ROMANIAN ENERGY REGULATORY AUTHORITY

ENERGY EFFICIENCY DEPARTMENT

REPORT

ON THE PROGRESS REGISTERED IN ACHIEVING THE NATIONAL TARGETS FOR ENERGY EFFICIENCY

APRIL 2016

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The paper contains 27 tables and 44 figures.

1. INTRODUCTION

The Parliament of Romania adopted **Law No 121/2014 on energy efficiency** on 18 July 2014, which was published in the **Official Gazette of Romania, Part I no 574 of 1 August 2014**. This law transposes **Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency**, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, published in the Official Journal of the European Union L 315 on 14 November 2012.

This law establishes that the improvement of energy efficiency is a strategic goal of the national energy policy due to its major contribution to achieving the security of energy supply, sustainable development and competitiveness, saving primary energy resources and reducing greenhouse gas emissions.

Policy measures relating to energy efficiency apply to the entire chain: primary resources, production, distribution, supply, transmission and final consumption of energy.

A national indicative target is set for reducing energy consumption by 19% by the year 2020.

The provisions of **Article 19(1) of Law No 121/2014 on energy efficiency** establish the obligation of updating the **National Energy Efficiency Action Plan**. This plan **(PNAEE 2014–2020)** was approved by **Government Decision No 122/2015**.

The plan includes the general framework of national energy efficiency action plans, and follows the structure of the **Template,** including the list of mandatory elements as approved by the Commission Implementing Decision of 22 May 2013.

In accordance with the provisions of **Law No 121/2014 on energy efficiency**, the **Energy Efficiency Department** was established within the **National Energy Regulatory Authority** by **Order No 95/2014 of the President of the National Energy Regulatory Authority (ANRE), published in the Official Gazette of Romania No 737/2014**.

The main duties and responsibilities of the **Energy Efficiency Department**, as laid down in the provisions of **Article 3(2) of Law No 121/2014 on energy efficiency**, include the following:

a) drafting policy proposals and secondary legislation on energy efficiency;

b) monitoring the implementation of the **National Energy Efficiency Action Plan and of the programmes for increasing energy efficiency at national level for the period 2014–2020**, as well as of the energy savings resulting from the provision of energy services and other energy efficiency improvement measures;

c) ensuring the surveillance of the equipment and appliance market for which specific regulations on energy efficiency and eco-design are in place;

d) submitting a report to the Government in order to notify the European Commission on the progress registered in achieving the national targets for energy efficiency, drawn up according to Annex 11, Part 1, by 30 April of each year at the latest, starting in 2015;

e) approving energy auditors from the industry and certifying energy managers.

In accordance with the provisions of **Article 3(2) point (e) of Law No 121/2014 on energy efficiency, the Energy Efficiency Department** operating within ANRE has the following responsibility:

> ***'submit a report to the Government in order to notify the European Commission on the progress registered in achieving the national targets for energy efficiency, drawn up according to Annex 11, Part 1, by no later than 30 April of each year, starting with 2015'.***

The provisions of Annex 11 of the Law: General framework for reporting, Part I: The general framework for annual reporting is presented in Annex 1.

This annual report is the second report to be prepared in accordance with the law and includes the information requested in Annex 11, Part I, point (a), as well as, for this report, points (b), (c), (d) and (e) of **Law No 121/2014 on energy efficiency**.

It should be clarified that **Article 3(2) point (e) and Annex 11 to Law No 121/2014 on energy efficiency** transpose into Romanian legislation the provisions of Article 24(1) and of Annex 14 to Directive 27/2012/EU.

Recently, ANRE has received information from the European Commission concerning the method of preparing the annual reports. Furthermore, meetings were also held at European level within the project entitled **'Concerted Action - Energy Efficiency Directive'**, which is an event that involves the participation of the competent authorities from EU Member States. During these meetings, the representatives of the EC- DG ENER made some clarifications regarding the elaboration of the annual reports.

Inter alia, the definitions and the methodology for the calculation of the specific indicators of the reports were presented. These indicators are not entirely present in the statistical reports of the authorised institutions (INS – National Institute of Statistics at national level, and EUROSTAT at European level). Moreover, further clarifications were made concerning the significance of some indicators for which multiple interpretations were possible. This report was drawn up in accordance with the information and clarifications received.

ANRE is part of the EED Committee in Brussels operating under DG Energy, Unit C3 Energy Efficiency, which is charged with assisting the European Commission by adopting measures for the implementation of Directive 2012/27/EU and offering support in the analysis and assessment thereof. This Committee serves as a forum for the exchange of information and best practices at EU level in order to prepare staff working documents, which explain the key provisions of Directive 2012/27/EU.

In the letters sent to the **Energy Efficiency Department** operating within ANRE,

DG ENER of the European Commission requested the inclusion of further indicators in the annual reporting, which are not specified in **Annex 14, Part I, point (a)**, stating that the inclusion is voluntary. This request has been taken into consideration as much as possible.

In order to enable the aggregation of the results and carry out comparisons, the representatives of DG ENER of the European Commission recommended that all Member States use the EUROSTAT database as a source of primary information in order to ensure that all reports have a unified nature.

Under these circumstances, the primary information from the EUROSTAT database and from http://www.worldenergy.org/data/efficiency-indicators/ was used in drawing up this **Report**.

2. UPDATES OF THE MAIN LEGISLATIVE AND NON-LEGISLATIVE ACTS IMPLEMENTED THE PREVIOUS YEAR (pursuant to the provisions of Annex 11(b) of *Law No 121/2014 on energy efficiency*)

A series of changes occurred in the primary and secondary legislation in **2015**.

2.1 Primary legislation:

- **GD No 602/2015 amending and supplementing Government Decision No 462/2006 approving the 'Heating 2006-2015 heat and comfort' Programme and establishing the *Project management unit***
- **GD No 846/201** amending and supplementing **GD No 219/2007 on the promotion of cogeneration based on a useful heat demand**.
- ***Law No 122/2015 approving certain measures for promoting the generation of electricity from renewable sources, and amending and supplementing certain administrative acts***

- In order to ensure clear and coherent transposition of Directive 2012/27/EU into the national legislation, pursuant to the Reasoned Opinion issued by the European Commission in case 2014/0367, the **Draft law amending and supplementing Law No 121/2014 on energy efficiency** was drawn up by the Working Group established at the request of the Ministry of Energy, and it was approved during the Government meeting of 24 February 2016 and sent to the Parliament of Romania on 1 March 2016, with a view to emergency approval.

2.2 Secondary legislation

- **Decision no 13/DEE of 23 February 2015** approving the analytical programmes for the specialised courses in the fields of energy management and energy audit conduct;
- **Order No 15/2015 of ANRE** approving the 'Methodology for establishing and adjusting the prices for electricity and heat generated and supplied from cogeneration power plants benefiting from the aid scheme, and the bonus for high efficiency cogeneration'. The methodology was subsequently amended and supplemented by **Order No 148/2015 of ANRE**;
- **Order No 148/2015 amending and supplementing the Methodology for establishing and adjusting the prices for electricity and heat generated and supplied from cogeneration power plants benefiting from the aid scheme, and the bonus for high efficiency cogeneration, approved by Order No 15/2015;**
- **Order No 95/2015 amending Order No 119/2013 approving the contribution for high efficiency cogeneration and certain provisions concerning its invoicing;**
- **Order No 15/2015 approving the Methodology for establishing and adjusting the prices for electricity and heat generated and supplied from cogeneration power plants benefiting from the aid scheme, and the high efficiency bonus, repealing Order No 3/2010;**

- **Order No 10/2015 approving the monitoring and reporting methodology for the aid scheme for the promotion of cogeneration based on a useful heat demand, repealing Order No 33/2011;**
- **Order No 4/2015 of ANRE approving the Rules for green certificate issuance;**
- **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 48/2014 of ANRE;**
- **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 101/2014 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 60/2015 of ANRE approving the Rules for the organisation and the operation of the green certificate market, revision 2;**
- **Order No 166/2015 of ANRE amending and supplementing the Rules for the organisation and the operation of the green certificate market.**
- **Order No 78/2015 of the President of ANRE approving the *Methodology for monitoring the green certificate promotion system for energy from renewable sources.***

2.3. Guidelines

ANRE Guidelines

- Template for drawing up the **Energy efficiency improvement programme for municipalities having more than 5 000 inhabitants** approved by Decision No 7/DEE of 12 February 2015
- Template for drawing up the **Energy efficiency improvement programme for industrial plants** approved by Decision No 8/DEE of 12 February 2015

MDRAP Guidelines

- Good practice guide for designing ventilation/air conditioning installations in buildings (Designator GEx 011-2015)
- Good practice guide for designing lightening/protection installations in buildings (Designator GEx 012-2015)
- Guidelines for the use of energy renewable sources in new and existing buildings (Designator GEx 013-2015)

The guidelines are published on MDRAP website and are not approved by minister order.

In December 2015, the Ministry of Energy submitted to the European Commission **'The Report on the evaluation of the national potential of implementation of high efficiency cogeneration and of efficient district heating and cooling'**, pursuant to the provisions of **Article 14(1)** of **Law No 121/2014 on energy efficiency.** The report was published on the website of the European Commission at the following link:

http://ec.europa.eu/energy/en/topics/energy-efficiency/cogeneration-heat-and-power

3. MACROECONOMIC INDICATORS OF ENERGY CONSUMPTION EVOLUTION
(pursuant to Annex 11(i)(a) of *Law No 121/2014*)

According to **Annex 11, Part I, of Law No 121/2014 on energy efficiency**, the annual reports are the basis for monitoring progress towards the national objectives for 2020. They should include, as minimum information, an estimation of several indicators (defined in the law) for the year preceding the last year concluded [year (1)X – 2]. The list of these indicators is laid down in the law. The law also provides that, in sectors where the energy consumption is stable or is increasing, the causes shall be analysed and the evaluation shall be attached to the estimations.

Table 1 contains the values recorded in 2014 for the indicators listed in **Annex XI, part I, point (a)** to the law. In order to make comparisons possible and to identify trends, values from the period 2010-2013 were also included. The designation of the indicators and the order in which they are presented is in line with the designation and order in **Annex 11, part I, point (a)** of the law.

Table 1

Item	Indicator	MU	2014	2013	2012	2011	2010
1	**primary energy consumption**	**thousand toe**	**30 800**	30 889	33644	34 830	34 328
2	**final energy consumption, of which:**	**thousand toe**	**21 712**	21 834	*22 801*	*22 771*	*22 593*
2.1	*industry*	*thousand toe*	**6 471**	*6 310*	*6 787*	*7 105*	*6 880*
2.2	*transport*	*thousand toe*	**5 473**	**5 354**	*5 448*	*5 349*	*5 124*
2.3	*households*	*thousand toe*	**7 401**	*7 722*	*8 061*	*7 860*	*8 102*
2.4	*services*	*thousand toe*	**1 768**	*1 785*	*1 763*	*1 774*	*1 880*
2.5	*agriculture*	*thousand toe*	**421**	**469**	*498*	*434*	*392*
3	***gross added value, of which:***	*million Euros 2005*	**89 293.0**	86 871.6	83 440.0	83 083.6	82 727.8
3.1	*industry*	*million Euros 2005*	**31 886.7**	30 864.2	29 691.2	31 431.4	33 229.2
3.2	*services*	*million Euros 2005*	**51 058.2**	49 749.1	50 063.6	43 857.0	43 319.5
4	**total disposable income of households**	million Euros	**112 751**	108 498	104 389	103 620	100 571

5	**gross domestic product (GDP)**	in prices from 2005	million Euros (2005)	**100 420.1**	97 534.0	94 207	93 607	92 628.6
		in prices from 2010	million Euros 2010	**137 407.7**	133 458.6	128 906.2	128 085.2	126 746.4
		in current prices)	million Euros	**150 230.1**	144 253.5	133 511.4	133 305.9	126 746.4
		at purchasing power parity	million Euros PPP	**301 200**	289 224	280 905	267 932	256 051
6	**GDP increase rate as compared to the previous year**		**%**	**3.0**	3.5	0.6	1.1	-0.8
7	**electricity generation from thermal power generation**		thousand toe	**3 317.2**	3 322.5	3 788.5	3 945.1	3 476.4
			TWh	**38.5**	38.6	44.0	45.8	40.4
8	**electricity generation from combined heat and power**		thousand toe	**985.5**	1 029.8	1 245.3	1 288	1 099.8
			TWh	**11.1**	12.0	14.5	15.0	12.8
9	**heat generation from thermal power generation**		thousand toe	**1 862.3**	2 025.4	2 133.9	2 361.3	2 367.1
10	**heat generation from combined heat and power plants, including industrial waste heat**		thousand toe	**1 537**	1 648.1	1 729.5	1 928.6	1 880.1
11	**fuel input for thermal power generation**		thousand toe	**10 760**	10 943.1	12 798.1	13 677	12 115.2
12	**passenger kilometres**		million passengers-km	No data for passenger road transport 2014	21 464	21 451	20 592	17 392
13	**tonne-kilometres**		million tonnes-km	**59 160**	59 209	55 654	52 477	52 581
14	**population**		inhabitants	**19 947 311**	20 020 074	20 095 996	20 199 059	20 294 683

15	**losses from the transmission and distribution of energy**	thousand toe	**1 068.8**	1 116.7	1 335.0	1 363.0	1 425.1
16	**heat generation from thermal plants for centralised heat distribution**	thousand toe	**325.3**	377.5	404.4	432.6	487.0
17	**fuel input for thermal plants for centralised heat distribution**	thousand toe	**504.5**	572.7	459.2	611.9	688.7

In order to provide a more complete overview on the efforts made concerning the increase of energy efficiency at national level and of the results achieved, the values of other energy indicators at macroeconomic level were also calculated (intensity of primary energy consumption, intensity of final energy consumption, etc.). The values of these indicators are shown in **Table 2** below.

Table 2

Item	Indicator		MU	2014	2013	2012	2011	2010
1	**Gross inland consumption of primary energy**		thousand toe	**32 289.7**	32 427.7	35 373.2	36 558.4	35 799.6
2	**Primary energy intensity**	GDP calculated in Euros 2005	toe/thousand Euros 2005	**0.322**	0.332	0.375	0.391	0.386
		GDP calculated in Euros 2010	toe/thousand Euros 2010	**0.235**	0.243	0.274	0.285	0.282
		GDP calculated in Euros	toe/thousand Euros	**0.215**	0.225	0.265	0.274	0.282
		GDP calculated in Euros at the purchasing power parity	toe/thousand Euros ppp	**0.107**	0.112	0.126	0.136	0.140
3	**Intensity of final energy**	GDP calculated in Euros 2005	toe/thousand Euros 2005	**0.216**	0.224	0.242	0.243	0.244
		GDP calculated in Euros 2010	toe/thousand Euros 2010	**0.158**	0.164	0.177	0.178	0.178
		GDP calculated in Euros	toe/thousand Euros	**0.145**	0.151	0.171	0.171	0.178
		GDP calculated in Euros at the purchasing power parity	toe/thousand Euros ppp	**0.072**	0.075	0.081	0.085	0.088
4	**Primary energy consumption per capita**		toe/inh	**1.544**	1.543	1.674	1.724	1.691
5	**Final energy consumption per capita**		toe/inh	**1.088**	1.091	1.135	1.127	1.113

6	**Final energy consumption of households per capita**	toe/inh	**0.371**	0.386	0.401	0.389	0.399

The main observations and comments with regard to the values of these indicators are the following:

a) Primary energy consumption is a fundamental indicator in monitoring the progress made by the EU as a whole and by each Member State in achieving the goals set out by *Directive 2012/27/EU*. This indicator is defined as the difference between the gross primary energy consumption and the non-energy consumption of all energy carriers (for example, natural gas used as raw material in the chemical industry).

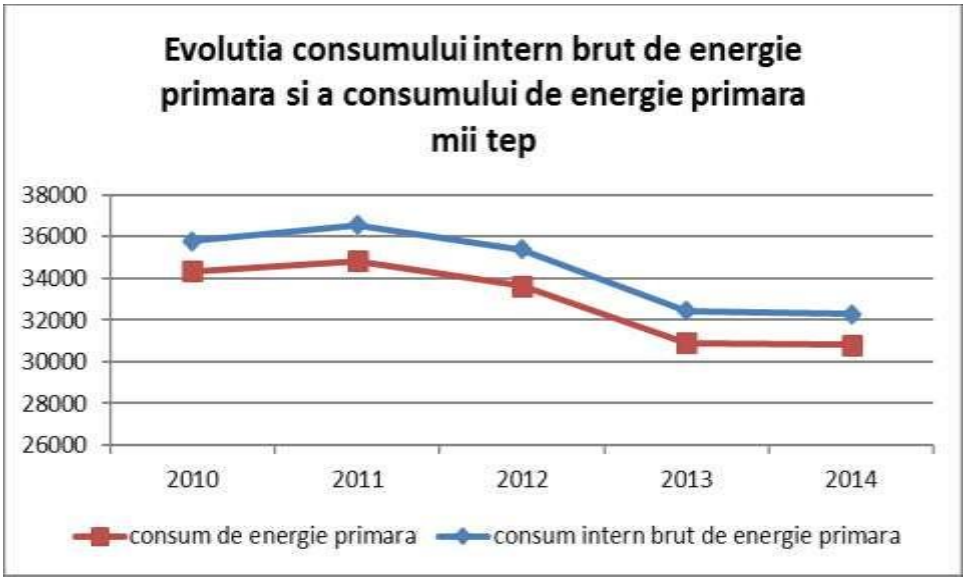
The values in **Table 1**, row 1 have been calculated according to this definition and are represented in Figure 1 graphic.

In 2014, primary energy consumption fell as compared to the previous year, in a context of GDP increase. This is the third consecutive year when this phenomenon occurs and its significance is undoubtedly positive. **Primary energy consumption fell by 11.6%** as compared to 2011, whereas the **GDP rose by 7.3%**.

In order to give a more complete overview on the national progress, Table 2, row 1 also shows the evolution of the gross consumption of primary energy, which is used for calculating the indicator 'primary energy intensity'. To be noticed that the gross consumption of primary energy also records a decreasing tendency.

The non-energy consumption of energy carriers in 2014 was practically equal to the consumption in 2010 (after a maximum value was reached in 2012).

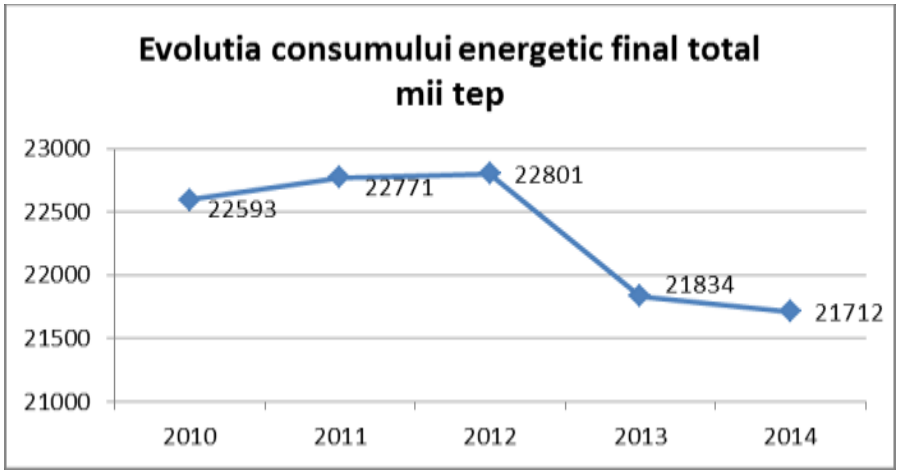
Figure 1



RO	EN
Evolutia consumului intern brut de energie primara si a consumului de energie primara mii tep	Evolution of primary energy consumption thousand toe
consum de energie primara	Primary energy consumption
consum intern brut de energie primara	Domestic gross primary energy consumption

Moreover, final energy consumption has decreased, which triggers from the very beginning the conclusion of an increase in energy efficiency in the final consumption sectors (Figure 2). A **significant decrease was recorded in the household sector (by 4.2% as compared to 2013 and by 9.7% as compared to 2010)**. We point out that **the household sector is the most important final consumption sector, accounting for 34%**. The energy consumption has also decreased in the services and agriculture sectors.

Figure 2



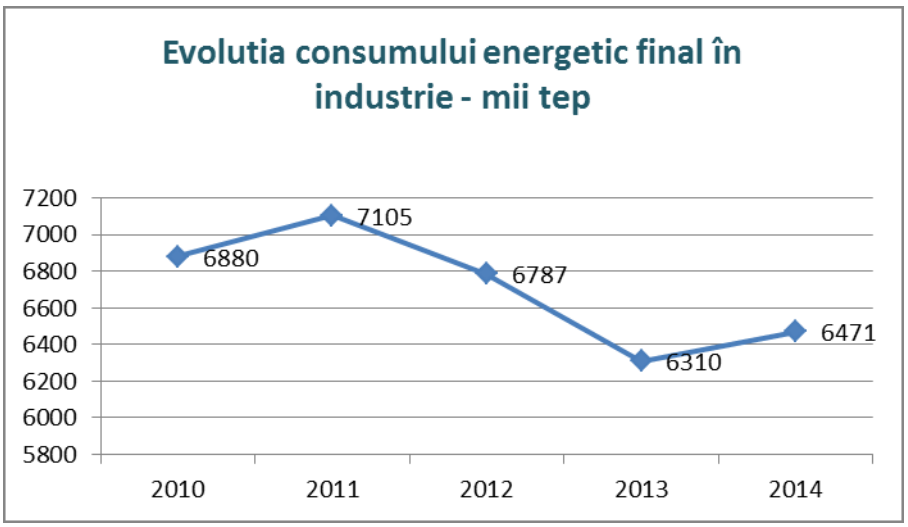
RO	EN
Evolutia consumului energetic final total mii tep	Evolution of the total final energy consumption thousand toe

Increases in final energy consumption have been recorded in industry and transport, but their value was low.

The energy consumption in industry, in 2014, **was higher (by 2.5%) as compared to 2013**, but **the gross added value produced in industry increased more rapidly (3.3%)**. Moreover, we point out that the energy consumption in industry in 2014 only represented 94% of the value recorded in 2010 **(Figure 3)**, while the volume of industrial production increased by 25.9%.

Energy consumption in transport increased by 2.2% in 2014 as compared to the previous year. We point out that the highest energy consumption in this sector was recorded in the road transport. The road transport consumed in 2014 **5 005 thousand toe** as compared to **5 473 thousand toe per total transport**, **which is 91%** and increased by **3.8% as compared to the previous year**. The national decision-makers draw up more programmes on increased energy efficiency in transport and first of all on road and rail infrastructure refurbishment.

Figure 3



RO	EN
Evolutia consumului energetic final în industrie - mii tep	**Evolution of the final energy consumption in industry - thousand toe**

b) For the 'total disposable income of households' indicator, no values were found for Romania for the years 2012, 2013 and 2014 in the EUROSTAT section indicated in the recommendations of the European Commission. The values in Table 1, row 4, are values from the Statistical Yearbook of the INS corresponding with the indicator 'actual final consumption of national households', defined as follows:

The actual individual final energy consumption of national households *includes: expenditure of national households for purchasing goods and services in order to satisfy the needs of their members, individual consumption expenditure of public administrations (products, medical devices and equipment, outpatient services, hospital services, public health services, recreational and sporting services, cultural services, education, family and children, unemployment, dwellings, social exclusion) and the individual expenditure of households and non-profit institutions serving households.*

Figure 4

RO	EN
Evolutia venitului total disponibil al gospodariilor - milioane euro	**Evolution of the total disposable income of households - million toe**

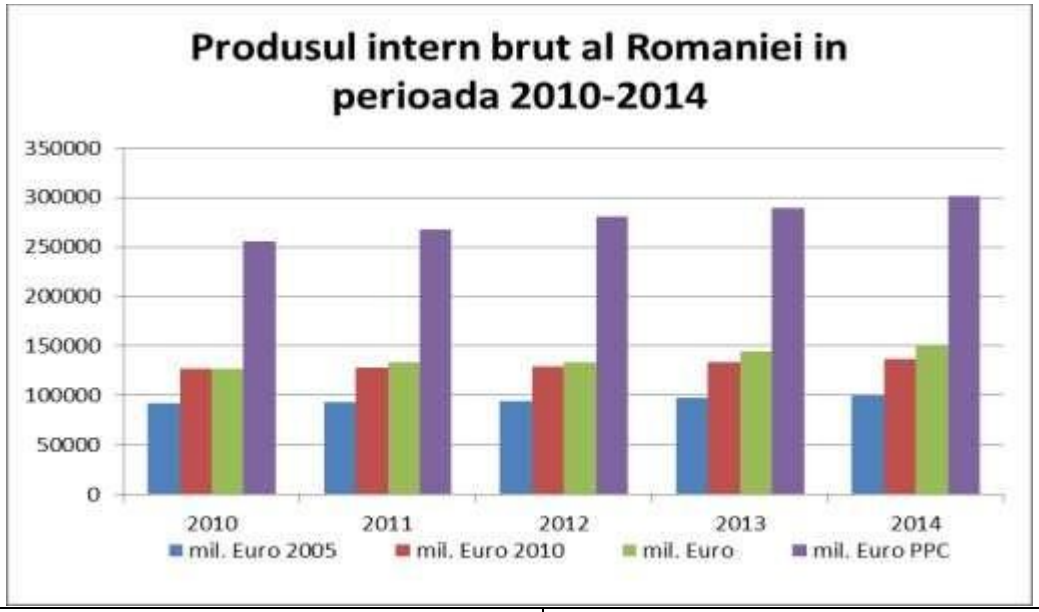
c) The **gross domestic product (GDP)** is expressed in Euro in a first stage, depending on its value in the national currency and on its parity against Euro. Certain corrections are carried out frequently, the most common of which are as follows:

- elimination of the influence of price changes on the internal market (calculated in Euros) against a certain year chosen as reference year (2010 or 2005) with GDP expressed in Euros in 2010 or in 2005, respectively,

- introduction of the influence of the purchasing power of the population and of the use of the purchasing power parity (PPP) between the national currency and Euro with the GDP expressed in Euros PPP.

The European Commission recommended initially the use of GDP values calculated by EUROSTAT using the ESA95 methodology and expressed in Euros 2005. However, as of 2015, EUROSTAT uses a new methodology (ESA 2010) for GDP calculation (which also inserts GDP calculation in Euro 2010) and practically abandons the previous methodology. Table 1 shows the GDP values both in Euros 2005 and Euros 2010, in Euro and Euro PPP, which were all taken from the EUROSTAT database.
The same approach was used in Table 2 for showing the energy efficiency indicators.

Figure 5



RO	EN
Produsul intern brut al Romaniei in perioada 2010-2014	**Gross domestic product of Romania in the period 2010-2014**
mil. Euro	**mil. Euros**
PPC	**PPP**

For developed countries, the carrying out of these corrections, in particular the choice of one measurement unit or the other for calculating the GDP, has a relatively reduced influence on the final result. However, the influence is very high for Romania. In order to illustrate the significance of this influence factor, Figure 6 shows the values of the ratios

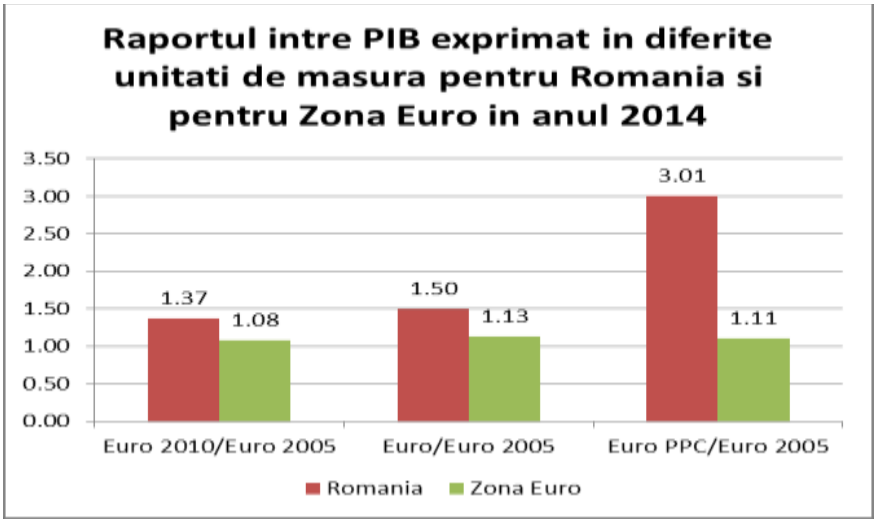
between:

- the GDP calculated in Euros PPP, Euros and Euros 2010 and
- GDP calculated in Euros 2005

for the Euro zone States and for Romania, in 2014.

We point out again that the values in Figure 6 have been calculated by the team having drawn up the report based on primary EUROSTAT information.

Figure 6



RO	EN
Raportul intre PIB exprimat in diferite unitati de masura pentru Romania si pentru Zona Euro in anul 2014	**Ratio between the GDP expressed in different measurement units for Romania and for the Euro Zone in 2014**
Euro	**Euros**
PPC	**PPP**
Zona Euro	**Euro Zone**

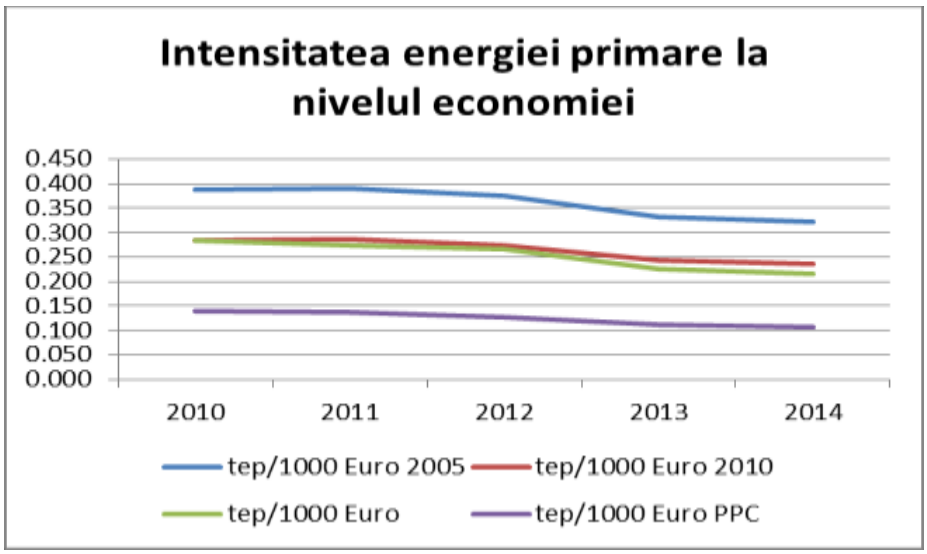
The most extreme case is the GDP for Romania in 2014 calculated in Euros PPP, which is more than three times higher than the GDP calculated in Euros 2005. The Euro zone States, the value calculated in Euros PPP is only 11% higher than the value calculated in Euros 2005.

This has a very big influence on the values of the energy intensity indicators and on the qualitative appreciations and evaluations on the level of economic development in general and on the level of energy efficiency for Romania, in particular.

Our opinion is that stopping to express GDP values in Euros 2005 and to calculate the energy efficiency indicators starting from these values would lead to a correct and objective overview of reality.

d) The **intensity of primary energy** is witnessing a continuous and powerful decrease, which has been going on for several years.

Figure 7



RO	EN
Intensitatea energiei primare la nivelul economiei	**Intensity of primary energy in the economy**
tep/1000 Euro	**toe/thousand Euros**
PPC	**PPP**

The value of this indicator, in the case of Romania, largely depends on the way GDP is expressed has an effect on the comparisons made with the current situation on international level. The evolution of primary energy intensity in the period 2010-2014 is shown in **Figure 7**.

Irrespective of the calculation method, namely the measurement unit used, the intensity of primary energy has a continuous decreasing tendency. This tendency was present not only between 2010 and 2014, but it is obvious in the overall evolution after 1992. It is more pronounced after 1998, when Romania launched the process of integration into the European Union.

The intensity of primary energy decreased in the period 2010-2014 as follows:

- by 24% if calculated in toe/thousand Euros or in toe/thousand Euros PPP,
- by 17% if calculated in toe/thousand Euros 2005 or in toe/thousand Euros 2010

This decrease is higher than the EU average. According to EUROSTAT, the EU-28 intensity of primary energy, calculated in toe/thousand Euros 2010, decreased by 11.5% during the time period under analysis.

On the other hand, it shall also be taken into consideration that the intensity of primary energy at the level of the national economy is first of all a macroeconomic parameter, which depends on the structure of the national economy and only secondarily is it a technical parameter characterising the intensities of energy use. Romania inherited from the period of centralised economy a powerfully intensive structure of economy, and thus, a very high intensity of primary energy. The permanent and significant decreases in the values of primary energy intensity were possible both by means of technical measures for improving the efficiency of energy use, and largely by means of structural economic measures. The differences from developed countries regarding economic structures,

however, are yet to be completely eliminated.

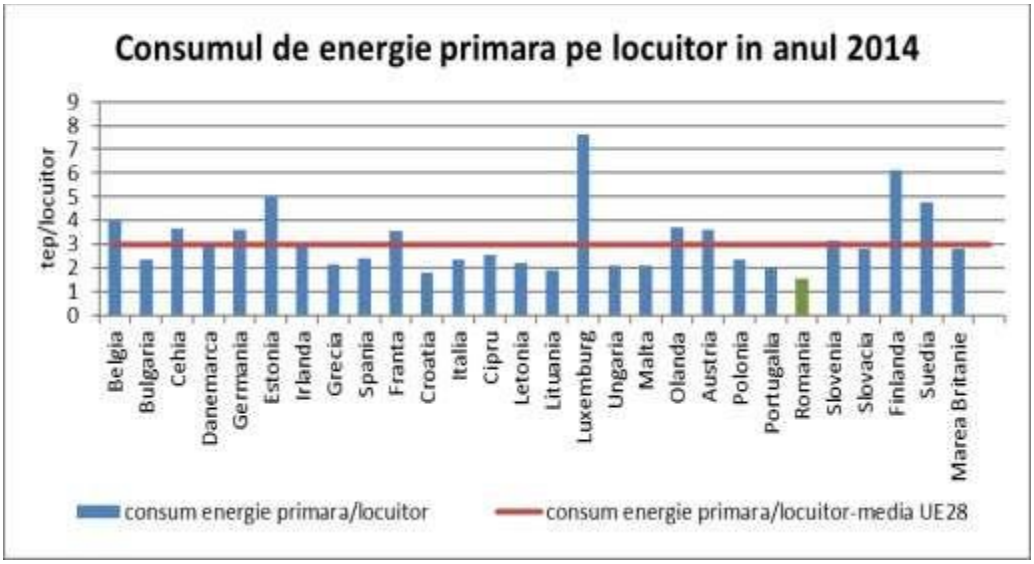
4. ROMANIA'S PLACE IN EUROPE IN TERMS OF ENERGY EFFICIENCY

4.1 The quantitative and qualitative assessments *on energy efficiency* in Romania and the future possibilities of decrease in energy consumption should consider the current level of this consumption.

Romania has the lowest value of primary energy consumption per capita in EU-28 (**1.544 toe/capita in 2014)**, which is almost two times less than the EU-28 average in the same year **(2.973 toe/capita)**. The comparative situation is shown in Figure 8.

In these conditions, the consumption of primary energy per capita however records a continuous decreasing tendency, representing in 2014 80% of the value in 2008 and 90% of the value in 2011. The energy efficiency policies have had an important contribution to this evolution.

Figure 8



RO	EN
Consumul de energie primara pe locuitor in anul 2014	**Consumption of primary energy per capita in 2014**
tep/locuitor	**toe/capita**
consum energie primara/locuitor	**primary energy consumption/capita**
consum energie primara/locuitor-media UE28	**primary energy consumption/capita – EU-28 average**

Without making any exhaustive analysis, we shall present certain values of the energy consumption in the household sector as compared to the European records. According to the data in Table 1, **the household sector represents the highest share in the final energy consumption at national level (35.8% in 2010 and 34% in 2014)**. This triggers the idea that efforts need to be focused in this sector with a view to increase energy efficiency. This idea is actually shared in all EU Member States.

The energy consumption per capita in the household sector in Romania in **2014 (0.371 toe/capita)** accounted for **71.5%** of the EU-28 average. The differences from the Northern countries are normal, taking into account the different climate conditions. However, differences are also recorded as compared to countries with similar or even milder climate conditions (Italy, Slovenia, Croatia, etc.).

The differences grow deeper and become critical when analysing electricity

consumption per capita in the household sector. Romania records the lowest consumption of electricity per capita in the EU (0.0513 toe/capita), which is 2.6 times less than the EU-28 average (0.1332 toe/capita).

The fact that a decrease has been also recorded in the national consumption of energy in the household sector is the result of the energy efficiency policy and of the programmes run (thermal insulation of blocks of flats, labelling of household appliances, etc.).

4.2. The intensity of primary energy is considered to be the most representative synthetic indicator of energy efficiency use at national level.
According to the above, the intensity of primary energy in Romania is witnessing a continuous and powerful decrease, which has been going on for several years.

The value of this indicator, in the case of Romania, largely depends on the way GDP is expressed. This has an effect on the comparisons made with the current situation on international level.

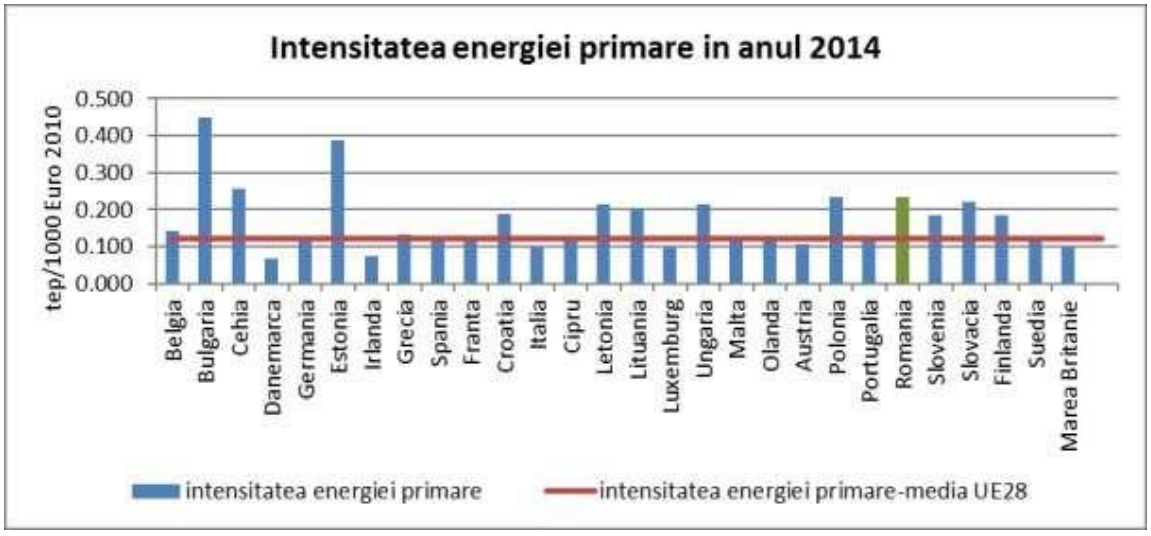
EUROSTAT presents the GDP values in the period 1975 - 2015 for all EU Member States calculated according to ESA 2010 methodology, using numerous measurement units, such as:

- Euros, current prices,
- Euros 2005,
- Euros 2010,
- Euros PPP,
- Euros at the purchase power of the previous year,
- national currencies, etc.

EUROSTAT also presents the values of gross primary energy consumption in the same period. In these conditions, it is easy to calculate the value of energy intensity for Romania and for any of the EU Member States in 2014, using various measurement units.

Among the various possible variants, EUROSTAT presents primary energy intensity in toe/thousand Euros 2010. The values concerned are shown in Figure 9.

Figure 9



RO	EN
Intensitatea energiei primare in anul 2014	**Intensity of primary energy in 2014**
tep/1000 Euro	**toe/thousand Euros**
intensitatea energiei primare	**intensity of primary energy**
intensitatea energiei primare-media UE28	**intensity of primary energy – EU-28 average**

In this version, the intensity of primary energy for Romania (0,235 toe/thousand Euros 2010) in 2014 was 1.93 times higher than the EU-28 average (0,122 toe/thousand Euros 2010).

The analysis of the data reveals that the highest values of this indicator were recorded by:

- Bulgaria (0.449 toe/thousand Euros 2010),
- Estonia (0.386 toe/thousand Euros 2010).

The following countries (former socialist countries) recorded energy intensities similar to Romania:

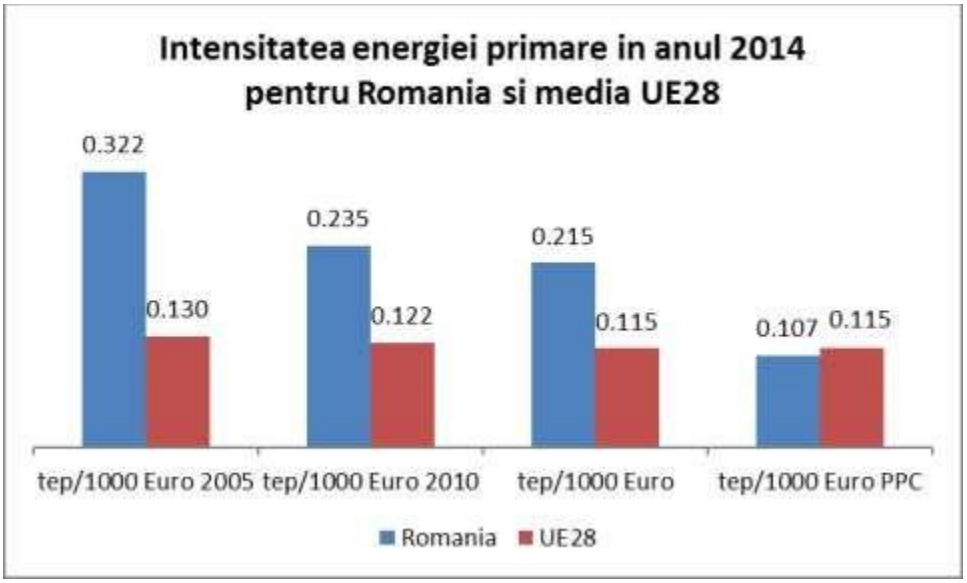
- The Check Republic (0.259 toe/thousand Euros 2010),
- **Romania (0.235 toe/thousand Euros 2010),**
- Poland (0.234 toe/thousand Euros 2010),
- Slovakia (0.221 toe/thousand Euros 2010),
- Hungary (0.215 toe/thousand Euros 2010),
- Latvia (0.215 toe/thousand Euros 2010),
- Lithuania (0.203 toe/thousand Euros 2010).

Romania thus belongs to the group of former socialist countries still paying the price of the economic structures inherited from the centralised economy time. The significant element in this context is the fact that the intensity of primary energy in the economy decreases permanently, which is a strategic objective whose achievement is aimed at all levels.

However the fact that this indicator is (still) almost double as compared to the EU-28 average (according to the EUROSTAT summary table) is also the result of calculation hypotheses and a change in these hypotheses may lead to different results.

Based on the primary information provided by EUROSTAT, the team drawing up the report has calculated the value of the primary energy intensity for Romania as well as the average EU-28 value using various measurement units. The results are given in Figure 10.

Figure 10



RO	EN
Intensitatea energiei primare in anul 2014 pentru Romania si media UE28	**Intensity of primary energy in 2014 for Romania and EU-28 average**
tep/1000 Euro	**toe/thousand Euros**
PPC	**PPP**
UE28	**EU-28**

In the case of Romania, the choice of the measurement unit for GDP calculation has a decisive influence on the value of energy intensity. The intensity of primary energy in Romania calculated as toe/thousand Euros 2005 is thus more than three times higher as compared to the version where the same indicator is calculated in toe Euro/thousand Euros PPP, for the same country and for the same year.

In the case of developed countries, these differences are insignificant and this explains the minor differences between the EU-28 averages calculated using different measurement units. This explains why the values of the 'primary energy intensity' indicator should be used with certain caution, especially in the case of international comparisons. We consider that specifying the measurement unit used to express this indicator is mandatory.

Many prestigious international organisations (such as the World Energy Council) and expert teams perform various additional corrections to the calculation of the primary energy intensity when they make international comparisons and when they wish to highlight the real progress in energy efficiency increase.

The energy intensity of the Romanian industry decreased by approximately 42% between 2007 and 2012, both as a result of the measures taken for the increase of energy efficiency and as a result of the restructuring that took place during the crisis.

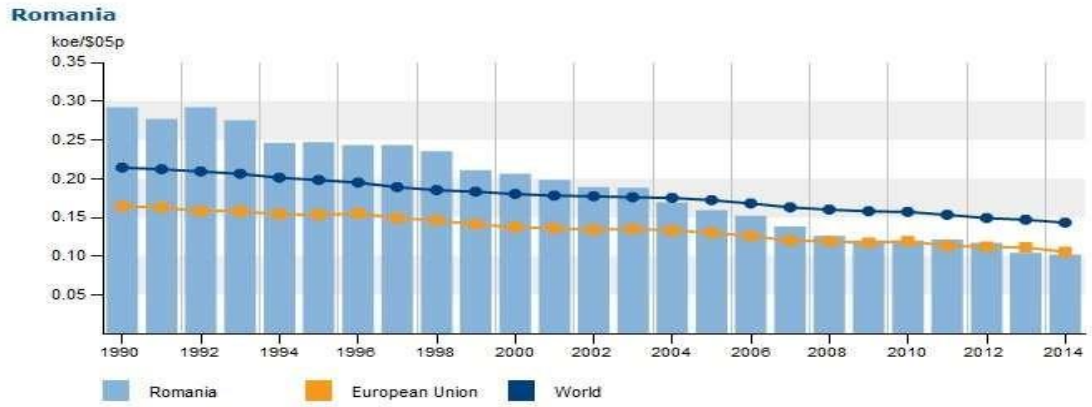
Taking into consideration that the energy intensity of the Romanian economy remains slightly higher than the EU average, it is appropriate to continue the policies and measures for increasing energy efficiency in order to ensure sustainable development.

In order to eliminate the influence of these structural differences, it is customary to calculate the intensity of primary energy with the structural correction of the economy. Such analysis was prepared by the World Energy Council within the framework of a series of studies conducted in collaboration with ADEME and ENERDATA. The intensity of primary and final energy intensity in Romania was (re)calculated taking into consideration

an economic structure similar to the structure of the EU average and considering energy intensities by sectors at the level of actual sector values. The results are presented in Figure 11 (the intensity of primary energy) and Figure 12 (the intensity of final energy). The gross domestic product is calculated in USD 2005, while the intensity of primary energy and final energy, respectively, is calculated in ktoe/USD 2005.

Figure 11

Intensity of primary energy adjusted to the economic structure of the EU



The analysis of the graphic reveals that the intensity of primary energy, corrected with the correction coefficient for economic structure, clearly shows that, starting with 2008, Romania has almost the same value as the European Union average.

Figure 12

Intensity of final energy

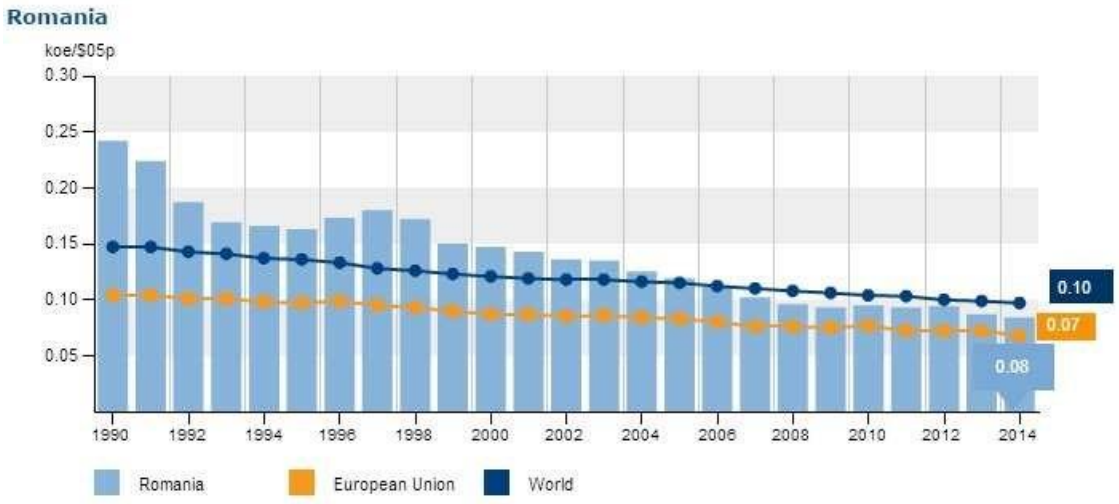


Figure 13

Intensity of final energy in relation to the structure of GDP 2005

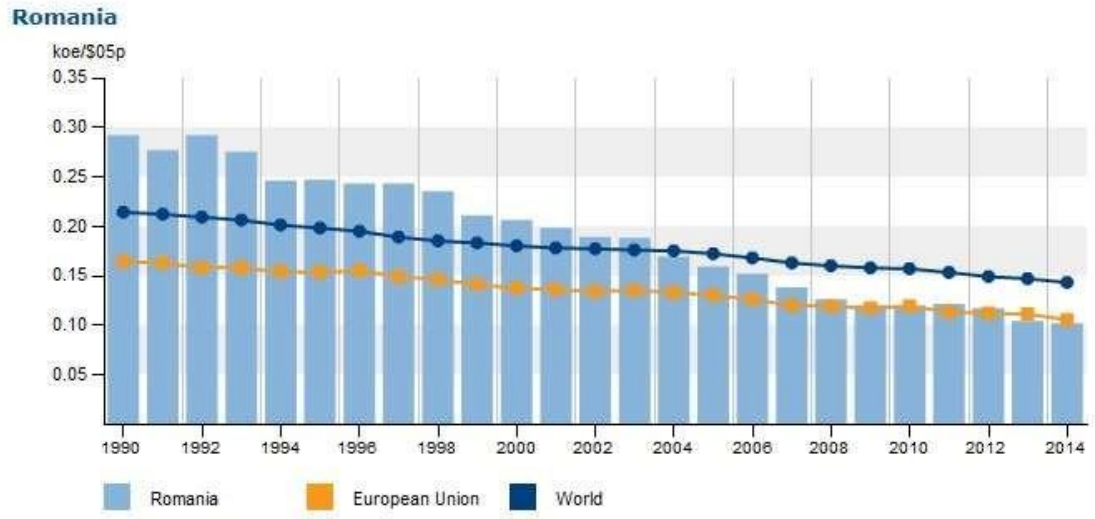
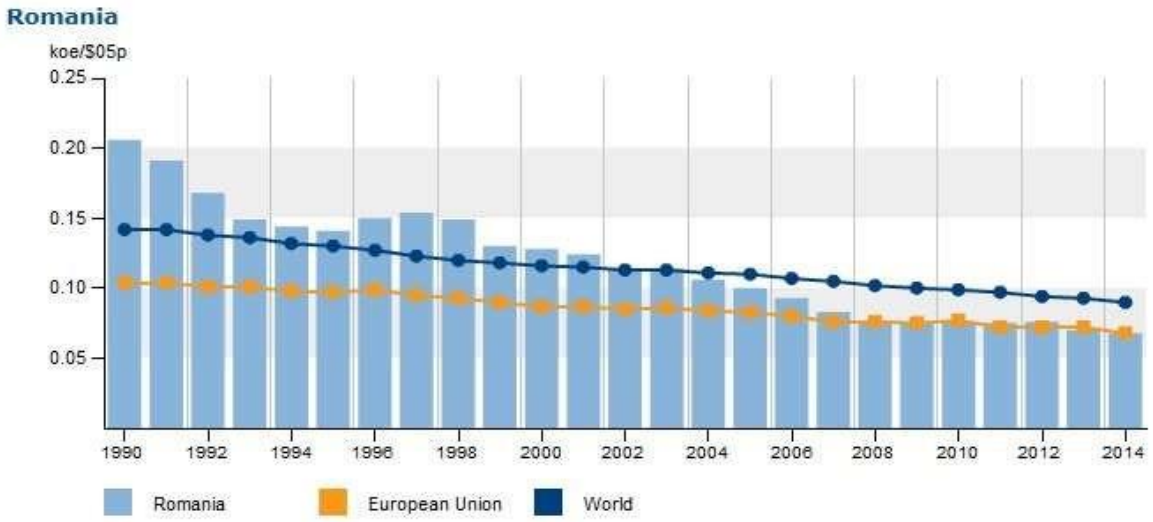


Figure 14

Intensity of final energy in relation to the economic structure of the EU



The analysis of the above graphics reveals that the intensities of primary energy and those of final energy at national level, corrected with the correction coefficients for economic structure have almost the same value as the European Union average.

The restructuring process of the national economy has yet to be completed. It is to be expected that the intensity of primary energy and that of final energy (calculated in toe/thousand Euros 2005) in Romania shall approach the values registered by developed countries as the structure of the Romanian economy approaches that of the economy of these countries.

5. MONITORING IN THE AREA OF ENERGY EFFICIENCY

5.1 Monitoring of large industrial consumers

In accordance with the provisions of **Article 9(3)(a) of Law No 121/2014 on energy efficiency, the Energy Efficiency Department (DEE)** operating within ANRE is responsible for drawing up a template for drafting the Programme for improving energy efficiency. The **Guidelines for drafting the Programme for improving energy efficiency for industrial establishments** were thus updated in 2015**, and the new document was approved by Decision No 8/12.02.2015 of the Head of DEE**.

The following elements were considered upon revision of the guidelines:

a) The need to remove certain deficiencies in drawing up one's own programme, which had been found in previous reports and during discussions with the candidates to the exam for energy manager certification:
   - Insufficient justification of the programme correlated with the actual and future situation of the energy consumer;
   - Inclusion of energy saving measures in the programme that are not relevant taking into account the quantity and structure of energy consumption;
   - Absence of information on the level of energy efficiency in the economic sector to which belongs the consumer, so as the programme could support competition capacity;
   - Insufficient justification of the financing necessary for the implementation of the measures proposed;
   - Lack of coherence in the reports from one year to the other.

b) The need to supply benchmarking data, which should allow to compare own efficiency with sector efficiency or with the best available technologies (BAT) in the field;

c) The need to provide information on the possible measures for increasing energy efficiency of different types of installations and equipment (boilers, ovens, drive systems, etc.), which should give more options to the people drawing up their own programmes;

d) The need of better structure of the data reported, which should help to summarise national data under the PNAEE monitoring and the reporting to the European Commission.

Implementing the MIS information programme (monitoring energy management in industry)

In order to make it easier to collect and, in particular, process reporting data from the industrial energy consumers under monitoring, the online reporting procedure was launched, based on the MIS information programme, held by ANRE, which has been extended with a component related to energy efficiency issues. Moreover, a training activity for economic agents was launched with regard to on-line reporting and granting of access passwords for

the database. For this purpose, training workshops were organised for certified energy managers in: Bucharest (17 and 18 March 2015), Craiova (24 and 24 March 2015), Iași (25 March 2015) and Brașov (30 and 31 March 2015), which were attended by more than 330 people.

The total consumption of energy for the 675 economic operators having reported in 2015 amounted to 10 870 486.61 toe, which is 2.22% more than in 2014.

A number of 682 economic agents with consumptions higher than 1 000 toe/year were monitored in 2015 (data reported for energy consumption in 2014), of which:

- 6.74% with consumption above 50 000 toe/year,
- 27.57% with consumption between 5 000 and 50 000 toe/year,
- 65.69% with consumption between 1 000 and 5 000 toe/year.

As compared to 2014, when **713 economic operators** were recorded to have a total annual consumption of more than 1 000 toe, their number decreased by **31** operators in 2015. The causes leading to this are:

- declassification of **52 economic operators** in the area of 'production and supply of electricity and heat, gas, hot water and air conditioning' whose own technological consumption (CPT) was below 1 000 toe;
- two economic operators ceased their activity;
- a number of 23 new economic operators have entered the database.

The energy management at the **682 final energy consumers** (including 52 subsidiaries, worksites) with an annual energy consumption of over 1 000 toe/year is undertaken by **441 energy managers accredited by ANRE**. Some consumers opted for the outsourcing of the energy management service to a total number of **21 freelancer providers** (authorised natural persons - PFA) and **37 energy service provider companies** accredited by ANRE. In this context, the accredited and authorised energy management coverage was **98.5%** in 2014, having the following structure:

- 64.66% (441 consumers) - their own ANRE-certified energy managers,
- 33.87% (231 consumers) - PFA and energy service provider companies accredited by ANRE,
- 1.47% (10 consumers) - no ANRE-accredited energy management.

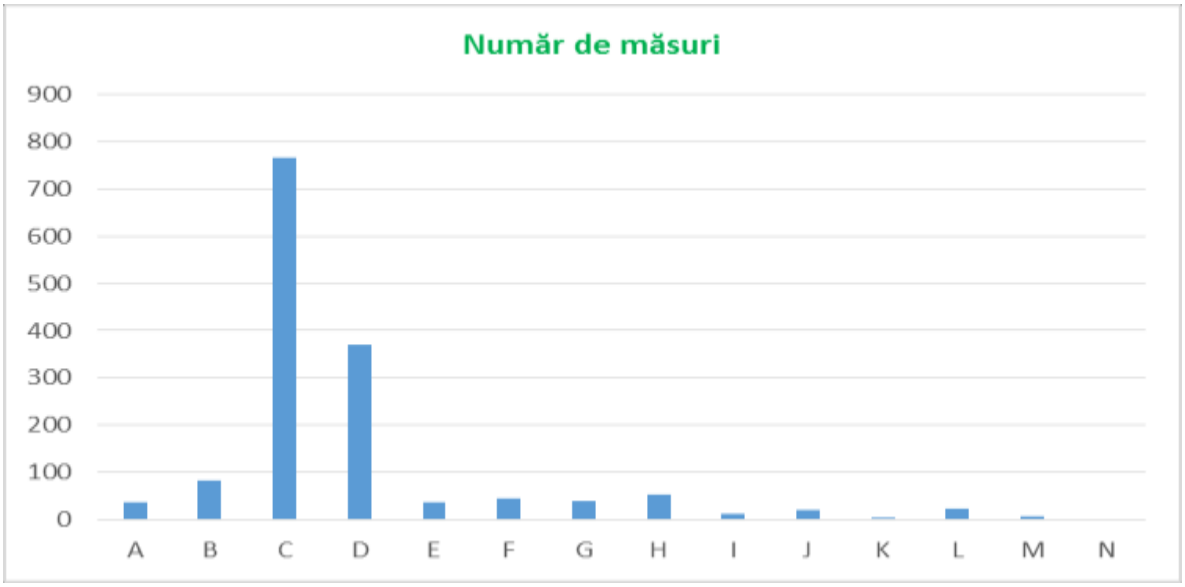
In order to reduce the cases of non-compliance, after adoption of Law No 121/2014, it was used as legal basis for 1 225 warning letters, 66 notifications of absence of reporting documents and 72 notifications to the Directorate General for Control concerning the absence of certified energy manager, with a view to starting control actions at local level and to inflict penalties to economic operators where appropriate.

The analysis of the own programmes of energy efficiency increase in 2015, as a result of implementing energy efficiency measures, has revealed that the economic agents monitored, from various activity fields, reported energy savings of **141 767 toe**, which is **2.88% less than in 2014** (Figure 15).

This decrease is largely due to the fact that most of the economic operators have already applied low-cost, no-cost measures, but do not have sufficient financial means for higher cost measures.

The share of energy saving in the total consumption of energy by the final consumers of energy (above 1 000 toe) accounts for **1.28%, as compared to 1.515% in 2015** and to **1.97% in 2014**. Taking into account that the average performance duration of the investment projects reported by the monitored consumers is 3 years, the resulting annual average value is **47.256 toes.**

Figure 15

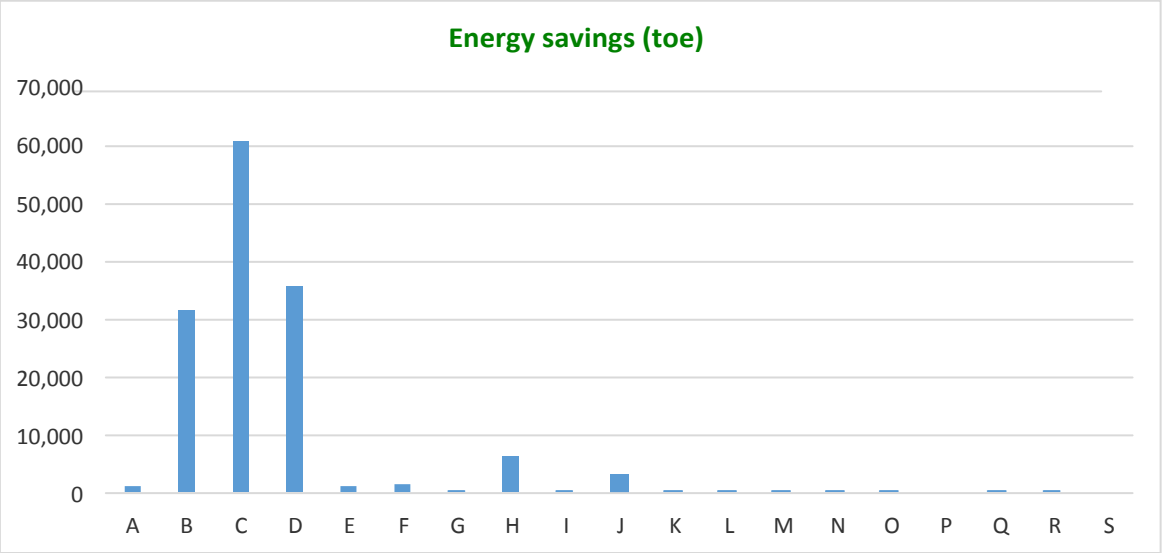


RO	EN
Număr de măsuri	**Number of measures**

NOTE: the indices (A,B,D….Q,R,S) refer to the national economic activity classification codes - CAEN

The implementation of these measures leads to the energy savings shown in Figure 16.

Figure 16



NOTE: the indices (A,B,D….Q,R,S) refer to the CAEN classification codes

This is largely due to the fact that most of the economic operators have already applied low-cost, no-cost measures, but do not have sufficient financial means for higher cost measures.

In **PNAEE,** the target for the programme **P6 – Energy audit and energy management is energy saving of 350 000 toe for the period 2014-2020, of which 50 000 toe for 2015**.

We thus consider that the target for 2015 was reached up to **97%**.

5.2. Monitoring of municipalities having more than 5 000 inhabitants

In order to monitor the local authorities, their low capacity of compliance with the legal provisions was taken into account, in particular with the new legal provisions inserting reporting obligations for medium municipalities too (5 000-20 000 inhabitants).

In accordance with the provisions of **Article 9(14) of Law No 121/2014 on energy efficiency, the Energy Efficiency Department (DEE)** operating within ANRE drew up the ***Guidelines for drafting the Programme for improving energy efficiency for municipalities having more than 5 000 inhabitants*** in 2015**, which was approved by Decision No 7/12.02.2015**.

A number of **105 municipalities having more than 20 000 inhabitants and 558 municipalities having between 5 000 and 20 000 inhabitants** falling under the provisions of Law No 121/2014 on energy efficiency were identified and entered in the database.

Difficulties were found at the level of local authorities, in particular among those with 5 000 to 20 000 inhabitants, related to the drawing up and reporting of the plan for improving energy efficiency: lack of data on consumption in public institutions and with the population, lack of specialised staff for drafting the programme, lack of funds for supporting a specialised consultancy activity, etc.

Consequently, in 2016, meetings will be organised with the representatives of the

local authorities, for advices on the drafting of the Plan for improving energy efficiency. Part of the municipalities has joined the Mayors' Convention and they thus have an obligation to draw up an Action Plan for Economic Development (PAED), based on identification and reduction of CO2 emissions. As a result, the way of correlation of the two documents (PAED and PIEE) was discussed with the Association Municipalities-Energy in Romania, which coordinates the collaboration with the Mayors' Convention, taking into account the link between energy consumption and CO2 emissions.

5.3. Monitoring of the market of energy efficient equipment

In order to check the compliance with the legislation in force concerning energy-related labelling of household appliances, **ANRE, the authority competent for market surveillance** in this area**,** through the **Control Department,** and at the request of the **Energy Efficiency Department**, has launched 69 local control actions, whose summary results have been communicated to the Ministry of the Economy (Market Surveillance National Authority), with a view to annual reporting to the European Commission.

Moreover, actions have been launched for enabling better structuring of the monitoring of the equipment market:

- Organising, at the initiative of ANRE, of a working group including the participation of the Ministry of the Economy and of the Consumer Protection National Authority (ANPC);
- Cooperation with the Association of the European Manufacturers of Household Appliances in Romania (CECED) and with the Market Survey German Institute (Gfk) with a view to assessing the sales volume and the energy savings achieved by replacing worn household appliances.

5.4. Monitoring of the National Energy Efficiency Action Plan (PNAEE)

In accordance with the provisions of Article 3(2) point (b) of *Law No 121/2014 on energy efficiency*, the Energy Efficiency Department monitors, at national level, the implementation of the **National Energy Efficiency Action Plan**, as well as of the energy savings resulting from the provision of energy services and other energy efficiency improvement measures.

ANRE has proposed that the implementation of the actions contained in the PNAEE should be made through a series of **energy efficiency programmes**, each of whom could be the object of a national plan, among which the most important are the following:

A. Increase of energy efficiency in networks

B. Promotion of High-Efficiency Cogeneration

C. District Heating Programme 2006 – 2015

D. Energy Audit and Energy Management

E. Energy Efficiency in the Housing Sector

F. Energy Efficiency in Governmental Buildings and Public Services

G. Energy Efficiency in the Transport Sector

Pursuant to **Article 8(8),** ***the Energy Efficiency Department*** draws up an annual report based on the reports received from the institutions involved in the implementation of this Law by 30 March. In this context, ANRE sent warning letters in the period from 15 January to 15 February 2016 with a view to be notified the data necessary for drawing up the annual report, to the following institutions: MDRAP, MECRMA, MT, MMAP, ANRSC, ANAP, AFM, URTP and CECEED. Moreover, information has been requested from the specialised departments of ANRE with regard to increasing energy efficiency in the networks, to promoting high-efficiency cogeneration and to intelligent metering.

Moreover, letters were sent to the Mayor's Offices of the municipalities having more than 20 000 inhabitants requesting ***the Programme for improving energy efficiency***, pursuant to the provisions of **Article 9(13) of Law No 121/2014 on energy efficiency**, as well as data on the renovation of the heating systems in public buildings.

Based on the statistical data and on the reports received with regard to the actions taken in 2015, the main **area** where significant energy savings were obtained are the following:

A. INCREASE OF ENERGY EFFICIENCY IN NETWORKS

PNAEE estimates for 2015 average savings amounting to **10 000 toe** for electricity distribution networks and to **1 000 toe** for electricity transmission networks.

❖ OWN TECHNOLOGICAL CONSUMPTION (CPT) DECREASE IN THE ELECTRICITY DISTRIBUTION NETWORK (RED)

According to the PNAEE, the target for consumption decrease in the RED is **80 000 toe** for the period 2014-2020. The savings estimated by the companies for 2014 amount to **4 045 toe**. The analysis of the own programmes for energy efficiency increase and of the reports of the companies in 2015 reveals that the preliminary energy savings for 2015 amount to **4 331 toe**.

ANRE has regulated the targets of reduction of CPT share in the RED according to the data in Table 3.

Table 3

Distribution operator	Voltage level	Own technological consumption regulated by ANRE [%]				
		2014	2015	2016	2017	2018
ENEL Distribuție Banat	IT	0.66	0.66	0.65	0.64	0.63
	MT	3.67	3.64	3.60	3.57	3.54
	JT	14.70	14.60	14.50	14.30	14.14
ENEL Dislribuție Muntenia	IT	0.63	0.62	0.61	0.60	0.59
	MT	3.52	3.51	3.47	3.44	3.40
	JT	16.04	16.00	15.96	15.64	15.34
ENEL Distribuție Dobrogea	IT	1.72	1.72	1.72	1.71	1.71
	MT	2.48	4.47	4.45	4.35	4.24
	JT	13.25	13.24	13.23	13.22	13.21
CEZ Distribuție Oltenia	IT	1.18	1.17	1.16	1.15	1.14
	MT	4.01	4.00	3.99	3.98	3.97
	JT	22.00	20.00	19.00	18.00	17.00
E.ON Dislribuție Moldova	IT	1.00	0.99	0.98	0.97	0.96
	MT	2.85	2.84	2.83	2.81	2.80
	JT	18.50	17.50	17.00	16.50	16.00
Electrica Distribuție Muntenia Nord	IT	1.03	1.02	1.01	1.00	0.99
	MT	6.20	6.05	5.90	5.75	5.50
	JT	14.63	14.60	14.57	14.54	14.51
Electrica Distribuție Transilvania Sud	IT	1.11	1.08	1.07	1.06	1.05
	MT	4.14	4.13	4.12	4.10	4.07
	JT	17.30	16.90	16.20	15.80	15.50

Electrica Distribuție Transilvania Nord	ÎT	1.13	1.12	1.11	1.10	1.00
	MT	4.55	4.54	4.53	4.52	4.51
	JT	12.43	12.16	11.73	11.20	10.82

❖ **CPT DECREASE IN RET**

According to PNAEE, the target of consumption decrease in the RET is **9 000 toe** for the **period 2014-2020.** The savings estimated by the national transmission operator amount to **155.6 toe/year.**

The analysis of the own programmes for energy efficiency increase reported by the transmission companies in **2015** reveals that the preliminary energy savings amount to **3 017 toe/year**.

According to the provisions of **Article 15(4)** of ***Law* No 121/2014 *on energy efficiency*** 'The Transmission System Operators (TSO) and the Distribution System Operators for electricity and natural gas shall submit the following documents to the ANRE, by 30 June 2015:

a) a report assessing the potential of energy efficiency increase of electricity and natural gas networks, with regard to transmission, distribution, load management and interoperability, as well as to the connection of the production capacities, including microgenerators;

b) a measure programme for improving the energy efficiency of the networks, for at least 5 years, correlated with the annual investment programmes, which should be efficient in terms of costs, and their implementation schedule.

Based on the reports submitted, a ***Summary*** was drawn up ***of the Reports assessing the potential of energy efficiency increase of electricity and natural gas networks***, with regard to transmission, distribution, load management and interoperability, as well as to the connection of the production capacities, including microgenerators and of the *Measure programmes for improving the energy efficiency of the networks,* for at least 5 years, correlated with the annual investment programmes, which should be efficient in terms of costs, and their implementation schedule, submitted by the transmission system operators and by the distribution system operators for electricity and natural gas, pursuant to the provisions of **Article 15(4) of *Law No 121/2014 on energy efficiency***.

The conclusions of the summary are shown below.

Energy efficiency increase has a major contribution to achieving the security of energy supply, sustainable development and competitiveness, saving of primary energy resources, and reducing greenhouse gas emissions.

The analysis of the data submitted by the transmission and distribution system operators for electricity and natural gas reveals that the measures for improving energy efficiency are mainly based on:

- increasing the innovation and technological development capacity (applying modern principles of energy management),
- ensuring investments for the development of the energy sector, including by attracting private capital and funds made available by the EU;
- ensuring surveillance of the equipment and appliances market for which specific rules exist with regard to energy efficiency and environment protection;
- promoting the use of renewable sources of energy with consumers through

complementary actions and regulatory activities.

-

The data summary submitted by the operators has revealed a high difficulty level, taking into account the following aspects:

- Significant differences have been found with regard to the assessment of the energy savings related to the same type of works,
- The data and information submitted by certain operators, in particular in the area of natural gas, failed to comply with ANRE's recommendation related to contents,
- The assessment of the technical potential of energy efficiency increase in the natural gas networks, where this aspect was analysed, was mainly focused on the decrease in technological consumption, in measurement deviations and, possibly, the decrease in technical incidents in the distribution system,
- The lack of concise assessment of the technical potential of energy efficiency increase in the natural gas networks has led to simplified details of the objectives of energy efficiency improvement in the networks,
- The measures taken by the natural gas operators for improving energy efficiency in the period 2011-2014 have not been detailed by each and every operator,
- The action programmes presented by some of the natural gas distribution operators did not contain any concrete investments in their own network in the period 2015-2019, and all the less investments correlated with the annual investment programmes of the operator.

The summary of data and information communicated by the distribution operators for natural gas and electricity and by the 2 transmission system operators for electricity and natural gas, respectively, triggers the conclusion that it is necessary to amend **Article 15 of Law No 121/2014 on energy efficiency**, by inserting a provision laying down that the report on the assessment of the potential of energy efficiency increase of electricity and natural gas networks and the programme for concrete actions and investments for improving the energy efficiency of networks should be reviewed by the operators and submitted to ANRE **every two years, by 30 June**.

A legal framework will thus be created for ANRE to be able to regulate the methods for monitoring and reporting on the programmes for actions for improving energy efficiency in the area of transmission and distribution of electricity and natural gas.

This would enable effective analysis, assessment and follow up of the measure programmes proposed and of the results obtained by implementing the efficiency measures. Data presentation in uniform formats, such as mock-ups, will provide the operators with accurate and easy to understand means of summary and the analysis of the mock-ups will enable ANRE to perform annual monitoring of the measure programmes on improving energy efficiency of the own networks, proposed by the electricity and natural gas operators, as well as the possibility of adopting appropriate measures for reaching the national objectives in the area of energy efficiency.

❖ INTELLIGENT METERING

Pursuant to the provisions of ***Law No 123/2012 on electricity and natural gas*** **as subsequently amended and supplemented**, the assessment of the implementation of intelligent metering systems in terms of costs and long term benefits for the market, of efficiency and of feasible implementation deadlines, was completed on 3 September 2012, through the study *Intelligent metering in Romania* drawn up by the company A.T. Kearney.

The feasibility study, including the results of the cost-benefit analysis for electricity, indicated positive value of the updated net revenue, leading to the conclusion that the implementation of intelligent metering in the area of electricity has the potential of being a profitable investment due to the benefits resulting from the decrease of losses in the network and from reduced operational costs, under certain conditions and considerations.

Pursuant to the provisions of Article **66 of *Law No 123/2012 on electricity and natural gas* as subsequently amended and supplemented** and based on the conclusions of the study *Intelligent metering in Romania* drawn up by the company A.T. Kearney, ANRE has launched the process of implementation of the intelligent metering systems for electricity by approving **Order No 91/2013 and Order No 145/2014, on the implementation of intelligent metering systems for electricity**. These orders defined the functionalities of the intelligent metering systems for electricity that are to be installed in Romania, as well as the stages to go through until fixing the implementation schedule and the schedule of the national plan for implementing the intelligent metering systems for electricity.

Pursuant to the provisions of **Order No 145/2014 of ANRE, *on the implementation of intelligent metering systems for electricity***, the concessionaire distribution operators sent to ANRE proposals of pilot projects to be achieved in 2015, whose results should provide the information necessary for establishing the conditions and elements for drafting the national schedule for the implementation of intelligent metering systems, as well as the ***National Plan for the Implementation of intelligent metering systems*****.**

In 2015, ANRE approved **18 pilot projects amounting to RON 69 639 770**, referring to the implementation of intelligent metering systems for electricity, in accordance with Table 4.

Table 4

Distribution Operator	No of pilot projects	No of clients included in the pilot projects	Total value of the pilot projects on intelligent metering systems (SMI) [RON]
Enel Distribuție Banat	3	9 961	5 275 260
Enel Distribuție Dobrogea	4	10 000	4 928 379
Enel Distribuţie Muntenia	1	11 392	6 650 281
CEZ Distribuție	2	20 150	16 085 781
E.ON Distribuţie România	2	23 237	8 303 582
FDEE Transilvania Sud	2	23 047	22 893 216
FDEE Transilvania Nord	2	5 335	4 069 333
FDEE Muntenia Nord	2	2 143	1 433 938
TOTAL	**18**	**105 265**	**69 639 770**

Pilot projects on implementing SMI approved by ANRE

The results of monitoring the intelligent metering system implementation system were included in the ***Analysis reports on the progress of the pilot projects on the***

***implementation of the intelligent metering systems as of 30 June 2015, 31 August 2015 and 1 November 2015*, submitted to the *Regulatory Committee* of ANRE.**

A set of performance indicators has been defined for the intelligent metering systems, so that the progress in implementing the intelligent metering systems for electricity could be monitored during the implementation process and for a period after its completion. These indicators will be applied for all the projects involving intelligent metering systems for electricity, so that the level of achievement of the objectives established could be checked. The performance indicators refer to the following aspects: stage in implementing the intelligent metering systems for electricity, structure of the intelligent metering systems for electricity, economic effects, qualitative performance indicators, safety of the information moved through the intelligent metering systems for electricity.

The implementation areas have been defined and the relevant data and information characterising these areas in technical, economic, qualitative and social and demographic terms have been established. Processing these data will help to prioritise/rank the areas of each concessionaire distribution operator, through a multi-criteria analysis, with a view to assessing the potential of implementing intelligent metering systems for electricity and of preparing the **National Plan** and the ***Implementation Schedule* for intelligent metering systems for electricity**.

Table 5

Distribution Operator	No of implementing areas	No of substations	No of meters			Monthly average consumption/meter (kWh)	No of meters scheduled for metrological replacement in the period 2016 - 2020	Book value still undepreciated for meters that are to be replaced (RON)	The network was refurbished in the last 5 years: %	Number of connected producers
			Total	Single-phase	Three-phase					
CEZ Distribuție	2 606	13 268	1 398 919	1 322 403	76 516	112.70	1 202 115	86 068 358	10	16
Enel Distribuție Banat	448	7 679	866 366	759 696	106 670	251.54	360 022	73 690 952	5	37
Enel Distribuție Dobrogea	344	5 498	626 627	577 942	48 689	234.13	301 874	62 323 993	19.64	15
Enel Distribuție Muntenia	254	6 805	1 201 804	1 072 787	129 013	343.74	569 298	156 808 264	13.36	9
E.ON Distribuție România	2 552	9 857	1 154 729	1 101 939	52 790	104.60	947 300	0	4	70
FDEE Muntenia Nord	1 414	10 218	1 246 502	1 158 577	87 925	107.41	730 766	0	13.25	87
FDEE Transilvania Nord	1 963	8 719	1 224 969	1 132 469	92 500	110.55	576 320	0	11.34	36
FDEE Transilvania Sud	1 782	6 059	1 078 383	878 898	224 212	122.03	627 864	0	8.39	43
TOTAL	**11 363**	**68 103**	**8 798 299**	**8 004 711**	**818 315**	**173.34**	**5 315 559**	**378 891 567**	**10.67**	**313**

Summary of information referring to the implementation areas

Pursuant to the provisions of **Article 4(5) of Order No 145/2014 of ANRE**, the concessionaire distribution operators submitted the results of the implementation of the pilot projects, accompanied by the cost-benefit analyses, to ANRE on 1 November 2015.

The Report on the analysis of the achievement progress of the pilot projects on the implementation of the intelligent metering systems as of 1 November 2015 has revealed the following conclusions:

- The post-implementation results referring to the benefits aimed are not relevant for all the pilot projects because of the very short period of time between the completion of the implementation of the pilot projects and the reporting of the results (absence of relevant duration of monitoring), and they do not provide clear premises for justifying the decisions on the roll-out.
- The cost-benefit analyses submitted by the distribution operators do not allow comparative analyses of the results obtained, as the analysis models used differ, and they are aimed at the business strategy of the operator, with specific highlights and focuses.
- The results of the cost-benefit analyses are positive for the companies Enel Distribuție, EON Distribuţie România and FDEE Transilvania Sud, and negative for CEZ Distribuție.

A need was thus revealed that ANRE should impose a detailed model for the cost-benefit analysis or should conduct the cost-benefit analysis itself for all the distribution operators, possibly through an unbiased external consultant, in order to avoid accusations of lack of transparency or objectivity.

The measures proposed included in the report mentioned above and submitted to the *Regulatory Committee* of ANRE are the following:

- Establishing a monitoring period of 6 months or one year for the pilot projects achieved in 2015, so that the quantification of the benefits and costs could be based on concrete results, achieved by all the distribution operators, including FDEE Transilvania Nord and Muntenia Nord.
- **Amending Order No 145/2014** concerning the time limits established for the approval of the national schedule for the implementation of the intelligent metering systems, and of the national plan for implementing the intelligent metering systems.

- Conducting monitoring in 2016 of the pilot projects achieved in 2015 and implementing pilot projects for intelligent metering systems for electricity in urban and rural areas with networks that have not been refurbished recently, which should provide relevant information for sizing the implementation of the intelligent metering systems for electricity at national level.
- Contacting an external consultant for establishing an appropriate model of cost-benefit analysis for the achieved/future projects referring to installing intelligent metering systems for electricity, as well as for establishing the interoperability requirements to be met by the intelligent metering systems for electricity, and the analysis of the proposals of the distribution operators referring to the communication technologies, to the communication standards and protocols used.

B. PROMOTION OF HIGH-EFFICIENCY COGENERATION

Based on the data provided by the **Energy Efficiency Department of ANRE (Directorate General for Efficiency in the Area of Energy Generation, Transmission, Distribution and Supply)**, a series of specific rules were issued in 2015 with a view to improving the application of this programme, as follows:

Order No 148/2015 amending and supplementing the Methodology for establishing and adjusting the prices for electricity and heat generated and supplied from cogeneration power plants benefiting from the aid scheme, and the bonus for high efficiency cogeneration, approved by Order No 15/2015.

Order No 95/2015 amending Order No 119/2013 approving the contribution for high efficiency cogeneration and certain provisions concerning its invoicing.

Order No 15/2015 approving the Methodology for establishing and adjusting the prices for electricity and heat generated and supplied from cogeneration power plants benefiting from the aid scheme, and the high efficiency bonus, repealing Order No 3/2010.

Order No 10/2015 approving the monitoring and reporting methodology for the aid scheme for the promotion of cogeneration based on a useful heat demand, repealing Order No 33/2011.

The values of energy savings achieved in 2015 are shown in Table 6.

Table 6

MU	**Q1 201**	**Q2 2015**	**Q3 2015**	**Q4 2015**	**TOTAL 2015**
GWh	1 077	421	266	890	2 654
toe	92 622	36 206	22 876	76 540	228 244

The support scheme for the promotion of high-efficiency cogeneration was established in Romania **by Government Decision No 219/2007** ***on the promotion of cogeneration based on a useful heat demand*** (transposing into national legislation Directive 2004/8/EC *on the promotion of cogeneration based on a useful heat demand in the internal energy market*, which, as of 5 June 2014, was replaced by the provisions of **Directive 2012/27/EU**) **and implemented by Government Decision No 1215/2009** ***establishing the criteria and the conditions required for the implementation of the support scheme for the promotion of high-efficiency cogeneration based on a useful heat demand***.

By the new **Directive 2012/27/EU** ***on energy efficiency***, the European Commission places a special emphasis on the promotion of high-efficiency cogeneration, encompassing the provisions of Directive 2004/8/EC. ***Directive 2012/27/EU*** **was transposed by adoption of** ***Law No 121/2014 on energy efficiency*****, whose Article 19(3) lays down that**

GD No 219/2007 supplements the provisions of this law**.** Considering this, the entire legal framework subsequent to **GD No 219/2007 shall remain in force**. **GD No 846/2015 amending and supplementing GD No 219/2007 points out the provisions on cogeneration included in Directive 2012/27/EU that are transposed.**

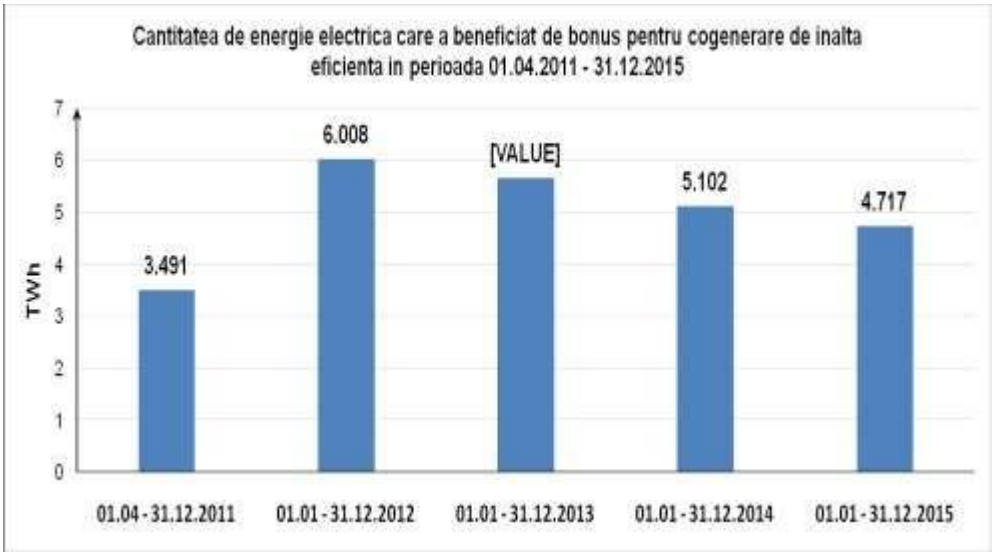
The scheme offering bonuses is a state aid **(N 437/2009 – Romania)** authorised by the European Commission, which declared it compatible with the common market in accordance with the provisions of **Article 87(3) point (c) of the EC Treaty, by Decision C(2009)7085**. The authorisation was communicated by publication in the **Official Journal of the European Union C31/9 February 2010**. The effective date of entry into force of the scheme offering bonuses was 1 April 2011.

The main regulatory directions in promoting produced by high-efficiency cogeneration in 2015 were the following:

a) drafting rules enabling the implementation of the promotion scheme offering **bonuses** established by ***GD No 219/2007*** *on the promotion of cogeneration based on a useful heat demand* and implemented by ***GD No 1215/2009*** *establishing the criteria and the conditions required for the implementation of the support scheme for the promotion of high-efficiency cogeneration based on a useful heat demand*, as well as the monitoring of its implementation;
b) updating the regulatory framework referring to the guarantees of origin for the quantity of electricity produced by high-efficiency cogeneration;
c) issuing decisions amending/supplementing the ***List of production capacities for cogenerated electricity and heat, with final accreditation***;
d) issuing monthly/annual decisions approving the quantities of electricity produced by high-efficiency cogeneration benefiting of bonus;
e) issuing decisions on the overcompensation of the production of electricity and heat by high-efficiency cogeneration related to the assessment period from 1 January 2014 to 31 December 2014;
f) issuing the annual decisions approving the bonus for electricity and the regulated prices for electricity and heat produced by high-efficiency cogeneration, valid for 2016, simultaneously with conducting the ante-overcompensation analysis for 2016 for the activity of the producers accessing the support scheme;
g) analyses on the adjustment of the contribution for Q2 2015 and on establishing the contribution for cogeneration, as from 1 January 2016.

For the 38 producers concerned, the total quantity of electricity produced by high-efficiency cogeneration and having benefited of bonus during the period from January to December 2015 was **4.566 TWh**, before the adjustment performed in March 2016, and **4.717 TWh** after the adjustment performed in March 2016, which is **7.5% less than the equivalent value of year 2014**.

Figure 17



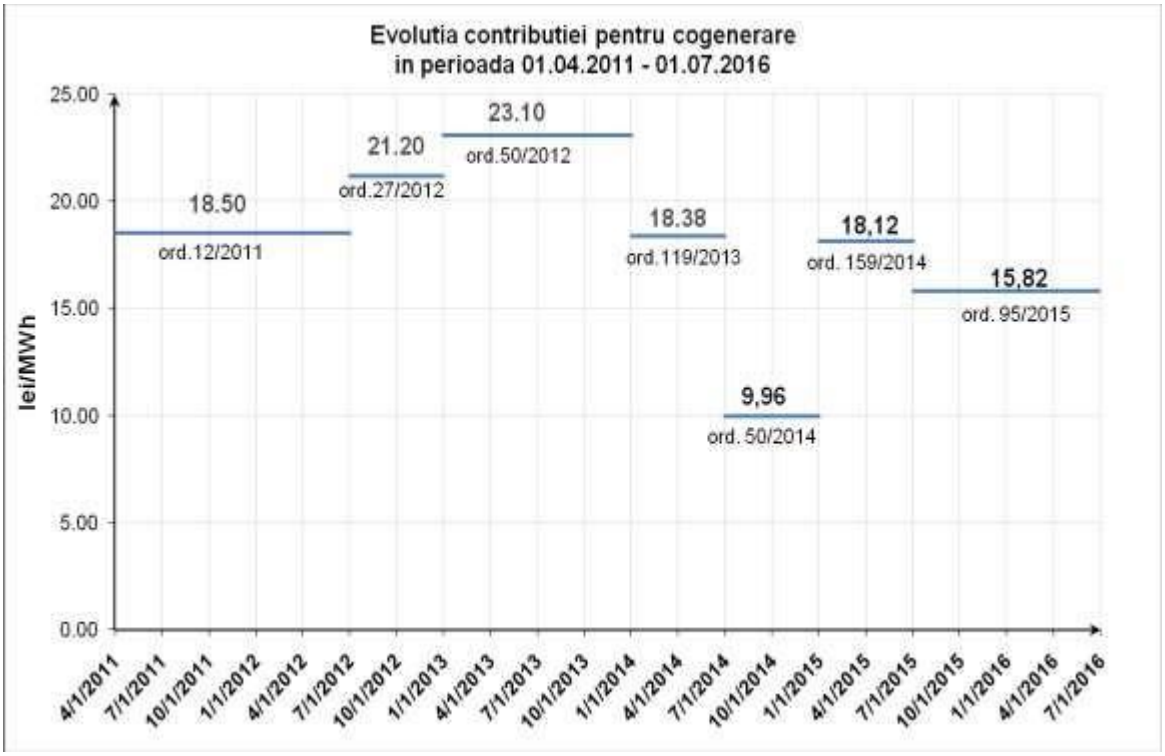
RO	EN
Cantitatea de energie electrica care a beneficiat de bonus pentru cogenerare de inalta eficienta in perioada 01.04.2011 - 31.12.2015	**Amount of electricity having benefited from bonus for high-efficiency cogeneration in the period from 1 April 2011 to 31 December 2015**

The analysis on the overcompensation of the production of electricity and heat by high-efficiency cogeneration related to the assessment period from 1 January 2014 to 31 December 2014 has revealed that the implementation of the support scheme in the period concerned for **43 combined heat and power plants (commercially operated by 36 producers)**, has resulted in **5 plants with overcompensation of the combined heat and power production activity**, amounting in total to **RON 48 800 270**. The same overcompensation analysis conducted in Q1 2015 revealed the adjustment amount for the ante-overcompensation of **5 producers who, according to the ante-overcompensation analysis for Q4 2013, saw their bonus decreased in 2014 as compared to the reference bonus, the total adjustment amounting to RON 8 391 054.**

The value of the contribution for Q2 2015 has changed, based on the assessment from June 2015 of the costs and revenues achieved under the support scheme as well as estimated for Q2 2015, and amounts to RON 15.82/MWh, without VAT, approved by **Order No 95/2015 of ANRE**. A decisive factor in reducing the contribution as compared to the established value of **RON 18.12/MWh,** without VAT, approved by **Order No 159/2014 of ANRE,** was the consideration of the amount of overcompensation related to the assessment period from 1 January 2014 to 31 December 2014.

As from 1 January 2016, the provisions of Order No 95/2015 of ANRE remain valid, and the **value of the contribution for cogeneration is RON 15.82/MWh,** without VAT. According to the provisions of Article 23(3) of **Order No 117/2013 of ANRE**, the value of the contribution for cogeneration does not change as compared to the value applied in Q2 2015, taking into account that the variation of the contribution calculated as compared to the one in force **was below 2.5%.**

Figure 18



RO	EN
Evolutia contributiei pentru cogenerare in perioada 01.04.2011 - 01.07.2016	**Evolution of the contribution for cogeneration in the period from 1 April 2011 to 1 July 2016**
Lei	**RON**

The data related to the monitoring of the support scheme for cogeneration for years 2011, 2012, 2013, 2014 and 2015 are shown in Table 7.

Table 7 - Results of the application of the support scheme for the period 2011-2015

Indicator	**MU**	**2011**	**2012**	**2013**	**2014**	**2015**
Total amount of contribution invoiced to consumers and exporting suppliers [1)]	thousand RON	690 931	928 877	1 072 840	770 626	757 447
Amount of electricity invoiced to final consumers (including that consumed by self-supplying/self-consuming suppliers and producers) to which cogeneration contributions were applied	GWh	32 639	46 450	44 930	45 457	46 476
Amount of electricity exported to which the cogeneration contribution was applied	GWh	1 465	1 108	1 959	3 310 [1)]	0 [1)]

Amount of electricity produced by high-efficiency cogeneration benefiting from the support scheme	GWh	3 491	6 008	5 654	5 102	4 717
Total value of bonuses due to cogeneration producers that are beneficiaries of the bonus scheme	thousand RON	594 473	978 098	1 098 112	927 234	896 796
Amount of electricity imported with guarantees of origin for the high-efficiency cogeneration of electricity, for which the reimbursement of the contribution was requested	GWh	0	0	0	0	0
Fuel saving achieved in high-efficiency cogeneration processes, which benefit from bonuses, in compliance with the provisions of the *Rules of eligibility*	GWh	2 131	3 498	3 430	3 016	2 623

[1)] According to GD No 494/2014 amending GD No 1215/2009 establishing the criteria and the conditions required for the implementation of the support scheme for the promotion of high-efficiency cogeneration based on a useful heat demand, high-efficiency cogeneration, in particular the unit price, paid monthly, expressed in RON/kWh, by suppliers exporting electricity is exempt from payment of the related contribution.

The unit bonuses in 2015 (related to the fifth year of granting) were as follows:

- **RON 189.18/MWh** for plants mainly using natural gas from the transmission network;
- **RON 207.61/MWh** for plants mainly using natural gas from the distribution network;
- **RON 169.75/MWh** for plants mainly using solid fuel.

In 2015, two more producers accessed the scheme, and they were applied the unit bonus related to the first year of accession of a plant using natural gas from the distribution network – **RON 222.18/MWh**.

Based on the operational data for 2014, submitted by the producers in 2015, the following aspects have been assessed pursuant to the provisions of **Article 13(3) of *GD No 219/2007 on the promotion of cogeneration based on a useful heat demand***:

- *electricity and heat* produced by cogeneration by each energy producer holding cogeneration units, based on the calculation method laid down in Annex II to **Directive 2004/8/EC (currently replaced by Annex I to D2012/27/EU) – (Table 8)**;
- *cogeneration capacities (for electricity/heat)* **(Table 9)**,
- *fuel quantities* **(Table 10)** and
- *amounts of electricity produced by high-efficiency cogeneration and primary energy savings obtained through the use of cogeneration*, determined in accordance with

Annex III to **Directive 2004/8/EC (currently replaced by Annex II to D2012/27/EU) – (Table 11):**

Table 8 – National production of electricity and heat by cogeneration

Year	Total electricity produced in cogeneration units	Electricity produced by cogeneration (Annex II - D2004/8/EC replaced by Annex I – D2012/27/EU)		Electricity produced by cogeneration from the total national production	Useful heat produced in cogeneration units (Annex II - D2004/8/EC replaced by Annex I – D2012/27/EU)	
		Total	of which Self-producers		Total	of which Self-producers
	TWh	TWh	%	%	LP	%
2007	14.23	6.62	14.65	10.7	73.2	15.85
2008	14.06	6.21	15.62	9.6	71.5	18.04
2009	12.33	6.26	13.74	10.8	66.3	17.50
2010	11.93	6.54	17.74	10.8	69.0	22.46
2011	13.47	7.28	17.45	11.9	71.9	23.50
2012	12.54	6.72	16.07	11.4	66.1	22.37
2013	11.1	6.6	18.78	11.3	57.9	21.99
2014	**10.7**	**6.1**	**19.38**	**9.4**	**55.4**	**21.86**

Table 9 – Electricity and heat cogeneration capacities in Romania in 2014

Cogeneration technology	Maximum capacity	
	Electricity	Heat
	Gross	Net
	MW	MW
Combined cycle GT, with heat recovery	214	214
GT with heat recovery	130	210
Internal combustion engines	172	150
Steam backpressure turbines	782	3 311
Condensing ST with cogeneration switches	3 102	6 072
Other cogeneration technologies	1	5
TOTAL	**4 401**	**9 962**

Table 10 - Quantities of fuel used to produce electricity and heat by cogeneration

Year	Total fuel used by the cogeneration units	Fuel used for cogeneration (Annex II - D2004/8/EC replaced by Annex I – D2012/27/EU)	of which:				
			Solid fossil fuel	Fuel oil	Natural gas	Renewables and waste	Other fuels
	LP	LP	%	%	%	%	%
2007	221.4	122.8	38.2	8.3	52.8	0.0	0.7
2008	216.8	118.1	39.5	6.3	52.8	0.0	1.4
2009	188.6	112.4	39.8	6.9	49.7	0.5	3.1
2010	186.1	117.3	38.6	3.8	50.8	1.9	4.9
2011	200.3	124.3	38.2	3.5	52.4	2.0	3.9
2012	188.5	114.5	38.4	3.3	53.7	2.0	2.7
2013	159.7	103.6	37.4	0.6	54.6	3.6	3.8
2014	**154.1**	**97.7**	**36.0**	**0.5**	**54.4**	**5.4**	**3.7**

Table 11 - Electricity produced by high-efficiency cogeneration and primary energy savings obtained through the use of cogeneration

Year	Electricity produced by high-efficiency cogeneration (Annex III - D2004/8/EC replaced by Annex II – D2012/27/EU)	Fuel consumption for high-efficiency cogeneration (Annex III - D2004/8/EC replaced by Annex II – D2012/27/EU)	PES in absolute value (Annex III-D 2004/8/EC replaced by Annex II – D2012/27/EU)	PES (Annex III - D2004/8/EC replaced by Annex II – D2012/27/EU)
	TWh	LP	LP	%
2007	**4.4**	**67.9**	**10.5**	**13.4**
2008	**3.7**	**62.4**	**9.2**	**12.8**
2009	**3.5**	**49.6**	**8.2**	**14.2**
2010	**3.3**	**47.5**	**8.0**	**14.5**
2011	**3.4**	**43.3**	**8.3**	**16.0**
2012	**3.0**	**36.7**	**7.2**	**16.4**
2013	**4.4**	**56.9**	**10.5**	**15.5**
2014	**3.3**	**39.7**	**8.7**	**18.0**

PES – saving of primary energy compared with separate production of energy (Primary Energy Savings)

A number of 12 decisions were issued in 2015 **on the *eligibility of the amounts of electricity produced by high-efficiency cogeneration* from renewable sources of energy**, which benefit from *additional green certificates* pursuant to the provisions of **Article 6(4) of *Law No 220/2008* establishing the system for promoting the production of energy from renewable sources, republished as subsequently amended and supplemented.**

C. DISTRICT HEATING PROGRAMME 2006-2020

The implementation period for the governmental programme **'District heating 2006-2015 - Heat and Comfort', according to the data supplied by the competent authority - the Ministry of Regional Development and Public Administration - was extended until 2020, by GD No 602/2015 amending and supplementing Government Decision No 462/2006 approving the 'District heating 2006-2015 Heat and Comfort' Programme and establishing the *Project management unit*.**

An **allocation of RON 75 000 000 was approved** by **Law No 186/2014 of the State budget for 2015 for the programme 'District heating 2006 – 2015 Heat and Comfort' – *Component on the restoration of the heat supply centralised system* – RON 75 000 000.**

By **31 December 2014**, **42 territorial administrative units** were included in the programme for the restoration and upgrading of centralised heat supply systems in municipalities. The works carried out concerned the refurbishment of the sources of thermal power generation and of thermal units, the resizing and replacement of the heat transmission and distribution pipes, thus contributing to increasing the energy efficiency of the district heating systems and to improving the quality of the public service for the supply of thermal energy.

The energy efficiency achieved as a result of the progress recorded in implementing the investment projects in the period 2008-2015 is **29 603 toe**.

In 2015, **6 more district heating systems (SACET)** were closed down, and thus the current number of municipalities benefiting of district systems has dropped to **64**.

The implementation period of the governmental programme 'District heating 2006-2015 - Heat and Comfort' has been extended until 2020 taking into account the need in investment in the infrastructure for producing, transmitting and distributing heat to the population. Moreover, account was taken of the fact that from the total amount of RON 2 120 billion initially laid down in **GD No 462/2006 for the financing of the programme, approximately RON 423 million (20%) have been allocated so far, of which approximately RON 337 million (15.9%) have actually been used**.

An allocation was approved by **Law No 186/2014 approving the State budget** for 2015, for the programme **'District heating 2006 – 2015 Heat and Comfort'** – component of restoration of the district heating system – amounting to **RON 75 000 000 (3.53%)**, which is a slight increase in financing as compared to the annual average in the period 2006-2014, which was only **2.5%/year**.

Energy savings estimated under the PNAEE in 2015 amount to **24 000 toe (11.9% of the energy savings for the period 2014-2020)**, of which **2 279 toes (9.5%)** were actually achieved (source: MDRAP).

The local financing capacity was very low **(RON 9 776 480)**, and therefore, in 2015, **13 administrative units**, actually use under the programme **RON 37 377 974** of the amounts allocated from the State budget (Annex 3). The works carried out concerned the refurbishment of the sources of thermal power generation and of thermal units, the resizing and replacement of the heat transmission and distribution pipes, thus contributing to increasing the energy efficiency of the district heating systems and to improving the quality of the public service for the supply of thermal energy.

In December 2015, the '**Study on assessing the potential of implementing efficient district heating and cooling in the administrative units'** was drawn up pursuant to the provisions of **Article 14(1) of Law No 121/2014** on energy efficiency. This study included a baseline scenario based on the following hypotheses:

- the heat demand progresses depending on the development of the built area and of the energy efficiency programmes in buildings pursuant to the scenario PS2 MDRAP, which is in line with the energy in the PNAEE
- energy efficiency in the distribution networks tends to limit the losses to 15%
- by 2020, the programme of investments from EU funds has already been established for 7 municipalities and for Bucharest (POIM), and it covers approximately 75% of the operational networks
- the investments in networks will also be supported in the period 2020-2030, but not to a level that could fully cover the new and existing networks, and thus the losses in 2030 will be of 18%

According to the 'Study on the national district heating system' published on the website of the National Regulatory Authority for Municipal Services (ANRSC), approximately **12% of the heat supply network (primary and secondary) is currently refurbished**, and the national target is to refurbish and restore approximately **25% of the total heat supply network** by 2020.

The national average value of losses recorded has increased every year as the number of flats connected to the network decreased. **The average national loss recorded** in 2010 **was 27.91%, the average heat loss** in 2011 **was 26.54%, in 2012 it was 27.23%, and in 2013 the average loss was 26.98%, while the average loss of heat in the centralised system reached 28.32% in 2014.**

The main financing source envisaged for the next period consists of European funds.

European funds were envisaged for the support of the programmes on the refurbishment of the district heating systems, in particular the refurbishment of the heat transmission and distribution networks under **Priority Axis 7 – 'Energy efficiency increase in the district heating systems of the selected municipalities'.**

D. ENERGY AUDIT and ENERGY MANAGEMENT

As compared to 2014, when **713 economic operators were recorded to have a total annual consumption of more than 1 000 toe, in 2015, their number decreased to 682.** The causes thereto are the following:

- ✓ declassification of **52 economic operators** in the area of 'production and supply of electricity and heat, gas, hot water and air conditioning' whose own technological consumption (CPT) was below 1 000 toe;
- ✓ two economic operators ceased their activity;
- ✓ a number of **23 new economic operators** have entered the database.

The total consumption of energy for 2015 for the **675 economic operators having reported amounted to 10 870 486.61 toe, which is 2.22% more than in 2014**.

The analysis of the ***Own programmes for increasing energy efficiency*** **for 2015 reveals savings of 141 767 toe, which is 2.88% less than in 2014.** This decrease is largely due to the fact that most of the economic operators have already applied low-cost, no-cost measures, but do not have sufficient financial means for higher cost measures.

The share of energy saving in the total consumption of energy by the final consumers of energy (above 1 000 toe) accounts for **1.28%, as compared to 1.515% in 2015** and to **1.97% in 2014**. Taking into account that the average performance duration of the investment projects reported by the monitored consumers is 3 years, the resulting annual average value is 47 256 toe.

In PNAEE, the target for the programme is **energy saving of 350 000 toe for the period 2014-2020, of which 50 000 toe for 2015**.

We thus consider that **the target for 2015 was reached up to 97%**.

E. ENERGY EFFICIENCY IN THE HOUSING SECTOR

According to the PNAEE, this programme includes the following components as follows

- ➢ Implementing the National programme for the improvement of energy performance of blocks of flats,

According to the data supplied by the competent authority - the Ministry of Regional Development and Public Administration through the National programme for the improvement of energy performance of blocks of flats, funded pursuant to GEO No 18/2009, approved by **Law No 158/2011 as subsequently amended and supplemented,** energy efficiency works were performed **by 31 December 2015** on **1 554 blocks of flats**, from various climate areas, consisting of approximately **59 208 flats**. According to the legislative act, the blocks of flats included in the programme have been subject to intervention works mainly on their envelope, so that the annual specific energy consumption for heating could drop below 100 kWh/m^2.

The progress in completing the works on the blocks of flats included in the national programme mentioned above is shown in Table 12.

Table 12

Period of time	No of completed blocked of flats	No of completed flats
2011	521	18 878
2012	61	2 285
2013	75	2 184
2014	68	3 534
2015	36	953
TOTAL	**1 554**	**59 208**

Figure 19

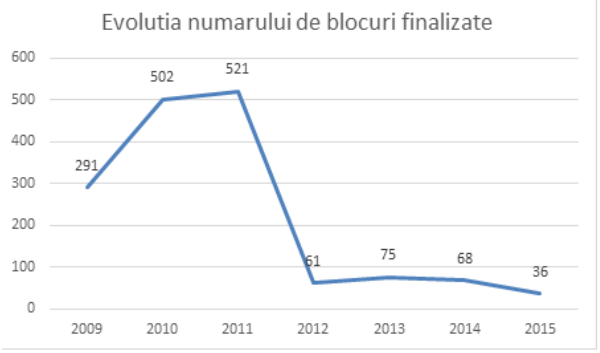


Figure 20

RO	EN
Evolutia numarului de blocuri finalizate	**Evolution in the number of blocks of flats completed**
Evolutia numarului de apartamente finalizate	**Evolution in the number of flats completed**

When calculating the target, account was taken of the cumulated effect of restoration in the period 2011- 2015, and thus the resulting energy saving in 2015 in residential buildings **included in the national programme (approximately 40% of the final energy consumed prior to building restoration)** is shown in Table 13.

Table 13

Energy saving calculated	
Primary energy [kWh]	**thousand toe**
536349528	46.12

Source: MDRAP

- Implementation of *Local multiannual programmes* on increasing energy performance of blocks of flats

The data submitted by the public local authorities reveal that, under the *Local programmes* funded pursuant to the provisions of **Article II of GEO No 63/2012 amending and supplementing Government Emergency Order No 18/2009 on improving energy performance of the blocks of flats**, intervention works on the envelope of blocks of flats were completed on 216 buildings by 31 December 2015, which refers to approximately **9 626 flats**, for which the primary energy saving calculated is shown in Table 14.

Table 14

Energy saving calculated	
Primary energy [kWh/year]	**thousand toe/year**
74 993 966	6.45

Source: MDRAP

- Implementation of the *Programme for thermal rehabilitation of the blocks of flats* funded from structural and cohesion funds

Under the Programme for thermal rehabilitation of the blocks of flats funded from structural and cohesion funds of the European Union, in accordance with the rules and procedures for accessing these funds and in the conditions established in the procedural documents specific for the implementation of operational programmes, by 31 December 2015:

- a number of **138 contracts were concluded, referring to works for increasing the energy performance of 728 blocks of flats**, consisting of **30 617 flats**;
- a number of **57 contracts were completed, referring to 248 blocks of flats, namely 12 633 flats.**

The energy saving thus resulting in the residential buildings included in this programme (approximately 40% of the final energy consumed prior to restoration of the buildings) is shown in Table 15.

Table 15

Energy saving calculated	
Primary energy [kWh/year]	**thousand toe/year**
45 558 388	3.92

- *Purchasing high performance electric equipment*

The PNAEE provides for such purchases for the population, public buildings, including governmental buildings and the service sector. However, the specialised institutions make global statistics, oriented towards the analysis of the sales volume, without specifications on the category of consumers or on the energy saving. Consequently, the assessment of the impact of the PNAEE uses data made available thanks to GfK TEMAX® România, which reveal the following situation for 2015:

The sale performance for Q3 2015 was exceeded by the performance of the first two quarters, for a value amounting to EUR 534 million. This is an **increase of 9.5% for the durable goods market as compared to Q3 2014**.

The large and small household appliances and electronics sectors have contributed to this result. Instead, the value of the IT sector, as well as of the sector of printers, multifunctional devices and consumables has decreased.

The year 2015 was characterised by intense promotional activities, which contributed to increasing the durable goods market.

In Q2 2015, the value of the large household appliances sector reached **EUR 95 million**, and all the categories included therein contributed to the total surplus of **more than 11%**. While built-in household appliances and refrigerators recorded 2-digit increases, the washing machines slowed down the increase rate to 1 digit. There are no signs of stagnation in refrigerator sale evolution, which recorded **a 20% surplus** in Q 2 2015.

The sales of large household appliances recorded an increase rate of approximately 11% in Q3 2015, up to an amount of EUR 127 million – which is 12 million more than in Q3 2014. The increase resulted from the seasonal sales of refrigerating appliances (refrigerators and freezers), as well as of built-in household appliances, which have continued their ascending trend. The washing machine market has slowed down, recording a 1-digit increase rate in Q3.

Project on 'Improving energy efficiency in low-income households and communities in Romania'

The project is run according to the Project Document signed in June 2011 by MDRAP and the United Nations Development Programme (UNDP), in the period June 2011 - June 2016. The project is based on the Action Plan of the Country Programme for 2010 - 2012 adopted by the Government of Romania and UNDP. The Project Document has been approved by the Secretariat of the Global Environment Facility (GEF), who has delegated MDRAP and UNDP Romania as implementing authorities.

The project beneficiaries at local level are the administrative units in: Călan, Petrila, Petroșani, Vulcan (Hunedoara County) and Calafat, Craiova (Dolj County).

The budget of the project amounts to USD 3.05 million (GEF and UNDP grant), and the main results consist of the thermal rehabilitation of 7 social buildings in the 2 beneficiary counties Dolj and Hunedoara. Moreover, promotion actions were conducted by drafting three brochures on the self-implemented measures of thermal rehabilitation of buildings, with natural and accessible materials as follows:

- Self-implemented measures of thermal rehabilitation of buildings, with natural and accessible materials for plateaux, pre-mountainous and mountainous areas in Romania
- Self-implemented measures of thermal rehabilitation of buildings, with natural and accessible materials for low areas in Romania
- Self-implemented measures of thermal rehabilitation of buildings, with natural and accessible materials - building insulation by wall covering,

and the 'Electronic register of thermally restored buildings in Romania' is being completed.

F. ENERGY EFFICIENCY in GOVERNMENTAL BUILDINGS and PUBLIC SERVICES

- Energy efficiency in buildings held or occupied by the central public administration**:**

In order to implement the provisions of Article 5(1) of Directive 2012/27/EU on energy efficiency and the provisions of Annex 11 points c) and d) of Law No 121/2014 on energy efficiency, an inventory was made for the buildings exceeding 250 m^2, which includes relevant energy data on these buildings, as laid down in Order No 3466/2013 of MDRAP, published in the Official Gazette of Romania, Part I, no 778/2013, and in Order No 263/2015 of MDRAP, published in the Official Gazette of Romania, Part I, no 490/2015.

In order to achieve the annual restoration ratio of 3% for this building category, calculated in relation with the total useful area of the heated and/or cooled buildings, held and occupied by the central public administration, the following actions have been taken:

a) the following actions have been launched/achieved for **160 buildings**, as appropriate:

- technical assessment of the building frame structure;
- energy audit, including the preparation and display of the energy performance certification of the inventoried buildings;
- energy efficiency plans with specific objectives and actions in terms of the major restoration/ thermal rehabilitation of the inventoried buildings, and the estimated energy saving;

b) **a number of 185 buildings** have been subject to energy performance improvement works consisting of:

- replacement of exterior joinery with energy efficient joinery;
- partial thermal insulation of certain elements of the building envelope;
- replacement of incandescent/fluorescent luminaires with energy saving luminaires with high energy efficiency;
- revision/repair of interior heating installations, including the replacement of central heating units with high-efficiency units;

c) a number of 97 buildings have been subject to complex energy performance

improvement works (major restoration).

The primary energy savings calculated after completion of the specific works for energy efficiency improvement are shown in Table 16.

Table 16

Energy saving calculated	
Primary energy [kWh/year]	**thousand toe**
15 317 584	2.24

- **Thermal rehabilitation of public buildings**

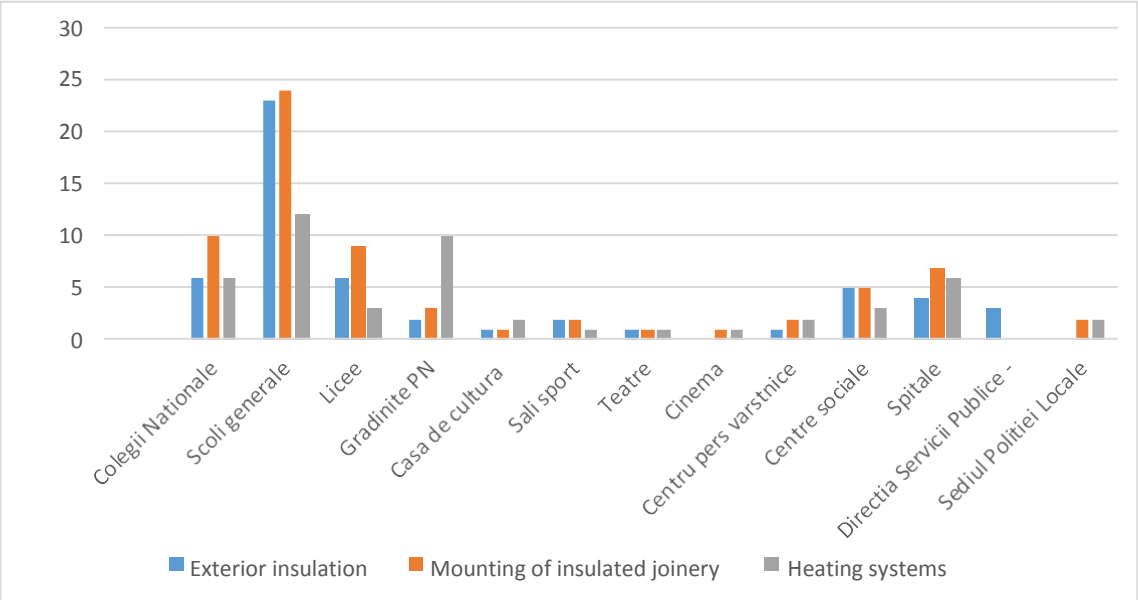
In order to assess the impact of this measure, in January 2016, ANRE sent letters to **103 municipalities** having more than 20 000 inhabitants **(Letter No 5455 of 26 January 2016)** requesting data on the thermal upgrading of public buildings. By the time of drafting this report, 60 municipalities have replied and reported the following achievements:

- in Table 17 and Figure 21: reports for 2014
- in Table 18 and Figure 22: reports for 2015

Table 17

Building type	**Exterior insulation**	**Mounting of insulated joinery**	**Heating systems**
National Colleges	6	10	6
Elementary schools	23	24	12
High schools	6	9	3
Kindergartens Standard Hours	2	3	10
Cultural House	1	1	2
Sports Halls	2	2	1
Theatres	1	1	1
Cinema		1	1
Elderly Centre	1	2	2
Social Centres	5	5	3
Hospitals	4	7	6
Directorate for Public Services	3		
Local Police Headquarters		2	2
TOTAL	**54**	**67**	**49**

Figure 21



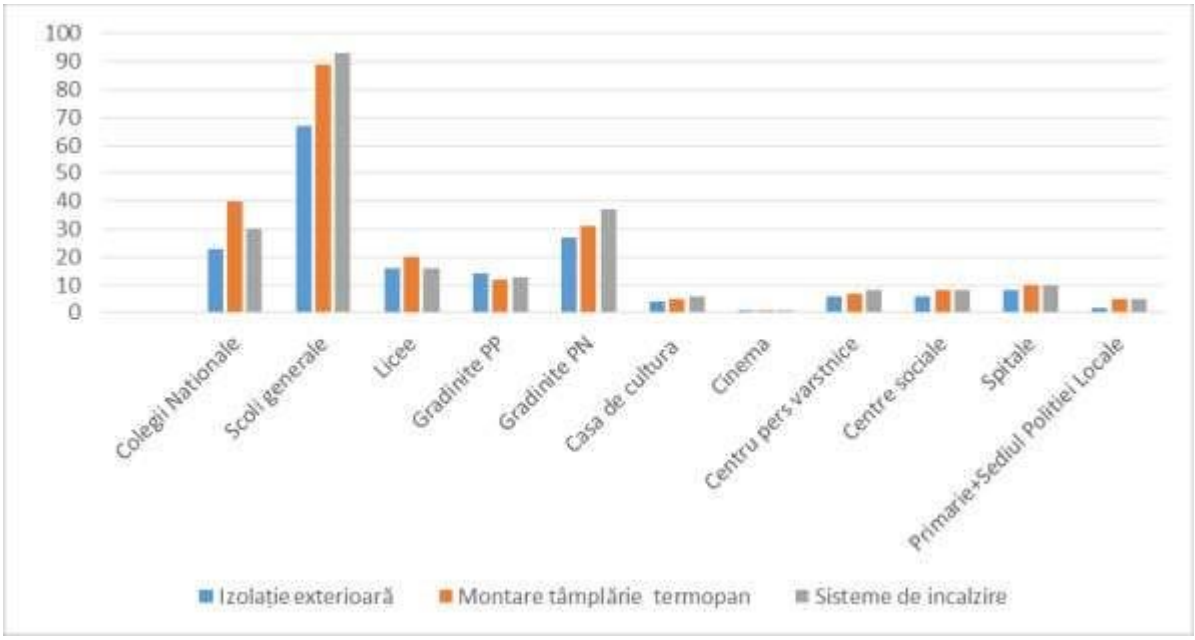
RO	EN
Colegii nationale	National Colleges
Scoli generale	Elementary schools
Licee	High schools
Gradinite PN	Kindergartens Standard Hours
Casa de cultura	Cultural House
Sali sport	Sports Halls
Teatre	Theatres
Cinema	Cinema
Centru pers varstnice	Elderly Centre
Centre sociale	Social Centres
Spitale	Hospitals
Directia servicii publice	Directorate for public services
Sediul politiei locale	Local Police Headquarters

Table 18

Building type	Exterior insulation	Mounting of insulated joinery	Heating systems
National Colleges	23	40	30
Elementary schools	67	89	93
High schools	16	20	16
Kindergartens Extended Hours	14	12	13
Kindergartens Standard Hours	27	31	37
Cultural House	4	5	6
Cinema	1	1	1

Elderly Centre	6	7	8
Social Centres	6	8	8
Hospitals	8	10	10
Town Hall + Local Police Headquarters	2	5	5
TOTAL	**108**	**228**	**227**

Figure 22



RO	EN
Colegii nationale	National Colleges
Scoli generale	Elementary schools
Licee	High schools
Gradinite PP	Kindergartens Extended Hours
Gradinite PN	Kindergartens Standard Hours
Casa de cultura	Cultural House
Cinema	Cinema
Centru pers varstnice	Elderly Centre
Centre sociale	Social Centres
Spitale	Hospitals
Primarie + Sediul politiei locale	Town Hall + Local Police Headquarters
Izolatie exterioara	Exterior insulation
Montare tamplarie termopan	Mounting of insulated joinery
Sisteme de incalzire	Heating systems

We can notice a significant increase in the number of public buildings subject to thermal rehabilitation, the largest share consisting of different categories of educational establishments: colleges, elementary schools, kindergartens.

A very low number of municipalities had sufficient data to also report the value of the energy saving achieved through these rehabilitations.

G. ENERGY EFFICIENCY in the TRANSPORT SECTOR

The data supplied by the competent authority - the Ministry of Transport - reveal that the main projects conducted under the PNAEE are the following:

- **Extension of the underground in Bucharest**
  The savings resulting from the replacement of the old trains with **16 new trains** produced by the Spanish company CAF, the parallel supply of the traction installation and the replacement of fluorescent lighting with LED system lighting in 5 underground stations, were estimated to **747 toe/year**.

- **Upgrading of rail transport**
  C.N. CFR has implemented 5 energy efficiency measures leading to energy savings of 1 903 toe/year, SNTF CFR Calatori SA has implemented energy efficiency measures leading to energy savings of 139 toe/year and SNTF CFR Marfa SA has implemented energy efficiency measures leading to energy savings of 64 toe/year.

- **Upgrading of water-borne transport**

  CN Administrația Porturilor Maritime SA Constanta has implemented 12 energy efficiency measures leading to energy savings of **105 toe/year**.

- **Upgrading of air transport**

Pursuant to Joint Order No 169/2011 approving the National Action Plan on reducing greenhouse gas emissions in the area of civil aviation for the period 2011-2020, drawn up in accordance with the recommendations of the International Civil Aviation Organisation (ICVO), the Directorate for Air Transport draws up annually, for the previous calendar year, a report on actions for more efficient consumption of aviation fuel and for reducing greenhouse gas emissions due to civil aviation activities.

The efficiency indicators for 2011, 2012, 2013, 2014 calculated based on the ratio fuel quantity/tonnes kilometre are:

- Efficiency indicator for 2011: 203506000 l kerosene/546088917 tonnes.km=0.372
- Efficiency indicator for 2012: 182719000 l kerosene/490119064 tonnes.km=0.372
- Efficiency indicator for 2013: 168200000 l kerosene/484088685 tonnes.km=0.347
- Efficiency indicator for 2014 180769000 l kerosene/502596946 tonnes.km=0.359

- **Urban Public Transport**

  The analysis of the *Programmes for energy efficiency improvement* received has revealed that energy efficiency measures have been implemented leading to energy savings of 2 280 toe/year for a period of two years as follows. The savings made in 2014 amounted to **1 692 toe/year**, and in 2015 to **590 toe/year**. The main measures applied aimed at:

- upgrading the infrastructure of tramway transport network
- purchasing new vehicles with better energy efficiency
- mounting automated compensation devices for the power factor
- mounting monitoring systems for the gas oil consumption
- mounting monitoring systems for the consumption for interior and exterior lighting
- upgrading the heating systems of large halls in depots.

ENERGY SAVINGS OBTAINED THROUGH THE ALTERNATIVE MEASURES ADOPTED (information in accordance with **Annex 11 part i point e)** to Law No 121/2014) – Table 19.

Table 19

Programme	**Measure**	**Target**	**Achieved**
A – Increase of energy efficiency in networks	• Decrease of CPT in the RED	10 000	**4 331**
	• Decrease of CPT in the RET	1 000	**3 017**
B – Promotion of high-efficiency cogeneration	• Promotion of high-efficiency cogeneration	20 000	**228 244**
C – District heating 2006-2016	• 'District heating 2006-2016' Programme	24 000	**2 279**
D – Energy audit and management	• Energy audit and energy management	50 000	**47 256**
E - Energy Efficiency in the housing sector	• Thermal rehabilitation of the blocks of flats	58 000	**46 120**
F – Energy efficiency in governmental buildings and public services	• Thermal rehabilitation of governmental buildings	3 000	**2 240**
	• Thermal rehabilitation of public buildings (town halls, schools,	5 000	*
G - Energy Efficiency in the transport sector	• Upgrading of rail transport	17 000	**2 897**
	• Upgrading of water-borne transport	500	**105**
	• Upgrading of air transport	700	**113**
	• Upgrading of urban public transport	19 600	**590**

*The municipalities did not have sufficient data to also report the value of the energy saving achieved through these rehabilitations

6. STATUS OF THE DRAWING UP OF ENERGY AUDITS AND ACCESS TO THE SYSTEMS FOR ENERGY AUDITOR AUTHORISATION AND FOR ENERGY MANAGER CERTIFICATION

The authorisation of energy auditors/certification of energy managers supports the promotion and development of a system which ensures the availability of audits able to unlock the potential of energy saving among final energy consumers.

The relevant number of energy auditors authorised each year indicates the opening of the energy services market, thus offering final energy consumers the possibility to conduct energy audits in accordance with the provisions of the law. Thanks to the information regarding the types of authorisations and the contact details of the persons authorised by ANRE, made available on the website of ANRE, free and unconditional access of the stakeholders in ensured.

The transparent and non-discriminatory minimum requirements for the energy audits prescribed by the *Rules for the authorisation of energy auditors* provides a basis for the development of some quality works having the aim of identifying certain measures for the improvement of energy efficiency at the final energy consumer and of achieving the targets for energy saving undertaken by Romania in the ***National Energy Efficiency Action Plan 2014–2020***.

Pursuant to the provisions of **Article 3(2)(g) of *Law No 121/2014 on energy efficiency, the Department for Energy Efficiency*** of ANRE is responsible for certifying energy managers and for authorising energy auditors.

In the context of **Article 9(13) of *Law No 121/2014 on energy efficiency,*** requirements and conditions for certifying energy managers for municipalities having more than 20 000 inhabitants has to be stipulated.

The Rules for certifying energy managers and for approving companies providing energy services and ***the Rules for authorising energy auditors in industry*** **bring in new elements as compared to the rules approved by *Order No 38/2013 of the President of ANRE***, as follows:

- clarifications concerning the minimum criteria to be met when drafting the energy audits - requirement imposed by ***Directive 2012/27/EU*** **and thus by *Law No 121/2014 on energy efficiency*;**
- approval conditions for the professional trainers organising specialised courses in the energy audit drafting and in the area of energy management;
- based on an analysis of the request of the economic operators and of the courses curricula, new BA level lines of study, eligible for the certification of energy managers: electronics engineering and telecommunications, transport engineering, material engineering; environment engineering;
- the *List of equipment* was inserted, including the essential devices necessary for performing the measurements when conducting the energy audits;
- the conditions for suspending and withdrawal of energy auditor authorisations and energy manager certificates were reviewed;

- reporting obligations were inserted for the energy managers conducting their activity as freelancers, as well as for companies providing energy services;

- requirements and conditions were inserted for the certification of energy managers for municipalities having more than 20 000 inhabitants.

The main objective of energy management applied in a company is to ensure judicious and efficient energy consumption with a view to maximising profit by minimising energy costs, and thus increasing the company's competitiveness on the market.

Energy management services are of major importance in a company for monitoring energy consumptions and for reducing the related costs by implementing a plan for improving energy efficiency containing energy efficiency measures leading to measurable energy savings with visible effects in decreasing energy costs.

This is possible either by employing an ANRE-certified energy manager in the company, or by concluding an energy management contract with a freelancer (PFA) certified by ANRE or with a company providing energy services and employing minimum one ANRE-certified energy manager.

By ensuring effective energy management, the economic operators will thus benefit of:

- An increase in energy efficiency and a decrease in energy consumption with a view to reducing costs;
- Accountability of the different compartments of the company for specific energy-related issues and good communication between compartments;
- The development and use of a monitoring system for energy consumptions;
- The reporting of consumptions and the development of specific strategies for optimising consumptions;
- Identification of methods for decreasing costs through short time frame for investment recovery;
- Installation operation at optimum parameters;
- The development of interest from all the employees to use energy efficiently, and their education through specific programmes on minimising energy loss;
- Supply safety for energy facilities.

The assessment of energy management in the analysis of many energy management programmes implemented in various activity fields has proven that:

• energy and money savings amounting to 5-15% may be obtained in a very short time, with minimum costs or even without costs, by just applying aggressive energy management,

• energy and money savings of up to 30% may be obtained with low and medium costs and with short amortisation period. The application of such measures is frequent;

• high cost investments in modern technologies and equipment may lead to savings of 50-70%, where the amortisation periods may be up to 5-6 years.

The discussions held with energy managers during the energy manager certification process have revealed that the most important action for ensuring success in implementing the *Programme for energy management* is to involve the top management in

the running of the programme. The objectives of the programme may not be achieved without this commitment. The role of the energy manager in involving the management team in the running of the programme is thus crucial.

There are two cases, with equal chances, to start a *Programme for energy management*:

- in the first case, the management team may decide that a *Programme for energy management* is needed and may decide its implementation. In this case, the energy manager needs to react with responsibility,

- in the second case, the employee in charge of energy-related issues has decided to convince the management team of the need to implement a *Programme for energy management*, which implies the employee's aggressive reaction.

The best way of convincing the management team of the need to implement a Programme for energy management is to show results based on energy efficiency calculations and on statistical analysis of consumptions and costs.

- ***Summary results of energy auditor authorisation activities in industry***

Certification situation at the end of 2015: **431 energy managers, 233 energy auditors as natural persons, 73 energy auditors as legal persons of which 17 energy auditors as freelancers, 59 companies providing certified energy services (of which 19 freelancers).**

The structure of authorisations/certifications/approvals in 2015 is shown in **Table 20**.

Table 20

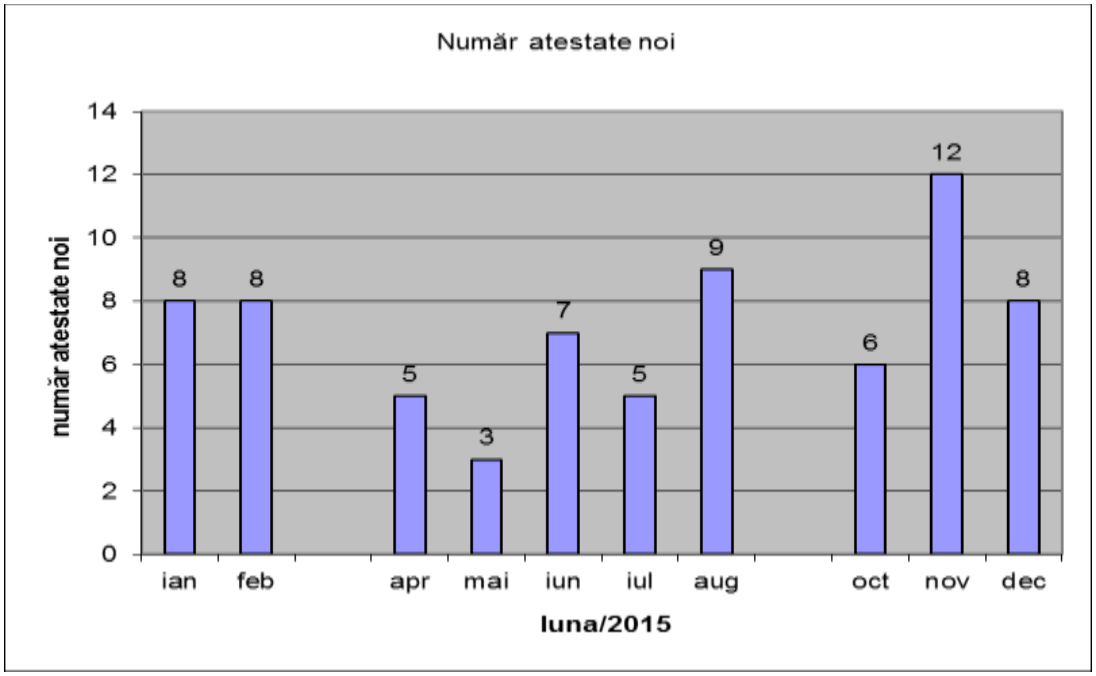
	Total	**New certificates/authorisations**	**Extended certificates/authorisations**
Energy managers	123	71	52
Energy auditors as natural persons	53	43	10
Energy auditors as legal persons	14	12	2
Companies providing certified energy services	17	-	-

The activity of authorisation/certification/approval by month in 2015 is as follows:

6.1 Energy manager certifications

Figure 23

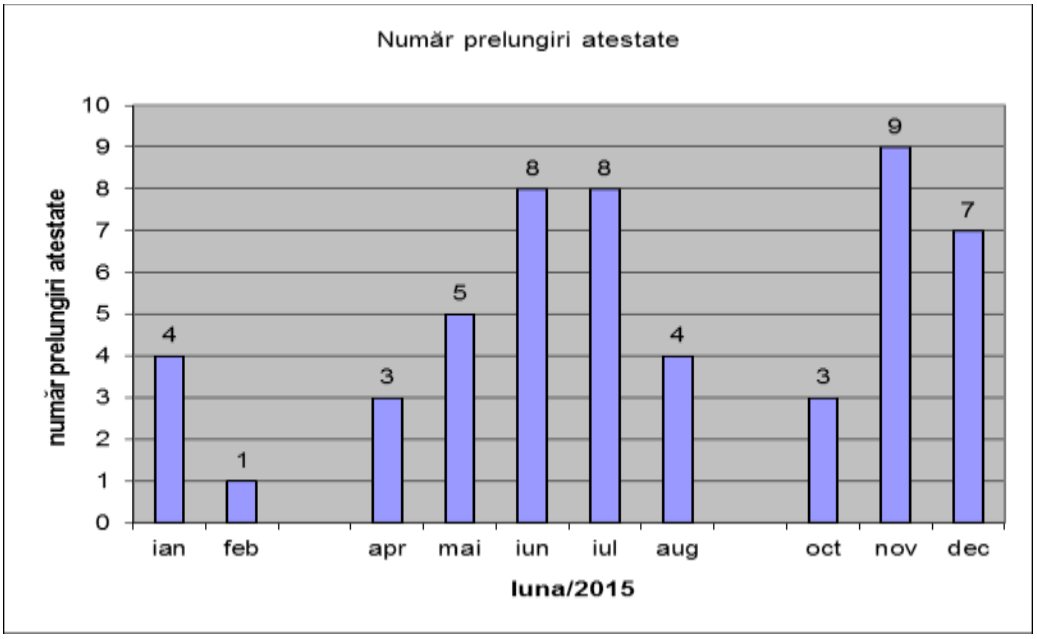
New certificates for energy managers granted in 2015



RO	EN
Numar atestate noi	Number of new certificates
Luna/2015	Month/2015

Figure 24

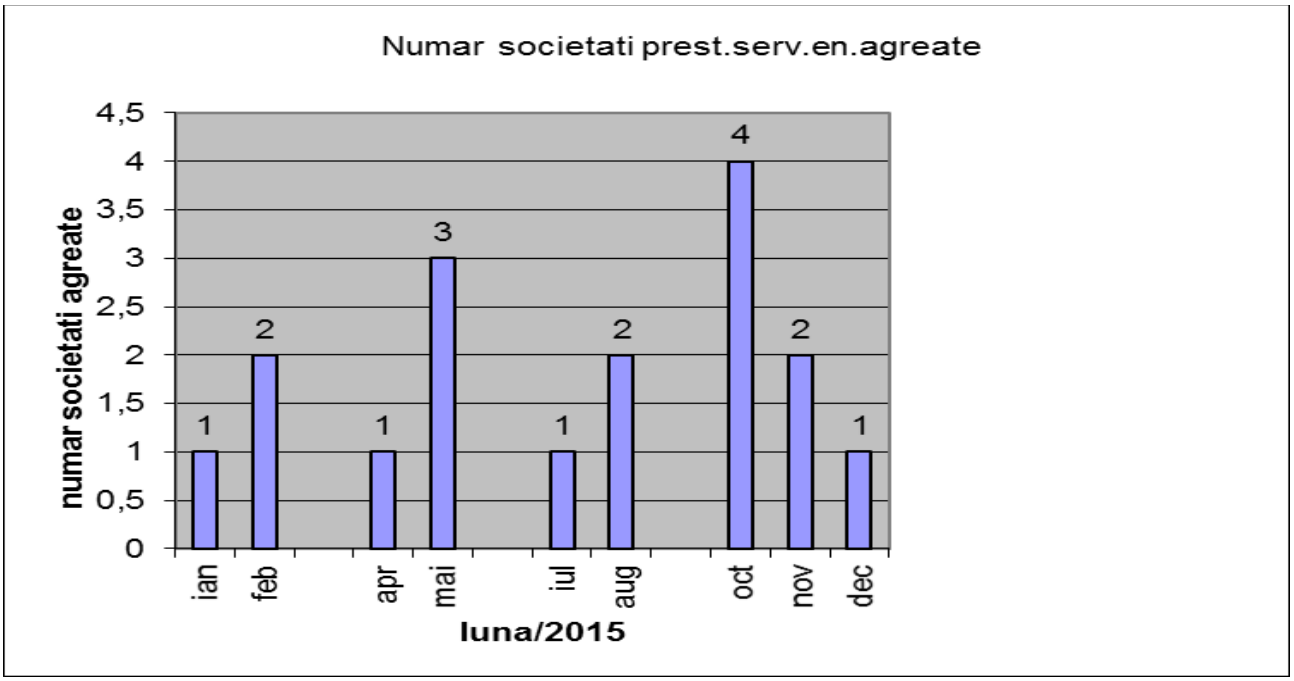
Extended certificates for energy managers granted in 2015



RO	EN
Numar prelungiri atestate	Number of extended certificates
Luna/2015	Month/2015

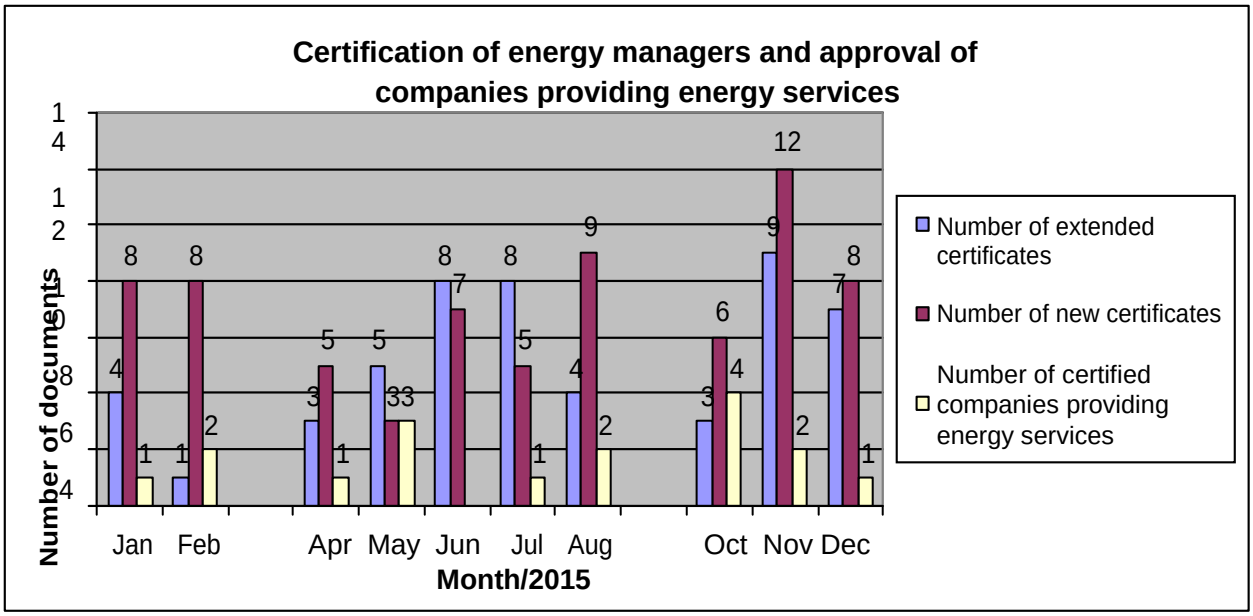
Figure 25

Certified companies providing energy services in 2015



RO	EN
Numar societati prest. serv. en. agreate	Number of certified companies providing energy services
Numar societati agreate	Number of certified companies
Luna/2015	Month/2015

Figure 26



6.2. Energy auditor authorisations

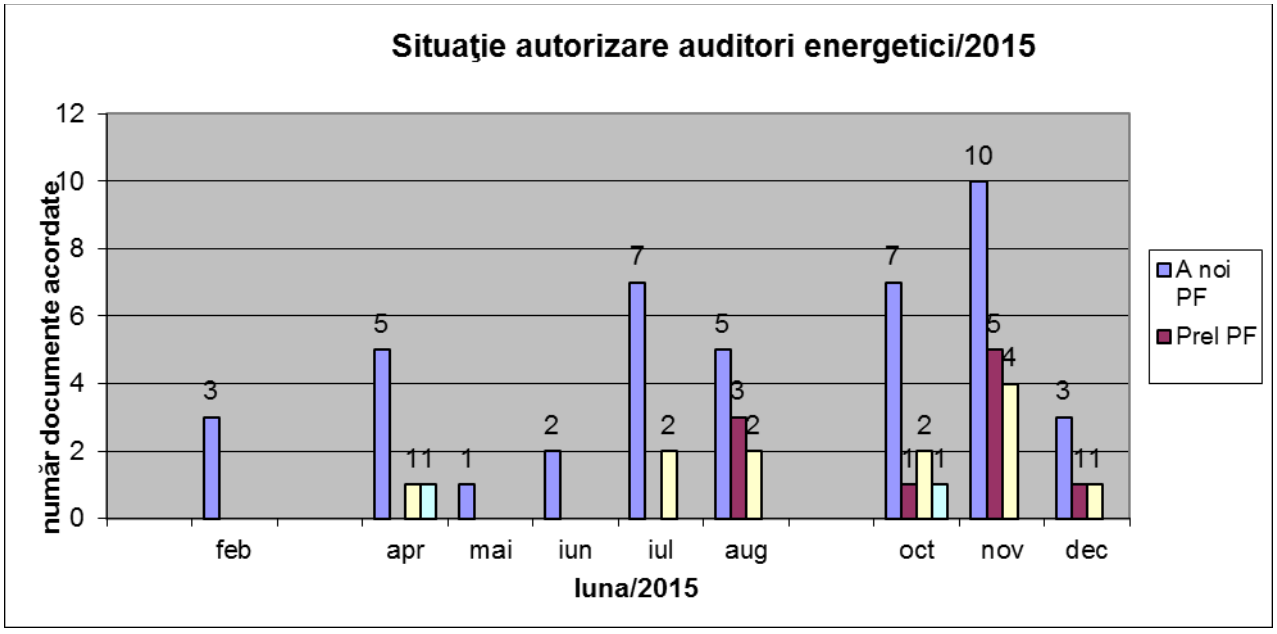
An increase in the number of economic agents having conducted energy audits in 2015 and a **double number of authorised energy auditors** are to be noticed. These increases may be explained in the context of the provisions laid down in **Article 9 of Law No 121/2014 on energy efficiency** providing for the obligation to conduct an energy audit every four years for all energy consumers, except for the SMEs.

Table 21

H. Year	LP auditors having conducted energy audits	Economic ag. having conducted energy audits	Energy efficiency measures	Estimated energy savings (toe)
2015	73	448	1 118	247.611

As a result of implementing energy efficiency legislation, the number of economic operators having conducted energy audits has increased as from 2013. Moreover, the number of energy auditor authorisations for natural and legal persons has increased.

Figure 27



RO	EN
Situaţie autorizare auditori energetici/2015	Energy auditor authorisation/2015
Numar documente acordate	Number of documents granted

A noi PF	A new NP
Prel PF	Ext. NP
Luna/2015	Month/2015

Figure 28

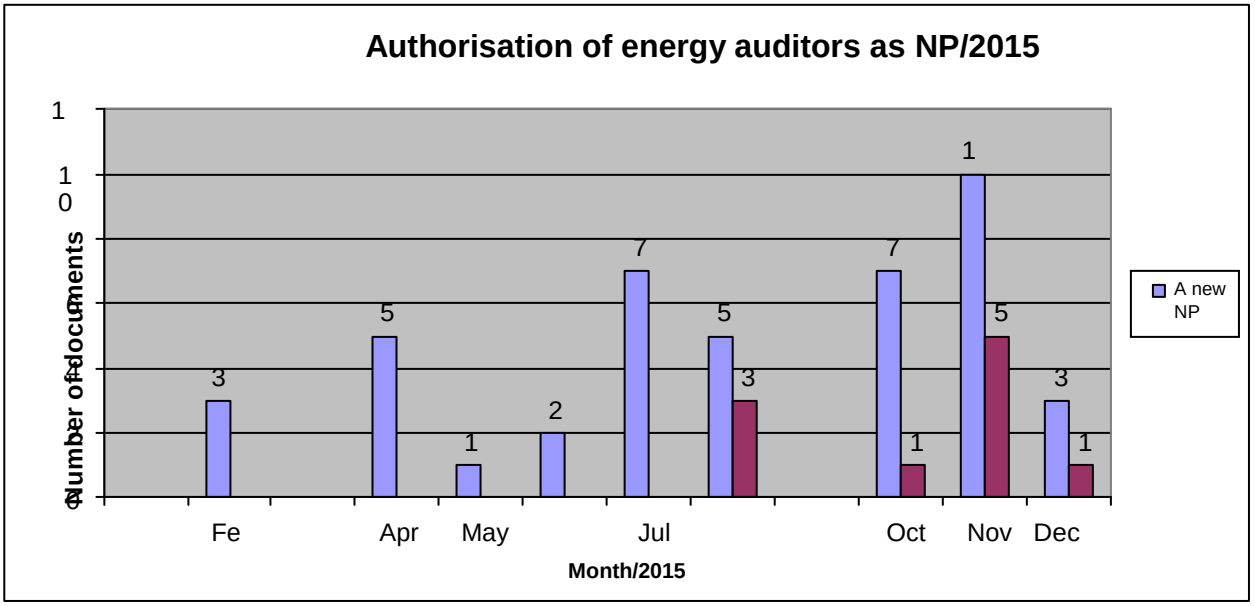
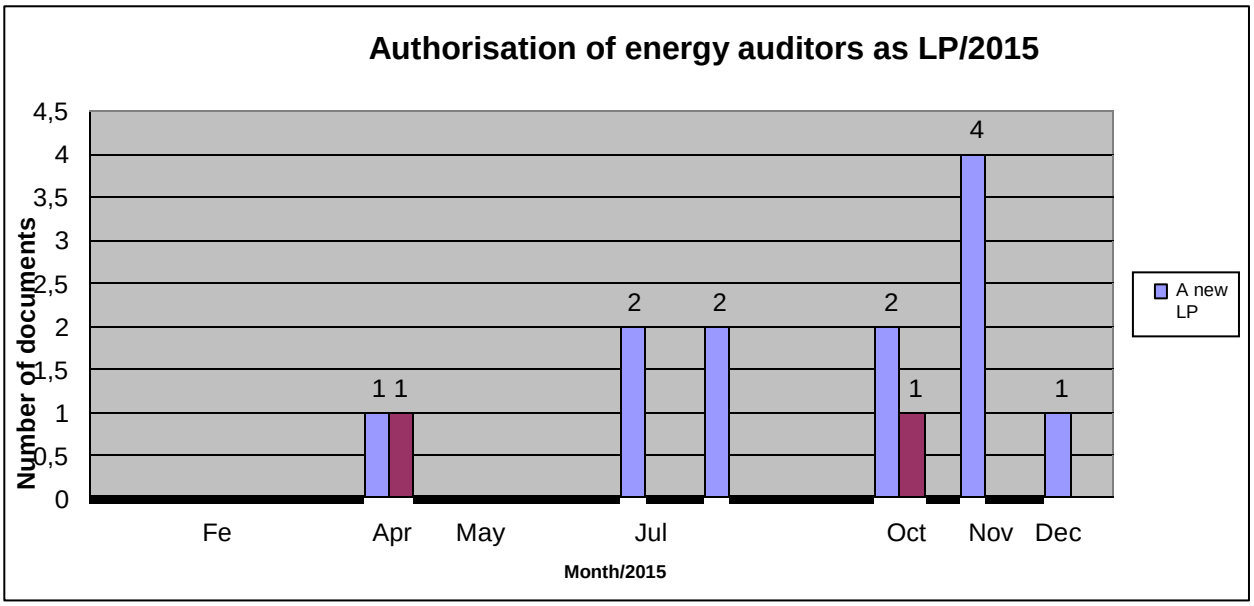


Figure 29



According to the ***Rules for authorising energy auditors in industry*** **approved by Decision No 2794/2014 of ANRE-DEE, the energy auditors who are legal persons** have to submit the ***Annual report on the activity of conducting energy audits*** to the *Authorising Commission* of ANRE-DEE, by 30 January of the year following the analysed year***.*** The content and the way of drafting this report are shown in Annex 12 to the rules in the legislative act mentioned above.

The activity reports of the energy auditors as legal persons (including freelancers) on the energy audits drawn up in 2015 have been received and summarised. All **73 legal persons authorised as energy auditors** have submitted their Report on drafting the energy audits for 2015. In particular: **19 legal persons (of which 6 freelancers)** conducted no energy auditing activity in 2015, and **54 legal persons (of which 11 freelancers)** conducted energy audits.

The reports of the **54 energy auditors have revealed that energy audits have been conducted at 431 economic agents**, where more than 1 000 efficiency improvement measures have been found, having led to energy savings of **247 611 toe/year, with investments of approximately RON 750 761 thousand**.

By way of example, we point out some of the frequently proposed measures:

- variable torque drives,
- loss decrease in compressed air network,
- compensation of the power factor,
- optimisation of burning in ovens,
- optimisation of operation in plants and technological flows,
- increasing efficiency of lighting in production halls.

The status of energy audit drafting in the period 2010 – 2015, is shown in Table 22

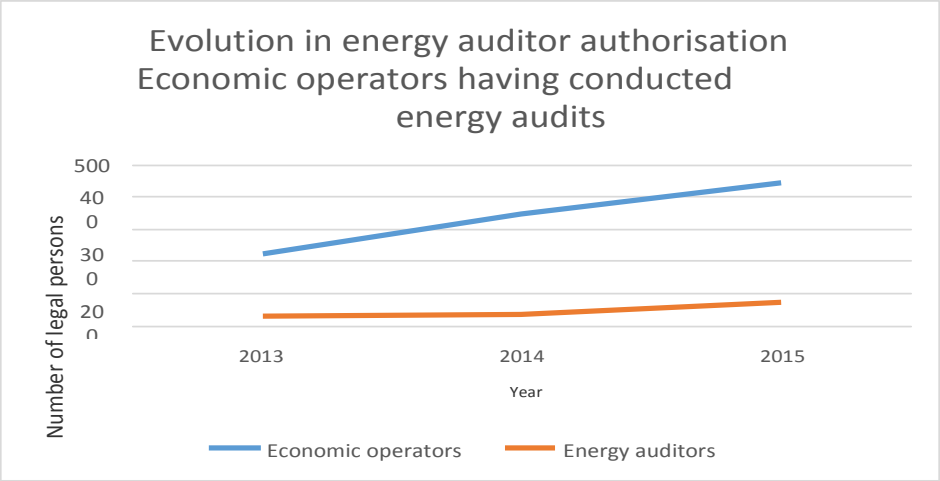
Table 22

Year	Auditors	Economic ag.	Energy efficiency measures	Estimated energy savings (toe)	Estimated costs (thousand RON)
2010	14	72	275	176 200	1 628 212
2011	6	41	103	112 171	128 813
2012	23	198	564	406 652	1 791 466
2013	33	226	701	196 705	663 684
2014	37	349	432	26 790	1 160 678

2015	**73**	**431**	**1 118**	**247 611**	**750 761**

An increase in the number of economic agents having conducted energy audits in 2015 and a double number of authorised energy auditors are to be noticed. These increases may be explained in the context of the provisions laid down in ***Article 9 of Law No 121/2014 on energy efficiency*** providing for the obligation to conduct an energy audit every four years for all energy consumers, except for the SMEs. The evolution in energy auditor authorisation as compared to the number of economic operators having conducted energy audits for the period 2013-2015 is shown in Figure 30.

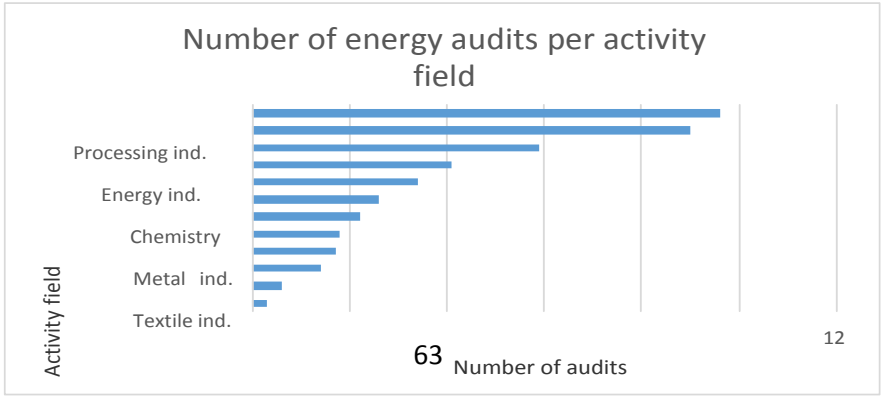
Figure 30



Factors having determined the increase in the number of economic operators having conducted energy audits as from 2013: application of the legislation on energy efficiency, the price of electricity and natural gas, the change in consumers' behaviour.

The number of energy auditor authorisations for legal persons has doubled as compared to 2014. The situation is due to a big demand of such services from the economic operators who record annual energy consumptions above 1 000 toe and who have to conduct energy audits on the whole contour of energy consumption in accordance with the provisions of ***Law No 121/2014 on energy efficiency***.

Figure 31



An overview of the energy audits broken down by activity field is shown in **Figure 32**. This graphic shows that most of the energy audits have been conducted in the areas of services, processing industry and food industry. As compared to 2014, a significant number of economic operators in the area of transport have conducted energy audits.

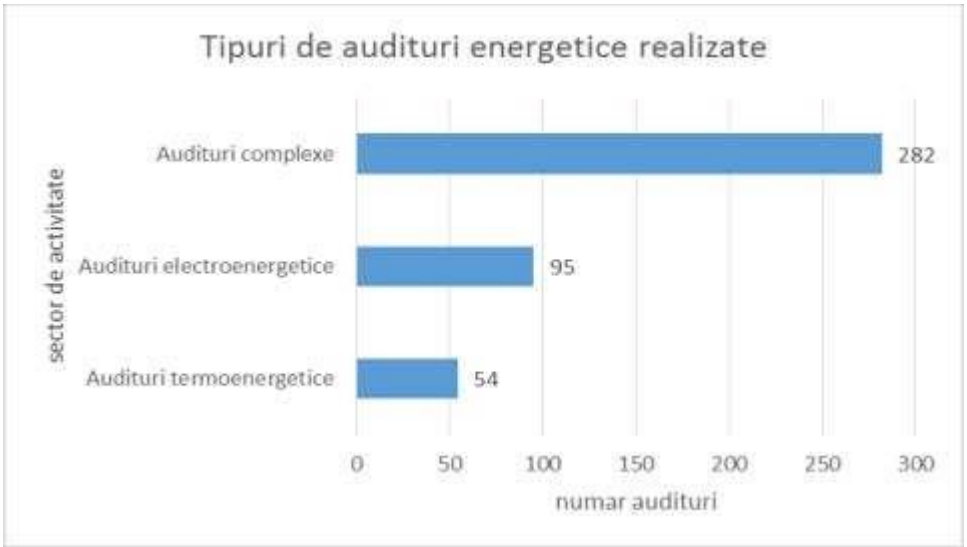
Whereas the provisions of **Article 9 of *Law No 121/2014 on energy efficiency*** also apply to consumers who did not have the obligation to conduct the energy audit until the entry into force of the law, the compliance with the provisions of the above-mentioned law is checked for the category of consumers of less than 200 tonnes oil equivalent of energy. The economic operators in this segment mainly conduct their activity in the area of services: consulting, IT, trade, storing, insurance-reinsurance companies, media.

The energy savings estimated to be obtained as a result of implementing the energy efficiency measures recommended by the energy auditors may be broken down by type of energy audit conducted, as follows:

Table 23 - Table on the number of energy audits and energy savings estimated in toe by type of energy audit

	Number of audits			**Energy savings (toe)**		
	PFA	LP	TOTAL	PFA	LP	TOTAL
Thermal power audits	3	51	54	81	58 681	58 762
Electric power audits	9	86	95	109	8 050	8 159
Complex audits	36	246	282	3 243	177 447	180 690
TOTAL	**48**	**383**	**431**	**3 433**	**244 178**	**247 611**

Figure 32



RO	EN
Tipuri de audituri energetice realizate	Types of energy audits achieved
Audituri complexe	Complex audits
Audituri electroenergetice	Electric power audits
Audituri termoenergetice	Thermal power audits
Sector de activitate	Activtiy field
Numar audituri	Number of audits

The graphic above shows that most of the energy audits conducted are of the complex type. This share is due to the obligation stipulated in **Article 9(1)(a) of *Law No 121/2014 on energy efficiency*** for the economic operators recording annually energy consumption higher than 1 000 tonnes oil equivalent, namely to conduct an energy audit on the whole energy consumption contour, which implies conducting a complex-type energy audit.

According to the reports submitted by the energy auditors who are legal persons, the highest energy savings may be obtained as a result of complex energy audits, as shown in Figure 33.

Figure 33

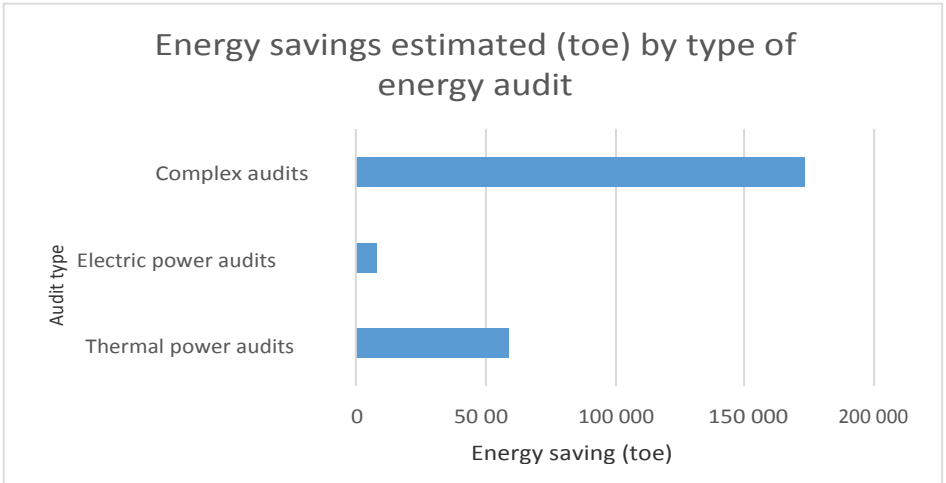


Figure 34 shows the energy savings found to have been obtained as a result of the implementation of the energy efficiency measures recommended by different types of energy audit.

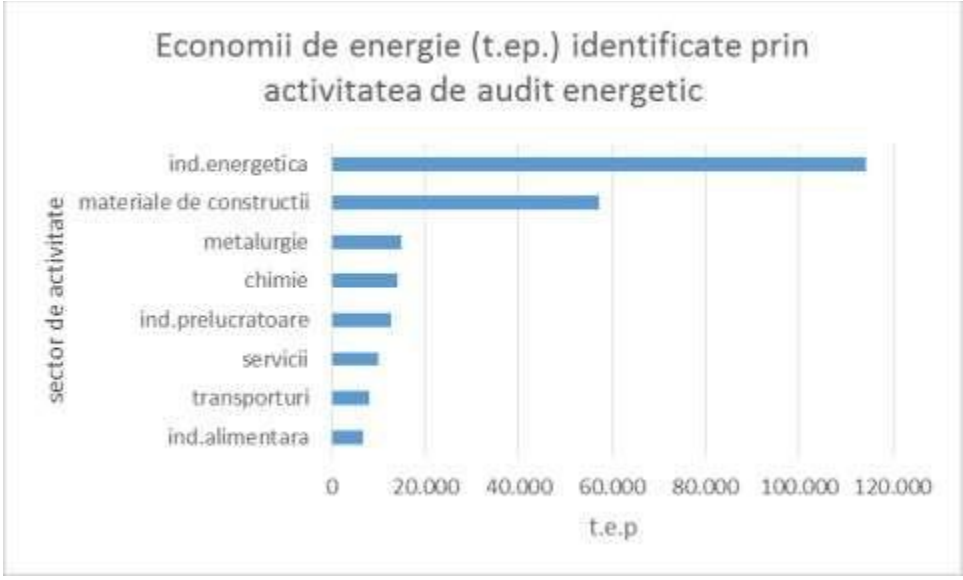
As a result of the energy audits, more than 1 000 energy efficiency measures have been recommended, whose implementation could lead to the energy savings estimated **Table 24**.

Table 24

Industrial sector	Estimated energy savings (toe)
Metal industry	17 492
Chemistry	14 058
Constructions	289
Transport	8 010
Energy ind.	118 801
Processing ind.	13 136
Food ind.	6 816
Textile ind.	952
Wood processing	692
Building materials	57 230
Services	9 895
Average	240
TOTAL	**247 611**

The energy savings estimated to be obtained in various activity fields as a result of the implementation of the energy efficiency measures recommended by the energy audits are shown in Figure 34.

Figure 34



RO	EN
Economii de energie (t.ep.) identificate prin activitatea de audit energetic	Energy savings (toe) found by the energy audit activity
Sector de activitate	Activtiy field
Ind. energetica	Energy ind.
Materiale de constructii	Building materials
Metalurgie	Metal industry
Chimie	Chemistry
Ind. prelucratoare	Processing ind.
Servicii	Services
Transporturi	Transport
Ind. alimentara	Food ind.
tep	toe

The graphic above shows that the highest energy savings may be obtained as a result of the energy efficiency measures recommended in the energy industry. The following types of energy efficiency measures have been proposed in this activity field:

- Replacing the old pipes and insulation with pre-insulated pipes;
- Putting in place an information system for real-time monitoring of the operation of the whole district heating system, and of the losses in various areas;
- Replacing the old boilers with boilers re-located from plants where consumption decreased (as a result of disconnection);
- Avoiding the operation of power boilers at low loads;
- Operating all plants at normal parameters;
- Upgrading the district energy systems, in particular those sited in conurbation areas;
- Replacing conventional engines with high energy efficiency engines;
- Replacing cascade compressors with high efficiency and variable speed compressors.

Significant estimated energy savings may also be obtained in the area of building

materials. The energy efficiency measures in this segment aim at:

- Using high efficiency asynchronous motors (IE3);
- Compensating the power factor;
- Inserting variable torque drives;
- Decreasing losses of compressed air.

The following energy efficiency measures have been recommended in the area of transport:

- Monitoring and managing the transport routes in the process of goods delivery and reception;
- Mounting fuel consumption gauges on vehicles from the fleet with a view to real-time monitoring of the fuel consumptions in relation with the routes monitored by GPS;
- Training programmes for drivers (eco-driving system).

Concerning the costs for implementing the energy efficiency measures recommended by the energy auditors, a high value of investments proposed in the energy and processing industries can be noticed. The energy auditors have included in these fields a series of measures on replacing old equipment with other, more energy efficient equipment, which are solutions requiring high investments for implementation.

Concerning the number of energy managers, the database updated on 30 December 2015 shows the situation in Table 25.

Table 25

Number of economic operator found with more than 1 000	Number of economic operators with authorised managers	Authorised energy managers within economic operators	Energy management contracts with Freelancers (PFA) and Companies providing energy services	Coverage (%)
682	672	441	231*	98.5

*energy management contracts concluded by 21 PFA and 37 companies providing energy services

More and more economic operators have become aware of the benefits of energy management in companies, and they have launched the implementation of quality standard SR EN ISO 50001 on energy management. In this respect, the following economic agents are to be mentioned: OMV PETROM, SC CELESTICA ORADEA, SC ISOVOLTA SA, SC CONTINENTAL AUTOMOTIVE SYSTEMS Sibiu.

7. MEETING EUROPEAN UNION TARGETS

➢ Progress in reaching the national energy efficiency target of reducing primary energy consumption by 19% by the year 2020

The national indicative target **in terms of energy efficiency** is based on the consumption of primary energy.

Romania has established a national indicative energy efficiency target for 2020 to save **10 million toe of primary energy**, which represents a **reduction by 19% in the primary energy consumption (52.99 million toes)** forecast in the Primes 2007 model for the realistic scenario.

The achievement of this target would lead to primary energy consumption of **42.99 million toes**, and to final energy consumption of **30.32 million toes** in 2020.

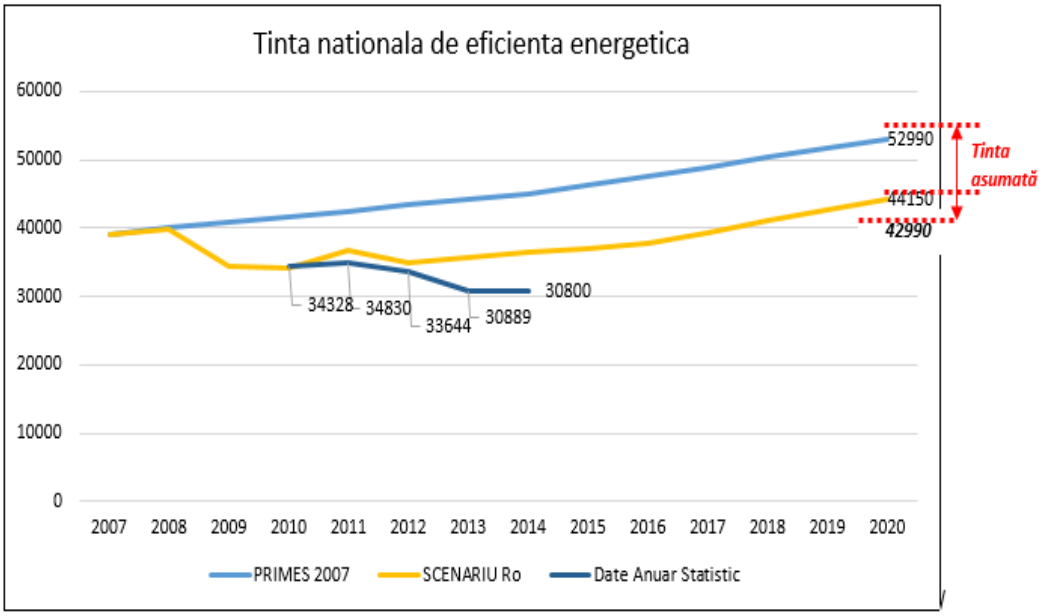
The National Reform Programme ***2014 (PNR 2014)*** is a framework platform for defining reforms and economic development priorities for Romania during a period of 12 months (July 2014 – June 2015), in accordance with the *Europe 2020 strategy* and the documents resulting from the European Semester 2014.

The **Annual report on monitoring the energy savings achieved** has been drawn up based on the reports received from the institutions involved in implementing **Law No 121/2014 on energy efficiency**, **pursuant to Article 8.8**. According to this report, the energy saving achieved for the different components of PNAEE in 2015 was **275 926 toe**. The highest contribution to achieving this level came from the programme on ***Promoting high-efficiency cogeneration.***

Based on the statistical data and on the reports on the 2015 actions received, the status of PNAEE implementation is as follows:

- The primary energy consumption decreased, and its level in 2014 is approximately 14.5% below the forecast curve for 2020 **(44 150 thousand toe)**, which indicates the achievement of the national target of 19% decrease in consumption by 2020 (**42 920 thousand toe**).

Figure 35



RO	EN
Tinta nationala de eficienta energetica	Energy efficiency national target
Tinta asumata	Assumed target
Scenariu RO	Ro Scenario
Date anuar statistic	Statistical Yearbook

- **Progress recorded in promoting electricity production from renewable sources**

- *Evolution of the legislation in the area of promoting electricity production from renewable sources, data supplied by the* **Department for Energy Efficiency of ANRE (Directorate General for Efficiency in the Area of Energy Generation, Transmission, Distribution and Supply)**

The promotion of electricity production from renewable sources (RES-E) is an imperative of the current period at the level of the European Union for the following reasons: environmental protection, increasing energy independence from imports by the diversification of energy supply sources, as well as because of economic and social cohesion reasons. Consequently, taking into account the high level of investment costs relating to the production of RES-E, all European states have put in place support schemes for RES-E.

In this context, by **Government Decision No 1892/2004 *establishing the support scheme of electricity production from renewable energy sources***, a promotion system of green certificates was introduced in Romania, which is a scheme oriented towards competitive market mechanisms, such as the mandatory quota system combined with the trading of green certificates (GC).

The promotion scheme put in place was reconfirmed by **Law No 220/2008**, **hereinafter referred to as *Law***, whose aim is to make the scheme more attractive to investors by introducing new opportunities, including awarding more green certificates, differentiated by type of technology for RES-E production.

The promotion system of green certificates established under the Law was authorised by the European Commission through ***Decision C (2011) 4938 on State aid***

SA 33134 (2011/N) for Romania – Green certificates for promoting electricity from renewable sources.

Pursuant to the primary legislation in the area of promotion of electricity from renewable energy sources, which has been subject to numerous amendments and supplements over time **(GD No 1892/2004 was amended and supplemented by GD No 958/2006, and Law No 220/2008 was amended and supplemented by GO No 29/2010, Law No 139/2010, GEO No 88/2011, Law No 134/2012, GEO No 57/2013, Law No 23/2014 and Law No 122/2015),** ANRE has drawn up and subsequently amended and supplemented whenever necessary the regulatory framework specific to this area.

With a view to implementing the promotion scheme authorised by the European Commission and transposed in the national legislation by **GEO No 88/2011**, ANRE has issued:

- **Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, approved by Order No 42/2011 of ANRE**;
- **Rules for issuance of green certificates, approved by Order No 43/2011 of ANRE**;
- **Rules for the organisation and the operation of the green certificate market, approved by Order No 44/2011 of ANRE**;
- **Methodology for establishing the annual quotas of green certificates, approved by Order No 45/2011 of ANRE**;
- **Methodology for monitoring the promotion scheme for energy from renewable sources through green certificates, approved by Order No 6/2012 of ANRE.**

In 2012, the Parliament of Romania adopted **Law No 134/2012 approving GEO No 88/2011, which brought amendments to the GC promotion scheme**.

With a view to implementing the provisions of this law, ANRE issued **Order No 37/2012 amending and supplementing the Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, approved by Order No 42/2011 of ANRE**.

Subsequently, by **GEO No 57/2013**, new amendments were brought to the green certificate promotion scheme established by Law, and ANRE issued the following acts with a view to its implementation:

- **Order No 55/2013 of ANRE amending and supplementing the Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, approved by Order No 42/2011 of ANRE, as subsequently amended,**
- **Order No 55/2013 of ANRE amending and supplementing the Rules for issuance of green certificates, approved by Order No 43/2011 of ANRE,**
- **Rules for the organisation and the operation of the green certificate market, approved by Order No 57/2013 of ANRE, as amended by Order No 25/2014 of ANRE.**

Moreover, in the same year 2013, the ***Methodology for monitoring the promotion***

scheme for energy from renewable sources through green certificates was amended by Order No 17/2013 of ANRE.

In March 2014, ***Law No 23/2014 approving GEO No 57/2013 amending and supplementing Law No 220/2008 establishing the system for promoting the production of energy from renewable sources*** was published in the **Official Gazette of Romania No 184 of 14 March *2014*,** for whose implementation the following rules were issued:

- **Order No 48/2014 of ANRE approving the Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, revision 1;**
- **Order No 49/2014 of ANRE approving the Methodology establishing the mandatory annual quotas of electricity produced from renewable sources of energy benefiting from the green certificate promotion system and the green certificate purchase quotas, revision 1;**
- **Order No 144/2014 of ANRE approving the Methodology establishing the mandatory annual quotas of electricity produced from renewable sources of energy benefiting from the green certificate promotion system and the green certificate purchase quotas, revision 2;**
- **Order No 4/2015 of ANRE approving the Rules for issuance of the green certificates.**

The amendments to the GC promotion system brought through **Law No 134/2012, GEO No 57/2013 and Law No 23/2014 were authorised by the European Commission by *Decision C(2015) 2886 of 4 May 2015*.**

In June 2015, ***Law No 122/2015 approving certain measures in the area of promoting the production of electricity from renewable sources of energy and amending and supplementing certain administrative acts***, was published in the **Official Gazette of Romania No 387 of 3 June *2015,*** for whose implementation the following rules were issued:

- **Order No 100/2015 of ANRE amending and supplementing the Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, approved by Order No 48/2014 of ANRE;**
- **Order No 138/2015 of ANRE amending and supplementing the Rules for certification of the producers of electricity from renewable sources of energy with a view to applying the green certificate promotion scheme, approved by Order No 48/2014 of ANRE, as subsequently amended and supplemented;**
- **Order No 101/2014 of ANRE approving the Methodology establishing the mandatory annual quotas of electricity produced from renewable sources of energy benefiting from the green certificate promotion system and the green certificate purchase quotas, revision 3;**
- **Order No 60/2015 of ANRE approving the Rules for the organisation and the operation of the green certificate market, revision 2;**
- **Order No 166/2015 of ANRE amending and supplementing the Rules for the organisation and the operation of the green certificate market.**

Moreover, in the same year 2015, the ***Methodology for monitoring the promotion scheme for energy from renewable sources through green certificates,*** **approved by Order No 78/2015 of ANRE**, was revised.

Concerning the compliance with the European Union requirements related to the certification of origin of the RES-E, the Rules on the certification of origin of electricity produced from renewable sources of energy have been promoted, and they were used as basis by ANRE when issuing the **Procedure for supervising the issuance of guarantees of origin for electricity produced from renewable sources of energy, approved by Order No 23/2004 of ANRE**. Consequently, ANRE set up the Single Register of Guarantees of Origin and, during the period 2005 – 2010, it issued guarantees of origin for electricity produced from renewable sources of energy every semester, and permanently updated the data in this register.

Further to amending the European legislation in the field, by promoting **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**, a reconsideration of the rules on the certification of origin of electricity produced from renewable sources of energy was necessary, and the **Rules on issuing and monitoring the guarantees of origin for electricity produced from renewable sources of energy, approved by GD No 1232/2011** was approved**.**
Pursuant to the provisions of **GD No 1232/2011**, ANRE has implemented the web application for the issuance and monitoring of the guarantees of origin, a secured website specially developed for this purpose, and it started to issue the guarantees of origin based on the new rules as from February 2013.

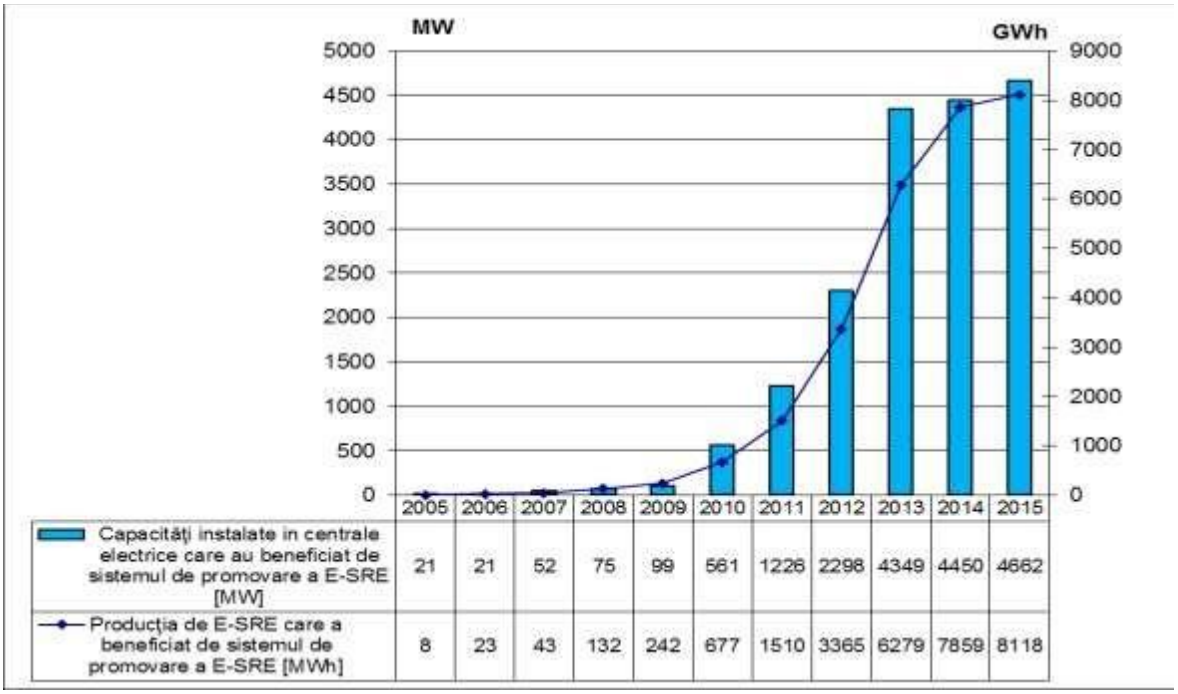
- *Results obtained from the operation of the promotion system for electricity from renewable sources of energy through green certificates*

The promotion system for electricity from renewable sources of energy through green certificates has been operating since 2005.

We further present the evolution of the main indicators of this sector for the period 2005-2015:

- The evolution of the electric capacity installed in power plants having benefited from the promotion system for RES-E and of electricity produced in these power plants for the period 2005÷2015 is shown in Figure 36.

Figure 36

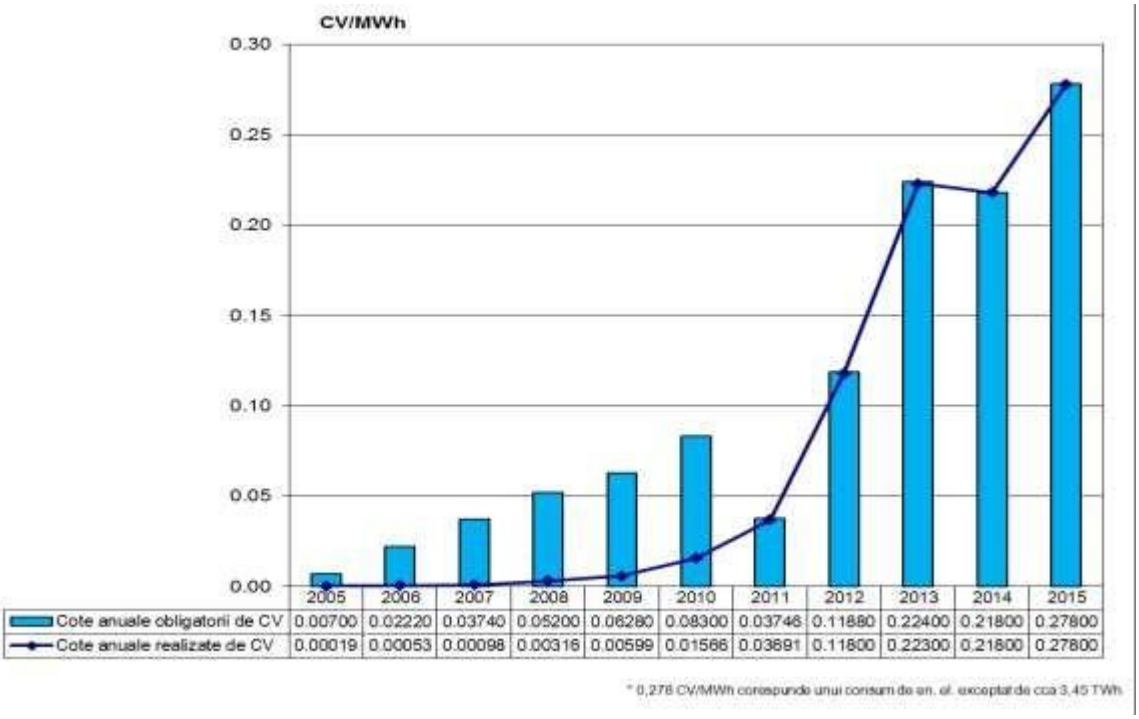


RO	EN
Capacităţi instalate in centrale electrice care au beneficiat de sistemul de promovare a E-SRE [MW]	Capacities installed in power plants having benefited from the promotion system for RES-E [MW]
Producţia de E-SRE care a beneficiat de sistemul de promovare a E-SRE [MWh]	Production of RES-E having benefited from the promotion system for RES-E [MWh]

Note 1: The values of the capacities installed in power plants having benefited from the promotion system for RES-E refer to each end of calendar year
Note 2: The value of the capacity installed in power plants having benefited from the promotion system for RES-E for 2014 also contains the power plants with expired temporary certification

- The evolution of the mandatory annual quotas of GC and of the GC purchase quotas achieved by the economic operators having the obligation to purchase green certificates, in the period 2005÷2015 is shown in Figure 37.

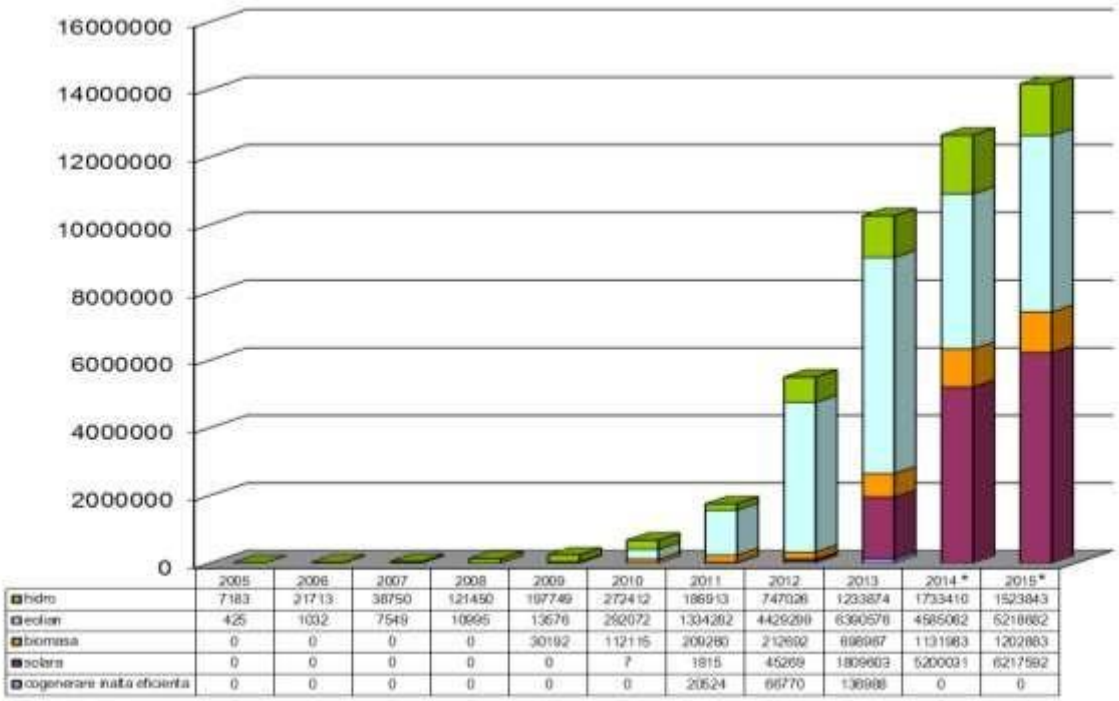
Figure 37



RO	EN
CV	GC
Cote anuale obligatorii de CV	Annual mandatory quotas of GC
Cote anuale realizate de CV	Annual quotas of GC achieved
0,276 CV/MWh corespunde unui consum de en. el. exceptat de cca 3,45 TWh	0,276 GC/MWh corresponds to exempt electricity consumption of approx. 3,45 TWh

The annual evolution of the number of GC issued since the application of the RES-E promotion system to present is shown in Figure 38.

Figure 38



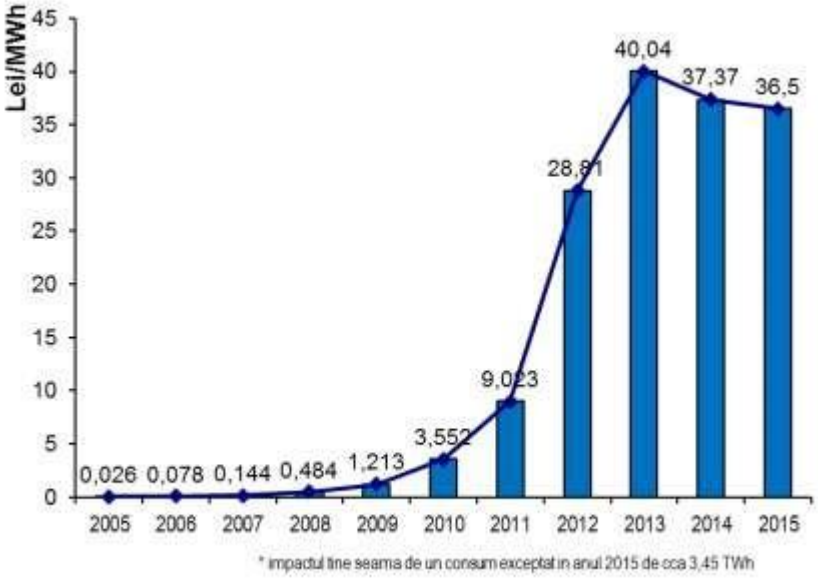
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014 *	2015*
hidro	7183	21713	38750	121450	197749	272412	186913	747028	1233874	1733410	1523843
eolian	425	1032	7549	10995	13676	262072	1334282	4429289	6360576	4585062	5218882
biomasa	0	0	0	0	30192	112115	209280	212692	699987	1131983	1202883
solara	0	0	0	0	0	7	1815	45269	1809803	5200031	6217592
cogenerare inalta eficienta	0	0	0	0	0	0	20524	66770	136988	0	0

RO	EN
Hidro	Hydro
Eolian	Wind
Biomasa	Biomass
Solara	Solar
Cogenerare inalta eficienta	High-efficiency cogeneration

*the value for biomass also contains high-efficiency cogeneration

- The evolution of the impact of implementing the promotion system for RES-E on the price of electricity at the final consumer for the period 2005÷2015 is shown in Figure 39.

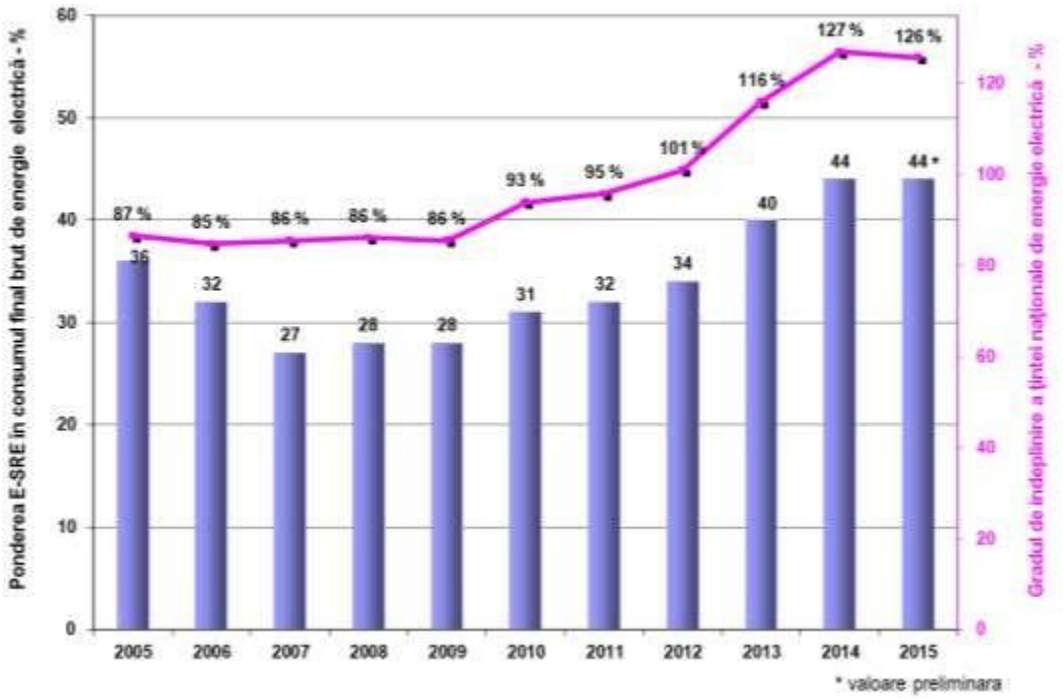
Figure 39



RO	EN
Lei	RON
impactul tine seama de un consum exceptat in anul 2015 de cca 3,45 TWh	The impact considers exempt consumption of approx. 3,45 TWh in 2015

- The evolution of the level of achievement of the national target of RES-E in the gross final consumption of electricity in Romania in the period 2005-2014 is shown in Figure 40.

Figure 40



RO	EN
Ponderea E-RES in consumul final brut de energie electrica - %	Share of RES-E in the gross final consumption of electricity - %
Gradul de indeplinire a tintei nationale de energie electrica - %	Level of achievement of the national target of electricity - %
Valoare preliminara	Preliminary value

- *Monitoring of the promotion system for electricity from renewable energy sources through green certificates*

The Methodology for monitoring the promotion system for electricity from renewable energy sources through green certificates, **approved by *Order No 78/2015 of the President of ANRE***, details the way of conducting the analysis on the overcompensation of the support granted for the producers of RES-E benefiting from the support scheme.

The cost-benefit analysis updated for analysis year 2015 at aggregated level for each category of RES-E production technology, taking into account the indicators resulting from the mediation of costs and according to the capacities estimated for commissioning, has revealed an overcompensation risk for solar power plants.

Taking into account this situation and the fact that the green certificate promotion system established by ***Law No 220/2008*** **establishing the system for promoting the production of energy from renewable sources, republished, as subsequently amended and supplemented (*Law*)** applies to the producers for electricity produced from renewable sources, including for electricity produced during the testing period, it will no longer be possible to take measures on adjusting the support granted for solar power plants under the current support scheme through green certificates, based on the certification decision issued by ANRE, for the commissioning and refurbishment of groups/plants achieved by the end of 2016.

8. ANALYSIS OF THE STRUCTURE OF ELECTRICITY CONSUMPTION AT FINAL CONSUMERS

As far as the analysis of the evolution of the structure of electricity consumption at final consumers is concerned, based on the data processed by ANRE for the year 2014, the data shown in Table 26 reveal the following:

- the final consumption of electricity recorded in 2014 increased by 1.5% as compared to 2013;
- the amount and share of the household consumption in the final consumption in 2014 as compared to 2013 was maintained;
- the consumption of non-household consumers having changed their supplier increased by approximately 18% in 2014 as compared to 2013, and its share in the final consumption increased by approximately 9% in 2014 as compared to 2013;
- the consumption of non-household consumers supplied in a regulated system decreased by approximately 51% in 2014 as compared to 2013, and its share in the final consumption decreased by approximately 9%.

Table 26

	2008		2009		2010		2011		2012		2013		2014	
	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%	GWh	%
Consumers supplied under a regulated	23 416	51	23 046	55	21 365	49	20 289	44	20 779	45	18 966	43	15 213	34
Household	10 376	23	10 990	26	11 246	26	11 590	25	11 987	26	11 670	27	11 626	26
Non-household	13 040	28	12 057	29	10 119	23	8 699	19	8 792	19	7 296	17	3 587	8
Consumers supplied under a competition	22 414	49	18 536	45	22 075	51	25 625	58	25 105	56	24 805	57	29 235	66
Household	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-household	22 414	49	18 536	45	22 075	51	25 625	58	25 105	56	24 805	57	29 235	66
Total final consumption	45 830	100	41 583	100	43 440	100	45 814	100	45 884	100	43 771	100	4 448	100

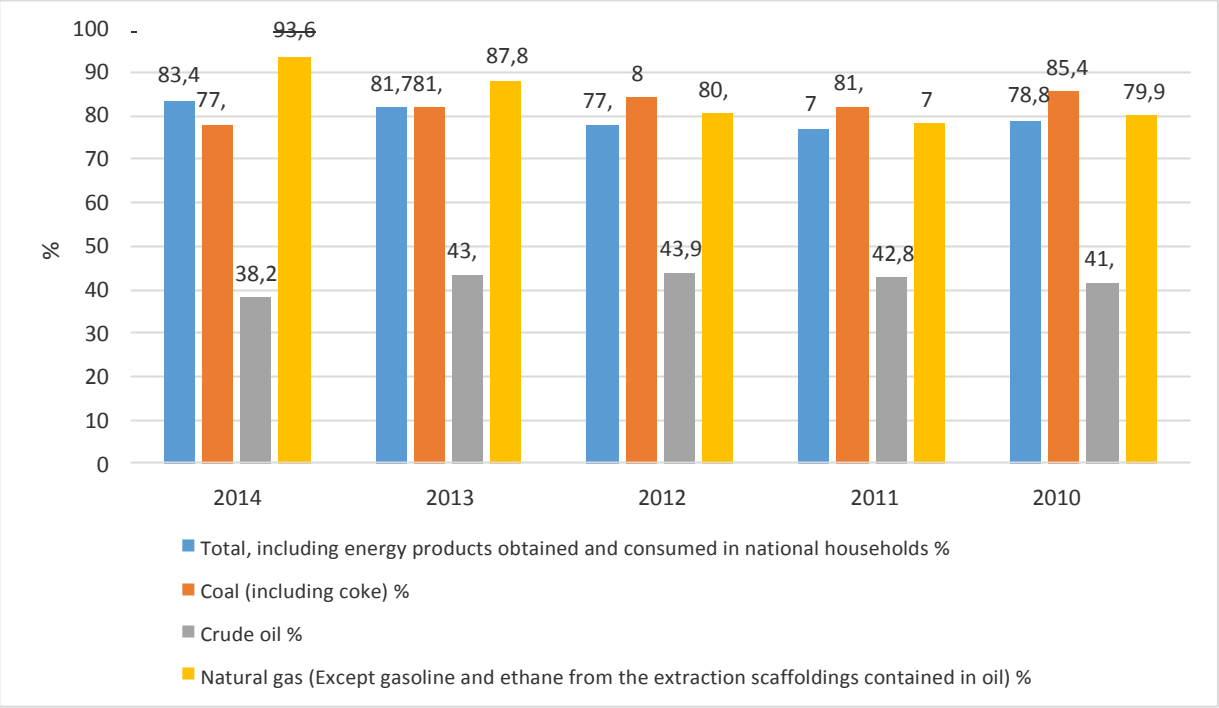
9. LEVEL OF ENERGY INDEPENDENCE

Table 27

Item	Indicator	MU	2014	2013	2012	2011	2010
1	**Total**, including energy products obtained and consumed in national households	**%**	83.4	81.7	77.7	77	78.8
2	**Coal** (including coke)	**%**	77.8	81.9	84	81.8	85.4
3	**Crude oil**	**%**	38.2	43.4	43.9	42.8	41.5
4	**Natural gas** (Except gasoline and ethane from the extraction scaffoldings contained in oil)	**%**	93.6	87.8	80.3	78	79.9

Source Statistical Yearbook 2015

Figure 41



10. ENERGY SCARCITY

An extremely important issue affecting Romania and not only is people's high poverty and thus energy scarcity.

A EUROSTAT study shows that **40% of the population in Romania** suffers of poverty. According to this study on energy scarcity at European level published by the European Commission in 2015, more than **54 million people** (2012 data) were found to be affected by: increases in the prices of energy, low incomes and low energy efficiency housings.

All the Member States have implemented a series of energy efficiency measures, and based on this study, 30% of the approach of the Member States referring to vulnerable consumers and/or energy scarcity focuses on the need to implement energy efficiency programmes.

According to the principles of the European Union of Energy contained in *Communication **COM/2015/080** of the European Commission,* the measures for more efficient energy consumption, largely disseminated among energy consumers, are essential elements for decreasing the amounts of the energy invoices. The implementation of the measures for increasing energy efficiency will thus be the basis of all future decisions in the context of the European Union of Energy.

Moreover, the conclusions of the ***Citizens Energy Forum 2016*** organised by the European Commission in London in the period 23 - 24 February 2016 include recommendations on **the approach of energy scarcity and the protection of vulnerable consumers, mainly through energy efficiency measures (such as thermal rehabilitation of buildings and eco-design of equipment), together with social policies and protection measures against disconnections.**

Similarly to the other European States, the government approved, in 2015, the ***National Strategy on Social Inclusion and Poverty Reduction for 2015-2020, approved by GD No 383 of 27 May 2015*** under which **ANRE will cooperate with the MMFPSPV to find solutions for the issues faced by vulnerable people at risk of energy scarcity, according to the relevant EU rules, under the *Action Plan for 2015-2020*.** In this case, the **Country Report for Romania** recently published by the European Commission on 26 February 2016 lays down the following: '*The strategy for social inclusion and poverty reduction, adopted in May 2015, provides a comprehensive framework for poverty reduction, but its success depends on concrete and realistic planning, budget availability and cooperation within the central and local public administration and with civil society.'*

In order to make the decision-makers accountable in the area of policies and active measures for increasing energy efficiency, reducing energy scarcity and protecting vulnerable consumers in Romania, the Romanian Academy, at the request of ANRE, has drawn up the study ***'Energy efficiency — national priority for reducing energy scarcity, increasing energy consumers' life quality and safety'*.** This study is published on the website of ANRE.

The study approaches in a unitary and balanced way the issues related to the possibility of reducing energy scarcity in Romania by implementing measures for increasing efficiency in energy consumption, and it also provides an overview of the

current status of the electricity, gas and heat consumption market.

The main conclusions and recommendations of the study drawn up by the Romanian Academy

The general objective of the strategy of the energy sector consists in meeting the need of energy in the present, as well as on a medium and long term, at a price as low as possible, adequate in a modern market economy and for a civilised standard of living, in conditions of quality, safe supply, and compliance with sustainable development principles.

1. Critical issues related to the current social policy that accompanies the reform of the energy system. There are no assessing analyses on the social policy measures related to energy taken in Romania in the last decade.

Recommendation:

Launching a research programme on the social impact of energy consumption in a context of energy price increase in the period 2017-2018. The programme may be conducted under the coordination of the Government of Romania, with support from ANRE for a period of 3 to 5 years and will provide a basis for crystallisation of an energy policy in the social component for the next 10 years.

2. The social policy in the area of energy is characterised by a lack of global strategy. There are many measures, but they are sectoral/local, and they are not gathered under an *integrating vision*: support of vulnerable social groups, policy of energy rehabilitation of housings, ensuring access to energy systems for the entire population, promotion of a culture of energy consumption, local/personal initiatives of energy production (solar, biomass, wind energy, etc.), policy on encouraging rational and responsible energy consumption, promotion of efficient energy systems.

Recommendations:

- The current definitions of energy scarcity have not developed a clear and satisfactory concept, written down in a coherent policy document, and to a national strategy. An accurate definition of energy scarcity in its full complexity is crucial for the development of a social energy policy.
- Launching a national programme for increasing efficiency in household energy consumption. According to a study on the programmes implemented by the EU states, 30% of the programmes related to vulnerable consumers/energy scarcity use the promotion of energy efficiency as main instrument.
- Reconsideration of the heating support system: it is not based on a correlation between the need in fuel for optimum heating, the type of fuel used and the energy status of the housing. Two aspects should be considered.
- Setting up an effective mechanism for the participation of the household consumer to the decisions on energy consumption. The household consumer is poorly represented at national and European decision-making levels.
- ANRE could give a good example in this respect by developing mechanisms and procedures for involving the representatives of the consumers into its operation. The participation of the associations of retired persons could be a very good example.

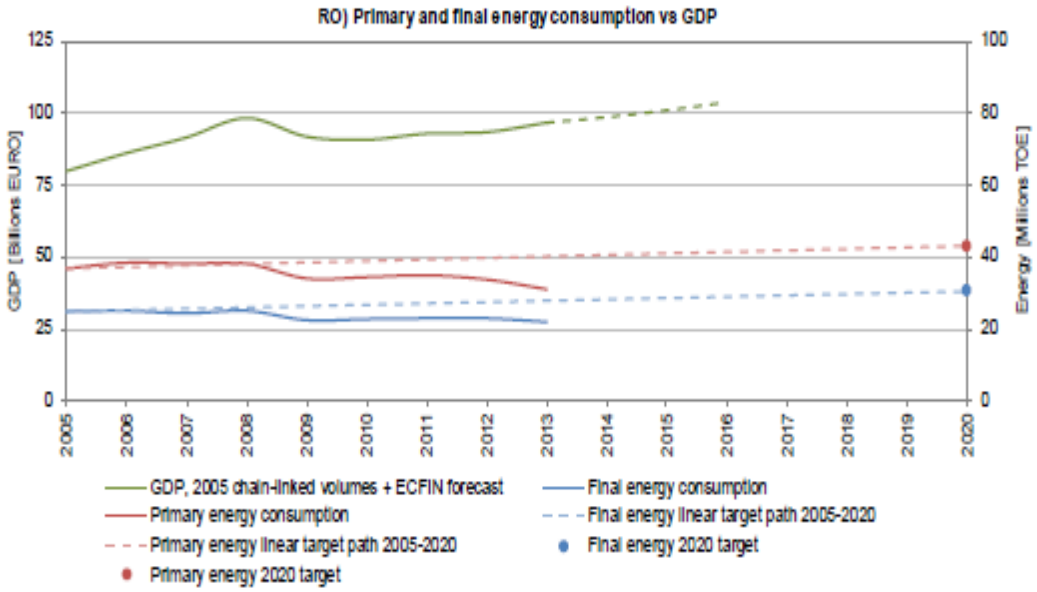
11. CONCLUSIONS

1. For several years, Romania has followed an upward tendency with regard to energy efficiency in the national economy. These tendencies have been obvious, in particular:

- energy consumption has decreased despite economic growth,
- energy efficiency indicators improved.

The objective for 2020 in terms of energy efficiency in Romania is **42.99 Mtoe** expressed as primary energy consumption (**30.32 Mtoe** expressed as final energy consumption). Although the current consumption of primary energy in Romania of **30.8 Mtoe in 2014** is below its objective for 2020, the efforts for increasing energy efficiency have to be pursued in order to maintain primary energy consumption at this level or to record a slight increase so as to meet the 2020 target in spite of economic growth in the next five years.

Figure 42



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The measures for the restructuring of the national economy, the implementation of energy efficiency programmes (including programmes funded by the European Union) in all economic sectors and for the population, as well as the promotion of the use of renewable sources of energy have substantially contributed to these tendencies.

Considering all the above, we consider that reaching the target of **10 million toe** proposed for 2020 is feasible. In addition, there is a real possibility that Romania could exceed this figure by 2020 and achieve savings amounting to **12-15 million toes**, with the related consequences.

2. As compared to 2011, **the consumption of primary energy decreased by 11.6% while the GDP increased by 7.3%.**

3. In industry, **the consumption of energy** in 2014 **was higher (by 2.5%) than in 2013, but the gross added value produced in industry recorded higher increase (3.3%).** Moreover, it should be noted that the consumption of energy in industry in 2014 only accounted for 94% of the value recorded in 2010, while the volume of industrial production increased by 25.9%.

4. The consumption of energy in transport **increased in 2014 by 2.2% as compared to the previous yea**r. We point out that the highest share of energy consumption in this sector was recorded in the road transport. In 2014, the road transport consumed **5 005 thousand toe as compared to the total consumption of 5 473 thousand toe in the transport sector**, namely 91% and it **increased by 3.8% as compared to the previous year**.

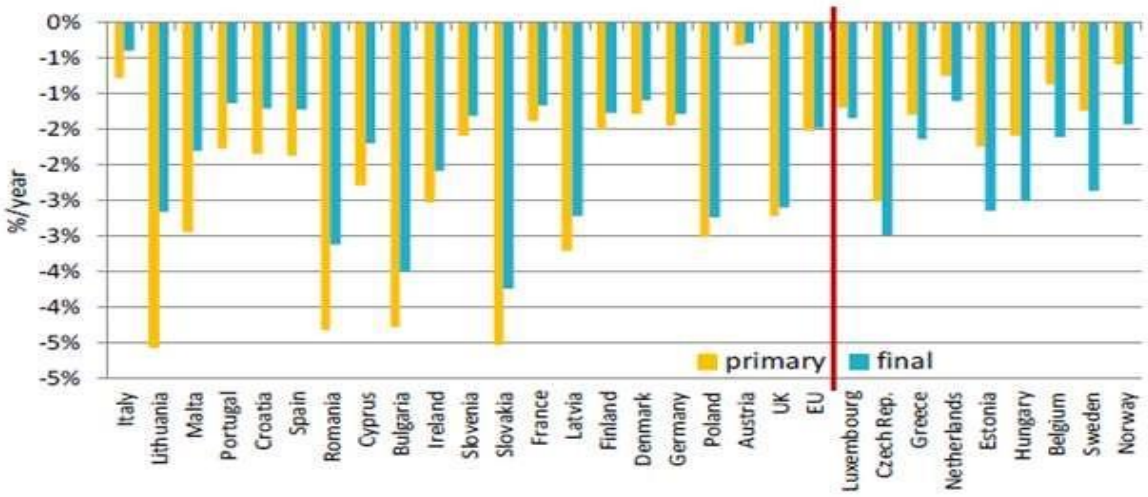
5. Romania records the lowest consumption of electricity per capita in the EU **(0.0513 toe/capita)**, which is **2.6 times lower than the EU-28 average (0.1332 toe/capita).**

6. The primary energy intensity decreased in the period 2010-2014 as follows:

- **by 24%** if calculated in toe/thousand Euros or in toe/thousand Euros PPP;
- **by 17%** if calculated in toe/thousand Euros 2005 or in toe/thousand Euros 2010.

The intensity of primary energy and the intensity of final energy recorded decrease ratios of 4.5%/year and 3%/year respectively as compared to the EU average of 2%.

Figure 43

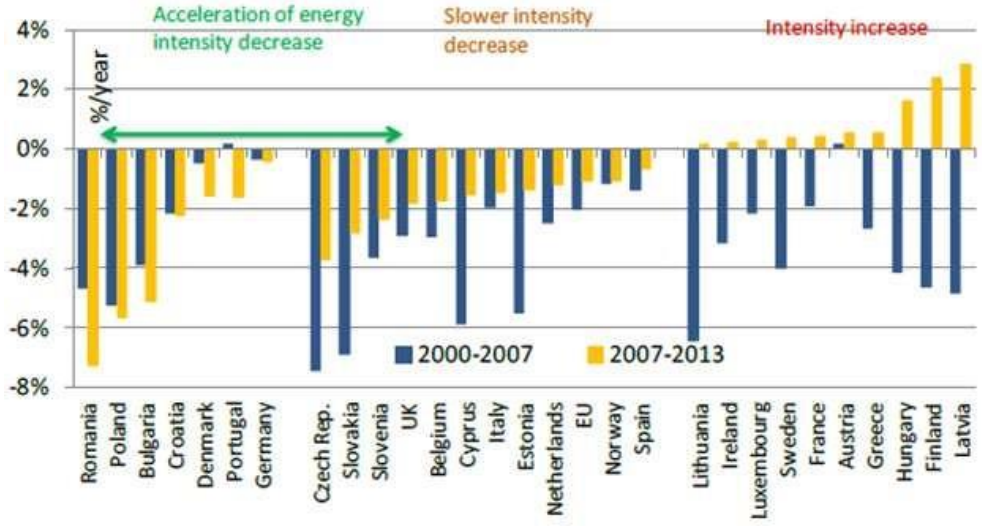


Source: Synthesis: Energy Efficiency Trends and Policies in the EU
An Analysis Based on the ODYSSEE and MURE Databases - September 2015

Romania records the strongest trend of reduction in energy intensity in industry,

which was intensified in the period 2007-2013 as compared to the period 2000-2007. As a result, Romania, together with Denmark and Germany, follows an accelerated trend of decrease in energy intensity.

Figure 44



Source: Synthesis: Energy Efficiency Trends and Policies in the EU
ODYSSEE and MURE Databases - September 2015

7. However, the primary energy consumption per capita follows a continuous decrease trend, accounting in 2014 for 80% of the value in 2008 and for 90%of the value in 2011. The energy efficiency policies have had a significant contribution to this evolution.

8. The coverage of certified energy managers was **98,5%** in 2015, and had the following structure:

- **64.66%** (441 consumers) have own energy managers certified by ANRE;
- **33.87%** (231 consumers) with freelancers and energy services companies certified by ANRE ;
- **1.47%** (10 consumers) without managers certified by ANRE.

9. Certification situation at the end of 2015: **431 energy managers, 233 energy auditors as natural persons, 73 energy auditors as legal persons** of which **17 energy auditors as freelancers, 59 companies providing certified energy services** (of which 19 freelancers).

The number of energy auditor authorisations for legal persons **has doubled** as compared to 2014**.**

10. The **682 final consumers of energy** monitored by ANRE in 2015 generated energy savings of **141 767 toe**.

11. In 2015, **6 more district heating systems (SACET)** were closed down, and thus the current number of municipalities benefiting of district systems has dropped to **64**.

12. The assessment of energy saving is difficult for a significant number of PNAEE components, because of the absence of data reported in this respect, and

therefore studies and data collection are necessary in order to ensure indirect assessment of energy saving.

13. According to the data provided by the Ministry of the Environment, Water and Forestry for the Programme **ENERGY EFFICIENCY in ETS SECTOR INDUSTRY,** the largest part of the reductions in emissions recorded in economic establishments is due to the closing down of certain industrial capacities, because of which the related energy consumption is no longer present in the national balance, and therefore this programme should be removed and the estimated energy saving of **980 000 toe** should be allocated to other programmes, as appropriate, depending on the level of achievement of the national target.

14. Concerning the target of Romania for 2020 consisting of a **24%** share for energy from renewable sources in the consumption structure, it was exceeded at the end of 2015, where this share was **24.9%.**

15. The total amount of electricity produced by high-efficiency cogeneration having benefited from the bonus for the period January – December 2015 was lower by 7.5% than the equivalent amount in 2014.

16. The final draft of the **Country Report for Romania - SWD(2016) 91, drawn up by the European Commission, lays down that 'Romania is on track to meet its 2020 energy efficiency target'.**

According to the same Report, 'Electricity and gas-price deregulation and a stable legal framework could boost competition and investment in sustainable and cost-efficient supply'. Electricity and gas prices for non-household consumers have been completely liberalised since 2014 and 2015, respectively. The liberalisation of household consumption markets is scheduled to be completed by 2018 for electricity and by 2021 for gas.