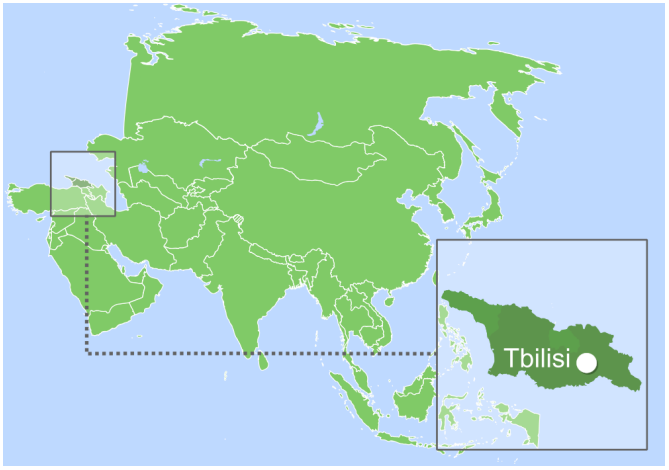



# Energy Industry in Georgia

## General State of the Economy

Georgia is a country located in the South Caucasus region at the crossroads of Western Asia and Eastern Europe. The country borders Russia to the north, Armenia and Turkey in the south and Azerbaijan to the southeast. Georgia is bounded on the west by the Black Sea, with a total coastline of 310 km.

According to 2023 statistics, Georgia is home to about 5 million people.

| Georgia | | |
|---|---|---|
| Capital: Tbilisi | Density: 57.6/km$^2$ | Currency: Georgian lari (₾) (GEL) |
| Official languages: Georgian | Life expectancy at birth: 72.76 years | GDP (PPP): $80.611 billion (2023 est.) |
| National Day: 26 May | Area (land): 69,700 km$^2$ | GDP - per capita (PPP): $21,922 (2023 est.) |
| Population: 4,927,228 (2023 est.) | Coastline: 310 km | Internet country code: .ge |

*Source: [1,2,3,4,5]*

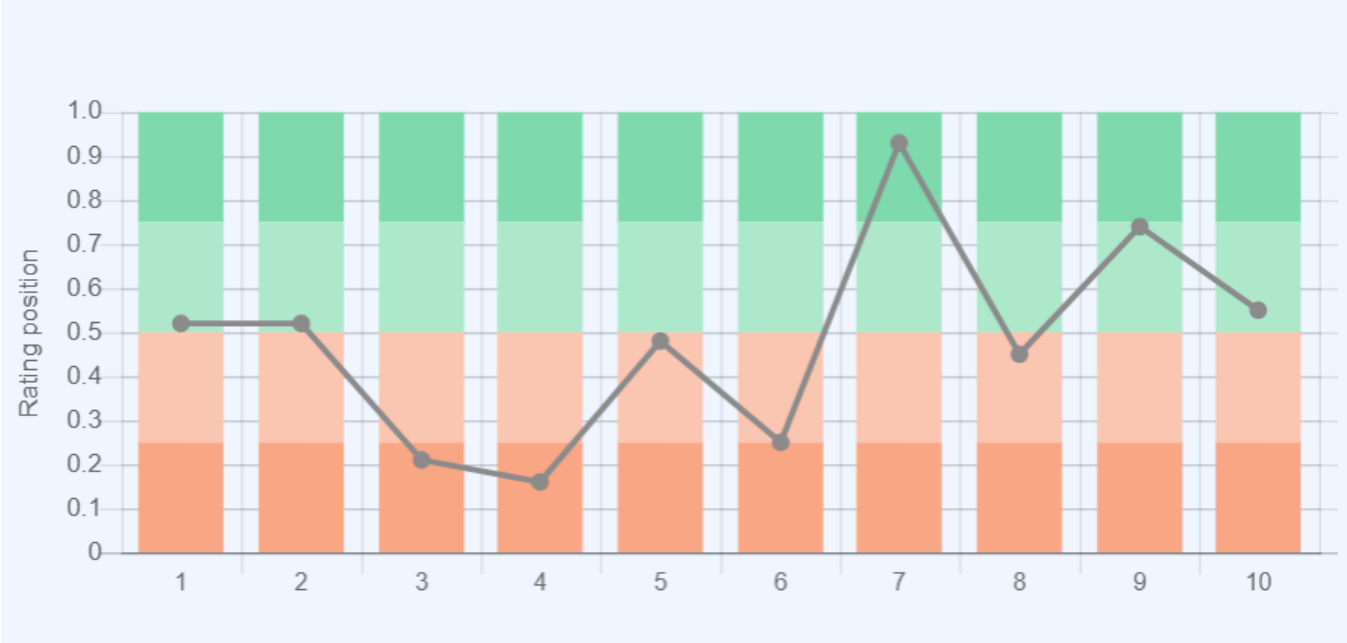
*Tbilisi, Georgia. Envato Elements. LW7GJ5V936*

In terms of population density the country is 166th in the world from 248 countries considered. The national capital and largest city is Tbilisi. The political form of government is a semi-presidential republic and the administrative map of the country is divided into 9 regions, 1 city, and 2 autonomous republics [1,2,3].

The rating positions of Georgia relative to other countries have been determined for an extensive list of economic, energy, innovative and educational indices, as well as for metrics reflecting the state of the environment. The economic indices include, for example, GDP per capita, annual average GDP growth, high-technology exports, and others. The list of energy indices includes proven reserves of oil, gas and coal, production-consumption ratio combined, and energy use, etc. Each of the indices has a ranked list of included member countries. Since the number of countries in each rating is different for each index, the positioning of the country of interest is displayed on a special chart, where the vertical axis is a uniform relative scale from 0 to 1, whereas the horizontal axis denominates the various indices and respective numbers relating to the descriptions given underneath.

Thus, in such a relative "0-1" diagram, the country's position is marked with a dot in proportion to its location in the original rating list. If the country is among the leaders regarding the selected indicator, it will be marked close to 1 in the upper green zone on the relevant chart "0-1", if the country is an outsider in the rating list, then it will be marked in the lower red zone of the chart "0-1", etc.

Ranking position of Georgia for list of economic indices:




Sources:
1. GDP (purchasing power parity), 2020 est. / The World Factbook/Library/Central Intelligence Agency *228
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4. Charges for the use of intellectual property, receipts (BoP, current US$), 2020 / International Monetary Fund, Balance of Payments Statistics Yearbook, and data files. / License: CC BY-4.0 *88
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7. 2021 Index of Economic Freedom / International Economies / The Heritage Foundation *178
8. Reserves of foreign exchange and gold, 2017 est. / The World Factbook / Library / Central Intelligence Agency *195
9. Annual average GDP growth in %, for the last 10 years (2011-2020) / World Bank national accounts data, and OECD National Accounts data files / License: CC BY-4.0 *206
10. Public debt (% of GDP), 2017 est. / The World Factbook / Library / Central Intelligence Agency (from smallest to largest) *210
* Total number of countries participating in ranking

*Figure 1. Economic Indices of Georgia*

Half of Georgia's economic indices are below the world average, which indicates certain difficulties in the country's development. Of all the indices presented, Georgia has the highest values for the Index of Economic Freedom (0.93) and Average Annual GDP Growth in % (0.74). The weakest points in the Georgian economy are Charges for the use of intellectual property (0.16) and the Inflation rate (0.21).

## Energy resources

Georgia has no significant reserves of fossil fuels. For example, the share of oil reserves in the country relative to the world's reserves is 0.002%, the share of natural gas is 0.004%. The share of coal is slightly higher – 0.02%. In terms of tons of oil equivalent, according to 2024 data, conventional proved reserves by fuel type were: 3.1% – oil, 5% – gas, and 91.9% – coal (Fig.5).

**Table 1. Fossil energy resources of Georgia**

| Resource/explanations | Crude oil* | Natural gas* | Coal * | Tight Oil | Shale Gas |
|---|---|---|---|---|---|
| **Value** | 0.035 (0.002%) | 0.3 (0.004%) | 221.56 (0.02%) | - | - |
| **Unit** | billion barrels | Tcf | million short tons | - | - |
| **Year** | 2021 | 2020 | 2021 | - | - |
| **Source** | [6] | [6] | [6] | [-] | [-] |

**the share of the country's reserves in world total is provided in brackets*

Of all renewable energy sources, hydropower has the greatest potential and the country relies heavily on it to meet its electricity needs. Thanks to its thousands of rivers, Georgia ranks among the highest in terms of water resources per capita, and hydropower provides about 80% of the country's electricity. According to the Ministry of Economy and Sustainable Development of Georgia, out of 26,000 rivers, 300 rivers can provide excellent opportunities for hydropower generation, yet only 22% of the total hydro potential has been utilized to date [7].

**Table 2. Renewable energy resources of Georgia**

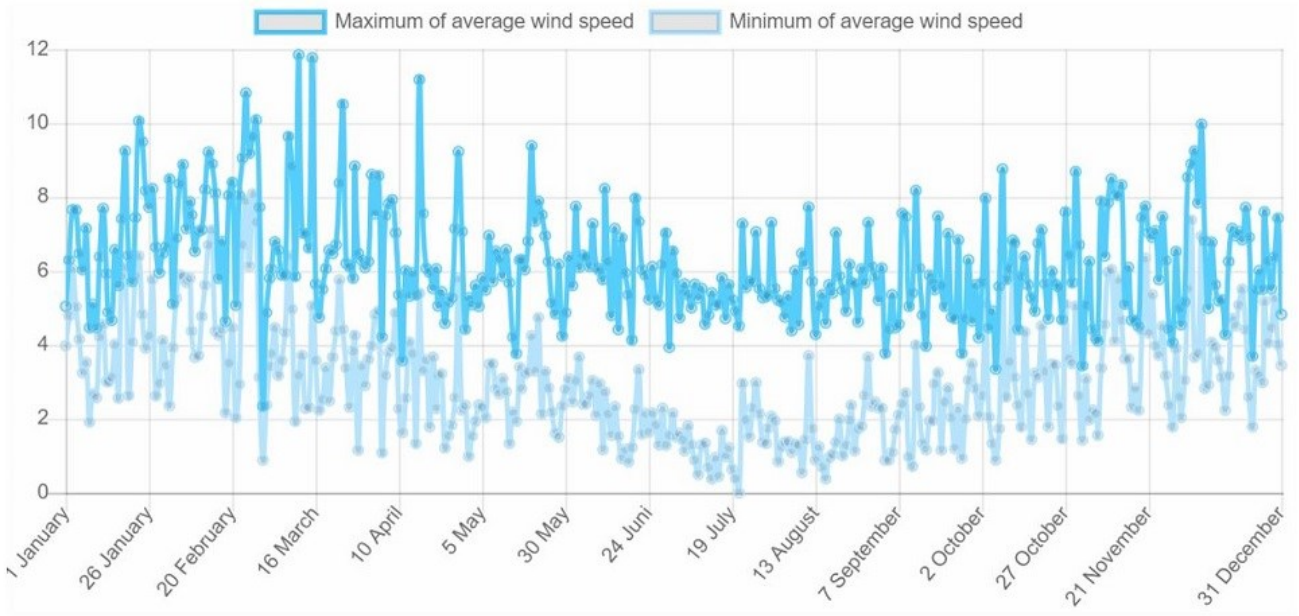
| Resource/ explanations | Solar Potential (GHI)* | Wind Potential (50 м)* | Bio Potential (agricultural area) | Bio Potential (forest area) | Municipal Solid Waste |
|---|---|---|---|---|---|
| **Value** | 3.5 -4.1 | 4.0-7.0 | 34.2 | 40.6 | 0.60 |
| **Unit** | kWh/m$^2$/day | m/s | % of land area | % of land area | kg/per capita/day |
| **Year** | 2020 | 2020 | 2020 | 2020 | 2018 |
| **Source** | [8] | [9] | [10] | [11] | [12] |

**for the majority of the territory of the country*

In addition, Georgia has great potential for solar and wind energy resources, which remain largely untapped. Wind speeds can reach up to 7 m/s at a height of 50 m mainly in central part and along Georgia-Russia land border. During the year in most regions there are 250-280 sunny days and the annual average amount of sunshine hours is over 2000.The highest solar GHI intensity is 4.1-4.4 kWh/m$^2$ per day, distributed in different parts of the country.
A rather extensive agricultural and forest area forms a decent resource base for the development of a number of bioenergy technologies, in particular, the production of biogas, bioethanol or biodiesel.

**KUTAISI, GEORGIA**
Latitüde: 42.27, Longitude: 42.63
Average speed: 4.61 m/s, Operational share: 61%

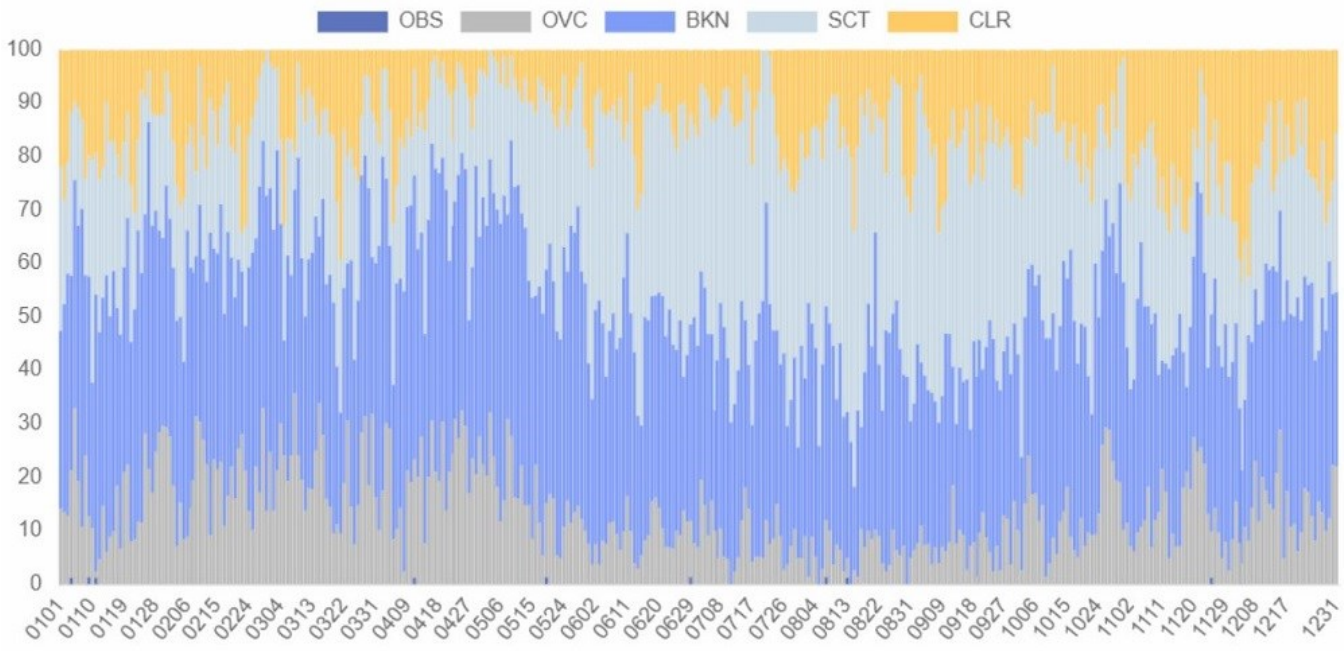
**Average daily wind speed for 10 years of observations, m/s, 10 m above the ground**




*Source: based on NOAA U.S. Department of Commerce*
*Detailed information:* Interactive map of wind resources

**KUTAISI, GEORGIA**
Latitüde: 42.27, Longitude: 42.63

**Average daily sky coverage over 10 years of observations, %**

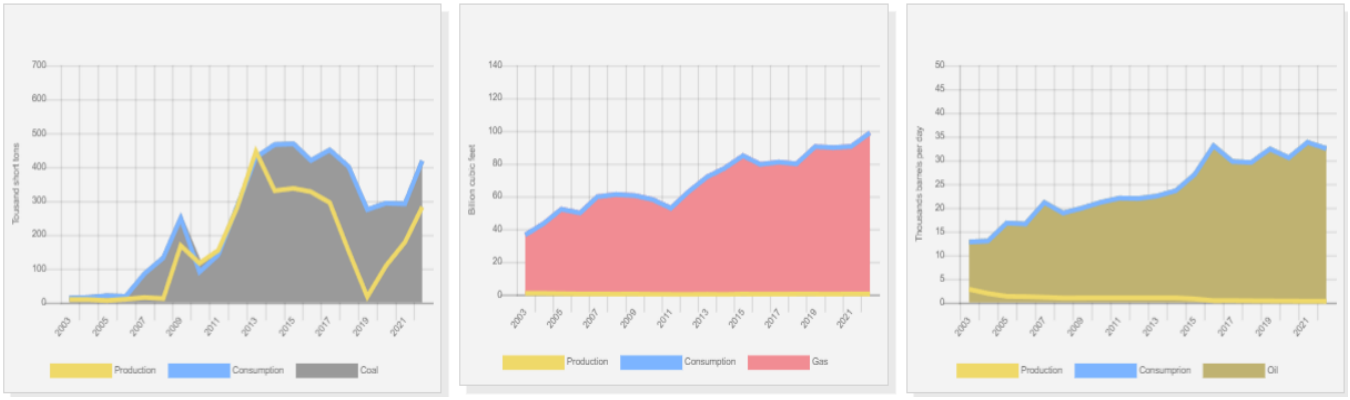



*CLR - clear, SCT - scattered from 1/8 TO 4/8, BKN - broken from 5/8 TO 7/8, OVC - overcast, OBS - obscured, POB - partial obscuration*

*Source: based on NOAA U.S. Department of Commerce*
*Detailed information:* Interactive map of solar resources

## Energy balance

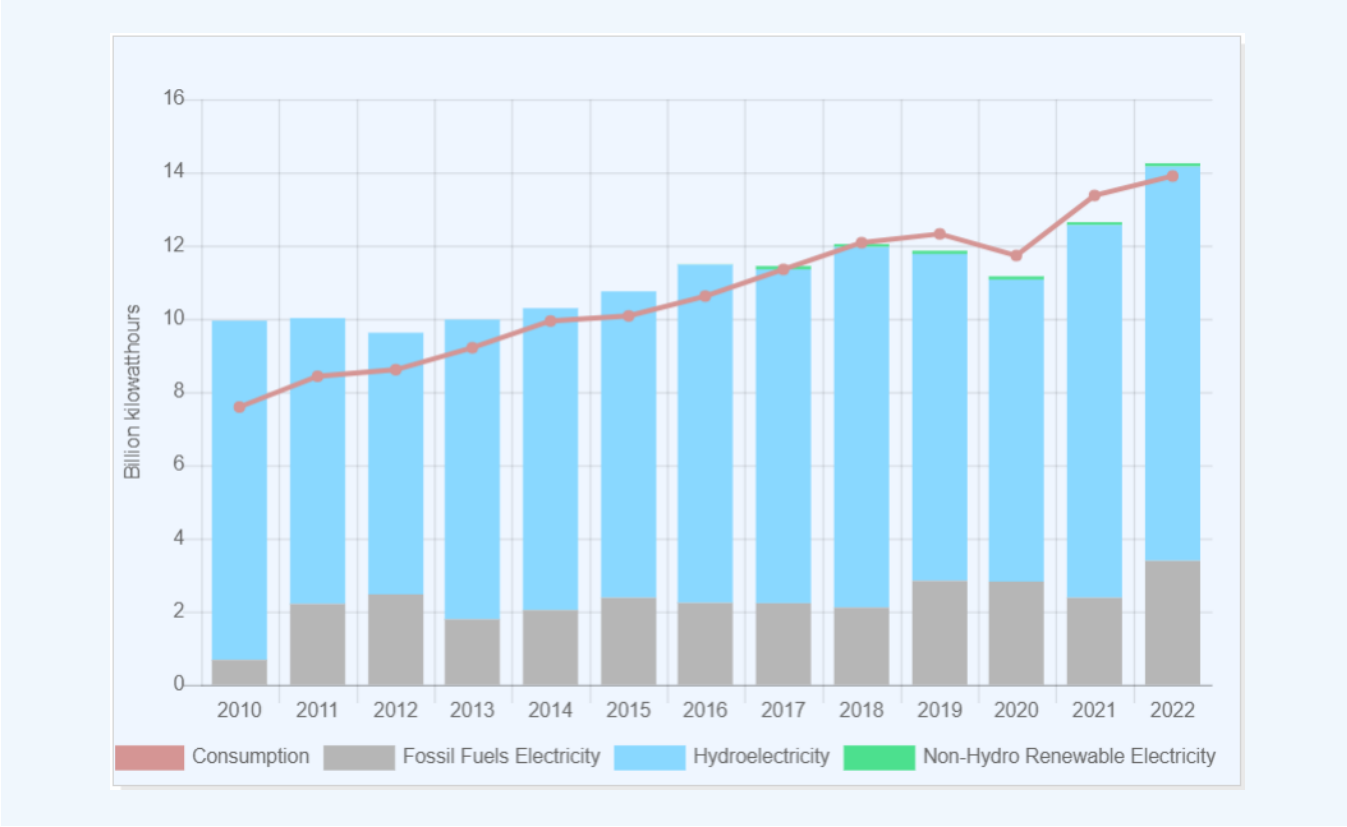
According to [6], in 2022 in Georgia, the total production of primary energy was 0.043 quadrillion Btu, while consumption was at the level of 0.217 quadrillion Btu. Thus, the share of domestic production in primary energy consumption was about 19.8%. This makes Georgia a country heavily dependent on energy imports.




Source: U.S. Energy Information Administration (Mar 2024) / https://www.eia.gov/

*Figure 2. Production and consumption of fossil fuels in Georgia (left—coal, in the center– gas, right—oil)*

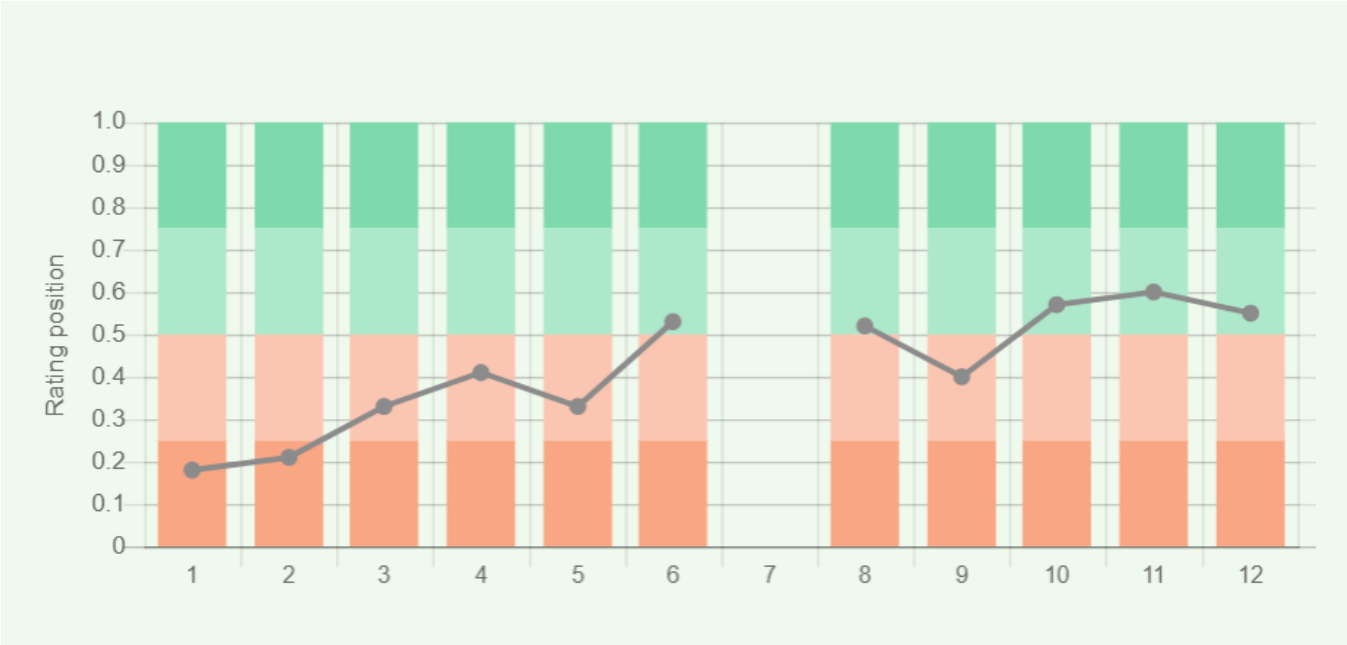
As can be seen from the graph above, natural gas and crude oil consumption increased by a factor of about 2.5 between 2003 and 2022. Coal consumption has increased more than 30-fold in that time. Almost all fossil fuels are imported.




Source: U.S. Energy Information Administration (Mar 2024) / https://www.eia.gov/

*Figure 3. Electricity production in Georgia*

Total electricity consumption in Georgia almost doubled over the past ten years. In 2022, approximately 75.6% of electricity was produced by hydro power plants, 23.8% – by thermal power plants and 0.6% – by other renewables. The country has been experiencing a shortage of domestically produced electricity since 2019, and in 2021 about 15% of electricity was imported, the main reason for which was the partial stoppage of the Enguri hydroelectric dam. In 2022, the share of imports in the consumption decreased to 4.5% [13].

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7. Electricity – from other renewable sources (% of total installed capacity), 2017 est. / The World Factbook / Library / Central Intelligence Agency *170
8. GDP per unit of energy use (PPP per unit of oil equivalent), 2020 *66
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12. Combination of electricity production-consumption (kWh)/The World Factbook/Library/Central Intelligence Agency *216
* Total number of countries participating in ranking

*Figure 4. Energy indices of Georgia*

As Georgia does not have significant fossil fuel reserves, the country's positions for crude oil (0.18) and natural gas (0.21) reserves are the lowest of those shown in the chart above. Georgia is not included in the Electricity - from other renewable sources ranking, leaving this indicator blank. The country's strongest performance indicators are slightly above the world average and include, for example, Electricity consumption per capita (0.60) and the Combination of electricity production and consumption (0.55).

## Energy Infrastructure

A territorial map showing distribution of the largest infrastructure projects of the fossil fuel sector in Georgia is displayed in Figure 5. Georgia is an important transit country for the region, with a number of major oil and gas pipelines running across its territory. Three terminals and storages located on the Black Sea coast provide a wide range of services for the storage and transportation of oil, oil products and natural gas. In addition, Vladikavkaz-Tbilisi Gas Pipeline includes Kvesheti compressor station in the north of the country.


*Figure 5. Basic infrastructure facilities of the fossil fuel sector in Georgia*

The main international energy projects of Georgia are the Baku-Tbilisi-Supsa and Baku-Tbilisi-Ceyhan oil pipelines. The first of them was put into operation in 1999, the second in 2006. The volume of oil transportation through the Baku-Tbilisi-Supsa oil pipeline can reach 7 million tons per year, and through the Baku-Tbilisi-Ceyhan oil pipeline more than 50 million tons per year.

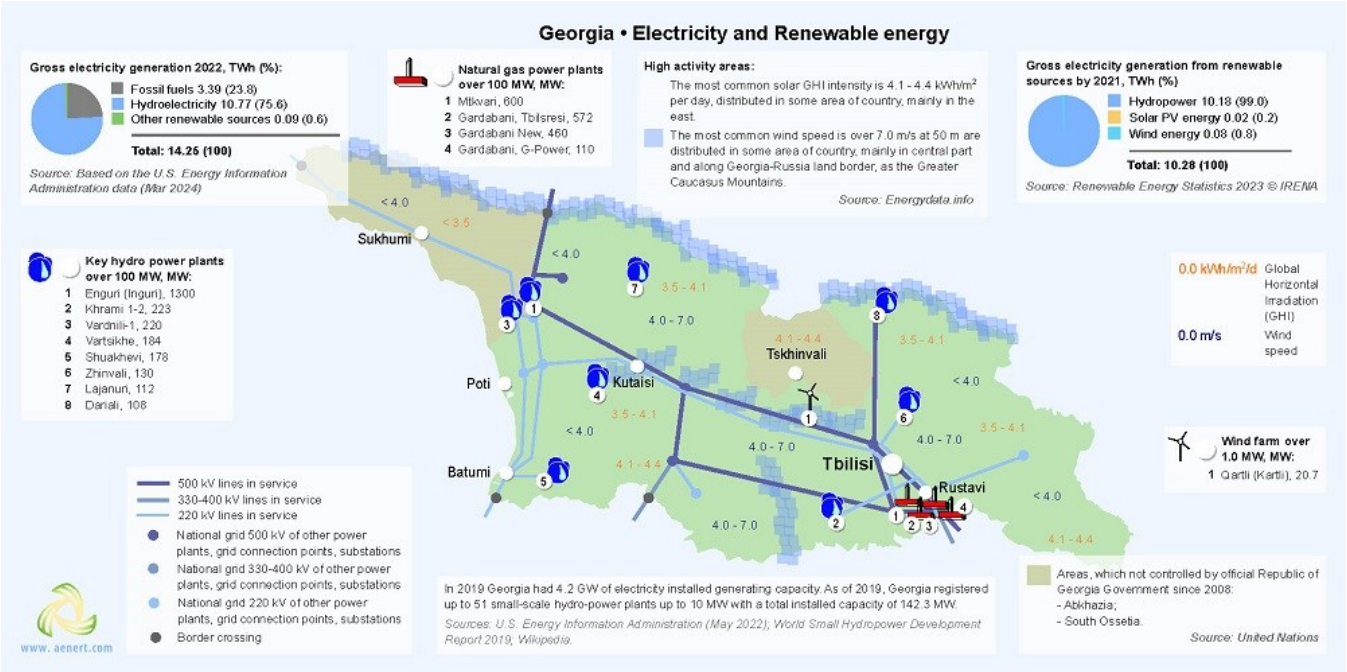



*Figure 6. Electricity production and Renewable energy in Georgia*

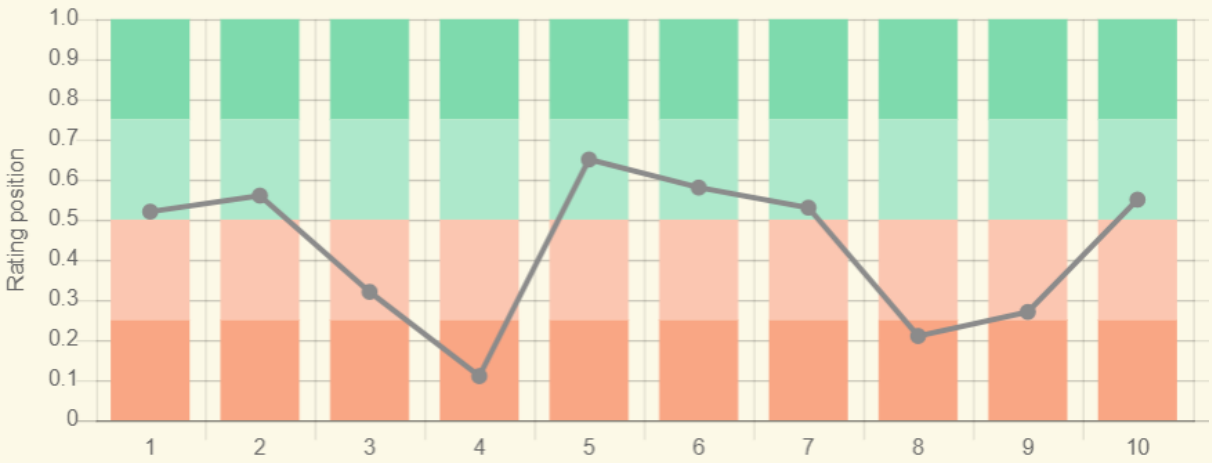
However, the dependence of oil delivery on the conditions of the Bosphorus and Dardanelles straits and the insignificant capacity significantly reduced the competitiveness of the Baku-Tbilisi-Supsa oil pipeline. In this regard, pumping through this pipeline is often interrupted. On the other hand, the Baku–Tbilisi–Ceyhan oil pipeline provides direct access to the deep-water port of Ceyhan on the Mediterranean Sea. Therefore, the loading of this oil pipeline is 1.2 million barrels of oil daily. As already mentioned, up to 80% of the electricity produced in Georgia is generated by hydroelectric power plants. Hydro power plants are spread across the country with the main being the Enguri HPP, which generated the 26% of electricity produced in Georgia. According to the Transparency International Georgia report [13], by the end of 2022, Georgia had 109 hydropower plants, 5 thermal power plants and 1 wind power plant. The 20.7 MW Qartli wind farm, located in Gori, about 90 km from Tbilisi, has been in operation since 2017 and is the first commercial wind farm built in Georgia.

*Industrial cranes in sea port, Batumi, Georgia. Envato Elements. 2J3N6SLZ8K*

It accounts for about 0.6% of local electricity generation in Georgia. Wind and solar technologies do not yet contribute significantly to electricity generation. The government plans to change the situation by introducing the potential of wind, solar, biomass and geothermal resources for the development of new energy capacities, which will reduce dependence on energy imports and increase the country's energy security. Georgia presented a draft National Energy and Climate Plan, one of the main objectives of which is to achieve a 27.4% share of renewable energy sources in gross final energy consumption by 2030, with 85% renewable energy sources for electricity, 10.45% – transportation, and 7% – heating and cooling [14].

## Education and Innovation

The following chart shows Georgia's positions in terms of education and innovation:

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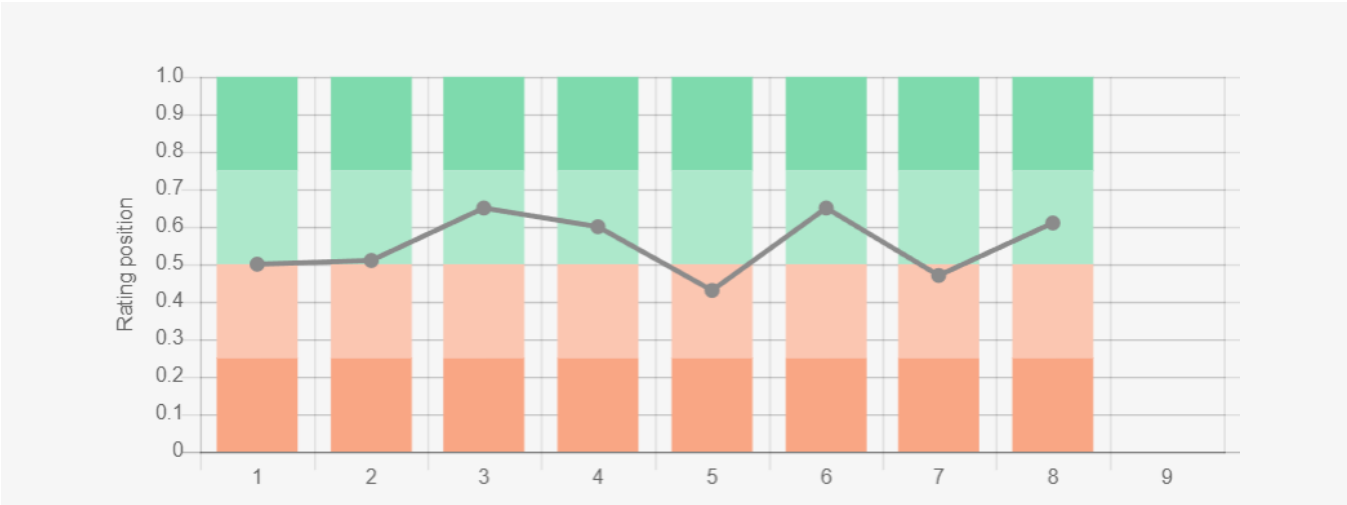
9. Research and development expenditure (% of GDP), 2018 / UNESCO Institute for Statistics. License: CCBY-4.0 / Data *119
10. Scientific and technical journal articles, 2018 / National Science Foundation, Science and Engineering Indicators. License: CCBY-4.0 / Data *197
* Total number of countries participating in ranking

*Figure 7. The indices of education and innovation in Georgia*

The presented indices show that Georgia's performance in education and innovation is at average or below average level. The lowest spot in the country is the QS World University Rankings 2022 (0.11), which can be partly explained by relatively low government expenditure on education (0.21) and on research and development (0.27). Georgia has the highest position of those presented for SCImago Country Rankings (0.65) and Internet Users (0.58).

## Ecology and Environment Protection

Indicators related to environmental issues are presented in the following diagram:




Sources:
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5. The Environmental Performance Index (EPI) 2020 / Rankings / Yale Center for Environmental Law & Policy / Yale University *180
6. Annual freshwater withdrawals (m3 per capita), 2017 *179
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Available at: License : Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) *191
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* Total number of countries participating in ranking

*Figure 9. Environmental Indices of Georgia*

Most indices characterizing the country's position in various international rankings related to ecology and environmental protection are slightly above the world average level. Georgia has the highest positions in Annual freshwater withdrawals (0.65), Forest area (0.65) and Methane emissions (0.61).

*Aerial view of Jvari Monastery, Mtskheta, Georgia. Envato Elements. VNY9DBJWM3*

For two indicators – The Environmental Performance Index (0.43) and The National Footprint Accounts (0.47) – Georgia's position is slightly below the world average. The country is not included into the Climate Change Performance Index leaving this indicator blank in the chart above.

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[7] Renewable Energy in Georgia Challenges and opportunities /October 2019 / PDF / https://unece.org/fileadmin/DAM/energy/se/pp/gere/GERE.6_Oct.2019/2_RE_Auctions/2_M.Arabidze_Georgia.6th.GERE.pdf

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The sources of charts and curves are specified under the images.

For more information about the energy industry in Georgia see here