

❖ **CONTENTS:**

❖	<b>INTRODUCTION.....</b>	<b>3</b>
❖	<b>ROMANIA’S PROGRESS REPORT ON PROMOTING AND USING ENERGY FROM RENEWABLE SOURCES, IN ACCORDANCE WITH ARTICLE 22 OF DIRECTIVE 2009/28/EC .....</b>	<b>4</b>
1.	<b>Sectoral and overall shares and actual consumption of energy from renewable sources in the last 2 years (2015 and 2016) (Article 22(1)(a) of Directive 2009/28/EC).....</b>	<b>4</b>
2.	<b>Measures taken in 2015 and 2016 and/or planned at national level to promote the increase in the quantity of energy from renewable sources taking into account the indicative trajectory for achieving the national RES targets as outlined in the National Renewable Energy Action Plan in Romania (Article 22(1)(a) of Directive 2009/28/EC) ..</b>	<b>9</b>
2.a	<b>Progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of energy from renewable sources (Article 22(1) of Directive 2009/28/EC).....</b>	<b>18</b>
2.b	<b>Measures taken to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or the rules for bearing separately or sharing the costs related to grid connections and grid reinforcements (Article 22(1)(f) of Directive 2009/28/EC) .....</b>	<b>21</b>
3.	<b>Support schemes and other existing measures to promote energy from renewable sources and the reporting of any kind of developments in the measures used as compared to those set out in the National Renewable Energy Action Plan (Article 22(1)(b) of Directive 2009/28/EC) .....</b>	<b>24</b>
3.1	<b>Information on how supported electricity is allocated to end consumers for purposes of Article 3(6) of Directive 2003/54 (Article 22(1)(b) of Directive 2009/28/EC)</b>	<b>46</b>
4.	<b>Information on how, where appropriate, support schemes have been structured to take into account applications that use E-RES and offer additional benefits, but may also have higher costs, including biofuels made from waste, residues, non-food cellulosic material, and ligno-cellulosic material (Article 22(1)(c) of Directive 2009/28/EC).....</b>	<b>56</b>
5.	<b>Information on the system of guarantees of origin for electricity, heating and cooling from renewable energy sources and the measures taken to ensure the reliability and protection against the fraudulent use of the system (Article 22(1)(d) of Directive 2009/28/EC).....</b>	<b>57</b>
6.	<b>Developments in 2015 and 2016 in the availability and use of biomass resources for energy purposes (Article 22(1)(g) of Directive 2009/28/EC) .....</b>	<b>62</b>
7.	<b>Information on the potential changes in commodity prices and land use in Romania associated with its increased use of biomass and energy from renewable sources (Article 22(1)(h) of Directive 2009/28/EC).....</b>	<b>66</b>
8.	<b>Development and shared use of biofuels produced from waste, residues, non-food cellulosic material and ligno-cellulosic material, and ligno-cellulosic material (Article 22(1)(i) of Directive 2009/28/EC) .....</b>	<b>67</b>
9.	<b>The estimated impact of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality in 2015 and 2016 (Article 22(1)(j) of Directive 2009/28/EC) .....</b>	<b>69</b>
10.	<b>The estimated net greenhouse gas emission saving due to the use of energy from renewable sources (Article 22 (1)(k) of Directive 2009/28/EC).....</b>	<b>72</b>

<b>11.</b>	<b>Report on the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries, as well as the estimated potential for joint projects, until 2020 (Article 22(1)(l), (m) of Directive 2009/28/EC).....</b>	<b>73</b>
<b>11.1</b>	<b>Statistical transfers, joint projects and decision-making rules on joint support schemes.....</b>	<b>77</b>
<b>12.</b>	<b>Information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates (Article 22(1)(n) of Directive 2009/28/EC).....</b>	<b>78</b>
<b>13.</b>	<b>The quantities of biofuels and bioliquids in energy units (ktoe) corresponding to each category of raw material group listed in Part A of Annex VIII taken into account by Romania in order to meet the targets set out in Article 3(1) and (2) and the first subparagraph of Article 3(4).....</b>	<b>79</b>
❖	<b>CONCLUSIONS .....</b>	<b>80</b>
❖	<b>BIBLIOGRAPHY .....</b>	<b>81</b>
❖	<b>ACRONYMS .....</b>	<b>77</b>

## ❖ INTRODUCTION

Pursuant to Article 22 of Directive 2009/28/EC, Member States shall submit to the European Commission the fourth Report on the progress achieved in the promotion and use of energy from renewable sources in 2015 and 2016. The deadline for submitting the fourth report is 31 December 2017.

The Ministry of Energy is responsible for reporting on this matter, as an obligation of the Member States under Directive 2009/28/EC on energy from renewable sources.

The reports of the Member States are important for monitoring the achievement of policies in the field of renewable energy at EU level, and the application of the requirements set forth in Directive 2009/28/EC and the measures in the National Action Plans in the field of energy from renewable sources (NREAP) drawn up in 2010.

The EU legislation promoting the use of energy from renewable sources has been in force since 2001, when the first directive on the promotion and the use of energy from renewable sources was adopted.

Romania's fourth report was drawn up in accordance with the recommendations set out by the European Commission in the document entitled 'Template for the Contracting Party Progress Reports under Renewable Energy Directive 2009/28/EC as adapted by Ministerial Council Decision 2012/04/MC-EnC'. When compiling the report, the definitions, calculation rules and terminology laid down in Directive 2009/28/EC and in Regulation (EC) No 1099/2008 of the European Parliament and the Council should be complied with.

As a result of Directive 2015/1513 of 9 September 2015 amending Directive 2009/28/EC, an update of the reporting method has been made, including additional provisions. As far as possible, the update was made, but taking into account that the requirements were non-binding and completely voluntary.

The overall objective of this study is to provide 'Consulting services on drawing up Romania's Progress Report on promoting the use of energy from renewable sources' for 2015-2016.

**❖ ROMANIA'S PROGRESS REPORT ON PROMOTING AND USING ENERGY FROM RENEWABLE SOURCES, IN ACCORDANCE WITH ARTICLE 22 OF DIRECTIVE 2009/28/EC**

**1. Sectoral and overall shares and actual consumption of energy from renewable sources in the last 2 years (2015 and 2016) (Article 22(1)(a) of Directive 2009/28/EC)**

**Table 1: The sectoral (electricity, heating and cooling, and transport) share and overall shares of energy from renewable sources**

	<b>2015</b>	<b>2016</b>
RES-H&C (%)	25.9	26.9
RES-E (%)	43.2	42.7
RES-T (%)	5.49	1.76
Overall RES share (%)	24.79	24.22
<i>Of which from cooperation mechanism (%)</i>	0	0
<i>Surplus for cooperation mechanism (%)</i>	0	0

*Source: National Institute of Statistics*

The overall shares of energy from RES in gross final energy consumption in 2015 and 2016, namely 24.79 % and 24.22 %, significantly exceed the share established for the indicative trajectory of 20.59 % for 2015-2016 calculated in accordance with the provisions in Directive 2009/28/EC (Annex I).

The sectoral shares for electricity (RES-E) and heating and cooling (RES-H&C) exceed the values in the indicative trajectory set out in the NREAP, which is not the case for the transport sector (**Table 2**).

**Table 2: Comparison between the shares in reporting years 2015, 2016 and the values estimated in NREAP**

	<b>Indicative trajectory set out in NREAP</b>		<b>Data from the reporting years</b>	
	<b>2015</b>	<b>2016</b>	<b>2015</b>	<b>2016</b>
RES - H&C (%)	17.07	17.27	25.9	26.9
RES - E (%)	41.86	42.84	43.2	42.7
RES - T (%)	8.11	8.43	5.49	1.76
Overall RES share (%)	20.13	20.59	24.79	24.22
<i>Of which from cooperation mechanism (%)</i>	0	0	0	0
<i>Surplus from cooperation mechanism (%)</i>	0	0	0	0

**Table 1.a: Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)**

	<b>2015</b>	<b>2016</b>
(A) Gross final consumption of RES for heating and cooling	3408.6	3507.0
(B) Gross final consumption of electricity from RES	2197.2	2188.5
(C) Gross final consumption of energy from RES in transport	292.3	96.1
(D) Gross total consumption from RES	5898.1	5791.6
(E) Transfer of RES to other Contracting Parties or Member States	0	0
(F) Transfer of RES from other Member States and third countries	0	0
(G) RES consumption adjusted for target (D)-(E)+(F)	5898.1	5791.6
Gross final consumption of energy in aviation adjusted pursuant to Article 5(6)	-	-
Share of RES in final energy consumption (%)	24.79	24.22

*Source: National Institute of Statistics*

Whereas the amount of energy consumed in the aviation sector in 2015 and 2016 was 1.15 % and 1.34 %, respectively, of final gross energy consumption, there was no need to adjust the final energy consumption pursuant to Article 5(6) of Directive 2009/28/EC.

**Table 1.b: Total actual contribution (installed capacity, gross electricity generation) of each renewable energy technology in Romania to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity**

	<b>2015</b>		<b>2016</b>	
	<b>MW</b>	<b>GWh</b>	<b>MW</b>	<b>GWh</b>
Hydro	<b>6730.0</b>	<b>16477.1</b>	<b>6734.0</b>	<b>16689.4</b>
non pumped	6359.0	17006.6	6377.0	18536.2
< 1MW	93.0	210.9	88.0	264.5
1MW-10 MW	425.0	1085.0	447.0	1163.9
>10MW	5841.0	15710.7	5842.0	17107.8
pumped	92.0	-	92.0	-
mixed	279.0	-	265.0	-
Geothermal energy	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

	2015		2016	
	MW	GWh	MW	GWh
Solar energy:	<b>1326.0</b>	<b>1982.0</b>	<b>1372.0</b>	<b>1819.7</b>
<i>photovoltaic energy</i>	1326.0	1982.0	1372.0	1819.7
<i>concentrated solar power</i>	-	-	-	-
Tide, wave, ocean energy	-	-	-	-
Wind energy:	<b>3130.0</b>	<b>6566.4</b>	<b>3025.0</b>	<b>6408.1</b>
<i>onshore facilities</i>	3130.0	7062.9	3025.0	6590.0
<i>offshore facilities</i>	-	-	-	-
Biomass:	<b>118</b>	<b>523.0</b>	<b>123</b>	<b>530.7</b>
<i>solid</i>	104	462.3	107	465.8
<i>biogas</i>	14	60.8	16	64.9
<i>bioliquids</i>	0	0	0	0
<b>TOTAL</b>	11304.0	25548.6	11254.0	25448.0
<i>of which in cogeneration</i>		387.2		417.3
Gross final electricity consumption (GWh)		59194.0		59582
<b>RES-E share (%)</b>	43.2		42.7	

Source: National Institute of Statistics

The values of electricity generated by hydropower plants and by wind power plants are normalised values calculated in accordance with the requirements in Annex 1 to Directive 2009/28/EC.

**Table 1.c: Total actual contribution (final energy consumption) from each renewable energy technology in Romania to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling (ktoe)**

	2015	2016
<i>Geothermal energy (excluding low temperature geothermal heat in heat pump applications)</i>	25.7	31.7
<i>Solar energy</i>	0.5	0.5
<i>Biomass</i>	3382.4	3474.8
<i>solid</i>	3375.2	3465.2
<i>biogas</i>	7.2	9.6
<i>bioliquids</i>	0.0	0.0
<i>Renewable energy from heat pumps:</i> - <i>of which aérothermal</i>	0.0	0.0

	2015	2016
- of which geothermal		
- of which hydrothermal		
<b>TOTAL</b>	<b>3408.6</b>	<b>3507.0</b>
of which central heating	14.4	13.0
of which biomass in households	2950.9	2974.8
Final energy consumption for heating and cooling (ktoe)	13160.6	13037.2
RES-H&C share (%)	25.9	26.9

Source: National Institute of Statistics

**Table 1.d: Total effective contribution from each renewable energy technology in Romania to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector (ktoe)**

	2015	2016*
- Bioethanol	61.5	0.0
- Biodiesel (EMAG)	140.9	7.7
- Hydrotreated Vegetable Oil (HVO)	-	-
- Biomethane	-	-
- Fischer-Tropsch diesel	-	-
- Bio-ETBE	-	-
- Bio-MTBE	-	-
- Bio-DME	-	-
- Bio-TAEE	-	-
Biobutanol	-	-
- Biomethanol	-	-
- Pure vegetable oil	-	-
Total sustainable biofuels	-	-
Of which	-	-
sustainable biofuels produced from feedstock listed in Part A of Annex IX	-	-
other sustainable biofuels eligible for the target set out in Article 3(4)(e)	-	-
sustainable biofuels produced from feedstock listed in Part B of Annex IX	-	-
sustainable biofuels for which the contribution towards the renewable energy target is limited according to Article 3(4)(d)	-	-

	2015	2016*
Imported from third countries	-	-
Hydrogen from renewable sources	0	0
Electricity from renewable sources	89.9	88.4
of which		
consumed in road transport	3.6	3.2
consumed in rail transport	86.3	85.2
consumed in other transport sectors		
others (please specify)		
<b>TOTAL</b>	292.3	96.1
Gross final energy consumption in transport (ktoe)	5325.1	5468.7
RES-T share (%)	5.49	1.76

*\*Note: Estimated values*

*Source: National Institute of Statistics*

In analysis period 2015-2016, only biofuels meeting the sustainability criteria were reported. Comparing the values of gross final consumption of electricity, final consumption of energy for heating and cooling, gross final consumption of energy in the transport sector in **tables 1.b, 1.c, 1.d** with the corresponding values in NREAP, underpinned by a 3.9 % GDP growth in 2015 and 4.8 % in 2016, as compared to the 6.0 % and, respectively, 5.7 % forecast in NREAP, we note the following:

- The final energy consumption in 2015 and in 2016, respectively, was below the forecast value in the increased energy efficiency scenario, due to both the 2008-2012 economic and financial crisis followed by the economic restructuring period, and the measures adopted in the National Energy Efficiency Plans for 2007-2013 and 2014-2020. Thus, the gross final consumption achieved in 2016 represents 81.7 % of the value estimated in NREAP;
- The electricity consumption from RES was 2 188.5 thousand toe in 2016, as compared to 2 481 thousand toe in NREAP. The actual value of gross final energy consumption in 2016 was 5 124 thousand toe, as compared to the 5 790 thousand-toe value forecast in NREAP. Under the presented conditions, where there is a drop in gross final energy consumption as compared to the forecast values, the share of electricity consumption from RES in gross final electricity consumption was 42.7 % in 2016, which is lower than the 42.84 % forecast in the NREAP.
- The energy consumption from RES in transport, observing the sustainability criteria in Directive 2009/28/EC, was 96.1 thousand toes in 2016, as compared to the 458.2 thousand toe estimated in NREAP. In the conditions of a gross final energy consumption in the transport sector amounting to 5 468.7 thousand toe, as compared to the 5 314 thousand toe estimated in the NREAP, the share of energy consumption from RES in the transport sector of 1.76 % is below the 8.4 % share forecast in NREAP.
- The RES energy consumption for heating/cooling in 2016 was 3 507.0 thousand toe, which is much higher than the forecast (3 058 thousand toe), 99 % of which is biomass consumption in households (fire wood). In 2016, the share of energy consumption from

RES for heating and cooling in the total energy consumption for heating and cooling was 26.9 %, as compared to the 17.27 % forecast in NREAP.

- At national level, the total energy consumption from RES in 2016 was 5 791.6 thousand toe. The share of energy consumption from RES in the gross final consumption was 24.22 % in 2016, as compared to the 20.59 % forecast in NREAP.

**2. Measures taken in 2015 and 2016 and/or planned at national level to promote the increase in the quantity of energy from renewable sources taking into account the indicative trajectory for achieving the national RES targets as outlined in the National Renewable Energy Action Plan in Romania (Article 22(1)(a) of Directive 2009/28/EC)**

**Table 2: Overview of all policies and measures**

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<p><b>1. Establishing the Regulation for issuing green certificates:</b></p> <p>How to calculate the quantity of E-RES benefiting from the GC promotion scheme laid down in Law No 220/2008.</p> <p>How to issue a GC.</p> <p>The parties involved and their obligations in the process of issuing the GC.</p> <p>(Order No 4/2015 of ANRE)</p>	Regulatory	It creates the legal framework needed to extend the use of RES	Transmission System Operator (TSO), as GC issuer; Economic operators accredited by ANRE to benefit from the GC promotion scheme	Existing	Entered into force in February 2015
<p><b>2. Methodology for setting the annual mandatory quotas of electricity produced from RES benefiting from the GC promotion scheme and GC acquisition quotas</b></p> <p>This methodology also includes the calculation of the number of GCs for the</p>	Regulatory	Increasing installed power in RES using establishments	Economic operators having the obligation to purchase green certificates in order to fulfil the mandatory annual GC quota; producers of electricity from RES, who are holders of GC; Transmission System Operator; Operator of the GC	Existing	Entered into force in July 2015

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<p>failure to meet the estimated annual GC quota for each quarter of the analysis year, by the economic operators having the obligation to purchase GC; how to calculate the amount of money for non-fulfilment of the estimated annual GC quota for each quarter; how to calculate the amount of money for the failure to meet the mandatory annual quota for the acquisition of GC. (Order No 101/2015 of ANRE, Order No 2/2016 of ANRE, Order No 16/2016 of ANRE, Order No 41/2016 of ANRE)</p>			market		
<p><b>3. Establishing the Rules on the operation of the green certificate market</b> This regulation includes: How to organize and operate the GC market; The parties involved and responsibilities in organizing and operating the GC market; How to record and manage GC trading information; Information needed to monitor the functioning of the GC market (Order No 60/2015 of ANRE)</p>	Regulatory	Development of market mechanisms with reference to GC promotion	Participants to the GC market. Operator of the GC market as organizer and manager of the GC market and as manager of the GC register. Transmission System Operator as the issuer of the GC.	Existing	Entered into force in 1 April 2015

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<p><b>4. Establishing the methodology for monitoring the scheme for promoting energy generation from renewable sources through green certificates</b></p> <p>This methodology: determines the indicators allowing the monitoring of the GC support scheme for the promotion of electricity produced from RES, as regards the development of the use of these resources, the return on investment in this area and its impact on the price of electricity to end consumers; monitors the development over time of the level of achievement of the proposed targets as regards the share of RES-based electricity in gross final consumption of electricity; establishes the necessary information, the providers, the frequency and the format of their reporting; establishing the content and the frequency of monitoring reports. The monitoring results are used to determine whether the application</p>	Regulatory	Monitoring the E-RES promotion scheme	ANRE Producers holding energy production units produced from RES, economic operators having the obligation to purchase GC provided in Article 8 of Law No 220/2008, network operators and operator of the GC market	Existing	Entered into force in 29 June 2015

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
of the green certificate support scheme leads to overcompensation, to prepare reports to national and European public authorities, and to draft proposals to improve the green certificate support scheme and related secondary legislation. (Order No 78/2015 of ANRE, Order No 52/2016 of ANRE)					
<p><b>5. Establishing the quarterly GC quota to be purchased under Law No 134/2012</b></p> <p>The number of GCs is equal to the product between the value of the annual mandatory quota for GC purchase established for that year and the quantity of electricity expressed in MWh, invoiced or self-provisioned quarterly to the end consumer (Law No 122/2015)</p>	Regulatory	Regular Green Certificate procurement and uniformity in the payment effort of the consumers.	Electricity suppliers	Existing (amendments and supplements to Law No 220/2008)	Entered into force in June 2015
<p><b>6.</b></p> <p>Electricity producers with power plants with installed power from 1 to 3 MW per producer, respectively from 2 MW to 3 MW per producer for high-efficiency biomass-based cogeneration, benefiting from the promotion scheme and falling in the SME category according to Law No 346/2004, can</p>	Regulatory	Participation in the electricity market and the GC market	Producers / Suppliers	Existing (derogation from Law No 123/2012)	Entered into force in June 2015

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
conclude bilateral contracts negotiated directly to buy or sell electricity (Law No 122/2015)					
<b>7.</b> Producers of electricity from RES that own power plants benefiting from the promotion scheme, with installed power of up to 1 MW per producer, and up to 2 MW per producer for high-efficiency biomass-based cogeneration can conclude bilateral contracts to buy or sell electricity and GC negotiated directly with the suppliers of end consumers (Law No 122/2015)	Regulatory	Participation in the electricity market and the GC market	Producers / Suppliers	Existing (derogation from Law No 123/2012)	Entered into force in June 2015
<b>8. Accreditation of economic operators with installed capacities between 125 and 250 MW and who did not benefit from the GC promotion scheme</b> (Law No 122/2015)	Regulatory	Partial transposition of the provisions of the European Commission Decision	Electricity producers with large installed powers	Existing (amendments and supplements to Law No 220/2008)	Entered into force in June 2015
<b>9. Approval of the Regulation on the accreditation of producers of electricity from RES to apply the GC promotion scheme</b> This regulation contains:	Regulatory	Increasing installed power in RES using establishments	Producers of electricity using RES	Existing (amendments and supplements to Law No 220/2008)	Entered into force on 1 June 2014

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<p>the steps of the accreditation process and the documentation required for accreditation; accreditation conditions; how to apply the green certificate promotion scheme; the rights and obligations of economic operators whose power plants have been accredited; the conditions for the amendment, suspension and withdrawal of accreditation. (Order No 48/2014 of ANRE, Order No 100/2015 of ANRE, Order No 77/2016 of ANRE)</p>					
<p><b>10.</b> The development of transmission and distribution electric networks for ensuring that electricity from RES is taken over (Outlook Plan for the Electricity Transmission and Distribution Networks for 2019-2023 drawn up by CN Transelectrica SA, SC ENEL SA, SC CEZ SA, SC Electrica SA, SC DELGAZ Grid S.A.</p>	Investments	Ensuring the transmission and distribution of electricity produced from RES, under safe operation of the National Power System	CN Transelectrica SA, SC ENEL SA, SC CEZ SA, SC Electrica SA, SC DELGAZ Grid SA, Producers of electricity using RES	Planned	Entered into force in 2010 Estimated value: 2019-2023
<p><b>11.</b> Updating the Sectoral Operational</p>	Financial	Increasing installed power in RES using establishments.	E-RES producers (public authorities and companies)	Existing	Entered into force in 2013. Validity

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<p>Programme for Increasing Economic Competitiveness, Axis 4 Increased energy efficiency and safe supply in a context of fight against climate change, intervention area 4.2 Making use of renewable energy sources for producing green energy – increasing the allocated envelope</p>					extended to 2020
<p><b>12. Large Infrastructure Operational Programme (LIOP), Priority Axis 6</b>  Promoting clean energy and energy efficiency aiming at supporting a low carbon economy.  Specific objective 6.1  Increase of energy production from less exploited renewable resources (biomass, biogas, geothermal)</p>	Financial	<p>Creating and/or modernising the production capacities of electricity and/or heat using biomass and biogas;  Building and upgrading the production capacities of heat based on geothermal energy.  Supporting investments in the extension and modernization of electricity distribution networks in order to take over the energy produced from renewable resources under safe operating conditions of the National Energy System (NES)</p>	<p>Administrative and territorial units where there is the potential for use of geothermal or biomass / biogas RES.  Companies which are engaged in the production of energy for trading.</p>	Existing	2014-2020
<b>13. Regional</b>	Financial	Environmentally	Users of means of	Existing	2014- 2020

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
<b>Operational Program (ROP) Priority Axis 3</b> Supporting the shift towards a low-carbon economy (National Environmental Fund)		friendly means of transport	transport		
<b>14.</b> National Environment Fund	Financial	Increasing installed power in production establishments using RES and generating electricity and heating	Electricity and heating producers	Existing	
<b>15.</b> Programme regarding the installation of heating systems that use renewable energy, including the replacement of or addition to traditional heating systems, ' <b>GREEN HOUSE</b> ' for natural and legal persons	Financial	Increasing installed power in production establishments using RES and generating energy	Population and administrative units, public institutions and religious entities	Existing	
<b>16.</b> Possibility of purchasing electric and/or hybrid cars within the programme for stimulating the renewal of the national car fleet.	Financial	Increasing the number of electric and hybrid cars used	Producers and distributors of cars, and natural and legal persons purchasing cars	Existing	Entered into force in: September 2011 Estimated value:
<b>17.</b> Establishing the share of biofuels in petrol and diesel placed on the market in 2013–2014 (Government Decision No 935/2011)	Regulatory	Increasing biofuel consumption	Fuel producers	Planned	Entered into force in 11 October 2011 Estimated value: 2020
<b>18.</b> Placing on the	Regulatory	Implementation of	Fuel producers	Planned	Entered into

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
market only biofuels and bioliquids obtained from raw material meeting the sustainability criteria defined and the obligation to check the compliance with such criteria (Government Decision No 935/2011)		sustainable development principles			force in 11 October 2011 Estimated end date: 2020
<b>19.</b> Establishing the share of biofuels in petrol and diesel placed on the market in 2013–2014 (Government Decision No 1121/2013 amending and supplementing GD No 935/2011 and GD No 928/2012)	Regulatory	Increasing biofuel consumption	Fuel producers	Planned	Entered into force in 01 January 2014 Estimated value: 2020
<b>20.</b> Certifying biofuels and bioliquids with regard to meeting the sustainability criteria, voluntary schemes recognised by the European Commission for proving the compliance with sustainability criteria pursuant to Directive 2009/28/EC (Order No 136/2012 of the Ministry of Economy and Business Environment)	Regulatory	Transposition of EU law	Fuel producers	Planned	Entered into force in February 2012 Estimated value:

## **2.a Progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of energy from renewable sources (Article 22(1) of Directive 2009/28/EC)**

The evaluation and improvement of the administrative procedures for the use of renewable energy and the alignment of such procedures to the EU standards is a constant concern of all national, regional and local synthesis and decision-making factors.

The European legislative framework for energy from renewable sources is regulated by *Decision C (2011) 4938 on State Aid SA 33134 (2011/N) for Romania – Green certificates for promoting electricity from renewable sources* and has been amended in 2015 by Decision C(2015) 2886, and in 2016 by Decision C(2016) 8865/2016.

In 2015 new documents were issued in the field of renewable energy, which changed the existing legislative framework. Thus, by Decision C(2015) 2886 of 4 May 2015, the European Commission authorised the modifications to the green certificates scheme for promoting RES and these were adopted in Romania by:

- Law No 134/2012 approving GEO No 88/2011 amending and supplementing Law No 220/2008 establishing a mechanism for the promotion of electricity generation from renewable sources;
- GEO No 79/2013 amending and supplementing Land Enhancement Law No 138/2004 supplementing GEO No 82/2011 on certain measures for organising land enhancement, and to amend Article 3(6)(e) of Law No 220/2008 establishing a mechanism for the promotion of electricity generation from renewable sources;
- Law No 23/2014 approving Government Emergency Order No 57/2013 amending and supplementing Law No 220/2008 establishing the scheme for promoting energy generation from renewable sources.

The main actions and measures taken during the 2015-2016 reporting period will be presented below.

### **a. Improving the system of mandatory quotas of electricity from renewable energy sources combined with the trading of Green Certificates.**

As shown in the second report (2011-2012), Law No 220/2008 set up the legal framework for establishing a mechanism for the promotion of electricity generation from renewable sources through implementation of a mandatory quota system combined with the trading of Green Certificates (GC).

Law No 23/2014 approving Government Emergency Order No 57/2013 amending and supplementing Law No 220/2008 establishing the scheme for promoting energy generation from renewable sources was published in the Official Journal of Romania, Part I No 184 on 14 March 2014.

We point out that, compared to the form authorised by EC in 2011, the main amendments to Law No 220/2008 republished as subsequently amended and supplemented by the legislative acts mentioned above are as follows:

- Not applying the promotion scheme for electricity generated in photovoltaic power plants sited on land duly classified as agricultural use land on 31 December 2013;
- Not applying the promotion scheme for the generation of electricity from renewable sources for quantities of electricity delivered in addition by dispatch establishments as

compared to the quantities of electricity from the hourly physical notifications submitted by the renewable electricity producers to the TSO (CN Transelectrica SA);

- Postponing a certain number of Green Certificates from trading, depending on RES type, for producers owning E-RES plants with operational power as of 31 December 2013;
- The Green Certificates postponed will be recovered as from 1 April 2017 for new hydropower plants and for solar power plants, and as from 1 January 2018 for wind power plants, in instalments until 31 December 2020 at the latest;

These provisions have been amended, in accordance with Article I paragraph (11) of GEO No 24/2017, the postponed GCs will be recovered as from 1 January 2025 in equal monthly instalments until 31 December 2030.

- Changes related to the mandatory annual quotas of electricity generated from renewable energy sources that benefit from the green certificate promotion scheme
  - for the period 2010-2013 the quotas were the following: 2010 – 8.3 %; 2011 – 10 %; 2012 – 12 %; 2013 – 14 %.
  - As from 2014, ANRE monitors every year the annual quotas of electricity generated from renewable energy sources that benefit from the green certificate promotion scheme and, depending on the achievement of the national objective and on the impact at the level of the end consumer, it estimated, published on its own website and informed the government by 30 June of the current year of the mandatory annual quota of electricity generated from renewable energy sources that benefit from the green certificate promotion scheme for the following year;
- For electricity produced in power plants that use biomass originating from energy crops, one green certificate in addition to those provided for in paragraph (2)(d) shall be granted for each MWh produced and supplied;
- The green certificates issued by the Transmission System Operator (TSO) are valid for 12 months;

This provision has been amended in accordance with Article IX of GEO No 24/2017, the GCs postponed to trading as of 1 July 2013 are valid and can be traded until 31 March 2032.

- Removing the guarantee fund managed by the electricity market trader;
- The producers of electricity from renewable energy sources owning power units/plants that benefit of the promotion scheme, having installed powers of maximum 1MW per producer and 2MW per producer in the case of biomass-based high-efficiency cogeneration, may conclude bilateral sale contracts for energy and directly negotiated green certificates only with suppliers to end consumers, as an exception from GC centralised trading;
- Not including the equivalent amount of non-purchased green certificates in the invoice to the end consumer;
- The electricity invoice sent to the end consumer shall contain the green certificates value separately from the electricity tariff / price and shall specify the legal basis.

On 29 May 2015, the Official Journal of Romania, Part I, No 387, published Law No 122 for the approval of some measures on the promotion of electricity production from renewable energy sources and for amending and completion of certain normative acts. Compared to the form authorised by EC in 2011, the main amendments to the Law are as follows:

- Green certificates trading is allowed for RES electricity producers and for economic operators having the obligation to purchase green certificates in a transparent,

centralised and non-discriminatory manner on the centralised markets managed by the operator of the electricity market.

- In the case of electricity producers and economic operators commercially operating E-RES power plants with installed power above 125 MW, any negative differences between the number of green certificates received and the number of green certificates due according to the individual decision of the EC, will be regulated on the basis of a decision issued by ANRE, by issuing for trading additional green certificates in their favour within 24 months from the date of issuing the EC decision.
- An economic operator with installed capacities between 125 MW and 250 MW, who did not benefit from the green certificates promotion system or for which no individual EC approval decisions were issued, will be certified by ANRE without the need to obtain the individual authorization decision from the EC. Any differences between the number of green certificates received and the number of green certificates due according to the legal provisions will be settled within 24 months from the issuing date of the accreditation.
- The competent Ministry, in cooperation with ANRE, develops the mechanism for opening the green certificates promotion scheme for the production of electricity from renewable sources to producers from other Member States of the European Union, which is approved by a Government Decision.

The Green Certificates Support Scheme had the validity date of 31 December 2016 under the conditions of Article 2554 of the New Civil Code and Regulation (EC, Euratom) No 1182/71 of the Council of 3 June 1971 determining the rules applicable to periods, dates and time limits.

- The promotion system for electricity from RES does not apply to energy produced from renewable energy sources and sold at negative prices.

Pursuant to Law No 123/2012, updated, the competitive mechanisms of the electricity market already do not allow the sale of electricity at negative prices, therefore these provisions are applied.

- The competent Ministry, together with ANRE, develops and submits to the Government for approval the state aid scheme for supporting the production of energy from renewable sources in power plants with installed power below 500 kW per plant through regulated prices defined for each technology within the 90 days from the date of entry into force of Law No 122/2015, after which it will be approved by Government Decision within 30 days from the date of its communication by the Ministry

These provisions have been repealed by Article II of GEO No 24/2017.

- In the electricity bill sent to end consumers, the value of green certificates is billed separately from electricity charges / prices, specifying the legal basis. This value is the product of the amount of the mandatory annual green certificate acquisition quota (GC/MWh) estimated by ANRE, the quantity of electricity invoiced (MWh) and the price of green certificates, calculated as the weighted average price of transactions in the centralized market for green certificates in the month preceding the month of billing or the last monthly weighted average available.

The scheme for the promotion of electricity generated from renewable energy sources worked during the period 2011-2016 based on secondary legislation consisting of rules and methodologies. In particular, the following rules were applied in 2015 and 2016:

Order No 4/2015 of ANRE approving the Rules for green certificates issuance;

- Order No 60/2015 of ANRE approving the Regulation for the organisation and functioning of the green certificates market, 2nd revision;
- Order No 78/2015 of ANRE amending the Methodology for monitoring the green certificate promotion system for energy from renewable sources;
- Order No 100/2015 of ANRE amending and supplementing the Rules for the certification of the producers of electricity from renewable sources for the application of the green certificate promotion system, approved by Order No 44/2014 of ANRE;
- Order No 101/2015 of ANRE approving the Methodology for establishing the annual mandatory quotas for electricity generated from renewable sources benefiting from the green certificate promotion system and the green certificate purchase quotas, revision 3;
- Order No 138/2015 of ANRE amending and supplementing the Rules for the certification of the producers of electricity from renewable sources for the application of the green certificate promotion system, approved by Order No 48/2014 of ANRE, as subsequently amended and supplemented;
- Order No 166/2015 of ANRE amending and supplementing the Rules for the organisation and the operation of the green certificate market;
- Order No 2/2016 of ANRE on amending and supplementing the Methodology for establishing the annual mandatory quotas for electricity generated from renewable sources benefiting from the green certificate promotion system and the green certificate purchase quotas, approved by Order No 101/2015 of ANRE;
- Order No 16/2016 of ANRE on amending and supplementing the Methodology for establishing the annual mandatory quotas for electricity generated from renewable sources benefiting from the green certificate promotion system and the green certificate purchase quotas, approved by Order No 101/2015 of ANRE;
- Order No 17/2016 of ANRE on amending the Rules for the organisation and the operation of the green certificate market, approved by Order No 60/2015 of ANRE;
- Order No 41/2016 of ANRE approving the Methodology for establishing the annual mandatory quotas for electricity generated from renewable sources benefiting from the green certificate promotion system and the green certificate purchase quotas;
- Order No 52/2016 of ANRE approving the Methodology for monitoring the green certificate promotion system for energy from renewable sources;
- Order No 77/2016 of ANRE on amending and supplementing the Rules for the certification of the producers of electricity from renewable sources for the application of the green certificate promotion system, approved by Order No 48/2014 of ANRE.

**2.b Measures taken to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or the rules for bearing separately or sharing the costs related to grid connections and grid reinforcements (Article 22(1)(f) of Directive 2009/28/EC)**

Law No 123/2012 on electricity and natural gas published in the Official Journal of Romania No 485 of 16 July 2012 replaces Law No 13/2007 on energy, which mainly transposes Directive 2009/72/EC and Directive 2009/73/EC.

Law No 123/2012 includes **Chapter V** Promotion of renewable and high-efficiency cogeneration electricity.

By law, through technical and commercial rules, the competent authority provides for:

- guaranteed access to the electricity grid and priority dispatch of renewable and high-efficiency cogeneration electricity;
- priority access to the electricity grid and priority dispatch of renewable and high-efficiency cogeneration electricity generated in plants with installed power below or equal to 1 MW, to the extent the safety of the National Energy System is not affected.

Pursuant to law, the criteria for promoting renewable electricity refer to the following aspects:

- reaching the national target with regard to the share of electricity produced from renewable sources of energy;
- compatibility with the market competition principles;
- characteristics of the various renewable energy sources and the power generation technologies;
- the most efficient way of promoting the use of renewable energy sources.

Pursuant to Law No 123/2012, the users (holder of licence for the generation of electricity and end consumer) have regulated access to power networks of public interest. The access to the electricity grids of public interest is a mandatory service, under regulated conditions the transmission system operator (TSO), as well as the distribution operator (DO), have to meet. The stages and the procedures necessary for connecting the users to the transmission and distribution networks shall be established in the rules for the connection of users to public interest networks, approved by ANRE. Currently, the following ANRE Orders are in force:

- Order No 29/2013 amending and supplementing the Technical Standard ‘Technical conditions for the connection to the electric networks of public interest for wind power plants’ approved by Order No 51/2009;
- Order No 30/2013 approving the technical norms for connection to public electricity networks for photovoltaic power plants;
- Order No 59/2013 of ANRE approving the Rules with regard to connecting users to public interest electricity grids;
- Order No 11/2014 approving the Methodology for setting tariffs for connecting users to public electricity networks. Order No 29/2003 is repealed;
- Order No 63/2014 on amending and supplementing the Rules with regard to connecting users to public interest electricity grids approved by Order No 59/2013;
- Order No 61/2014 on the approval of the Methodology for setting the tariffs for issuing and updating the technical connection approvals, connection certificates and location permits;
- Order No 74/2014 for the approval of the framework content of technical connection approvals. Order No 21/2010 is repealed;
- Order No 87/2014 on amending and supplementing the Methodology for setting the charge for connecting users to public interest electricity grids approved by
- Order No 11/2014;
- Order No 11/2015 for the approval of the framework-contract for connecting users to public electricity networks. Order No 9/2006 is repealed;
- Order No 102/2015 approves the Regulation for establishing solutions for connecting users to public electricity networks. Order No 129/2008 is repealed;

- Order No 10/2016 approves the amendment of the Methodology for establishing cash compensations between users connected at different stages through joint facilities to public interest electricity grids, approved by Order No 180/2015.

CN Transelectrica SA provides the public service of transmission for all the users of power transmission networks, in non-discriminatory conditions, ensuring access thereto for any applicant according to law and avoiding, in particular, discrimination in favour of affiliated economic operators, in compliance with the rules and the performance laid down in the technical rules in force.

Expenditure on changing electricity transmission installations as a result of connecting new users or changing the original energy characteristics of existing users, including the evacuation of locations, is subject to the regulations in force.

Expenditure on modifying electricity distribution installations as a result of connecting new users or changing the original energy characteristics of existing users, including the evacuation of locations, shall be incurred according to the regulations issued by the competent authority on the basis of objective criteria.

### **3. Support schemes and other existing measures to promote energy from renewable sources and the reporting of any kind of developments in the measures used as compared to those set out in the National Renewable Energy Action Plan (Article 22(1)(b) of Directive 2009/28/EC)**

The reporting period 2015-2016 was covered by the support schemes set forth in the NREAP for the promotion of energy from RES. Based on the monitoring of the operation of the promotion scheme for electricity generated from renewable sources in 2015-2016, the ANRE has indicated the need for changes to the schemes. The final conclusions of the monitoring reports and the main changes performed are presented below.

#### **A. The system of mandatory quotas, combined with trading Green Certificates**

The system of mandatory quotas, combined with trading Green Certificates, was set up as a support mechanism for promoting electricity generation from RES through Government Decision No 1892/2004, and was reconfirmed by Law No 220/2008 establishing the scheme for promoting electricity generated from renewable energy sources, and authorised by the European Commission (EC) in July 2011 through Decision C(2011) 4938 on State Aid SA 33134 (2011/N) for Romania – Green certificates for promoting electricity from renewable sources. **Chapter 2.a** described in detail how the system of mandatory quotas of electricity generated from RES combined with GC trading was improved.

The national targets with regard to the share of electricity produced from renewable sources of energy in the gross final electricity consumption in 2010, 2015 and 2020 is 33 %, 35 % and 38 %, respectively. For meeting these targets, the electricity produced in hydropower plants with more than 10 MW installed power is also taken into account.

As from 2014, ANRE monitors every year the annual quotas of electricity generated from renewable energy sources that benefit from the green certificate promotion scheme and, depending on the achievement of the national objective and on the impact at the level of the end consumer, it estimates, publishes on its own website and informs the government of the mandatory annual quota of electricity generated from renewable energy sources that benefit from the green certificate promotion scheme for the following year, renewable energy sources benefiting from the green certificates promotion system for the period 2015-2016 were established by GD No 1110/2014 and GD No 1015/2015 and were as follows: 2015 – 11.9 %; 2016 – 12.15 % of the gross final electricity consumption.

The amount of electricity for which the requirement to acquire green certificates is established includes the following:

- Electricity acquired by electricity suppliers, intended both for their own final consumption, and to be sold to end consumers;
- Electricity used by an electricity producer for own final consumption other than internal technological consumption;
- Electricity used by a producer to supply electricity to consumers connected to its power plant through direct lines.

The producers and suppliers mentioned above are compelled to purchase annually a given number of green certificates, equivalent to the product between the value of the annual mandatory quota for the year in question and the amount of electricity set forth previously, expressed in MWh, supplied annually to the end consumers.

Both the suppliers, and the producers who fail to meet their annual mandatory quota, are compelled to pay to the Environmental Fund Administration the equivalent value of the non-purchased green certificates. As a result of the application of the green certificate promotion scheme during the reporting period, certain conclusions can be drawn:

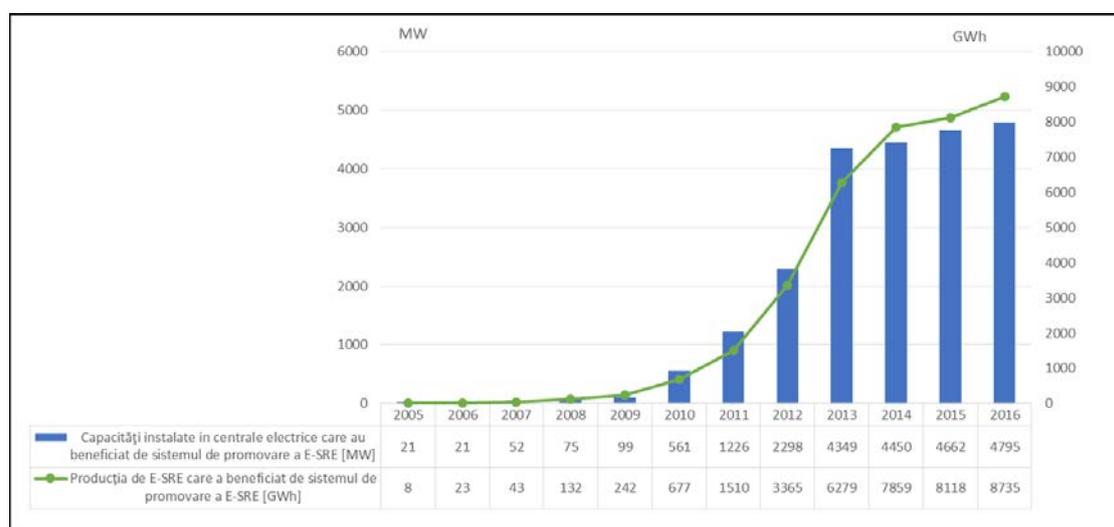
- The number of E-RES license holder producers and accredited by the end of 2015 and 2016 respectively was 698 and 778 producers respectively, compared to 578 at the end of 2014 (**Table 3.1**). Of the 778 producers accredited in 2016, 71 use wind energy, 103 use hydro power in power plants with installed power of up to 10 MW, 576 use solar energy and 28 use biomass, including landfill gas and sewage treatment plant gas.

**Table 3.1 Total number of producers qualified / accredited at the end of the year**

Year	Wind		Hydro		Biomass	Photovoltaic	Total
	New	Retechnologized	New	Retechnologized			
2011	42	-	32	-	4	4	82
2012	56	-	47	-	7	41	151
2013	60	13	51	9	14	370	517
2014	64	12	70	15	14	403	578
2015	66	4	74	15	25	514	698
2016	67	4	79	24	28	576	778

Source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2016

The total installed capacity in accredited E-RES generation units at the end of 2015 and 2016 was 4 450 MW and 4 795 MW, respectively, as compared to 4 349 MW at the end of 2014 (**Figure 3.1** – source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2016);



**Figure 3.1 – Evolution of the power capacity installed in power plants that benefited**

**from the promotion scheme of E-RES and electricity generated in these power plants  
for the period 2005÷2016**

RO	EN
Capacități instalate în centrale electrice care au beneficiat de sistemul de promovare a E-SRE [MW]	Capacities installed in power plants having benefited from the promotion scheme of E-RES [MW]
Producția de E-RES care a beneficiat de sistemul de promovare a E-SRE [GWh]	E-RES production that benefited from the promotion scheme of E-RES [GWh]

- The structure of the total installed power capacity by type of RES at the end of 2015 was the following: 62.874 % wind; 7.031 % hydro; 27.80 % photovoltaic; 2.28 % biomass. The structure of the total installed power capacity by type of RES at the end of 2016 was the following: 62 % wind; 7 % hydro; 28 % photovoltaic; 3 % biomass;
- The structure of the E-RES production that benefited from the promotion scheme at the end of 2015 was the following: 60.90 % wind, 10.51 % hydropower, 8.92 % energy produced in biomass plants, including landfill gas and sewage treatment plant gas and 19.67 % solar energy. The structure of the E-RES production that benefited from the promotion scheme at the end of 2016 was the following: 64.21 % wind, 11.74 % hydropower, 5.73 % energy produced in biomass plants, including landfill gas and sewage treatment plant gas and 18.32 % solar energy;
- The total electricity production from renewable energy sources supported under the promotion scheme was: 1 510 TWh in 2011, 3 365 TWh in 2012, 6 279 TWh in 2013, 7 859 TWh in 2014, 8 118 TWh in 2015, 8 735 TWh in 2016 (**Figure 3.1**).

**Table 3.2** shows the structure of E-RES production in plants that benefited from the E-RES promotion system (for which green certificates were issued) and the related capacities for 2015 and 2016.

**Table 3.2 Structure of the E-RES production in plants that benefited from the E-RES promotion scheme by type of source and the related electrical capacity in 2015 and 2016**

Type of source	2015		2016	
	Production of electricity, GWh	Installed capacity, MW	Production of electricity, GWh	Installed capacity, MW
<b>Wind</b>	4944	2932	5608	2963
<b>Hydro</b>	853	328	1025	348
<b>Solar</b>	1597	1296	1601	1360
<b>Biomass</b>	724	106	501	124

The green certificate market is separate from the electricity market, and it operates based on competition mechanisms, i.e., based on the supply and demand of green certificates.

The green certificate supply is given by the number of green certificates issued by CN Transelectrica SA to E-RES producers. The green certificate trading is carried out, in a system of competition, on the market of bilateral contracts and/or the centralised green certificates market, between the E-RES producers and the economic operators compelled to purchase green certificates, and it is not subject to the trading of the related electricity.

In order to ensure the operation of the green certificate market and the demand on these markets, annual quotas of electricity supported by green certificates were established under the promotion scheme adopted.

The economic operators that are compelled to purchase green certificates shall thus purchase annually a number of green certificates equivalent to the product between the value of the mandatory quota of green certificates purchase established for the year concerned and the quantity of electricity supplied annually to the end consumers. The relation between the annual mandatory quotas of E-RES established according to the law and the mandatory quotas of GC purchase is determined by ANRE in the *Methodology establishing the annual mandatory quotas of electricity generated from renewable energy sources benefiting from the promotion scheme through green certificates and the quotas of green certificate purchase*, approved by Order No 101/2015 of ANRE, and Order No 41/2016 of ANRE.

As a result of the increase in the number of GCs existing on the market, every year, the economic operators having the obligation to purchase green certificates had to purchase a green certificate for a lower quantity of electricity supplied.

Consequently, while in 2005 a supplier had to purchase one green certificate for each 2 730 MWh of electricity supplied, in 2011, a supplier had to purchase one green certificate for each 27 MWh of electricity supplied, and in 2015, an economic operator having the obligation to purchase green certificates had to purchase one green certificate for each 3 597 MWh of electricity supplied.

Under the monitoring of the operation of the GC market, ANRE monitors a set of indicators established in the *Methodology for monitoring the promotion scheme for energy from renewable energy sources through green certificates* approved by Order No 52/2016 of ANRE, as subsequently amended, in order to assess, on the one hand, the development and the operation of the GC market, the efficiency of the E-RES promotion scheme and its economic and environmental impact, and, on the other hand, how the national target assumed by Romania was achieved. These indicators are the following:

**a) Types of participants to the green certificate market (GCM)**

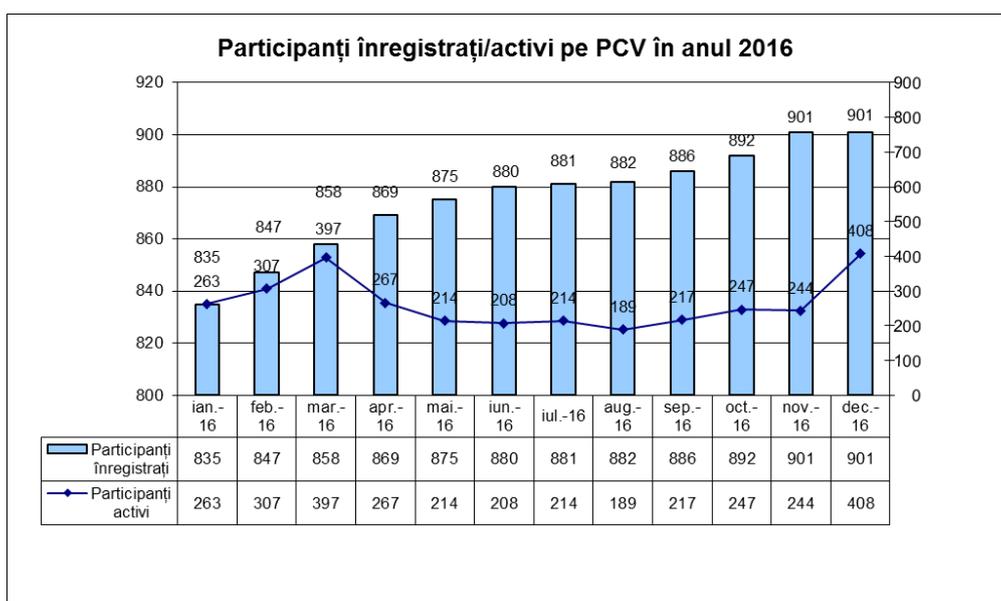
Types of participants to the GCM are established based on:

- the number of participants recorded / active on the GCM;
- the number of participants active on the Centralized Market for Green Certificates (CMGC) and on the Green Certificate Bilateral Contracts Market (GCBCM);
- Herfindahl – Hirschman indicator (for E-RES producers).

In order to achieve the mandatory quota of GC for analysis year 2015, the transactions on the GCM were also performed during Q1 2016. Consequently, there were 829 participants registered on the GCM at the end of 2015. Part of the participants to the GCM have a double

role of electricity supplier or producer supplying own consumption sites and/or consumers connected to the circuits of the power plant, on the one hand, and E-RES producer, on the other hand. From the 829 participants registered on the GCM by the end of 2015, 185 were economic operators having the obligation to purchase green certificates depending on the electricity delivered to end consumers.

**Figure 3.2** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017) shows the comparative evolution of the number of participants registered on the GCM and the number of participants active on the GCM in 2016.



**Figure 3.2 – Participants registered / active on the GCM in 2016**

RO	EN
Participanți înregistrați/activi la PCV în anul 2016	Participants registered / active on the GCM in 2016
Participanți înregistrați	Registered participants
Participanți activi	Active participants

In 2015, 12 193 817 GC and in 2016 12 657 375 GC had to be purchased in order to ensure achievement of the quota.

While the period 2005÷2009 was characterised by significant market shares of GC beneficiaries among hydropower electricity producers (S.C. Hidroelectrica S.A. in the period 2005-2007, S.C. ELSID S.A. in the period 2008-2009, respectively), in 2010, 2011 and 2012, the significant market share was represented by the wind power electricity producer, S.C. TOMIS TEAM SRL (36 % in 2010, 41 % in 2011, 19 % in 2012, respectively). In 2013, CEZ România held the first place with an 18 % share, and in 2015 Enel România had a 10 % share.

In 2015, as in the previous year, significant market shares of green certificate recipients were recorded by energy producers in wind plants (Enel Green Power România with a 10 % share, CEZ România with a 5 % share, EDP România with a 5 % share, Verbund Renewable Power with a 4 % share) and SC Hidroelectrica S.A. recorded only 1.44 % (in 2014 and 2015 an

installed capacity of 221 MW and 5.45 MW respectively did not benefit from the green certificate promotion system because the accreditation period expired for these capacities). In 2016, the significant market shares of GC beneficiaries referred to producers of electricity in wind power plants (Enel Green Power România with 19 %, CEZ România with 15 %, EDP România with 15 %, Verbund Renewable Power with 6 %), while the producer S.C. Hidroelectrica S.A recorded only 1.1 %.

#### **b) Tendering of GC issued on the GC market**

The level of GC tendering is established based on:

- the E-RES production that benefited from the promotion scheme;
- the number of GCs issued in total and by type of RES;
- the number of GCs tendered/sold on the two GC markets by the E-RES producers.

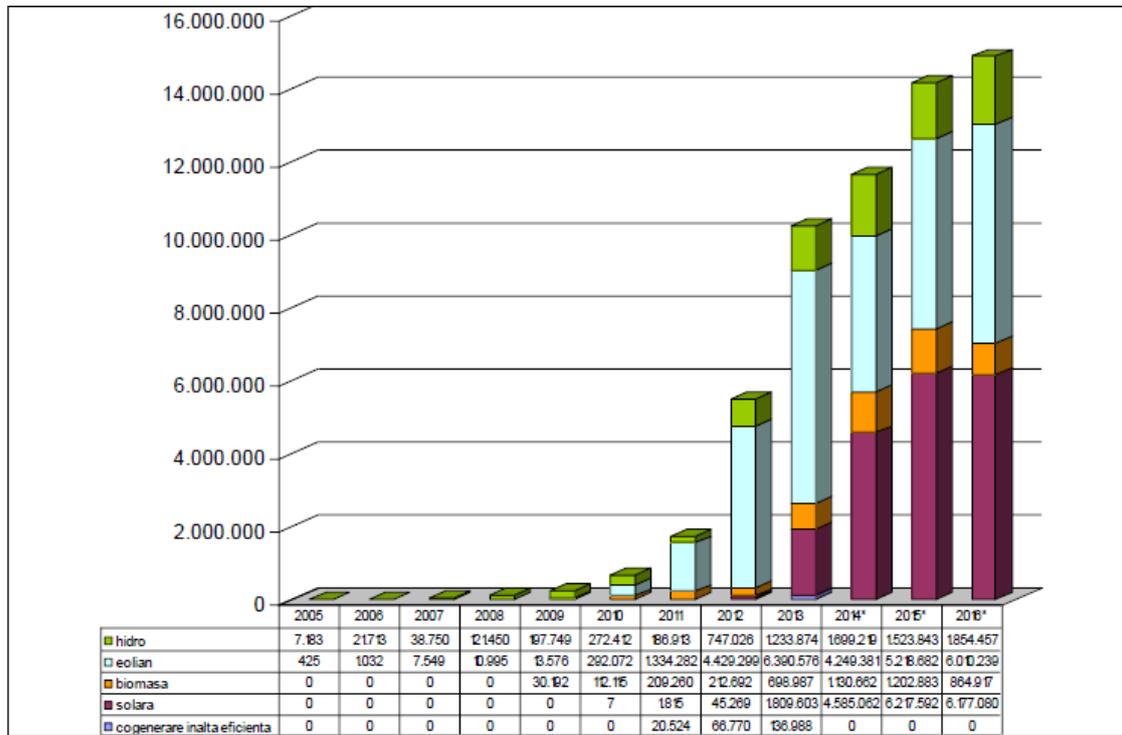
The E-RES promotion scheme was implemented in 2015 for electricity generation amounting to 8 118 GWh, for which 21 584 191 GC were issued, of which 14 157 103 GC for trading and 7 427 088 GC postponed from trading.

The records concerning the GC issued for trading by type of renewable energy source are the following: 37 % producers from wind sources, 11 % producers from hydro sources, 44 % from photovoltaic sources and 8 % from biomass, including landfill gas power plants.

The E-RES promotion scheme was implemented in 2016 for electricity generation amounting to 8 735 GWh, for which 22 758 837 GC were issued, of which 14 906 693 GC for trading and 7 852 144 GC postponed from trading.

The records concerning the GC issued for trading by type of renewable energy source are the following: 40.32 % producers from wind sources, 12.44 % producers from hydro sources, 41.44 % from photovoltaic sources and 5.80 % from biomass, including landfill gas power plants.

**Figure 3.3** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017) shows the annual evolution in the number of GCs issued by the TSO (CN Transelectrica SA) for the implementation of the E-RES promotion scheme, by type of technology, during the period 2005-2016.



\*valoarea pentru biomasa contine si cogenerarea de înalta eficiență

**Figure 3.3 – Annual evolution in the number of GCs issued by TSO to E-RES producers during the period 2005-2016**

RO	EN
hidro	hydro
eolian	wind
biomasă	biomass
solară	solar
cogenerare înaltă eficiență	high-efficiency cogeneration
*valoarea pentru biomasa conține și cogenerarea de înalta eficiență	*the biomass value also includes high-efficiency cogeneration

In 2015, 36 618 GCs were traded on CMGC, 10 070 686 GCs were traded on GCBCM based on 1 412 bilateral contracts between E-RES producers and electricity suppliers and based on 154 supplier – supplier bilateral contracts.

In 2016, 8 468 GCs were traded on CMGC. A minimum of 7 019 976 GCs were traded on the GCBCM and 14 143 349 GCs were transferred based on 1 872 bilateral contracts concluded between E-RES producers and electricity suppliers and 211 supplier – supplier bilateral contracts.

**c) Number of GCs available on the green certificate market for achieving the mandatory quota of GC purchase for 2015 and 2016**

The number of GCs available on the green certificate market for achieving the mandatory quota of GC purchase for 2015 and 2016 shall be established based on:

- the number of GCs issued in 2015/2016;
- the number of GCs issued in the first two months of 2016/2017;

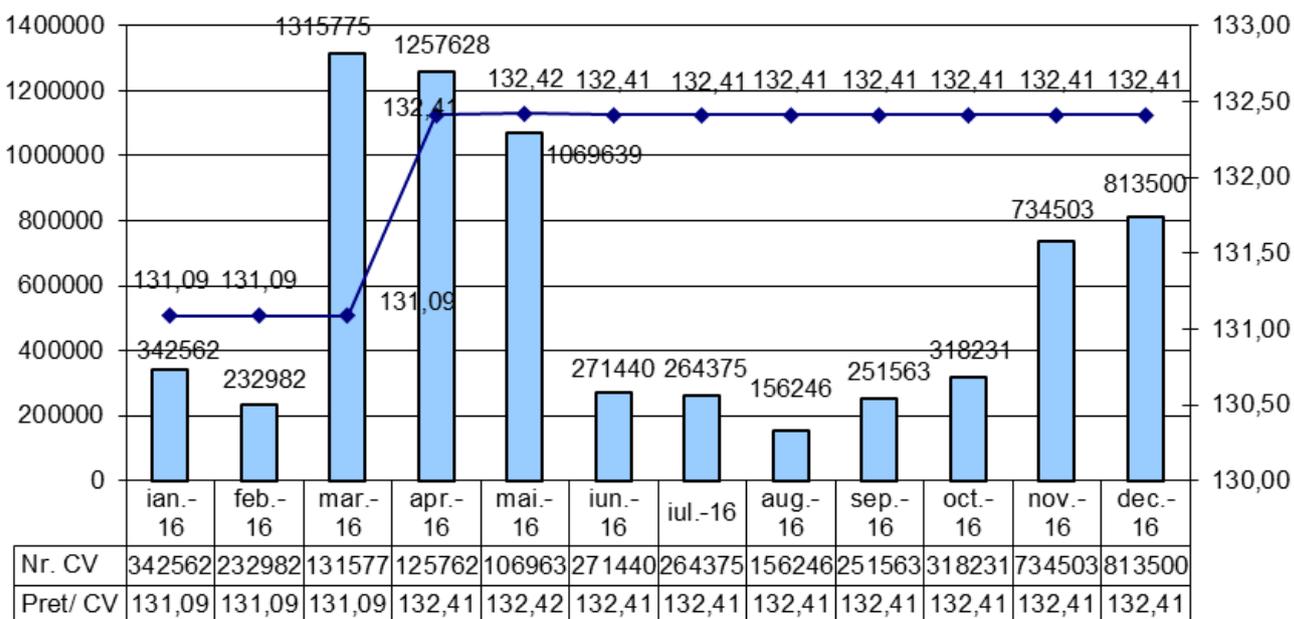
In order to achieve the mandatory quota of GC purchase for 2015 (0.278 GC/MWh), a number of 17 740 832 GC were available, of which:

- GC issued for trading for 2015 (14 157 103 GC);
- GC issued for trading in February and March 2016, for electricity pertaining to January and February 2016 (3 583 729 GC);

In order to achieve the mandatory quota of GC purchase for 2016 (0.305 GC/MWh), a number of at least 17 079 666 GC were available, of which:

- GC issued for trading for 2016 (14 906 693 GC);
- GC issued for trading in February and March 2017, for electricity pertaining to January and February 2017 (2 172 973 GC);

**Figure 3.4** shows the monthly evolution in the number of GCs traded and of the GCM trading price in 2016 (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017).



**Figure 3.4 – Monthly evolution in the number of GCs traded and the GCM trading price (RON/MWh) in 2016**

RO	EN
Nr. CV	No of GCs
Preț/CV	Price/GC

#### **d) The level of the sale of GC available on the green certificate market in 2015 and 2016**

The level of the sale of GC available on the GC market in 2015 and 2016 is established based on:

- the number of GCs consumed for achieving the 2015/2016 quota;
- the number of GCs cancelled during 2015/2016 as a result of the expiry of the period of validity;
- the number of GCs still available for the following year;
- the level of GC tendering on the CMGC;
- the level of GC tendering on the GCBCM.

Of the total of 17 740 832 GCs available for 2015, the economic operators having the obligation to purchase GCs for the year 2015 had to purchase 12 193 817 GCs. The number of GCs still valid to fulfil the next quota was 5 547 015 GCs. In 2015, 355 892 GCs were cancelled following the expiry of validity.

Out of the total of 17 079 666 GCs available for 2016, economic operators having the obligation to purchase green certificates for 2016 had to purchase 12 657 375 GCs. Of these, 80 268 GCs have not been purchased. The number of GCs still valid to fulfil the next quota was 4 422 291 GCs. During 2016, 829 428 GCs were cancelled following the expiry of validity.

The CVs issued in 2015 to producers of electricity from renewable energy sources were tendered and traded on the two markets, CMGC and GCBCM, as follows: 0.36 % on CMGC and 99.64 % on GCBCM. The CVs issued in 2016 to producers of electricity from renewable energy sources were tendered and traded on the two markets, CMGC and GCBCM, as follows: 0.12 % on CMGC and 99.88 % on GCBCM.

#### **GC price for trading on the GCM in 2015 and 2016**

The GC were traded on the Centralised Market of Green Certificates at a weighted average price of:

- 130.95 RON/GC, i.e. 29.46 EUR/GC in 2015;
- 131.70 RON/GC, i.e. 29.26 EUR/GC in 2016.

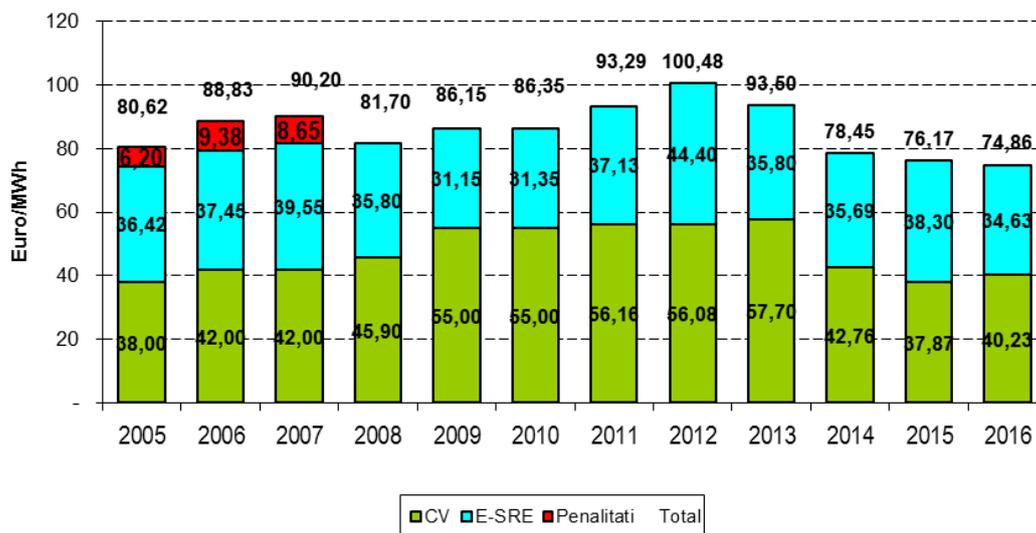
The GC were traded on the Green Certificate Bilateral Contracts Market at an average price of:

- 131.04 RON/GC, i.e. 29.45 EUR/GC in 2015;
- 132.06 RON/GC, i.e. 29.41 EUR/GC in 2016.

#### **f) Unit revenue of the E-RES producer**

In 2016, the unit revenue of the producer having benefited from the promotion system recorded an average value of 74.86 EUR/MWh, i.e. 327.09 RON/MWh. In 2015, the unit revenue of the producer having benefited from the promotion system recorded an average value of 76.17 EUR/MWh, i.e. 338.55 RON/MWh.

**Figure 3.5** shows the evolution of the unit revenue obtained by E-RES producers in the period 2005-2016.



**Figure 3.5. The evolution of the unit revenue obtained by E-RES producers in the period 2005-2016**

RO	EN
Euro/MWh	EUR/MWh
CV	GC
E-SRE	E-RES
Penalități	Penalties
Total	Total

The price of E-RES in the period 2005-2009 was the price regulated by Order of the President of ANRE.

The price of E-RES during the period 2010-2016 was calculated as the average sale price of E-RES used by E-RES producers.

#### g) Achievement of the annual mandatory quota of GC purchase

The level of achievement of the annual mandatory quota of GC purchase was established in 2015 and 2016 based on:

- the number of GCs that have to be purchased by the economic operators having the obligation to purchase GC in 2015/2016;
- the number of GCs not purchased by the economic operators having the obligation to purchase GC;
- the number of GCs consumed by the economic operators having the obligation to purchase GC to achieve to 2015/2016 quota;
- the number of GCs from the E-RES producer account to the supplier account.

In 2015, a number of 185 electricity suppliers / producers having the obligation to purchase GC had the obligation to buy green certificates depending on the electricity delivered to end consumers. Among them, 15 electricity suppliers / producers having the obligation to purchase GC had the obligation to buy green certificates failed to achieve their mandatory GC quota, resulting in 108 568 GC they failed to purchase. The level of achievement of the annual mandatory quota of GC purchase in 2015 was 99 %;

In 2016, 210 electricity suppliers / producers having the obligation to purchase green certificates had to purchase green certificates depending on the electricity delivered to end consumers. Of these, 29 suppliers / producers having the obligation to purchase green certificates did not fulfil their mandatory GCs quota, resulting in 80 268 GCs not purchased. The extent to which the green certificate acquisition quota for 2016 was met was 99.99 %.

The equivalent value of a non-purchased green certificate was of:

- 534.0673 RON/GC, i.e. 119.7702 EUR/GC in 2015, pursuant to the provisions of Order No 18/2016 of the President of ANRE updating the limit trading values for green certificates and the equivalent value of a non-purchased green certificate, applicable for 2015;
- 314.356 RON/GC respectively 70 EUR/GC in 2016 calculated at the average value of the exchange rate established by the National Bank of Romania for the previous year, according to the provisions of GEO No 24/2017 for amending and supplementing Law No 220/2008 for establishing a system for promoting energy production from renewable energy sources and amending other normative acts.

The amount resulting from the collection of the equivalent value of non-purchased green certificates was:

- RON 57.98 million in 2015, higher than in 2014 when it was RON 40.76 million,
- RON 25.23 million in 2016, lower than in 2015,

is revenue at the Environment Fund, pursuant to the Law, with a view to financing the generation of energy from renewable sources by natural persons who invest in energy capacities with installed power of up to 100 kW.

#### **h) Financial effort for E-RES promotion**

The State aid reported by the E-RES producers from the sale of GC for 2015 and 2016 amounted to approximately RON 1 730 million and RON 1 882 million, respectively.

**Table 3.3** shows the amount of the State aid from the sale of GC by technology category in 2015 and 2016.

**Table 3.3 Amount of the State aid in 2015 and 2016 (million RON)**

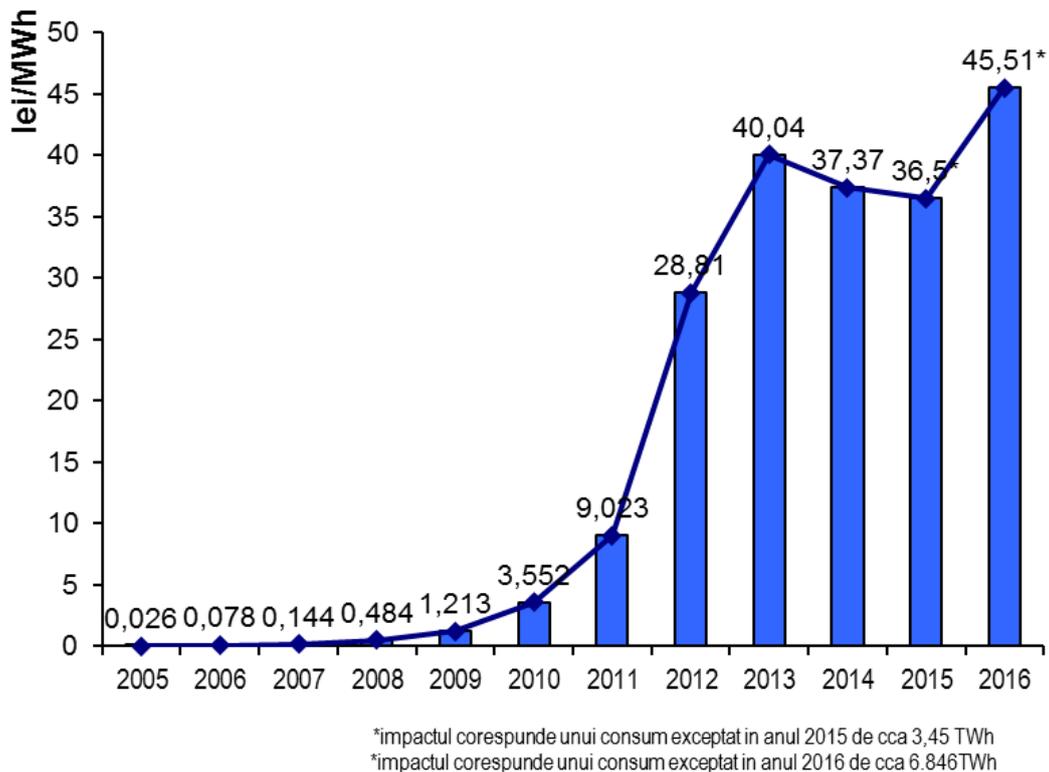
E-RES type	Amount of State aid	
	2015	2016
<b>Wind</b>	630	762
<b>Hydro</b>	189	233
<b>Biomass</b>	146	86
<b>Solar</b>	765	801

*Source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources*

#### **i) GC impact on electricity price**

The impact in the invoice to the end consumer during the period January-December 2015 and 2015 was 36.5 RON/MWh, and 45.51 RON/MWh, respectively.

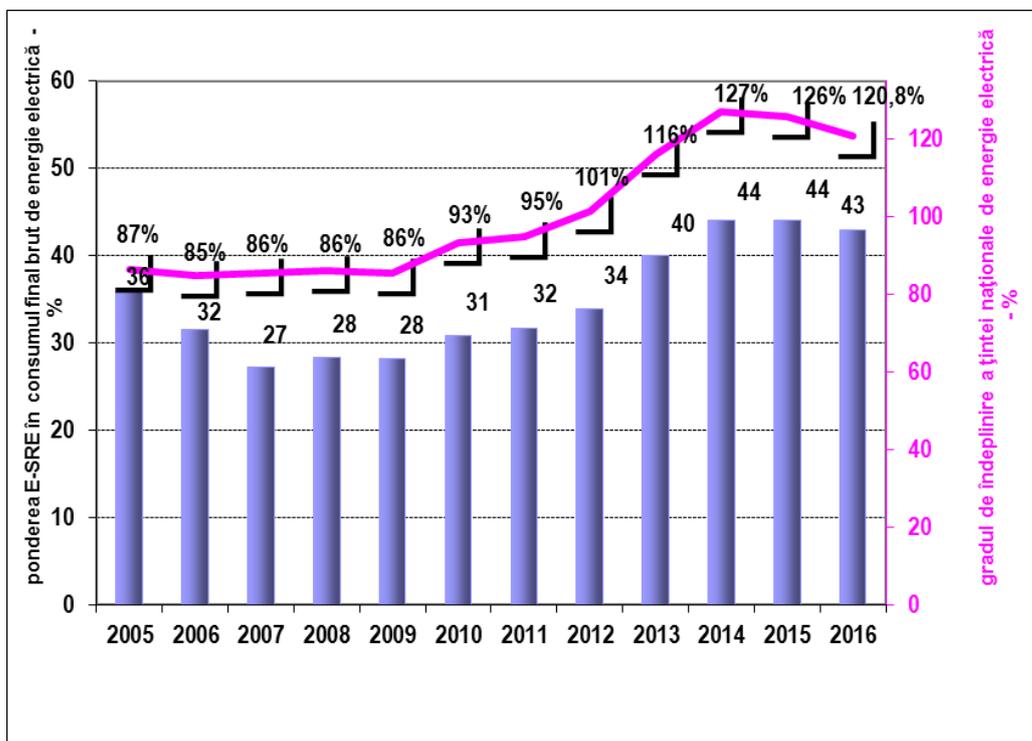
The evolution in the impact of implementing the E-RES promotion scheme on the electricity price for the end consumer in the period 2005-2016 is shown in **Figure 3.6** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017).



**Figure 3.6 Evolution in the impact of implementing the E-RES promotion scheme on the electricity price for the end consumer in the period 2005-2016**

RO	EN
Lei/MWh	RON/MWh
*impactul corespunde unui consum exceptat în anul 2015 de cca. 3,45 TWh	* the impact corresponds to an exempted consumption in 2015 of approx. 3.45 TWh
*impactul corespunde unui consum exceptat în anul 2016 de cca. 6,846 TWh	* the impact corresponds to an exempted consumption in 2016 of approx. 6.846 TWh

The amount of electricity generated in 2016 in E-RES generation units was 26 273 GWh (normalised value), which led to a share of E-RES in the total gross final consumption of electricity in Romania of 43 %. The evolution in the achievement of the E-RES national target in the final gross consumption of electricity in Romania in the period 2005-2016 is shown in **Figure 3.7** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017).



**Figure 3.7 – Level of achievement of the national target of E-RES share during the period 2005-2016**

RO	EN
ponderea E-SRE în consumul final brut de energie electrică - %	share of E-RES in the gross final electricity consumption - %
gradul de îndeplinire a țintei naționale de energie electrică - %	level of achievement of the national target of electricity - %

**Table 3.4** makes a comparison between the E-RES generated in 2016 and the one in the NREAP.

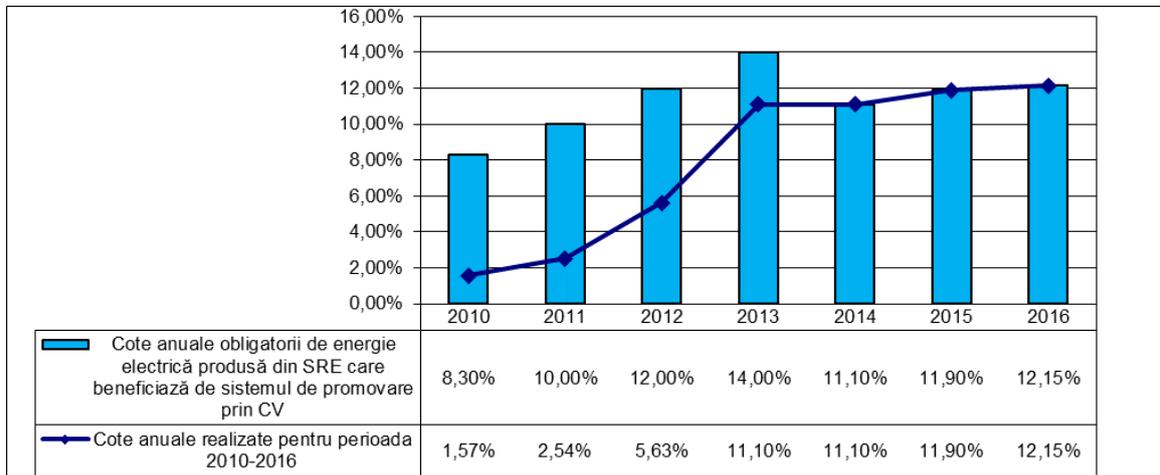
**Table 3.4 – Comparative records of E-RES generated in 2016 (GWh)**

E-RES type	Achieved <sup>1)</sup>	NREAP <sup>2)</sup>
<b>Wind</b>	5608	7271
<b>Hydro</b>	1025	1284
<b>Biomass</b>	501	2450
<b>Solar</b>	1601	220

*Note: 1) E-RES supported under the GC promotion scheme  
2) generated E-RES*

*Source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017*

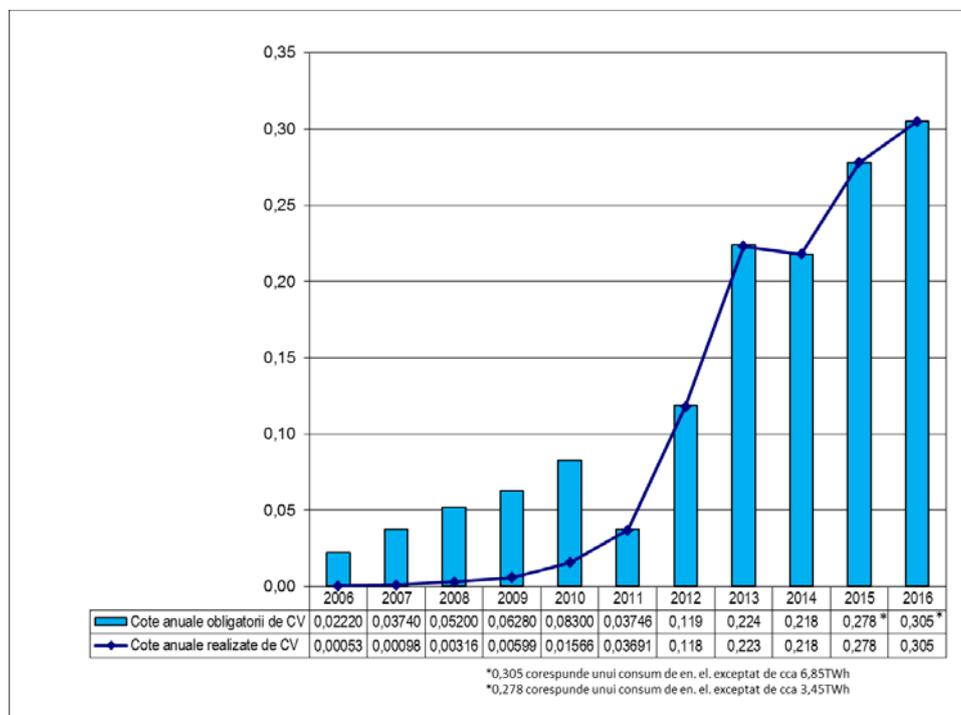
**Figure 3.8** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017) shows the comparative evolution between the annual mandatory quotas of electricity generated from renewable energy sources benefiting from the green certificate promotion scheme and the values achieved.



**Figure 3.8 – Annual mandatory quotas of electricity generated from RES benefiting from the GC promotion scheme**

RO	EN
Cote anuale obligatorii de energie electrică produsă din SRE care beneficiază de sistemul de promovare prin CV	Annual mandatory quotas of electricity produced from RES benefiting from the GC promotion scheme
Cote anuale realizate pentru perioada 2010-2016	Annual quotas achieved for the period 2010-2016

The evolution of the annual mandatory GC purchase quotas and the GC purchase quotas achieved by the economic operators having the obligation to purchase GC in the period 2005-2016 is shown in **Figure 3.9** (source: Monitoring report on the operation of the promotion scheme for electricity from renewable energy sources in 2016, ANRE 2017).



**Figure 3.9 Annual mandatory GC purchase quotas in the period 2005-2016**

RO	EN
Cote anuale obligatorii de CV	Annual mandatory quotas of GC
Cote anuale realizate de CV	Annual quotas of GC achieved
*0,305 corespunde unui consum de en.el. exceptat de cca. 6,85 TWh	* 0.305 corresponds to an exempted consumption of electricity of approx. 6.85 TWh
*0,278 corespunde unui consum de en.el. exceptat de cca. 3,45 TWh	* 0.278 corresponds to an exempted consumption of electricity of approx. 3.45 TWh

ANRE is responsible for monitoring the costs and revenues resulting from the generation of E-RES for the producers benefiting from the green certificate promotion scheme, for analysing the possibility of overcompensation for one or several authorised technologies and for proposing measures for decreasing the number of green certificates for the new beneficiaries in a report made public.

The *Methodology for monitoring the promotion scheme for energy from renewable energy sources through green certificates*, approved by Order No 52/2016 of ANRE, amended by Order No 17/2013 of the President of ANRE, specifies the monitoring objectives pursued by ANRE:

- To evaluate the functioning of the GC support scheme and its effectiveness in meeting the national targets set by the Law regarding the E-RES share in gross final energy consumption;
- To assess the effectiveness of the GC support scheme in relation to the required financial effort;
- To determine whether, following the application of the GC support scheme, E-RES production is overcompensated and to allow the scheme to be reconfigured to adapt it to actual conditions;
- To assess the functioning of the MGC in transparent and non-discriminatory terms, in compliance with the legal provisions;
- To check the classification under budget of the scheme estimated when it is approved by the EC;
- To assess the overlapping of the support scheme by annual mandatory GC rates with other mechanisms to support E-RES production.

In the years 2015 and 2016, ANRE carried out the overcompensation analysis of E-RES production activity for the beneficiaries of the support scheme. This analysis is based on the evolution of the following indicators:

1. average level of the specific investment;
2. average level of the specific variable costs;
3. average level of the specific fixed costs;
4. average level of the capacity factor.

The mechanism for decreasing the number of green certificates within the overcompensation analysis is based on annual recalculation, the length of the period of implementation of the aid scheme, the number of GC/MWh, so that the aggregate internal rate of return by technology, for the new entries, should not be higher by 10 % as compared to the value considered for that technology upon authorisation of the promotion scheme.

ANRE has drawn up Reports on the overcompensation analysis of the green certificates promotion system for electricity produced from renewable energy sources for 2015 and 2016. The conclusions of these reports are as follows:

- From the cost-benefit analysis, updated for the analysis years 2015 and 2016, aggregated for each category of E-RES production technology, taking into account the cost-benefit indicators and projected capacities to be put into operation, there was a risk of overcompensation in solar power plants in 2015 and all types of technologies in 2016;
- At the same time, it is specified that the green certificate promotion system established by *Law* was applied to the producers of electricity produced from renewable sources, including electricity produced during the probation period, based on the accreditation decision issued by ANRE for commissioning, i.e. groups / plants upgrading achieved by the end of 2015 and 2016.

## **B. Programmes that fund projects for the valorisation of renewable energy sources.**

The Ministry of European Funds aims at achieving the thematic objectives related to the valorisation of renewable energy sources in 2014-2020 under the following programmes:

- Large Infrastructure Operational Programme (LIOP);
- Regional Operational Programme (ROP).

LIOP benefits from a financial allocation of approx. EUR 11.8 billion, of which:

- EUR 6.94 billion Cohesion Fund
- EUR 2.48 billion European Regional Development Fund
- EUR 2.46 billion Cofinancing

Under this programme, there are two priority axes that fund projects for the valorisation of renewable sources. These priority axes (PA) are:

- **PA 6 – Promoting Clean Energy and Energy Efficiency to Support a Low Carbon Economy** (allocated amount – EUR 197 329 787);
- **PA 8 – Smart and sustainable transmission systems for electricity and natural gas** (allocated amount – EUR 68 026 596).

Under PA 6, the following specific objectives for the financing of renewable energy projects are set:

- **6.1 Increased energy production from less exploited renewable resources (biomass, biogas, geothermal);**
- **6.4 Increasing savings in primary energy consumption produced by high-efficiency cogeneration.**

Under SO 6.1, actions are taken in view of:

- Creating and/or modernising the production capacities of electricity and/or heat using biomass and biogas;
- Achieving and upgrading the heat production capacities based on geothermal energy;
- Supporting investments in expanding and upgrading electricity distribution grids in order to take the energy produced from renewable resources under safe operating conditions of the National Energy System (NES).

Under SO 6.4 it actions are taken in view of developing / modernising high-efficiency cogeneration power plants (maximum 8 MW) using natural gas and biomass at the level of enterprises.

Under PA 8, there is the specific objective 8.1 Increasing the capacity of the National Energy System for taking the energy produced from renewable resources. Under this objective, the electricity transmission networks (overhead power lines and stations) are designed and/or modernized.

**The 2014-2020 Regional Operational Programme (ROP)** is the successor of the 2007-2013 Regional Operational Programme and one of the programmes by which Romania will be able to access European structural and investment funds from the European Regional Development Fund (ERDF) in 2014-2020.

ROP 2014-2020 aims to increase the overall economic competitiveness and improve the living conditions of local and regional communities by supporting the development of the business environment, infrastructure and services for the sustainable development of the regions so that they can effectively manage resources and capitalize on their potential for innovation and assimilation of technological developments.

These objectives are translated into 11 priority axes (plus a technical assistance axis), with an estimated total allocation of EUR 8.25 billion, of which EUR 6.7 billion represents EU support, through the European Regional Development Fund (ERDF), and EUR 1.5 billion – national contribution.

Under ROP, there are two Priority Axes that finance projects aimed at promoting renewable energy resources, namely:

- **PA 3 – Supporting the shift to a low-carbon economy** (allocated amount – EUR 2 374.57 million);
- **PA 4 – Sustainable Urban Development** (allocated amount – EUR 1 386.86 million).

These priority axes finance the purchase of green cars for urban transport and green cars for institutions and natural persons.

Within the Sectoral Operational Program ‘Increase of Economic Competitiveness’, Axis 4 ‘Increasing energy efficiency and security of supply, in the context of combating climate change’, Key Area of Intervention 4.2 ‘Valorisation of renewable energy sources for the production of green energy’ in 2009-2013 financing contracts were concluded for investment projects for building power and heating production capacities by valorisation of renewable energy sources. These projects were co-financed by non-reimbursable financial assistance from the European Regional Development Fund (ERDF) and the state budget, benefiting both economic operators (small, medium and large enterprises) and local public authorities.

In 2015 and 2016, 29 projects were finalised, namely:

- 16 projects in 2015 (11 photovoltaic plants, 3 wind power plants, 1 MHP, 1 biomass plant) (**Table 3.5**);
- 13 projects in 2016 (7 photovoltaic power plants, 1 wind power plant, 2 biomass plants, 3 mixed wind and biomass plants – hybrid) (**Table 3.5**).

**Table 3.5. Projects completed in 2015 and 2016 projects**

<b>Year</b>	<b>Resource type</b>	<b>Number of completed projects</b>	<b>Installed power (kW<sub>e</sub>)</b>	<b>Installed power (kW<sub>t</sub>)</b>	<b>RON</b>	<b>EUR (4.5 RON/EUR)</b>
<b>2015</b>	Biomass	1	990	981	26,714,732	5,936,607
	PV	11	9695	NA	202,966,229	45,103,606
	Wind	3	22600		198,771,122	44,171,360
	Micro-hydro	1	10479		189,155,421	42,034,538
	<b>Total</b>	<b>16</b>	<b>34069</b>	<b>981</b>	<b>617,607,504</b>	<b>137,246,111</b>
<b>2016</b>	Biomass	2	2020	2020	60,328,796	13,406,399
	PV	7	13896	NA	545,672,483	121,260,552
	Wind	1	11500		110,549,849	24,566,633
	Hybrid*	3	690	NA	15,443,958	3,677,133
	<b>Total</b>	<b>13</b>	<b>28106</b>	<b>2020</b>	<b>731,994,773</b>	<b>162,910,717</b>

*Note: \*Wind and biomass*

*Source: Ministry of Energy – Intermediate Body for Energy*

**The National Rural Development Program 2014-2020** includes measures that support projects for the generation of energy from renewable resources. These measures are:

- Measure 4 ‘Investments in physical assets’ which, inter alia, supports investments in installations for the production of electricity and/or heat by using biomass. The total financial allocation for 2014-2020 is EUR 2.4 billion;
- Measure 6 ‘Farm and business development’ that supports investments in biomass fuel production.

One of the areas of diversification covered under sub-measures 6.2 ‘Support for the establishment of non-agricultural activities in rural areas’ and 6.4 ‘Investments in the creation and development of non-agricultural activities’ is the production of biomass fuel (e.g.: manufacture of pellets and briquettes) for the marketing, production and use of energy from renewable sources to carry out their own activities. The financial allocation for sub-measure 6.2 is EUR 117.8 million, and for measure 6.4, it is EUR 152.6 million.

Through sub-measure 8.1 ‘Afforestation and the creation of woodland’, support is given for the afforestation of agricultural and non-agricultural land. Species eligible for afforestation include acacia and 3 species of willow: white willow, goat willow, crack willow. This sub-measure benefits from a financial allocation of approx. EUR 124.5 million.

Measures of local interest that could be funded under Measure 19 ‘LEADER Local Development’ encourage, among other things, investments aimed at promoting the use of biomass-based heat sources, the creation and development of biogas production and

distribution systems at community level. The total public allocation for 2014-2020 is EUR 563.5 million.

The Ministry of Agriculture and Rural Development, through its policies, supports the development of agriculture and energy crops, in line with the legal framework provided by the Common Agricultural Policy. As with other crops (wheat, corn, sunflower, etc.), energy crops are eligible for both direct payment schemes from European funds and transitional national aid financed from the national budget. The amount per hectare of these payments is determined annually by Government Decision, after the Paying and Intervention Agency for Agriculture determines the areas eligible for payment, by the end of March of each year. Also from the national budget, the growers of non-food energy crops benefit from the reimbursement of the amounts representing the difference between the standard excise duty and the reduced excise duty of 21 EUR/1000 litres of diesel fuel. The nominal amount of the support for 2016 was approx. RON 1.8 per litre and the maximum annual amount of diesel for which state aid is granted in the form of reimbursement is 100 litres/ha.

The Environment Fund set up according to the European principles the 'polluter pays' and 'producer responsibility' finances investments aimed at encouraging the use of renewable energy sources. Thus, in the years 2015-2016, the following programmes were carried out:

- Increasing the production of energy from renewable sources;
- Replacing the heating systems using renewable energy, including replacing or complementing the classical heating systems;
- Programme to stimulate the renewal of the national car fleet;
- Promoting clean and energy-efficient road transport vehicles.

In 2016 under the RO 06 Renewable Energy Programme (RONDINE) the following projects were ongoing:

- The energy development of Tarcău river and its tributaries, MHP on the Tarcău River and the Brateş and Ața tributaries (contract value of EUR 6.7 million, grant EUR 3.4 million, co-financing EUR 3.3 million);
- Utilisation of hydropower potential in Someş-Tisa basin. Investments in MHP (contract value of EUR 4.2 million, grant EUR 1.7 million, co-financing EUR 2.5 million);
- Construction of the small power plant on Timiș River (contract value of EUR 1,99 million, grant EUR 0,99 million, co-financing EUR 1,0 million);
- The use of geothermal energy for heat production for consumers of the PT902 thermal point by reinjecting geothermal water used for heating in the deposit (contract value of EUR 3.9 million, grant EUR 3.9 million);
- Utilisation of geothermal water resources for the heating of the Clinical Emergency Hospital 'Prof. Dr. Agripa Ionescu' Balotești, Ilfov County (contract value of EUR 1.9 million, grant EUR 1.7 million, co-financing EUR 0.2 million).

**C. Table 3** shows the value of the amounts used in 2015 and 2016 for supporting the promotion of energy from RES.

**Table 3: Support schemes for energy from renewable sources**

Support schemes for E-RES in 2015			Support per unit	Total (million EUR)
A. Mandatory quota system combined with green certificate trading	Obligation/quota (%)	11.9	76.17 EUR/MWh electricity generated The support was granted for 8.118 TWh	EUR 618.35 million
	Certificate average price EUR/GC 29.46 EUR/GC on CMGC 29.45 EUR/GC on GCBCM			
	Penalty 119.77 EUR/GC not purchased			EUR 13.0 million
B. LIOP, PA 4 SO 6.1 and SO 6.2	Grants for investments in E-RES capacities			EUR 50.0 million
C. SOP IEC PA 4 KAI 2	Grants for investments in E-RES capacities			EUR 137.2 million
D Programme funded from the Environment Fund				EUR 12.3 million
D1 Programme regarding the increase in energy generation from RES				EUR 1.0 million
D2 Programme regarding the installation of heating systems that use renewable energy, including the replacement of or addition to traditional heating systems ('Green House' Programme – natural persons)			- RON 6 000 (approx. EUR 1 400) / applicant for solar panels and for biomass-based heat generation facilities - RON 8 000 (approx. EUR 1 860) / applicant for heat pumps	EUR 6.1 million
D3 Programme regarding the installation of heating systems that use renewable energy, including the replacement of or addition to traditional heating systems – beneficiaries: the			- RON 4 000 000 for administrative units having more than 100 000 inhabitants; - RON 3 000 000 for administrative units having between 50 000 and 100 000 inhabitants; - RON 2 000 000 for administrative units	EUR 0.2 million

administrative unit, public institutions and religious entities			having between 20 000 and 50 000 inhabitants; - RON 1 000 000 for administrative units having between 3 000 and 20 000 inhabitants; - RON 500 000 for administrative units having less than 3 000 inhabitants.	
D.4 'Rabla' programme			The amount of the scrapping premium is RON 6 500, plus an eco-bonus of - RON 1 500 (about EUR 300) for the purchase of a new hybrid vehicle; - RON 2 500 (about EUR 500) for the purchase of a new hybrid electric vehicle.	EUR 5 million for natural and legal persons
Total annual estimated support in the electricity sector				EUR 806.55 million
Total annual estimated support in the heating sector				EUR 6.2 million
Total annual estimated support in the transport sector				EUR 5.0 million
<b>Support schemes for E-RES in 2016</b>			<b>Support per unit</b>	<b>Total (million EUR)</b>
A. Mandatory quota system combined with green certificate trading	Obligation/quota (%)	12.15	74.86 EUR/MWh electricity generated The support was granted for 8.735 TWh	EUR 616.54 million
	Certificate average price EUR/GC 29.26 EUR/GC on CMGC 29.41 EUR/GC on GCBCM			
	Penalty 70.0 EUR/GC not purchased			EUR 5.618 million
B. LIOP, PA 4 SO 6.1 and SO 6.2	Grants for investments in E-RES capacities			EUR 50.0 million
C. SOP IEC PA 4 KAI 2	Grants for investments in E-RES capacities			EUR 162.9 million
D Programme funded from the				EUR 4.2 million

Environment Fund				
D1 Programme regarding the increase in energy generation from RES				EUR 0.5 million
D2 Programme regarding the installation of heating systems that use renewable energy, including the replacement of or addition to traditional heating systems ('Green House' Programme – natural persons)			- RON 6 000 (approx. EUR 1 400) / applicant for solar panels and for biomass-based heat generation facilities - RON 8 000 (approx. EUR 1 860) / applicant for heat pumps	EUR 3.0 million
D3 Programme regarding the installation of heating systems that use renewable energy, including the replacement of or addition to traditional heating systems – beneficiaries: the administrative unit, public institutions and religious entities			- RON 4 000 000 for administrative units having more than 100 000 inhabitants; - RON 3 000 000 for administrative units having between 50 000 and 100 000 inhabitants; - RON 2 000 000 for administrative units having between 20 000 and 50 000 inhabitants; - RON 1 000 000 for administrative units having between 3 000 and 20 000 inhabitants; - RON 500 000 for administrative units having less than 3 000 inhabitants.	EUR 0.5 million
D.4 'Rabla Plus' programme			The amount of the scrapping premium is RON 6 500, plus an eco-bonus of - RON 1 500 (about EUR 300) for the purchase of a new hybrid vehicle;	EUR 0.2 million for natural and legal persons

			- RON 2 500 (about EUR 500) for the purchase of a new hybrid electric vehicle.	
E Programme RO 06 Renewable energy (RONDINE)				EUR 18.69 million
Total annual estimated support in the electricity sector				EUR 848.59 million
Total annual estimated support in the heating sector				EUR 3.5 million
Total annual estimated support in the transport sector				EUR 0.2 million

### 3.1 Information on how supported electricity is allocated to end consumers for purposes of Article 3(6) of Directive 2003/54 (Article 22(1)(b) of Directive 2009/28/EC)

The provisions of Article 3(6) of Directive 2003/54/EC were transposed into the Romanian legislation by the Energy Labelling Rules approved by Order No 69/2009 of ANRE – revision 1, published in the Official Journal of Romania, Part I, No 537/2009.

Details regarding the contents of these Rules were included in the first progress report for years 2009-2010. The objectives considered include:

- Transparency on the electricity market;
- Information and education of electricity consumers in Romania;
- Energy development instrument for sustainable development.

Pursuant to Article 6(1) of the Labelling Rules, once a year, but no later than 15 April, the electricity supplier shall accompany the electricity invoice it issues to each consumer it supplies of the electricity label for the electricity supplied in the previous calendar year.

For electricity supplied to the consumers using regulated tariffs, the competent authority shall draw up and publish the electricity label. The data concerning the electricity generation features for consumers using regulated tariffs are fixed at national level, and do not depend on the portfolio of primary sources of the electricity supplier.

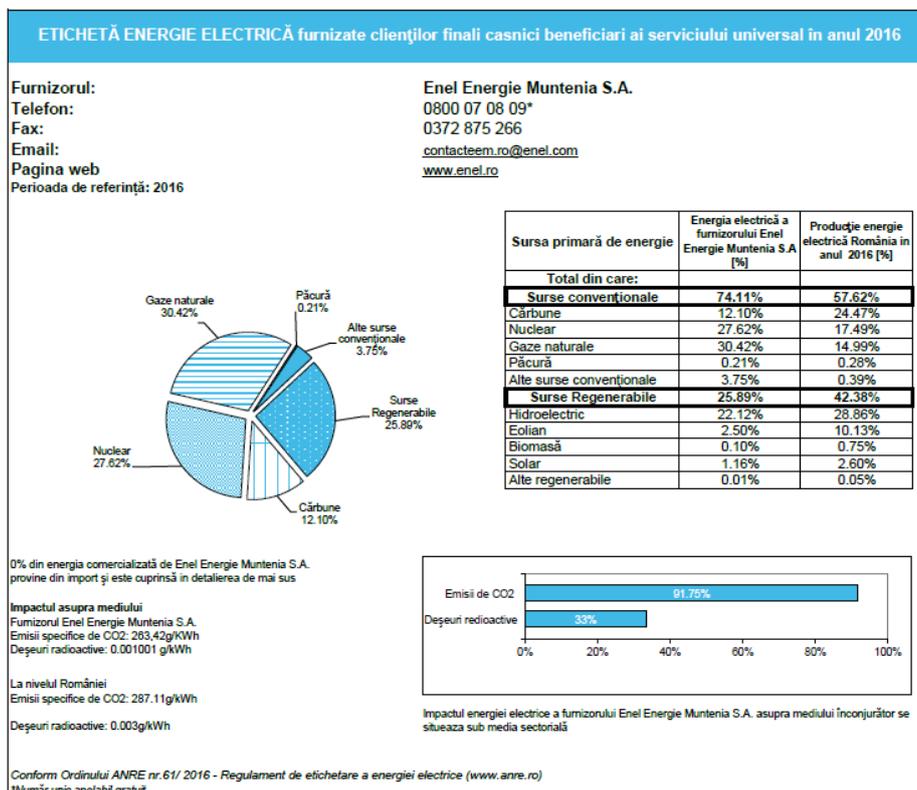
For electricity supplied to eligible consumers, the suppliers draw up the electricity label pursuant to the provisions in Annex 4 to the Rules. In this case, the suppliers are compelled to use the ‘supplier portfolio’ labelling system. The suppliers draw up the labels pursuant to the model in Annex 1 to the Rules.

The electricity label shall contain the following mandatory information, determined by the supplier based on the statements submitted by the producers:

- • the contribution of each primary source of energy to covering the purchase of electricity by supplier

- • the specific emissions of CO<sub>2</sub> and the radioactive waste resulting from the electricity supplied
- • comparison of the data above with the national average values.

**Figure 3.10** shows the Energy Label for electricity provided to domestic end consumers benefiting from the universal service by Enel Energie Muntenia Sud SA in 2016, and **Figure 3.10** shows the Energy Label for electricity provided to eligible consumers by Enel Energie Muntenia Sud SA in 2015.



**Figure 3.10 Electricity label provided by ENEL Energie Muntenia Sud SA in 2016**

<b>ELECTRICITY LABEL</b> for domestic end consumers benefiting from the universal service in 2016			
<b>Supplier:</b>		<b>Enel Energie Muntenia S.A.</b>	
<b>Telephone:</b>		<b>0800 07 08 09*</b>	
<b>Fax:</b>		<b>0372 875 266</b>	
<b>E-mail:</b>		<a href="mailto:contacteem.ro@enel.com">contacteem.ro@enel.com</a>	
<b>Website:</b>		<a href="http://www.enel.ro">www.enel.ro</a>	
<b>Reference period: 2016</b>			
	<b>Primary source of energy</b>	<b>Electricity of the provider Enel Energie Muntenia S.A. [%]</b>	<b>Electricity production Romania in 2016 [%]</b>
	<b>Total, out of which:</b>		

	<b>Conventional sources</b>	<b>74.11 %</b>	<b>57.62 %</b>
	<b>Coal</b>	<b>12.10 %</b>	<b>24.47 %</b>
	<b>Nuclear</b>	<b>27.62 %</b>	<b>17.49 %</b>
	<b>Natural Gas</b>	<b>30.42 %</b>	<b>14.99 %</b>
	<b>Fuel Oil</b>	<b>0.21 %</b>	<b>0.28 %</b>
	<b>Other conventional sources</b>	<b>3.75 %</b>	<b>0.39 %</b>
	<b>Renewable sources:</b>	<b>25.89 %</b>	<b>42.38 %</b>
	Hydropower	22.12 %	28.86 %
	Wind	2.50 %	10.13 %
	Biomass	0.10 %	0.75 %
	Solar	0.16 %	2.60 %
	Other renewables	0.01 %	0.05 %

0 % of the energy traded by Enel Energie Muntenia S.A. comes from import and is included in the situation presented above

**CO<sub>2</sub> emissions**  
**Radioactive waste**

**Impact on the environment**

Provider Enel Energie Muntenia S.A.  
Specific CO<sub>2</sub> emissions: 263.42 g/kWh  
Radioactive waste: 0.001001 g/kWh

In Romania  
Specific CO<sub>2</sub> emissions: 287.11 g/kWh  
Radioactive waste: 0.003 g/kWh

Impact on the environment of electricity of provider Enel Energie Muntenia S.A. below sector average

According to Order No 61/2016 of ANRE – Rules for labelling electricity ([www.anre.ro](http://www.anre.ro))

\* Single free phone number

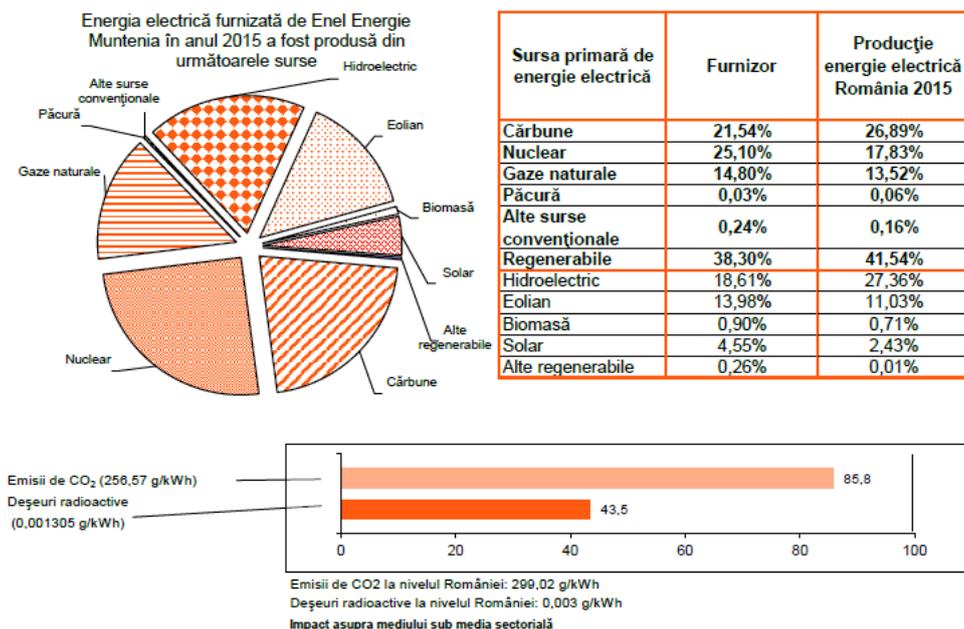
## ETICHETĂ ENERGIE ELECTRICĂ PENTRU CONSUMATORII ELIGIBILI

**Furnizor:** Enel Energie Muntenia S.A.

**Telefon:** 0800 07 08 09\*

**Site Internet:** [www.enel.ro/ro/clienti-em.html](http://www.enel.ro/ro/clienti-em.html)

Energie electrică furnizată de Enel Energie Muntenia SA în anul 2015



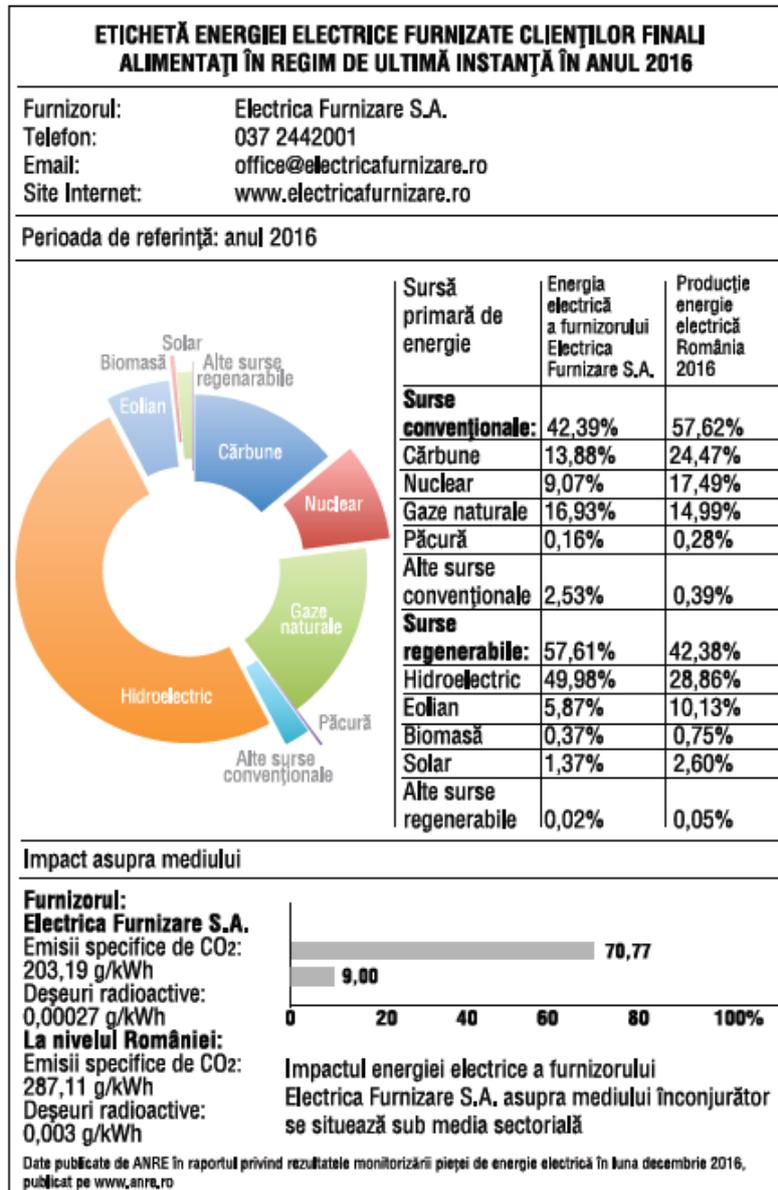
Conform Ordinului ANRE nr. 69/2009 - Regulament de etichetare a energiei electrice (www.anre.ro)  
\*Număr unic apelabil gratuit

**Figure 3.11 Electricity label provided by Enel Energie Muntenia Sud SA in 2015**

ELECTRICITY LABEL FOR ELIGIBLE CONSUMERS			
<b>Supplier:</b>	<b>Enel Energie Muntenia S.A.</b>		
<b>Telephone:</b>	<b>0800 07 08 09*</b>		
<b>Website:</b>	<a href="http://www.enel.ro/ro/clienti-em.html" style="color: blue; text-decoration: underline;">www.enel.ro/ro/clienti-em.html</a>		
Electricity supplied by Enel Energie Muntenia S.A. in 2016			
	Primary source of electricity	Supplier	Electricity production Romania 2015
	<b>Coal</b>	<b>21.54 %</b>	<b>26.89 %</b>
	<b>Nuclear</b>	<b>25.10 %</b>	<b>17.83 %</b>
	<b>Natural Gas</b>	<b>14.80 %</b>	<b>13.52 %</b>
	<b>Fuel Oil</b>	<b>0.03 %</b>	<b>0.06 %</b>
	<b>Other conventional sources</b>	<b>0.24 %</b>	<b>0.16 %</b>
	<b>Renewables:</b>	<b>38.30 %</b>	<b>41.54 %</b>
	Hydropower	18.61 %	27.36 %
	Wind	13.98 %	11.03 %
	Biomass	0.90 %	0.71 %
	Solar	4.55 %	2.43 %
	Other renewables	0.26 %	0.01 %

CO <sub>2</sub> emissions (256.57 g/kWh)
Radioactive waste (0.001305 g/kWh)
<p>CO<sub>2</sub> emissions in Romania: 299.02 g/kWh</p> <p>Radioactive waste in Romania: 0.003 g/kWh</p> <p><b>Impact on the environment – below sector average</b></p> <p><i>According to Order No 69/2009 of ANRE – Rules for labelling electricity (<a href="http://www.anre.ro">www.anre.ro</a>)</i></p> <p><i>* Single free phone number</i></p>

**Figures 3.12, 3.13 and 3.14** show the Electricity Label for the electricity supplied in 2016 by Electrica Furnizare SA to end customers as a last resort, to end customers benefiting from the universal service, to end customers supplied under competition rules.



**Figure 3.12 Electricity label provided by Electrica Furnizare SA in 2016 to end customers, supplied as a last resort**

<b>ELECTRICITY LABEL PROVIDED TO END CUSTOMERS SUPPLIED AS A LAST RESORT IN 2016</b>			
<b>Supplier:</b>	Electrica Furnizare S.A.		
<b>Telephone:</b>	037 2442001		
<b>E-mail:</b>	office@electricafurnizare.ro		
<b>Website:</b>	www.electricafurnizare.ro		
<b>Reference period: 2016</b>			
	<b>Primary source of energy</b>	<b>Electricity of provider Electrica Furnizare S.A.</b>	<b>Electricity production Romania in 2016</b>
	Conventional sources	42.39 %	57.62 %
	Coal	13.88 %	24.47 %

	<b>Nuclear</b>	<b>9.07 %</b>	<b>17.49 %</b>
	<b>Natural Gas</b>	<b>16.93 %</b>	<b>14.99 %</b>
	<b>Fuel Oil</b>	<b>0.16 %</b>	<b>0.28 %</b>
	<b>Other conventional sources</b>	<b>2.53 %</b>	<b>0.39 %</b>
	<b>Renewable sources:</b>	<b>57.61 %</b>	<b>42.38 %</b>
	Hydropower	49.98 %	28.86 %
	Wind	5.87 %	10.13 %
	Biomass	0.37 %	0.75 %
	Solar	1.37 %	2.60 %
	Other renewables	0.02 %	0.05 %

#### **Impact on the environment**

##### **Provider: Electrica Furnizare S.A.**

Specific CO<sub>2</sub> emissions: 203.19 g/kWh

Radioactive waste: 0.00027 g/kWh

##### **In Romania**

Specific CO<sub>2</sub> emissions: 287.11 g/kWh

Radioactive waste: 0.003 g/kWh

Impact on the environment of electricity of provider Electrica Furnizare S.A. is below sector average

Data published in December 2016 by ANRE in the report on the results of monitoring the electricity market, published on [www.anre.ro](http://www.anre.ro)

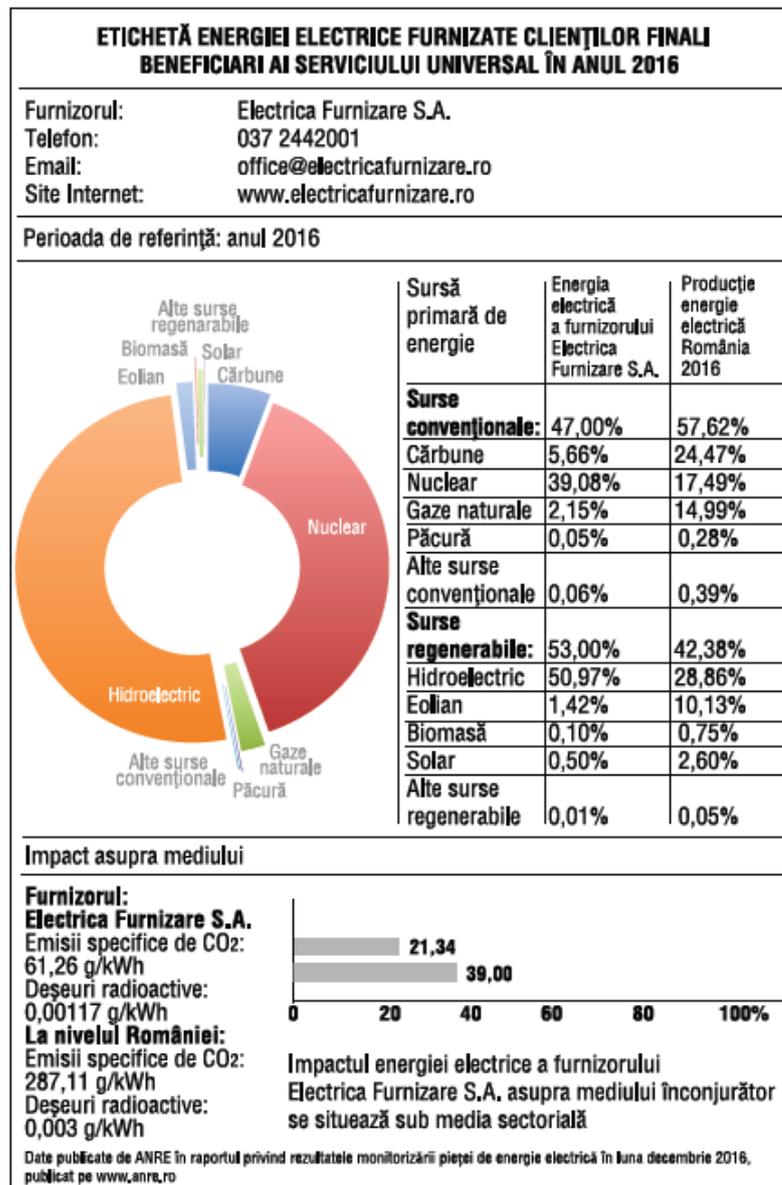
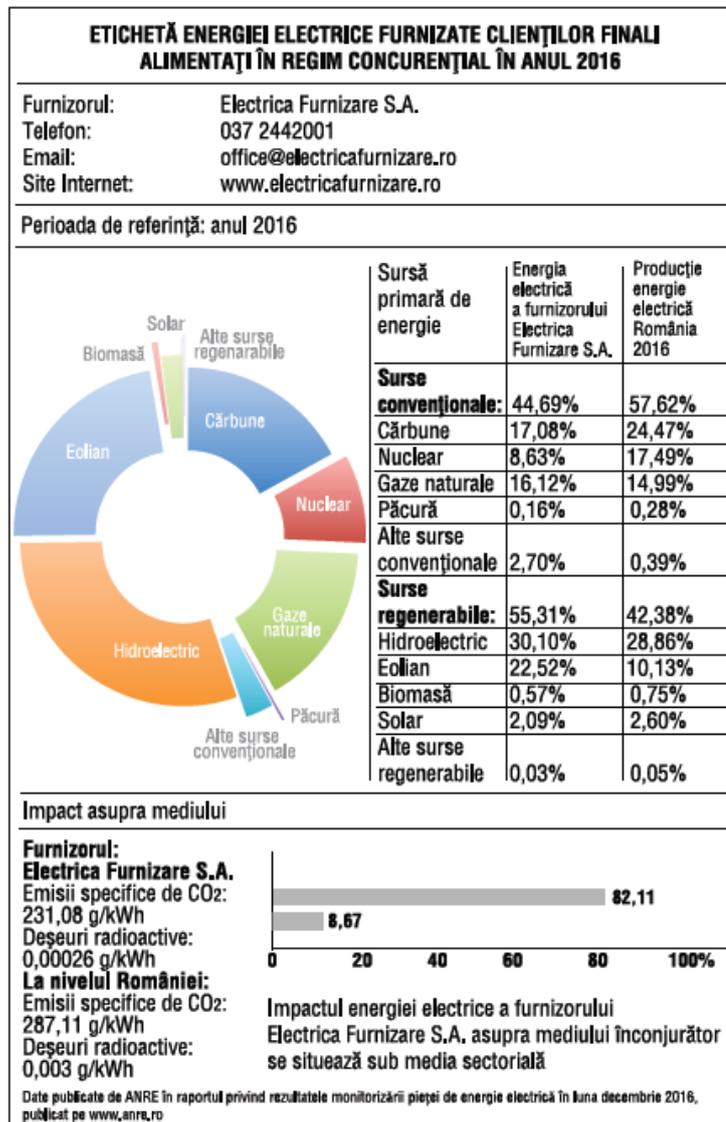


Figure 3.13 Electricity label provided by Electrica Furnizare SA in 2016 to end customers benefiting from the universal service

ELECTRICITY LABEL PROVIDED TO END CUSTOMERS BENEFITING FROM THE UNIVERSAL SERVICE IN 2016			
Supplier:	Electrica Furnizare S.A.		
Telephone:	037 2442001		
E-mail:	office@electricafurnizare.ro		
Website:	www.electricafurnizare.ro		
Reference period: 2016			
	Primary source of energy	Electricity of provider Electrica Furnizare S.A.	Electricity production Romania in 2016
	Conventional sources	47.00 %	57.62 %
	Coal	5.66 %	24.47 %

	<b>Nuclear</b>	<b>39.08 %</b>	<b>17.49 %</b>
	<b>Natural Gas</b>	<b>2.15 %</b>	<b>14.99 %</b>
	<b>Fuel Oil</b>	<b>0.05 %</b>	<b>0.28 %</b>
	<b>Other conventional sources</b>	<b>0.06 %</b>	<b>0.39 %</b>
	<b>Renewable sources:</b>	<b>53.00 %</b>	<b>42.38 %</b>
	Hydropower	50.97 %	28.86 %
	Wind	1.42 %	10.13 %
	Biomass	0.10 %	0.75 %
	Solar	0.50 %	2.60 %
	Other renewables	0.01 %	0.05 %
<b>Impact on the environment</b>			
<p><b>Provider: Electrica Furnizare S.A.</b>            Specific CO2 emissions: 61.26 g/kWh            Radioactive waste: 0.00117 g/kWh</p> <p><b>In Romania</b>            Specific CO2 emissions: 287.11 g/kWh            Radioactive waste: 0.003 g/kWh</p> <p style="text-align: center;">Impact on the environment of electricity of provider Electrica Furnizare S.A. is below sector average</p> <p>Data published in December 2016 by ANRE in the report on the results of monitoring the electricity market, published on <a href="http://www.anre.ro">www.anre.ro</a></p>			



**Figure 3.14 Electricity label provided by Electrica Furnizare SA in 2016 to end customers, supplied under competition rules**

<b>ELECTRICITY LABEL PROVIDED TO END CUSTOMERS UNDER COMPETITION RULES IN 2016</b>			
<b>Supplier:</b>	Electrica Furnizare S.A.		
<b>Telephone:</b>	037 2442001		
<b>E-mail:</b>	office@electricafurnizare.ro		
<b>Website:</b>	www.electricafurnizare.ro		
<b>Reference period: 2016</b>			
	<b>Primary source of energy</b>	<b>Electricity of provider Electrica Furnizare S.A.</b>	<b>Electricity production Romania in 2016</b>
	<b>Conventional sources</b>	<b>44.69 %</b>	<b>57.62 %</b>
	<b>Coal</b>	<b>17.08 %</b>	<b>24.47 %</b>
	<b>Nuclear</b>	<b>8.63 %</b>	<b>17.49 %</b>

	<b>Natural Gas</b>	<b>16.12 %</b>	<b>14.99 %</b>
	<b>Fuel Oil</b>	<b>0.16 %</b>	<b>0.28 %</b>
	<b>Other conventional sources</b>	<b>2.70 %</b>	<b>0.39 %</b>
	<b>Renewable sources:</b>	<b>55.31 %</b>	<b>42.38 %</b>
	Hydropower	30.10 %	28.86 %
	Wind	22.52 %	10.13 %
	Biomass	0.57 %	0.75 %
	Solar	2.09 %	2.60 %
	Other renewables	0.03 %	0.05 %
<b>Impact on the environment</b>			
<p><b>Provider: Electrica Furnizare S.A.</b>  Specific CO2 emissions: 231.08 g/kWh  Radioactive waste: 0.00026 g/kWh</p> <p><b>In Romania</b>  Specific CO2 emissions: 287.11 g/kWh  Radioactive waste: 0.003 g/kWh</p> <p style="text-align: center;">Impact on the environment of electricity of provider Electrica Furnizare S.A. is below sector average</p> <p>Data published in December 2016 by ANRE in the report on the results of monitoring the electricity market, published on <a href="http://www.anre.ro">www.anre.ro</a></p>			

**4. Information on how, where appropriate, support schemes have been structured to take into account applications that use E-RES and offer additional benefits, but may also have higher costs, including biofuels made from waste, residues, non-food cellulosic material, and ligno-cellulosic material (Article 22(1)(c) of Directive 2009/28/EC)**

The effort to make use of renewable energy sources in Romania also took into consideration the possibilities to direct the support schemes towards applications that bring additional advantages, but imply higher costs, being generally considered unattractive by investors. The evaluation and re-evaluation of the opportunities brought by the enhancement of renewable energies in specific applications is carried on, and the integration of these applications in the support schemes is performed both in terms of primary and secondary legislation, and through specific methodologies promoting certain measures.

The co-financing by the European Commission and the State budget of the projects in the energy sector under the Sectoral Operational Programmes was also structured so as to promote applications bringing additional advantages, but for higher costs. Thus, according to the project evaluation criteria for non-reimbursable co-financing, a higher score is granted to projects that have high current economic net value and low financial return rate, and lower scores are granted to projects that have a financial return rate higher than the sector or technology average. It thus became possible to support applications regarding the use of local geothermal resources or the municipal public lighting from renewable energy sources.

Another category of eligible projects receiving higher scores are the projects using biomass in high efficiency co-generation plants. Romania has seen low growth in biomass power plants, as compared to NREAP estimates, and to its available national potential resources.

The Large Infrastructure Operational Programme has been structured so as to ensure co-financing of TSO and DO projects on strengthening networks for the take-up and transmission of electricity produced in power plants from renewable sources. LIOP has a priority axis PA 6 with the specific objective of creating and/or modernising the production capacities of electricity and/or heat using biomass and biogas, as well as the creating and modernising the production capacities of thermal energy based on geothermal energy.

The programmes financed from the Environment Fund were structured so as to consider applications that bring additional advantages, such as:

- financing natural persons for applications (electricity and/or heat from RES) in their individual households, applications that are for local consumption and that do not impact the electricity grids;
- financing public institutions and administrative units that supplement or replace the traditional heating / lighting systems in their own buildings with systems using E-RES;
- subsidies for the purchase of electric or hybrid cars.

With regard to the promotion of biofuels resulting from waste, residues, non-food cellulosic material and ligno-cellulosic material, GD No 935/2011 was amended by GD No 918/2012, in the sense that the mandatory values for biofuels set forth for gas and diesel sold at gas stations may be reduced by half if biofuels obtained from the above-mentioned waste is used. As a consequence, the first applications for obtaining biofuels from food waste occurred in Romania.

During the reporting period 2015/2016, the budgetary difficulties that did not allow the development of support schemes for investments in costly biofuel technologies persist, especially as the infrastructure needed to use waste on a large scale, including the production of biofuels from waste, residues, non-food cellulosic material and ligno-cellulosic material, is missing.

## **5. Information on the system of guarantees of origin for electricity, heating and cooling from renewable energy sources and the measures taken to ensure the reliability and protection against the fraudulent use of the system (Article 22(1)(d) of Directive 2009/28/EC).**

In November 2011, Order No 42/2011 of the ANRE approving the Rules for the accreditation of E-RES producers with a view to implementing the promotion system through green certificates was issued. The Accreditation Rules defined the accreditation requirements for power plants producing electricity from renewable energy sources for production technologies using wind, hydro, solar, biomass and biogas sources.

On 26 June 2014, by Order No 48/2014 of ANRE approved the new Rules for the accreditation of producers of electricity from renewable energy sources for the implementation of the green certificate promotion system and repealing Order No 42/2011. According to these rules, for accreditation, RES power plants have to ensure the measurement of energy from RES, proving that they ensure separate measurement by electrical generation

unit and type of RES, and, in the case of multi-fuel power plants and co-generation power plants, the quantity and the quality of the fuels used must be measured. In addition to the documents and the statements that have to be submitted in order to comply with the accreditation requirements, the ANRE monitors and has the right to control the accredited facilities, being entitled to modify, suspend or cancel the accreditation. Moreover, during the monitoring process performed by ANRE, the quantities of electricity generated from RES and delivered to the grids are notified; the TSO also records these quantities monthly, by producer, and they are published on the website [www.transeletrica.ro](http://www.transeletrica.ro), the green certificate market.

The system for the accreditation of RES producers and the monitoring of production and compliance with the accreditation requirements gives the certification of origin for the production of energy from RES for a significant quantity of electricity obtained from renewable sources.

Strictly referring to the issuance of the guarantees of origin in Romania, Government Decision No 1232/2011 approving the Rules for issuing and monitoring the guarantees of origin for electricity from renewable sources transposes Article 15 of Directive 2009/28/EC into the national legislation.

According to these Rules, the ANRE is the body that issues to producers of E-RES, upon their written request, the guarantees of origin. The certification system on the origin of electricity from renewable energy sources (E-RES) aims at increasing the transparency towards the customer by differentiating between electricity from renewable energy sources and electricity produced from conventional sources.

Thus, the guarantee of origin is an electronic document with the only purpose of providing to the end consumer proof that a share or a quantity of the energy comes from renewable energy sources.

Pursuant to GD No 1232/2011 approving the Regulation on the issuance and monitoring of guarantees of origin for electricity from renewable sources, ANRE prepares annually the 'Report on the monitoring of guarantees of origin for electricity produced from renewable energy sources'.

2016 is the fourth year of operation of the E-RES certification system after the change of European and national legislation.

At the end of 2016, 801 E-RES producers licensed to produce electricity were registered, broken down by RES types, as follows:

- Wind energy – 81 E-RES producers,
- Hydro energy – 106 E-RES producers,
- Biomass energy – 28 E-RES producers and
- Photovoltaic energy – 586 E-RES producers.

The data presented resulted from searching the ANRE – MIS application, related to the guarantees of origin.

E-RES producers that requested and were granted guarantees of origin in 2016, highlighting of RES type, can be found in **Table 5.1**.

**Table 5.1. Centralized situation of guarantees of origin issued by producers and types of RES in 2016**

No	Name of E-RES producer	GO	RES type
		number	
1	ALIZEU EOLIAN	115,946	Wind energy
2	AMV SOLAR	3,177	Solar energy
3	BRAILA WIND	117,320	Wind energy
4	CLEAN ENERGY ALTERNATIV	679	Solar energy
4	COMPANIA COLTERM	1,163	Hydro power
6	CORNI EOLIAN	129,898	Wind energy
7	D&P ELECTRONIC SERVICE	210	Solar energy
8	DAN HOLDING MGM	16,592	Wind energy
9	ECO POWER WIND	22,369	Wind energy
10	ELECTROCARBON	54,951	Hydro power
11	ELSID	91,203	Hydro power
12	ENEL GREEN POWER ROMÂNIA	1,576,447	Wind energy
13	EOL ENERGY MOLDOVA	38,650	Wind energy
14	EWIND	228,053	Wind energy
15	EYE MALL	22,682	Solar energy
16	GREEN ENERGY FARM	17,492	Wind energy
17	KELAVENT CHARLIE	27,259	Wind energy
18	KELAVENT ECHO	25,094	Wind energy
19	LJG GREEN SOURCE ENERGY BETTA	22,638	Solar energy
20	LJG GREEN SOURCE ENERGY GAMA	61,693	Solar energy
21	MAR-TIN SOLAR ENERGY	9,761	Solar energy
22	MIREASA ENERGIES	107,843	Wind energy
23	MONSSON ALMA	13,939	Wind energy
24	SMART CLEAN POWER	20,691	Wind energy
25	SMART BREEZE	19,202	Wind energy
26	SC HIDROELECTRICA SA	13,757,448	Hydro power
27	SOFT GROUP	30,258	Wind energy
28	SOLAR ELECTRIC CURTISOARA	1,126	Solar energy
29	SOLEK PROJECT EPSILON	692	Solar energy
30	SOLEK PROJECT KAPPA	1,081	Solar energy
31	SOLEK PROJECT KHI	722	Solar energy
32	SOLPRIM	9,029	Solar energy
33	SUENO SOLAR	57	Solar energy
34	TEB PROJECT ONE	28,267	Biogas
35	THREE WINGS	6,136	Wind energy
36	TINMAR GREEN ENERGY	10,376	Solar energy
37	TOTAL NATURAL	272	Wind energy
38	WIND PARK INVESTMENT	13,766	Wind energy
39	WIND STARS	8,843	Wind energy

No	Name of E-RES producer	GO	RES type
		number	
40	WIND FARM MV1	23,310	Wind energy
<b>TOTAL</b>		<b>16,636,225</b>	

Following the requests of E-RES producers, ANRE issued 16 636 255 guarantees of origin, corresponding to 16 636 255 MWh of E-RES.

According to the data in **Table 5.1**, 40 E-RES producers, which represent 4.99 % of the total of 801 E-RES producers, have requested guarantees of origin.

Of the total number of guarantees of origin issued in 2016, 82.70 % were guarantees of origin issued for SC Hidroelectrica SA, which received 13 757 448 guarantees of origin.

**Table 5.2** shows the total number of guarantees of origin issued for each type of RES. In 2016, for the energy produced from biomass, 28 267 guarantees of origin were issued, related to a single E-RES producer.

**Table 5.2 The total number of guarantees of origin issued by RES type and E-RES producer**

No	RES TYPE	Number of E-RES producers	Number of GOs issued
1	Hydro	4	13,904,765
2	Solar energy	14	143,873
3	Wind energy	21	2,559,350
4	Biomass	1	28,267
<b>TOTAL</b>		<b>40</b>	<b>16,636,255</b>

From the analysis of the centralized situation of the holders of guarantees of origin in 2016, highlighting the number of guarantees of origin expired in the producer's account and the percentage of guarantees of origin transferred by E-RES producers. It follows that, out of a total of 49 E-RES producers holding guarantees of origin in 2016, only 21 requested the transfer of the guarantees of origin. The number of guarantees of origin transferred was 2 143 810, accounting for 13.90 % of the total of 15 421 900 guarantees of origin held, the rest remaining in the producers' portfolio.

14 E-RES producers are found to have transferred over 90 % of the guarantees of origin held in the portfolio, while SC Hidroelectrica SA and Enel Green Power Romania, by contrast, had transferred 8.96 % respectively, 18.64 % of all the guarantees of origin they held.

In view of the above, it is noted that 21 E-RES producers requested ANRE to issue 633 672 guarantees of origin, but did not request the transfer of any guarantee of origin.

Compared to 2015, when the number of guarantees of origin transferred from producer to supplier was 1 017 579, in 2016 the number of guarantees of origin transferred was 2 143 810, showing an increasing trend.

**Table 5.3** shows the centralized situation of holders of guarantees of origin in 2016, highlighting the number of guarantees of origin expired in the account of electricity suppliers and the percentage of guarantees of origin used at end customer level.

**Table 5.3 Centralized situation of electricity suppliers, holders of guarantees of origin in 2016**

No	Supplier name	Initial balance No	GO primed by transfer No	Expired GO No	Transferred GO No	Total GO held before use No	GO used	
							No	%
1	ARELCO POWER	0	20,269	0	0	20,269	0	0
2	CEZ SA	0	38,754	38,754	0	0	0	0
3	ELECTRICA FURNIZARE	0	519,155	231,390	0	287,716	0	0
4	ENEL ENERGIE	366,748	862,904	495,990	0	733,659	0	0
5	ENEL ENERGIE MUNTENIA	264,509	375,135	338,540	0	301,104	22,317	7.41
6	MET ROMANIA ENERGY MARKET	153,692	119,255	153,692	0	119,255	119,255	100.0
7	MET ROMANIA ENERGY TRADE	0	210	0	0	210	0	0
8	MIDAS& CO	0	323	113	210	0	0	0
9	RWE ENERGIE	0	70,077	13,446	0	56,631	5,763	10.18
10	TINMAR ENERGY	97,380	137,938	95,379	0	139,939	86,003	61.46
	<b>TOTAL</b>	<b>882,329</b>	<b>2,144,020</b>	<b>1,367,356</b>	<b>210</b>	<b>1,658,783</b>	<b>233,338</b>	<b>14.07</b>

The analysis of the information in **Table 5.3** shows that out of the total number of guarantees of origin received by electricity suppliers by transfer in 2016, 4 of these suppliers used them for end customers, namely:

- ENEL ENERGIE MUNTENIA used 22 317 guarantees of origin for end customers, accounting for 7.41 % of the guarantees of origin in the portfolio;
- RWE ENERGIE used 5 763 guarantees of origin for end customers, accounting for 10.18 % of the guarantees of origin in the portfolio;
- TINMAR ENERGY used 86 053 guarantees of origin for end customers, accounting for 61.46 % of the guarantees of origin in the portfolio;
- MET ROMANIA ENERGY TRADE used 119 255 guarantees of origin for end customers, accounting for 100 % of the guarantees of origin in the portfolio.

It follows that 14.07 % of the total guarantees of origin received by suppliers by transfer were used at end customer level.

Compared to 2015 when, by the notifications received from ANRE from electricity suppliers as regards the use of guarantees of origin for end customers, a number of 66 631 guarantees of

origin were used, in 2016 the number of guarantees of origin used for end customers was 233 338.

The centralized situation of guarantees of origin used in 2016 highlighting end customers can be found in **Table 5.4**.

**Table 5.4 Centralized situation of guarantees of origin used by end-customers in 2016**

No	Supplier of electricity holder of GO	End-customers	Number of GO used
1	ENEL ENERGIE MUNTENIA	BOB DEVELOPMENT	6,969
2	ENEL ENERGIE MUNTENIA	BOB REAL PROPERTY	11,684
3	ENEL ENERGIE MUNTENIA	IKEA România	3,293
4	ENEL ENERGIE MUNTENIA	PEPAS 2000	371
5	REPOWER FURNIZARE	MEGA IMAGE	119,255
6	RWE ENERGIE	PHILIPS ORASTIE	5,763
7	TINMAR ENERGY	KAUFLAND România	54,392
8	TINMAR ENERGY	LIDL DISCOUNT	31,611
	<b>TOTAL</b>		<b>233,338</b>

During 2016, ANRE received notifications regarding the use of guarantees of origin from 4 economic operators S.C. Enel Energie Muntenia S.A., REPOWER FURNIZARE, RWE ENERGIE and TINMAR ENERGY as electricity suppliers, for 8 end customers, the number of guarantees of origin used for each of the end customers, as shown in **Table 5.4**.

The registration of guarantees of origin shall be made electronically in the *Register* containing information on the guarantees of origin issued, transferred, used or withdrawn.

In 2016, there were no requests for the recognition of guarantees of origin issued by the authorities of other EU Member States.

ANRE did not receive requests for issuing guarantees of origin for electricity for pumping water into the upper basin of a hydroelectric pumped storage power plant or for electricity produced in multi-fired power plants in 2016.

## **6. Developments in 2015 and 2016 in the availability and use of biomass resources for energy purposes (Article 22(1)(d) of Directive 2009/28/EC)**

**Table 4: Biomass supply for energy use**

	Amount of domestic raw material (thousand tonnes)		Primary energy from domestic raw material (ktoe)		Amount of raw material imported from EU (tonnes)		Primary energy from raw material imported from EU (ktoe)		Amount of raw material from non EU States (tonnes)		Primary energy from the amount of raw material imported from non EU States (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
<b>Biomass supply for heating and electricity:</b>												
Indirect supply of wood biomass (residues and co-products from wood industry, etc.)	14,429	14,691	3520	3579	0	0	0	0	0	0	0	0
Energy crops (grasses, etc.) and short rotation coppice (please specify) - energy willow - miscanthus	8.0	8.2	3.2	3.3	0	0	0	0	0	0	0	0
Agricultural by-products / processed residues and fishery by-products	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Biomass	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

	Amount of domestic raw material (thousand tonnes)		Primary energy from domestic raw material (ktoe)		Amount of raw material imported from EU (tonnes)		Primary energy from raw material imported from EU (ktoe)		Amount of raw material from non EU States (tonnes)		Primary energy from the amount of raw material imported from non EU States (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
from waste (municipal, industrial, etc.)												
Others (please specify)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Biomass supply for transport:</b>												
Common arable crops for the production of biofuels (please specify the main types) - maize - sunflower - rapeseed	475*  225 250	540*  240 300	339.8	386	0	0	0	0	0	0	0	0
Energy crops (grasses, etc.) and short rotation coppice for the production of biofuels (please specify the main	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

	Amount of domestic raw material (thousand tonnes)		Primary energy from domestic raw material (ktoe)		Amount of raw material imported from EU (tonnes)		Primary energy from raw material imported from EU (ktoe)		Amount of raw material from non EU States (tonnes)		Primary energy from the amount of raw material imported from non EU States (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
types)												
Others (please specify)	0	0	0	0	0	0	0	0	0	0	0	0

\* The total production (thousand tonnes) of raw material is reported, for biofuels and contained primary energy, regardless of whether the produced biofuels meet the sustainability criteria or not.

Source: NIS – Energy balance

In 2015, domestic wood biomass production (fire wood including biomass) was 14 429 thousand tonnes, i.e. 3 520 ktoe, which is higher than domestic consumption (13 580 thousand tonnes, i.e. 3 306 ktoe). Import (410 000 tonnes, i.e. 98.4 ktoe), export (433 000 tonnes, i.e. 106 ktoe) amounts were recorded, as well as stock variations, with export surplus. Under these conditions, it was deemed that domestic consumption was fully covered from domestic production.

In 2016, the domestic wood biomass production (fire wood including biomass) was 14 691 000 tonnes, i.e. 3 579 ktoe, which is higher than the domestic consumption (13 943 000 tonnes, i.e. 3 393 ktoe). Import (462 000 tonnes, i.e. 111 ktoe) and export (321 000 tonnes, i.e. 79 ktoe) amounts were recorded, as well as stock variations, with export surplus. Under these conditions, it was deemed that domestic consumption was fully covered from domestic production.

**Table 4.a: Current domestic agricultural land use for production of crops dedicated to energy production (thousand ha)**

Land use	Surface (thousand ha)	
	2015	2016
1. Land used for common arable crops	6248.7	6396.5 <sup>1</sup>
Grain maize	2598.0	2580.9 <sup>1</sup>
Wheat	2093.2	2137.7 <sup>1</sup>
Potatoes	185.4	182.2 <sup>1</sup>
Sunflower	1006.8	1039.8 <sup>1</sup>
Rapeseed	365.3	455.9 <sup>1</sup>
2. Land used for short rotation coppice	n.a	n.a

Energy willow	0.3	0.6 <sup>2</sup>
Energy poplar	n.a.	2.6 <sup>2</sup>
3. Land used for other energy crops, such as grasses, sorghum	0.1	0.1
Sorghum	n.a.	0.6 <sup>2</sup>
Myscanthus	n.a.	0.6 <sup>2</sup>

*Note: 1 Tempo Online Database of NIS*

*2 Paying and Intervention Agency for Agriculture*

*Source: National Institute of Statistics*

Dynamically, as compared to the reporting in previous years, the land use for common arable crops is relatively unchanged, and the land use for energy crops, at an early stage, is noted.

### **7. Information on the potential changes in commodity prices and land use in Romania associated with its increased use of biomass and energy from renewable sources (Article 22(1)(h) of Directive 2009/28/EC)**

As shown by the Statistical Yearbook of 2016, in 2013 there were 3 601.8 thousand agricultural holdings in Romania, about 0.7 % lower than the number resulting from the General Agricultural Census in 2010.

Thus, in 2013, there were the following agricultural holdings:

- 3 601 776 holdings without legal personality (individual agricultural holdings, self-employed, sole proprietorships, family businesses); the average surface of an agricultural holding without legal personality was 2.06 ha;
- 27 880 holdings with legal personality (86 autonomous companies, 1 343 agricultural companies / associations, 14 531 companies, 3 107 public administration units, 66 cooperative units, 8 747 other types); the average surface of an agricultural holding with legal personality was approx. 210.74 ha.

The 2010 census revealed that the national unused agricultural surface was 896 000 ha, and the agricultural surface at rest was 953 000 ha.

The progress concerning the use of cultivated land in the period 2006-2016 is shown in **Table 7.1**.

**Table 7.1 Progress concerning the cultivated land in the period 2006-2016  
[thousand ha]**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016 <sup>1</sup>
Total cultivated surface, of which:	7884	7777	7798	7884	7807	8082	8058	8167	8234.4	8244.4	8250.5
cereals for grains, of which:	5114	5129	5211	5282	5041	5225	5440	5421	5443.2	5463.6	5468.2

wheat	2013	1975	2110	2149	2162	1947	1998	2104.0	2112.9	2106.8	2117.3
grain maize	2520	2525	2441	2339	2098	2590	2730	2518.3	2512.8	2604.5	2650.2
root crops, of which:	344	320	298	297	282	279	266	246	243.8	225.1	234.5
potatoes	278	268	255	255	241	243	224	203.4	198.5	185.9	195.5
industri al plants, of which:	1331	1354	1251	1269	1431	1490	1272	1436	1504.0	1544.1	1549.8
oil plants, of which:	1298	1340	1239	1254	1410	1473	1261	1427	1496.5	1514.7	1525.2
sunflow er	991	836	814	766	791	995	1067	1074.6	1001.0	1011.5	1114.5
rapeseed	110	365	365	420	537	393	105	276.6	406.7	367.9	410.7

Note: 1 Estimation

Source: NIS – Romanian Statistical Yearbook

We note that, between 2006 and 2016, the surface cultivated with rapeseed and eventually meant for the production of biodiesel increased by 2010, up to 537 000 ha, after which it decreased to 393 000 ha in 2011, and 105 000 ha in 2012. From 2013, this area increased up to in 2016 approx. 410 000 ha.

The total cultivated surface in the same period of time increased from 7 884 000 ha to 8 250 000 ha.

It is considered that Romanian agriculture offers important possibilities for extensive and intensive development, and it is hard to talk about limitations on the food products introduced by promoting energy crops.

No information is available on changes in prices for basic products resulting from the use of biomass and other renewable energy sources

#### **8. Development and shared use of biofuels produced from waste, residues, non-food cellulosic material and ligno-cellulosic material, and ligno-cellulosic material (Article 22(1)(i) of Directive 2009/28/EC)**

**Table 5: Biofuels in development (kteo)**

<i>Raw materials listed in Part A of Annex IX to Directive 2009/28/EC</i>	<b>2015</b>	<b>Year 2016</b>
<i>(a) Algae, if cultivated on land in ponds or photobioreactors</i>		
<i>(b) Biomass fraction of mixed municipal waste, but not</i>		

<i>separated household waste subject to recycling targets under point (a) of Article 11(2) of Directive 2008/98/EC</i>		
<i>(c) Bio-waste as defined in Article 3(4) of Directive 2008/98/EC from private households subject to separate collection as defined in Article 3(11) of that Directive</i>		
<i>(d) Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry, and excluding feedstocks listed in part B of this Annex</i>		
<i>(e) Straw</i>		
<i>(f) Animal manure and sewage sludge</i>		
<i>(g) Palm oil mills effluent and empty palm fruit bunches</i>		
<i>(h) Tall oil pitch</i>		
<i>(i) Crude glycerine</i>		
<i>(j) Bagasse</i>		
<i>(k) Grape marcs and wine lees</i>		
<i>(l) Nut shells</i>		
<i>(m) Husks</i>		
<i>(n) Cobs cleaned of kernels of corn</i>		
<i>(o) Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, branches, pre-commercial thinnings, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil</i>		
<i>(p) Other non-food cellulosic material as defined in point (s) of the second paragraph of Article 2</i>		
<i>(q) Other ligno-cellulosic material as defined in point (r) of the second paragraph of Article 2 except saw logs and veneer logs</i>		
<b>Raw materials listed in Part B of Annex IX to Directive 2009/28/EC</b>	<b>2015</b>	<b>2016</b>
<i>(a) Used cooking oil</i>		
<i>(b) Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009 of the European Parliament and of the Council</i>		

In Romania difficulties persist with regard to developing the necessary infrastructure for a wide scale use of waste, and with regard to funding support schemes that facilitate the introduction of costly technologies, such as the biofuels laid down in Article 22(2).

Pursuant to GD No 1121 of 18 December 2013, the biofuel share in petrol sold in Romania decreased from 5 to 4.5 % as from 1 January 2014. Concerning diesel oil, the biodiesel share remained 5 % and was maintained as such until 1 January 2016, when it increased to 6.5 %. The biodiesel share in diesel oil should have reached 6 % already at the beginning of 2013,

but, in autumn 2012, the oil companies stated that they had failed to prepare the infrastructure necessary for the transfer to the new recipes, and they also expressed their suspicions related to potential problems these recipes might cause on engines in older generation vehicles. If the 6 % share had been applied, the oil companies would have had to place on the market two types of petrol: one for newer cars, which allow such a share of bio-components, and another type of petrol for older cars.

There are a series of issues that may bring about failures on the fuel market, such as technical barriers found in the use of this type of petrol by motor vehicles in circulation, manufactured in general prior to 2000, as well as the heterogeneous structure of the car fleet concerned, which varies from one motor vehicle manufacturer to another. This is an objective situation whose injurious effects on the consumers, fuel suppliers and motor vehicle manufacturers and importers must be decreased accordingly.

As from 1 January 2018, the mandatory share will be 8 %.

Government Decision No 1121/2013 also stipulates that, by 31 December 2020, fuel suppliers have to reduce the level of greenhouse gas emissions by 10 % as compared to 2010. As intermediary threshold, the emissions have to be reduced by 6 % by 31 December 2018.

Certain provisions set forth in 2012 with regard to the decrease in the mandatory quotas established for biofuels in petrol and diesel oil sold in gas stations, in case of biofuels resulting from waste, residues, non-food cellulosic material and ligno-cellulosic material, among other factors, led to the occurrence of the first applications for obtaining biofuels from food waste in Romania in 2013.

#### **9. The estimated impact of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality in 2015 and 2016 (Article 22(1)(j) of Directive 2009/28/EC)**

In the initial stage (2005-2010) there were no explicit provisions in the domestic law with regard to sustainable production of biofuels and bioliquids, and with regard to the evaluation of the impact of such production on biodiversity, water resources, water quality and soil quality, etc. These provisions were introduced by Government Decision No 935/2011 on promoting the use of biofuels and bioliquids and by Government Decision No 928/2012 establishing the conditions for putting petrol and diesel oil on the market and introducing a mechanism for monitoring and reducing greenhouse gas emissions. These government decisions were amended and supplemented by GD No 1121/2013, which entered into force on 6 January 2014.

Fuel suppliers put on the market only petrol and diesel oil that contain biofuels, as follows:

- a)** from the date of entry into force of this Decision, diesel oil with a minimum 5 % biofuel content by volume;
- b)** from 1 January 2013, diesel oil with a minimum 6 % biofuel content by volume; this provision has been repealed as from January 2014;
- c)** from 1 January 2016, diesel oil with a minimum 6.5 % biofuel content by volume;
- d)** from the date of entry into force of this Decision, petrol with a minimum 4 % and a maximum 5 % biofuel content by volume;

- e) from 1 January 2013, petrol with a minimum 5 % biofuel content by volume; from 1 January 2014, petrol with a minimum 4.5 % biofuel content by volume;
- f) from 1 January 2018, petrol with a minimum 8 % biofuel content by volume.

The values of the biofuel content in petrol and diesel oil put on the market laid down at points (c), (e) and (f) refer to biofuels that are not obtained from waste, residues, non-food cellulosic material and ligno-cellulosic material. The values of the biofuel content laid down in paragraph (1)(c), (e) and (f) are cut by half when the biofuels used are obtained from waste, residues, non-food cellulosic material and ligno-cellulosic material.

The values resulting from the cutting to half of the biofuel content laid down at points (c), (e) and (f) are justified based on the certificates of origin of the biofuels obtained from waste, residues, non-food cellulosic material and ligno-cellulosic material.

The verification of the biofuel content in petrol and diesel oil is made by bodies acknowledged by the Ministry of Economy through its Department for Energy, under the system for monitoring petrol and diesel oil quality.

Only biofuels and bioliquids that are produced from raw materials that meet the sustainability criteria are allowed to be put on the market, regardless of whether the raw material comes from an agricultural area within or outside the European Union. These criteria are the following:

- The reduction in greenhouse gas emissions due to the use of biofuels and bioliquids, as compared to the greenhouse gas emissions due to the use of fossil fuels is as follows:
  - a) minimum 35 %, starting with 1 January 2012;
  - b) minimum 50 %, starting with 1 January 2017;
  - c) minimum 60 %, starting with 1 January 2018;in case of biofuels produced in plants in which production started on 1 January 2017 or after this date.

In case of biofuels and bioliquids produced in operating plants, these provisions only apply as from 1 April 2013. The Annex to Government Decision No 1121/2013 includes the calculation methodology for the reduction of the greenhouse gas emissions resulting from the use of biofuels and bioliquids.

- Biofuels and bioliquids may not be produced from raw materials produced on land rich in biodiversity, in particular land that, starting with 1 January 2008, belonged to one of the following categories, regardless of whether this classification is still valid or not:
  - a) primary forests and other forests with native species, where there are no visible signs of human activity, and the environmental processes are not significantly affected;
  - b) areas designated by law or by the environmental authority, for the protection of the environment or for the protection of ecosystems or rare or endangered species, acknowledged in international agreements or included in the lists drafted by the inter-governmental organisations or by the International Union for the Conservation of Nature and Natural Resources, except where evidence is provided that the production of the raw material did not affect the scope of environmental protection;
  - c) pastures rich in biodiversity, such as the natural pastures rich in biodiversity that would continue to be pastures in the absence of human intervention, and that keep the structure of natural species, the environmental features and processes, or pastures rich in biodiversity that are not natural, and that would cease to exist as pastures in the absence of human intervention, and that contain a large diversity of species and are not degraded,

if no evidence is provided that harvesting the raw materials is necessary for maintaining the pasture status.

- Biofuels and bioliquids cannot be produced from raw materials that come from land with high carbon stock, in particular land that used to hold one of the following statuses, starting with 1 January 2008, and that no longer holds said status, as follows:
  - a) wetlands, in particular areas permanently, or over a significant period of the year, covered or saturated with water;
  - b) high-density forests, in particular land areas larger than one hectare, covered with trees more than 5 metre high, and with a canopy larger than 30 % or trees that can reach these thresholds in situ;
  - c) land larger than one hectare, covered with trees more than 5 meter high and a canopy between 10 % and 30 % or trees that can reach these thresholds in situ.

These provisions do not apply if, on the date the raw material was obtained, the land had the same status as before 1 January 2008.

- Biofuels and bioliquids cannot be produced from raw materials that come from lands which, on 1 January 2008, were peat bogs, except for the case in which there is proof that the planting and harvesting of that raw material does not involve the drainage of the soil that had not been drained previously.

Government Decision No 935/2011 transposed into the domestic legislation:

- The provisions in Article 1, Article 3(4) and Article 4 of Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport;
- The provisions in Article 2(m), (n) and (o), Articles 17, 18, 19, 21 and Article 26(3) of 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.

GD No 928/2012 was amended and supplemented by GD No 1121/2013, and some of the significant amendments were the following:

- a) By way of exception from paragraph (1), until 1 January 2019, suppliers shall place on the market petrol with a maximum oxygen content of 2.7 % m/m and a maximum ethanol content of 5 % v/v.
- b) Where the ethanol content in petrol exceeds 5 % v/v or the oxygen content in petrol exceeds 2.7 % m/m, the label laid down in Article 3(3) shall include the following warning text: ‘Warning! Please check the compatibility of the engine of your motor vehicle with this fuel mix.’;
- c) By 31 December 2020, suppliers shall reduce life cycle greenhouse gas emissions per unit of energy of fuel and the energy supplied by up to 10 % as compared to the life cycle greenhouse gas emissions per unit of energy of fossil fuel in 2010, using as reference the fuel baseline standard for that period. This reduction refers to a decrease by 6 %, by 31 December 2018.

**10. The estimated net greenhouse gas emission saving due to the use of energy from renewable sources (Article 22 (1)(k) of Directive 2009/28/EC)**

*Table 6: Estimated greenhouse gas emission savings from the use of energy from renewable sources (thousand tCO<sub>2</sub> eq.)*

<b>Environmental aspects</b>	<b>2015</b>	<b>2016</b>
<b>Total estimated net greenhouse gas (GHG) emission saving from using energy from renewable sources</b>	<b>38,144</b>	<b>38,718</b>
- Estimated net GHG emission saving from the use of electricity from RES	24,209	25,031
- Estimated net GHG emission saving from the use of renewable energy in heating and cooling	12,999	13,374
- Estimated net GHG emission saving from the use of renewable energy in transport.	936	308

For the calculation of the net estimated reduction of greenhouse gas (GHG) emissions, as a result of the use of electricity from renewable sources, the data provided by the National Institute of Statistics through the Energy Balances and sent by Romania to the EUROSTAT/IEA/UNECE international institutions in 2015 were used. For electricity from hydro and wind sources, the actual quantities generated in 2015 and 2016 were used, and not the normalised quantities.

The estimation of the CO<sub>2</sub>equivalent emission savings for the production of electricity, and of the heat for heating/cooling, was done considering that the RES replace a solid fuel (brown coal). The efficiency used to determine the energy consumption is the average of the values reported in the Energy Balance, for electricity and heat generation, for the appropriate type of fuel, in particular brown coal: in the generation and self-generation of electricity (main activity and co-generation) – 30 %; in generating heat (main activity and co-generation) – 65 %; in heat self-generation (main activity and co-generation) – 40 %; in generating heat for heating / cooling in industry and in other sectors, the estimate of the CO<sub>2</sub> emission savings was calculated based on energy consumption.

The estimation of GHG emission savings by using biomass in transportation was made considering that it replaced the diesel oil.

The emission factors used are specific to Romania, taken from INEGES, sent in January 2017 to the European Environmental Agency and to the European Commission, for 2015, in particular 91.1 CO<sub>2</sub> [t/TJ] for brown coal and 76.48 CO<sub>2</sub> [t/TJ] for diesel fuel.

11. Report on the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/imported from other Member States, as well as the estimated potential for joint projects, until 2020 (Article 22(1)(l), (m) of Directive 2009/28/EC)

**Table 7: Actual and estimated excess and/or deficit production of renewable energy in Romania compared to the indicative trajectory which could be transferred to/from other Member States and/or third countries (ktoe).**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual / estimated excess or deficit production of electricity from RES	130	112	-21	-45	-70	-63	66	-6	24	42	7	0
Actual / estimated excess or deficit production of RES energy for heating and cooling	1226	1365	980	1088	871	925	1162	1255	198	346	244	0
Actual / estimated excess or deficit production of RES energy for transport	-203	-171	-165	-101	-156	-170	-139	-363	36	17	12	0
<b>Total</b>	<b>1153</b>	<b>1306</b>	<b>794</b>	<b>942</b>	<b>645</b>	<b>692</b>	<b>1089</b>	<b>886</b>	<b>258</b>	<b>405</b>	<b>263</b>	<b>0</b>

*Source: data processed according to Tables A and B in this chapter*

The excess / deficit of energy generated from renewable energy sources for 2009-2016 was determined by using actual data from statistics reports.

The data regarding the actual gross final energy consumption, the energy production from RES compared to the indicative trajectory for reaching the target, adjusted according to the actual final consumption, are shown in **Table A** below.

**TABLE A: ACTUAL GROSS FINAL ENERGY CONSUMPTION, E-RES CONSUMPTION ADJUSTED ACCORDING TO THE INDICATIVE TARGETS ON THE INDICATIVE TRAJECTORY, THE SECTORAL INDICATIVE TRAJECTORY AND SECTORAL PRODUCTION FROM E-RES IN ORDER TO DETERMINE THE ACTUAL EXCESS OR DEFICIT (-) CONSUMPTION OF E-RES IN THE 2009 – 2016 PERIOD (ktoe)**

	2009	2010	2011	2012	2013	2014	2015	2016
<b>Actual gross final energy consumption (ktoe)</b>	23,746*	24,161	24,414	24,305	23,936	23,789	23,576	23,630
<b>Actual gross final ERS energy consumption, according to the indicative trajectory:</b>								
1). % of target	17.44 %	17.80 %	17.95 %	19.04 %	19.35 %	19.66 %	20.13 %	20.59 %
2). (ktoe)	4,141	4,300	4,382	4,628	4,631.6	4,676.9	4,745.8	4,865.4
<b>Generation of electricity from RES:</b>								
1). Indicative trajectory (ktoe)	1,310	1,379	1,592	1,717	2,026	2,229	2,131	2,195
2). Actual production (ktoe)	1,440*	1,491*	1,571*	1,672*	1,956	2,166	2,197	2,189
<b>Generation of energy for heating / cooling from RES:</b>								
1). Indicative trajectory (ktoe)	2,554	2,602	2,524	2,600	2,969	2,925	2,247	2,252
2). Actual production (ktoe)	3,780*	3,967*	3,504*	3,688*	3,840	3,850	3,409	3,507

<b>(ktoe)</b>								
<b>Gross final consumption of RES electricity</b>	277	319	266	311	375	405	431	459
<b>in transport:</b>	74*	148*	101*	210*	219	235	292	96
<b>1). Indicative trajectory (ktoe)</b>								
<b>2). Actual consumption from the domestic production (ktoe)</b>								

\* NIS Data

Compared to the previous report and to the estimates included in the NREAP regarding the excess/deficit of energy from renewable energy sources in Romania, as a result of new analysis elements identified in the reported period, the estimates for 2015–2020 were revised by taking into consideration the following elements:

- The final gross energy consumption recorded between 2010 and 2016 is lower than the consumption estimated in the NREAP, the scenario for increased efficiency, by -6.59 % in 2010, by -7.66 % in 2011, by -9.84 % in 2012, by -13 % in 2013, by -15 % in 2014, by -17.6 % in 2015 and by -18.3 % in 2016;
- The capacities installed in plants generating electricity from RES have increased very fast. The installed capacities in wind power plants at the end of the year between 2009 and 2014 was thus 15 MW in 2009, 988 MW in 2011, 1 822 MW in 2012, 2 773 MW in 2013 and 3 244 MW in 2014. The installed power in the photovoltaic power plants at the end of the year between 2014 and 2016 was: 1 293 MW in 2014, 1 326 MW in 2015 and 1 372 MW in 2016. According to the NREAP, the installed power in wind power plants in 2020 must be 4 000 MW and in the photovoltaic power plants, 320 MW.
- Taking into account the above, the possibility to obtain some excess/deficit of the production of energy from renewable sources compared to the level of indicative intermediate targets, between 2015 and 2020, are based on the following assumptions:
- The evolution in the final gross energy consumption (ktoe) is equivalent to the data included by the National Council for Forecast in the ‘Energy Balance Forecast’ issued in May 2017 for the period 2017-2020. The estimated trajectory of final consumption (26 950 ktoe in 2020) is lower than the energy consumption estimated in the NRAEP, the increased efficiency scenario (30 278 ktoe in 2020).
- The production of energy from renewable sources (6 465 ktoe) was recalculated based on its share in the final gross energy consumption based on the indicative intermediate trajectory. The intermediate targets regarding the share of E-RES in the final energy consumption are 21.21 %, 21.83 %, 22.92 % for 2017, 2018, 2019, 24 % for 2020.
- The indicative targets for sectors were recalculated based on the new final consumption, keeping the annual shares per sector provided for in the NREAP.

- The estimates for the production of electricity from renewable energy sources for 2017-2020 took into consideration the normalised value of the production in hydropower plants of more than 10 MW and the programme for investments in this sector; the capacities installed and to be installed by the end of 2017 for hydro technologies under 10 MW, wind, solar and biomass; the capacity factors accomplished for each technology in 2016, according to the Monitoring Report of NAER; the stimulating effect of the support schemes and of the non-reimbursable co-financing programmes for investments.
- The estimate for biofuel consumption for the transport sector took into account the potential for production of sustainable biofuels, but also the limitation of biofuel consumption to the intermediary quotas and to the final quota of 10 % from the annual fuel consumption foreseen for 2020.

The data obtained regarding the estimated production of E-RES, compared to the indicative trajectory to reach the target of 24 % of the final gross energy consumption, are shown in Table B below.

**TABLE B: ESTIMATED GROSS FINAL ENERGY CONSUMPTION, ESTIMATED E-RES CONSUMPTION ALONG THE INDICATIVE TRAJECTORY, SECTORAL INDICATIVE TRAJECTORY AND ESTIMATED SECTORAL PRODUCTION FROM E-RES IN ORDER TO DETERMINE THE ESTIMATED EXCESS AND/OR DEFICIT (-) PRODUCTION OF E-RES IN COMPARISON TO THE INDICATIVE TRAJECTORY THAT COULD BE TRANSFERRED FROM/TO OTHER MEMBER STATES AND/OR THIRD COUNTRIES (ktoe)**

	2017	2018	2019	2020
<b>Estimated gross final energy consumption (ktoe)</b>	25,110	25,780	26,330	26,950
<b>Gross final RES energy consumption, according to the indicative trajectory (ktoe)</b>	5,352	5,635	6,047	6,465
<b>Gross final consumption of RES electricity:</b>				
1). Indicative trajectory (ktoe)	2,176	2,238	2,293	2,343
2). Estimated production (ktoe)	2,200	2,280	2,300	2,343
<b>Gross final consumption of RES electricity for heating/cooling:</b>				
1). Indicative trajectory (ktoe)	2,762	2,954	3,276	3,617
2). Estimated production (ktoe)	2,970	3,300	3,500	3,617
<b>Gross final consumption of electricity from RES in the transport sector:</b>				
1). Indicative trajectory (ktoe)	414	443	478	505
2). Estimated production (ktoe)	450	460	490	505

Processing the estimates for 2017–2020 showed that, per total, in each year of the analysed period, the estimated production of energy from RES is higher than the final

gross consumption of E-RES, which ensures that the intermediary and final targets with regard to the share of E-RES in the final energy consumption are reached.

The electricity surplus from RES on the indicative trajectory may be the object of some statistical transfers.

The energy surplus from RES in the heating/cooling sector is reflected in the annual trade surplus and in the increase of the final stocks.

The energy deficit from RES in the transportation sector is reflected in the annual trade deficit for sustainable biofuels.

### **11.1 Statistical transfers, joint projects and decision-making rules on joint support schemes**

Romania considers it can reach the global objective of 24 % as the share of E-RES in the final gross energy consumption in 2020, without using transfer from other Member States. The overall shares of energy from RES in the gross energy consumption in 2015 and 2016, namely 24.79 % and 24.22 %, significantly exceed the shares established for the indicative trajectory of 20.59 % for 2015-2016.

For the electricity generated from RES, a surplus is estimated for years 2017–2018, which could be the object of statistical transfers. In 2015 – 2016, Romania did not establish any contacts and has no procedures that can materialise into statistical transfers.

According to Article 10(3) of Law No 220/2008, until meeting the national targets provided for in Article 4(2) on the share of electricity from RES benefiting from the promotion system in the final gross consumption of electricity, the green certificate promotion scheme will only apply to cover the final gross consumption of electricity in Romania.

The national targets regarding the share of electricity from RES in the final gross consumption of electricity provided for in Article 4(2) are 33 % in 2010, 35 % in 2015 and 38 % in 2020. The promotion scheme does not include the energy generated in hydropower plants with installed powers of over 10 MW, but the electricity generated in hydropower plants with installed powers of more than 10 MW will be considered in order to meet the national targets.

At the moment, the structural funds, as well as the national programmes represent significant possibilities for financial support to investments for the use of RES. It is estimated that the investments that are to be made this way will be enough to fall within the indicative trajectory of the production of energy from RES.

During the reporting years, the volume of private investments in installations for the generation of energy from RES has increased considerably. No national procedures have been established for joint projects yet.

Romania was involved in implementing ‘Joint Implementation’ investment projects, by collaborating with various states, in order to make the technological transfer with a view to decreasing the greenhouse gas emissions, to increasing the energy efficiency in the projects that are subject to such investments and to improving the quality of the environment.

The opportunity for joint projects on own territory will be examined based on the evolution of the effective use of the national potential. When drafting the procedures in this sense, the specific experience existing at that time at EU level will be used, to the

maximum possible extent. Romania will also be able to use its own experience gathered from Joint Implementation projects, according to the Kyoto protocol.

**12. Information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates (Article 22(1)(n) of Directive 2009/28/EC)**

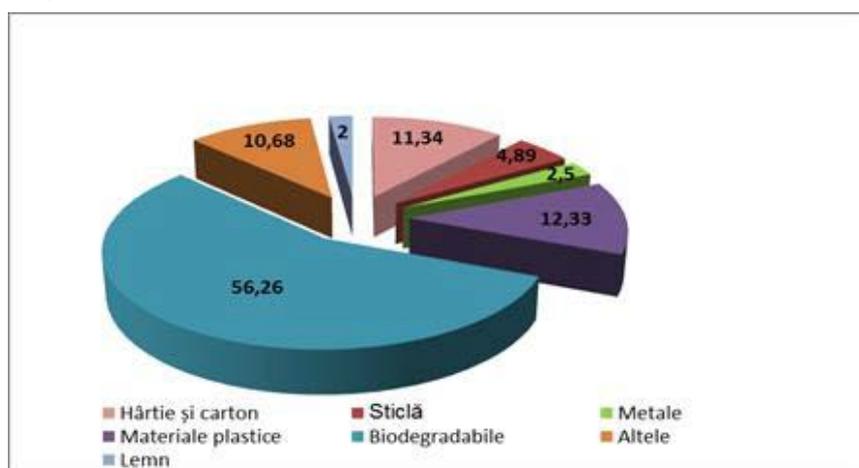
The first National Strategy for Waste Management 2014-2020 was approved by GD No 870 of 6 November 2013, published in the Official Journal of Romania Part I No 750 of 4 December 2013. This strategy proposes a framework of measures to ensure the shift from the production and consumption-based development model to a model based on the prevention of waste generation and the use of raw materials in the recovery sector, thus ensuring the preservation of national natural resources, creating the premises for the reconciliation of the economic and ‘environmental’ imperatives.

The National Strategy for Waste Management 2014-2020 established Romania’s policy and strategic objectives in the field of waste management in the short term (2015) and medium term (2020). For the short-term implementation of the Strategy, the National Waste Management Plan (NWMP) and the National Waste Prevention Plan were drafted in 2017, containing details on the actions taken to achieve the objectives of the Strategy, how these actions are carried out, including targets, deadlines and responsibilities for implementation.

For the purposes of this Report, we point out that no energy obtained from the biodegradable action of waste was recorded in 2015 and 2016.

Concerning the quantities of biodegradable waste generated in Romania, the Annual Environmental Status Report for 2015 points out that, in 2014, the amount of municipal waste collected through the specialized services of the municipalities or the sanitation companies was 4 981 000 tonnes. Of the total amount of municipal waste collected by sanitation operators, 79 % is household waste and assimilable waste.

The percentage composition of household waste and assimilated households collected in 2014 (Figure 12.1) shows that 56.26 % of them is biodegradable waste, which represents about 2 800 000 tonnes.



**Figure 12.1 Composition of household waste and similar waste collected in 2014**

RO	EN
Hârtie și carton	Paper and cardboard

Materiale plastice	Plastic
Lemn	Wood
Sticlă	Glass
Biodegradabil	Biodegradable
Metale	Metal
Altele	Other

NWMP proposes programmes for energy recovery of biodegradable waste, but in Romania there are not yet feasible applications.

**13. The quantities of biofuels and bioliquids in energy units (ktoe) corresponding to each category of raw material group listed in Part A of Annex VIII taken into account by Romania in order to meet the targets set out in Article 3(1) and (2) and the first subparagraph of Article 3(4).**

Raw materials group	2015	2016
Cereals and other starchy crops		
Sugars		
Oilseeds		

There is currently no official information on the quantities of biofuels and bioliquids manufactured by companies using cereals and other starch-rich crops, sugars, oil seed crops as raw materials during the period 2015-2016.

## CONCLUSIONS

- Romania considers it can reach the global objective of 24 % as the share of E-RES in the final gross energy consumption in 2020, without using transfer from other Member States. The overall shares of energy from renewable sources in the gross final energy consumption in 2015 and 2016, namely 24.79 % and 24.22 %, significantly exceed the shares established for the indicative trajectory of 20.59 % for 2015-2016. For the electricity generated from RES, a surplus is estimated for years 2017–2018, which could be the object of statistical transfers. For the time being, Romania has not established any contacts and has had no procedures that can materialise into statistical transfers.
- According to Article 10(3) of Law No 220/2008, until meeting the national targets provided for in Article 4(2) on the share of electricity from RES benefiting from the promotion system in the final gross consumption of electricity, the green certificate promotion scheme will only apply to cover the final gross consumption of RES electricity of Romania.
- The national targets regarding the share of electricity from RES in the final gross consumption of electricity provided for in Article 4(2) are 33 % in 2010, 35 % in 2015 and 38 % in 2020. The promotion scheme does not include the energy generated in hydropower plants with installed powers of more than 10 MW. The electricity generated in hydropower plants with installed powers of more than 10 MW will be considered in order to meet the national targets.
- During the reporting years, the volume of private investments in installations for the generation of energy from RES has increased considerably. No national procedures have been established for joint projects yet.
- Romania was involved in implementing ‘Joint Implementation’ investment projects, by collaborating with various states, in order to make the technological transfer with a view to decreasing the greenhouse gas emissions, to increasing the energy efficiency in the projects that are subject to such investments and to improving the quality of the environment.
- The opportunity for joint projects on the Romanian territory will be examined based on the evolution of the effective use of the national potential. When drafting the procedures in this sense, the specific experience existing at that time at EU level will be used, to the maximum possible extent. Romania will also be able to use its own experience gathered from Joint Implementation projects, according to the Kyoto protocol.
- The Government of Romania supports the use of energy from renewable sources as part of the objectives under the National Energy Strategy, in particular: sustainable development and energy safety.

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## ❖ ACRONYMS

**ANRE** – National Energy Regulatory Authority  
**TCA** – Technical Connection Approval  
**C1** – Market share of the biggest E-RES producer benefiting from GC  
**WPP** – Wind Power Plant  
**HEPSPP** – Hydroelectric Pumped Storage Power Plant  
**CN TRANSELECTRICA SA** – The National Power Grid Company  
**CNP** – National Prognosis Commission  
**NPP** – Nuclear Power Plant  
**GC** – Green Certificate  
**ENTSO-E** – European Network of Transmission System Operators for Electricity  
**ETBE** – Ethyl Tert-Butyl Ether  
**GO** – Guarantee of Origin  
**GD** – Government Decision  
**INEGES** – National Inventory for Greenhouse Gas Emissions  
**NIS** – National Institute of Statistics  
**MADR** – Ministry of Agriculture and Rural Development  
**MHP** – Micro-Hydro Plants  
**n.a.** – not available (unavailable data)  
**DO** – Distribution Operator  
**GO** – Government Order  
**GEO** – Government Emergency Order  
**OPCOM** – Electricity and Natural Gas Market Operator  
**TSO** – Electricity Transmission System Operator  
**GCM** – Green Certificate Market  
**GCBCM** – Green Certificate Bilateral Contracts Market  
**CMGC** – Centralised Market of Green Certificates  
**GDP** – Gross Domestic Product  
**NREAP** – National Renewable Energy Action Plan  
**LIOP** – Large Infrastructure Operational Programme  
**ROP** – Regional Operational Programme  
**EDN** – Electricity Distribution Network  
**ETN** – Electricity Transmission Network  
**EU** – European Union  
**NES** – National Energy System  
**RES** – Renewable Energy Sources  
**RES-H&C** – Consumption of energy from renewable sources for heating and cooling  
**RES-E** – Consumption of electricity from renewable sources  
**RES-T** – Consumption of energy from renewable sources for transport