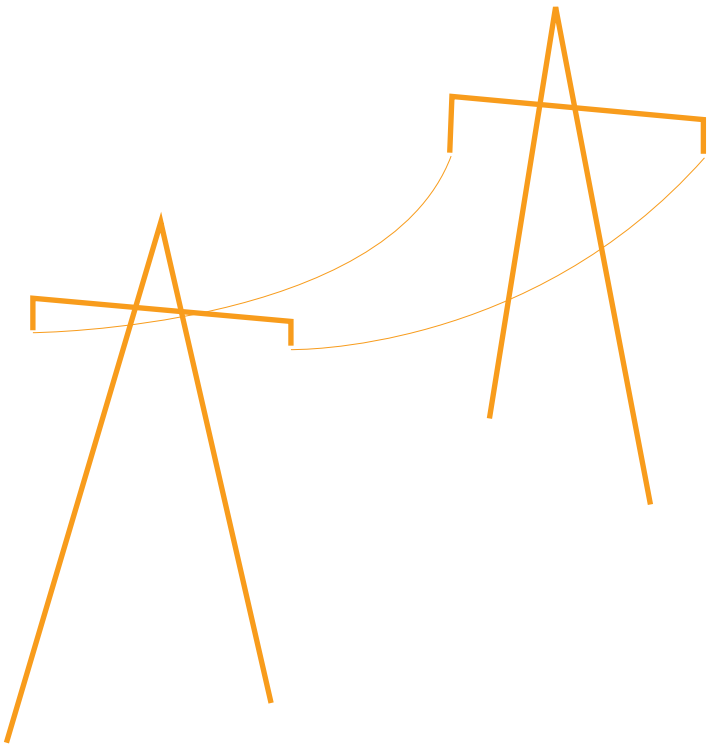
BUSINESS ASSOCIATION OF GEORGIA

June 2016

ELECTRICITY SECTOR: OVERVIEW



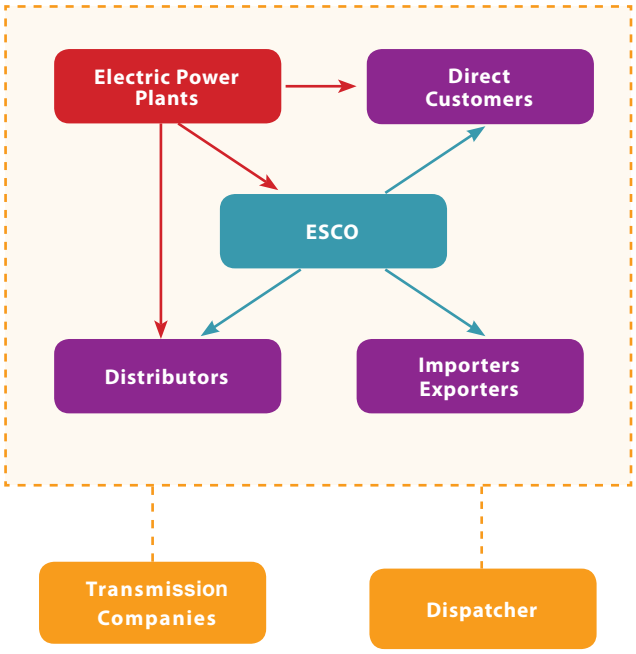
საქართველოს ბიზნეს ასოციაცია
BUSINESS ASSOCIATION OF GEORGIA

GENERAL OVERVIEW AND STATISTICS

MARKET STRUCTURE

Georgian electricity market is comprised of a number of actors: producers, consumers, distributors, importers, exporters, regulator, and other directly or indirectly affected parties:

Diagram 1: Electricity Market Structure

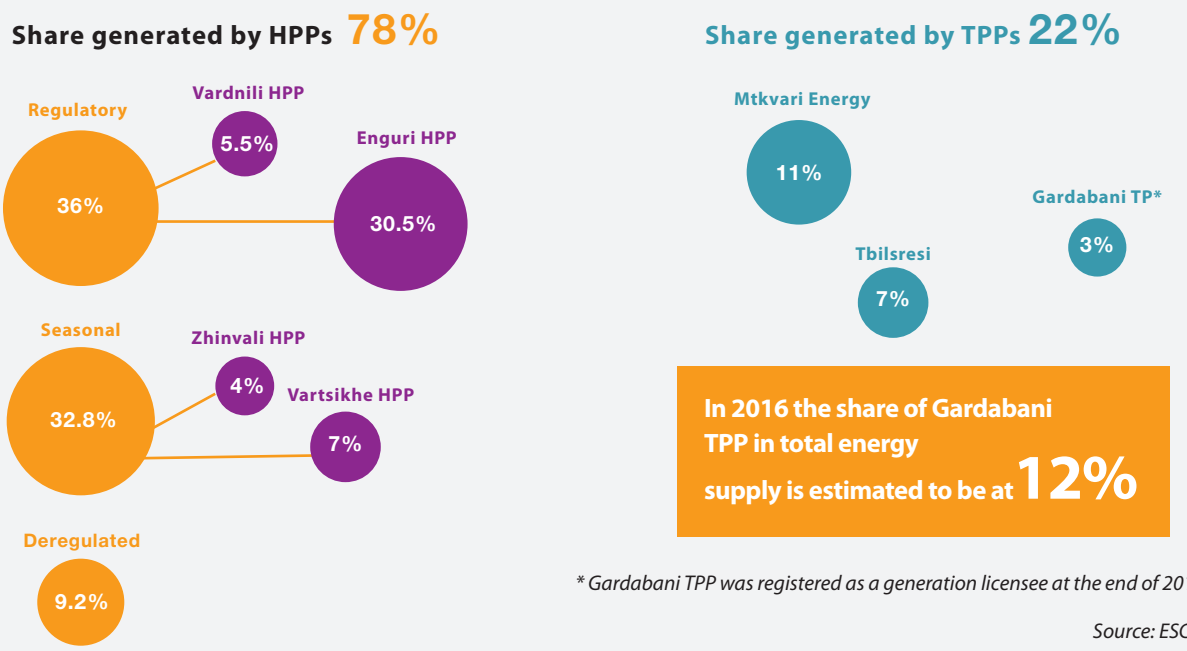


Electric Power Plants. There are two principal sources for generating electricity in Georgia: Hydroelectric power plants (HPPs) - the primary source of electricity, and thermal power plants (TPPs).

Building a hydroelectric power station requires a special permit. Upon the completion of construction, the plant is registered as a holder of a license to generate hydroelectric power. Hydroelectric stations with capacity less than 13 MW are deregulated: they do not require a license to generate power, are free to choose the buyer and conduct negotiations about the price. As of now, there are 19 licensed and about 50 small, deregulated HPPs operating in the country. The largest source of power generation is the Enguri HPP, which is responsible for the third of all power generated in the country. The Enguri HPP, along with the Vardnili HPP, that have large dams and can respond to change in demand, are considered as regulatory plants.

Thermal power plants, apart from the Tkibuli TPP, are sources of guaranteed capacity. Their main purpose is to fill the lack of electricity in the system. Considering that TPPs ensure the stability of Georgia's electric energysystem, they have to be on standby in order to generate energy should the need arise.

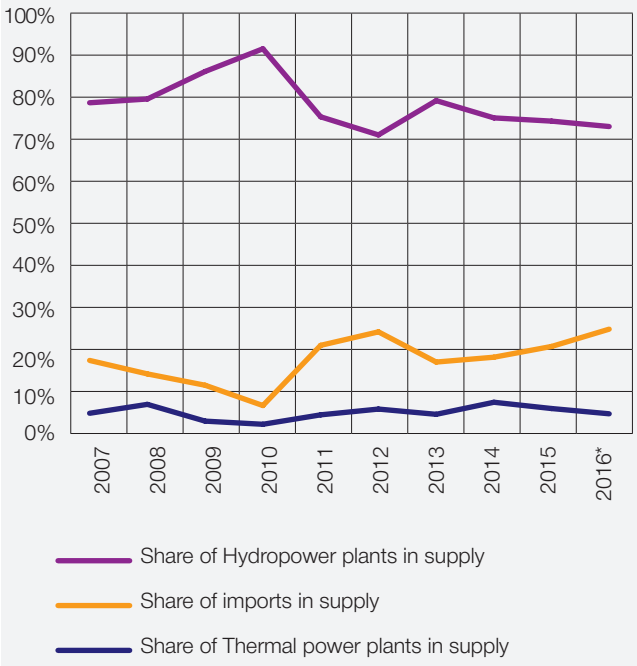
Graph 1: Distribution of electricity by source of generation, 2015



** Gardabani TPP was registered as a generation licensee at the end of 2015*

Source: ESCO

Graph 2: Share of electricity sources in total supply



** forecasted data*
Source: ESCO

Distributors dispense electricity to consumers countrywide. There are three distributor companies in Georgia: JSC Telasi, that serves consumers in Tbilisi, JSC Kakheti Energy Distribution, that provides electricity to the region of Kakheti and JSC Energo-Pro Georgia[1], that serves the rest of Georgia. Distribtor companies allocated 70% of total consumed energy in 2015.

ESCO (Electricity System Commertial Operator) is a state-owned company and its functions include tradeing with balance electricity and guaranteed capacity, setting up and operating unified database, etc.

Direct customers. Generation licensees can also sell electricity directly to customers. To qualify, the customer has to consume at least 1 million KWh energy per year. From 2017 all customers that consume at least 1 KWh per year will be eligible to register as direct customer. As of now, there are only five registered direct customers: Georgian Water and Power Ltd, Rustavi Steel Corporation Co. Ltd, Georgian Manganese Ltd, JSC Georgian Railway, and Geoferrometal Ltd. Only the first four of them consume electricity through direct trading contracts and in 2015 their share in all domestically consumed electricity was about 12% (1.2 billion KWh).

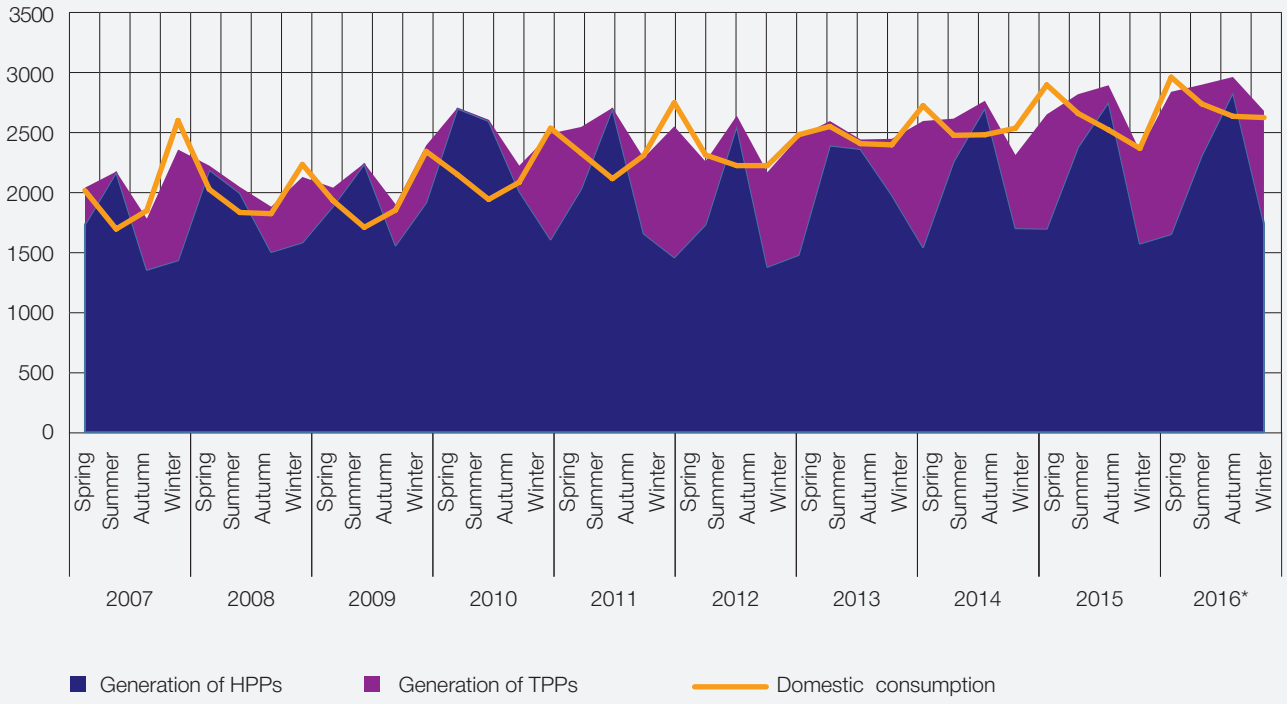
Transmitters. Electricity transmission network requires constant control and maintenance by transmission licensees. There are three electricity transmittion licensees in Georgia: JSC Georgian State Electrosystem (GSE) (100% of stocks belong to JSC Partnership Fund), Energotrans Ltd (a subsidiary of GSE) and JSC Sakrusenergo (owned by the Minsitry of Energy of Georgia and the United Energy System of Russia). These companies hold transmission lines and substations. They also construct, install, repair and use transmission lines of various voltage powers.

Dispatcher. The only licensed dispatcher in Georgia is JSC Georgian State Electrosystem (GSE). Its mission is the technical administration of Georgian Electricity system and the provision for its reliability and proper operation in both normal and emergency modes.

Georgian electricity supply sector is regulated by a body independent from state organizations – Georgian National Energy and Water Supply Regulatory Commision. The commission monitors the electricity market in Georgia, sets regulations and conditions for electricity generation, transmission, and distribution, issues and annuls licenses according to the legislation[2], sets and regulates tariffs, etc.

1 JSC Energo-Pro Georgia is a distribution and generation licencee at the same time.
2 According to the Law of Georgia On Electricity and Natural Gas and the rulls of licensing

Graph 3: Seasonality of electricity generation (million KWh)



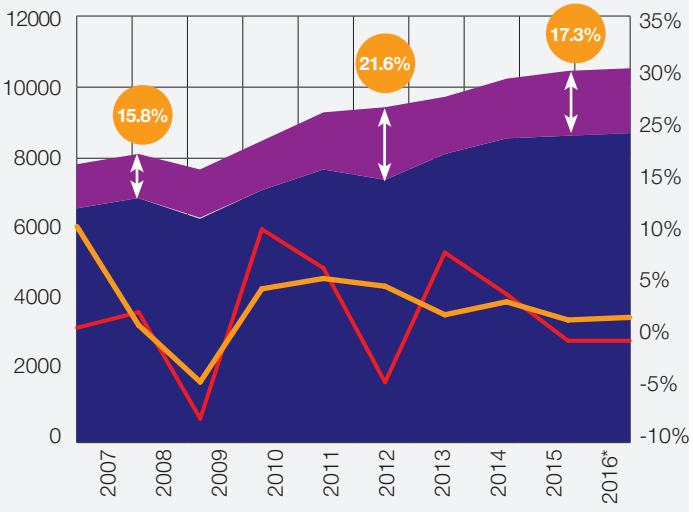
* forecasted data

Source: ESCO

MARKET CHARACTERISTICS

As mentioned above, in Georgia electricity is mainly generated by hydroelectric power plants. HPPs' output depends on the water level in rivers (especially for run-of-river HPPs). Consequently, generation of hydro electric energy changes seasonally. In Georgia, May-August is a period of high discharge. In addition to this, the level of electricity consumption is relatively low during this period, therefore, energy generated through hydroelectric power plants almost covers the local demand (81-82% of domestic consumption including Abkhazia in 2014-2015). Excess electricity is exported. In fall and winter – a period of peak demand, discharge of rivers is low and hydroelectric power generation is decreased. In order to fill the supply gap, supplementary electric energy is generated through TPPs or is imported from neighboring countries.

Graph 4: Electricity consumption (million KWh)



* forecasted data

Source: ESCO, GeoStat

CURRENT CONDITION OF THE MARKET

A large portion of electricity generated by HPPs is consumed on the domestic market; only excess electricity is exported. Turkey is the only significant export market out of all neighboring countries. In 2015, 4% of all generated electricity was exported to Turkey, exceeding 400 million KWh.

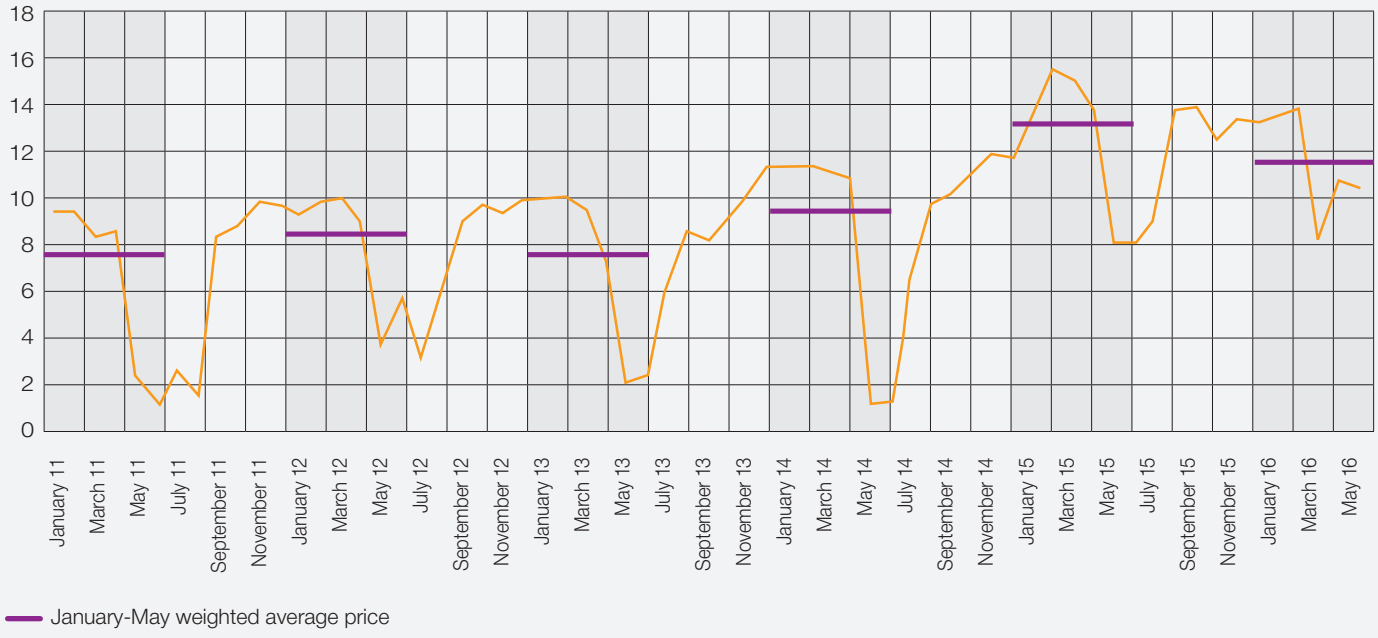
Graph 5: Foreign trade of electricity (million KWh)

Source: ESCO

Graph 6: Electricity import (million KWh)

Source: ESCO

Graph 7: Weighted average tariff of the balancing electricity (Tetri/KWh)



Source: ESCO

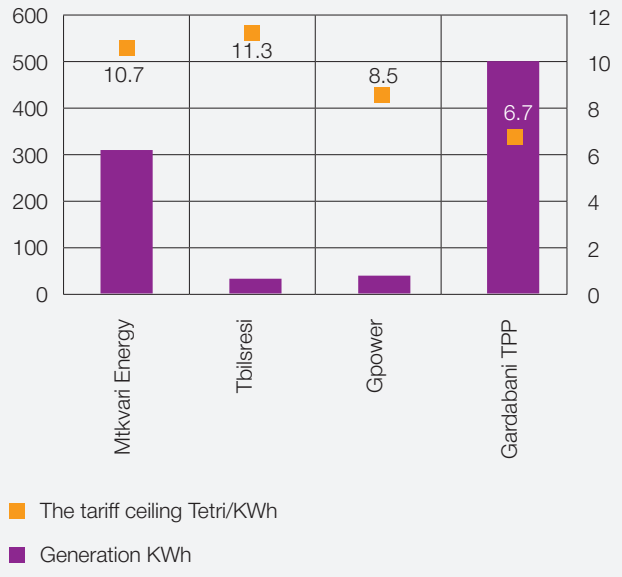
Although the electricity generated by TPPs is more expensive than that generated by HPPs, and the operation of TPPs is more costly, their existence guarantees the safety and sustainability of the system.

As of 2016, guaranteed capacity sources in Georgia are:

- Unit N9 Gardabani TPP of LTD Mtkvari Energy
- LTD Gpower's gas turbine PP
- Units N3 and N4 of LTD Georgian International Energy Corporation
- Combined cycle thermal power plant of LTD Gardabani TPP

In 2015, cost of guaranteed capacity (GC) of these stations amounted 67.8 million GEL. In 2016 this sum is likely to increase as a result of high GC costs of the recently opened combined cycle power plant. The cost of guaranteed capacity exceeded 60 million GEL during January-April of this year and 70% of this sum (42.8 million GEL) covered only the cost of the new Gardabani combined thermal power plant. However, it must be noted that the new Gardabani TPP is relatively more efficient than other power plants (generation costs are lower).

Graph 8: Generation of guaranteed capacity sources, January-April 2016 (million KWh)



Source: ESCO

INVESTMENT ATTRACTIVENESS

Abundant water resources of Georgia carry a significant potential of generating hydroelectric energy. The maximum potential capacity of Georgia's 300 rivers fit for hydroelectric energy generation is around 15,000 MW, and annual generation is estimated at 50 billion KWh. 80% of exploitable water resources is not being used. Low costs of hydroenergy increases its competitiveness and stirs investors' interests in its favor.

Agreements on new HPPs are concluded on BOO (build, own, operate) basis. Also, new hydroelectric power plants are deregulated. They themselves choose the buyer and conduct private negotiations about the price. Furthermore, they can link the plant to the transmission network for free.

Starting April 2015, the company that wins a tender for the construction permit of a hydroelectric power plant will sell the electricity generated during several months to ESCO at previously negotiated prices. Clearly, this agreement helps reduce risks associated with the sales of generated electricity for a new source of generation.

During the last several years the growth rate of electricity supply has been falling behind that of electricity consumption. Consequently, there is an increase in the share of relatively expensive energy in consumption, which is eventually reflected on the tariff. It is evident that there is a need for more hydroelectric energy in the electricity market.

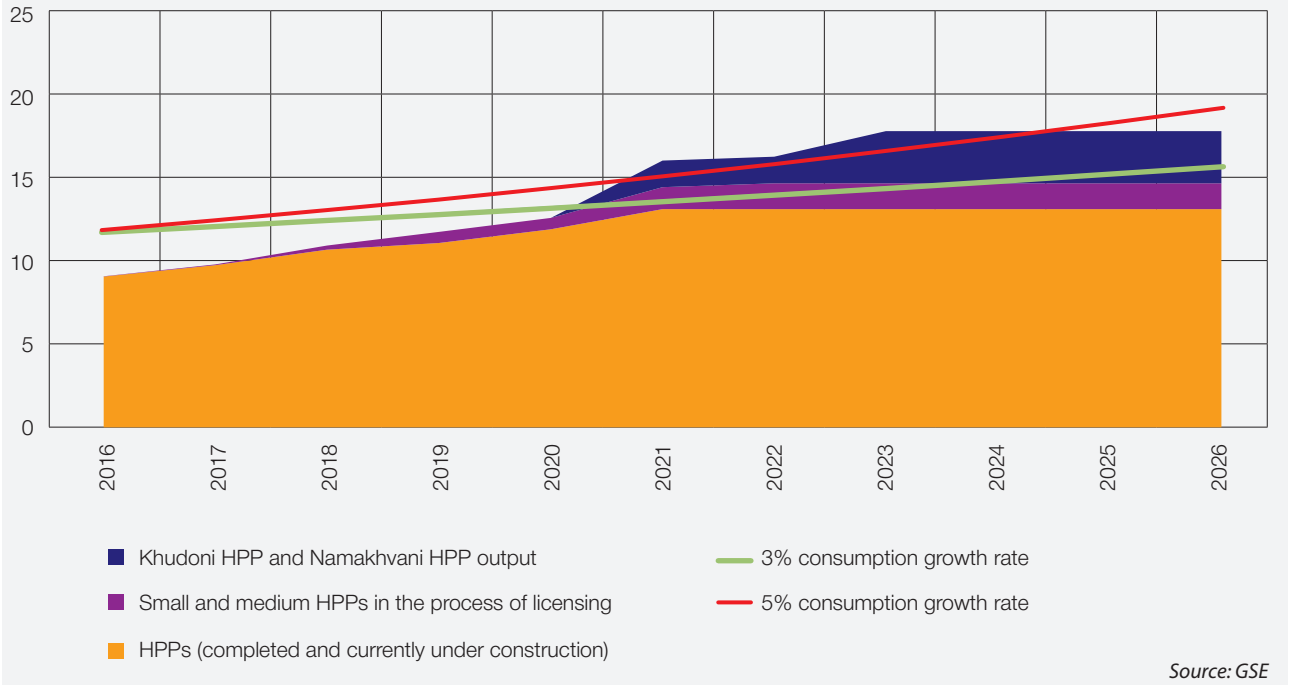
Graph 9 shows the future development plan of HPPs. Even in case of 3% demand growth rate (pessimistic scenario), electricity generated by existing stations along with those currently under construction will be insufficient. Among HPPs that are under construction or in the process of licensing, three large projects are notable:

Table 1.

NAME	INSTALLED CAPACITY (MW)	ANNUAL OUTPUT (GW)	COMMISSIONING DATE
Nenskra HPP	280	1194	2019-2021
Namakhvani HPP Cascade	441	1579	2021
Khudoni HPP	702	1528	2020

Source: GSE

Graph 9: Hydroelectric energy development plan



Source: GSE

Nenskra HPP is currently under construction and will start operating in 2019. The project will be fully completed in 2021. The Khudoni HPP and Namakhvani HPP Cascade projects are still being developed and the tentative dates of their completion might change. If the demand growth rate does not exceed 3%, electricity supply gap will be covered provided that these HPPs start operating on time. However, in case consumption increases at a faster rate, the need of other electricity sources will arise anyway.

CURRENT CHALLENGES OF THE ELECTRICITY SECTOR

▸ **Defining long-term development for the sector and sending clear messages to stakeholders:** Besides the energy policy and the 10-year development plan, a long-term development strategy of the system is necessary. The sector development strategy reflects a long-term vision of the state, and is a principal document for potential investors.

It is notable that within the frames of the European Union Association Agreement, and with the goal of becoming a member of the European Energy Union, Georgia has to carry out legislative amendments in the energy sector in order to form a free and a transparent market and increase investment attractiveness. Long-term vision shell define steps to be taken taken for integration in Energy Union and also, a regulatory impact analysis has to be conducted.

▸ **Defining priorities when dispatching electricity:** Priority shall be given to small, run-of-river HPPs. According to this method, the dispatcher will first distribute the electricity generated in run-of-river HPPs, then that generated in storage and pumped-storage HPPs. Implementing this method will reduce the volume of spilled water, which is particularly frequent in case of run-of-river HPPs. Besides, adopting this system will encourage the construction of small, run-of-river HPPs, as they will have the advantage to sell. Building small HPPs, as opposed to other types of HPPs, requires less invest-

ment, and notably, small HPPs do less harm to the environment.

▸ **Developing a transborder transmission network in Georgia** will not only encourage exports, but will also help Georgia be perceived as a transit country. Georgian electric energy system, as noted before, is of seasonal nature. Adding new HPPs in coming years will produce excess electricity during periods of high discharge. Considering the future development of the energy market, the transmission network of Georgia should ensure the export of increased capacity towards Turkey, transmit increased volume of electricity from Russia to Armenia, etc. Besides having a powerful transmission network within Georgia's borders, this also requires active negotiations about the construction of equally powerful transmission lines in neighboring countries.

▸ **Enhancing the safety and reliability of the system.** The domestic transmission network should be developed in respect with the economic development of Georgia. New enterprises create additional demand of electricity. The increased flow of foreign tourists will also significantly increase the demand of electricity in tourism zones. In order to ensure the network sustainability and the transmission of increased capacity, new substations and transmission lines have to be added to the system.

The development of the transmission network is also needed to minimize the power outages.

▸ **Import Substitution.** Further exploring hydro resources will encourage the energy-independence of the country. Being less reliant on imported electricity will enhance the system reliability; and increasing the share of hydro resources in total consumption will positively affect both the economy and the environment.

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