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GREEN GROWTH STRATEGY: HOW IS THE RENEWABLE ENERGY SECTOR IN GEORGIA PROGRESSING, AND WHAT ELSE IS STILL REQUIRED?

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INTRODUCTION

The increasing proportion of renewable energy in the world's overall energy supply indicates the growing popularity of renewable energy globally. From 2010 to 2021, this percentage rose from 3.2% to 5.2%, while modern bioenergy increased from 5.7% to 6.7%.¹ However, the demand for energy is also rising, and limited resources may prove unable to fully meet this demand in the future. As such, increasing the proportion of renewable energy is a crucial component in the fight against climate change, and it is a key objective within the green growth strategy.² The energy crisis caused by the Russia-Ukraine War has moreover highlighted the significance of energy security within national security. Recent events have thus accelerated the transition towards renewable resources and necessitated further drastic change. Consequently, the European Union has established a long-term policy that includes regulating natural gas storage, reducing natural gas demand, and diversifying energy supplies.³ Countries with notable potential for exploiting renewable energy sources and exporting the energy they generate are therefore growing increasingly more significant. Georgia is also a part of this global process, one which aims to transition to renewable energy. It is essential to evaluate the current energy market in Georgia, the role of renewable energy in this market, and its growth potential. This policy report provides a brief review of Georgia's policies and the legislative framework related to renewable energy, and it explores difficulties in the sector and potential solutions.

CURRENT SITUATION

Almost all of Georgia's consumption of oil, petroleum products, and natural gas is supplied from foreign sources, thus making the country's energy industry heavily reliant on imports. For example, the statistics suggest that only 25% of total domestic consumption derived from domestic sources in 2021.⁴ The electricity market is relatively balanced, with over 90% of local demand being met by domestic production. However, generation by thermal power plants and the element of seasonality need to be taken into consideration. Qualitatively, the electricity generated by these plants derives from imported natural gas, the production of which rises in tandem with domestic demand, particularly in winter. Seasonality in the generating market in 2022 can be seen from the dramatic change in the proportion of renewable resources, specifically hydro power plants (HPP), in the total Georgian output. From January-February and November-

¹ Available at: <https://www.iea.org/reports/renewables>

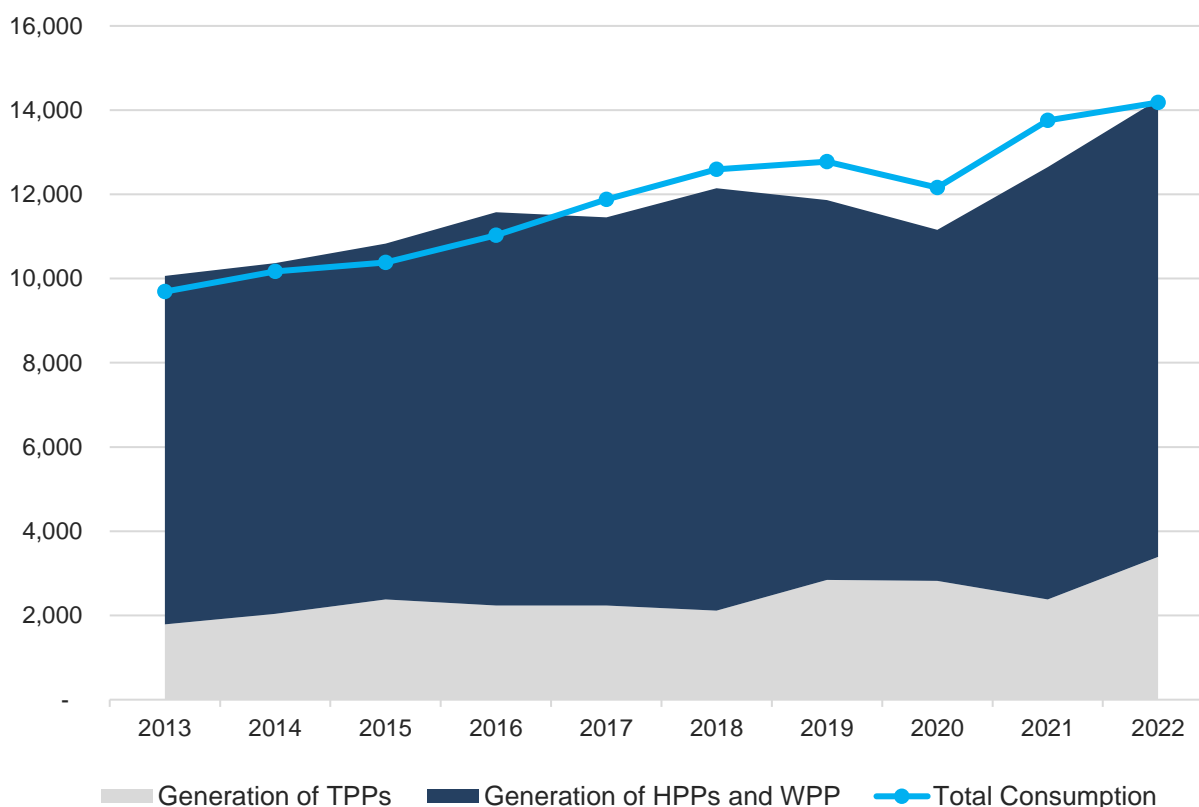
² Green growth entails fostering economic growth and development, while ensuring that natural assets continue to produce the resources on which prosperity depends. It also acts as a catalyst to attract investments and innovations, those which provide new economic opportunities and contribute to sustainable development (OECD).

³ Available at: <https://www.consilium.europa.eu/en/infographics/eu-measures-to-cut-down-energy-bills/#:~:text=EU%20countries%20have%20therefore%20adopted,2022%20to%2031%20March%202023>

⁴ Available at: <https://www.geostat.ge/en/single-archive/3381>

December, the percentage of renewable energy in overall output fluctuated between 50% and 55%, whereas from May-July, it reached 99%. Similar numbers have equally been observed in previous years. Therefore, it is crucial to exploit the potential of renewable energy to replace seasonal shortfalls and to minimize the demand for natural gas. Recent developments indicate that the proportion of renewable energy of the total output is rather consistent (up to 75% in 2012 and up to 76% in 2022). Due to seasonal imbalances and a rising consumption that continuously outpaces supply, it is crucial to exploit all forms of renewable resources in a timely and effective manner (see Figure 1).

Figure 1. Proportion of renewable and non-renewable energy in total power production and consumption (mln. kWh)



Source: Electricity Market Operator (ESCO).

The significance of renewable energy is also evident on a larger scale. When evaluating energy generation, renewable energy sources constitute the majority of the country's total energy production. According to 2021 Geostat data, hydropower accounts for 70.17% of domestic generation, and geothermal, solar, and wind energy amount to 2.17%. Therefore, it is reasonable to assert that renewable energy sources significantly contribute to Georgia's electricity production, yet the power generation market remains less diversified. Nonetheless, Georgia still has

significant potential in terms of utilizing alternative renewable energy sources, such as wind, solar, green hydrogen, and geothermal energy.

The average annual potential for wind energy generation in Georgia is estimated to be 4 terawatt-hours (TWh), with an installed capacity of 1,500 MW;⁵ the current estimates suggest that only 1% of capacity and 2% of production are being utilized. Georgia's average yearly output potential from solar energy is valued at an installed capacity of 520 MW,⁶ of which only 3% has been utilized thus far.⁷ Furthermore, under recent hydro-geological research, the yearly potential for geothermal waters amounts to 250 million m³ – the utilization of which would significantly improve the country's energy security and reduce its dependence on imports. However, as previously noted, given Georgia's abundance of hydro resources, most proposed power projects involve HPPs. The potential overall capacity for hydropower is estimated at 15,000 MW, with a total annual generation potential of 50 TWh, according to existing research. At present, only an approximate 22% of capacity and 20% of production are utilized from this total potential.⁸

The effective use of renewable energy sources and the production of an additional 20 TWh could save seven million tons of fossil fuel, thereby reducing the emission of dangerous materials into the environment and mitigating their negative effects.⁹ In addition, timely deployment of renewable resources could help lessen the country's geopolitical risks by assuring energy security, therefore enhancing national security.

CURRENT POLICIES, LAWS, AND ASSISTANCE PROGRAMS

In 1997, the Law of Georgia on Electricity and Natural Gas was ratified,¹⁰ and it stood as the first and most significant energy law in the history of independent Georgia. Since its enactment, it has regulated the energy sector, and one of its primary objectives has been to promote the preferential use of hydropower alongside other renewable and alternative resources.

In 2006, Georgia issued its first energy policy document, espoused as the “main directions of the state policy in the field of energy,” which identified the use of local renewable energy sources as the most significant factor in the development of Georgia's energy industry. In addition, the development of wind, solar, and geothermal energy sources were each highlighted. In June 2015, this document was replaced by a new energy policy. However, the key policy directions have not significantly changed. The main objective of this energy policy paper was to develop a long-term,

⁵ https://www.gse.com.ge/sw/static/file/TYNDP_GE-2022-2032_ENG.pdf

⁶ Ibid

⁷ Once we calculate generation of total micro-power plants integrated into net-metering mechanism

⁸ Available at: http://www.economy.ge/uploads/files/2017/energy/samoqmedo_qegma/ganakhlebadi_energiis_erovnuli_samoqmedo_qegma_2020.pdf

⁹ Available at: http://www.economy.ge/uploads/files/2017/energy/samoqmedo_qegma/ganakhlebadi_energiis_erovnuli_samoqmedo_qegma_2020.pdf

¹⁰ Available at: <https://matsne.gov.ge/en/document/view/31744?publication=36>

comprehensive state vision that would provide a basis for developing short-, medium-, and long-term strategies in the future, namely by 2030, with a focus on the use of local renewable energy.

In accordance with various international regulations, Georgia has taken the obligation to work more actively on renewable energy issues. By signing the Association Agreement in 2014,¹¹ the country formalized further cooperation in the energy sector. Furthermore, Georgia joined the Energy Community in 2017 and thereby agreed to implement European legislation.

Alongside the strengthening of international relations, the country is actively pursuing the promotion of these commitments and is making a number of legislative changes within the renewable energy industry. Specifically, the Georgia National Energy and Water Supply Regulatory Commission enacted a resolution in 2016 that went into effect the same year. It envisioned the implementation of ‘net metering’, a conventional and widespread policy for the development of user-owned renewable microelectric power plants. Individual connections were initially permitted, sparking consumer interest in microelectric plants. During the second phase in 2019, the Commission changed the aforementioned regulation to allow for consumer group involvement, and in 2020, it decided to increase the maximum allowable installed capacity from 100 kW to 500 kW. Additionally, the requirement that a micro power plant be physically located at the point of consumption was eliminated, with the intention of expanding the geographical locations of energy sources and creating further opportunities for consumers.¹²

In the same year, Georgia enacted the Law on Promoting the Generation and Consumption of Energy from Renewable Sources,¹³ which developed a legal framework to encourage the generation and consumption of renewable energy. The current law establishes both the legal framework and the so-called support mechanism for encouraging the generation of renewable energy.

Instead of the 2020 Ordinance N403,¹⁴ in November 2022 the Prime Minister introduced a new Contract for Difference (CfD) incentive mechanism – similar to a Guaranteed Power Purchase

¹¹ Between the European Union and the European Atomic Energy Community and their Member States on one side and Georgia on the other.

¹² Furthermore, the requirement for micro power plants to be physically located at the point of consumption has been removed, allowing for greater flexibility in the location of energy sources and thus providing additional options for interested parties.

¹³ Available at: <https://matsne.gov.ge/en/document/view/4737753?publication=1>

¹⁴ This renewable energy support program outlined steps supporting the building and operation of renewable energy power plants with an installed capacity of more than five megawatts by private investors. It was a contract for difference (CfD) with two components: a support term and a premium rate. The duration of assistance was determined to be eight months per year for a period of ten years following the activation of the station and the granting of the production license (if required by law). The premium rate was 0.015 USD per kWh, which would be paid in addition to the wholesale (equilibrium) price, fixed for the relevant hour in the organized electricity market, but only if the wholesale price fixed for 1 kWh of electricity generated by the station during the support period and sold in the organized electricity market met the necessary requirements. The price at equilibrium is less than 0.055 USD. If the difference between the wholesale (equilibrium) price determined for the relevant hour on the organized electricity market, and 0.055 USD, is less than 0.015 USD, the premium tariff would be based on the difference. However, because the market did not open,

Agreement (PPA) –¹⁵ based on the Law of Georgia on Promoting the Generation and Consumption of Energy from Renewable Sources. This contract aims to promote building power plants of up to 1,500 megawatts by establishing an economically profitable guaranteed price per kilowatt hour for each station.

The Georgian Ministries of Economy, Environmental Protection, and Agriculture are also currently developing an integrated energy and climate plan,¹⁶ that will include a long-term (2030) action plan for renewable energy.

TRENDS AND CHALLENGES IN RENEWABLE ENERGY

GENERATION

Between 2009 and 2022, as a result of the strategy and in accordance with regulations and plans, renewable power plants with a total installed capacity of 744 MW became operational. This represents approximately 21 percent of the total installed capacity at present. In this respect, Georgia's promotional measures for renewable microstations, such as the increasingly popular net metering scheme, are effective. Details from the Commission in 2021 revealed that 368 subscribers, with a total capacity of 17,711 kilowatts, were registered in the net metering system. It also is worth noting that in 2021 the number of subscribers rose by 1.5 times and the connection capacity increased by 4.4 times, compared to the previous year.

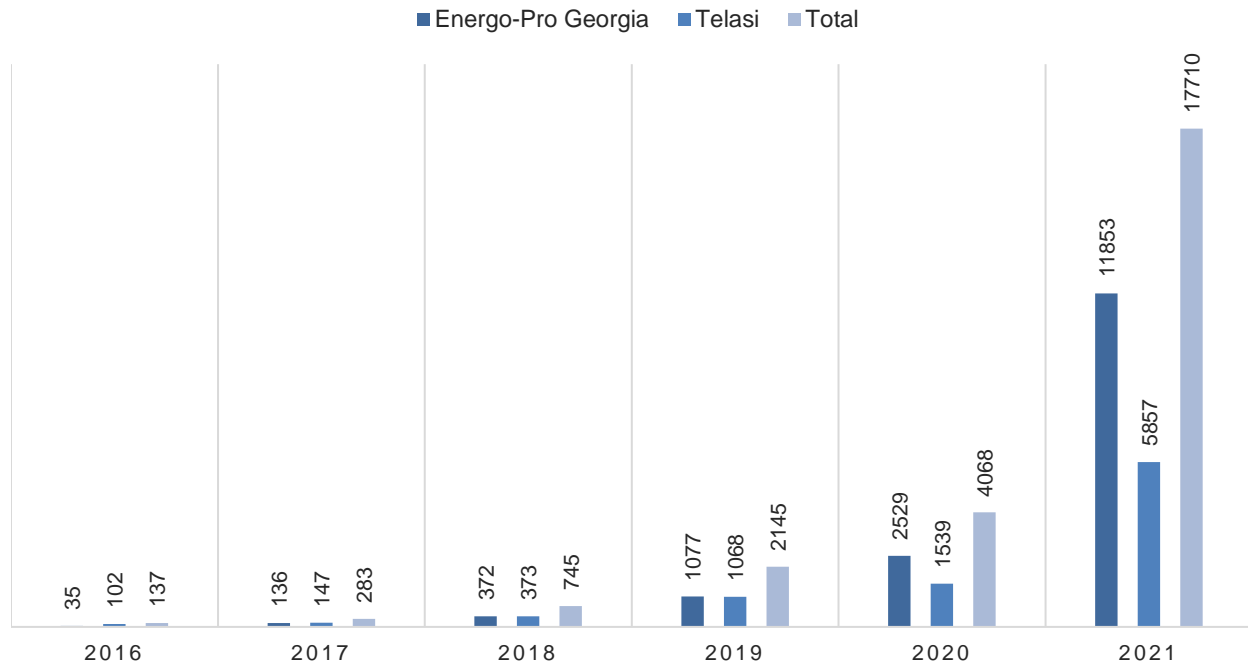
Figure 2 below depicts the dynamics of micro power plant development in Georgia from 2016 to 2021. It is clear that the rise in the grid threshold for micro power plants included in the metering system has had a favourable influence on the growth rate of micro power plants, but this is predominantly due to individual connections, as only 15 group connections have been requested as of 2021.

this idea was never implemented. Unfortunately, according to an initial evaluation, this investor incentive program was insufficient to encourage investment in green energy in the country.

¹⁵ For further details, please visit: <https://matsne.gov.ge/ka/document/view/6700?publication=0>

¹⁶ Available at: <https://www.undp.org/georgia/publications/fourth-national-communication-georgia-under-united-nations-framework-convention-climate-change>

Figure 2. Overall installed capacity of micro power plants (kW)



Source: GNERC.

Notwithstanding the success of the net metering system, the installation of large wind and solar stations remains a difficulty. Nevertheless, supporting renewable energy generation is only one aspect to consider; the sustainability of production, which impacts the ability to execute renewable energy generation, is another. According to the 2022-2032 Ten-Year Network Development Plan, Georgia’s transmission network was only prepared to integrate 25% of its full potential (133 MW of wind and 130 MW of solar energy) by 2020-2021, thus indicating that the system requires significant strengthening for the full integration of renewable energy. Ultimately, it is intended to develop innovative clean technologies and utilize renewable energy sources. It is also designed to maximize the usage of green hydrogen generation,¹⁷ and other current energy storage technologies, to include more solar and wind power plants as previously agreed.¹⁸

However, the process of developing renewable resources is accompanied by specific obstacles. In order for further success within this industry, it becomes necessary to analyse them thoroughly.

¹⁷ Electrolysis produces green hydrogen, which is considered green as it is produced from renewable energy sources such as the sun, wind, and water. Hydrogen is used as a source of energy that can be converted into electricity or consumed as a gas. At this level, hydrogen is most frequently employed in oil refining and fertilizer manufacturing.

¹⁸ Energy Policy Project of the State of Georgia.

Based on desk research and interviews conducted in the private sector, the subsequent subchapters explore the specific difficulties the industry faces.

TECHNICAL DIFFICULTIES

There is a distinct upward trend in domestic energy consumption in Georgia, Turkey, and in other European nations (with the exception of 2020 due to the pandemic). While hydro power stations can improve the system's sustainability, their construction still requires a considerable amount of time. Georgia maintains the opportunity to utilize variable generating sources, such as wind and solar, which can be built relatively quickly, but if they are integrated in excessive volume, the sustainability of the network may face difficulties.

Connecting to the electricity transmission network remains a significant obstacle for new investors, as renewable energy projects face problems in supplying electricity to the network. Specifically, in order to connect to the network, the projects must incur additional costs.¹⁹

In addition, the full utilization of renewables will remain impossible if the country does not concurrently begin building the infrastructure necessary for electricity export. For instance, the existing cross-border transmission lines need to be reinforced to attain their full potential. For the development of new generating sources, it is moreover necessary to create additional cross-border connections and strengthen the existing network.²⁰

INSTITUTIONAL, POLITICAL, AND REGULATORY ISSUES

Political and economic instability is a key obstacle for investors. There are still uncertainties surrounding the final opening of the power market, and the fact that it has been repeatedly delayed creates an unfavourable climate for investment. Furthermore, there are unanswered questions regarding imbalanced charges; it has not yet been determined what exceptions would be given for stations with unpredictable production or when there is insufficient hydrological data to create accurate estimates. Notwithstanding, the new law, the novel incentive scheme, the amended policy document, and the integrated action plan on energy and climate change aim to offer investors a clearer direction. Consequently, these improvements will make the financial flow from investments more predictable for those interested in the development of renewable sources.

The opening of the new electricity market is of particular importance to investors because it will allow them to determine the true value of the electricity they produce. A well-functioning market

¹⁹ Available at: <https://web-api.parliament.ge/storage/files/shares/tematuri-mokvleva/dargobrivi/ganaxlebadi/mosazrebebi/ganaxleb-daskvna.pdf>

²⁰ According to the state electrical system's ten-year plan, an inter-system transmission infrastructure with a capacity of 1,000 to 400 megawatts (MW) will be constructed with all surrounding nations.

enables investors to ascertain genuine prices, thus allowing them to evaluate both the demand for generation and the potential surplus of output. However, the opening of this market is also associated with certain risks,²¹ and the development of renewables is highly dependent on its efficient operation.

FINANCIAL DIFFICULTIES

Inflation stemming from the current economic crisis has seriously impacted the pricing of construction materials and greatly increased the cost of every project, consequently necessitating a greater price guarantee from investors. In addition, there are still certain financial restrictions in place. Crucially, there is no capital market, and international organizations have limited resources. In terms of local business, banks lack the resources since the energy sector requires a substantial amount of capital investment; even if this were an option, loans for small- and medium-sized stations are extremely expensive. Additionally, the financial resources of green funds have not been utilized to their full capacity, as the country lacks experience in this area.

SOCIAL DIFFICULTIES

The major concerns include the scarcity of human resources for the sector, the lack of high-quality research, and the absence of quality control in research. While environmental groups often view such evaluations with mistrust. Moreover, the project planning and implementation process is insufficiently participatory and open, thereby leading to protests and a lack of public confidence. In some cases, the lack of awareness among the population is also a barrier. Currently, several renewable energy projects are on hold due to social protests, with local residents objecting to energy projects being implemented in their vicinity, such as the construction of hydro power plants and new electrical transmission systems. This resistance is largely due to the low level of social awareness and exposure to various myths about the dangers of these projects.²²

RECOMMENDATIONS AND POTENTIAL SOLUTIONS

Discussions with interested parties and research compiled by the Parliament in 2021 indicated that the Power Purchase Agreement and the guaranteed Contract for Difference are key incentive

²¹ Import-based dumping risks, subsidized plant risks (thermal power plants and the Enguri HPP), speculating with memoranda, etc.

²² Available at: <https://web-api.parliament.ge/storage/files/shares/tematuri-mokvleva/dargobrivi/ganaxlebadi/mosazrebebi/ganaxleb-daskvna.pdf>

measures for the development of renewables; particularly as most developers consider them to be the only prerequisite for attracting investment into the Georgian energy market.

It is of utmost importance for the government to be involved in all phases of the construction of energy projects, particularly in communicating with local communities. The state has a direct responsibility to ensure the reliability of the electric network, the details of which must also be fully comprehended. For this reason, it is necessary to establish backup facilities and strengthen internal and cross-border networks, those which will eventually facilitate the integration of renewable energy sources with variable production characteristics into the network. Given that the construction of large hydropower facilities is the only economically viable option for a stable electrical supply, it is necessary for the government to facilitate good communication between protesters and investors. Concurrently, it is important to develop an environmental impact assessment methodology in accordance with international standards, and to perform all phases of a project with the principles of participation and transparency in mind. This would strengthen the credibility of Greens and, thus, the trust of the population.

Equally critical is the issue of training energy sector specialists and, therefore, developing high-quality, specialized training programs. Introducing global experience and expertise into the renewable energy sector would ultimately lessen the reliance on costly foreign labor. Greater emphasis should also be placed on enhancing local market research and development capacity. It is essential to have a transparent and evidence-based research component in the sector in order to establish a robust framework for effective policymaking in the country.

Moreover, a fully functional, liberalized electricity market could help guarantee profits for investors, as the price of electricity exhibits an upward trend. Regardless, it will be impossible to attract investment into renewables if the government continues to subsidize certain market segments and fails to implement transparent and equitable market rules.

Lastly, enhancing the capacity and knowledge of private investors is necessary in order for them to gain expertise in green funding. Thereafter, during subsequent phases of project development, they would be able to raise more green financing and issue green bonds thanks to such experience.²³

²³ On the basis of parliamentary research, certain issues and recommendations were discovered, some of which were taken into account by this chapter, some of which were implemented, and a significant portion of which have not yet been taken into consideration, thus additional work is still required in this respect.

CONCLUSION

As noted, Georgia has spent years attempting to expand its energy sector. Despite this, the country continues to face significant obstacles, which are further compounded by the rising imbalance between consumption and output. Thus, a systematic approach to resolving the issue is crucial. The present challenges require answers that are both technological and financial, economic and social. As such, it is essential for Georgia to collaborate with international organizations and to attract international knowledge.

The current energy crisis and expanding energy prices present various opportunities to promote the generation of renewable energy. Western support schemes are increasingly geared toward finding new ways of meeting the rising global energy demand and creating a more reliable and environmentally friendly global energy market, and thus they could provide Georgia with a new perspective on the development of renewable energy and further the objectives of the green growth strategy.

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