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RENEWABLE ENERGY **IN ROMANIA**

FLANDERS INVESTMENT & TRADE MARKET SURVEY

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RENEWABLE ENERGY IN ROMANIA

December 2021

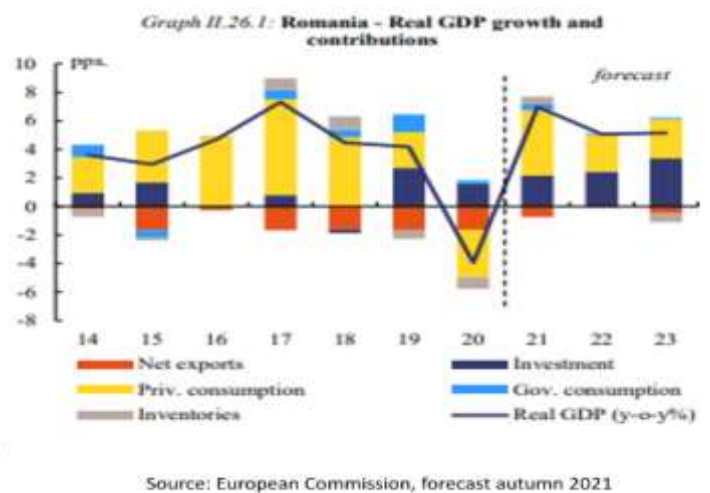
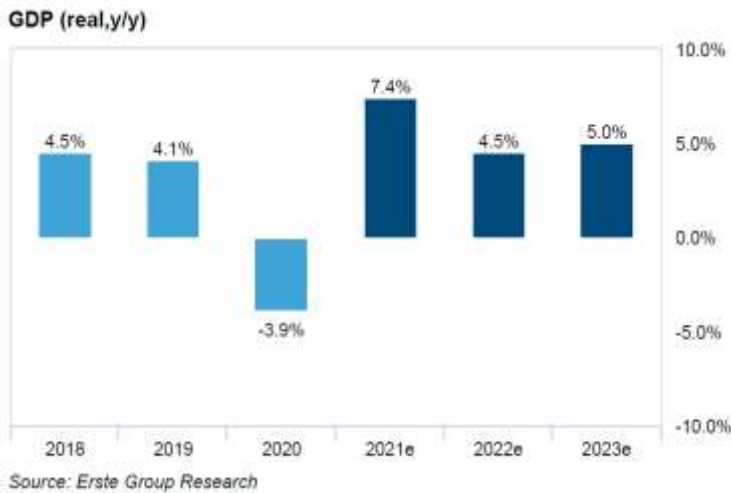
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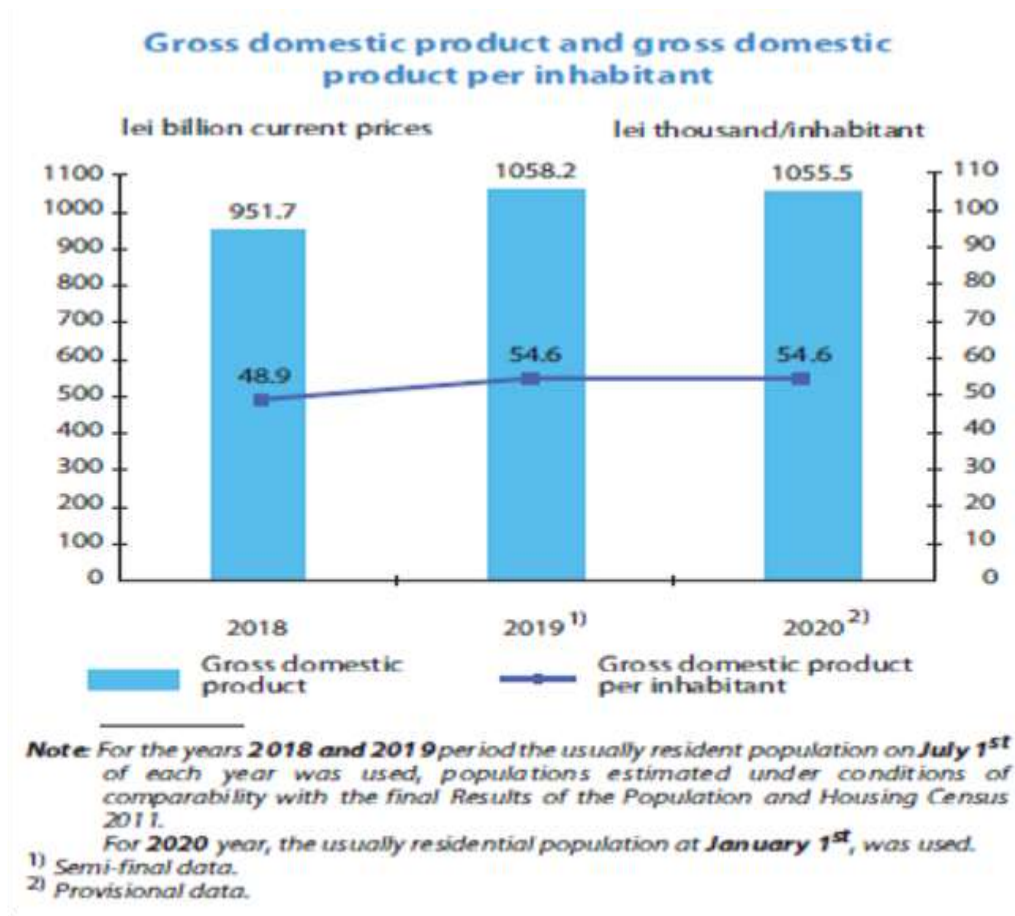
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Source: National Institute of Statistics, Romania in figures 2021

Romania's gross minimum wage (€ 446) is the third lowest in the EU, however as of 1st of January 2022, there will be an increase to about € 515. The monthly average wage can differ significantly depending on the industry and the regions in the country. The capital and the big cities, where the largest local and multinational companies are operating, as well as industries like IT and telecommunication, oil and gas or banking, register the highest salaries. The horeca, the textile and food industries pay the lowest salaries.

Due to the economic growth between 2016-2019 and the creation of new jobs, the unemployment rate registered a decreasing trend reaching 3.9 % in 2019. In the context of the pandemic, the unemployment rate increased and rose to 5% in 2020. As of 2022 the unemployment rate is expected to decline.

Monthly average nominal earnings (lei¹/employee)

¹ 1 EUR = 4.9476 RON (November 2021)

	2018	2019	2020
	gross / net	gross / net	gross / net
Total	4518 / 2642	5105 / 2986	5655 / 3307

Source: National Institute of Statistics,
Romania in figures 2021 & 'calculator-salarii.ro'

Unemployment rate" (%)

2018	2019	2020""
4,2	3,9	5,0

"according to the ILO (International Labour Office)
"" provisional data

Source: National Institute of Statistics,
Romania in figures 2021

Main features of country forecast - ROMANIA

	2020			Annual percentage change						
	bn RON	Curr. prices	% GDP	02-17	2018	2019	2020	2021	2022	2023
GDP		1055.5	100.0	4.0	4.5	4.2	-3.9	7.0	5.1	5.2
Private Consumption		645.0	61.1	5.8	7.7	3.9	-5.3	7.5	4.2	4.5
Public Consumption		199.0	18.9	0.2	3.3	7.3	1.7	2.3	0.7	0.7
Gross fixed capital formation		259.2	24.6	5.8	-1.1	12.9	6.8	8.8	9.5	12.5
of which: equipment		85.1	8.1	3.2	11.6	5.3	1.9	9.2	7.8	17.4
Exports (goods and services)		393.3	37.3	10.8	5.3	5.4	-9.7	9.4	7.1	5.8
Imports (goods and services)		440.4	41.7	12.2	8.6	8.6	-5.1	10.3	6.3	4.1
GNI (GDP deflator)		1042.4	98.8	3.9	4.0	4.7	-3.8	7.3	5.4	5.5
Contribution to GDP growth:										
Domestic demand				5.7	5.1	6.5	-1.5	7.2	5.1	4.2
Inventories				-0.3	1.0	-0.6	-0.8	0.5	0.0	-0.4
Net exports				-1.3	-1.6	-1.6	-1.6	-0.7	-0.1	-0.5
Employment				-1.3	0.1	0.1	-1.8	1.1	0.6	0.5
Unemployment rate (a)				6.9	4.2	3.9	5.0	5.0	4.8	4.5
Compensation of employees / head				11.7	12.9	10.9	7.0	4.8	7.5	9.9
Unit labour costs whole economy				6.0	8.2	6.6	9.3	0.9	2.9	5.1
Real unit labour cost				-2.7	1.9	-0.2	5.4	-2.9	-1.4	0.9
Saving rate of households (b)				:	:	:	:	:	:	:
GDP deflator				8.9	6.2	6.8	3.5	3.9	4.4	4.1
Harmonised index of consumer prices				6.3	4.1	3.9	2.3	4.0	4.0	2.8
Terms of trade goods				2.1	0.6	2.1	3.4	-1.9	-0.5	0.5
Trade balance (goods) (c)				-9.8	-7.5	-8.0	-8.8	-9.8	-10.0	-9.8
Current-account balance (c)				-5.5	-4.4	-5.3	-5.5	-4.5	-6.3	-6.1
Net lending (+) or borrowing (-) vis-a-vis ROW (c)				-4.2	-3.2	-3.8	-3.8	-4.9	-4.7	-4.4
General government balance (c)				-3.1	-2.9	-4.4	-9.4	-8.0	-6.9	-6.3
Cyclically-adjusted budget balance (d)				-3.4	-3.5	-4.9	-7.5	-7.1	-6.4	-6.1
Structural budget balance (d)				-1.5	-3.2	-4.8	-7.5	-7.1	-6.4	-6.1
General government gross debt (c)				26.5	34.7	35.3	47.4	49.3	51.8	53.2

(a) Eurostat definition, (b) gross saving divided by adjusted gross disposable income, (c) as a % of GDP, (d) as a % of potential GDP.

Source: European Commission, forecast autumn 2021_Romania

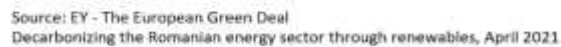
What makes the energy mix of the country balanced and remarkable are its resources in coal, hydropower, natural gas, nuclear energy, wind power, solar energy and biomass.



Romania already reached its 2020 EU target of 24% in the final energy consumption coming from renewables several years ago. Romania set a new renewable energy share target at 30.7% for 2030, as part of the European Green Deal. To achieve this some 6 GW of new wind power and solar PV capacities need to be installed over the next 10 years.

In 2020, Romania has switched from being an exporter to a net importer of electricity, especially due to the drought that affected the hydro power generation.

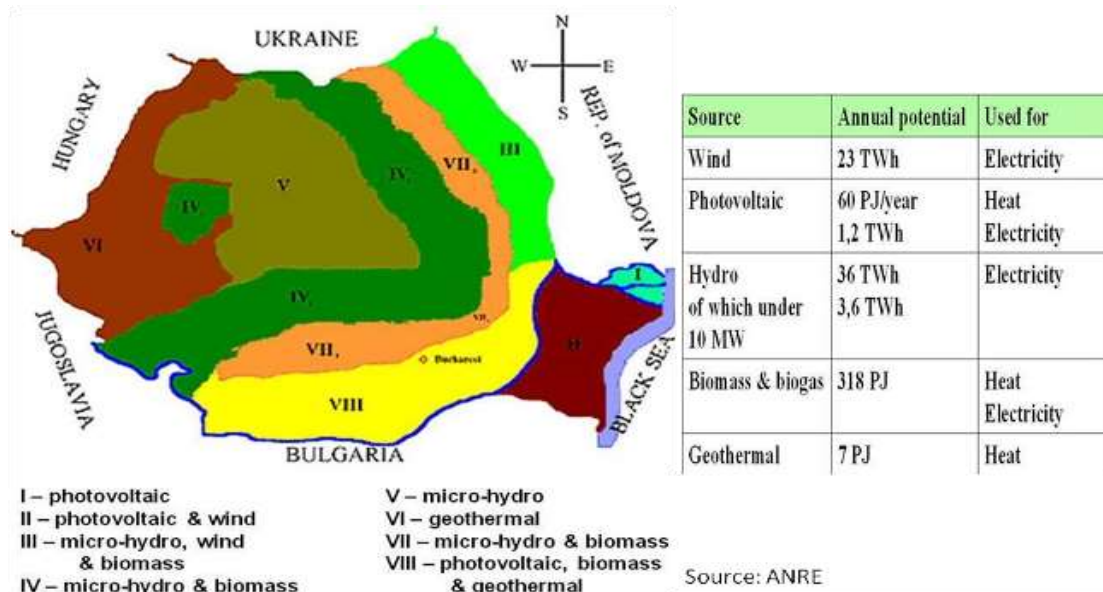
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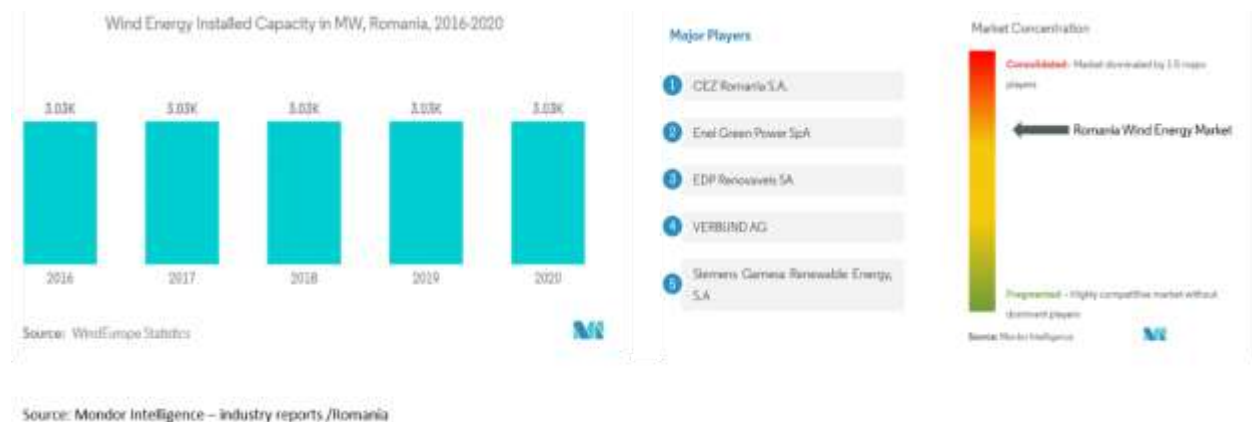
Annual potential per source



Romania's potential in wind energy is considered to be the highest in South Eastern Europe. It is estimated at around 14,000 MW installed capacity, generating around 23 TWh per year.

This potential is mainly concentrated in the Dobrogea, Moldova and Banat regions and most notably in Constanta and Tulcea. The market is expected to undergo a significant demographic and economic growth, leading to an increase in energy demand. Thus investments in wind farms are expected to rise what will be supported by the government policies and efforts to reduce the reliance on fossil fuel-based power generation.

Romania's wind energy installed capacity in MW, 2016 – 2020 <-> major players



Solar energy shows a moderate potential throughout the entire territory of the country, but the most abundant solar resources are located in the southern part of the country and Dobrogea. Considering solely the solar electricity potential, its potential is approximately 1.2 TWh.

Romania's solar energy installed capacity in MW, 2012 – 2019 <-> major players



Source: Mondor Intelligence – industry reports /Romania

Thanks to its many rivers, Romania has great potential for hydroelectric power with an estimated total usable hydro power of approximately 36 TWh per year. 30% of this potential is currently used for electricity generation. The vast majority of this production results from large-scale reservoir hydro power plants. However there are around 5,000 locations in Romania that are favorable for small hydroelectric power plants.

For Romania, biomass represents an important renewable source, both in terms of potential and utilization possibilities, as raw materials used in the production of biofuels and bioliquids are widely cultivated (sunflower, rape, soya, corn, sugar cane or sorghum, energetic willow, Cynara, Miscanthus). Biomass reserves are mainly wood waste, agricultural waste, domestic waste and energy crops. Production of biomass is not only a renewable energy resource but also a significant opportunity for sustainable rural development.

Regarding geothermal energy, Romania shows the third highest potential in Europe (after Italy and Greece) with major potential locations in the Western Plain, South Plains (Bucharest region) and Southern Carpathian regions. Total potential reaches around 7 PJ per year.

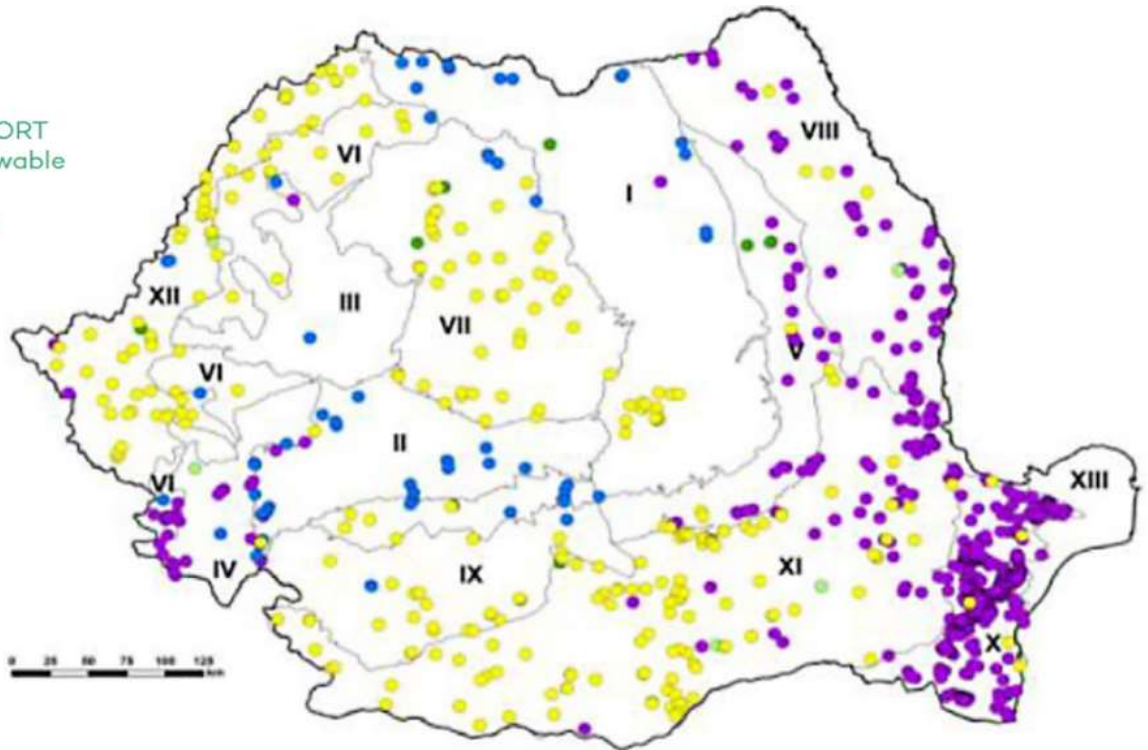
Taking into consideration the distribution of renewable energy production projects as well as the potential of renewable sources in Romania, the most widely used are wind, solar and hydropower, as showed in the figure below (Bankwatch Romania).

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DISTRIBUTION OF RES PROJECTS⁴⁸

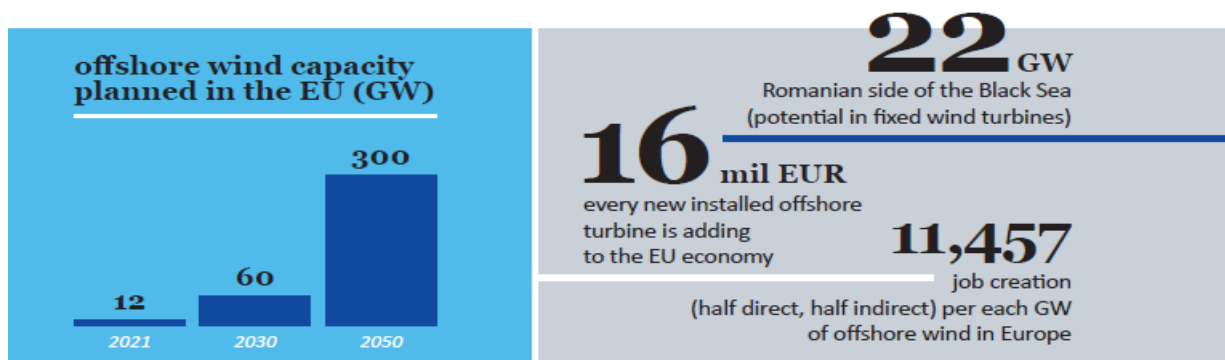
- Biomass
- Biogas
- Micro-hydro
- Solar
- Eolian

- I Eastern Carpathians
- II Southern Carpathians
- III Apuseni Mountains
- IV Banat Mountains
- V Getic Piedmont
- VI Subcarpathians
- VII Western Hills
- VIII Transylvanian Tableland
- IX Moldavian Plateau
- X Dobrogea Plateau
- XI Romanian Plain
- XII Western Plain
- XIII Danube Delta



The Romanian Renewable Energy: a potential still untapped, report December 2020

2019 -> prosumer legislation comes into force – co-finance up to 90% of the total investments in (solar) PV systems for households.



CODE OF GOOD PRACTICE || RENEWABLE ENERGY IN ROMANIA

Source: EPG, 2020

- green hydrogen -> Dobrogea region in Romania can host a cluster for hydrogen technology. The region has both exceptional capacity to produce clean hydrogen through wind, and potentially significant hydrogen demand from existing refineries, the steel industry, district heating, urban public transport, decarbonizing port activities, as well as naval transport.
- (some) Projects & Investments
 - Enel, one of the energy companies present in Romania, plans to decarbonize their energy mix by 2050, with renewables taking over fossil fuels in terms of electricity production.
 - Hidroelectrica acquired the Crucea Wind Farm (with a capacity of 108 MW) and STEAG Energie Romania from STEAG GmbH.
 - Electrica acquired the Stănești photovoltaic park.
 - GFG Alliance's steel businesses, including Liberty Steel Galati, will be incorporated into a new global group Liberty Steel Group with plans to implement a carbon-neutral strategy by 2030.

Other projects

(October 2021)

E.ON Romania is currently working on 150 projects for solar energy

(September 2021)

Romania is seeking € 492 million financing from the European Investment Bank's (EIB) Modernisation Fund for nine mostly green strategic investment projects: the construction of

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The Romanian Association of the Photovoltaic Industry
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<http://rpia.ro/>

The Romanian Association of Biomass and Biogas (ARBIO)
<https://www.arbio.ro/english/#all>

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6. ELECTRICITY MARKET PARTICIPANTS

Source: ANRE

(Romanian Regulatory Authority, electricity market monitoring report December 2020)

A Electricity generators on classic sources operating dispatching units		31	Hokrom Renewable Energy SRL
1	Bepco SRL	32	Horia Green SRL
2	CET Arad SA	33	Kelavent Charlie SRL
3	CET Govora SA	34	Kelavent Echo SRL
4	CE Hunedoara SA	35	Land Power SRL
5	CE Oltenia SA*	36	Mireasa Energies SRL
6	Contour Global Solutions SRL	37	NRX Wind SRL
7	Donau Chem SRL	38	Ovidiu Development SRL
8	Electrocentrale Bucuresti SA	39	Renovatio Trading SRL*
9	Electro Energy Sud SRL	40	Peștera Wind Farm SRL
10	Enet Focsani SA	41	Veronki Wind SRL
11	Modem Calor SA	42	Sibioara Wind Farm SRL
12	OMV Petrom SA	43	Smart Clean Power SRL
13	Petrotel-Lukoil SA*	44	Smartbreeze SRL
14	Rulmenti SA	45	Sofi Grup SRL
15	SNGN Romgaz SA	46	Tomis Team SRL
16	Termoficare Oradea SA	47	Verbund Wind Power Romania SRL
17	Veolia Energie Iasi SRL	48	Wind Park Invest SRL
18	Veolia Energie Prahova SRL	49	Windfarm MVI SRL
19	Vest Energo SA	50	VS Wind Farm SRL
		C Electricity generators on biomass source operating dispatching units	
		1	Bioenergy Suceava SRL

- ## Disclaimer

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