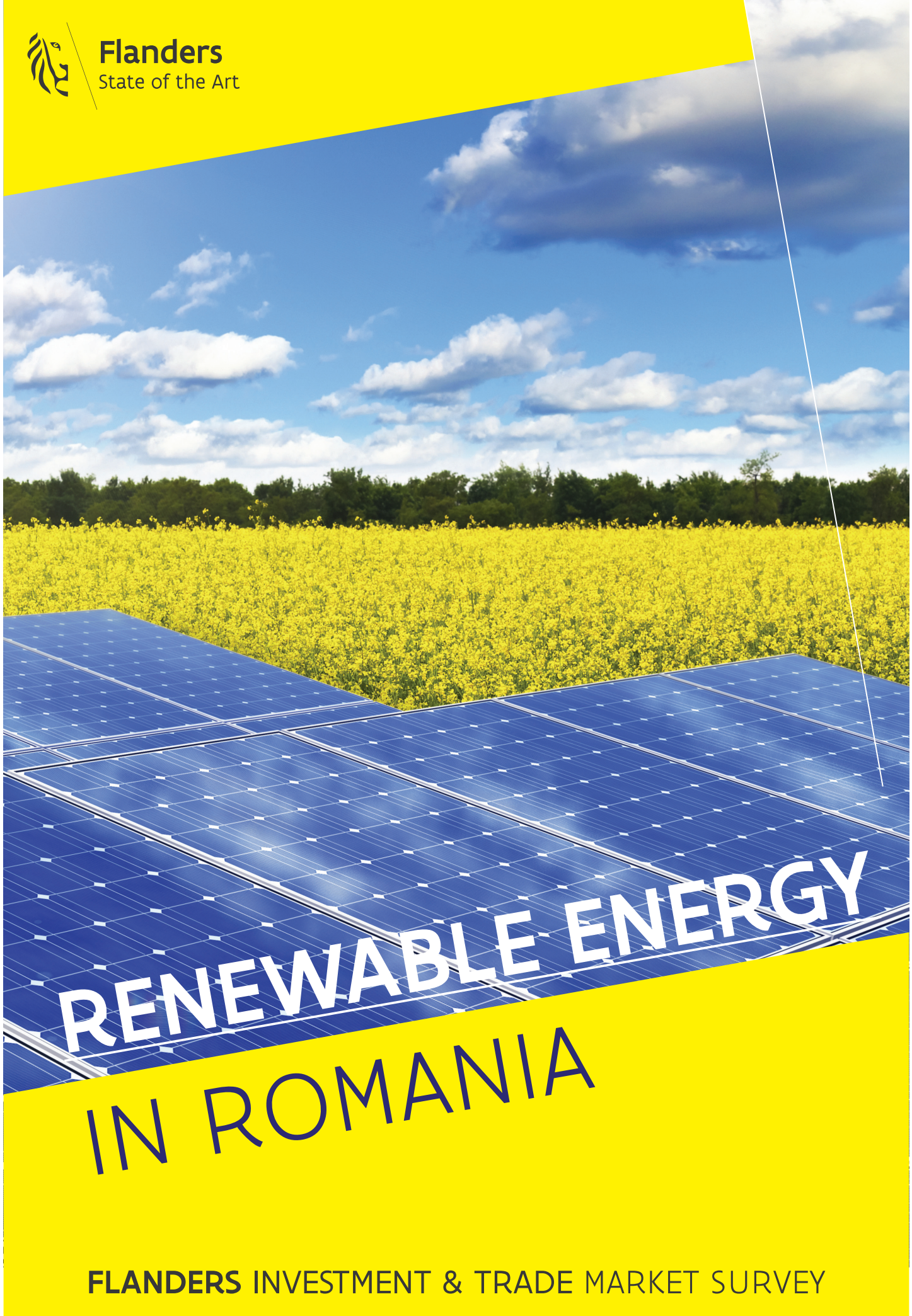




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# RENEWABLE ENERGY IN ROMANIA

FLANDERS INVESTMENT & TRADE MARKET SURVEY

# Renewable energy in Romania

A study updated by Dana Tanasi

October 2015

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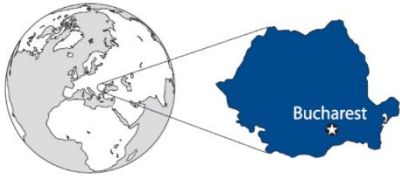
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## 1. General economic overview

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Romania's economic freedom score is 66.6, making its economy the 57<sup>th</sup> freest in the 2015 Index. Its score is 1.1 points better than last year, reflecting improvements in freedom from corruption, labour freedom, and the management of government spending that outweigh a decline in business freedom. Romania is ranked 27<sup>th</sup> out of 43 countries in the

Europe region, and its overall score is higher than the world average.

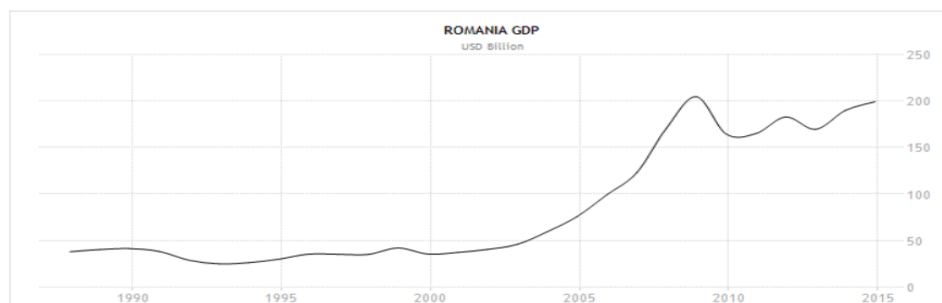
With a steady five-year increase in economic freedom, Romania joins a growing trend in Eastern Europe. Since 2011, economic freedom in Romania has improved by nearly 2.0 points. Advances in six of the 10 economic freedoms include particularly impressive gains in reducing corruption and loosening labour regulations. In the 2015 Index, Romania has achieved its highest economic freedom score ever.

Romania's economic outlook remains positive. Focus Economics panelists see the economy expanding 2.8% in 2015, which is unchanged from last month's estimate.

### 1.1 GDP development

Gross Domestic Product in Q1 2015 was, in real terms, by 1.5% higher as compared to Q4 2014.

**Graph. 1: GDP Development 2006-2014**



*Source: Trading Economics*

- As against the same quarter of 2014, the Gross Domestic Product recorded an increase by 4.3% for the unadjusted series and by 4.2% for the seasonally adjusted series.
- After the revision of seasonally adjusted series, the Gross Domestic Product in Q1 2015 increased by 1.5% as compared to Q4 2014 and by 4.1 as compared to Q1 2014.

Table 1: Quarterly Gross domestic product 2012-2015

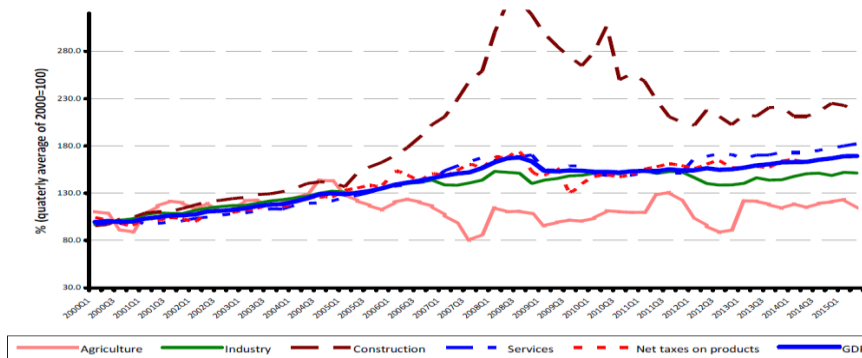
		Q1	Q2	Q3	Q4	Year
- in % as against the corresponding period of the previous year -						
Unadjusted series	2012	100.2	102.0	99.5	100.8	100.6
	2013	102.1	101.4	104.2	105.2	103.4
	2014	104.0	101.6	103.3	102.6	102.9
	2015	104.3				
Seasonally adjusted series	2012	100.4	102.2	99.4	100.8	-
	2013	102.0	101.7	104.2	105.1	-
	2014	104.0	102.0	103.2	102.5	-
	2015	104.1				
- in % as against the previous quarter -						
Seasonally adjusted series	2012	100.1	101.9	98.6	100.2	-
	2013	101.3	101.6	100.9	101.2	-
	2014	100.3	99.6	102.2	100.5	-
	2015	101.5				

Source: National Institute of Statistics

### Seasonally adjusted series

The Gross Domestic Product – seasonally adjusted data - estimated for Q1 2015 amounted to 175892.4 million lei current prices, increasing – in real terms – by 1.5% against Q4 2014 and by 4.1% against Q1 2015.

Graph. 2: Seasonally adjusted series



Source: National Institute of Statistics

Table 2: Quarterly GDP, in Q1 2015 - seasonally adjusted series

		Q1 2015
Millions RON, current prices	<i>Provisional (1)</i>	174848.5
	<i>Provisional (2)</i>	175892.4
	<i>Differences</i>	1043.9
In % as against the previous quarter	<i>Provisional (1)</i>	101.6
	<i>Provisional (2)</i>	101.5
	<i>Differences</i>	-0.1
In % as against the corresponding period of the previous year	<i>Provisional (1)</i>	104.2
	<i>Provisional (2)</i>	104.1
	<i>Differences</i>	-0.1

Source: National Institute of Statistics

## Unadjusted series

The Gross Domestic Product estimated for Q1 2015 amounted to 140176.2 million lei current prices, increasing – in real terms – by 4.3% as against Q1 2014.

Table 3: Quarterly GDP, in Q1 2015 - unadjusted series

		Trim. I 2015
Millions RON, current prices	<i>Provisional (1)</i>	139267.1
	<i>Provisional (2)</i>	140176.2
	<i>Differences</i>	909.1
In % as against the corresponding period of the previous year	<i>Provisional (1)</i>	104.3
	<i>Provisional (2)</i>	104.3
	<i>Differences</i>	0.0

<sup>1</sup> Ron = EUR 0.2252 (exchange rate at 01.09.2015) - Source: National Institute of Statistics

## The contribution of resources and uses to the growth rate of GDP

### Resources

Gross value added volume by industries recorded more significant changes in:

- Information and communication (-0.9 percentage points);
- Shows, culture and recreation activities; repair of household goods and other services (-0.9 percentage points).

Table 4: The contribution of GDP resources to the nominal value and growth rate of GDP, in Q1 2015.

	Contribution to the nominal value of GDP - %		Contribution to the growth rate of GDP - %	
	Provisional (1)	Provisional (2)	Provisional (1)	Provisional (2)
Agriculture, forestry and fishing	1.9	1.9	0.2	0.2
Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities	21.1	21.0	0.9	0.9
Construction	4.1	4.1	0.2	0.3
Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	17.8	17.5	1.0	1.0
Information and communication	7.0	7.0	0.9	0.8
Financial intermediation and insurance	3.6	3.6	0.1	0.1
Real estate activities	10.6	10.5	0.1	0.1
Professional, scientific and technical activities; activities of administrative services and support services	6.0	6.0	0.2	0.2
Public administration and defence; social insurance of public sector; education; health and social assistance	10.6	11.1	0.2	0.2
Shows, culture and recreation activities; repair of households goods and other services	3.1	3.0	0.1	0.0
<b>Gross value added</b>	<b>85.8</b>	<b>85.7</b>	<b>3.9</b>	<b>3.8</b>
<b>Net taxes on products</b>	<b>14.2</b>	<b>14.3</b>	<b>0.4</b>	<b>0.5</b>
<b>Gross domestic product</b>	<b>100.0</b>	<b>100.0</b>	<b>4.3</b>	<b>4.3</b>

Source: National Institute of Statistics

### Uses

From GDP uses standpoint, significant changes in the contribution to the growth rate of GDP between the two estimates were recorded for individual and collective final consumption expenditure of General Government, from -0.2% to +0.4%, as a result of their activity volume

decrease (individual consumption from 98.6% to 102.1% and collective consumption from 99.4% to 103%, respectively).

**Table 5: Gross Domestic Product by Resources and Uses, in Q1 2015**

	Milions RON current prices	Volume indices - in % as against Q1 2014	Price indices - in % as against Q1 2014
			<b>unadjusted series</b>
Agriculture, forestry and fishing	2679.3	108.9	102.5
Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities	29431.5	104.2	97.4
Construction	5742.7	106.1	101.8
Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	24484.6	105.6	103.0
Information and communication	9750.6	112.3	103.2
Financial intermediation and insurance	5056.1	102.7	105.4
Real estate activities	14769.9	100.6	101.6
Professional, scientific and technical activities; activities of administrative services and support services	8357.4	102.9	108.4
Public administration and defence; social insurance of public sector; education; health and social assistance	15535.4	102.1	106.1
Shows, culture and recreation activities; repair of households goods and other services	4268.9	101.5	105.0
Gross value added	120076.4	104.3	102.2
Net taxes on products <sup>1)</sup>	20099.8	104.0	113.9
<b>Gross domestic product</b>	<b>140176.2</b>	<b>104.3</b>	<b>103.8</b>
Final consumption	115361.4	104.4	101.7
Actual individual consumption of households <sup>2)</sup>	103425.8	104.5	101.4
Final consumption expenditure of households	91873.1	104.9	100.9
Final consumption expenditure of Non-profit institutions serving households	1298.7	99.0	103.1
Individual final consumption expenditure of General government	10254.0	102.1	105.7
Collective final consumption expenditure of General government <sup>3)</sup>	11935.6	103.0	104.7
Gross capital formation	23674.5	112.9	106.9
of which:			
Gross fixed capital formation	21831.6	108.3	100.3
Net export	1140.3	-	-
Export of goods and services	70888.7	108.4	98.7
Import of goods and services	69748.4	111.4	96.4



Table 6: Gross Domestic Product by Resources and Uses, in Q1 2015

	seasonally adjusted series		
	Millions RON current prices	Volume indices – in % as against Q4 2014	Price indices – in % as against Q4 2014
Agriculture, forestry and fishing	8937.2	100.6	119.5
Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning production and supply; water supply; sewerage, waste management and decontamination activities	40057.9	102.2	97.7
Construction	11528.2	99.9	105.9
Wholesale and retail; repair of motor vehicles and motorcycles; transport and storage; hotels and restaurants	28121.0	102.8	100.8
Information and communication	10633.7	103.4	100.5
Financial intermediation and insurance	5037.5	99.7	102.0
Real estate activities	16133.4	100.4	100.4
Professional, scientific and technical activities; activities of administrative services and support services	11986.2	95.5	100.5
Public administration and defence; social insurance of public sector; education; health and social assistance	15911.7	100.8	102.4
Shows, culture and recreation activities; repair of households goods and other services	5192.6	99.2	100.6
Gross value added	153539.4	101.3	101.1
Net taxes on products <sup>1)</sup>	23153.9	101.9	119.4
Statistical discrepancy	-800.9	-	-
<b>Gross domestic product</b>	<b>175892.4</b>	<b>101.5</b>	<b>102.2</b>
Final consumption	132571.6	101.4	100.0
Actual individual consumption of households <sup>2)</sup>	119881.5	101.7	100.2
Final consumption expenditure of households	105822.0	101.8	100.1
Final consumption expenditure of Non-profit institutions serving households	2846.4	97.9	97.3
Individual final consumption expenditure of General government	11213.1	100.3	102.6
Collective final consumption expenditure of General government <sup>3)</sup>	12690.1	95.7	101.6
Gross capital formation	42144.1	55.5	197.7
of which:			
Gross fixed capital formation	38389.9	103.5	97.9
Net export	-316.9	-	-
Export of goods and services	73159.1	103.9	101.0
Import of goods and services	73476.0	105.1	101.4
Statistical discrepancy	1493.6	-	-

Source: National Institute of Statistics

Economic growth in Romania is forecast to stay above potential, at 2.7% in 2015 and 2.9% in 2016, powered by domestic demand and also supported by the gradual recovery expected in the global economy. Private consumption is expected to remain robust, as growing wages, low inflation, falling interest rates and improving labour market conditions are all supportive for the purchasing power of households. As already observed in 2014, local currency lending is projected to continue growing given easing credit conditions and an expected slowdown in the deleveraging process.

## 1.2 Employment & earnings

Table 7: Economically active population

Economically active population	2007	2008	2009	2010	2011	2012	2013	2014	Q1 2015
<b>Total</b>	9994268	9944668	9924140	9964540	9867953	9964017	9977068	9242421	8891386
<b>Employed</b>	9353326	9369121	9243457	9239390	9137736	9262807	9247397	8613739	8236636
<b>Unemployed</b>	640942	575547	680683	725150	730217	701210	729670	628682	654750

MU: Persons

Source: National Institute of Statistics

Table 8: Employment by activities of the national economy

Activity of national economy	Year 2008	Year 2009	Year 2010	Year 2011	Year 2012	Year 2013	Quarter III 2014
<b>Agriculture, forestry, fish farming</b>	2689336	2689064	2779935	2612481	2682341	2634044	2589957
<b>Manufacturing</b>	1905181	1751319	1646654	1671561	1683037	1686596	1606385

MU: Persons

Source: National Institute of Statistics

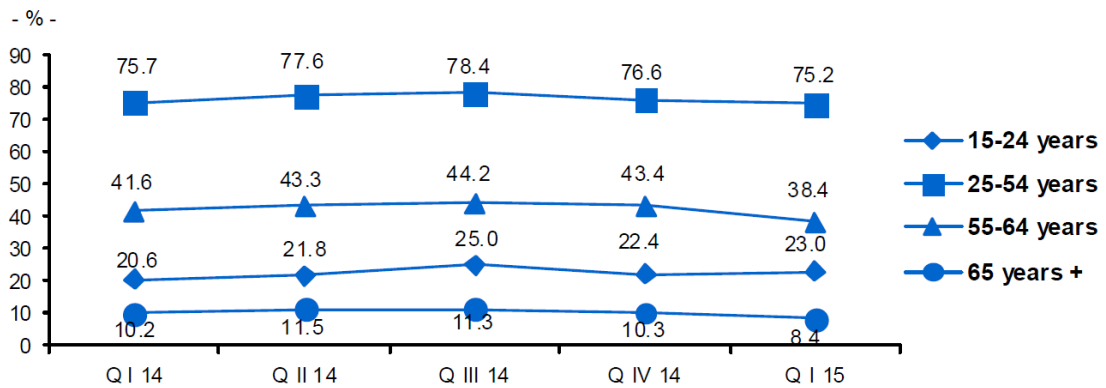
Romania's labour market has been remarkably stable over the last few years, with employment and unemployment rates hovering around constant levels. The labour market shows signs of improvement.

### Employment

In the first quarter of 2015, the employment rate for working age population (15-64 years) was 59.1%, decreasing as against the one recorded during previous quarter (1.7 percentage points). The employment degree was higher for men (66.8% as against 51.4% for women). Employment rate was approximately equal for the two areas of residence (59.5% in urban and 58.7% in rural area).

The employment rate for youth (15-24 years) was 23.0%.

Graph.3: Evolution of employment rate for population aged 15 years and over, by age groups

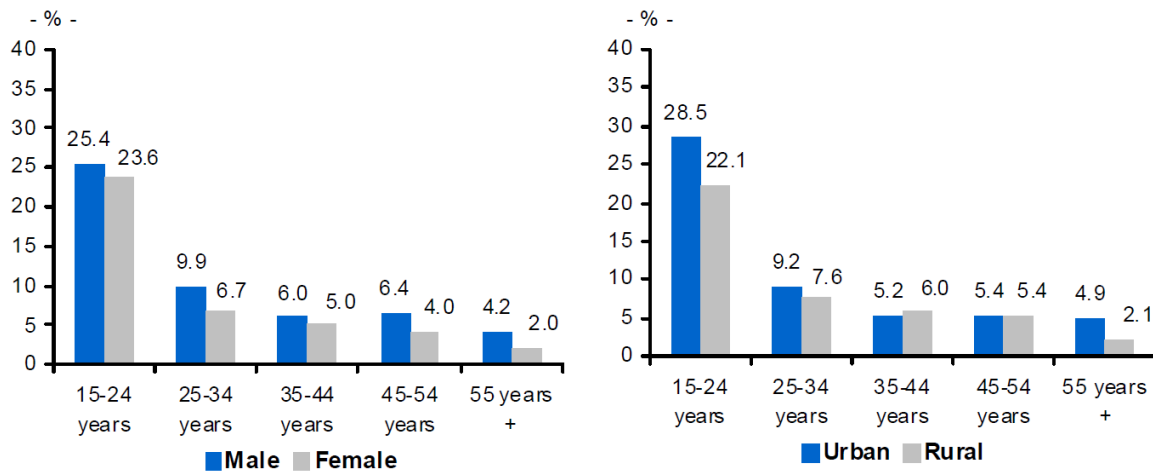


Source: National Institute of Statistics

## Unemployment

Unemployment rate in the first quarter of 2015 was 7.4%, increasing as compared to the previous quarter (6.7%).

Graph. 4: Unemployment rate by age groups, sex and area in the first quarter of 2015



Source: National Institute of Statistics

By sex, the gap between the two unemployment rates was 2.4 percentage points (8.4% for men as against 6.0% for women), while by residential area it was 0.5 percentage points (7.6% for urban area, as against 7.1% for rural area).

The unemployment rate reached the highest level (24.7%) among young persons (15-24 years).

## Average earnings 2013 – 2014

Table 9. Evolution of net average earnings (December 2013 – December 2014) - RON

	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
	2013	2014											
<b>TOTAL ECONOMY</b>	1760	1625	1626	1706	1735	1682	1687	1719	1683	1698	1705	1743	1866
<b>Agriculture, forestry and fishing</b>	1351	1219	1225	1263	1331	1309	1285	1322	1303	1315	1375	1334	1482
<b>Industry total</b>	1832	1625	1620	1732	1770	1737	1725	1779	1713	1749	1729	1781	1962
<b>Mining and quarrying</b>	3282	3045	2841	3143	3264	3610	3366	3373	3474	3814	3302	3202	3979
<b>Manufacturing</b>	1672	1485	1494	1593	1620	1574	1576	1623	1553	1582	1589	1656	1782
<b>Electricity, gas, steam and air conditioning supply</b>	3435	2810	2810	3005	3151	3040	3005	3221	3020	2949	2958	2965	3584
<b>Water supply; sewerage, waste management and remediation activities</b>	1575	1455	1439	1527	1558	1483	1481	1547	1498	1504	1496	1520	1668
<b>Construction</b>	1422	1233	1213	1246	1267	1255	1255	1300	1299	1304	1292	1303	1408
<b>Wholesale and retail trade; repair of motor vehicles and motorcycles</b>	1539	1455	1485	1574	1596	1492	1508	1548	1511	1511	1528	1552	1673
<b>Transportation and storage</b>	1806	1709	1670	1696	1767	1753	1767	1764	1731	1724	1747	1832	1919
<b>Accommodation and food service activities</b>	940	972	957	970	986	959	981	1011	996	996	998	1033	1061
<b>Information and communication</b>	3322	3061	3129	3231	3347	3117	3270	3244	3266	3348	3269	3281	3640
<b>Financial and insurance activities</b>	4283	3633	3589	3900	4577	3717	3724	3862	3693	3583	3747	3939	4341
<b>Real estate activities</b>	1825	1411	1410	1469	1583	1514	1455	1478	1432	1457	1441	1464	1639
<b>Professional, scientific and technical activities</b>	2894	2426	2497	2786	2623	2550	2592	2642	2563	2592	2592	2642	2939
<b>Administrative and support activities</b>	1197	1160	1166	1275	1228	1247	1238	1258	1263	1269	1268	1300	1388
<b>Public administration and defense; compulsory social security</b>	2335	2309	2308	2326	2320	2325	2322	2373	2353	2364	2373	2389	2396
<b>Education</b>	1479	1470	1453	1491	1472	1500	1506	1478	1431	1463	1541	1567	1533
<b>Human health and social work activities</b>	1495	1477	1470	1495	1487	1493	1485	1491	1498	1492	1493	1518	1543

<b>Arts, entertainment and recreation</b>	1331	1223	1262	1285	1302	1281	1312	1272	1296	1291	1281	1307	1348
<b>Other service activities</b>	1067	1071	1090	1121	1162	1136	1158	1212	1190	1189	1193	1200	1311

Source: National Institute of Statistics

## December 2014 vs. December 2013

As compared to December of the previous year, the average net nominal earnings increased by 6.0%. The real earnings index in relation with the same period of previous year was 105.1%.

The highest values of the average net nominal earnings were recorded in extraction of crude petroleum and natural gas (5802 lei), while the lowest in accommodation and food service activities (1061 lei).

Average nominal net wage income in Romania was RON 1,857 in April 2015, up 1.5% on a monthly basis and 7% from April 2014, according to data released by the National Statistics Institute (INS).

The April 2015 average gross wage income was RON 2,564, up 1.4 per cent from March 2015.

The highest increase in the net wage income, of 18.6%, was reported in financial intermediation, with the exception of insurance and pension funds, followed by the manufacturing of means of transportation, electricity, heat, natural gas, hot water and air conditioning generation and provision and ancillary financial intermediation – including insurance and pension funds – coal mining, telecommunications and mining related services, with rises of between 10 and 14.5%.

On the other hand, monthly decreases in the average net income were the result of production failures and smaller than expected revenues as well as financial hardships facing business operators, and staff hiring on small wages.

The most significant drop, of 29.7%, was recorded in the tobacco industry.

Slight monthly increases of 0.6% were reported in the public sector, the education system, while the average net wage income was down 0.8% in the public administration, and also down 0.3% in the healthcare and social security branches.

### 1.3 Inflation & fiscal situation

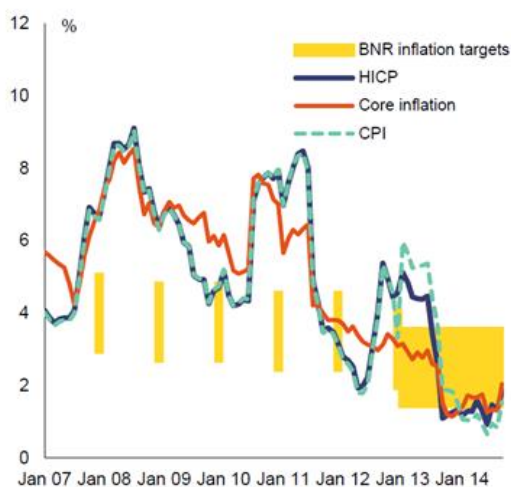
Table 10: Yearly Consumer Price Index

Reference period	CPI TOTALS (%)	CPI Food goods (%)	CPI Non-Food goods (%)	CPI Services (%)
Year 2007	138.8	126.26	147.23	144.82
Year 2008	128.7	115.6	138.43	133.39
Year 2009	121.88	111.96	130.32	122.41
Year 2010	114.88	109.4	118.71	116.82
Year 2011	108.6	103.2	111.83	111.84
Year 2012	105.09	101.28	107.76	106.44
Year 2013	101.07	98.37	102.45	103.16
January 2015	100,33	100,53	100,39	99,81

Source: National Institute of Statistics

Inflation was persistently high in Romania but has been decelerating sharply. The high pre-crisis levels of inflation were not reverted with the 2009 crisis. A succession of upward price shocks resulted in inflation levels well above those in the EU. A sharp drop during the 2008-2009 crisis was followed by strong price increases. In 2011, significant increases in indirect taxation led to an inflation peak of 8.5%. A temporary decrease at the beginning of 2012 was soon reverted, due to the pressure from rising food prices in the second half of the year and phasing out of administrative prices in 2013.

Graph. 5: Inflation



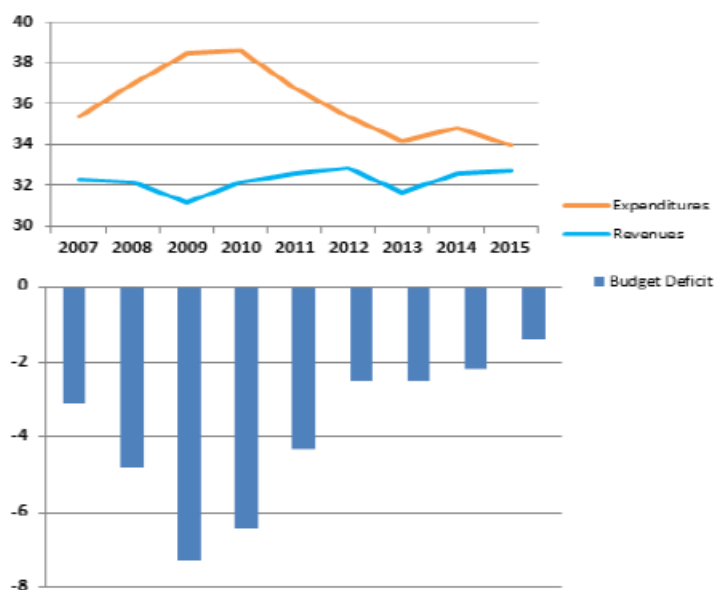
Source: NSI, European Commission

Following a sharp decrease in 2014, inflation is forecast to remain moderate in 2015-2016. After reaching an historical low of 0.9% in June 2014, HICP inflation slightly picked up in recent months.

Annual average inflation declined from 3.2% in 2013 to 1.4% in 2014 mainly reflecting a VAT cut for bread, a good harvest and lower global energy prices. It is forecast to remain at moderate levels and to reach an annual average of 1.2% in 2015, mainly due to the significant decline in energy prices, subdued inflation in the EU and lower inflation expectations. Inflation is forecast to accelerate to 2.5% in 2016 as the recovery in domestic demand continues.

## Fiscal developments

**Graph 6: Government Revenues, Expenditures and Fiscal Deficit (% of GDP)**



Source: World Bank Group

Since 2009, the Government has implemented significant fiscal consolidation, graduating from the EU's excessive deficit procedure in mid-2013. The Government's fiscal deficit was brought down from around 7.3% of GDP in 2009 to 2.0% in 2014. In structural terms, the fiscal deficit was reduced from 7.9% of GDP in 2009 to an estimated 0.7% in 2014 (cash terms).

This was mainly achieved through a combination of cuts in public sector wages and pensions in 2010 and increases in social contributions in 2009 and

the value added tax (VAT) in 2010. Public investment was maintained at around 6% of GDP throughout the crisis. The increased absorption of EU funds has supported the overall fiscal framework, with transfers from the EU amounting to around 1.5–2.0% of GDP per year in recent years. By mid-March 2015, the cumulative absorption of EU Structural and Cohesion Funds had reached around 53% of the total available for the period 2007–2013.

The 2014 budget deficit is estimated to have dropped below 2% of GDP at end-December. In agreement with the IMF and the European Commission, the Government targeted a 2.2% of GDP deficit for the year, down from 2.5% of GDP in 2013, but it failed to spend all money earmarked for investment, including from EU grants.

For 2015, the Government agreed with the IMF and the European Commission on a cash deficit of 1.8% of GDP, while the structural deficit will be 1.0% of GDP, in line with the Medium Term Objective (MTO) under the Fiscal Compact. The cash deficit includes 0.4% of GDP for co-financing EU-funded projects. A big improvement in EU funds absorption is expected to increase the overall revenue figure (31.9% of GDP), which remains very modest compared to the EU average. EU funds are expected to support a substantial improvement in public investments and stimulate growth. The direct effect of the higher inflows of EU funds on the GDP growth rate is expected to be 0.4%.

## 1.4 Macro Indicators

Table 11: Macroeconomic indicators

	1996-2000	2001-2005	2006-2010	2011	2012	2013	2014	2015	2016
<b>Core indicators</b>									
GDP growth rate	-0.2	5.8	3.1	1.1	0.6	3.4	3.0	2.7	2.9
Output gap <sup>1</sup>	-2.4	1.3	4.0	-3.1	-4.1	-2.4	-1.2	-0.8	-0.5
HICP (annual % change)	68.8	18.6	6.2	5.8	3.4	3.2	1.4	1.2	2.5
Domestic demand (annual % change) <sup>2</sup>	0.9	8.2	4.7	1.1	-0.5	-0.9	2.4	2.7	3.1
Unemployment rate (% of labour force) <sup>3</sup>	6.3	7.7	6.5	7.2	6.8	7.1	7.0	6.9	6.8
Gross fixed capital formation (% of GDP)	20.3	22.3	30.5	27.1	27.5	23.8	22.0	22.3	22.5
Gross national saving (% of GDP)	14.1	18.0	20.1	23.1	22.3	23.4	22.2	22.6	22.7
<b>General government (% of GDP)</b>									
Net lending (+) or net borrowing (-)	-4.0	-1.9	-5.2	-5.5	-3.0	-2.2	-1.8	-1.5	-1.5
Gross debt	17.2	21.2	18.3	34.2	37.3	38.0	38.7	39.1	39.3
Net financial assets	n.a.	23.5	-0.1	-15.1	-18.8	n.a.	n.a.	n.a.	n.a.
Total revenue	32.0	32.3	33.3	33.7	33.4	32.9	33.0	32.7	32.4
Total expenditure	36.1	34.2	38.6	39.2	36.4	35.2	34.8	34.2	33.9
<i>of which: Interest</i>	3.8	2.0	1.0	1.6	1.7	1.7	1.6	1.6	1.6
<b>Corporations (% of GDP)</b>									
Net lending (+) or net borrowing (-)	-0.2	-5.6	-1.3	9.5	n.a.	n.a.	n.a.	n.a.	n.a.
Net financial assets; non-financial corporations	n.a.	-82.8	-108.9	-104.8	-112.5	n.a.	n.a.	n.a.	n.a.
Net financial assets; financial corporations	n.a.	-0.4	1.9	7.4	8.4	n.a.	n.a.	n.a.	n.a.
Gross capital formation	10.3	18.0	19.4	14.5	n.a.	n.a.	n.a.	n.a.	n.a.
Gross operating surplus	25.8	23.5	27.3	25.0	n.a.	n.a.	n.a.	n.a.	n.a.
<b>Households and NPISH (% of GDP)</b>									
Net lending (+) or net borrowing (-)	-1.2	2.9	-2.0	-7.7	n.a.	n.a.	n.a.	n.a.	n.a.
Net financial assets	n.a.	34.7	51.4	37.5	45.9	n.a.	n.a.	n.a.	n.a.
Gross wages and salaries	28.7	32.2	32.7	30.2	n.a.	n.a.	n.a.	n.a.	n.a.
Net property income	6.3	2.1	0.9	-1.0	n.a.	n.a.	n.a.	n.a.	n.a.
Current transfers received	20.9	15.9	15.5	15.6	n.a.	n.a.	n.a.	n.a.	n.a.
Gross saving	2.5	-3.5	-3.8	-4.1	n.a.	n.a.	n.a.	n.a.	n.a.
<b>Rest of the world (% of GDP)</b>									
Net lending (+) or net borrowing (-)	-5.5	-4.6	-8.7	-4.2	-3.3	1.1	1.4	1.3	1.2
Net financial assets	n.a.	27.2	58.0	78.5	80.2	n.a.	n.a.	n.a.	n.a.
Net exports of goods and services	-6.4	-7.9	-10.4	-5.6	-5.0	-0.7	0.0	0.0	0.0
Net primary income from the rest of the world	-1.1	-2.2	-2.5	-1.3	-1.8	-2.5	-2.4	-2.5	-2.5
Net capital transactions	0.2	0.6	0.4	0.5	1.4	2.2	2.4	2.4	2.4
Tradable sector	63.6	58.5	52.7	50.6	50.9	50.3	n.a.	n.a.	n.a.
Non-tradable sector	27.5	30.9	36.3	37.1	36.9	38.0	n.a.	n.a.	n.a.
<i>of which: Building and construction sector</i>	5.6	6.2	9.5	8.0	8.5	6.6	n.a.	n.a.	n.a.

Source: European Commission



## 2. Electricity sector

### 2.1 Electricity production / consumption / import – export

The Romanian electricity market shows excellent growth perspectives reflecting the great potential of exploitable natural resources combined with the need for replacement and refurbishment of energy production facilities.

Romania has a balanced portfolio of generation capacity comprising hydro (36%), nuclear (19%), coal (33%) and gas-fired power plants (10%), with renewables (other than hydropower) representing a small but rapidly growing subsector of the generation market.

In 2010, the gross generation capacity was over 20GW, while the net generation capacity was approximately 17GW (increasing from 16.1GW in 2009), giving Romania the largest generation sector in South- East Europe. As at January 2012, Romania's gross installed capacity had risen to approximately 22 GW, an increase mainly driven by the development of wind generation.

**Table 1: Resources in Romania**

thousand tonnes oil  
equivalent

	01.01.2015-28.02. 2015			01.01.2015-28.02. 2015 as against 01.01.2014-28.02. 2014					
				Differences (±)			- % -		
	Total	Production	Import	Total	Production	Import	Total	Production	Import
<b>Resources – total</b>	<b>5333.9</b>	<b>3749.7</b>	<b>1584.2</b>	<b>-15.4</b>	<b>151.3</b>	<b>-166.7</b>	<b>99.7</b>	<b>104.2</b>	<b>90.5</b>
of which:									
Net coal	932.4	819.1	113.3	87.8	43.5	44.3	110.4	105.6	164.2
Crude oil	1674.5	611.3	1063.2	-118.9	-10.2	-108.7	93.4	98.4	90.7
Usable natural gas	1495.9	1443	52.9	-171.3	10.5	-181.8	89.7	100.7	22.5
Hydroelectric energy, nuclear – electric energy and electric energy from imports	889.3	876.3	13	114	107.5	6.5	114.7	114	200
Petroleum products from imports	265.2	-	265.2	72.7	-	72.7	137.8	-	137.8

Source: National Institute of Statistics

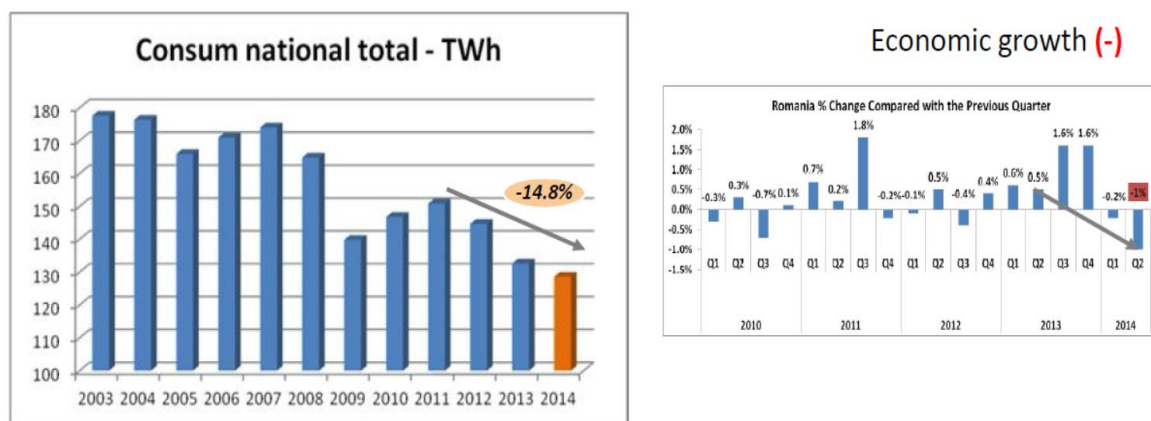
During 01.01.-28.02.2015, primary energy resources decreased by 0.3%, while those of electricity increased, as compared to the same period of previous year, by 3.9%.

The main primary energy resources during 01.01.-28.02.2015 amounted to 5333.9 thousand tonnes oil equivalent 1 (toe), decreasing by 15.4 thousand toe as against 1.1.-28.11. 2014.

Domestic production amounted to 3749.7 thousand tonnes, increasing by 4.2% as against the same period of previous year, while imports amounted to 1584.2 thousand toe, decreasing by 9.5%.

The final consumption of electric energy during this period was 8385.8 million KWh, by 4.1% lower as against the corresponding period of 2014.

Graph. 1: Total national consumption & Economic growth



Source: GDF Suez

Table 2: Net available power and consumption values.

2013 (MW)	Jan	Feb	March	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
<b>Net available power</b>	18914	18956	19076	19152	19152	19179	19375	19375	19375	19824	19900	20082
<b>Consumption</b>	7568	7248	6422	6224	5933	6597	5995	6120	5817	6142	6501	7427

Source: CN Transelectrica SA

Currently, electricity demand is fully met by domestic electricity production in Romania.

Romania has again become a net electricity exporter in 2013, after having to import electricity in 2012, a year affected by drought. Romanians used 5% less energy in 2013, and the country managed to sell its surplus electricity abroad.

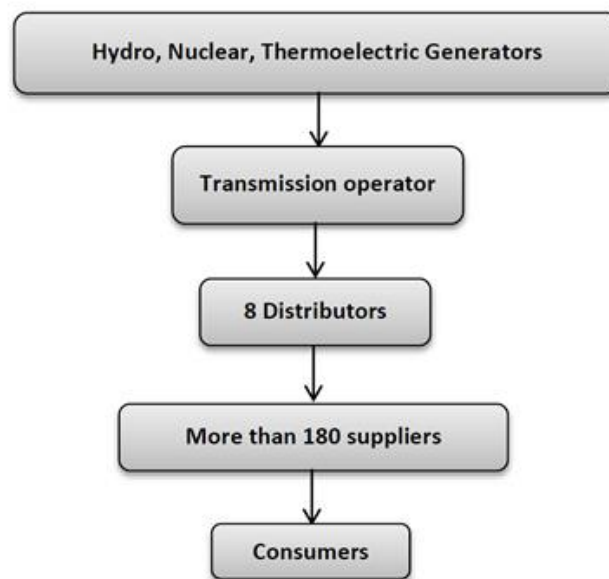
Romania exported 4.7 TWh of electricity in 2013, or 8.5% of the total national consumption. The country imported just 2.7 TWh, or 4.8% of the total consumption, according to data from The European Network of Transmission System Operators for Electricity (ENTSO-E).

Last year, electricity exports reached 9.936 GWh, exceeding twice the 2013 level.

## 2.2 Electricity market & main players

The Romanian electricity market has been fully liberalized since 1 July 2007. However, in practice, a large regulated electricity supply market has continued to exist thereafter. Consequently, electricity is supplied under two systems: the regulated market (44%), which covers households and part of the industrial sector, and the competitive market (56%), mainly represented by large industrial consumers.

Chart 1: Chain of electricity delivery in Romania



Source: KPMG Report & ANRE

As presented in the figure above the chain of delivery for the energy market starts with the generators. Table 1 presents the annual quantities of electricity (separately for producers with a production of more than 1000 GWh) of producers with dispatchable units, subject to market monitoring activities. It is also noted that the first 6 producers (with an annual production in 2013 of more than 1 TWh) represent approximate 85.93% of the total annual production registered by producers with dispatchable units.

The electricity transmission system is operated, maintained and further developed by Transelectrica, a natural monopoly owned by the state.

Table 3: Main producers of electricity

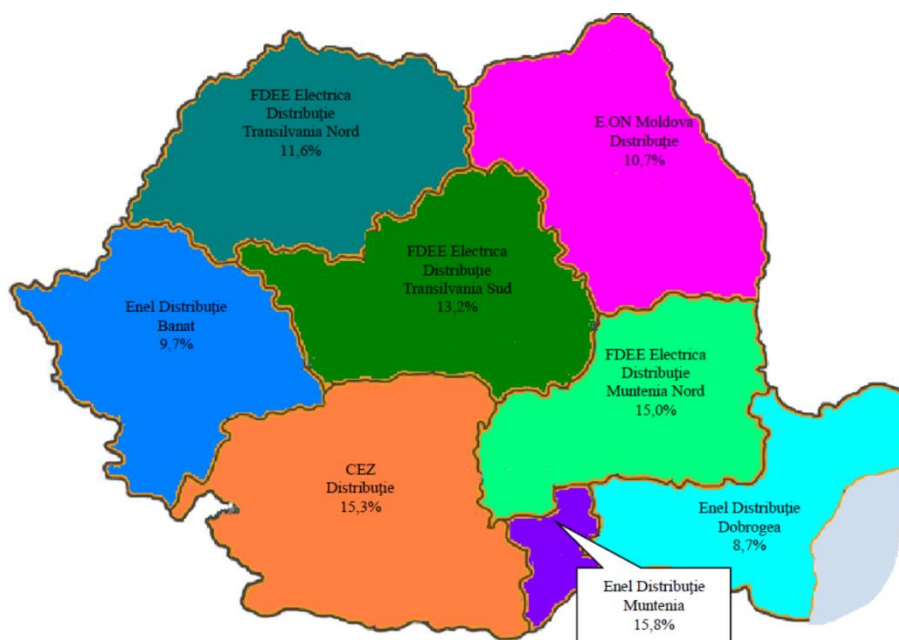
Producer	Electricity generated	
	TJ	GWh
S.C. Hidroelectrica S.A.	4116	14819
S.C. Complexul Energetic Oltenia S.A.	3285	11827
S.N. Nuclearelectrica S.A.	3227	11618
S.C. OMV Petrom S.A.	958	3447
S.C. Complexul Energetic Hunedoara S.A.	837	3014
S.C. Electrocentrale București S.A.	767	2762
Other dispatchable generators (including wind)	2303	8290
<b>TOTAL</b>	<b>15493</b>	<b>55777</b>

Source: Annual reports of producers

Regarding the distributors on the Romanian energy market, there are a number of 8 main operators that divided the market geographically: CEZ, Electrica Distribution Muntenia North, Enel Muntenia, Electrica Distribution Transylvania South, Electrica Distribution Transylvania North, EON Moldova Distribution, Enel Distribution Banat and Enel Distribution Dobrogea.

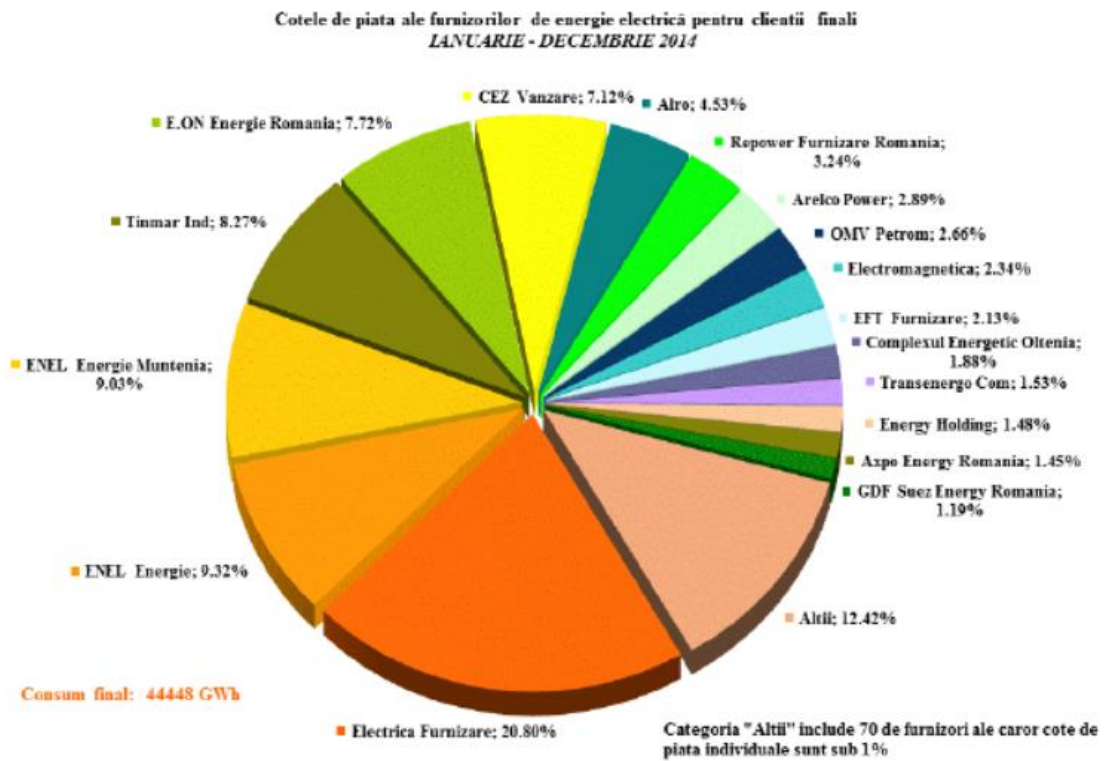
Between the most important suppliers operating on the energy market in Romania we mention: EON, CEZ, Enel, Electrica, Alpiq, GDF Suez, Biol, etc.

Map 1: Share of electricity distributed by concessionaire distribution operators of the total electricity



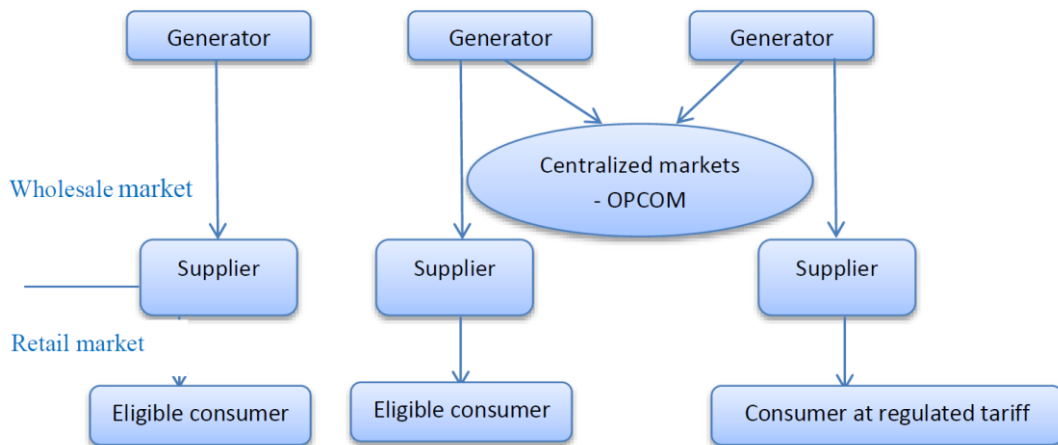
Source: Regulatory Authority for Energy

Graph. 4: Market shares of suppliers for final customers  
January – December 2014



Source: Romanian Energy Regulatory Authority

Chart 2: Wholesale and retail energy markets



Source: Energy Area

## 2.3 Regulatory institutions, associations & electricity companies

- ***The Ministry of Economy, Trade and Business Environment (MECMA)*** - has the mission to generate and implement macro-economic policies for the development of the national economy. The ministry follows the government programme strategy in the field of industry, mineral resources, energy, trade, SMEs, cooperatives and the business sector, applying market economy principles and supporting economic agents' initiatives.
- ***Ministry of the Environment and Climate Change (MMSC)*** - the central competencies within the field of climate change adaptation are assigned to the Ministry of Environment and Climate Change through the Directorate for Climate Change.
- ***National Energy Regulatory Authority (ANRE)*** - ANRE is the Romanian regulatory authority for energy, acting as an independent body responsible for regulating and ensuring a competitive electricity and gas market environment. ANRE provide sustainable development of the national economy, diversification of the energy resources, establishment and functioning of a competitive energy market, granting nondiscriminatory and regulated access to the energy market and to the public electrical networks to all participants, ensuring transparency with respect to the determination of any tariffs, taxes and prices in the energy sector, environment protection etc.
- ***Transelectrica SA*** - The transmission system operator (**TSO**) in Romania, responsible for electricity transmission, system operation and market, ensuring the safety of the National Power System (NPS).
- ***Market Operator of Electricity and Gas (OPCOM)*** fulfils the role of the electricity market administrator, providing an organized, viable and efficient framework for the commercial trades' deployment on the wholesale electricity market and performs administration activities of the centralized markets in the natural gas sector, complying with the consistency, correctness, impartiality, independence, equidistance, transparency and non-discrimination conditions.
- ***Competition Council*** - Competition Council is an autonomous administrative body aimed at protecting and stimulating competition in order to ensure a normal competitive environment, with a view towards the consumers' interests. Competition Council's role has two major dimensions: a corrective dimension – restoring and maintaining a normal competitive environment and a preventive dimension – monitoring markets and observing the behavior of the actors participating in such markets.

### Associations

- [Agency for Energy Efficiency & Environment Protection](#)
- [Center for Promotion of Clean & Efficient Energy \(ENERO\)](#)
- [Romanian Wind Energy Association](#)
- [Romanian Photovoltaic Industry Association](#)
- [Romanian Small Hydropower Association \(ROSHA\)](#)
- [Employers Association "New Sources of Energy"](#)

➤ [Federation of Associations of Energy Utility Companies \(ACUE\)](#)

## List of electricity providers

### *Suppliers of last resort*

- CEZ Vanzare SA;
- ENEL Energie SA;
- E.ON Energie Romania SA;
- ENEL Energie Muntenia SA;
- Electrica Furnizare SA;

**Table 4: Electricity Producers exploiting dispatchable generation units and operates in the electricity market as a supplier of electricity**

1	CE Hunedoara SA	10	Lukoil Energy & Gaz Romania SRL
2	CE Oltenia SA	11	Modern Calor SA
3	CET Arad SA	12	OMV Petrom SA
4	CET Govora SA	13	OMV Petrom Wind Power SRL
5	Dalkia Termo Prahova SRL	14	RAAN
6	Ecogen Energy SA	15	SN Nuclearelectrica SA
7	Electrocentrale Bucuresti SA	16	SNGN Romgaz SA
8	Enet SA	17	TEN Transilvania Energy SRL
9	Hidroelectrica SA	18	WDP Development RO SRL

**Table 5: Electricity Suppliers**

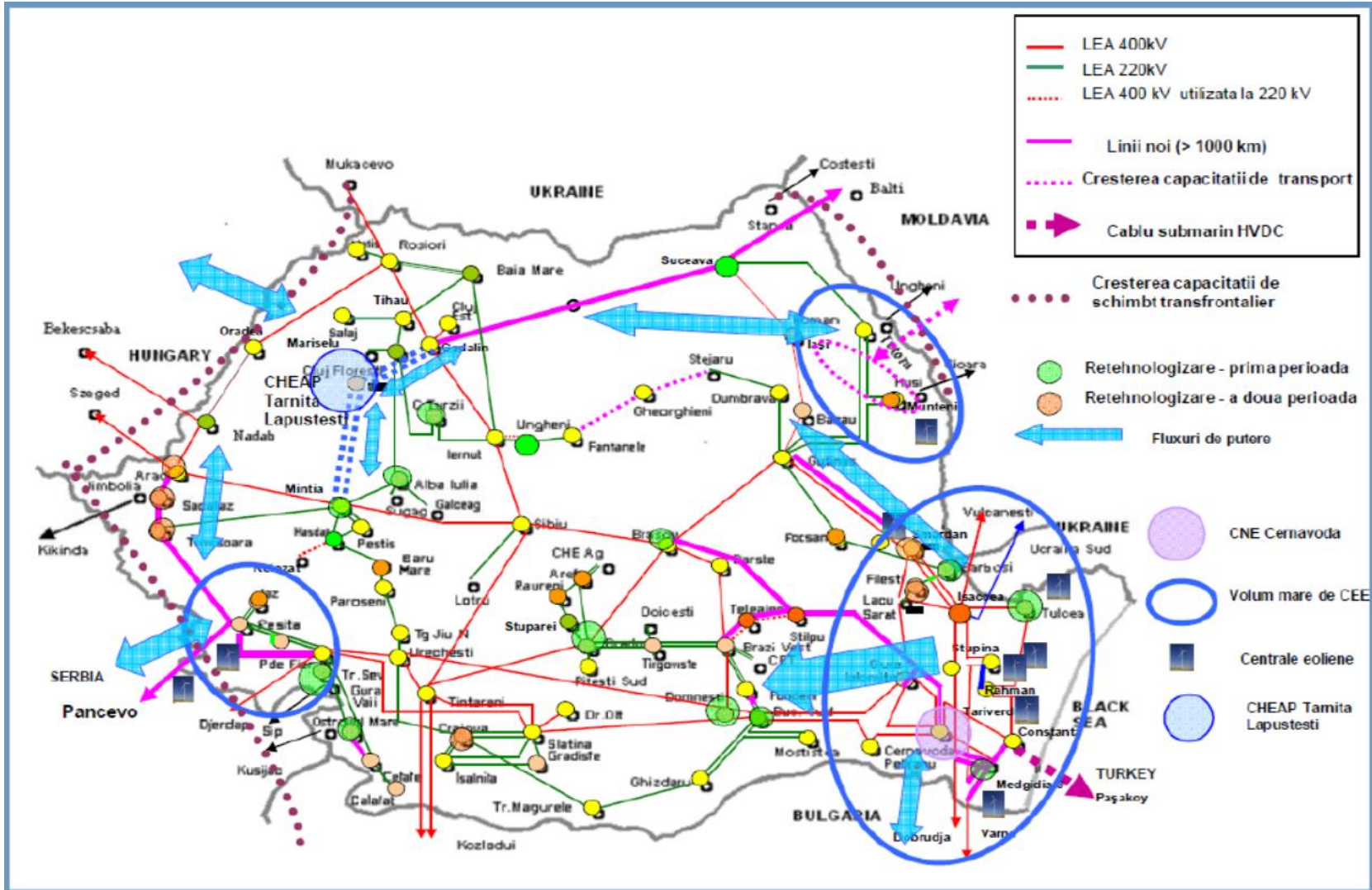
1	SC A Energy Ind SRL	31	SC General Com Invest SRL
2	SC Aderro G.P. Energy SRL	32	SC Getica 95 COM SRL
3	SC Alpiq RomIndustries SRL	33	SC Grivco SA
4	SC Alro SA	34	SC Hermes Energy International SRL
5	SC AMV Style SRL	35	SC ICCO Energ SRL
6	SC Arelco Power SRL	36	SC ICPE Electrocond Technologies SA
7	SC Axpo Energy Romania SA	37	SC Industrial Energy SA (ex Romenergo)

8	SC Belectric Energy Trading SRL	38	SC Inversolar Energy SA
9	SC Biol Energy SRL	39	SC KDF Energy SRL
10	SC C-Gaz & Energy Distributie SRL	40	SC Luxten LC SA
11	SC EFE Energy SRL	41	SC Menarom PEC SRL
12	SC EFT Furnizare SRL	42	SC Monsson Energy Trading SRL
13	SC Electricom SA	43	SC Neptun SA
14	SC Electrificare CFR SRL	44	SC Nova Power&Gas SRL (ex TEN Gas)
15	SC Electromagnetica SA	45	OET Obedineni Energini Targovtsi
16	SC Elsaco Energy SRL	46	SC P.C. Management & Consulting SRL
17	SC Enel Trade Romania SRL	47	SC Polimed Energy Trading SRL
18	SC Elsid SA	48	SC QMB Energ SRL
19	SC Energotrans SRL	49	SC Renovation Trading SRL
20	SC Energy Distribution Services SRL	50	SC Repower Furnizare Romania SRL
21	SC Energy Holding SRL	51	SC Romenergy Industry SRL
22	SC Energy Market Consulting SRL	52	SC RWE Energie SRL
23	SC Energy Network SRL	53	SC Tinmar Ind SA
24	SC Enex SRL	54	SC Transenergo Com SA
25	SC Enol Grup SA	55	SC Transformer Energy Supply SRL
26	SC Entrex Services SRL	56	SC Three Wings SRL
27	SC Eolian Project SRL	57	SC UGM Energy Trading SRL
28	SC Fidelis Energy SRL	58	SC Verta Tel Bucuresti SRL
29	SC GDF SUEZ Energy Romania SA	59	SC Werk Energy SRL
30	SC GDM Logistic SRL		

Source: ANRE



## 2.4 Power Transmission Grid (PTG) 2014-2023



Source: Transelectrica - Power Transmission Grid (PTG) Perspective Plan 2014 – 2023

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### 3. Renewable energy – Rule system

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#### 3.1 Main laws and regulations

- Energy *Law No. 13/2007* regarding the general legal framework for carrying out the production of electricity together with thermal energy produced in cogeneration;
- *Law No. 134/2012* regarding the approval of Emergency Ordinance No. 88/2011 Amending and Complementing Law No. 220/2008 Establishing a System for the Promotion of Electricity Generation from Renewable Energy Sources;
- *Law No. 127/2014* regarding the Amendment and Completion of Law No. 123/2012 on Electricity and Natural Gases and of Law No. 283/2004 on Petroleum;
- *Law No. 122/2015* regarding the approval of some measures for promoting electricity from renewable energy sources and also for amending and supplementing some normative acts was published in the Official Gazette. The purpose of this law is to revitalize the renewable energy market and support the companies owning projects from renewable energy sources with capacities smaller than 3 MW by enabling them the possibility to sign bilateral agreements. Another important measure through which it is wanted the continuous flow of the Green Certificates market is by introducing the obligation to purchase green certificates quarterly.
- *Order No. 42/2011* subsequently amended by Order No. 37/2012 and Order No. 55/2013 regarding the approval of the Regulation for the accreditation of producers of RES-Electricity for the application of the GCs promotion scheme;
- *Order No. 43/2011* subsequently amended by Order No. 56/2013 regarding the approval of the Regulation for issuance of GCs;
- *Order No. 57/2013* regarding the approval of the Regulation for the organization and functioning of the GC market;
- *Order No. 45/2011* regarding the approval of the Methodology for the establishment of the annual acquisition quota of GCs;
- *Government Decision No. 1232/2011* regarding the approval of the Regulation certifying the origin of electricity produced from renewable energy sources.
- *Government Decision No. 713/2013* approving Order No. 48/2013 regarding the endorsement of the Regulation for obtaining the licenses and authorizations in the electricity field;
- *Order No. 59/2013* to approve the Regulation for the connection of users to electricity grids of public interest;
- *Government Decision No. 1069/2007* regarding the approval of the "National Energy Strategy 2007-2020";
- *Law No. 123* as of July 10, 2012 for electric energy and natural gas came into force on July 19th, 2012 and established the procedures of electricity transactions that are to take place exclusively on the competitive market managed by the Romanian Power Market Operator (OPCOM) in a transparent, public, centralized and non-discriminating manner.

The above mentioned legislation has been supplemented by national legislation that transposes, in its entirety, the EU Acquis dealing with energy efficiency and developed the needed support instruments for RES, including timeframes for implementation.

Specific national legislation includes the regulation of the ANRE (Romanian Energy Regulatory Authority).

### *Governmental Decisions and basic Regulations to set up and operate the GCs market*

- ANRE's *Order No. 60 of April 1st 2015* approving the Regulation of organization and functioning of the green certificates market;
- *Governmental Decision No. 224/2014* approving the annual quota for electricity generated from renewable energy sources for 2014 which benefit from the Green Certificate Scheme;
- *ANRE Methodology from 16.06.2014* for defining the annual quota for electricity generated from renewable energy sources which benefit from the Green Certificate Scheme;
- *Decree No. 14/2014* on actualizing the limiting values for the transaction of green certificates and the value of non-purchased green certificates, applicable for 2014
- *Government Decision No. 958/18.08.2005* modifying the GD no. 443/2003 regarding the promotion of electricity generation from renewable sources and modifying and supplementing the GD no. 1892/04.11.2004 determining the system to promote electricity generation from renewable sources, published in the OG no. 809/06.09.2005;
- *Government Decision No. 1429/02.09.2004*, Decision for the application of the Regulation certifying the origin of electricity generated from renewable sources; published in the OG Part I, no. 843 / 15.09.2004
- *Directive 2009/28/EC* of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC
- *Government Decision no. 1535/2003* regarding the approval of renewable energy promotion strategy;
- *Government Decision No 163/2004* regarding the approval of the National Strategy for Energy Efficiency.
- *Government Decision* regarding the approval of the Plan with existing and planned activities to promote electricity generation and consumption from renewable sources, published in the OG Part I, no. 1036/22.11.2005;
- ANRE's Order regarding approval of the change in the compulsory quota of green certificates (GC) purchase by electricity suppliers in 2005, published in the *OG Part I, no. 1158/21.12.2005*;
- Regulation for the organization and operation of the green certificates market, issued by ANRE and approved by *Order no. 40/17.10.2005* published in Romania's Official Gazette no. 938, Part I / 20.10.2005;
- Convention of participation to the GC market, approved under ANRE's *Notice no. 6/17.03.2006*.

Table 1: Green Certificates Market

<b>2015</b>	
Total Number of Green Certificates issued for E-RES produced in 2015 by the Participants registered at GCM, communicated at OPCOM S.A. until 14th May 2015	<b>3171153</b>
Total Number of Green Certificates cancelled, until 14th May 2015	<b>3787</b>
Number of Green certificates traded on Centralized Market for GC until the 14rd May, from those issued by the TSO for E-RES produced in 2015, communicated at OPCOM S.A. until 8th May 2015.	<b>1301</b>
-from which traded directly by producers that received them from TSO:	<b>1301</b>
Number of Green Certificates transferred until the 14th May 2015 on Bilateral Contracts Market for GC, from those issued for the E-RES produced in 2015.	<b>524060</b>
Number Green Certificates from E-RES produced in 2015 and reserved by the Producers of E-RES registered at GCM, which are also suppliers, for the fulfillment of their own quota and communicated at OPCOM S.A., until 14th May 2015.	<b>50857</b>
Number Green Certificates available for transaction, from those issued by TSO for the E-RES produced in 2015, until 14th May 2015.	<b>2591148</b>
Number Green Certificates available for transaction, from those issued by TSO for the E-RES produced in 2014 and in 2015, communicated at OPCOM S.A. until 14th May 2015.	<b>4228289</b>

Source: Romanian gas and electricity market operator

### 3.2 Generating RES-Electricity

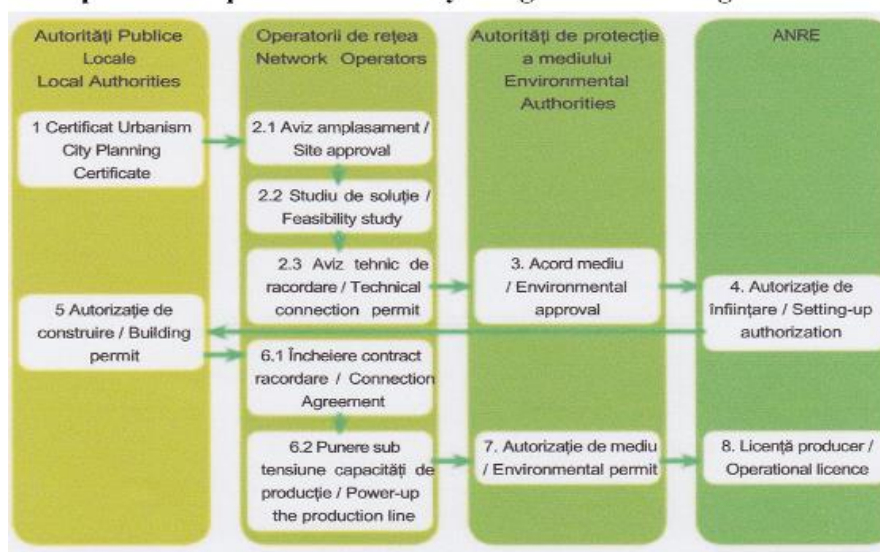
The authorization procedure involves several factors such as: the local City Hall, the Romanian Regulatory Authority for Energy (ANRE), the area grid exclusive distributor, the Energy Market Operator (OPCOM) and Transelectrica (TSO). The authorizations are awarded in principle subject to the execution of a feasibility study, an environmental impact assessment and based on a financial assessment.

#### Necessary steps for starting-up a generation capacity based on E-RES

- obtaining the authorizations and approvals needed for building-up the generation capacity;
- building up the generation capacity;
- obtaining the generation license;
- obtaining the qualification certificate for the electricity priority production;
- registration at the Electricity Market Operator (SC OPCOM SA) – for selling E-RES on the DAM (Day Ahead Market);
- registration at TSO (CN TRANSELECTRICA SA) – for obtaining the green certificates (GC);
- registration at the Green Certificates Market Operator (SC OPCOM SA) – for participating on the centralized market of the green certificates.

Chart 1:

**The phases of a production facility using RES according to PNAER**



Source: PNAER – (TPA Horwath)

### 3.3 Access of RES-Electricity to the electricity network

The Regulation for connection of users to the public interest energy network, approved by the ANRE Order No. 59/2013 dated 2 August 2013 (the “Connection Regulation”) provides that any applicant who intends to connect to the grid must obtain a technical connection approval and conclude a connection agreement with the grid operator.

Access to the national grid can only be restricted if this affects the safety of the national energy system. In addition, as per Law 220/2008, the TSO (Transelectrica) or the DSO (Distribution System Operator), as the case may be, has an obligation to grant RES Electricity producers access to the national grid with priority, to the extent that the safety of the national energy system is not affected thereby.

In line with the promotion of RES-Electricity, the competent authorities must establish technical and commercial rules for:

- guaranteed access to electricity grid and priority dispatch of RES-Electricity and high efficiency cogeneration;
- priority access to electricity grid and priority dispatch of RES-Electricity and high efficiency cogeneration in generating facilities with installed power under 1 MW, if the safety of national grid is not affected.

Upon completion of the construction works and conclusion of the taking-over certificate, the renewable energy producer shall, among others, have the obligation to energize the utilization installation and obtain the grid connection certificate. The technical connection approval is required before commencing any grid connection or grid reinforcement works. The technical connection approval is valid until the issuance of the grid connection certificate. Also, the technical connection approval shall cease its validity, among others, if, within 12 months as of its issuance, the relevant connection agreement has not been concluded. After obtaining the technical connection approval, the applicant and the grid operator that issued the technical connection

approval enter into a connection agreement, based on which the grid operator will ensure the design, construction and commissioning of the connection installation.

### 3.4 RES-Electricity promotion system & incentives

#### ***GREEN CERTIFICATES MARKET***

***OPCOM – Green Certificates Market Operator*** – legal person which assures Green Certificates trading and determines the prices on the Centralized Green Certificates Market, performing the functions established by the Regulation for organizing and functioning of the Green Certificates Market (Order no. 15 / 2005 issued by ANRE ).

***Green Certificate*** – Document which proves that a quantity of 1 MWh of electricity was produced from renewable energy sources.

***Quota Obligation System*** – Mechanism used to promote the production of electricity from renewable energy sources by means of the acquisition by the suppliers of a specified quota of electricity produced from renewable energy sources in order to sell it to their consumers.

*The functioning of the quota obligation system to promote the electricity produced from renewable energy sources supposes the following phases:*

- The Regulator Authority establishes a fixed quota of electricity produced from renewable energy sources which the suppliers are obliged to buy.
- The Regulator Authority yearly qualifies the producers of electricity from renewable energy sources in order to receive Green Certificates.
- The Producers receive for each unit of electricity delivered into the network, (1 MWh), a Green Certificate, which can be sold separately from the electricity which produced them, on the Green Certificates Market.
- In order to fulfill their obligation, the suppliers have to own a number of Green Certificates corresponding with the quota of electricity produced from renewable energy sources imposed.
- The Green Certificates value represents an additional income received by the producers for the “clean” energy that they deliver into the network.
- The price of electricity sold is determined on the electricity market
- The additional price received for the Green Certificates sold is determined on a parallel market, separated from the electricity market, where are traded the environmental benefits of the “clean” electricity production.

The system for promoting electricity production from renewable energy sources applies to electricity generated from:

- Hydro energy used in the power stations whose installed power is less than 10 MW
- Wind energy
- Solar energy

- Geothermal energy
- Biomass
- Bio-liquids
- Waste fermentation gas
- Gas from the fermentation of sludge from the used water cleaning plants.

The Green Certificates Value is determined by means of the market mechanisms:

- Bilateral contracts negotiated between producers and suppliers;
- On a Centralized Market organized and administrated by OPCOM.

The price of Green Certificates varies in a range established by Government Decision. The minimum price is imposed in order to protect the producers and the maximum price to protect the consumers.

For the period 2008-2014 the trading value of Green Certificates ranged between a minimum value of 27 euro/certificate and a maximum value of 55 euro/certificate. The value in Romanian Currency (Lei) will be calculated at the exchange rate determined by Romanian National Bank as the average exchange rate for the month of December of the previous year. (Law 220/27.10.2008).

Electricity is traded separately from Green Certificates.

The main players involved:

- Romanian Energy Regulatory Authority – ANRE;
- Producers which own technologies that use renewable energy sources to produce electricity;
- Suppliers;
- Transport and System Operator - TRANSELECTRICA;
- Romanian Electricity Market Operator – OPCOM.

Mandatory annual quotas for the electricity produced from renewable energy sources in the final national consumption (E-RES) for the period 2008 – 2020 are shown in table 1:

**Table 2: Mandatory annual quotas of green certificates**

Year	Annual obligatory quota Law 220/2008 (%)	Annual obligatory quota based on the new modified law 220/2008 (%)
2008	5,26	
2009	6,28	
2010	8,30	8,3
2011	8,30	10,0
2012	8,30	12,0
2013	9,00	14,0
2014	10,00	15,0
2015	10,80	16,0
2016	12,00	17,0
2017	13,20	18,0
2018	14,40	19,0
2019	15,60	19,5
2020	16,80	20

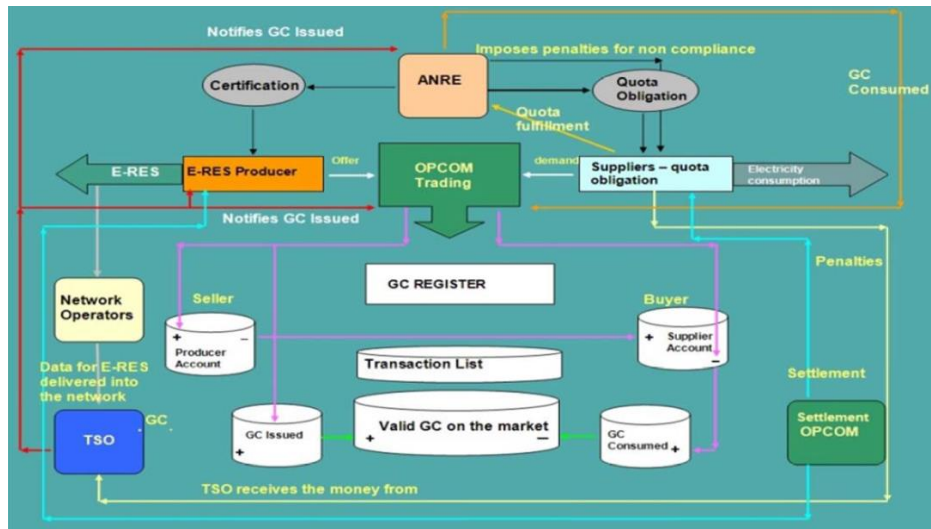
Source: "Biogas In" - Intelligent Energy Europe

## Validity of GC

The validity period of GCs shall be decreased from 16 months to 12 months.

## Functionality of GCs market

Chart 2: Functionality of GCs market



Source: Romanian Gas and Electricity Market Operator

## ROLES OF INSTITUTIONS

Table 3: Roles of institutions

ANRE	<ul style="list-style-type: none"> <li>✓ Qualify electricity producers which use RES eligible sources, to participate on the Green Certificates Market;</li> <li>✓ Can modify the yearly mandatory quota in the period 2005- 2007, in the first decade of December, when the installed capacity in the power plants which use RES cannot assures the demand of Green Certificates;</li> <li>✓ Controls the mandatory quota fulfilment by the suppliers;</li> <li>✓ Applies penalties for quota non-fulfilment.</li> </ul>
SUPPLIERS	Suppliers are obliged to buy yearly a number of Green certificates equal with the mandatory quota multiplied with the amount of electricity sold yearly to their final consumers.
TRANSELECTRICA	<ul style="list-style-type: none"> <li>✓ Monthly receives from the producers and the Network Operators where the producers are connected notifications concerning the quantities of electricity from RES delivered into the network;</li> <li>✓ Monthly issues Green Certificates to producers for the quantity of E- RES produced and delivered into the network in the previous month;</li> </ul>

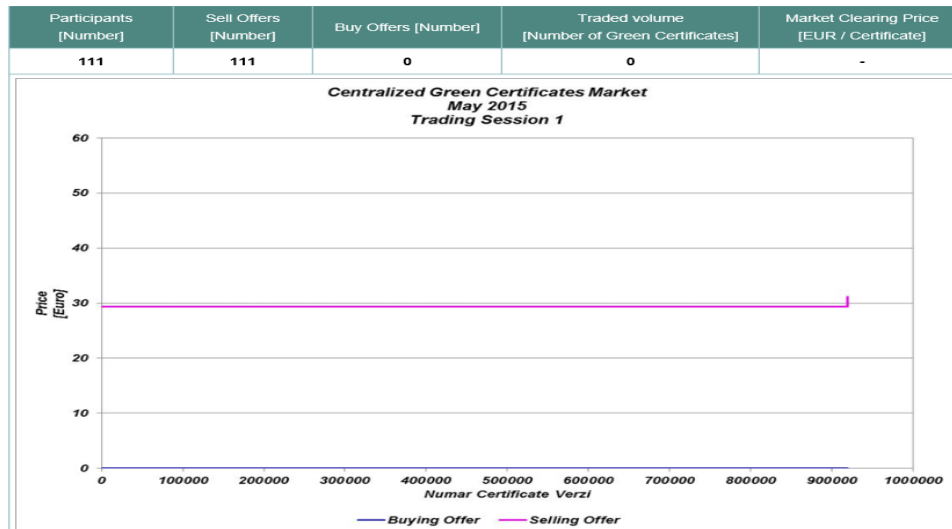


(TRANSPORT & SYSTEM OPERATOR )	<ul style="list-style-type: none"> <li>✓ Collects the amount of money corresponding to the penalties from the suppliers which non fulfilled their quota at the end of the period of conformity.</li> <li>* The amount of money resulted from the enforcement of the penalties, collected by Transelectrica is allocated yearly by ANRE, based on objective criteria, for investments, to facilitate the access to the transport/distribution networks. (Law 220/27.10.2008)</li> </ul>
OPCOM	<ul style="list-style-type: none"> <li>✓ Registers the participants on the Green Certificates Market;</li> <li>✓ Forecasts and publishes the demand and the offer of Green Certificates Market at the national level;</li> <li>✓ Registers the bilateral contracts for Green Certificates trading between the electricity producers from RES and the electricity suppliers;</li> <li>✓ Set up and administrates the Green Certificates Register;</li> <li>✓ Provide the trading framework for the Green Certificates Market on the Centralized Green Certificates Market;</li> <li>✓ Receives the sell/buy offers for Green Certificates from the Producers/Suppliers;</li> <li>✓ Determines and publishes the Centralized Green Certificates Market Clearing Price and the number of Green Certificates traded each month on the Centralized Green Certificates Market;</li> <li>✓ Publishes each month the cumulated demand and the cumulated offer of Green Certificates for the current year;</li> <li>✓ Determines the payment obligations and the receiving rights for the Centralized Green Certificates Market participants.</li> </ul>

***The Centralized Green Certificates Market assures:***

- ✓ Competition, transparency, non-discrimination
- ✓ Trading prices reduction
- ✓ Determination of the reference prices for other transactions on the Green Certificates Market.

Graph 1: Centralized Green Certificates Market May 2015



Source: Romanian Gas and Electricity Market Operator

**Centralized Green Certificates Market functioning:**

- ✓ OPCOM registers participants on the Centralized Green Certificates Market.
- ✓ The Participants send monthly sell or buy offers, in the Offer Interval.

**Green Certificates Market Operator:**

- ✓ Undertakes the offers and transmits receiving confirmations
- ✓ Validates the offers and transmits Notifications concerning the offers acceptance or rejection.
- ✓ During the Transaction Day, determines the number of Green Certificates traded and the Centralized Green Certificates Market Clearing Price (CGCMCP)
- ✓ Elaborates and transmits to each participant the Settlement Notes

The number of green certificates received by the producers depending upon the renewable source that they use has been amended as follows:

Table 3: Promotion system for RES-Electricity

RES	Type of power plant/group	GC/MWh	GCs/MWh as of 1.1.2014	Support period (years)	GCs suspension <sup>9</sup>
1. Hydro (used in power plants with installed power ≤10 MW)	New (commissioned as of 1 January 2004)	3 GC	2.3	15	1 GC
	Upgraded/refurbished	2 GC		10	
	Commissioned prior to 1 January 2004 and not upgraded	0.5 GC		3	
2. Wind energy	(new)	2 GC until 2017	1.5	15	1GC
		1 GC as from 2018	0.75		
	Second-hand	2 GC until 2017		7	
		1 GC as from 2018			
3. Biomass (regardless of its aggregation form)	(new) – from all types of bio waste	2 GC		15	
	(new) – from energy crops	3 GC		15	
	High efficiency cogeneration (additional to GC for biomass plants mentioned above)	1 additional GC		15	
4. Landfill gas and sewage treatment plant gas	(new)	1 GC		15	
5. Geothermal	(new)	2 GC		15	
6. Solar Energy	(new)	6 GC	3	15	2 GCs

Source: Wolf Theiss "RES-Electricity in Romania"

### Support schemes

The main support schemes for renewable energy in Romania are:

- Promoting system of green certificates consisting of a system of mandatory quotas combined with green certificates ("GC") trading;
- Financing scheme based on Environmental Fund resources;
- Financing scheme based on EU structural funds;
- Support for joint implementation projects through Emission Reduction Units ("ERUs").

### GCs promotion system

The promotion system combines the mandatory quota system with the trading of green certificates. On the basis of an accreditation decision issued by ANRE and starting on the calendar month when the accreditation decision has been issued, renewable energy producers benefit from green certificates for the electricity produced and delivered.

In July 2011, the Commission approved the Romanian green certificate support system for promoting electricity from renewable energy sources.

Depending on the type of green energy and technology used, producers are awarded a number of certificates for every megawatt of green energy produced and delivered to the grid.

The certificates come in the form of bonds that can be traded on a special market independently of the amount of electricity they account for.

Electricity suppliers need to purchase a mandatory quota of green certificates and fully pass on the costs of the green certificates to end consumers.

An important aspect of Promotion of Electricity produced from Renewable Energy Sources (E-SRE), established by law, is that transmission system operators and distribution system operators must provide with priority the access to the grid system of electricity produced from renewable energy sources.

### Overcompensation

Overcompensation is defined as the situation in which, taking into consideration the specific average technical and economic indicators achieved for a period of minimum 3 years for each technology, from the cost-benefit analysis performed for the set of generation capacities using the same technology, it results an internal rate of return higher by 10% than the value considered for the relevant technology when authorizing the promotion system.

Cost-benefit analysis means the economic analysis performed in view of determining the profitability of investments made in the production of electricity from renewable sources, carried out by using the updating technique applied to the investment costs, the exploitation costs and the revenues resulting from the operating life of the projects.

Internal rate of return is the indicator resulting from a cost-benefit analysis expressing the profitability of an investment project, namely the discounting rate for which the discounted incomes equal the discounted expenditures.

Starting 1 January 2014, according to the Government emergency ordinance no.57/2013 ("GEO 57/2013") for the amendment and supplementation of Law no. 220/2008 ("Law 220/2008") on the establishment of the promotion system for the production of energy from renewable energy sources has been approved by Law no. 23/2014, with the following significant amendments and supplementations:

- 0.7 green certificates for each MWh produced and delivered, if the hydroelectric plants are new, with a maximum power installed of 1MW;
- 0.5 green certificates, until 2017 and 0.25 green certificates starting from 2018, for each 1 MWh produced and delivered by wind power producers;
- 3 green certificates for each 1MWh produced and delivered by solar power producers.

The number of GCs was reduced to 1.5 GCs/MWh until 2017 and to 0.75 GCs/MWh starting with 2018, due to overcompensation calculations – affecting the producers accredited after January 1, 2014.

## FUNDS

### Programmes co-financed by the EU

In its effort to contribute to tackling climate change, the European Union has created a strong framework at strategic level and at regulation level. Part of this effort is highlighted through the *Europe 2020 - A strategy for competitive, sustainable and secure energy* which calls for the

transformation of the European Union into a smart, sustainable and inclusive economy and sets, among others, a priority area on climate and energy; however, the strategy is seen as the first step to prepare the European Union for the greater challenges which it may have to face by and after 2020.

The 20/20/20 objectives, established through the regulation (20% increase of RES, 20% increase of energy efficiency, 20% decrease in GHG emissions) is thought to be delivered through a set of regulation which includes the Renewable energy directive and the Energy efficiency directive (EED).

**Table 4: Romania's Europe 2020 targets**

National EU 2020 targets	Current situation	Development challenges				
		I	II	III	IV	V
70 % of the population aged 20-64 to be employed	63.8 % (2012)	*	*			*
2 % of GDP to be invested in R&D	0.49 % (2012)	*	*	*		*
Reduction of greenhouse gas emissions with 20% (compared to 1990 level)	49.54 % (2011)	*		*	*	*
24 % of total gross final energy consumption from renewable sources	22.9 % (2012) <sup>5</sup>	*		*	*	*
Reduction of 10 Mtoe (19%) in the primary energy consumption	16.6 % (2012) (7.3 Mtoe) <sup>6</sup>	*		*	*	*
Less than 11.3% of children should leave school at an early age	17.4 % (2012)		*	*		*
At least 26.7% of 30-34-year-olds should complete third level education	21.8 % (2012)		*	*		*
Reduce by 580,000 less people the number of people at risk of after social transfer by the year 2020 (compared to 2008 levels)	164,000 (2012)		*	*		*

Source: Ministry of European Funds

#### European Funds for Energy Efficiency. Proposed Priorities 2014- 2020

- Promoting the production and distribution of electricity and thermal energy from RES (biomass, geothermal, micro hydro);
- Improving energy efficiency in enterprises by high efficiency low power cogeneration systems rated less than 8MW;
- Implementation of smart energy distribution low and medium voltage systems;
- Developing electricity and thermal energy monitoring systems in industrial sites, in order to increase energy efficiency;
- Improving energy efficiency of residential stock, and to public buildings;
- Promoting investments for public transportation systems;
- Replacing/improving lighting systems in the public realm;
- Improve the sustainability of municipal district heating systems.

#### Romania's allocation for 2014-2020 - 43 billion Euros:

On 6 August 2014, the European Commission adopted the Partnership Agreement 2014-2020 with Romania. This sets out the strategic plans for the optimal use of European Structural and Investment Funds (ESI funds) such as:

- *Cohesion Policy -22.99 billion Euros*
  - European Fund for Regional Development – **ERDF**: 10.73 billion Euros

- European Social Fund - **ESF**: 4.77 billion Euros
  - Youth Employment Initiative -**YEI** (matched by the same amount from ESF): 0.10 billion Euros
  - Cohesion Fund – **CF**: 6.94 billion Euros
  - Territorial Cooperation – **TC**: 0.45 billion Euros.
- *Common Agricultural Policy -18.98 billion Euros*
    - European Agricultural Fund for Rural Development - **EAFRD**: 8.13 billion Euros
    - European Agricultural Guarantee Fund –10.85 billion Euros.
  - *Integrated Maritime Policy - 0.17 billion Euros*
    - European Maritime and Fisheries Fund – **EMFF**: 0.17 billion Euros.
  - *Fund for European Aid to the Most Deprived -0.44 billion Euros.*

### ***Absorption of EU Structural and Cohesion Funds (SCF)***

European Union (EU) funds available to Romania represent a significant source of financing for economic growth. During the 2007–2013 programming period, Romania was eligible for EUR 19.1 billion (15.3% of 2007 GDP) of external financing from the EU’s structural and cohesion funds (SCF). These funds were allocated across seven operational programs (OP) designed to foster Romania’s competitiveness, cooperation and convergence with other EU members.

**Table 5: Romania: Structural and Cohesion Funds (SCF)**

#### **Absorption**

(Billions of euros)

Operational Program	Budget 2007-13 1/	SCF payments 2/	Absorption Rate (Percent)	Estimated budget 2014-20 3/
Regional	4.0	2.5	63.6	6.7
Environment	4.4	2.2	49.9	...
Human resources	3.5	1.5	41.8	4.3
Competitiveness	2.5	1.4	56.7	1.3
Large infrastructure	...	...	...	9.4
Transportation	4.3	2.6	60.1	...
Technical assistance	0.2	0.1	51.9	0.2
Administrative capacity	0.2	0.2	83.1	0.6
<b>Total</b>	<b>19.1</b>	<b>10.5</b>	<b>54.8</b>	<b>22.5</b>

1/ Under the n+2 rule, 2015 is the last year to receive reimbursement for projects started under the 2007-13 programming period.

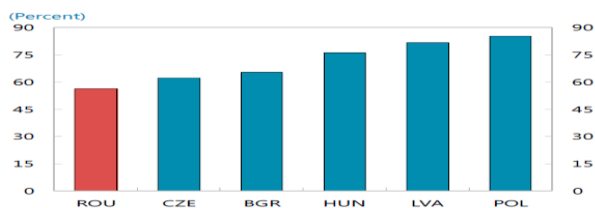
2/ Includes actual payments, payments in progress, and advance payments as of November 3, 2014. Excludes top up payments.

3/ No payments have been received for the 2014-20 programming period as of November 3, 2014.

The OPs for transportation and environment, primary infrastructure development, were the largest, accounting for 46% of the available resources. Romania is eligible for another EUR 22.5 billion (13.7% of estimated 2014 GDP) under the 2014–2020 programming period. Six OPs are being considered for this period, with the large infrastructure OP allocated EUR 9.4 billion, part of which is contingent upon EC approval of a Master Transportation strategy.

*Sources: Romanian authorities and European Commission*

Graph 2: EU Funds Absorption, 2014



Romania's absorption of SCF is the lowest in the EU, despite a recent pick up. As of early November 2014, Romania's absorption rate, including pre-financing, was 50%, compared to an average of 71% in other new member states.

Source: European Commission

### Large Infrastructure Operational Programme 2014-2020

#### Clean Energy and Energy Efficiency (3 axis)

- ✓ Priority Axis 6. Promote clean and efficient energy - 197 Mil. Euro
- ✓ Priority Axis 7. Increasing energy efficiency in cities - 249 Mil. Euro
- ✓ Priority Axis 8. Smart and Sustainable transport systems of electricity and natural gas – 42 Mil. Euro.

#### Program 6.1: Renewable Energy

- ✓ Production and distribution of energy from renewable sources: 95 Mil. Euro
- ✓ Development and modernization of production capacities for biomass / biogas and geothermal facilities
- ✓ Strengthening electricity distribution networks in order to safely connect the energy from RES to the National Power Grid.

#### Program 6.2: Monitoring Energy Consumption

- ✓ Monitoring energy consumption of industrial consumers: Budget undecided
- ✓ Implementing of systems monitoring the energy consumption of industrial consumers.

#### Program 6.3: Intelligent Metering of Consumption

- ✓ Intelligent systems for metering the energy consumption in low-tension networks: Budget undecided
- ✓ Implementing of metering systems monitoring the energy consumption of private consumers, demonstration projects for some selected regions.

### Regional Operational Programme

#### Axis 3: Increasing energy efficiency in public buildings:

- ✓ Heat insulation, repairing installations, using alternative energy, etc.
- ✓ Hospitals, schools, administrative buildings, prisons, etc.

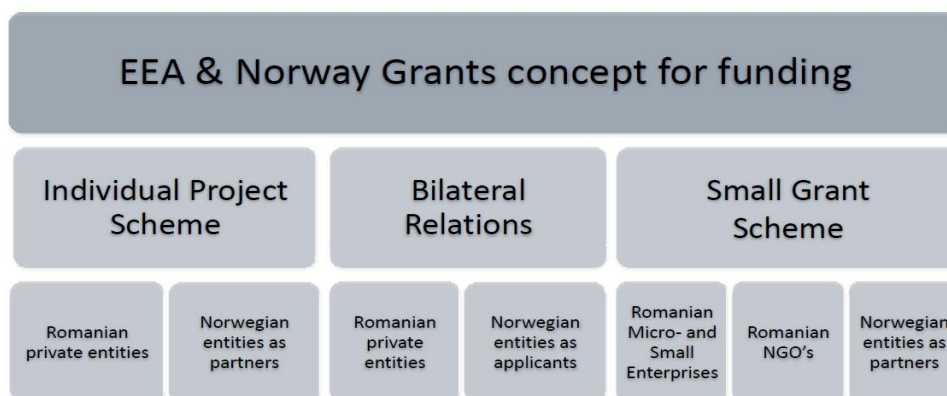
*Program 4.1: Increasing energy efficiency in apartment blocks and improve public illumination:*

- ✓ Heat insulation, repairing installations, etc.
- ✓ Extension of public illumination systems, low-energy lamps, etc.

EEA & Norway Grants

The EEA Grants and Norway Grants represent the contribution of Norway, Iceland and Liechtenstein to reduce economic and social disparities and to strengthen bilateral relations with 16 EU countries in Central and Southern Europe.

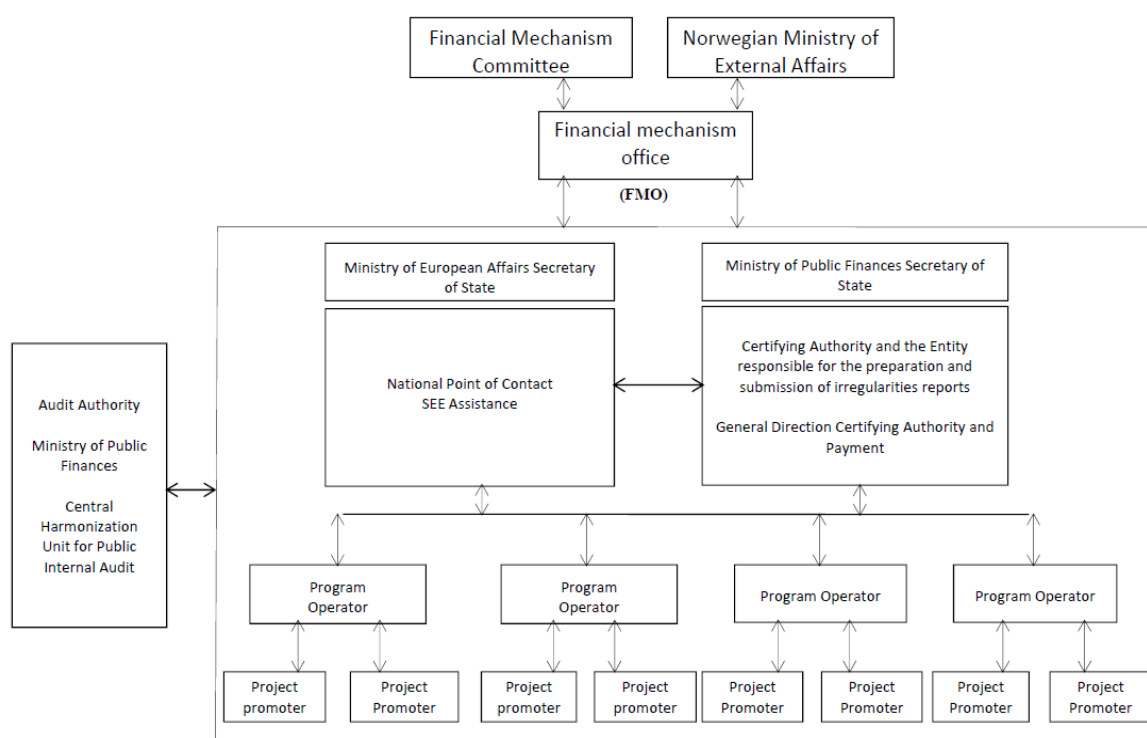
Chart 3: The funding concept of EEA & Norway Grants in Romania



Source: DCC Management



Chart 4: EEA & Norway Grants in Romania - Institutional Chart



Source: DCC Management

Table 6: Energy efficiency and renewable energy 2009-2014

Country	Energy efficiency	Renewable energy	Saving energy and promoting renewable energy sources	Partners	Grant amount (€ million)
Bulgaria	●	●		· Norwegian Water Resources and Energy Administration	13.3
Greece		●			9.5
Hungary	●	●		· National Energy Authority of Iceland	16.1
Latvia		●			4.6
Malta		●			0.9
Poland			●		145
Portugal		●		· National Energy Authority of Iceland	4
Romania	●	●		· National Energy Authority of Iceland · Norwegian Water Resources and Energy Administration	20.3
<b>Total</b>					<b>213.7</b>

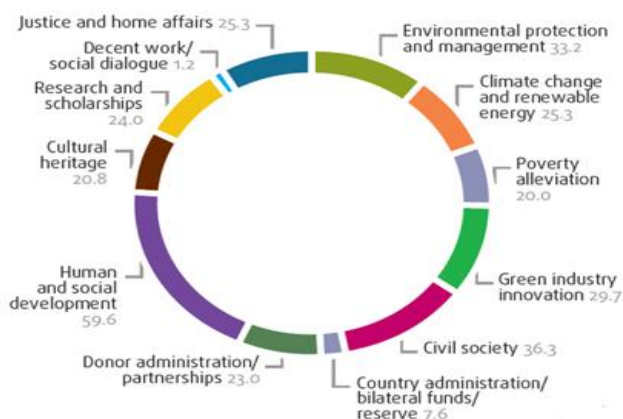
Source: EEA Grants & Norway Grants

Romania has been receiving funding since entering the EU and EEA in 2007. For the period of 2009-2014, € 306 million were allocated to the country, making Romania the second largest beneficiary of the EEA and Norway Grants.

Table 7: EEA & Norway Grants

	2009-14		2004-09
<b>Total allocation:</b>	€305.95 M	<b>Total allocation:</b>	€98.5 M
<b>EEA Grants:</b>	€190.75 M	<b>EEA Grants:</b>	€50.5 M
<b>Norway Grants:</b>	€115.2 M	<b>Norway Grants:</b>	€48 M

Graph. 3: Distribution of funding (€ Million)



Source: EEA Grants & Norway Grants

Some projects are still being implemented and will be completed in 2017 (PA05, PA06).

Re-granting to projects as per April 2015:

- Bilateral Relations : 148724 Eur
- Small Grant Scheme : 735459 Eur
- Individual Project Scheme : 4805773 Eur
- Grand Total : 5689956 Eur.

Other institutions to offer financing

The EU EBRD Romania SME Sustainable Energy Finance Facility (RoSEFF) is a 60 Million Euro programme to help Small and Medium Sized Enterprises (SMEs) and housing associations invest in energy efficiency and renewable energy solutions.

RoSEFF is a financing programme from the *European Union* and the *European Bank for Reconstruction and Development*.

To promote sustainable energy in the private sector, the EBRD and the EU have teamed up with Romanian banks to provide finance and advice to companies investing in energy efficiency and small-scale renewable-energy projects.

Finance for energy efficiency in the private sector is currently available at [Banca Comerciala Romana \(BCR\)](#), [BRD Groupe Société Générale](#), [Banca Transilvania](#) and [UniCredit Tirioc Bank](#) under the [EU-EBRD Romania SME Sustainable Energy Finance Facility](#) (RoSEFF), a key instrument for promoting the efficient use of energy to cut bills and boost the competitiveness of SMEs.

The EBRD is the leading institutional investor in Romania. In 2014 alone, the Bank invested € 600 million in the country. To date, the EBRD has invested over € 7 billion across 370 projects in Romania. It has also mobilized more than € 14 billion for these ventures from other sources of financing.

Table 8: Differences between EEFF and RoSEFF

Credit line	EEFF	RoSEFF
Eligible companies	Private sector, any size	Private sector SMEs
Type of investments	Energy efficiency	Energy efficiency and renewables
Max. credit per company	2.5 million Euro	1 million Euro
Free technical study	Yes - for all investments.	Yes - for investments of >250 000 Euro and for complex investments. For smaller investments, it will be possible to simply choose equipment from a list.
EEFF loan funding	80 million Euro	60 million Euro
No. participating banks	Six	Four
Timing	2008 – 2012	2012 – 2014
EU grants	15%	Up to 15%

Source: Energy Efficiency Finance Facility

### 3.5 Main barriers

There are many barriers, which constitutes in most of the challenges for development of investment projects in the energy sector, especially in developing projects that focus on renewable energy.

Negative impact of barriers in the energy sector in making investments falls upon the energy sector, but also on the entire economy.

*Main issues:*

#### 1. Access to land

Access to land to conduct certain permanent or temporary activities takes up to 18 months in Romania, unlike other EU countries where it takes several months.

Moreover:

- Such elements cause costly delays in carrying out the investment phases and generate large administrative and compliance costs;
- Difficult conditions to exercise the easement rights established by the legislation, which involve a considerable amount of time until settlement;
- Due to the lack of cadastral and land registration in the Land Book, often owners of land necessary for exploration and exploitation activities cannot be identified. In such conditions, concluding a convention on the amount of rent due for exercising the easement right established under the Petroleum Law is impossible.

#### 2. Approval and permitting processes for investment works

A significant number of investors decided to no longer invest in Romania when they discovered the long, complicated and costly procedures for getting permits, authorizations, approvals, licenses etc.

Moreover:

- The response to a request lasts from a minimum of 30 days to several months after the provision of documents;
- There are disruptions of investments and additional costs are generated;

- The Romanian state loses due to the lack of updated situation of natural resources and their actual exploitation;
- Investors refocus on states with a lower degree of bureaucracy;
- Cumbersome procedures within the authorities involved;
- Limited powers of regulatory agencies and shortage of human resources and materials they face;
- Duration of ratification of concession agreements is very high, because the endorsement circuit includes numerous ministries. Moreover, the entire permitting circuit must be entirely resumed when the holder initiates a change of the operation plan, but also when there are changes in the top of authorizing ministries – even if they do not concern the type of operations in discussion.

### ***3. Non harmonization between the laws on energy and other Romanian and EU laws***

There is a major lack of harmonization in the Romanian legislation, but also between the Romanian legislation and the European legislation. Conceptually, energy legislation was largely drawn up 10 years ago, being subsequently supplemented, updated and harmonized, without taking into account the new requirements – market liberalization, privatization of energy companies, listing on the stock exchange, integration in the unique European market – a new concept being required, necessary to be properly rebuilt from the foundation.

Moreover:

- Lack of harmonization between various normative acts governing the prospecting and exploitation activities;
- Lack of harmonization of legislation in the energy sector with the legislation on constructions and environment;
- Local authorities interpret the law according to local “customs”.

### ***4. Stability of the legislative framework and predictability in the energy sector***

Lack of a long-term stable, transparent, predictable and competitive framework determines aversion to invest or unprofitable investments which do not bring added value in the long term.

Moreover:

- The current regime of imposing taxes and royalties starts from the necessary revenues to the state budget, not from the principles of a balanced and stimulating taxation of the industry, beneficial for both the state and investors;
- Information about concessions and reserves are treated as state classified information, although, under the law, they are confidential information;
- The energy sector requires a proper institutional and legislative framework. It needs a stable, transparent legislation, attractive for all participants, and an institution to supervise its implementation.

## *5. Inappropriate public policies*

Incapacity to produce coherent, clear documents, pointing out the main priorities in line with sectorial needs, which had to be identified until now.

Moreover:

- It's necessary to have tax policies stimulating investments in this sector, increasing economic efficiency and the degree of use of infrastructure, protecting vulnerable customers, promoting new strategic directions (new forms of energy, discovery of new resources, innovation and research, new technologies etc.);
- It's necessary to harmonize energy, fiscal, social policies, but also to harmonize them with some policies specific to various areas of activity.

## *6. Energy market*

Romania is a country that relies in transactions on human relations, contracts being only a form of protection. The Romanian gas market is currently a reactive market in which we don't know that happened to our own gas, owned and paid for, except at the end of the month, when we are before a fait accompli.

Moreover:

- Lack of mechanisms to allocate the amounts sold make determine the situation in which the amounts sold cannot be individualized according to the law;
- The lack of the transmission and distribution network code setting the responsibilities and rights of the parties, as well as the manner in which gas flow continuity must be ensured, penalties charged or from which the client benefits;
- Lack of storage facilities code, as detailed rules on the injection/extraction from storage facilities;
- Lack of gas market code – the gas market in Romania works “randomly”, absence of rules on correlation between trading actions and transmission actions, distribution and storage, make it impossible to monitor gas flows from the acquisition point to the delivery point;
- The lack of knowledge of firm/interruptible/backhaul capacities, in points of transmission, distribution and storage systems;
- Lack of balancing operator makes the gas market in Romania work, almost exclusively, depending on outside temperature, contracts becoming, for this reason, useless;
- Lack of mechanisms to ensure the flexibility of supply by developing secondary mechanisms through which to manage the proper execution of contracts;
- Lack of cheap guaranteeing systems, reducing high risks related to each transaction;
- Lack of systems to send and store information, allowing continuous monitoring, at least daily and making possible the proper development of contracts signed;
- Lack of preventive/reactive plans for emergency situations;
- Legal restrictions allowing the direct or indirect “manipulation” of the price and which make the free market not able to work, except imposing high risks on those who trade gas;
- Reengineering of the transmission and distribution system, of interconnections and storage, not adapted to the liberalized market, in which rights and obligations must be on both sides;

- Lack of state involvement in promoting the culture, knowledge and dissemination of information specific to the gas market.

### ***7. Planning and management in the energy sector***

Processes carried out in the past 15 years in the energy sector: market liberalization, unbundling of former integrated energy companies, privatization of energy companies, lack of data in the market needed to substantiate a unitary decision, with the reason of classifying them at the level of companies and sectors, separating positions coordinating the energy sector between various institutions (NAMR, ANRE) determine the lack of unitary national coordination of energy resources and lack of forecasts and energy planning.

Moreover:

- National planning on energy resources would eliminate the inefficient allocation of resources and coordination of crisis situations when market forces cannot cope or when they develop extreme speculative actions. Developing policies, rules, regulations, institutions to ensure energy security, in order to offset speculations and cover the unprofitable activity (or at the limit of profitability), which the market fails to appropriate;
- Lack of forecasts on demand for energy forms in the short, medium and long term and energy mix on the principle of ensuring sources with minimum costs in accepted risk conditions;
- Absence of an entity responsible with the monitoring of energy strategy implementation and of strategic plan implementation.

### ***8. Failure to comply with the corporate rights of investors***

Investments, including in the energy sector, are made by companies with Romanian or foreign capital and which face multiple bureaucratic difficulties.

Moreover:

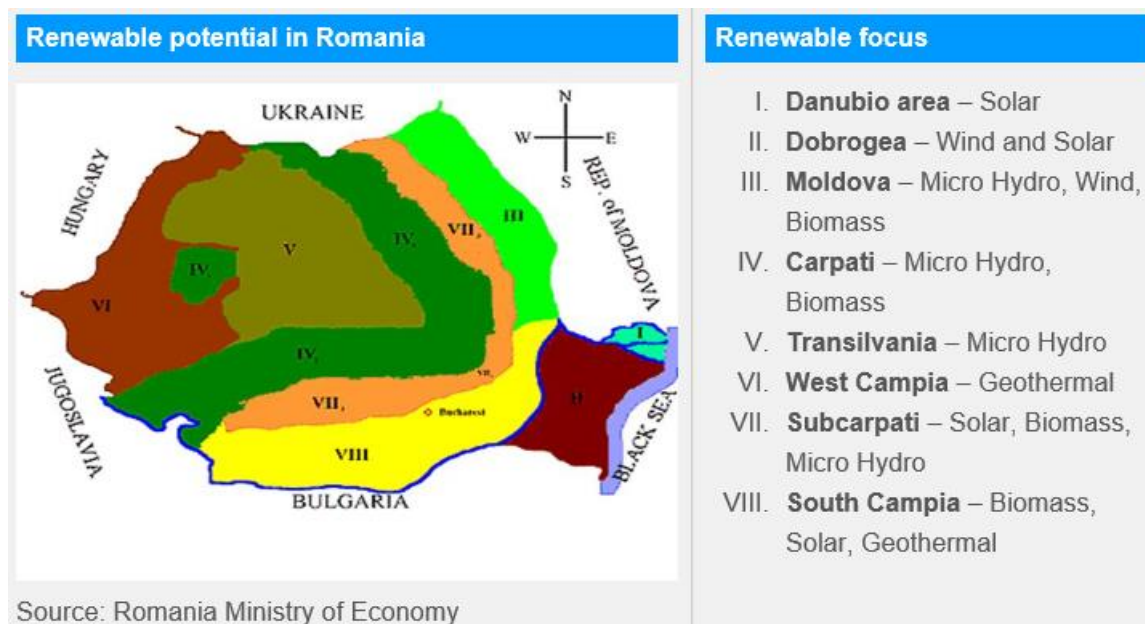
- Investors often face great difficulties in using power of attorney in the General Meetings of Shareholders;
- Romanian legislation requests the existence of special power of attorney stipulating the exact vote of the shareholder for each point on the agenda of the General Meeting of Shareholders;
- The attorney-at-fact must follow the voting instructions;
- It determines the obligation to issue a new power of attorney for each meeting and for each issuer, which restricts the investors' capacity to react ad-hoc to current events and to debates within the general meetings of shareholders and does not allow them to use the power of attorney issued at the time of opening the securities account;
- The power of attorney must be in original, stamped and signed, without further formalities;
- Time to prepare the power of attorney is, in practice, extremely limited and sometimes makes it extremely complicated, if not even possible, its issuance by foreign investors. It is especially determined by the fact that, in order to get the power of attorney, the agenda of the Meeting must be known, which, in some cases, becomes final only 10 days before the meeting, while the power of attorney must be delivered 48 hours before the meeting;

- Voting procedures within the general meeting of shareholders are difficult and require a long time of preparation and a lot of documentation to be submitted for votes to be considered;
- Vote by correspondence or electronic vote require time and effort to be used, so it remains complicated to be used by investors;
- Often, companies do not submit the reports in English.

## 4. Renewable energy - Sources

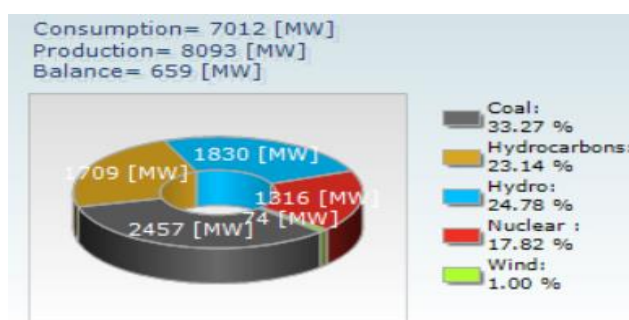
Romania's attractiveness in terms of investment destination for renewable energy projects is still declining according to EY's latest Renewable energy country attractiveness index (RECAI) which ranks our country the 35<sup>th</sup>, down three positions compared to the previous report.

Map 1: Renewable potential in Romania



Fortunately, Romania can develop production systems on all types of renewable sources, according to the specifics of each geographical areas in the country. Following studies conducted in the country, the potential in the production of green energy is 65% biomass, 17% wind, 12% solar energy, 4% and 2% small hydro and geothermal voltaic.

Graph 1: Romania Energy Status - 16/07/2015



Source: Hidroelectrica

According to The National Renewable Energy Action Plan (NREAP), Romania's potential for electricity generation from renewable resources is as follows:

- Hydro energy potential: 40TWh (out of which 6TWh is for small hydro), compared to the current output of 16TWh;
- Wind energy potential: 23TWh (current output is 0.46TWh based on 2010 figures);
- Solar energy potential: 1.2TWh, but no major generation capacity was in place in 2010.



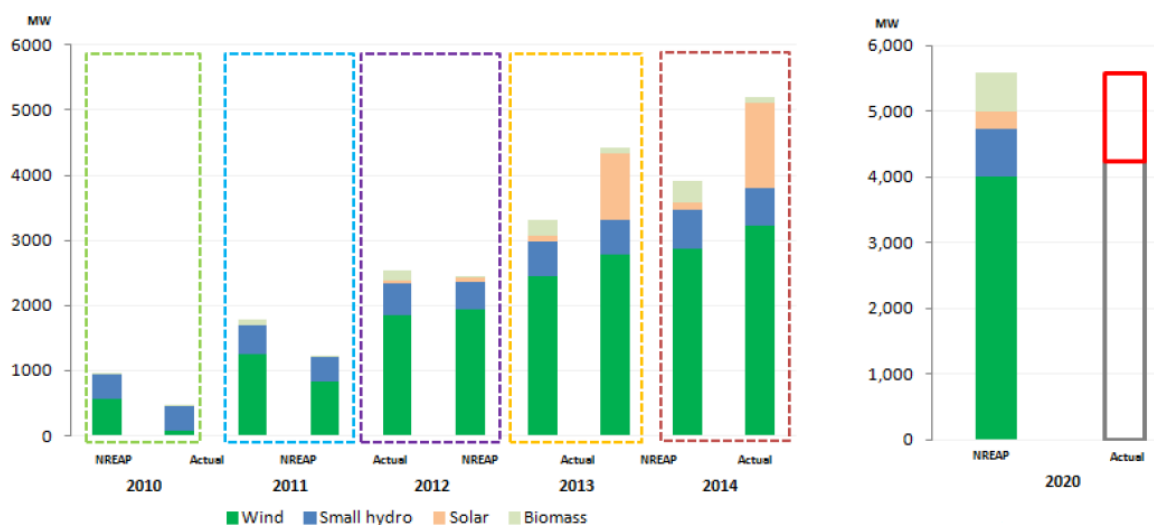
The Romanian NREAP splits the overall 24% renewable energy target into 42.1% RES-E, 22% RES-H&C, and 10% RES-T.

According to Foreign Investors Council, during 2010–2014, were invested € 7 billion investments in RES modern capacities.

These investments represented an impressive transfer of new technologies and know-how to the Romanian energy sector.

The new capacities built until 2014 have been in line with the pathway to 2020 envisaged by the Action Plan for Renewable Energy (PNAER, 2010).

Graph 2: Growth of installed renewable capacities and benchmarking with PNAER (2010)



Source: TSO, PNAER 2010

According to ANRE report, 71 permits for solar farms, 12 for wind farms, 9 for hydrocarbon-burning plants, 12 for hydropower plants, 4 for biogas plants and 3 for biomass plants were issued in 2014. Their installed energy production capacity totalled 1.056 MW.

The capacity installed in renewable energy units licensed in 2014 totalled 357 MW, of which 219 MW in wind farms, 21 MW in hydropower plants, 34 MW in biomass plants, including those burning gas obtained from fermented waste and fermented water treatment mud, and 83 MW in solar farms.

Of the total capacity installed in renewable energy units, 256 MW were taken out from the green certificates subsidy scheme in 2014 (4 MW from wind farms, 241 MW from hydropower plants with installed power of 10 MW at most, and 11 MW from solar farms), while an installed capacity of 515 MW was temporarily suspended from licensing, representing electrical plants with an installed capacity in excess of 125 MW that the European Commission was notified about in line with national legislation.

At the end of last year, the capacity installed in licensed renewable energy units totalled 3.935 MW, of which 3.853 MW representing plants with electricity production licenses and 82 MW plants with construction permits.

Table 2: Projections for Renewable Energy in 2020

RES-E 2020 Projections	NREAP		
	MW Installed	RES Electricity Generation (GWh)	% in Electricity Consumption
Large Hydro	7,000	18,410	25
Hydro (below or equal to 10 MW)	729	1,359	1.9
Photovoltaic	260	320	0.4
Wind Onshore	4,000	8,400	11.4
Biomass (solid,biowaste,bioliquid)	405	1,950	2.6
Biogas	195	950	1.3
<b>Total RES-E</b>	<b>12,589</b>	<b>31,389</b>	<b>42.6</b>

Source: European Renewable Energy Council

### How much does renewable energy cost?

A cost-benefit analysis conducted by ANRE for 2014 indicated no risk of overcompensation, therefore it argues that “no measures are needed to reduce the number of green certificates for manufacturers who will be accredited after 1 January 2016 to the present legal provisions.”

From the cost-benefit analysis carried out for 2014, with an updated analysis, at an aggregate level for each category of technology of E-SRE (electricity from renewable energy sources), taking into account the indicators resulting from mediation costs and as the anticipated capacities are put into operation with no identifiable risk of overcompensation”, shows the ANRE report.

The energy market regulator has found that specific investments in new projects of renewable energy come with the following costs:

- 1.48 million Euro for 1 MW installed *wind power plants*
- million Euro per 1 MW installed in new *hydro plants*
- million Euro per 1 MW installed in *biomass cogeneration plants*
- 1.25 million Euro for 1MW installed in *photovoltaic plants*.

## 4.1 Wind

### Potential & best locations

Romania was the first country in Eastern Europe which joined the Partnership for Renewable Energy and Energy Efficiency.

Romania has the highest wind power potential in South Eastern Europe of around 14,000 MW (second highest in the EU after Scotland) and a power generating capacity of 23 TWh. A study of Erste Bank places Romania and especially the Dobrogea Region with Constanta and Tulcea counties as the second best place in Europe (after Scotland) to construct wind farms due to its large wind potential. Another study made by the Romanian Energy Institute (REI) said that wind farms could contribute with 13 GW to the national power generation capacity by 2020, and between 2009 and 2017 total wind farm capacity will comprise 4,000 MW with investments of US\$ 5.6 billion.

## Capacity installed

Romania has been a leader among emerging markets of Europe in 2012 in terms of new installed wind power capacity positioning 5<sup>th</sup> place in Europe, after Germany (2415 MW), United Kingdom (1897 MW), Italy (1973 MW) and Spain (1122 MW), and also 10<sup>th</sup> place among the most attractive countries in the world in investments in wind energy, according to Ernst & Young.

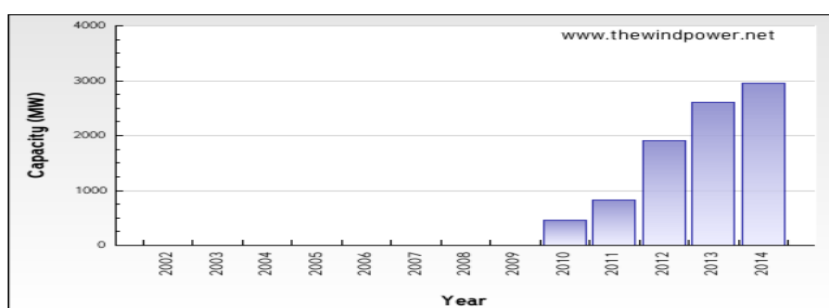
This statistic depicts the total installed wind power capacity in Romania at the end of 2013, and at the end of 2014. Romania ranks 11<sup>th</sup> overall among European nations for total installed wind power capacity.

As of 2014, wind power in Romania has an installed capacity of about 2,954 MW, up from the 14 MW installed capacity in 2009.

Graph 1: Production capacities

### Production capacities

- End 2002: 1 MW (- %)
- End 2003: 1 MW (- %)
- End 2004: 1 MW (- %)
- End 2005: 1 MW (- %)
- End 2006: 3 MW (+200 %)
- End 2007: 8 MW (+166.7 %)
- End 2008: 8 MW (- %)
- End 2009: 14 MW (+75 %)
- End 2010: 462 MW (+3200 %)
- End 2011: 826 MW (+78.8 %)
- End 2012: 1,905 MW (+130.7 %)
- End 2013: 2,599 MW (+36.5 %)
- End 2014: 2,954 MW (+13.7 %)



Source: Wind Power

Although last year there were 50 per cent fewer new wind turbines installed in Romania compared to 2013, the Romanian wind energy market has climbed one position in Europe among the largest markets for wind power, finishing in the tenth place in 2014 according to total capacity.

Romanian wind market has been developing rapidly, with most major international players entering the market. CWP was one of the first developers to recognize the country's wind power potential and the first to implement a large scale wind farm project.

CWP developed a 600 MW wind farm Fantanele - Cogeaalac, in Constanta County- the largest onshore wind farm in Europe. As at the end of 2012, all 240 turbines are operational, exporting power to the grid.



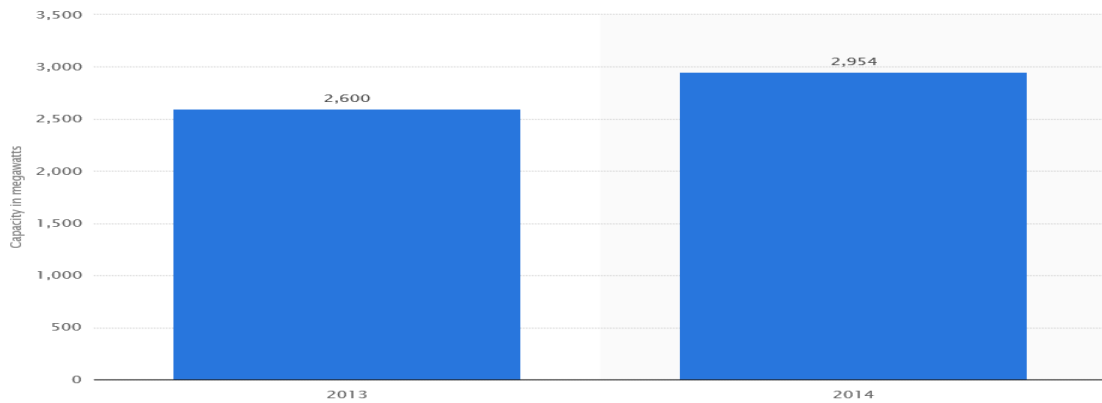
The turbines produced almost constantly over 2,000 MWh, with a maximum recorded on April 7, 2015 - 2,700 MWh, and a minimum of 32 MWh recorded on April 5, 2015. In general were exported about 1,500 MWh, with a maximum of 1,829 MWh, recorded on April 6, 2015.

Moreover, during this period was recorded and the first record daily production in 2015 CEZ Wind Farm, which produced green energy at full capacity: 13,547 MWh. Wind Park recorded April 7, 2015 a new daily production record. 234 wind turbines operated at full capacity of 2,500 kW and produced 13,547 MWh of green power.

Until now, the park daily production record was registered on October 25, 2014, when 237 wind turbines produced 13,658 MWh of clean energy that does not consume finite natural resources of Romania.

Monthly production record was recorded in the park in December 2014, reaching 190 GWh.

Graph 2: Wind power capacity in Romania in 2013 and 2014



Source: Statista

Table 1: Global Wind Power Capacity (MW)

GLOBAL INSTALLED WIND POWER CAPACITY (MW) – REGIONAL DISTRIBUTION			
<b>EUROPE</b>			
Germany	34,250	5,279	39,165
Spain	22,959	28	22,987
UK	10,711	1,736	12,440
France	8,243	1,042	9,285
Italy	8,558	108	8,663
Sweden	4,382	1,050	5,425
Portugal*	4,730	184	4,914
Denmark	4,807	67	4,845
Poland	3,390	444	3,834
Turkey	2,958	804	3,763
Romania	2,600	354	2,954
Netherlands	2,671	141	2,805
Ireland	2,049	222	2,272
Austria	1,684	411	2,095
Greece	1,866	114	1,980
Rest of Europe <sup>3</sup>	5,715	835	6,543
<b>Total Europe</b>	<b>121,573</b>	<b>12,820</b>	<b>133,969</b>
of which EU-28 <sup>4</sup>	117,384	11,791	128,752

Source: Global Wind Energy Council

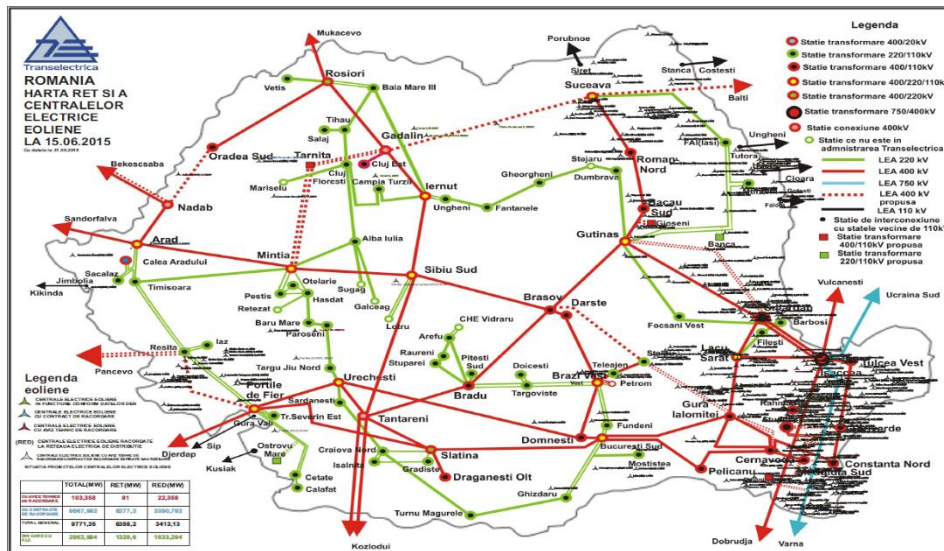
TOP 3 WIND FARM COUNTIES:

*Constanta* – having an installed capacity of 600MW

*Galati* – having an installed capacity of 649 MW

*Tulcea* – having an installed capacity 399 MW;

Map 2: Map Electricity Transmission and wind power 15.-6.2015



Source: Transelectrica

## Projects & main players

### Functional wind farms

Table 2: Top 10 of the largest wind projects in Romania

Topul celor mai mari 10 proiecte funcționale pe data de 01.10.2013			
Nr. Localitate	Putere brută (MW)	Valoare proiect (mil. euro)	Investitor
1. Fântânele Est și Fântânele Vest (Constanța)	347,5	625,5	MW Invest și TOMIS TEAM (CEZ)
2. Cogeaalac (Constanța)	252,5	454,5	OVIDIU DEVELOPMENT (CEZ)
3. Pantelimon, Constanța	123,0	184,5	EWIND - Emanuel Muntmark
4. TÂRGȘOR 1 (ZEFIR 1), Constanța	119,6	179,4	ELCOMEX EOL - Ion Grecu
5. Peștera, Constanța	90,0	135,0	PESTERA WIND FARM, Energias de Portugal
6. Casimcea, Tulcea	81,3	122,0	SC ALPHA WIND SRL, Verbund
7. MIHAI VITEAZU, Constanța	80,0	120,0	EOLICA DOBROGEA ONE SRL, Iberdrola
8. Casimcea, Tulcea	75,9	113,9	SC CAS REGENERABILE SRL, Verbund
9. Sălbaticea, Tulcea	70,0	105,0	ENEL GREEN POWER
10. Sălbaticea, Tulcea	70,0	105,0	BLUE LINE VALEA NUCARILOR, Enel

Source: Transelectrica

### Wind farm investors

- **CEZ Group (Czech Republic)** – CEZ Romania has a decade long story in Romania including more than EUR 2.2 billion of investments and constant portfolio growth.

In 2008 - invested EUR 1.1 billion in the construction of Cogeaalac and Fantanele Wind Farm, located in Dobrogea region, the largest onshore wind farm in Europe. The wind farm has a total of 240 turbines and a capacity of 600 MW. This represents a huge financial investment for CEZ group.

July 2010, the second stage of construction, the building of Cogeaalac Wind Farm and Fantanele Extension, began. This involved building 120 wind turbines, with a total capacity of 300MW.

- **ENEL Green Power (Italy)** – In December 2010 commenced operation of its first wind farm in Romania.

The “Agighiol” plant, located in Valea Nucarilor municipality, close to Tulcea. The wind farm has 17 turbines with a capacity of 2 MW each, for a total installed capacity of 34 MW.

January 2011 – Salbatica I. The wind farm has 35 turbines with a nominal output of around 2 MW each and delivers up to 70 MW.

Enel Green Power Romania continued to expand at a rapid clip over the next two years, with: Corugea, Salbatica I, Salbatica II, Moldova Noua, Zephir I, Zephir II and Gebelesis, bringing Enel Green Power to a total wind installed capacity in Romania of around 500 MW.

A total of around 340 million Euro was invested in constructing these wind farms, part of the investments being covered by credits from Danish government’s Export Credit Agency.

In July 2013, Enel Green Power connected to the network its first photovoltaic plants in Romania. The two plants, Berceni 1 and Berceni 2, are located in Prahova and have a combined installed capacity of around 19 MW. Shortly after, Enel Green Power connected to the grid the Colibași and Podari photovoltaic plants. The start of their operations brought the installed solar capacity of the Enel Group’s renewables specialist in Romania to approximately 36 MW.

- **Energias de Portugal (Portugal)** – began operations in the country in 2008, through the acquisition of several wind projects in different stages of maturity.

In 2010 EDPR completed the construction of its first project in Romania – Pestera, totaling 90 MW out of the current 521 MW of installed capacity.

In 2013 EDPR’s first Solar Power Plant, with 50 MW, entered in operation in Romania.

Key Data FY 2014	
Installed Capacity – EBITDA	521 MW
Installed Capacity – Total	521 MW
Production GWh	712
Load factor	22%
Market Share	18%

EDP Renovaveis (EDPR), the Portuguese Energias de Portugal renewable energy division and the third most powerful investor in green energy sector in Romania, conducted in late October 2014 three capital subscriptions in two project companies. The resulting capital reached more than 80 million Euro, according to data from the Trade Register. The highest amount of 59.5 million Euro was subscribed in October in the capital of the Ialomita Power Company, in proportion of 99.9% of EDP Renewables Europe, a division registered in Spain.

According to Transelectrica, Ialomita Power won last year the connection contract for a 264 MW wind farm in Facaeni, Ialomita County. If the investment will be completed, the project will be the second largest wind farm in Romania after the one opened by Czech Republic’s CEZ.

Table 3: EDP - Energias de Portugal, S.A. – Subsidiaries in Romania

Subsidiaries	Head Office	Share capital / Currency	Assets 31-Dec-13 Euro'000	Liabilities 31-Dec-13 Euro'000	Equity 31-Dec-13 Euro'000	Total Income 31-Dec-13 Euro'000	Net Profit/(Loss) 31-Dec-13 Euro'000	% Group
<b>Renewable Energy Activity:</b>								
<b>Europe Geography / Platform:</b>								
<b>Romania:</b>								
EDP Renewables Romania, S.R.L.	Bucharest	2,000,200 RON	175,638	170,569	5,069	32,717	-3,239	65.90%
Castellaneta Wind, S.R.L.	Milan	10,000 RON	13	9	3	-	-4	77.53%
Cernavoda Power, S.R.L.	Bucharest	40,317,400 RON	197,172	199,908	-2,736	30,744	1,592	65.90%
Cujmir Solar, S.R.L.	Bucharest	23,716,000 RON	18,343	11,432	6,910	3,555	1,487	77.53%
EDPR-RO-PV, S.R.L.	Bucharest	69,926,510 RON	35,183	21,176	14,008	1,779	-1,716	77.53%
Foton Delta, S.R.L.	Bucharest	441,000 RON	6,837	6,984	-147	353	-246	77.53%
Foton Epsilon, S.R.L.	Bucharest	441,000 RON	10,639	10,814	-174	577	-273	77.53%
Laterza Wind, S.R.L.	Milan	10,000 RON	13	10	3	-	-5	77.53%
Pestera Wind Farm, S.A.	Bucharest	28,755,070 RON	120,240	129,802	-9,561	22,197	2,853	65.90%
Potelu Solar, S.R.L.	Bucharest	29,343,040 RON	12,097	4,068	8,029	2,901	1,414	77.53%
S.C. Ialomita Power, S.R.L.	Bucharest	1,000 RON	212,581	214,454	-1,872	3,713	-1,779	65.90%
Sibioara Wind Farm, S.R.L.	Bucharest	600 RON	57,733	58,543	-810	3,570	-876	65.90%
Studina Solar, S.R.L.	Bucharest	20,746,330 RON	15,161	8,884	6,277	3,354	1,536	77.53%
Vanju Mare Solar, S.R.L.	Bucharest	18,788,000 RON	15,797	10,361	5,436	2,838	1,145	77.53%
VS Wind Farm, S.A.	Bucharest	105,000 RON	46,347	46,796	-448	3,851	-263	65.90%

Source: EDP-Annual Report 2013

- **Monsson Group** - Turned to renewables since 2004 and quickly became one of the largest developers of wind field in Romania, reaching to hold a portfolio of projects developed over 2.400 MW, which accounts for more projects than 1.000 MW are already built and in operation.

The best known project of Monsson Group developed and built by CEZ is Fantanele-Cogeaalac Park - 600 MW, which was at that time the largest wind project, onshore in the world except USA.

- **Verbund (Austria)** - March 2011, marked the construction start of the wind farm of Casimcea, which lies in the east of Romania in the province of Tulcea, near the Black Sea coast.

The wind farm has 88 individual wind turbines with a capacity of 2.5 MW each, for a total installed capacity of 226 MW.

At the same time as the construction of the first 99 MW, VERBUND built a 400-kV/750 MVA substation, which serves exclusively to feed energy generated from wind power into the Romanian transmission grid for all wind farms in the region. With that, VERBUND has contributed significantly to the expansion of the Romanian power grid.

- **Iberdrola Renovables (Spain)** – 2011 started the construction of wind farms in Constanta County (Dobrogea).

Mihai Viteazu (I, II, III, IV) wind farm has 40 turbines, with a nominal output of 2.0 MW and a total capacity of 80 MW.

- **E.ON (Germany)** - E.ON Romania, member of E.ON Group, the world's largest investor-owned energy service provider, is the platform company supporting the operational E.ON companies in Romania in the energy sector. E.ON Romania holds the majority stake in E.ON Energie Romania S.A., E.ON Gaz Distributie S.A. and E.ON Moldova Distributie S.A. The company is involved in the development of several wind energy projects, mainly located in Moldova.

E.ON has wind farm parks in eastern Romania, with a total installed capacity of 150-200 MW. Investments in these projects was to € 225-€ 300 million.

In 2015, E.ON plans to invest more in Romania, especially in upgrading the distribution networks. For this, the German company has a EUR 400 million budget (EUR 90 million).

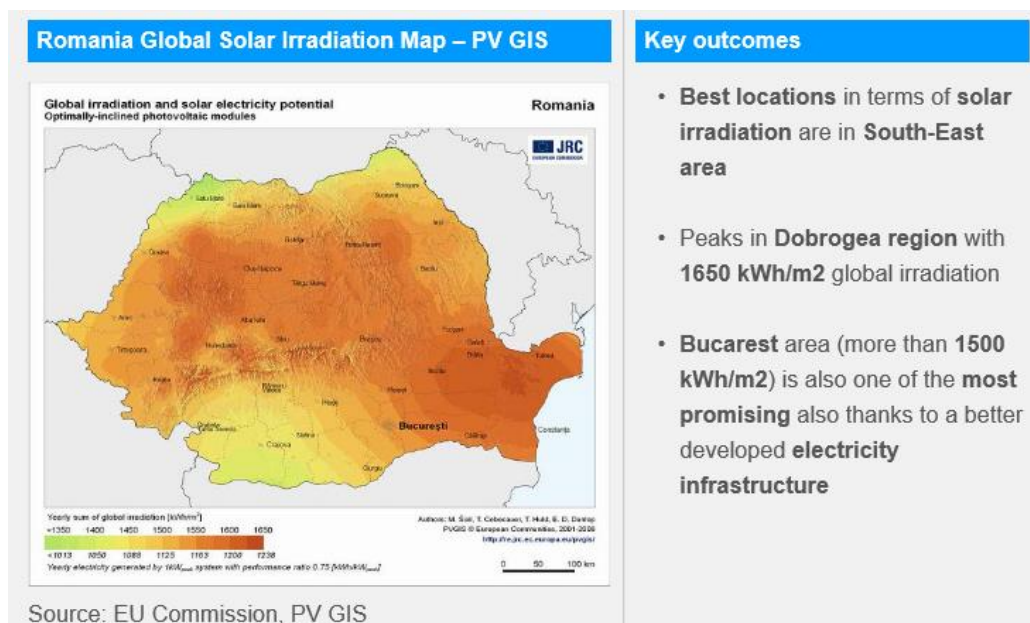
- **GDF Suez Energy (France)** – July 2013, GDF SUEZ officially opened its first wind park at Gemecele, Braila County. Gemecele wind farm has 21 turbines with a capacity of 2.3 MW and an installed capacity of 48 MW.

## 4.2 Solar

### Potential & best locations

Because of his placement, Romania is situated in the European B sunlight, which gives the country a major solar potential waiting to be tapped. With 210 sunny days a year, Romania is eligible for annual energy flow between 1000 and 1300 located kWh/sqm/year.

Map 1: Romania - Global Solar Irradiation



### Capacity installed

The solar power generation potential in Romania is one of the higher levels in Europe. The average daily solar power generation potential is between 3.2 and 3.4 kWh/kWp in Romania depending on location.



There are two types of solar power investments currently taking place in Romania:

- Stand-alone solar power installations established on cleared land and usually consisting of higher capacities (>0.4 MWp)
- Roof-top solar power installations installed on commercial and private buildings with lower capacities (<0.9 MWp).

During the 1970's and 1980's Romania was an early player in the solar power industry, installing around 800.000 m<sup>2</sup> of early-technology solar cells, which placed the country third worldwide as far as the total surface of photovoltaic panels was concerned. One of the most important solar projects was the installation of a 30 kW solar panel on the roof of the Politehnica University of Bucharest that is capable of producing 60 MWh of electricity per year.

**Table 1: History of PV deployment**

Year	Total (MW <sub>p</sub> )	Added (MW <sub>p</sub> )
2006	0.19	n.a.
2007	0.30	0.1
2008	0.45	0.15
2009	0.64	0.3
2010	1.94	1
2011	3.5	2
2012	51	47
2013	1,151	1,100
2014	1,219	69

*Source: IEA PVPS - Power*

in Central and South-Eastern Europe financed by the Bank and the fourth joint project with EDPR in Romania. Earlier investment concerned three wind energy projects: two wind parks of 138 MW and 90 MW in Dobrogea region in 2011 and the latest 24 MW and 33 MW wind farms in Vaslui and Tulcea counties in 2012.

As the solar energy is a renewable source of electricity, for each MW produced in such a plant and then delivered, there are granted three green certificates (GCs) under the updated support-scheme, effective as from January 1, 2014.

According to Transelectrica, the country's transmission company and electricity system operator, Romania installed 363.181 MW of new solar PV in 2014.

Romania remains a focus for European investors.

Newly added solar PV installations in 2014 are considerably smaller than the 834 MW of new PV capacity installed in 2013.

In 2014, Portuguese renewable energy developer, EDP Renováveis (EDPR) secured € 30 million in project finance for 50MW of Romanian PV, despite recent cuts to the County's solar incentives.

Europe financial investor, European Bank for Reconstruction and Development (EBRD), provided € 20 million, and the international investment institution, Black Sea Trade Development Bank (BSTDB) provided € 10 million.

The € 30 million went to the construction and operation of 6 PV plants, totalling 50MW. The 50MW of PV is in operation in the south of Romania, in Oltenia. This is the first PV project

Table 2: Top 10 largest operational solar parks - 01.10.2013

Topul celor mai mari parcuri solare functionale in România pe data de 01.10.2013				
Poz.	Localitate	Putere instalată (MW)	Valoare investiție (mil. euro)	Investitor
1.	Comuna Slobozia (Giurgiu)	45,0	100,0	LJG GREEN SOURCE ENERGY ALPHA (Samsung)
2.	Izvoarele (Giurgiu)	20,0	31,0	LJG GREEN SOURCE ENERGY BETA
3.	Târgu-Cărbunești (Gorj)	10,0	15,5	EYE MALL
4.	Târgu-Cărbunești (Gorj)	10,0	15,5	EYE MALL
5.	Grojdibodu (Olt)	9,9	15,4	STUDINA SOLAR (Energias de Portugal)
6.	Uiești (Giurgiu)	9,5	14,7	TINMAR GREEN ENERGY
7.	Izvoru (Argeș)	8,8	13,6	POWER L.I.V.E. ONE
8.	Vânju Mare (Mehedinți)	8,7	13,4	VANJU MARE SOLAR (Energias de Portugal)
9.	Frăsinet (Călărași)	8,3	12,8	SOLAR ELECTRIC FRASINET
10.	Uiești (Giurgiu)	8,0	12,4	MARTIN SOLAR ENERGY

Source: Transelectrica

## Projects & main players

### Investors in PV market larger than 10 MW:

- **Samsung (South Korean)** - has become the strongest investor in solar parks in Romania, having invested 100 million euros in Slobozia, Giurgiu. Solar Park completed in Slobozia was worth 100 million euros.
- Solaris project, with a capacity of 56 MW, covers 135 hectares and produce 67.000 MWh per year.
- **GPSBase Solaris 48** developed in Ciuperceni, Satu Mare the largest project at this moment, with a capacity of 55.9 MW, being installed on 136 hectares. The investment amounts to around 87 million euros per megawatt calculating investment 1.55 million.
- GPSBase Solaris 48 is controlled by Spanish company Bester Generation with a stake of 61.75% in the company, as contained in the Trade Registry data (RC).
- **Bester Generacion, Energiaprima and Stargreen Consulting** invested in 2014 - 74.4 million euros in the construction of Solaris solar park, with an installed capacity of 56 MW, in Livada town, Satu Mare.
- **ET Solar Group** - The company installed 3 photovoltaic solar parks with a total of 50 MW in 2013. The three plants are located in Targu Carbonești, Gorj County, and Simnicu de Sus, Dolj County.
- **SC Metalluk Srl** installed in Caras Severin, 2014, the solar park Iaz, with an installed capacity of 48MW.
- **MBG Energie Rinnovabili Srl** developed in 2014 in Uzunu village, Calugareni, Giurgiu a solar park with an installed power of 45.938 MW.
- **EGC Solar Cluj** invested 69.8 million euros in developing a solar park in Teiuș, an area of 869.400 square meters and an installed power of 45 MW.
- **Mega Construct, Max Agro, Max Center and Iosca & Erjica** developed the solar park Gataia, in Timis with a gross installed capacity of 32 MW.

- The majority of shares is owned by the Swiss company Swiss H1 Ventures Holding, controlled in turn by Chinese supplier of photovoltaic panels Hareon.
- **Sunowe** - Chinese manufacturer of solar modules invested 40 million euros in a photovoltaic park in Sibiu, an area of 50 hectares and with an output of 25 MW.
- **Green Vision Seven** have Ucea Park 1 and Ucea Park 2, in Brasov County. Ucea Park 1 has a gross installed capacity of 29.5 MW, while Ucea Park 2 has a power of 19.5 MW. Both parks have required investments of over 85 million.

#### Projects due to be finished in 2016

**Armand Group**, with activities in the renewable energy industry in Romania, and **Greentech**, a British company, have announced that they would develop 20 MW solar projects by the end of 2016.

The two companies signed an agreement for the funding and development of several photovoltaic projects with capacity below 500 KW.

Group representatives have stated that the investment amounts to approximately 20 million.

### 4.3 Hydro (micro < 10 MW)

#### Potential & best locations

Harnessing hydropower energy is the best alternative for the development of Romania's energy sector. Although, the hydro energy field has seen a slow advance despite its great potential. Micro hydropower potential is reported to be distributed throughout Romania in four out of eight regions (i.e. Moldova, Carpathian Mountains, Transylvania and Sub Carpathians). Currently, Romania's hydropower potential is tapped by 48%.

The rivers with the greatest micro-hydropower potential in Romania are: Olt, Mures and Tisa-Somes.

In Romania, the main river hydropower potential is 40.000 GWh/year, which can be obtained in large hydro power (> 10 MW / hydro unit) or low (<10 MW/hydro unit).

According to the official data concerning Romania's hydropower potential – some 40 TW per year in the hydropower energy sector and 6 TW in the small hydropower energy field – barely half of this potential is used. Even so, hydropower remains a major source of electricity, accounting for about 30% of the total power produced within the country.

An alternative which has been neglected, since no new major projects have been carried out over the past years, except some technological upgrades and the commissioning of some plants where the works had already started (such as Racovita Hydroelectric Power Plant whose construction works started 24 years ago), Romania's hydro power sector has not seen any major investments during the last 24 years.

One or maybe the main reason is probably the cost involved when investing in a hydropower station which is considerably higher than that needed for completing a wind or solar plant. Besides that, such a project is far more complex, needing an extended period of time for its completion. So, according to ANRE's estimations, whilst 1MW installed in a wind power plant generates a cost of some 1.4 million euro, for same power capacity installed in a SHC (small hydro-power), an investor will spend about two times more.

Another reason it is due to the latest decision concerning the reduction of the green certificates quota effective, which affects the wind, solar and hydropower energy producers.

The installed capacity of hydropower is 6715 MW, representing a third of Romania's total installed electricity generating capacity. The country's hydropower potential is extremely large, with an estimate additional potential of over 9 GW. Geographically, the hydroelectric potential of Romania are concentrated along the Danube and in the valleys of rivers emerging from the mountain core of the country. Other hydrographic resources include more than 2500 lakes, ranging from the glacial lakes of the mountains to those of the plains and the marshes of the Danube delta region.

### Capacity installed

Romania has a total of at least 767 hydroelectric power plants. A majority, 621, of these plants are small hydroelectric plants, with less than 10 MW of capacity.

The small hydroelectric plants have a total capacity of 1,125 MW, and the large plants have a total capacity of approximately 5,550 MW.

Is estimated the increase of the country hydropower potential usage by building new production capacities, from about 50% in 2005 to 70% in 2025.

#### *Top attractive counties for micro-hydro projects*

The opportunities for hydro development in Romania are very good. Micro hydropower potential is reported to be distributed throughout Romania in four out of eight regions (i.e. Moldova, Carpathian Mountains, Transylvania and Sub Carpathians). Around 5000 locations in Romania are favorable for SPH's.

Hunedoara, Sibiu and Harghita counties are suitable for micro hydro power plants investment projects.

### Projects & main players

#### Main owners & investors in small hydro plants in Romania:

- **S.C. Hidroconstructia SA (Romania)** - 182 hydropower plants with an installed capacity up to 1050 MW/central;
- **Hidroelectrica (Romania)** – owns 128 small hydro plants, with an installed capacity of up to 4 MW each.

Hidroelectrica announced it will put 31 micro-hydropower plants up for sale at a combined starting price of 70 million lei (15.8 million euro) in November, 2015. The plants have an installed capacity of 25.7 MW and will be offered for sale via open outcry auctions. The micro-hydropower plants are located in the counties: Suceava, Bacau, Neamt, Hunedoara, Maramures, Brasov, Arad, Vrancea, Sibiu, Arges, Buzau, Valcea and Timis.

Hidroelectrica has sold 28 micro-hydropower plants so far, for a combined 79.6 million lei (17.8 million euro).

- **Luxten Lighting Company SA (Romania)** – The plants have an installed capacity of 10.689 MW, and production in 2014 was 24.22 GWh;

- **Rott Energy (Romania)** - Owns 2 micro hydropower plants with an installed capacity of 1.7 MW (0, 95 MW –MHC1 respectively 0, 75 MW – MHC2), on Râul Mic, Cugir locality, Alba County, Mures River hydrographic basin.
- **CEZ Romania (Czech Republic)** - In December 2010, CEZ purchased 100% shares of TMK Hydroenergy Power System. The value of the transaction was 19.8 million euro. The hydropower system includes 4 hydropower plants (Grebla, Crainicel I, Crainicel II and Breazova), with installed capacity of about 22MW.

Network net production delivered in June 2015 by Hydroenergy TMK Power S.R.L., was 4937 GWh, of which:

- ✓ Grebla: 3.019 GWh
- ✓ Crainicel 1: 0.791 GWh
- ✓ Crainicel 2: 0.845 GWh
- ✓ Breazova: 0,282 GWh.

- **Romelectro (Romania)** - Holds and operates 3 micro hydropower plants in Voineasa, along the Manaileasa Brook, with an installed power of 1.45 MW.

Romelectro was involved in performing the most important investment in Romania, in hydropower field: the complex development of the Jiu River on the Bumbesti–Livezeni stretch and construction of 3 hydropower plants with an installed power of about 75 MW.

The work has been completed in 2014, with the commissioning of:

- ✓ Dumitra Hydropower Plant
- ✓ Bumbesti Hydropower Plant
- ✓ Livezeni Hydropower Plant.

- **Electromagnetica (Romania)** - Owns 10 sites located in Suceava, namely:

- ✓ Brodina 1: 0.65 MW
- ✓ Brodina 2: 0.99 MW
- ✓ Brodina de Jos: 0.87 MW
- ✓ Ehreste: 0.6 MW
- ✓ Galanești-Balca: 0.312 MW
- ✓ Galanești-Balca 2: 0.45 MW
- ✓ Galanești-Balca 3: 0.384 MW
- ✓ Putna: 0.239 MW
- ✓ Sadau: 0,518 MW
- ✓ Tibenii: 0,454 MW

- **Energy Holding S.R.L. (Romania)** - Acquired in 2004 five hydropower plants located on the River Topolog, Arges, becoming one of the first private producer of green energy in Romania. They have an installed capacity of nearly 6 MW of power, with an average production of 8000 MWh/year.

In March 2015, Energy Holding has started an investment program worth 800.000 Euros, for modernization of the 5 SHPs. The investment shall be satisfied in the next 5 years.

- **ESPE Energia S.R.L. (Italy)** - Owns 5 small hydropower plants with a total power of 7 MW. They are involved in the construction phase of small hydropower plants, with a total capacity of 7 MW.

ESPE Energia plans to invest 40 million Euros to build SHPs in Romania in the coming years.

According to information provided by the Department for Waters, Forest and Fishery, more than 300 small hydropower plants have permits for water management, being built and functional, while another 150 are pending authorization.

#### 4.4 Biomass & Biogas

##### Potential & best locations

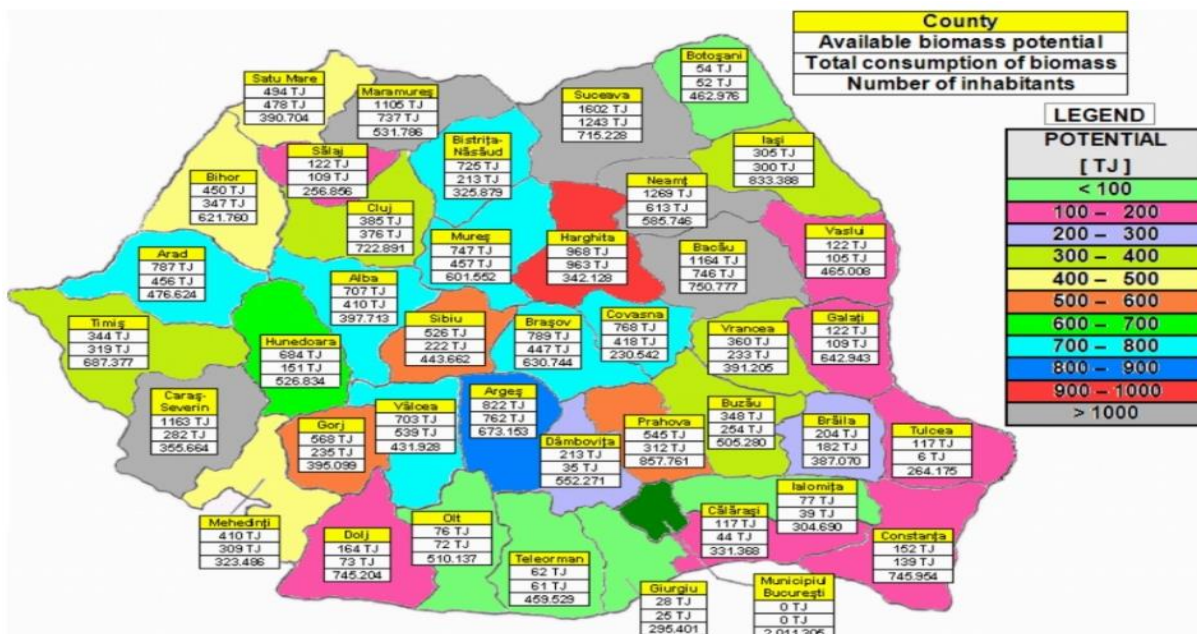
Biomass carries the highest potential for green energy production in the country. According to Ministry of Agriculture, the country's biomass energy potential is of approximately 7.6 million tons of equivalent oil per year, out of which: biogas (7.7%), lumber and firewood waste (15.5%), wood waste (6.4%), agricultural waste from cereals, corn stalk, vineyards (63.2%) and urban household waste (7.2%)

Approximately 36% of this potential is currently used in Romania. So far, biomass usage has mainly focused on household firewood: direct burning, space heating, cooking and water heating account for around 95% of the current biomass exploitation, while industrial biomass use only 5%.

Biomass and biogas have a share of 0.62% in Romania's total renewable energy. Based on the fact that biogas provides a non-polluting and renewable source of energy, leads to employment growth in the rural areas and generates environmental benefits, the biogas sector in Romania has impressive premises for future development.

Carpathians and Sub-Carpathians provide around 66% of the firewood and wood waste, whilst the South Plain, West Plain and Moldova regions provide approximately 58% of the agricultural waste. About 27% of Romania's land is covered by forests, whose exploitable potential is estimated at 20.000 cubic meters.

Map 1: Biomass potential



Source: Intech

### Capacity installed

According to the Romanian Regulatory Authority for Energy (ANRE), with approximately 70 MW installed capacity in power plants using biomass or its derivatives (such as biogas) as fuels in May 2014, the sector has a significant potential for medium term growth in Romania.

### Projects & main players

According to ANRE, the average investment in a biomass cogeneration plant in Romania is estimated at approximately 3.1 million EUR/MW installed, in terms of the electric power capacity.

- CHIMCOMPLEX S.A. Borzesti (Romania)** – The first cogeneration plant was developed with a partner from Switzerland, Turbomach and commissioned in 2009. Energy efficiency of over 90% has led Chimcomplex to build a second plant of this type in 2015.

Part of SCR Group, Chimcomplex SA Borzesti has completed in July 2015 an investment of 14.35 million Euros in the most efficient cogeneration plant from Romania and Europe. Tests showed that overall efficiency exceeds 91%. The CHP plant has electric power of 7.68 MWe and thermal output of 11.7 MWt.

- Genesis BIOPARTNER** - Romanian holding company formed in partnership with Baupartner Romania and Vireo Energy from Sweden, inaugurated in 2013 the first station in renewable energy cogeneration from biogas. The plant from Filipeștii de Pădure, Prahova County, has a capacity of 1MW/h electric and 1,2MW/h heat and process 49 tons daily amount of organic substrate. The project involved an investment of approximately 5 million EUR.

Genesis Biopartner has announced the intention to open new biogas cogeneration stations in the next years.

- ***Egger (Austria)*** - At the beginning of 2014 Egger finished construction works at the largest biomass power plant in Radauti, Suceava County, with a thermal power capacity of 83 MW, following investments of approximately 35 million EUR.
- ***Holzindustrie Schweighofer (Austria)*** – opened two cogeneration power plants using biomass in May 2009 in Radauti, Suceava County and then another two cogeneration power plants in Sebes, Alba County.  
 CHP Plant 1 in Radauti has a capacity of 27.5 MW of which 5 MW represent electricity, and CHP Plant 2 has a capacity of 28 MW of which 10 MW represent electricity.  
 CHP Plant 1 in Sebes has a capacity of 8.6 MW of which 2.4 MW represent electricity, and CHP Plant 2 has a capacity of 27.5 MW of which 8.5 MW represent electricity.
- ***Eco Bihor (Romania)*** - *the operator of the landfill in Oradea, Bihor County, has launched in 2014 a biogas facility with a total capacity of 1.6 MW/h, that uses organic waste deposited in the landfill as fuel for generating electricity and heat. The project is based on a partnership with the company New Life Energy in Cluj Napoca.*
- ***TEB Energy Business S.A. (Romania)*** - 2013 marked the beginning of TEB investments in renewable sources, respectively biogas projects. The first project was the cogeneration plant in Vornicenii Mici village, Suceava County, with electrical power installed of 2.974 MW and thermal output of 2.944 MW. Commissioning of it took place in March 2014, following investments of 6.3 million EUR exclusively from private sources.
- ***Iridex Group Import Export S.R.L. (Romania)*** – Owns a cogeneration power plant based on biogas from organic waste located in Chiajna, Ilfov County. The plant was put into operation in 2011, and has an installed capacity of 2.4 MW.  
 Currently, the construction works continue in the third group of the plant, which will have an electrical power of 1.2 MW and 1.25 MW thermal output.  
 The plant will be gradually extended, depending on the amount of biogas. Are expected in the future five CHPs with a total of 6 MW electric power and up to 4 MW heat output.
- ***KDF Energy Bucuresti (Romania)*** - Currently, the company is in the process of developing its own units for electricity production from renewable energy sources. The projects include three wind power plants, with an installed power of 9 MW, 24 MW and 48 MW, and also a 4.2 MW cogeneration biomass plant.  
 Since September 2012, KDF Energy has been investing in building a biomass plant in cogeneration to produce renewable energy based on biomass at Horezu, Valcea County. The production power plant of 4.2 MW amounts to about 48.8 million lei (11 million Euros).
- ***City Hall of Avrig (Romania)*** - The Municipality of Avrig, Sibiu County is developing the “Local Energy Program” having as main strategic goal to implement the sustainable energy efficiency concept. By the “Local Energy Program”, the Municipality of Avrig has developed the proper action to implement the first Integrated Model for Energy Efficient Communities in Romania. Activities regarding biomass and biogas are in the beginning, but alternative energy is high on the agenda. A biomass plant, is being used for district heating, two photovoltaic installations and three solar systems have been installed on public buildings and educational entities.



The "Local Energy Program" includes the following projects, which will be completed till the year 2020:

- 2 micro hydropower plants (2 MWe) on the river Avrig
  - 1 micro hydroelectric power (0.5 MWe)
  - 1 CHP biomass plant (10 MWe + 20 MWt)
  - 1 CHP biogas (5 MWe + 5 MWt)
  - 2 photovoltaic power plants (2 x 5 MWe)
  - 74 micro PV power plants housing blocks
  - 2 heat distribution networks in Avrig and Marsa
  - 3 micro-grids for residential areas in Avrig and Marsa
  - 1 smart grid on the territory of Avrig City.
- **OMV Petrom** – Since 2009, OMV Petrom initiated in the Division of Exploration and Production, a series of projects converting petroleum gas into electricity (G2P) or into electricity and heat (CHP). Since 2014, the program generated approximately 170.000 tonnes total reduction of CO<sub>2</sub> /year compared to 2009. At the moment, 25 such plants with an installed capacity of 54 MW are functional.
  - **CET Govora (Romania)** – The state-owned heating operator in Ramnicu Valcea County seeks a private investor that will be in charge of financing, building and operating a biomass combined heat and power plant (18.5 MWh and 4.6 MWe). It is intended that this contract to be awarded as soon as possible, in 2015, and the biomass power plant will have to obtain the necessary accreditation on behalf of ANRE by 31 December 2016.

#### 4.5 Geothermal

##### Potential & best locations

The "deep geothermal" deposit of Romania is mainly situated in the west of the country.

Map 1: Location of the main Romanian geothermal reservoirs



Source: "The Geothermal Potential of Romania", Polizu, Hanganu-Cucu

**Table 1: Geothermal DH potential (with the highest capacity)**

Localisation	Capacity (MWth)
Moara Vlasiei	29.9
Beius	21
Oradea-Iosia Nord	19.0
Calimenesi	10.7
Otopeni	10.6

*Source: Geothermal DH Potential in Europe, November 2014*

### Capacity installed

The thermal capacity of existing wells is 480 MWth (when the reference temperature is 25°C). Of these total, currently only 96 wells are used, that are producing hot water in the temperature range of 40÷115°C, equivalent of 180 MWth.

The main direct uses of geothermal heat in the country are for district heating and individual space heating, and health and recreational bathing. In a few places geothermal energy is also used for greenhouse heating (about 10 ha), fish farming (a few farms), industrial processing, and drying. In areas where the available wellhead temperature is low, the geothermal water is only used for health and recreational bathing (i.e. Felix spa), or for fish farming, depending upon the chemical composition of the fluid. Higher temperatures and in larger communities, geothermal water is first used for district heating, some industrial processes, and then part of the depleted water used for bathing and/or fish farming, the rest being reinjected. The market for ground-source heat pumps began in the late 1990s, and is now developing quite well. There are over 2,000 large borehole heat exchangers ranging from 70 to 125 m in depth.

**Table 2: Romania – Direct Uses**

	MWt	TJ/year
individual space heating	29.63	207.28
District heating	78.31	616.17
Greenhouse heating	15.69	80.49
fish farming	4.78	9.50
Agricultural drying	6.32	12.70
Industrial process	3.75	6.84
bathing and swimming	66.65	492.34
geothermal heat pumps	40	480

Total thermal installed capacity in MWt	245.13
Direct use in TJ/year	1905.32
Direct use in GWh/year	529.30
Capacity factor	0.25

Source: International Geothermal Association

### Top attractive County for geothermal projects

The largest quantity of energy from geothermal sources is produced in Bihor country, mainly in the towns Oradea and Beius.

### Projects & main players

There are two companies in Romania currently exploiting most of the geothermal resources, Transgex S.A. and Foradex S.A., which have a long term concession for almost all known geothermal reservoirs.

- Transgex S.A.** - the most active company, is looking at developing district heating projects in a number of communities. In late 2012, Transgex S.A. installed the first power generation unit in Romania. It is a 50 kWe unit, manufactured by ElectraTherm, which is using 10 l/s of 105°C geothermal water from the production well in the Iosia district, Oradea.

At present, as basic activity, Transgex S.A. is developing the use of geothermal energy for district heating in the towns of Oradea, Beius, Salonta and Marghita, as well as in the villages Livada, Sacuieni, Tasnad, Sinicolau de Munte and Santion. Geothermal energy is delivered in towns to blocks of flats, administrative institutions and economic agents, and in smaller communities to blocks of flats and administrative buildings, mainly in open loops.
- Foradex S.A.** has the exploration and exploitation licences for the geothermal resources in the southern part of Romania. The main part of its activity is drilling (in Romania and abroad). It has a Geothermal Department, exploration or exploitation licences in the southern (North Bucharest, Olt Valley) and south-western part of Romania, but not much information is available regarding its activities.
- Turism Felix S.A.** is a tourist company owning almost all hotels in Felix Spa (the largest spa in Romania), near the City of Oradea, as well as the geothermal wells and the exploitation licence. The geothermal water is only used for health and recreational bathing.
- The University of Oradea** has established a Geothermal Research Center which provides geothermal training and research.

## 5. Necessary investments & opportunities

The Department for Energy has presented the new National Energy Strategy (NES) which foresees investments worth approximately 100 billion euro for the next framework 2015-2030.

Major investments are anticipated in energy efficiency projects, new production facilities, refurbishing and increasing efficiency of existing energy production units or transport and distribution networks.

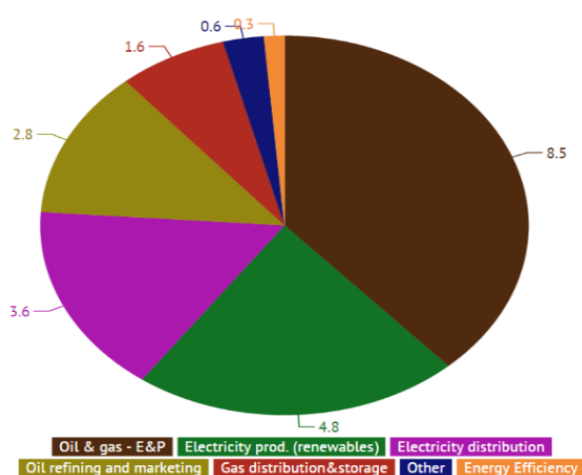
The Cernavoda Units 3 and 4 project, as well as the Tarnita-Lapustesti pumped-storage hydropower station are among the strategic objectives included in the NES. Additionally, the plan of action comprises the development of smart metering and smart grid infrastructure, the development or expansion of interconnection capacity and facilitation of energy export or import or the modernization of coal-fired power stations.

At the same time, the exploitation of natural gas deposits in the Black Sea, security of natural gas supply, the extension of the export capacity, building new pipelines and investments to increase gas extraction capacity of storage facilities are also listed as strategic projects in the next multiannual framework.

Investment levels in Romania would greatly benefit from a more stable tax policy environment and a more conducive business environment. Indeed, Romania ranks 48th in the 2015 World Bank's ease of doing business report and 20th amongst the 28 EU Member States.

Foreign direct investment has been channeled increasingly to energy, machinery, transport, IT and communication (ICT), and agriculture – sectors where investors see future potential. Investments in these areas and in transport, energy and healthcare infrastructure may help the country to progress towards its EU 2020 targets, notably in R&D spending and improvements in energy efficiency.

Graph 1: Foreign investments 2002 - 2014 (billion euro). Total – € 22.2 billion



Source: FIC analysis

In the energy sector, foreign investors have invested in excess of €22 billion since the start of major privatizations in 2002. Between 2012-2014, approximately 6 billion euro in new investments have been contributed by foreign companies to the energy sector, mostly driven by investments in renewables, oil and gas exploration and production and gas and electricity networks.

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## 6. Main national trade fairs

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- Renexpo® South-East Europe - <http://www.renexpo-bucharest.com>
- Enreg Energia Regenerabila - <http://www.enreg-expo.com>
- ExpoEnergiE - <http://www.eee-expo.ro>
- Renewable Energy Research Room & Environmental Protection
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2	<a href="http://www.focus-economics.com">http://www.focus-economics.com</a>	22	<a href="http://www.rottenergy.ro">www.rottenergy.ro</a>
3	<a href="http://www.marketinfo.dk">http://www.marketinfo.dk</a>	23	<a href="http://www.luxten.com">www.luxten.com</a>
4	<a href="http://www.rbd.doingbusiness.ro">www.rbd.doingbusiness.ro</a>	24	<a href="http://www.cez.ro">www.cez.ro</a>
5	<a href="http://www.energyarea.ro">http://www.energyarea.ro</a>	25	<a href="http://electromagnetica.ro">http://electromagnetica.ro</a>
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