

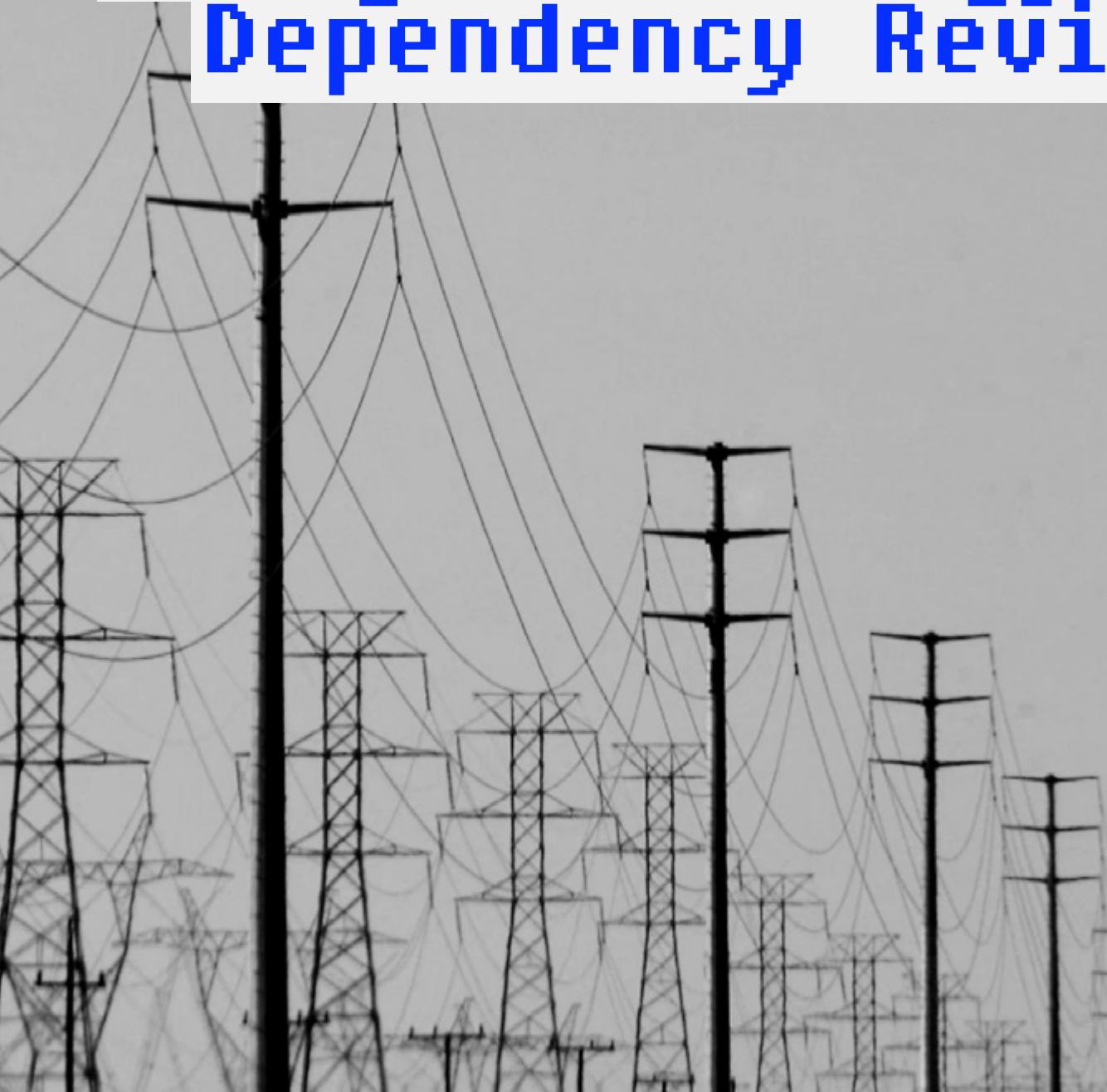


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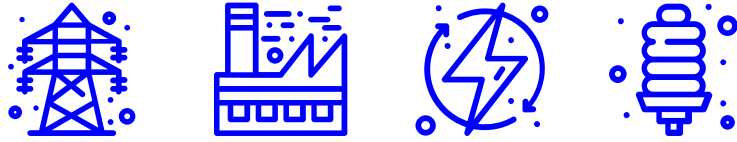


**USAID Economic Governance Program**

# Georgia's Energy Dependency Review



**2023**



# Georgia's Energy Dependency Review



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**Economic Policy Research Center**  
ეკონომიკური პოლიტიკის კვლევის ცენტრი

**USAID Economic Governance Program**

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<https://eprc.ge/economic-index/>

## Contents

<b>Key Findings</b>	<b>4</b>
<b>Introduction</b>	<b>6</b>
<b>Georgia's Consumption of Electricity and Import Dependency</b>	<b>7</b>
<b>History of Georgia's Energy Sector</b>	<b>7</b>
<b>Electricity Balance of Georgia in 2007-2011</b>	<b>8</b>
<b>Electricity Balance of Georgia in 2012-2022</b>	<b>9</b>
<b>Georgia's Consumption of Natural Gas and Import Dependency</b>	<b>11</b>
<b>Georgia's Consumption of Petroleum Products and Import Dependency</b>	<b>12</b>
<b>Threats of Import Dependency in the Context of Growing Demand</b>	<b>12</b>
<b>Important Factors That Influenced the Formation of Trends</b>	<b>13</b>
<b>A New Support Mechanism - Contract for Difference</b>	<b>14</b>
<b>Forecast of growth in electricity consumption</b>	<b>16</b>
<b>Georgia's Renewable Energy Potential</b>	<b>19</b>
<b>Conclusion</b>	<b>21</b>

## Key Findings

- Georgia's electricity sector relies mainly on the following sources: hydro, thermal, and renewable (mainly wind) power plants, as well as imports. At the same time, Georgia's thermal power plants operate on natural gas imported from Azerbaijan. In terms of direct electricity imports, the country's dependence on neighboring countries for electricity supply amounts to 40% a year on average, although in some months this dependence exceeds 60% as many of our power plants are run-of-river facilities, which are characterized by seasonal generation.
- Over the period between 2012 and 2022, fifty-four new power plants were built in Georgia, amounting to 26% (more than one fourth) of the total installed capacity of the country. Of those power plants that were built between 2012 and 2022, 61% are hydropower plants and 39% are thermal power plants.
- The annual power consumption of Georgia has significantly increased over the last decade, reaching 15 billion in 2022. The growth rate of electricity consumption in Georgia has notably exceeded the growth rate of power generation, and consequently, the share of domestic electricity production has declined from 89% in 2012 to 69% in 2022, showing that the energy independence and energy security of the country have been markedly decreasing year by year.
- Between 2012 and 2022, Russia accounted for the largest volume of electricity imports into Georgia. The electricity that Georgia purchased from Russia over the last decade accounted for 52% of all electricity imports, although in different years, the share of Russian imports to Georgia ranged from 15% to 95%.
- Electricity consumption in Abkhazia accounts for a significant share of Georgia's energy consumption. According to the data for 2020, growing energy consumption in Abkhazia reached 93% of the generation of the Enguri Hydro Power Plant, and per capita consumption in Abkhazia was 3.3 times higher than per capita consumption in the rest of Georgia, which is a definite contributing factor in Georgia's growing electricity dependency. In 2022, up to 82.5% of electricity imports came from Russia, and half of that imported electricity was consumed by Abkhazia. However, Russia supplies this electricity at a special price.
- The growing dependence on Russian energy resources can also be seen in natural gas imports. Since 2016, the share of Russian natural gas imports has tripled, from 5% to 15% in 2021.
- Georgia produces very little petroleum products, and the country is, in fact, completely dependent on imports of this commodity. In recent years, Georgia has steadily purchased 1.4 – 1.5 million tons of various petroleum products, of which one third accounts for motor petroleum, another one third accounts for transport diesel, and the rest are crude oil, jet fuel, and other petroleum products. Until 2021, Georgia's imports of petroleum products were fairly diversified, but from 2019 to 2023, the share of Russia in total imports of this commodity increased by 20% to 46%.
- Overall, it is worth noting the growing dependence on Russian imports (especially in the last four years) of strategically important goods that actually have to be considered in terms of national security, such as electricity (51.6% in 2022; 29% in 2019); natural gas (24.4% in 2022; 10.9% in 2019); and petroleum and petroleum products (46.6% in 2022; 26% in 2019).

## → Georgia's Energy Dependency Review

- In 2021, the generation of thermal power plants increased to their maximum capacity, by 42.4% a year. This has led, accordingly, to an increase in natural gas imports, as these power plants operate on imported natural gas. Consequently, natural gas imports from Russia have also increased. Thus, reducing electricity imports by increasing thermal power generation does not significantly reduce our energy dependence on neighboring countries and especially on Russia.
- According to the ten-year plan for the development of Georgia's power transmission network, drawn up by the Georgian State Electrosystem, the total consumption of the country is predicted to exceed 20 billion kWh by the year 2033 (which is, at least, 25% growth). The only way for Georgia to reduce its energy dependency is to develop its own renewable energy resources, increase electricity production, and build new hydro, wind, solar, and alternative power plants.

## Introduction

Energy security is one of the key components of the country's national security and provides for a guaranteed uninterrupted supply of energy resources of adequate quality, in sufficient quantities, and at affordable prices to the country and to every citizen.

This means that absolutely all citizens of the country must have the opportunity to purchase electricity, fuel, whether it be oil or gas, and other energy resources uninterruptedly and at affordable prices, both in the short term (protection against technical interruptions, sabotage, and state of emergency) and in the long run (development of new sources in response to rising demand, availability of imports, and optimal prices).

Although energy security is the combination of national security and access to natural resources as they are consumed, there is no such thing as absolute energy security. There is always a risk that energy supplies may be interrupted, discontinued, or become expensive. Risks must be controlled and must not lead to critical threats to the country.

A country is energy independent if it can produce enough fuel and electricity to meet its demand. Countries that are strong and rich in various types of energy resources strive to attain energy independence.

Energy security and access to energy sources affect the provision of basic human needs and sustainable development. It also contributes to a country's economic growth, political stability, and overall development of other sectors and security.

Georgia's energy security and independence are now in a complex, critical phase. **A rapid increase in the demand for energy resources makes energy security a challenge for Georgia.**

**This paper examines the development path of Georgia's electricity sector over the last 30 years, the current situation, the challenges the sector faces, and the huge potential the country has in the form of renewable energy sources.**

Georgia's energy supply largely depends on external sources. According to Geostat, almost half of it is imported natural gas, of which 15% is purchased from Russia, while 85% is purchased from Azerbaijan and imported through the Tbilisi-Baku-Ceyhan pipeline. Georgia cannot stop depending on oil and natural gas imports, as these resources are not actually produced in the country. However, the international transit corridors passing through the country provide certain security guarantees. **The best chance to gain energy independence is in the electricity sector, but even here, the country is dependent on neighboring countries.**

Georgia's thermal power plants also operate on natural gas imported from Azerbaijan. Combined with direct electricity imports, this makes Georgia's dependence on neighboring countries for electricity supply about 40% a year on average, although in some months this dependence exceeds 60% as many of our power plants are run-of-river facilities, which are characterized by seasonal generation.

**Although Georgia does not currently produce enough electricity, the country, despite its small size, is rich in various types of renewable energy potential, the development of which could allow Georgia not only to eradicate power imports but also export electricity and thereby improve its economic condition.**

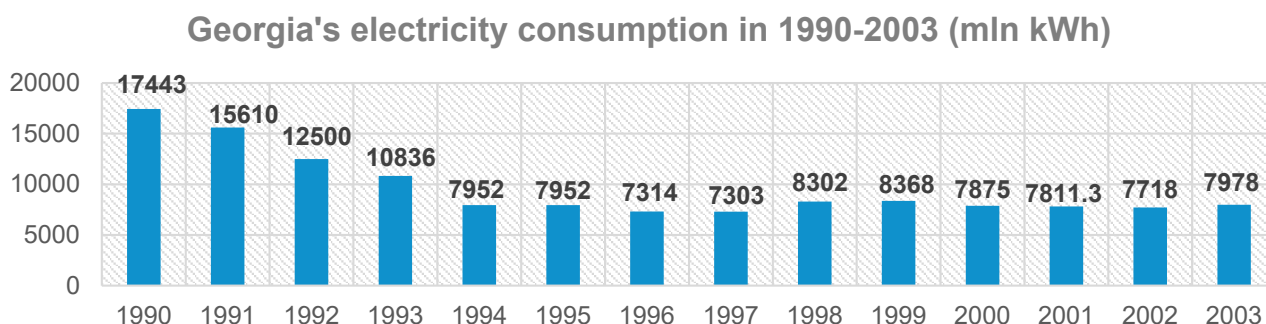
## Georgia's Consumption of Electricity and Import Dependency

### HISTORY OF GEORGIA'S ENERGY SECTOR

Before regaining its independence, Georgia had 45 HPPs (with an installed capacity of 2893 MW) and two TPPs (with an installed capacity of 380 MW) operating in the country.<sup>1</sup> According to ESCO, the electricity market operator, historically the highest consumption in the country was observed in 1980-1989. In 1980, consumption totaled 13.9 billion kWh, almost equal to Georgia's current consumption. That year, Georgian generation met the demand for electricity and even exported it. By the end of the decade, however, consumption had increased to 17.9 billion kWh, requiring the import of 2.1 billion kWh of electricity.<sup>2</sup> Such a high demand for electricity was caused by the industrial processes taking place in the country.

Although the country's energy sector was at a high level of development at that time, the disintegration of the USSR and the disconnection from its energy system led the sector to its virtual destruction, and the country's annual electricity consumption began to gradually decline. Georgia's record high consumption of 17.4 billion kWh in 1990 declined to 7.7 billion kWh in 2022 (Chart 1).

CHART 1. ELECTRICITY CONSUMPTION BY YEARS.



Due to the situation in Georgia, only six small HPPs with a total installed capacity of 13.3 MW and one thermal power plant, Mtkvari TPP, with an installed capacity of 300 MW, were commissioned over the entire decade since 1990. At that time, the functioning of the country's energy sector was in question.

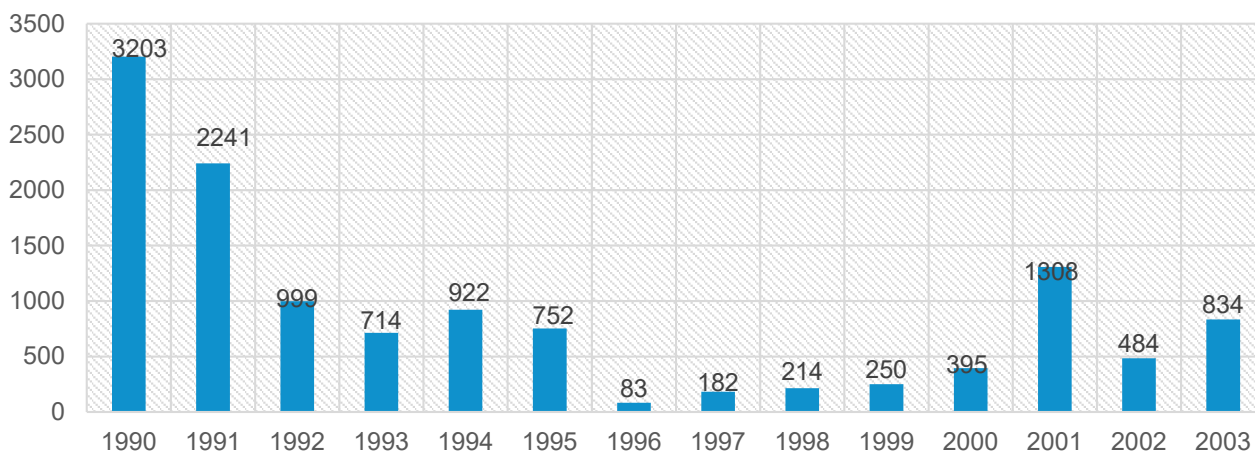
Similarly, since 1991, the country's balance of electricity exports and imports also decreased from 3.3 billion kWh in 1990 to 0.8 billion kWh in 2003. However, this decrease was not gradual over the years: in 1996, it dropped to even 0.083 billion kWh, whereas in 2001, it totaled 1.3 billion kWh (Chart 2).

1 The Ministry of Economy and Sustainable Development of Georgia.

2 ESCO data archive.

CHART 2. BALANCE OF EXPORTS AND IMPORTS (ESCO DATA).

**1990-2003 (mln kWh)**



Between 2003 and 2007, annual electricity consumption in Georgia steadily totaled 7-8 billion kWh. During that period, six HPPs with a total installed capacity of 33.35 MW were commissioned, of which five were small and one was a medium-sized hydropower plant, Khadori HPP, with an installed capacity of 110 MW. In addition, an air turbine power plant of “gPower” with an installed capacity 100 MW was commissioned in 2006.

At that time, the consumption of Georgia was fairly small, and therefore, little attention was paid to the development of hydropower. The construction of the thermal power plant in 2006, after the Tbilisi-Baku-Ceyhan pipeline had been commissioned, was a logical decision because the thermal power plant would purchase natural gas from the pipeline at a subsidized price and would produce electricity at low costs.

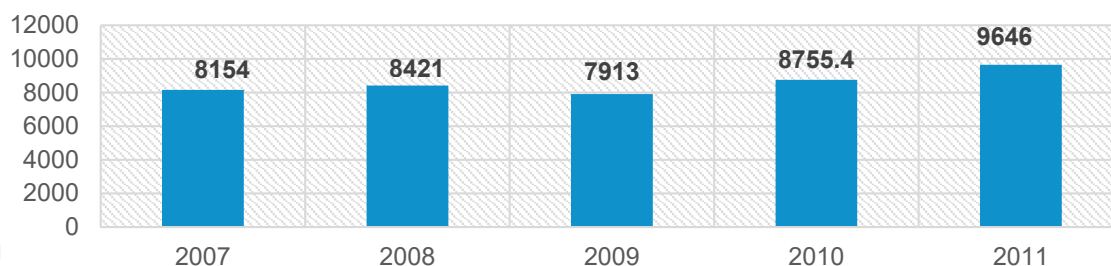
**Electricity Balance of Georgia in 2007-2011**

The last 15 years were the most important period in the recovery, strengthening and development of Georgia's energy sector.

Over the period from 2007 to 2011, consumption in Georgia was fairly stable, within the range of 8-9 billion kWh (Chart 3).

CHART 3. ELECTRICITY CONSUMPTION IN GEORGIA BY YEARS (ESCO DATA).

**Electricity consumption in Georgia in 2007-2011 (mln kWh)**





## → Georgia's Energy Dependency Review

As a result of maintaining stable consumption, Georgia sold more electricity than it purchased during that period. The country actively exported power to neighboring countries – Russia, Azerbaijan, Turkey, and Armenia. The largest volume of electricity was exported to Russia. Electricity exports in 2007-2011:

- 0.6 billion kWh in 2007
- 0.4 billion kWh in 2008
- 0.5 billion kWh in 2009
- 1.1 billion kWh in 2010
- 0.6 billion kWh in 2011<sup>3</sup>

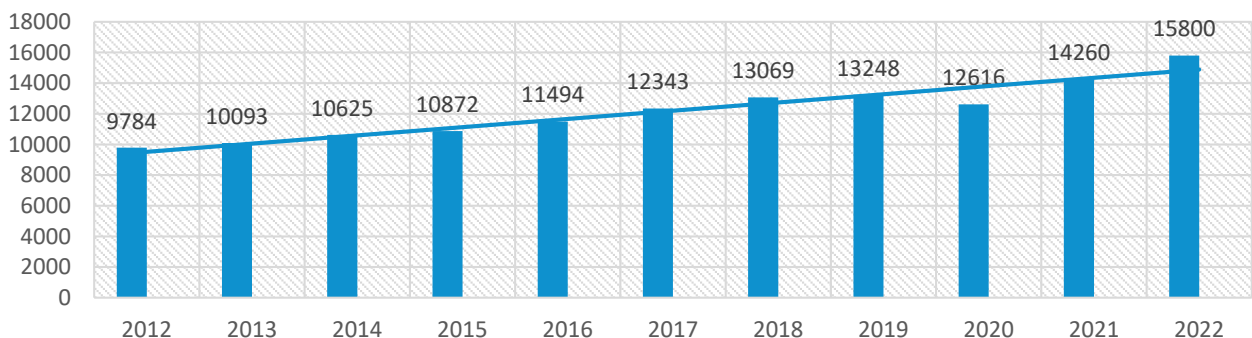
## Electricity Balance of Georgia in 2012-2022

2012-2020 was the most important period in the rehabilitation and development of Georgia's energy sector. Since 2012, the energy sector has started to advance actively. Within 10 years, electricity consumption in Georgia significantly increased annually and reached 15 billion kWh<sup>4</sup> by 2022 (Chart 4).

Over the last decade, 54 new power plants were built in Georgia, which is a record high. The total installed capacity of the power plants constructed between 2012 and 2022 was 1197.474 MW. This means that 26%, i.e., more than a quarter, of the country's total installed capacity was built precisely in the last decade. Of the power plants built between 2012 and 2022, 61% are hydropower plants and 39% are thermal power plants.

CHART 4. ELECTRICITY CONSUMPTION BY YEARS, IN MILLION KWH.

Electricity consumption in georgia in 2012-2022 (mln kWh)



Despite the fact that a record number of new power plants were built in Georgia during this period, electricity imports have continued to grow since 2010. From this period to the present day, the share of generation in total consumption has decreased notably. The share of domestic electricity production has declined from 89% in 2012 to 69% in 2022, showing that the energy independence and energy security of the country have been markedly decreasing year by year. In the mentioned period, the largest volume of electricity has been purchased from Russia. Electricity purchased from Russia over

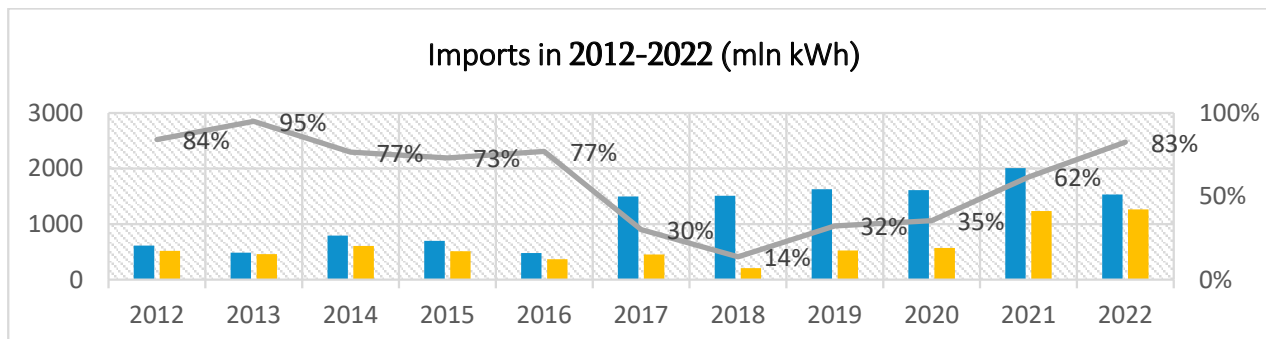
3 ESCO data.

4 Electricity generation (net generation) and sales - esco.ge

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the last decade accounted for 52% of all electricity imports, although in different years, the share of Russian imports to Georgia ranged from 15% to 95%.

CHART 5. ELECTRICITY IMPORTS (2012-2022). SOURCE: GALT & TAGGART



Total imports; Import from Russia; Share of import from Russia

The increase in electricity imports from Russia is due to increased demand in Georgia, but it is also due to a lower tariff for Russian electricity imports compared to other sources. Azerbaijan and Turkey account for the rest of the electricity imports. Imports from these countries depend on the availability of electricity and the proposed tariff. Electricity purchased from Azerbaijan also accounts for a significant share in the electricity balance of Georgia: in 2016, we purchased 109.8 GWh of electricity from Azerbaijan; in 2017 – 917.6 GWh; in 2018 – 1294.8 GWh; in 2019 – 1102 GWh; in 2020 – 726.3 GWh; and in 2021 – 463.1 GWh. **There has not been a noticeable upward trend in electricity purchases from Azerbaijan over the years.**

Georgia can replace Russian sources of imports with Azerbaijani and Turkish sources, but this involves economic pressure on the one hand, as these countries often raise electricity tariffs. On the other hand, Russia is notorious for using other countries' dependence on its energy sources for political purposes. Such cases have been seen in Georgia and Ukraine, as well as the Baltic States. Russia has always tried in various ways to prevent other countries from becoming energy independent from it. Therefore, while in the short term, importing electricity from Russia may not be considered a serious threat to Georgia, in the long term, this dependence could put the country at serious political risk.

Data on the export of electricity from Georgia in 2022 is worth noting. According to Galt&Taggart, total electricity exports increased by 153.7% in 2022 annually and amounted to 1.0 TWh. Revenues from electricity exports increased by 436.5% (5.4 times) annually and reached \$84.3 million. The average export price increased by 118.9%, amounting to 8.7 US cents per kWh. The export of electricity started in May and continued until the end of September. Electricity exports in September are very unusual for Georgia, as in the last few years even August fell off the list of export months due to increased domestic consumption. When planning the demand-supply balance for 2022, the Ministry of Economy took into account the possibility of high export revenues and planned the operation schedule of Enguri and thermal power plants in such a way as to ensure the possibility of exporting electricity from May until the end of September. It is important to note that the increase in world prices on natural gas has not affected the operation of thermal plants in Georgia, as they use so-called "social natural gas," which Georgia receives as transit gas from Azerbaijan to Turkey through the South Caucasus Pipeline. **Social natural gas is supplied to the Georgia side only in limited quantities, so its consumption by thermal power plants is limited too. It is precisely because of this limitation that exports have not increased to a greater extent.**

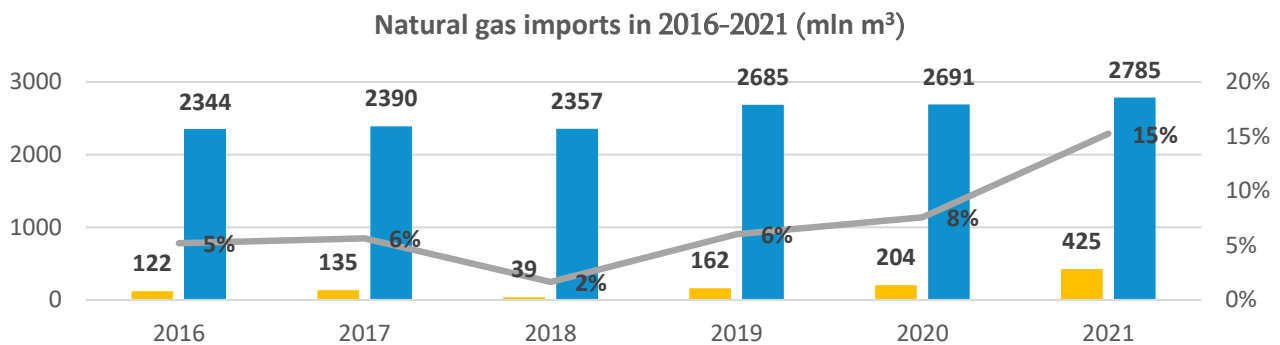
## Georgia's Consumption of Natural Gas and Import Dependency

The growing dependence on Russian energy resources can also be seen in natural gas imports. Since 2016, the share of Russian natural gas imports has tripled, from 5% to 15% in 2021 (Chart 6).

Particularly notable growth was observed in 2021. In 2020, the share of Russian natural gas in total imports was 12.2% in monetary terms. This year, the figure reached 23.1%, as the value of total natural gas imports in 2021 was \$333 million, of which \$256 million was Azerbaijani gas and \$77 million was Russian gas.

The country buys Russian natural gas through the North-South Main Gas Pipeline. This pipeline transports 2.2 - 2.3 billion cubic meters of gas per year, and it is the main pipeline for natural gas supplies to Armenia. Until the end of 2015, Georgia received a transit fee in kind - 10% of the transited natural gas - but since 2016, the Russian company, Gazprom Export, has been paying the transit fee to Georgia in the form of money, and the amount of the fee is a commercial secret.

CHART 6. NATURAL GAS IMPORTS IN 2016-2021.



Import from Russia; Total imports; Share of Russian import in total imports

Although Georgia's natural gas consumption has gradually increased over the past few years, the volume of natural gas imports from Russia has exceeded the growth rate of the consumption of natural gas, which allows us to conclude that in some cases, the natural gas imports from Russia have partially substituted natural gas imports from Azerbaijan; however, it should be noted that Georgia may purchase so-called "social natural gas" from Azerbaijan in limited quantities, which in some cases may force Georgia to import natural gas from Russia.

## Georgia's Consumption of Petroleum Products and Import Dependency

As regards petroleum products, Georgia produces them in very little quantities, and the country is, in fact, completely dependent on imports of this commodity. **In recent years, Georgia has steadily purchased 1.4 – 1.5 million tons of various petroleum products (Geostat)**, of which one third accounts for motor petroleum, another one third accounts for transport diesel, and the rest are crude oil, jet fuel, and other petroleum products.

Georgia's imports of petroleum products are fairly diversified because the commodity comes from various countries. The statistics of those countries in 2021 was the following

The geography of oil imports to Georgia is rather diversified, as the commodity comes from different countries. The statistics of imports in 2021 is the following (top five): Turkmenistan - \$32 million, 60,400 tons; 2) Russia - \$28 million, 59,400 tons; 3) Romania - \$27.4 million, 51,200 tons; 4) Azerbaijan - \$20.1 million, 43,000 tons; 5) Bulgaria - \$14.4 million, 26,900 tons.

Georgia's imports of petroleum products are fairly diversified. In 2019-2021, Georgia imported diesel from about 40 countries. Although Russia is among the top four along with Azerbaijan, Turkmenistan and Romania, the share of Russia among these partners remains medium (ranging from 9% to 27%). This trend is upward, and if it is maintained, Georgia may, over the years, become more dependent on Russia for petroleum products too, which is a factor to consider in terms of Georgia's energy security.

## Threats of Import Dependency in the Context of Growing Demand

As the analysis of imports of electricity, natural gas, and petroleum products over the years has shown, Georgia's dependence on energy resources from Russia is quite significant, which, given the geopolitical situation in the world, puts the country at risk as Russia has repeatedly used other countries' dependence on its energy resources as a lever for political pressure.

The country is most heavily dependent on electricity imports from Russia, as the demand for electricity has been significantly increasing year after year. The analysis of existing trends allows us to conclude that the generation of new power plans was insufficient to meet the growing demand of Georgia, and the supply gap was largely covered by imports from various countries. By years, preference was given to the country that provided the required electricity at a lower price, and this price was most often offered by Russia.

The 2022 statistics were significant. According to the 2022 report by Galt & Taggart, last year, the increased demand was mainly met by the growth in hydro and thermal generation. The generation of thermal power plants increased by 42.4% year-on-year, while electricity imports dropped by 23.6%. This shift from electricity imports to thermal generation can be mainly explained by the difference in cost between the two. The average cost of electricity imports was 7.0-7.8 US cents per kWh, while the cost of thermal generation ranged between 3.3 and 4.5 US cents per kWh. Georgia managed to keep the cost of thermal generation lower owing to "social natural gas."

## → Georgia's Energy Dependency Review

Despite the intensive operation of thermal power plants, 82.5% of total imports in 2022 came from Russia. Half of the imported electricity was consumed by the Abkhazia region. Russia supplies this electricity at a “special” price (below 0.5 US cent per kWh). This special price markedly reduces the weighted average import price, which stood at 3.2 US cents per kWh in 2022.

- The price of imports from Azerbaijan increased by 55.5% year-on-year and reached an average of 7.5 US cents per kWh;
- The average import price from Armenia was 7.4 US cents per kWh;
- The price of imports from Russia stood at 7.0 US cents per kWh in October (up by 42.3% compared to October 2021). Importantly, there were no electricity imports to the Abkhazia region in October, so this is the pure commercial price of electricity imports from Russia.

At some points in 2021, the import price was even 7.2 US cents, and in 2022, it reached 8.7 US cents. The commercial price of electricity imports is much higher.

The year 2022 was the exception, as thermal power plants increased electricity generation to their maximum capacity. However, this also led to an increase in natural gas imports, as these power plants operate on imported natural gas. Accordingly, natural gas imports from Russia increased. Thus, **it can be concluded that reducing electricity imports by increasing thermal power generation does not significantly reduce our energy dependence on neighboring countries, especially Russia, and the country continues to face certain energy security risks.**

## Important Factors That Influenced the Formation of Trends

The Power Purchase Agreement (PPA) was introduced in Georgia to facilitate the development of energy projects. In Europe, PPA, as an investment support mechanism, is also known as Feed-in-Tariff (FIT). PPA/FIT support mechanisms serve the purpose of project financing, which provides financing compatibility for financial institutions/investors (IRENA, 2018). Under the PPAs, 41 projects have been implemented in Georgia.

Since 2016, the Ministry of Finance of Georgia has been using the fiscal transparency standards of the International Monetary Fund (IMF). In the energy sector, this applies to PPAs and requires public disclosure of information on fiscal risks and fiscal costs under the aforementioned agreements.

In 2017, on recommendation of the IMF, Georgia declared a moratorium on the issuance of new PPAs, or more specifically, it allowed an exception for two projects, Koromkheti HPP and Namakhvani HPP Cascade, as PPAs were considered a fiscal risk. In Europe, PPA/Fit prices differ country by country and range between 8.8 US cents per kWh and 14.7 US cents per kWh (depending on technologies) (USAID/Deloitte, 2019). The average PPA tariff in Georgia, however, was only 6 US cents.

Although the PPA mechanism was in place in the country until 2017, it is noteworthy that **electricity production by domestic generation facilities has declined notably since 2010, declining from 89% to 69%, which shows that the energy independence and energy security of the country have been markedly decreasing year by year.** Moreover, the total capacity of hydro and wind power plants commissioned since 2010 was only 700 MW, while 1500 MW was required to meet the growing

## → Georgia's Energy Dependency Review

demand. The rate of growth in electricity consumption has been twice as fast as the rate of growth in electricity generation. This reality, combined with the negative effects of the moratorium on PPAs, has placed a heavy burden on the energy sector, and construction of new power plants has slowed since 2017. The abolition of the Ministry of Energy, along with the elimination of PPAs, also contributed to the slowdown in the development of new projects, and shaped the country's energy policy. By a decision of the Georgian government, the Ministry of Energy was merged with the Ministry of Economy and Sustainable Development of Georgia. While in 2013-2017, when the Ministry was active, power plants with a record-high total capacity of 544.75 MW were commissioned, after the abolition of the Energy Ministry and the PPA, only 194.97 MW of capacity were commissioned in 2018-2020.

To incentivize investors, the government, instead of PPA, introduced a new financial instrument called FEED IN PREMIUM (FIP), which, according to the government's explanation, involved adding 1.5 US cents per kWh to the x sales price of electricity generated by a hydropower plant. The government set the average electricity tariff at 4 US cents, thereby offering investors a guaranteed electricity sales price of 5.5 US cents.

Although agreements on up to 20 renewable energy projects were signed under the government resolution N403, the above-described model did not work, and none of the power plants obtained financing under this model.

The failure of FIP was due to the fact that there was no lower tariff limit set, which meant that if at any point in time the electricity tariff fell to zero US cents, the company would receive a total of only 1.5 US cents with government assistance. Equally important was the fact that the upper limit of the support was set at 5.5 US cents, meaning that if the tariff exceeded this threshold, the company would no longer be eligible for state support, which made this mechanism rather ineffective because during the period defined by the resolution, the winter months, the tariff often exceeds 5.5 US cents due to high demand and low supply.

## **A New Support Mechanism - Contract for Difference**

Until 2022, the process of obtaining financing hampered by the absence of an effective support mechanism, led to delays in the construction of a number of projects. However, in 2022, the Ministry of Economy and Sustainable Development introduced a contract for difference (CFD) for the energy sector with a new resolution N556.

This new support scheme for renewable energy projects is based on competition and market principles, which favor the development of the energy sector in Georgia.

This resolution will only apply to those projects that are at the feasibility study stage for the construction of power plants.

The content of a CFD contract is as follows: the price difference will be paid by ESCO as an addition to the equilibrium price fixed in the day-ahead and intraday markets at the corresponding hour only if the equilibrium price fixed for 1 kWh each hour on the day-ahead and intraday markets during the power plant support period is less than the tariff defined by the CDF contract, and vice versa.

## → Georgia's Energy Dependency Review

The settlement will be made based on the volume of electricity produced (net generation) at each hour.

The support scheme includes a support period of 15 years after the power plant is commissioned, for various sources of renewable energy in the following months:

- Hydro power plant – 8 months (September - April)
- Wind power plant – 9 months (August - April)
- SOLAR power plant – 12 months (January - December)

Under the support scheme, capacity auctions will be announced for up to 1,500 MW by the following categories:

- Hydro power plants – 950 MW
  - Regulated/reservoir HPPs – 300 MW
  - Run-of-river HPPs – 650 MW
- Wind power plants – 250 MW
- Solar power plants – 250 MW
- Other renewable energy sources (hydrogen, biogas, biomass, geothermal, etc.) – 50 MW

The auction for the sale of these capacities will be held in three stages:

- Phase I – 300 MW (2022-2023)
- Phase II – 400 MW (2023-2024)
- Phase III – 800 MW (2024-2025)

Phase I of the auction has already been conducted, and 24 projects have obtained support, of which 14 are hydropower plants, two are wind farms, and 10 are solar power plants.

For other renewable energy source projects, for which 10 MW were auctioned, no winner was identified. Therefore, these 10 MW of capacity were redistributed among the hydro, wind, and solar power plant projects as the demand for contracts for difference was very high from the private sector. For the announced 300 MW, the Ministry of Economy and Sustainable Development received bids for a total installed capacity of 950 MW. Given the very high demand, the Ministry has decided to organize a Phase II auction for a larger capacity of 400 MW in the same year.

The 300 MW put up for Phase 1 of the auction were distributed as follows:

- Hydro power plants (run-of-river) – 153 MW;
- Wind power plants – 77 MW;
- Solar power plants – 70 MW.

Under the CFD mechanism, the government will offer the following median tariffs by type of renewable energy to the companies that have won these capacities in the auction: 6.825 US cents for HPPs; 6.825 US cents for wind farms; and 6.367 US cents for solar power plants. The renewable energy power plants will be paid according to a set tariff.

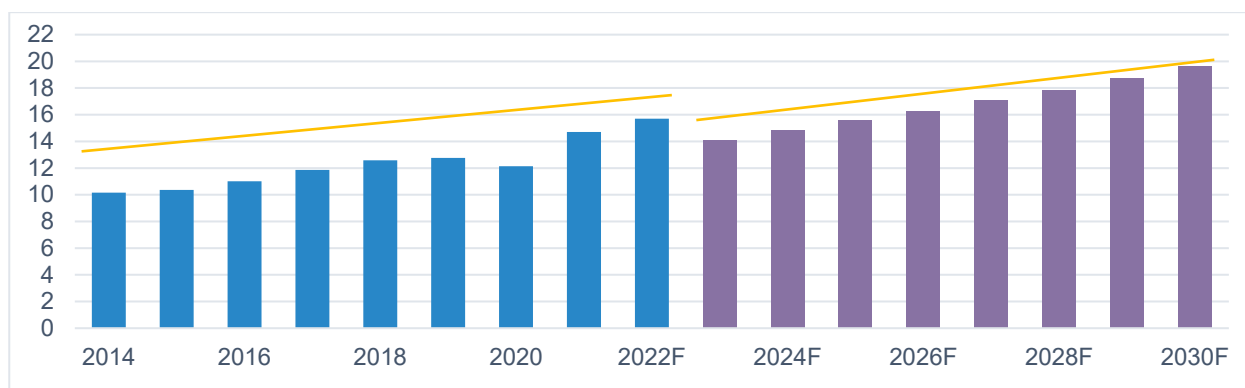
## Forecast of growth in electricity consumption

According to the ten-year plan for the development of Georgia's power transmission network, drawn up by the Georgian State Electrosystem, the total consumption of the country is predicted to reach 16 billion kWh in 2025, and in 10 years, by 2033, it will exceed 20 billion kWh.

In 2022, Georgia's electricity consumption reached 15 billion kWh, which means that growth of at least 5 billion kWh, i.e., around 33% increase on the current consumption, should be expected in the following years; however, Georgia is currently unable to generate enough electricity during 10 months a year.

Between 2014 and 2022, consumption grew by 5.6% a year (compound annual growth rate, CAGR). According to the forecast for 2023-2033, the consumption should have increased by 4.8% per year, but given the reality, the CAGR may exceed this figure (Chart 7).

CHART 7. FORECAST OF ELECTRICITY CONSUMPTION (VAGR) (GALT & TAGGART).



Along with the increase in Georgia's total consumption, consumption has also been growing in Abkhazia in annual terms. The economic situation in Abkhazia is more difficult than in the rest of Georgia; the main cause of uncontrolled consumption is so-called free electricity. The fact that Abkhazia does not pay for the electricity supplied encourages uncontrolled consumption of that commodity. The growth of consumption in Abkhazia is often associated with so-called "mining," but even 10 years ago, when almost no one knew anything about bitcoins, per capita consumption of electricity in Abkhazia was 125% higher than per capita consumption in the rest of Georgia.

The official rate per kWh in Abkhazia is 40 kopecks, that is, around 1.7 tetri. Police officers and war veterans are exempted from even this low fee, while those who are not entitled to such an exemption do not pay the electricity due to the absence of metering.

Electricity supply to Abkhazia should be covered by electricity generated by the Enguri HPP, but since Abkhazia consumes almost as much electricity as Tbilisi, the share of electricity generated by Enguri is no longer sufficient to meet Abkhazia's needs. However, the population of Tbilisi, which officially stands at 1.2 million but actually exceeds 1.5 million, is at least six times the population of Abkhazia. This ultimately jeopardizes Georgia's energy security, as Georgia has to purchase electricity from Russia for Abkhazia to cover the shortage.



## → Georgia's Energy Dependency Review

According to the analysis of World Experience for Georgia, apart from the outflow of energy and financial resources, the growing demand negatively affects the technical conditions of the Enguri-Vardnili cascade and the operating conditions of the entire energy system, increases energy dependence on Russia and Azerbaijan, and creates additional economic and political risks, which in sum can be considered a creeping occupation of the energy sector.

The electricity market operator, ESCO, has been recording data on electricity generation, consumption, imports, and exports since 2007. That year, Abkhazia consumed 1.255 billion kWh of electricity, and the whole of Georgia, including Abkhazia, consumed 7.815 billion kWh of electricity. In 2020, these figures were 2.552 billion kWh and 12.157 billion kWh, respectively. Over 13 years, consumption in Abkhazia grew by 103%, compared to 55.6% for the whole of Georgia and 46.4% without Abkhazia. Analysis of the data for 2021 further increases the contrast, with consumption reaching 3.101 billion kWh in Abkhazia, i.e., 147% growth compared to 2007, and that of 14 billion kWh in the whole of Georgia, that is, an 80% increase compared to the 2017 figure. Georgia's consumption, excluding the occupied territories, totaled 10.968 billion kWh, up by only 67%.

Apart from Enguri, the Vardnili HPP cascade, consisting of four hydropower plants, is located on the administrative border. Of these four, only Vardnili 1 HPP has operated for 30 years. If Vardnili 2, 3, and 4 HPPs were rehabilitated, the annual output of the facility would increase by 380 million kWh. Despite negotiations with the Abkhazian side and the allocation of funds, the plan to restore and rehabilitate these power plants has remained on paper for three decades now.

There are two ways to meet increased consumption in the country. One is to attract foreign investments and build renewable energy plants; the other is to increase imports, thereby injecting additional finance into the economies of neighboring countries. An important factor for imports is the availability of power transmission lines and their capacity.

Georgia transports electricity from neighboring countries through the following transmission lines:

- 220kV transmission line Salkhino – Russia (Georgian State Electrosystem)
- 500kV transmission line Kavkasioni – Russia (Sakrusenergo)
- 110kV transmission line Java - Russia (Georgian State Electrosystem)
- 500kV transmission line Stepantsminda-Mozdoki - Russia (Sakrusenergo)
- 110kV transmission line Dariali - Russia (Georgian State Electrosystem)
- 500kV transmission line Mukhranis Veli – Azerbaijan (Sakrusenergo, Georgian State Electrosystem)
- 300kV transmission line Gardabani - Azerbaijan (Gardabani)
- 110kV transmission line Lalvari – Armenia (Georgian State Electrosystem)
- 500kV transmission line Marneuli-Airum – Armenia (Sakrusenergo)
- 220kV transmission line Alaverdi – Armenia (Georgian State Electrosystem)
- 110kV transmission line Ninotsminda - Armenia (Georgian State Electrosystem)
- 400kV transmission line Meskheta – Turkey (Energotrans)
- 220kV transmission line Adjara – Turkey (Sakrusenergo)
- 154 transmission line Batumi-Murati – Turkey (Energopro)

## → Georgia's Energy Dependency Review

In the context of growing demand, the import of increased volumes through existing transmission lines may be associated with technical risks since, according to the Georgian State Electrosystem, their transmission capacity is limited based on the permissible operating parameters of the country's energy system.

**CHART 8. ABILITIES FOR CAPACITY FLOW OF GEORGIA'S TRANSMISSION GRID FOR 2033 (GEORGIAN STATE ELECTROSYSTEM).**



According to the ten-year plan for the development of the Georgian State Electrosystem for 2025-2033 (Chart 8), Georgia's transmission lines connected to the grids of neighboring countries will be strengthened: the capacity to exchange flows with Turkey will be increased to 1050 MW, with Russia to 1600 MW, and Armenia to 700 MW. From 2023 on, power flows of up to 2000 MW will be possible in Azerbaijan.

Apart from the fact that increasing imports is currently a technical challenge, it is also important to note that imports in such volumes also carry financial risks, as import prices have actually increased every year for many years. In addition to the financial risks, it is also worth considering that at certain times, especially during the winter months, neighboring countries may not have spare electricity to sell to us.

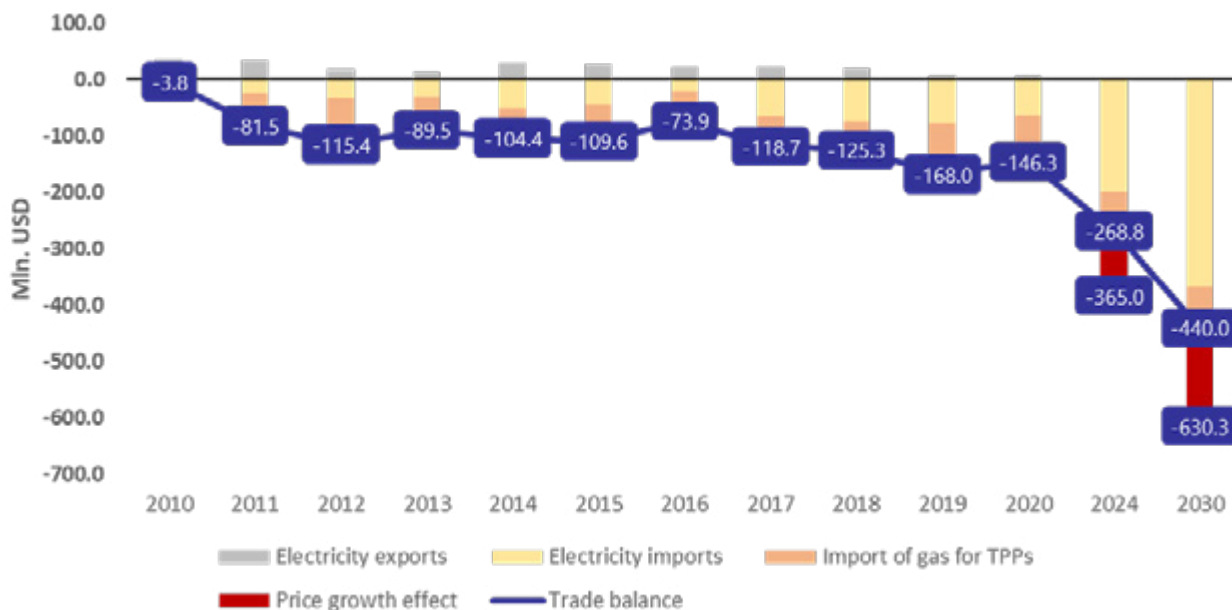
Georgian Renewable Power Company has developed a financial model that shows the financial pressure the country will experience if it meets an increased demand with imports.

Between 2010 and 2020, the country imported a total of \$1.1 billion worth of electricity, although this figure may be very small compared to the forecast for the coming years. If the current trend continues, the annual trade deficit will exceed \$600 million per year by 2030.

To avoid such an outcome, new power plants with an installed capacity of 3,000 MW must be built, compared to only 700 MW over the same historical period. If imports and consumption of electricity increase, the result could be much worse.

## → Georgia's Energy Dependency Review

**CHART 9. FINANCIAL MODEL FOR MEETING INCREASED DEMAND THROUGH IMPORTS.**

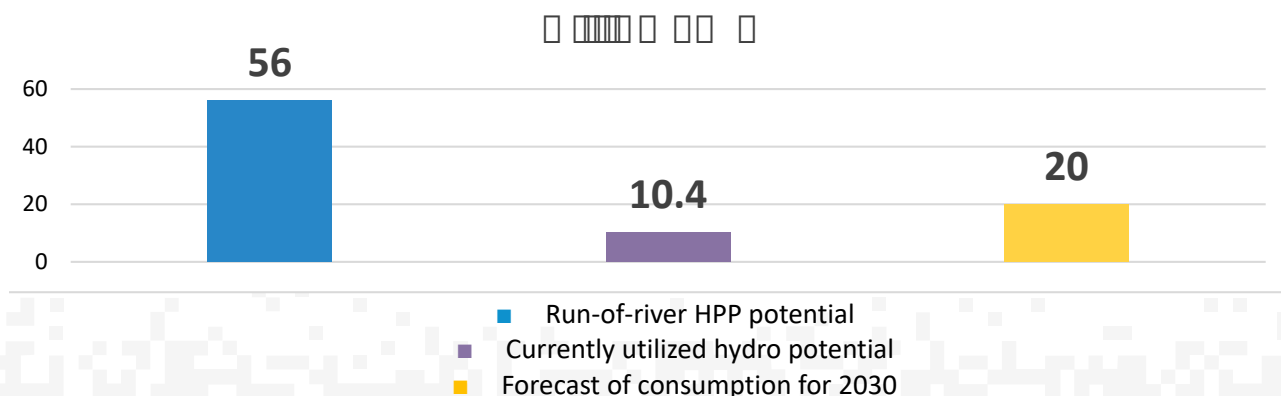


## Georgia's Renewable Energy Potential

According to the ten-year plan for the development of Georgia's power transmission network, drawn up by the Georgian State Electrosystem, the total consumption of the country is predicted to exceed 20 billion kWh by the year 2033. The only way for Georgia to improve its energy security and strengthen its energy independence is to develop its own renewable energy resources and build new power plants.

According to a [study conducted by the Norwegian Water Resources and Energy Directorate](#) in 2021, Georgia's technically and economically favorable **hydro potential for run-of-river HPPs is 56 billion kWh**. In addition, Georgia has resources for the construction of three reservoir HPPs. These are: Khudoni HPP (1.7 billion kWh), Nenskra HPP (1.2 billion kWh), and Namakhvani HPP (1.5 billion kWh). **Their total installed capacity will allow them to generate an amount of electricity almost equal to the energy generated by one Enguri HPP.**

By utilizing the potential of only run-of-river HPPs alone, Georgia, instead of paying huge sums for electricity imports, can gain huge financial benefit by exporting electricity.



## → Georgia's Energy Dependency Review

With the existing tariff, Georgia can export surplus electricity (56-20=36 billion kWh) for 8.7 US cents, i.e., about 23 tetri. In this case, Georgia can get up to 8.3 million lari. Of this amount, at least 1.6 billion lari will be transferred to the budget. However, it should be noted here that export prices are actually increasing every year, which means that by 2030, this figure will be even higher. In the case of full utilization of hydro potential, our country's electrical system will get an additional 1.5 billion lari through exporting 26 billion kWh for 1.5 US cents.

In 2020-2021 (after the enactment of balancing mechanisms), 333 MW of wind and 130 MW of solar power plants (25% of potential) could be integrated into the Georgian power system. By 2025, 500 MW of wind and 250 MW of solar power plants could be integrated. In 2030, it will be possible to integrate 100% of the potential of 1332 MW of wind and 520 MW of solar power plants.

**The Georgian State Electrosystem estimates the potential of wind energy at 5 billion kWh and solar energy at 0.695 billion kWh. Currently, only 22% of the hydropower potential and 1.7% of the wind potential are utilized in the country, and large solar power plants included in the energy system have not yet been built.**

By developing these resources, Georgia will not only be able to replace imports with its own generation sources but also export its electricity, thereby noticeably improving its economic situation. In 2020, Gross Energy Group conducted a study, "Analyzing the Economic Impact of the Development of Local Renewable Energy Resources and Their Role in Ensuring Energy Security," in which it assessed the impact of the construction of various power plants on the gross domestic product (GDP).

According to their findings:

**The construction of a 1 MW hydroelectric power plant has a GDP impact of \$2.16 million over ten years. For a solar power plant, this figure is \$1.29 million, and for a wind farm, it is \$1.53 million.**

The Black Sea underwater cable project opens up a wide range of opportunities for electricity exports. If realized, the 1,195 km cable will be laid to Romania, which will allow the countries of the South Caucasus and Romania to take advantage of increased export opportunities to Europe.

The significance of this project is crucial both in terms of political stability and economic development in Georgia, as Georgia, being a transit corridor from the Caspian Sea side, will become a necessary corridor for Europe through which a direct physical connection will be established without an intermediary country.

So far, Georgia has been connected to Europe by gas and oil pipelines, but only through Turkey. The submarine cable in the Black Sea will bring Georgia's energy security and independence to a higher level. By the end of the next decade, renewable, clean energy should become Georgia's main export commodity, replacing scarce minerals, ore, and ferroalloy metals.

## Conclusion

Georgia must take care to overcome the expected energy famine. The growth of consumption and economic development of the country will require more capacity than we have today. It is important that the construction and development of generating capacities keep pace with the growth of consumption.

An analysis of trends in recent years shows that an increase in demand for electricity and natural gas in Georgia automatically means an increase in its energy dependence on neighboring countries, as Georgia is not building renewable power plants in sufficient numbers.

The most noteworthy and, at the same time, alarming fact is that the sources of imports are not diversified, and the increased demand is mainly met by imports from Russia.

Russian energy prices are most often markedly lower compared to other neighboring countries, making the tariffs of those other countries less competitive. Although Russia offers economically more favorable prices, cheap energy resources come at a cost in terms of energy security. Georgia is becoming increasingly dependent on imports of electricity, natural gas, and petroleum oil products from Russia, giving it leverage to control and influence the entire Georgian energy system.

Currently, the only area where Georgia can end its dependence on Russia is in electricity generation. Utilizing its own renewable energy potential will allow Georgia to substitute electricity imports and reduce the operation of thermal power plants to avoid the need for additional natural gas imports from Russia.

Among other neighboring countries apart from Russia, dependence on Azerbaijani sources for natural gas and electricity imports is also significant, but the international project in the area of natural gas imports still offers a higher guarantee of energy security and economic affordability. Dependence on Azerbaijani electricity is relatively more significant, as the tariffs it offers are increasing every year. Purchasing electricity from Azerbaijan at a higher tariff, with increasing demand, for years to come could place such a financial burden on Georgia that it would be very difficult for the country to sustain. Therefore, increased dependence on Azerbaijani electricity is not a favorable scenario for Georgia.

In the case of Georgia, energy security is key. Dependence on all neighboring countries entails certain risks, whether political or financial. However, both factors are extremely important for the stable and smooth functioning of the country.

Georgia has two ways to strengthen its own energy security: strengthening its function as an energy corridor and increasing its own power generation.

If Georgia uses its own energy potential, it will not have to import energy from neighboring countries. The development of renewable energy also offers great opportunities for exports and a noticeable improvement in the country's economic situation. Increasing energy independence should be a guarantee of energy and, consequently, the national security of our country. For this purpose, Georgia needs sustainable development of the energy sector, proper environmental and social policies, and appropriate development of energy sources. Communication plays a crucial role in this regard. The energy sector organized in this way can be used to attract foreign or domestic investors and create additional economic growth.



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## About the USAID Economic Governance Program

The USAID Economic Governance Program is a five-year, up to \$19 million project funded by United States Agency for International Development (USAID) and implemented by Deloitte Consulting LLP. The Program aims to improve economic governance and leadership in Georgia by supporting development of a system that will enforce consistent and cost-effective economic policies, laws, and regulations to promote economic growth by including the voices, needs, and aspirations of all Georgians. <https://www.facebook.com/USAIDEconomicGovernanceProgram>

## About USAID in Georgia

As the leading development agency of the U.S. Government, USAID supports Georgia to build the capacity to plan, finance, and implement its own solutions to development challenges. USAID has worked in Georgia since 1992, supporting the country's transformation into a democracy that is increasingly integrated into Western political, security, and economic institutions. More than 35 USAID programs strengthen Georgia's resilience to malign influence, consolidate democratic gains through enhanced citizen responsive governance, and enable high-value employment through increased economic growth. For more information, please visit: <https://www.usaid.gov/georgia>.

