



RENEWABLE ENERGY SECTOR OVERVIEW

Republic of Moldova

Key facts



Name
Republic of Moldova

Employment
rate, 2020

38.8%



Capital:
Chisinau ca. 833,000

Inflation rate,
2020

3.8%



Population:
3.55 million
January 1st, 2021

GDP per capita
at PPP, 2020

\$13,001



Area:
33,847 km²

GDP current
prices, 2020,
billion

\$11.5



Language:
Romanian (official)
Other spoken languages:



Currency MDL:
1 EUR = 20.8 MDL
September, 2021

RES



65,029 GWh

5,591 ktoe technical
potential of RES

ca. **210** MW
Minimum

ca. **865** MW
Maximum

Load in the system

500 MW

Annual average load in
electricity system

€ **142**
EUR/month
Minimum salary
in 2021

⚡ **91.5** EUR/
MWh
End user at 0.4 kV

⚡ **51** EUR/
MWh
wholesale market

Average prices for electricity

☀️ **1950-
2210** hours/
year
Sunshine

Free Trade Agreements signed with 43 countries, including:

DCFTA (Deep and Comprehensive Free Trade Area with the European Union) - 500 million population;

FTA with CIS countries (Armenia, Azerbaijan, Tajikistan, Uzbekistan) - 250 million population;

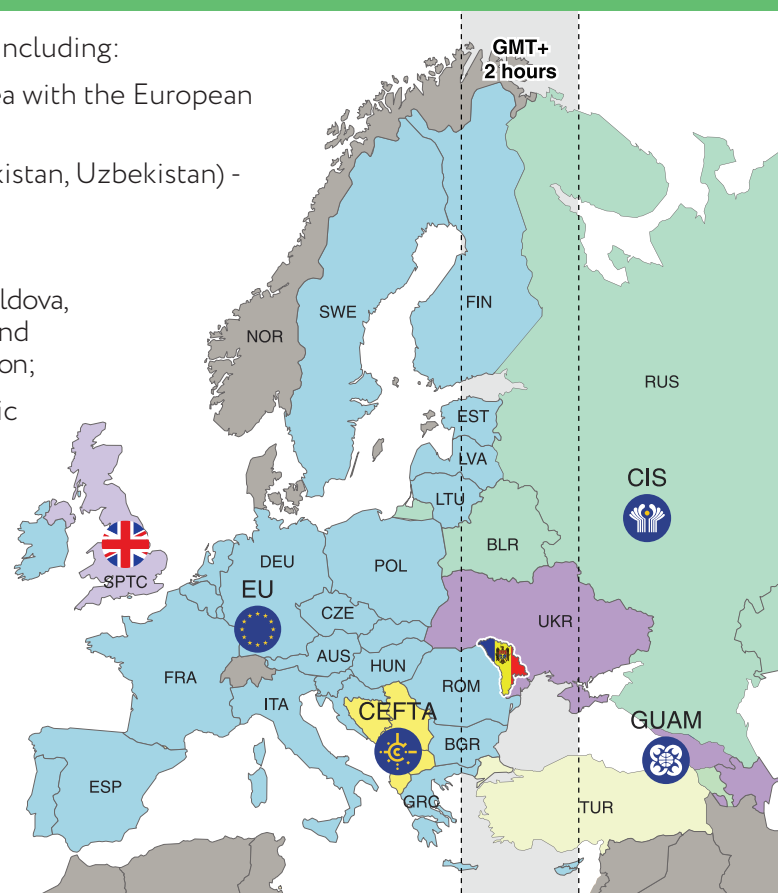
FTA with Turkey - 80 million population;

CEFTA Central European Free Trade Agreement (Moldova, Macedonia, Albania, Serbia, Montenegro, Bosnia and Herzegovina and UNMIK (Kosovo) - 30 million population;

GUAM Organization for Democracy and Economic Development (Georgia, Ukraine, Azerbaijan and Moldova) - 60 million population;

SPTC - Strategic Partnership, Trade and Cooperation Agreement between The United Kingdom of Great Britain and Northern Ireland and The Republic of Moldova.

880 million customers
Free Trade Area



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Overview of the Moldovan Energy Sector

The institutional support

The Ministry of Infrastructure and Regional Development is the central public authority in the Energy construction and transport sectors.

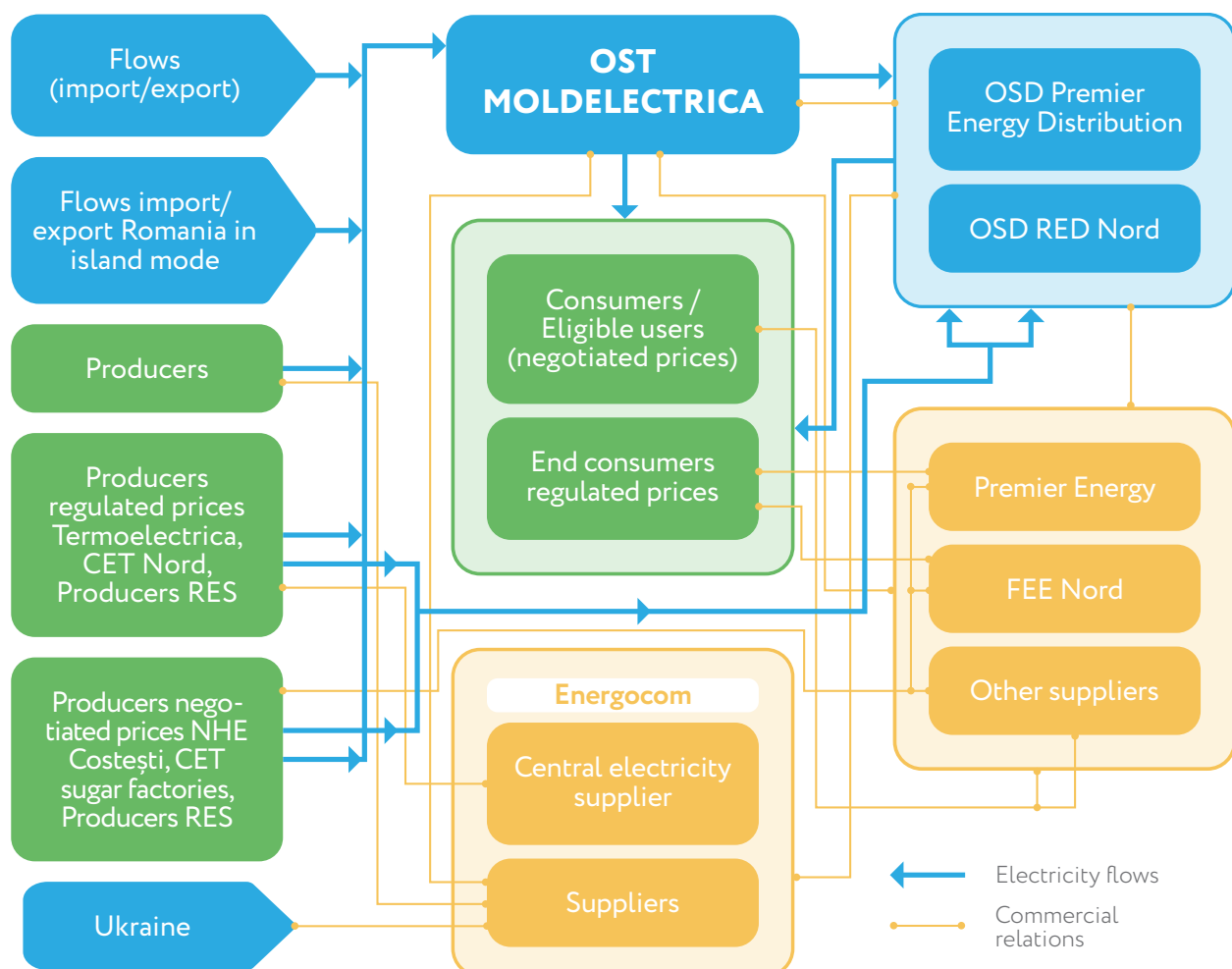
National Agency for Energy Regulation (ANRE) is the institution responsible for regulating the energy sector.

Agency for Energy Efficiency (AEE) is the institution responsible for the implementation of the energy efficiency and renewable energy policies as well as the identification, evaluation and financing of EE and RES 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 29.05.2014
- Law on the Labelling of Energy-Related Products, No. 44 of 27.03.2014
- Low-Emission Development Strategy (LEDS-2030)

Energy market model



Main operators

Moldelectrica

Electricity transmission system operator (TSO) is the State Enterprise “Moldelectrica”, founded in 2000.

The main duties of the “Moldelectrica” are the electric power transmission into transmission network, the centralized management of the electric power system, the operation of electric power transmission networks and interconnections with electric power systems of other countries, providing electricity transmission services for 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 7 interconnections of 330 kV and 11 interconnections of 110 kV. The lowest electricity transmission capacity of these interconnections is 600 MVA.

Also, the electric power system of the Republic of Moldova has 5 interconnections with the electric power system of Romania, which can be operated in “island mode” through 4 interconnections of 110 kV and an interconnection of 400 kV. The electricity transmission capacity of these interconnections is 310 MVA.

Energocom

Energocom was appointed by the Government of the Republic of Moldova as the central electricity supplier, starting with April 2018.

Based on the Law, the central electricity supplier purchases all electricity from eligible producers, from renewable energy sources and from 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 5.91 Euro cent / kWh).

The length of the transmission power lines of TSO Moldelectrica

Voltage	Lenght, km
35 kV	787.25
110 kV	3336.90
330 kV	377.34
400 kV	203

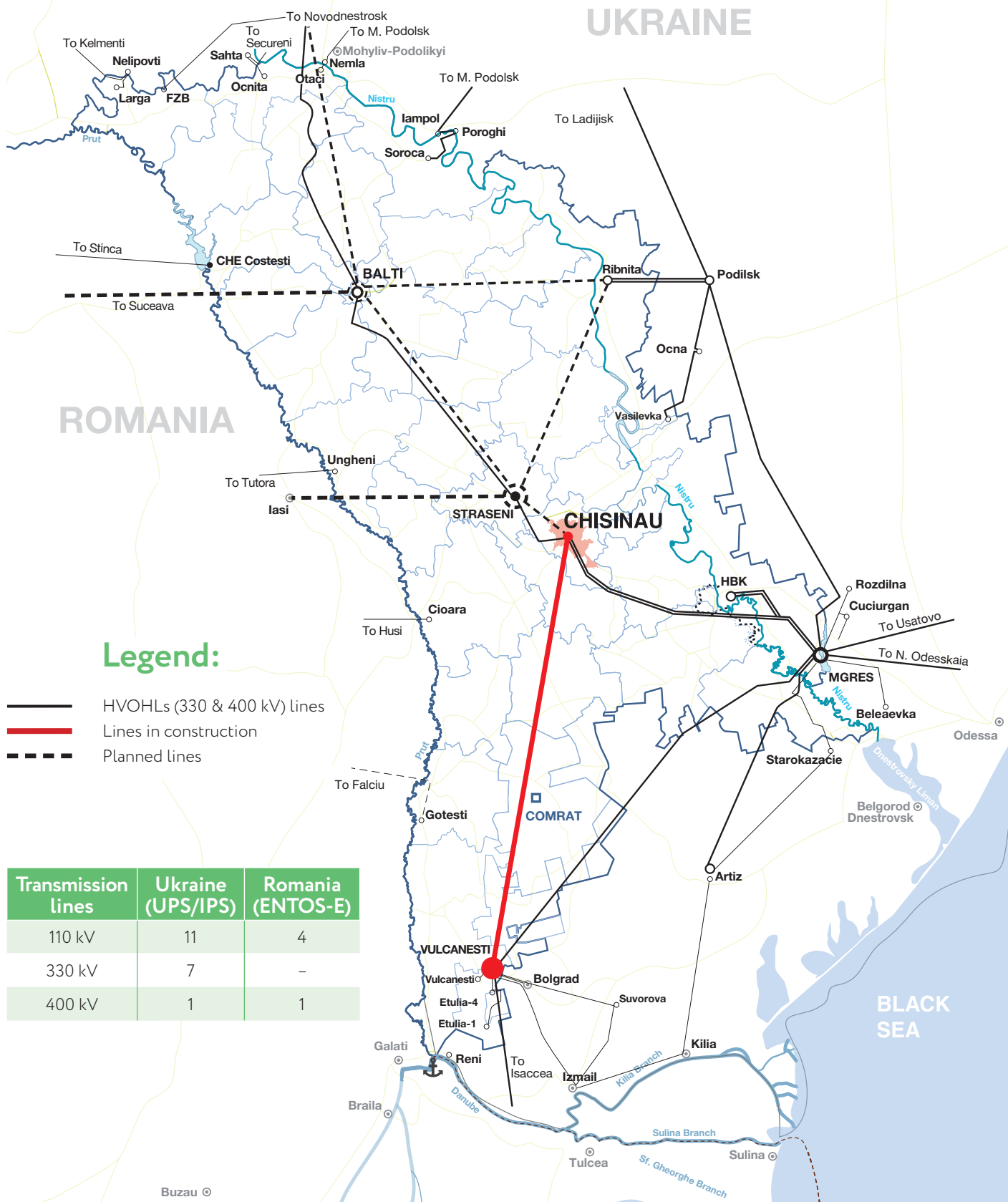
The amount of electricity entered in the electricity transmission network in 2020 amounted to 4.3 TWh

Source of electricity	Quantity, M. kWh
Moldovan Thermal Power Plant (MGRES)	3251.3
Termoelectrica	621
CET Nord	100.5
NHE Costesti	46.8
Renewable Energy Souces	65.8
Other domestic sources (sugar factories)	1.9
Import from PS of Ukraine	167.1

Electricity purchased and supplied by the central supplier in 2020:

Source of electricity	Quantity M. 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

Interconnection Map



Distribution System Operators

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 in the central and southern areas, including Chisinau Municipality.

The length of Premier Energy Distribution transmission lines

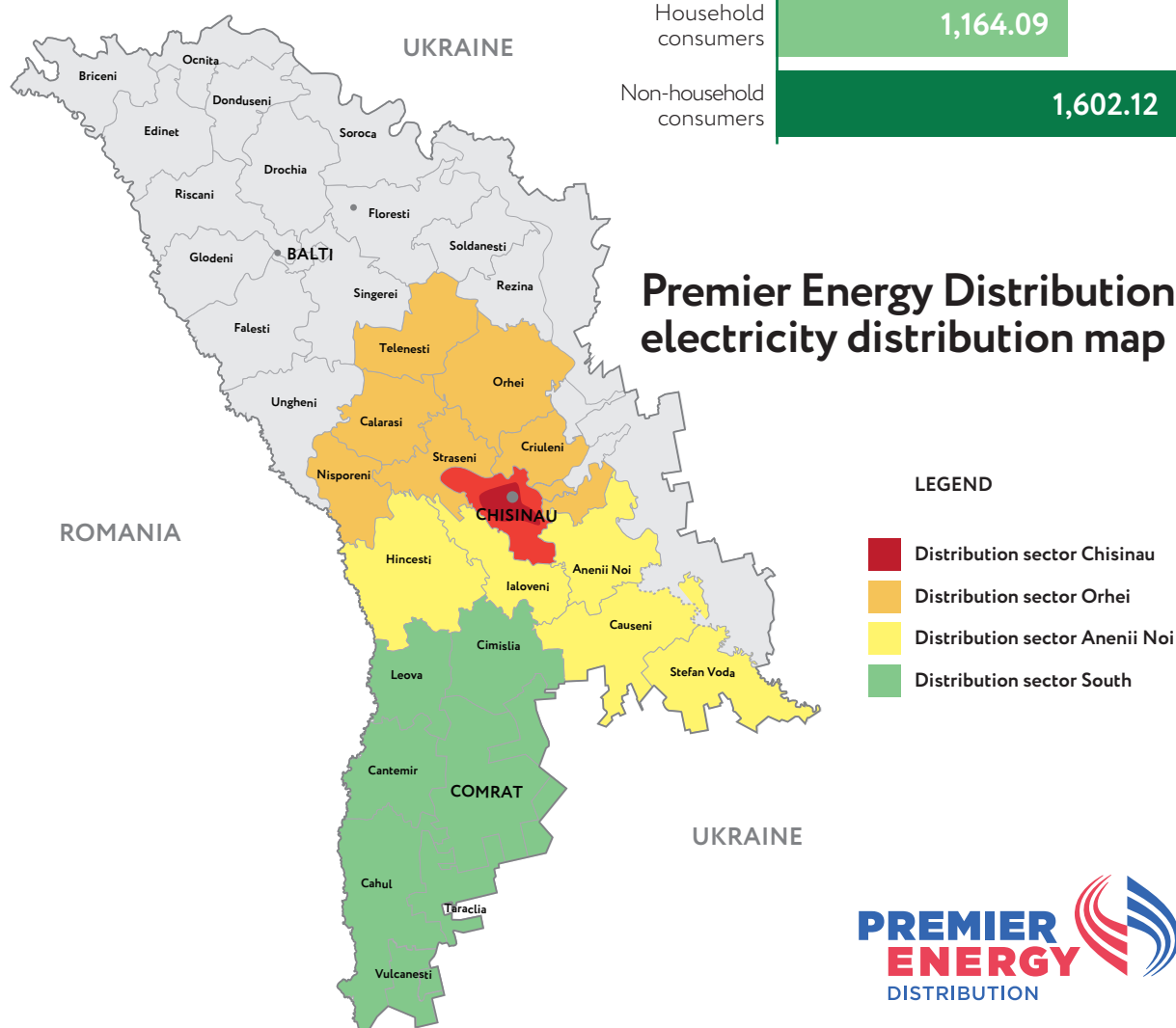
Transmission lines	Length, km
Transmission lines 110 kV	510.1
Transmission lines 35 kV	1,292.6
Transmission lines 6-10 kV	14,474.5
Transmission lines 0,4 kV	19,065.6

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

Categories of electrical distribution networks	Tariff, Euro cent/kWh
High voltage (35; 110 kV)	0.10
Medium voltage (6; 10 kV)	0.63
Low voltage (0,4 kV)	1.88

Electricity distributed to consumers, M. Kwh

Household consumers	1,164.09
Non-household consumers	1,602.12



Rețelele Electrice de Distribuție Nord (RED-Nord)

Rețelele Electrice de Distribuție Nord (RED-Nord) carries out the activity of electricity distribution on 30% of the territory of the Republic of Moldova, especially in the northern areas, including Balti Municipality. The electricity distribution license of RED-Nord is valid until 04.06.2023.

The tariffs for electricity distribution service for RED-Nord are approved by the National Agency for Energy Regulation. Decision no. 322 from 16.08.2019:

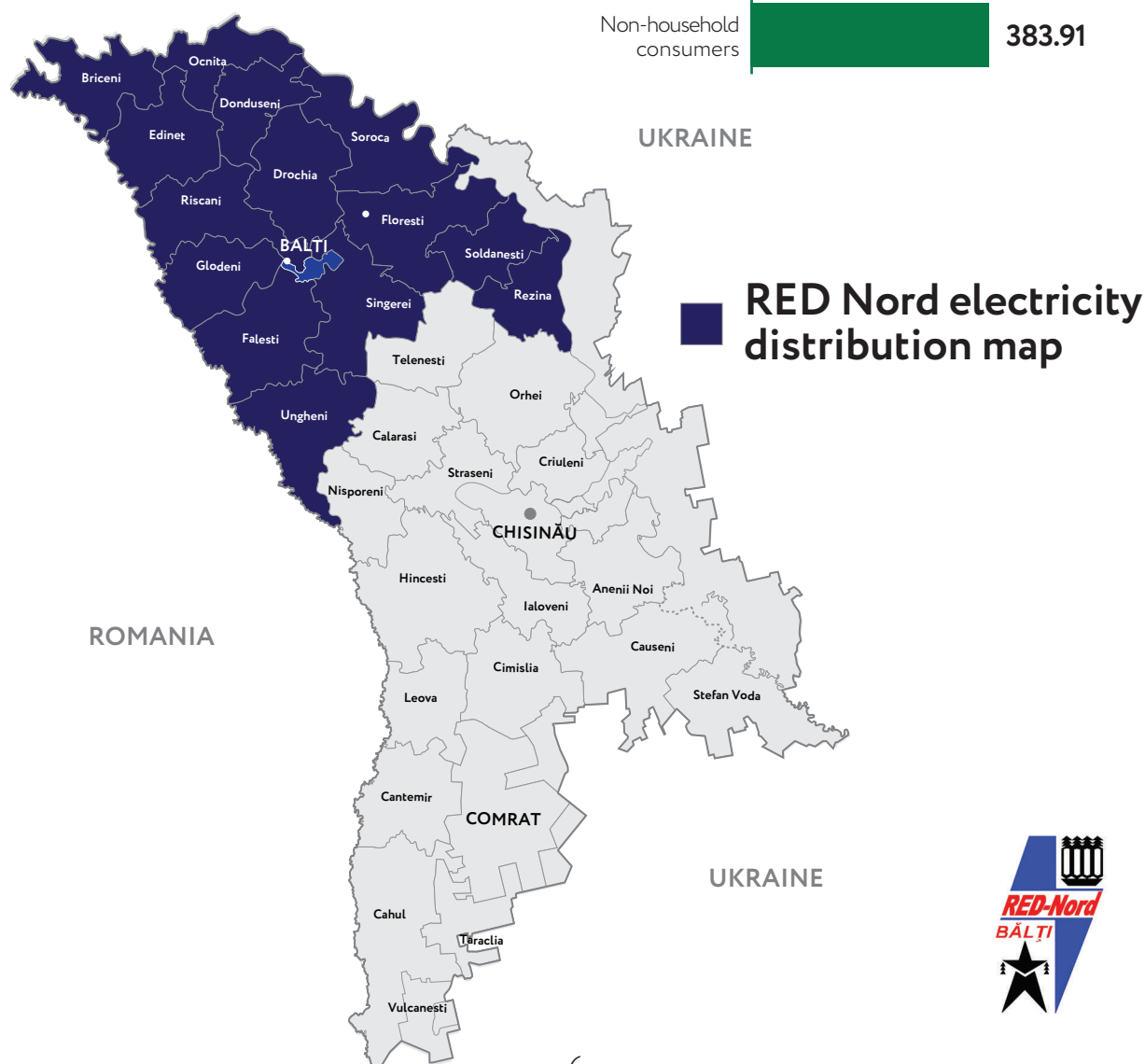
Categories of electrical distribution networks	Tariff, Euro cent/kWh
Medium voltage (6; 10 kV)	1.35
Low voltage (0,4 kV)	4.28

The length of RED-Nord transmission lines

Transmission lines	Length, km
Transmission lines 6-10 kV	7,822.5
Transmission lines 0,4 kV	14,425.7

Electricity distributed to consumers, M. Kwh

Household consumers	490.07
Non-household consumers	383.91



Thermal energy market

Termoelectrica

Termoelectrica is the main producer of electricity in cogeneration, distributor and supplier of thermal energy in Chisinau and is a joint stock company with 100% state owned, being managed by the Public Property Agency.

The company has an important system of thermal energy installations and experience in the thermal energy field, being specialized in the production and distribution of thermal energy through a centralized thermal energy supply system and the delivery of domestic hot water to consumers in Chisinau and its suburbs.

Termoelectrica has 2 main activities:

- electricity production (cogeneration)
- production, distribution and supply of thermal energy to consumers

Termoelectrica owns two combined heat and power plants (CHPs) of 240 MW (Source 1) and 66 MW (Source 2) respectively. Both CHPs use natural gas as fuel, and heavy oil can be used as a reserve fuel.

CET Nord

CET Nord is a producer of electricity in cogeneration, distributor and supplier of thermal energy in Balti Municipality and is a joint stock company with 100% state owned, being managed by the Public Property Agency.

CET Nord delivers thermal energy to about 100,000 inhabitants in Balti. Approximately 76% of the thermal energy is delivered to household consumers, ca. 18% to public institutions and ca. 6% to legal entities.

CET Nord produces heat and electricity in cogeneration through a combined heat and power plant of 24 MW and 142 Gcal/h and 4 combustion engines with a total power of 13.4 MW and 10.75 Gcal/h.

The CHP uses natural gas as fuel, and oil can be used as a reserve fuel.



Photo credit: Invest Moldova

All electricity produced by S.A. Termoelectrica at CHPs is purchased by Energocom as central electricity supplier.

Technical characteristics of the basic equipment of the district heating power plants:

	CET 2	CET 1
Nominal capacity of electricity generators	240 MW (3x80MW)	66 MW
Nominal thermal capacity	1200 Gcal/h	–
Installed thermal capacity	–	239 Gcal/h

Termoelectrica's heat distribution networks are of ca. 529 km with additional ca. 180 km of networks for distribution of domestic hot water (DHW). Thermal energy losses in the thermal networks of Termoelectrica constitute ca. 19%.

General characteristics:

- Installed electrical capacity - 37.4 MW
- Installed thermal capacity - 153 Gcal/h
- Operating mode - district heating
- Heating scheme – closed

Total length of thermal networks is 205.7 km

Thermal energy losses in thermal networks of CET Nord constitute ca. 21%.

Technical parameters:

Electricity generated	113.544 M. kWh
Electricity delivered	100.463 M. kWh
Thermal energy delivered	175,855 Gcal
Total Efficiency in cogeneration	77.59%

Energy balance, 2019

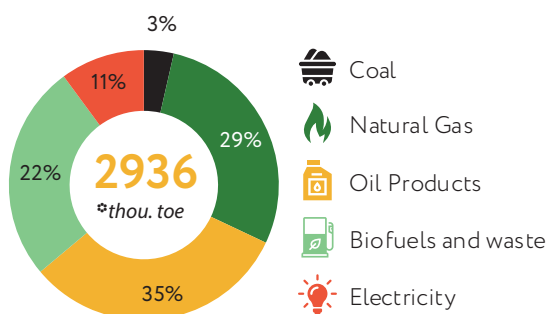
Thousands tonnes of oil equivalent

	Energy resources						
	Total	Coal	Natural gas	Oil products	Biofuels and waste	Electricity	Heat
Primary Production	668	-	0	5	653	10	-
From other sources	246	-	-	-	-	246	-
Imports	2,031	92	854	1,029	1	55	-
Exports	9	-	-	9	0	0	-
Stock changes	0	-10	-1	7	4	-	-
Gross consumption	2,936	102	855	1,018	650	311	-
Transformation, input	389	-	349	8	22	10	-
Production of electricity and heat	369	0	349	3	17	0	0
Transformation, output	315	-	-	4	0	81	230
Production of electricity and heat	311	-	0	0	-	81	230
Other energy sector consumption	19	-	0	0	-	18	1
Losses	104	-	30	3	-	37	34
Final energy consumption	2,672	102	476	953	619	327	195
Industry	234	23	64	37	0	62	48
Residential	1,274	62	293	58	608	144	109
Commerce and public services	48	1	8	0	1	37	1
Agriculture	123	1	3	112	1	6	0
Other Sectors	224	15	88	1	9	74	37
Non-energy use	67	-	-	58	9	-	-
Final consumption	2,739	102	476	1,011	628	327	195

Source: National Bureau of statistics

1

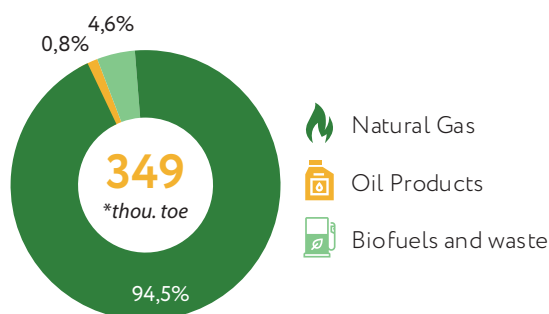
What energy resources do we use in the Republic of Moldova?



1/3 of total energy resources available in our country (**Gross inland consumption**) comes to **oil products**

2

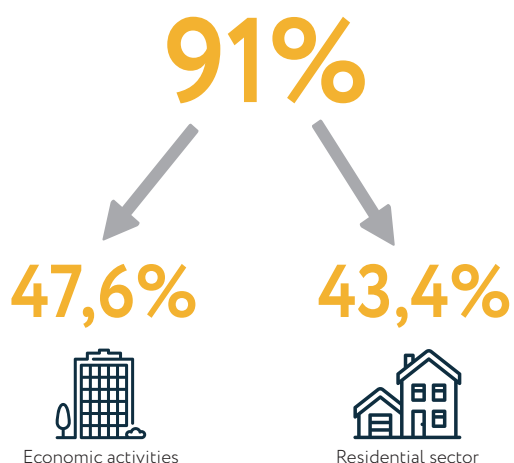
What energy resources are used for production of electricity and heat?



for the production of electricity and heat most often is used the **natural gas** **349** thou. toe

3

How much energy do the final consumers use?

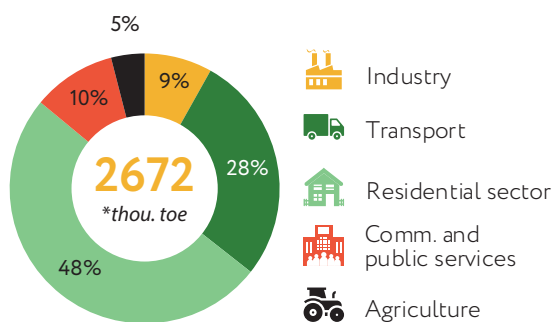


Out of the total energy resources available in our country, 93,3% are used directly for energy purposes, i.e. **Final energy consumption**

4

Who are the main final consumers of the energy?

Energy resources were used:



1/2 of the energy resources are consumed in the residential sector, i.e. **population**

* thou. toe – thousands tonnes of oil equivalent

Overview of the Renewable Energy Sources (RES)

The Republic of Moldova takes active part in the global and regional energy and climate agenda. Moldova signed the Paris Agreement in 2016 and is among leaders of 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 residuals) 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.

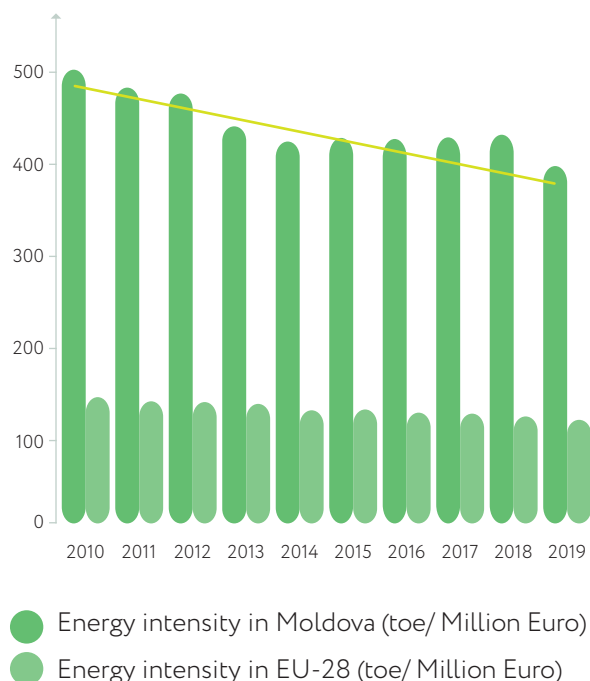
In 2019 Moldova's economy continued to consume approx. 3.5 times more energy per GDP than EU average.

Wind energy has the greatest technical potential at approximately 77.3%, followed by solar potential equal to approximately 9.3%; biomass constitutes about 8.3%, out of which, solid biomass constitutes 7% & and biogas potential is estimated at 1.2%, and hydro potential is about 5.2%.

The technical potential of RES for power generation in the Republic of Moldova is estimated to be 65,029 GWh, equivalent to 5,591 ktoe.

Already 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.

The energy intensity of the Republic of Moldova



Source: National Statistics Bureau, Eurostat

Available technical RES potential

RES Type	Technical Power			
	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
Biomass	850	3.1	5,388	8.3
Biogas	134	0.5	805	1.2
Biofuel	716	2.6	4,583	7.0
Total	27,207.1	100	65,028.7	100

Source: International Renewable Energy Agency, IRENA

Top reasons to invest in Moldovan Energy Sector

The growth potential of the Moldovan electricity market is much higher compared to the countries in the region and from all over Europe, as currently the average electricity consumption per capita is over 3 times lower as 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.

Now is the right time to enter the energy market of the Republic of Moldova, from several points of view:

- In the Republic of Moldova is already completed the separation process of the operators on the electricity market. 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 the Moldova will become a new connection between the IPS / UPS system and ENTSO-E.
- Privatization process of the state-owned companies in the energy sector is in progress. The state owns 100% of the shares in both companies that manage central heating systems based on cogeneration S.A. Termoelectrica (Chisinau) și S.A. CET-Nord (Balti) and hydroelectric power plant Costesti. The state also owns 100% of the S.A. RED-Nord, the second largest operator of the electricity distribution system,
- the next 5-10 years will be the most intensive

from the perspective of the implementation of investment projects, since the proclamation of the independence of the Republic of Moldova. The total volume of investments in electricity and thermal infrastructure is estimated at over 750 million Euros for the next 10 years.

Instant opportunities for investors:

- Participation in tenders for the construction of electrical infrastructure.
- Participation in tenders for the reconstruction of generation groups 2 and 3 at Source no.1 of "Termoelectrica".
- Production and distribution of the electricity from renewable sources, taking advantage of the "net metering" mechanism, which allows consumers to become "prosumers" by installing generation capacity and partially or completely substituting the energy consumed from the network with the energy produced at the consumption place. Given the price of energy to final consumers up to 9.61 and 11.33 Euro cent/kWh (depending on the distribution area), investors can provide technical solutions and financing, which will make these investments attractive to consumers in the Republic of Moldova. Moreover, the end user prices will continue to grow in the mid-term, following the global trend of rising energy prices.
- Energy audit services, bundled with the implementation and financing of energy efficiency measures, especially for big companies.

Top reasons to invest in 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.

¹ All prices have been recalculated from MDL to Euro based on the average exchange rate for September 2021 of 20.8 MDL/EURO

Fixed Price

Support mechanism for investment in RE power plants over 1 MW (over 4 MW for wind), based on an investment bidding procedure. The tendering documentation is being developed. Government plans to allocate 150 MW of RE electricity generation capacities through this mechanism, including 80 MW for wind and 70 MW for solar-PV.

Steps of tender process for providing the status of eligible producers

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

Feed-in tariff

Support mechanism for investment in RE power plants from 10 kW till 1 MW (in case of wind 4 MW). Simple application procedure for eligible supplier status:

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

In order to benefit from feed-in tariff for 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, €/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

Source: Governmental Decision 689 of 11.07.2018

Net-Metering

This support mechanism is designed to help consumers become prosumers by installing RES-based electricity generation at its consumption place, up to 200 kW, but not more

than the capacity contracted from distribution system operator. In essence, it allows the prosumer to use the grid as accumulator.

Additional support to investors



Availability of the Solar Energy Atlas/Wind Energy Efficiency Atlas/Estimates of the Energetic Potential of Solid Biomass



Availability of 17 Energy Efficiency (EE) and RES studies and guides



Availability of a Single Database in EE and RES



Implementation of RES projects following the Energy Services Companies (ESCO) and PPP concepts



The Agency for Energy Efficiency Exercises the functions of Investors' Information Center in RES



Available tax and customs exemptions

Key Data about RES



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 €/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)

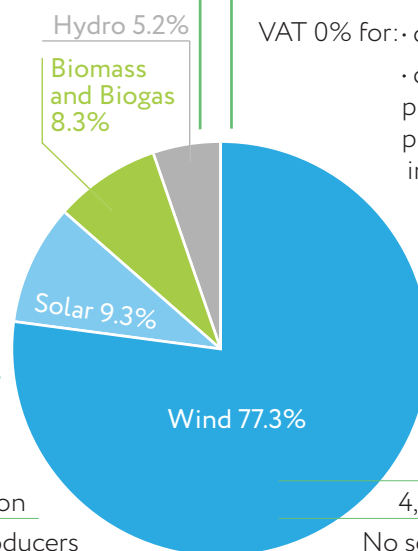
Sunless days 69 - 86 days

Feed-in Tariff (<1 MW): 15 MW @ 89.5 €/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 €/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 €/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





Photo credit: Esco-Voltaj

Wind Energy

According to the Report “Cost-competitive renewable power generation: Potential across South East Europe”, IRENA, 2017, the maximum wind generation capacity in Moldova is estimated at 20.8 GW, able to produce 50.2 TWh annually, which is 12 times more than the current country’s electricity consumption. Another source, the online version of the Wind Energy Atlas mentioned above, estimates the technical wind energy potential for the height of 100 meters above ground at approximately 9,138 MW in installed capacity.

The Government intends to allocate 80 MW for investment bidding procedure under Fixed price mechanism applicable to projects over 4 MW. The regulation on the investment bidding procedure is under development.

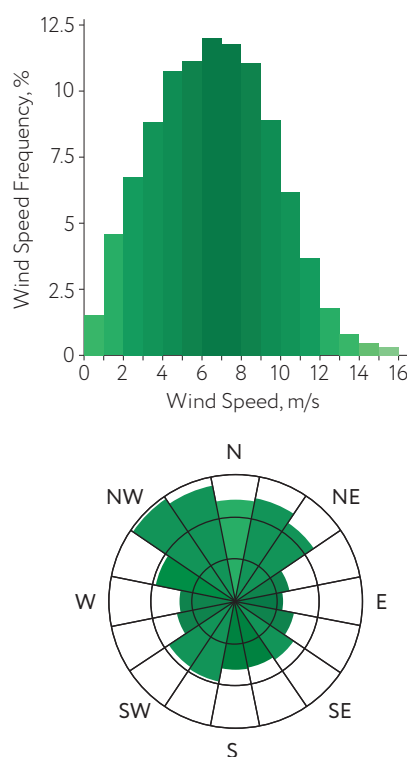
The National Energy Regulator approved Feed-in-Tariffs for wind projects with installed capacity under 4 MW, based on the following parameters:

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

The approved feed-in-tariff was approx. 73,8 €/MWh and is guaranteed to the eligible supplier for 15 years and protected against currency risk.

6 companies were awarded Eligible Supplier status, accounting for 20 MW in installed capacity, out of the total 20 MW capacity cap approved for the Feed-in-Tariff mechanism in 2020, based on “first come, first served” principle. The Government intends to allocate another 25 MW to investors under the same mechanism.

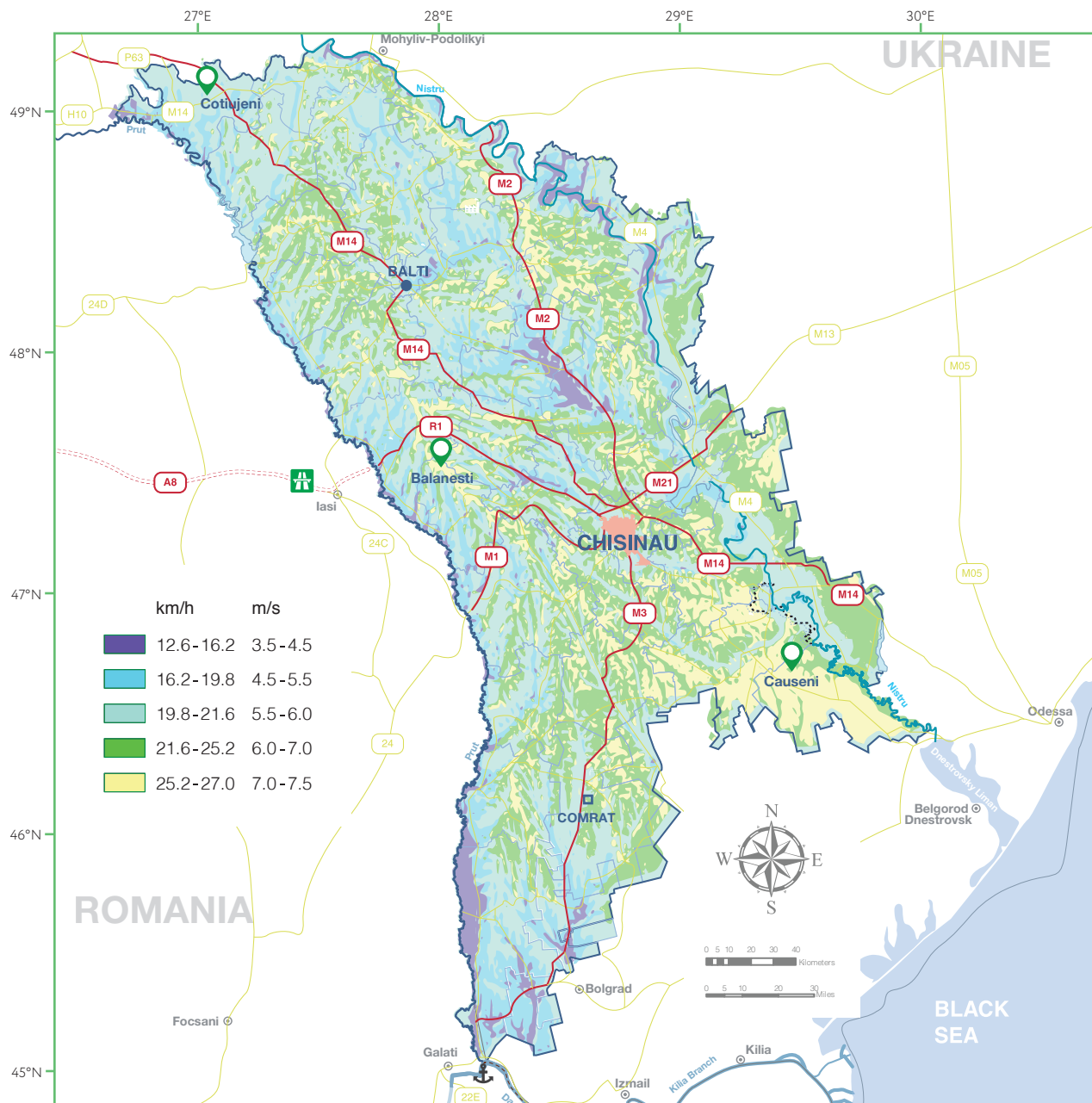
Fiscal incentives include 0% VAT for switching electrical circuits equipment and construction and installation works for wind turbines



Source: Location of Esco-Votaj Ltd based on Moldova Interactive Wind Atlas <https://moldova.awstruepower.com/>

Moldova Wind Atlas

Annual Average Wind Speed at 100 m altitude



Source: Moldova Interactive Wind Atlas <https://moldova.awstruepower.com/>

Annual measured and calculated average wind speeds, m/s

Cotiujeni tower				Bălănești tower				Căușeni tower			
H,m.	Meas.	Calc.	Dif.,%	H,m.	Meas.	Calc.	Dif.,%	H,m.	Meas.	Calc.	Dif., %
30	5.42	5.66	4.43	15	5.07	4.95	-2.37	50	5.02	6.04	7.74
60	6.14	6.33	2.26	42	5.76	5.98	3.82	70	6.05	6.38	4.45
100	6.96	6.87	-1.30	75	6.45	6.66	3.26	80	6.21	6.52	5.00
102	6.99	6.90	-1.29	100	6.75	7.02	4.00	84	6.31	6.57	4.12
				103	6.81	7.05	3.52	100	6.55	6.76	3.21

Source: "Wind Energy Resources Atlas of the Republic of Moldova", Ion Sobor, Andrei Chiciuc, Vasile Rachier; Univ. Tehn. a Moldovei, Agenția pentru Eficiență Energetică, AWS Truepower [et al.]. – Chișinău: S. n., 2017

Solar Photovoltaic (PV)

There are 279-296 sunshine days in the Republic of Moldova, providing a sunshine duration between 1950 h/yr in the Northern part to 2210 h/yr in the South. According to the Report "Cost-competitive renewable power generation: Potential across South East Europe", IRENA, 2017, the maximum solar photovoltaic capacity in Moldova is estimated at 4.65 GW, able to produce 6 TWh annually, which is about 1.3 times more than the current country's electricity consumption.

The Government intends to allocate 70 MW for investment bidding procedure under Fixed price mechanism applicable to photovoltaic projects over 1 MW. The regulation on the investment bidding procedure is under development.

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

The approved feed-in-tariff was approx. 89.5 €/MWh and is guaranteed to the eligible supplier for 15 years and protected against currency risk.

20 companies were awarded Eligible Supplier status, accounting for 14.994 MW in installed capacity, out of the total 15 MW capacity cap approved for the Feed-in-Tariff mechanism in 2020, based on "first come, first served" principle.

The Government intends to allocate another 75 MW to investors under the same mechanism.

Also, photovoltaic installations are best suited for the net metering mechanism, designed for consumers who intend to become prosumers by substituting part of the electricity from the grid with electricity generated from renewable energy at their consumption point. This mechanism also opens opportunities for investors, particularly in terms of providing turn-key solutions to consumers.

Under current conditions, for capacities up to 200 kW (cap for net-metering provisioned by Law):

- specific investment costs per kW installed capacity = 1000 Euro/kW,
- for the Central and Southern part of Moldova served by Premier Energy Distribution DSO, the capacity factor for photovoltaic systems = 16%, which is equivalent to an estimated annual average net output of electricity of 1'401 kWh/year/1 kW installed. At the current end-user tariff for consumers connected to low-voltage grid (71.9 Euro/MWh), the payback period would constitute almost 10 years.
- for the Northern part of Moldova, served by RED-Nord DSO, the capacity factor for photovoltaic systems = 14%, equivalent to 1126 kWh/year/1 kW installed. At the current end-user tariff for consumers connected to low-voltage grid (97.1 Euro/MWh), the payback period would constitute about 9 years.

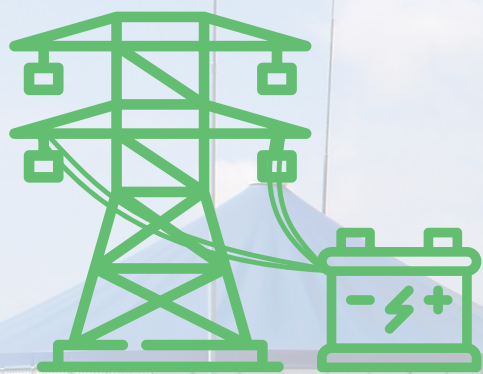
Fiscal incentives include VAT 0% for:

- photovoltaic systems construction and installation works
- diodes, transistors, semiconductor photo-sensitive devices, including photovoltaic cells even assembled in module or mounted in panels, light emitting diodes
- piezoelectric crystals mounted



Photo credit: Invest Moldova, 2018

The largest production of Green Energy in RM



8.5 Mio. cubic meters of biogas a year

Supplying the power grid with 18.2 Mio. kW a year

Photo credit: Südzucker Moldova

Biogas

Biogas is currently one of the biggest contributors to the production of electricity from RES. Even before the new Renewable Energy Law entered into force in 2018, 5 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 Report “Cost-competitive renewable power generation: Potential across South East Europe”, IRENA, 2017, there is a 134 MW potential capacity for biogas power plants in Moldova, able to produce 805 GWh annually, which is about 18.3% of the current country’s electricity consumption. Electricity volumes that can be generated are limited by availability of raw materials for biogas production, 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 investment bidding procedure under Fixed price mechanism applicable to biogas cogeneration projects over 1 MW. The regulation on the investment bidding procedure is under development.

In 2020, the National Energy Regulator approved Feed-in-Tariffs for biogas cogeneration projects with installed capacity under 1 MW, based on the following parameters:

- specific investment costs per kW installed capacity = 3078 Euro/kW,
- capacity factor = 70%, which is equivalent to an estimated annual average net output of electricity of 6’132 kWh/year/1 kW installed
- operation and maintenance costs = 105 EUR/year /1 kW installed
- Weighted Average Cost of Capital = 8.28%.

Eligible Supplier status, accounting for 637 kW in installed capacity, out of the total 12 MW capacity cap approved for the Feed-in-Tariff mechanism in 2020, based on “first come, first served” principle. The Government intends to allocate another 100 MW to investors in biogas cogeneration projects under the same mechanism. Capacities will be allocated separately for projects based on different sources of biogas: animal (livestock) manure, landfill gas, and water treatment plants.

Solid Biomass

Solid biomass has the biggest contribution to Moldova's energy balance as 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 is converted to electricity. According to the Report "Cost-competitive renewable power generation: Potential across South East Europe", IRENA, 2017, the potential capacity for power production from solid biomass in Moldova is 716 MW, able to produce 4,583 GWh annually, which is slightly more than the current country's electricity consumption. The main potential sources of biomass are agricultural residuals and wastes, since forests only cover about 12% of the country's area and need to be protected and expanded.

The Government intends to allocate 30 MW for investment bidding procedure under Fixed price mechanism applicable to solid biomass cogeneration projects over 1 MW, and additional 15 MW for syngas cogeneration over 1 MW. The regulation on the investment bidding procedure is under development.

In 2020, the National Energy Regulator approved Feed-in-Tariffs for biomass cogeneration projects with installed capacity under 1 MW, based on the following parameters:

- specific investment costs per kW installed capacity = 3,518 Euro/kW,
- capacity factor = 70%, which is equivalent to an estimated annual average net output of electricity of 6,132 kWh/year/1 kW installed
- operation and maintenance costs = 113.3 EUR/year /1 kW installed
- Weighted Average Cost of Capital = 8.28%.



Photo credit: Ministry of Economy and Infrastructure

The approved feed-in-tariff was approx. 93 €/MWh and is guaranteed to the eligible supplier for 15 years and protected against currency risk. However, none of the 5 MW allocated under feed-in tariff mechanism have been attributed to eligible suppliers, 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



Photo credit: Technical University of Moldova

Research and Development (R&D) in RES



Professional Labour Force

Moldova offers an active, educated and multilingual workforce. It is a melting pot of several nationalities, such as Romanians, Russians, Ukrainians and others. There are available skilled construction and installation workers and electricians because of a strong tradition and competence in industry and the energy sector.

In accordance with the State Energy Inspectorate (2017), presently there are over 430 authorized (licensed) electricians in Moldova and over 100 authorized energy auditors (individuals).

At the same time, the national authorities work over the certification / qualification schemes for the following specialties (guided by European regulations, transposed into national legislation):

- installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps.
- evaluators of the energy performance of buildings;
- inspectors of heating and air-conditioning systems of buildings;
- inspectors of air-conditioning systems of buildings.



Education

Well-educated young graduates, in sector-specific faculties, are available to work in companies. Moldova has strong technical faculties and specific colleges, e.g. Balti Polytechnic Colleges, Technical College of

UTM, Center of Excellence in Energy and Electronics, Center of Excellence in Informatics and Information Technologies, Center of Excellence in Light Industry etc. The Technical University of Moldova has competence in power engineering, electronics, construction, mechanical engineering, etc

The Technical University of Moldova (UTM), located in Chisinau, is the main higher education institution for technical education. The number of engineers, managers and other specialists is sufficient to meet the investor's demand in most sectors.



Dual VET System

The dual vocational education and training, also known as dual VET, aims to respond to modern demands of the labour market and produce skilled workers with required qualifications. In Moldova, Dual VET in energy and renewables sector was applied by several companies: Esco Voltaj SRL and Premier Energy SRL. There are currently more than 12 VET institutions (schools, colleges and centers of excellence) in different regions of the Republic of Moldova that are offering trainings for specialties in energy sector and are open to cooperate with your company.



Research Projects

The Technical University of Moldova, the main higher education institution in technical field, has entered into partnership with private companies to develop their R&D laboratories. The two projects worth mentioning is the "PowerTech Lab" Project and the "Technology Museum Park" Project.

Renewable energy conversion systems developed at The Technical University of Moldova

The Development of Renewable Energy Conversion Systems Department of the Technical University of Moldova (TUM) conducted research in the following areas:

- wind energy conversion systems
- hydro-kinetic energy conversion systems
- photovoltaic energy conversion systems

Wind energy conversion systems

The aerodynamic profiles of the blades used for low power wind turbines with horizontal and vertical axis have been optimized.

In terms of practical applications:

- 15 inventions in total, out of which 10 prototypes of horizontal axis wind turbines with a power of 10 kW each have been developed, designed and manufactured.
- 12 inventions developed, designed and manufactured experimental prototypes of vertical axis wind turbines with adjustable blades, made of composite materials, which are at the stage of experimental research in the Aerodynamics Laboratory within the Machine Design Department.

Hydro-kinetic energy conversion

The hydrodynamic profiles of the blades used for vertical axis water turbine have been

optimized and increased the conversion efficiency.

18 inventions, the scientist from The Technical University managed to develop, design and manufacture 3 prototypes of micro hydropower plants for the conversion of energy from flowing water into mechanical energy (for pumping water for irrigation) and electricity. The prototypes were tested in real conditions on the Test Polygon on Prut river.

Photovoltaic solar energy conversion systems (solar panel orientation mechanism)

The analysis of the methods for increasing the conversion efficiency of photovoltaic solar energy allowed the elaboration of 13 patents, development, design and manufacture of prototypes of photovoltaic systems with automatic orientation towards the sun.

The PowerTech Lab is developed within the Faculty of Power and Electrical Engineering of Technical University of Moldova with the TEKWILL support and includes the "Renewable Energy Sources" laboratory, the "Electric Machines and Devices" laboratory, the "Electrical Actuators and Industrial Automation" laboratory, and the "Moldova Power Accelerator" where the start-ups are developed.



Educational Institutions





Population of Moldova
in 2019,
thousand people

Population of the rayon /thousand	Population of the rayon capital city /thousand	City
83.0	8.8	Anenii Noi
28.0	12.4	Basarabeasca
71.4	9.9	Briceni
124.1	39.4	Cahul
76.6	16.1	Călărași
61.3	5.7	Cantemir
89.4	20.0	Căușeni
58.6	14.2	Cimișlia
73.4	8.5	Criuleni
41.7	10.1	Donduseeni
85.5	20.3	Drochia
35.0	20.5	Dubăsari
79.2	18.4	Edineț
90.3	16.8	Fălești
85.6	15.4	Florești
58.7	11.2	Glodeni
118.6	17.3	Hâncești
101.8	16.8	Ialoveni
52.0	10.7	Leova
64.8	14.3	Nisporeni
52.9	9.3	Ocnita
124.0	34.1	Orhei
49.9	12.9	Rezina
66.5	12.9	Râșcani
91.4	14.8	Sângerei
40.9	7.4	Șoldănești
99.4	37.9	Soroca
69.4	8.5	Ștefan Vodă
92.1	20.8	Strășeni
42.2	15.0	Taraclia
71.0	8.1	Telenești
116.7	38.3	Ungheni

source: www.ipt.md
Interactive map of Technical
Vocational Education Institutions

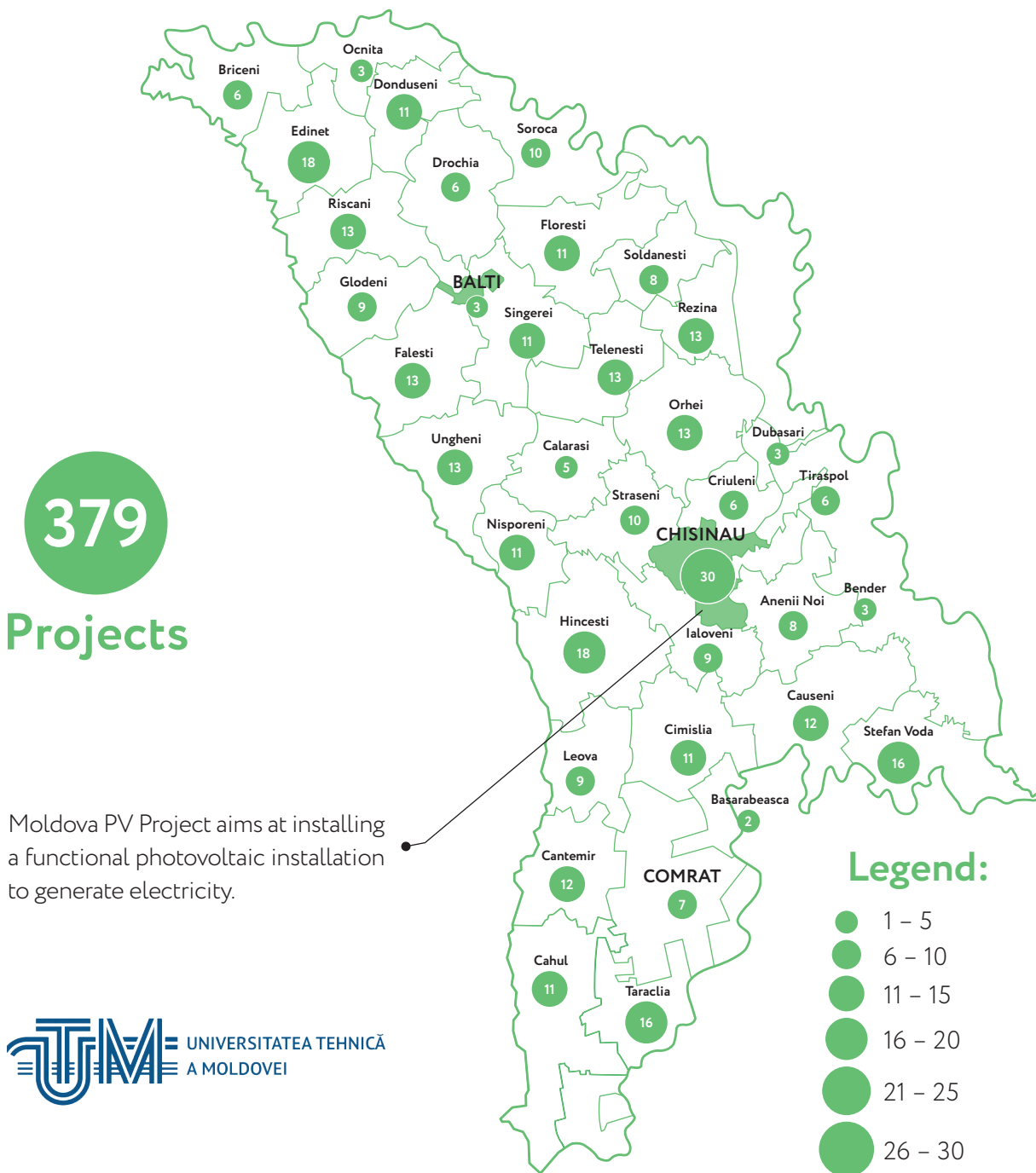
Population, thousand people	
3,542.7	Republic of Moldova, total
832.9	Chișinău Municipality,
695.4	Chișinău City
151.8	Bălți Municipality,
146.9	Bălți City

LEGEND:

-  Secondary Vocational Institutions (vocational schools)
-  Dual Secondary Vocational Institutions
-  Post secondary Vocational Institutions (colleges and excellence centers)
-  Higher Education Institutions (universities)

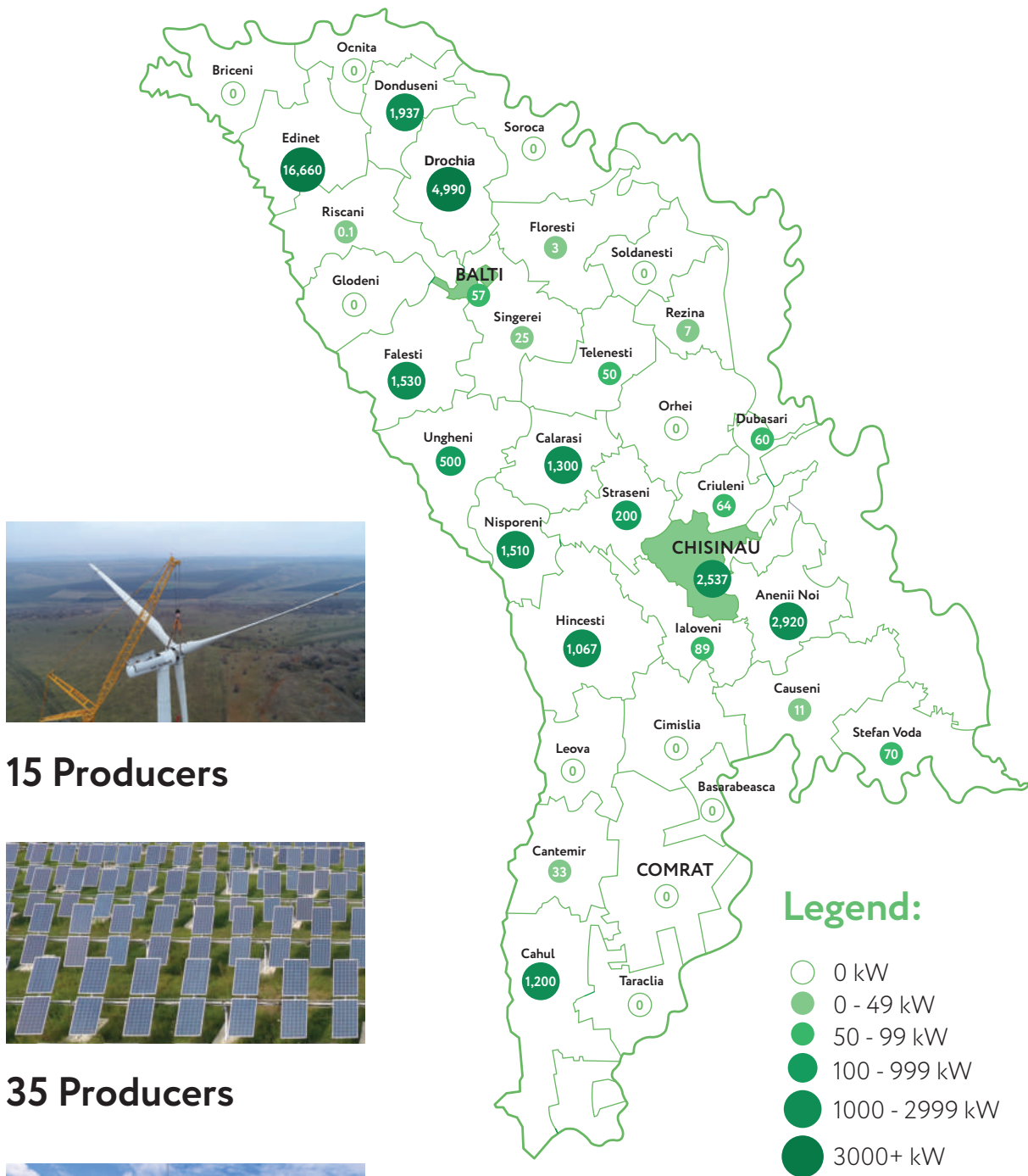
Population of ATU Găgăuzia, thousand people	
161.7	ATU Găgăuzia
26.4	Comrat Municipality
22.8	Ciudăr-Lunga
16.7	Vulcănești

RES Projects



379 projects in the field of Renewable Energy were implemented all over in Moldova until 2020 with the support of the Energy Efficiency Fund, Moldova Social Investment Fund, the UNDP Project Energy and Biomass.

RES Production Capacities, kW



The capacities of RES producers, 2020:

- wind energy producers 29.4 MW
- solar energy producers 2.2 MW
- biogas energy producers 5.7 MW



“The company’s main focus is wind energy. We have started our activity with the development of 3 projects with a total capacity of 90 MW. It is worth mentioning that the local authorities, with whom we have collaborated, have been committed to finding feasible solutions, so that we were able to manage various difficulties with identifying and registering of not allocated land, putting it into use, changing destination, endorsing of the technical-design projects, etc.”

Marcela Lefter,

Executive Director, Electra Norte Molwind (Electra Norte, Spain)

“Esco Voltaj is a local company that provides energy services and renewable energy solutions. Our portfolio contains a wide variety of energy efficiency solutions, being an Eco friendly company. We encourage entrepreneurs, civil society and the authorities to become more energy independent through the use of renewable energy sources.

We greatly appreciate the efforts of the Moldovan authorities in promoting energy efficiency measures and renewable energy solutions and we believe that this area will be further promoted and developed even more intensely in the near future.

We strongly believe that projects in this field will be very attractive for both investors and end consumers and, of course, a great achievement in protecting the environment.”



Nicolae Claichnet,

General Manager, Esco Voltaj Company

“FlyRen Development is a joint venture between the Danish Renewables and flyRen Energy Group. Today flyRen Development has a pipeline of over 70 MWp in Moldova, of which 33 MWp have all permits to be ready to build. With the rapid expansion of the pipeline flyRen Development is on track to become the leading holding dedicated to clean energy investments in Moldova.

Danish Renewables was founded in 2014 and manages the entire value chain of on-shore wind and solar photovoltaic (PV) projects, including green field development, construction and operation of operating assets, repowering and divestment of projects and operating assets to institutional and private investors.

Danish Renewables owns wind and solar projects, operational as well as under development, in Denmark, South Africa, Sri Lanka and Georgia.

FlyRen was founded in 2007 and is active in Italy and Turkey in Solar PV project development. In 2015 flyRen starts operations in Moldova, and in 2018 it builds and operates the country’s largest PV plant. flyRen has been granted the first eligible energy producer license in Moldova for energy sale direct to customers in July 2019.”



Esben Kumke Christensen,

Managing Director of Danish Renewables

Carlo Arturo Garuzzo,

Executive Chairman and Co-founder, flyRen Energy Group

“Investments in the renewable energy are oriented towards saving the environment and the human race and should not be seen as a business opportunities first. I believe that this kind of investments together with the transition to a rational consumption of energy must become part of social culture, and Moldova steps firmly into embracing these values.”



Chiril Gaburici,

Developer & Managing Partner Renergy Solutions SRL

Former Prime Minister of the Republic of Moldova

“Südzucker Moldova has worked with the Government of the Republic of Moldova on the development of the regulatory background for the “Green Energy”, so that projects of this level can be implemented. We have invested already more than 14 mil. Euro in the Green Energy projects. One of the examples is the biogas plant, located at the company’s facility in Drochia. It represents the country’s largest green energy supplier. And produces 8.5 million cubic meters of biogas from beet pulp in a year.”



Dr. Alexander Koss,

Speaker of the Board of the Moldovan-German company Südzucker Moldova

INVEST MOLDOVA AGENCY



THE ONE-STOP SHOP FOR ALL YOUR INVESTMENT QUESTIONS

ASSISTANCE & INFORMATION



Provide

- Information on the investment climate
- Sector-specific information
- Consulting on suitable locations – FEZ, IP (Invest Moldova database)
- Information on relevant tax, legal and administrative issues



Assist

- Scoping missions (agenda, logistics, follow up)
- Investment incentive application
- Information on business providers - HR, Legal, Consulting, etc.



Connect

With relevant partners:

- Embassies
- Government authorities
- Business associations
- Existing investors

INVESTMENT ATTRACTION & PROMOTION ACTIVITIES

G2B and B2B Missions abroad

International events-
promotion of the investment
climate of the Republic of
Moldova

Moldova Business Week

AFTERCARE

Platforms for Investors

Council for the promotion of projects of national importance, chaired by Prime Minister

Economic Council to the Prime Minister of the Republic of Moldova

- 41 associative structures of the business community
- 43 state institutions
- 16 representatives of the scientific and research community
- 6 Working groups:

Eliminating constraints in entrepreneurial activity: Coordinator - American Chamber of Commerce (AMCHAM)

Facilitation of trans-border trade: Coordinator - European Business Association (EBA)

Stimulation and retention of private investments : Coordinator - Foreign Investors Association (FIA)



CONTACT US:

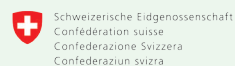
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We provide tailored services for potential investors throughout the investment decision process. We also support existing investors in extending their operations.

Our team consists of permanent investment attraction staff, sectorial consultants, as well as regional officers. Combining our experience, we are able to provide you with information relevant for your decision making, as well as links to businesses and government.



Swiss Agency for Development and Cooperation SDC
Agenția Elvețiană pentru Dezvoltare și Cooperare
Швейцарское управление по развитию и сотрудничеству

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