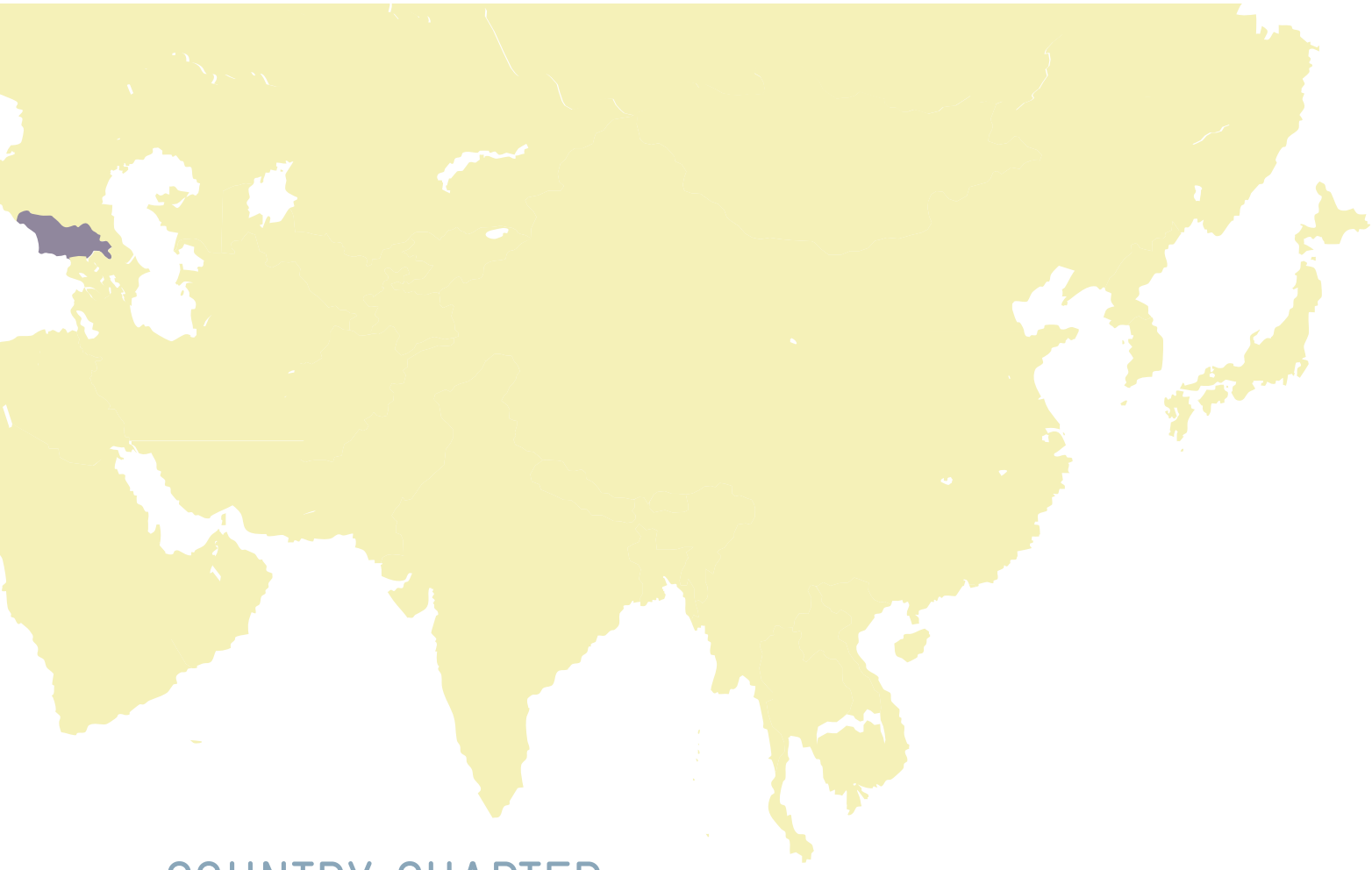

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CONTENTS GEORGIA

ACRONYMS AND ABBREVIATIONS

GEORGIA

ADB	Asian Development Bank
CAR	Central Asian Region
CCA	Common Country Assessment
CENN	Caucasus Environmental NGO Network (CENN)
CDM	Clean Development Mechanism
CHP	Combined Heat and Power Plant
CIS	Commonwealth of Independent States
CO_2	Carbon Dioxide
DDP	Distribution Demonstration Project
EBRD	European Bank for Reconstruction and Development
EEC	Energy Efficiency Centre
ESCO	Energy System Commercial Operator
FSU	Former Soviet Union
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas Emissions
GNERC	Georgian National Electricity Regulatory Commission
GNIA	Georgian National Investment Agency – GNIA
GSE	Georgian State Electro System
GWEM	Georgian Wholesale Electricity Market
HPP	Hydro Power Plant
HV	High Voltage
HVL	High Voltage Lines
HVN	High Voltage Network
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IEA	International Energy Agency
JSC	Joint Stock Company
MB&C	Metering, Billing and Collection
MDG	Millennium Development Goals
NATO	North Atlantic Treaty Organization
O&M	Operation and Maintenance
PREGA	Promotion of Renewable Energy, Energy Efficiency and Greenhouse Gas Abatement
RAO UES	Russian energy company
RE	Renewable Energy
SPP	Small Power Plant
SHPP	Small Hydro Power Plant
SJSC	State Joint Stock Company
UDC	Unified Dispatch Center
UEDC	United Energy Distribution Company
UNDAF	UN Development Assistance Framework
UNDP	United Nations Development Program
UPSCAR	United Power System of Central Asia Republics
USAID	United States Aid
USD	US Dollar
US	United States
VAT	Value Added Tax
WB	World Bank

MEASUREMENTS

°C	degree Celsius
km	kilometer
km^2	square kilometer
km^3	cubic kilometer
kV	kilovolt (1kV = 1,000 V)
kWh	kilowatt hour
l	liter
m	meter
m^3	cubic meter
mm	millimeter
MW	megawatt (1 MW = 1,000 kW)
GWh	gigawatt hour (1 GWh = 1,000,000 kWh)
TWh	terawatt hour (1 TWh = 1,000,000,000 kWh)
kj	kilojoule (1 kj = 1,000 Joules)
ktoe	kilotons of oil equivalent (1 ktoe = 11,630,000 kWh)

1 SUMMARY

Georgia has vast resources of almost all types of Renewable Energy (RE) – solar, wind, geothermal, hydro and biomass. The achievable annual potential of all RE sources is estimated at 15,000 GWh per year. This is enough energy to meet over a third of Georgia's annual primary energy needs. Apart from large hydro power resources, only a very small part of this potential is currently used. Below, please find an overview of the largely untapped achievable potentials:

TABLE 1

Untapped Achievable Potentials

	ACHIEVABLE POTENTIAL
Small hydro power	5,000 GWh
Wind energy	5,000 GWh
Biofuels	3,000–4,000 GWh
Solar energy	60–120 GWh
Geothermal energy	3,000 GWh

Source: data compiled by the author from different sources

The Georgian Government has been implementing a major restructuring of the energy sector since 2004. The main objective for the long-term policy is to fully satisfy the country's overall demand for electricity with domestic hydro resources. Besides tendering a number of new large Hydro Power Plants, the Ministry of Energy seeks foreign investors for the development of new small and medium Hydro Power Plants. On its official website, the Ministry of Energy has published a list of 91 potential sites with prospective capacities ranging from 0.6 MW to 99 MW[1]. Investors can be benefit from a guaranteed purchasing agreement for the first 10 years of operation.

Since the Rose Revolution in 2003, Georgia has been making enormous progress towards the improvement of the investment climate. Today, the World Bank (WB) ranks Georgia 11th in the world in terms of ease of doing business, ahead of many industrialized countries like Japan and Germany. Investor confidence has, however, suffered after the armed conflict between Russia and Georgia in August 2008. Russia's role as the main geopolitical player in the region has strengthened, and the relationship between the two states will play an important role in Georgia's the future economic development.

1 SEE WEBSITE OF GEORGIA'S MINISTRY OF ENERGY: WWW.MINENERGY.GOV.GE/?LANG=ENG

2 COUNTRY INTRODUCTION

2.1 GEOGRAPHY AND CLIMATIC CONDITIONS

Georgia is located in the Caucasus region of south-western Asia with a land area of 69,700 km^2. It is bordered to the West by the Black Sea (with a coastline of 310 km), to the South by Turkey and Armenia, to the East by Azerbaijan and to the North by Russia. Mountains are the dominant geographic feature of Georgia. The northern border with Russia roughly runs along the crest of the Greater Caucasus mountain range – a commonly acknowledged boundary between Europe and Asia with highest peaks above 5,000 m. The southern part of the country is bounded by the Lesser Caucasus Mountains with elevations of less than 3,500 m.

Native Georgians constitute about 84 % of Georgia's current population of 4.6 million people (as of 2009). Other major ethnic groups include Azeris (6.5 %), Armenians (5.7 %), Russians (1.5 %) and numerous smaller groups. The country with the capital of Tbilisi (Tiflis) consists of nine administrative regions and two autonomous republics (Abchazia and Ajaria). Abchazia and the autonomous administrative district of South Ossetia have officially declared their independence, but are only recognized by Russia, Nicaragua, Venezuela and Transnistria.

The climate of Georgia is extremely diverse, considering the nation's small size. There are two main climatic zones, roughly separating the eastern and western parts of the country. Much of western Georgia lies within the humid subtropical zone with annual precipitation ranging from 1,000–4,000 mm. The climate of the region varies significantly with elevation, and while many of the lowland areas of western Georgia are relatively warm throughout the year with average temperatures from 5–12 °C, the foothills and mountainous areas experience cool, wet summers and snowy winters.

Eastern Georgia has a transitional climate from humid subtropical to continental. Annual precipitation ranges from 400–1,600 mm – considerably less than that of western Georgia due to influences by dry air masses from Central Asia.

FIGURE 1
Map of Georgia

2.2 POLITICAL AND ECONOMIC DEVELOPMENT

Georgia has been an independent republic since its separation from the former Soviet Union in 1991. Georgia's main economic activities include the cultivation of agricultural products such as grapes, citrus fruit and hazelnuts, the mining of manganese and copper and output of a small industrial sector producing alcoholic and non-alcoholic beverages, metals, machinery, aircrafts and chemicals. Tourism is an increasingly significant part of the Georgian economy. About a million tourists brought 313 million USD to the country in 2006. The services sector contributed 59.6 % to the country's Gross Domestic Production (GDP) in 2008 followed by industry 27.9 % and agriculture 12.5 %[2].

The country's economic transition from a centrally planned economy to a market economy was a difficult process. Like all post-Soviet states, Georgia faced a severe economic collapse, where its GDP fell by 20 % per year between 1990 and 1995. The civil war and military conflicts in South Ossetia and Abkhazia aggravated the crisis. The country embarked on a slow pace of economic growth between 1998 and 2003 (3–3.5 %). This growth, however, was not enough to benefit the country's impoverished majority. By 2003, an estimated 52 % of Georgians were living below the official poverty line. Growing dissatisfaction ultimately triggered Georgia's 2003 Rose Revolution – a national uprising that brought down the regime of Eduard Shevardnadze.

Since the end of the Rose Revolution, the Saakashvili Government has been achieving a remarkable progress: From administrative chaos, the virtual non-existence of an open national economy and the stranglehold of mafia-like organizations, Georgia has moved rapidly to reconstitute the state's authority, abandon the structures and practices that made corruption endemic, launched a campaign to fight criminality, liberalized the national economy and opened it up to new disciplines and opportunities to play in global markets. Within a period of four years, Georgia had not only constructed a proper state, but had also emerged as one of the world's fastest growing and most rapidly transforming econoMIEs.

The improved business environment led to a remarkable inflow of foreign capital fuelling the country's economy. The World Bank recognized Georgia as the world's fastest-reforming economy in its 2008 Doing Business Report, ranking in the same league as countries like Germany, Sweden and Estonia. GDP growth was above 9 % from 2005 to the first quarter of 2008[3].

Despite its internationally recognized borders, the country had to struggle to gain control over its territory since gaining independence. In August 2008, the conflict around the internationally not recognized republics of Abkhazia and South Ossetia escalated in a short war with Russia. The war caused severe damage to Georgia's economic and financial system, a total collapse of military infrastructure, stopped direct investment flow into the country and significantly undermined the status of Georgia as safe and stable energy transit country[4]. In combination with the global financial crisis, GDP growth dropped to 2.1 % in 2008 and is projected to further decrease to -4 % for 2009 before increasing again to 2 % in 2010[5].

2 CIA, AS OF 2009
3 WORLD BANK GROUP/IFC, AS OF 2008/2009
4 TRANSPARENCY INTERNATIONAL GEORGIA/BP GEORGIA, AS OF 2008
5 IMF, AS OF 2009

The roots of the war with Russia are related to Georgia's geo-strategic location as an energy corridor for East Caspian resources (Kazakh oil and Turkmen gas) to western countries via Turkey. This is probably the most important reason for the growing US and EU influence in Georgia, notably through proposed EU and NATO membership, the US military assistance program and the construction of the Baku-Tbilisi-Ceyhan pipeline. These projects have strained Tbilisi's relations with Moscow. The armed conflict between Russia and Georgia made it obvious that Russia's role as the main geo-political player in the region has strengthened and that the safety of the South Caucasian transit infrastructure depends on the kind will of Russia. Meanwhile, Georgia's strategic location has also lost some importance since the Caspian countries have now access to alternative routes towards China and Iran.

SHORT BUSINESS INFO

Since the Rose Revolution, Georgia has been reconstituting the state's authority, abandoning the structures and practices that made corruption endemic, launching a campaign to fight criminality, liberalizing the national economy and opening it up to new disciplines and opportunities to play in global markets.

The World Bank recognized Georgia as the world's fastest-reforming economy in its 2008 Doing Business Report, ranking in the same league as countries such as Germany, Sweden and Estonia.

LAND AREA:	69,700 km²
POPULATION:	4.6 million (as of 2009)
DENSITY:	66 inhabitants/km²
BIGGEST CITIES AND POPULATION:	Tbilisi (1.48 million), Kutaisi (186,300)
LANGUAGE:	Georgian
CLIMATE:	Warm and pleasant; Mediterranean-like on Black Sea coast
AVERAGE ANNUAL TEMPERATURE:	In lower areas 5–12 °C, at 2,500 m above sea level <0 °C
ALTITUDE:	Sea level to Mt'a Shkhara 5,201 m
RIVERS:	26,000 rivers
ECOSYSTEM AREAS:	Forests (48 %), shrubland, savannah, grassland (11 %), cropland and crop/natural vegetation mosaic (39 %), urban and built-up areas (1 %), sparse or barren vegetation, snow and ice (1 %), wetland and water bodies (1 %)
INFLATION RATE:	11 % (as of 2008)
AGRICULTURAL PRODUCTS	Citrus fruit, grapes, tea, hazelnuts, vegetables, livestock
INDUSTRIES:	Steel, aircrafts, machine tools, electrical appliances, mining (manganese and copper), chemicals, wood products, wine
ELECTRICITY – PRODUCTION:	7,287 GWh (as of 2006)
ELECTRICITY – CONSUMPTION:	5,669 (as of 2006)
ELECTRICITY – TARIFFS:	8 USc/kWh
NATIONAL ELECTRICITY CAPACITY IN OPERATION:	4,388 GW
ELECTRIFICATION RATE:	n.a.
NATURAL RESOURCES:	Forests, hydro power, manganese deposits, iron ore, copper, minor coal and oil deposits, natural gas
OIL – PRODUCTION:	0.98 thousand barrels/day (as of 2007)
OIL – EXPORT:	2 thousand barrels/day (as of 2007
OIL – CONSUMPTION:	12.9 thousand barrels/day (as of 2006)
OIL – PROVEN RESERVES:	0.035 billion barrels (as of 2008)
NATURAL GAS – PRODUCTION:	1 billion cubic feet/year (as of 2005)
NATURAL GAS – PROVEN RESERVES:	300 billion cubic feet (as of 2008)
EXPORTS:	2.76 billion USD (as of 2008)
EXPORTS – COMMODITIES:	Scrap metal, wine, mineral water, ores, vehicles, fruits and nuts
EXPORTS – PARTNERS:	Turkey 13 %, US 11.2 %, Azerbaijan 6.3 %, UK 5.4 %, Bulgaria 5.1 %, Ukraine 5 %, Armenia 4.8 %, Turkmenistan 4.5 %, Canada 4.2 % (as of 2007)
IMPORTS:	7.3 billion USD (as of 2008)
IMPORTS – COMMODITIES:	Fuels, vehicles, machinery and parts, grain and other foods, pharmaceuticals
IMPORTS – PARTNERS:	Turkey 14 %, Russia 12.3 %, Ukraine 8.5 %, Azerbaijan 7.3 %, Germany 6.8 %, US 5 %, Bulgaria 4.6 % (as of 2007)
EXCHANGE RATE:	1 € = 2.5 Lari (as of 2009)

Source: CIA World Fact Book, as of 2009; IEA, as of 2006

3 ENERGY MARKET IN GEORGIA

Georgia imports nearly all its needed supplies of natural gas and oil products. The share of energy in the GDP of Georgia is three times greater than in the developed countries of Europe. The competitiveness of Georgia's economy is, therefore, particularly affected in times of high energy prices. The country, however, has a considerable hydro power potential, which can reduce its dependency on energy imports, if better developed.

Although Georgia does not own large-scale oil and gas resources, it can generate revenues from oil and gas transit because of its geo-strategic location. Despite its lucrative location, Georgia has been struggling to secure a basic energy supply for its citizens since its independence from the former Soviet Union. The civil war and the economic crisis in the early years of independence destroyed many state-owned energy assets, while the remaining resources were severely damaged or abandoned in disrepair. The last sabotage against the electricity infrastructure took place in the period 2004–2005. Since then, the Saakashvili Government managed to stabilize the electricity sector. Generation units and transmission lines are being rehabilitated with budgetary funds and the assistance of foreign donors.

The Parliament's Resolution on the Main Directions of Georgia's Energy Sector Development, adopted in 2006, identified the transfer of energy units in private ownership as a main component in improving the country's energy sector. Besides that, the state energy policy focuses on energy efficiency and saving, namely (i) on the reduction of energy consumption and loss in industrial and communal areas and (ii) the examination and implementation of measures necessary for creating cogeneration systems and for the utilization of Renewable Energy sources (hydro, wind)[6]. Critics, however, say that there is too little political will to enforce that policy[7].

3.1 IMPORTANT PLAYERS OF THE TURKMEN ENERGY MARKET

The majority of the Georgian energy sector is privatized and mostly in the hands of Russian-Georgian business groups. Despite the possible danger during and after the military conflict between Russia and Georgia in August 2008, Russian-Georgian business groups stayed in business and did not stop supplying the population with electricity and gas. When the military conflict was over, the Georgian government positively evaluated the activities of energy companies during the conflict and expressed readiness to continue receiving investments from Russia.

RAO Telasi is the power distribution company of Tbilisi and has been in the Georgian energy market since 2003, when Inter RAO UES[8] bought 75 % of stocks from the US firm AES with the remaining 25 % of stocks belonging to the municipality of Tbilisi. As part of the deal, RAO UES purchased the 600 MW Mtkvari gas fired power station from AES. RAO Telasi has signed electricity purchase agreements with the Enguri, Khrami and Zhinvali Hydro Power Plants.

Energo Pro is a Czech Company, which entered the Georgian energy market in 2007 and has been supplying the Georgian regions with electricity ever since. Besides the distribution network, the company owns several hydroelectric power stations with a joint capacity of 354 MW. The company cannot meet consumer needs with only its own generation; therefore it also purchases electricity from Enguri and other hydroelectric power stations.

Georgian National Electricity Regulatory Commission (GNERC) is responsible for the regulation of the power sector as well as the natural gas sector. GNERC is set up as an independent legal body with its Commission Chairman appointed by the President of Georgia. The Commission has the authority to grant licenses and deal with licensees concerning generation, transmission and distribution within the Electricity and Natural Gas Sectors of Georgia. GNERC also has the mandate to set tariffs for generation, transmission and distribution. The commission is to provide attractive terms and conditions for new private HPP investors.

Electricity System Commercial Operator (ESCO) was set up in 2006 with a mandate to be the market maker in the electricity system in Georgia. ESCO provides medium- and long-term purchase agreements with operators of power plants and trades with electricity in Georgia and neighboring countries. ESCO guarantees the purchase of all electricity from newly built HPPs, which nominally reduces market risk. Questions remain regarding the viability of ESCO in the medium term, as its predecessor, the Georgian Wholesale Electricity Market (GWEM), had to file for bankruptcy in 2004 because of the persistent lack of payment from its customers.

3.2 PRIMARY ENERGY CONSUMPTION, TRANSMISSION AND PRICES

In 2006, the total primary energy supply in Georgia was 3,344 ktoe (38,890 GWh). The total final consumption was 2,509 ktoe (29,179 GWh). 71 % of the supplied primary energy in 2006 was imported, out of which 41 % was natural gas and 23 % oil products[9]. Local biofuels (mainly in the form of firewood) play an important role in primary energy supply. The consumption of firewood is in the same range as the consumption of electricity produced through the hydro power stations. Firewood is mainly consumed in rural areas for cooking and heating purposes. The consumption of firewood is very inefficient due to the widespread practice of using woodstoves of very low efficiency (35–40 %). Transmission and Distribution System

The gap between primary energy supply and consumption indicates that a significant part of energy is lost due to outdated distribution networks and theft. IEA estimates these losses in the range of 10 % (as of 2006) of the total primary energy supply (distribution losses and theft) which indicates that there is still a considerable need for technical and political measures to make the energy sector more efficient[10].

6 RESOLUTION ADOPTED BY THE PARLIAMENT ON 7 JUNE 2006

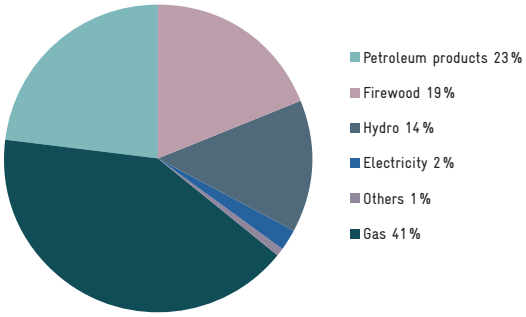
7 TRANSPARENCY INTERNATIONAL GEORGIA/BP GEORGIA, AS OF 2008

8 INTER RAO UES IS A RUSSIAN ENERGY COMPANY ENGAGED IN POWER GENERATION AND ELECTRICITY TRADING.

9 IEA, AS OF 2006

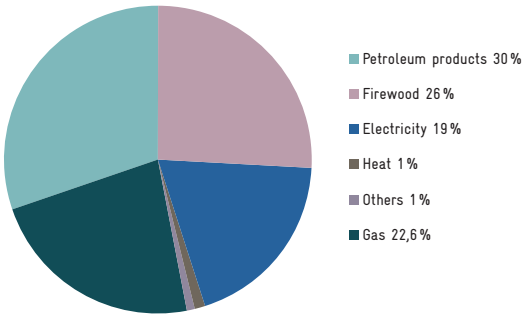
10 WORLD EXPERIENCE FOR GEORGIA, AS OF 2008

FIGURE 2
Composition of Total Energy Supply
Total Primary Energy Supply and Consumption



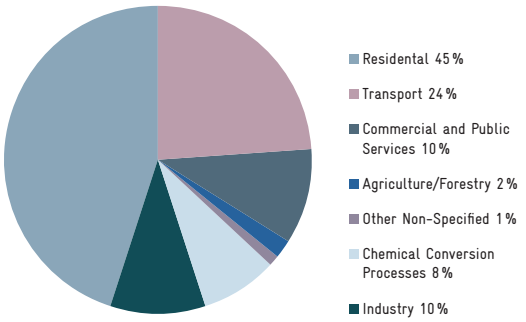
Source: International Energy Agency (IEA), as of 2006

FIGURE 2.1
Composition of Total Energy Supply
Total Final Consumption



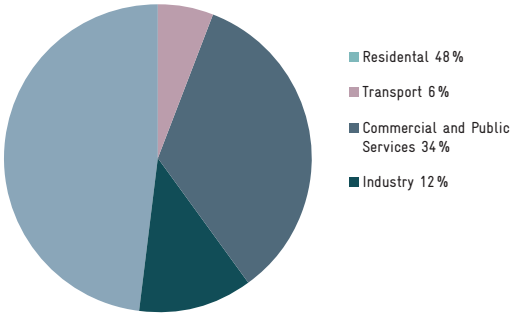
Source: International Energy Agency (IEA), as of 2006

FIGURE 3
Final Energy Consumption by Sector



Source: International Energy Agency (IEA), as of 2006

FIGURE 4
Final Electricity Consumption by Sector



Source: International Energy Agency (IEA), as of 2006

The Figure below shows the energy consumption by sector. The consumption by the residential sector is particularly large with 45% of the total consumption, while the consumption in the industry sector is particularly low with only 10%.

Electricity Sector

The installed electricity generation capacity in Georgia totals 4,470 MW of which 62% are located in Hydro Power Plants. The other 38% are located in thermal power plants mainly used to meet peak and winter demand. The average annual electricity generation in the 2000–2006 period totaled 8,180 GWh, of which 72.5% was hydroelectricity, 13.5% was generated in thermal power plants and 14% was imported (see Annex 2).

A number of power plants have been privatized in recent years. Inter RAO UES purchased the 600 MW Mtkvari gas fired power station, while Energo Pro bought 6 medium-sized Hydro Power Plants with a total installed capacity of 361 MW in 2007. Other power plants are scheduled to be privatized. However, most of the important generation assets, such as the 1,300 MW Enguri HPP generating almost one third of the country's electricity, remain state-owned. Other assets are partly controlled by Georgian municipalities[11].

About 15% of the generated electricity are used by the energy sector itself (e. g. for pumped storage) and 13% are lost in the distribution network or by theft. Although losses are still significant, huge progress was made by improving the network in recent years. Final Electricity consumption totaled 5,669 GWh in 2006[12]. The figure below shows electricity consumption by sector.

Until recently, Georgia's electricity sector suffered from a surplus of hydraulic energy compared to system demand during the months of May–July. In this period, the water discharge in rivers strongly increases, and electricity usage considerably decreases. Specialists estimate the amount of excessive energy at 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. 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 generation from new prospective small or big HPPs.

This situation changed in 2007, when the newly created market maker ESCO managed to develop an export potential by arranging seasonal energy swaps with neighboring countries. Today, almost all surplus hydroelectricity can be sold which will positively influence the development of small hydro power and other grid-connected RE solutions in the future.

11 ECON, AS OF 2007
12 IEA, AS OF 2006

Natural Resources

Water resources

Water resources take the first place among the natural riches of Georgia. The total length of Georgia's rivers is estimated 60,000 km. Around 300 Rivers are significant in terms of energy production. Their technical hydroelectric potential is estimated at 90,000 GWh per year. The total renewable water resources of Georgia are estimated 63.3 km³.[13]

Oil and Gas

Georgia does not have significant oil and gas resources. The country's eleven oilfields with confirmed reserves of 28 million tons have yet to be explored. 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. Oil extraction and exploration works are conducted by both Georgian and foreign companies. In 2008, the crude oil production in Georgia totaled 52.800 tons, while the natural gas production totaled 17.000 toe[14].

Coal

There are no significant coal deposits in Georgia.

Transmission and Distribution System

The transmission network in Georgia has been one of the major weaknesses of the electricity system. Much of the capacity is already utilized, and the construction of the larger planned HPPs (Khodoni and Namakhvani) will require significant investments in new transmission capacity, especially for eventual exports to the Turkish market.

The backbone of the transmission grid is the 500 kV line connecting the main generation assets in Georgia with the Russian transmission network. The line is partly owned by RAO UES (50 %) and partly by the Georgian state (50 %). The Government also owns the transmission company of Georgian State Electro System (GSE), which is responsible for operating and maintaining the 35–300 kV grid and ensuring that new generation facilities are connected to the grid.

Historically, the losses in the transmission system in Georgia were very high, peaking in 2002 at almost 16 % of total electricity transferred. The reasons for these exceptionally high losses were mismanagement of the system, theft and lack of investment in upgrading the network. Meanwhile, losses have been reduced to less than 2 %, comparable with transmission losses in the well-maintained European grid.

There are five distribution companies in Georgia. Two have approximately 1 million customers each: Telasi (responsible for Tbilisi and 75 % owned by RAO UES) and United Energy Distribution Company (UEDC; responsible for distribution outside Tbilisi and fully owned by Energo Pro). Adjara and Kakheti are smaller distribution companies, both in the process of being integrated into UEDC after being purchased by Energo Pro. There is also a state-owned distribution company in Abkhazia, outside the control of the central Government in Tbilisi.

The newly created market maker, Energy System Commercial Operator (ESCO), is responsible for ensuring grid stability.

Prices

The January 2006 explosions on a gas pipeline between Russia and Georgia severely strained Russian-Georgian relations. In view of these tensions, Russia increased the natural gas price from 110 to 235 USD per 1,000 m3. Naturally, such an increase in prices would be reflected in consumer tariffs on electricity and gas. The average tariff for electricity is now in the range of 8 US Cent per kWh. In order to create additional guarantees for social protection and for the promotion of rational consumption of electricity, rigid step tariffs were introduced: for the consumption of up to 100 kWh, for 101–300 kWh and for more than 301 kWh[15].

The average regulated generation tariff in Georgia is relatively low with approximately 2.8 US Cent/kWh. Generation tariffs, however, fluctuate widely between different power plants. The tariffs for power producers in Georgia are set by the independent regulator of GNERC, which is committed to facilitate private sector investments in the sector. Investors in new HPPs are allowed to negotiate the rate of return on equity with GNERC before committing to a project, which should ensure acceptable returns, especially when CDM credits are factored in. The returns - GNERC is operating with – are without CDM credits.

Power producers have two options when selling their electricity: (i) entering into a direct contract with a customer or (ii) selling the electricity to the ESCO for the price set by GNERC. After amendments to the Electricity Market Rules in June 2007, ESCO guarantees the purchase of all electricity from newly built HPPs. The expected average generation cost for new hydro in the first 7 years of operation would be in the range of 6–8 US Cent/kWh, falling to 2–3 US Cent/kWh after 7 years[16].

Import and Export of Energy

Georgia imports almost all natural gas and oil products consumed in the country. However, it provides an important part of the land corridor along which major volumes of Caspian oil and gas are transported in transit to European and Mediterranean markets.

Georgia is a net exporter of electricity during summer while it imports electricity in winter. Imports totaled 756 GWh in 2006 as opposed to exports of 140 GWh in the same year[17]. With new HPPs in the planning stage it is expected that Georgia will become a net exporter of electricity by 2011. The market maker ESCO is responsible for the contracting related to electricity export and import.

Growth Predictions for the Energy Sector

The electricity generation demand is forecasted to grow with a 0.6 GDP elasticity ratio. Although the times of double digit GDP growth rates may be over for the years to come, there is no doubt that Georgia will find back on a growth path requiring additional generation capacity.

13 INDEXMUNDI (WWW.INDEXMUNDI.COM/GEORGIA/) AS OF 2008
14 GNIA, AS OF 2009
15 TRANSPARENCY INTERNATIONAL, AS OF 2008
16 ECON, AS OF 2007
17 IEA, AS OF 2006

The easiest way to enhance generation capacity is the rehabilitation and upgrading of existing sites. While Georgia has approximately 1,600 MW of hydro power 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 2,200–2,500 GWh of additional hydroelectricity online. This is the least costly way to expand generation capacity and is given priority by the Government. Many of these rehabilitations are already underway.

Besides that, the Government is promoting 7 new HPPs with a total generating capacity of approximately 6,000 GWh. Thus, in a few years there will be more than 8,000 GWh of new electricity available with a considerable part of it being excess electricity. There are two possible markets for electricity excess: (i) export markets and (ii) the promotion of Georgia as a location for electricity intensive industry[18].

4 POLICY FRAMEWORK FOR RENEWABLE ENERGIES

4.1 NATIONAL STRATEGIES AND PROGRAMS TO SUPPORT RENEWABLE ENERGIES TO SUPPORT RENEWABLE ENERGIES

As mentioned in the last chapter, the development of alternative energy sources (wind, solar and geothermal energy) is an objective of Georgia's State Energy Policy. This objective is also mentioned in the existing Law on Electricity and Gas[19]. However, no specific targets were defined for the share of energy to be generated by renewable sources. There were discussions about drafting a more specific RE law[20] in 2008. After the war from August 2008, however, these initiatives seem to have lost momentum.

The Government of Georgia has approved of a Renewable Energy 2008 State Program[21], which regulates and supports the construction of new RE projects in Georgia with a capacity up to 100 MW. The program is designed to attract foreign investments. The program is largely focusing on the development of small and medium Hydro Power Plants. The Tax Code enacted in 2005 does not provide any tax benefits for the production, use, import and implementation of equipment for the production of RE or power saving equipment.

There are a number of relevant international documents for the development of RE sources in Georgia. These include the Energy Charter Treaty[22], the Framework Convention on Climate Change and the Kyoto Protocol[23], the Energy Community Treaty[24], the European Neighborhood Policy[25] and others.

18 ECON, AS OF 2007
19 SEE GEORGIAN LAW ON ELECTRICITY AND NATURAL GAS (WWW.MINENERGY.GOV.GE/INDEX.PHP?M=205&LANG=ENG), AS OF 1997
20 WELLER, J./PIERCE ATWOOD LLP, AS OF 2008
21 MINISTRY OF ENERGY OF GEORGIA , AS OF 2008
22 ENERGY CHARTER SECRETARIAT, AS OF 2009
23 UN FRAMEWORK CONVENTION ON CLIMATE CHANGE – UNFCCC (HTTP://UNFCCC.INT/)
24 EUROPEAN UNION, AS OF 2006
25 EUROPEAN COMMISSION – EC, AS OF 2004

For Georgia, who has joined or requested membership to organizations that execute and/or bide by these regulating documents, the implementation of the recommendations and opportunities given by these documents is both beneficial and in some cases mandatory. In addition to providing technical assistance and guidance, several of these international energy agreements offer financial incentives and project financing opportunities for Georgia to develop RE projects and undertake energy sector reforms to harmonize its energy legislation with international standards.

International institutions are playing the leading role in development of RE in Georgia up to now. USAID, the United Nations Development Program (UNDP), the German development Bank of KfW, the Global Environment Facility (GEF), EBRD, the Norwegian Government and others are supporting a great number of activities including pilot projects, policy analysis, trainings and more.

SHORT BUSINESS INFO

Although the development of RE is an objective of Georgia's Energy Policy, there are no specific targets for the share of energy to be produced by RE.

4.2 REGULATIONS, INCENTIVES AND LEGISLATIVE FRAMEWORK CONDITIONS

On 7 June 2007, the Parliament of Georgia adopted the Resolution on Main Directions of Georgia's State Energy Policy, which defines the concept of the state energy policy as well as the ways and means of its implementation. The Resolution is based on the Law of Georgia on Electricity and Gas (adopted in 1997). The main objectives of the policy are:

- Full satisfaction of the industrial and communal demand for electricity by maximum utilization of local hydro power resources in the electricity sector
- Development of alternative energy sources (wind, solar and geothermal energy)
- Diversification of electricity and gas supply sources
- Inclusion of the country's energy sector into the regional infrastructure through participation in region-wide export-import operations. For this purpose, existing electricity transmission lines and gas pipelines have to be repaired or new ones must be constructed.
- Development of an energy corridor connecting Europe to Asia, which has to encompass West-East (from Caspian to the Black Sea to the European Union) as well as North-South directions

These objectives shall be achieved through the development of a commercially profitable economic model attractive to private investors by means of:

- Simplifying licensing and other bureaucratic procedures and creating a favorable business environment for local and foreign companies that are interested in investing in the sector
- Gradual liberalization and deregulation of the electricity market, which ultimately will be reflected in direct

contracting between wholesale electricity producers and wholesale buyers
- Introduction of new market rules insuring the separation of rights and obligations and responsibilities among actors in the sector[26]

The Ministry of Energy has achieved remarkable improvements with the above policy. Improvements over the last few years include a more regular supply of electricity for most parts of the country, the rehabilitation of Enguri HPP and other HPPs, the rapid reduction in transmission losses and a much improved collection rate for the distribution companies. The development of RE in Georgia is regulated by the following legal and regulatory documents:

- Law on Electricity and Natural Gas
- Main Directions of State Policy in Georgian Energy Sector
- Renewable Energy 2008 State Program
- Law on Use of Natural Resources
- Law on Forest Use
- Tax Code
- Customs Code
- Electricity Market Rules
- Gas Market Rules
- Legal Acts of the Ministry of Energy
- Legal Acts of GNERC
- Presidential Decree on Development of Non-traditional Energy Sources in Georgia

It should be noted that the above mentioned legal acts and regulations are not enough to create a sufficiently favorable environment for the development of all RE sources, which creates barriers in attracting investments in this field. Only electricity generation is addressed to some extent by Georgia's legislation.

There has been a series of changes to the Law on Electricity and Natural Gas as well as in Electricity Market Rules that are directed to creating a favorable environment for small grid-connected plants. Under recent amendments, for example, small hydroplants can sell all of their output to ESCO at average ESCO tariff.

In general, electricity generation, transmission, dispatch and distribution without a valid license are forbidden according to the Law on Electricity and Natural Gas. Exemptions are made for individuals generating electricity for their own consumption and whose generating facility is not connected to the transmission or distribution grids. Moreover, small power plants declared as power plants up to 10 MW do not require a generation license[27]. The Georgian National Energy Regulatory Commission (GNERC) has the authority to grant licenses and also regulate activities of licensees, importers, exporters, commercial system operator and suppliers within the electricity and natural gas sectors of Georgia. Licensing procedures and rules are regulated by four main documents. These are:

- Georgian Law on Electricity and Natural Gas
- Georgian Law on Licenses and Permits
- GNERC Resolution #3 on Licensing Rules in Electricity and Natural Gas Sectors from 23 August 1999
- GNERC Resolution #12 On Administrative Procedures of the Georgian National Energy Regulatory Commission from 7 August 2003

Clean Development Mechanism (CDM)

Georgia ratified the UN climate change agreements in 1994, established a National Climate Protection Program in 1996 and acceded the Kyoto Protocol in 1999. Georgia meets the eligibility requirements to sell emission reductions from projects in the international carbon market under the Clean Development Mechanism (CDM). In 2005, the Ministry of Environmental Protection and Natural Resources has been appointed as the Designated National Authority for executing the CDM. In the same year, a Coordination Board for the implementation of the CDM was created[28].

Georgia has no obligatory quota for reducing greenhouse gases under the Kyoto Protocol. In fact, after the disintegration of the Soviet Union (and the resulting collapse of the region's energy intensive industries), Georgia's greenhouse gas emissions were substantially reduced from 46 million tons of CO2 in 1990 to 14 million tons in 1997[29].

Georgia has considerable potential to develop a large number of CDM projects, especially in the RE and energy efficiency sectors. Georgia will have the possibility to generate tens of millions of dollars in carbon revenue over the next few years by leveraging investments in the energy, waste, forestry and agricultural sectors. Carbon reduction revenue is potentially available for projects that:

- Increase the efficiency of power generation including the rehabilitation and modernization of existing Hydro Power Plants
- Make use of RE technologies
- Minimize emissions associated with gas transportation and distribution
- Decrease losses in power transmission and distribution
- Increase energy efficiency in the residential sector

On 31 August 2007, the first Emission Reductions Purchase Agreement (ERPA) was signed with participation from the International Bank for Reconstruction and Development, the Community Development Carbon Fund and the Energy Efficiency Centre of Georgia. As of December 2009, there were four CDM projects validated with a total average annual emission reduction of 273,177 tons CO_2[30].

26 TRANSPARENCY INTERNATIONAL, AS OF 2007

27 THE LAW ONLY MENTIONS THAT SPP DO NOT REQUIRE A GENERATION LICENSE OR A LICENSE IN GENERAL. IT IS NOT FURTHER SPECIFIED WHETHER FEEDING ELECTRICITY INTO A GRID IS SUBJECT TO LICENSING OR NOT FOR SPPS.

28 WORLD EXPERIENCE FOR GEORGIA, AS OF 2008

29 TRANSPARENCY INTERNATIONAL, AS OF 2008

30 IGES, CDM PROJECT DATABASE, AS OF 2009

5 POTENTIAL FOR RENEWABLE ENERGIES AND PRESENT USE

Georgia has vast resources of almost all types of RE – solar, wind, geothermal, hydro and biomass. The achievable annual potential of all RE sources is estimated at 15,000 GWh. This is enough energy to meet over a third of Georgia's annual primary energy needs. Apart from large hydro power, only a very small part of this potential is already developed.

5.1 BIOENERGIES

Georgia has a considerable potential of biomass resources. It is conditioned by its geographical position and a favorable climate for growing forests and agricultural products. In some regions, it is even possible to have two yields per year.

Unfortunately, the current use of biomass in Georgia is rather inefficient and unsustainable. Firewood consumption is estimated at 8 million m³ per year, which covers almost 50 % of the population's energy demand. This consumption is far above sustainable forest development level, which should not exceed 1 million m³ per year. Therefore, the RE potential of forest and forest residues must be set to 1 million m³ of bark energy, amounting to approximately 2,700 GWh.

The total energy potential of corn cultures' residues amounts to 1,300 GWh/year, i. e. 112,000 toe. The total energy potential of residues from farming and poultry breeding is 6,900 GWh/year.

Residential waste is another type of biomass. 900,000 tons of waste per year accumulate in the Tbilisi and Kutaisi dumps according to municipal data. An estimated 90 million m³ biogas can be obtained by re-treating these residues; this would equal 64 million m³ of natural gas.

Approximately 160 million m³ of biogas can be annually obtained from the sewage water cleaning station of Tbilisi (with a population of 1.2 million). The resulting biogas energy is estimated to be 1,000 GWh/year equaling 100 million m³ of natural gas.

Therefore, the technical potential of the major biomass sources in Georgia amounts to 12,500 GWh. The achievable potential is estimated at 3,000-4,000 GWh. This estimate does not incorporate the potential of farming energy crops. For comparison, one can note that the total annual electricity generation in Georgia is in the range of 8,000 GWh.[31]

Apart from firewood, which is used for cooking and heating, and a few donor supported biogas initiatives, the biofuel potential remains untapped.

5.2 SOLAR ENERGY

The climatic conditions of Georgia are favorable for utilizing solar energy. Most regions of the country have 250–280 days of sunshine per year. Direct and global radiation reaches daily values of 3.5 to 5.3 kW/m² and an annual average of 1,550 kW/m². The potential of solar energy, however, is strongly seasonal and varies by a factor of more than four from mid-summer to mid-winter. The achievable potential of solar energy in Georgia is estimated at 60–120 GWh annually.

The conversion coefficient of PV modules is approximately 12–15 % and about 60–95 % for water heating collectors. Based on these estimates, one can calculate that on average about 190 kWh of electric energy can be annually obtained from one m² surface of solar PV panels and 1,200 kWh of thermal energy (hot water) from solar water heating panels.

The use of solar energy in Georgia still low, but during the last decade, solar water heaters became increasingly popular. The cheapest systems provide about 110 l/day of hot water at a temperature of 60 °C. The 180 l/day systems cost approximately 1,800–2,000 USD. For water heating systems, the investment payback period is about 3–9 years; these are most profitable in applications where hot water expense is high and the main load is in summer (swimming pools, hotels).

Although more than 70 % of this potential is realizable in the months of April through September, solar power can contribute to reducing energy dependence by almost completely replacing the need for gas currently used for hot water supply throughout the year.

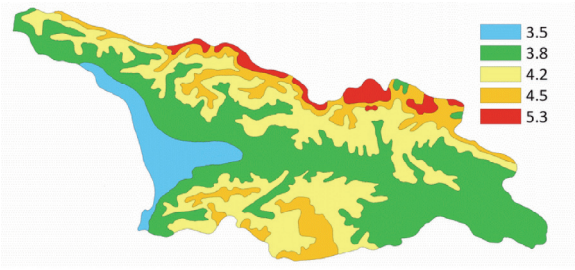
There are a number of specialized private companies doing the installation of solar systems, namely SpecHelioTbomontaji, Ekoeni, Aido, Solar House etc. Some of them manufacture cheap systems locally. Most of the systems, however, are imported. Currently there are no legal acts or tax benefits supporting the development of solar energy use in Georgia.

5.3 WIND POWER

The potential of wind energy has been analyzed by the Wind Energy Research Center of Karenergo. The analysis was based on existing meteorological data (30 years of synoptic observations) and their own perennial measurements and gives only the intensiveness of the wind and dynamics of seasons on the land area of Georgia. The findings were compiled in the Wind Energy Atlas of Georgia.[32] The figure below shows the annual average wind speeds in Georgia. The analysis did not address important parameters for the planning of wind energy projects such as security, environmental protection or civil expediency. Based on the data in the Wind Energy Atlas, the technical potential of wind energy was assessed. The calculations have shown that about 2,000 MW of capacity and 5,000 GWh energy per year can be obtained.

FIGURE 5

Distribution of Daily Solar Irradiation in kW/m²/day



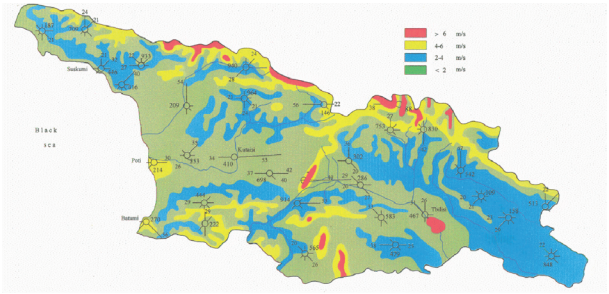
Source: Sustainable Energy Center – "Sun House", Tbilisi, Georgia, as of 2009

31 WORLD EXPERIENCE FOR GEORGIA, AS OF 2008

32 KARENERGO, AS OF 2004

FIGURE 6

Average Wind Velocities and Directions per Year



Source: Karenergo, as of 2004

Karenergo proposed a number of promising locations for medium- and large-scale wind farms in the range of 30–630 MW. Many of these potential wind farm sites show a favorable seasonal output pattern with maximum output in winter. This conforms best with seasonal domestic energy demand in Georgia, indicating that wind energy has good potential to offset external energy dependence in winter. There are other local places with high wind potential that are not reflected in the Karenergo report.

Currently, there is no wind energy capacity used in Georgia except for some small units (up to 6 kW each). In 2007, an MOU was signed between the Government of Georgia and the Georgian-American company of Karidani concerning the construction of a 24 MW wind plant in the suburbs of Tbilisi.

Feasibility studies of wind energy utilization in the Kutaisi and Mounteen-Sabueti regions were carried out by Japanese companies (Nichimen Corporation and Tomen Corporation) in 1999 and 2000. It was proved that the construction of wind power plants can be cost effective in these regions and will make a significant contribution to the country's overall energy balance.

Furthermore, the wind energy research center of Karenergo has developed several business plans for wind farm development in other locations in order to attract potential investors. Despite the positive conclusions made by foreign experts, the aforementioned projects have not been developed for a variety of reasons. The main reasons were:

- A wind power utilization tradition does not exist in Georgia; therefore, it was difficult to obtain state support
- A guarantee of the generated energy purchase does not exist
- The electricity tariff was deliberately low in that period

The last two points above have been addressed in the Renewable Energy 2008 State Program. Although implicitly focusing on hydro power, the Program can also be applied to the development of wind farms up to an installed capacity of 100 MW. Under that Program, investors are offered a guaranteed purchasing agreement with ESCO in which the tariff is determined based on negotiation with the investor and GNERC.

5.4 GEOTHERMAL ENERGY

In Georgia, thermal water has been used for hygienic and balneology purposes for centuries. Its utilization for energy purposes began in 1951. The forecasted reserve of thermal waters comprises 350 to 400 million m³/year corresponding up to 11,630 GWh of thermal energy[33]. There are more than 250 natural and artificial water channels with average temperatures from 30–110 °C. Their overall withdrawal comprises 160,000 m³/day (58 million m³/year). These water channels are grouped in 44 deposits.

More than 80 % of the geothermal deposits are in Western Georgia. In the Zugdidi-Tsaishi geothermal area, there are now 9 productive, 7 re-injection and 3 observation borehole wells which are considered to be exploitable. It is known that there are two independent horizons containing thermal water in the deposits from which it is possible to obtain up to 30,000 m³ of thermal water in case of re-injection per day.

The use of geothermal sources is already developed to a considerable extent. As the temperatures of geothermal sources are not very high, they are mostly used for heating and hot water supply. Poti, the main port city in Georgia, could be supplied with geothermal water through the Kvaloni and Menjisi water deposits. In Tbilisi, the output of geothermal water of 4,000 m³ per day is used to supply around 100 residential blocks. The prices are not regulated and determined by the supplier. In other locations the geothermal water is used by the neighboring population in an unorganized way.

There are projects in the planning stage to better utilize and expand the use of thermal waters from the existing wells in Zugidi and Tbilisi. The feasibility of these and other projects requires further study in order to determine economically viable options and volumes of geothermal energy utilization.

In order to promote the use of geothermal energy in other locations it is necessary to implement a number of policy measures including:

- Transparent rules for obtaining licenses for geothermal wells
- Clear regulations on land use and property rights for wells and pipe routes
- Clear definitions on price regulations and subsidies for different groups of consumers

33 N. TSERTSVADZE, G. BUACHIDZE, O.VARDIGORELI, AS OF 1998

TABLE 2
Existing Geothermal Installations in 2005

GEOTHERMAL	INSTALLE CAPACITY	DIRECT IN
District	37	29
Greenhouse	165	1,17
Fish pond	25	13
Acricultrural	4	3
Industrial	7	5
Bathing	9	6
total	249	1,75

Source: International Geothermal Association, as of 2009

5.5 HYDRO POWER

In Georgia there are 360 rivers with considerable energy potential. The total theoretical hydroenergy potential is in the range of 150,000 GWh per year. The technically available potential has been estimated at 81–90,000 GWh per year including the total hydroenergy potential of small Hydro Power Plants (SHPP) of 40,000 GWh/year and their technical potential estimated at 19,500 GWh per year. Although hydro power contributes more than 70 % to the country's electricity production, only about 15 % of the technical potential has been developed so far.

The development of a small hydroelectric generation industry in Georgia started in the late 1920s. Over 300 SHPPs, most of them run-of-river schemes, were constructed until 1970 with capacities ranging from 20 kW to 10 MW. In the 1960s, Georgia was integrated in the central grid delivering power to all Soviet Republics whereupon small and less efficient SHPPs were displaced by large-scale Hydro Power Plants and thermal power plants. Only those SHPPs operating in remote locations with no grid access were kept operating. The others were taken out of operation and abandoned. At present, only 15 % of all SHPPs of the Soviet era are still operating.

Following Georgia's independence in 1991, the privatization process of state-owned assets began. Many surviving SHPPs were transferred from state ownership to the private sector. The USAID sponsored Rural Energy Program is supporting the rehabilitation of existing SHPP in Georgia[34].

Besides tendering a number of new large HPPs[35], the Ministry of Energy pursues another initiative for the development of new small and medium Hydro Power Plants directed at foreign investors. On its official website, the Ministry of Energy has published a list of 91 potential small hydro power sites with a prospective capacity ranging from 0.6 MW to 99 MW. Most of these HPPs are expected to be run-of-the-river facilities. Investors interested in investing in Greenfield HPPs from the list have the possibility to download additional information for each location ranging from situation maps, topographical maps, technical data, economic calculations etc[36].

34 USAID/WINROCK INTERNATIONAL, AS OF 2006
35 ANNEX 3 PROVIDES A LIST OF THE NEW LARGE HPPS.
36 MINISTRY OF ENERGY OF GEORGIA, AS OF 2009
37 MINISTRY OF ENERGY OF GEORGIA, STATE PROGRAM RENEWABLE ENERGY, AS OF 2008
38 SEE WEBSITE OF TRANSPARENCY INTERNATIONAL AT WWW.TRANSPARENCY.ORG
39 HERITAGE FOUNDATION, AS OF 2009
40 WORLD BANK, AS OF 2009

Investors can benefit from the incentives provided through the Renewable Energy 2008 State Program[37]. Under the program, new Hydro Power Plants up to 100 MW are offered a guaranteed purchasing agreement with ESCO for the first 10 years of operation in which the tariff can be negotiated between the investor and GNERC. Alternatively, SHPP operators, i. e. HPPs with a capacity up to 10 MW, have the opportunity to sell electricity directly to consumers at tariffs negotiated bilaterally or even to export without the need for an export license. In any case, however, operators have to agree to supply only domestic customers during the three winter months in a year.

The difficulties of SHPPs are caused by several factors listed below:

- SHPPs (especially newly built ones) are not competitive with large and medium capacity power plants in the cost of generation.
- SHPPs have profound seasonality and dependence on river run-off conditions.
- They have an unfavorable annual generation profile, with maximum production in summer when power generation exceeds the consumption demand.
- SHPPs have undefined power-wheeling tariffs.
- Transmission and distribution network connection fees are not defined.

SHORT BUSINESS INFO

The annual potential of RE sources is estimated to be approx. 15,000 GWh, enough to meet over a third of Georgia's annual primary energy needs.

6 MARKET RISKS AND BARRIERS FOR MARKET ENTRY

6.1 GENERAL SITUATION

Corruption

Georgia has improved its performance in fighting corruption, but corruption is still perceived as significant. From 2005 to 2009 Georgia has advanced from rank 130 to 66 out of 180 countries in Transparency International's Corruption Perceptions Index[38]. The World Bank's Anti-Corruption in Transition 3 Report places Georgia among the countries showing the most dramatic improvement in the struggle against corruption. The government has fired thousands of civil servants and police, and several high-level officials have been prosecuted for corruption-related offences[39].

Availability of Local Know-how

Like all former Soviet republics, Georgia has a good educational system producing well-qualified specialists in a broad spectrum of subjects. More than 60 % of the workforce have completed a secondary education and 30 % have completed a tertiary education[40].

Local know-how in the field of RE is available at numerous local organizations. There is also a multitude of international organizations pursuing projects in various fields of RE development in Georgia.

Local Acceptance

A considerable number of pilot projects in the field of RE were implemented in recent years. There were no reports that certain technologies were not accepted for social reasons. If technologies failed, the reasons were mostly related to technical and maintenance issues.

6.2 BUSINESS DEVELOPMENT

Since the Rose Revolution in 2004, Georgia has made enormous progress toward improving the business climate. In 2006, the World Bank ranked Georgia as the number one economic reformer in the world because within one year it has improved from rank 112 to 18 in terms of ease of doing business. By 2010, Georgia will have advanced even further and will rank at 11 ahead of industrialized countries as Japan (15), Sweden (18), Switzerland (21) and Germany (25)[41].

The overall freedom to conduct a business is relatively well-protected under Georgia's regulatory environment. Starting a business takes an average of three days, as compared to the world average of 38 days. Obtaining a business license requires less than the world average of 18 procedures and 225 days. Closing a business is relatively simple.

Foreign and domestic investments receive equal treatment. Exceptions may be made for investments in certain sectors. Foreign firms may participate freely in privatizations, though transparency has been an issue. Residents and non-residents may hold foreign exchange accounts. There are limits and tests for international payments and current transfers. Capital transactions are not restricted, but must be registered. Foreign individuals and companies may buy non-agricultural land. Only domestic entities may buy agricultural land, but agricultural land can be purchased by forming a Georgian corporation that may be up to 100 % foreign-owned.

There are a number of barriers (listed below) that need to be addressed by the Georgian Government in order to allow a more rapid development of RE sources:

- The market for renewable electricity needs to be developed. Although Georgia does not produce enough energy to satisfy domestic demand, there is an excess of electricity from hydroplants in summer; thus there is no internal need for additional electricity from wind farms or SHPPs on the grid during this season.
- A sound and reliable legal framework for RE development needs to be formulated. Otherwise the frequency and quality of legislation changes may have a discouraging effect on investment decisions.
- Information on the benefit developers and local communities can derive from RE development and utilization should be made widely available.
- The fees and rules for grid connection, power wheeling tariffs, long term tariff methodology and other regulatory documents need to be developed.

Although the changes to the law on electricity and natural gas provide incentives to new RE plants, there is still a need for further conceptual and technical improvements to make these provisions fully effective and beneficial.

The few existing provisions in legislation in support of RE development need to be expanded and supplemented by adequate implementation mechanisms such as special legislation, supplementary regulatory documents, tax incentives, implementation agencies and information campaigns. The initiatives for RE development should be coordinated under a state strategy, plan for energy sector development and be based on sound market principles and transparency.

6.3 INTELLECTUAL PROPERTY RIGHTS

Judicial corruption is still a problem despite substantial improvement in efficiency and fairness in the courts. Both foreigners and Georgians continue to doubt the judicial system's ability to protect private property and contracts. The enforcement of laws protecting intellectual property rights is weak.

6.4 TAXATION

Georgia has a moderate Income Tax and a low Corporate Tax. The top Income Tax rate is a flat 25 %, and the corporate tax rate is 15 % as compared to 20 % as of January 2008. Other taxes include a Value Added Tax (VAT), a Tax on Interest and a Tax on Dividends. In the most recent year, the overall tax revenue was 21.7 percent of the GDP.

7 RENEWABLE ENERGY BUSINESS INFORMATION AND CONTACTS

Ministry of Energy of Georgia

Baratashvili 2, 0105 Tbilisi
Phone: (+995 32) 35 78 00
Fax: (+995 32) 35 78 00/28
E-mail: mail@minenergy.gov.ge
Department of International Relations and Investment Projects
Phone: (+995 32) 35-78-25
Website: www.minenergy.gov.ge

The Ministry of Energy provides information about possible investment projects for foreign investors and related legal requirements and supporting programs.

GNERC – Georgian National Energy Regulatory Commission

Al. Kazbegi Ave No.45, 0177 Tbilisi
Phone: (+995 32) 31 10 43
Fax: (+995 32) 24 10 40.
E-mail: mail@gnerc.org
Internet: www.gnerc.org

41 WORLD BANK GROUP/IFC, AS OF 2009

GNERC has the authority to set tariffs grant licenses for electricity generation, transmission and distribution.

ESCO – Electricity System Commercial Operator
Al. Kazbegi Ave No.45, 0177 Tbilisi
Phone: (+995 32) 31 14 70/31 14 71
Fax: (+995 32) 31-17-49
E-mail: office@esco.ge
Internet: www.esco.ge

ESCO provides power purchase agreements (PPA) with operators of power plants and purchasing guarantees for investors in new power plants smaller than 100 MW.

Georgian Chamber of Commerce and Industry
Berdznis Str. 29, Tbilisi
Phone: (+995 32) 72 07 10
Fax: (+995 32) 72 31 90
E.Mail: info@gcci.ge
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ABCO Georgia – Business Consulting
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Fax: +(995 32) 933539
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Internet: www.abco.caucasus.net

RENEWABLE ENERGY: RELEVANT INSTITUTIONS

Energy Efficiency Centre (EEC)
19, D.Gamrekeli Str. VI floor, 0160 Tbilisi
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E-Mail: eecgeo@eecgeo.org
Internet: www.eecgeo.org/

Caucasus Environmental NGO Network (CENN)
27, Betlemi Str., 0105 Tbilisi
Phone: (+995 32) 75 19 03; 75 19 04; 75 19 06
Fax: (+995 32) 75 19 05
E-Mail: info@cenn.org
Internet: www.cenn.org

Karenergo Scientific Wind Energy Center
Tsereteli Ave. 63-2-57, Tbilisi
Phone: (+995 32) 35 15 51, 899 50 93 93;
Fax: (+995 32) 35 15 51
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Geothermia Ltd. – Geothermal Consulting
Phaliashvili Str. 87/3, Tbilisi
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Institute of Water Management and Engineering Ecology
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Solar Water Heating System Providers

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Phone/Fax: (+995 32) 525 969
E.Mail: sun@sun.org.ge
Internet: www.sun.org.ge

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AYDIO
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8 BIBLIOGRAPHY

- Bodewig, K. (2007): Economic and Political Transition in Georgia, NATO 2007 Annual Session Report 170 ESCEW 07 E rev 2 (www.nato-pa.int/default.Asp?SHORTCUT=1171)
- G. Tsertsvadze, N. Buachidze, O. Vardigoreli (1998): Thermal Waters of Georgia, Tbilisi
- Central Intelligence Agency – CIA (2009): The World Fact Book – Uzbekistan
- ECON (2007): The Electricity Sector in Georgia – A Risk Assessment
- Energy Charter Secretariat (2009): 1994 Energy Charter Treaty (www.encharter.org/index.php?id=28&L=0.)
- European Commission (2004): European Neighbourhood Policy (http://ec.europa.eu/world/enp/documents_en.htm)
- European Union (2006): The Energy Community Treaty. Official Journal of the European Union L 198/32, 20.7.2006 (http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_198/l_19820060720en00180037.pdf)
- Heritage Foundation (2009): Index of Economic Freedom – Georgia
- Georgian National Investment Agency – GNIA (2009): Invest in Georgia (www.investingeorgia.org)
- Institute for Global Environmental Strategies – IGES (2009): IGES CDM Project Database (www.iges.or.jp/en/cdm/report_cdm.html)
- IndexMundi (2008): Georgia (www.indexmundi.com/georgia)
- International Energy Agency – IEA (2006): Statistics by Countries
- International Monetary Fund – IMF (2009): Caucasus, Central Asia Feel Crisis Impact, but Set for Modest Upturn, IMF Survey online (www.imf.org)
- Karenergo (2004): Wind Energy Atlas of Georgia, Volume 1, Regional Estimations (http://minenergy.gov.ge/index.php?m=377)
- Ministry of Energy Georgia (2009): various documents and data on Georgia's energy sector and policy published on the Ministry's website (www.minenergy.gov.ge/?lang=eng)
- Ministry of Energy of Georgia (2009): Potential Hydro Power Sites in Georgia. Interactive Map (http://hpp.minenergy.gov.ge/)
- Ministry of Energy of Georgia (2008): State Program Renewable Energy 2008 (www.georgia.gov.ge/pdf/2009_03_27_22_25_33_1.pdf)
- The President of Georgia/E. Shevardnadze (1997): Georgian Law on Electricity and Natural Gas, (www.minenergy.gov.ge/index.php?m=205&lang=eng), Tbilisi
- Transparency International Georgia/BP Georgia (2008): The Energy Sector and Georgia's Functions as a Transit State after the Russian-Georgian Armed Conflict in August 2008 (www.transparency.ge)
- Transparency International Georgia/BP Georgia (2008): National Policy of Georgia on Developing Renewable Energy Sources (www.transparency.ge)
- Transparency International Georgia/BP Georgia (2008): Georgia's State Policy of Georgia on the Effective Utilization and Preservation of Energy (www.transparency.ge)
- Transparency International (2008): State Policies of Georgia in the Energy Sector: Tariffs on Electricity and Gas (www.transparency.ge)
- Transparency International Georgia/BP Georgia (2008d): Georgia's State Policy in the Electricity Sector, Brief History and Ongoing Processes (www.transparency.ge)
- Transparency International (2007): Georgia's Energy Policy, Overview of Main Directions, (www.transparency.ge)
- Transparency International (2007): Georgia's Power Sector: Energy Crossroads in Uncertain Transition (www.transparency.ge)
- USAID/ Winrock International (2006): Rural Energy Programme Georgia (http://winrock.ge)
- Weller, J., Pierce Atwood LLP (2008): Draft Renewable Energy Law for Georgia, (http://winrock.ge/files/inga_outline_of_re_law.ppt), Batumi
- World Bank (2008): World Development Indicators 2008 – Composition of GDP (www.worldbank.org)
- World Bank Group/ International Finance Corporation – IFC (2008/2009): Doing Business. Georgia (www.doingbusiness.org/ExploreEconoMIEs/?economyid=74)
- World Bank (2009): Education at a Glance: Georgia
- World Bank Group/ International Finance Corporation – IFC (2009): Doing Business. Economy Rankings (www.doingbusiness.org/economyrankings/)
- World Experience for Georgia (2008): Energy Efficient Potential in Georgia and Policy Options for Its Utilization (http://weg.ge)
- World Experience for Georgia (2008): Renewable Energy Potential in Georgia and the Policy Options for Its Utilization (http://weg.ge)

Websites

- Ministry of Energy of Georgia (www.minenergy.gov.ge/?lang=eng)
- International Geothermal Association (www.geothermal-energy.org)
- Transparency International (www.transparency.org)
- UN Framework Convention on Climate Change – UNFCCC (http://unfccc.int/)
- Sustainable Energy Center – "Sun House" – Tbilisi, Georgia (www.sun.org.ge/)

9 ANNEX

ANNEX 1

TABLE 3

Key Economic Indicators of Georgia 2002–2006

INDICATOR	2002	2003	2004	2005	2006
A) Income and Growth					
1. GNI per Capita (Atlas method, currend USD)	730	860	1,050	1,300	1,590
2. GDP Growth (%)	5.5	11.1	5.9	9.6	9.4
B) Saving and Investment (current and market prices, % of GDP)					
1. Gross Capital Formation	25.5	27.7	28.3	28.6	28.0
2. Gross National Saving	19.3	18.3	21.5	17.8	13.0
C) Money and Inflation (annual change)					
1. Consumer Price Index (average annual % change)	5.6	4.8	5.7	8.2	9.0
2. Reserve	9.9	13.9	44.3	19.7	19.2
3. Broad Money (M3)	18	22.7	42.6	26.4	39.3
D) Government (% of GDP)					
1. Revenue (including grants)	16.7	16.2	22.0	23.4	26.7
2. Expenditure and Onlending	17.8	17.5	19.7	25.0	28.7
3. Overall Fiscall Balance (cash basis)	(1.0)	(1.6)	(0.3)	(2.5)	(2.2)
E) Balance of Payments					
1. Merchandise Trade Balance (% of GDP)	(14.4)	(16.0)	(17.7)	(18.9)	(26.0)
2. Current Account Balance (% of GDP)	(6.2)	(9.4)	(6.7)	(10.8)	(14.9)
3. Merchandise Exports (USD) Growth, annual % change	9.0	37.4	37.9	32.8	11.5
4. Merchandise Imports (USD) Growth, annual % change	2.0	33.1	39.2	32.5	38.7
F) External Payments Indicators					
1. Official reserve assets (USD million) in months of current year's imports of goods	202	196	387	479	939
2. External public and publicly guaranteed debt	23.4	12.6	11.6	7.2	6.7
3. External public and publicity guaranteed debt	53.3	46.4			
G) Memorandum					
1. GDP (GEL million)	7,456	8,564	9,824	11,621	13,784
2. Exchange Rate (end of period)	2.09	2.075	1.825	1.725	1.7135
3. Population (million)	4.6	4.6	4.5	4.5	4.5

Source: ADB, as of 2006/2007

ANNEX 2

TABLE 4

Installed electricity capacity in Georgia 2006

TITEL	MW	OWNERSHIP
Ltd Engurhesi	1300	State owned
JSC Tbilsresi TPP*	950	State owned (phase out 2011)
AES Mtkvari TPP*	600	Private (RAO UES)
Ltd Vardnilhesi Cascade	340	State owned (located in Abhasia)
JSC Khrami-1+2	227	State owned (managed by RAO UES)
JSC Vartsikhehesi	184	State owned
Energy Invest CCGT TPP*	150	Private
LTD Zhinvalhesi	130	In the process of being privatised
JSC Lajanurhesi	112	Private (Energo Pro)
JSC Dzevrulahesi	80	Private (Energo Pro)
JSC Gumathesi	67	Private (Energo Pro)
Ltd Rionhesi	48	Private (Energo Pro)
JSC Shaorhesi	38	Private (Energo Pro)
Ltd Zahesi	37	Private
Ltd Khadori	24	Private
Ltd Chitakhevihesi	21	Private
JSC Tboelektrocentrali	18	Private
Ltd Ortachalahesi	18	State owned (under privatisation)
Ltd Atshesi	16	Private (Energo Pro)
Ltd Satskhenhesi	14	Private
JSC Tetrikhevihesi	14	State owned
Ltd Bzhuzhahesi	12	Private
Other HPPs	70	Mostly private
Total	4470	

Source: ECON, as of 2007

TABLE 5

Annual Average Electricity Generation by Source in Georgia 2000–2006

ELECTRICITY PRODUCERS	AVERAGE TWH 2000-6	IN % OF TOTAL
Enguri HPP	2,57	31,44 %
Imports	1,15	14,03 %
A-E-S Mtkvary TPP	0,72	8,80 %
Varcixe HPP	0,66	8,13 %
Varduil HPP	0,4	4,83 %
Tbilsresi TPP	0,34	4,14 %
Jinvali HPP	0,33	4,02 %
Rioni HPP	0,3	3,73 %
Xrami-2 HPP	0,2	2,46 %
Gumati HPP	0,19	2,35 %
Xrami-1 HPP	0,18	2,17 %
Lajanuri HPP	0,16	1,90 %
Dzevrul HPP	0,13	1,64 %
Shaori HPP	0,1	1,26 %
Energy Invest TPP	0,04	0,55 %
Other HPPs	0,7	8,55 %
Total average	8,18	100 %

Source: ECON, as of 2007

ANNEX 3

TABLE 6

Potential of Small and Medium Hydro Power Projects in Georgia

NAME OF HPP	RIVER	INSTALLED CAPACITY (MW)	AVERAGE ANNUAL OUTPUT (GWH)	INVESTMENT COST (MIN USD)
Abuli	Paravani	12.5	81.8	21.9
Alpana (Sairme)	Rioni	73	398.9	131.4
Arakali	Paravani	10.8	63.1	19.4
Avani	Avanis khevi	4.6	18.6	7.8
Bakhvi 1	Bakhvistsqali	19.4	87.3	34.9
Bakhvi 2	Bakhvistsqali	24	139	36
Bakhvi 3	Bakhvistsqali	7	44.3	12.6
Boriti	Dumala	6.4	33.8	10.9
Chelti 1	Chelti	4.8	25	8.2
Chelti 2	Chelti	4.8	25.09	8.2
Cheshura	Cheshura	7.5	32.4	11.3
Tskhimra	Tekhuri	29	159.6	52.5
Dariali	Tergi	99	542.4	178.2
Duruji	Duruji	1.7	10.7	2.96
Erjia	Tekhuri	24.4	136.6	41.5
Poka	Paravani	0.6	3.1	1
Stori	Stori	11.8	56.8	20
Stori 3	Stori	13.7	60.6	24.7
Gubazeuli 6	Gubazeuli	7.8	38.3	8.3
Iori	Iori	9.7	54	19.4
Jejora	Jejora	15.8	86.6	28.4
Jonouli	Jonouli	13	66.5	22.8
Jria	Qvirila	9.2	53.1	18.4
Lebarde 1	Lebarde	4.6	19.8	9.1
Lebarde 2	Tekhuri	4.2	17.5	8.3
Lekarde	Magana	20	107	36
Lesulukhe	Tsachkuru	5.7	24.9	11.4
Lecheka	Tekhuri	18.8	118.7	33.8
Magana	Magana	20.6	106.38	37.1
Marelisi	Bjholiskhevi	4.6	19.7	7.8
Medani	Chanistqali	4.4	22.9	8.8
Merisi	Akavreta	11.5	56.7	20.1
Nakra	Nakra	29.2	162.5	52.5
Nakra 1	Nakra	19.6	102.6	34.3
Nenskra 1	Nenskra	22.4	116.4	38.1
Nenskra 2	Nenskra	24.4	125.1	41.5
Nenskra 3	Nenskra	24.4	122.9	41.5
Nenskra 4	Nenskra	46.2	234.1	78.5
Nenskra 5	Nenskra	29.6	149.4	50.3
Ninotsminda	Paravani	8.2	47.1	14.8
Nobulevi	Tekhuri	18.5	107.4	33.3
Ksani 1	Ksani	4	14.9	6.8
Ksani 2	Ksani	2.8	10.5	4.8
Ksani 3	Ksani	3.2	11.1	5.4
Ksani 4	Ksani	3.6	12.2	6.1
Ksani 5	Ksani	8.5	30.8	14.4
Samquirstsqali 1	Samquirstsqali	12.4	70.6	21.7
Samquirstsqali 2	Samquirstsqali	22.2	123.1	39.9
Sakhvlari	Shavitsqali	5.3	23.2	9
Somitso	Jejora	24.3	144.3	43.7
Stori 1	Stori	14	69.4	25.2
Stori 2	Stori	11.4	50.5	20.5
Skhalta	Skhalta	5.3	29	10.6
Tazara	Shavitqali	6	26.2	10.2
Tergi	Tergi	14.6	65.3	26.3
Tekhuri 1	Tekuri	3.5	10	5.3
Tekhuri 2	Tekuri	3.5	10	5.3
Tekhuri 3	Tekuri	3.5	10	5.3
Tekhuri 4	Tekuri	3.5	10	5.3
Tekhuri 5	Tekuri	3.5	10	5.3
Tekhuri 6	Tekuri	3.5	10	5.3
Uraveli	Uraveli	5	19.2	8.5
Tsablari 1	Tsablaristsqali	7.7	43.2	11.6
Tsablari 2	Tsablaristsqali	12	65.7	20.4
Chala	Qvirila	9.1	45.6	18.3
Khala	Chakvistsquali	13	92.4	22.8
Khan-Tsablari 3	Khans Tsablaris	9.4	58	15
Khani 7	Khanistsqali	7.3	46.1	12.1
Kheledula 1	Kheledula	18.8	94.3	33.8
Kheledula 2	Kheledula	21.6	102.8	38.9
Kheledula 3	Kheledula	44.3	229.4	79.7
Khobi	Khobistsqali	50	246.9	90
Khobi	Khobistsqali	25	132.8	45
Khobi	Khobistsqali	11.1	59.4	20
Khumpreri	Khumpreri	16.4	66.5	28.7
Khunevi	Dzirula	11.3	61.6	19.8
Qvirila 3	Qvirilstsqali	5.2	20.5	8.8
Zestaponi 1	Qvirila	10.6	43.7	21.2
Zestaponi 2	Qvirila	10.6	43.7	25.4
Zestaponi 3	Qvirila	15.9	59.2	39.8
Zestaponi 4	Qvirila	15.9	59.2	39.8
Bakhvi 4	Bakhvistsqali	1.2	6.9	2
Bakhvi 5	Bakhvistsqali	2	10.9	3.4
Dzegvi	Mtkvari	1.7	82.4	26.7
Truso	Tergi	8.7	40.9	14.8
Kobi	Tergi	11	45.4	18.7
Chkheri	Chkheri	14.6	64.6	26.3
Amali	Amali	14	66.8	23.8
Khdistqali	Khdistsqali	9.3	41.1	15.8
Juta	Juta	8.2	40.8	14
Tsodo	Juta	72	383.7	129.6

Source: Ministry of Energy of Georgia, viewed in 2009 (The related database is accessible via the website of the Ministry of Energy of Georgia (http://hpp.minenergy.gov.ge/))

TABLE 7

Potential of Large Hydro Power Projects in Georgia

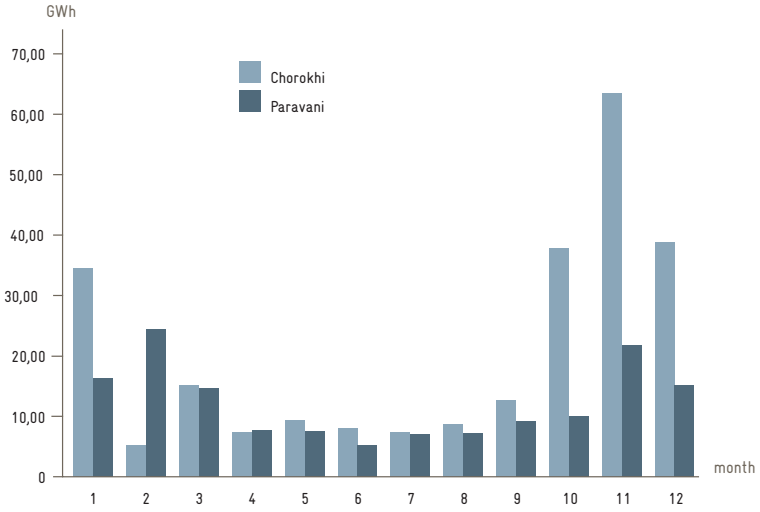
HPP PROJECT	RIVER NAME	PROJECTED INST. CAPACITY (MW)
1 Khudoni	Enguri	700
2 Namakhvani-Namakhvani	Rioni	250
3 Namakhvani-Zhoneti	Rioni	100
4 Namakhvani-Tvishi	Rioni	100
5 Oni Cascade	Rioni	276

Source: Ministry of Energy of Georgia, viewed in 2009

ANNEX 4

FIGURE 7

Seasonal Output of Wind Power Stations



Source: Ministry of Energy of Georgia, viewed in 2009

TABLE 8

Most Promising Sites for Wind Power Stations

LOCATION	CAPACITY (MW)	ANNUAL ENERGY (BILLION KWH)
Poti	90	0,21
Chorokhi	90	0,24
Kutaisi	150	0,34
Tskhratskaro	100	0,26
Gori-Kaspi	200	0,48
Paravani	120	0,29
Rustavi	60	0,15
Djvari	30	0,075
Goderdzi	60	0,17
Likhi	630	2
Mukhrani	90	0,2
Tbilsi	150	0,35

Source: USAID/Ministry of Energy of Georgia, viewed in 2009