

# GUIDE FOR INVESTING IN RENEWABLE ENERGIES

In the Eastern Partnership Countries

2022



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# REPUBLIC OF ARMENIA



## ENERGY SECTOR INVESTMENTS GOVERNANCE

The Ministry of Territorial Administration and Infrastructure (MTAI) of the Republic of Armenia (RA) is responsible for the development and implementation of energy policy. The Ministry develops relevant primary and secondary legislation, as well as investment plans for state-owned enterprises.

The Ministry of Economy of RA is responsible for the provision of information on Armenia's investment opportunities and conditions, including government incentives and other procedures. The Ministry of Economy is also responsible for providing support in all investment procedures, engaging with various state authorities and offering consultancy on resources required for investment, such as existing land and other real estate, state-owned property, co-financing sources and potential resident partners.

The Public Services Regulatory Commission (PSRC) of RA is an independent regulatory authority primarily responsible for tariff methodology and review, licensing procedures and import/export regulation. PSRC is a multi-sectoral regulatory authority which regulates energy as well as other sectors such as water, waste, telecommunications, post and rail transport.

Armenia does not have a dedicated agency for renewable energy policies. Therefore, the Renewable Resources and Energy Efficiency (R2E2) Fund is responsible for the implementation of renewable energy and energy efficiency projects.

## FACTS & FIGURES

According to the Law on "Energy Saving and Renewable Energy" of the Republic of Armenia, renewable energy resources are non-fossil renewable sources (wind, solar, hydro, geothermal, biomass, biogas, etc.), which are applicable for the generation of electrical and/or thermal energy.

- Armenia has a significant potential of wind, solar, geothermal, and especially hydro resources, and the State gives priority to maximising the use of this potential.
- The major contributors to the renewables share are hydroelectricity followed by rapidly growing solar energy.
- According to the 2021 Energy Balance of Armenia, renewable energy accounted for 30.5% of the overall energy production, including 19% from Hydro Power Plant Cascades and 11% from small Hydro Power Plants.



### Wind – 500 MW

In 2003, the Wind Energy Resource Atlas of Armenia was drawn. According to it, economically reasonable wind power has an estimated potential of 500 MW total installed capacity and an electric power output of 1.26 billion kWh/y. The most efficient locations are the Zod (Sotk) Pass, Bazum Range, Pushkin and Qarakhach Passes, Jajur Pass, Geghama Range, Sevan Pass, Aparan Region, Sisian-Goris Hills and Meghri Area.

### Solar – 1,330 MW

Armenia has a significant solar energy potential. The average annual amount of solar energy flow per square meter of horizontal surface is about 1,720 kWh (the average European is 1,000 kWh). One fourth of the country's territory is endowed with solar energy resources of 1,850 kWh/m<sup>2</sup>/year.

### Hydro – 1,400 MW

Constructing small hydropower plants (HPPs) is the favoured course of action for developing the renewable energy sector and securing energy independence in Armenia. Most designated, under-construction or operational small HPPs are derivational stations on natural water flows. The potential water energy resources of Armenia are 21.8 bn kWh, including large- and medium-size rivers (18.6 bn kWh) and small rivers (3.2 bn kWh)

### Geothermal and Biomass – not defined

Investigations have revealed precise locations of geothermal energy sources, suitable for the construction of geothermal power plants. At the Jermaghbyur site, geological and geophysical explorations have found that high-pressure (20-25 atmospheres) hot water (up to 250°C) is available at a depth of 2,500 m to 3,000 m. If these data are confirmed, it would be possible to construct Armenia's first geothermal power plant with 25 MW capacity in this area. As for biomass, there are no recent updates.

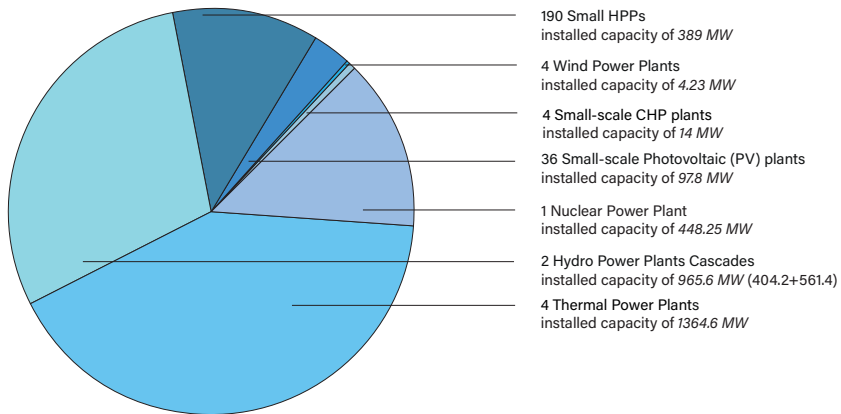
## CURRENT ELECTRICITY SECTOR STATISTICS

As of 2022 there are 240 operating power plants in Armenia:

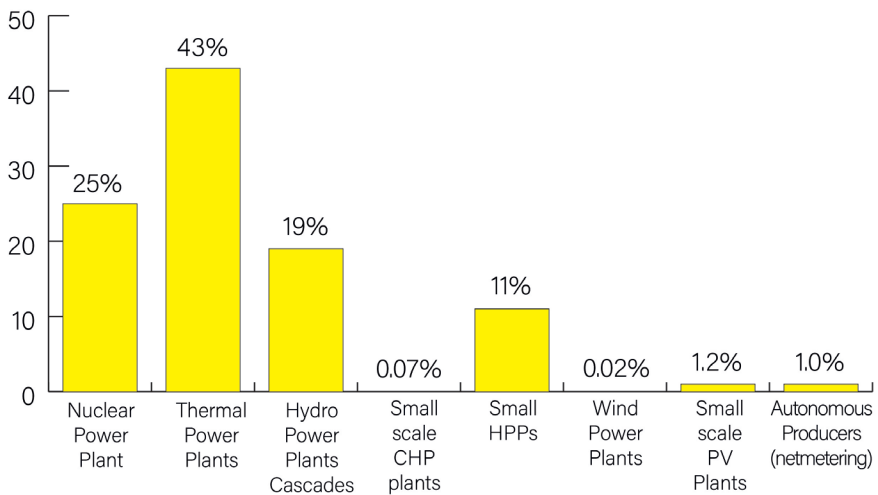
- Nuclear Power Plant *installed capacity of 448.25 MW*
- 4 Thermal Power Plants *installed capacity of 1364.6 MW*
- 2 Hydro Power Plants Cascades *installed capacity of 965.6 MW (404.2+561.4)*
- 190 Small HPPs *installed capacity of 389 MW*
- 36 Small-scale Photovoltaic (PV) plants *installed capacity of 97.8 MW*
- 4 Wind Power Plants *installed capacity of 4.23 MW*
- 4 Small-scale CHP plants *installed capacity of 14 MW*

In addition, there are 49 power plants currently under construction:

- Utility scale PV plant *capacity of 55 MW*
- 27 Small scale PV plants *capacity of 117.7 MW*
- 20 Small HPPs *capacity of 35.5 MW*
- Wind Power Plant *capacity of 4 MW*



Power Plants Installed Capacities (MW)



Electricity production sources in 2021.

## RENEWABLE ENERGY DEVELOPMENT IN ARMENIA

Armenia relies on imports of natural gas and oil to meet its energy needs. This exposes the country to supply risks and dependence on a single supplier. Since the Government considers energy security and the development of indigenous sources to be of primary importance for the energy sector, renewables and efficiency measures are considered as key areas. In order to satisfy expected demand growth while increasing reliability, the Government aims at increasing capacity and promoting domestic energy sources.

Regulatory reform has been supporting achievements in the power sector since the mid-1990's. The commitment to cost-recovery tariffs has facilitated investment in infrastructure and attracted substantial private-sector investment, resulting in improved reliability, enhanced service quality and operational efficiency in the sector.

In 2021, the Government adopted Armenia's 2040 strategic program to develop the energy sector. The strategic program outlines strategies for fuel diversification, mainly through renewables and nuclear power, and increasing power generation capacity. In the meantime, the Government approved the Schedule of Activities for 2021-2040 to implement the strategic program.

One of the main goals of this program is the economically efficient and reasonable use of renewable energy sources (RES) in accordance with all environmental standards. In addition, the program aims to achieve the maximum possible increase in the energy balance share of renewable energy (RE), with an ambitious target of at least 15% share of solar energy by 2030.

The program includes comprehensive analyses of renewable energy potential, costs and benefits, and the viability of specific technologies. Moreover, the program sets targets and objectives for renewables by 2040, including a plan for financing.

The main strategies for RE supporting schemes are as follows:

- Producers receive 15-20 years purchase guarantee from the distribution company, in accordance with the Energy Law.
- Feed-in tariff for RES producers, which is adjusted annually based on exchange rate and inflation.
- RES is recognized as an economic activity that takes priority; thus, the Government is eligible to adopt individual support schemes for different investors.

## **INVESTING IN RENEWABLE ENERGY IN ARMENIA**

Starting from 2017, the licenses for PV plants are issued with an annual limit.

During the first year the limit was 10 MW, however the capacity of each plant could not exceed 1 MW. In total, 12 licenses were issued, and all those plants are now operational. The tariff was 0.087 USD/kWh.

During the second year the limit was 200 MW, however the capacity of

each plant could not exceed 5 MW. In total, 49 licenses were issued, and 24 of those plants are now operational, with the remaining plants scheduled to start operation by November 2022.

The regulation of RES producers can be divided into three options:

- PSRC grants licenses and sets feed-in tariffs for small HPPs up to 30 MW, for PV plants up to 5 MW (under annual limits) and for wind plants up to 30 MW and biogas plants.
- For large scale RES producers, the license is granted, and the tariff (including its adjustment methodology) is set according to the Public Private Partnership (PPP) agreement, which is signed with the Government.
- Other RES producers can waive the purchase guarantee and operate in the free market.

Feed-in tariffs for renewable energy are set by Armenia's PSRC and are adjusted annually based on exchange rate and inflation. The adjustment formula is:

$$T = T_1 \left[ K_1 * \frac{CPI}{100} + K_2 * \frac{R_1}{R_2} \right]$$

T	Adjusted tariff
T <sub>1</sub>	Current tariff
K <sub>1</sub>	Coefficient, which is equal to 0.1 for wind and solar plants, and 0.35 for other plants
CPI	Consumer Price Index
K <sub>2</sub>	Coefficient, which is equal to 0.9 for wind and solar plants, and 0.65 for other plants
R <sub>1</sub> /R <sub>2</sub>	USD/AMD exchange rate

The current feed-in tariffs (excl. VAT) are:

- PV plants *6.012 USD Cent/kWh*
- Wind plants *6.012 USD Cent/kWh*
- Biogas stations *6.231 USD Cent/kWh*
- Small HPPs on rivers *6.231 USD Cent/kWh*
- Small HPPs on irrigational systems *4.153 USD Cent/kWh*
- Small HPPs on drinking water systems *2.770 USD Cent/kWh*

In order to develop solar PV technology, the Government of Armenia has applied the Scaling up Renewable Energy Program for Low Income Coun-

tries (SREP) under the Climate Investment Funds (CIFs) for the provision of concessional funding. The Renewable Energy Investment Project was approved by the financing organisation on 27 June 2014. According to one of the components of the investment project, the Climate Investment Funds (CIFs) and the World Bank (WB) allocated grants and soft loans to the Government of Armenia for the construction of the first solar PV plants and for the expansion of the PV technology in the country.

In preparation for the project, R2E2 Fund now implements the Project Preparation activities supported by the WB grant within the framework of the investment project. Six sites have been selected for the construction of solar PV plants. Spanish Ares Engineering has already implemented and submitted feasibility studies for the selected sites. Selected sites are community-owned, and their dimensions and details are provided in the feasibility studies. One of the projects went through the process and a PPP agreement was signed.

The Government of the Republic of Armenia is planning to announce a tender for the implementation of five remaining projects in order to define a minimum tariff. The tender and construction of plants will be carried out in several stages. The possible projects are as follows:

Location/ Community name	Installed capacity <i>average (MW)</i>	Annual electricity produced <i>average (GWh)</i>	Reduction of annual carbon dioxide emissions <i>average (tons)</i>
Talin 2	10	22	5427
Masrik 2	15	30	7515
Gagarin	17	25	6262
Dashtadem	10	13	3340
Merdzavan	7	11	2922

As for the PPP projects, the 2019 program of the Armenian Government emphasised the importance of policy development for Public Private Partnerships and efficient implementation of PPP projects. The objective of the Government is to implement such PPP projects which, in the long term, will allow concluded contracts to effectively manage the risks allocated between the public and private partners, contribute to building and developing infrastructures in the country within the framework of PPP projects, as well as ensure positive outcomes based on the quality and value of services rendered to the public. In order to achieve the specified objectives, processes aimed at developing PPP projects and shaping the

legislative implementation framework have been initiated.

In order for the Government to make a decision on the implementation of a PPP, it is necessary that this PPP meets all of the following criteria:

- Ensuring the share of risks between public and private partners, in accordance with the PPP procedure.
- Ensuring economic profitability for the Republic of Armenia, i.e. having economic internal rate of return which will exceed the base rate defined by the PPP procedure.
- Should be evaluated and selected as project to be implemented, in accordance with the procedure for identifying, developing and evaluating public investment programs.
- Should be fiscally affordable.
- If applicable, it must have a value for money greater than zero.

The PPP agreement procedure can be divided into five steps:

Step 1: PPP Project Identification

Step 2: PPP Project Preparation

Step 3: Private Partner Selection Process

Step 4: PPP Contract Management

Step 5: Result-based Evaluation of the PPP Project

## **PARTIES IN PPP PROJECTS**

- Competent authority: the Government; a body of the public administration system that develops and implements policies in a specific field of public administration; a local self-government body of the Republic of Armenia.
- Authorized body: a body of the public administration system that develops and implements the policy of the Armenian Government in the field of public finance management.
- Public partner: a competent authority which countersigns a PPP contract with the successful tenderer.
- Private partner: a private legal entity established and operating in accordance with the legislation of the Republic of Armenia.

## LICENSING AND TARIFF SETTING PROCEDURES

Land acquisition

The land can either be bought from private person or entities, or through the municipality. The land's function should then be changed to energetic or water-related. The changing procedure is done through the municipality.

License application

The licensing procedure is set by PSRC's resolution 374-N of 2013. The resolution also includes a list of required documents and further information. The licensing procedure can take up to 25 working days.

Conclusion of PPA with the DSO

The Power Purchase Agreement is concluded with the Distribution System Operator, which also acts as a Guaranteed Supplier. The PPA will cover plant connection as well as commissioning and testing relations.

Design of the project and expertise

The design and expertise shall be done by a licensed entity. In some cases the design may go through environmental and complex administrative expertises. Copies of design and expertise conclusions should be presented to PSRC.

Construction of the plant

The construction shall be done by a licensed entity. Plant construction is verified according to the Government's resolution 596-N of 2015, and final documentation is completed in collaboration with the municipality and Cadastre Committee of the Republic of Armenia.

Tariff setting application

After submitting the required documents set by PSRC's resolution 359-N of 2013, PSRC sets the tariff within 25 working days and, where applicable, the guaranteed purchase period starts.



**The content of the chapter has been developed with the kind contribution of the Public Services Regulatory Commission of the Republic of Armenia.**



# REPUBLIC OF AZERBAIJAN



## RENEWABLE ENERGY POTENTIAL IN AZERBAIJAN

Azerbaijan has a significant untapped potential for renewable energy, as it is relatively sunny and windy, and simultaneously having sizable hydro and biomass resources. The Government has been developing a legislative framework to support the production and provision of renewable energy. The potential of renewable energy sources that are economically viable and technically feasible is estimated at 27,000 MW, including 3,000 MW of wind energy, 23,000 MW of solar energy, 380 MW of bioenergy potential, and 520 MW of mountain rivers. The natural climate of Azerbaijan provides extensive opportunities to increase the production of electricity and thermal energy, particularly by harnessing solar energy potential. The number of sunny hours in Azerbaijan is 2400–3200 hours during the year, thus the number of solar rays falling on the territory of Azerbaijan is higher compared to other countries. This factor increases the attractiveness for investments in the use of solar energy. Azerbaijan is also one of the countries with a great potential for wind energy. In particular, the Absheron peninsula, the coastline of Caspian Sea, the islands in the northwestern part of Caspian Sea, the Ganja-Dashkesan zone in the west of Azerbaijan, and the Sharur-Julfa area of the Nakhchivan Autonomous Republic are favourable areas.

Despite the fact that Azerbaijan is rich in fossil energy resources and is recognised as an energy exporter in the world, special attention is paid to the use of renewable energy sources in the Republic of Azerbaijan. One of the main goals of the energy security policy is to strengthen the use of renewable energy sources in the country.

Azerbaijan also has a significant offshore wind (OSW) resource, located close to the shore and to its most populated area, in relatively shallow water. The World Bank has assessed Azerbaijan's OSW technical resource at 35 GW in shallow waters (for fixed foundations) and 122 GW in deep waters (for floating foundations), excluding environmental and social considerations. For this reason, the implementation of offshore wind energy projects in Azerbaijan can be considered expedient. The World Bank has developed and published the Offshore Wind Roadmap<sup>1</sup> for Azerbaijan within the Offshore Wind Development Program. This report provides a strategic vision for the development of offshore wind in Azerbaijan, looking at both opportunities and challenges under different growth scenarios.

Approximately 25% of Azerbaijan's internal water resources belong to Western Azerbaijan, which amounts to 2.56 bcm per year. Moreover, it should be noted that there is a favourable potential for the implementation of solar energy projects in Western Azerbaijan. As a result of initial observations, the relevant areas with favourable solar radiation were identified.

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1. <https://www.worldbank.org/en/country/azerbaijan/publication/offshore-wind-roadmap-for-azerbaijan>

The potential of solar energy in Western Azerbaijan is estimated at more than 7,200 MW. The newly established economic regions in the Western Azerbaijan were considered expedient on the basis of preliminary studies, topography for solar power projects, climatic conditions, proximity to the network, energy production potential, transport infrastructure, and comparative analysis of other technical factors.

The presence of favourable wind potential in Western Azerbaijan, especially in the mountainous parts, was determined according to preliminary research. The analysis shows that wind power potential in these areas is around 2,000 MW.

In the past years, relevant scientific research was carried out to identify the existence of geothermal energy sources in Western Azerbaijan. Geothermal energy is mainly used for electricity generation (with favourable temperature and debit), thermal power supply and tourism-balneological purposes. Preliminary analysis showed that there are geothermal sources in the mountainous part of the Lesser Caucasus (4,000-5,000 m<sup>3</sup> per day at temperatures of 30-74°C). Based on preliminary observations, it is more expedient to use this potential for heat supply and balneological purpose, respectively.

## **INTERNATIONAL COOPERATION**

### **European Bank for Reconstruction and Development**

#### — Project “Support for Renewable Energy Auctions in Azerbaijan”

The project enhances the selection of an electricity producer in the area of renewable energy sources by providing a set of conditions for holding auctions, as well as supporting the preparation of relevant contract templates to be used during the negotiation process. An international consulting company has been involved in implementing the project and developing the relevant rules. These rules have already been submitted to the Government, and are subject to governmental approval.

After adopting the above-mentioned rules, which is expected to occur in 2022, the first renewable energy auctions will be held. Improving the regulatory framework in the existing sector will stimulate the expansion of using renewable energy sources as well as encourage investment in this area.

- Project “Support for the application of the regulatory framework for clean measurement systems for small-scale renewable energy projects in Azerbaijan”

The project aims to support the relevant authorities of Azerbaijan in the design and implementation of a net metering system for the use of small-scale renewable energy facilities in accordance with the Law of the Republic of Azerbaijan “On the use of renewable energy sources in electricity generation”. The main purpose of adopting the “Rules on the application of support mechanism for the active consumer” is to transfer the surplus of electricity produced from renewable energy sources to the electricity supply grid in order to replace it later, and to be able to receive electricity from the grid if consumption exceeds production. These rules have already been drafted and submitted to the Government, and are subject to governmental approval.

- Project “Assessment of potential for a Low-Carbon Hydrogen Economy in Azerbaijan”

EBRD chose the consulting company Advisian to implement this project. The project envisages review and assessment of the potential of hydrogen production in Azerbaijan: technical and commercial feasibility, evaluating local demand and export opportunities. The report will include research on demand and production of hydrogen in the region, methods of transportation and storage, macroeconomic review of H2 production in the country, assessment of social and economic impacts and other.

### Asian Development Bank

- Project “Knowledge exchange and technical support for the development of floating solar panels”

The project’s framework foresees the installation of a 100 KW floating photovoltaic system on Boyukshor Lake as well as the establishment of business models to promote the participation of the private sector and strengthen national capacity through training. Further research is also being carried out to assess the implementation of large-scale projects on water objects in the future.

During the project implementation an international consulting company prepared a feasibility study for the development of floating solar panels (FPV) in Azerbaijan. In addition, the solar energy potential of water pools was assessed, using a methodology based on GIS. The project is planned to be completed by March 2023.

## International Finance Cooperation

- Project “Development of a Roadmap for the use of offshore wind energy in Azerbaijan”

The process of preparing a “Roadmap for the use of offshore wind energy in Azerbaijan” includes the development of geographical maps, zoning, economic, financial, environmental and social analysis, impact assessment, issuance of permits and approvals, improvement of the regulatory framework, re-transmission network construction, and supply chain studies.

According to preliminary analysis, the total technical potential of wind energy in the Azerbaijani part of the Caspian Sea is estimated at 157 GW (35 GW in shallow water basins and 122 GW in deep water basins). The project also envisages the organisation of tenders for relevant offshore projects and establishment of partnerships with the private sector. Efficient use of this potential at sea will create new jobs as well as opportunities that will add value to the country’s economy.

## POLICY AND LEGAL FRAMEWORK

The legal and regulatory framework of Azerbaijan’s power sector has evolved over the past 20 years. In this period, some elements of the legal and regulatory framework have been updated to account for intended changes to their structure and administration, such as the strive to introduce a competitive power market through the unbundling of the vertically integrated market and greater private sector participation. The list of the current legislation is presented below:

- Law on Energy Resources Utilization (30 May 1996)
- Law on Power Industry (3 April 1998)
- Law on Heat and Electric Power Plants (6 March 2000)
- Law on Energy (24 November 1998)
- Law on Use of Renewable Energy Sources in the Generation of the Electricity (31 May 2021)
- Law on Efficient Use of Energy Resources and Energy Efficiency (9 July 2021)

“Azerbaijan 2030: National Priorities for Socio-Economic Development” was approved by the Order of the President of the Republic of Azerbaijan, No. 2469, dated 2 February 2021. The “clean environment and green growth country” has been identified as one of the five National Priorities for the socio-economic development of the country in the next decade. In order to fully meet the needs of present and future generations, the application

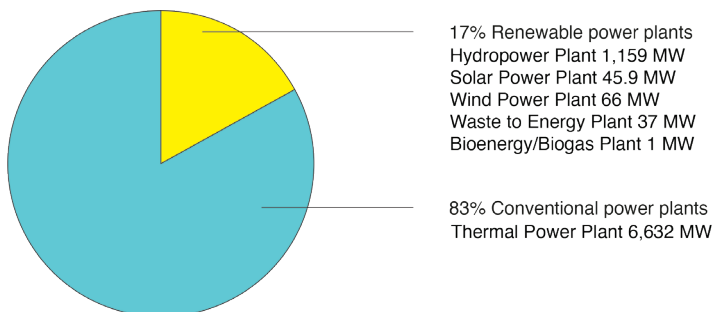
of environmentally friendly “green” technologies will be expanded, and the share of renewable energy sources in primary consumption will be increased in all sectors of the economy based on scientific and technological potential.

As a result of the work carried out to improve the legislative framework in the field of using renewable energy sources, the Law of the Republic of Azerbaijan “On the Use of Renewable Energy Sources in Electricity Production” was adopted on 31 May 2021. Besides the development of the renewable energy (RE) sector through private investment, this law will also contribute to the reduction of carbon emissions by creating certain incentives for active consumers. According to the law, secondary legislative acts are expected to be adopted. These have already been drafted and submitted to the Government by the Ministry of Energy, following agreement with the relevant authorities.

Azerbaijan has committed to reducing greenhouse gas emissions by 35% by 2030 compared to the base year (1990). Significant progress has already been made to achieve this goal. Moreover, during the COP26 Summit Azerbaijan increased its ambitions to reduce greenhouse gas emissions by 40% as well as to establish a “net zero-emission” zone in the economic regions by 2050.

In order to achieve its climate goals, make efficient use of the country’s renewable energy potential, ensure energy transition, and conserve traditional energy resources, Azerbaijan aims to increase the share of renewable energy sources in the country’s total installed electricity capacity from 17% to 30% by 2030. Nevertheless, these indicators are not final targets and they might be extended in line with the interest of foreign investors in the renewable energy sector and the implementation of new pilot projects.

The total power generation capacity of Azerbaijan is 7,937 MW, wherein the capacity of power plants of renewable energy sources, including large HPPs, is 17% of the total capacity.



*Total power generation capacity of Azerbaijan.*

As of 2022, Azerbaijan has a renewable installed capacity of around 1.3 GW, with the majority share coming from the hydroelectric sector. Regarding the use of modern renewable energy sources, several power plants are already in operation and the energy produced is transmitted to the grid:

- Wind power plants Yeni Yashma 50 MW, Hokmali 8 MW, Gobustan 2.7 MW and others.
- Solar power plants Babek 22 MW, Kangarli 5 MW, Gobustan 3 MW, Samukh 2.8 MW, Sahil 2 MW, Sharur 5 MW and others.
- Waste-to-energy power plants Tamiz Sahar 37 MW.
- Bioenergy/biogas power plants Gobustan (HES) BIO 0.7 MW.<sup>2</sup>

## PROJECT IMPLEMENTATION WITHIN LEGISLATION

In recent years, the work carried out in the legislative field continued and the Law of the Republic of Azerbaijan “On the use of renewable energy sources in the production of electricity”, No 339-VIQ, dated 31 May 2021, which contributes to the development of renewable energy, was approved. The implementation of relevant measures aimed at developing sub-legislative documents continues to ensure the application and implementation of the Law.

According to the Law, renewable energy projects are decided to be implemented by auctions or bilateral agreements.

Currently, the project “Support to Renewable Energy Auctions in Azerbaijan” is being implemented by the European Bank for Reconstruction and Development (EBRD). As part of the project, consultants will provide auction rules, a set of conditions for the auctions, as well as documents such as Power Purchase Agreement (PPA), Request For Qualifications (RFQ) and Request For Proposal (RFP).

Bilateral agreements can be reached under the following conditions:

- During the implementation of pilot projects.
- If deemed necessary in terms of national interests and strategic importance.
- If it is not possible to determine the investor at the auctions or if the auction did not take place.

Regulation in this domain covers areas of activity such as obtaining special permits for the use of lands, construction and operation of power plants, obtaining technical conditions for connecting to the power grid, signing the act of commissioning power units, signing a PPA with a distribution network and others. The list of governmental organisations that have an active role in regulating this domain, along with their area of activity, are

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2. <https://area.govaz/en/page/layiheler/berpa-olunan-enerji-stansiyalari/boem>

reflected in the table.

	Name of Organisation	Area of Activity	Note
1	Ministry of Energy	Central executive body responsible for implementing public policy and regulation in the field of fuel and Energy.	Also responsible for drafting the legislative basis and definitions of quotas for using or shearing RES.
2	Ministry of Economy	Issuance of special permits.	Procedure realised through ASAN Services.
3	Tariff Council	Approval of all tariffs.	
4	Azerbaijan Renewable Energy Agency under the Ministry of Energy	Takes measures to ensure the development of the sector and the efficient use of renewable energy sources, to coordinate the organisation and regulation of activities, and to increase investment attractiveness.	Provides analysis of project feasibility and monitors the operation process and the use of RES.
5	Azerbaijan Energy Regulatory Agency PLE	Regulation of interactions between producers, shippers, distributors, suppliers and consumers in the field of electricity and thermal energy, as well as gas supply.	Provides activity analysis of enterprises, carries out restructuring measures, develops incentive mechanisms for attracting investments and controls procedures on maintaining the requirements of the engineering management system and quality of services.
6	Azerishig OJSC	Obtaining technical conditions for connecting to the power grid.	Dispatching and reimbursement of the cost of energy received and sold.
7	Azerenergy OJSC	Ensures the operation of the country's electric power system, coordinates the production and transmission of electricity.	

*List of governmental organisations active in the electricity sector.*

## TARIFFS

Electricity tariffs are regulated by the Government and adjusted as fuel prices change. By the decision of the Tariff Council, dated 16 October 2021, tariffs for electricity increased and entered into force from 1 November 2021.<sup>3</sup>

3. <http://www.tariffcouncil.gov.az/?/az/content/70/>



	Names of the services	Current Tariffs (including VAT, Gapik/kWh)
1	Purchase from producer	
1.1	Private small hydropower stations	5.0
1.2	Wind power stations	5.5
1.3	Other renewable energy	5.7
2	Wholesale	6.6
2.1	Enterprises of the chemical and aluminium industry, mining ore-based steel foundries, with direct energy supply from 35 kV and 110 kV lines and for production purposes, with average monthly consumption not less than 5 million kWh.	
2.1.1	Day (08:00–22:00)	6.4
2.1.2	Night (22:00–08:00)	3.1
3	Transit transmission	0.2
4	Retail	
4.1	Residential	
4.1.1	For monthly consumption less than 300 kWh/200 kWh	8.0
4.1.2	For monthly consumption from 200 kWh to 300 kWh	9.0
4.1.3	For monthly consumption more than 300 kWh	13.0
4.2	Non-residential	
4.2.1	Trade and Services	11.0
4.2.2	Other	10.0

*Domestic electricity tariffs.*

## INCENTIVES AND GUARANTEES

In 2016, by the decree of the President of the Republic of Azerbaijan, the Investment Promotion Certificate (IPC) was approved. IPC is granted to investors by the Ministry of Economy.

All investors from various business sectors, including the renewable energy sector, can obtain this document by submitting their project to the Government.

With an IPC, investors are guaranteed to get incentives such as:

- Tax exemptions for seven years (investment promotion mechanisms).
- 50% exemption on income tax for individual entrepreneurs.
- 50% exemption on corporate income tax for legal persons.
- Full exemption from customs duties on import of technological equipment for the high priority industry lines.
- Full exemption from assets tax.
- Full exemption from land tax.

Simultaneously, the following guarantees are provided to investors according to the legislation of the Republic of Azerbaijan and bilateral agreements:

- Guaranteed off-take (Take or pay)
- Guaranteed connection
- Priority in dispatching
- Possibility of indexation of payments to foreign currency
- Long-term land lease

## ONGOING PROJECTS

### — 240 MW Khizi-Absheron Wind Power Plant

On 9 January 2020 the Ministry of Energy of the Republic of Azerbaijan and ACWA Power of the Kingdom of Saudi Arabia signed an Implementation Agreement. According to the Agreement, a pilot project will be implemented for the construction of a 240 MW wind power plant by "ACWA Power". In this regard, on 30 December 2020 the Investment Agreement, Power Purchase Agreement and Transmission Connection Agreement were signed between the Ministry of Energy, Azerenergy OJSC and ACWA Power of the Kingdom of Saudi Arabia for the 240 MW wind power plant. The project will be implemented in Sitalchay village of Khizi Region and Pirakashkul village of Absheron Region.

According to preliminary estimates, the wind power station will generate 1 billion kWh of electricity annually, provide an opportunity to save 220 million cubic metres of natural gas per year, prevent 400,000 tons of carbon dioxide emissions and supply 300,000 homes with electricity. The total cost of the project is approximately 300 million USD and it is expected to be fully funded by foreign investment.

### — 230 MW Garadagh Solar Power Plant

According to the Agreement, a pilot project will be implemented for the construction of a 230 MW solar power plant by "Masdar". In this regard, on 6 April 2021 the Investment Agreement, Power Purchase Agreement and Transmission Connection Agreement were signed between the Ministry of Energy, Azerenergy OJSC and "Masdar" of the United Arab Emirates for the 230 MW solar power plant. The project will be implemented in an area 9 km northwest of Alat settlement.

According to preliminary estimates, the solar power station will generate 500 million kWh of electricity annually, save 110 million cubic metres of natural gas per year, prevent 200,000 tons of carbon dioxide emissions and supply 110,000 homes with electricity. The total cost of the project is approximately 200 million USD and it is expected to be fully funded

by foreign investment. On 2 August 2022 Masdar achieved Financial Close and received approval for a 114.2 million USD loan package from financial institutions (EBRD, ADB, ADFD and JICA) for implementing the project.

— BP 240 MW Solar Power Plant

On 3 June 2021 the Ministry of Energy of the Republic of Azerbaijan and BP signed an Implementation Agreement for collaborating on the evaluation and implementation of a project to build a 240 MW solar power plant in the newly established economic regions in Western Azerbaijan. Cooperation within the Implementation Agreement covers areas such as the technical and commercial evaluation of the solar energy project, plant design, provision of financing and adoption of the final investment decision.

## GREEN ENERGY ZONE

According to the Order of the President of the Republic of Azerbaijan, No. 2620, dated 3 May 2021, the Ministry of Energy is developing a concept and a master plan for the establishment of a Green Energy Zone in Western Azerbaijan. For this purpose, the Ministry is cooperating with the Japanese company TEPCO, which specialises in this field.

In line with the President's instructions on the establishment of a Green Energy Zone in Western Azerbaijan, research is being conducted to identify solar, wind, biomass, thermal, geothermal, and other renewable energy potentials in these regions. The research will also establish the coordinates of the favourable areas and ensure energy supply through the construction of wind and solar power plants, hydropower plants in reservoirs, lakes and small rivers, using available resources. As part of the agreement, the Japanese company TEPCO prepared a concept document for establishing the Green Energy Zone. This concept envisages the generation of electricity in the region from renewable sources and the application of high and "green technologies" in the energy value chain. The concept document includes development models for the territories, which were created through a combination of various scenarios for energy demand, according to the growth rate of gross domestic product, population settlement scenarios and different energy supply options.

In the Green Energy Zone project there are number of opportunities for investors.

## EXAMPLES OF SIGNED MOU'S AND OTHER AGREEMENTS

- In line with the Order of the President of the Republic of Azerbaijan, No. 1673, dated 5 December 2019, "On Measures for the Implementation of Pilot Projects in the Use of Renewable Energy Sources", Implementation Agreements were signed between the Ministry of Energy and ACWA Power of the Kingdom of Saudi Arabia and Masdar of the United Arab Emirates for the construction of a 240 MW wind power plant and a 230 MW solar power plant respectively. The Investment Agreement, Power Purchase Agreement, and Transmission Connection Agreement for the 240 MW wind power plant project were signed on 30 December 2020, and similar agreements were signed on 6 April 2021 for the 230 MW solar power plant project. The wind and solar energy projects are projected to produce about 1.5 billion kWh of electricity per year. This, in turn, will save 330 million m<sup>3</sup> of natural gas and reduce CO<sub>2</sub> emissions by more than 600,000 tons. Formal ceremonies were held on 13 January and 15 March 2022 for the 240 MW "Khizi-Absheron" Wind Power Plant and the 230 MW Garadagh Solar Power Plant, which are to be built in Azerbaijan.
- On 22 February 2021 the Ministry of Energy and BP signed a Memorandum of Understanding to cooperate in assessing the potential and conditions required for large-scale decarbonised and integrated energy and transport systems, including renewable energy projects in the regions and cities of Azerbaijan. In addition, an Implementation Agreement was signed with BP on 3 June 2021 for the evaluation and implementation of the project to build a 240 MW solar power plant in the newly established economic regions in the Western Azerbaijan, and work in this area is ongoing. Cooperation within the Implementation Agreement includes evaluation of the solar energy project from both technical and commercial aspects, project design, provision of financing, and adoption of a final investment decision.
- On 14 April 2021 a Memorandum of Understanding was signed between the Ministry of Energy and the International Finance Corporation (IFC), a member of the World Bank Group, for cooperation in the use of off shore wind energy and development of the renewable energy sector in Azerbaijan. According to the Memorandum, cooperation with IFC envisages the assessment of offshore wind energy potential in Azerbaijan and the development of a road map. According to preliminary estimates, Azerbaijan's offshore wind potential is 157 GW.
- On 15 March 2022 the Ministry of Energy and Masdar signed a Memorandum of Understanding for cooperation in the field of renewable and clean energy. The Memorandum defines possible cooperation in the use of renewable energy sources in Western Azerbaijan. According to the document, Masdar intends to study investment opportunities in coordination

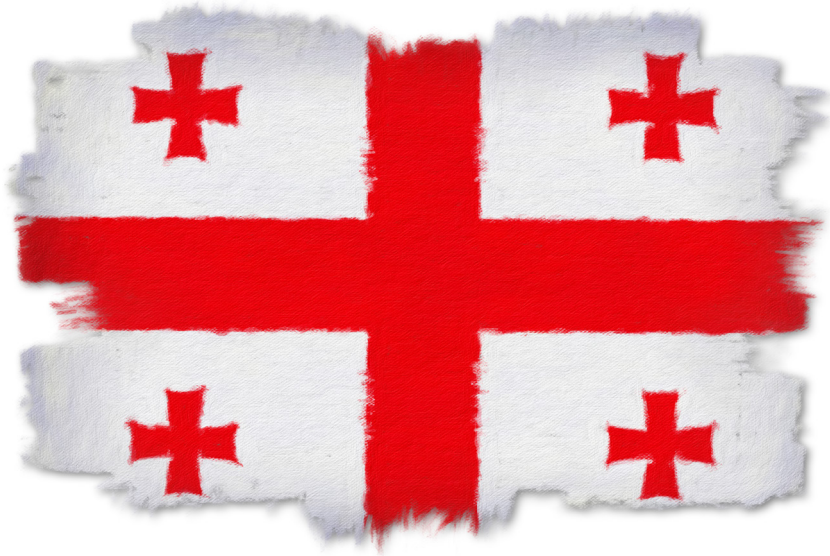
with the Ministry in areas such as utility-scale wind and solar PV plants, rooftop solar systems and others. On 15 March 2022 the Ministry of Energy of Azerbaijan and Masdar, from the United Arab Emirates, signed a Memorandum of Understanding for cooperation in the area of integrated offshore renewable energy. The Memorandum includes possible cooperation to support the use of renewable energy in Azerbaijan, integrated solutions covering offshore wind energy use, green hydrogen production, carbon capture, use and storage at the expense of this energy, and other activities. On 13 January 2022 the Ministry of Energy and ACWA Power, from the Kingdom of Saudi Arabia, signed a Memorandum of Understanding for cooperation in the field of offshore wind energy. The Memorandum consists in identifying the main principles of cooperation in the field of off-shore wind energy, assessing the potential and providing the conditions for profitable investment in renewable energy projects in Azerbaijan. A Steering Committee and Working Group will be established to guide and control the activities set out within the Memorandum.

- Masdar signed implementation agreements with the Ministry of Energy of the Republic of Azerbaijan to develop clean and renewable energy projects in the country with a combined capacity of 4,000 MW, as an exclusive concession and with the right to develop an additional 6,000 MW in a second phase, bringing the total production capacity of these projects to 10,000 MW – the largest contract of this type in Azerbaijan’s history. Masdar signed two implementation agreements, one relating to the development of onshore wind projects with a capacity of 1,000 MW and solar photovoltaic (PV) projects with a capacity of 1,000 MW. The second agreement covers integrated offshore wind and green hydrogen projects with a capacity of 2,000 MW.
- A Memorandum of Understanding on cooperation in renewable energy sources and energy efficiency was signed between Azerbaijan Railways CJSC (ADY) and UAE’s Masdar company. The main purpose of the Memorandum is to formalise the intention of the parties to explore the possibilities of using renewable energy sources in the railway sector and implement a comprehensive energy efficiency program.
- Azerbaijan Investment Company OJSC (AIC) and Abu Dhabi’s Future Energy Company, Masdar, signed a Memorandum of Understanding on a “Waste to Energy” project during the groundbreaking ceremony for the 230 MW solar power plant to be built in Azerbaijan by Masdar. The main purpose of the project initiated by the Azerbaijan Investment Company is to generate energy from waste disposal using environmentally-friendly technologies. Based on initial analysis conducted by Masdar, the processing capacity (waste utilisation) of the plant, which is planned to be located in the Western region (Ganja), is estimated at 300,000 tons per year.



**The content of the chapter has been developed with the kind contribution of the Azerbaijan Renewable Energy Agency under the Ministry of Energy of the Republic of Azerbaijan.**

# REPUBLIC OF GEORGIA



## FACTS & FIGURES

According to the Law of Georgia on “Promoting the Generation and Consumption of Energy from Renewable Sources”, renewable energy (RE) is the energy generated from renewable sources, such as wind and sun, but also including ocean energy, aerothermal energy, geothermal energy, hydrothermal energy, hydropower, biomass, gas generated from the decomposition of organic matter at landfills, gas generated in a wastewater treatment facility, and biogas.

- Georgia has a significant potential of wind, solar, geothermal, and especially hydro resources. Georgia’s share of total primary energy supply (TPES) from renewable energy sources (RES) ranked above the world average in 2017<sup>1</sup>.
- The major contributor to the renewables share is hydroelectric power.
- According to the 2020 Energy Balance of Georgia<sup>2</sup>, renewable energy accounted for 92% of the Georgian energy production, wherein 20% of TPES was made up of:
  - Hydro 14%
  - Biofuels (mainly wood) and waste 5%
  - Geothermal, solar and other 1%

### Wind – 1,450 MW

Georgia’s total potential of wind resources is totalling 1,450 MW, with an average annual generation of 4,160 million kWh. Several promising sites for wind farms have been identified in areas adjacent to Poti, Kutaisi, Rustavi, Tbilisi, the Rikoti Pass (Mount Sabueti) and the Chorokhi River. LLC “Qartli Wind Farm”, with an installed capacity of 20.7 MW, was successfully commissioned in 2016. Its average annual production amounts to 84.1 million kWh.

### Solar – 520 MW

Due to the geographical location of Georgia, solar radiation is rather high. In most regions of the country there are 250 – 280 sunny days annually, with approximately 6,000 – 6,780 hours of sunlight per year. The annual solar radiation varies depending on the region from 1,250 to 1,800 kWh/m<sup>2</sup>.

### Hydro – 15,000 MW

For hydropower, it is estimated that a total potential capacity of 15,000 MW exists, with a total production potential of 50 TWh per year. Out of this potential, approximately 22% is currently utilised in terms of capacity and 17% in terms of production.

### Geothermal – not defined

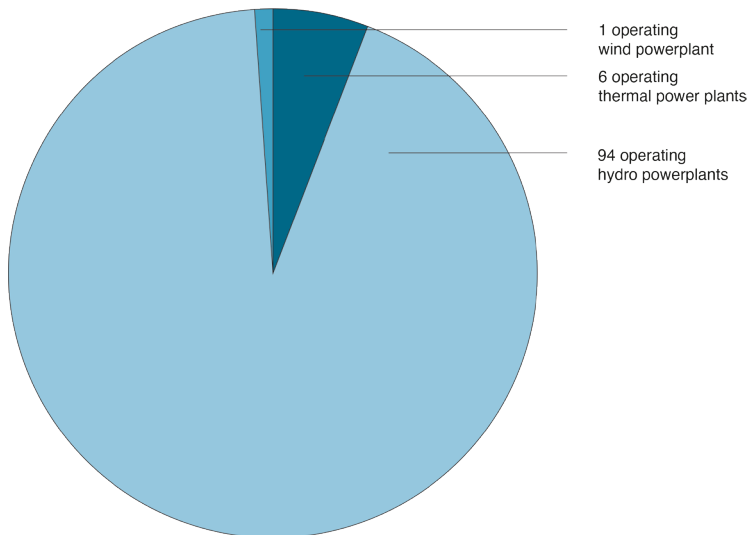
The recent hydro-geological studies claim that the Georgian geothermal water reserves reach 250 million m<sup>3</sup> per year. A total of 250 natural and artificially drilled geothermal sources are grouped into 44 geothermal fields, of which more than 80% are in western Georgia. Geothermal water varies in temperature from 30°C to 110°C.



The integration of renewable energy sources into the network remains a major challenge for wind and solar-based electricity generation. However, according to the estimates carried out by the European consultant consortium DlgSILENT-DMCC-R2B Georgia's electricity TSO, Georgian State Electrosystem (GSE), will be able to integrate approximately 665 MW of wind and 260 MW of solar by 2025 if certain assumptions, restrictions and requirements are met. By 2030 it is possible to integrate 1,332 MW of wind energy and 520 MW of solar (100% of Georgia's RE potential) (GSE, 2019)<sup>3</sup>.

## CURRENT RENEWABLE ENERGY SECTOR STATISTICS

There are 101 RE facilities in Georgia as of 2022<sup>4</sup>:



RE Facilities in Georgia.

The total installed capacity of those facilities constitutes 4,532.7 MW, including:

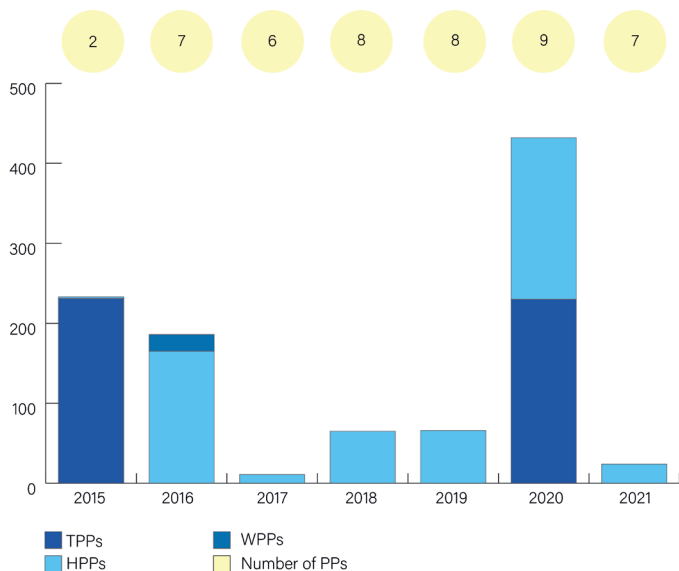
- Hydro Power Plants *installed capacity of 3,323 MW*
- Wind Power Plant *installed capacity of 20.7 MW*
- Thermal Power Plant *installed capacity of 1,189 MW*

1. [https://www.euneighbours.eu/sites/default/files/publications/2020-07/Georgia\\_2020\\_Energy\\_Policy\\_Review.pdf](https://www.euneighbours.eu/sites/default/files/publications/2020-07/Georgia_2020_Energy_Policy_Review.pdf)

2. <https://www.geostat.ge/en/modules/categories/719/energy-balance-of-georgia-2020>

3. [https://www.euneighbours.eu/sites/default/files/publications/2020-07/Georgia\\_2020\\_Energy\\_Policy\\_Review.pdf](https://www.euneighbours.eu/sites/default/files/publications/2020-07/Georgia_2020_Energy_Policy_Review.pdf)

4. The information/statistics was provided by the Georgian Energy Development Fund



Installed capacity additions by year of commissioning (MW).<sup>5</sup>

## RENEWABLE ENERGY DEVELOPMENT IN GEORGIA

On 12 December 2019 the Parliament of Georgia adopted the Law on “Promoting the Generation and Consumption of Energy from Renewable Sources” (hereinafter, the Law)<sup>6</sup> that creates a legal basis for encouraging, promoting and consuming energy generated from renewable sources. The Law also determines the mandatory national common target indicators of the total share of energy received from renewable sources in the total final consumption of energy.

The Law defines key concepts, national support schemes and national common target indicators for the share of energy received from renewable sources in the total final consumption of energy for 2030. Specifically, the national common target indicator for the share of energy received from renewable sources in the total final consumption of energy for 2030 defined under the Law is 35%.

In order to facilitate the use of energy received from renewable sources, the Government of Georgia has introduced a RE support scheme that is intended to reduce the cost of renewable energy production and increase the selling price of this energy. This scheme covers the investment aid, relief or decrease in tax, tax rebates, support schemes for obligations related to renewable energy, including schemes that use green certificates,

5. <https://api.galtandtaggart.com/sites/default/files/2022-02/report/electricity-market-watch-fy-2021-eng.pdf>

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

and direct price support schemes, which encompass a special green tariff and a premium tariff<sup>7</sup>.

Currently, the most widely used support scheme in Georgia is the premium tariff. Resolution No. 403 of the Government of Georgia on the “Approval Support Scheme for Production and Utilization/Consumption of Energy from Renewable Energy Sources (Hydro Power Plant)”, adopted on 2 July 2020, defines the support scheme for the construction and operation of a hydropower plant with an installed capacity of 5 MW and above by private investors. The support scheme covers two components: support period and premium tariff.

- The period of support is set for a period of ten years, spanning over eight months each year and starting after the hydropower plant enters operation and the production/generation licence is issued. The eight months cover: January, February, March, April, September, October, November and December.
- The premium tariff is 0.015 USD/kWh<sup>8</sup>. The premium tariff is payable as a supplement/addition to the wholesale price recorded at the relevant hour in the organised electricity market, only if the wholesale price for 1 kWh of electricity generated by the hydropower plant and sold in the organised electricity market during the support period is lower than 0.055 USD/kWh.<sup>9</sup>

Based on the specifics and importance of the power plant, the Government of Georgia may decide to develop specific conditions that might be different from the ones envisaged under the support scheme.

## INVESTING IN RENEWABLE ENERGY IN GEORGIA

“The Government Programme 2021-2024 Towards Building a European State”<sup>10</sup> (December 2020) reaffirms Georgia’s commitment to boost RES investments in the country through the construction of systemically important hydropower plants and the development of renewable energy sources. Therefore, to enable investments for the construction and operation of RE power plants, the Government encourages investors to use the Public Private Partnership (PPP)<sup>11</sup> agreement framework or to conclude a memorandum/agreement with the Government of Georgia (GoG) under Resolution No. 515 of the Georgian Government on “Rules and Conditions for Submitting to the Ministry of Economy and Sustainable Development and Reviewing the Proposals on Conducting Construction Feasibility Study,

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

8. It equals to 0.01431 EUR using the European Commission official rate: Exchange rate (InforEuro) | European Commission (europa.eu)

9. <https://matsne.gov.ge/ka/document/view/4914589?publication=0>

10. [https://www.gov.ge/files/41\\_78149\\_280277\\_GP.pdf](https://www.gov.ge/files/41_78149_280277_GP.pdf)

11. [https://vre.ge/dcf.com.ge/cdn/library/matsne-4193442-0%20PPP%20Law\\_ENG.pdf](https://vre.ge/dcf.com.ge/cdn/library/matsne-4193442-0%20PPP%20Law_ENG.pdf)

Construction, Ownership, and Operation of those Power Plants which are not Public-Private Partnership Projects<sup>12</sup>, adopted on 31 October 2018. The PPP framework facilitates the provision of public services and/or public infrastructure serving the public interest. It could also support the improvement of existing public infrastructure and public services. A PPP allows to attract private financing and the efficiency of public finances through sharing of risks between the public and private sectors, as well as benefitting from the know-how of a private partner.

In order to benefit from the PPP framework, the project shall meet the following criteria:

- Duration *no less than five years.*
- Value *the minimum value of the project shall be defined by the legal act of Georgia's Government. For instance, until 1 July 2020 the minimum value was set at GEL 5,000,000.*
- Public service or infrastructure *the provision of a public service or the establishment and maintenance and/or operation of public infrastructure by a private partner.*
- Risk allocation *risks shall be shared between public and private partners.*
- Financing *full or partial financing of a Public Private Partnership project.*

## **PPP PHASES FROM PROJECT IDENTIFICATION TO IMPLEMENTATION AND FOLLOW-UP**

The implementation of Public Private Partnership projects in the renewable energy sector involves the following phases:

Phase 1: Project Identification and Initiation

Phase 2: Project Preparation and Approval of PPP

Phase 3: Partner Selection and Conclusion of Agreement

Phase 4: Project Implementation and Operation

## **PHASE I IDENTIFICATION AND INITIATION OF THE PROJECT**

The potential Public Private Partnership projects can be identified by either the Ministry of Economy and Sustainable Development of Georgia and/or the Public Private Partnership Agency or by private developers.

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12. <https://matsne.gov.ge/ka/document/view/4356735?publication=0>

Therefore, there are two types of PPP proposals: solicited and unsolicited. The Ministry of Economy and Regional Development and/or the Public Private Partnership Agency can identify a potential renewable energy project in case of solicited proposals, whereas in the case of unsolicited proposals the private initiator may draft and submit to the relevant state authority the initiative to implement a project. The unsolicited project can only be carried out in the energy sector (a private developer has the right to prepare and submit to the Ministry of Economy and Sustainable Development an initiative proposal about a concession in the energy sector). In both cases a pre-feasibility study shall be prepared.

The potential projects shall fall within the realm of public interests and shall be compliant with:

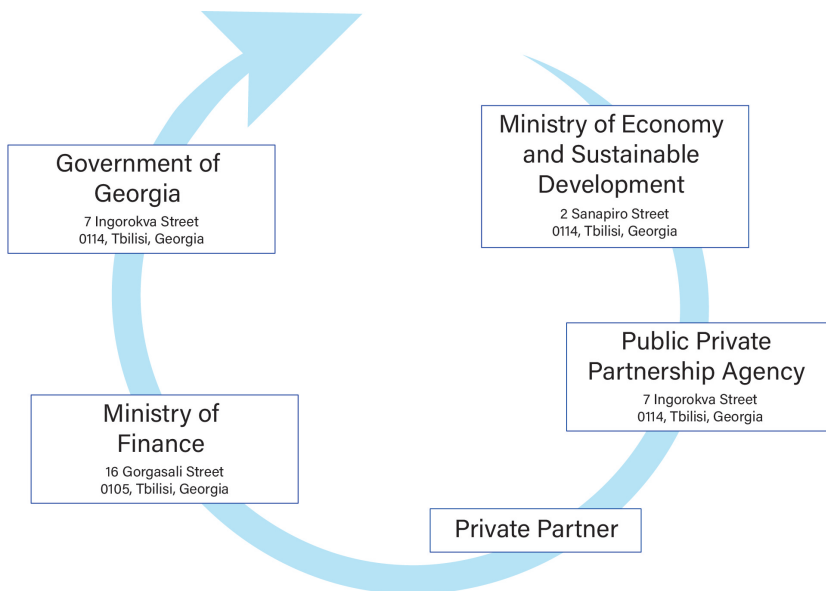
- State Development Plan/Strategy/Action Plan.
- Municipal Development Plan/Strategy/Action Plan.
- Directions provided in the Development Plans/Strategies/Action Plans of Adjara/Abkhazia Autonomous Republics.
- Requirements identified by the authorised body in the corresponding sector and/or in the priority sector defined by the Government of Georgia in compliance with public interests.

Pre-feasibility Study	Preparation of pre-feasibility study on a potential project by the Ministry of Economy and Sustainable Development and/or the Public Private Partnership Agency.
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Project Concept Note (PCN)	Preparation of a PCN by the Ministry of Economy and Sustainable Development, addressing project goals, costs, type of PPP (concessional or non-concessional), project financial and fiscal risks.
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Assessment of PCN	<ul style="list-style-type: none"> <li>– Submission of the PCN for assessment to the Ministry of Finance and the Public Private Partnership Agency.</li> <li>– Issuance of conclusions by the Ministry of Finance and development of recommendations by the Public Private Partnership Agency within one month.</li> </ul>
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Decision of GoG on PCN	Submission of the PCN to the Government of Georgia, which assesses the project in terms of its strategic or public importance, potential economic impact and availability of public finances. The Government will also make a decision regarding project's approval, refusal or further revision.
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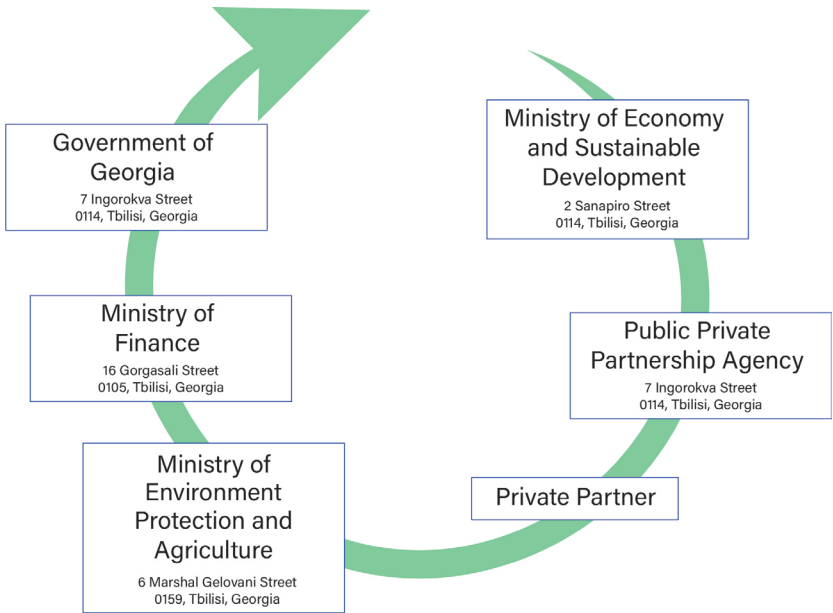
*Parties involved in phase I.*

## PHASE II PREPARATION AND APPROVAL OF A PUBLIC PRIVATE PARTNERSHIP PROJECT

Once the Government of Georgia approves the Project Concept Note, either the private developer or the Ministry of Economy and Sustainable Development will start the preparation of a feasibility study, which includes financial, technical, and economic analysis. For energy sector projects of more than 100 MW installed capacity the feasibility study shall be prepared by an independent party.

Launch of Feasibility Study	Preparation of the feasibility study, focusing on availability of financial resources, socio-economic impact, fiscal risks, cost-efficiency analysis, environmental impact assessment (if the energy project has an impact on the environment) and project profitability.
Expediency of PPP Framework	— If the Ministry of Economy and Sustainable Development of Georgia considers the project implementation expedient, it will decide on the procurement method and provide the expediency assessment of the Public Private Partnership.

- Submission of the decision of the Ministry of Economy and Sustainable Development of Georgia on expediency of PPP framework to PPP Agency for preliminary assessment.
- Assessment of Feasibility Study**
- Submission of feasibility study with accompanying documents to the Ministry of Finance of Georgia for review and assessment by the Ministry of Economy and Sustainable Development.
  - Conclusion of the Ministry of Finance on feasibility study and expediency of PPP framework within 45 days, which assesses the project in terms of arising direct and indirect fiscal obligations.
- Conclusion of GoG on Feasibility Study**
- Submission of the feasibility study with accompanying documents and the conclusion of the Ministry of Finance to the Government of Georgia.
  - Approval, refusal or revision of the project by the Government of Georgia.
  - Decision is taken by the Government of Georgia within 120 days.



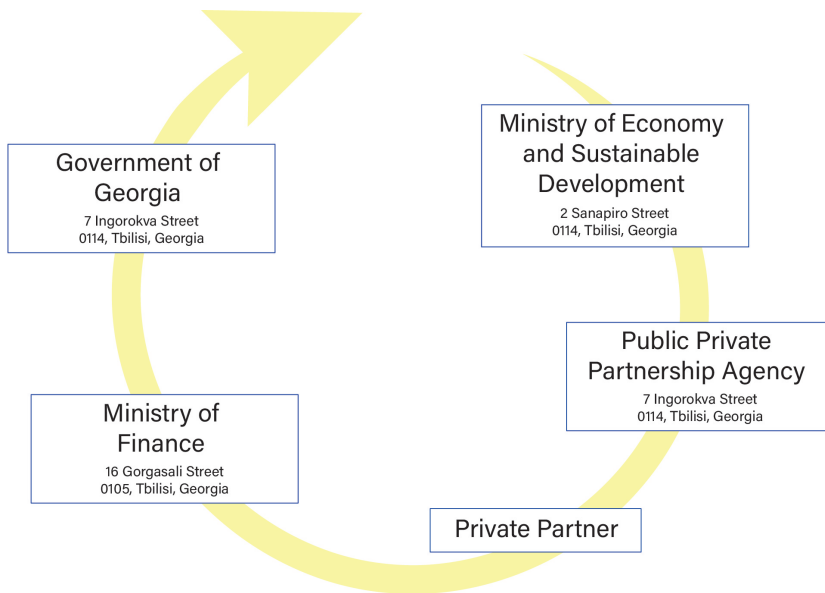
*Parties involved in phase II.*

### PHASE III SELECTION OF PRIVATE PARTNER AND CONCLUSION OF AN AGREEMENT

Direct negotiation in the energy sector is only possible in the case of unsolicited proposals. Generally, the private partner selection process starts with the establishment of a Selection Commission, which sets the qualification criteria for private partners to join the PPP.

Invitation to Submit Proposals	Sending an invitation to all private partner candidates, who successfully pass the qualification stage, to submit proposals.
Proposal Selection Process	<ul style="list-style-type: none"><li>– Assessment of proposals from financial, technical and legal perspectives.</li><li>– Preparations of a detailed assessment with comprehensive justifications by the Selection Commission.</li><li>– Selection of short listed candidates or selection of the winner by the Selection Commission.</li></ul>
Negotiation of Contract Conditions	Negotiation of agreement terms between the short listed candidates or winners and the Ministry of Economy and Sustainable Development.
Opinion of Ministry of Finance	Submission of the negotiated agreement together with the Commission's assessment report to the Ministry of Finance of final review and check.
Decision of Government	Submission of negotiated agreement together with the Ministry of Finance's opinion to the Government of Georgia, which either approves or returns the agreement to the Ministry of Economy and Sustainable Development of Georgia for further revision.
Agreement Signing	Once the Government of Georgia approves the agreement, the private partner and the Ministry of Economy and Sustainable Development of Georgia sign the PPP agreement.





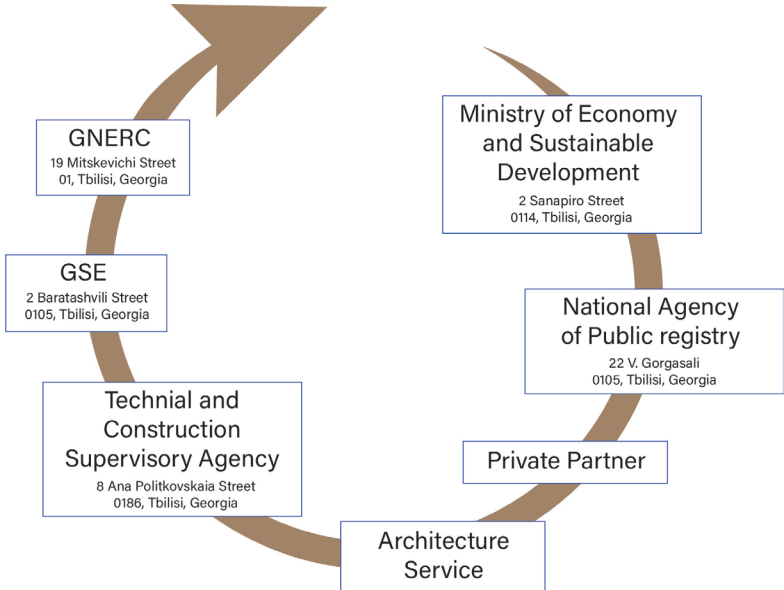
*Parties involved in phase III.*

## **PHASE IV PROJECT IMPLEMENTATION AND OPERATION**

In order to start the construction of the plant, the private partner should prepare a detailed project design and acquire the right to use the land, as well as apply for construction permit.

Land Clearance	Acquiring the right to use the land by the private partner, which encompasses privatisation of agricultural land if it belongs to the State, paying compensation for damage if the land quality is deteriorated due to its use for non-agricultural purposes, and the change of land category in case of necessity.
Construction Permit	Applying for plant construction permit and submitting all necessary documents to the relevant self-governing bodies (Architecture unit/service or Technical and Construction Supervision Agency).
Grid Connection	Applying for a power transmission grid connection to the transmission and dispatch licensee, the Georgian State Electrosystem (GSE), and signing a grid connection agreement with the GSE.

Generation License	Submission of a written application to the Georgian National Energy and Water Supply Commission (GNERC) for acquiring the generation license.
Operation	Following successful completion of the testing period and receiving approval from the GSE, the private developer has the right to commence commercial operations.



*Parties involved in phase IV.*

**UNSOLICITED PROPOSALS THAT DO NOT QUALIFY FOR THE PUBLIC PRIVATE PARTNERSHIP FRAMEWORK AND THEIR INITIATION AND IMPLEMENTATION PHASES**

Unsolicited proposals initiated by a private developer, which do not meet the criteria to be qualified for a Public Private Partnership, are subject to the following processes and procedures:

Initiation	Identification and submission of a project to the Ministry of Economy and Sustainable Development of Georgia together with the technical-economic pre- feasibility study.
Launch of Review Process	<ul style="list-style-type: none"><li>– Review of the submitted proposal and accompanying documents by the Ministry of Economy and Sustainable Development of Georgia within one month.</li><li>– Review period could be prolonged up to three months.</li></ul>
Completion of Review Process	Submission of proposal to the Government of Georgia for final review and decision.
Signing Agreement	If the proposal is considered reasonable and compliant with the Georgian legislation, the Government of Georgia signs the agreement with the private developer within three months.
Bank Guarantee	Submission of pre-construction and construction bank guarantees by private developer.



When Balance is Achieved

**The content of the chapter has been developed with the kind contribution of the Georgian National Energy and Water Supply Regulatory Commission and the Georgian Energy Development Fund.**

# REPUBLIC OF MOLDOVA



## OVERVIEW OF THE MOLDOVAN ENERGY SECTOR

### Institutional Support

The Ministry of Infrastructure and Regional Development is the central public authority that oversees the energy, construction and transport sectors.

The National Agency for Energy Regulation (ANRE) is the institution responsible for regulating the energy sector.

The Agency for Energy Efficiency (AEE) is the institution responsible for implementing energy efficiency and renewable energy policies as well as identifying, evaluating and financing energy efficiency and renewable energy projects.

### Legal Framework

- Law on the Accession of the Republic of Moldova to the Treaty establishing the Energy Community, *No.117 of 23.12.2009*
- Energy Strategy by 2030, Government Decision, *No. 102 of 05.02.2013*
- Law on Energy Efficiency, *No.139 of 19.07.2018*
- Law on the Promotion of the Use of Energy from Renewable Sources, *No.10 of 26.02.2016*
- Law on Approving Eco-Design Requirements for Energy-Related Products, *No. 151 of 17.07.2014*
- Law on the Energy Performance of Buildings, *No. 128 of 11.07.2014.*
- Law on Thermal Energy and Promotion of Cogeneration, *No. 92 of 9.05.2014*
- Law on the Labelling of Energy-Related Products, *No. 44 of 27.03.2014*
- Low-Emission Development Strategy (LEDS-2030)

## MAIN OPERATORS OF THE ENERGY MARKET

### Moldelectrica

The electricity transmission system operator (TSO) is the state enterprise Moldelectrica, founded in 2000. The main duties of Moldelectrica are electric power transmission, centralised management of the electric power system, operation of electric power transmission networks and interconnections with the electric power systems of other countries, and provision of electricity transmission services to system users, including electricity transit.

The electric power system of the Republic of Moldova is interconnected and operates in synchronous mode with the electric power system of Ukraine through seven interconnections of 330 kV and 11 interconnections

of 110 kV. The lowest electricity transmission capacity of these interconnections is 600 MVA.

In addition, the electric power system of the Republic of Moldova has five interconnections with the electric power system of Romania, which can be operated in "island mode" through four interconnections of 110 kV and an interconnection of 400 kV. The electricity transmission capacity of these interconnections is 310 MVA.

## THE LENGTH OF THE TRANSMISSION POWER LINES OF TSO MOLDELECTRICA

Voltage	Length, km
35 kV	787.3
110 kV	3,336.9
330 kV	3,773.3
400 kV	203

## ENERGOCOM

Energocom was appointed by the Government of the Republic of Moldova as the central electricity supplier, starting from April 2018. According to the Law, Energocom purchases all electricity from eligible producers, including renewable energy sources and cogeneration plants, and resells the respective electricity to suppliers at regulated prices, approved by the National Agency for Energy Regulation.

At the moment, the regulated price (excluding VAT) for electricity supplied by the central electricity supplier Energocom is 16.0 Euro cent/kWh.

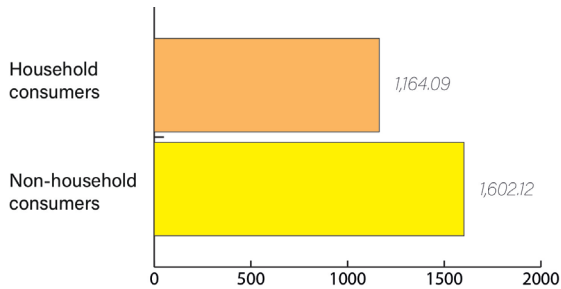
## ELECTRICITY PURCHASED AND SUPPLIED BY THE CENTRAL SUPPLIER IN 2020

Source of electricity	Quantity, million kWh
Termoelectrica, source 1	20,028
Termoelectrica, source 2	604,243
CET Nord	101,435
Hydro	0,153
Solar	2,245
Wind	20,424
Biogas	27,719

## PREMIER ENERGY DISTRIBUTION

Premier Energy Distribution carries out the activity of electricity distribution and covers 70% of the territory of the Republic of Moldova, especially the central and southern areas, including Chişinău Municipality.

The tariffs for delivering electricity distribution services by Premier Energy Distribution are approved by the National Agency for Energy Regulation in accordance with the methodology for calculating, approving and applying tariffs for electricity distribution services.



*Electricity distributed to consumers, Million, kWh.*

## THE LENGTH OF PREMIER ENERGY DISTRIBUTION TRANSMISSION LINES

Voltage	Length, km
Transmission lines 110 kV	510.1
Transmission lines 35 kV	1,292.6
Transmission lines 6-10 kV	14,474.5
Transmission lines 0.4 kV	19,065.6

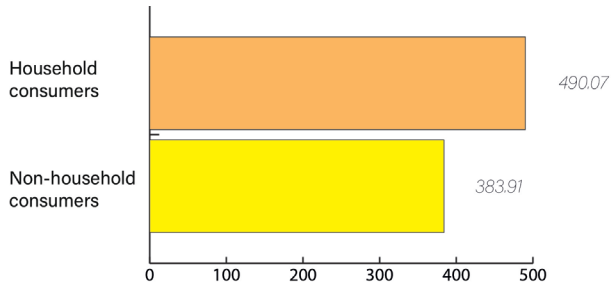
## REȚELE ELECTRICE DE DISTRIBUȚIE NORD (RED-NORD)

Rețelele Electrice de Distribuție Nord (REDNord) carries out the activity of electricity distribution on 30% of the territory of the Republic of Moldova, especially the northern areas, including Bălți Municipality.

The electricity distribution licence of REDNord is valid until 04.06.2023.

The tariffs for delivering electricity distribution services by RED-Nord are approved by the National Agency for Energy Regulation in accordance with Decision no. 322 of 16.08.2019.



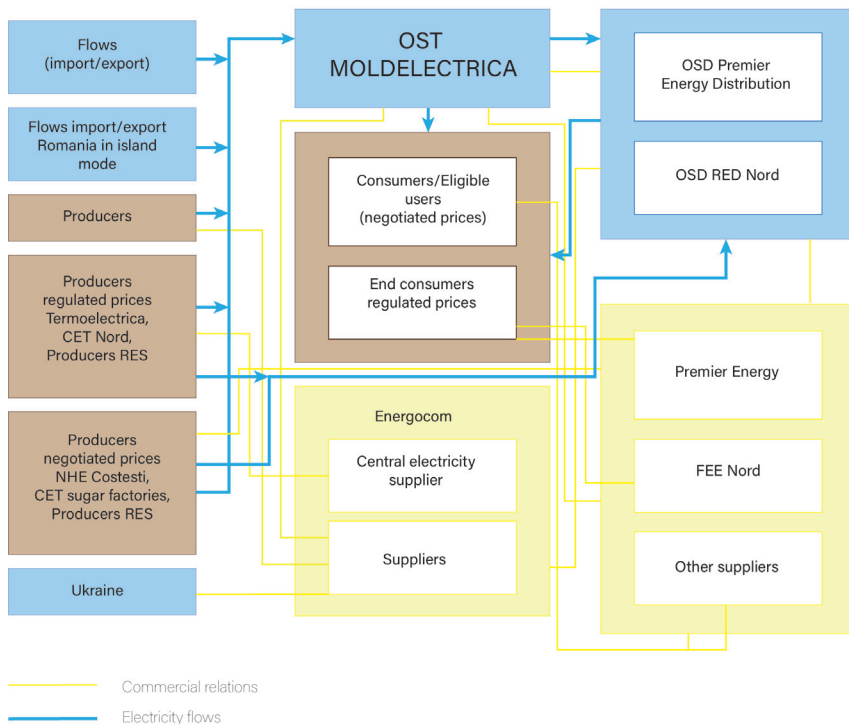


Electricity distributed to consumers, Million, kWh.

## THE LENGTH OF RED-NORD TRANSMISSION LINES

Voltage	Length, km
Transmission lines 6-10 kV	7,822.5
Transmission lines 0.4 kV	14,425

## ENERGY MARKET MODEL



## OVERVIEW OF THE RENEWABLE ENERGY SOURCES (RES)

The Republic of Moldova takes an active part in the global and regional energy and climate agenda. Moldova signed the Paris Agreement in 2016 and is among the leaders of the Eastern Partnership and Energy Community Treaty countries in terms of transposing EU *acquis* in the energy sector.

The National Energy Strategy and Low Emissions Development Strategy have been approved. Currently, the National Energy and Climate Plan is being drafted, setting the targets for 2030.

Primary energy supply figures for 2019 reveal that petroleum products and natural gas account for most of the total primary energy supply, with 34.7% and 29.1% respectively. In the same year, biofuels and wastes (including firewood and agricultural residues) accounted for 22.1% of the primary energy sources, being the only significant local primary source of energy.

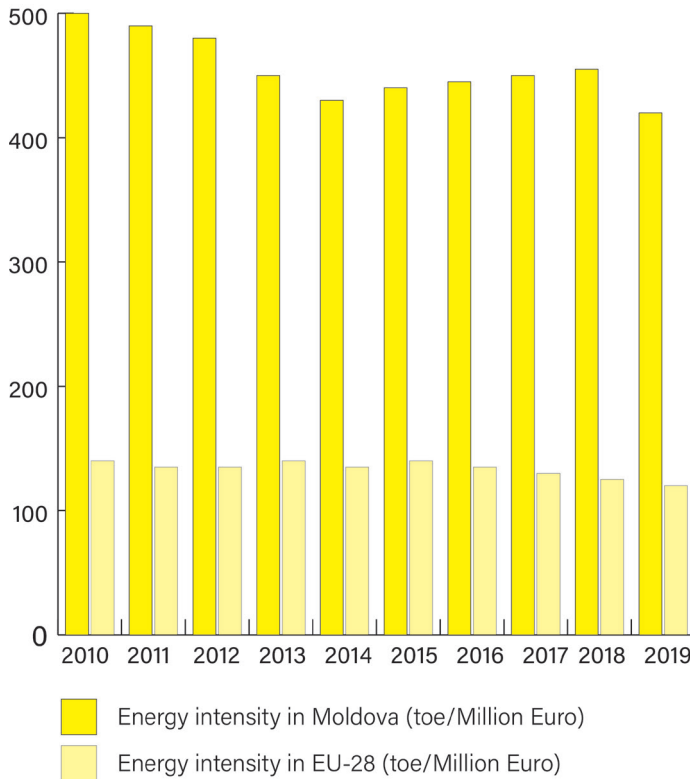
Around 10.6% of energy is supplied directly as electricity (mainly from the Transnistrian region), while coal accounted for only 3.5% of primary energy sources supplied. In 2019, Moldova's economy continued to consume approximately 3.5 times more energy per GDP than EU average.

Wind energy has the greatest technical potential, estimated at approximately 77.3% of the total available RES potential, followed by solar energy, estimated at approximately 9.3%. Biomass constitutes about 8.3% of the total available RES potential, out of which solid biomass and biogas account for 7% and 1.2% respectively, whereas hydro potential is approximately 5.2%.

The technical potential of renewable energy sources for power generation in the Republic of Moldova is estimated at 65,029 GWh, equivalent to 5,591 ktoe. In 2019, 26.8% of the energy consumed in the Republic of Moldova was green, this amount being almost totally oriented towards household heating and cooling, while renewable energy sources covered only slightly under 3% of the country's electricity consumption.

RES Type	MW	%	GWh	%
Solar PV	4,648	17.1	6,044	9.3
Wind	20,869.1	76.7	50,235.7	77.3
Hydro	840	3.1	3,361	5.2
<10	275	1.0	1,100	1.7
>10	565	2.1	2,261	3.5
<b>Biomass</b>	<b>850</b>	<b>3.1</b>	<b>5,388</b>	<b>8.3</b>
Biogas	134	0.5	805	1.2
Biofuel	716	2.6	4,583	7.0
<b>Total</b>	<b>27,207.1</b>	<b>100</b>	<b>65,028.7</b>	<b>100</b>

*Available technical RES potential.*



*The energy intensity in the Republic of Moldova.*

## TOP REASONS TO INVEST IN THE MOLDOVAN ENERGY SECTOR

The growth potential of the Moldovan electricity market is much higher compared to other countries in the region and across Europe, as the average electricity consumption per capita is currently over three times lower compared to the EU average.

At the same time, international private investors in the energy sector of the Republic of Moldova showed positive results over the years. It is a favourable moment to enter the Moldovan energy market due to the following:

- The separation process of the operators on the Moldovan electricity market has already been completed. The Government is focused on the construction of infrastructure that would ensure asynchronous interconnection between the electricity system of the Republic of Moldova and ENTSO-E. By 2024 Moldova will become a new connection between the IPS/UPS system and ENTSO-E.

- The privatisation process of state-owned companies in the energy sector is in progress. The state owns 100% of shares in the two companies that manage the central heating systems based on cogeneration, S.A. Termoelectrica (Chişinău) and S.A. CETNord (Bălţi), as well as 100% of shares in the Costeşti hydroelectric power plant. The state also owns 100% of S.A. RED-Nord, the second largest operator of the electricity distribution system.
- The next 5-10 years will be the most intensive since the independence proclamation of the Republic of Moldova from the perspective of implementing investment projects. The total volume of investments in electricity and thermal infrastructure is estimated at over 750 million EUR for the next 10 years.

## TOP REASONS TO INVEST IN THE MOLDOVAN RES

- Guaranteed Feed-in Tariffs (FiTs) for smaller projects and transparent competitive bidding procedure for bigger ones. FiTs are calculated based on weighted average cost of capital of 8.3%.
- Fiscal incentives for investments in generation of electricity from Renewable Energy.
- Electricity generated from RES by eligible suppliers is purchased obligatorily by Central Electricity Supplier, protecting investors against any commercial risks.

## FIXED PRICE

This is a support mechanism for investments in RE power plants over 1 MW (over 4 MW for wind power plants), based on an investment bidding procedure.

The tendering documentation is being developed. The Government plans to allocate 165 MW of RE electricity generation capacity through this mechanism, including 105 MW for wind power plants and 60 MW for solar-PV power plants.

1. Establishment of the timetable for tender's organization (by the government)
2. Elaboration of tendering documentation
3. Launching of the tendering procedure
4. Submission of the offers
5. Receipt of tenders
6. Offers opening and qualification
7. Offers evaluation (based on the lowest offered price criteria)

- |  |
|--|
| 8. Awarding of the eligible producer status  |
| 9. Signing of the contract for renewable electricity acquisition with the central electricity supplier |
| 10. Monitoring of the eligible producer's obligations fulfillment                                      |

*Steps of tender process for providing the status of eligible producers.*

## FEED-IN TARIFF

This is a support mechanism for investments in RE power plants with capacities ranging from 10 kW to 1 MW (4 MW for wind power plants). The mechanism also benefits from a simple application procedure for the eligible supplier status:

- grid connection permit for the required power capacity
- confirmation of land ownership or rent
- participation guarantee (less than 1% of investment)

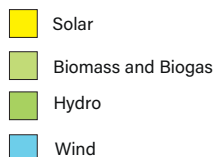
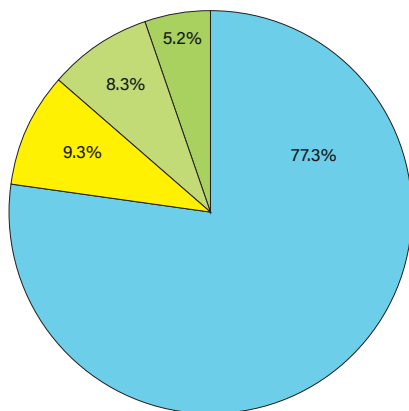
In order to benefit from the feed-in tariff over the next 15 years, the investor shall build and commission the power plant within 24 months, which could be extended by 12 months.

In 2020, over 35 MW have been allocated to 27 eligible suppliers, as follows:

Type of RES	Feed-in Tariff, EUR/MWh	Capacities used/ total allocated	Maximum capacity per project
Wind	73.8	20/20	4 MW
Solar-PV	89.5	15/15	1 MW
Biogas	87.6	0.6/12	1 MW
Biomass	93.0	0/5	1 MW
Hydro	41.7	0/3	1 MW

## NET-METERING

This support mechanism is designed to help consumers become prosumers by installing RES-based electricity generation of up to 200 kW, and not more than the capacity contracted with the distribution system operator, at their consumption location. In essence, it allows the prosumer to use the grid as an accumulator.



### Wind Energy

20.8 GW Potential capacity  
 50.2 TWh/yr potential generation  
 9,1 MW Technical potential at h=100 m.  
 Feed-in Tariff (<4 MW): 20 MW @ 73.8 EUR/MWh allocated to 6 eligible suppliers in 2020, and 25 MW more to be allocated.  
 Fixed price (>4 MW): 80 MW to be allocated.  
 Wind Energy Atlas  
 R&D projects  
 VAT=0% for:

- Switching electrical circuits equipment.
- Construction and installation works.

### Solar Energy

4,65 GW potential capacity  
 6 TWh / yr potential generation  
 Sunshine: 1950 h/yr (North) to 2210 h/yr (South)  
 Sunless days 69 - 86 days  
 Feed-in Tariff (<1 MW): 15 MW @ 89.5 EUR/MWh allocated to 20 eligible suppliers in 2020, and 75 MW more to be allocated  
 Fixed price (>1 MW): 70 MW to be allocated  
 VAT 0% for:

- Construction and installation works diodes, transistors, semiconductor photosensitive devices, including photovoltaic cells even assembled in module or mounted in panels, light emitting diodes.
- Piezoelectric crystals mounted.

### Biogas

134 MW potential capacity  
 805 GWh/yr potential generation  
 5.7 MW installed by 5 biogas producers generate over 1/3 of all renewable electricity in Moldova  
 Biogas is generated from animal (livestock) manure, agricultural residues, sugar industry residues (sugar beet) and solid municipal waste (landfill).  
 Feed-in Tariff (<1 MW): 0.6 MW @ 87.6 EUR/MWh allocated to 1 eligible supplier in 2020 and 100 MW more to be allocated  
 Fixed price (>1 MW): 100 MW to be allocated  
 Unexplored potential biogas sources: animal farms, food processing industry, water-treatment plants.

### Solid Biomass

716 MW potential capacity  
 4,583 GWh/yr potential generation  
 No solid biomass electricity generation installed yet.  
 Feed-in Tariff (<1 MW): 0 of 5 MW was allocated in 2020, despite FIT = 93.0 EUR/MWh and 30 MW are to be allocated for direct burning of solid biomass, plus additionally 15 MW for syngas installations  
 VAT rate reduced to 8% for solid biomass, including raw materials for producing solid biofuel:

- Agricultural and forestry products and vegetal residues.
- Vegetal residues from food industry.
- Wood residues.

## WIND ENERGY

According to the "Cost-competitive renewable power generation: Potential across South East Europe" report (IRENA, 2017), the maximum wind generation capacity of Moldova is estimated at 20.8 GW, with a potential electricity production of 50.2 TWh annually, which is 12 times more than the country's current electricity consumption. In addition, the online version of the Wind Energy Atlas estimates that the technical wind energy potential at 100 metres above ground is approximately 9,138 MW of installed capacity.

The Government intends to allocate 80 MW for the investment bidding procedure under the fixed price mechanism, which is applicable to projects over 4 MW. The regulation of the investment bidding procedure is currently being developed.

The National Energy Regulator approved feed-in tariffs for wind projects with installed capacity under 4 MW, based on the following parameters:

- Specific investment costs per kW installed capacity = 1,300 EUR/kW.
- Capacity factor = 30%, which is equivalent to an estimated annual average net output of electricity of 2,628 kWh/year/kW installed.
- Operation and maintenance costs for wind turbines = 39 EUR/year/kW installed.
- Weighted Average Cost of Capital = 8.28%.

The approved feed-in tariff was approximately 73.8 EUR/MWh and it is guaranteed to eligible suppliers for 15 years and protected against currency risk. Six companies were awarded the eligible supplier status on a "first come, first served" principle, accounting for 20 MW of installed capacity out of the total 20 MW capacity cap approved for the Feed-in Tariff mechanism in 2020.

The Government intends to allocate another 25 MW to investors under the same mechanism. Fiscal incentives include 0% VAT for replacing electrical circuits equipment and for construction and installation works for wind turbines.

More information about the Moldova Wind Atlas could be found on the webpage of Invest in Moldova Agency.<sup>1</sup>

## SOLAR PHOTOVOLTAIC (PV)

There are between 279 and 296 sunny days per year in the Republic

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1. For more information: [https://invest.gov.md/attached\\_files/2022/01/25//Renewable%20Energy%20Sector%202021%20small.pdf](https://invest.gov.md/attached_files/2022/01/25//Renewable%20Energy%20Sector%202021%20small.pdf)

of Moldova, providing a sunshine duration between 1950 h/yr (in the Northern part) and 2210 h/yr (in the Southern part). According to the “Cost-competitive renewable power generation: Potential across South East Europe” report (IRENA, 2017), the maximum solar photovoltaic capacity in Moldova is estimated at 4.65 GW, with a potential electricity production of 6 TWh annually, which is about 1.3 times more than the country’s current electricity consumption.

The Government intends to allocate 70 MW for the investment bidding procedure under the fixed price mechanism, which is applicable to photovoltaic projects over 1 MW. The regulation of the investment bidding procedure is currently being developed.

In 2020, the National Energy Regulator approved feed-in tariffs for photovoltaic projects with installed capacity under 1 MW, based on the following parameters:

- Specific investment costs per kW installed capacity = 853 EUR/kW.
- Capacity factor = 15%, which is equivalent to an estimated annual average net output of electricity of 1,314 kWh/year/kW installed.
- Operation and maintenance costs for solar PV panels = 16.4 EUR/year/kW installed.
- Weighted Average Cost of Capital = 8.28%.

The approved feed-in tariff was approximately 89.5 EUR/MWh and it is guaranteed to eligible suppliers for 15 years and protected against currency risk. A total of 20 companies were awarded the eligible supplier status on a “first come, first served” principle, accounting for 14.994 MW of installed capacity out of the total 15 MW capacity cap approved for the Feed-in Tariff mechanism in 2020.

## **BIOGAS**

Biogas is currently one of the biggest contributors to the production of electricity from RES. Even before the new Renewable Energy Law came into force in 2018, five biogas producers installed a total capacity of 5.7 MW based on biogas from animal (livestock) manure, agricultural residues, sugar industry residues (sugar beet) and solid municipal waste (landfill).

According to the “Cost-competitive renewable power generation: Potential across South East Europe” report (IRENA, 2017), there is a potential capacity of 134 MW for biogas power plants in Moldova, with a potential electricity production of 805 GWh annually, which is about 18.3% of the country’s current electricity consumption. Electricity volumes that can be generated are limited by the availability of raw materials for biogas pro-



duction, most of the unexplored potential biogas sources being animal farms, food processing industry and water-treatment plants.

The Government intends to allocate 100 MW for the investment bidding procedure under the fixed price mechanism, which is applicable to biogas cogeneration projects over 1 MW. Capacities will be allocated separately for projects based on different sources of biogas: animal (livestock) manure, landfill gas, and water treatment plants.

One company was awarded the eligible supplier status on a "first come, first served" principle, accounting for 637 kW of installed capacity out of the total 12 MW capacity cap approved for the Feed-in-Tariff mechanism in 2020.

## SOLID BIOMASS

Solid biomass has the biggest contribution to Moldova's energy balance as a renewable energy resource, accounting for about 22% of the primary energy sources in 2019. However, about 86% of it refers to firewood used for heating and cooking in rural areas, and none of it is converted to electricity.

According to the "Cost-competitive renewable power generation: Potential across South East Europe" report (IRENA, 2017), the potential capacity for power production from solid biomass in Moldova is 716 MW, with a potential electricity production of 4,583 GWh annually, which is slightly more than the country's current electricity consumption.

The main potential sources of biomass are agricultural residues and wastes, since forests only cover about 12% of the country's area and they need to be protected and expanded.

The Government intends to allocate 30 MW for the investment bidding procedure under the fixed price mechanism, which is applicable to solid biomass cogeneration projects over 1 MW, and another 15 MW for syngas cogeneration over 1 MW. The regulation of the investment bidding procedure is currently being developed.

The approved feed-in tariff was approximately 93 EUR/MWh and it is guaranteed to eligible suppliers for 15 years and protected against currency risk. However, none of the 5 MW allocated under the feed-in tariff mechanism have been attributed, since no applications have been received.

Despite this, the Government intends to allocate another 30 MW to investors

in solid biomass cogeneration projects under the same mechanism, plus 15 MW for syngas cogeneration projects under 1 MW.

Fiscal incentives include a reduced VAT rate (8% instead of 20%) for solid biomass, including raw materials for producing solid biofuel: agricultural and forestry products and vegetal residues, vegetal residues from food industry, wood residues.

More information about renewable energy projects and the production capabilities of renewable energy sources in the Republic of Moldova could be found on the webpage of the Invest in Moldova Agency.<sup>2</sup>

## KEY STAGES IN IMPLEMENTING RENEWABLE ENERGY PROJECTS IN THE REPUBLIC OF MOLDOVA

Given the relatively slow development of the renewable energy sector, multiple issues raised by investors regarding faults of the available support mechanisms, as well as the need to align the national regulatory framework to the provisions of *acquis-communautaire* in the field of energy, determined by the Association Agreement ratification, Law no. 10/2016 was adopted. The Law promotes the use of energy from renewable sources and transposes the provisions of the European Commission Directive no. 2009/28.

The Law enhances the application of support schemes, particularly by clarifying the power plant capacity thresholds for investment decisions, as well as the intentions of the support schemes (commercial or non-commercial).

For the development and implementation of investment projects in the field of renewable energy production it is necessary to take several steps, which are described in the following table.

	Key stages of development	Competent institution / Institutions involved	Notes
1.	Creation and establishment of the company	Public Services Agency; State Tax Service; Banking institutions	This stage involves: preparation of documents for registering the economic agent; obtaining the fiscal code; opening a bank account; registering with the State Fiscal Service.

2. For more information: [https://invest.gov.md/attached\\_files/2022/01/25//Renewable%20Energy%20Sector%202021%20small.pdf](https://invest.gov.md/attached_files/2022/01/25//Renewable%20Energy%20Sector%202021%20small.pdf)

2.	Registration of land ownership/lease rights	Public Services Agency; Local Public Administration Authorities	According to the regulations developed by the National Agency for Energy Regulation, or established by the Government in tenders, in order to obtain the status of eligible producer the applicant is required to provide confirmation of registering ownership rights for the land where the facility is to be built.
2.1	Changing the destination of land from agricultural to construction-related	Government of the Republic of Moldova; Local Public Administration Authorities; Institute for Spatial Design and Organisation; State Ecological Inspectorate; Public Services Agency	Considering the amendments brought to Land Code no. 828/1991, it is allowed to install photo-voltaic systems on agricultural lands, provided that easily demountable installations are used. For wind installations, it is allowed to change the destination of land regardless of the soil quality degree.
3.	Obtaining the urban planning certificate for designing the facility construction	Local Public Administration Authorities; Environmental agency; "Urbanproiect" or "Chisinauproiect" design institute	This is a regulatory act which provides the applicant (beneficiary) prescriptions and elements that characterise the legal, economic, technical and architectural-urban regime of a building / land, established by the urban planning and spatial planning documentation, and allows the elaboration of project documentation.
3.1	Obtaining approval for grid connection, along with technical conditions	Distribution System Operator; Transmission System Operator	This represents a written position issued by the system operator at the request of a private or legal person, indicating the technical-economic conditions for connecting the power plant to the electricity network, as well as the conditions of using the electrical network after switching on the power plant.

3.2	Topographic study	Authorised institutions	The topographic survey is elaborated by performing measurements on the land and it is part of the necessary documentation to obtain building permits, demolition or inclusion in urban plans.
3.3	Environmental opinion/ Environmental impact assessment	Environmental agency;	This is the administrative act issued by the competent authority for environmental protection, which confirms the assessment of environmental protection issues.
4.	Execution project	Authorised institutions;	The execution project is elaborated for both the electrical and the construction parts.
4.1	Project coordination and verification	Authorised verifiers; System operators; Authorised institutions	The verification and coordination of the project aims to ensure compliance with technical regulations.
5.	Building permit	Local Public Administration Authorities; Technical Supervision Agency; Environmental agency	This act authorises the execution of construction works on the basis of and in compliance with the urban planning certificate for design and the project documentation prepared, verified and approved.
6.	Obtaining the fixed price or the fixed tariff	Government of the Republic of Moldova; Energy Regulatory Agency	The decision between schemes with "fixed tariffs" and "fixed prices" is determined by the capacity of the power plant and by the capacity limits set through Government Decision no. 401/2021.
7.	Notification of the launch of construction works	Agency for Technical Supervision	
8.	Construction of the power plant	Economic agent/authorised company	
9.	Connection to the electricity transmission or distribution network	System operators	Following the verification of construction execution based on the connection notice and technical execution design, the power plant is connected to the transmission / distribution network.

10.	Testing and reception	National Agency for Energy Regulation	The reception of the power plant takes place by issuing the corresponding act.
11.	Signing the electricity supply contract	Central electricity supplier	
12.	Electricity supply contract comes into force and the operation phase starts	Central electricity supplier	

*Steps for the development of RE investment projects.*



**The content of the chapter has been developed with the kind contribution of the Invest Moldova Agency.**

# UKRAINE



## FACTS & FIGURES

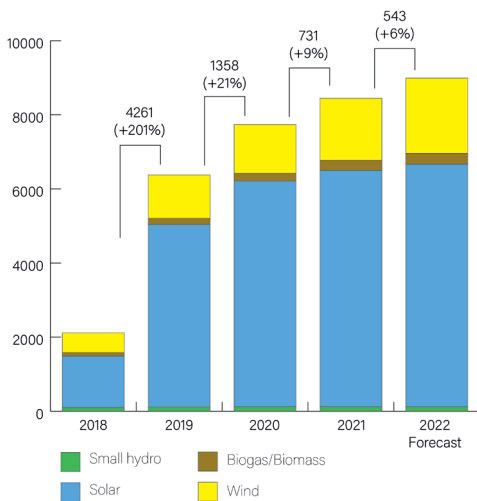
The Law of Ukraine "On Alternative Energy Sources"<sup>1</sup> promotes the production of electricity from renewable sources, in particular solar, wind, biomass, biogas, hydro (only for energy generated by micro, mini and small hydro-electric power plants) and geothermal energy.

- Ukraine has a significant potential of wind, solar, biogas and biomass resources.
- The major contributor to the renewables share is solar energy.
- According to the Annual Report 2021 of the National Energy and Utilities Regulatory Commission (NEURC)<sup>2</sup>, at the beginning of 2022 the share of renewable energy (RE) in the total energy balance accounted for 14.7%, including large hydro generation that exceeds 10 MW, or 8%, excluding large hydro generation. According to the "Energy Strategy of Ukraine until 2035", renewable energy is expected to account for 25% of Ukraine's energy needs by 2035. The renewable energy target of 11% share of total energy consumption was reached in 2020.
- As of 2022 there are more than 1000 RE facilities in Ukraine. In 2021, the total installed capacity of renewable power plants amounted to 11,435 MW, specifically:
  - solar 6,430 MW
  - wind 3,797 MW
  - biogas and biomass 941 MW
  - small hydro 267 MW

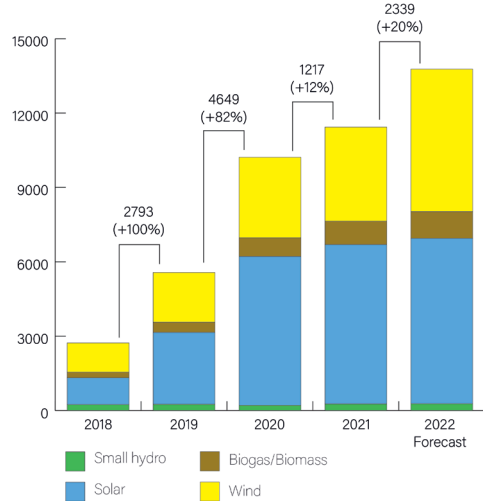
	Areas of RES uptake	Annual technically feasible energy potential (Mtoe)
1.	Wind energy	28.0
2.	Solar energy including:	6.0
2.1	— Electricity	2.0
2.2	— Heat	4.0
3.	Small hydropower	3.0
4.	Bioenergy including:	31.0
4.1	— Electricity	10.3
4.2	— Heat	20.7
5.	Geothermal heat energy	12.0
6.	Ambient energy (heat pumps)	18.0
	Total volume of replacement of traditional fuel and energy resources.	98.0

*Technically feasible potential of energy production from renewable energy sources and alternative fuels.*





Electric output, mln MWh.



Total installed capacity MW.

## RENEWABLE ENERGY DEVELOPMENT IN UKRAINE

The main state support mechanism for RE facilities has been in place since 2009.

### Feed-In Tariff System

The feed-in tariff (known as the Green Tariff in Ukraine) was introduced on 1 April 2009 as a preferential price for electricity produced from RE sources, and will continue to be paid until 1 January 2030. It is set by the Ukrainian regulator (NEURC) separately for each power plant. The size of the Green Tariff varies depending on the RE source type (technology), installed capacity (this applies for solar, wind and hydro power plants), and commissioning date. It also has a fixed minimum rate, calculated in EUR at the UAH-EUR exchange rate as of 1 January 2009.

In accordance with the latest legislative amendments (Law No. 810<sup>3</sup>), the follow apply:

- Feed-in tariff rates have been reduced since 1 August 2020 for solar and wind power plants.
- Green Tariffs may be set for new facilities such as:
  - Wind power plants with turbine capacity below 5 MW and with no more than two wind turbines (must be commissioned by the end of 2022).

1. <https://zakon.rada.gov.ua/laws/show/555-15#Text>

2. [https://www.nerc.gov.ua/storage/app/sites/1/Docs/Byuleten\\_do\\_richnogo\\_zvitu/byuleten\\_do\\_richnogo\\_zvitu\\_nkrek-p-2021.pdf?fbclid=IwARIZyF3PbO5y4mBv8p-DscdujH8LuCR7xnnFmDdX0vZ5H2m70vSpH0xg](https://www.nerc.gov.ua/storage/app/sites/1/Docs/Byuleten_do_richnogo_zvitu/byuleten_do_richnogo_zvitu_nkrek-p-2021.pdf?fbclid=IwARIZyF3PbO5y4mBv8p-DscdujH8LuCR7xnnFmDdX0vZ5H2m70vSpH0xg)

3. <https://zakon.rada.gov.ua/laws/show/810-20#n13>

- Solar power plants with installed capacity below 1 MW.
- Biogas power plants commissioned before 31 December of 2023, irrespective of their capacity.
- Others, irrespective of their capacity.
- Balancing responsibilities are applicable for RE facilities with installed capacity exceeding 1 MW. These responsibilities apply if deviation between actual and forecasted generation will exceed 5% for solar power plants or 10% for wind power plants.
- Payment of compensation to RE facilities for curtailment commands issued by the Transmission System Operator (TSO – NEC Ukrenergo) is ensured (Resolution of NEURC No. 2818 from 30.12.2020).
- New quota auction support system for renewables has been implemented.

### Quota Auction Support System

All RE projects are eligible for the quota auction support system. The Law No. 810 envisages mandatory participation in auctions for projects with an installed capacity of wind power over 5 MW and solar power over 1 MW. Other RE facilities may participate in auctions on a voluntary basis.

The State will provide a 20-year support starting from the date of commissioning the RE facility, through the guaranteed offtake of electricity established by the quota and at the tariff determined by auction. The Ukrainian Government improved the green auction procedure by adopting the Resolution of Cabinet of Ministers of Ukraine (CMU) No. 889 from 02.08.2022<sup>4</sup>. The CMU would approve and establish support quotas for one year after commissioning the facility and provide indicative forecasts of support quotas for the next four years. Support quotas must be allocated separately for solar and wind power plants, and together for all other technologies. The size of the quota for each technology should not be below 10%.

Auctions were planned to start from 1 July 2019 and continue until 31 December 2029. Auctions for allocating annual quotas are expected to be held in accordance with the auction schedule for the relevant year. However, the pilot auction has not been conducted by the Government yet.

In order to participate in the auction, applicants must secure land rights, grid connection and provide a bid bond. The bank guarantee amount to participate in the auction shall be 5 EUR per 1 kW of capacity. An additional bank guarantee shall be 15 EUR per 1 kW of capacity, in relation to which the auction winner guarantees to the offtaker (Guaranteed buyer) the performance of obligations under the power purchase agreement (PPA).

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4. <https://zakon.rada.gov.ua/laws/show/889-2022-%D0%BF#n53>

The auction price ceiling is set at the rate of feed-in tariffs for each RE technology. There are caps for auction bid prices as follows:

- For wind and solar power plants participating in feed-in auctions held by 31 December 2024 – not more than 9 Euro cents/kWh.
- For wind and solar power plants participating in feed-in auctions held from 1 January 2025 – not more than 8 Euro cents/kWh.
- For other types of renewable energy sources – not more than 12 Euro cents/kWh.

The auction winner is any bidder who puts forward the lowest price offer. The auction price shall be converted by the Guaranteed buyer into EUR as of the auction date, at the official exchange rate of the National Bank of Ukraine (NBU) on the given date.

Construction and commissioning of the RE facility should be completed by the auction winner within two years (for solar power plants) or three years (for other RE facilities) from signing the PPA concluded with the Guaranteed buyer and based on the auction results. If commissioning and connection of the power plant to the grid is not completed within the specified timeframe, the PPA shall be deemed invalid and obligations under the irrevocable bank guarantee shall be performed in favour of the Guaranteed buyer. However, the timescale of commissioning the power plant may be extended by up to one year, subject to providing an additional irrevocable bank guarantee in the amount of 30 EUR/kW.

### Additional Incentives

RE facilities may receive a premium of 5% or 10% on top of the Green Tariff or the auction price for using equipment of Ukrainian origin. The equipment must be certified by the Ukrainian Chamber of Commerce and Industry.

The State also guarantees mandatory offtake of all electricity produced from RE sources that receive support both through the feed-in tariff and the auction price, giving renewables priority in dispatch and settlement.

## GREEN RECOVERY

Despite the backdrop of the full-scale Russian war against Ukraine since 24 February 2022, the electricity grids of Ukraine have been successfully synchronised with the Continental European Grid since 16 March 2022<sup>5</sup>.

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5. [https://ec.europa.eu/commission/presscorner/detail/en/statement\\_22\\_1789](https://ec.europa.eu/commission/presscorner/detail/en/statement_22_1789)

The European Council granted Ukraine the status of candidate for accession to the EU in July 2022<sup>6</sup>. These important events have opened new opportunities in Ukraine, particularly for the energy sector. Ukraine's recovery and modernisation plans will be aligned with two main EU principles: Green Transition and Digital Transformation. Ukraine has the capacity to export more than 2 GW through its power infrastructure. However, this involves the prospects of increased use of RE.

According to the Draft Ukraine Recovery Plan<sup>7</sup>, presented at the Ukraine Recovery Conference in Lugano (URC 2022), new RE installed capacities may amount to 10 GW depending on export capability. New RE facilities, particularly solar and wind power plants and hydrogen plants, would be built within 2026-2032. The new low-carbon energy strategy also includes increasing biomethane production (up to 2 billion m<sup>3</sup> per year) and implementing other RE projects until 2032.

To implement the Green Recovery Plan, the Ukrainian Government has taken the following steps:

- Preparing the pilot auction for new RE facilities. The auction system would be the main support mechanism for the development of industrial RE projects.
- Drafting the feed-in premium (FIP support) Law<sup>8</sup>. Under the FIP support, renewable energy producers will be able to freely sell electricity on the electricity markets at competitive prices, with the State topping up the difference between market prices and the feed-in tariff or the auction price.
- Implementing an electronic register for guarantees of origin for electricity, in order to have an opportunity to transfer guarantees of origin at international level.

Implementing these measures will contribute to the development of RES in Ukraine on a competitive basis and the fulfilment of the State's strategic goal and international obligation to decarbonise the economy.

## **PROJECT IMPLEMENTATION STAGES FOR THE CONSTRUCTION OF RE FACILITIES**

### **Preparation Stage**

- Investment Plan
  - Preparation of Business/Investment Plan

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6. <https://www.europarl.europa.eu/news/en/press-room/20220616IPR33216/grant-eu-candidate-status-to-ukraine-and-moldova-without-delay-meps-demand>

7. [https://uploadssl.webflow.com/62f188db25fb24758792dd8/62dacaafb804d22348c8d8c08\\_\\_Energy%20Security.pdf](https://uploadssl.webflow.com/62f188db25fb24758792dd8/62dacaafb804d22348c8d8c08__Energy%20Security.pdf)

8. [http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art\\_id=245570020&cat\\_id=167475](http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245570020&cat_id=167475)

- Registration
  - Submission of application to the State Registrar for registering as business entity
- Land Rights
  - Submission of application to the local authority for obtaining land rights.
- Technical Possibilities of Connection
  - Identifying technical feasibility with the TSO in parallel with obtaining land rights
  - Obtaining technical specifications for grid connection after securing land rights
- Project Documentation Design
  - Development of project design for facility construction
- Project Documentation Expertise
  - Commissioning an expert organisation to carry out assessment of construction and provide expert reports

### Choosing the Support System

- Green Auction System
  - Preparing for the auction, providing the bid bond (offer) and obtaining bank guarantees
  - Participating and winning the auction
  - Signing the PPA concluded with the Guaranteed buyer based on the auction results
- Green Tariff System

### Construction and Operation Launch

- Preparation for construction
  - Obtaining permission for construction works
- Facility operation approval
  - Commissioning of power plant
  - Registering with the Government's Statistical Authority

### Licensing and Joining the Market

- Licensing
  - Submission of application to the Regulator (NERC) for Generation Licence
  - Submission of application to the TSO for registering as an electricity market participant

- Coordination with TSO/DSO
  - Conclusion of contract on energy distribution
  - Conclusion of contract on energy transmission and dispatching
- Joining the balancing market

### Completion Stage

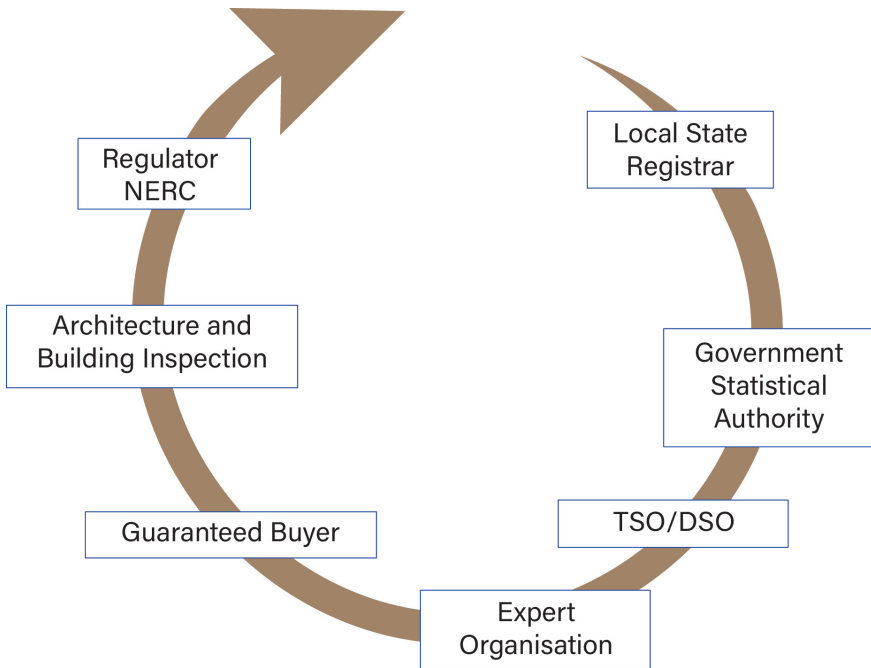
For projects implemented under the Green Auction System:

- Electricity output and selling

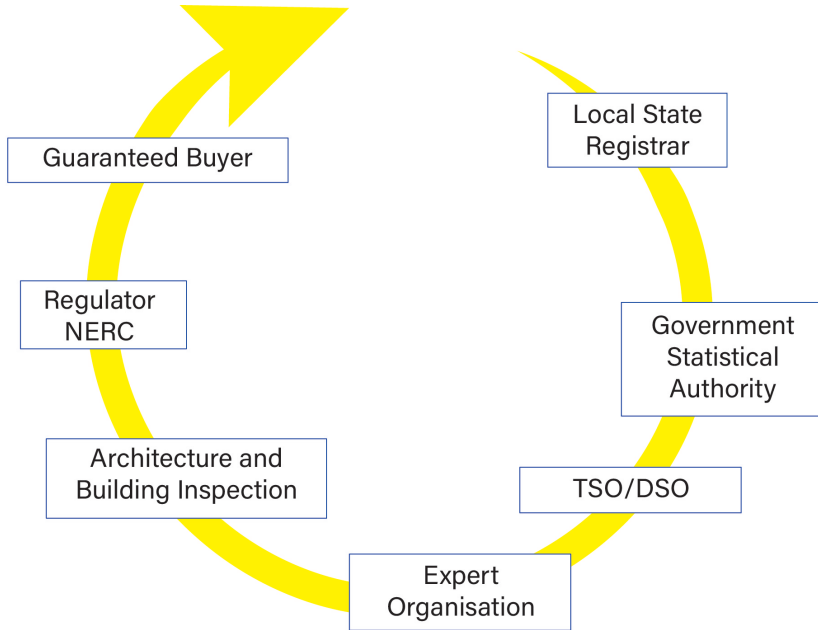
For projects implemented under the Green Tariff System:

- Applying to the Regulator (NERC) for a “green” tariff
- PPA conclusion with the Guaranteed Buyer
- Electricity output and selling

### **PARTIES INVOLVED FOR PROJECTS IMPLEMENTED UNDER THE GREEN AUCTION SYSTEM**



## PARTIES INVOLVED FOR PROJECTS IMPLEMENTED UNDER THE GREEN TARIFF SYSTEM





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