Hydropower in Georgia

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Introduction

Georgia is a country rich in natural resources. The diverse geological nature of the country means that there are, or have been, significant water, timber, solar, and mineral resources located within its borders. All of this translates into energy production. However, it is Georgian rivers which provide the majority of energy within the country. Over recent years there has been significant investment in the development of hydropower plants across the country. These investments have come from a multitude of sources and highlight the role that foreign investment plays in Georgia's modern economy.

Georgia imports, exports, and transits energy from the broader Caucasus region. The Electricity Market Operator (ESCO) reported that in 2017 Georgia imported 1,497 mln kwh, primarily from Russia and Azerbaijan. In that same year it exported 686 mln kwh to Turkey and transited 254 mln kwh to and from bordering nations. However, in more recent years there has been a significant decline in Georgia's role as an energy transit location, with ESCO reporting that in 2018 Georgia only transited 13.43 mln kwh. The total investment in hydropower development amounts to around 204 billion USD and would provide both energy security and economic opportunity for Georgia.

The development of hydropower capacity is also viewed in a positive light due to it offering a means of shifting the country away from a reliance on fossil fuels. However, there is increasing literature and evidence regarding the negative effects of the hydro-power development. Science Daily summarizes:

> *"Hydropower can generate electricity without emitting greenhouse gases but can cause environmental and social harms, such as damaged wildlife habitat, impaired water quality, impeded fish migration, reduced sediment transport, and diminished cultural and recreation benefits of rivers."*

Furthermore, there are issues associated with displacement of local populations and worker safety which are particularly pertinent within a Georgian context.

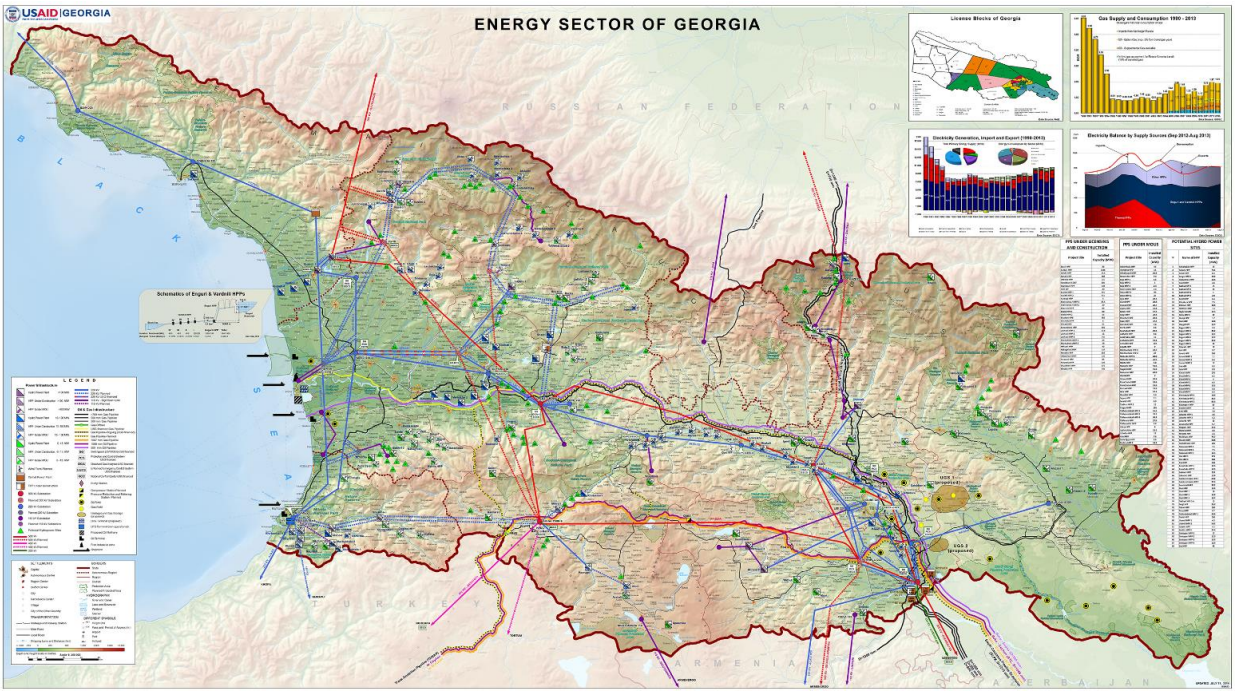
This article shall highlight the historical development of hydropower in Georgia. Examine the industries current development and future projections. The aspects of Georgia which make development attractive shall be inspected, as shall the social drawbacks of development and the negative response from numerous local communities to new developments.

Georgia's history with hydro

The first hydro-electric plant in Georgia was built in 1898 near Borjomi. By 1913 there were seven plants and construction escalated drastically from the mid-1920s. The natural power of the country was beginning to be harnessed. By 1941 the total capacity of Georgia's electricity stations reached 180 mw. However, supply could not keep up with demand. This promoted the development of the Enguri dam in Svaneti. Work was initiated in 1961 and the huge dam was finally operational in 1978. To this day the Enguri hydro-power plant provides a significant portion of Georgia's total electricity production.

The Enguri plant was inspected by foreign experts in the 1990s and found in an alarming state of disrepair. In 1999 9.4 mln Euro was given to Georgia to perform urgent repairs. As per the EBRD, between 1998 and 2006 a total investment of 116 mln Euro was made to bring the dam up to modern standards.

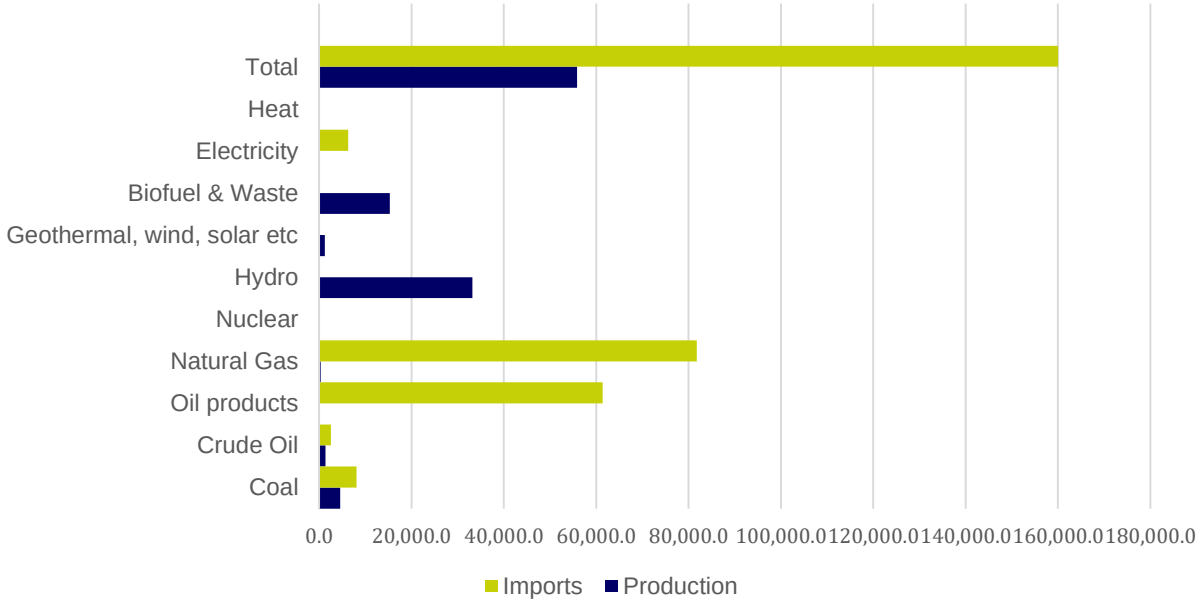
Current hydro power situation



Source: hydropower.ge

Georgia is a country undergoing a multitude of changes, the energy sector is no exception. Hydro-power is the primary source of energy but thermal, natural gas, oil and coal all also factor into the national energy consumption.

Domestic Energy Supply Production vs. Imports 2017



Source: Geostat

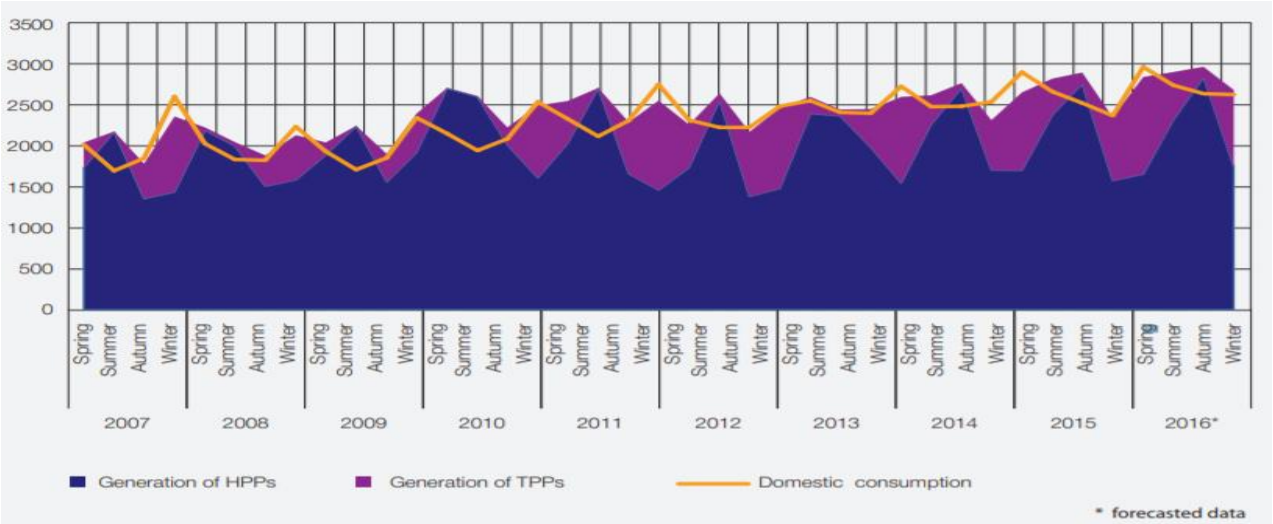
These statistics show the total energy consumption of Georgia. It is for this reason that imports far outstrip production levels as energy includes oil and gas consumption and these are predominately imported products. In Georgia 78% of electricity production is the result of hydro-power dams. However, while over the course of a year Georgia produces a surplus of electricity, in the winter months it has to import power due to reliance on hydro-power. Transelectrial limited summarizes the situation well in their report on the Khudoni HPP:

> *"During winter months there is a power ration in Georgia because of low river inflows and the power consumption is much larger as compared to summer months. During this period Georgia aims to satisfy all energy demands through domestic production and achieve independence from power generated by gas power stations. During summer months the reliable export market to Turkey exists. Therefore Government of Georgia has placed Khudoni Hydro Power Plant on high priority list."*

As it is impossible to store the electricity generated in the summer and use it in the winter, Georgia is forced to import electricity at select periods of each year – mainly from Azerbaijan and Russia.

The graph below illustrates this seasonal trend:

Seasonality of electricity generation (million KWh)



Source: esco.ge

This situation is driving the government's push for infrastructure development in energy technology and infrastructure. Hydropower plants are the main manifestation of this push with many development sites being proposed across the country. Indeed, Georgia has over 20,000 rivers, 300 of which have hydro power potential.

Svaneti:

One of the main areas of hydropower development focus is the region of Svaneti. The region currently has 35 proposed dams within its borders and is home to two mega hydropower plant developments – the Nenskra and Khudoni hydropower plants.

The Khudoni hydropower plant is planned to produce 702 Megawatts of energy and have a 364 million cubic meter reservoir. While the Nenskra HPP website states of their development: "Nenskra HPP with 280 MW of

installed capacity will annually provide Georgia with total energy generation of 1'200.00 GWh which will be fully consumed by the local energy market."

Both of these dams will be developed on the Enguri river, making it a thrice dammed water way (with the giant Enguri dam being the first development). The Enguri is estimated to have an approximate 3,530 MW power production potential, this amounts to 10.3 billion KW. Currently 5.5 billion KW is being used and the development of these major dams increase the power produced by the river (though diminish the power produced by each HPP individually).

Svaneti is a natural location for hydropower development. The mountainous region is sparsely developed and has many fast flowing rivers. The Nenskra and Khudoni hydropower plants are the major planned developments in the region, however, there are many smaller dams that are either being built or are proposed. Below is a map of all the proposed dam projects in Svaneti:

Map of all proposed dams in Svaneti, Georgia

Source: esco.ge

Protests

Despite the energy potential of HPP development there has been resistance to developments across the regions to be impacted. There are societal, environmental, and economic reasons that there has been resistance to some of the projects.

Societal – displacement

Construction of mega-projects often results in the displacement of populations. For instance, if work on the Nenskra and Khudoni dams is completed then significant numbers of the local populous would be displaced. The Khudoni HPP would displace an estimated 2000 people per bankwatch.org (about 12,000 people reside in Upper Svaneti) and the village of Kaishi (800) would be completely resettled. The Nenskra dam is thought to directly impact much fewer people, 80 families as per the Environmental and Social Impact Assessment

(ESIA) carried out in the region. However, the redirection of waterways and sources of irrigation would have a dramatic impact on many more indirectly.

There is also a cultural impact and historical legacy to contend with for the projects. Bankwatch and Green Alternative have both launched complaints with the grievance mechanisms of the EIB, EBRD, and the ADB (three central financiers of the Nenskra project) to get Svans recognized as an indigenous population. To date these complaints remain unresolved.

Environmental

The environmental impacts of HPPs are concerning for many locals. There is fear regarding the impact that development will have on access to fresh water, the ecology of river systems, and the potential increased risk of flooding, avalanches, and earthquakes. Indeed, it was environmental fears that sparked the recent violent clashes between Pankisi protestors and police. Eurasianet.org reported on the situation:

> *"What began as resistance to a hydroelectric project in the remote Georgian region of Pankisi escalated on April 21 to a mass brawl between villagers and security forces, prompting fears of broader civil strife...The clashes broke out on a Sunday after locals tried to prevent a construction team from proceeding with work on a small plant, called Khadori 3, a component of a wider hydropower complex. Local residents and several environment watchdogs believe the dam projects will harm the valley's ecosystem and restrict nearby villages' access to water."*

Furthermore, watchdog groups have criticized developments for not undertaking proper study regarding the potential impact that construction will have on avalanche, earthquake, and flooding in the surrounding valleys.

Populations living near the Shuakhevi Power Station in Upper Adjara have complained of environmental change since the completion of the station in 2017. OC-media reported that for this project an estimated 4,729,000 cubic metres of rock needed to be extracted. Rock cannot be reused and is usually dumped in ravines, roads, and, eventually, waterways.

Similar issues were reported from locals residing near the Acharistkali Cascades hydroelectric power plant. OC-media quotes one local: " We warned that the explosions would affect health, flora, and fauna. Oak trees have withered. Nine Streams have dried up, and we have problems with drinking water too…when the springs dried up, the local government managed to organize running water for only six households."

Economic

While the economic benefits of the hydropower plants are predominately held up as positives for the hydro-power plants, the economic impact development would have on local communities in the immediate vicinity of plants is argued to be negative by groups opposed to dam building. These populations will be forced to move and/or change their way of living in their homeland.

Furthermore, Bankwatch, a Central and East European based human rights and environmental watchdog that has taken a specific interest in the developments in Svaneti, points to the zero-tax that exists on energy exports and 1% property tax that those funding the dam developments will pay as indication that the economic benefits to Georgia as whole are exaggerated by interested parties. They are also skeptical regarding employment opportunities, stating: "The experience with other Georgian hydropower projects such as Larsi, Paravani and Dariali have shown that employment opportunities tend to be exaggerated and mostly limited to

the construction phase. The operation of Khudoni will require skilled work force which is likely to come from far away."

Georgia's future with hydroelectric power

Protests have successfully stalled a number of projects (namely Nenskra and Khudoni). However, suspended development may only be temporary and work has, or could soon, resume. How Georgia balances the complaints of local populations and the country's energy needs and economic goals will be a pressing issue moving forward.

Provided Georgia's economic environment and practices remain stable, Georgia will continue to be an attractive site for energy infrastructure investment. The government has made systematic efforts to encourage direct foreign investment in the country. This has resulted in Georgia becoming one of the easiest countries in which to do business; in 2018 Georgia was ranked 6th in the World Bank's ease of doing business rankings.

Invest in Georgia highlights these benefits as they pertain to doing business in the country's energy sector:

> *"Starting from 2008 Georgia has liberalized and deregulated energy market. Renewable projects are based on Build-Own-Operate (BOO) principle. There are no tariffs set for newly built HPPs, investor is free to choose market and negotiate price. No fee is required for the connection to transmission grid. No license is required for export and new HPPs have priority access to the capacity on the new interconnection to Turkey. Generation and export activities are exempted from VAT tax."*

There are currently 17 hydropower plants under construction (but many more are proposed) and it is in large part the removal of obstacles and lack of taxes on projects that has encouraged the level of investment that has occurred in Georgia.

Furthermore, while environmental watchdogs foresee negative economic impacts on local economies due to land disruption and impacts on tourism in natural areas, there is the possibility that some of the dam sites become tourist attractions in their own rights. The Enguri dam already attracts some visitors with its impressive construction and views of Abkhazia, but famous dams like the Hoover, Chardara, and Three Gorges perhaps offer better economic models.

How Georgia balances this investment opportunity with the interests and resistance to development from local populations will be a central issue for the country's future economic, political, and energy prospects.

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