical information from Georgian sources leaves market players and policy analysts running blind and, without the initiative early in 2010 to establish the GEOSTAT, Georgia risked being at a competitive disadvantage because of a lack of understanding of its home market.

Early Action

The importance of early action is self-evident at the outset of, for example, a building boom. It is also the point where the cost of inappropriate action is highest. Institution building takes time and a modest early start with very clear and focused performance and review objectives will pay dividends.

In the absence of ministry leadership, the chances of success are slim. With ministry leadership, clear objectives and a suitable degree of agency accountability and the relationship between policy, agency and market can deliver productively for all concerned.

Energy Pricing and Taxation

When the electricity market in Georgia was deregulated in the 1990s, GWEM was set up as the sole market maker in the system, purchasing and selling electricity.

The lack of payment discipline in the sector caused GWEM to file for bankruptcy in 2004, and the company was closed down in 2006 and replaced by the newly created market maker ESCO, a commercial entity owned by the Georgian state.

The GNEWRC sets tariffs for the generation, transmission dispatch, distribution, import and consumption of electricity and for the transport, distribution and consumption of natural gas. Large consumers can be supplied through direct contracts with generators in the bi-lateral market.

The cost of developing greenfield hydropower plants will be largely offset by power exports to Turkey. This will be facilitated by interconnections on which the transmission and energy authorities are actively working. This export capacity will also be beneficial at the regional level, as it will enhance trading and facilitate cross-support among countries in the region.

Bill collection rates increased to 95% in 2008. For small-scale renewable projects there is deregulation but no feed-in tariff. In most cases the price achieved for the generated electricity depends on the negotiating skills of the project developer.

In order to create additional guarantees for social protection and for the promotion of the rational consumption of electricity, rigid step tariffs were introduced for consumption of up to 100 kWh and 101-300 kWh and for more than 301 kWh.

The above achievements reflect the efforts of the authorities to arrive at a balanced approach to power and gas pricing that respects the following:

- need for cost reflective pricing to ensure ongoing and much needed investment
- importance of bill collection for the viability of the sector
- limited ability of consumers to affordably meet their energy needs.

Energy Efficiency and the Environment

The results of scenario modelling to 2025, as reported in Georgia's SNC to the UNFCCC, show how different measures could influence the evolution of GHG emissions in Georgia. In particular, they demonstrate the role of government policy in reducing GHG emissions.

The modelling results show that the GHG reductions attributable to new energy efficiency measures and RE are 6% of the projected future demand in 2025 with respect to the business-as-usual case in alternative scenario 1, and 12% under the alternative aggressive energy efficiency policy scenario.

This is an important first step in quantifying the benefits of energy efficiency and RE policies. The authors of the SNC were assiduous in stressing the quality and confidence aspects of the data used.

From the EU's standpoint, Georgia needs to implement the relevant provisions of the Kyoto Protocol and, where appropriate, implement concrete policies and measures to reduce GHG emissions, in particular in the energy and heavy industry sectors.

The EU has also observed that, to enhance the strategic planning, implementation and enforcement of environmental legislation, Georgia needs to strengthen its administrative capacity, in particular at regional and local levels, and to coordinate between the relevant authorities.

While Georgia has an NEAP, only a lesser part of the first NEAP recommendations are implemented, mainly due to a shortage of resources. A second NEAP is currently under preparation. Local environmental action plans are also being elaborated on in selected municipalities.

An EU assessment found that environment legislation is in place in several areas, but still needs further development, in particular with regard to implementing legislation. Georgia faces difficulties with the implementation and enforcement

of environment legislation due to limited administrative capacities and financial resources, especially at regional and local levels.

In the view of Transparency International, legislation is scattered and at times contradictory, and despite recent attempts at mainstreaming climate change issues, it is not fully factored into national planning and policy. In addition, there are no mechanisms for implementing this legislation, or to monitor whether the companies responsible for negative impacts on the environment comply with the obligations they have undertaken under the current legislation.

Public participation in discussions about environmental protection issues is minimal and the subsequent influence on the decision making process is limited.

Renewable Energy

Notwithstanding the merits of, and the absolute requirements for, investment in the refurbishment of large electricity and hydro facilities, there are concerns that other valuable resources and worthwhile courses of RE development may be neglected.

It is evident from the business-like efficiency and transparent approach to the development of small- and medium-scale hydropower plants that the ministry is closely involved in the lessons learnt from these practical studies and other donor supported initiatives.

The publicity that has attended the commissioning of the Lopota small hydro plant in March 2009 and the earlier grand opening of the Misaktsieli hydro plant in 2009 is testimony to a commitment to achieve results and promote an appetite for replication though appropriate publicity and awareness raising.

In order to develop renewable and alternative energy sources and support a financial return on corresponding investments the output of newly built plants approved by the Ministry of Energy is fully or partially subject to mandatory purchase by ESCO at the tariffs defined by the GNEWRC (Art.3 Clause1.M).

This provision can be partly considered as a guarantee of return on investment; however, there is no definite list of the principles and criteria to be used by the ministry in defining such a plant or by the GNEWRC in defining the tariffs (Winrock International, 2008).

The possibilities for consumer gain and business development are well illustrated where energy efficiency and RE combine to improve resource utilisation, service delivery and local development as set out in the Winrock International review of the potential for improved wood stoves for heating and cooking in Georgia.

The recommendations of the Winrock report are strategically framed to drive and increase the appetite for change in the short, medium and longer term.

RECOMMENDATIONS

General Recommendations

- The Government of Georgia should formalise and strengthen its approach to the making, delivery and review of energy efficiency policy in line with Energy Charter obligations.
- Energy policy goals should respect and fully reflect the potential of energy efficiency and RE to contribute to wider economic and environmental policies and goals as well as ensuring security of supply.
- Future energy strategies and policies should be transparent and consistent with long-term goals and should consider initiating programmes for energy efficiency and set objectives for key sectors.
- Future energy strategies and policies should be the subject of public consultation and be supported by robust analysis of their economic, energy efficiency and emission abatement potentials.
- The government should take full account of the barriers impeding the realisation of these potentials and, where market failure or other barriers exist, take remedial measures such as regulation, standards and information provision.

Institutional Framework

- The drafting, putting in place and delivery of a more coherent energy efficiency policy will require adequate resources in the Ministry of Energy and any associated delivery agency.
- The government should create an energy efficiency unit within the Ministry of Energy to lead the development of legislation, secure a budget line and promote sustainable energy within the government.
- The economic value and administrative implications of meeting EU energy efficiency directives should be regularly assessed to capture best international practice.
- The coordination of state and municipal governments and their agencies' efforts should be explicitly provided to promote effective action on energy efficiency.
- The government should continue to facilitate and, as far as practicable, ensure the ongoing involvement of private stakeholders, business associations and NGOs in the implementation of energy efficiency policies and supporting activities.
- The Ministry of Energy should, with other ministries and governmental bodies, advance the integration of energy efficiency considerations into all relevant state policies.

Energy Market and Pricing

- The government should continue its efforts in the reform of gas and electricity markets in line with the principles of efficient pricing.

- Where concerns arise over the social impacts of increased pricing, consideration should be given to methods other than pricing to address the concerns (such as fuel aid).
- Continued development of energy market regulation should support the development of effective energy services.
- The government should facilitate the effective disclosure of pricing and consumption information directly to consumers, to facilitate a more competitive energy market.

Energy Efficiency Funding

- A Georgian energy efficiency initiative with appropriate funding should be created as soon as possible. Consideration should be given to drawing resources through existing utilities.
- The government should ensure that its policies and actions leverage the substantial international financing available with domestic budget financing to best overall effect.
- It should ensure continued dialogue with IFIs and the donor community in order to strengthen the focus on energy efficiency and RE.
- EU neighbourhood funding for energy efficiency should be directed to achieve market transformation towards investments in energy efficiency in ways that are sustainable in the context of ongoing energy policies.
- The government should accelerate the identification and removal of any barriers to the use of ESCO services.

Specific Energy Efficiency Programmes and Measures

- The government should develop, in consultation with industry and other interested parties, a series of consistent short-, medium- and long-term strategies to enhance the energy performance of building stock.
- Considering the introduction of energy performance building regulations should be a priority for action by the government in light of the recent and projected high levels of activity in the renewal and expansion of the building stock.
- Given the existence of common building types in each of the distinct climate regions, suitable low-cost packages of efficiency upgrades for residences should be developed.
- Municipal governments should be encouraged to manage regionally relevant demonstration programmes in rehabilitating and constructing high-efficiency buildings in advance of setting new building codes.
- Energy efficiency must feature in any integrated approach to transport planning and provision.

- Consideration should be given to introducing energy efficiency measures in transport in parallel with the completion of major new transport infrastructure.
- The government should continue to encourage those municipalities that adopt IT management and information solutions to improving traffic flow.
- The government should promote measures to raise awareness of energy efficiency with local communities and citizens, and towards a more commercial environment for improving energy efficiency in industry.
- The government should develop and implement framework policies that promote and support energy efficiency so as to improve the competitiveness of industry and secure sustainable growth.

Renewable Energy Sources

- The government should continue to promote the development of RE with an emphasis on cost effectiveness.
- The government should evaluate the benefits of the complementary seasonal variations in hydropower and wind power resources.
- The effectiveness of various support measures in stimulating investment should be regularly assessed.
- The government should develop a robust strategy to achieve greater efficiency of biomass for heating in homes with an eye to meeting the needs of the disadvantaged and to achieve long-term RE objectives, for example through the deployment of high-efficiency wood burning stoves on the basis of the existing analysis, supplemented by several regional trials with the aid of donors.
- A biomass strategy should be developed in consultation with relevant market and government stakeholders to ensure an integrated policy approach to the production and use of biomass.
- The barriers to the development and application of geothermal resources should be addressed to facilitate entrepreneurial activity in this niche area in Georgia.

Data Collection and Monitoring

- The government should facilitate the collection of statistical data required for forward planning, investment appraisal and, crucially, indicators for energy efficiency.
- The Ministry of Energy should improve its capacity to analyse and assess energy efficiency as a basis for future policy development, including decisions on financing.
- The establishment of an independent monitoring/statistical gathering agency provides the opportunity for better coordination in the production of energy statistics and will ensure the accuracy, independence and robustness of all economic and energy data.

ANNEX 1: BASIC ECONOMIC AND PRIMARY ENERGY DATA

Table 8: Energy Balances, ktoe

Indicators	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Primary Energy Production	1,200	1,326	1,265	1,329	1,377	1,288	981	929	1,075	1,079	1,258
Net imports	2,575	1,558	1,296	1,202	1,333	1,532	1,898	2,145	2,322	1,965	1,971
Total Primary Energy Supply (TPES)	3,731	2,872	2,571	2,545	2,706	2,782	2,841	3,033	3,344	3,007	3,189
Total Final Consumption (TFC)	2,248	2,301	2,022	2,013	2,102	2,150	2,220	2,248	2,435	2,464	2,517

Source: IEA statistics, electronic version, 2010

Table 9: Total Primary Energy Supply Structure, ktoe

Products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	27	16	14	14	29	8	11	10	29	71	205
Crude, NGL and feedstocks	50	21	25	28	69	37	20	19	42	58	15
Petroleum products	1,509	706	565	541	542	548	739	730	908	798	861
Natural gas	964	953	812	679	771	903	1,061	1,378	1,386	1,081	1,086
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	447	504	477	582	561	520	536	457	586	616	637
Geothermal	0	6	10	10	10	10	10	14	16	14	44
Solar/wind/other	0	0	0	0	0	0	0	0	0	0	0
Combustible renewables and waste	674	645	645	645	645	645	349	373	394	378	382
Electricity	60	21	23	45	78	110	116	53	-17	-10	-42
Total Primary Energy Supply	3,731	2,872	2,571	2,545	2,706	2,782	2,841	3,033	3,344	3,007	3,189

Source: IEA statistics, electronic version, 2010

Table 10: Total Final Energy Consumption, ktoe

Products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	19	11	19	14	29	8	11	10	29	72	205
Petroleum products	659	634	561	538	540	539	700	726	931	835	802
Natural gas	306	463	334	279	317	371	569	609	529	608	541
Geothermal	0	6	10	10	10	10	10	14	16	14	44
Combustible renewables and waste	674	645	645	645	645	645	349	373	394	378	382
Electricity	568	541	453	464	490	506	531	488	502	513	504
Heat	22	0	0	63	71	70	50	29	34	44	40
Total Final Consumption	2,248	2,301	2,022	2,013	2,102	2,150	2,220	2,248	2,435	2,464	2,517

Source: IEA statistics, electronic version, 2010

Table 11: Basic Energy-Related Indicators

Indicators	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Population (million)	5.069	4.745	4.686	4.629	4.573	4.519	4.465	4.411	4.358	4.307	4.26
GDP (billion 2000 US$)	2.303	3.057	3.204	3.38	3.754	3.973	4.355	4.763	5.351	5.475	5.26
GDP (billion 2000 US$ PPP)	7.106	9.432	9.886	10.427	11.58	12.258	13.435	14.696	16.51	16.892	16.226
Primary Energy Intensity (TPES/GDP) (toe per thousand 2000 US$)	1.62	0.94	0.8	0.75	0.72	0.7	0.65	0.64	0.62	0.55	0.61
Primary Energy Intensity^{PPP} (TPES/GDP PPP) (toe per thousand 2000 US$ PPP)	0.53	0.3	0.26	0.24	0.23	0.23	0.21	0.21	0.2	0.18	0.2
TPES/Population (toe per capita)	0.74	0.61	0.55	0.55	0.59	0.62	0.64	0.69	0.77	0.7	0.75
Electricity Consumption/ GDP (kWh per 2000 US$)	3.02	2.1	1.98	1.95	1.84	1.79	1.72	1.44	1.32	1.32	1.33
Electricity Consumption/ Population (kWh per capita)	1,371	1,353	1,357	1,421	1,512	1,577	1,675	1,556	1,621	1,681	1,641
Energy Related CO_2 Emissions (Mt) (from fuel combustion)	7.06	5.91	5.09	4.58	4.11	4.37	3.46	2.88	3.09	3.29	n.a.

Source: IEA statistics, electronic version, 2010

Table 12: Electricity Generation, GWh

Products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	0	0	0	0	0	0	0	0	0	0	0
Petroleum products	1,713	274	25	30	30	42	66	24	24	12	39
Natural gas	1,238	1,290	1,370	460	604	833	965	1,948	1,490	1,279	1,107
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	5,203	5,860	5,542	6,767	6,526	6,049	6,236	5,315	6,818	7,162	7,412
Solar/wind/other	0	0	0	0	0	0	0	0	0	0	0
Combustible renewables and waste	0	0	0	0	0	0	0	0	0	0	0
Total electricity generation	8,154	7,424	6,937	7,257	7,160	6,924	7,267	7,287	8,332	8,453	8,558

Source: IEA statistics, electronic version, 2010

Table 13: Heat Production, TJ

Products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	1.839	0	0	0	0	0	0	0	0	0	0
Petroleum products	35.469	0	0	0	0	0	0	0	0	0	0
Natural gas	25.628	0	0.478	69.982	80.969	86.988	59.855	32.77	38.024	49.011	42.849
Nuclear	0	0	0	0	0	0	0	0	0	0	0
Hydro	0	0	0	0	0	0	0	0	0	0	0
Solar/wind/other	0	0	0	0	0	0	0	0	0	0	0
Combustible renewables and waste	0	0	0	0	0	0	0	0	0	0	0
Total heat production	62.936	0	0.478	69.982	80.969	86.988	59.855	32.77	38.024	49.011	42.849

Source: IEA statistics, electronic version, 2010

ANNEX 2: ENERGY END-USE

Table 14: Total Final Energy Consumption by Sector, ktoe

Sectors	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Residential	1,191	1,213	1,059	1,016	1,042	1,070	819	824	872	882	936
Industry sector	444	374	207	223	252	241	206	242	268	318	388
Service sector	109	265	192	200	211	218	263	230	262	295	183
Transport sector	373	358	421	442	453	440	546	562	710	618	791
Agriculture/forestry	119	59	25	27	20	31	122	132	138	143	78
Non-energy use	0	15	12	10	13	14	9	5	7	28	60
Non-specific (other)	12	16	107	96	111	137	255	251	179	180	81
Total final consumption	2,248	2,301	2,022	2,013	2,102	2,150	2,220	2,248	2,435	2,464	2,517

Source: IEA statistics, electronic version, 2010

Table 15: Final Energy Consumption in the Residential Sector, ktoe

Energy products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	1	11	4	2	4	4	5	5	5	8	18
Electricity	396	229	222	214	230	243	255	234	240	246	251
Natural gas	57	240	133	111	126	148	176	181	188	193	201
Heat	1	0	0	29	29	24	12	9	10	10	10
Petroleum products	99	130	93	53	45	44	56	60	73	81	89
Combustible renewables and waste	637	597	597	597	597	597	305	329	349	331	330
Total residential sector	1,191	1,213	1,059	1,016	1,042	1,070	819	824	872	882	936

Source: IEA statistics, electronic version, 2010

Table 16: Final Energy Consumption in the Services Sector, ktoe

Energy products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	7	0	0	0	0	0	0	0	3	11	55
Electricity	49	190	152	165	171	174	182	167	172	176	66
Natural gas	0	16	26	22	25	29	47	25	28	54	16
Heat	17	0	0	0	2	2	9	6	6	7	2
Petroleum products	8	47	1	1	1	1	2	2	3	3	0
Combustible renewables and waste	28	12	12	12	12	12	23	24	40	42	38
Total services sector	109	265	192	200	211	218	263	230	262	295	183

Source: IEA statistics, electronic version, 2010

Table 17: Final Energy Consumption in the Industry Sector, ktoe

Energy products	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal and coal products	11	0	15	12	26	4	5	5	1	27	45
Oil products	91	64	32	25	27	19	18	18	30	32	29
Gas	249	197	70	59	67	78	92	150	164	179	181
Combustible renewables and waste	9	36	36	36	36	36	0	0	0	0	0
Electricity	82	77	53	58	60	60	63	58	60	61	113
Heat	2	0	0	34	38	43	27	11	13	19	21
Total	444	374	207	223	252	241	206	242	268	318	388

Source: IEA statistics, electronic version, 2010

Table 18: Energy Consumption in the Industry Sector, by Sub-Sector, ktoe

Subsectors	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Iron and steel	0	0	40	45	57	36	37	37	39	68	102
Chemical and petrochemical	57	0	7	35	39	45	32	35	41	64	85
Non-ferrous metals	0	0	1	1	1	1	1	1	1	1	1
Non-metallic minerals	0	0	63	54	62	73	83	26	30	40	61
Transport equipment	0	0	5	4	5	5	6	2	2	2	3
Machinery	0	0	1	1	1	1	1	1	1	1	1
Mining and quarrying	0	0	1	1	1	1	1	1	1	1	11
Food and tobacco	0	0	24	19	20	24	26	14	19	20	9
Paper, pulp and printing	0	0	0	0	0	0	0	0	0	0	1
Wood and wood products	0	0	0	0	0	0	0	0	0	0	1
Construction	0	23	17	15	15	9	9	8	12	13	1
Textile and leather	0	0	1	1	1	1	1	0	0	0	1
Non-specified (industry)	387	352	47	46	50	46	9	116	120	107	111

Source: IEA statistics, electronic version, 2010

ANNEX 3: ENERGY SECTOR STATISTICS FOR 2005-2010

Table 19: Georgian Energy Sector Statistics for 2005-2010

		2005	2006	2007	2008	2009	2010
Natural Gas							
Local production	Mln m^3	17.2	23.5	24.3	19.5	15.7	11.1
Total imported gas	Mln m^3	1,335	1,808.8	1,702	1,473.2	1,180.9	1,113.3
Totally consumed gas *Including:*	Mln m^3	1,332	1,806.4	1,700	1,471.2	1,188.8	1,121.14
Commercial sector	Mln m^3	n.a.	n.a.	n.a.	552.4	482.5	478.8
Household sector	Mln m^3	n.a.	n.a.	n.a.	528.1	415.6	445.5
Power generation	Mln m^3	317.6	674.2	455.4	390.7	290.8	196.9
Transit to Armenia	Mln m^3	1,685.1	1,715.7	2,054.3	2,254.3	1,628.7	1,440.1
Transit to Turkey	Mln m^3	0	0	1,212.5	4,488.2	4,787.9	4,355.7
Oil							
Local production	Tons	66,700.3	63,500.7	56,635	52,814.5	52,867	51,444.1
Baku-Tbilisi-Ceyhan (transit)	Mln Barrel	1.8	64.9	212.2	246.6	285.8	286.3
Western route export pipeline (transit)	Mln Barrel	51.5	41.6	0.04	5.2	31.4	29.6
Coal	-	-	-	-	-	-	-
Extraction	Th. Tons	4,100	4,590	16,560	57,420	146,310	267,331
Import	Th. Tons	-	-	6,344	121,082.6	6,721.8	17,859.7
Import of Petroleum Products							
Total import	Th. Tons	-	800.5	791,279.1	847,759.6	847,759.6	936,594.9
Including:							
Gasoline/petrol	Th. Tons	-	318.9	383,910.1	407,537.0	407,537.0	435,891.2
Kerosene	Th. Tons	-	42.1	44,303.6	57,980.8	57,980.8	64,296.9
Diesel	Th. Tons	-	326.8	339,619.7	350,895.9	350,895.9	415,263.7
Black oil/Mazut	Th. Tons	-	12.5	9,235.8	15,839.6	15,839.6	4,475.2
Lubricant and other kinds of oil	Th. Tons	-	13.1	14,162.9	15,374.0	15,374.0	14,581.6
Other products	Th. Tons	-	64.3	46.1	132.2	132.2	2,086.3
Liquefied gas	Th. Tons	-	22.5	20,596	12,800.0	12,800.0	17,472.5
Crude oil	Th. Tons	-	-	8.9	43,009.4	43,009.4	6,448.6
Electricity Generation							
Total generation *Including:*	GWh	7,061	7,621.90	8,218.4	8,441.00	8,402.30	10,046.30
HPPs	Mln KWh	6,030.40	5,401.60	6,746.3	7,161.00	7,411.62	9,367.70
Thermal power plants	Mln KWh	1030.6	2,220.30	1,472.1	1280	990.68	678.6
Losses	Mln KWh	495.3	423.2	333.8	343.3	273.01	315.3
Import of electricity	Mln KWh	1398.6	777.00	433.5	649.1	254.98	222.1
Electricity export	Mln KWh	121.8	96.40	633.94	679.4	749.36	1,524.30
Electricity consumption	Mln KWh	-	-	-	-	7,907.9	8,744.20

Source: Ministry of Energy of Georgia

ANNEX 4: PRIORITIES OF THE GOVERNMENT FOR 2009-2012: ENERGY

The priorities of the Georgian government for 2009-2012 for energy as set out in the "Basic Data and Directions for 2009-2012" are listed below.

Generation of more than 500 mg/wt additional hydropower capacity:

- Growth of the use of the hydro potential by 13%
- Share of hydro resources in electricity generation to grow to 95%
- Memorandum signed covering the construction of hydroelectric power plants.

Growth of the sustainability of the energy system:

- Further regulation of the sector
- Generation and transmission system to be stabilised and diversified
- Generation of a great share of energy by using renewable resources (hydro resources)
- Diversification of the sources of imported energy resources
- Operation of the energy system in a parallel regime with contiguous countries.

Increase in the export of electric power:

- Maintaining an overall positive trade balance in electrical power
- Tripling power exports from 2007 levels.

Diversification of fuel sources for the rural population:

- Implementation of the gasification programme
- Growth of the number of settlements provided with gas by regulating the gas sector and attracting capital investment.

Inevitably, these priorities are carried forward through dedicated agencies of government and market actors.

ANNEX 5: RECOMMENDATIONS FROM THE 2005 IN-DEPTH REVIEW OF GEORGIA

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 that they are feasible, be supported by appropriate resources for energy efficiency.
- The government should adopt and ensure the 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 of energy consumption and how to make it more efficient.
- Energy efficiency should be considered in the various stages of the education process as well.
- Restructuring, privatisation, renovation and rebuilding of industry provide a good opportunity to promote energy efficiency. The government should ensure that any strategy for the 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 RE strategies and programmes.
- The government should ensure better coordination 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 the implementation of energy efficiency policies and programmes; the valuable experience of the EEC 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 eliminating any remaining subsidies and at the same time to creating 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's flexible mechanism, CDM, and consider how this mechanism could become an effective vehicle for bundling potential cost-effective energy efficiency projects and making 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 RE resources.
- The government should analyse the opportunities for the long-term cost-effective use of RE 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 6: ORGANISATIONS VISITED BY THE REVIEW TEAM

Advanced Engineering Associates International

EBRD

Energy Efficiency Centre (EEC)

EU Delegation

Georgian National Energy and Water Supply Regulatory Commission (GNEWRC)

Ministry of Economy and Sustainable Development

Ministry of Energy

Ministry of Environment Protection and Natural Resources

Tbilisi Municipality

USAID

Winrock International

ANNEX 7: LIST OF ABBREVIATIONS

CDM	Clean Development 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 gas
IEA	International Energy Agency
IFI	International financial institution
Km	Kilometre
kWh	Kilowatt hour
Mm	Millimetre
Mtoe	Million tonnes of oil equivalent
MW	Megawatt
NGO	Non-government organisation
PEEREA	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
TFEC	Total Final Energy Consumption
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VAT	Value added tax

ANNEX 8: BIBLIOGRAPHY

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In-Depth Review of Energy Efficiency Policies and Programmes: GEORGIA

Georgia ratified the Energy Charter Treaty (ECT) in 1995 and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) in 2004. By ratifying the Protocol, countries commit themselves to formulating and implementing policies for improving energy efficiency and reducing the negative environmental impact of the energy cycle (Art. 5). The guiding principle of the PEEREA is that contracting parties shall cooperate and, as appropriate, assist each other in developing and implementing energy efficiency policies, laws and regulations (Art. 3).

The country review process is a core activity in monitoring and facilitating the implementation of the Protocol. The in-depth energy efficiency reviews, implemented under PEEREA, have proven to be an important tool in assessing the progress of member countries in fulfilling their commitments under the Protocol. They also provide peer guidance to governments in developing and implementing energy efficiency policies.

The current in-depth review of Georgia's energy efficiency policies was carried out in 2010, following the previous review in 2005. The in-depth review report was discussed and approved by the PEEREA Working Group in 2011.

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