

Draft National Sustainable Energy Action Plan of Georgia

Contents

List of abbreviations.....	3
1. Executive Summary	5
2. Introduction	9
2.1. National Sustainable Energy Action Plan (NSEAP) Objectives	9
2.2. Methodology Used in Preparing the Sustainable Energy Action Plan	10
3. Georgia’s Development Policy and Energy Sector Overview	11
3.1. Georgia 2020: Social-Economic Development Strategy of Georgia	13
3.2. Energy Sector Overview	15
3.2.1. Electricity Sector.....	16
3.2.2. Natural Gas	22
c) Natural Gas Market Stability	25
3.2.3. Oil.....	26
3.2.4. Coal.....	27
4. Renewable Energy Potential & Its Utilization	28
5. Legal Framework on Energy	31
6. Global Agenda for Sustainable Development and Georgian Path from 2015	41
7. Overview of National Energy Efficiency Targets & Energy Efficiency Policy Measures.....	51
7.1 Horizontal measures.....	57
7.2. Energy Efficiency Measures in Buildings	61
7.3. Energy Efficiency Measures in Public Bodies	62
7.4. Policy Measures Addressing Energy Efficiency in Industry	65
7.5. Energy Efficiency Measures in Transport	66
7.6. Energy transformation, transmission, distribution, and demand response.....	69
8. Overview of National Renewable Energy Targets & Renewable Energy Policy Measures	71
9.1. National Overall Target for the Share of Energy from Renewable Sources	71
9.2. Renewable Energy Policy Measures.....	71
9. National Sustainable Energy Action Plan Summary (2018-2030).....	75
10. Conclusions and Recommendations	79

List of abbreviations

ASECCM	Automated System of Electricity and Capacity Control and Metering
BAU	Business As Usual
CCGT	Combined Cycle Gas Turbines
CO ₂	Carbon Dioxide
COP21	The 21st session of the Conference of the Parties to the UNFCCC
DCFTA	Deep and Comprehensive Free Trade Area
DSM	Demand-Side Management
DSO	Distribution system operator
EE	Energy Efficient
EED	Energy Efficiency Directive
EEO	Energy Efficiency Obligation
EnPC	Energy Performance Contracting
EPBD	Energy Performance in Buildings Directive
ESCO	Electricity System Commercial Operator
EU	European Union
EU-GEORGIA AA/DCFTA	EU-GEORGIA Association Agreement / Deep and Comprehensive Free Trade Areas
EUR	Euro
GDP	Gross Domestic Product
GEL	Georgian lari
GHG	Greenhouse Gas
GWh	Giga watt hour
GNERC	Georgian National Energy and Water Supply Regulatory Commission
GSE	Georgian State Electrosystem
HPP	Hydropower Plant
HLPF	High-Level Political Forum

IFI	International Financial Institutions
INDC	Intended Nationally Determined Contribution
ktoe	Kilotons of oil equivalent
kW	Kilowatt
LED	Light Emitting Diode
LEDS	Low Emission Development Strategy
mln.	Million
MW	Megawatt
NEAP	National Environmental Action Programme
NEEAP	National Energy Efficiency Action Plan
NREAP	National Renewable Energy Action Plan
PJ	Petajoule - (10^{15}) joules
RES	Renewable energy sources
SCADA	Supervisory Control and Data Acquisition System
SE4ALL-EECAA	Sustainable Energy for All in Eastern Europe, the Caucasus and Central Asia
SDG	Sustainable Development Goal
SFM	Sustainable Forest Management
SME	Small and Medium-Sized Enterprise
TPES	Total primary energy supply
TSO	Transmission System Operator
TWh	Terawatt Hour
VNR	Voluntary National Review
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar

1. Executive Summary

The UN adopted 2030 Agenda with its 17 Sustainable Development Goals (SDGs) and their targets promote eradication of poverty and hunger; combat inequalities within and among countries; building peaceful, just and inclusive societies; protection of human rights, gender equality and empowerment of women and girls; ensure lasting protection of the planet and its natural resources. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

Sustainable Development Goal 7 is to ensure access to affordable, reliable, sustainable and modern energy for all. Focusing on universal access to energy, increased energy efficiency and the increased use of renewable energy through new economic and job opportunities is crucial to creating more sustainable and inclusive communities and resilience to environmental issues like climate change.

The Sustainable Energy for All (SEforALL) is a global initiative led by the UN Secretary General. It was a precursor to SDG 7 and now serves to catalyse faster and bolder action to implement it and support the Paris Climate Agreement. In particular, the SEforALL pursues three key development objectives for the energy sector by 2030: **ensuring universal access to electricity and modern cooking solutions; doubling the rate of improvement of energy efficiency; and doubling the share of renewable energy in the global energy mix.** These objectives have been endorsed by the UN General Assembly, which declared 2014–2024 the Decade of Sustainable Energy for All.

Even though a lot has been done for improved functioning of the Georgia's energy sector, its transition to a sustainable development, providing enhanced energy efficiency, wider use of renewable energy sources and better energy access to attain the SEforALL objectives and SDG 7 targets, Georgia still faces various challenges related to sustainable development which require concrete actions to effectively adapt its national energy policies.

Elaboration of the draft National Sustainable Energy Action Plan (NSEAP), which identifies best practices, measures and procedures necessary for a sustainable energy transition, with a particular focus on the cross-cutting nature of energy efficiency, renewable energy and energy access, outlines concrete actions for the Government and other stakeholders to be implemented in the short- and medium-term in line with the country's commitment to achieve SDG7 objectives will be a step forward to achieve sustainable development goals related to energy for Georgia.

Georgia's energy system is in a state of active development. Reforms are particularly influenced by the EU-Georgia Association Agreement signed in 2014, under which Georgia took an obligation of implementing the EU directives in energy sector and will have to comply with the requirements of the third energy package.¹

Based on energy balance data, in 2017, fossil fuels accounted to up 70% of primary energy consumption in Georgia. Almost all fossil fuels (95%) are imported from neighboring countries which means that energy security and independence are important for the country – especially since there are strained relationships within the region. Moreover, there is a tendency of an increase in fossil fuels consumption

¹ European Union (30 August 2014) Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part. Official Journal of the European Union L261/4 Available at http://eeas.europa.eu/georgia/pdf/eu-ge_aa-dcfta_en.pdf

in recent years, the largest increase can be seen in natural gas imports (Fig.13). The main energy consumers are the residential, transport and industry sectors, which consume mainly natural gas and oil products. Further development of these sectors will require sustainable increased energy supply.

In this context energy efficiency is an essential component of sustainable development of Georgia's energy sector as internationally recognized the most cost-effective way of reducing dependency on fossil fuels.

In Georgia, energy intensity as a function of GDP (Fig.3), which is used to measure energy efficiency across countries, is too high though compared to other countries the Georgian economy does not have much energy intensive industry. This indicates that there is potential for energy efficiency improvements.

According to the 2017 Energy Balance of Georgia² renewable energy accounted for 88% of the Georgian energy production, and 26% of total primary energy supply (TPES) made up of hydro - 17%, biofuels (mainly wood) and waste – 8% and Geothermal, solar, etc. – 1%. It is worth noting that biomass, mostly the firewood, has major share in primary energy consumption and is increasingly causing forest degradation. Additionally, wind energy production began in 2017. One of the key priorities of the energy policy of Georgia is a full satisfaction of customer demand for electricity with the maximum possible utilization of local hydropower resources. Additionally, the utilization of the country's local indigenous renewable energy sources such as wind, solar, and geothermal, has become one of the major areas of Georgia's energy sector development.

The Sustainable Development Goal for energy (SDG 7) has three principal objectives: ensure universal access to modern energy services; significantly increase the share of renewable energy in the global energy mix; and double the global rate of improvement in energy efficiency.

The elaborated NSEAP integrate all directions, measures and activities specified in sub-sectoral strategies and action plans, such as National Energy Efficiency Action Plan, National Renewable Energy Action Plan, etc.

In the field of energy efficiency, Georgia's indicative national energy efficiency targets for 2021, 2025, and 2030 are laid out in Table8 , with 2021 and 2025 as interim target deadlines, and 2030 as an additional indicative target deadline for longer-term projections. The dates of 2021, 2025, and 2030 as the target dates were chosen to be consistent with the planning horizon of the EU and Energy Community – as well as with Georgia's Intended Nationally Determined Contribution for reduction of greenhouse gases against the BAU scenario for the UNFCCC.

By 2025, Georgia intends to achieve a 14% reduction in primary energy consumption as compared to the BAU. NSEAP states that achievement of targets in EE is partly dependent on the planning and establishment of a number of horizontal instruments. Such measures include: Financing schemes for energy efficiency and training and education, including energy advisory programmes; Consumer information programmes and training; Public awareness and capacity building programmes.

NSEAP tackles energy waste in buildings, public bodies, industry, transport, and energy sector. It also provides specific energy efficiency measures for each sector and their investment needs. (Detailed information on planned measures and necessary financial resources for their implementation could be

²Geostat (2017) Energy Balance of Georgia, 2017. Available at <https://www.geostat.ge/en/modules/categories/86/energy-balance-of-georgia-2017>

seen below in Chapter 7, Overview of National Energy Efficiency Targets & Energy Efficiency Policy Measures)

In 2016, transport accounted to 35.2% of all energy consumed in Georgia and implementation of energy efficient improvements in this sector will generate up to 64% of the energy savings by 2021. The measures in transport sector involve the following key aspects: Vehicle improvement measures (fuel switching and better management of the existing fleet); Public awareness campaigns on eco-driving and to encourage efficient transport modes would increase the efficiency of driving habits; Investments in intra-city urban mobility (modal shifts from passenger cars to public transport, walking, and cycling).

In industry sector which in 2016 which accounted for 14% of energy used in Georgia and consumption is expected to grow by 2030 as a result of economic development. Industry specific measures envisaged in NSEAP would account for up to 24% of targeted energy savings by 2021. These include work to improve the data availability and investment project in cement industry. Horizontal measures envisage the introduction of incentive-based and mandatory schemes to stimulate better energy performance in industry; creation of energy audit and management systems and certification schemes for the sector; and bringing in financing schemes for energy efficiency.

Draft NSEAP outlined energy efficiency measures in buildings are closely linked with public sector measures. The measures cover standards for labelling schemes in appliances as well as consumer information programmes and training, includes also green procurement methods and regulation for efficient lighting. All measures are closely related to implementation of EED and EPBD.

Draft NSEAP proposed energy efficiency improvements for energy supply include improvements the efficiency of gas and hydropower plants, as well as of the transmission and distribution system. Among proposed measures are: introduction of efficient wood burning stoves for rural households and solar hot water systems.

As estimated the implementation of horizontal and sector specific energy efficient measures will result in total energy savings equal to 2, 568 GWh by 2021.

In renewable energy field in order to meet the target of 30% of energy consumed coming from renewable energy for 2020 and implement the EU Renewable Energy Directive, a number of policy and investment measures were specified in draft NSEAP, as described in more details in below in Chapter 8 (Overview of National Renewable Energy Targets & Renewable Energy Policy Measures).

For the purposes of establishing what measures and investments would be necessary to achieve this target, scenarios were developed for the following sectors:

- Electricity production from renewable energy;
- Heating and cooling from renewable energy and;
- Transport from renewable energy – focused mostly on switching to electric vehicles

The measures in renewable energy field include:

- Promotion of solar hot water heaters
- Promotion of electric vehicles
- Ongoing support for hydropower production
- Ongoing support for wind production
- Ongoing support for solar power production
- Support for micro-generation (less than 100 kW) from renewable sources

- Ongoing support for geothermal heat production
- Improved management of solid biomass resources - Development of a new Forest Code, inventory of Forests, and support for the use of residues
- District heating and cooling infrastructure development
- Communications and capacity building of technical experts

Estimated total contribution (electricity generation) expected from renewable energy sources to meet the indicative 2020 targets in electricity in 2020 will amount to 9,345 GWh;

Estimated total contribution (final energy consumption) expected from renewable energy sources to meet the indicative 2020 targets in heating and cooling in 2020 will amount to 6,022 GWh and in transport will amount to 556 GWh.;

The National Sustainable Energy Action Plan of Georgia (2018- 2030) Summary Table (Table 27) provides information on all 48 proposed measures in energy efficiency and renewable energy field, estimated energy savings and indication of necessary investments for the implementation of the measures as well as relevance of each measure to a certain SDG. Total cost of implementation of proposed measures is estimated to be €3,168,306,000, including €2,033,112,000 for energy efficient measures and €1,135,194,000 for measures in renewable energy field. Primary Energy savings or renewable energy generation by 2021 is expected to amount to 12,701 GWh

Indeed elaboration of the first NSEAP is a step forward in identification of best practices, measures and procedures necessary for a sustainable energy transition, with a particular focus on the cross-cutting nature of energy efficiency, renewable energy and energy access, outlining concrete actions for the Government and other stakeholders to be implemented in the short- and medium-term in line with the country's commitment to achieve sustainable development goals related to energy for Georgia.

Of course, in author's opinion this document is far from being comprehensive and leaves room for further improvements for which a set of recommendations have been elaborated and which would be reflected in second NSEAP.

2. Introduction

The need to improve access to sustainable, affordable and environmentally sound energy services and resources was one of the main reasons to urge countries around the world to increase the awareness on the importance of addressing energy issues and to promote action at the local, national, regional and international levels. In response, Economic Commission for Europe launched UNDA project Sustainable Energy for All (SE4All) in Eastern Europe, the Caucasus and Central Asia. Project aims to strengthen the national capacity of economies in transition to develop National Action Plans for Sustainable Energy for all, namely in following areas: (1) ensuring universal access to modern energy services (2) improving energy efficiency and (3) increasing the share of renewable energy in the global energy mix.

While Georgia has huge renewable energy potential, country is high dependent on imported fossil fuels. Imported energy resources accounts more than 70% of total primary energy supply. On the other hand, it is worth to note that in 2016 Georgia become full member of European Energy Community and based on its accession protocol, recently, Georgia is in the process of harmonization European third energy package with its energy legislation. Hence, Georgia's energy policy and strategy is to support renewable energy and energy efficiency programs in order to achieve sustainable economic development in the country.

Over last decade, reforms in the Georgian energy sector accompanied with energy infrastructure developed guarantees energy security of the country as well as supports rational use of energy resources, promotion of renewable energy resource and energy efficient and environmentally friendly, clean technologies in all sectors of the economy. However, there is still lack of sufficient support mechanisms and level playing field that will promote large scale development in this regard.

Georgia as the country with transition economic, faces various challenges related to sustainable development which requires concrete actions for adaptation national effective measures into energy policy. The study was conducted through a comprehensive desk review together with stakeholder consultations covering ministries, energy companies, civil society organizations and IFIs active in Georgia.

The activities under the study include a baseline status analysis of Georgia's energy sector on energy production and consumption. They cover assessment of existing best practices in sustainable energy, together with identification of challenges and implementation of measures to overcome these challenges.

2.1. National Sustainable Energy Action Plan (NSEAP) Objectives

The following are objectives for development of NSEAP for Georgia:

- To identify best practices, measures and procedures necessary for a sustainable energy transition, with a particular focus on the cross-cutting nature of energy efficiency, renewable energy and energy access;
- To outline concrete actions for the Government and other stakeholders to be implemented in the short- and medium-term in line with the country's commitment to achieve Sustainable Development Goal (SDG) 7 objectives.

2.2. Methodology Used in Preparing the Sustainable Energy Action Plan

An interactive and participatory approach was adopted for the NSEAP development. A desk review of national policy documents, reports and roadmaps was undertaken covering access to energy, renewable energy and energy efficiency. Consultative meetings with appropriate Government organizations (Ministry of Economy and Sustainable Development, Ministry of Environmental Protection and Agriculture, Georgian National Energy and Water Regulatory Commission, Statistical Office of Georgia, SDGs Council in Georgia) and energy experts and professions working on various aspects of sustainable energy were organized to review the initial findings (in terms of interventions and bottlenecks). Annex 1- List of Stakeholders consulted

The elaborated NSEAP will integrate all directions, measures and activities specified in sub-sectoral strategies and action plans, such as National Energy Efficiency Action Plan, National Renewable Energy Action Plan, etc. Based on the findings, the draft National Sustainable Energy Action Plan was elaborated, which then will be presented to the Ministry of Economy and Sustainable Development of Georgia for adoption.

3. Georgia's Development Policy and Energy Sector Overview

Georgia's land area is 69,700 square kilometers. Its capital is city of Tbilisi with around 1.2 million population. Georgia has a mild climate, with an average maximum temperature of 33°C in July and an average minimum of -3°C in January, although in some places the temperature reaches 40°C in summer and in other places -20°C in winter. A map of Georgia is presented in Figure 1.

Population of Georgia in 2019 is 3.7235 million which is a dramatic reduction from previous estimates of 4.49 million³. Georgia is a middle-income country with 4046.8 US\$ GDP per capita (GEOSTAT, 2017). The Georgian economy has been developing with a steady growth rate – though this has been undermined by the global financial and economic crisis and conflict with Russia.

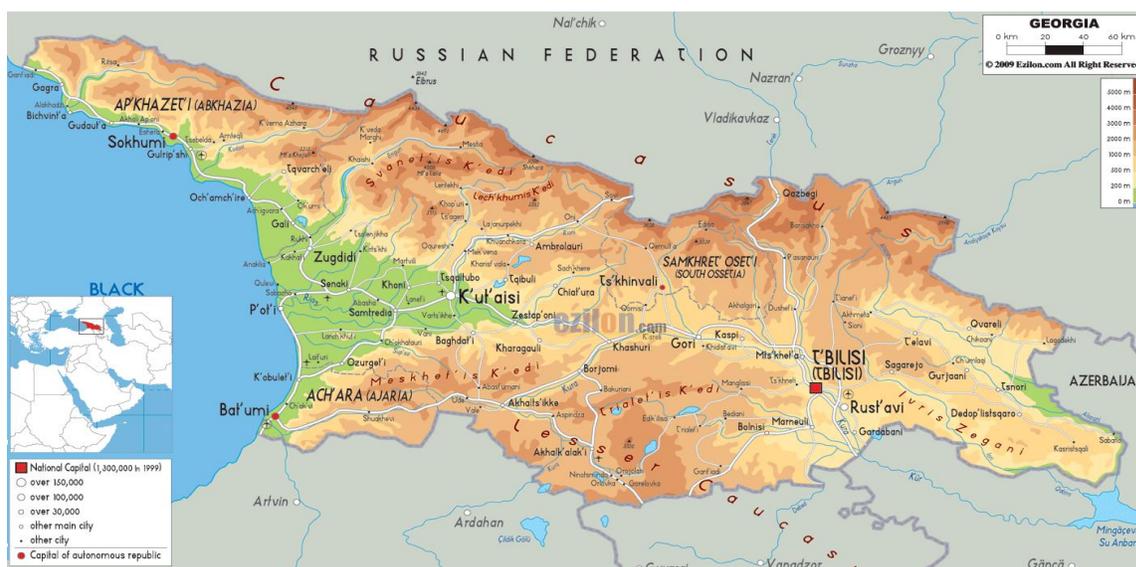


Figure 1. Map of Georgia

For the period 2010-2015 real GDP in domestic currency has increased by 37%. Economic reforms and rapid growth in recent years, have not fully addressed the major economic challenges faced by the country – poverty and unemployment. While the national unemployment rate makes 13.9% (GEOSTAT, 2017), youth unemployment reaches 40% in some of the regions. According to World Bank, poverty declined from 35% in 2006 to 17.1% in 2016. However, Georgia has not yet achieved the economic standards of EU countries. Development of Georgia's GDP and its actual growth rate is shown in Table 1.

Table 1. Gross Domestic Product ⁴

	2014	2015	2016	2017	2018*	2019*
GDP at current prices, billion GEL	29.2	31.8	34.0	37.8	41.1	9.7
GDP at constant 2010 prices, billion GEL	25.6	26.3	27.1	28.4	29.7	6.6

³ <https://www.geostat.ge/en/modules/categories/316/population-and-demography>

⁴ Source: Geostat; www.geostat.ge

GDP real growth, %	4.6	2.9	2.8	4.8	4.7	4.9
GDP deflator, percent	3.8	5.9	4.2	6.1	3.6	2.4
GDP per capita (at current prices),GEL**	7 837.4	8 524.3	9 129.0	10 152.0	11 013.9	2 617.2
GDP per capita (at current prices) USD**	4 438.3	3 754.9	3 857.3	4 046.8	4 345.5	981.0
GDP at current prices, billion USD	16.5	14.0	14.4	15.1	16.2	3.7
*Adjusted data will be published on Nov.15,2019						
** Per capita indicators for quarterly and annual figures were revised in line with updated data from 2014 general population census						

Georgia’s main economic activities include agriculture (grapes, fruit, tea, and hazelnuts), mining (manganese, copper, and gold), industrial sector (beverages, wine, spirits, and spring water; metals, machinery, chemicals, and aircraft) and tourism. Agriculture remains important, as more than 50% of the population lives and works on the land and agricultural goods account for about 20% of exports. While other sectors have grown significantly during last years, agriculture has not and its share in total GDP has declined (Figure 2). Recently, Georgia’s economy is highly dependent on imported fossil fuels, while dominated by industry activities.

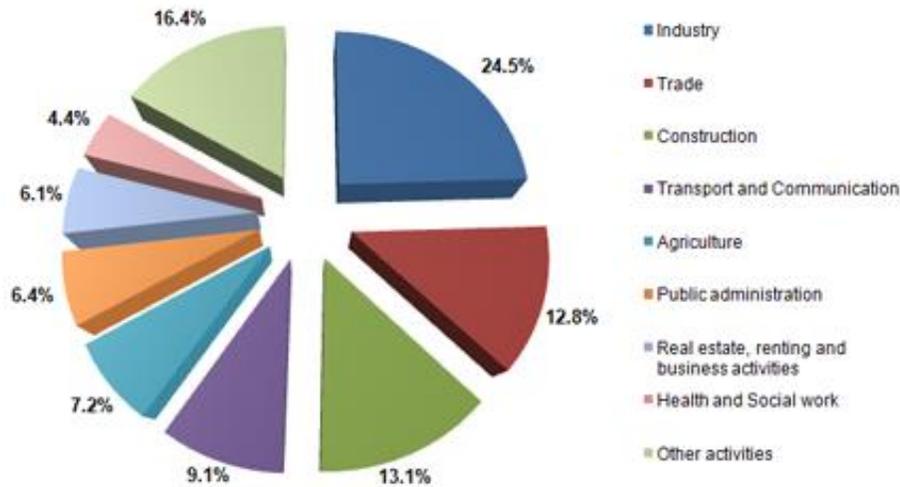


Figure 2: Share of GDP in 2017

3.1. Georgia 2020: Social-Economic Development Strategy of Georgia

Social-economic Development Strategy —Georgia 2020 reflects the priorities and problems that need to be resolved in order to achieve long-term, sustainable and inclusive economic growth.

Georgia 2020 strives to achieve the following forecast results by 2020:

Table 2.

Indicator	Current rate	Forecast rate
GDP per capita (GEL, nominal)	5811.7	13,000
GDP per capita (GEL in constant prices)	5811.7	9,200
Gini coefficient	0.41	0.35
Inflation (%)	2.4	3.0
Unemployment (%)	15.0	<12
Taxes (% of GDP)	24	25
Exports (goods and services, % of GDP)	45	65
Current account deficit (% of GDP)	>10	6
Public debt to GDP ratio (%)	34	<40

A two-legged long term growth strategy (Georgia 2020 and sectoral development policies) aiming to achieve a profound transformation of the country's macroeconomic framework. Goals of these two strategic plans are:

Fostering inclusive economic growth through: Reduced unemployment; Improved labor and living conditions; Establishment of social protection system; Human capital development

Fostering exports through selected key sectors with high growth and export potential: Tourism; Hydro Power; Agriculture; Transport

MAIN AXES OF GEORGIA 2020 STRATEGY ARE:

- Private sector competitiveness- Improvement of investment and business environment; Innovation and technologies; supporting the export growth; development of infrastructure and full use of transit potential;
- Human capital development- Development of workforce that meets labor market requirements, Improving the social assistance system, Ensuring the accessible and quality healthcare
- Access to finance- mobilization of investment resources; Developing financial intermediation

Georgia has undergone though a remarkable period of economic transformation led by major institutional and structural reforms. The reforms succeeded in building smart and low regulations, business friendly tax system, private sector driven and corruption free country.

Energy Sector targets under Georgia 2020 strategy are presented below:

Table 3 Energy Sector Targets Under Georgia 2020

Target	Baseline	2017	2020
Electricity Production (TWh)	9.7	14	18
Access to Electricity (According Doing Business Report)	50	35	25

With the achieved success Government of Georgia initiated new economic program -Action plan for 2016-2020- “Four Point Reform Plan”⁵. The Plan embarks on four strategic directions:

- 1. Economic Reforms** – Growth oriented reforms to provide the country with proper legal base and institutional development that are of significant importance for encouraging economic prosperity. Entrepreneurship facilitating jobs creation by improving business and investment environment further, including, inter alia, by implementation of tax reform and supporting entrepreneurship;
- 2. Education Reform** – supporting skills development through education reform targeted at bridging the gap between skills demand and supply. Promotion of vocational education, fundamental reforms in general and higher education systems will guarantee increased overall skill level of the local labor force leading to increase in employment and wages, thus, increasing the pace of local economic development.
- 3. Spatial Development Reform** – investing in core infrastructure development supporting expansion of the east-west and south-north trade corridors. The objective of the plan is to utilizing Georgia’s potential of a transit country between Europe and Asia, as well as its touristic potential, thus creating economic opportunities for our citizens. Given better infrastructure and regional development, which will break down transportation and communication barriers, will provide faster growth of investments and create favorable conditions for overall economic growth.
- 4. Open Governance** – enhance the principles of inclusive decision making process, where voices of opposition, civil society and private sector are heard and by improving and modernizing public services, including by introducing “single Window Principle” for all government services. Transparency and open governance will guarantee higher integration of public and private sectors. This will increase the level of trust of the society towards public institutions and public administration.

These reforms through productivity growth will accelerate growth potential and foster convergence to higher income levels.

Figure 3 shows GDP intensity comparison of Georgia with some EU countries. GDP intensity measures indicates how much energy is needed to generate 1 unit (in this case USD) of GDP. Even though compared to other countries, Georgian economy does not have much energy intensive industry. Country’s GDP intensity is still much higher than, for instance Turkey’s, which has much more energy intensive economic structure. This indicates, that there is a potential for energy efficiency improvements.

⁵ Freedom, rapid development & welfare; Government Program 2018-2020; http://gov.ge/files/67105_67105_704449_2018-2020programa_finalengl.pdf

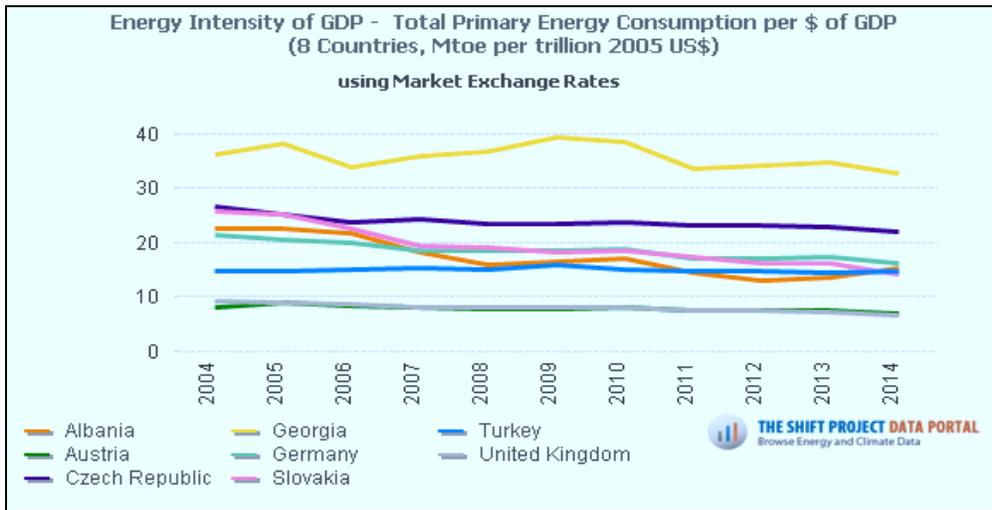


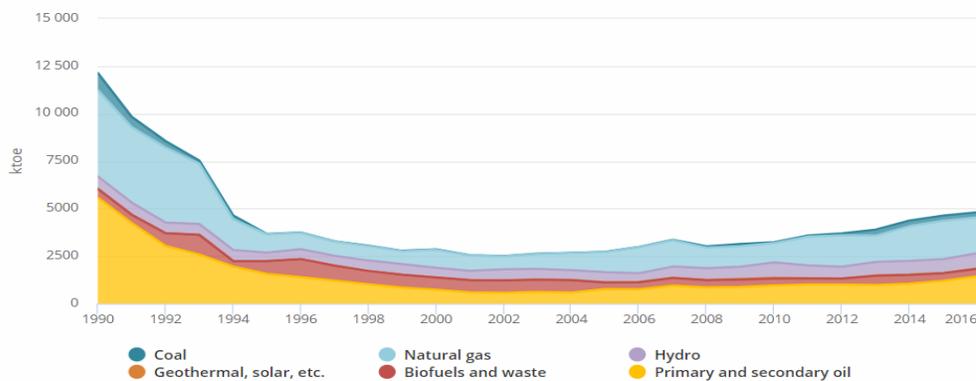
Figure 3: GDP intensity comparison of Georgia with some EU countries

3.2. Energy Sector Overview

In 2016, Georgia’s total primary energy supply (TPES) accounted for 4789.5 ktoe, where about 78% of energy resource, mostly oil products and natural gas were imported. In 2017 total primary energy supply amounted to 4736.9 ktoe.

On the other hand, total final energy consumption in the same years was 4330.5 ktoe dominated by oil products and natural gas with share of 64%. The transport sector was the biggest consumer, followed by residential at 29.4% and industry at 13.9% of the total final energy consumption (see Figure 5 and Figure 6). In 2017 total final energy consumption was 4363.4 ktoe.

Total Primary Energy Supply (TPES) by source*
Georgia 1990 - 2016



IEA World Energy Balances 2018

* TPES here excludes electricity and heat trade

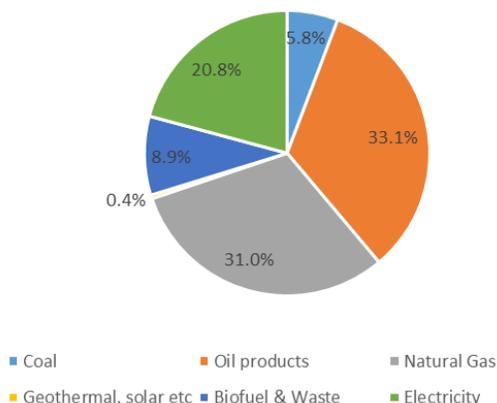
Figure 4: Total Primary Energy Supply by Source⁶

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<https://www.iea.org/statistics/?country=GEORGIA&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES>

The development of Georgia’s energy markets over the past several years has been influenced by a number of factors. Relatively mild economic growth (3-5 per cent annual growth in 2013-2016) influenced energy consumption and supply patterns. The main drivers of structural and regulatory changes in Georgia’s energy markets were the EU-Georgia Association Agreement signed in June 2014, and Georgia’s membership of the European Energy Community, which began in October 2016. These developments will lead to changes in the electricity, natural gas, and crude oil markets, as well as energy efficiency and environmental regulations. Most of these regulatory changes are expected to be implemented by 2023.

Total Final Energy Consumption by Source, 2016 ⁷



Total Final Energy Consumption by Sector ,2016 ⁸

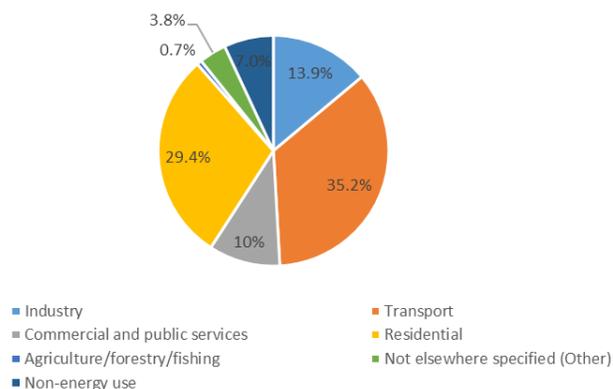


Figure 5: Total Final Energy Consumption by Source Figure 6: Total Final Energy Consumption by Sector

3.2.1. Electricity Sector

The power system in Georgia is characterized by relatively stable seasonal supply and consumption patterns. Due to abundant hydro resources, hydropower dominates the electricity generation in Georgia. Currently, 87 small, medium and large scale hydro power plants are operating with total of 3260.07 MW installed capacity and 9949,3 mln. kWh annual generation (2018).

However, In spring-summer period electricity production peaks, though consumption decreases, creating imbalance between supply and demand. The electricity shortages in winter is compensated by thermal power plants and electricity imports. To meet increasing energy demand, overcome the winter deficit and to decrease the dependence on imported energy resources additional generation units are being developed. In total, 139 renewable energy projects are under development. The total installed capacity of these projects is 3218 MW and approximate electricity generation is around 13891 mln. kWh. Out of which, 24 Projects are on Construction and Licensing stage, with installed capacity of 235 MW, annual

⁷

<https://www.iea.org/statistics/?country=GEORGIA&year=2016&category=Energy%20consumption&indicator=TFCbySource&mode=chart&dataTable=BALANCES>

⁸

<https://www.iea.org/statistics/?country=GEORGIA&year=2016&category=Energy%20consumption&indicator=TFCSHareBySector&mode=chart&dataTable=BALANCES>

generation of 1,065 mln. kWh. 24 Projects are on Construction stage, installed capacity equals 376 MW, annual generation of 1700 mln. kWh. 91 Projects on the Feasibility Study Stage with 2607 MW installed capacity and annual generation of 11 126 mln. kWh.

The first wind power plant “Kartli” was taken into operation in 2016. Total installed capacity is 20,7 MW and total annual generation equals 84,3 mln kWh (2018). In 2017, share of the electricity generated by HPPs in the total generation was 80,4%. The share of the electricity generated by wind power plant being put in operation at the end of 2016 amounted to 0,8%, though not yet enough to cover the country’s consumption-generation gap.

As for thermal power, there are four gas-fired thermal power plants and one coal-fired thermal power plant with total installed capacity of 924,4 MW.

Additionally, Ministry of Economy and Sustainable Development has planned to construct another 230 MW thermal power, equipped with combined cycle gas turbine, and decommission Mtkvari Unit 9 by 2025.

➤ Electricity Market

The structure of the electricity market, reflecting amendments made to Georgian legislation in previous year is provided on Fig 7. Electricity trade at wholesale level is mainly carried out on the basis of the direct contracts. Electricity sale will take place through generators, importers, whereas the electricity is purchased by the distribution licensees (in terms of supply), direct customers, exporters, electricity generators (in cases of plant losses) and the dispatch licensee (for the purpose of ensuring electricity (capacity) transit with the view to cover losses related to the purchase of the electricity). For the purpose of electricity trade at the wholesale market, registration with the Electricity System Commercial Operator (ESCO) as a qualified enterprise is necessary.

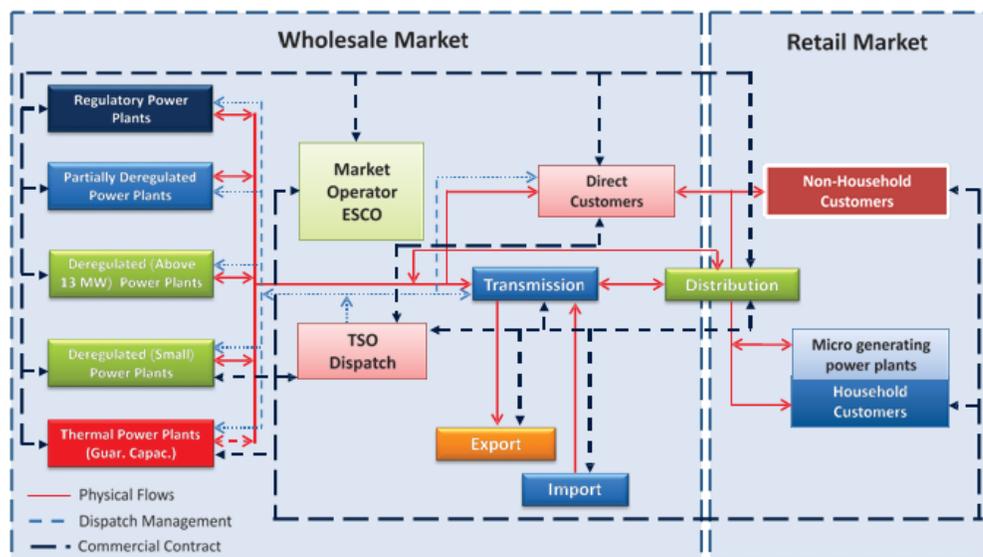


Figure 7: Structure of the Electricity Market in Georgia

For the regulatory purposes, electricity generators are classified as:

- a) Regulatory power plants to which the Georgian National Energy and Water Supply Regulatory (Commission) sets fixed tariffs;
- b) Partially deregulated power plants to which the Commission sets marginal (upper margin) tariffs;

- c) Deregulated power plants constructed after August 1, 2008 and act on the market without any tariffs set by the Commission;
- d) Guaranteed capacity sources (Thermal Power Plants) to whom the Commission sets guaranteed capacity fee and marginal tariffs (upper margin) of the electricity generation.

For the power plants with installed capacity exceeding 15 MW, the Commission issues electricity generation license, whereas power plants up to 15 MW (small power plants) are exempted from licensing procedures. The list of guaranteed capacity sources is defined by the Government of Georgia individually according to the time periods during which those guaranteed capacity sources can provide guaranteed capacity to the system and they are used for ensuring sustainable, secure and reliable functioning of the integrated electricity system of the country.

The electricity import and export activities are deregulated and do not require licensing. The price of the electricity export activities is free (without tariffs), whereas the price for the electricity import is set according to the marginal tariff formula set by the Commission.

In terms of purchase and selling electricity the Electricity System Commercial Operator (ESCO) is entitled to purchase and/or sell electricity through direct contracts or standard terms and conditions of the balance electricity direct contracts, for the purpose of meeting (balancing) qualified enterprises' demand. At the same time, ESCO organizes guaranteed capacity trading, registers companies as participants to the wholesale trade, makes amendments to the registration data and revokes registrations. The market operator possesses and exploits the Automated System of Commercial Metering (ASCM) that encompasses unified base and gets metering data from Automated System of Electricity and Capacity Control and Metering (ASECCM) automatically. It is intended for receiving, checking, collecting, grouping and summing up data for the wholesale electricity trade.

The Transmission System Operator (TSO) and the Transmission and Distribution licensees carry out network and system services. The TSO (the Dispatch Licensee) has signed contracts with the Transmission Licensees on conveying rights of operating and developing transmission network to it. The TSO manages system mainly through Supervisory Control and Data Acquisition System (SCADA) and at the same time uses upper level Automated System of Electricity and Capacity Control and Metering (upper level ASECCM).

The Distribution licensees carry out network services, including wheeling, through networks under their ownership or under the third person's ownership. The distribution licensees provide network services to: retail customers that purchase electricity from small power plants based on direct contracts, direct customers connected to the distribution network and so called distributed generation – power plants that are connected to the distribution network.

Electricity is sold by the distribution licensees at the electricity retail market on the basis of household tariffs set by the Commission. At the same time, they ensure network and system service of retail customers. According to the current legislation sale of the electricity to the retail customers can be carried out by the small power plants, though their participation at the retail market is quite rare, as far as small power plants have possibility to sell generated electricity at wholesale market for the price higher than weighted average price of the household tariffs that does neither incentivize them, nor customers to trade on the basis of direct contracts.

After amendments in the Georgian Law on Electricity and Natural Gas, the Law incorporated provisions that micro power plants, with installed capacity up to 100 kW, may be included in the net-metering policy only in the case that production takes place at the point of consumption. There is no additional procedure

to apply for participation in net-metering policy. All consumers with connected micro generators can automatically benefit from net-metering. At the same time, Commission’s regulation on “Electricity (Capacity) Supply and Consumption Rules” defines net-metering policy, micro generation connection procedures, and compensation mechanisms in detail. Customer submits the application and DSO takes over the application and carries out all related works without customer involvement. The timeframe of micro generator connection after application is strictly defined from 20 up to 40 days depending on the capacity and connection voltage level. The rules are published and available for customer on the Commission’s website.

The net excess energy provided onto the grid by the micro generator is carried over to next month’ bill as kWh credits that can be consumed by the consumer in that particular month. In case there is still surplus generation after some time the consumer has the right to claim financial remuneration that equals the opportunity cost (average wholesale energy price) of a supplier (i.e. DSO).

In 2018, the electricity wholesale supplier has entered the electricity market, which has been granted the status of qualified enterprise. Its function is the procurement of electricity from the generation license holder, small power plant, importers and electricity supply for direct consumers and export;

During last decade significant increase in the electricity consumption has been observed. In 2017 the electricity consumption has increased by 7.7% The electricity consumption in Georgia during 2007-2017 has been increasing by 4.4% in average (see Figure 8).

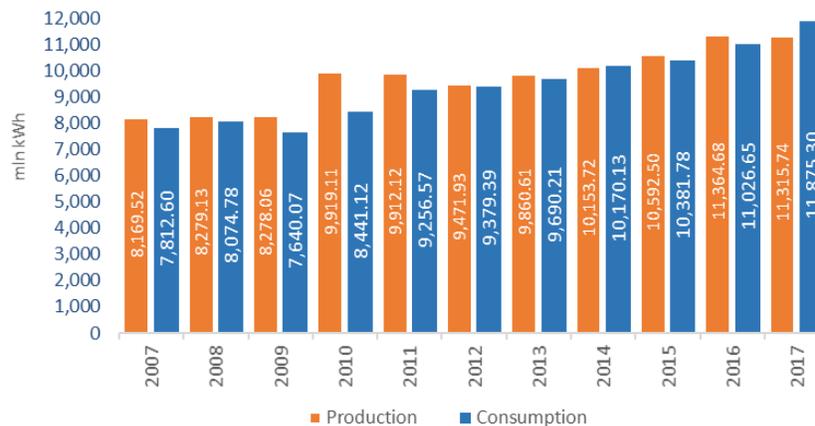


Figure 8. Electricity generation (bus bar delivery) and consumption

In the electricity generation structure increase of the electricity shares generated (delivered on a bus bar) by thermal and hydro power plants is more or less stable. Electricity generated by the thermal power plants in 2016-2017 has constituted 18.8% of the total generated electricity. The share of the electricity generated by HPPs in the total generation has been 80.4%.

The share of the electricity generated by the wind power plant being put into the operation by the end of 2016 has been 0.8%.

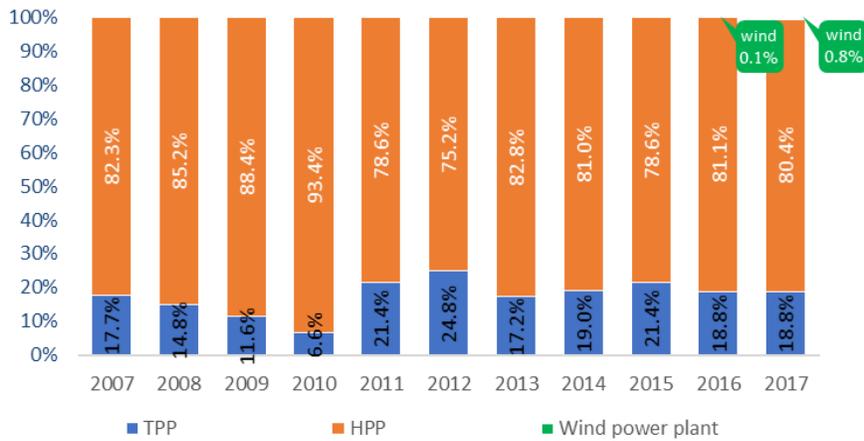


Figure 9. Structure of the electricity delivered on a busbar by the power plants

In 2017 the electricity imports exceeded exports by 2.2 times (see Figure 10) and reached to 1,497.2 mln kWh that exceeds the same indicators of the previous year by three times and indicators of 2015 by two times.

With regards to exports, 685.7 mln kWh electricity has been exported from Georgia that exceeds indicators of the previous year by 22.7%. The dramatic increase of imports has been caused by the decreased water inflow and stopping of Enguri HPP for two weeks. Besides, for the purpose of meeting internal consumption and filling the deficit that has resulted from decreased hydro generation, thermal generation was substituted by import based on its competitive price.

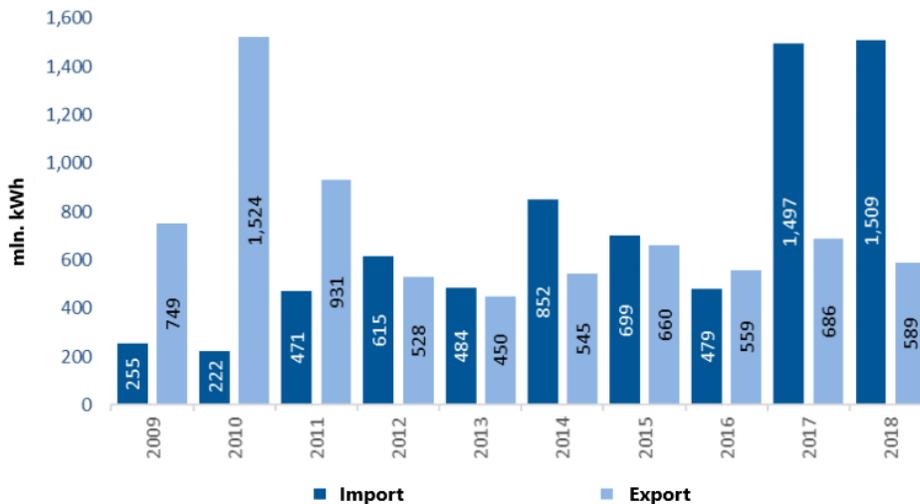


Figure 10: Electricity import and export by years

The main feature of the energy security in the electricity sector is uninterrupted supply. It can be ensured through meeting electricity demand by maximum utilization of indigenous resources. This will enable substitution of import in a short-term perspective and thermal generation in a long-term perspective. The dynamics of the electricity generation and consumption per month is provided on Figure 11. As it can be observed from the Figure, hydro and thermal generation capacities are not enough to meet the demand in autumn and winter periods. Respectively, electricity import becomes necessary for satisfying the demand. On the other hand, abundant water resources in second half of spring period and summer makes it possible to meet the electricity demand and export the rest of the electricity.

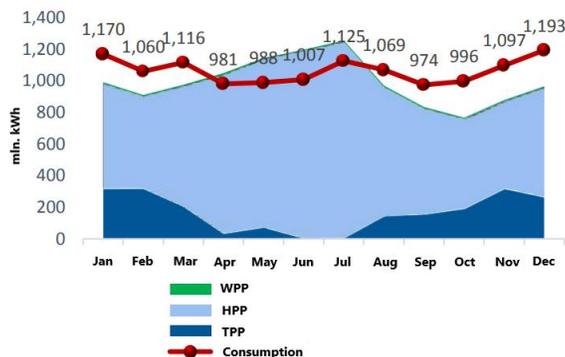


Figure 11: Electricity generation and consumption per months in 2018

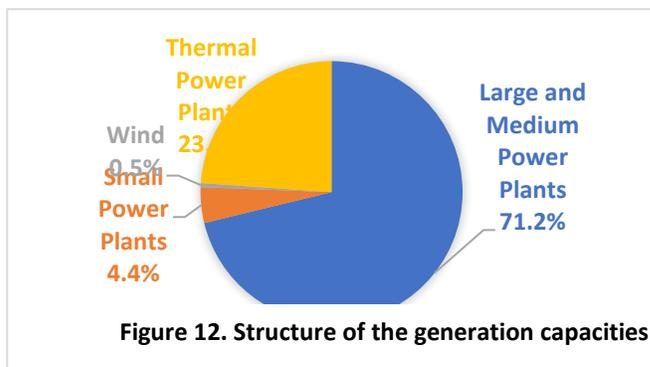


Figure 12. Structure of the generation capacities

Based on analysing results of the electricity supply and consumption balance 2017, one can state that important attention shall be paid to the construction of new generation units through utilizing local energy resources. Respectively, hydrocarbon resources and renewable resources shall be utilized together with hydro resources to a maximum extent, including wind and solar energy resources.

The signing of the Association Agreement and Georgia’s accession to the energy community in October 2016 imposed some important obligations on the country to reform its energy markets. For the electricity market, 2018 was a turning point. Among the key obligations the country committed to under the energy community accession protocol were the adoption of: (i) Directive 2009/72/EC, concerning common rules for the internal market in electricity and (ii) Regulation (EC) No 714/2009, on conditions for access to the network for cross-border exchanges in electricity. Provisions from both of these documents have to be incorporated into Georgian legislation by the end of the year. This entails some crucial steps to ensure non-discriminatory access by any third party to the electricity market. To meet this obligation, Georgia will have to:

1. Unbundle vertically integrated companies in distribution and generation according to provisions of EU directive 2009/72/EC
2. Create a functional trading mechanism to ensure access of third parties to the market. This will most probably entail set-up of a day-ahead market.

➤ The Electricity Market Concept Design ⁹

The electricity market concept design constitutes the vision of the Ministry of Economy and Sustainable Development of Georgia regarding the general structure, organization, and functioning of the electricity market in Georgia (hereinafter—the Market).

This Market Concept, in defining a new structure of the Market, includes transitional measures for phased implementation to the market structure envisaged herein. The transitional measures of this Market Concept are outlined for and are binding during the Transitory Phase lasting from 1 January 2019 until 31 December 2022.

The overarching design target of the Market Concept is to establish Organized Electricity Markets. The Organized Electricity Markets encompass the competitive markets for electricity, being a Day- Ahead Market (DAM), Intra-Day Market (IDM) and Balancing Market. The envisaged design is in line with Georgia’s international commitments as a Contracting Party of the Energy Community and is also aligned to the Energy Community target model. In addition to the establishment of Organized Electricity Markets, the Market Concept also aims to promote further regional integration between Georgia and its neighbouring countries based on market-based solutions supported by relevant international agreements with these countries.

3.2.2. Natural Gas

➤ Natural Gas Sector

Natural gas remains one of the substantial energy sources of Georgia by means of which 33.1%¹⁰ of final energy consumption of Georgia is satisfied. In 2017 the demand for natural gas increased by 3.6% compared to the previous year., which mostly was caused by the increased demand at household sector - result of current gasification process. In 2018 - 81,895 new consumers were connected to the natural gas distribution network and the total number of the consumers comprised 1,239,022 by the end of 2018.

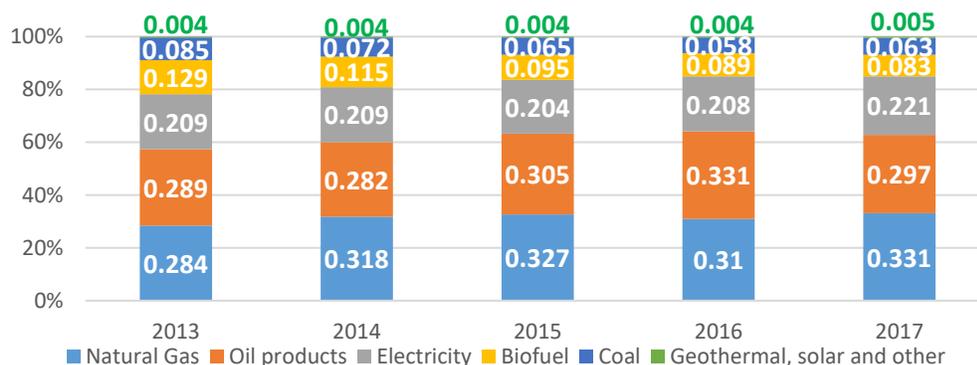


Figure 13: Energy Balance of Georgia

10

Natural gas is used mainly for cooking, heating of water and apartments.

⁹ <http://www.gse.com.ge/sw/static/file/The-Concept-Design-approved-ENG.pdf>

¹⁰ Source: Geostat ; www.geostat.ge

The Figure 14, which contains preliminary data subject to change, provides for the assessment of the size of the natural gas market of Georgia and the parameters of main flows of natural gas in 2018.

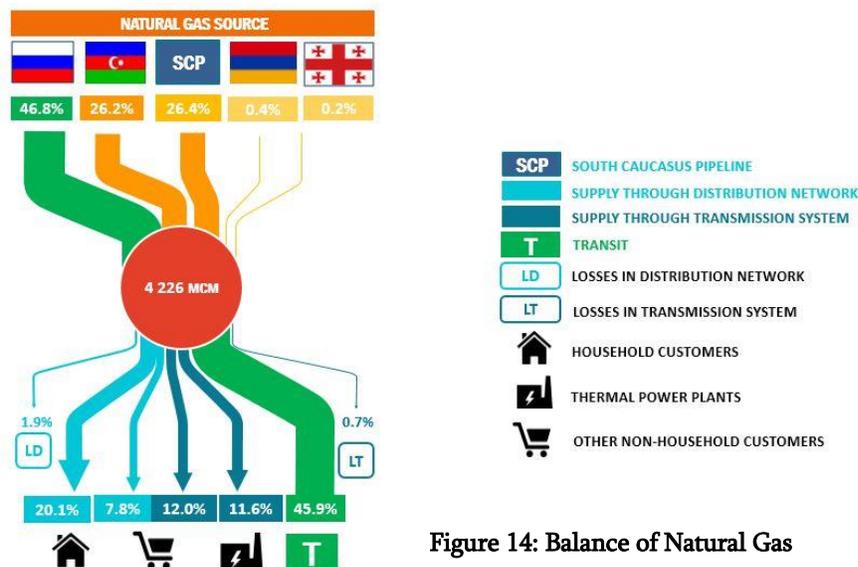


Figure 14: Balance of Natural Gas

GOGC carries out natural gas import on the basis of agreements made between the parties followed by wholesale supply of natural gas to the so-called social (power generation sectors and household) and commercial consumers.

Transit of gas in Georgia is provided by

two gas pipelines - the South Caucasus Pipeline (SCP) and the North-South Main Gas

Pipeline (NSMP).

The South Caucasus Pipeline also known as Baku-Tbilisi-Erzurum Gas Pipeline transits gas produced from Shah Deniz field from Azerbaijan to Turkey. The pipeline length is 692 km, the length of the Georgian section is 249 km. The design throughput of the pipeline is 20 billion cubic meters per year. SCP mainly lies parallel to BTC pipeline.

The North-South Main Gas Pipeline (NSMP) transits Russian gas to Armenia. The length of the Georgian section of NSMP is 234 km and its design throughput is 12 billion cubic meters per year.

The natural gas transportation system in Georgia is operated by Georgian Gas Transportation Company LLC (GGTC) which is the state-owned enterprise and the natural gas transportation licensee.

➤ Natural Gas Market

The structure of the natural gas market of Georgia remains unchanged. The companies affiliated to Socar are still holding dominated positions and participating in the wholesale and retail markets. Natural gas organized market does not exist in Georgia. Due to this reason selling and purchasing of natural gas take place only through bilateral agreements. At present the natural gas market of Georgia is concentrated at the wholesale and retail levels. Therefore, one of the challenges is an access to the natural gas for the deregulated customers on a competitive price.

The protocol concerning the Accession of Georgia to the Treaty Establishing Energy Community envisages reforming of the natural gas sector including the natural gas market by 2021. The EU Third Energy Package focuses on customer rights for them to have possibility to choose the supplier on the competitive market and as a result, purchase natural gas in a competitive price through healthy competition.

Together with other factors, competition on the market is hard to exist without sufficient number of suppliers. In order to reach the above-mentioned goal, non-discriminatory and fair conditions on the natural gas market for accessing suppliers shall be introduced.

➤ Natural Gas Regulatory Frameworks

In 2018 the regulatory framework of natural gas sector was updated, in particular, the amendments were made to the primary and secondary legislation in the reporting year:

1. Pursuant to the amendments to the Law of Georgia on Electricity and Natural Gas, the issue regarding the notification the Commission about commencement of the activities by the supplier was resolved. Before the above-mentioned amendments, natural gas suppliers were entitled to carry out activities without notifying the Commission. Due to this fact, the Commission was unable to fully record the regulated utilities (suppliers) on the market. In addition, the Commission became obliged to approve Uniform System of Accounts (USoA) for the natural gas transportation licensees and distribution licensees before December 31, 2021.

2. Under the Resolution №22 of August 31, 2018 the Commission approved Natural Gas Network Rules. The rules define the procedures, conditions and principles for managing the transportation system, distribution network and using the network, the relationships between existing companies in the natural gas sector and the persons using their services. The rules resolved the issues such as the connection to the transportation system, the relationship between the system user and the transportation licensee. In addition, the qualitative characteristics of natural gas were determined that should be met by the natural gas injected in the transportation system, etc.

Figure 15: Natural Gas Market Structure

The network rules envisage the requirements necessary for accessing the natural gas systems and determines transparency standards that is one of the basic preconditions for development of competition. The development of a new model of the natural gas market significantly depends on efficient implementation of the requirements set by the above-mentioned document.

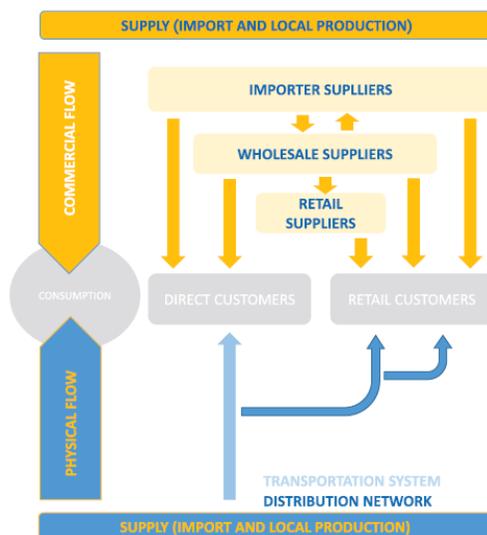
The network rules envisage the requirements necessary for accessing the natural gas systems and determines transparency standards that is one of the basic preconditions for development of competition.

➤ Natural Gas Market and Its Participants

The natural gas market with its nature and characteristics can be divided into two levels. Despite the fact that it is not defined by the legislation, the wholesale and retail levels of the natural gas market (trading)

can be distinguished. At the wholesale level the suppliers import natural gas (or purchase small amount of extracted natural gas) and resell it to other suppliers while at the retail level suppliers supply natural gas directly to the end-use customers. The above-mentioned fact does not exclude the activity of one supplier at both levels of the market. In 2018, 33 suppliers carried out activities on the market - two of them were active only on the wholesale market, 25 only on the retail market and 6 - at both levels of the market.

Physical delivery of natural gas to the end-user customers is provided by natural gas transportation (whose basic function is to transport natural gas from the source of its extraction or import to the residential areas) and distribution licensees.



Since Georgia produces only insignificant volumes of natural gas, it relies heavily on foreign import to satisfy domestic demand.

➤ **Functional, legal and ownership unbundling**

Pursuant to the current legislation natural gas distribution and supply are considered as different activities, however, the distribution licensees are not prohibited to carry out supply activities and therefore, they also represent natural gas suppliers within their scope..

According to the EU Third Energy Package, ownership unbundling is obligatory for the natural gas transportation licensee (Georgian Gas Transportation Company LLC). However, two alternatives are also considered which can be chosen by the country. Though the effective status of the transportation licensee in Georgia is very close to the definition of the Independent System Operator (based on the lease agreement owns the natural gas transportation system of Georgia). However, in order to achieve full compatibility, it is necessary to be functionally fully independent from the system owner, not to carry out the natural gas supply and address other less important issues.

➤ **Main characteristics of natural gas market**

The natural gas market with its nature and characteristics can be divided into retail and wholesale markets.

a) Wholesale Market

The Republic of Azerbaijan still remains as the main supplier of natural gas for Georgia, from where the country received natural gas necessary to satisfy its needs. Georgia remains the transit country of natural gas from Russia to Armenia. Accordingly, Georgia receives a fee for transit from Russia to Armenia. In addition, Georgia received natural gas from South Caucasus Pipeline (SCP) as a transit fee. Local extraction remains insignificant.

In 2018 four suppliers imported natural gas to Georgia to satisfy 99.8% of country's demand. Also 4 more suppliers (from which one of them is also importer) delivered natural gas to the market from local extraction.. HHI is 5,050 among natural gas suppliers of Georgia that indicates the highly concentrated market. Such condition is particularly characteristic to the countries with the developing markets.

b) Retail Market

Natural Gas is consumed by retail customers (connected to the distribution network) and direct customers (connected to transportation system). About half of the total consumption of direct customers is composed by consumption of TPPs. The gas filling stations are also among the largest consumers. They account for significant part of retail consumption.

c) Natural Gas Market Stability

Natural gas market stability is of crucial importance for Georgia's power security. Natural gas averaged consumption grows approximately by annual 7%. Moreover, the natural gas sector embraces extreme seasonal factors. Namely, in winter season (October-March) the consumption constitutes about 75% of total consumption. Naturally, based on the existing consumption structure and for improving power security system it is necessary to build a gas storage tank. Construction works for Samgori South Dome Underground Storage with total volume 500 Mm³ will finish by end of 2023. Total value of the project will exceed 250 million USD.

Underground gas storage tank construction will considerably strengthen Georgia's power security. The project will regulate seasonal misbalance between gas supply and consumption and peak consumption will be satisfied in winter period. Moreover, if supplier countries cease gas supply to Georgia, Georgian consumers will receive natural gas from the gas storage tank.

3.2.3. Oil

Oil products account for more than 30% of energy consumption in Georgia. The country is almost 100% dependent on foreign imports of crude oil and refined petroleum products required to satisfy its domestic demand. Imports are mainly carried out from Romania, Azerbaijan, the Russian Federation, Bulgaria, Greece and Turkmenistan. Even though oil production in Georgia is insignificant, due to its geostrategic location, Georgia has a long history of serving as a transit corridor for oil transportation

from the Caspian Sea to the western energy markets.

Currently, the territory is divided into license blocks, where different companies selected through international tenders extract oil. They have concluded production sharing agreements with the government. GOGC as a national oil company (NOC) cooperates with the companies, monitors their activities and manages state share of oil.

Six investor companies carry out oil production activities in Georgia, they are Ninotsminda Oil Company, Schlumberger Rustaveli Company Limited (Georgia), Frontera Resources Georgia, VPI Georgia Satskhenisi Georgia, Norio Khevi Georgia and Georgian Oil and Gas Corporation, which extracts oil with its own resources.

Seven investor companies carry out only exploration works, they are GOG Limited, Elenito, Marexin, Georgia New Ventures Inc., Norio Oil Company, West Gulf Petroleum Engineering Company and Coalition Energy Limited Company.

For the last ten years the average annual production totals to 43.6 thousand tones.

➤ Oil Production

Oil and gas production industry is governed by the Law of Georgia "On Oil and Gas" and bylaws issued based on it. On the basis of this Law, GOGC has the status of the National Oil Company (NOC) and it performs functions assigned by the legislation which implies participation in drafting and negotiating the agreements between the State and Investors and their approval; acting as a commercial partner from the Georgian part in the agreements; regulatory evaluation of mining work plans and technological schemes for exploitation of mineral resources; administering the state share of produced oil and gas; creation of the joint coordination committee with the Investor for management of the agreement; implementation of operating and commercial rights and obligations of the state party in the agreements; implementation of other sectoral functions assigned by the state including maintenance of wells located on a non-licensed area on behalf of the state and other oil operations.

GOGC represents the owner of sectoral state property (wells, special equipment, railway dead-end, oil-accumulation system, warehouses etc.) and has a right to transfer it into the ownership of respective license-holder Investors.

In addition to performance of NOC functions, GOGC performs sectoral economic activities, in particular, it has the oil primary treatment enterprise with 50 000 ton tank farm where services are provided for treatment of crude oil to stock-tank condition and its storage until the sale.

Also, GOGC holds the license for oil production and produces oil on the license area.

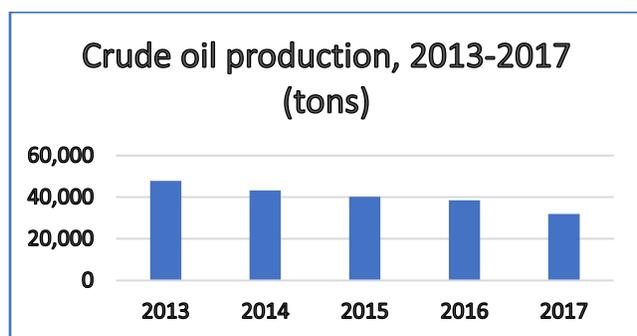


Figure 16: Crude oil production 2013-2017 ¹¹

➤ Oil Transportation

The Baku-Tbilisi-Ceyhan (BTC) and the Western Route Export Pipeline (WREP) transport oil through the territory of Georgia. BTC pipeline exports oil extracted from the Azeri-Chirag-Guneshli field to the Ceyhan port in Turkey. The pipeline is also used to transport oil from Turkmenistan and Kazakhstan. BTC is the second longest pipeline in the world. The total length of the pipeline is 1.768 km with 229 km in Georgia. The pipeline has eight pumping stations, two of which are located in Georgia. BTC is capable of transporting 1,2 million barrels of oil per day (around 58 MTA). The pipeline is operated by *BP* and owned by the International Consortium *BTC Co*.

Western Route Export Pipeline (WREP) also known as the Baku-Supsa Pipeline is the first investment of International Oil Consortium in Georgia, which has been in operation since 1999. The length of the WREP is 830 km. Its diameter is 530 mm. The pipeline transports crude oil from Azeri-Chiragi-Guneshli oil field to the Supsa terminal in West Georgia. where it is transported to Turkey by tankers. The pipeline is capable of transporting up to 120 000 tons of oil per day. The Georgian part of WREP is owned by GOGC and operated by BP.

3.2.4. Coal

Coal deposits in Georgia are mainly located in three regions: Tkibuli-Shaori, Tkvarcheli and Akhaltsikhe. Available coal supplies are of two types: coal and brown coal (lignite). Total volume of Industrial coal supplies (category A, B and C1) equals to approximately 372 million tons.

The Tkibul-Shaori field is considered large, with an industrial stock of about 280 million tons. It does not cox independently, but in combination with Tkvarcheli coal transforms into metallurgical cox. Currently imported high calorie coal is used for its enrichment. Industrial stock of Tkvarcheli field is relatively small - about 21 million tons. Akhaltsikhe Lignite coal deposit has a relatively higher industrial stock of about 71 million tonnes. Currently, coal in Georgia is used for industrial, commercial as well as residential purposes.

¹¹ Source: Geostat; www.geostat.ge

4. Renewable Energy Potential & Its Utilization

➤ Hydro

Natural abundance of river networks contributes to Georgia's energy potential. "According to "Hydro Project", 319 out of total amount of rivers have significant hydropower potential, with potential capacity of 15.63mln kW and average annual generation of 135.8 bl. kWh, as a whole. 208 out of these rivers are small and medium sized rivers with potential capacity of 14.78GWh and 129.5TWh. The rest 111 rivers have potential of 851 thousand kW (7% of total capacity of the rivers). The energy of total surface waters of Georgia accounts for 228.5 TWh, with corresponding capacity of 26.1 GWh"¹².Of this potential approximately 22% is currently utilised in terms of capacity and 17% in terms of production.

Currently, 87 small, medium and large scale hydro power plants are operating with total of 3260.07 MW installed capacity and 9949,3 mln. kWh annual generation (2018). In total, 139 renewable energy projects are under development. The total installed capacity of these projects is 3218 MW and approximate electricity generation is around 13891 mln. kWh. Out of which, 24 Projects are on Construction and Licensing stage, with installed capacity of 235 MW, annual generation of 1,065 mln. kWh. 24 Projects are on Construction stage, installed capacity equals 376 MW, annual generation of 1700 mln. kWh. 91 Projects on the Feasibility Study Stage with 2607 MW installed capacity and annual generation of 11 126 mln. kWh.

➤ Solar Energy

Considering geographical location of Georgia, solar radiation effectiveness and duration is quite high. In majority of Georgian regions annual duration of sunny days varies within 250-280 days, which (considering ratio between the day and night hours) equals 1900-2200 hours a year. Annual solar radiation varies according to regions between 1250-1800 kWh/m². Overall, solar potential of Georgia is estimated at 108 MW, equivalent to 34 ths. tones of heat ¹³.

Maximum solar radiation reaches 10kWh/m² in summer and 4-4.5kWh/m² in sunlit days of winter. Annual maximum for solar radiation was seen in Rodionovka – 2633 hours, while the minimum was observed in Sairme- 1147 hours.

At present approximately up to 50,000 solar collectors are being installed for hot water supply, mostly used to deliver hot water for bathroom and kitchen, heating of swimming-pools. Small-sized PV systems are quite well-spread within population, mostly with the capacity between 20-2000 watts. Through recent net-metering project which enables customers to satisfy own energy demand, deliver excess energy to the network and make respective settlement, by the end of 2018, about 70 subscribers with total installed capacity of about 750 KW¹⁴ were engaged in the project.

By 2020 solar PV plants with total installed capacity of about 150 MW will be constructed and connected to the grid.

¹² <https://www.elynsublishing.com/journal/article/renewable-energy-potential-and-its-utilization-in-georgia>; Renewable Energy Potential and Its Utilization in Georgia: Demur Chomakhidze and Maia Melikidze

¹³ Mirskhulava D, Chomakhidze D, Arveladze R, Eristavi E, Tsintsadze P. Energy Strategy of Georgia, Bakur Sulakauri, Tbilisi, 2004:297. [in Georgian]

¹⁴ GNERC Annual Report 2018; <http://gnerc.org/files/wliuri%20angariSi/2018%20w-report%20-%2015.05.2019.pdf>;

➤ Wind Energy

Average annual wind speed in Georgia is 0.5- 9.2 meters/second. In some regions it exceeds 15 m/sec. The average annual electricity generation potential of wind in Georgia is estimated to be 4 TWh with an installed capacity of 1,500 MW.¹⁵ Several studies of wind power have identified the areas for potential wind farm construction with total installed capacity up to 1450 MW

In 2016 the first wind farm with the installed capacity 20.7 MW, and annual generation of 88 GWh was put into operation.

➤ Biomass and biofuels

a) Biomass supply

Georgia faces an imminent crisis in supplying its regions with heating energy. The fuel wood that constitutes about 12% of country's total energy balance, and about 35% of domestic primary energy, is utilized in a highly unsustainable way. The Forestry Agency of the Ministry of Environment estimates the annually available renewable wood resource at 600,000 m³, while the total consumption was estimated at 2.5 million m³ in 2014.

It is noteworthy that in the time period between 2014 (the baseline year) and 2016 (the last year for which the energy balance was available, fuel wood production and consumption dropped by 911 GWh (approximately 17%) or approximately 400,000 m³ to 2.1 million m³.

There are significant volumes of solid woody biomass residues currently not utilized which can be used for heating through production of upgraded solid biofuels (briquettes, pellets and chips) to satisfy heating needs – particularly outside the capital. This includes agricultural (theoretical potential 7-8 PJ equivalent annually) and forestry waste as well as waste from tree trimming in the cities, and from other underutilized sources. These sources can be summarised as follows:

b) Biomass residues:

The theoretical potential is approximately 1 million m³ of biomass residues. There is approximately 3.02 million ha of agriculture land. Nearly 0.8 million ha of this is arable land and 0.33 million ha is used for perennial crops. Pasturelands (1.8 million ha), and meadows (0.14 million ha) make up the remainder of the agricultural lands.¹⁶

c) Residential waste:

Approximately 900,000 tonnes of waste per year accumulate in the Tbilisi and Kutaisi waste disposal sites according to municipal data. An estimated 90 million m³ biogas could be obtained by re-treating these residues; this would equal 64 million m³ of natural gas. Approximately 160 million m³ of biogas can be

¹⁵ Ministry of Energy (2013) HPP Potential: http://www.energy.gov.ge/energy.php?lang=eng&id_pages=60

¹⁶ Current land policy issues in Georgia - J. Ebanoidze, Association for the Protection of Landowners' Rights, Tbilisi, Georgia

annually obtained from the sewage water cleaning station of Tbilisi (serving 1.2 million). The resulting biogas energy is estimated to be 1,000 GWh/year equalling 100 million m³ of natural gas.

Therefore, the technical potential of the major biomass sources in Georgia amounts to 12.5 TWh/year. The achievable potential is estimated at 3-4 TWh/year.

This estimate does not incorporate the potential of farming energy crops. For comparison, one can note that total annual electricity generation in Georgia is in the range of 8,000 GWh. Apart from firewood, which is used for cooking and heating, and a few donor supported biogas initiatives, the biomass potential remains untapped.

5. Legal Framework on Energy

The Law on Electricity and Natural Gas ¹⁷ is the key piece of legislation regulating the country's energy sector since 1997. The objectives of the law include stimulating the use of local hydro energy and other renewable energy sources. This Law has been amended several times since 2006 and currently incorporates some EU principles – notably reflecting the principles of deregulation and liberalisation of the energy market.

“The Main Directions of the State Energy Policy of Georgia” has been adopted on June 2015,¹⁸ The Energy Policy develops a long-term comprehensive state vision, which is the basis for the development of short, medium- and long-term strategies, with a special emphasis on the utilization of Georgia's renewable energy resources. Energy efficiency is also incorporated into the document.

Since 2015 the Ministry of Energy (now Ministry of Economy and Sustainable Development of Georgia) approves a “Ten-year network development plan of Georgia for 2015-2025” on annual basis This is the time-bound program designed for reinforcement of national transmission system infrastructure, addressing the existing problems, responding to the future challenges and implementing the opportunities. One of the core subjects identified in the document is an integration of renewable energy sources into the network, which still remains a major challenge for the wind and solar based electricity generation.

For the purpose of supporting the construction of new generation, units the Government of Georgia has adopted state programs and several sub-laws.

The National Environmental Action Programme (NEAP) of Georgia 2012-16 ¹⁹ assumes that Georgia is on a fast track for economic development. Economic growth is the basis for the country's welfare which may bring considerable pressure on natural resources and the environment. Therefore, sustainable economic development is important for the country from the perspective of environmental protection and rational use of natural resources. The NEAP sets long term (20-year) goals and short term (5-year) targets in 11 thematic environmental areas including climate change. Climate change mitigation is among the short term targets – Target 3: the creation of favourable conditions for the reduction of GHG emissions. The proposed measures related to this National Energy Efficiency Action Plan (NEEAP) are: the elaboration of Low Emission Development Strategy (LEDS) (ongoing) and the Promotion of EE in the Transport and Building sectors.

Draft State Strategy for the Development of Solid Biofuels in Georgia has been elaborated and is subject of the government approval and adoption in the near future.

The major goal of the strategy is the facilitation of the utilization of solid biomass residues in Georgia, through the encouragement of the production and utilization of the modern solid biofuels. The main directions of the strategy include:

- Sustainable management and provision of supply of solid biomass residues from forest, agriculture, industry and other sources;
- Support of the advancement of the new technologies and business processes for the production of the solid biofuels;

¹⁷ Available in its updated form at: http://www.energy.gov.ge/legislation.php?lang=eng&id_pages=33

¹⁸ Available at: http://www.energy.gov.ge/ministry.php?id_pages=12&lang=eng

¹⁹http://www.preventionweb.net/files/28719_neap2.eng.pdf

Encouragement of the sustainable production and demand for the energy received from biomass residues.

Georgia joined the Energy Community as a full-fledged member in the course of 2017, following the ratification of the accession agreement by the Georgian Parliament.

As a full member of the Energy Community Treaty, Georgia plans to follow the provisions of the EU Directives and transpose the *acquis communautaire* according to the Energy Community work program. Georgia (via the Ministry of Economy and Sustainable Development) is also developing a new Law on Energy and Water Supply which is expected to be approved in the near future. This law will become a key part of legislation regulating the energy sector. However, it is expected that it will predominantly govern natural gas and electricity markets.

Table 4: Overview of policies and regulations related Sustainable Development Goal 7

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
Law on Energy Efficiency	<p>Implement the EU’s Energy Efficiency Directive (EED - 2012/27/EU), help Georgia to meet its commitments under the Energy Community Treaty and the EU Association Agreement, and achieve the goals set out in the National Energy Efficiency Action Plan (NEEAP). Specific elements of the law which are relevant include:</p> <ul style="list-style-type: none"> • Establishment of an EE Agency to facilitate investment and carry out Monitoring, Reporting and Verification (including for EE in buildings, energy labelling and ecodesign requirements) • Establishes the NEEAP as the document for establishing EE targets at a national level • Requirement of public bodies to purchase EE equipment where feasible (Responsibility of the State Procurement Agency) • Requirement of annual EE plans in municipalities (Responsibility of municipalities though the EE Agency would help) • Plan for establishment of a web-based MRV system (Responsibility of the EE Agency) • Establishment of the legal basis for energy performance contracts • Requirement for setting up of certification programmes for energy auditors and for publication of information on them (Responsibility of the Georgian Accreditation Center to approve certifying organisations) • A requirement that 1% of central-government owned and occupied buildings with a total useful floor area over 500 m2 should be renovated each year to meet EE standards (the list would be published in secondary legislation and the EE standards would be part of Energy Performance in Building secondary legislation) (Responsibility would be the EE Agency) • Language to encourage end-user energy efficiency amongst consumers via awareness raising, financial measures, and training. 	MoESD with overarching responsibility, though different articles have specific responsibility	Expected adoption in 2019
Law on Energy Performance of Buildings	<p>To approximate the Energy Performance in Building Directive. This includes specific relevant provisions to:</p> <ul style="list-style-type: none"> • Require private buildings sold or rented and all public buildings with more than 500 m2 (lowered to 250 m2 on 30 June 2023) and visited often by the public and to have energy performance certificates 	Ministry of Economy and Sustainable Development of Georgia	Expected to be adopted by the end of 2019

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
	<ul style="list-style-type: none"> • Set minimum energy performance standards for primary energy consumption for new buildings or buildings which undergo major renovations – to a cost-effective level. • Require that all new buildings shall satisfy the requirements of Nearly Zero Energy Buildings unless it is not cost-effective to do so. • Requires regular inspections of boilers • Encourages public education on the topic of EE in buildings and review of financing measures to encourage EE <p>Various secondary legal acts are also required for the full implementation of the EPBD</p>		
Law on Environmental Protection ²⁰	<p>Use of natural resources with consideration of environmental principles and sustainable development. Specifically, Article 51 of the law relates to the Protection of Climate against the Global Changes</p> <ol style="list-style-type: none"> 1. The purpose is to protect the climate of the earth against the global changes, the subject of the activity is obliged to observe the limits to the emission of gases which cause the greenhouse effect as well as to take measures for mitigating their emissions. 2. The emission of the gases, which causes the greenhouse effects is regulated on the basis of the integrated control of the pollution of the environment. 3. The legal rules of the protection of climate against the global changes shall be provided by law of Georgia in the framework of Georgia’s jurisdiction. 	Ministry of Environmental Protection and Agriculture of Georgia	Existing 10 Dec 1996
The Forest code of Georgia ²¹	<p>Rules for conducting tending, protection, restoration, and the use of the Georgian Forest Fund’s resources.</p> <p>The Draft forest code is expected to limit access to wider population to the forests. This may influence biomass production, both positively and negatively.</p>	National Forestry Agency	22 June 1999 A New Forest Code is in the Parliament.
Law - Waste Management Code ²²	<p>Facilitate waste prevention and its increased re-use as well as environmentally safe treatment of waste. A number of specific provisions are potentially relevant including:</p> <ul style="list-style-type: none"> • The burning of waste outside permitted incinerators shall be prohibited 	Ministry of Environmental Protection and	26 Dec 2014

²⁰ http://www.vertic.org/media/National%20Legislation/Georgia/GE_Environmental_Protection.pdf

²¹ http://biomass.ge/sites/default/files/annex_1_acc200835_georgianforestcode.pdf this is the old one

²² http://environment.cenn.org/app/uploads/2016/06/Waste-Management-Code_FINAL_2015.pdf

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
	<ul style="list-style-type: none"> The Ministry shall develop a Strategy on management of biodegradable municipal waste Including targets and measures for the reduction of the amount of biodegradable municipal waste going to landfill. The requirement that legal and natural persons that produce more than 200 tonnes of non-hazardous waste or 1,000 tonnes of inert waste or any amount of hazardous waste annually, shall prepare a company waste management plan and have an environmental manager 	Agriculture of Georgia	
Law of Georgia on Environmental Impact Permits ²³	Facilitates protection of the environment and natural resources from irreversible quantitative and qualitative changes, and their rational use. Defines the cases where an environmental impact assessment is required. This is not expected for this project but it should be double-checked.	Ministry of Environmental Protection and Agriculture of Georgia	14 Dec 2007
Law on Renewable Energy ²⁴	<p>To define open issues and approximate the Renewable Energy Directive. Relevant provisions of the draft include:</p> <ul style="list-style-type: none"> Requiring that targets are set within the Renewable Energy Action Plan Promotion of the installation of renewable energy sourced for new buildings and settlements amongst local self-governing units Definitions of what constitutes renewable energy (including biomass) Requirement of RE in new or substantially refurbished buildings starting in 2025 and for public buildings starting in 2022 For biomass stoves, the Government should promote those conversion technologies that ensure achievement of a conversion efficiency of at least 85% for residential and commercial applications and at least 70% for industrial applications. For solar hot water, the Government should promote the use of certified equipment and systems based on European standards where these exist, including eco-labels, energy labels and other technical reference systems established by the European standardisation bodies. 	Ministry of Economy and Sustainable Development, with some delegated responsibilities to GNERC and / or local authorities.	Expected to be adopted by the end of 2019

²³ <http://environment.cenn.org/app/uploads/2016/10/The-Law-of-Georgia-on-Environmental-Impact-Permit.pdf>

²⁴ http://hydropower.ge/user_upload/6.HIPP_Report_on_RES_Law.pdf

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
	<ul style="list-style-type: none"> • Requires the setting up of training / information distribution to the public on RE, setting up of certification programmes for RE installers (small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps), and may have lists of certified installers • The Government shall ensure that guidance is made available to planners and architects, as well as to all relevant actors, so that they are able properly to consider the optimal combination of renewable energy sources, of high-efficiency technologies and of district heating and cooling when planning, designing, building and renovating industrial or residential areas. • The Government with the participation of local self-government and regional governmental authorities shall develop suitable information, awareness-raising, guidance or training programmes in order to inform citizens of Georgia of the benefits and practicalities of developing and using energy from renewable sources. • Sets up the legal basis for certificates of origin 		
Draft ²⁵ Main Directions of the State Energy Policy of Georgia	<p>The aim is to develop a long-term comprehensive state vision, which will later become the basis for the development of short, medium and long term strategies for 2030, with a special emphasis on the utilization of Georgia’s renewable energy resources. The Energy Policy of Georgia defines nine strategic energy policy directions of which three are related to sustainable energy:</p> <ul style="list-style-type: none"> • Utilization of Georgia’s renewable energy resources; • Develop and implement an integrated approach to energy efficiency in Georgia; • Gradual approximation and later harmonization of Georgia’s legislative and regulatory framework with the EU Energy acquis. <p>The development of renewable energy resources is key to tackling climate change and deploying cleaner sources of energy as well as decreasing Georgia’s dependence on imported energy. Attracting investments in RES sector is a strategic goal for Georgia. With regards to its integrated approach to energy efficiency, the Energy Policy of Georgia considers the decrease of energy intensity through various measures of demand-side management (DSM). To</p>	Ministry of Economy and Sustainable Development	2015 - ongoing

²⁵ <http://www.energy.gov.ge/projects/pdf/news/Sakartvelos%20Energetikuli%20Politika%20Proekti%20Araofitsialuri%20Inglisuri%20Targmani%20796%20geo.pdf>

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
	facilitate DSM corresponding legislative framework as well as energy efficiency programs need to be created, measures on introduction and development of energy efficient technologies and equipment planned and implemented.		
Law on the System of Protected Territories ²⁶	Encourages the activities aimed at preserving those areas, which are valuable for agricultural, industrial, transportation, energy purposes, as well as natural resources	Ministry of Environmental Protection and Agriculture of Georgia, the Central Department of Protected Territories, State Reserves and Hunting Areas	March 1996
Action Plans and Strategies			
Social-economic Development Strategy of Georgia 2020 ²⁷	<p>The third main principle of the Strategy is based on rational use of Use of natural resources, ensuring environmental safety and sustainability and avoiding natural disasters during the process of economic development. Specific indicative statements include the following:</p> <ul style="list-style-type: none"> • Energy efficiency will be enhanced and relevant legislative mechanisms will be drawn up in accordance with international and European norms in order to preserve the country's energy resources. The efficient use of energy is important as a means of increasing the country's energy independence and rational use of resources, and can potentially decrease future costs. • Building natural gas infrastructure/metering in regions Government of Georgia will continue building natural gas infrastructure in villages, introducing individual meters and building electricity infrastructure in villages that have no electricity. This will lead to lessened consumption of natural resources for heating/fuel and improved social conditions in the regions. 	Government of Georgia	2014 - 2020

²⁶ <http://www.elaw.org/content/georgia-law-system-protected-territories-english>

²⁷ <https://www.adb.org/sites/default/files/linked-documents/cps-geo-2014-2018-sd-01.pdf>

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
Ten-year network development plan of Georgia for 2018-2028 ²⁸	Reinforcement of national transmission system infrastructure, addressing the existing problems, responding to the future challenges and implementing the opportunities, including the Integration of renewable energy sources into the network	Georgia State Electrosystem	2018-2028
National Energy Efficient Action Plan (NEEAP) of Georgia	<p>Includes Georgia’s indicative national energy efficiency targets for 2021, 2025, and 2030. Specific measures listed in the NEEAP which are relevant for the project include:</p> <ul style="list-style-type: none"> • Adoption and implementation of the EPBD / energy efficiency standards in buildings (policy measure triggering investments) • Implementation of EE measures in schools, kindergartens, and other public buildings (to be funded through IFI / lending + donor grants) • Support for efficient biomass stoves (to be funded through donor grants) • Support for solar hot water heaters (to be funded through donor grants) 	Ministry of Economy and Sustainable Development – with specific responsibilities for measures as appropriate.	Expected adoption in early 2019 for the period impacting 2019 - 2021
Ministry of Energy Medium-term Action Plan	<p>Development of Action Plans for the utilization of electricity from renewable and alternative energy sources and the creation of the legislation to support energy efficiency measures – described in more detail elsewhere in this table. Specific relevant actions include:</p> <ul style="list-style-type: none"> • The RE action plan is focused on electricity generation from renewables/renewable heating and cooling / and renewables in transport has been developed as of energy community guidelines and national targets defined. document is draft but expected to be approved by the end of the year. • Similarly the NEEAP is in the final stage of inter-ministerial consultation process. <p>Both action plans set requirements for establishing the relevant regulatory frameworks, adjustment of institutional settings and establishing support schemes for support of efficient biomass stoves and solar hot water heaters.</p> <p>The Energy Performance in Buildings Law has been drafted and submitted to the Parliament in the Fall of 2018.</p> <p>The Draft EE Law, RE Law and overall Law on Energy and Water supply are finalized and will be submitted to the parliament in March 2019.</p>	Ministry of Economy and Sustainable Development	2017 - 2020

²⁸ http://www.gse.com.ge/sw/static/file/TYNDP_GE-2018-2028_GEO.PDF

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
The National Environmental Action Programme (NEAP) of Georgia - 3rd National Environmental Action Program of Georgia 2017-2021 (NEAP 3) ²⁹	<p>Outlines a number of relevant activities to be carried out in the period of 2017 – 2021, including:</p> <ul style="list-style-type: none"> • Revision of the forest code • Promotion of access to alternative fuel sources (biomass) for population and public entities • Preparation of Low Emission Development Strategy (LEDS) which includes various measures related to energy efficiency • And other climate change commitments (Biennial Update Reports, National Communications, Climate Change Strategy, etc.) 	Ministry of Environmental Protection and Agriculture of Georgia	2017 – 2021
State Strategy for the Development of Solid Biofuels in Georgia	<p>The main goal of the strategy is to promote the use of solid biomass in Georgia by stimulating the production and use of modern solid biofuel. The strategy defines basic directions and state measures in support of UBF production and consumption in Georgia. Main directions of the strategy include:</p> <ul style="list-style-type: none"> • Sustainable management and provision of supply of solid biomass residues from forest, agriculture, industry and other sources; • Support of the advancement of the new technologies and business processes for the production of the solid biofuels; • Encouragement of the sustainable production and demand for the energy received from biomass residues. <p>The following topics are discussed in the strategy: definition of the responsible body, necessary changes in the legal framework (RE legislation, Taxation, tax incentives for UBF business, waste management); standardization (introduction of standards for biomass and fuels), as well as for appropriate manufacturing and consumption technologies; stimulation of demand; Innovative and logistic support, awareness raising and enhancement of knowledge & skills; seek financing from IFIs and climate funds; Creation of sustainable production processes.</p>	Ministry of Environmental Protection and Agriculture of Georgia	Draft prepared in 2017. Currently is under review
Strategy for Agricultural development in	Fostering the competitiveness of agriculture; ensuring the sustainable management of natural resources, and climate action; and achieving a balanced territorial development of rural economies and communities including the creation and maintenance of employment.	Ministry of Environmental Protection and	Adopted in 2015

²⁹ <http://mepa.gov.ge/En/Files/ViewFile/1605>

Name of Legislation / Policy	Brief	Responsible institution	Status of adoption / implementation
Georgia 2015-2020 ³⁰		Agriculture of Georgia	
Rural Development Strategy of Georgia 2017-2020 ³¹	Includes the objective of the improvement of the management of water, forest and other resources and the promotion of sustainable systems of waste management in rural areas.	Ministry of Environmental Protection and Agriculture of Georgia	Adopted in 2016
Low Emission Development Strategy (LEDS) ³²	Outlines a number of activities to reduce net greenhouse gas emissions – including those included in the NEEAP related to efficient biomass heaters and solar hot water heaters.	Ministry of Environmental Protection and Agriculture of Georgia overall – with various ministries for implementation	Draft published, Sep.2017
Intended Nationally Determined Contribution (INDC) ³³	Georgia plans to unconditionally reduce its greenhouse gas (GHG) emissions by 15% below the Business As Usual scenario (BAU) for the year 2030. The 15% reduction target can be increased up to 25% in a conditional manner, subject to a global agreement addressing the importance of technical cooperation, access to low-cost financial resources and technology transfer. The 25% reduction below BAU scenario would also ensure that Georgian GHG emissions by 2030 will stay at 40% below the 1990 levels.	Ministry of Environmental Protection and Agriculture of Georgia overall – with various ministries for implementation	Submitted to UNFCCC at the end 2015

³⁰ <http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/8466.pdf>

³¹ <http://enpard.ge/en/wp-content/uploads/2015/05/Rural-Development-Strategy-of-Georgia-2017-2020.pdf>

³² http://www.decisionwaregroup.com/assets/wi-172_2017-09-14-georgia-s-low-emission-develdevelopment-strategy_eng.pdf

³³ https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Georgia%20First/INDC_of_Georgia.pdf

6. Global Agenda for Sustainable Development and Georgian Path from 2015

The UN General Assembly adopted 2030 Agenda for Sustainable Development on September 2015. 17 Sustainable Development Goals and 169 associated targets balance three dimensions of sustainable development—economic, social and environmental. 2030 Agenda is the sole global agenda that unites every country to achieve sustainable development with the core principle of “leaving no one behind”.

The Administration of Government of Georgia (AoG) expressed high level political support to prioritizing SDGs. The Government of Georgia (GoG) started nationalizing SDGs in 2015 and undertook important steps in this direction. The same year, the AoG was granted coordination functions of the implementation of SDGs. Georgia currently has all 17 goals, **95 targets and 215 indicators nationalized**³⁴. The GoG aims to nationalize all 169 targets till 2030.

The Sustainable Development Goals Council was established for monitoring and efficient coordination of SDG implementation.

Incorporation of SDGs in national policy documents started in 2018. This will be an inevitable component in transferring SDGs into the daily agenda of public institutions.

Integration of nationalized SDGs into development planning of Georgia is very high:

The 37 national strategies cover 93 % of nationalized SDG targets; The process of defining adjusted SDG targets, development of relevant indicators has drawn on a set of strategic and multi-sectoral development documents, especially: EU–Georgia Association Agenda; Social and Economic Development Strategy “Georgia 2020”; National Strategy for the Protection of Human Rights in Georgia; Public Administration Reform Roadmap and its Action Plan 2015-2016.

Government Policy Priorities in pursuit to SDGs- 4 point reform plan of the Government of Georgia: Economic reform; Education reform; Spatial development: Regional and Infrastructural Development; Governance reform.

Thematic Working Groups

Social Inclusion	<ul style="list-style-type: none"> • Poverty eradication, employment, food, water, equality 	<p>The Council has four thematic Working Groups: on Social Inclusion; Economic Development; Democratic Governance and Sustainable Energy and Environmental Protection. The AoG performs the functions of Secretariat of the Council.</p> <p>The national document – SDGs Matrix was elaborated which includes all the necessary information that will guide lead government</p>
Economic Development	<ul style="list-style-type: none"> • Economic growth, macroeconomic policy, ODA, inequality 	
Democratic Governance	<ul style="list-style-type: none"> • Peace, human rights, gender equality, anti-corruption 	
Sustainable Energy & Environment Protection	<ul style="list-style-type: none"> • Land degradation, climate change, biodiversity, access to electricity 	

institutions in the process of implementing the 2030 Agenda. Namely, the Matrix reflects global and Georgia-adjusted targets, as well as indicators that should be achieved by 2030 and baseline indicators to measure the achievement of the targets.

The High-Level Political Forum (HLPF) has a central role in overseeing follow-up and review of the progress made on SDGs at the global level. Georgia submitted its first Voluntary National Review (VNR) to the HLPF

³⁴Source: Presentation “Nationalization of SDGs in Georgia. 3-year summary” Administration of the Government of Georgia; Giorgi Bobghiashvili; April 16, 2019

in 2016. However, VNR was not detailed at that time and highlighted Georgia’s general aspirations towards achieving sustainable development, the process of establishing institutionalized coordination and nationalization mechanism and future plans. Georgia was due to submit its next VNR in 2019, describing detailed progress of all SDGs compared to relevant indicators, but the date of submission was postponed to 2020. The Council and Working Groups in the process of elaboration of the first progress report will use innovative Electronic Monitoring System (EMS). The EMS provides for effective and transparent monitoring of the national agenda of UN Sustainable Goals. The electronic monitoring tool will support the distribution of up-to-date information about the performance of public institutions on subsequently all relevant targets of the SDGs.

Table 5: SDG 7

GOAL 7. ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL			
Global Target	Georgia Adjusted Target	Global Indicator	Lead Ministry /Agency
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1 By 2030, Georgia achieves significant progress in ensuring nationwide access to affordable, reliable and modern energy services	7.1.1: Percentage of population with access to electricity 7.1.2: Proportion of population with primary reliance on clean fuels and technology	Ministry of Economy & Sustainable Development
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2 By 2030, increase substantially the share of renewable energy in the energy mix of Georgia	7.2.1: Renewable energy share in the total final energy consumption	
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3 By 2030, significantly increase the rate of improvement in energy efficiency in Georgia	7.3.1: Energy intensity measured in terms of primary energy and GDP	
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology in Georgia	7.a.1: Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment	

7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes support.	7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all	7.b.1: Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services	
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Access to electricity- According to database from Sustainable Energy for All Global Tracking Framework, led by World Bank, International Energy Agency and the Energy Sector Management Assistance Program, almost 100% of Georgian population has access to the electricity³⁵ However, according to the information from the Ministry of Economy and Sustainable Development of Georgia, all households in urban areas have access to electricity while in rural areas there are few villages where households lack access to electricity.

Modern Energy for Cooking

According survey - “Energy Consumption in Households”, conducted in 2017 by National Statistics Office of Georgia, about 80% of rural population uses natural gas for cooking, while these figure is almost 3 times lower among rural households, as about 40% of rural population uses firewood and agricultural waste, followed by 27% of those who use LPG.

Energy Source	Urban	Rural
Natural Gas	77.8	27.8
LPG	6.3	27
Firewood, agricultural waste	9.3	39.9
Coal	0.1	0.1
Electricity	6.5	5
Other	0	0.2
	100%	100%

Table 6. Distribution of Households (%) in Urban and Rural Areas by Used Energy Forms for Cooking³⁶

As fuel wood which is largely used by population in rural areas both for heating and cooking is mostly burnt in primitive inefficient wood stoves, the introduction of energy efficient wood stoves will not only reduce fuel wood consumption thus improving access and affordability to this source of energy, but also improve comfort level and decrease indoor air pollution in the houses, which is connected to SDG 3.

Considerable work has been done by the Government of Georgia to nationalize Sustainable Development Goals (SDGs) with special emphasis on ensuring that all SDGs have gender-sensitive indicators and that gender equality policies reflect commitments made in the nationalized SDGs and their targets. Achievement of gender equality (SDG 5) and the SDGs will not be possible without women’s economic empowerment, the Government Action Plan on Human Rights 2018-2020 ³⁷ incorporates issues such as: economic

³⁵ <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?locations=GE>

³⁶ Source: National Statistics Office Publication; “Energy Consumption in Households” 2017. p.39. www.geostat.ge

³⁷ <http://myrights.gov.ge/en/plan/Human%20Rights%20Action%20Plan%20for%202018-2020>

empowerment of rural women, identifying needs of women living in rural areas, ensuring equitable access to resources etc.

Access to energy can increase opportunities for women, enabling them to work from home and thereby generate an independent source of income. Impacts will initially be greatest at the household level, with society-wide implications emerging over time. The more empowered women become, the more likely they are to push local initiatives that directly benefit them from an energy-access perspective, since they are often the ones to gain most from the use of cleaner, easier-to-obtain fuels for cooking and lighting. Access to energy reduces the importance of physical gender differences in the labour force, increasing access to the professions for women. Public outdoor lighting would increase security for women and girls, in the evening.

The country's energy potential affects its economy at both the macro and micro levels. Accordingly, it reflects both on the economic performance of the country as a whole and on the well-being of each of its residents.

In the macro aspect, there is a strong link between consumed or produced energy and the country's economic development. From a micro perspective, energy can be a source of health improvement, productivity growth, additional income, and a reduction in labor costs for each individual household. Hence, gender-based energy consumption priorities may be identified, as the main household energy users are usually housewives.

It is obvious that the improved energy situation for each family directly affects the well-being of the woman as a housewife. This is especially true in Georgia, where the majority of women are housewives while the rest are employed, but still take their part in a daily housekeeping activities. Consequently, access to energy sources is vital for both categories, so that their free time and money can be spent more efficiently.

At this stage, gasification procedures are under intense development. Between the years of 2019-2021, the LLC "Georgian Gas Transportation Company" shall ensure 58 849 customers across 233 settlements with the natural gas supply through the gasification project and construction work developments, which will allow housewives to replace widely used bio fuel (wood) with natural gas. (Decree N 791 of the Government of Georgia of April 5, 2019 – On Facilitating Natural Gas Supply for the Population of Georgian between 2019 – 2021).

It is also very important for families to have uninterrupted power supply, which is directly related to the use of family equipment and information sources. In this regard, the decree N751 of the Government of Georgia dated April 4, 2019 - on allocation of funds from the Highland Settlement Development Fund, according to which 2 000 000 GEL will be allocated to the Ministry of Regional Development and Infrastructure of Georgia for the purpose of providing solar panels to municipalities that are left without electricity.

The below table shows the number of employees in the energy sector. The table noticeably indicates the growing number of women employed in the energy sector.

Number of Employees in the Energy Sector 2015-2019														
2015			2016			2017			2018 *			2019 I Quarter		
Totally	Women	Man	Totally	Women	Man	Totally	Women	Man	Totally	Women	Man	Totally	Women	Man
14588	2680	11908	14473	2666	11807	14881	2728	12153	59191	10385	48806	14876	2623	12253

Table 7: Number of employees in the energy sector by sex

The establishment of **SDG 6, Ensure availability and sustainable management of water and sanitation for all**, reflects the increased attention on water and sanitation issues in the global political agenda. Fresh water, in sufficient quantity and quality, is essential for all aspects of life and sustainable development. The human rights to water and sanitation are widely recognized by Member States. Water resources are embedded in all forms of development (e.g. food security, health promotion and poverty reduction), in sustaining economic growth in agriculture, industry and energy generation, and in maintaining healthy ecosystems.

Coordination between the water, energy, food and environment sectors is challenging even at the national level. But the complexity increases substantially in transboundary river basins where the impacts spread from one country to another and trade-offs and externalities may cause friction between the riparian countries.

Improved water, energy and food security on a global level can be achieved through a nexus approach — an approach that integrates management and governance across sectors and scales. A nexus approach can support the transition to a Green Economy, which aims, among other things, at resource use efficiency and greater policy coherence.

The nexus assessments undertaken under the Water Convention are intended to provide a picture of the interdependencies across water, ecosystems, energy, food and other areas such as climate change and biodiversity in terms of uses, needs, economic and social benefits, potential synergies, conflicts and trade-offs, and also to identify possible policy responses.

The nexus assessment of the Alazani/Ganykh Basin ³⁸ elaborated by UNICE “Reconciling resource uses in transboundary basins: assessment of the water-food-energy-ecosystems nexus” aimed at supporting transboundary cooperation between Georgia and Azerbaijan in the areas of water, energy, food and environmental policies by strengthening the knowledge base for integrated policy development and decision-making. The pilot nexus assessment of the Alazani/Ganykh River Basin includes the preliminary identification of possible solutions to improve the management of the basin’s land, water, energy and environmental resources. These potential solutions have been classified under five headings: **institutions, information, instruments, infrastructure, and international cooperation and coordination.**

The nexus assessment of the Alazani/Ganykh Basin findings and recommendations, include:

- **The sustainable use and management of the Alazani/Ganykh Basin’s resources is essential for the development of the riparian regions in Georgia and Azerbaijan.** The basin has productive agricultural land, attractive landscapes, and abundant and good quality water resources. The agriculture and tourism sectors, which rely on those resources, are expected to drive development in the riparian regions. Improving energy access and affordability in rural areas contributes to improving rural livelihoods.
- **The basin’s resources are increasingly under pressure.** Economic development is driving water demand and water transfers to supply cities outside of the basin, raising pollution levels from agriculture and households, and increasing the exploitation of hydropower potential. Despite reduced levels of poverty, poverty is still an issue, and it is driving erosion and sedimentation owing to excessive logging for fuelwood and poor maintenance of river banks and irrigation infrastructure. In addition to erosion processes, flooding of agricultural plots also takes place.
- **There are multiple linkages in the Alazani/Ganykh Basin between the different basin resources.** Energy-land and land-water linkages are particularly strong. But second degree linkages are also relevant – for example, lack of modern fuels in the upper basin leads to deforestation for fuelwood

³⁸http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_Nexus/Nexus_assessment_Chapter_5_Alazani-Ganykh_ge_web_final.pdf;
http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_Nexus/ece_mp.wat_46_eng.pdf

collection, impacting on land erosion and sedimentation, which in turn affects water resources and populations (through flooding) as well as energy production through siltation of reservoirs and the impact of floods.

Therefore, understanding the consequences of different policy options requires looking at the chain of indirect impacts across sectors, and quantifying them whenever possible.

- **Possible solutions to support the sustainable use and management of the basin resources.** They include solutions related to institutions, information, instruments, investments, and international cooperation and coordination. Often, coherent packages of measures will need to be devised, for example, with regard to agricultural support or the promotion of fuel switching. A nexus perspective should inform the selection of measures, for example, in the development of sustainable and multi-purpose renewable energy sources.
- **Management of the nexus requires stronger transboundary governance.** The two countries are currently negotiating a transboundary agreement for the Kura Basin to which the Alazani-Ganykh belongs. Finalizing that agreement represents a valuable opportunity for engaging different water-using sectors in cooperating at the transboundary level.
- **More intense transboundary cooperation on the integrated management of basin resources will bring additional real benefits.** It will allow Georgia and Azerbaijan to exploit complementarities in their resource bases (e.g. Georgian forests, Azerbaijani gas) to optimize resources development as well as risk management at the basin scale (e.g. coordinated hydropower development, coordinated flood management) to effectively protect the resource base for regional economic development, and to generate new economic opportunities (e.g. through more intense energy trade). There are certainly opportunities for the two countries to learn from each other, for example, Georgia would benefit from Azerbaijani experience in promoting the switch from fuelwood to modern fuels, and Azerbaijan could learn from the Georgian experience in economic valuation of ecosystem services.
- **Ultimately, stronger and more coherent national policies are needed to “manage the nexus”.** To a large extent, the dynamics between the resources and sectors at the transboundary level are explained by national developments. Intersectoral planning needs to be strengthened, which will require improved information exchange, but also mechanisms to take into account cross-sectoral impacts when carrying out sector planning. The preparation of the National Water Strategy of Azerbaijan and the updating of the Georgian Water Law provide an opportunity to strengthen intersector coordination of water-user sectors. Similarly, the development of the new Energy Strategy for Georgia represents an opportunity to consider the chain of impacts on other sectors (agriculture, forest, tourism, urban development) of different energy policy options.

Agenda 2030 requires substantial and coordinated efforts across and within all national institutions and bodies. The following ministries play the strongest role of integrating the agenda by contributing to the implementation of the majority of the nationalized SDG targets:

- Ministry of Economy and Sustainable Development;
- Ministry of Internally Displaced Persons from the Occupied Territories, Labour, Health and Social Affairs;
- Ministry of Environmental Protection and Agriculture;
- Ministry of Education, Science, Culture and Sport.
- Ministry of Regional Development & Infrastructure

In May 2019, UN Development Programme (UNDP) led assessment of how Georgia's national and sub-national policies are aligned with the SDGs was presented. The analysis reviewed 55 different sectoral strategies and Georgia's Association Agreement with the European Union (EU) to assess how well SDG targets are reflected in national plans, and how well national priority goals are funded.

According to the assessment ³⁹ integration of nationalized SDGs into development planning of Georgia is very high.

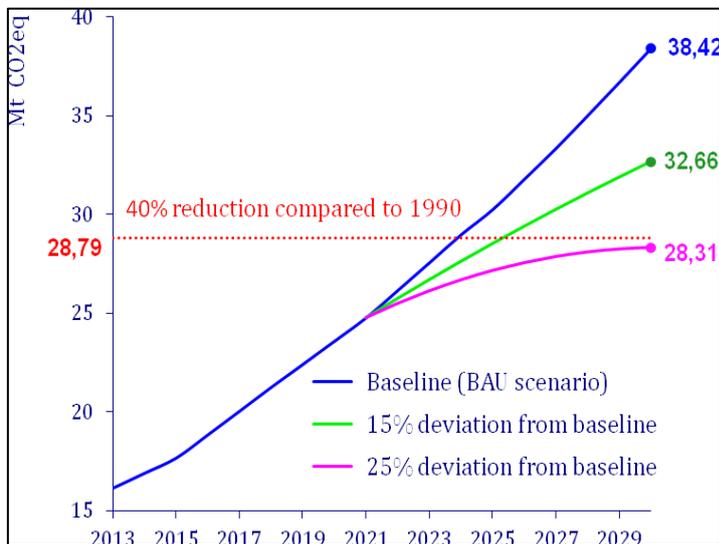
Long-term strategies, including the AA cover, 77% of the nationalized SDG targets. The findings were broadly positive in terms of strategic alignment: 37 national strategies cover fully 93 percent of the SDG targets that Georgia has adopted as national priorities. It's revealing, however, that the EU Association Agreement makes a huge contribution to the country's alignment with SDG targets, covering fully 63 percent of all targets. This underlines the complementarity of the SDGs and the European integration agenda, and also suggests a need for the refinement of sectoral strategies. Alignment work is needed in particular for four SDGs: gender equality (#5); reduced inequalities (#10); peace, justice and strong institutions (#16); and partnerships for sustainable development (#17).

In terms of spending, some priority areas are faring better than others. Peace (#16), education (#4) and infrastructure (#9) have generous budgets, whereas poverty (#1), gender equality (#5) and environmental protection and climate change (#6, 12, 13, 14 and 15) are significantly less well-funded.

As concluded in the assessment "the potential acceleration points are targets of *Economic growth* and *Access to energy*. Targets that could provide strong enabling role are *Equal access to resources* and *Sustainable tourism*. They are highly influential in achieving other targets, but many of these are not well integrated across the government.

The potential weak points are targets related to *Agricultural productivity* and the *Employment targets*(especially youth employment). Environmental and Pollution targets are also underperforming. All of these have strong linkages with other targets. If not addressed, they can pull the entire development agenda of Georgia backwards".

Planetary SDG targets should be integrated into economic, social and other policies. A 'new growth' model which considers climate change and environment should be discussed.



Georgia has also developed Georgia's Intended Nationally Determined Contribution (INDC) which was submitted to the United Nations Framework Convention on Climate Change (UNFCCC) at the COP21 in Paris at the end of 2015. Georgia plans to "unconditionally reducing its GHG emissions by 15% below the Business as Usual Scenario (BAU) for the year 2030. This is equal to reduction in emission intensity per unit of GDP by approximately 34% from 2013 to 2030. The 15% reduction target will be increased up to 25% in a conditional manner, subject to a global agreement addressing the importance of technical cooperation, access

to low-cost financial resources and technology transfer. This is equal to reduction of emission intensity per unit of GDP by approximately 43% from 2013 to 2030. The 25% reduction below BAU scenario would also ensure that Georgian GHG emissions by 2030 will stay by 40% below the 1990 levels" ⁴⁰ covering following

³⁹http://www.ungeorgia.ge/eng/publications/joint_publications_reports_strategic_documents?info_id=678#.XTPxpPZuLA0
http://www.ungeorgia.ge/docs/5458MAPS_brochure_OneUN.pdf

⁴⁰https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Georgia%20First/INDC_of_Georgia.pdf

sectors: energy, industry, agriculture and waste with consideration of various mitigation as well as adaptation measures.

Georgia also submitted a forest related annex as part of the INDC document describing that the Georgian Government prioritizes three options for climate change mitigation activities in the forestry sector: (a) establishing Sustainable Forest Management (SFM) practices; (b) conducting afforestation / reforestation and assist natural regeneration; and (c) expanding the protected area.

Georgia is making strides toward low emission sustainable economic development. The country's mid-term (5-year) climate objectives, as laid out in the 3-d National Environmental Action Plan (*NEAP*) of Georgia ⁴¹, include implementing measures for adaptation to climate change and reducing greenhouse gas (GHG) emissions.

In order to fulfill its obligations under the Paris Agreement, the MEPA has planned the development of a 'Climate Action Plan 2021-2030' (CAP) before 2020 and its implementation in the following years. As one of the first steps, a revision of the Georgian INDC is planned to be conducted based on which, the new NDC will be developed and submitted to the UNFCCC secretariat by 2019.

The EU-Georgia AA is another key document shaping the Climate Change commitments at the national level. Specifically, the AA stresses the need for cooperation on the following areas: mitigation of climate change, adaptation to climate change, carbon trade, integration into industrial policy on climate change issues and the development of clean technologies.

The agreement explicitly mentions the cooperation on the preparation of the Low Emission Development Strategy (LEDS), as well as Nationally Appropriate Mitigation Actions (NAMA), and the measures aimed at promoting technology transfer based on the technology needs assessment.

The preparation of LEDS started in 2013 and was completed in 2017. It aims to (a) provide an integrated comprehensive pathway for long-term sustainable development; (b) take into account the country's development objectives and unique circumstances; (c) promote transformational development; (d) help the country meet international climate change commitments; and (e), help the country to access financing from both public and private sources.

Two major international processes – the new international climate agreement under the United Nation Framework Convention on Climate Change (Paris Agreement), and adoption of Sustainable Development Goals (SDGs) by the United Nations General Assembly as part of the 2030 Agenda for Sustainable Development, represented the main international context of the Georgia's LEDS process.

Furthermore, at European level, the LEDS process could contribute toward fulfilling certain part of the commitments undertaken under the Association Agreement, and specifically for the area of energy, under the Energy Community.

Georgia needs to make strong and determined steps towards shifting the economy to a low emission development pathway in order to fulfil its INDC commitment by 2030. Furthermore, at

Within the framework of this initiative, the following NAMAs have either been implemented or are under preparation: Adaptive Sustainable Forest Management in the Borjomi-Bakuriani Forest District; the Efficient Use of Biomass for Equitable Climate-Proof and Sustainable Rural Development; Energy Efficient Refurbishment in the Georgian public building sector; and Vertically Integrated Nationally Appropriate Mitigation Action (V-NAMA) with a focus on the urban transport sector.

⁴¹ <https://mepa.gov.ge/En/PublicInformation/66>

The Georgian Laws on Environmental Protection (1996) and on Ambient Air Protection (1999) acknowledge the significance of GHG emissions and stress the need to implement mitigation measures. It is highly expected that Georgia's contribution to global greenhouse gas emissions will increase driven by the increasing trends of the projections of population and economic development.



However, by joining the Paris Agreement, Georgia is going to contribute to the international commitment by reducing its national GHG emissions.

The importance of actions addressing climate change effects at the national level is acknowledged

in the Social-economic Development Strategy of Georgia "Georgia 2020". The document declares that "it will be necessary to attract

environmental investments from the international funds of the UN Framework Convention on Climate Change (Green Climate Fund (GCF), Global Environmental Facility (GEF)) in order to meet the requirements of the Convention. This will facilitate the process of introducing energy-saving, environmentally-friendly modern technologies in Georgia".

The Agricultural Strategy for 2015-2020, among other activities, integrates climate change-related aspects and aims to introduce climate-smart agricultural practices in the country. It is expected that the soon-to-be implemented Strategic Environmental Assessment (SEA), will further facilitate the integration of climate change issues in sectoral policies

Georgia strongly supports the EU initiative - Covenant of Mayors (CoM). By joining the municipalities and cities of Georgia to the CoM, vertical coordination dialogue has advanced between both the central and local governments with regard to climate change mitigation. The intensification of the dialogue has a dual effect for better coordination. On one hand, the local governments have been exchanging knowledge on translating national climate goals to their action plans and on the other hand, the mitigation targets and needs raised by the municipalities and cities have been included in national climate-related strategies. For instance, the Sustainable Energy (and Climate) Action Plans (SE(C)APs) prepared under the CoM have been translated into the development of GHG emission scenarios, such as business as usual and alternatives. Currently, there are 23 signatories, from which 12 signatories committed to 20% emissions reductions by 2020, and 11 signatories are committed to 30% emissions reductions by 2030. Ten signatories have submitted their Sustainable Energy Action Plans (SEAP) showing emission reductions mostly from the transport and public sectors. The new initiative offered by the commission regarding the CoM for climate and energy is open for the cities of Georgia in order to strengthen climate actions towards developing adaptive capacity and enhancing mitigation measures vis-a-vis promoting secure, sustainable and affordable energy.

To achieve long-term benefits, it should be highlighted that climate change mitigation and adaptation does not only serve environmental goals. This is an integrated process that improves the efficiency of the economy as well. Energy efficiency, the diversification of energy sources, and shifting to alternative energy sources are cost intensive. Although, in the long run, these measures will provide better energy independence and lower operational costs for the whole economy. Climate change also has serious negative effects on Georgia's critical economic sectors as mentioned above and may lead to significant economic losses. According to expert opinion, the estimated economic losses without adaptation measures during 2021-2030 could be about GEL 25-30 billion, while adaptation measures could cost up to GEL 2.5-3 billion. Therefore, the implementation of adaptation measures is a key area under the given climate change trends.

Another important arena are the mitigation measures planned within the framework of the LEDS for the following sectors: energy, industry, transport, residential, agriculture, LULUCF (Land Use, Land Use Change and Forestry) and waste. The implementation of the SEAPs within the CoM will also significantly contribute

to the reduction of GHG emissions and the climate change mitigation process. Finally, in order to properly implement any adaptation or mitigation measures, it is necessary to track climate change process in Georgia related to permanent studies and analyses. The UNFCCC requires from each party to communicate regularly all possible information on processes related to climate change. Therefore, the preparation of NDCs and biannual update reports is essential procedures for the country. In order to address the above described cross-sectoral challenges, the following long-term goal and short-term targets have been defined below:

LEDS is directly related to SDG 13 which calls for an urgent action to combat climate change and its impacts along three lines:

- Target 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
- Target 13.2: Integrate climate change measures into national policies, strategies and planning.
- Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

The most important cross-sectoral linkages of SDG 13 include the following sectors:

- Climate Change Adaptation and Resilience: Agriculture and food security, forestry, health, water resources, biodiversity, spatial planning, land management, urban planning, rural development, tourism, and disaster risk reduction. Climate Change Mitigation: energy, transport, buildings, industry, waste, water, agriculture, and forestry.
- Climate Change horizontal issues: education, R&D and innovation, communication strategies of relevant sectors, reforms of administration, and gender.
- Linkage with other SDGs: SDG 13 is interconnected with almost all, but the most pronounced connection is demonstrated with SDG 7: Affordable and clean energy, SDG 11: Sustainable cities and communities, SDG 3: Good health and well-being, SDG 12: Sustainable Consumption and Production and SDG 15: Life on Land.

7. Overview of National Energy Efficiency Targets & Energy Efficiency Policy Measures

Georgia’s indicative national energy efficiency targets for 2021, 2025, and 2030 are laid out in Table 8. The country intends to use 2021 and 2025 as interim target deadlines, with 2030 as an additional indicative target deadline for longer-term projections.

Table 8: Georgia’s indicative energy efficiency targets for 2021, 2025, and 2030 versus the Business As Usual Case

Year	2014		2021		2025		2030	
Category	Primary Energy (GWh)	Final energy (GWh)						
BAU	54,894	46,758	63,185	57,426	85,542	70,201	101,810	83,710
Savings from EE measures	-	-	5,436	2,568	10,856	6,167	14,584	9,253
With measures	54,894	46,758	57,748	54,857	74,687	64,034	87,226	74,457
% energy reduction from the BAU	0%	0%	9%	4%	13%	9%	14%	11%

Note: Figures for energy consumption in 2014 come from Geostat’s Energy Balance (published in 2015). The final energy consumption figures for 2014 do not include 27 GWh of non-energy use consumption of oil products in the energy sector.

The BAU estimates of primary and final energy consumption are based on modelling in MARKAL carried out by the Ministry of Economy and Sustainable Development (see major assumptions below). Savings from measures represent the sum of savings elaborated upon later in this document.

As can be seen from Table 8, energy efficiency measures would have a significant impact on Georgia’s energy consumption as well as the efficiency of energy production – particularly on electricity production from natural gas-fired power plants.

The BAU scenario was developed using MARKAL modelling software using inputs developed by the Georgian Government as part of the LEDS project. The critical assumptions underlying the Business As Usual scenario are as follows:

- The current population is assumed to be 3,720,400 people – and would remain constant at this level.
- GDP growth is projected to be 5.6% through 2030.
- Per capita GDP is projected to grow from ~EUR 3,450 in 2015 to ~EUR 7,660 in 2030.
- The number of households is projected to remain steady at 955,000 through 2030.
- Growth of energy consumption in industry is projected to grow by 5.6% per year through 2030.

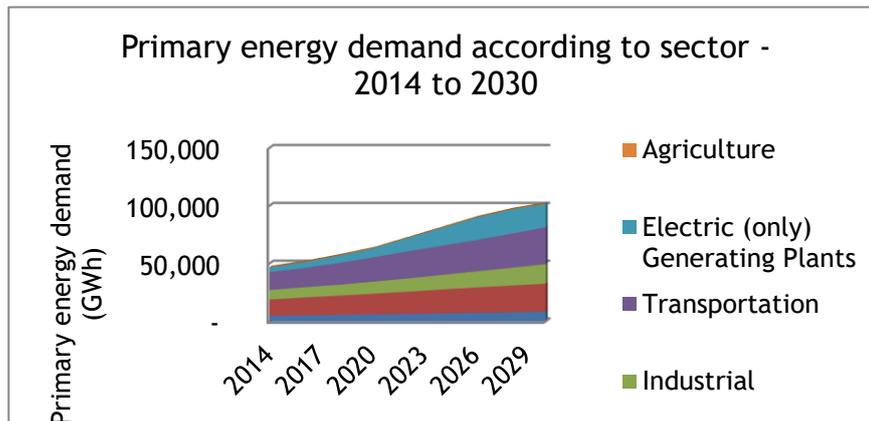
The assumptions for GDP and population for 2015 and the target years are shown in Table 7. Projections of primary energy demand according to sector through 2030 are shown in Figure 17⁴²

⁴² It should be noted that USAID is planning to engage an expert to analyse the demand forecast for electricity including examining the underlying drivers of the electricity growth to develop a baseline electricity growth curve for the next 10-15 years.

Table 9: Population and GDP assumptions for the target years ⁴³

Name of the variable	Units	2015	2020	2025	2030
Population growth	%	0.0%	0.0%	0.0%	0.0%
Population	#	3,720,400	3,720,400	3,720,400	3,720,400
GDP growth	%	2.9%	5.6%	5.6%	5.6%
GDP	1000 EUR	€ 12,796,355	€ 16,469,572	€ 21,627,280	€ 28,400,206

Figure 17: Primary energy demand according to sector – 2014 to 2030 ⁴⁴



The impact on energy consumption has been calculated through the use of individual models for each measure – wherein a BAU case was developed in terms of final energy use and primary energy use, and then the energy efficiency case was developed which entailed a number of potential changes including:

- **Switching to energy sources which use less primary energy input from non-renewable fuels for the same amount of final energy** – such as switching from electricity for hot water heating to solar resources – wherein there is no savings of final energy demand, but there is savings of primary energy as the primary energy to create electricity is reduced.
- **Improvement of distribution/ transmission/ transformation efficiencies** – such as reducing electricity losses or natural gas losses on their respective networks, or improving the efficiency of natural-gas fired power plants by switching to combined-cycle plants.
- **Improving the efficiency of end-use equipment** – such as introducing efficient lighting, efficient wood-stoves, improving the efficiency of vehicles, efficient pumps and boilers in industry, etc.
- **Switching to more efficient transport means** – such as switching from personal cars to buses or metros.
- **Reduction of end-user demand** – such as reduction of heating losses in building envelopes, reduction in the use of motorized transport (switching to walking/cycling), improving maintenance of industrial firms, etc.

For electricity, the conversion factor for converting final energy savings into primary energy savings were based on levels of efficiency and losses for electricity production projected over the time period. The primary energy to be consumed is the final energy divided by the conversion efficiency. The following methodological issues are relevant:

- **For efficiency measures related to primary energy production/transformation or transmission:** the conversion factor used was before the losses in the transmission and distribution – with the

⁴³ Source: Calculations using the assumptions in the MARKAL model

⁴⁴ Source: Calculations using the assumptions in the MARKAL model

assumption that the decreased energy required would result in less production from natural gas-fired power plants (i.e. the conversion factor used was Conversion Factor #1 below)

- **For most end-use efficiency measures resulting in reduction of electricity demand:** the conversion factor used was the average conversion efficiency of primary energy to final energy for natural gas-fired power plants (Conversion Factor #3) – with the assumption that the reduction in demand would result in less natural-gas fired power plant energy production which is the marginal electricity resource typically used.
- **For end-use measures in the industry sector and building sector resulting in reduction of electricity demand:** the conversion factor used was the average conversion efficiency of primary energy to final energy for all power plants (Conversion factor #5) – assuming that the power production displaced would be a mix of natural-gas fired plants and hydro-plants.
- **For end-use measures resulting in reduction of natural gas demand:** Conversion factor #6 was used which reflects the losses in the distribution grid.
- **For all other fuels (diesel, gasoline, wood, etc.):** a conversion factor of 100% was used.

The calculation of primary energy from final energy is given by the following equation:

$$\text{Primary energy} = \text{Final Energy} / \text{Conversion factor}$$

Table 10: Average conversion efficiencies and losses for electricity production/distribution and for natural gas distribution

Conversion factor #	Label	Units	2015	2020	2025	2030
1	Average conversion efficiency of natural gas-fired power plants	MWh (grid)/MWh (primary)	32.9%	35.1%	35.8%	36.7%
2	Average network transmission and distribution losses	MWh (final)/MWh (grid)	7.5%	8.5%	8.5%	8.5%
3	Average conversion efficiency of primary energy to final energy for natural gas-fired power plants	MWh (final)/MWh (primary)	30.5%	32.1%	32.8%	33.6%
4	Average conversion efficiency of all power plants	MWh(grid)/MWh(primary)	72.9%	78.1%	85.6%	87.0%
5	Average conversion efficiency of primary energy to final energy for all power plants	MWh (final)/MWh (primary)	67.4%	71.5%	78.3%	79.6%
6	Average end delivery of the natural gas network (1 - % losses)	MWh (final)/MWh primary	91.3%	93.4%	94.7%	95.6%
7	All other fuels	MWh (final)/MWh primary	100%	100%	100%	100%

Note: Additional information on the calculation of Conversion factors 1, 2, 4, and 6 are included in Annex 6.

The BAU only includes a limited transition to CCGT plants (as described in Measure E-1's assumptions and in Annex 6 under "Thermal power plants – BAU" – taken from the MARKAL model.

The targets for measures were calculated based as much as possible on the market potential for EE interventions for particular measures .

The dates of 2021, 2025, and 2030 as the target dates were chosen to be consistent with the planning horizon of the EU and Energy Community – as well as with Georgia’s Intended Nationally Determined Contribution for reduction of greenhouse gases against the BAU scenario for the UNFCCC.

The achievement of the indicative targets depend on three factors:

1. **The implementation of an ambitious policy agenda for energy efficiency:**
 - a. Implementation of an overall project identification, technical assistance, and grant distribution scheme via a designated national body –with the exact scope to be decided by the Government
 - b. Incentivizing energy efficiency in industry
 - c. In buildings, implementation of the EPBD including energy audit rules (H-9) and building up expertise
 - d. In industry, building up knowledge amongst decision-makers (H-3), establishing energy audit rules and expertise amongst auditors The introduction of green public procurement practices A regulatory mechanism to increase the share of the market for efficient light bulbs and industry investments); and
 - e. A technical inspection programme of vehicles
2. **The availability of technical assistance for implementation:** Many measures are contingent upon the availability of technical assistance within the various sub-sectors to assist private and public sector actors in planning energy efficiency investments.
3. **The availability of investment funds for implementation:** Furthermore, the availability of lending funds at a reasonable rate – and for some measures grants – will prove to be crucial for widespread uptake of measures.

It can be noted that the savings are fairly well spread across the sectors, with the primary energy sector and transport sectors having a large impact on primary energy savings. Savings targets were not calculated for most horizontal measures, as their impact will be mostly related to stimulation of investment in other sectors.

Table 11: Expected energy and GHG savings by measures according to sector

Sector	2021			2025			2030		
	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
Horizontal measures	221	193	61,200	1,298	1,348	387,188	3,288	2,993	969,178
Building sector measures	34	24	8,464	305	239	83,571	175	139	48,719
Public sector measures	78	32	17,080	231	96	50,989	374	161	84,923
Industry sector measures	614	614	216,836	744	744	262,964	1,190	1,190	420,578
Transport sector measures	1,645	1,645	316,256	3,537	3,535	662,293	4,377	4,375	831,672

Energy transformation, transmission, distribution, and demand response measures	2,844	61	1,512,807		205	2,165,603	5,179	394	2,350,819
Total savings	5,436	2,568	2,132,643	10,856	6,167	3,612,608	14,584	9,253	4,705,889

Table 12: Estimates of key national energy production and consumption figures in 2021, 2025, and 2030

Estimate of energy consumption	GWh – 2021	GWh – 2025	GWh – 2030
Total primary energy consumption	67,656	85,542	101,810
Electricity transformation input (thermal power generation)	6,503	6,600	6,962
Electricity generation output (thermal power generation)	2,409	2,460	2,647
CHP transformation input	-	-	-
CHP transformation output – thermal	-	-	-
CHP transformation output – electrical	-	-	-
Energy transformation losses	4,094	4,141	4,315
Electricity distribution and transmission losses	1,385	2,096	2,451
Natural gas distribution losses	953	1,039	1,183
Additional losses	1,103	8,065	10,151
Total final energy consumption	60,121	70,201	83,710
Final energy consumption – Commercial	6,295	7,147	8,307
Final energy consumption – Residential	18,527	21,356	24,327
Final energy consumption – Industry	10,928	13,263	16,877
Final energy consumption – Transport	22,181	26,160	31,884
Final energy consumption – Other sectors	2,190	2,276	2,315

Note: Primary energy consumption and final energy consumption per sector were calculated using the MARKAL model. Expected energy distribution and transmission losses for electricity and distribution losses for natural gas are described in Annex 6 of NEEAP.

The Table below shows the key priority policy measures to be implemented by the Government of Georgia – which are directly related to facilitating investment in EE. The most critical measures as far as energy saving and /or facilitation of market development have a light blue background.

Table 13: Key priority policy measures and implementation timeline

No.	Title of the energy saving measure	2019	2020	2021	2022
Horizontal measures to be implemented					
H-1	Alternative policy measures - Financing schemes for energy efficiency	■	■	■	■
H-3	Alternative policy measures – Training and education, including energy advisory programmes	■	■	■	■
H-8	Consumer information programmes and training	■	■	■	■
T-2	Public awareness - Information campaign for transport	■	■	■	■
H-2	Alternative policy measures – Incentivising / mandating energy efficiency in industry	■	■	■	■
H-7	Energy audits and management systems, boiler inspections in the industry sector*	■	■	■	■
Industry policy measures					
H-6	Qualification, accreditation, and certification schemes – Industry*	■	■	■	■
Public sector and Building policy measures					
H-4	Standards and norms and labelling schemes in appliances*	■	■	■	■
H-5	Qualification, accreditation, and certification schemes – Buildings*	■	■	■	■
H-9	EPBD Transposition and Enforcement: Standards and norms and energy performance certification schemes in buildings*	■	■	■	■
B-1	Regulations leading to improved efficient lighting systems in residential and commercial buildings	■	■	■	■
P-1	Develop a national energy efficiency information system for publicly owned buildings*	■	■	■	■
P-8	Energy efficient procurement*	■	■	■	■
Transport sector policy measures					
T-1	Vehicle improvement - Mandatory periodic roadworthiness tests for motor vehicles*	■	■	■	■
T-8	Vehicle improvement - Increase of hybrid and electric vehicles**	■	■	■	■
Primary Energy sector policy measures					
E-2	Policies and investments to rehabilitate hydropower assets	■	■	■	■
E-3	Optimization of reserves and seasonal operational regimes	■	■	■	■
E-5	Regulations on the rules of calculation of normative electricity losses - stimulating investments**	■	■	■	■
E-6	Regulations on the rules of calculation of normative natural gas pipeline losses - stimulating investments**	■	■	■	■
■ Policy development and adoption ■ Policy implementation ■ Priority measures for energy saving / facilitation of market development * Policy required as part of Energy Community Membership / EU accession ** Policies already in place					

➤ Overview of primary energy savings

The primary and final energy savings expected for 2021, 2025 and 2030 are provided in Table 14. The primary energy savings are linked to final energy savings in that primary consumption is calculated based on final consumption divided by a conversion factor. The factors used are specific to each measure and described in the assumptions in the measure descriptions in NEEAP, Section 3⁴⁵.

Table 14: Overview of the estimates of primary and final energy savings

	Primary energy savings (GWh)	Final energy savings (GWh)
2020	5,436	2,568
2025	10,856	6,167
2030	14,584	9,253

7.1 Horizontal measures

Energy efficiency obligation scheme/ alternative measures

Overall theoretical target of the Energy Efficiency Obligation scheme/alternative measures

Article 7 of the EED requires EU member states to set up an energy efficiency obligation (EEO) scheme **or to achieve the same amount of savings with alternative measures**. The EEO scheme requires energy distribution companies to achieve yearly energy savings of at least 1.5% of annual sales to final consumers. For Energy Community Contracting Parties, the target for EEOs was set at 0.7% each year from 1 January 2017 to 31 December 2020 over the most recent three-year period prior to 1 January 2016. A country can opt to introduce the above 0.7% target gradually (i.e., 0.5% in 2017 and 2018; 0.7 % in 2019 and 2020), and such and other alternative calculation measures should be notified by 15 October 2017.

Georgia has opted to utilize alternative policy measures in combination with various investment/technical measures within the different sectors in order to achieve these targets. Therefore, the EEO target will not be used for Georgia's NEEAP. For reference, however, information has been included to demonstrate that the planned achieved savings of the NEEAP will far surpass those of the EEO. Table 14 shows the theoretical EEO targets for each year starting in 2019 and going to 2021.

Table 15: Energy Efficiency Obligation Scheme targets for Georgia

Savings per year - EEO according to EnC adoption of the EED (MWh)	0.50%	0.50%	0.70%	0.70%	Total	Cumulative
2017	75,587				75,587	75,587
2018	75,587	75,587			151,175	226,762
2019	75,587	75,587	105,822		256,997	483,759
2020	75,587	75,587	105,822	105,822	362,819	846,578
Annual average					90,705	
NEEAP target for savings in 2021					3,766,712	

⁴⁵ Section 3-Policy measures implementing the EED, p.23. Georgia's First National Energy Efficiency Action Plan (NEEAP) - 2019 - 2021;

Instead of implementing an EEO scheme, Georgia plans to implement a set of alternative policy measures linked with technical/investment measures which reduce final energy consumption. As an alternative (or supplement) to setting up an energy efficiency obligation scheme, the Article 7 of EED allows to take other policy measures to achieve energy savings among final consumers.

The alternative measures included in the Republic of Georgia's first NEEAP are as follows:

- Financing schemes for energy efficiency
- Incentivising / requiring energy efficiency in industry
- Training and education, including energy advisory programmes
- Standards and norms and labelling schemes in appliances ⁴⁶

The above measures will not achieve the entire **direct** savings equivalent to the impact of the EEO scheme, however they will make it possible to achieve savings through the specific technical/investment measures described later in this section which are linked to these alternative measures. Savings in sector-specific measures will more than make up for the lack of savings achieved by a lack of an EEO scheme.

Since the alternative policy measures described are to be linked to other sector-specific technical / investment measures, energy savings have not been calculated for any of them except for the measure related to standards and norms and labelling schemes in appliances. The lack of energy savings calculations for the first three measures ensures that there is no double-counting in the presentation of potential savings.

⁴⁶ This measure is linked to Directive 2010/30/EU but Georgia is not yet an EU Member State – though it is a Contracting Party to the Energy Community. Therefore, for classification purposes the measure is considered as an “Alternative Policy Measure” for this NEEAP.

Table 16: Overview of individual horizontal measures

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
H-1	Alternative policy measures - Financing schemes for energy efficiency	EE measures in all sectors to be defined by charter and operational manual	2	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
H-2	Alternative policy measures – Incentivising / mandating energy efficiency in industry	All industry, but particularly large industrial sites or large sectors in Georgia	2									
H-3	Alternative policy measures – Training and education, including energy advisory programmes	Commercial/business and state entities – particularly related to commercial and industrial sector	2									
H-4	Standards and norms and labelling schemes in appliances	Existing buildings, appliance replacement, vehicles, and industrial equipment	3	0.6	0.4	144	16.0	12.5	4,391	54.8	43.6	15,270
H-5	Qualification, accreditation, and certification schemes - Buildings	Buildings	2	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
H-6	Qualification, accreditation, and certification schemes - Industry	Industry	2									
H-7	Energy audits and management systems, boiler inspections in the industry sector	All industry	3	73.3	64.8	19,515	353.7	496.6	106,497	928.0	850.2	256,005

H-8	Consumer information programmes and training	End-users in residential sector, public, commercial/businesses, media	2	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
H-9	EPBD Transposition and Enforcement: Standards and norms and energy performance certification schemes in buildings	New buildings, significant reconstruction of existing buildings (including appliances and systems for lightning, heating, cooling), and existing buildings being rented, sold, or public.	6	59.3	57.6	19,043	420.7	411.5	139,880	1,028.0	1,010.9	350,675
Total				133.1	122.9	38,701	790.3	920.7	250,768	2,010.8	1,904.7	621,949

7.2. Energy Efficiency Measures in Buildings

Policy and investment measures linked to buildings and to public bodies are closely connected. This is because public sector measures are often linked to EE in buildings and also because the policy framework bringing about investments in the private building sector and public sector are closely linked as given in Figure 18 below.

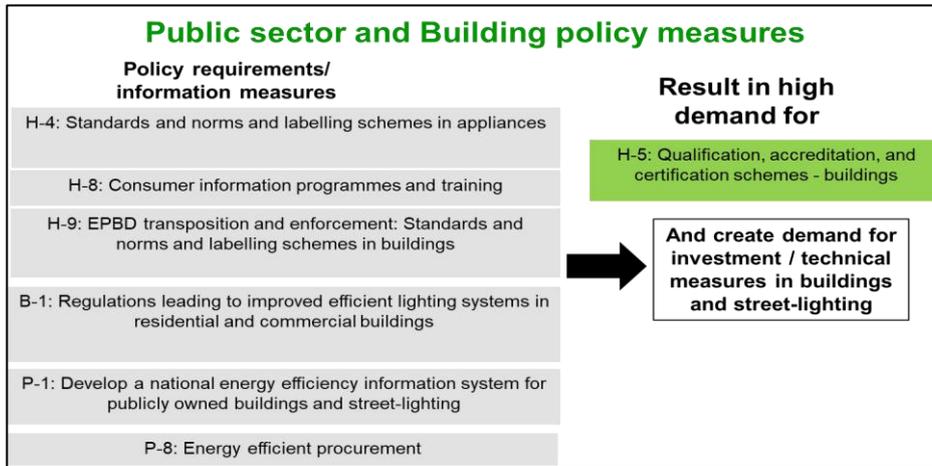


Figure 18: Public sector and building policy measures

Addressing the requirements of the recast EPBD (2010/31/EU)

In 2014 Georgia signed the Association Agreement with the EU.⁴⁷ The Agreement recognizes Georgia's commitment to implementing and promoting energy efficiency in the buildings sector under the EPBD. Annex XXV of the Agreement states that the EPBD 2010/31/EU provisions shall be implemented in accordance with the timeline agreed by Georgia in the framework of the Energy Community Treaty.

Georgia is obligated to align its national laws with the EU legislation and is at the beginning of the EPBD transposition process. Support for reforms in the field of energy outlined in the EU-Georgian Association Agreement for building sector improvement is currently being planned within the framework of the Danish Neighbourhood Program launched by the Government of Denmark and Ministry of Economy and Sustainable Development of Georgia.

Denmark is already supporting energy efficiency in Georgia with the multi-donor fund "The Eastern Europe Energy Efficiency and Environmental Partnership" (ESP) offering a combination of grants and loans for investments in energy efficiency.

The Danish Neighbourhood Program objectives for Georgia envisage:

- The development of the energy efficiency buildings codes by 2019;
- The showcasing of energy efficiency demonstration projects.

It is expected that new codes will provide minimum energy performance indicators that with the aid of demonstration projects will help Government of Georgia to demonstrate compliance for public sector buildings with the new energy performance and owners and users of public buildings will benefit from reduction of operational costs of buildings.

⁴⁷ Official Journal of the European Union L26/4 (30 August 2014) Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part. Available at http://eeas.europa.eu/georgia/pdf/eu-ge_aa-dcfta_en.pdf

Table 17: Overview of individual measures in the buildings sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
B-1	Regulations leading to improved efficient lighting systems in residential and commercial buildings	Existing and new buildings - Practically all types of buildings except those owned by the public and by industries - which are covered in other measures	3	33.8	24.2	8,464	304.8	238.8	83,571	175.0	139.2	48,719
Total				33.8	24.2	8,464	304.8	238.8	83,571	175.0	139.2	48,719

7.3. Energy Efficiency Measures in Public Bodies

As per the Energy Community’s adoption of the EED, Contracting Parties to the Energy Community must ensure that, as from 1 December 2017, 1% of the total floor area of heated and/or cooled buildings owned and occupied by their central government is renovated each year to meet at least the minimum energy performance requirements set out in the recast EPBD. The 1% rate is to be calculated on the total floor area of buildings with a useful floor area over 500 m² that do not meet the national minimum energy performance requirements. That threshold will be lowered to 250 m² as of 1 January 2019. Georgia has commitment to carry this out each year starting from 15 March 2021. However, as noted, the number of buildings and useful floor area are not yet known in Georgia. Additionally, the national minimum energy performance requirements have not been yet established.

Table 18: Overview of individual measures in the public sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
P-1	Develop a national energy efficiency information system for publicly owned buildings	- All types of publicly owned buildings and energy consumers in them. - Consumption/ production of energy on municipal level - Potentially other sub-sectors of the public sector (vehicles, waste management processes, etc.)	2	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
P-2	Pilot project for low energy public sector buildings	Existing public administrative building(s)	1	0.1	0.1	22	0.1	0.1	22	0.1	0.1	22
P-3	Efficient lighting systems in public buildings	Existing and new buildings - Practically all types of governmental and municipally-owned buildings except for schools and kindergartens which are covered in separate measures.	2	4.1	1.3	827	7.0	2.3	1,417	6.9	2.3	1,417
P-4	Improvement of the energy efficiency in central government-owned and occupied public buildings	Public buildings owned by the central government. This does not include schools which are handled as separate measures. It would include office buildings, sports centres/ recreation halls, police buildings, museums, social homes, and potentially military buildings and prisons.	2	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								

P-5	Improvement of the energy efficiency in schools	Existing school buildings	2	9.9	8.7	3,302	26.2	23.6	9,099	44.6	40.5	15,599
P-6	Improvement of the energy efficiency of non-central government-owned public buildings - kindergartens	Existing kindergartens	2	1.5	1.2	383	10.1	8.5	2,811	18.3	15.6	5,154
P-7	Improvement of the energy efficiency of non-central government-owned public buildings - non-kindergartens	Public buildings owned by the non-central government (predominantly municipalities). This does not include kindergartens which are handled as a separate measure. It would include office buildings, sports centres/ recreation halls, retirement homes, and libraries.	11	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
P-8	Energy efficient procurement	All types of end use in public sector, such as heating, ventilation and air conditioning, lighting, office equipment, means of transportation, etc.	5									
P-9	Improvement of efficiency in street-lighting/outdoor lighting	Street-lighting	4	62.8	20.4	12,546	187.2	61.3	37,639	304.5	102.2	62,731
Total				78.5	31.9	17,080	230.6	95.9	50,989	374.4	160.8	84,923

7.4. Policy Measures Addressing Energy Efficiency in Industry

A number of measures can be carried out in the industry sector – which are described below. They are directly linked with the following measures (see **Error! Reference source not found.**):

- H-2: Alternative policy measures – Incentivising / mandating energy efficiency in industry – which will stimulate interest and improve the financial case for investment even beyond the strong financial parameters present. The energy savings from investments described in this section (except for I-2) are attributed to H-2.
- H-3: Alternative policy measures – Training and education, including energy advisory programmes – which will educate industry’s decision-makers on investment options;
- H-6: Qualification, accreditation, and certification schemes, and potentially to energy efficiency investment schemes – Industry – which will increase the level of certified expertise in the industry sector to better enable investment planning and implementation.
- H-7: Energy audits and management systems, boiler inspections in the industry sector – which will require energy audits/energy management in large industries and encourage them in SMEs

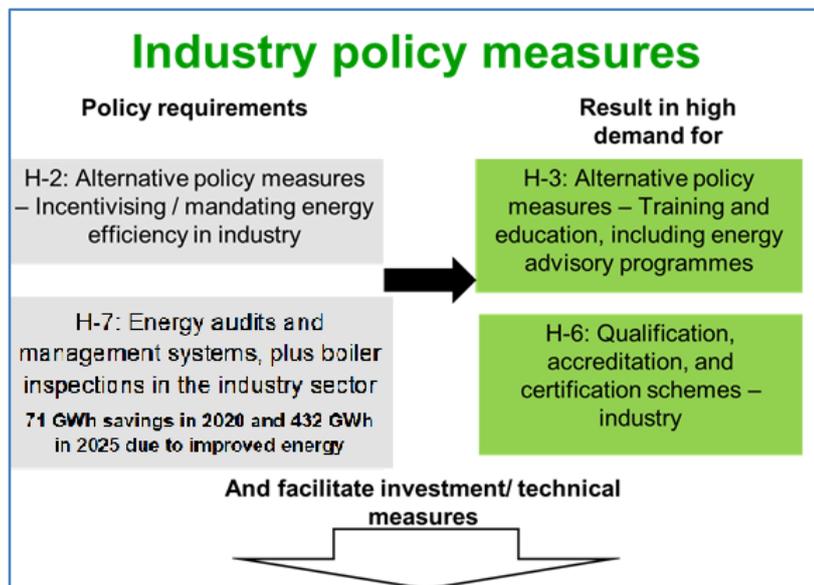


Figure 19: Measures in the industry sector

The implementation of these measures would involve the following key aspects:

- Improvement of the statistical data on industry production and energy consumption
- A programme of technical assistance for the period 2019 – 2022.
- Energy audits from the horizontal measures (H-7) would also be linked to investments in this sector – which has technical assistance requirements.
- Investment from industry – via a credit line, bank financing, or other financing sources of a total of approximately EUR 58 million over the period of 2019 through 2021. This number is mostly due to investments in the cement industry. However, the potential for investment in other industries is also likely to be significantly larger..

Table 19: Overview of individual measures in the industry sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
I-1	Industry data disaggregation	Improved baseline information	1	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
I-2	Conversion of wet-cement process to dry cement process	Cement sector production process	2	613.5	613.5	216,836	744.0	744.0	262,964	1,190.0	1,190.0	420,578
Total				613.5	613.5	216,836	744.0	744.0	262,964	1,190.0	1,190.0	420,578

7.5. Energy Efficiency Measures in Transport

Main policy measures addressing energy efficiency in transport

The package of measures outlined below involve the following key aspects:

- **Vehicle improvement measures** would result in fuel switching to natural gas (and potentially electricity) and better management of the existing fleet – including due to introduction of technical inspections.
- **Public awareness campaigns** on Eco-driving and to encourage efficient transport modes would increase the efficiency of driving habits.
- **Investments in intra-city urban mobility** would result in modal shifts from passenger cars to public transport, walking, and cycling. Additionally, improvements in the road infrastructure would improve efficiency of movement of traffic.

The three major policy/information measures are expected to achieve significant energy savings results whilst other technical measures are generally independent of policies at a national level.

Technical assistance would be necessary for implementation of these measures, likely to be divided into 2 programmes: ⁴⁸

1. Assistance to municipalities for urban infrastructure and transport planning – including feasibility studies for major infrastructure projects such as tramlines, bike lanes, etc.
2. Assistance to the national government in implementing the programme for mandatory periodic roadworthiness tests for motor vehicles, as well as in planning major national infrastructure projects and evaluating – amongst other aspects - how they may impact energy consumption.

Table 20: Overview of individual measures in the transport sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
T1	Vehicle improvement - Mandatory periodic roadworthiness tests for motor vehicles	Passenger transport within cities - public transport, private vehicles, and freight vehicles	2	317.1	317.1	76.5	770.6	770.6	186.3	907.2	907.2	220.4
T-2	Public awareness - Information campaign for transport	Passenger and freight transport throughout Georgia	2	184.4	184.4	45,314	412.6	412.6	102,409	481.6	481.6	120,986
T-3	Urban mobility - Improvement of buses/ minivan transport systems	Passenger transport within cities - public transport	3	734.8	734.8	168,111	1,186.8	1,186.8	271,818	1,597.4	1,597.4	365,924

⁴⁸ EBRD is currently planning a significant programme of technical assistance linked to investment for municipalities which could address item 1 above. The Asian Development Bank is also active in providing technical assistance in the sector.

T-4	Urban mobility - Encouraging modal shifts from cars to public transport/ walking/ bicycling	Passenger transport within cities	4	249.3	248.7	59,877	839.0	837.4	202,617	982.1	980.4	238,687
T-5	Urban mobility - Improved road infrastructure and traffic management within cities	Passenger transport within cities	2	96.8	96.8	23,290	146.3	146.3	35,389	171.7	171.7	41,796
T-6	Urban mobility - Gondola system development & bus rapid transit	Passenger transport within cities - public transport	2	1.2	1.3	273	1.2	1.3	273	1.2	1.3	273
T-7	Urban mobility - Improvement of the metro system in Tbilisi	Passenger transport within Tbilisi (metro)	1	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
T-8	Vehicle improvement - Increase of hybrid and electric vehicles	Passenger transport	8	55.0	55.0	14,057	173.5	173.5	44,345	229.0	229.0	58,529
T-9	Vehicle improvement - Renewal of the public transport fleet	Passenger transport within cities (public transport)	8	6.8	6.8	5,256	6.8	6.8	5,256	6.8	6.8	5,256
Total				1,645	1,645	316,256	3,537	3,535	662,293	4,377	4,375	831,672

7.6. Energy transformation, transmission, distribution, and demand response

Table 21: Overview of individual measures in the energy supply sector

No.	Title of the energy saving measure	End-use targeted	Duration (years)	2021			2025			2030		
				Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)	Primary energy savings (GWh)	Final energy savings (GWh)	GHG emissions abated per year (tonnes CO2eq)
E-1	Natural gas savings through replacement of old Thermal Power Plants (TPP) with new technologies	Improved energy efficiency and energy savings of power sector	2	1,019	-	205,995	2,269	-	458,608	2,269	-	458,608
E-2	Policies and investments to rehabilitate hydropower assets	Power production	2	23	-	7,109	194	-	61,182	376	-	120,108
E-3	Optimization of reserves and seasonal operational regimes	Power production	1	Supports the establishment of Enabling Environment for implementation of other Sustainable Energy Measures								
E-4	Reduction of losses in electricity transmission networks and grid integration of new generation	Energy transmission	13	1,021	-	357,368	1,174	-	411,047	1,174	-	411,047
E-5	Regulations on the rules of calculation of normative electricity	Electricity distribution	4	181	-	50,611	223	-	66,820	266	-	81,000

	losses - stimulating investments											
E-6	Regulations on the rules of calculation of normative natural gas pipeline losses - stimulating investments	Gas supply	5	536	-	860,733	660	-	1,058,909	660	-	1,058,909
E-7	Efficient wood-burning stoves for rural households	Residential heating	4	61	61	26,108	205	205	88,113	394	394	169,699
E-8	Solar hot water heating	Residential hot water	4	4	-	4,883	16	-	20,923	40	-	51,448
Total				2,844	61	1,512,807	4,741	205	2,165,603	5,179	394	2,350,819

8. Overview of National Renewable Energy Targets & Renewable Energy Policy Measures

9.1. National Overall Target for the Share of Energy from Renewable Sources

Table 22: National overall target for the share of energy from renewable sources in gross final consumption of energy in 2014 and 2020 ⁴⁹

(A) Share of energy from renewable sources in gross final consumption of energy in 2014 (S2014, %)	2014	27.9%
(B) Target of energy from renewable sources in gross final consumption of energy in 2020 (S2020, %)	2020	30.0%
(C) Expected total adjusted energy consumption in 2020 (ktoe)	2020	4,545
(D) Expected amount of energy from renewable sources corresponding to the 2020 target (calculated as B x C) (ktoe)	2020	1,364

For the purposes of establishing what measures and investments would be necessary to achieve this target, scenarios were developed for the following sectors:

- Electricity production from renewable energy
- Heating and cooling from renewable energy and
- Transport from renewable energy – focused mostly on switching to electric vehicles

In order to meet the target of 30% of energy consumed coming from renewable energy for 2020 and implement the Renewable Energy Directive, a number of policy and investment measures should to be undertaken.

9.2. Renewable Energy Policy Measures

Table 23: Measures proposed for the implementation by the National Renewable Action Plan

Name and reference of the measure	Type of measure	Expected result	Existing or planned	Start and end dates of the measure
Promotion of solar hot water heaters	Investment	This measure is also included as energy efficient measure and will involve the active promotion of solar hot water heaters as a replacement for natural gas and other forms of water heaters	Planned	2018 – 2020
Promotion of electric vehicles	Investment	This measure will involve the establishment of infrastructure for	Planned	2018 – 2020

⁴⁹ Draft National Renewable Energy Action Plan.

		electric vehicles, the purchase of electric vehicles for public transport, and incentivising the private sector and population to adopt electric vehicles		
Ongoing support for hydropower production	Regulatory / investment	This measure involves the continued support for new hydropower production via agreements with power producers	Ongoing	2018 – 2020
Ongoing support for wind production	Regulatory / investment	This measure involves the continued support for new wind production via agreements with power producers	Ongoing	2018 – 2020
Ongoing support for solar power production	Regulatory / investment	This measure involves the continued support for new solar power production via agreements with power producers	Ongoing	2018 – 2020
Support for micro-generation (less than 100 kW) from renewable sources	Regulatory / investment	This measure involves the continued support for new micro-generation of renewable energy power production via agreements with owners	Ongoing	2018 - 2020
Ongoing support for geothermal heat production	Regulatory / investment	This measure involves the continued support for expansion of the use of existing geothermal production – including feasibility studies (cost-benefit analyses, resource assessments) and investments.	Ongoing	2018 – 2020
Improved management of solid biomass resources - Development of a new Forest Code, inventory of Forests, and support for the use of residues	Regulatory / investment	This measure involves the development of improved forestry management practices and potentially support for the use of biomass residues for heating, hybrid electricity production, etc.	Planned	2018 – 2020
District heating and cooling infrastructure development	Investment	This measure involves the development of feasibility studies and potentially investment in renewable energy based district heating and cooling – currently underway in Borjomi / Akhaltsikhe	Existing / Planned	2018 – 2020
Communications and capacity building of technical experts	Capacity building	This measure involves capacity building of technical experts and continued communications activities with the general public about renewable energy	Planned	2018 - 2020

Table 24: Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Georgia to meet the indicative 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity 2018-2020

	2014		2018		2019		2020	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydro	2,807.6	8,221.1	3,244.3	8,234.0	3,345.8	8,707.4	3,410.2	9,019.6
< 1 MW	5.6	15.3	6.3	16.8	6.5	17.8	6.6	18.2
1 MW - 10 MW	122.5	346.1	153.9	501.9	160.2	537.4	197.6	709.9
> 10 MW	2,679.5	7,859.7	3,084.1	7,715.3	3,179.1	8,152.3	3,206.1	8,291.5
Of which pumping	-	-	-	-	-	-	-	-
Geothermal	-	-	-	-	-	-	-	-
Solar:	-	-	1.5	2.4	4.7	7.5	14.7	23.7
photovoltaic	-	-	1.5	2.4	4.7	7.5	14.7	23.7
concentrated solar power	-	-	-	-	-	-	-	-
Tide, wave, ocean	-	-	-	-	-	-	-	-
Wind:	-	-	20.7	88.0	45.7	167.2	79.8	301.8
onshore	-	-	20.7	88.0	45.7	167.2	79.8	301.8
offshore	-	-	-	-	-	-	-	-
Biomass:	-	-	-	-	-	-	-	-
solid	-	-	-	-	-	-	-	-
biogas	-	-	-	-	-	-	-	-
bioliquids (1)	-	-	-	-	-	-	-	-
Total:	2,807.6	8,221.1	3,266.5	8,324.3	3,396.2	8,882.1	3,504.7	9,345.2
Of which CHP:	-	-	-	-	-	-	-	-

(1) Taking into account only those complying with the sustainability criteria (cf. Article 5(1) of Directive 2009/28/EC last subparagraph).

Table 25: Estimation of total contribution (final energy consumption) expected from each renewable energy technology in Georgia to meet the indicative 2020 target and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling 2018-2020 (ktoe)

	2014	2018	2019	2020
Geothermal (excluding low temperature geothermal heat in heat pump applications)	8	10	13	16
Solar	7	9	10	11
Biomass:	465	488	488	488
solid	465	488	488	488
biogas	-	-	-	-
bioliquids (1)	-	-	-	-
Renewable energy from heat pumps:				
— of which aerothermal	-	-	-	-
— of which geothermal	-	-	-	-
— of which hydrothermal	-	-	-	-

Total		480	507	511	515
	Of which DH (2)	-	-	-	-
	Of which biomass in households (3)	465	488	488	488

(1) Take into account only those complying with the sustainability criteria (cf. Article 5(1) last subparagraph of Directive 2009/28/EC)

(2) District heating and/or cooling from total renewable heating and cooling consumption (RES-DH)

(3) From the total renewable heating and cooling consumption.

(5) Direct use and district heat as defined in Article 5(4) of Directive 2009/28/EC.

Table 26: Estimation of total contribution expected from each renewable energy technology in Georgia to meet the indicative 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector 2018-2020 (6) (ktoe)

	2014	2018	2019	2020
Bioethanol/bio-ETBE	-	-	-	-
Of which Biofuels (1)	-	-	-	-
Article 21(2)	-	-	-	-
Of which imported (2)	-	-	-	-
Biodiesel	-	-	-	-
Of which Biofuels (1)	-	-	-	-
Article 21(2)	-	-	-	-
Of which imported (3)	-	-	-	-
Hydrogen from renewables	-	-	-	-
Renewable electricity	28.41	34.36	35.06	38.26
Of which road transport	-	-	-	2.19
Of which non-road transport	28.41	34.36	35.06	36.07
Others (as biogas, vegetable oils, etc.)	-	-	-	-
Of which Biofuels (1) Article 21(2)	-	-	-	-
Total	28.41	34.36	35.06	38.26
(1) Biofuels that are included in Article 21(2) of Directive 2009/28/EC.				
(2) From the whole amount of bioethanol/bio-ETBE.				
(3) From the whole amount of biodiesel.				
(6) For biofuels take into account only those compliant with the sustainability criteria (cf. Article 5(1) last subparagraph).				

9. National Sustainable Energy Action Plan Summary (2018-2030)

All directions, measures and activities specified in NSEAP in the field of energy efficiency have been defined with the consideration of Georgia's indicative national energy efficiency targets for 2021, 2025, and 2030 (see Table 8), with 2021 and 2025 as interim target deadlines, and 2030 for longer-term projections. The dates of 2021, 2025, and 2030 as the target dates were chosen to be consistent with the planning horizon of the EU and Energy Community – as well as with Georgia's Intended Nationally Determined Contribution for reduction of greenhouse gases against the BAU scenario for the UNFCCC.

By 2025, Georgia intends to achieve a 14% reduction in primary energy consumption as compared to the BAU. NSEAP states that achievement of targets in EE is partly dependent on the planning and establishment of a number of horizontal instruments, like financing schemes for energy efficiency and training and education, including energy advisory programmes; Consumer information programmes and training; Public awareness and capacity building programmes.

NSEAP tackles energy waste in buildings, public bodies, industry, transport, and energy sector. It also provides specific energy efficiency measures for each sector and their investment needs.

As estimated the implementation of horizontal and sector specific energy efficient measures will result in total energy savings equal to 2,568 GWh by 2021.

In renewable energy field in order to meet the target of 30% of energy consumed coming from renewable energy for 2020 and implement the EU Renewable Energy Directive, a number of policy and investment measures were specified in draft NSEAP, as described in more details in Chapter 8. The following sectors were covered: electricity production from renewable energy; heating and cooling from renewable energy and transport from renewable energy – focused mostly on switching to electric vehicles.

As estimated the implementation of the proposed measures in renewable energy field will result in primary energy savings or renewable energy generation up to 12,701 GWh by 2021.

The National Sustainable Energy Action Plan of Georgia (2018-2030) Summary Table (Table 27) provides information on all 48 proposed measures in energy efficiency and renewable energy field, estimated energy savings and indication of necessary investments for the implementation of the measures as well as relevance of each measure to a certain SDG. Total cost of implementation of proposed measures is estimated to be €3,168,306,000, including €2,033,112,000 for energy efficient measures and €1,135,194,000 for measures in renewable energy field.

Table 27. The National Sustainable Energy Action Plan of Georgia (2018- 2030) Summary Table

National Sustainable Energy Action Plan of Georgia 2018-2030										
#	Measure	Responsible State Body	Targeted Sector	Investment required by 2030 in EUROS			Results Expected GWh Primary energy saved or RE generated			Relevant SDG
				State	Other	Total	2021	2025	2030	
1	Financing schemes for energy efficiency	MoESD and MFO	All	€ 1,453,000	-	€ 1,453,000	Creation of enabling environment			SDG 7, SDG 11
2	Incentivizing / mandating energy efficiency in industry	MoESD and MFO	Industry	€ 1,076,000	€ 148,560,000	€ 149,636,000	Creation of enabling environment			SDG 7, SDG 9, SDG 11
3	Training and education, including energy advisory programmes	MoESD and MoES	All	€ 960,000	-	€ 960,000	Creation of enabling environment			SDG 1, SDG 4, SDG 5, SDG 7, SDG 8, SDG 10
4	Standards and norms and labelling schemes in appliances	MoESD	Buildings	€ 791,000	€ 169,277,000	€ 170,068,000	0.6	16.0	54.8	SDG 3, SDG 7, SDG 11
5	Qualification, accreditation, and certification schemes - Buildings	MoESD	Buildings	€ 593,000	-	€ 593,000	Creation of enabling environment			SDG 4, SDG 5, SDG 7, SDG 9, SDG 11
6	Qualification, accreditation, and certification schemes - Industry	MoESD	Industry	€ 620,000	-	€ 620,000	Creation of enabling environment			SDG 4, SDG 5, SDG 7, SDG 9, SDG 11
7	Energy audits and management systems, boiler inspections in industry	MoESD	Industry	€ 264,000	€ 3,519,000	€ 3,783,000	73.3	353.7	928.0	SDG 7, SDG 9, SDG 12
8	Consumer information programmes and training	MoESD	All	€ 1,014,000	€ 400,000	€ 1,414,000	Creation of enabling environment			SDG 4, SDG 5, SDG 7
9	Standards & norms and energy performance certification in buildings	MoESD	Buildings	€ 1,055,000	€ 260,396,000	€ 261,451,000	59.3	420.7	1,028.00	SDG 7, SDG 11, SDG 12
10	Regulations for efficient lighting in residential & commercial buildings	MoESD and Municipalities	Buildings	€ 66,000	€ 30,772,000	€ 30,838,000	33.8	304.8	175	SDG 7, SDG 9, SDG 11, SDG 12
11	National energy efficiency information system for public buildings	MoESD	Buildings	€ 44,000	€ 1,055,000	€ 1,099,000	Creation of enabling environment			SDG 7, SDG 11, SDG 12
12	Pilot project for low energy public sector buildings	MoESD and Municipalities	Buildings	€ 12,000	€ 35,000	€ 47,000	0.1	0.1	0.1	SDG 7, SDG 9, SDG 11, SDG 12, SDG 13
13	Efficient lighting systems in public buildings	MoESD and Municipalities	Buildings	€ 134,000	€ 71,000	€ 205,000	4.1	7	6.9	SDG 3, SDG 7, SDG 11, SDG 12

14	EE Improvement in central government-owned & occupied buildings	MoESD and MFO	Buildings	€ 3,350,000	€ 5,000,000	€ 8,350,000	Creation of enabling environment				SDG 3, SDG 7, SDG 11, SDG 12
15	Improvement of the energy efficiency in schools	MoESD and MoES	Buildings	€ 3,753,000	€ 12,497,000	€ 16,250,000	9.9	26.2	46.6		SDG 3, SDG 7, SDG 11, SDG 12
16	EE Improvement of municipal owned public buildings - kindergartens	MoESD and Municipalities	Buildings	€ 824,000	€ 4,973,000	€ 5,797,000	1.5	8.5	18.3		SDG 3, SDG 7, SDG 11, SDG 12
17	EE Improvement in other municipal-owned public buildings (non-kindergartens)	MoESD and Municipalities	Buildings	€ 66,000	€ 643,000	€ 709,000	Creation of enabling environment				SDG 3, SDG 7, SDG 11, SDG 12
18	Energy efficient procurement	MoESD and MFO	All	€ 4,943,000	€ 527,000	€ 5,470,000	Creation of enabling environment				SDG 3, SDG 7, SDG 9, SDG 11
19	EE Improvement in street-lighting/outdoor lighting	MRDI and Municipalities	Street Lighting	€ 14,000	€ 81,969,000	€ 81,983,000	62.8	187.2	304.5		SDG 7, SDG 9, SDG 11
20	Industry data disaggregation	Geostat	Industry	€ 0	€ 0	€ 0	Creation of enabling environment			-	
21	Conversion of wet-cement process to dry cement process	MoESD	Industry	€ 0	€ 48,775,000	€ 48,775,000	613.5	744	1,190.00		SDG 9, SDG 12
22	Mandatory periodic roadworthiness tests for motor vehicles	MoESD	Transport	€ 1,319,000	-	€ 1,319,000	317.1	770.6	907.2		SDG 3, SDG 11, SDG 13
23	Information campaign for transport	MoESD	Transport	€ 364,000	€ 60,000	€ 424,000	184.4	412.6	481.6		SDG 3, SDG 9, SDG 11, SDG 13
24	Improvement of buses/ minivan transport systems	MoESD and Municipalities	Transport	-	€ 1,114,000	€ 1,114,000	734.8	1,186.80	1,597.40		SDG 3, SDG 9, SDG 11, SDG 13
25	Encouraging modal shifts from cars to public transport/ walking/ bicycling	MRDI and MoESD	Transport	-	€ 618,000	€ 618,000	249.3	839	982.1		SDG 3, SDG 11, SDG 13
26	Improved road infrastructure and traffic management within cities	MRDI	Transport	-	-	-	96.8	146.3	171.7		SDG 3, SDG 11, SDG 13
27	Gondola system development & bus rapid transit	MoESD	Transport	-	-	-	1.2	1.2	1.2		SDG 11
28	Improvement of the metro system in Tbilisi	Tbilisi city hall	Transport	-	-	-	Creation of enabling environment				SDG 9, SDG 11
29	Increase of hybrid and electric vehicles	MoESD	Transport	€ 24,989,000	€ 746,092,000	€ 771,081,000	55	173.5	229		SDG 3, SDG 7, SDG 9, SDG 11, SDG 12
30	Renewal of the public transport fleet	MoESD and Municipalities	Transport	-	€ 16,140,000	€ 16,140,000	6.8	6.8	6.8		SDG 3, SDG 11, SDG 13
31	Natural gas savings through replacement of old Thermal Power Plants (TPP) with new technologies		Energy	-	€ 100,000,000	€ 100,000,000	1,019	2,269	2,269		SDG 7, SDG 9
32	Policies and investments to rehabilitate hydropower assets	MoESD	Energy	€ 66,000	€ 95,818,000	€ 95,884,000	23	194	376		SDG 7, SDG 8, SDG 9

33	Optimization of reserves and seasonal operational regimes	GSE	Energy	-	-	-	Creation of enabling environment			SDG 7, SDG 9
34	Reduction of losses in electricity transmission networks and grid integration of new generation	MoESD and energy companies	Energy	-	€ 184,754,000	€ 184,754,000	1,021	1,174	1,174	SDG 7, SDG 9
35	Regulations on the rules of calculation of normative electricity losses - stimulating investments	GNERC	Energy	-	€ 43,496,000	€ 43,496,000	181	223	266	SDG 7
36	Regulations on the rules of calculation of normative natural gas pipeline losses - stimulating investments	GNERC	Energy	-	€ 4,410,000	€ 4,410,000	536	660	660	SDG 7
37	Efficient wood-burning stoves for rural households	MEPA	Biomass and waste	-	€ 8,535,000	€ 8,535,000	61	205	394	SDG 3, SDG 7, SDG 11, SDG 12, SDG 13, SDG 15
38	Solar hot water heating	MRDI	Energy	-	€ 15,836,000	€ 15,836,000	4	16	40	SDG 3, SDG 5, SDG 7, SDG 11, SDG 13
39	Promotion of solar hot water heaters	MoESD	Buildings			€ 2,328,000	60.5			SDG 3, SDG 4, SDG 5, SDG 7, SDG 11, SDG 13
40	Promotion of electric vehicles	MoESD	Transport			€ 2,584,000	85			SDG 3, SDG 11, SDG 13
41	Ongoing support for hydropower production	MoESD	Energy			€ 984,782,000	6438			SDG 7, SDG 8, SDG 9, SDG 13
42	Ongoing support for wind production	MoESD	Energy			€ 70,500,000	293			SDG 7, SDG 8, SDG 9, SDG 13
43	Ongoing support for solar power production	MoESD	Energy			€ 4,903,000	8			SDG 7, SDG 8, SDG 9, SDG 13
44	Support for micro-generation (less than 100 kW) from renewable sources	MoESD	Energy			€ 24,517,000	25.5			SDG 7, SDG 8, SDG 9, SDG 13
45	Ongoing support for geothermal heat production	MoESD	Energy			-	442			SDG 7, SDG 8, SDG 9, SDG 13
46	Improved management of solid biomass resources - Development of a new Forest Code, inventory of Forests, and support for the use of residues	MEPA	Biomass and waste			€ 5,480,000	Creation of enabling environment			SDG 7, SDG 11, SDG 12, SDG 13, SDG 15
47	District heating and cooling infrastructure development	MRDI and Municipalities	Buildings			€ 40,000,000.00	Creation of enabling environment			SDG 3, SDG 7, SDG 9, SDG 11, SDG 13
48	Communications and capacity building of technical experts	-	All			€ 100,000	Creation of enabling environment			SDG 4, SDG 5, SDG 8

10. Conclusions and Recommendations

Despite the fact that Georgia's Energy Sector, mainly the Electricity part, is relatively Green – produced from source of renewable energy, there are many issues and gaps for sector development in a sustainable manner, moreover increase of the consumption and to meet the demand through the sustainable way is even more challenging.

The key issues and gaps to be addressed are identified and summarized as follows:

GAPs

- Primary legislative acts as well as national action plans are drafted but deadlines for adoptions are not met
- Secondary legislation necessary for implementation of primary legislations are not yet prepared
- Insufficient institutional and human capacities for implementation of NSEAP commitments
- Lack of technical norms and standards
- Absence of relevant accreditation and certification systems
- Limited access to financing of NSEAP measures
- Low awareness at decision maker and public level

Recommendations

- To ensure timely approval of the developed draft regulatory documents additional consultative meetings with national decision makers should be organized with participation of international stakeholders
- To attract TA for gap analysis and elaboration of required secondary legislation as well as for elaboration of necessary technical standards and norms;
- To conduct institutional mapping and capacity needs analysis for development, coordination, monitoring and reporting of NSEAP measures both at national and sub-national level with the consideration of recent international experience of countries in transition;
- To establish national accreditation, certification and training system, necessary methodologies and curricula;
- To intensify communication and coordination with donors and IFIs focused on implementation of Sustainable Developments Goals;
- To ensure allocation of public financing (co-financing) from national and sub-national budget for implementation of NSEAP measures.
- For mainstreaming of sustainable energy, conduct continuous tailored awareness raising campaigns with involvement of mainstream and social media.