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1. General Context of the Second NAPEE

1.1 Focus points of the second NAPEE

The second NAPEE shall be examined by considering the evolutions occurring in recent years at the EU and at the national level in the area of sustainable development policies and the implementation of such policies. The Strategic Energy-Climate Change package adopted in 2008 stipulates ambitious targets at the level of the European Union, in the area of primary energy consumption reduction, renewable source promotion, greenhouse gas emission reduction and the use of biofuels in transportation. Romania is using significant efforts to fulfill the obligations falling with it in meeting such targets as an EU member state.

The economic crisis in 2009-2010 has had a deep impact on our country, however, signs of economic revival were registered at the beginning of 2011. It is expected for such positive evolutions to continue to grow in the following period and for this to facilitate the implementation of the policies on increasing energy efficiency.

During the centralized economy period, a strong energy-intensive structured economy was carried out in Romania, which is also specific to other countries in our geographical area. The main objective of the transition and of the post-transition period was economic restructuring and separating economic development for the increase of energy consumption. Such a phenomenon had occurred in developed states as early as the period prior to the first oil shock in 1973. The nationally adopted strategies in the last decade have established the reduction of energy intensity as specific targets. The performed analyses prove that Romania is evolving on a correct path, however, that important progress is still required until this macroeconomic indicator shall have values similar to those registered in developed states.

A certain change has recently been noticed in the approach of sustainable development issues. The targets to be reached in the future are no longer established with the aid of indicators correlating energy consumption with economic development (e.g. the energy intensity indicator), but they exclusively concern the energy consumption, CO₂ emissions, etc. without explicitly correlating such indicators with economic development. This new approach makes technological and behavioral issues in the area concerning the increase of energy efficiency become more important than in the previous stage.

The second NAPEE contains a separate chapter intended for the measures of saving primary energy in the energy sector (electricity and heating generation, energy transmission and distribution, renewable source promotion). According to the data supplied by the NREAP, the promotion of renewable energy for the generation of electricity shall lead to a primary energy saving in 2020 of 1883 thousand toe. Other measures (high efficiency cogeneration promotion, refurbishing large power units within coal-fired power plants, the performance of new units, etc.) shall have a positive impact, so that the total savings in 2020 registered in the electricity generation sector are estimated at 3403 thousand toe. The savings to be made by reducing losses in the transmission and distribution networks shall be added to them.

The first Romanian NAPEE committed to reduce the final energy consumption in the sectors falling under the incidence of the ESD by 1.5% per year in 2008-2016 compared to the average registered in 2001-2005. This leads to a final energy saving of 2800 thousand toe in 2016 with an intermediary target of 940 thousand toe in 2010. An assessment was made of the savings achieved in 2010 in the final consumption sectors falling under the

incidence of the ESD by using the top-down indicators recommended in B[3]. The final results are summarized in table 1.1.

Table 1.1

	[thousand toe]		
	2008	2009	2010
industry	453	1052	1060
transports	-72	16	99
services	511	714	782
household	42	190	281
TOTAL	935	1972	2223

It is noticed that the total value of such savings (2223 thousand toe) far exceeds the intermediary target for 2010 in the NAPEE (940 thousand toe) and that it is relatively close to the target undertaken by Romania for 2016 (2800 thousand toe). On assessing this value, it should be considered that it was registered under economic restructuring conditions and based on the recession period in such years. The highest values were registered in the “Industry” and “Services” sectors, which were also the sectors where major transformation was registered. However, important energy efficiency increasing programs were also developed during the analyzed period (including with direct financial aid granted to consumers from the European Union and state budget funds). Such programs shall continue and shall expand during the following period, which shall be a period of positive economic evolution. Thus, it can be considered that the final target for 2016 shall be met and that Romania shall contribute to the reduction by 20% of the primary energy consumption of the European Union in 2020.

All eight development regions of Romania can access the EU structural and cohesion funds. In the context of the current economic and financial crisis and of the need to drastically reduce the state budget deficit, the use of such funds is extremely important for the funding of the energy efficiency projects. Large progress has been registered to this extent lately. Therefore, until 31.08.2011, only within the Regional Sectoral Operational Program, Priority Axis 3, “Improvement of social infrastructure”, 342 projects were contracted on the retrofitting of public buildings (hospitals, schools, rest homes, social security institutions, etc.).

In the general context of decentralizing the decisional process (and the use of funds), we are witnessing an ever stronger involvement of the local authorities in solving energy efficiency issues.

The second NAPEE shall be implemented in a period when the energy price policies shall undergo national change. The elimination in a relatively near future of aid provided for heating supplied to household consumers through the heating systems is forecast, together with only applying social aid for energy for those who need it and for the required term (based on rigorously established criteria), etc. Therefore, new signals shall be given by prices to household consumers for increased efficiency in the use of energy.

The implementation of the new EU directives in the area of energy efficiency (the Directive on the energy efficiency of buildings, however without limitation) shall also contribute to the reduction of energy consumption.

The resumption of energy development shall allow a stronger (including financial) support from the state of the energy efficiency measures.

Considering the importance of the contribution of the second National Energy Efficiency Action Plan for the meeting of the national objectives on climate change, it is necessary to subsequently perform an impact study on enforcing the measures stipulated in this national plan on the greenhouse gas emissions.

The assurance of energy efficiency shall contribute to the meeting of the objectives established in the Strategic Energy-Climate Change Pack approved by the European Parliament and of the Council in December 2008, respectively the reduction at a European level in 2020, by energy efficiency measures, of the primary energy consumption by 20% in comparison with the value registered by the same consumption in the absence of such measures and greenhouse gas emission reduction by 20% in 2020 in comparison with the same emissions in 2020.

1.2 National context in the area of energy savings

- The evolution of the Romanian economy after 2000 is characterized by two separate periods: the 2000-2008 economic development period and the 2009-2010 recession period. The values of the main macroeconomic indicators in this period are shown in Table 1.2.

Table 1.2

	U.M.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
GDP growth rate	%	2.4	5.7	5.1	5.2	8.5	4.2	7.9	6.3	7.3	-7.1	-1.3
GDP in Euro current prices	mill. Euro	40278	44865	48637	52569	61030	79746	97787	124654	139762	117529	122008
GDP in Euro 2005	mill. Euro 2005	60356	63796	67050	70536	76532	79746	86046	91467	98144	91176	89990
Population	thousand	22435	22408	21795	21734	21673	21624	21584	21538	21504	21470	21462
GDP/capita in Euro/ capita	Euro/ capita	1795	2002	2232	2419	2816	3688	4530	5788	6499	5474	5685
Inflation rate	%	45.7	34.5	22.5	15.3	11.9	9	6.56	4.84	7.85	5.59	8.00
RON/Euro exchange rate	leu/Euro	1.9956	2.603	3.126	3.756	4.053	3.623	3.5245	3.3373	3.6827	4.2373	4.2099

Source: National Institute of Statistics – Annual Statistical Report of Romania

The GDP growth in million Euro current prices in 2010 compared to 2009 (under economic recession conditions) was determined by the consolidation of the national currency (RON) in relation to the Euro. Thus, a convergence process is registered between the official exchange rate and the purchasing power parity.

The positive evolution of the national economy in 2000-2008 has led to the growth by 3.62 times of the gross domestic product per capita. However, the value of this indicator remains greatly behind the EU 27 average, meaning that Romania must continue to make important progress in terms of the economic development, so as to meet the average EU level.

- The evolution of the economy has influenced the energy consumption and the structure thereof. The evolution of the energy consumption in 2000-2010 is shown in Table 1.3.

Table 1.3

	[thousand toe]										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Primary energy consumption	36374	37971	36480	39032	39018	37932	39571	39159	39799	34328	34200
Final energy consumption, of which	22165	22438	23370	25153	27332	25102	25312	25028	25303	22387	22250
Industry	9017	9351	10616	10892	11285	10505	9998	9989	9415	6612	6750
Transports	3508	3975	4305	4319	5915	4244	4407	4739	5400	5377	5370
Population	8433	7197	7284	7879	7910	8055	7889	7559	8090	8037	7980

Source: National Institute of Statistics – Energy balance and structure of the energy equipment

The GDP (expressed in Euro 2005 constant prices) has grown in 2000-2008 by 63%, however the primary energy consumption has only increased by 9.4%, and the final energy consumption has increased by 14%. This indicates the fact that a separation was successfully made of the economy increase from the increase of energy consumption. The economic crisis in 2009-2010 has led to the decrease of the primary energy consumption by 14% and of the final energy consumption by 12%, while the GDP decreased by 8.3%. At the same time, changes were made in the structure of the final energy consumption. The industry share has decreased from 40.7% in 2000 to 37.2% in 2008 and to 30.3% in 2010.

The transport sector share has increased from 15.8% in 2000 to 21.3% in 2008 and to 24.1% in 2010.

The share of the population's energy consumption has decreased from 38% in 2000 to 32% in 2008, however it has increased from 35.9% in 2010 due to the decrease of the total consumption.

The main macroeconomic indicators of the energy consumption are shown in table 1.4.

Table 1.4

	U.M.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Primary energy consumption/capita	toe/capita	1.621	1.694	1.674	1.796	1.800	1.754	1.833	1.818	1.851	1.599	1.594
Primary energy intensity	toe/1000 Euro 2005	0.603	0.595	0.544	0.553	0.510	0.476	0.460	0.428	0.406	0.377	0.380
Final energy intensity	toe/1000 Euro 2005	0.367	0.352	0.349	0.357	0.357	0.315	0.294	0.274	0.258	0.246	0.247

Source: ICEMENERG – NEO based on the primary information provided by the National Institute of Statistics

The primary energy consumption per capita was lower in 2010 than in 2000 and it has values under the EU 27 average. The primary energy and final energy intensity have had a favorable evolution, however they continue to register values over the EU 27 average.

- The fundamental event for Romania during this period, with influences in all fields of economic and social life, was the acquirement as of January 1st, 2007, of the status of European Union member state.

As early as the accession negotiation period, several strategic documents were adopted, of which the most important for the energy sector were:

- The energy roadmap for Romania (GD 890/2003¹)
- The strategy on renewable energy source capitalization (GD 1535/2003²)
- The national strategy on energy efficiency (GD 163/2004³)
- The national strategy on the heating supply of localities through district generation and distribution systems (GD 882/2004⁴)
- The national program "Heating 2006 - 2015 heat and comfort" (GD 462/2006⁵)
- The National Development Plan 2007-2013

The following were adopted in 2007, after accession:

- Romania's national energy strategy 2007-2020 (GD 1069/2007⁶).
- The national strategy on the sustainable development of Romania - Horizons 2013-2020-2030 (GD 1460/2008⁷)

A significant importance for the development of the overall energy sector is held by the National Action Plan for the Capitalization of Renewable Energy Sources drafted in accordance with the provisions of Directive 2009/28/EC. The document also has important impact on the national primary energy consumption.

Significant achievements were registered on adopting the European Union legislation. The following EU directives impacting the energy sector were transposed in the internal legislation:

- Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC was transposed by GO 22/2008⁸ and the Methodological norms enforcing GO 22/2008, approved by GD 409/2009⁹;

¹ GD 890/2003 approving "The energy roadmap for Romania" was published in Official Gazette no. 581 as of 14 August 2003

² GD 1535/2003 approving the Strategy on the capitalization of renewable energy sources e was published in Official Gazette no. 8 as of 7 January 2004

³ GD 163/2004 approving the National strategy for energy efficiency was published in Official Gazette no. 160 as of 24 February 2004

⁴ GD 882/2004 approving the National strategy national strategy for heat supply in centralized district heating systems was published in Official Gazette no. 619 as of 8 July 2004

⁵ GD 462/2006 republished, approving the program "Heating 2006-2015 heat and comfort" and the establishment of the Project management unit was published in Official Gazette no. 556 as of 23 July 2008

⁶ GD 1069/2007 approving the Romanian Energy Strategy for 2007-2020 was published in Official Gazette no. 781 as of 19 November 2007

⁷ GD 1460/2008 approving the National strategy on sustainable development - Horizons 2013-2020-2030 was published in Official Gazette no. 824 as of 8 December 2008

⁸ GO 22/2008 on energy efficiency and the promotion of end-use renewable energy was published in Official Gazette 628/29.08.2008

⁹ GD 409/2009 approving the Methodological norms enforcing Government Ordinance no. 22/2008 on energy efficiency and the promotion of end-use renewable energy was published in Official Gazette no. 263 as of 22 April 2009

- Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council and 2000/55/EEC of the European Parliament and of the Council was transposed by GD 1043/2007¹;
- 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 was transposed by Law no. 220/2008 republished²;
- Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC was transposed by GD 219/2007³;
- Directive 2009/33/EC of the European Parliament and of the Council of April 23 2009 on the promotion of clean and energy-efficient road transport vehicles was transposed by GEO 40/2011⁴;
- Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants (LCP Directive) was transposed by GD no. 440/2010⁵
- Directive 2008/1/EC on integrated pollution prevention and control, transposed by GEO no. 152/2005⁶ on integrated pollution prevention and control, approved with amendments and supplements by Law no. 84/2006, with further amendments and supplements.

- Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport shall be transposed in the national legislation by 27 February 2012. In accordance with art. 17) under 1), of Directive 2010/40/EU, the Ministry of Transport and Infrastructure has submitted the report on the national activities and projects in priority areas, on 26 August 2011. The report includes information received from the Romanian National Company of Motorways and National Roads, the Ministry of Administration and Internal Affairs (for authorities coordinated at a county level), the Ministry of Regional Development and Tourism, the Ministry of Communication

¹ GD 1043/2007 establishing a framework for the setting of ecodesign requirements for energy-using products, as well as amending, supplementing and repealing certain normative acts was published in Official Gazette no. 627 as of 12 September 2007

² Law 220/2008 republished, establishing the system for the promotion of energy from renewable sources, published in the Official Gazette no. 577/13.08.2010

³ GD 219/2007 on the promotion of cogeneration based on a useful heat demand in the internal energy market published in the Official Gazette no. 200/23.03.2007

⁴ GEO 40/2011 promoting clean and energy-efficient road transport vehicles was published in Official Gazette no. 307/04.05.2011

⁵ GD no. 440/2010 concerning the establishment of measures on the limitation of emissions of certain pollutants into the air from large combustion plants was published in Official Gazette no. [352 as of 27 May 2010](#)

⁶ GEO no. 152/2005 on integrated pollution prevention and control was approved with amendments and supplements by Law no. 84/2006, with further amendments and supplements published in Official Gazette no. 1078/30 November 2005

and Informational Society and the Special Telecommunications Service, integrated by the Ministry of Transport and Infrastructure.

1.3 Reviewing the energy saving objectives and achievements

- The national strategy on energy efficiency (GD 163/2004) specifies the fact that the essential scope of the energy efficiency policy is the reduction of energy intensity and it forecasts a reduction of this indicator's value by 40% in 2004-2015.

The data shown in table 1.3 indicate that in 2004-2010, the primary and final energy intensities decreased by 31%, which means that to this extent, Romania is evolving on the right path. The values submitted on the EUROSTAT website on the evolution of the primary energy intensity are extremely similar to the values calculated based on the data provided by the National Institute of Statistics and they confirm the aforementioned conclusion.

- The National Development Plan 2007-2013 approved by the Government in December 2005 establishes as a target for 2015 a primary energy intensity value amounting to 0.504 toe/1000 Euro at the exchange rate, compared to 0.770 toe/1000 Euro at the exchange rate in 2003. In 2010, the primary energy intensity value was 0.280 toe/1000 Euro at the exchange rate, i.e. greatly lower than the target established for 2015.

- In accordance with the provisions of Directive 2006/32/EC, Romania has drafted the first National Energy Efficiency Action Plan in 2007, through which it commits to reduce its final energy consumption in 2008-2016 by 1.5% per year compared to the annual average consumption in 2001-2005, respectively to 315 thousand toe/year. In 2016, the reduction should amount to 13.5%, respectively 2800 thousand toe, with an intermediary target of 940 thousand toe in 2010. The calculations made through the top-down indicators method recommended by the B[3] have shown that in 2010 a total final energy saving of 2223 thousand toe was made, a value that is vastly superior to the intermediary target in the NAPEE and close to the final target established for 2016. The calculations are shown in chapter 3.

- Romania's energy strategy for 2007-2020 includes consistent reference to the energy efficiency issue (saving potential, estimating the energy savings per sectors in 2010-2016, energy efficiency increase measures in the energy sector and in the final consumption sectors). The main provisions of this document are shown in chapter 2.2. c).

- The evolution of the primary and final energy consumption in the last decade, as well as the achievements in terms of energy savings are shown in chapter 2.3 and chapter 3.

2. Primary energy savings

2.1 Targets/Objectives on primary energy, forecasts of the primary energy consumption

- The performance of forecasts on the evolution of the energy consumption is a current activity contributing to underlying the main energy policy decisions adopted in Romania. The results allow the initiation and performance of the optimum measures for the energy supply of consumers (under safety conditions, under minimum prices, in observance of the environmental protection requirements, etc.).

The main role in performing medium- and long-term macroeconomic and energy forecasts is held by the National Commission of Prognosis - NCP (a public institution subordinated to the government structure). The NCP adjusts the "Forecast of the main macroeconomic

indicators on a short (5 years) and long (10 years) term” on a half-yearly basis and, every year, it adjusts the “Long term (10 years) energy balance forecast”. Based on the NCP forecasts, the specialized institutions perform their own forecasts, emphasizing the primary and final energy generation and consumption per economic sectors and energy forms, of other specified issues.

Such forecasts are used by the summary and decisional factors at a national level, required to draft/underlay the national economy development strategies and, in particular, of the energy sector.

- The strategic documents adopted by the Romanian Government in the last decade generally include forecasts of the energy consumption made within pre-defined economic development scenarios and targets on the evolution of this consumption and of the macroeconomic indicators. Such documents shall be submitted in the following chapter.

The examination of the drafted scenarios and of the forecasts of the energy consumption performed within the strategies adopted during the pre-accession period should, however, be made by considering the fact that, during the respective period, Romania was following an extended transition period, and the restructuring of the economy (and particularly of the energy sector) was not finalized. The fundamental strategic objectives and the derived objectives, as well as the paths and measures established to meet such objectives have concerned the development of the Romanian energy sector based on the market economy and European Union integration principles. Such documents have had an important role in the positive evolutions registered by Romania in recent years. However, the ex-ante quantity forecasts and assessments were not always confirmed by the registered evolutions, and the current economic crisis was not anticipated in any development scenario contained in the respective strategic documents. At the level of the European Union, new and significant items were registered in recent years, on the strategic development directions of the energy sector, correlated with the sustainable development principles. Such items were not included in the 2003-2004 strategies. Under such conditions, the adjustment of the aforementioned national strategies is required and the respective action was initiated.

- Romania’s energy strategy for 2007-2020 (GD 1069/2007¹) includes forecast of the energy consumption made in 2007 based on the information provided by the NCP and the specialized institutes. However, such forecasts do not consider the influence of the economic crisis.

In 2010, the National Commission of Prognosis published the macro-economic and energy forecasts for 2020, by considering such influences.

Such forecasts are shown in table 2.1.

The Romanian specialists are also aware of the energy forecasts made within the Technical University of Athens with the aid of the PRIMES model. Table 2.1 also shows the main values forecast in 2007, as well as in 2009 for Romania for 2020.

¹ GD 1069/2007 approving Romania’s energy strategy for 2007-2020 was published in Official Gazette no. 781 as of 19 November 2007

Table 2.1

	UM	2010	2015	2020
GDP				
forecast 2007 Energy strategy 2007-2020	bil. Euro 2005	108.3	142.2	186
forecast 2009 NCP	bil. Euro 2005	90.54	111.7	144
forecast 2007 PRIMES	bil. Euro 2005	104.9	141.1	185.1
forecast 2009 PRIMES	bil. Euro 2005	93.8	115.4	135.0
Final energy consumption				
forecast 2007 Energy consumption 2007-2020	thousand toe	27075	29862	31620
forecast 2009 NCP	thousand toe	23580	25995	27410
forecast 2007 PRIMES	thousand toe	28044	32019	35906
forecast 2009 PRIMES	thousand toe	24884	27053	28708
Primary energy consumption				
forecast 2007 Energy consumption 2007-2020	thousand toe	40071	45504	48360
forecast 2009 NCP	thousand toe	35890	39180	40975
forecast 2007 PRIMES	thousand toe	41890	46946	52991
forecast 2009 PRIMES	thousand toe	39111	41409	42802

The values in this table underline the following:

- The energy forecasts made in 2007 (both the forecast of Romania's energy strategy for 2007-2020, and the forecast made with the PRIMES model) were made in the same macroeconomic development scenario, according to which the GDP in Romania in 2020 was to reach approx. 185 bil. Euro 2005. This scenario was denied by the subsequent evolutions of the national economy in the context of the global crisis.
 - The primary energy consumption registered in 2010 (34.2 million toe) had lower values than the forecast consumption (both in 2007, and in 2009), and the economic crisis has had an important contribution to this extent.
 - Both for the forecasts made in 2007 and for the forecasts made in 2009, the (primary and final) energy consumption values forecast by the NCP are lower than those forecast with the PRIMES model. This is determined by the fact that the NCP forecasts are made in a scenario concerning the national energy efficiency increase, due to applying certain measures to this extent.
 - Lately, under the coordination of the European Commission, national targets are being established on the primary energy savings at the level of 2020 so as to meet the global objective on the reduction of the primary energy consumption by 20%. Considering that:
 - the PRIMES 2007 model is forecasting a 52.991 Mtoe primary energy consumption for Romania in 2020
 - NCP has recently forecast a 40.1 Mtoe primary energy consumption for the same year
 the conclusion is that a primary energy saving of 12.841 Mtoe, respectively 24.2 % is possible, compared to the PRIMES 2007 value for 2020. (**optimist scenario**)
- Considering the degree of uncertainty affecting forecasts in general and especially current forecasts, it is deemed that Romania shall be able to achieve a primary energy saving of approx. 10 Mtoe (approx. 19%) in 2020 compared to the PRIMES 2007 forecasts (**realistic scenario**).

The performed analyses and estimates were made in the context of the national enforcement of the Europa 2020 Strategy.

The main measures considered to increase energy efficiency are:

- applying the state aid scheme afferent to high efficiency cogeneration;
- intensifying the information campaigns of the population and of the business environment;
- continuing the “Heating 2006-2015 heat and comfort” program ;
- the compulsory acquirement of the energy efficiency certificate, starting with 2010, for single parent homes and apartments in current blocks of flats that are sold or leased out;
- continuing the Program for the thermal retrofitting of blocks of flats;
- continuing the certification of energy auditors both for buildings and for industrial activities;
- upgrading passenger and goods railroad transport and subway transport.
- the enforcement by the central and local public authorities of GO no. 22/2008 on energy efficiency and the promotion of the final consumer use of energy from renewable sources
- expanding the National program for energy efficiency (retrofitting the heating system, retrofitting public buildings and increasing the efficiency of public lighting) for 2011 – 2015

The main influencing factors in taking such measures are:

- the duration of the current economic-financial crisis and the evolution of the GDP (as the energy consumption is influenced by the economic evolutions);
- enforcing the environmental legislation (enforcing the ETS directive whose collator effect consists of improving energy efficiency).

At the same time, the occurrence of internal limitations is noticed, which may lead to the failure to meet the target:

- The reluctance of the banking system to grant credits for energy efficiency projects;
- The low level of awareness of the population and of the economic operators on the benefits of enforcing the energy efficiency measures and the new technologies. Concerning the latter, it is relevant that within the first call for energy efficiency projects within the SOP-IEC, only four projects were submitted. Under this context, the Ministry of Economy, Trade and Business Environment launched during 2010 the second call for projects, with a constant submission by November 30th, 2010. 27 projects were submitted in total. A third call for project proposals was made in 2011. The call included a constant submission and it was open in 13.04.2011-15.12.2011.
- For the energy efficiency of buildings - the low buying power and the financial statement of the building owners;
- Insufficient staff at an institutional level;
- The limited enforcement by the central and local public authorities, due to the current financial constraints, of energy efficiency programs/measures (in accordance with the provisions of GO no. 22/2008).

2.2 Strategies on the primary energy savings

a) The national energy efficiency strategy

The strategy was drafted in the context of the accession negotiations of Romania to the European Union, and it was approved by GD 163/12.02.2004¹.

The strategy exclusively concerns the increase of energy efficiency in the final consumption sectors (industry, residential sector, tertiary sector, agriculture, transportation), as well as the district heating supply. The time horizon of the strategy is 2015.

Based on the analysis of the situation at the respective time, it was concluded that energy efficiency in Romania was low in comparison to the EU member states. This was first of all caused by the structure of the national economy where the share of energy intensive branches and products was still high, however also by certain lower efficiencies in the transformation, transport and use of energy carriers.

The considered economic development scenario stipulates an average growth rate of the gross internal product in the analyzed period by 5.4%. The analyses that were carried out have led to the conclusion that the reduction by 40% of the primary energy intensity in 2004-2015 is achievable and that it sets the essential scope of the energy efficiency policy. The forecast evolution of the primary energy intensity and of the primary energy consumption in the considered time horizon is shown in table 2.2.

Table 2.2

	U.M.	Performed in 2001	2005	2010	2015
Primary energy intensity	toe/USD ₉₈	0.859	0.742	0.613	0.511
Total internal consumption	thousand toe	37982	40440	44660	47950

Source: National energy efficiency strategy

It is noticed that in 2010, the primary energy consumption that was actually carried out (34.2 million toe) was more than 10 million toe lower than that forecast in 2003; this is due both to the measures that were taken in order to reduce consumption and to increase energy efficiency and due to the effects of the current economic crisis.

This document shows the following sectoral targets on the annual reductions of the primary energy consumption:

- in the industrial sector: 337 thousand toe;
- in the residential sector: 823 thousand toe;
- in transport: 303 thousand toe;
- in the tertiary sector: 48 thousand toe;
- in the district heating supply sector: 612 thousand toe.

The strategy thus assesses the annual reduction of the primary energy consumption by 2122 thousand toe. This shall lead at the end of the 2004-2015 period to acquiring the reduction of the primary energy annual consumption by approx. 25.4 million toe. For the entire 2004-2015 period, the result is a cumulated saving of approx. 132 million toe.

The main measures proposed in the “National strategy on energy efficiency” for reaching the established targets are as follows:

¹ GD 163/12.02.2004 approving the National energy efficiency strategy was published in Official Gazette of Romania, part I, no. 160/24.02.2004. The strategy is an annex to GD 165/2004 and it was subsequently published in the Official Gazette of Romania, part I, no. 160 bis.

- continuing the legal adoption of the high energy efficiency norms on the installation of new capacities (resulting in the reduction of the energy consumption by 9.5 million toe);
- initiating, developing and implementing organizational and institutional measures to increase energy efficiency (whose scope consists of reducing the energy consumption by 15.9 million toe), for all significant energy consumers (consumers with annual consumptions over 1000 toe, local communities including over 20 thousand inhabitants and administrative buildings whose laid out surfaces exceed 1500 m²) and in the district heating supply systems.

b) Energy roadmap for Romania

The document was also drafted in the context of the accession negotiations and it was approved by GD 890/29.07.2003¹.

The document approaches a wider range of issues, with the focus placed on the reform of the energy sector (introducing market economy mechanisms and submitting the energy market model adopted for Romania, restructuring the electricity generation sector, investment and privatization issues in the energy sector, the pricing policy and the social policy, etc.).

The basic scenarios selected for economic development, the evolution of the primary energy consumption and of the primary energy intensity are the same as those in the aforementioned energy efficiency strategy.

The forecast for the electricity generation and consumption is shown in table 2.3.

Table 2.3

	U.M.	2001	2010	2015
Final electricity consumption	TWh	41.13	50.99	57.59
Gross electricity consumption (including losses in the grids)	TWh	49.96	58.9	66.6
Gross electricity generation	TWh	53.9	64.9	72.9

Source: Roadmap for the energy sector in Romania

In order to ensure energy and the efficiency of the National Power Grid, large scale investments are required in Romania for upgrade and reconstruction, to expand the current capacities and to establish new capacities.

Despite the efforts made in the energy generation sector, it still requires the largest investment effort and, in the future, the most important objective in terms of development, with the main focus placed on the heating sector, considering that the fossil fuel-fired heating equipment, representing capacities of 5000 MW, are very old.

The strategy indicates a list of the new capacities and of those requiring upgrade, as well as the list of capacities to be decommissioned.

¹ GD 890/29.07.2003 approving "Roadmap of the energy sector for Romania" was published in Official Gazette of Romania, part I, no. 581/14.08.2003.

c) National strategy on the heating supply of localities through district generation and distribution systems

The strategy was approved by GD 882/2004¹. The strategy concerns the 2015 time horizon and it considers that the district system urban heating services must be maintained and developed. They can ensure the heating supply of the residential sector under safety conditions, high energy efficiency and cost efficiency, while also having a positive impact on the environment.

The strategy establishes the following priority measures for saving energy for consumers:

- Heating metering and control; heating cost allocators; thermostatic adjustment valves

For the 1.9 million apartments connected to the district urban heating systems, it is estimated that this measure can lead to a reduction by 15% (1.376 Gcal/year) of the average energy consumption per apartment (9.174 Gcal/year).

The total final energy saving at a national level could thus finally amount to 261 thousand toe per year, and the total required investment shall be estimated at approx. 1.8 million Euro.

- Thermal insulation of buildings

A national measure program for the thermal insulation of buildings must be initiated immediately, and it shall result in a reduction of the heating consumption by approx. 50%, by the ends of its implementation.

This program shall have a positive social impact and it shall not allow unreliable investments in the heating sector.

- Retrofitting the heating generation and distribution capacities

The investment priorities in the heating sector shall be established based on the future heating need (local level energy planning), by considering the energy saving effects.

The following were established as priorities in the heating grid area:

- priority 1A – retrofitting 2049 km grids for which the retrofitting shall lead to a reduction of the heat losses by more than 70%
- priority 1B – retrofitting the heating system of Bucharest municipality (3369 km) for which the retrofitting shall lead to a reduction of the heat losses by 63%

The achieved heating savings are estimated at 3293762 Gcal/year (329 thousand toe/year), and the required investment is estimated at 890 million Euro.

The percentage heating losses shall decrease from 19.2% to 8.9%.

- Retrofitting the thermal substations

It is estimated that the retrofitting of thermal substations shall lead to a decrease of heat losses by 1842166 Gcal/year (184 thousand toe/year).

It is hereby specified that the aforementioned values are an estimate of the potential of the energy consumption reduction for each measure and that they cannot be considered as targets for 2015.

The national strategy on the heating supply of localities through district generation and distribution systems assesses the investment need by 2015, for the district urban heating systems, to approx. 340 million euro/year (in total, approx. 2.72 billion euro). The value does not include the investments made in the cogeneration thermal power plants.

¹ GD 882/2004 approving the National Strategy on the heating supply of localities through district generation and distribution systems was published in the OFFICIAL GAZETTE no. 619 as of 8 July 2004.

The implementation of the strategy has resulted in the limitation of the population's disconnection phenomenon from the district heating grids, however not in the full removal thereof. Therefore, by the end of 2010, according to the data provided by the NRAMS (National Regulatory Authority for Municipal Services), 1.55 million apartments were connected to such systems nationally, of which 0.57 million apartments in Bucharest municipality.

d) National Development Plan 2007-2013

In the context of the EU accession negotiations, the Romanian Government has drafted the National Development Plan 2007-2013 (NDP)¹, approved in December 2005. The issue concerning energy efficiency is included both in the chapter on the "Analysis of the current situation" and in the chapter on the "Development strategy".

The NDP has represented the strategic planning document directing and stimulating the social and economic development of Romania in accordance with the EU development policies.

In order to meet the global objective and the specific objectives for the 2007-2013 period, the considered measures and actions are grouped within **six national development priorities**:

- Increasing economic competitiveness and developing knowledge based economy;
- Developing and upgrading the transport infrastructure;
- Protecting and improving the quality of the environment;
- Developing human resources, promoting employment and social inclusion and strengthening administrative capacity;
- Developing rural economy and increasing productivity in the farming sector;
- Diminishing development disparities between country regions.

The improvement of energy efficiency and the capitalization of renewable energy sources are deemed priorities subordinated to the first priority. It is shown that Romania aims to reduce energy intensity on the entire chain - natural resources, generation, transmission, distribution and end-use of electricity and heating - in accordance with the commitments undertaken within the EU accession negotiations.

The following are mentioned amongst the predicted measures:

- supporting investments in high efficiency energy generation and use equipment (including retrofitting and refurbishment)
- supporting investments in the electricity distribution system
- promoting provision of services for increasing the energy efficiency by the energy service companies (ESCO)
- supporting programs for the establishment of an energy service market
- supporting the investment needed for interconnecting the transport networks for electric energy, petrol and natural gas with the European networks

In accordance with the European Union legislation on the Cohesion Policy, Romania has drafted the **National Strategic Reference Framework 2007-2013 (NSRF)**², as a

¹ The National Development plan is published on the http://www.inforegio.ro/user/File/PND_2007_2013.pdf website.

² The National Strategic Reference Framework 2007-2013 (NSRF) is published on the <http://www.fonduri-structurale.ro/Detaliu.aspx?t=CSNR> website.

reference document for programming the Structural and Cohesion funds during the reference period.

The NSRF connects the national development priorities, established in the National Development Plan 2007-2013 with the European priorities. The NSRF undertakes and summarizes the main elements included in the NDP, however they are reorganized according to the priorities and guidelines in the Strategic Guidelines of the European Union.

As a major difference between the NDP and the NSRF, it is worth mentioning that, in terms of financing, the NSRF is exclusively supported by the Structural and Cohesion Funds and the afferent national cofunding, while the NDP also includes other financing (national and local investment programs, external credits, European funds for rural development and fisheries, etc.).

The NSRF is implemented through the Operational Programs within the “Convergence” and “European Territorial Cooperation” Objectives. The list of the Operational Programs drafted by Romania or for the drafting of which it has collaborated with other EU member and non-member states, as well as the institutions responsible for the management of such programs, is indicated below.

Table 2.4

Sectoral Operational Program (SOP)	Managing Authority
Coordinator: Ministry of Public Finance Authority for the Coordination of Structural Instruments (ACSI)	
SOP Increasing Economic Competitiveness (IEC)	Ministry of Economy, Trade and Business Environment
SOP Transport	Ministry of Transport and Infrastructure
SOP Environment	Ministry of Environment and Forests
SOP Regional	Ministry of Regional Development and Tourism
SOP Human Resources Development (HRD)	Ministry of Labor, Family and Social Protection
SOP Administrative Capacity Development	Ministry of Administration and Internal Affairs
OP Technical Assistance	Ministry of Public Finance

Source: National Strategic Reference Framework 2007-2013 (NSRF)

All the above mentioned programs have specific importance in the promotion of energy efficiency.

- SOP IEC, with a total allocated funding (ERDF + National Budget) of approx. 3.011 billion Euro (of which the EU contribution through the ERDF 84.83%) has five priority axes, of which Priority Axis 4 - “Increasing energy efficiency and the security in supply, in the context of combating climate change” has three major fields of intervention:
 - Field 4.1: “Efficient and sustainable energy (improving energy efficiency and the sustainable development of the energy system in terms of the environment)”;
 - Field 4.2: “Capitalizing renewable energy sources for the generation of green energy”;
 - Field 4.3: “Varying the interconnection networks for the security of the energy supply”.

The total funds granted to Axis 4 amount to 24.095% of the total, respectively approx. 725 million Euro.

The Intermediary Body for the implementation of Priority Axis 4 operates within the General Energy Directorate within the Ministry of Economy, Trade and Business Environment, and it fulfills the attributions delegated by the Managing Authority for the SOP IEC.

- SOP Environment has six priority axes, of which Priority Axis 3 “Reducing pollution and diminishing the effects of climate change by restructuring and retrofitting the urban heating systems in order to meet the energy efficiency targets in the localities that are most affected by pollution” finances projects on urban heating energy efficiency.
- SOP Regional has six priority axes, of which Priority Axis 3 “Improving the social infrastructure” finances projects on the energy efficiency of public buildings. Details are provided in chapter 3.4.1.2.
- SOP DRU can finance projects on education and professional training related to energy efficiency.

e) Romania’s energy strategy for 2007-2020

The strategy was adopted immediately after, on January 1st, 2007, Romania became an EU member state. The strategy was approved by GD 1069/05.09.2007¹.

The strategy is a complex document dealing with all components of the energy sector (the oil, natural gas, coal industry, electricity and heating generation, the capitalization of renewable sources, increasing efficiency in use, etc.).

The general objective of the energy sector strategy is meeting the energy need both in the present, and on an average- and long-term, at the lowest possible price, adequate for a modern market economy and for a civilized standard of living, under quality and safety in supply conditions, in observance of the sustainable development principles.

The strategic objectives are:

- Energy safety
- Sustainable development
- Competitiveness

The reference scenario for the energy demand forecast in 2007—2020 considers the evolution forecast for the main macroeconomic indicators in 2007—2020, drafted by the National Commission of Prognosis. The following values are estimated for the 2007—2020 period for the development indicators (table 2.5):

Table 2.5

	UM	2007	2008	2009	2010	2015	2020
Population	10 ⁶ inhabitants	21.47	21.38	21.32	21.26	21.2	20.9
GDP	10 ⁹ Euro 2005	91.10	96.84	102.55	108.30	142.2	186
GDP/capita	10 ³ Euro 2005/ capita	4.24	4.53	4.81	5.09	6.70	8.89
GDP growth	%	6.4	6.3	5.9	5.6	5.6	5.5
Primary energy	toe/10 ³ Euro	0.44	0.42	0.39	0.37	0.32	0.26

¹ GD 1069/05.09.2007 approving the Energy strategy of Romania for 2007—2020 was published in the Official Gazette of Romania, part I, no. 781/19.11.2007.

intensity	2005						
Final energy intensity	toe/10 ³ Euro 2005	0.29	0.28	0.26	0.25	0.21	0.17
Internal electricity consumption	TWh	60.7	62.5	64.2	66.1	74.5	85
Electricity generation, of which:	TWh	62.7	65.5	67.7	70.6	89.5	100
Electricity generation in renewable hydro power plants	TWh	16	18	19.5	21.7	26	32.5
Electricity generation in nuclear power plants	TWh	7	10.8	10.8	10.8	21.6	21.6
Electricity generation in thermal power plants, of which:	TWh	39.7	36.7	37.4	38.1	41.9	45.9
coal-fired	TWh	28.7	25.7	26.4	27.1	30.9	34.9
natural gas-fired	TWh	9.5	9.5	9.5	9.5	9.5	9.5
fuel oil-fired	TWh	1.5	1.5	1.5	1.5	1.5	1.5

Source: Energy strategy of Romania for 2007—2020

By comparing the values forecast in the strategy for 2010 in the previous table with the actual achievements submitted in tables 1.1 and 1.3, the following conclusions can be drawn:

- the obtained value of the gross domestic product in 2010 was 17% lower than the forecast value;
- the obtained values of the energy intensity were practical equal to the forecast values.

The strategy has a separate section “Improving energy efficiency and promoting renewable energy sources”.

The national energy saving potential, respectively the reduction of energy losses is estimated at 27—35% of the primary energy resources (industry 20—25%, buildings 40—50%, transport 35—40%). For an annual primary energy resource consumption of approx. 36 million toe/year, the saving potential is of approx. 10 million toe/year.

The heating and district urban heating system field is analyzed separately in the strategy, identifying the following short term objectives:

- establishing the cogeneration (and trigeneration) — industrial potential; for heating; farming (heating and cooling consumption);
- increasing the efficiency of district heating systems and maintaining the heating urban consumption on this base;
- identifying all the fossil and renewable energy resources in the cogeneration area and drafting the local strategies for the implementation (development) of cogeneration in the localities or areas identified as having cogeneration potential;
- drafting feasibility studies for the promotion of the most efficient solutions for the production of cogeneration electricity and heating and for the operation of the entire potential of renewable resources.

The same document establishes the following average- and long-term objectives:

- reducing heating costs for household consumers, up to maximum 10% of the gross average income per capita;

- performing electricity and heating cogeneration production units with efficiencies over 80%;
- replacing the pipeline networks for the transmission of the primary heat fluid and the worn and oversized heating distribution networks, as well as reducing technological losses in the network to values under 15%;
- refurbishing the thermal stations and substations, by equipping them with high efficiency heat exchangers, variable revolutions, full automation and remote monitoring pumps;
- implementing the measurement and control systems throughout the energy chain source — grid — consumer, for the most accurate emphasis possible of losses afferent to various energy sub-assemblies and the correct replacement of energy balances;
- reducing or fully removing secondary distribution networks by installing substations or thermal modules at a real estate property level;
- fully replacing the heating distribution networks with real estate properties and adapting the configuration thereof to the needs for the individual metering of the heating consumption at an apartment level;
- metering all individual heating consumers both in condominiums, and in individual homes, simultaneous with the mounting of thermostatic valves on each piece of heating equipment and on the consumer hot water meters.
- informing and educating the population on the need to save energy resources, on environmental protection and expanding the use of renewable energy resources;
- expanding and implementing programs on the use of renewable resources and the production in cogeneration of electricity and heating, including in the rural environment.

In order to reduce energy intensity in the high energy consumption sectors and in order to meet the targets proposed both in the National strategy on energy efficiency, and in the Action plan on energy efficiency afferent to Directive 2006/32/EC on the end-user efficiency, measures shall be taken in the following directions:

Industry

- information campaigns;
- long term voluntary agreements in various sectors of the processing industry;
- energy audits and efficient energy management;
- improving energy efficiency by supporting financing through the funds of the European Union.

Transport

- reducing energy consumption through projects on upgrading passenger and goods railroad transport;
- increasing the quality of public transportation, for the use thereof in the detriment of transport by private vehicles;
- expanding public transportation through new routes;
- increasing the efficiency of traffic and parking;
- means of public transportation for employees, ensured by the beneficiary economic companies;

- a larger development of means of transportation on tracks within urban transportation (trams, trolleys);
- increasing the energy efficiency of vehicles by establishing minimum efficiency criteria;
- introducing normative acts supporting the most efficient and clean vehicles;
- using gaseous fuels and biofuels in transport.

In order to perform the abovementioned measures, an essential component is represented by the education of the population for the wide scale acceptance and implementation thereof.

Residential (the final energy consumption in buildings: heating, hot water and lighting):

- retrofitting the enclosure through the thermal retrofitting of buildings, providing financial support for owners with low financial income for the performance of the retrofitting works;
- increasing the efficiency of the current heating subsystems;
- increasing the efficiency of the lighting fixtures, the use of low consumption lamps;
- the compulsory requirement of enforcing the provisions of the directive and the European standards on efficiency for new buildings;
- improving energy efficiency by supporting funding under the European Union funds;
- continuing the metering of heating at end-users;
- carrying out a national program on the energy education of the population in schools and the media to save energy, for environmental protection and the local use of renewable energy resources;
- stimulating the operation of energy service companies (ESCO).

Public sector

- increasing efficiency and reducing the consumption of public lighting;
- increasing efficiency and reducing the consumption of water supply subsystems;
- increasing energy efficiency in public buildings.

Farming

- increasing efficiency and using biofuels in farming vehicles;
- developing energy crops both for the production of biofuels, and for the production of cogeneration electricity and heating;
- increasing the energy efficiency of irrigations.

Cogeneration

- promoting high efficiency cogeneration;
- identifying and capitalizing the national cogeneration potential;
- the energy audit of cogeneration units;
- retrofitting and upgrades of the current subsystems, in order to increase efficiency and to reduce environmental impact;
- erecting new high efficiency cogeneration subsystems.

The strategy shows that the support financial mechanisms of the abovementioned measures on energy efficiency are relatively limited in Romania, thus generating a

negative impact in the promotion thereof. In order for the implementation of the abovementioned measures to be successful, financial aid is needed that is materialized in the form of aid, charge reductions, aid from private companies involved in the implementation of such plans, as well as loans under beneficial conditions from banks. The proposed financial aid shall be granted by law, in observance of the legal conditions on state aid.

The energy savings estimated in Romania's Energy Strategy for 2007—2020 for 2010 and 2016 are shown in table 2.6.

Table 2.6. Estimation of the energy economy per sectors in 2010 and 2016

Sectors	Savings in 2010 million toe	Savings in 2016 million toe
TOTAL FINAL CONSUMPTION (exclusively the companies included in the NAP), of which:	0.664	1.992
- through investments in the current subsystems, buildings...	0.349	1.047
- through investments in new subsystems, buildings...	0.315	0.945
INDUSTRY Total, of which	0.060	0.180
- through investments in the current subsystems	0.009	0.027
- through green field investments	0.051	0.153
RESIDENTIAL Total, of which:	0.416	1.247
- through investments in the current buildings	0.300	0.899
- through the establishment of new buildings	0.116	0.348
TRANSPORT Total, of which:	0.160	0.480
- through investments in the current means of transportation	0.038	0.114
- through the establishment of new means of transportation	0.122	0.366
TERTIARY Total, of which:	0.028	0.085
- through investments in current buildings	0.002	0.007
- through the establishment of new buildings	0.026	0.078

Source: The energy strategy of Romania for 2007—2020

The following measures are stipulated for the achievement of such savings:

- increasing efficiency in the use of electricity and natural gas in the industry, performing demo projects to attract investments intended for the upgrade of the technological devices and equipment;

- continuing investments for the retrofitting of the district heating supply systems in cities and reducing energy losses;
- implementing the National program for the thermal retrofitting of the current residential buildings, approved by the Government;
- establishing minimal energy efficiency levels in the industry, transport, constructions, farming, services and in the residential sector;
- supporting the energy efficiency programs through the allocation of funds from the Romanian Fund for Energy Efficiency;
- implementing projects and demo areas of energy efficiency;
- creating the legal framework required for the development of the competitive energy service market;
- promoting the trading of white certificates for the stimulation of investments in increasing energy efficiency, under the conditions of developing an European practice to this extent;
- promoting DSM (Demand Site Management) actions;
- granting tax and financial incentives for the implementation of projects on increasing energy efficiency, in observance of the legal requirements on state aid.

The financing of investments whose main objective consists of increasing energy efficiency can be made:

- from the state budget and the local budgets;
- based on a performance agreement concluded with third parties;
- based on a performance agreement concluded with an energy service company (ESCO);
- through bank credits obtained from external financing bodies (WB, EBRD, EIB, JBIC) or from trade banks;
- by co-financing from structural funds.

2.3 Primary energy saving measures

2.3.1 Primary energy saving measures in electricity and heat production

2.3.1.1 Overview

The evolution of electricity and heat production in recent years is described in table 2.7.

Table 2.7

[GWh]

	2005	2006	2007	2008	2009
Electricity production, of which	59413	62696	61673	64956	58016
in power plants					
in thermal power plants					
classical plants, of which	33559	38086	37298	36176	30095
in thermal power					
plants which produce only electricity					16272
(condensation plants)	16074	21553	20072	19330	
in thermal power plants which produce					
electricity and heat (Combined Heat and Power Plants					
-CHP)	17485	16533	17226	16847	13823
nuclear plants	5556	5631	7708	11224	11752
hydroelectric and wind power	20207	18355	15969	17201	15816

Thermal power production	1362	1381	1890	2752	2881
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Source: National Institute of Statistics – Energetic balance and structure of the energy machinery

Around 80 % of the thermal-power plants in Romania were installed in the period 1970-1980, the technologies used being those available in the '60s and '70s. Practically, they have exceeded their regulated operating life, with a high level of wear and tear. Consequently, their technical-economic outputs are low and there is an obvious tendency of reduction in the last decade. The retrofitting actions for thermal power units on coal had favourable effects but did not succeed in determining a favourable evolution at the level of the national power system in terms of the power efficiency ratios. Based on the primary information provided by EUROSTAT, the evolution of the specific fuel consumption and of the output in the period 2005-2009 were calculated for condensation power plants (which produce only electricity), and the global electricity and heat generation output in combined heat and power plants. The figures are included in table 2.8.

Table 2.8

	M.U.	2007	2008	2009
Specific consumption rate in the condensation thermal power plants	kgoe/MWh	262	269	276
Electricity production output in condensation thermal power plants	%	32.81	32.01	31.11
Global electricity and heat generation output in combined heat and power plants	%	63.14	60.00	67.32

Source: ICEMENERG-OEN, based on the primary information from EUROSTAT

The same computations as for EU 27 in 2008 were made. The electricity production output in condensation thermal power plants was of 40.63%, and the global electricity while heat production output in combined power and heat plants was of 65.85%, rates which are higher than those registered in Romania.

The absence of a clear growth tendency of the electricity production output in thermal power plants is confirmed by the data published by NIS. The evolution of the specific fuel consumption for national electricity production is described in table 2.9.

Table 2.9

	M.U.	2005	2006	2007	2008	2009
Total specific thermal power consumption rate	kgoe/MWh	232	240	244	244	243

Source: National Institute of Statistics – Statistical Annuary of Romania

The increase of the energy efficiency in electricity production is a major concern for the Ministry of Economic, Trade and the Business Environment, a context in which a special attention is given to primary energy saving measures in electricity production. The main measures considered are described below.

2.3.1.2. Closing production facilities

The closing of production facilities depending on their real operating life registered and their degree of wear shall contribute to the reduction of the primary energy consumption rate as these units will be replaced with modern units with higher outputs. By the end of 2020, units with a total installed power of 5544 MW must be closed, of which 2340 MW in combined power and heat units.

2.3.1.3 Upgrading some units within the thermal power plants

The technical-economic studies made have justified the upgrading of units from thermal power plants depending on their technical state. This will lead to an increase of efficiency and to the extension of the operating life.

The results obtained after the upgrading of the lignite-fired units no. 4 and 5 - 330MW from Turceni thermal power plant justifies the upgrading of other similar units. Their upgrading is also justified by the existence of the needed lignite in the country at competitive prices for the next 20-40 years and its aims are to increase outputs, to adjust to the EU environmental requirements and to extend the operating life of units with approx. 10000 hours (15 years).

The estimated annual savings of primary energy are high and shall be monitored on the basis of the reports drawn up by these commercial companies, pursuant to the law, for NIS and other official institutions.

2.3.1.4 Building new, modern, coal-fired thermal power units

All the energetic strategies produced in the recent period are centred on the capitalization of domestic lignite, a measure dictated by economic, energetic and social reasons. For the capitalization of this resource, the focus is on the upgrading of units built before 1990. The upgrading will continue in the next period. However, new, high power and high output units will also be built. For this purpose, we need to obtain private capital.

The company ENEL has initiated the project for building coal-fired thermal plants which shall be located on the territory of the Galati Free Area Administration, close to the municipality's harbour area. The thermal plant will have 2 x 700-900MW coal-fired units with coal brought from Ukraine. The thermal plant shall be commissioned in 2014.

Other private investments in thermal power units are predictable and shall bring primary energy savings compared to the situation in which the proper quantity of electricity would be produced by plants built before 1990.

It is estimated that, in this decade, private investors will build new thermal power units with an installed power of 2000 MW and this will ensure primary energy savings in 2020 of approx. 60 thousand toe.

2.3.1.5 Internal plans for thermal power plants

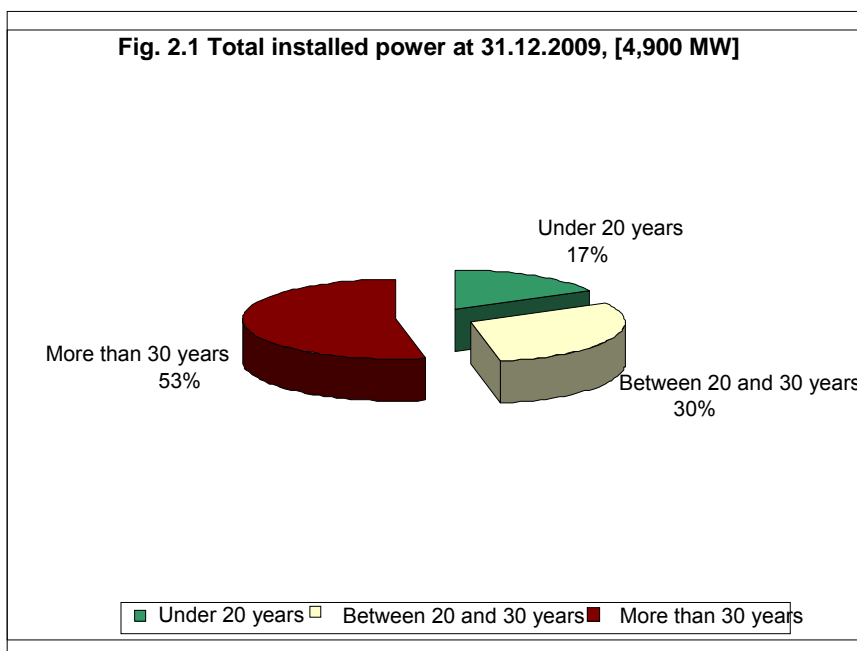
Practically all thermal power plants in the country have drawn up their own plans with measures for increasing energy efficiency. The national law (G.O. 22/2008 regarding energy efficiency and promotion of the use of renewable energy to final consumers) stipulates (in article 3) that economic operators who annually consume a quantity of

energy of more than 1000 toe must perform an annual energy audit in order to establish and implement measures for the improvement of energy efficiency. They must also draw up plans for the improvement of energy efficiency which include short-, medium- and long-term measures. A selective list of such measures included in the current plans of major electricity producers is presented in Annex 1.1. These plans are annually updated. The medium- and long-term measures (upgradings, new units etc.) are presented separately. The short-term measures depend on the technical state of substations at the time of drafting of the balances and may differ from one year to another and from one unit to another. Statistically, it is estimated that these measures bring primary energy savings of approx. 150-200 toe per year. The total estimated savings for the end of 2020 are estimated to 20 thousand toe.

The ex-post monitoring of energy savings registered shall be made on the basis of measurements in each unit, simultaneously with the preparation of energy balances.

2.3.1.6 Promotion of high efficiency cogeneration

Promotion of high efficiency cogeneration represents a key measure in reducing primary energy consumption. Cogeneration was largely promoted in Romania during the period of centralized economy with the technology and equipment available in those times. Large-size district heating systems were built in many cities in the country for the heat supply of apartment buildings. Currently, most of them are in an advanced state of wear. The age structure of public combined heat and power plants (exclusive of self-producers) is illustrated in figure 2.1.



The global performance of cogeneration plants in Romania is reduced (table 2.8.) but the value registered in 2009 shows the beginning of an upturn.

The heating networks (district heating systems) are also in an advanced state of wear and high heat losses. Such a reduction in the quality of the service supplied to consumers was registered simultaneously with an increase of costs. The population's confidence in district heating systems dropped and a massive disconnection phenomenon of domestic consumers emerged. The restructuring of the economy and the closing of some industrial

enterprises has deepened the cogeneration crisis in Romania. Many industrial units were consumers of the heat produced in public combined heat and power plants and their closing generated a reduction in demand. Other industrial units had, as self-producers, combined heat and power plants which supplied with heat the respective unit and the apartment buildings in the locality. The closing of these units has also triggered the closing of the respective plants and, in the end, at the decommissioning of the entire local district heating system.

The share of electricity produced by cogeneration from the total electricity produced in classical thermal power plants decreased from 61% in the year 2000 to 46% in the year 2009.

The Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market was transposed in the national legislation by the Government Decision 219/2007¹, in order to promote high efficiency cogeneration. The Romanian Energy Regulatory Authority issued the secondary legislation necessary for the implementation of this normative act. Therefore, Romania effectively applies the support scheme that grants bonuses for the electricity produced in these plants. In parallel, Romania promotes the production of electricity from renewable sources of energy (including biomass) by applying the mechanism of mandatory quotas combined with the transaction of green certificates. Producers of biomass-based electricity in high efficiency cogeneration plants may select one of the two support schemes mentioned above. The first results have begun to show.

Annex 1.2 contains the list of electricity and heat production facilities in high efficiency cogeneration which have received final accreditation from RERA and which benefit from the respective support scheme. This list contains older production facilities and new facilities fitted with modern technologies (gas turbine, combined cycle, etc.). Annex 1.3 contains the list of electricity production facilities in biomass-based plants (new high-efficiency combined power and heat plants) and which benefit from green certificates.

However, it must be said that, in accordance with the national law, only the electricity supplied in public networks benefit from support. Therefore, Annexes 1.2. and 1.3. contain only the production facilities which fulfil this condition. Aside from these, high efficiency combined heat and power plants (powered by natural gas or by biomass) are also in service, belonging to self-producers who produce electricity exclusively for their own consumption and which are not registered on the RERA lists of certified producers which benefit from the support scheme and green certificates.

Hereinafter we present a few recent accomplishments and running projects.

Intreprinderea Electrocentrale Bucuresti (ELCEN) is a fully-owned state commercial company and the largest producer of combined heat and power in Romania. The enterprise has three branches, the most important of which is Sucursala Electrocentrale Bucuresti, with five combined heat and power plants built in the period of centralized economy. The electricity is supplied in system and the heat supplies the heating system of Bucharest municipality. These facilities need to be modernized in order to achieve the primary energy savings and to improve heat supply in Bucharest Municipality. As early as 2003, the Romanian Government authorized the Commercial Company Electrocentrale S.A. to take up the extension of Bucuresti Vest CHHP with new combined heat and power facilities in modern technology by contracting some external loans guaranteed by the state. The first high efficiency combined heat and power unit in combined cycle in

¹ G.D. 219/2007 on the promotion of cogeneration based on a useful heat demand published in the Official Gazette no. 200/23.03.2007

Romania was built with an electrical power of 186 MW, a thermal power of 198 MW and a global efficiency of 87.1%. The technical data of this substation are presented in Annex 1.4. The unit was commissioned in the first quarter of 2009.

ELCEN will continue to accomplish new installations with modern technologies by attracting private capital and setting mix companies that will work as independent power producers (IPP). As a result of these actions, projects for new „green-brown field” capacities are in various phases of development at Bucuresti Sud plants, Palas CHHP, Titan CHHP. It also started an action for attracting private capital for two new projects at Progresu CHHP and Fantanele CHHP.

In 2010 the company Dalkia (which has the concession over the district heating in Ploiesti Municipality) inaugurated at Brazi CHHP (an old plant built in the period of centralized economy) a high efficiency combined heat and power unit with an installed power of 25 MWe and 30 MWt.

The commercial company Chimcomplex S.A. Borzesti (Bacau County) is a big electricity and heat consumer. In order to optimize its costs, the company put into function a high efficiency cogeneration group with an installed power of 7.2 MW. The plant uses natural gas as raw material and it can also be supplied with the hydrogen excess obtained from the electrolysis of sodium chloride technological system. The plant is made of a gas turbine and a recovery boiler with additional hydrogen ignition (resulting from the technological process). The project benefited by funds from EU-EBRD. The plant was commissioned at the end of 2008. After one year and a half of operation, the EBRD representatives analyzed the framing of the installation within the project parameters and it was ascertained that the high efficiency concept was fulfilled by the plant. As a result, Chimcomplex received “the best investment with the greatest energy saving” award in 2010 at the EBRD energy efficiency excellence awards ceremony. However, the electricity produced by this plant is used exclusively for its own consumption, therefore it does not benefit from the support scheme set out by the internal law and it is not registered on the list of high efficiency combined heat and power plants certified by RERA which is presented in Annex 1.2.

Petrom company whose main shareholder is the Austrian group austriac OMV started to build a 860 MW cogeneration plant with a power at Brazi Refinery. The plant is made of two cogeneration groups of 310 MWe each (gas turbine and the steam recovery boiler without additional ignition) and a 305 MWe steam turbine. The plant shall be powered by the natural gas in the area. The energy produced will be used to cover the Petrom company necessities and the excess will be sold on the free market. The building of the plant began in 2009 and it is estimated to be commissioned this year.

The company ALRO Slatina has announced the start of a project for building of a 420 MW electric cogeneration plant within the alumina production plant in Tulcea (a great heat consumer). The works could begin in 2012 and could last 4-5 years.

The accomplishment of new cogeneration electric power and heat producing installations is possible only based on the building authorizations and operating licenses issued by RERA, so that a correct and complete record is possible for the current situation and its evolution. Ex-post monitoring of primary energy savings shall be accomplished based on

reports prepared by each unit and the information from the national (NIS) and international (EUROSTAT) databases.

2.3.1.7 Reengineering/upgrading of district heat supply systems

The national "Heating Programme, heat and comfort 2006 - 2015" was approved by G.D. 462/2006 with further amendments¹.

The programme has two components:

- the rehabilitation of the district heating system
- the thermal rehabilitation of buildings

The local public administration authorities that own district thermal energy supply systems can be beneficiaries of the projects from the first component.

Owners' associations from apartment buildings - condominiums connected to the district heating system can benefit from the projects from the second component.

The beneficiaries of the non-refundable funding must observe the provisions of the regulation for the implementation of the programme approved by the MIRA Order no.471/08.05.2008 .

The programme is coordinated by an inter-ministry commission and a programme management unit was established for its implementation, a unit which operates within the Ministry of Administration and Internal Affairs. The co-funding quota from the state budget is of maximum 70% from the total eligible costs of the project.

An initial total amount of RON 2120 million (RON 265 million/year) was provided for the entire period of execution of the programme for the first component and RON 200 million (RON 25 million/year) for the second component. The budget restrictions in recent years have led to a reduction of these sums. The funding of thermal rehabilitation works of buildings (the second component of the programme) was practically fully taken over by the Multi-annual programme for financing thermal rehabilitation works for buildings, presented in chapter 3.3.2.3.

The aim of the National "Heating Programme - heat and comfort 2006-2015" is to continue the upgrading works of the centralized thermal energy supply systems. The following objectives shall be fulfilled at the end of these works:

- the significant reduction of thermal energy costs for all consumers connected to the district heat supply systems and the improvement of the quality of the service;
- the reduction of consumption of primary energy resources with approx. 100000 toe/year compared to 2004;
- the increase of the annual energy output of cogeneration units to less than 80% and for at least 70% of the units using biomass, correlated with the provisions of GD 219/2007 on the promotion of cogeneration based on the demand of useful heat;
- the reduction of service losses in the heat transmission and distribution grids to less than 15%;
- the exploitation at local level of the potential of renewable resources for covering the heat demand for the population and the replacement and reduction of expensive and adverse fuels;

¹ G.D. 462/2006 (republished) for the approval of the " 2006-2015 Heating Programme - heat and comfort" and the establishment of the Project Management Unit was published in the Official gazette no. 556 on July 23rd, 2008.

- the reduction of polluting emissions in the living urban space generated by the use of individual and local heat sources and by global pollution by reducing greenhouse gas emissions.

On the other hand, at national level there is still an important volume of heat plants and transmission grids used by commercial companies for heat feeding for service purposes and for heating administrative buildings. These can be modernized by taking low cost and economically and energetically efficient measures.

The National Freight Railway Company “CFR Marfă” SA is conducting a rehabilitation programme for the heating plants which ensure the heat production needed for heating buildings under its administration and service needs. The programme includes the maintenance, service, technical and periodical repairs of its own heat production plants.

An energy saving of 1.733 GWh/0.15 thousand tel) was achieved in the year 2010 and for the year 2016, a saving of 10.398 GWh (0.89 thousand toe) is estimated.

2.3.1.8 Production of electricity from renewable sources of energy

The production of electricity from renewable sources of energy is a key component of the EU and national energy strategy and leads to significant savings of fossil fuels and primary energy. Thus, if 1 GWh is produced in a classical thermal power plant, the consumption of primary energy (fossil fuel) is of 244 toe (the value being valid for Romania in 2007; source: AS). If the same quantity of electricity is produced from the direct conversion from hydraulic, wind or solar energy, then the primary energy consumption rate is of 86 toe. The primary energy saving achieved is of 158 toe. Romania has prepared a National Renewable Energy Action Plan in accordance with the provisions of Directive 2009/28/EC. The document provides the following trajectory of total electricity production in hydro, wind and solar PV paths:

Table 2.10

	M.U.	2007	2012	2013	2015	2017	2020
Total hydrological, solar-photovoltaic and wind energy, of which:	GWh	16572	20581	22358	25473	26977	28488
Hydrological	GWh	16571	17215	17624	18679	19063	19768
Solar-photovoltaic	GWh	0	50	100	180	246	320
Wind	GWh	1	3316	4634	6614	7668	8400
Additional production compared to the year 2007	GWh	0	4009	5786	8901	10405	11916
Primary energy savings	th. toe	0	633	914	1406	1644	1883

Source: *The National Renewable Energy Action Plan*

EU Member States must periodically report (pursuant to Directive 2009/28/EC) the production of energy from renewable sources in order to facilitate the monitoring of primary energy savings obtained by promoting renewable sources of energy.

2.3.1.9 Assessment of primary energy savings for 2020 in the electricity production sector

Directive 2006/32/EC on the energy end-use efficiency and energy services refers to the period 2008-2016 and stipulates the need to calculate and report energy savings compared to 2007, as reference year. Since the 2007 energy-environment strategy package and the recent EU documents set forth the objective of achieving 20% primary energy savings in 2020, the energy savings were calculated by energetic efficiency measures in electricity production in 2020. Table 2.11 contains the relevant information for the categories of measures previously described.

Table 2.11

Year	[th. toe]		
	2007	2015	2020
Retrofitting/upgrading measures for some energy groups from coal-fired plants	0	100	100
New investments in coal-fired thermal power plants	0	0	600
Precise measures of energetic efficiency based on the programmes developed by thermal power plants	0	12	20
Promotion of high efficiency cogeneration	0	300	800
The promotion of renewable sources of energy	0	1406	1883
Total primary energy savings at electricity production	0	1818	3403

2.3.2 Energy saving measures in terms of distribution and transmission

2.3.2.1 General data

The investments made so far in the power transmission grid (PTG) have enabled the execution of new and modern dispatcher management infrastructures and of an infrastructure needed for the operation of electricity markets (the national optical fiber grid, the new EMS-SCADA system, the system for measuring wholesale quantities of energy, It trading and settlement platforms). The programme for the upgrading of the entire grid at the highest European standards is in progress with upgrading and retrofitting works of the most important power plants in the power transmission grid PTG, and for the development of the capacity of interconnection lines. The technical progress achieved enabled the adherence to the Union for the Coordination of the Transmission of Electricity (UCTE)/ENTSO-E in 2003 and in 2004 the synchronous connection of the National Power Grid (NPG) to the UCTE/ENTSO-E system, by ensuring an increase in the operating safety of NPG, new trans-border electricity trading opportunities and Romania's accession to the regional energy trading market.

Power distribution grids (PDG) are characterized by an advanced state of physical wear (approx. 65%) of the low-, medium- and high-voltage lines (110 kV), of transformer substations and of transformation points. The moral wear adds up, as 30% of the installations are equipped with equipment produced in the '60s.

The centralized district heating systems face a high degree of physical and moral wear at the level of installations and equipment, insufficient financing resources for maintenance, rehabilitation and upgradings and high transmission and distribution losses.

The best district heating systems (the apartment building-heat-transmission-distribution system) have approx. 35% heat losses and the most inefficient systems approx. 77% losses paid by the end user and by the social protection system. The increase of the price of energy and the reduction of the quality of services have led to the disconnection of

tenants from district heating. The difficult situation of the district heating sub-sector in Romania had a very large social impact.

Approximately 69% of the total length of the National Natural Gas Transmission System have exceeded their operating life. From the total number of adjustment and measurement stations, approximately 27^ have been in service for more than 25 years.

Natural gas distribution networks are characterized by the high degree of wear of the pipes and connections, approx. 40% of these have exceeded their regulated operating life.

The evolution of electricity, heat and natural gas losses after 2000 is presneted in table 2.12.

Table 2.12

	M.U.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Electricity losses	th. toe	571	586	593	523	521	503	560	561	621	605
	GWh	6629	6814	6886	6079	6056	5844	6510	6516	7209	7029
Heat losses	th. toe	588	610	623	705	628	601	598	545	489	444
Natural gas losses	th. toe	304	379	414	515	431	575	890	434	450	319

Source: The National Institute of Statistics - The energy balance and structure of the energy machinery

The Electricity Law no. 13/2007¹, the Technical transmission grid code², The Technical distribution grid code set forth explicit provisions for the development of transmission and distribution grids.

TRANSELECTRICA must prepare an perspective plan for the next ten years, updated every two years, regarding the transmission of electricity according to the current situation and the future evolution of electricity consumption. The Perspective Plan is subject to the approval of the competent authority (RERA) and to the approval of the line ministry (Ministry of Economy, Commercial and Business Environment). This is a public document and it will be posted on the TRANSELECTRICA website.

The perspective plan for the development of PTG must include:

- the coverage of the power and electricity consumption, under safety and economic efficiency conditions, in accordance with the national energy policy;
- the correlation of the actions between TRANSELECTRICA and the participants to the electricity market, concerning any service requested which might have an impact on the operating safety of NPG;
- the local opportunities of connection and use of PTG depending on the consumption development forecast and on the demand for new installed capacities, in order to ensure an efficient, safe operation;

¹ Electricity law no. 13/2007 was published in the OFFICIAL GAZETTE no. 51 of January 23, 2007. This law was subsequently modified by the EMERGENCY ORDINANCE no. 33 of May 4, 2007 published in the OFFICIAL GAZETTE no. 337 of May 18, 2007, by the EMERGENCY ORDINANCE DE no. 172 of November 19, 2008 published in the OFFICIAL GAZETTE no. 787 of November 25, 2008, by RECTIFICATION no. 172 of November 19, 2008 published in the OFFICIAL GAZETTE no. 864 of December 22, 2008, by the EMERGENCY ORDINANCE no. 1 of January 25, 2010 published in the OFFICIAL GAZETTE no. 62 of January 27, 2010 and by the EMERGENCY ORDINANCE no. 43 of May 5, 2010 published in the OFFICIAL GAZETTE no. 316 of May 13, 2010.

² The Technical Transmission Grid Code and the Technical Distribution Grid Code are posted on the website: <http://www.anre.ro/documente.php?id=251>.

- to set up the reserve level in NPG for the production and transmission of electricity at peak consumption in accordance with the sizing requirements.

Each distribution operator (DO) shall schedule the development and upgrading of PDG within NPG.

The schedule made on the basis of an estimated development study, for an average period of 5 years and maximum 10 years, of the respective power grid, a technical-economic-based study. The selected solutions must allow the development of installations after this period, without important changes, by integrating the main elements of the existing grids (the solutions must be self-structuring). The studies shall be updated each year.

The medium-term out perspective plan (5 years), respectively the annual updates of this plan shall be subject to the approval of the competent Authority and shall constitute a public document.

Based on the perspective plan, each DO shall prepare the annual investment schedule for the development and upgrading of PDG.

The scheduling of the PDG development must ensure, among others, the power discharge from the producer's stations, including from the local production stations.

The current operating activity of plants and the scheduling of grid development share the same priority, namely that of increasing the quality of the service supplied to beneficiaries but the problem of energy losses also enjoys a significant attention.

Grid operators operate under the specific conditions of the energy market and recover their costs on the basis of the regulated fees, approved by RERA. These fees include a distinct component for recovering expenses incurred by the respective operators from the purchase of energy consumed in their own plants. When reviewing the documentation drawn up by operators, RERA monitors if the value of such costs can be reduced. This leads to a close pursuit of the problem of grid losses both by grid operators and by the regulatory authority.

The provisions of GO 22/2008 mentioned in the previous chapter regarding the obligation of annually preparing an energetic audit and energy efficiency improvement programmes with short-, medium- and long term measures also applies to grid operators. In these conditions, grid operators have prepared and implement these programmes.

2.3.2.2 Reduction of losses in power transmission grids

The Romanian Power Grid Company TRANSELECTRICA has developed, until 2010, major investment works aimed at reducing power losses in grids correlated with the increase of operating safety. These works have led to a 111 GWh (9.5 th. toe) power transmission grid loss reduction in 2010, compared to 2005, which represents approx. 27 th. toe of primary energy.

The company's perspective plan until 2017 and the set of measures for reducing PTG losses set forth the execution of investments, explicitly or implicitly, aimed at reducing grid losses. These investments are grouped in three categories, namely:

- the replacement of equipment with a high service consumption (11 works)
- the upgrading of stations which are technically and morally out-of-date (12 works)
- the upgrading of lines which are technically and morally out-of-date (8 works).

Annex 1.5 describes the scheduled works for the three categories mentioned above. The achievement of these works will lead to a 73 GWh (6.3 th. toe) energy saving in 2016, which means 17.8 million toe of primary energy.

TRANSELECTRICA also wants to reduce energy losses by optimization of operation, including of maintenance and repair works. The main measures from the set of measures for PTG loss reduction are described in table 2.13.

Table 2.13

No.	Type of energy saving measure	Target considered	Duration	Energy savings (GWh)	
				in 2010 compared to 2005	in 2020 compared to 2010
E1	Reduction of the duration of preventive maintenance works by de-energizing installations	<ul style="list-style-type: none"> - Reduction of electricity losses in the transmission grid after decommissioning key elements of the grid - Reduction of costs as a result of congestions generated by maintenance works 	2007-2016 (as per the Preventive maintenance regulation)	no data available	no data available
E2	Reduction of the duration of corrective maintenance works by de-energizing installations	<ul style="list-style-type: none"> - Reduction of electricity losses in the transmission grid after the accidental decommissioning of some key elements of the grid - Reduction of costs as a result of congestions generated by maintenance works 	2005-2016 (conform NTE 004/05/00)	no data available	no data available
E3	The use of live operation for the execution of works in the PTG installations	<ul style="list-style-type: none"> - Reduction of electricity losses in the power transmission grid (PTG) after the decommissioning of the key elements of the grid - Reduction of costs as a result of congestions generated by the maintenance works 	2010-2016 (as per the TEL Strategy and Programmes in the field of LST)	no data available	no data available
E5	Major maintenance works at the transformer units from the PTG stations	<ul style="list-style-type: none"> - Streamlining/Reducing electricity consumption by mounting/replacing auxiliary components 	2005-2016 (as per the TEL Strategy and Programmes in the field of transformer units)	5	3.5
E6	Major maintenance works and investments on the overhead lines (OHL) with a proper technical state	<ul style="list-style-type: none"> - Reduction of OHL losses through the Corona effect - Transfer to the 400 kV voltage of the Gutinas - Bacau Sud - Roman Nord - Suceava axis 	2005-2016 (as per the Preventive maintenance regulation and TEL maintenance programmes)	no data available	no data available
E7	Increase of the energetic efficiency of buildings and of other service installations within power plants.	<ul style="list-style-type: none"> - Streamlining/Reducing electricity and heat consumption inside the power station buildings 	2005-2016	no data available	no data available
E8	Increase of the energetic efficiency of equipments corresponding to the internal services of power plants	<ul style="list-style-type: none"> - Reduction of the electricity consumption of equipment corresponding to internal services by replacing them with high efficiency equipment; - Supplying internal services from the tertiary of AT; - Training the operating staff to prevent energy waste 	2005-2016	3	1

Note: We were not able to quantify energy savings for some of the measures presented in table 2.13. These measures have multiple effects, including on the operative management, design and purchase of equipment, the operation of the electricity market, the interconnection operation of the system etc. and all these effects were taken into consideration for their promotion.

The ex-post monitoring of the efficiency of these measures will be made on the basis of the synthetic indicators at the level of PTG regarding the internal service consumption. Annexes 1.6, 1.7 and 1.8 contain details about three of the measures presented in table 2.13.

2.3.2.3 Reduction of energy distribution grid losses

Romanian distribution operators exploit public power grids up to a 110 kV voltage, inclusive. Based on the technical state of these grids, upgrading plans were prepared which aim at increasing the operating safety and quality of the services supplied to grid users, and reducing power losses. The main categories of measures with direct effects on the reduction of losses are presented in table 2.14.

Table 2.14

Nr.	Type of energy saving measure	Target considered	Duration	Energy savings (GWh)	
				in 2010 compared to 2005	in 2020 fata de 2010
1	Transfer of medium-voltage power grids from 6 kV, respectively 10 kV to 20 kV	- Reduction of power losses determined by the reduction of the value of electric power via lines - Increase of the electrical power which can be distributed via lines	2005-2020	14	30
2	Upgrading of medium voltage/low voltage transformer points	- Replacement of MV/LV power lines with a high degree of physical and moral wear with new, efficient, low loss transformers	2005-2020	4	6
3	Additional power injections in low voltage grids	- Execution of additional MV/LV transformer points (additional power injections)	2005-2020	30	50
4	Upgrading of low voltage power lines	- Increase of the cross-section of the conductors of distribution grids - Biphasing/triphasing of biphased/mono-phased circuits - Upgrading of mono-phase connections using co-axial connections and BMPs which helps reduce grid losses and reduce to the point of removal of the possibilities of pilfering energy from the distributor's grids	2005-2020	5	8
5	Total energy savings			53	94

Therefore, it is estimated that the measures taken by distribution operators will lead to a reduction of power grid losses with 94 GWh in 2020 compared to 2010, which means a primary energy saving of approx. 8.1 th. toe.

Annexes 1.9, 1.10 si 1.11 contain information, for illustrative purposes, for various power distribution operators in Romania.

2.3.2.4 Reduction of losses in heat transmission and distribution grids

Heat losses in transmission and distribution grids decreased from 705 th. toe in 2003 to 444 th. toe in 2009 (see table 2.16), but this was largely determined by the reduction of the quantity of heat produced and respectively transmitted/distributed. The share of losses from the total heat production practically remained the same (approx. 19.5 %).

The specific activities of public heat supply services are regulated by Law 325/2006¹. The law stipulated that the establishment, organization, coordination, monitoring and control of the public heat supply service are obligations of the local public administration. These authorities had the following duties, among others:

- the annual preparation of their programme in the field of thermal energy, correlated with their own energy efficiency programme
- the set-up of an energy department in their organization
- the approval of the DHS development, upgrading and metering programme

The management of the public heat supply service through DHS can be organized by:

- direct management, in this case local public authorities shall directly assume all their duties and responsibilities
- delegated management, in this case the authorities assign the rights and obligations to an operator that can be a state-owned, private-owned or mixed-owned commercial company; the delegated management is assigned either by concession or according to the public-private partnership procedure.

At national level, some local authorities have opted for the direct managements, other for the delegated management.

The operators' capacity to invest in the rehabilitation of the grids within DHS is limited by the low payment capacity of the population and by the need to keep the heat supply price to a low level. It is estimated that the National "Heating Programme - heat and comfort 2006-2015" (presented in chapter 2.3.1.7) will contribute to a large extent to the execution of such works, but the economic-financial difficulties from recent years have caused achievements to be below expectations.

Bucharest municipality is in a relatively difficult situation in which the management of the heat supply service through DHS is made by direct management. The Autonomous Heat Distribution Administration (RADET) is under the direct subordination of the municipality. Based on the National strategy for the heat supply of localities through centralized production and distribution systems (G.D. 882/2004), the rehabilitation of the heating system in Bucharest municipality was considered a priority, but the achievements were modest.

In the winter of 2010/2011 the price of a gigacalory supplied to the population was of RON 124 lei (approx. EUR 28.5) VAT included, which means less than half of the actual costs. The municipality grants subsidies to RADET whose value was estimated to 800 million (approx. EUR 185 million) in the previous year. The problem is not only technical or economical. The company Price Waterhouse Coopers conducted a study concerning the retrofitting of RADET whereby it recommends a concession or privatization. The general mayor of the capital, Mr Sorin Oprescu, declared that, personally, he would opt for concession, because otherwise the town hall was to invest more than EUR 2 billion in the

¹ Law 325/2006 regarding the public heat supply service was published in the OFFICIAL GAZETTE no. 651 of July 27, 2006

next two years in infrastructure. The General Council of Bucharest Municipality did not make a decision yet.

However, the situation varies to a large extent from one town to another. The towns where the administration of DHS is made by commercial companies are often in a more favourable situation. Therefore, in Ploiesti municipality, the town hall leased the respective activities to the company Dalkia. The previous chapter contained a description of the measures taken by Dalkia to build a new high efficiency cogeneration group. In parallel, grid rehabilitation actions were adopted.

it is difficult to make an evaluation of the primary energy savings by reducing heat losses in grids at this time considering the complexity of the problem and the fact that the decision is a decentralized one at the level of local authorities. It can be estimated that in the following years, simultaneously with an economic revival , the „National Heating Programme - heat and comfort 2006-2015” will be re-launched so that at least the saving potential (329 th. toe/year), which is part of the priority measures, can be capitalized.

3. Final energy savings in end-use sectors

3.1 The review of the targets concerning final energy savings and the achievements in terms of final energy savings

The targets concerning final energy savings were presented in chapter 1.3 the achievements concerning final energy savings during 2008-2010 are presented in chapters 3.3.2.1 (residential sector), 3.3.3.1 (industry sector), 3.3.4.1 (transports) and 3.3.5.1 (services sector).

3.2 List of strategies having an impact on final energy demand

Chapter 2.3 includes the energy strategies adopted in Romania during the last decade and which are in force. Out of these, „The national strategy on energy efficiency” refers exclusively to the increase of energy efficiency in end-use sectors (industry, residential sector, tertiary sector, agriculture, transports) as well as to centralized heat supply. The strategy’s horizon time is the year 2015. The other documents presented also make reference to energy savings in end-use sectors.

3.3 Measures concerning the increase of energy efficiency in end-use sectors and the final energy savings

3.3.1 Calculation methodology

The calculation concerning final energy savings during 2008-2010 was performed by using mainly the recommendations made by the European Commission contained in the document “Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use efficiency and energy services” for top-down method with some adjustments to local application conditions. Distinctively, the calculation concerned:

- a) Final energy savings in the residential sector
 - a1) electricity savings in the residential sector
 - electricity savings concerning refrigerating devices, by using P4 indicator (electricity consumption according to types of domestic appliances, rendered in kWh/year);
 - electricity savings concerning washing machines, by using P4 indicator according to types of domestic appliances, rendered in kWh/year);
 - electricity savings concerning lighting devices in the residential sector, by using P5 indicator adjusted (electricity consumption for lighting devices in the residential sector, rendered in kWh/m² living area);
 - a2) non-electric energy savings in the residential sector, by using M1 indicator adjusted (the consumption of non-electric energy with climate correction in households rendered in ton of oil equivalent/m² living area);
 - non-electric energy savings in households connected to the natural gas network or central heating
- b) final energy savings in industry using P14 indicator (energy consumption on product unit for an industry subsector, defined as the relation between final energy consumption and the production index of the envisaged subsector;

- c) final energy savings in transports
 - c1) electricity savings in road transport by using M5 indicator (road vehicles energy consumption rendered in ton of oil equivalent/ equivalent vehicle)
 - c2) electricity savings in rail transport by using M6 indicator (energy consumption in rail passenger transport rendered in grams of oil equivalent /passenger-km)
 - c3) electricity savings in inland waterway transport by using M7 indicator (energy consumption in waterway goods transport rendered in grams of oil equivalent /tons-km)

- d) final energy savings in services
 - d1) non-electricity energy savings in services by using M3 indicator (the relation between the consumption of non-electricity energy with climate correction in the services sector and the number of full-time employees from the same sector)
 - d2) electricity savings in services by using M4 indicator (the relation between the consumption of electricity in the services sector and the number of full-time employees from the same sector)

The primary data used were mainly provided by the base data EUROSTAT. They were completed with information provided by the National Institute of Statistics in publications such as:

- Statistical Yearbook of Romania
- Energy balance and the structure of energy equipment
- Monthly statistical bulletins
- Population and houses census 2002

There was used information provided by RERA and ANRSC, considered to be highly reliable, as well as GFK reports.

There were also examined papers drafted in relation to some EU funded projects, presenting statistical data for Romania (projects like ODYSSEE-MURE, REMODECE, EL-TERTIARY, EUROTOPTEN) or internal funded ones (CREFEN).

Concerning the calculation methodology used, the following appreciations are further made:

- the population's consumption of non-electricity energy was divided in two categories:
 - The consumption of natural gas and heat supplied through district-heating systems
 - The consumption of solid fuel (firewood, agricultural waste etc)

The natural gas and heating supplied through district-heating systems are obtained from the population by exclusively commercial means, so that the statistical data are highly reliable.

Firewood and agricultural waste are widely used especially in rural area while they are currently obtained by non-commercial means. EUROSTAT and INS would publish information concerning the population's consumption of biomass, but these are estimations accepted through the international methodology in energy statistics, since all the countries face such problems. Thus, according to the National Institute for Statistics, the energetic consumption of firewood and biomass of the population has increased from 1,7 million ton of oil equivalent in 2001 to 2,7 million ton of oil equivalent in 2007 and 3,4 million ton of oil equivalent in 2009, although during this

period of time the number of households using solid fuel for heating, cooking or providing domestic hot water has actually been constant.

In such conditions the calculation concerned only non-electric energy savings performed in households connected to natural gas networks and central heating. We considered that in households using solid fuel, energy savings were not registered. Such an approach is justified by the fact that energy efficiency measures for heating were mainly applied in households supplied with energy by energy networks.

- Indicators P5 and M1 to be found in the recommendations made by the European Commission provide the calculation of consumption for electricity used for lighting and respectively, of consumption for non-electric energy according to each household. Still, lately Romania has been facing an important increase of new-built households' surface and consequently, an increase of the average household's surface. Thus, according to the data provided by the National Institute for Statistics, between 2000-2009 the average living area on national level increased from 34,6 m²/household to 38,9 m²/household. This leads to a further energy consumption although the new-built homes are certainly more energy efficient. According to the local situation, we considered more appropriate that indicators P5 and M1 be calculated by reporting the respective consumption of energy to the living area (and not to the number of households).

- For the period of centralized economy, in Romania the use of air conditioning devices was prohibited. The restriction was eliminated in the year 1990 but the economic crisis which accompanied the transition period limited the purchase and use of such devices by people. Sales have increased lately, but the level is still low. Their use is frequently occasional. Obtaining primary information concerning the number of air conditioning devices and their energy consumption are difficult operations. Store chains and producers/distributors' associations do not have any information concerning the structure of such devices' selling process (to firms, to institutions and to people).

Under such conditions, it was not possible to calculate energy savings corresponding to electricity consumption for air conditioning devices.

The rather late introduction in Romania of air conditioning devices in the residential sector can be advantageous since the traded devices are modern ones, cu high energy efficiency.

3.3.2 Measures concerning the increase of energy efficiency in the residential sector and the final energy savings

3.3.2.1 Final energy savings in the residential sector performed between 2000-2010

The electricity savings and non-electric savings were distinctively calculated.

a) Electricity savings

In Romania, the consumption of electricity in the residential sector still has low values. Thus, in the 2008 the consumption of electricity according to each inhabitant (484 kWh) was with 41,7% higher than in the year 2000, but 3,4 times less than the EU 27 average (1640 kWh) and 2,7 times less than the value registered in Bulgaria (1311 kWh).

Two divergent factors influenced the evolution of electricity consumption in the household system:

- The quantity and quality of the service obtained (the number of appliances and their size);
- Energy efficiency.

Regarding Romania, the influence of the first factor is preponderance and still the Romanian market is far from being saturated. Under such circumstances, it was not possible to use indicator M2 (“electricity consumption in the residential sector according to each home”) [B3]. Otherwise, document [B3] considers that indicator M2 is difficult to be used for calculating energy savings unless a saturation of appliances supplying has been reached. Thus, using a top-down indicator such as “electricity consumption according to inhabited household” is not recommended, even contraindicated for Romania.

Electricity savings were distinctly calculated for:

- Freezers/refrigerators
- Washing machines
- Lighting devices

The calculation was performed by using P4 indicator (electricity consumption according to types of appliances, rendered in kWh/m² living area) for lighting.

We could not calculate electricity savings for air conditioning devices due to the above-mentioned reasons.

The results are presented in:

- figure 3.1: electricity savings for freezers/refrigerators
- figure 3.2: electricity savings for washing machines
- figure 3.3: electricity savings for lighting devices in the residential sector
- figure 3.4: total electricity savings in the residential sector

Figure 3.1

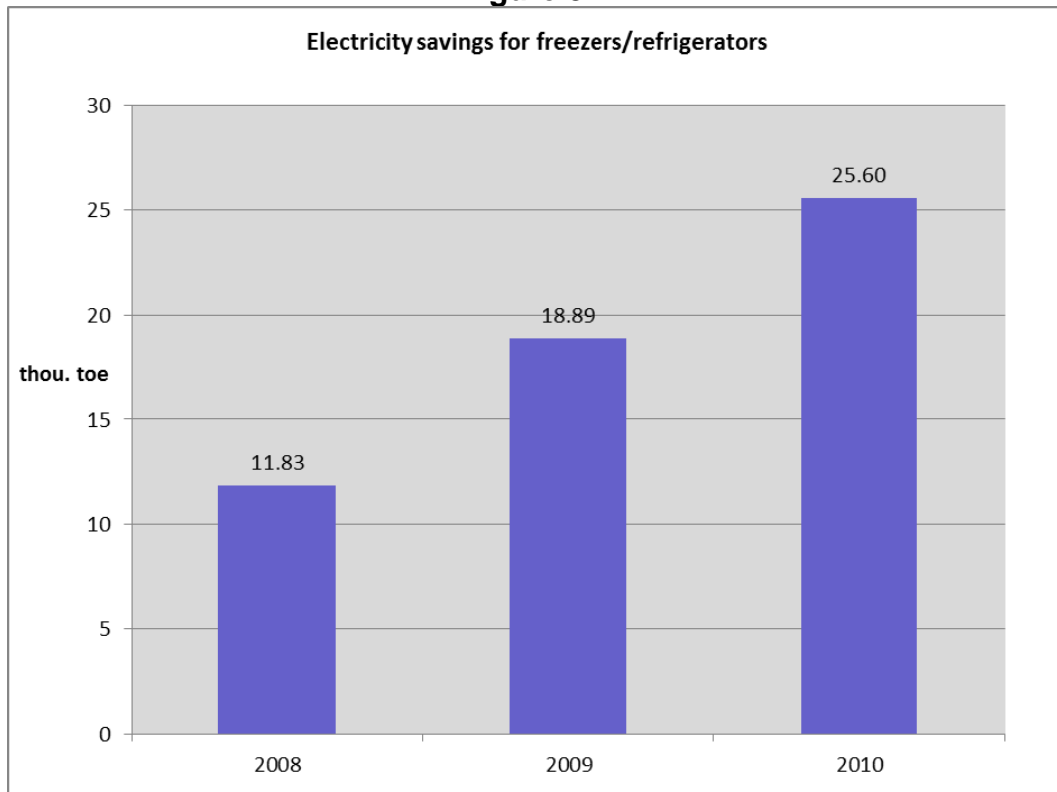


Figure 3.2

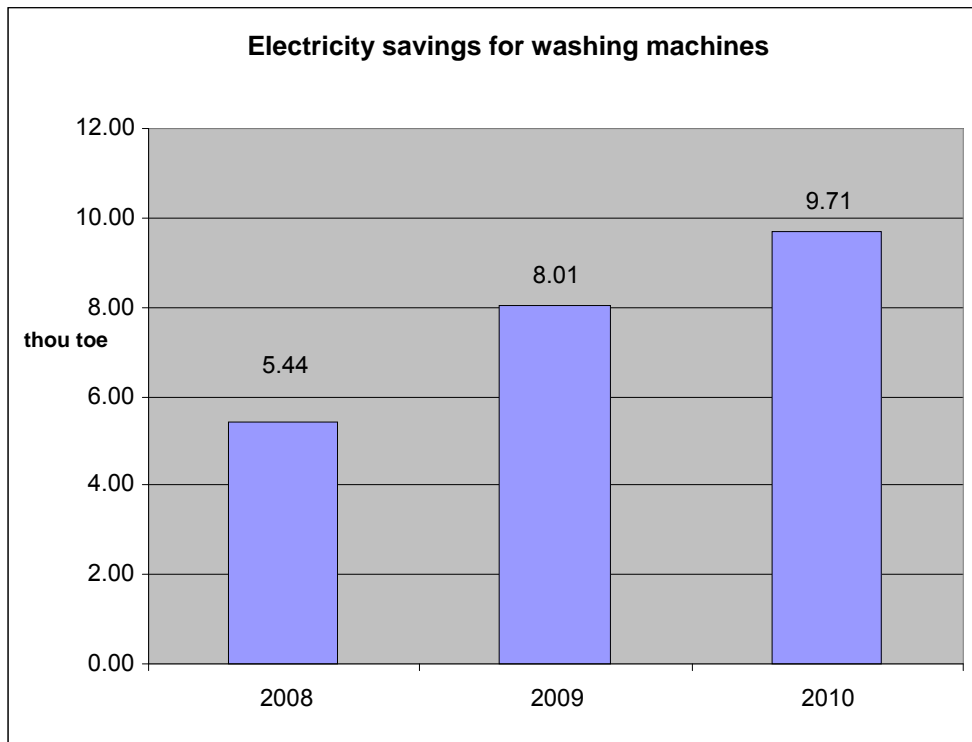


Figure 3.3

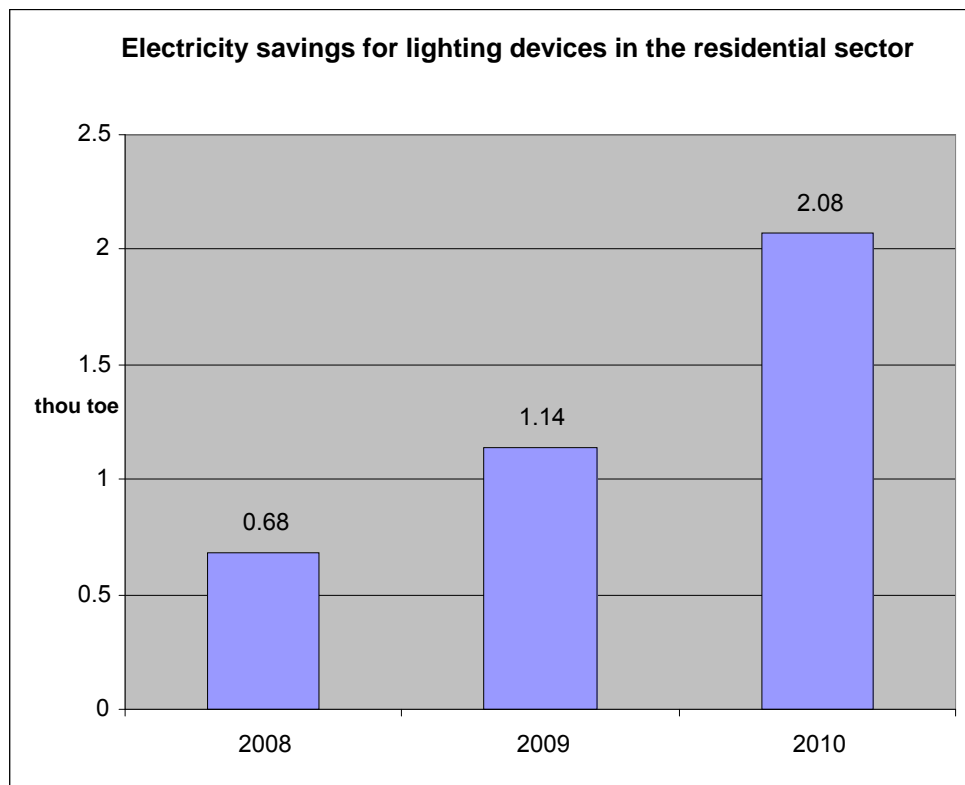
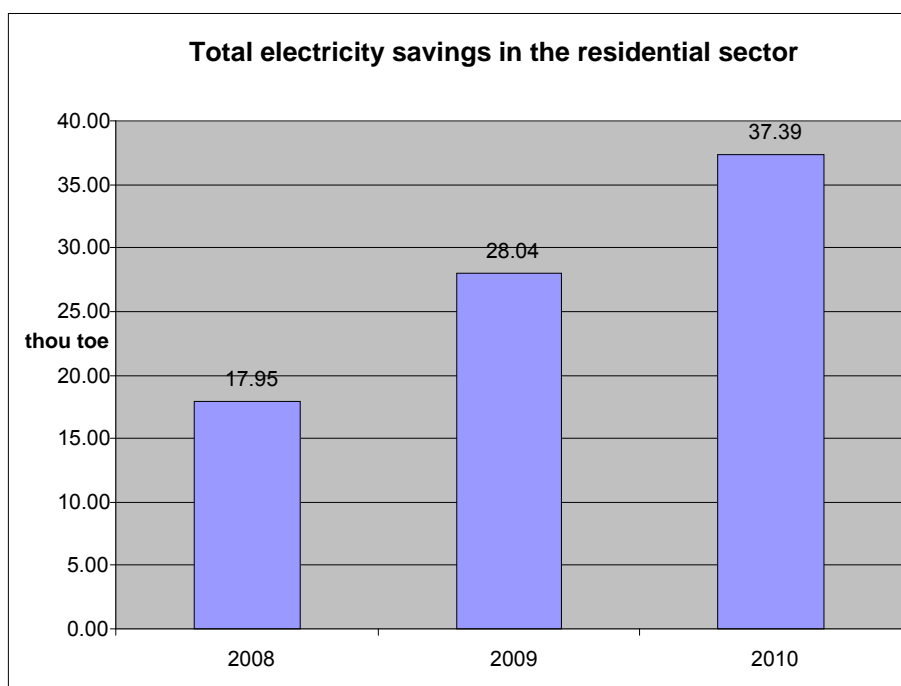


Figure 3.4



Details of calculation are presented in:

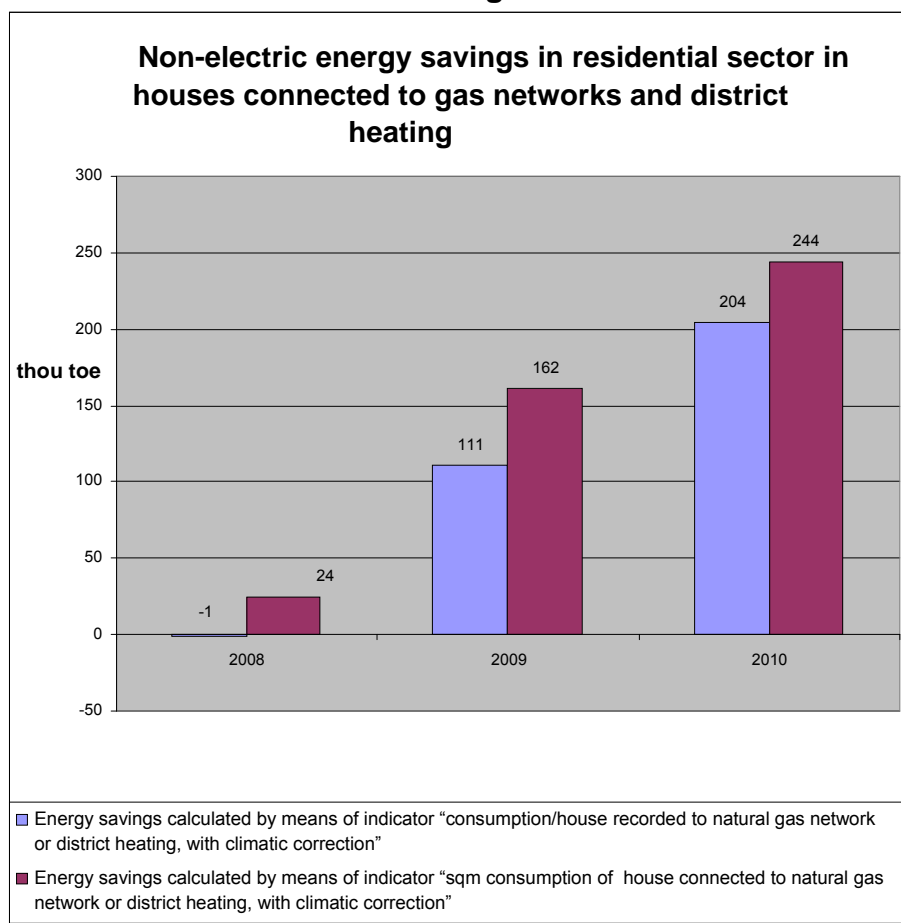
- Annex 2.1 for freezers/refrigerators
- Annex 2.2 for washing machines
- Annex 2.3 for lighting devices

b) Non-electric energy savings

The calculation of non-electric energy savings in the residential sector was performed by means of top-down method, by using M1 indicator adjusted (the consumption of non-electric energy with climate correction in homes, rendered in tons of oil equivalent/m² living area). The calculation was limited to the large number of homes connected to gas networks and central heating which use these energetic vectors for heating, cooking or providing domestic hot water. The calculation of energy consumption corresponding to these homes included the consumption of natural gas and heat (those data were provided by EUROSTAT and INS). In Romania, electricity is accidentally used for such purposes, so that the corresponding consumption was neglected. The low value of electricity consumption in the residential sector according to each home supports this hypothesis. The climate correction was done according to data provided by EUROSTAT.

Calculations are available for the consumption of energy with climate correction according to each home and, distinctly for the consumption of energy with climate correction according to m² living area and energy savings. The results obtained in both versions are presented in figure 3.5. Taking into consideration the increase of the average surface of homes which has been registered in Romania during the last decade, we consider that the relevant value was calculated according to the consumption of energy with climate correction on m² living area.

Figure 3.5



Details of calculation are included in Annex 2.4.

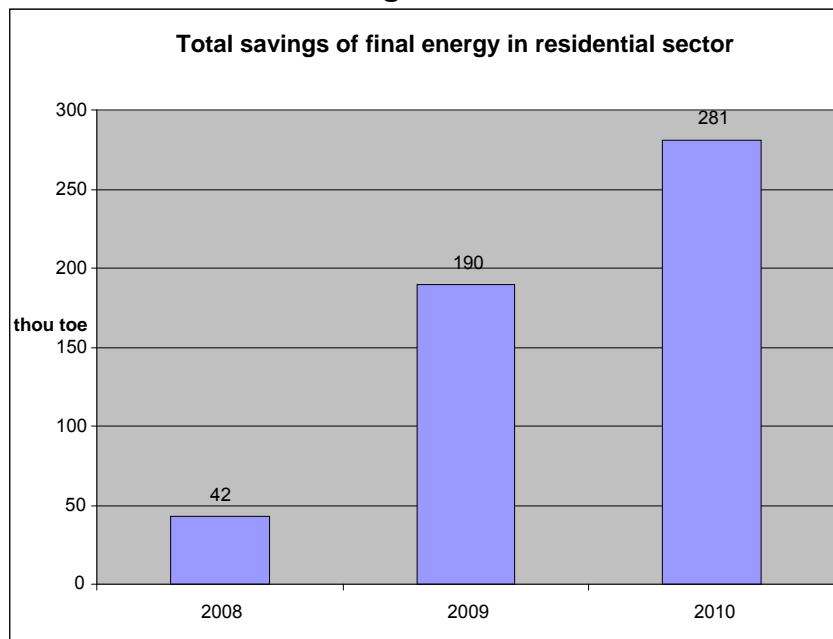
We also tried calculating non-electric energy savings in homes unconnected to gas networks and central heating but using traditional stoves with solid fuel for heating, cooking and providing domestic hot water. Such category usually includes old dwellings in rural area and on the outskirts of cities, which use biomass (firewood, agricultural waste etc.) often obtained through non-commercial means. As it was previously mentioned, the official statistic information concerning biomass consumption in the residential sector is represented only by estimations. Under such circumstances, we consider that this category of dwellings did not perform energy savings. Such a hypothesis is reasonable, as in numberless cases people took, at their expense, measures for improving energy performances in those buildings, but there is no specific information concerning the present situation on national level.

Under the specified conditions, the overall non-electricity energy savings in the residential sector in Romania are those registered in dwellings connected to energy networks and presented in figure 3.5.

c) Overall final energy savings in the residential sector

The overall energy savings registered in the residential sector during 2008-2010, in comparison to the year 2007, were determined by adding electricity savings, on the one hand and natural gas and heating savings (energy products supplied to the population by distribution networks), on the other hand. We could provide no calculation for non-electricity energy savings performed during such processes as heating, cooking or providing domestic hot water by means of individual stoves and by usually using energy products purchased through non-commercial means (especially firewood and agricultural waste). In such a case, no energy saving was considered to be registered during the period submitted for analysis, although progress was actually made. Under such circumstances, the overall value of energy savings in the residential sector is presented in figure 3.6.

Figure 3.6



3.3.2.2 Measure title: Promoting the use of appliances and of energy efficient lamps

a) Measurement application between 2008-2010. Energy savings performed

Romania has transposed into national law EU directives on energy labeling of domestic appliances and electric lamps and have effectively implemented their provisions. Thus, there are established requirements on the labeling of and the energetic/ecological efficiency for the following category of receivers:

- Domestic refrigerating devices according to the Governmental Directive 1039/2003 republished¹
 - Domestic air conditioning equipment according to Governmental Directive GD 1871/2005²

¹ GD1039/2003¹ republished on establishing requirements for labelling and energy efficiency of domestic refrigerating devices in view of their introduction on the market was published in Romania's Official Monitor no. 455 on 5 July 2007

² GD 1871/2005 on establishing requirements for labelling and energy efficiency of domestic air conditioning devices in view of their introduction on the market was published in Romania's Official Monitor no. 69 on 25 January 2006

- Domestic electric ovens according to Governmental Directive GD 456/2006¹
- Domestic electric clothes dryers according to Governmental Directive GD 736/2006²
- Domestic combined electric washing and drying machines according to Governmental Directive GD 671/2001 republished³
- Domestic dishwashers according to Governmental Directive 86/2006⁴
- Domestic electric lamps according to Governmental Directive 1056/2001⁵ and the Governmental Directive 542/2004⁶
- Ballasts for fluorescent lighting sources according to Governmental Directive 1160/2003⁷

More legislations approved by Governmental Directives developed the provisions of the previous legislations (GD 1258/2007⁸, GD 321/2008⁹).

In the year 2007, in Romania, they started the promoting of voluntary labeling Energy Star office equipment - IT within Energy Star Program established according to the Agreement between the United States Government and the European Community on matters on labeling programs coordination concerning the energy efficiency of office equipment. The following actions were developed for promoting the mentioned Program:

- Organizing a MEC-RAEC meeting in April 2007 on MEC premises with representatives of associations in the field: APREL, ARIES.
- Posting on RAEC site of useful information for accessing the Program and signing up of possible interested persons as well as providing the list with the program's partners and with the products available in the program on www.eu-energystar.org

The checking of applying this voluntary labeling system has not been the object of interest of RAEC/RERA since this institution was not designated as an authority responsible for the implementation of Regulation 106/2008/CE.

The above-mentioned measures have led to an increase in energy efficiency in the residential sector. The energy savings achieved were presented in chapter 3.3.2.1 a).

¹ GD 456/2006 on establishing requirements for labelling and energy efficiency of domestic electric ovens in view of their introduction on the market was published in Romania's Official Monitor no. 364 on 26 April 2006

² GD 736/2006 on establishing requirements for labelling and energy efficiency of domestic electric clothes dryers in view of their introduction on the market was published in Romania's Official Monitor no. 538 on 22 June 2006

³ GD 671/2001 on establishing requirements for labelling and energy efficiency of domestic combined electric washing and drying machines in view of their introduction on the market was published in Romania's Official Monitor no. 650 on 24 September 2007

⁴ GD 86/2006 on establishing requirements for labelling and energy efficiency of domestic dishwashers in view of their introduction on the market was published in Romania's Official Monitor no. 129 on 10 February 2006

⁵ GD 1056/2001 on establishing requirements for labelling and energy efficiency of domestic electric lamps in view of their introduction on the market was published in Romania's Official Monitor no. 727 on 15 November 2001

⁶ GD 542/2004 on establishing the Criteria for granting ecological labelling to the group of electric lamps products published in Romania's Official Monitor no 368 on 27 April 2004

⁷ GD 1160/2003 on establishing requirements for labelling and energy efficiency of ballasts for fluorescent lighting sources in view of their introduction on the market was published in Romania's Official Monitor no. 716 on 14 October 2003

⁸ GD 1258/2007 on amending and completion of some legislation on energy efficiency was published in Romania's Official Monitor no. 731 on 29 October 2007

⁹ GD 321/2008 on amending and completion of some legislation on consumers' protection was published in Romania's Official Monitor no. 240 on 27 March 2008

b) Application of the measure during 2011-2016 as well as with a view to the year 2020. Anticipated energy savings

Promoting the use of domestic appliances, office equipment - IT and energy efficient lamps shall continue over the period 2011-2016, according to the European Union legislation.

3.3.2.3 Measure title: Thermal insulation and ventilation to multi-floor residential buildings made in the period 1950-1990

a) Measure implementation in the period 2008-2010. Energy savings made

According to the Population and Buildings Census, at national level 39% of the total residences are located in block type residential buildings, most of them being built during the period of the centralised economy at the standards in force during that time, with a high wear and tear level. The renovation of these buildings with government financial support was launched in 2002, by the approval of the GEO 174/2002¹. The support measures established in 2002 were extended in 2009 by the GEO no.18/2009².

By the GEO no.18/2009 published in the Official Journal no. 155 of 12th of March 2009, with the addition of Law 5/2010, published in the Official Journal no. 18 of 11th of January 2010, there are established the intervention works for thermal insulation of the residential blocks built according to designs elaborated in the period 1950-1990; there are also established the necessary stages for the works elaboration, their manner of financing, as well as the obligations and liabilities of public administration authorities and of Flat Owners' Associations. These works are considered investments of public local interest and are intended for the improvement of the energetic performance of the residential blocks, in order for the annual specific power consumption calculated for heating to decrease less than 100 kWh/m² of net area in conditions of economic efficiency. The financing of execution of intervention works is insured as follows:

¹ GEO 174/2002 concerning the institution of special measures for the thermal renovation of several residential blocks-condominiums was published in the Official Journal of Romania, part I no. 890 of 9th December 2002 and approved with further modifications and amendments by Law 211/2003 published in the OJ no. 315/22.05.2003. The methodological standards of implementation of this ordinance were approved by GD no. 1070/2003, published in the Official Journal no. 661/18.09.2003.

² GEO no. 18/2009 concerning the development of power performance of the residential blocks was published in the Official Journal no. 155 of 12th of March 2009 and was amended by Law 5/2010, in order to complete the Article 1 of the GEO 18/2009, law published in the Official Journal no. 18 of 11th January 2010.

- 50% of the public budget allowances, within the funds approved annually with this destination in the budget of the Ministry of Regional Development and Tourism.
- 30% of funds approved annually with this destination of the local budgets.
- 20% of the repairing fund of the Flat Owners' Association

The public local administration authorities may also insure, within the limits of the annually approved funds with this destination, in addition to the quota of 30%, the partial or entire undertaking of the expenditures related to intervention works specific to the 20% quota, which is shared in by the Flat Owners' Association.

The Ministry of Regional Development and Tourism by the National Institute for Research and Development in Construction and Construction Economy – INCERC of Bucharest monitors the energetic performance of the residential blocks and constitutes specific data banks.

For these intervention works, the construction authorisation is issued without the transfer of legal taxes to the State Inspectorate in Constructions (ISC) and to the Builders' Social Fund (CSC).

The multi-annual programme for the works' financing of thermal renovation of the buildings, approved by the Order of the Ministry of Regional Development no. 362/2009¹, enjoyed in 2009 a value of 360 millions lei (approx. 85 millions EUR). By several minister orders, the separation of this sum on cities was approved and there was established the list of buildings that are supposed to have intervention works. According to the Order 1045/09.12.2004², the final list included 1257 of blocks with 51677 flats.

The programme continued also in 2010, but in the context of the economic crisis, the sum allocated from the public budget was of 150 millions lei (approx. 35 millions EUR), according to the Order of the MRDT no. 1032/16.02.2010³. The list of buildings included in the multi-annual programme with financing in 2010 is attached to that specific order and contains 896 blocks with 40670 flats.

¹ The Order 362/27.05.2009 for the approval of the Multi-annual national programme concerning the improvement of the power performance in the residential blocks with financing in 2009 of the Ministry of Regional Development and Housing is published on the site www.mdrd.ro/lucrari-publice/programul-de-reabilitare-termica and on the site www.mdrl.ro.

² The Order 1045/09.12.2009 of the Ministry of Regional Development and Housing for the modification, amendment and replacing of the annex to the Order of the Ministry of Regional Development and Housing no. 362/2009 is published on the site www.mdrl.ro.

³ The Order no. 1032/16.02.2010 of the Ministry of Regional Development and Tourism is published on the site www.mdrl.ro and on the site www.mdrd.ro/lucrari-publice/programul-de-reabilitare-termica.

For 2011, for that programme is allocated the sum of 150 millions lei (approx. 35 millions EUR) by the Order of the MRDT no. 1158/2011¹. The list of the buildings included in the multi-annual programme with financing in 2011 is attached to that specific order and contains 1336 blocks with 54861 flats.

There are plenty of situations when the population took measures of improving the thermal performances in the building, in the flats of the blocks build independently during the period 1950-1990.

b) Measure implementation in the period 2011-2016 and in perspective of 2020. Energy savings predicted

GEO 18/2009 doesn't predict a deadline for implementing the measures concerning the power performance improvement of the residential blocks and there are premises to consider that it will be in force as time as there will be demands related to the thermal renovation of the residential blocks.

3.3.2.4. Measure title: Improving the power efficiency to the heating/cooling systems of the individual homes

a) Measure implementation in the period 2008-2010. Energy savings made

The use of air conditioners in the individual homes is in a relatively incipient stage, but it is in an accentuated tendency of development. An analysis made within the project REMODECE according to the answers to 623 of surveys, showed that 8.67% of the homes have air conditioners. We mention here that the surveys were filled in by persons of the city.

The demands relating to the energetic labelling and efficiency for the introduction on the market of the home *air conditioners* are approved by **GD no. 1.871/2005**².

¹ The Order no. 1158/11.03.2011 of the Ministry of Regional Development and Tourism is published on the site www.mdrtr.ro/lucrari-publice/programul-de-reabilitare-termica.

² GD no. 1871/2005 concerning the establishment of demands related to the energetic labelling and efficiency for the introduction on market of home air conditioners was published in the Official Journal 69/25.01.2006

During the period 2007-2009, there were carried out several control actions on the verification of compliance with the provisions of this government decision. The results of the control actions are shown in table 3.1:

Table 3.1

	2007	2008	2009
Number of controls	168	140	145
Non-compliances	39%	34%	29%
Formal Notices	55	39	33
Fines	10	9	9

There can be notices a decrease the time passing of non-compliances discovered, as well as of formal notices and fines applied.

b) Measure implementation in the period 2011-2016 and in perspective of 2020. Energy savings predicted

The implementation of this measure shall continue also in the next period.

3.3.2.5 Measure title: Promotion of high-efficiency cogeneration

The measure “Promotion of high-efficiency cogeneration” was presented in section 2.3.1.6.

3.3.3 Measures concerning the improvement of power efficiency in industry and final energy savings

3.3.3.1 Industry final energy savings made in the period 2008-2010

The calculation of industry final energy savings made in the period 2008-2010 in comparison with 2007 (main year) was made using the top-down index P14 recommended in document [B3]. This index is defined as the rate between the final energy consumption and the production index for every industrial branch of final consumption. It is used to calculate energy savings for every industrial branch of final consumption and, by summing up, it is obtained the value of industry energy savings in general.

The production index values relating to industrial branches are presented in Annex 3.1, the information source being the Romanian Statistical Yearbook by the INS (National Institute of Statistics) (2010 edition) for the values related to the period 2005-2009. For 2010, there were made estimations OEN-ICEMENERG, according to the information published in the monthly statistical bulletins published by INS.

The values of industry final energy consumption are presented in the Annex 3.2, the source of information being the Energetic balance and the energetic machine structure, publication edited also by INS. In the same annex, there are also presented some information concerning the industry final energy consumption published on the EUROSTAT site. There are also noticed some differences between the INS data and EUROSTAT data, due to differences between calorific powers used by EUROSTAT and those nationally used, differences that are maximum in 2007. These differences are registered at the total consume and have relatively high values in the industrial branches “Non-metal material products”, “Chemistry” and “Metallurgy”. Taking into account the fact that for the index values of the industry production, the information source was INS, for data comparability reasons, it was chosen the same source also for the consumption values of final energy.

There was calculated the consumption value of final energy under the ESD incidence on industry branches. The values are presented in Annex 3.3.

With the values of annexes 3.1 and 3.3 and using the methodology and the calculation relationships recommended by B[3], there were calculated the final energy savings on industry branches and on total industry. The values are presented in Annex 3.4 and Table 3.2.

Table 3.2

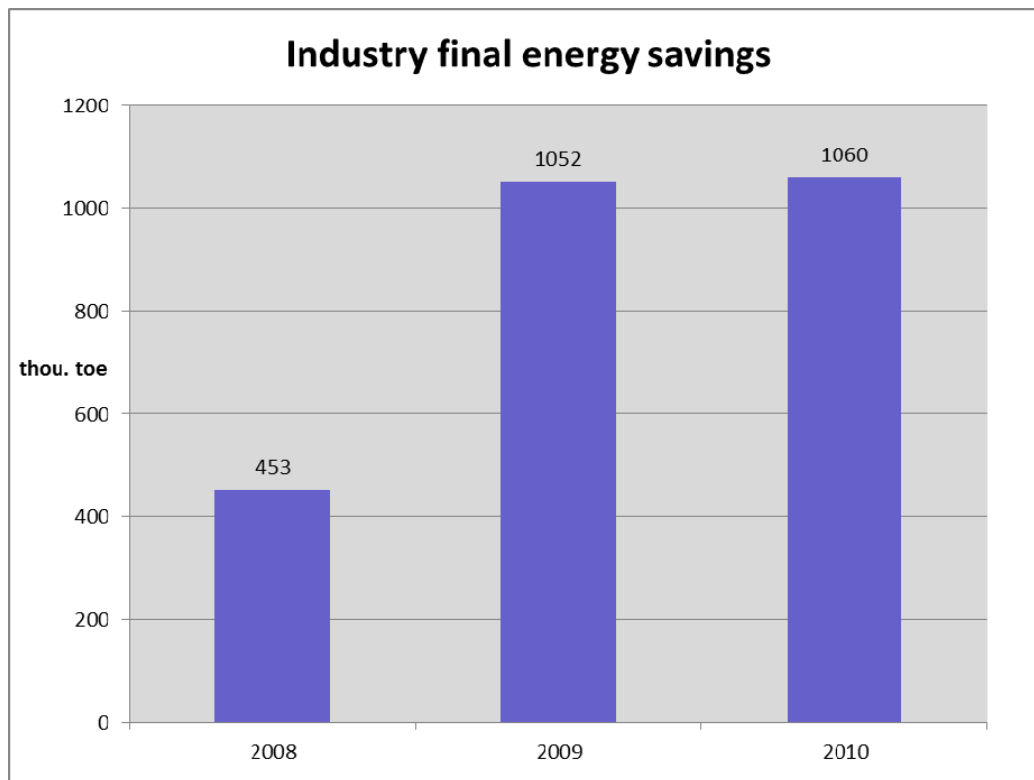
[thousands toe]

	2008	2009	2010
Extraction of iron ore, nonferrous metals	-0.99	-1.83	-1.74

Other extractive activities	-26.69	-14.90	-14.29
Food, drinks, tobacco	68.89	211.46	212.07
Textile products	37.75	27.26	26.84
Clothes	-27.39	-7.02	-1.25
Leather and shoes	-9.74	-10.70	-13.86
Wood processing	13.53	113.15	120.75
Cellulose, paper and paper items / Printing and reproduction of registrations on supports	116.64	127.73	128.68
Substances, chemical and pharmaceutical products	45.44	261.63	255.48
Rubber products and plastics	-12.36	59.99	60.63
Manufacturing of other products of non-metallic ores	69.10	27.44	10.03
Metallurgy	28.95	33.17	36.67
Metallic constructions, machines and equipments	44.90	57.34	56.04
Furniture	-6.94	18.69	25.13
Constructions	112.18	148.77	159.20
Total savings of industry energy	453.29	1052.17	1060.39

The value of final energy savings in comparison with 2007, made in the general industry, is graphically presented in Figure 3.7.

Figure 3.7



There are notices high values of energy savings obtained in the industry, both in 2008 and in 2009 and 2010. The value of savings was maximum in the chemical industry and in the food industry. The evolutions registered represent a continuation of favourable evolutions registered during the period before the reference year.

When appreciating these values, have to take into account the fact that P14 index, using the index of industrial production, has also a macroeconomic character, in a large measure.

After the accentuated decline registered in the period 1990-2000, the Romanian industry passed in the latest decade by a revival in conditions of accentuated restructure. There were registered changes in the industry structure on branches, as well as in the structure of industrial production related to every single branch. Thus, the industry was the economic sector of Romania that resisted the most to the current economic crisis. In 2009, the gross domestic product decreased with 7.1% in comparison with the year before, while industry (including the energy sector) knew a decrease of only 1.4% and proved itself the motor of fighting the crisis of the national economy.

The growth of the industrial production doesn't mean a uniform increasing of the production for the same products, but has a more complex signification, which includes the structure changes appeared. The energy savings calculated and presented before are due both to the implementation of several technical measures of improving the energetic efficiency and to the structure changes registered.

3.3.3.2 Measure title: Improving the energy efficiency to industrial operators by concluding long-term agreements – LTA

a) Implementation of the measures in the period 2008-2010. Energy savings made

According to a cooperation agreement concluded between the Ministry of Economy and Commerce (MEC) of Romania and the Ministry of Economic Affairs Netherlands, Romania had technical support concerning the improvement of energetic efficiency, in different sectors of the processing industry, by the procedure of Long Term Agreements (LTA).

SenterNovem, the company designated by the Dutch minister to support the LTA implementation in Romania, made a Pilot Project, by means of it being achieved a free energetic audit for the Promex Brăila Company, in order to be used as an example for the rest of the industry. The audit was materialized also by the establishment of energetic efficiency measures, recommended to the society for application.

The achievement of this Pilot Project had to be followed by negotiations with Promex and with other industry companies, in order to conclude a LTA.

The absence of possibilities of providing some facilities for the companies of the processing industry determined for the moment the freezing of these negotiations.

Within the same actions, there were offered funds for the training of RAEC specialists in order to conclude and monitor the LTA.

b) Measure implementation in the period 2011-2016 and in perspective of 2020. Energy savings predicted

The resuming of positive economic development of Romania in the next years will create the premises of conclusion of long term agreements.

3.3.3.3 Measure title: Energy efficiency improvement to industrial operators by the energy demand management and the energy balances made

a) Measure implementation in the period 2008-2010. Energy savings made

The legislative frame for the elaboration and implementation of the national policy of efficiently using the energy was initially insured by Law 199/2000¹. Its provisions were resumed then by G.O. no. 22/2008² insuring the harmonisation of the national legislation with the Directive 2006/32/EC (ESD). G.O. no. 22/2008 provides:

Article 3 (1):

In order to achieve the national policy of energy efficiency, the economic operators consuming annually a power quantity of more than 1,000 tones oil equivalent are entitled to:

- a) annually make an energetic audit elaborated by a natural or legal person empowered by the Romanian Agency for Power Conservation, according to the law regulations, and that is at the basis of the establishment and implementation of energetic efficiency improvement measures;*
- b) make programs of energetic efficiency improvement including measures on short, medium and long term;*
- c) entitle an energetic manager, authorised by the Romanian Agency for Power Conservation, according to the law in force, or to conclude an energetic management agreement with a natural/legal person providing energetic services, authorised under the conditions of this ordinance.*

Article 4:

Economic operators annually consuming an energy quantity comprised between 200 and 1,000 tones oil equivalent, are entitled to make every 2 years an energetic audit made by a legal/natural person authorised by the Romanian Agency of Power Conservation under the conditions of this ordinance, which are at the basis of the establishment and implementation of measures of energetic efficiency improvement.

¹ Law 199/2000 republished concerning the efficient use of energy was published in the OFFICIAL JOURNAL no. 734 of the 8th of October 2002

² GO no. 22/2008 concerning the energetic efficiency and promotion of use to final consumers of the regenerable energy sources was published in the Official Journal part I no. 628 of 29/08/2008.

The authorisation regulation of the energetic auditors and that of attesting the energetic managers received over the time updates in the context of the harmonisation of the Romanian law with the European one in what concerns the energetic efficiency. The successive variants of these regulations were approved by:

1. The Order of the Ministry of Industry and Resources no. 245/2002¹
2. The Order of the Ministry of Economy no. 1767/2009²
3. The Order of the National Authority for Energy Regulation (A.N.R.E.) no. 42/2010³

The authorisation process of the energetic auditors and the attesting process of the energetic managers began in 2004. The authorisations' statistics for the period 2007-2010 is presented in table 3.3:

Table 3.3

	Energetic managers attested	Energetic auditors authorised	
		Natural persons	Legal persons
2007	140	57	11
2008	47	12	5
2009	27	24	3
2010	75	74	8

¹ The Order of the Ministry of Industry and Resources no. 245/2002 concerning the approval of the Regulation for the authorisation of natural and legal persons being entitled to make energetic balances and of the Regulation for attesting the responsible persons with tasks in the domain of energy management was published in the O.J. no. 836/20.11.2002.

² The Order of the Ministry of Economy no. 1767/2009 concerning the approval of the Regulation for the authorisation of the energetic auditors and of the Regulation for attesting the energetic managers was published in the O.J. no. 729/28.10.2009.

³ The Order RERA nr. 42/2010 concerning the approval of the Regulation for the authorisation of energetic auditors and of the Regulation for attesting the energetic managers was published in the O.J. no. 67/26.01.2011.

At the end of 2009, a number of 318 economic operators have entitled energetic managers and those were attested by the RAEC.

The 9th of May 2011, the Updated evidence registry of the energetic attested managers published on the site www.anre.ro indicates a number of only 262 persons. This indicated that, due to conditions generated by the economic crisis, many industrial unities decreased their power consumption under 1000 toe.

The same day, there were authorised 35 legal persons and 166 natural persons as energetic auditors.

A survey on 132 economic agents with annual energetic consumption of more than 1000 toe/year indicates that improving programs of the energetic efficiency include a number of approx. 500 measures of energetic efficiency improvement:

- replacement of old pumps with pumps with an efficiency of 10-15% higher than the current one;
- replacement of classic asynchronous motors ($\eta=0.89$) with asynchronous motors of high efficiency ($\eta=0.94$);
- modernisation of the interior light;
- cleaning of surfaces of heating exchange at the boilers;
- replacement of old compressors of compressed air with energetically efficient ones;
- mounting of cogeneration groups in thermal plants;
- mounting of local equipments of compensation of reactive energy;
- modernisation of heating furnaces;
- modernisation of thermal processing furnaces;

The energy savings of the measures programs during the period 2008-2010 were estimated at 1171134 toe/year; the energy savings made were of 705186 toe/year.

A survey was made concerning the activity of authorised energetic managers, a number of 50 files made by them being analysed. The analysis showed that the respective economic agents registered energy savings of approx. 32,800 toe/year by the implementation of improvement measures of the energetic efficiency. The main measures implemented were:

- the increasing of the energetic efficiency of the use of air compressors;
- the improvement of the power factor and the local compensation of the reactive power;
- the recovery of the biogas produced at the purge station and the use of thermal plants;
- the replacement of air compressors and of overdimensional transformers;
- modernisation of light in production halls;

- modernisation of pumping stations;
- modernisation of thermal plants;
- heating and cooling of spaces with heating pumps;
- heating of spaces by boilers with scraps of wood masses;
- monitoring of consumptions and achievement of energetic dispatchers;
- insulation of vapour and hot water conduits.

The annual synthesis of the activity developed by 14 energetic auditors, legal persons authorised by RERA, showed that they made 81 energetic balances ended with measures leading to an energetic saving of 171,603 toe/year.

b) Measure implementation in the period 2011-2016 and in the perspective of 2020. Energy savings predicted.

The management of energetic demand and the elaboration of energetic balances at the industrial operators is a measure of improving the energetic efficiency provided by the law in force. Its implementation will be continued in 2011-2016 and in the perspective of 2020.

3.3.3.4 Measure title: Improving the energetic efficiency by supporting the financing of the investment projects dedicated to the decrease of energetic demand

a) Measure implementation in 2008-2010. Energy savings made

The Romanian Fund for Energy Efficiency (RFEE) was created by the GEO 124/2001¹. RFEE finances under commercial conditions the companies of the industrial area and other energetic consumers in order to facilitate the adoption and use of technologies of energetic efficient use.

The main characteristics of the Romanian Fund for Energy Efficiency, as financial institution, are:

¹ GEO 124/2001 concerning the creation, organisation and functioning of the Romanian Fund for Energy Efficiency was published in the Official Journal 644 of the 15th of October 2001. The ordinance was approved by Law no. 287/15.05.2002, published in the Official Journal 344 of 23rd May 2003.

- financial institution based on the demand;
- funds' reunion;
- public-private partnership;
- prudent investment portfolio;
- transparency and opportunities promotion in an equal manner for all the eligible customers;
- supporting the investments made.

The aim of the Romanian Fund for Energy Efficiency is to have a demonstrative effect, by the successful implementation of the programme GEF/BIRD of energetic efficiency and to increase the interest of the bank sector concerning the support of investments in the domain of energetic efficiency in Romania.

Information about the Romanian Fund for Energy Efficiency can be accessed on the www.free.org.ro site.

During the period September 2004-December 2010, RFEE concluded 24 loan agreements of 13.198 millions of USD in order to make total investments of 35.8 millions USD.

The performance indicators of RFEE for the period 2004-2010 are presented in table 3.4.

Table 3.4 Performance indicators for the period 2003-2010

	2004	2005	2006	2007	2008	2009	2010
Number of financed projects	2	6	8	3	2	2	1
The loan volume (millions of USD)	0.555	2.589	3.194	4.093	1.260	0.375	0.959
The investment volume (millions of USD)	1.468	3.268	3.936	22.234	2.978	0.500	1.199

The agreements concluded in the period 2004-2010 are presented in Annex 4.1.

In 2010, RFEE paid, according to the financing agreements concluded, 1,110,261 USD. From the creation, RFEE paid 11,979,000 USD. From the point of view of the current agreements, the default rate was of 0%.

Following the elaboration of projects of the RFEE portfolio, the annual estimated energy savings are of approx. 37.3 thousands toe (according to the customers' declarations), and the annual decreases of the CO₂ emissions are of approx. 112,583 tones.

The private sector beneficiates of more than 90% of the total volume of investments. More than 85% of the total volume of investments is directed to industry.

b) Measure implementation in the period 2011-2016 and in the perspective of 2020. Energy savings predicted

The 2nd of February 2011, the Romanian Fund for Energy Efficiency concluded the 25th financing agreement. The Beneficiary is Tarna Mare commune, Satu Mare County, which obtained a commercial credit of 173,000 USD, in order to finance an investment in energetic efficiency of 217,000 USD. The investment is dedicated to the modernisation of the exterior public lighting system in the Tarna Mare commune.

The Romanian Fund for Energy Efficiency will use the expertise and capital needed in order to facilitate the achievement, in the next years, of investments of 50 millions USD. The co-financing opportunities include:

- attraction of the bank sector in order to finance/co-finance the investment projects evaluated by the Fund;
- initiation of partnerships of the Fund with other financiers interested in the financing/co-financing of investment projects in the energetic efficiency area

3.3.3.5 Measure title: Improving energy efficiency for industrial operators by performing some investment projects co financed from European Union funds

a) Measure implementation in the period 2008-2010. Energy savings made

Performing some investment projects co financed from European Union funds is possible in two ways:

- i) using structural funds, through financing assured by the sectoral operational program increase of economic competitiveness (SOP IEC)
- ii) applying financing facilities for energy efficiency (EEFF) through the credit line with funds from EC and EBRD

The two ways will be presented differently below.

- i) SOP IEC /Priority axis 4: Increasing energy efficiency and security of supply, in the context of combating climate change/ Key area of intervention 1 – *Efficient and sustainable energy* (environmental sustainability of the energy system) financially supports:
- investments in installations and equipment for industrial operator, leading to energy savings;
 - modernization of the electricity transmission, natural gas and oil transport and electricity/natural gas distribution grids, in order to reduce network losses and in order to reduce losses and secure the continuity and safety of transport and distribution services;
 - Investments in flue gas de-sulphurization installations, burners with reduced NOx and filters on refurbished/upgraded groups of large combustion plants.
- In 2010, within SOP IEC/Priority axis 4: Increasing energy efficiency and security of supply, in the context of combating climate change/ Key area of intervention 1 – Efficient and sustainable energy, 27 projects were submitted, with a total value of the required grand of 59 million Euro.
- Up until now, in the domain 4.1, two financing contracts have been signed (presented in table 3.5).

Table 3.5

No.	BENEFICIARY NAME	PROJECT TITLE	AWARDED NON-REIMBURSABLE FINANCING		
			AWARDING YEAR (FINANCING CONTRACT SIGNING YEAR)	AWARDED VALUE (ACCORDING TO THE FINANCING CONTRACT) (LEI)	
				From FEDR	From the national budget
1	S.C. ECOPAPER ZARNESTI, Brasov county	Increasing energy efficiency when manufacturing paper for cardboard corrugated on the paper machinery in S.C. ECOPAPER ZĂRNEȘTI, by modernizing machine driving and the hydropulper	2011	3.274.818,80	446.566,20
2	SC PREFABRICATE VEST PATRU S.A, Bucharest	Energy consumption efficiency at SC PREFABRICATE VEST PATRU SA	2011	29.012.317,78	3.956.225,16

Source: MECMA - OIE

- ii) EEFF is a Energy Efficiency Finance Facility having the structure of a credit line based on grants, established by the European Commission and the European Bank for Reconstruction and Development.

The Romanian private companies benefit from the following facilities:

- Loan of up to 2,5 million EUR from one of the participating banks
- Free technical consultancy
- Grant of 15% (up to 375.000 EUR) when completing the investment.

Free technical consultancy is provided by the company Tractebel Engineering. The grants are awarded after investment completion, the completion validation being performed by the Italian company MWH.

The participating banks in Romania are Banca Comercială Română, BRD Groupe Societe Generale, Banca Transilvania, CEC Bank, OTP Bank, Raiffeisen Bank.

Three types of investments are eligible to receive financing through EEFF:

- Technology investments of industrial companies, obtaining minimally 20% energy savings:
- Building investments bringing the companies in any sector energy savings of minimally 30%
- Co-generation of thermal and electrical energy for own consumption of any company in the sector

Since the establishment of this credit line, a number of 71 projects have been financed in the industrial sector. The list is presented in Annex 4.3.

The projects finalized in 2009 (for which loans of 2976 thousands Euro and grants of 447 thousands Euro were awarded) lead to the performance of some annual energy savings of 9502 toe. These savings are registered effectively starting with the year 2010.

After the implementation of all the projects (starting with the year 2013) the obtaining some annual savings of final energy of approximately 73 thousands toe is foreseen.

Using European Union funds for financing the energy efficiency projects is very important for all final consumption sectors, the public sector being especially highlighted. Details in this respect are presented in chapter 3.4.1.2.

b) Measure implementation in the period 2011-2016 and in perspective of 2020. Energy savings predicted

In the 2011-2013 period, the funds awarded for the project calls related to SOP IEC/Priority axis 4/main intervention domain 1 are of approximately 243 million Euro of which 58 million Euro for energy efficiency.

3.3.3.6 Measure title: Promoting the development of energy service companies - ESCO

a) Measure implementation in the period 2008-2010. Energy savings made

The actions destined for promoting the energy service companies have started long before 2008, but by including this measure in NAPEE these actions have taken a systematic character.

So founding the measure took into account the reports performed by EC-JRC “Latest Development of Energy Service Companies across Europe“ (2007) and “Energy Service Companies Market in Europe. Status Report 2010”, as well as the recommendations in the Phare study “Development of Financial Incentives Mechanism for Energy Efficiency” from 2007-2009 which included two specific points:

- Brochure for Energy Savings in Municipalities via ESCOs
- Implementation Guide for Energy Saving in Municipalities via ESCO's

The main effort was for promoting the ESCO companies in the public sector. Due to lack of experience and local authorities reticence of involving in this type of projects without a clear legislative base, international technical assistance was requested. By cooperating with the German authorities in 2006 an agreement was signed between the Energy Agency in Berlin and the Romanian Agency for Energy Conservation (RAEC) for applying the Energy Performance Contract (EPC). In this agreement 200 brochures and CD's were prepared and distributed concerning the application of EPC especially in the municipalities in the Energy City Association Romania.

Accordingly in the period 2008-2010 the priority was given to classifying the legal frame by involving along with RAEC the relevant institutions: the National Authority for Regulation and Monitoring of Public Procurement (ANRMAP) and the Ministry of Public Finances (MFP).

The EPC concept was include by GD no. 22/2008¹, implementing the Directive 2006/32/CE, but GEO no. 34/2006², regulating public purchases, has no specific provisions, which needed a series of clarifications. Also GD no. 71/2007³ was taken into account for approving the regulations concerning concession contract awarding for public works and services.

A series of legal documents created favorable conditions for ESCO activity:

- Economy Ministry Order no. 1767/2009⁴ introduces the possibility of outsourcing the energy management activity
- The support schemes for high efficiency co-generation;
- GD no. 1661/2008⁵ approves the national program for increasing energy efficiency and the use of renewable energy in the public sector, awarding financial facilities to the public authorities developing rehabilitation projects for thermal system, public buildings and public lighting.

By creating an energy service market in Romania, the RERA considered two objectives:

- Developing the request for energy services in the public sector by actions of information and training destined for the persons responsible with energy

¹ GD 22/2008 on enegy efficiency and promote of renewable energy to end users was published in the Official Gazette, Part I no.628 of 29.08.2008

² The updated GEO 34/19.04. 2006 with regard to the award of public procurement contracts, of public works concession contracts and of services concession contracts was published in the Official Gazette no. 418/15.05.2006, subsequently modified and completed by Law 337/2006, Law 128/2007, GEO 94/2007, Decision 569/2008, GEO 134/2008, GEO 228/2008, GEO 19/2009, GEO 72/2009, GEO 76/2010, Law 284/2010, Law 278/2010

³ GD 71/2007 on the approval of application norms for the previsions with regard to the award of public procurement contracts, of public works concession contracts and of services concession contracts of the Government Emergency Ordinance no. 34/2006

⁴ The Economy Mintry Order no. 1767/6.10.2009 concerning the approval Regulation for authorizing energetic auditors and of the Regulation for atesting the energetic managers was published in the Official Gazzete [729 from october 28th 2009 \(M. Of. 729/2009\)](#)

⁵ GD 1661/2008 concerning the approval of the national program for increasing energetic efficiency and using renewable energy sources in the public sector, for the years 2009-2010 was published in the Official Gazzete Oart I no. 858/19.12.2008.

management and for the persons responsible with public procurement inside municipalities; identifying pilot projects of the type EPC also considered the obligation of the cities with more than 20 000 inhabitants to develop energy efficiency plans, according to GO 22/2008;

- Developing the energy services offer through:
 - o identifying ESCO companies and facilitating contracts with the municipalities
 - o encouraging the energy and gases supply and distribution companies to develop ESCO tributaries, based on the obligation provided in article 9 of the GO 22/2008 for providing energy service to end user; in the 2010 April - June period reunions with the biggest companies from Targu Mures, Medias, Iasi and Bacau were organized

The know-how transfer for applying the EPC has as main instrument the project European Energy Service Initiative (EESI - <http://www.european-energy-service-initiative.net/ro/proiect.html>) inside the European project Intelligent Energy Europe (IEE) which allowed standard documents designation, the performance of training seminars with the local authorities in Iasi, Medias and Brasov, the distribution of a newsletter and of some articles in the specialty magazines. The most important element of the project EESI was identifying and promoting pilot projects by applying EPC. The finalized projects have proved energy savings of 25-55%. The director committee of the project includes representatives from the Ministry of Economy, Trade and Business Environment, the Ministry of Public Finances, the “Energy Cities” Network, ESCO and is coordinated by a member of the Romanian Parliament – Chamber of Deputies.

A special role in implementing the measure in NAPEE was that of the EBRD initiative to perform the study “Romania: Public Sector Energy Efficiency Programme”. The study analyzed the conditions of the energy services market, identified a portfolio of projects and clarified important aspects concerning EPC application.

EBRD also awarded this year a loan of 10 million euro to the company EnergoBit ESCO, member of the Group EnergoBit in Cluj, for financing the energy efficiency, concerning the public sector.

“A growing demand for ESCO services can be seen in Romania. Through this loan to EnergoBit, we contribute to Romania’s goal to reduce energy consumption by 20% by 2020, because ESCO projects play an important role in achieving this objective”, declared the EBRD Director for Romania, Claudia Pendred on this opportunity.

EnergoBit Group announced that, aside EBRD financing, there will be a own capital contribution of 2,5 million euro, managing this way to extend its activities.

From the beginning of its activities in Romania, EBRD awarded over five million euro to different sectors of the country’s economy, and last year 90 % of its investments were directed to the private sector.

**b) Measure implementation in the period 2011-2016 and in perspective of 2020.
Energy savings predicted**

Table 3.6

<i>Energy saving measure</i>	<i>Promoting the energy performance in the public sector</i>
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Description	Terms	<p><i>Start: 2010</i> <i>Finalization: 2016</i> <i>Major changes are provided, amendments, improvements:</i></p> <ul style="list-style-type: none"> - a new EE financing mechanism for public buildings; - increased rehabilitation capacity for public buildings;
	Objective/short description	<ul style="list-style-type: none"> - Empowering the local authorities in Romania to prepare, launch and perform auctions for private companies in order to finance and take over the investments for energy saving in public buildings, which will be recuperated from future energy savings; - Creating markets for legal entities in Romania offering energy saving services based of the energy performance contracts signed with the public sector; - Establishing the mechanisms and instruments for supplying the investment funds necessary for financing the energy saving projects under these public-private agreements;
	Final purpose	<i>Reducing the energy consumption by 20 % for rehabilitated buildings;</i>
	Target group	<i>Local authorities</i>
Implementation information	List and description of the energy saving actions basing the measure	<ul style="list-style-type: none"> - Creating a specific legal frame and the necessary directing lines for implementing the energy performance contracts - Promoting the concept of energy performance contract at the level of local authorities in order to increase the thrust in this type of contract and connected energy services; - Information exchange with the EU countries with experience in this domain; - Technical assistance from GEF awarded to the local authorities for initiating and supporting infrastructure creation; - Financing offered or mediated by EBRD through specific financial instruments which would bring long term funds based on the results of the energy performance contracts, possibly in collaboration with the credit lines from the local banks directly financing the energy services companies; <p><i>An advantage of this approach is that the payments are calculated so that the total amount for EPC and the energy necessary after finishing the investment will not exceed what the client (meaning the municipality or the budget entity controlled by the municipality) spent for energy before the investment. Once the energy performance contract is finalized and the investment is returned (usually after 5 – 7 years) the client enjoys all the benefits of energy saving.</i></p> <p><i>Another advantage of this approach is that it authorizes a big number of energy companies to participate in multiple projects based on short term commercial funds available on the commercial markets.</i></p>
	Budget and financing sources	<p>To develop this kind of projects in Romania, EBRD will award the amounts of 4,57 million \$ from Global Environment Facility (GEF) for financing the necessary technical assistance and the support program for the cities in Romania in order to prepare and launch energy performance contracts for improvement of the public buildings patrimony.</p> <p>The EESI project with a financing of 41 444 euro offered by EACI will develop until June 2012</p> <p>40% of the total budget of the National Program for Energy Efficiency (NEEP) will be awarded for the rehabilitation of public buildings. The Government Ordinance Program for approving the Program for the period 2011-2013 is under evaluation at the ministry level</p>
	Implementation entity	<i>RERA in cooperation with ANRMAP, MFP and EBRD</i>
	Monitoring authorization	<i>MECMA</i>
Energy savings *	Methods of monitoring/measuring the resulted savings	<i>Project concerning monitoring procedure</i>

Savings registered in 2010*	<i>4 pilot project had the result of energy cost saving of 25% - 40% for buildings and up to 63% for public lighting</i>
Energy savings estimated for 2016*	<i>Minimally 100 rehabilitated public buildings</i>
Energy savings estimated for (if available)	<i>no</i>
Suppositions*	<i>EBRD Fund for ESCO</i>
Connections, multiplication effect, synergy	<i>Possible multiplication effect by combining EPC with structural funds used for public buildings</i>

3.3.4 Measures concerning energy efficiency increase in transportation and final energy savings

3.3.4.1 Final energy savings in transportation performed in the period 2008-2010

The calculus for the final energy savings in transportation performed in the period 2008-2010 in relation to the year 2007 (base year) was made according to the recommendations in B[3] using:

- M5 indicator for energy saving in road transportation
- M6 indicator for rail transportation
- M7 indicator for inland waterway transport

Further are presented the results obtained for each transportation type.

a) Energy saving in road transportation

The M5 indicator used is defined as the energy consumption of road vehicles in toe/auto equivalent. This indicator connects the total energy consumption in the road transportation and a fictional park of all the vehicles, measured in auto equivalents.

The conversion coefficients of each vehicle type in auto equivalents reflect the difference between the average annual consumption of a real vehicle and the corresponding consumption of an equivalent vehicle. If, for example, a bus uses an average of 15 toe/year and a car 1 toe/year, then a bus is equivalent with 15 cars. The conversion coefficients presented in document B[3] were used, meaning:

- 1 truck and 1 light vehicle (goods transportation vehicles) = equivalent with 4 cars
- 1 bus (person transportation vehicle) = equivalent with 15 cars
- 1 motorcycle = equivalent with 0,15 cars

This indicators reflects different saving types: technical savings (increasing the energy efficiency of vehicles), savings connected to driving behavior or reducing the distance made by the vehicles.

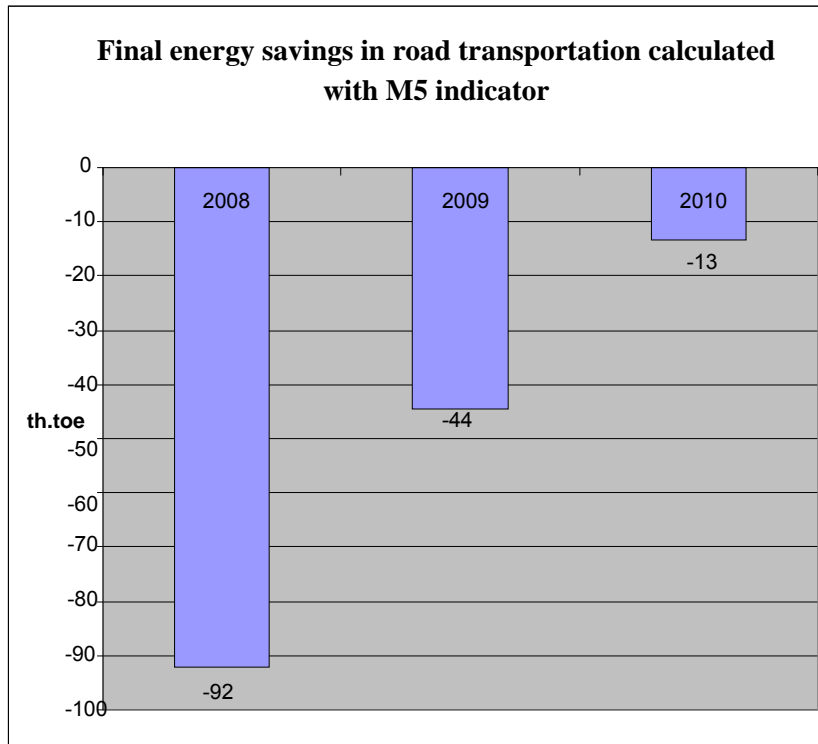
The information concerning the road vehicle park in circulation are offered by Romania Statistical Yearbook.

The information concerning the energy consumption in road transportation are the ones supplied by EUROSTAT.

The data concerning the road vehicle park in circulation are presented in Annex 5.1.

The energy savings in road transportation in the period 2008-2010 are presented in figure 3.8.

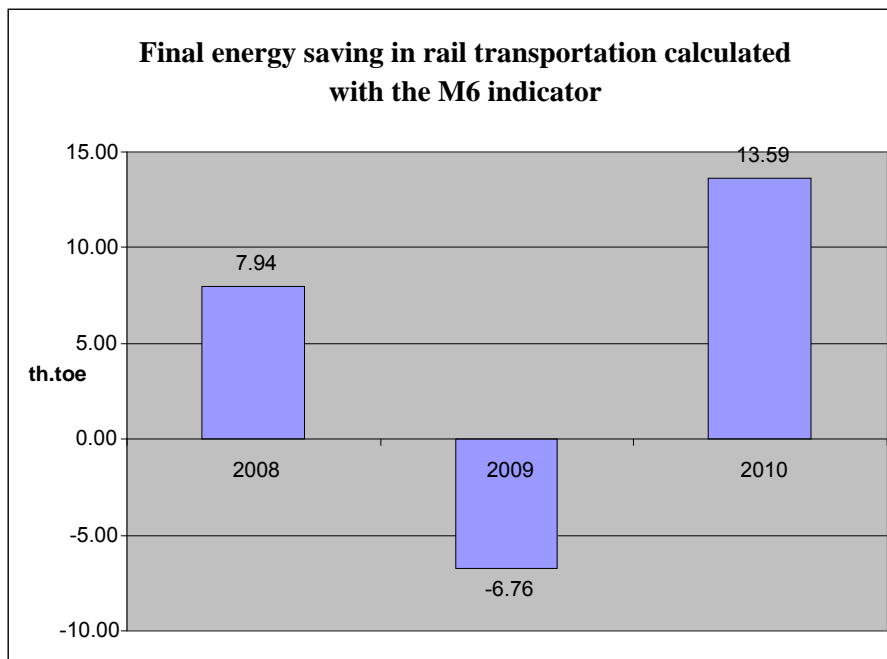
Figure 3.8



b) Energy savings in rail transportation

The primary information volume disposed to the work drawing up team did not allow the use of the indicators P10 and P11 for calculating the energy saving in rail transportation. Still, official information were provided which allowed the use of the M6 indicator. This indicator is calculated as the report between the energy consumption in the rail transportation and the total distance expressed in gross tone-km. The information concerning the passengers and goods distance adherent to rail transportation were offered by Romania Statistical Yearbook. The data concerning the energy consumption in rail transportation was taken from EUROSTAT. The equivalence coefficients between the passenger and goods transportation are the ones in the recommendations of the European Commission (B[3]). Based on these information, the energy savings in the period 2000-2007 in relation to the year 2007 (base year) were calculated. The primary information and the calculus details are presented in Annex 5.2. The results obtained are presented in figure 3.9.

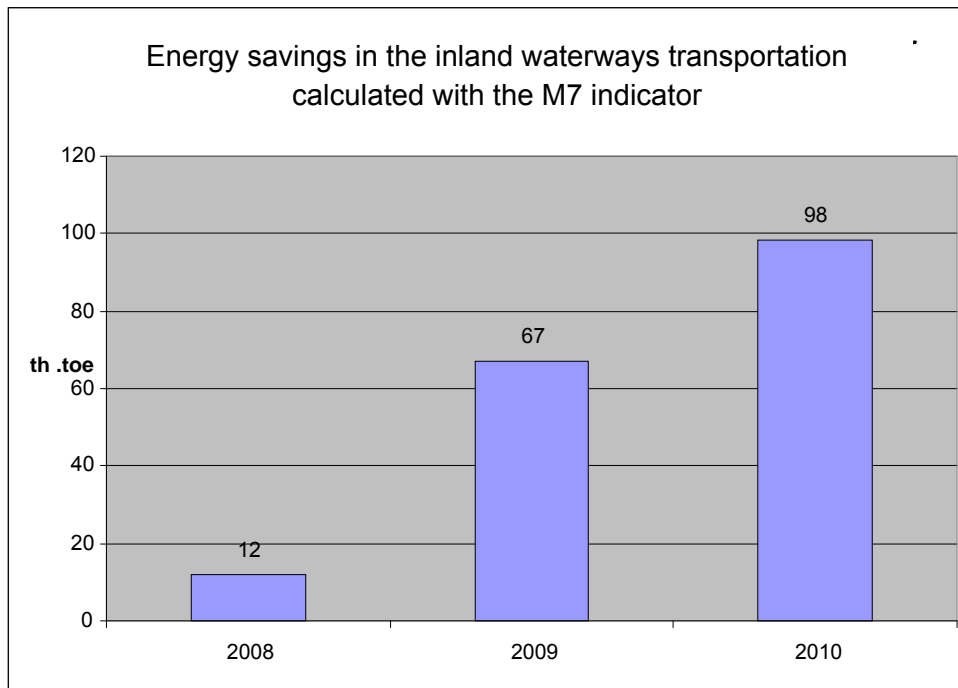
Figure 3.9



c) Energy savings in the inland waterways transportation

For calculating the energy savings in the inland waterways transportation the indicator M7 was used (the only indicator recommend by B[3] for this transportation mean). Passengers transportation was neglected, its share being insignificant in the total inland waterways transportation. B[3] recommendation allow this neglecting. The information concerning the goods distance adherent to inland waterways transportation are offered by Romania Statistical Yearbook and the information concerning the energy consumption for this transportation mean were taken from EUROSTAT. The primary information are presented in Annex 5.3. The results are presented in figure 3.10.

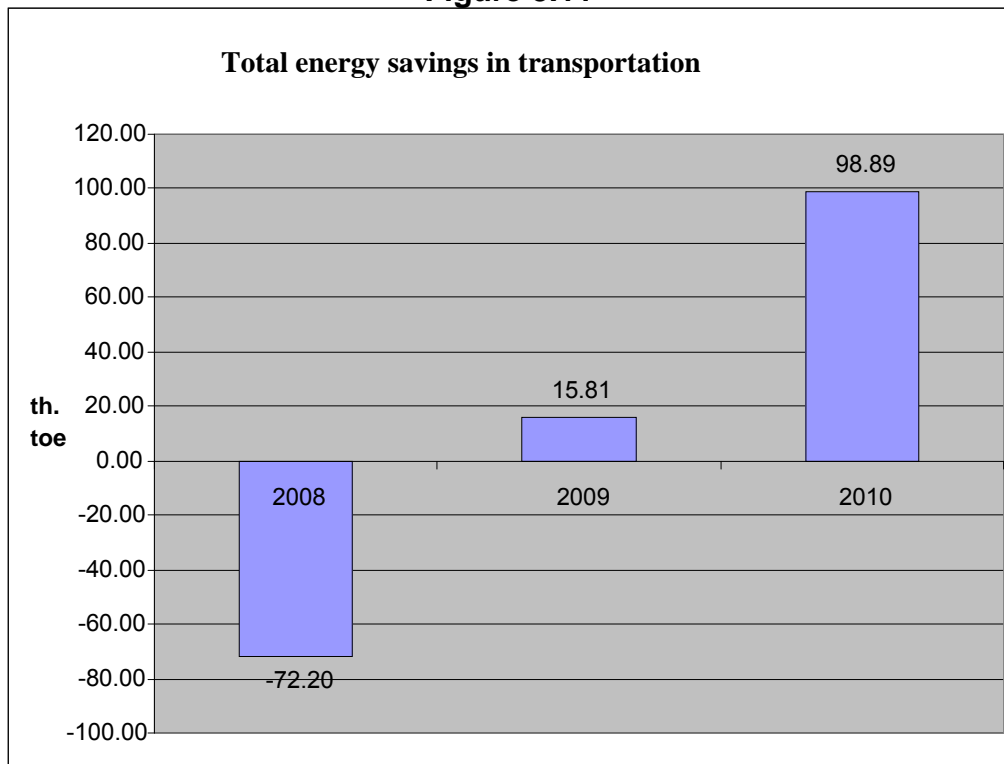
Figure 3.10



d) Total final energy saving in transportation

The total final energy savings in transportation were calculated by adding the values corresponding to road, rail and inland waterways transportation. The values obtained are presented in figure 3.11.

Figure 3.11



3.3.4.2 Measure title: Renewal of the national car fleet program with financing from the Environment Fund budget

a) Measure implementation in the period 2008-2010. Energy savings made

The modernization of road transportation was not the object of a special measure included in the first NAPEE sent to the European Commission in 2007, but it was a national priority. The most important program performed nationally was the Renewal of the national car fleet program (popularly know as “Rabla” program) financed from the Environment Fund budget. Considering the important role of the Environmental Fund in financing energy efficiency programs, in Annex 7 we have presented information regarding this fund. It is mentioned that the Program was initiated in 2005 and enjoyed an absolute success. The funds awarded for this program rose from year to year reaching a record value in 2010.

This program awards an annulment bonus of 3800 lei to the owners of vehicles older than ten years and that are annulling these vehicles and store them in specially destined centers. The annulment bonus is awarded in the form of vouchers which can be used only for purchasing a new vehicle.

Detailed information concerning this program (including the legal documents that regulate its development) are found on the website www.rabla.ro, created by the company Radacini Group, one of the most important vehicle distributor in Romania.

The evolution of the number of annulled cars in the period 2005-2010 is presented in table 3.7.

Table 3.7

Year	Annulled cars	Available volume	Success rates
2010	189.000	190.000	99,5%
2009	32.327	50.000	64,7%
2008	30.466	40.000	76,2%
2007	16.444	16.500	99,7%
2006	15.110	16.500	91,6%
2005	14.607	15.000	97,4%

Source: the website www.rabla.ro

According to these date, in the years 2008-2010 251.793 vehicles were annuled, the vouchers received being used for purchasing new vehicles. Starting with 2010 the possibility of commercializing the vouchers between physical entities appeared. A physical entity could purchase a new car using a maximum number of three vouchers.

b) Measure implementation in the period 2011-2016 and in perspective of 2020. Energy savings predicted

The Renewal of the national rolling stock program will continue and will be extended in the following period. In the previous period the program was exclusively for physical entities, but considering its success, it will be extended for legal entities.

3.3.4.3 Measure title: Measures taken by the economic agents for reducing the fuel consumption of the own car fleet

a) Applying this measure in the period 2008-2010. Performed energy savings

GO 22/2008¹ provides that:

The commercial company, as well as the local and central public administrative units owning more than 25 vehicles, have the obligation to develop monitoring and management programs for the fuel consumption of the own car fleet.

The constant and significant growth of the fuel price contributed to taking some measures by the economic agents in order to reduce the fuel consumption and to make it efficient. This way, Societatea Națională de Transport Feroviar de Marfă "CFR Marfă" SA (National Rail Goods Transportation Company "CFR Marfa" SA) has modernized its car fleet by replacing the old vehicles with the auto means, equipped with powerful engines and reduced polluting emission.

In 2010, an energy saving of 4,535 GWh was performed (0,39 thousands toe).

b) Applying this measure in the period 2011-2016 and in perspective of the year 2020. Foreseen energy savings

The measure will continue in the period 2011-2016. Societatea Națională de Transport Feroviar de Marfă "CFR Marfă" SA foreseeing for the year 2016 an economy of 27,210 GWh (2,34 thousands toe) by modernizing its rolling stock.

3.3.4.4 Measure title: Modernizing rail transportation

a) Applying this measure in the period 2008-2010. Performed energy savings

I. Passenger rail transportation

Modernizing the rolling stock was performed through the programme of high energy efficiency rolling stock, specifically :

- Rail cars and electric multiple units,
- New electric powered engines for passenger trains,
- New passenger coaches for day and night trains, including for vehicle transportation,

Also, a modernization program was developed for:

¹ GD 22/2008 on energy efficiency and promote of renewable energy to end users was published in the Official Gazzete, Part I no. 628 from 29/08/2008

- Electric powered engines (for increasing the efficiency, reliability and performing the inter-operability requirements)
- Passenger coaches for long and medium distance trains, including multi-stage coaches.

The energy savings performed in 2010 were of 27,1 thousand toe.

b) Applying this measure in the period 2011-2016 and in perspective of the year 2020. Foreseen energy savings

The programs mentioned before will continue in the next period. The budget necessary for the period 2011-2014 is of approximately 1.244.955 thousand lei, having as financing source the state budget. Responsible for implementing the programs is Societatea Națională de Transport de Călători “CFR Călători” SA. The foreseen energy saving for 2011 is of 4,4 thousand toe. We cannot make estimations for energy savings for a longer period due to uncertainties concerning the future train circulation graphic.

II. Goods rail transportation

Modernizing the fleet of locomotives

This measure consists of replacing the present engines with more efficient, low specific consumption and reduced pollutant emissions engines which result in a reduced energy consumption as well as in a reduction of the operation and maintenance costs.

The 1250 C.P. hydraulic diesel engine stock is under a modernization program by replacement of the old Sulzer 6 LDA-28B engines with new CATERPILLAR 3508 B engines.

The program is financed from the personal incomes of the Societății Naționale de Transport Feroviar de Marfă “CFR Marfă” SA and is developing until 2020.

In 2010 6 engines were upgraded and an energy saving of 22,954 GWh was realized (1,98 thousand toe). In 2011 the upgrade of 3 engines is planned.

Reducing the electricity consumptions related to producing compressed air necessary for the functioning of fixed train break testing installations

In order to correlate the performance of the installations with the foreseen activity volume, a program for replacing the old Resita compressors, big electricity consumers and with low efficiency with modern, efficient equipment, is being developed, the location structure being drafted in relation to the activity volume. In 2009 2 new compressors were commissioned, and this way in 2010 an energy saving of 0,081 GWh was performed (0,01 thousands toe). The program will continue in the following period, the foreseen energy saving for 2016 being of 3,888 GWh (0,33 thousands toe).

III. Rail transportation infrastructure

i. Implementing a tele-management system for electricity and for compensating the power factor at the sub-stations of electric traction

The system consists of collecting, transmitting and reworking the consumption data at the traction sub-stations, in order to plan the resources and the exact costs sharing for:

- Reducing the deviations from the prognosis of traction electricity consumption,
- Reducing the reactive electricity absorbed by the traction substations.

The program develops in the period 2011-2014 and is the responsibility of Compania Națională de Căi Ferate "CFR" SA.

For assessing the energy savings that will be accomplished after the development of this program, it was proposed for the year 2010 an annual consumption of electricity of 950 GWh and a reduction of the annual consumption with 3% after performing the investment. A primary annual energy saving of approximately 2500 toe resulted.

The economic efficiency of the investment is increased by the fact that the reactive electricity consumption is reduced in the traction substations and implicitly the value of the invoice to the supplier for this energy.

ii. Implementing the European management system for rail traffic (ERTMS) level 2

Reducing the electric powered engine's energy consumption is made by implementing some intelligent traffic management systems and by increasing the security of rail transportation.

Implementing the pilot project ERTMS level 2, on the period 2010 – 2013 is made by assuring the inter-operability and traffic management process optimization with an impact on the increase of rail safety and electric powered engine consumption.

The estimated budget for the pilot project is of 60 million euro, and responsible for the ERTMS implementation is Compania Națională de Căi Ferate "CFR" SA.

The evaluation of the energy savings is made by a regular estimation of the main reliability, availability, maintainability, safety, traffic, energy consumption factors.

3.3.4.5 Measure title: Modernization of subway transportation

I. Modernization of the electric trains stock by replacing the old electric trains (IVA) with new generation trains by:

- Purchasing 16 new generation trains, with a consumption with at least 10% smaller and an estimated saving of 20 GWh/annually,
- Complying the installations for the circulation of new generation trains,
- Monitoring the electricity consumption by "The system of measuring electricity, tele-transmission and tele-management in property of METROREX".

The budget necessary is of approximately 96 million euro and its financing source is a BEI loan. Responsible for implementing the program is the company "METROREX" SA.

It is estimated that this action will start at the end of 2013 by replacing the old trains (IVA) with new generation trains and will result in an energy saving of approximately 60 GWh in 2016 and of 140 GWh in 2020.

II. Modernization of lighting installations in public areas

For reducing the electricity consumptions the lighting of subway stations with LED tubes will be introduced. The action was started in January 2011 and consists of purchasing 500 LED tubes for the vestibule level in Piata Romana station. The budget at this stage is of 12.500 euro and is provided from the personal incomes of the company "METROREX" SA. It is estimated a reduction of the electricity consumption with approximately 0,007

GWh/annually. Using the LED tubes in the following years will lead to an electricity saving of approximately 0,042 GWh in 2016 and of 0,07 GWh in 2020.

3.3.5 Measures concerning the increase of energy efficiency in the services sector and final energy savings

3.3.5.1 Final energy saving in the services sector performed in the period 2008-2010

For the calculus of the final energy savings in the services sector the indicators M3 and M4 were used from B[3]. These indicators reflect the electricity savings and non-electricity energy savings in the services sector as a whole. The absence of information concerning the final energy consumption related to the sub-sectors of the services sector has determined the option for these indicators.

In the work there were used the values of the energy consumption supplied by EUROSTAT, considering that this was the explicit recommendation of the European Commission.

Regarding the primary information used, the following observations and comments are stated:

- In EUROSTAT there distinctly presented the data concerning the energy consumption related to the sector "Services" and for the category "Other activities"; in the methodological notes it is explained that "Other activities" are activities not included in the previous categories (industry, transportation, services, housing sector), the military activities being given as an example;

- The energy balance edited by INS does not explicitly contain the line "Services" (and neither the lines related to the sub-sectors of the sector), but only the line "Other economy branches"; the values figuring in this line (the energy consumption in "Other economy branches") are practically equal to the sum of the values related to the sectors "Services" and "Other activities" in EUROSTAT;

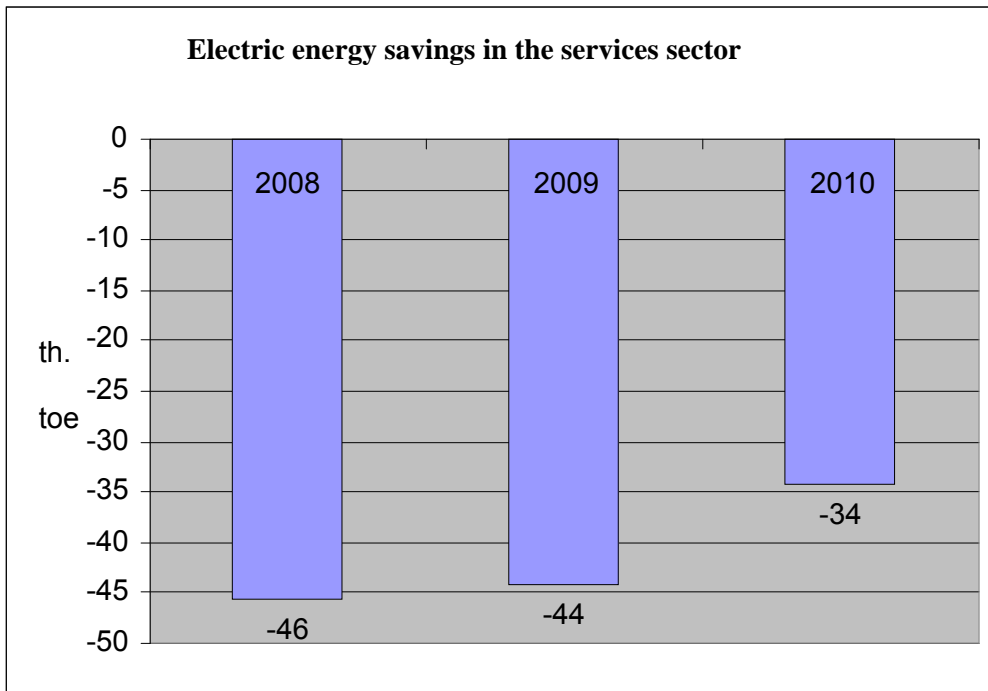
- The directive 2006/32/EC mentions on article 2 "Scope" the fact that the directive applies to all armed forces only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces;

- in these conditions it was considered as final energy consumption in the services sector (total value, electricity and non-electricity) the sum of the values related to the sectors "Services" and "Other activities" from EUROSTAT, the practically equal sum (according to those mentioned before) with the value in the energy Balance.

The primary information used for the calculus of the M3 and M4 indicators are presented in Annex 6.

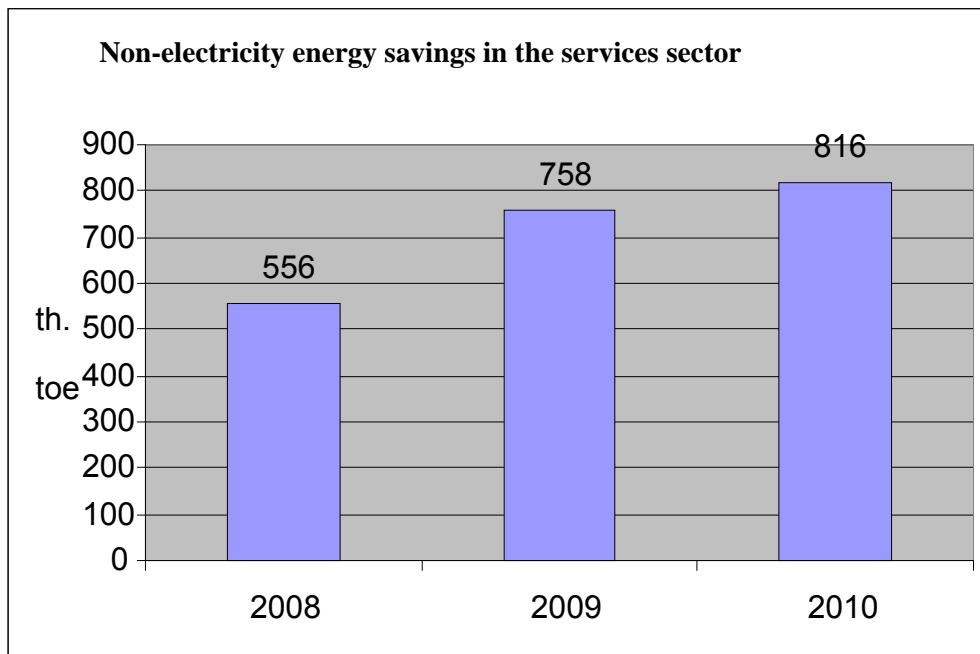
The results of the calculus concerning energy saving in the services sector is presented in figures 3.12, 3.13 and 3.14.

Figure 3.12



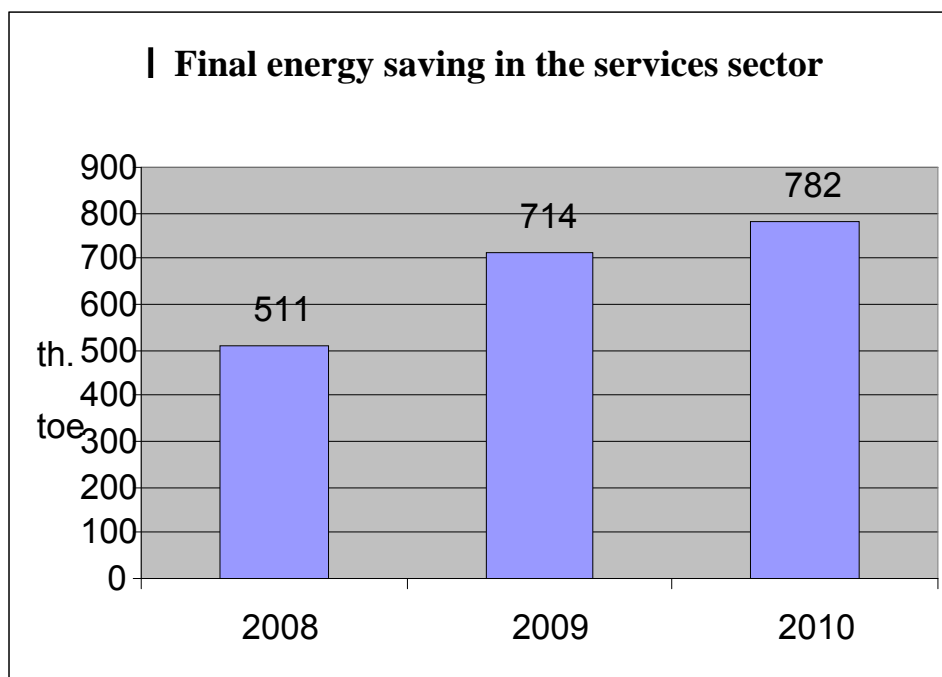
The negative value of the electricity savings was determined by the extension of the use of electricity consuming devices in this sector (and mainly of the air conditioning devices) on an unsaturated market.

Figure 3.13



The high value of non-electricity savings in the services sector was determined both by the increase in energy efficiency and by the development and restructuring activities registered in a sector with a high dynamic.

Figure 3.14



3.3.5.2 Energy efficiency measures in the services sector:

The first National Energy Efficiency Plan was made in 2007 in accordance with the provisions of Directive 2006/32/CE it does not contain distinct measures regarding the services sector. The plan has the section **III.2 Measures for improving energy efficiency in the residential and tertiary sector**, those measures being presented in chapter 3.3.2 **Measures concerning the increase of energy efficiency in the residential sector and final energy savings**. The energy savings obtained in the services sector were calculated using the indicators P4, P5 and M1, the results being presented in that chapter.

Considering that the use ways of energy and installations/equipment/receivers used for this purpose present a high degree of similarity with the ones in the housing sector, the measure leading to energy savings being also the ones presented in chapter 3.3.2.

3.3.6 Total final energy savings in the final use sectors

In the previous chapters were determined the final energy savings in the end use sectors (residential sector, industry, transport, services sector). The calculus was performed using the top-down indicators recommended in B[3]. The final results are summarized in table 3.9.

Table 3.9

	2008	2009	2010
industry	453	1052	1060
transportation	-72	16	99

[thousand toe]

services	511	714	782
hosehold	42	190	281
TOTAL	935	1972	2223

Note that the total value of the final energy savings performed in 2010 (2223 thousand toe) exceed by far the intermediary target for 2010 in NAPEE (940 thousand toe) and is relatively close to the one assumed by Romania for 2016 (2800 thousand toe). When appreciating this value should be kept into account that it was recorded in economical restructuring conditions and in the background of the recession period of these years. The highest values were recorded in the sectors „Industry” and „Services” which were also the sectors where major transformations were recorded. On the other hand, in the analyzed period there were conducted important programs for energy efficiency increase (including with direct financial support granted to the consumers from European Union funds and from the state budget). These programs will continue and will grow in the following period, which will be a period of positive economical evolution. It can be considered that the final target for 2016 will be performed and Romania will contribute to the reduction with 20% of the primary energy consumption in the European Union in 2020.

3.4 Public sector

3.4.1 The example role of the public sector

The strategies and legal acts adopted in the last years include explicit references to increase the energy efficiency in the public sector. Thus, the Romanian Energy Strategy in for the period 2007-2020 provides that in the public sector the following measures will be implemented:

- Increasing efficiency and reducing the public lighting consumption;
- Increasing efficiency and reducing the water supply installations consumption;
- Improving the energy efficiency in public buildings

GO 22/2008 contains explicit provisions destined:

- Energy planning of localities;
- Increasing energy efficiency for public buildings and for public car fleet;
- Public procurement.

These provisions are presented below.

Art. 6

The administrators of the building in public ownership have the obligation of taking measures for:

- a) efficient use of the heating and air-conditioning system;*
- b) the use of measurement and adjustment devices for the energy consumption.*

Art. 7

(3) The public administration authorities of the localities with a population exceeding 20,000 inhabitants have the obligation to develop improvement programs for energy efficiency, including short time and long time measures (3-6 years), aiming for an investment program that will draw up feasibility studies.

(4) Without prejudice to the national and Community legislation in the field of public procurement, the central and local public administration authorities

have the obligation of applying at least two measures from the measure list regarding the promotion of energy efficiency through public procurement, provided in annex no. 2.

Art. 8

(1) Commercial societies, as well as the local and central administration units owning more than 25 vehicles have the obligation of developing monitoring and management programs for fuel consumption of the owned vehicle group.

Annex 2 referred to in article 7(4) is practically identical with annex VI of the Directive 2006/32/EC.

GO 22/2008 transposes into the Romania legislation the provisions of Directive 2006/32/EC (according to Chapter VIII – Transitory and final dispositions). GO 22/2008 does not contain any distinct article that could transpose article 5 of the directive and that could provide the exemplary role of the public sector in the energy efficiency field. The provision of article 5(2) concerning the awarding of a new or already existing organization of the administration tasks, management and applying for the integration of energy efficiency improving obligations in the public sector was not reached. This has led to difficulties in the inventory and monitoring of the programs and measures performed in this sector. In the analyzed time interval (2008-2010) the central and local public authorities have performed programs and measures for energy efficiency with financial support from the state budget and (especially) from European funds. However, centralizing them has proven to be a difficult operation. The difficulties were accentuated by the fact that in 2008, on the basis of the economic and financial crisis, the previous Romanian Agency for Energy Conservation was liquidated (details will be presented in chapter 4).

According to the Romanian constitution, a government ordinance (GO) is a document issued by the Government with law power and that applies from the moment of its publishing in the Official Journal. It is then approved by the Parliament in order to become a proper law. The Parliament can approve a GO in its initial form, he can amend it or abolish it. Presently, according to the information that we possess, the specialized commissions of the Parliament are analyzing GO 22/2008 for its approval. There are signals that the Parliament will approve with amendments the GO 22/2008 and these amendments will contribute to a more complete transcription of the Directive 2006/32/CE in the Romanian legislation. The Parliament will also consider the new directive on energy efficiency whose project is still presently under public discussion.

In this difficult context, in Romania have still been performed significant programs and measures concerning the increase of energy efficiency in the public sector.

3.4.1.1 The national program for the increase energy efficiency and use of renewable energy sources in the public sector, for years 2009-2010

The national program for the increase of energy efficiency and use of renewable energy sources in the public sector, for years 2009-2010 was approved through GD 1661/2008¹. The program was destined for the assurance of financial support for the non-reimbursable co-financing from the state budget for the following types of investment objectives:

- Rehabilitation and modernization of district heating systems, including the change of fuel type at the energy combustion plants (for example, use of biomass);

¹ GD 1661/2008 on approving the National Program for increasing energy efficiency and using renewable energy resources in the public sector, for years 2009-2010 was published in the Official Gazette no. 858/19.12.2008.

- Thermal rehabilitation of public buildings and use of local potential for renewable energy sources for electricity and heat supply;
- Modernization of internal and external public illumination.

The initiators and beneficiaries of the investment projects from the program were local authorities. The maximum co-financing percent from the funds of the investment projects program was:

- Up to 30% for rehabilitation and modernization works of DHS, respectively for modernization works of the internal and external illumination
- Up to 50 % for thermal rehabilitation works of certain public buildings.

The three types of eligible investment objectives previously specified benefited from the following percent of allocations of the total of the annually allocated sum for the program:

- 40% for DHS rehabilitation and modernization;
- 40% for thermal rehabilitation of certain public buildings;
- 20% for the modernization of public illumination.

For the financing of the program, the sum of 32,9 million lei was initially allocated (through GD 1661/2008) for year 2010 and, respectively 40 million lei for 2010. Subsequently, in the context of the financial crisis and the necessity to reduce the state budget deficit, the sum allocated for 2010 was reduced to circa 12 million lei. The approval and dismissal of this sum in the last part of the year made that the time necessary for the accomplishment of the project selection procedures (imposed by the legislation specific for public acquisition) to be very short. The creation of contracts was possible only within the limit of circa 2 million lei (see Annex 4.2).

The competent authority for the implementation of the program was designed to be RAEC (an institution which, at the time, was not dissolved yet). RAEC had to ensure the specialty technical analysis for the establishment of project eligibility and for their selection on technical-economical criteria. Through its territorial branches, RAEC had to ensure the monitoring of project implementation for the entire duration of the works, as well as ulterior to commissioning for the verification of the project parameters observance. The list of projects financed within the programme is presented in annex 4.2. The dissolution of RAEC territorial branches with the dismissal of the personnel cause the monitoring to be performed at lower parameters.

3.4.1.2 Regional Sectorial Operational Programme

An important opportunity for rehabilitating public buildings is represented by the use of European funds and especially of those from the Regional Operational Programme. The Programme benefits for the entire 2007-2013 period from a co-financing from structural funds of European Union of 3,74 billion Euro, to which the internal co-financing is added.

The management authority of the programme is the Ministry for Regional Development and Tourism.

The programme has six primary axes, namely:

- **Primary Axis 1: Supporting the sustainable development of towns –urban growth poles (30% of the budget allocated to the ROP)**
Support for the development of towns in order to improve the quality of life for the people to create jobs.
- **Priority Axis 2: Improvement of regional and local transport infrastructure (30% of the budget allocated to the ROP)**
Support for the rehabilitation and modernisation of the network of county roads, urban roads, inclusively of ring-roads.

- **Priority Axis 3: Improving the social infrastructure (15% of the budget allocated to the ROP)**
Support for the improvement of the infrastructure of social and health services, and of public safety in emergency situations; modernisation of the education infrastructure.
- **Priority Axis 4: Support for the development of the regional and local business environment (17% of the budget allocated to the ROP)**
Financing for the development of business support structures, rehabilitation of disused industrial sites; support for micro-enterprises.
- **Priority Axis 5: Sustainable development and tourism promotion (15% of the budget allocated to the ROP)**
Support for cultural – historic heritage restoration, modernisation of tourism infrastructure; improvement of the quality of infrastructure in the nature areas that could attract tourists.
- **Priority Axis 6: Technical assistance (2,65% of the budget allocated to the ROP)**
Support for the transparent and effective implementation of the Regional Operational Programme

Of these, Primary Axis 3 has the greatest importance for financing investment works for rehabilitating public buildings. Further, an analysis of the projects financed within this primary axis will be presented.

Primary Axis 3 has four Key areas of intervention (KAI), namely:

- KAI 3.1: Rehabilitation / modernisation / equipping of the health services infrastructure
- KAI 3.2: Rehabilitation / modernisation / development and equipping of social services infrastructure
- KAI 3.3: Improving the equipment of operational bases for interventions in emergency situations
- KAI 3.4: Rehabilitation, modernisation, development and equipping of educational, pre-university, university and continuous vocational training infrastructure

KAI 3.1, 3.2 and 3.4 explicitly finances projects for an efficient energy growth of hospital units, social services units and school units.

The projects submitted within this primary axis propose thermal rehabilitation works for an increase of energy efficiency, ensuring an increase of comfort and reducing the energy consumption. The financial allocation for the period 2007-2013 is of 657,54 million Euro, of which 558,90 million Euro of FEDR, and the rest of national co-financing. The increase of energy efficiency in the rehabilitated units is an indicator followed at a programme level, according with the Strategic Environment Assessment of POR.

The observance of the national legislation and that of the European Union in the energy efficiency field represents an eligibility condition of the submitted projects.

The first project summons was launched at the beginning of year 2008.

Table 3.10

	KAI 3.1	KAI 3.2	KAI 3.4
Number of projects submitted until 31.12.2008	24	33	57
Number of projects concluded until 31.12 2008	0	0	0
Number of projects submitted until 31.12.2009	84	194	637
Number of projects concluded until 31.12 2009	13	26	38
Number of projects submitted until 31.12.2010	123	390	672
Number of projects concluded until 31.12 2010	39	79	146
Number of projects contracted until 31.08.2011	49	122	185
Number of projects contracted until 31.08.2011 which include rehabilitation/modernization of existing buildings	47	112	183
Total sum afferent to projects contracted until 31.08.2011 which include rehabilitation/modernization of existing buildings: - lei (1 Euro = 4.2 lei)	842,721,076	334,990,678	1,378,171,258

Source: www.inforegio.ro

The beneficiaries of the contracted projects are usually public local authorities (county councils, local councils, town halls).

A low number of projects had as beneficiaries state universities (within KAI 3.4), church structures (within KAI 3/2) and NGOs.

The contracted projects are, most of the times, complex projects, which aim at both increasing the energy performances of the buildings and at carrying out consolidation works, extension of existent buildings, providing different equipment to the beneficiary organizations.

As it was previously mentioned, no organization specialized in monitoring energy savings in the public sectors was designed in Romania. Under these conditions, the energy savings anticipatorily calculated in approved projects could not be determined.

Considering the fact that the first contracts were concluded in 2009 (their number increasing significantly in 2010 and 2011), it is to be expected that the investments are finalized beginning with year 2010. The energy savings practically achieved will contribute to reach the target Romania assumed for year 2016.

3.4.1.3 Promotion of the use of household appliances and energy efficiency lamps in the public sector

Promoting the use of energy efficient electrical appliances and lamps in the public sector was firstly achieved with the aid of labeling the energy efficiencies of the appliances and energy lamps. This was possible because the market from which the public sector acquires appliances and lamps is the same one destined for the population. The regulations in force were presented in chapter 3.3.2.2. In the same chapter, the phase of introducing the Energy Star voluntary labeling system in Romania for office – IT equipment was presented.

Regulation 106/2008/EC on a Community energy-efficiency labelling programme for office equipment requests the central authorities from the member states to procure by means of public procurement contracts equipment at least as efficient as Energy Star.

The national programme for the increase of energy efficiency and use of renewable energy sources in the public sector, for years 2009-2010 (presented in chapter 3.4.1.1) contains four projects destined for the modernization of public illumination in municipalities Cluj-Napoca and Targu-Mures.

Within the Regional Operational Programme (presented in chapter 3.4.1.2), KAI 1.1, the project “Modernizing the public illumination in Suceava Municipality” was contracted, with a total value of 11234851 lei, of which 9270077 non-reimbursable funds.

3.4.2. The leading role of the public sector within EPBD

Numerous public buildings in Romania have a high degree of wear and tear, the heat losses are high, the working conditions offered to the personnel carrying out its activity in these buildings are leaves much to be desired, and the social impact is usually negative.

3.4.2.1 Actions realized by the central authorities

The economical recession from 1990-2000 and the budgetary difficulties of the last years caused the funds available for public building rehabilitation to be chronically limited.

The national programme for increasing energy efficiency and using renewable energy sources in the public sector, for years 2009-2010 had a component dedicated to rehabilitating public buildings, but the total funds were reduced.

Using European funds is a good opportunity for thermal rehabilitation of the buildings from the public sector. Information on the projects contracted within the Regional Sectoral Operational Programme, Primary Axis 3, was presented in chapter 3.4.1.2.

3.4.2.2 Actions realized by local authorities

In the general context of decentralizing the decision making process (and the use of funds) one assists to an increasingly pronounced involvement of local authorities for solving problems of energy efficiency. Further, the main actions carried out on a local level will be presented.

a) Local associations for energy

In many counties/localities from the country, associations for energy efficiency were instated, with a legal status of non-governmental organizations and for which county/local councils are founder members. Numerous commercial companies (especially SMEs) are members of these associations. Many of them were founded with an initial financial support from European Union.

These societies:

- Offer technical counseling and consultancy to public local authorities and subordinated institutions for initiating and implementing measures for energy management.

For this, one must consider the fact that the members of county and local councils, such as mayors, are chosen on political criteria so that the technical component in energy problems is frequently questionable. The employees of the subordinated institutions (usually with a civil servant status) also have a limited capacity to solve specific problems, especially after the implementation of measures taken by the Government in year 2008/2009 regarding the restructuring of budgetary apparatus, reducing the salaries of civil servants, etc. The specialists within local associations for energy have a remarkable competence and they ensure the increase of professionalism degree in the activities of local authorities. They also ensure a certain continuity in the local energy policy, regardless of the political changes occurring in the leadership of local authorities.

- Offer technical counseling and consultancy to trade companies from the respective geographical area (and firstly to the members of the association) Usually, the incomes of the associations (and implicitly the salary of the employed experts) are constituted of member contributions (the contribution of county and local councils and town halls having an important share) and of sponsorships. The experts offer free technical consultations on energy problems to the members of the association (commercial companies). The trade companies that are not members can benefit from the consultancy in exchange for a modest sum.
- Carry out activities for disseminating information on a local level (including in schools).
- Organize fairs and expositions with a specific thematic, etc.

b) National associations with activities regarding the energy efficiency in localities

The necessity of coordinating local actions and ensuring a synergy between these led to the foundation of certain associations on a national level.

A representative association is "Energy Cities Romania" (ECR). The association was founded in 1994 through PHARE programme and with the support of "Energy Cities" and, at the present, has its headquarters in Brasov Municipality (site <http://oer.ro>). Since 1997, the association was accepted as a member of the "Energy Cities" European network. The association gathers 31 municipalities interested in improving energy efficiency in public urban services (heating, public illumination, water and gas supply, collection, storage and transport of domestic waste, etc.), in promoting renewable energy sources and environment protection.

The main activities carried out by the association are:

- Supporting local authorities in compiling and pursuing an efficient energy and environmental local policy
- Offering information on experiences, technologies and modern equipment
- Experience exchange between the members of the network and with associations and other similar organisms
- Consultancy and recommendation on the legislation for members
- Training the representatives of local authorities

- Representing its members and their interest to the national institutions and energy operators
- Organizing conferences, seminars and other reunions on a regional, national and international level
- Participating in regional, national and European projects
- Publishing and distributing informative bulletins and other publications
- Constituting a data base on a local and national level

On a national level, other associations of public local authorities are also organized, among which:

- Municipalities in Romania Association (site www.amr.ro)
The association was founded in 1990 and, at present, includes all the 103 municipalities in the country, as well as the 6 sectors of Bucharest Municipality.
- Cities in Romania Association (site www.aor.ro)
The association was founded in 1994, at present has 185 members and wants to represent the interests of small urban localities.
- Communes in Romania Association (site www.acor.ro)
The association was founded in 1997 and, at present, has more than 2000 members.
- Local Authorities of Romania Federation (site www.falr.ro)
The federation groups the three associations aforementioned.

All of these associations constituted an executive structure and carry out significant activities regarding the management and administration of energy.

c) Participating in activities with an European character

After the adoption in 2008 of the legislative package of European Union regarding climate and energy, the European Commission launched the Covenant of Mayors to sustain and support the efforts of local authorities in applying the policies regarding sustainable energy. The Covenant of Mayors was described by European institutions as being an exceptional governing model on several levels.

In order to translate their political commitment in concrete measures and projects, the signers of the Convention commit, especially, to compile a reference inventory of CO₂ emissions and to send, in a maximum of a year from the signing, an action plan regarding sustainable energy that describes the key actions that these plan to implement.

At present, 30 localities from Romania adhered to the Covenant of Mayors, assuming the commitments that result from this. Bucharest Municipality is part of these localities (starting with 26.05.2011), as well as other big cities of the country (Cluj-Napoca, Craiova, Timisoara, Brasov, etc).

The signers of the Covenant of Mayors compile the following action plans:

- The Action Plan for Sustainable Energy until 2020
 - Creating an adequate administrative structure for energy management;
 - Creating a data base regarding the technical data of the constructions and the energy consumptions afferent to these;
 - Creating the inventory of CO₂ emissions on the territory of the local/municipal/city administration;
 - Creating the action plan for sustainable energy until year 2020;
 - Implementing and monitoring results in order to attain the objectives every 2 years.

- The Action Plan for sustainable urban mobility:
 - An efficient exploitation of an integrated and efficient multi-modal network;
 - Reducing the energy consumption;
 - Using cleaner energy;
 - Political decision on a local level, an important role in improving urban transport;
 - A greater share of the public transport;
 - Creating a better infrastructure for walking on foot and by bicycle.

Numerous local authorities in Romania take part in international projects with an European financing within INTERREG, IEE, etc. programs. This participation has a positive influence on the participators.

3.4.3. Specific measures for public procurement

RERA launched the introduction of public acquisition guides in the Regulations programme for year 2011 for:

- Computers, including monitors;
- Imagery apparatus – printers, copiers, or combinations;
- Public illumination equipment with a high energy efficiency.

3.5 Ensuring the availability of counseling and informing

a) Applying the measure during 2008-2010

- During 2007-2010 RAEC/RERA organized informing/communication/training actions, correlated with the measures included in NAPEE 2001 and intended for facilitating the collaboration with target groups, disseminating information and training persons involved in the implementation of respective measures.
 - For the promotion of the use of household appliances, seminars were organized within project SELINA. Aspects of the operation of the apparatus in «stand-by» and «off» mode were approached, less known to domestic users;
 - For the promotion of Voluntary accords in industry seminars and meetings were organized in accordance with the provisions of the “Memorandum of understanding” document, signed between RAEC and SenterNovem – Holland, to which the representatives of professional organizations in the cement industry (CIROM), in the car building industry (FEPA-CM) and glass industry (STIROM) were invited, as well as representatives of involved ministries;
 - A special training activity dedicated to the consultancy companies involved in the accomplishment of energy audits in industrial enterprises, in order to realize the “energy performance scan” phase for the consolidation of voluntary agreements;
 - A distinct training activity was dedicated to the training of the personnel from the territorial branches of RAEC for monitoring if industrial units involved in voluntary agreements. A part of these units participated in a works meeting organized by the RAEC branch in Oradea.
 - For the promotion of ESCO companies and of the « performance contracting » concept, informing/communication actions were organized within the Partnership agreement signed between RAEC and the Energy Agency of Berlin, as well as

- training actions for local authorities according to the provisions of the European Energy Service Initiative (EESI) project in cities Iași, Mediaș and Brașov.
- For the purpose of initiating and implementation action for article 6 of Directive 32/2006, informing actions were organized for the distribution companies from the electrical energy and gas field in cities Iași, Mediaș, Targu-Mureș and Mangalia
 - Measures contained in NAPEE were also the subject of certain presentations sustained by the ARTCE personnel in reunions organized by the Association for Energy Cities of Romania (OER), Association for Automation and Instrumentation of Romania (AAIR), EBRD, Romanian Committee for Global Energy Council (CNR-CME), etc.
 - The communication/informing actions were completed by articles published in the Energy Messenger, AAIR magazine, etc. with participations at television shows organized by channels Money Channel and TVR Cluj and with interview given to great newspapers;
 - In 2010, the Informing Center for energy efficiency and renewable energies was open in Cluj. The center includes documentary materials in classical and electronic format and models of efficient equipment.
- Non-governmental organizations of different types that activate in Romania had an important role for counseling and information. In this respect, the activities performed by the following are noticeable:
 - Chamber of commerce and industry of Bucharest municipality as well as the chambers of commerce and industry organized in the counties of the country
 - Local agencies for energy founded in different counties of the country with financing through the Intelligent Energy – Europe (IEE) programme
 - “Energy Cities Romania” Association (founded in 1994 through PHARE programme and with the aid of “Energy Cities” network)
 - Association National Romanian Committee for Global Energy Council
 - Association National Romanian Institute for the Study of Capitalization of Energy Sources (IRE), which represents Romania in EURELECTRIC
 - A high number of professional associations and foundations that unfold their activity according to Romanian legislation and which activate in the energy efficiency domain.

b) Applying the measure during 2011-2016

For the period 2011-2016, RERA will continue its communication/informing actions in accordance with the provisions included in the PNR of Romania.

The main actions and the financing necessary are presented in table 3.11:

Table 3.11

Action name	Estimated cost (euro)	OBS
<p>1. Actions resulted from GO 22 and NAPEE</p> <p>Promoting the market for energy services according to GO 22 and Directive 32/2006.</p> <p>1.1.1 Stimulating the demand of energy services:</p> <p> a) in the industry</p> <p> - organizing a reunion with authorized managers in order to present the energy performance contract specific of the activity of the companies for energy services;</p> <p> - organizing a round table with the participation of auditors authorized for the analysis of the energy efficiency in the industry and of the demand volume of energy services in the industry;</p> <p> b) stimulating the demand of energy services in the public domain:</p> <p> - training seminaries for local authorities, organized in different cities, for the presentation of the manner of application of energy performance contract;</p> <p>1.1.2. Stimulating the offer of energy services:</p> <p> - organizing a meeting with the participation of energy services companies (ESCO) from Romania and other countries as well as the marketing departments of the electrical energy and gase distribution and supply companies, and the services companies created by restructuring the gase and electricity companies.</p> <p>Promoting the efficient energy management in accordance with the provisions of chapter II of GO 22/2008.</p> <p> 1.2.1. in the industry :</p> <p> a) a working reunion with universities accredited to hold training courses for energy managers and energy auditors for industry, in order to analyze the application of the energy management standard SRN 16001; the improvement of the syllabi for the training of the managers</p>	<p>3*1000</p> <p>1500</p> <p>3*2200</p> <p>5000</p> <p>2000</p> <p>2*2500</p> <p>500</p>	<p>A participation fee will be charged</p> <p>The principle of “cost raising” through sponsorships acceptance will be applied</p> <p>co-financing in collaboration with the Energy Agency from Austria</p>

<p>and auditors will be analyzed;</p> <p>1.2.2 in municipalities :</p> <p>a) organizing, in cooperation with the Association Energy Cities in Romania, a training section for persons responsible for compiling energy efficiency plans in the cities with more than 20000 residents according to the provisions of GO 22.2008;</p> <p>1.2.3. initiating the construction of the national association for authorized energy managers in the industry (establishing a communication system between the interested persons and organizing an event for launching the association)</p> <p>1.2.4. acquiring manuals for energy management, translating and distributing them for the training of authorized managers;</p> <p>1.2.5. organizing courses in common with the Lodger's Associations Union and local authorities for authorizing residential buildings administrators</p> <p>1.2.6. training courses for the administration of public buildings on building categories, in cooperation with the Energy Auditors for Buildings Association</p> <ul style="list-style-type: none"> - hospitals - schools - administrative buildings and offices 	<p>1500</p> <p>-</p> <p>1500</p>	<p>The courses are organized for a fee</p> <p>The principle of "cost raising" through sponsorships acceptance will be applied</p>
<p>1.3 Actions for informing the population</p> <p>1.3.1. flyers for energy saving in households (cooperation with energy distributors and providers for creating and distributing materials);</p> <ul style="list-style-type: none"> - flyer (leaflet) with general information - flyer for insulating apartments (cooperation with MRDT and banks) - image catalogue with thermo-vision for thermally insulated residential buildings and rehabilitated public buildings; <p>1.3.2. creating the information center for energy efficiency in Cluj and in the Territorial Offices where necessary space exists or in collaboration with the local authorities;</p>	<p>2500</p> <p>2000</p> <p>6000</p> <p>800</p> <p>1000</p>	<p>The principle of "cost raising" through sponsorships acceptance will be applied</p>

<p>1.3.3. implementing promotional actions in schools (mainly high-schools with an energy profile) and organizing competitions with prizes awarding.</p>		
<p>1.4. Promoting the activity of the electricity and natural gas distributors for sustaining the energy efficiency actions.</p> <p>1.4.1. round table for the analysis of the application of chapter III of GO 22/2008, in order to issue a specific regulation applicable to the distribution and supply companies authorized by RERA</p> <p>1.4.2. organizing in Bucharest a EnR reunion – working group for energy efficiency (EnR = the association of energy efficiency agencies in EU countries) regarding the application of art. 6 of Directive no. 32 for knowledge sharing;</p>	<p>500</p> <p>1500</p>	<p>The principle of “cost raising” through co-financing will be applied</p>
<p>1.5 Implementing prizing systems for research in the energy efficiency field according to GO 22/art.22-b</p>	<p>2000</p>	
<p>2. Actions destined for the increase of information/communication capacity of RERA</p> <p>2.1. restructuring site www.anre.ro by including a new specific domain entitled “Energy efficiency” along with the existent domains: Electrical energy, respectively Natural gase</p> <p>2.2. creating certain protocol and representation elements:</p> <ul style="list-style-type: none"> - RERApresentation material in Romanian and English; - initiating press conferences for issues of energy efficiency - ensuring RERApresentation at marking events of energy efficiency with an impact on the information transfer (e.g. Summer studies organized by the European Council for an Energy Efficient Economy (ECEEE) – June 2011 	<p>2500</p> <p>2000</p> <p>600</p> <p>2000</p>	
	<p>50 000</p>	

total		
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3.6 The obligations of energy companies in promoting the energy savings in the final consumption

In 2010, RERA initiated consultations and informing with certain gas and electricity companies regarding the compliance with the provisions of art.6 of the Energy Services Directive; with this occasion, several options were analyzed according to the international practice: applying the demand side management for energy (DSM), creating subsidiaries of energy services (ESCO), etc.

In parallel, it conducted a poll within 84 distribution and supply companies on the knowledge and application of provisions of art. 6 of the Energy Services Directive.

The conclusions that resulted from the analysis of the answers received reveals several modes used by these companies, most of them being based on information/communication problems, without entering background problems:

- Notifying the clients (by mail) on the necessity and respectively the imperativeness of compiling energy balances, as well as their availability to find, together with the consumers, the best measures for increasing energy efficiency;
- Providing consultancy to the customers at the acquisition of gas-consuming tools or apparatus, at the exchange of the old ones with others more efficient or in what regards their more efficient operation;
- Concluding contracts with consultancy companies in order to perform energy audits and to offer an adequate energy management
- Using the webpage to offer consultancy to final consumers;
- Sending information through the invoice, regarding the authorized auditors or the way in which the energy consumption can be reduced;
- Sending a asset of information regarding measures for saving energy at the conclusion of supply contracts with the new clients;

However, the development of more complex actions, with an increased impact, includes higher costs that the energy companies wish to include in the consumers' bills.

The discussion conducted with the companies during the information collection process, revealed the fact that these have proven to be available to contribute to the creation of a fund for energy efficiency, through a financial contribution.

In the actual economical situation, marked by the effects of the financial crisis, this aspect becomes a problem of political choice.

In order to clarify this problem, for 2011, RERA introduced in the Regulations Programme the objective of "Principles regarding the establishment of participating mechanisms of the electrical energy and natural gases distributors and providers in order to increase energy efficiency for the final consumers – according to art. 9 of GO no. 22/2008."

Also in the following period, 2011-2013, RERA will continue to monitor the way in which the energy distributors and providers apply the provisions of GO no. 22/2008. An example in this respect is represented by the current action to create a data base on a national level, regarding the consumers of the energy distributors and providers (electrical energy and natural gases), with an annual consumption above 100 toe. RERA prepares to apply the provisions of the future Directive on energy efficiency as well, regarding the obligations of the energy distributors and providers, whose draft was launched at the end of July 2011.

3.7 Energy services market

For the development of the energy services market during 2011-2013, two types of actions are taken into consideration:

a) Extension and completion of unfolding activities and measures, initiated in the previous period:

- Finalizing the legal frame and publishing a guide regarding the application of EPC that includes the recommendations of the work group RERA, ANRMAP, MPF, as well as documents elaborated within the EBRD study (methodology and contract model based on the service concession contract provided in the regulations for public acquisitions)
- Identifying new pilot project of a EPC type using the following instruments:
 - Energy efficiency plan for cities with more than 20000 residents;
 - Energy efficiency national plan – financial facilities for local authorities
 - Covenant of Mayors – sustainable development plans
 - Local energy plans developed by OER within the MODEL project
- Assistance for preparing biddings afferent to EPC
 - Help desk for EPC. It is important that the current help desk initiated by RERA within the EESI project be extended with the participation of the experts of ANRMAP and MPF, so that it can offer a complete assistance for the preparation of biddings for EPC
 - Assistance for preparing the applications for credit. EBRD intends to extend the positive experience within the financing facilities for energy efficiency (EEFF) and to create a new technical assistance unit for a new financing mechanism destined for ESCO companies
- Financing mechanisms
 - Based on the conclusions of the study “Romania: Public Sector Energy Efficiency Programme”, EBRD will initiate a financing mechanism specific to ESCO companies; for this purpose a project portfolio was identified, made of 13 education units which have an investment necessary estimated at 60-65 thousands euro/unit

b) New measures in accordance with the provisions of the new directive on energy services (COM(2011)370 final):

- Inventorying public buildings, which will facilitate the marketing of ESCO companies
- Certification schemes for energy services providers, auditors, plumbers, which will increase the level of confidence of local authorities and of other category of energy consumers
- Listing the energy services providers
- Disseminating the information regarding the financing mechanisms available for energy services

In the current stage, it is difficult to estimate the rhythm of development of ESCO companies, as well as the level of improvement of local authorities' capacity to organize biddings and to negotiate EPC. However, for the accomplishment of NAPEE objectives, an important volume of investments is needed in the public sector and, if the energy services market will not respond to these necessities, other stimulation options will have to be assessed for this market, according to European experience, thus:

- Creating a central entity for the preparation of biddings in the public domain, capable of developing project packages of great dimensions, with a great investment volume, respectively an attractive cash-flow for the great ESCO companies
- Creating a public ESCO after the model of Belgium: FEDESCO
- Creating ESCO subsidiaries in the energy companies

3.8 Strategy for increasing the number of buildings with a nearly zero energy consumption

For the reduction of energy consumptions in the existent building and the increase of the number of new buildings with a nearly zero energy consumption during 2011-2013, two new types of actions are taken into consideration:

- a) Increasing the number of buildings with low energy consumption through thermal rehabilitation of the dwelling buildings – household flats and unfamiliar buildings – with a financing through bank credits with a governmental warranty, provided by the Government Emergency Ordinance no 69/2010, which mainly regulates the following aspects:
 - Reducing the barriers and encouraging investments for thermal rehabilitation of the **blocks of flats and dwelling buildings for one family**, built and received until the end of year 2000 and for which the lodgers/owners associations can sustain financially, through bank credits with subventioned interest, the execution of the works;
 - The possibility of using alternative energy sources for heating, illumination or preparing warm domestic water;
 - Ensuring a financing system for the thermal rehabilitation works through bank credits for a period of up to 5 years, with a governmental warranty and subventioned interest;
 - The possibility of participation, with up to 30%, of the local public administration authorities in the expenses regarding the thermal rehabilitation of the household flats.
- b) New measures that take into consideration the transposition into the national legislation the provisions of Directive 2010/31/EU on the energy performance of buildings, thus:
 - For new buildings owned/managed by the public administration authorities and for which the reception upon works completion will be performed after the 31st of December 2018, the investors and designers will take all the measures so for these to be buildings whose energy consumption is almost equal to zero. For the other building categories, the provision will apply starting with the 31st of December 2020;
 - For the existent buildings which undergo major renovation works, the improvement of their energy performance will be taken into account, insofar as this is technically, functionally and economically possible.

3.9 Alternative measures heating and air conditioning systems

For the purpose of using alternative energy sources, both for heating and for building climate control, the competent central public administration authorities will provide measures:

- For new buildings – through the urban planning certificate issued by the competent local/county public administration authorities, for the purpose of obtaining, under legal conditions, a construction permit for buildings, which will require the elaboration of a study regarding the possibility of using highly efficient alternative systems, depending on their technical, economical and environmental feasibility;
- For existent buildings – in case of a major renovation of the buildings, their owners/administrators may assemble alternative systems for generating energy, insofar as the project establishes that this is technically, functionally and economically possible.

Also, for the purpose of saving energy in buildings, in case of new buildings, as well as in case of a major renovation of existent buildings, their owners/administrators may request, under legal conditions, the assembly of intelligent counting systems, or, as is the case, the installation of active control systems, as well as automation, control and/or monitoring systems.

For the inspection of heating systems and the technical expertise of thermal stations and heating systems for buildings, the certified technical experts compile inspection reports which include the result of the technical inspection/expertise, as well as recommendations for the improvement of energy performance profitability of the inspected/expertised system.

3.10 Measures for sustaining EPBD implementation

For the implementation of EPBR provisions, competent central public administration authorities will take actions for:

- Informing and education programs initiation for building owner, as well as other activities for disseminating information, through all the informing means, in relation to the different methods and practices that allow an increase of energy performance, the introduction of alternative energy systems, as well as informing on the available financial instruments in this respect, including for the use of funds obtained through the initiation and development of green investments schemes according to provisions of the Government Decision no 432/2010;
- The initiation and promotion of policies and programmes for the increase, during 2012-2020, of the buildings number with a nearly zero energy consumption;
- The initiation and promotion of programmes for the assembly and operation of alternative energy systems in buildings;
- Certification of specialists as energy auditors for buildings.

Also, the creation of a National Qualification Platform is wanted, which will reunite all the main actors involved in the qualification and professional education in the energy efficiency domain and that of using energy from renewable sources in buildings and which helps

that, together with these, they compile a national strategy and a coherent progress book that supports the fulfillment of the targets assumed for year 2020, through a project coordinated by the National Research-Development in Constructions, Urban Planning and Sustainable Territorial Development Institute "INCD URBAN-INCERC", from the coordination of the Ministry for Regional Development and Tourism.

For the purpose of reducing energy consumption in buildings, of improving the energy performance of the buildings, as well as for the transitions towards buildings whose energy consumption is nearly equally to zero, the competent central public administration authorities can approve national programmes with a financial backing which consider, especially, the following aspects:

- Adequate use of structural funds in order to increase the energy efficiency of the buildings, especially of the dwellings, regardless of the propriety form;
- Efficient use of funds attracted from public financial institutions;
- Coordinating the use of funds from the European Union with the national ones
- Other support forms, in order to stimulate investments in the energy efficiency, for the purpose of achieving national objectives.

4. Determination of competent bodies and designated companies

4.1 Competent bodies and organizations designated by the Government Ordinance no. 22/2008

The Government Ordinance no. 22/2008¹, which transposes in the internal legislation the Directive no. 2006/32/EC, contains a distinct chapter (chapter V) called "Competences and Liabilities". In accordance with this legislative deed:

- the Romanian Agency for Energy Conservation is the specialty body of the central public administration, which participate in the development of the energetic efficiency policy, being the institution responsible at national level for its implementation and monitoring, having legal character, being subordinated to the Ministry of Economy and Finance.
- The organization and operation of the Romanian Agency for Energy Conservation is approved by decision of the Government, considering the following main competences and responsibilities:
 - a) participation in the development of the national policy of energetic efficiency of the energy upon the request of the Ministry of Economy, Commerce and Business Environment;
 - b) monitoring the programmes for increasing the energy efficiency and savings and , resulted from providing energy services and other energy efficiency improvement measures and reporting the results to the Ministry of Economy, Commerce and Business Environment;
 - c) cooperation with internal and international institutions and bodies in order to efficiently use the energy and to reduce the negative impact on the environment;

¹ The Government Ordinance no. 22/2008 on energetic efficiency and promotion of utilization to the final consumers of renewable energy sources was published in the Official Gazette no. 628/29.08.2008

- d) participation in drafting technical norms and regulations for the purpose of increasing the energetic efficiency in all activity fields;
 - e) ensuring the monitoring of the equipment and device market for which there are specific regulations regarding the energetic efficiency;
 - f) development, coordination of training programs regarding the improvement of the energetic efficiency and of the efficiency of utilization by the final consumers of the renewable energy sources, authorization of energy auditors and certification of energetic managers;
 - g) making available to the providers of energetic services and energetic efficiency improvement measures qualifications and accreditation systems, which shall be justifiably implemented, depending on the necessities;
 - h) technical assessment, authorization and monitoring the projects of investments in the field of energy efficiency for which funding from the state budget and from other internal and external sources available to the Government is required;
 - i) drafting the synthesis of the energy efficiency programs;
 - j) cooperation with habilitated institutions for the purpose of developing short, medium and long term scenarios with regard to the evolution of the energy demand/offer ratio and of the calculation of the energetic efficiency indicators at national level;
 - k) providing consultancy, free of charge, for the development and application of energy efficiency projects and for the development of the energy efficiency programmes;
 - l) promoting the use of renewable energy sources to consumers by actions complementary to the energy market regulation;
 - m) carrying out, including by co-funding from the state budget or from private sources, of studies for the purpose of substantiating the national energy efficiency programs and participation in eligible projects, energetic efficiency and renewable energy programs initiated by international bodies;
 - n) substantiation, with the support of the National Energetic Observatory, of the indicative energy saving targets and of their accomplishment measures, and also their submittal to the Ministry of Economy, Commerce and Business Environment for the purpose of subjecting them to the approval of the Government;
 - o) monitoring the volunteer approvals;
 - p) drafting, together with the National Authority for Regulation and Monitoring of Public Procurement, and publishing the guidelines on the energetic efficiencies and energy savings as possible criteria for the evaluation of the bids in the public procurement contract awarding procedures;
 - q) substantiation of the national plans for energy efficiency and submitting them to the Ministry of Economy, Commerce and Business Environment for the purpose of subjecting them for the approval of the Government;
 - r) development of energy efficiency programs associated to a mechanism for providing financial support from the state budget and/or from the local bodies for the improvement of energetic efficiency.
- The Ministry of Development, Public Works and Housing (currently, the Ministry of Regional Development and Tourism) coordinates, from technical perspective, the actions regarding the increase of energy performances of buildings by:
 - a) drafting specific technical regulations, in accordance with the provisions of the Law no. 10/1995 on the quality in constructions, as subsequently amended;

b) certification of energetic auditors for buildings;
c) monitoring the energetic performance of buildings and construction of specific data banks by the National Institute for Research and Development in Constructions and Construction Economy – INCERC, Bucharest, a unit coordinated by the Ministry of Development, Public Works and Housing. Monitoring contains the centralization and processing of data/information provided by the energy auditors for buildings, by energy performance certificates, and by the local public administration authorities, respectively, by issued building authorizations. In order to substantiate the national plans in the field of energy efficiency, the National Institute for Research and Development in Constructions and Construction Economy – INCERC, Bucharest, provides, upon the request of the Romanian Agency for Energy Conservation, the data held by it.

- The Romanian Agency for Energy Conservation and the Ministry of Development, Public Works and Housing draft contract templates for financial instruments.
- The National Authority for Regulation and Monitoring of Public Works, together with the Romanian Agency for Energy Conservation cooperate with the European Commission for the exchange of the best practices for public procurement in the field of energetic efficiency and ensure their dissemination at national level.
- The Romanian Agency for Energy Conservation and the Ministry of Development, Public Works and Housing ensure the availability of efficient energy audit systems, independently developed, in order to identify potential measures for the improvement of energy efficiency, and which to be available for all final consumers, including domestic consumers, small commercial consumers and small and big industrial consumers.
- The Ministry of Economy, Commerce and Business Environment submits to the European Commission the national plans in the field of energy efficiency.
- The Methodological Norms for the application of the Government Ordinance no. 22/2008 were approved by the Government Decision no. 409/2009¹. This documents show, among others, that Energy Research and Modernizing Institute ICEMENERG (trading company with complete state character, subordinated to the Ministry of Economy, Commerce and Business Environment) has the capacity of National Energy Observatory. The institute is responsible for drafting synthesis reports based on processing the aggregate statistical information provided by the energy distributors, energy distribution system operators and/or energy retail companies. These synthesis reports are submitted to MECBE and RAEC. The respective activities are funded by the Ministry of Economy, Commerce and Business Environment according to the law.

4.2 Restructuration of the competent bodies and organizations designated by Government Ordinance no. 22/2008

In 2009, based on the global economic crisis which also affected Romania, and for the compliance with the framework agreements with the European Commission and International Monetary Fund, an important action was carried out at national level with

¹ The Government Decision no. 409/2009 for the approval of the Methodological Norms for the application of the Government Ordinance no. 22/2008 on the energetic efficiency and promotion of utilization to the final consumers of the renewable energy sources was published in the Official Gazette no. 263 of April 22nd, 2009.

regard to the reorganization of public authorities and institutions. The Law no. 329/2008¹, approved by the Parliament in this regard, provides the dissolution of RAEC and its taking over by the Romanian Energy Regulatory Authority. The organization and operation of RERA under these conditions was regulated by Government Decision no. HG 1428/2009², which provides, among others:

- The Regional Energy Regulatory Authority is organized and operates as public autonomous institution of national interest, with legal character, with private patrimony, in direct coordination of the vice-prime-minister, by taking over the Romanian Agency for Energy Conservation
- The Regional Energy Regulatory Authority drafts, determines and follows the application of the mandatory regulations at national level necessary for the operation of the electric power and natural gas sector and market, under the conditions of energetic efficiency, competition, transparency and consumer protection, and exercises the competences established by law.
- The National Energy Regulatory Authority fulfils the tasks and competences provided by the Gas Law no. 351/2004, as subsequently amended and supplemented, Electric Power Law no. 13/2007, as subsequently amended and supplemented, and by the Government Ordinance no. 22/2008 on the energetic efficiency and promotion of utilization to the final consumers of the renewable energy sources or by other valid normative deeds.
- The National Energy Regulatory Authority collaborates, on a protocol basis, with other state institutions or entities for the fulfilment of its tasks and for the efficient use of energy and reduction of the negative impact on the environment.

The Government Decision has two annexes which contain RERA Organization and Operation Regulation. This regulation contains the departments of RERA and the organizational structure of RERA. According to these annexes, the following departments are organized within RERA:

- a) Electric Power Market, Price and Tariff Regulation Department
- b) Natural Gas Market, Price and Tariff Regulation Department
- c) Network Access Regulation and Electric Power and Natural Gas Authorization Department
- d) Energy Efficiency Regulation Department
- e) Control and Consumer Protection Department
- f) Cooperation, Program and Communication Department

Explicit tasks in the field of energy efficiency are submitted to the Energy Efficiency Regulation Department and Control and Consumer Protection Department.

The Energy Efficiency Regulation Department ensures:

- implementation and monitoring the application of national energy efficiency policy, monitoring the programs of efficient utilization of the energy and resulted energy savings, technical evaluation of the investment programs in the field of energy efficiency for which funding is required, drafting, together with the National Authority for Regulation and Monitoring the Public

¹ The Law no. 329/2009 on the reorganization of public authorities and institution, rationalization of public costs, support of the business environment and compliance with the framework agreements concluded with the European Commission and the International Monetary Fund, was published in the Official Gazette, Part I, no. 761 of November 9th, 2009.

² The Government Decision no. 1428/2009 on the organization and operation of the National Energy Regulatory Authority no. 1428/2009 was published in the Official Gazette, Part I, no. 847 of December 8th, 2009

Procurement, and publishing the guidelines on the energy efficiency and energy savings as possible criteria for the evaluation of the bids to the procedures of awarding the public procurement contracts, authorization of energetic auditors and certification of energetic managers;

- promotion of electric power obtained from renewable energy sources and in high efficiency cogeneration.

The Control and Consumer Protection Department ensures the performance of specific activities regarding the protection of consumers, settlement of divergences in the field of electric power and natural gases, according to the law, control of compliance with the regulations issued by the National Energy Regulatory Authority, and also with the specific norms, regulations and measures regarding the increase of energy efficiency in the field of activity.

The dissolution of RAEC and its taking over by RERA was accompanied by the dissolution of the territorial subsidiaries of RAEC, dismissing the afferent personnel. This fact created some difficulties at central level with regard to the inventory and monitoring of energy efficiency programs (especially of those developed at local level), determination of the actually made energy savings and evaluation of foreseen energy savings, respectively.

4.3 Other competent bodies/organizations

The efficient use of energy (including program/project funding) is a complex action. Various national and local bodies/organizations are involved in the performed actions.

The European funds have a special role in funding energy efficiency projects/programs. The sectoral operational program management authorities and the intermediate bodies established for the management of these programs represent competent bodies at national level regarding the performance of energy efficiency projects and monitoring their execution.

The environment fund finances important energy efficiency projects. The Ministry of Environment and Forests as well as the Environmental Fund Administration are also competent at national level.

Acronyms

1	RERA	Romanian Energy Regulatory Authority
2	ANRMAP	National Authority for Regulation and Monitoring of Public Procurement
3	ANRSC	National Regulatory Authority for Community Services of Public Utility
4	RAEC	Romanian Agency for Energy Conservation
5	TCA	Technical Connection Approval
6	EBRD	European Bank for Reconstruction and Development
7	NBR	National Bank of Romania
8	NACE	Classification of activities from national economy
9	EI	Economic competitiveness increase
10	CHP	Cogeneration Plant
11	CNE	Nuclear and Electric Power Plant
12	EPC	Energy Performance Contract
13	NSRF	National Strategic Reference Framework
14	HP	Heating plant
15	GC	Green Certificate
16	DGE	MECMA General Directorate for Energy
17	DGEPG	MECMA General Directorate for Energy, Oil and Gas (currently, DGE)
18	KAI	Key Area of Intervention
19	EEFF	Energy Efficiency Finance Facility
20	EESI	Energy Service Initiative European Project within Intelligent Energy Europe Program
21	EESI	European Energy Service Initiative
22	ESCO	Energy Service Company
23	E-SRE	Electric Power Produced from Renewable Sources
24	RFEE	Romanian Fund for Energy Efficiency
25	AEG	Aeolian Electric Generators
26	NG	Natural Gases
27	GD	Government Decision
28	INS	National Institute of Statistics
29	OH(T)L	Overhead transmission line
30	MAI	Ministry of Administration and Interior
31	MDRT	Ministry of Regional Development and Tourism
32	MECMA	Ministry of Economy, Commerce and Business Environment
33	MIRA	Ministry of Interior and Administrative Reform (currently, Ministry of Administration and Interior)
34	DO	Distribution Operator
35	OER	Romanian “Energy Cities” Network
36	GO	Government Ordinance

37	OIE	Intermediate Energy Body
38	OPCOM	Commercial Operator of the Electric Power Market
39	OTS	Transport and System Operator (=TRANSELECTRICA)
40	GEO	Government Emergency Ordinance
41	GDP	Gross Domestic Product
42	PNAER	National Action Plan in the Field of Energy from Renewable Sources
43	SOP	Sectoral Operational Program
44	PDG	Power distribution grid
45	PTG	Power transmission grid
46	DHS	Centralized thermal energy supply system
47	NPG	National power grid
48	SRE	Renewable energy sources
49	TRANSELECTRICA	TRANSELECTRICA SA Romanian Power Grid Company (=OTS)
50	VAT	Value Added Tax
51	UCTE	Union for Coordination of Electric Power Carriers
52	EU	European Union

Bibliography

- B[1] Directive no. 2006/32/EC on energy efficiency and energy services
- B[2] Directive no. 2009/28/EC on the promotion of energy use from renewable sources
- B[3] Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end-use efficiency and energy services – Preliminary draft excerpt – June, 2010
- B[4] Roadmap of energy field in Romania (GD. 890/2003)
- B[5] Strategy for capitalization of renewable energy sources (GD. 1535/2003)
- B[6] National strategy in the field of energy efficiency (GD. 163/2004)
- B[7] National strategy regarding the supply with thermal energy of localities by centralized production and distribution systems (GD. 882/2004)
- B[8] National Development Plan 2007-2013
- B[9] Energy strategy of Romania for 2007-2020 (GD. 1069/2007).
- B[10] National strategy for sustainable development of Romania – Horizons 2013-2020-2030 (GD. 1460/2008)
- B[11] National Action Plan for Capitalization of Renewable Energy Sources
- B[12] The First National Action Plan for Energy Efficiency

Annex 1 Categories and examples of energy efficiency measures

Annex 1.1 – Energy efficiency measures at thermal power stations from Romania – selection

Seq. no.	Power station	Energy saving measure	Execution period	Foreseen annual energy savings (toe)
1	CTE Turceni	Static frequency converter system for electric motor which drives the basic condensation extraction pump from the condenser tank of F1C 330 MW steam turbine at energy block no. 4	2011	536
2	CTE Rovinari	Clean maintaining equipment for the condenser pipes of group 6	2011	200
3	CTE Rovinari	Modernization of the equipment for slag and ash discharge from boiler 3	2011	130
4	CTE Rovinari	Modernization of the equipment for slag and ash discharge from boiler 6	2011	130
5	CTE Rovinari	Installation of a water supply pump with high output at boiler 6	2011	146
6	CTE Rovinari	Water pump installation for cooling the condenser from ST no. 6 with adjustable angle of rotating blades	2011	112
7	CTE Deva	Implementation of a computer-based product for monitoring the specific consumptions and economical operation of the power station	2011	344
8	CTE Deva	Installation of a variable flow pump for water cooling control through cooling towers	2011	17,2
9	CTE Deva	Replacement of adjustment elements with driving of variable speed electric motor	2012	12.9
10	CET Galati	Installation of frequency converters to electric motors driving EPA 9 and SPT 1 pumps	2011	297
11	CET Galati	Burners installation with low level of NO _x , which dually operate on furnace gas and natural gas at TGM 89 no. 4, 5	2011-2013	1424

Annex 1.2 –Capacities list of electric and thermal power produced in cogeneration, with final accreditation, of electric and thermal power producers based on high efficiency cogeneration

Seq. no.	Producer		Installed electric power (MW)	Technology type (*)	Installed electric power in high efficiency groups (MW)
1.	S.C. ELECTROCENTRALE GALATI S.A.		375	ST	100.5
2.	S.C. TERMICA S.A. SUCEAVA		100	ST	75.4
3.	S.C. TERMOCALOR CONFORT S.A. din Pitesti CET Găvana		6	BPST	4.5
4.	S.C. CET IAȘI S.A.	CET II	100	ST, BPST	69.9
		CET I	125	ST	41.7
5.	S.C. DALKIA TERMO PRAHOVA S.R.L. CET Brazi		260	ST, BPST	90.9
			26	GT	25.54
6.	S.C. ELECTROCENTRALE DEVA S.A. Grupul 3		210	ST	82.8
7.	RAAN din Drobeta-Turnu Severin ROMAG TERMO (**)		222	ST, BPST	87.8 (123.2)
8.	S.C. CET ARAD S.A.		50	ST	50.0
9.	S.C. Centrala Electrică de Termoficare BRAȘOV S.A.		100	ST	46.3
10.	S.C. Electrocentrale Bucuresti S.A.	Bucuresti CET Sud Subsidiary	550	ST	322.6
		Bucuresti CET Vest Subsidiary	435	ST, GT+ ST	267.0
		Bucuresti CET Grozavesti Subsidiary	100	ST	72.0
		Bucuresti CET Progresu Subsidiary	200	ST, BPST	106.4
		Constanta CET Palas Subsidiary	100	ST	84.8
		Bucuresti CET Titan Subsidiary	8.0	BPST	2.9
11.	S.C. CET S.A. BACAU		64	ST, GT	36.0
12.	S.C. COMPLEXUL ENERGETIC CRAIOVA S.A. S.E. Craiova II		300	ST	145.0
13.	S.C. ELECTROCENTRALE ORADEA S.A.		195	ST, BPST	87.7

14.	S.C. CET GOVORA S.A.		210.7	ST, BPST	90.3
15.	S.C. TERMoeLECTRICA S.A. CET Paroşeni		150	ST	44.1
16.	S.C. CET S.A. BRĂILA		75	BPST	24.8
17.	S.C. OMV PETROM S.A. Petrobrazi (**)		53.14	GT	11.1 (53.14)
18.	S.C. Compania Locala de Termoficare COLTERM S.A. din Timisoara	CET Sud	19.70	BPST	12.5
		CET Freidorf	1.0	M	0.9
19.	S.C. ENET S.A. FOCSANI		8.0	BPST	7.3
20.	S.C. CET GRIVIŢA S.A. din Bucuresti		11.40	BPST	5.7
21.	R.A.G.C.L. PASCANI Centrala termica CT5		0.69	M	0.69
22.	S.C. COLONIA CLUJ-NAPOCA ENERGIE S.R.L.	CT 3	0.58	M	0.58
		CT 8	0.21	M	0.21
		CTZ	4.65	M	4.65
23.	S.C. RULMENŢI S.A. BARLAD (**)		11.99	M	3.6 (9.02)
24.	S.C. U.A.T.A.A. MOTRU S.A.		5.50	BPST	3.0
25.	S.C. INTERAGRO S.R.L. ZIMNICEA (**)		2.01	M	0.87 (1.25)
26.	S.C. BIOFUEL ENERGY S.R.L. ZIMNICEA (**)		12.0	GT	6.32 (11.61)
27.	S.C. BEPCO S.R.L.	CET Nord Brasov	20.17	M	20.17
		CET Metrom Brasov	6.71	M	6.71
		CET Noua Brasov	2.68	M	2.68
28.	S.C. VEST-ENERGO S.A. din Bucuresti		4	BPST	2.77
29.	S.C. SERVICII COMUNALE S.A. RĂDĂUŢI		7	GT	7
30.	S.C. ECOGEN ENERGY S.A. din Buzau		6.09	M	6.09
31.	S.C. MODERN CALOR S.A. din Botosani		6.5	BPST, GT	5.1
32.	S.C. CONTOUR GLOBAL SOLUTIONS S.R.L. din Ploiesti		6.08	M	6.08
33.	S.C. TERMICA S.A. TARGOVISTE		5.88	M	5.88
34.	S.C. COMPA S.A. SIBIU		3.1	M	3.1
35.	REGIA AUTONOMA MUNICIPALA RAM - Buzau		0.68	M	0.68
36.	S.C. ENERGO MUR S.A. din Targu Mures		0.51	M	0.5
37.	S.C. ENERGO SIB S.R.L. din Sibiu		0.95	M	0.48
38.	S.C. ZAHARUL LUDUS S.A. (**)		6	BPST	0.35 (3.18)
39.	UNIVERSITATEA POLITEHNICA BUCURESTI (**)		1.67	M	0.69 (1.67)
40.	PRIMARIA MUNICIPIULUI DEVA (**)		0.9	M	0.73 (0.9)
41.	S.C. VIROMET S.A. din Victoria(**)		12	BPST	0.42 (1.9)

Source: www.anre.ro

(*) Type of cogeneration technology: GT+ST – combined cycle; ST – steam, condensation, heating connection turbine; BPST – Back-pressure steam turbine; GT – gas, thermal power turbine, with thermal energy recovery; M – internal combustion motor

(**) Economic operator which holds/commercially exploits cogeneration units and which consumes electric power from the production of such units for the supply of its private consumption locations afferent to some of its activities, others than the generation of electric and thermal energy – in these cases, the total high efficiency electric cogeneration capacity per producer was diminished compared to the high efficiency electric capacity resulted from the self-assessment calculation. The values of high efficiency cogeneration capacity before diminution are the ones included between parentheses in the column “Total high efficiency electric capacity per producer”.

**Annex 1.3 – List of electric power production capacities from plants
with benefit of green certificates**

Seq. no.	Producer	Installed electric power (MW)
1	S.C. BIOELECTRICA TRANSILVANIA S.R.L.	8.080
2	S.C. HOLZINDUSTRIE SCHWEIGHOFER S.R.L.	8.752
3	S.C. GENERAL ENERGETIC S.A.	6.500
4	S.C. IRIDECS GRUP S.R.L.	1.920

Source: www.anre.ro

Annex 1.4 – Information on the applied measure “Development of a high efficiency cogeneration group at Electrocentrale Bucuresti – CET VEST”

Brief description:

CET Bucuresti Vest Power Plant is located on the west side of Bucharest and belongs to Electrocentrale Bucuresti enterprise (trading company with complete state capital).

The cogeneration group developed at CET Bucuresti Vest consists in:

- A set of gas turbine – generator, which contains a gas turbine and an air cooled electric generator directly connected to the gas turbine. The gas turbine of heavy duty type is equipped with dual burners on natural gas and diesel oil, and with a system for NOx emission reduction and control with water injection;
- A heat recovery steam generator with single pressure and supplementary natural gas burning. On the cold side of heat recovery steam generator there is a heat exchanger for the heating network water;
- A back pressure turbine with radial exhaust in a cooled heat exchanger with water from the heating network and directly installed with a turbo-generator;
- Water supply system provided with deaerator and demineralised water tank, boiler supply water pumps;
- Thermal system equipped with pipes, heat exchangers, recirculation pumps;
- Distributed control system of the new unit (DCS);
- High voltage electrical equipment;
- Two block transformers;
- Auxiliary mechanical and electrical equipment, including: auxiliary system for water cooling, closed water cooling system, lifting equipment, natural gas supply system, diesel oil supply system, fire extinction systems, compressed air system etc.;

All the units necessary for the new energy group: demineralised water, fuel (natural gas, diesel oil), technological air, cooling water, softened water, drinking water and fire extinction water are provided from the auxiliary systems of CET Bucuresti Vest.

Technical project performances:

Gas turbine performances:

- Electric power: 124 MW;
- Specific heat consumption: 10.656 Kj/KWh;
- Electric efficiency: 33.8 %.

Heat recovery boiler performances:

Steam at the outlet of the overheater:

- flow: 270 t/h;
- pressure: 67-105 bars;
- temperature: 510-515 °C.

Steam turbine performances:

- Electric power: 60 MW

Steam Turbine input:

- pressure: 67-105 bars;
- temperature: 510-515 °C;
- connection steam: 5-6 bars;
- back pressure: 1.1-0.5 bars.

Cogeneration group performances:

- Total electric power: 192.4 MW;
- Specific heat consumption: 8380 Kj / kWh;
- Heat delivered in the thermal system: 170Gcal/h;
- Global efficiency: 87.1 %.

Annex 1.5 –Planned works for the loss reduction in PTG

I. Equipment replacement with high CPT:

1. Replacement of 100 MVAR bucking coil, Mintia
2. Installation of 1-400/110 KV-250 MVA substation in 400/110 kV station, Oradea Sud
3. Installation of 2-400/110 KV-250 MVA substation in 400/110 kV station, Oradea Sud
4. Installation of AT 1-220/110 kV in 220/110 kV station, Timisoara
5. Installation of AT 1-220/110 kV in 220/110 kV station, Floresti
6. Installation of AT 1-220/110 kV in 220/110 kV station, Barbosi
7. Installation of AT 2-220/110 kV in 20/110 kV station, Barbosi
8. Installation of AT 2-220/110 kV in 220/110 kV station, Baia Mare
9. Installation of AT 1-220/110 kV in 220/110 kV station, Salaj
10. Installation of AT 1-220/110 kV in 220/110 kV station, FAI
11. Installation of AT 1-220/110 kV in 220/110 kV station, Gheorghieni

II. Modernization of the stations which are technically and morally outdated

- Increase of NPG safety degree by retooling the 400/220/110kV power station, Brazi Vest – 110 kV station
- Retooling of 400/110/20 kV power substation, Mintia
- Retooling of 400/220/110/20 kV power substation, Lacu Sarat
- Retooling of 400 kV power station, Gadalin
- Modernization of protection systems afferent to AT 200 MVA and PDB 220 kV/110 kV transformations stations, 14 stations: Vetis, Alba Iulia, Ungheni, Ghizdaru, Mostistea, Teleajen, Gradiste, Calafat, GT. Jiu, Arad, Baru Mare, Iaz, Resita, Munteni
- Retooling of 400/110 kV station, Brasov
- Retooling of 220/110 kV station, Turnu-Severin Est
- Retooling of 400/110/20 kV station, Tulcea Vest – Technological part
- Retooling of 220/110 kV station, Barbosi
- Retooling of 220/110/20 kV power station, Campia Turzii
- Modernization of 110 kV and 20 kV power station, Suceava
- Retooling of 220/110 kV station, Filesti

II. Execution of new electric lines

1. OH(T)L 220 kV d.c. Ostrovu Mare – PTG
2. Regional: Interconnection Project between Balti (Moldova) and Suceava (Romania) OH(T)L 400 kV Suceava – Balti (Moldova Rep.)
3. OH(T)L 400 kV Cernavoda Stalpu and connection to 400 station, Gura Ialomitei
4. OH(T)L 400 kV Gadalin – Suceava, including interconnection to SEN
5. Passing to 400 kV voltage of Portile de Fier – Resita – Timisoara – Sacalaz axis
6. OH(T)L 400 kV of interconnection Resita (Ro) – Pancevo (Srb)
7. Connection of OH(T)L 400 kV Isaccea – Varna and Isaccea – Dobrudja to 400 kV Medgidia Sud station
8. OH(T)L 400 kV DC Gutinas - Smardan

Annex 1.6 – Reducing the duration of preventive maintenance works by disconnecting the equipment

Period	2007-2016 (according to the Preventive Maintenance Regulation)
Scope/brief description	Optimization of the frequency and content of the preventive maintenance actions by disconnection for the purpose of reducing the planned unavailability which has an effect on the energy losses and congestions from PTG
Final targeted use	<ul style="list-style-type: none"> - Decrease of energy losses from the transport network as result of the planned retirement of some important network elements - Decrease of costs as result of congestions induced by the maintenance works
Target group	PTG afferent equipment: electric stations and overhead electric lines (OH(T)L) of 220-400 kV
List and description of energy saving actions which substantiate the measure	<ul style="list-style-type: none"> - 2007 – The first edition of the Preventive Maintenance Regulation is drafted; - 2010 – The 1st revision of the Preventive Maintenance Regulation is issued; - Annual and perspective development of maintenance programs; - Organization of maintenance activity; - Monitoring the execution of the maintenance program, adjustment of the maintenance program in order to respond to some conjuncture factors; - Monitoring the specific performance indicators
Budget and financial source	Maintenance budget of the company – Private funds
Implementation body	CNTEE “Transelectrica” SA
Monitoring authority	RERA
Method of monitoring/measuring the resulted savings	<ul style="list-style-type: none"> - Calculation of permanent regimes for various contingents in order to determine the losses from PTG - Calculation of planned unavailability of the network elements (transformers and OH(T)L) according to the Performance Standard
Savings obtained in 2010	See note from table 2.14
Energy savings foreseen for 2016	See note from table 2.14
Foreseen impact on the energy savings in 2020 (if any)	See note from table 2.14

Annex 1.7 – The usage of the operation under voltage for the performance works in PTG equipment

Period	2010-2016 (according to TRANSELECTRICA strategy and Programs in the field of operation under voltage)
Scope/brief description	The usage of technologies under voltage in preventive and corrective maintenance actions is to reduce the planned/accidental unavailability and default, the energy losses and congestions from PTG
Final targeted use	- Decrease of energy losses from the transport network as result of the planned retirement of some important network elements - Decrease of costs as result of congestions induced by the maintenance works
Target group	PTG equipments: electric stations and overhead electric lines (OH(T)L) of 220-400 kV
List and description of energy saving actions which justify the measure	2010 – the Excellency Center for Operation under voltage was built 2010 – NTI S010 technical norm were drafted for the regulation of conditions which must be complied with by the equipment, clips and reinforcements of PTG installations in order to be able to execute LST works 2011 – NTE 010/2011 “LST Regulation” technical norm was drafted 2011 – training polygons for operation under voltage
Budget and financial source	Maintenance budget of the company – Private funds
Implementation body	CNTEE “Transelectrica” SA
Monitoring authority	RERA
Method of monitoring/measuring the resulted savings	- Calculation of permanent regimes for various contingents in order to determine the losses from PTG - Calculation of involved congestion costs
Savings obtained in 2010	See note from table 2.14
Energy savings foreseen for 2016	See note from table 2.14
Foreseen impact on the energy savings in 2020 (if any)	See note from table 2.14

Annex 1.8 – Increase of energy efficiency of the equipment related to the internal services of power stations

Period	2005-2016
Scope/brief description	Making efficient and modernizing the internal services of the power stations for the purpose of decreasing the electric power consumption
Final targeted use	<ul style="list-style-type: none"> - Decrease of electricity consumption of the equipment related to internal services by replacement with equipment with high features; - Supply of internal services from ATs tertiary; - Training of operational personnel for prevention of energy dissipation
Target group	Internal services afferent to power stations
List and description of energy saving actions which substantiate the measure	<ul style="list-style-type: none"> - Replacement of equipment afferent to internal services with modern equipment which have low energy consumption and increased reliability; - Supply of internal services from ATs tertiary; - Execution of operational procedures which are focused on the operation of internal services considering the safety in operation and decrease of electric power consumption
Budget and financial source	Maintenance budget of the company - Private funds
Implementation body	CNTEE “Transelectrica” SA
Monitoring authority	RERA
Method of monitoring/measuring the resulted savings	Comparative analyses
Savings obtained in 2010	3 GWh compared to 2005 (as a result of modernizations from 2005-2010)
Energy savings foreseen for 2016	4 GWh compared to 2005 (as a result of modernizations from 2005-2010 and of the ones foreseen for 2011-2016)
Foreseen impact on the energy savings in 2020 (if any)	Seen note from table 2.14

Annex 1.9 – Passing of distribution networks which currently operate at 6 kV and 10 kV within FDEE Electrica Distributie Transilvania Sud to 20 kV

Period	01.01.2008-31.01.2020
Scope/brief description	Necessity of changing approximately 700 km of 6 and 10 kV network
Final targeted use	Reduction of losses from distribution networks
Target group	Final customers supplied at MT and at 0.4 kV and 230 V
Regional application	Transilvania Sud distribution license area (Alba County, Brasov County, Covasna County, Harghita County, Mures County and Sibiu County)
List and description of energy saving actions which substantiate the measure	<ul style="list-style-type: none"> - Replacement of overhead cables and networks with cables and networks for 20 kV - Replacement of the current 6 (10)/0.4 kV transformers connected to these networks with 20/0.4 kV substations
Budget and financial source	- Investments, private sources, credit from providers, other legally construed sources
Implementation body	FDEE Electrica Distributie Transilvania Sud
Monitoring authority	FDEE Electrica Distributie Transilvania Sud
Method of monitoring/measuring the resulted savings	Statistical methods (energy balances)
Savings obtained in 2010	120 MWh
Energy savings foreseen for 2016	1100 MWh
Foreseen impact on the energy savings in 2020 (if any)	1400 MWh

Annex 1.10 – Increase of energy efficiency by replacing the present transformers of the secondary compact substations with low losses transformers

Period	01.01.2013-31.01.2020
Scope/brief description	Replacing 1918 transformers of the 8385 transformers existing in unit
Final targeted use	Increase of energy efficiency and reduce the active energy losses in distribution networks
Target group	
Regional application	Permit distribution area Transilvania Sud (jud. Alba, Brasov, Covasna, Harghita, Mures and Sibiu)
List and description of the energy saving actions that fundament the measure	Replacing the present transformers of the secondary compact substations made between 1970..1980 with low losses transformers
Budget and financial source	- Investments, own sources and European Funds, suppliers' credits, other legal sources
Implementation organism	FDEE Electrica Distributie Transilvania Sud
Monitoring authority	FDEE Electrica Distributie Transilvania Sud
Method of monitoring/measuring the resulted savings	Statistic methods (energy balances) and comparative measurements per transformers having the same powers (dismantled and remounted transformer)
Savings obtained in 2010	-
Energy savings foreseen for 2016	7-10 GWh / year in case the European funds are obtained and the work is performed
Foreseen impact on the energy savings in 2020 (if any)	7-10 GWh / year

Annex 1.11- Passing of distribution networks which currently operate at 6 kV and 10 kV within FDEE Electrica Distributie Muntenia Nord to 20 kV

Period	01.01.2005-31.01.2020
Scope/brief description	Improving the technical conditions of electricity supply
Final targeted use	All the 6 kV and 10 kV networks shall operate with 20 kV
Target group	Residential and trade agents category clients
Regional application	Prahova, Buzau, Dambovita, Vrancea, Braila, Galati
List and description of the energy saving actions that fundament the measure	- Replacing the power transformers - Resizing the electric conductors
Budget and financial source	- Investments, own sources and European Funds, suppliers' credits, other legal sources
Implementation organism	FDEE Electrica Distributie Muntenia Nord
Monitoring authority	FDEE Electrica Distributie Muntenia Nord
Method of monitoring/measuring the resulted savings	Statistic methods (energy balances)
Savings obtained in 2010	3900 MWh
Energy savings foreseen for 2016	10000 MWh
Foreseen impact on the energy savings in 2020 (if any)	15000 MWh

Annex 2 - Information used to calculate energy savings in the residential sector

Annex 2.1-Information used to calculate energy savings for refrigerators / freezers / refrigerator-freezers

	M.U.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
total number of devices	thousand pieces	6291.1	6736.0	7185.4	7558.9	8022.0	8220.5	8316.0	8538.2	8827.3	8990.1	9068.4
number of devices manufactured until 1995	thousand pieces	4500.0	4450.0	4350.0	4200.0	3900.0	3600.0	3400.0	3000.0	2500.0	2200.0	1900.0
number of a devices manufactured between 1996 and 2000	thousand pieces	1791.1	1791.1	1791.1	1791.1	1791.1	1791.1	1740.0	1690.0	1650.0	1620.0	1590.0
number of devices manufactured between 2001 and 2003	thousand pieces	0.0	495.0	1044.4	1567.8	1567.8	1567.8	1567.8	1567.8	1567.8	1567.8	1567.8
number of devices manufactured after 2004	thousand pieces	0.0	0.0	0.0	0.0	763.1	1261.6	1608.2	2280.4	3109.5	3602.4	4010.6
unit consumption of the devices manufactured until 1995	kWh	440	440	440	440	440	440	440	440	440	440	440
unit consumption of the devices manufactured between 1996 and 2000	kWh	350	350	350	350	350	350	350	350	350	350	350
unit consumption of the devices manufactured between 2001 and 2003	kWh	290	290	290	290	290	290	290	290	290	290	290
unit consumption of the devices manufactured after 2004	kWh	235	235	235	235	235	235	235	235	235	235	235
total consumption of the devices manufactured until 1995	GWh	1980	1958	1914	1848	1716	1584	1496	1320	1100	968	836
total consumption of the devices manufactured between 1996 and 2000	GWh	627	627	627	627	627	627	609	592	578	567	557
total consumption of the devices manufactured between 2001 and 2003	GWh	0	144	303	455	455	455	455	455	455	455	455
total consumption of the devices manufactured after 2004	GWh	0	0	0	0	179	296	378	536	731	847	953
total consumption	GWh	2607	2728	2844	2930	2977	2962	2938	2902	2863	2836	2801
unit consumption	kWh / pc.	414	405	396	388	371	360	353	340	324	315	307
energy savings	GWh	-469	-439	-401	-360	-250	-168	-111	0	137	219	297
energy savings	thousand toe	-40.33	-37.77	-34.55	-31.01	-21.54	-14.45	-9.56	0.00	11.83	18.89	25.60

Annex 2.2- Information used to calculate energy savings for washing machines

	M.U.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
total number of washing machines	pieces	3425.9	3545.0	3683.3	3927.1	4155.5	4443.7	4714.6	4905.1	5212.5	5477.1	5600.0
number of washing machines manufactured until 1995	pieces	2500.0	2350.0	2100.0	1900.0	1650.0	1400.0	1100.0	800.0	350.0	200.0	100.0
number of washing machines manufactured between 1996 and 2000	pieces	925.9	925.9	925.9	925.9	925.9	900.0	875.0	845.0	800.0	770.0	740.0
number of washing machines manufactured between 2001 and 2003	pieces	0.0	269.2	657.5	1101.3	1101.3	1101.3	1101.3	1101.3	1101.3	1101.3	1101.3
number of washing machines manufactured after 2004	pieces	0.0	0.0	0.0	0.0	478.4	1042.4	1638.3	2158.8	2961.2	3405.8	3658.7
unit consumption of the washing machines manufactured until 1995	kWh	320	320	320	320	320	320	320	320	320	320	320
unit consumption of the washing machines manufactured between 1996 and 2000	kWh	320	320	320	320	320	320	320	320	320	320	320
unit consumption of the washing machines manufactured between 2001 and 2003	kWh	270	270	270	270	270	270	270	270	270	270	270
unit consumption of the washing machines manufactured after 2004	kWh	220	220	220	220	220	220	220	220	220	220	220
total consumption of the washing machines manufactured until 1995	GWh	800	752	672	608	528	448	352	256	112	64	32
total consumption of the washing machines manufactured between 1996 and 2000	GWh	296	296	296	296	296	288	280	270	256	246	237
total consumption of the washing machines manufactured between 2001 and 2003	GWh	0	73	178	297	297	297	297	297	297	297	297
total consumption of the washing machines manufactured between after 2004	GWh	0	0	0	0	105	229	360	475	651	749	811
Total energy consumption of the washing machines	GWh	1096	1121	1146	1202	1227	1263	1290	1299	1317	1357	1377
total unit consumption per wm	kWh	320	316	311	306	295	284	274	265	253	248	245
energy savings for washing machines	GWh	-189	-182	-171	-162	-127	-86	-42	0	63	93	113
energy savings for washing machines	thousand toe	-16.27	-15.68	-14.67	-13.92	-10.89	-7.41	-3.57	0.00	5.44	8.01	9.71

Annex 2.3 - Information used to calculate energy savings for lighting in the residential sector

	M.U.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
number of permanently occupied households	thousand households	6990	7166	7185	7206	7227	7249	7276	7310	7362	7411	7427
area of the permanently occupied households	thousand sqm	242125	269115	270605	272269	273963	275799	278046	280939	284797	288517	288337
electricity consumption for lighting in the residential sector	GWh	2460	2735	2755	2770	2780	2800	2815	2839	2870	2890	2905
	thousand toe	212	236	237	239	239	241	242	245	247	249	250
electricity consumption for lighting per sqm of occupied household	kWh/m2	10.160	10.163	10.180	10.174	10.147	10.152	10.125	10.106	10.079	10.060	10.023
energy savings for lighting	GWh	-12.97	-15.23	-20.01	-18.44	-11.24	-12.64	-5.13	0.00	7.87	13.22	24.13
	thousand toe	-1.12	-1.31	-1.72	-1.59	-0.97	-1.09	-0.44	0.00	0.68	1.14	2.08

Annex 2.4 - Informations used to calculate non-electricity energy savings in the residential sector

Indicator name	M.U.	2003	2004	2005	2006	2007	2008	2009	2010
total number of households	thousands	8152	8176	8201	8231	8270	8329	8385	8402
total number of occupied households	thousands	7206	7227	7249	7276	7310	7362	7411	7427
the share of the occupied households in the total number of households	%	88.40	88.39	88.39	88.40	88.39	88.39	88.39	88.39
total number of demolished households	thousands	7.997	4.516	6.938	8.936	7.176	8.029	5.866	5.400
newly built households with district heating	thousands	13.037	14.005	15.1	20.259	28.15	47,076	44.48	38
newly built households with gas stoves	thousands	1683	1558	1522	1486	1442	1014	0.906	0.6
total number of newly built households connected to the gas network or with district heating	thousands	14.72	15.56	16.62	21.75	29.59	48.09	45.39	38.60
total number of newly built occupied households connected to the gas network or with district heating	thousands	13.01	13.76	14.69	19.22	26.16	42.51	40.12	34.12
newly built households with solid fuel stoves	thousands	14.277	14.412	16.065	17.709	17.328	18.523	16.616	14
total number of occupied households connected to the gas network or with district heating	thousands	3502	3515	3530	3549	3576	3618	3658	3692
total number of occupied heated with solid fuel stoves	thousands	3704	3712	3719	3727	3734	3744	3753	3734
total households area	thousand sqm	308012	309938	312020	314540	317834	322205	326413	326210
total occupied households area	thousand sqm	272269	273963	275799	278046	280939	284797	288517	288337
the share of the occupied households connected to the gas	%	48.59	48.64	48.70	48.78	48.91	49.14	49.36	49.72

Indicator name	M.U.	2003	2004	2005	2006	2007	2008	2009	2010
network or with district heating									
area of the occupied households connected to the gas network or with district heating	thousand sqm	132306	133264	134309	135635	137414	139962	142405	143352
area of the occupied households equipped with solid fuel stoves	thousand sqm	139963	140699	141490	142411	143525	144835	146112	144985
total non-electricity energy consumption in the households sector	thousand toe	7170	7218	7260	7028	6665	7194	7089	7029.87
total energy consumption of the occupied households connected to the gas network or with district heating	thousand toe	4483	4161	4092	3978	3344	3417	3351	3300
Total energy consumption of the occupied households equipped with solid fuel stoves	thousand toe	2687	3057	3168	3050	3321	3777	3738	3730
annual number of heating degree days	degree days	3264.1	3008.3	3154.8	3072.4	2749.8	2776.3	2772.7	2772.0
average number of heating degree days	degree days	3129.1	3129.1	3129.1	3129.1	3129.1	3129.1	3129.1	3129.1
consumption / occupied household connected to the gas network or with district heating	toe / household	1.28	1.18	1.16	1.12	0.94	0.94	0.92	0.89
consumption / sqm occupied household connected to the gas network or with district heating	kgoe / sqm	33.88	31.22	30.46	29.33	24.33	24.41	23.53	23.02
energy savings calculated using the indicator "consumer / occupied household connected to the gas network or with district heating"	thousand toe	-1208.60	-873.37	-790.45	-658.71	0.00	-33.28	70.27	152.74
energy savings calculated using the indicator "consumer / sqm occupied household connected to the gas network or with district heating"	thousand toe	-1263.86	-918.17	-823.57	-677.54	0.00	-11.04	114.44	188.06

Indicator name	M.U.	2003	2004	2005	2006	2007	2008	2009	2010
total non-electric consumption with climate correction in occupied households connected to the gas network or with district heating	thousand toe	4298	4328	4058	4051	3805	3851	3781	3725
consumption / household connected to the gas network or with district heating with climate correction	toe / household	1.23	1.23	1.15	1.14	1.06	1.06	1.03	1.01
consumption per sqm of household connected to the gas network or with district heating with climate correction	kgoe / sqm	32.48	32.48	30.22	29.87	27.69	27.51	26.55	25.99
energy savings calculated using the indicator "consumption / household connected to the gas network or with district heating with climate correction"	thousand toe	-571.55	-586.99	-301.81	-274.32	0.00	-0.84	111.42	203.84
energy savings calculated using the indicator "consumption per sqm of household connected to the gas network or with district heating with climate correction"	thousand toe	-634.43	-637.98	-339.49	-295.75	0.00	24.47	161.69	244.03
total energy consumption for occupied household equipped with solid fuel stove with climate correction	thousand toe	2576	3180	3143	3106	3779	4257	4218	4210
consumer / household for households equipped with solid fuel stoves with climate correction	toe / household	0.70	0.86	0.85	0.83	1.01	1.14	1.12	1.13
consumption per sqm of occupied household equipped with solid fuel stoves with climate correction	kgoe / sqm	18.40	22.60	22.21	21.81	26.33	29.39	28.87	29.04

Indicator name	M.U.	2003	2004	2005	2006	2007	2008	2009	2010
energy savings calculated using the indicator "consumer / household for households equipped with solid fuel stoves with climate correction"	thousand toe	1173.24	576.34	621.11	665.12	0.00	-468.31	-419.83	-431.04
energy savings calculated using the indicator "consumption per sqm of occupied household equipped with solid fuel stoves with climate correction"	thousand toe	1109.98	525.14	583.35	643.72	0.00	-443.40	-370.78	-392.38

Annex 3 - Information used to calculate the final energy savings in industry
Annex 3.1 Industrial production indices

	2005	2006	2007	2008	2009	2010
Industry	100	109.3	120.6	123.8	116.9	117.3
Extraction of ferrous and non-ferrous metals	100	79.9	18.8	4.2	2.8	2.7
Other mining activities	100	129.1	152.6	170.9	109.6	115.2
Food, drinks, cigarettes	100	105	129	135.7	134.6	135.2
Textile products	100	95.3	101.1	92.5	72.2	74.5
Clothing	100	101.2	88.8	71	52.9	60.1
Leather and footwear	100	101.6	95.9	82.7	65.1	69.3
Wood processing	100	121.5	133.2	122.7	145.1	151.8
Pulp, paper and paper products / printing and reproduction of recordings on media	100	112.3	120	112.6	101.1	103.6
Drugs, chemicals and pharmaceuticals	100	104.2	104.7	121.4	102	103.2
Rubber and plastic	100	128	161.8	179.2	167.3	166.1
Manufacture of other non-metallic mineral products	100	115	147.4	166	114.7	118.3
Metallurgy	100	101.4	103.1	87.1	55.8	58.4
Ironworks, machinery and equipment	100	125.8	147	170.4	148.2	154.3
Furniture	100	113.6	117.3	113.2	96.8	92.9
Construction	100	130.6	174.3	215.2	175.8	167.1

*Source: Romanian Statistical Yearbook for 2006-2009;
 OEN-ICEMENERG for 2010*

Annex 3.2 Final energy consumption in industry

[Thousand toe]

	2005	2006	2007	2008	2009	2010
Final energy consumption in industry,	10505.2	9997.8	9989.2	9414.6	6611.8	6750
Ferrous min., nonferrous metal mining industry	42.9	25.8	4.6	2.0	2.5	2.4
Other mining activities	31.3	41.7	37.4	68.5	41.7	42.5
Food, drinks, cigarettes	986.8	581.4	729.6	690.9	526.3	529
Textile products	114.4	97.4	122.6	74.4	60.3	63.5
Clothing	67.8	118.7	145.9	144.1	93.9	100
Leather and footwear	27.7	53.3	29.2	35.0	30.6	35
Woodworking	203.2	269.3	285.8	249.8	198.2	205
Pulp, paper and paper products / printing and reproduction of recordings on media	266.8	353.1	253.4	121.1	85.8	90.1
Drugs, chemicals and pharmaceuticals	2514.3	2129.6	2344.2	2657.5	1934.9	1970
Rubber and plastic	158.9	106.2	144.0	171.9	88.9	87.2
Products made of non-metallic materials (construction materials)	1336.6	1248.9	1097.3	1038.3	775.5	852
Metallurgy	3472.8	3567.8	3351.6	2767.1	1740.2	1817
Ironworks, machinery and equipment	605.9	677.5	663.8	619.9	478.1	510
Furniture	109.0	81.2	125.5	128.1	84.9	74.3
Construction	412.6	531.0	554.1	571.9	410.1	372

Source: NIS - Energy balance and energy equipment structure

[Thousand toe]

	2005	2006	2007	2008	2009
Final energy consumption in industry, out of which	9942	9579	9139	8798	6411
Metallurgy	3556	3545	3290	2778	1729
Chemistry	2508	2240	2150	2519	2029
Products made of non-metallic materials (construction materials)	813	904	661	577	534

Source: Eurostat

Annex 3.3 Final energy consumption in industry subject to ESD

	2005	2006	2007	2008	2009	2010
Ferrous min., nonferrous metal mining industry	42.9	25.8	4.6	2.0	2.5	2.4
Other mining activities	31.3	41.7	37.4	68.5	41.7	42.5
Food, drinks, cigarettes	888.1	523.2	656.6	621.8	473.7	476.1
Textile products	114.4	97.4	122.6	74.4	60.3	63.5
Clothing	67.8	118.7	145.9	144.1	93.9	100.0
Leather and footwear	27.7	53.3	29.2	35.0	30.6	35.0
Woodworking	203.2	269.3	285.8	249.8	198.2	205.0
Pulp, paper and paper products / printing and reproduction of recordings on media	266.8	353.1	253.4	121.1	85.8	90.1
Drugs, chemicals and pharmaceuticals	1885.7	1597.2	1758.2	1993.2	1451.2	1477.5
Rubber and plastic	158.9	106.2	144.0	171.9	88.9	87.2
Products made of non-metallic materials (construction materials)	467.8	437.1	384.1	363.4	271.4	298.2
Metallurgy	1562.8	1605.5	1508.2	1245.2	783.1	817.7
Ironworks, machinery and equipment	181.8	203.2	199.2	186.0	143.4	153.0
Furniture	109.0	81.2	125.5	128.1	84.9	74.3
Construction	412.6	531.0	554.1	571.9	410.1	372.0

*Source: NIS - Energy balance and energy equipment structure
OEN - ICEMENERG*

Annex 3.4 Energy savings in industry

Final energy savings	2005	2006	2007	2008	2009	2010
Ferrous min., nonferrous metal mining industry	-18.40	-6.24	0.00	-0.99	-1.83	-1.74
Other mining activities	-6.77	-10.14	0.00	-26.69	-14.90	-14.29
Food, drinks, cigarettes	-379.07	11.23	0.00	68.89	211.46	212.07
Textile products	6.86	18.17	0.00	37.75	27.26	26.84
Clothing	96.47	47.54	0.00	-27.39	-7.02	-1.25
Leather and footwear	2.83	-22.36	0.00	-9.74	-10.70	-13.86
Woodworking	11.37	-8.61	0.00	13.53	113.15	120.75
Pulp, paper and paper products / printing and reproduction of recordings on media	-55.65	-115.90	0.00	116.64	127.73	128.68
Drugs, chemicals and pharmaceuticals	-206.47	152.54	0.00	45.44	261.63	255.48
Rubber and plastic	-69.92	7.72	0.00	-12.36	59.99	60.63
Manufacture of other nonmetallic mineral products	-207.25	-137.47	0.00	69.10	27.44	10.03
Metallurgy	-99.90	-122.17	0.00	28.95	33.17	36.67
Ironworks, machinery and equipment	-46.30	-32.81	0.00	44.90	57.34	56.04
Furniture	-1.93	40.35	0.00	-6.94	18.69	25.13
Construction	-94.65	-115.83	0.00	112.18	148.77	159.20
Total energy savings in industry	-1068.80	-293.97	0.00	453.29	1052.17	1060.39

Annex 4. Programs funded by RFEE and RERA

Annex 4.1 The portfolio of loans granted by RFEE at 31.12.2010

No.	Year	Beneficiary	Project description	Date of signing the contract	Investment (thousand USD)	Loan (thousand USD)	Annual energy savings
A	2004	UNIO SA SATU MARE I	Replacement of the 3V45 Resita reciprocating compressors with Ingersoll brand screw compressors	28.09.2004	290	130	440
2	2004	TRANSGEX SA ORADEA	Connection of 5 thermal substations to the geothermal water drilling no. 4767 Oradea	03.11.2004	1178	425	5800
3	2005	CET SA IASI	Modernization of PT102 and 102A Tudor Vladimirescu, PT8 and PT10 Cantemir and of their associated heating networks	24.03.2005	1250	980	937
4	2005	ULEROM SA VASLUI	Installing a sunflower hulls fired boiler and its related equipment	28.04.2005	560	448	621
5	2005	SOMES SA DEJ	Installing a system to monitor the energy consumption and the modernization of the condensed steam system of the packing paper manufacturing equipment	05.07.2005	940	752	1130
6	2005	LOCAL COUNCIL ROVINARI	Modernization of the public lighting in the municipality of Rovinari	23.09.2005	125	100	47
7	2005	LOCAL COUNCIL DOROHOI	Modernization of the public lighting in the municipality of Dorohoi	24.10.2005	268	209	172
8	2005	LOCAL COUNCIL BRAN	Modernization of the public lighting in the city of Bran	14.11.2005	125	100	97
9	2006	UNIO SA SATU MARE II	Modernizing the local heating industrial system with radiant	23.01.2006	257	206	957

			tubes				
10	2006	ARC SRL DOROHOI	Modernization of technology equipment	05.05.2006	514	400	898
11	2006	LOCAL COUNCIL MIHAI EMINESCU	Modernization of the public lighting in Mihai Eminescu commune	30.06.2006	168	135	0
12	2006	LOCAL COUNCIL PECICA	Modernization of the public lighting in the town of Pecica	25.07.2006	250	200	105
13	2006	STEAUA ROMANA REFINERY	Modernization of thermal energy generation used for technology purpose	11.09.2006 22.12.2006	759	603	1601
14	2006	ORADEA COUNTY HOSPITAL	Installation of two pellet fired boilers and the related equipment	22.09.2006	405	324	187
15	2006	OMNIMPEX HARTIA SA I	Modernization of the micro hydro energy generation units to cover exclusively the electricity demand of Steaua Romana SA Refinery	22.12.2006	1163	990	1012
16	2006	TERMOELECTRICA SA	Automation and streamlining of the public lighting systems	22.12.2006	420	336	0
17	2007	ENEAS SRL BUCURESTI	Installation, commissioning and operation of a co-generation unit for the benefit of a third party (ESCO)	25.04.2007	623	499	462
18	2007	CHIMCOMPLEX BORZESTI	Installation of a co-generation system	07.05.2005	8147	2000	13509
19	2007	A6 IMPEX SRL DEJ	Installation of a wood waste fired boiler	21.11.2007	13,464	1594	7743
20	2008	3FAN CONSTRUCT SANTIMBRU	Modernization of the technology line for bricks manufacture	03.03.2008	2578	1000	684
21	2008	OMNIMPEX HARTIA SA II	Modernization of the micro hydro energy generation units to cover exclusively the electricity demand of Steaua Romana SA Refinery	22.12.2008	400	260	0
22		ELECTROPRECIZIA	Sectorisation and optimization of	04.08.2009	284	203	148

	2009	SACELE	process water and compressed air consumption in the production facilities of Electroprecizia SA				
23	2009	LOCAL COUNCIL MOCIU	Modernization of the public lighting in Mociu commune	10.11.2009	216	172	43
24	2010	OMNIMPEX HARTIA SA III	Modernization of the micro hydro energy generation units to cover exclusively the electricity demand of Steaua Romana SA Refinery	01.03.2010	1199	959	688
		TOTAL			35800	13198	37379

Annex 4.2 List of projects funded under the National program for increase of the energy efficiency and utilization of renewable energy sources in the public sector for 2009-2010

Year 2009

No.	Investment objective	Beneficiary unit	City Hall / City Council	Total investment value for 2009 [thousand lei]	Co-finance value granted by RAEC [thousand lei]	Annual energy savings, Ean [toe / year]
1	Rationalization of the district heat production and distribution system in the municipality of Braila. HCL 13/31.01.2006 / HCL 296/31.10.2008HCL 65/30.03.2009	SC CET SA BRAILA	City Hall Braila, Braila County	9420	1546	5095
2	Rehabilitation of the heat distribution network to the heating plant and to the thermal substations in the municipality of Brasov. HCL 142/2009	CET SA BRASOV	City Hall Brasov, Brasov County	5772	1000	2774
3	Development of the municipal utilities - heating systems in the Municipality of Buzau, additional works (extensions) – primary networks. HCL 58/26.03.2009	MUNICIPAL AUTONOMOUS ADMINISTRATION BUZAU	City Hall Buzau	14522	1160	1320
4	Rehabilitation of the 2 nd heating main line – overhead piping area, Buzau. HCL 58/2009	MUNICIPAL AUTONOMOUS ADMINISTRATION BUZAU	City Hall Buzau, Buzau County	856	228	1300

5	Rehabilitation and energy rationalization of the building of the primary and middle school 'Horea, Cloșca și Crișan'. HCL 197/30.08.2008;HCL 33/19.03.2009	Primary and middle school 'Horea, Cloșca și Crișan'	City Hall Turda, Cluj County	1315.003	446	79.34
6	Rehabilitation and energy optimization of the building of 'Dr. I Ratiu' Arts and crafts high school Turda – 2 nd premises, 6 Stefan cel Mare St. 6. HCL 198/30.09.2008;HCL 122/2009	Technical College 'Dr. I Ratiu'	City Hall Turda, Cluj County	683.843	306	16.82
7	Power thermal plant modernization / automation - replacement of the boilers in the power thermal plants. HCL 377/2008, HCL 122/17.03.2009; HCL122/2009	Autonomous Heating Administration Cluj Napoca	City Hall Cluj Napoca, Cluj County	7146.237	1745	4745
8	Public lighting modernization -rehabilitation - extension – Grigorescu District and Titulescu area. HCL 857, 859, 860, 861/2005; HCL122/2009	City Hall Cluj Napoca	City Hall Cluj Napoca, Cluj County	1060	215	5.35
9	Public lighting modernization -rehabilitation - extension - Gheorghieni District – Micro 1, 2, 3, 4 area. HCL 862, 863, 864, 865/2005; HCL122/2009	City Hall Cluj Napoca	City Hall Cluj Napoca, Cluj County	1498.86	408	24.42
10	Targoviste-South thermal power plant modernization by expanding with 6.5 Mwe gas-fired heat engines and with 14 Mwt / h hot water boilers. HCL 7/2005, HCL 157/2009	SC TERMICA SA TÂRGOVIȘTE	City Hall Targoviste, Dambovita County	5000	535	21039
11	Modernization and expansion of the thermal substations and exterior thermal networks in the Municipality of Petrosani. Modernization of the exterior thermal networks in the Municipality of Petrosani, under PT1A, PT10 and Modernization of the secondary thermal networks PT13 , PT18, PT18B. HCL 68/2009	SC TERMOVICARE SA PETROSANI	City Hall Petrosani, Hunedoara County	3733	96,907	1300

12	Thermal rehabilitation of Geoagiu City Hall premises. HCL 25/11.02.2009	Local public service	City Hall Geoagiu	795.58	2.9	43.95
13	Modernization of the heating system in the Municipality of Iași. HCL 352/2005, HCL 118/2009	CET IASI	City Hall Iasi, Iasi County	31770	2141	24947.65
14	Separation of the public lighting and centralized control of the electricity consumption for public lighting in the Municipality of Targu Mureș. HCL 94/2009	City Hall Targu Mures	City Hall Targu Mures, Mures County	2000	535	74.44
15	Modernization of the thermal network in the Municipality of Piatra Neamt, phase I. HCL 34/23.01.2009	SC LOCATO SA	City Hall Piatra Neamt, Neamt county	9000	1338	1053.13
16	Modernization of heat production and distribution system in CT1 in the Municipality of Piatra Neamt. HCL 282/25.06.2009	SC LOCATO SA	City Hall Piatra Neamt, Neamt county	975	277	137
17	Rehabilitation of the interior thermal facilities in the schools from the Municipality of Piatra Neamt, phase I. HCL 32/23.01.2009	City Hall Piatra Neamt	City Hall Piatra Neamt, Neamt county	1120	300	70.13
18	Modernization of the blanket of the Primary and middle school no.7 premises, Mediaș. HCL 376/2008, HCL 94/2009	City Hall Medias	City Hall Medias, Sibiu County	520	232	26.06
19	Rehabilitation of the heating system (sources and networks) in the city of Rădăuți. HCL 28/18.08.2005; HCL 14/2009	SC SERVICII COMUNALE SA RADAUTI	City Hall Radauti, Suceava County	7361	446	12384
20	Extension of the heat supply system in the Municipality of Vatra Dornei, Resort Area '+' heating connection CET Vatra Dornei. HCL 55/2006; HCL 15/2009	PUBLIC AREA ADMINISTRATION DIRECTION	City Hall Vatra Dornei, Suceava County	8137	1250	10391

21	Modernization of the heat transport and distribution system for 40 TS and their associated heating networks in the Municipality of Suceava-Phase '40 PT-2009'. HCL 56/2009	SC TERMICA SA SUCEAVA	City Hall Suceava, Suceava County	23330	1500	32000
22	Rehabilitation of the primary fluid heating network between Tulcea prison and E3 District - Municipality of Tulcea. HCL 130/29.05.2008; HCL64/2009	City Hall Tulcea	City Hall Tulcea, Tulcea County	7852.55	955.00	1151
23	Modernization of the CT5 heating plant –city of Macin, Tulcea County. HCL 4 and 25/2009	SPGC MACIN	City Hall Macin, Tulcea County	2050.91	446	450
24	Use of renewable energy sources, heat pumps and solar thermal panels within the investment 'Consolidation and rehabilitation of the primary and middle school with grades one through eight in Măldărești commune' Vâlcea County. HCL County 1/12.01.2009	School with grades one through eight Măldărești	Măldărești Village Hall, Valcea County	648.44	289	54.12
25	Use of renewable energy sources, heat pumps and solar thermal panels within the investment for the rehabilitation of Stoiceni stationary premises to build a nursing home for the elderly in Nicolae Balcescu commune, Vâlcea County. HCL 2/23.01.2009 and HCL 14/2009	NURSING HOME FOR THE ELDERLY STOICENI	Nicolae Balcescu Village Hall, Valcea County	795.25	279	40.59
	TOTAL			147362.67	17676.81	120522

Year 2010

No.	Investment objective	Beneficiary unit	City Hall / City Council	Co-finance value granted by RAEC [thousand lei]
1	Feasibility study for the rehabilitation of DHS in the Municipality of Pitesti by the conversion of the thermal substations in heating plants; HCL 73/2010	LOCAL PUBLIC HEATING SERVICE	City Hall Pitesti, Arges County	572
2	Development of the municipal utilities - heating systems in the Municipality of Buzau, additional works (extensions), HCL 21/2010	MUNICIPAL AUTONOMOUS ADMINISTRATION BUZAU	City Hall Buzau, Buzau County	105
3	Modernization of the public lighting in Garii, Grigorescu, Gheorghieni, Gruia, Manastur, Marasti, Zorilor districts in the Municipality of Cluj Napoca, HCL 22/2010	Local Council of Cluj Napoca	City Hall Cluj Napoca, Cluj County	464
4	Replacement and completion of the traditional heating systems with systems that use solar energy at the City Hall premises and at the Kindergarten in Tulucesti commune, Galati County. HCL 6/2010	Kindergarten in Tulucesti commune	Tulucesti Village Hall, Galati County	73
5	Replacement and completion of the traditional heating systems with systems that use solar energy at Pechea City Hall premises and at 'Costache Conachi' High School, in Pechea commune, Galati County. HCL 113/2010	Pechea commune City Hall and 'Costache Conachi' High School	Pechea Village Hall, Galati County	95

6	Replacement and completion of the traditional heating systems with systems that use solar energy at Draganesti School and Malul Alb School, Draganesti commune. HCL 7/2010	Draganesti School and Malul Alb School from Draganesti commune	Draganesti Village Hall, Galati County	93
7	Modernization of the heating system in the Municipality of Iasi, HCL79/25.02.2010	SC CET IASI	City Hall Iasi, Iasi County	573
	TOTAL			1975

Annex 4.3 List of projects funded by EEFF

Criteria no.	Criteria no.	Company	Invest type	EEFF loan [thousands Euro]	Grant [mii Euro]	Energy savings [toe/year]
A. IMPLEMENTED PROJECTS						
A1. PROJECTS FINALIZED IN 2009						
1	1	Rom Olsena Company	Buildings	61	9	35
2	2	Turnatoria Centrala Orion (TCO)	Equipment	551	83	144
3	3	Recomplast (1st sub-project)	Equipment	90	14	3
4	4	Promex (1st sub-project)	Equipment	473	71	445
5	5	Metalul Mesa	Equipment	86	13	364
6	6	Lemarco Cristal (1st sub-project)	Equipment	1370	205	8264
7	12	Sterk Plast	Equipment	345	52	248
	TOTAL A1			2976	447	9502
A2. PROJECTS FINALIZED IN 2010						
8	7	Doosan IMGB (1st sub-project)	Equipment	1500	225	1676
9	8	Doosan IMGB (2nd sub-project)	Equipment	1000	150	1684
10	9	World Machinery Works (WMW)	Equipment and Buildings	400	60	72
11	10	Spicul / SE-GES	Equipment	1000	150	303
12	11	Cemacon	Equipment	2500	375	2105
13	13	Recomplast (2nd sub-project)	Equipment	138	21	99
14	15	Plimob	Equipment	738	111	22
15	16	Indra Import-Export	Equipment	360	54	65
16	17	Moda	Equipment	269	40	85
17	19	Kubo Ice Cream	Equipment	1146	172	129
18	21	Mirfo	Equipment	329	49	37
19	22	Amplast Co	Equipment	867	130	380
20	23	Rulmenti (1st sub-project)	Equipment	364	55	1959
21	24	IPEC (1st sub-project)	Equipment	2000	300	2782
22	26	Petrom / SE-GES	Equipment	1100	165	1545

23	38	Remat Bucuresti Sud	Equipment	401	60	60
24	28	Pion Impex	Equipment	239	36	95
25	30	Chimcomplex	Cogeneration	2500	375	7145
26	32	Mega Press Holding	Equipment	2450	368	1196
27	34	Pufulete	Equipment	180	27	10
28	35	Prod Cresus	Equipment	43	6	42
29	36	Fresh Flowers	Equipment	126	19	163
TOTAL A2				19650	2948	21656
A3. PROJECTS FINALIZED IN 2011 (UP TO 31.08.2011)						
30	64	Can-Pack Romania	Equipment	2500	375	527
31	40	Sara (1st sub-project)	Equipment	33	5	13
32	41	IPEC (2nd sub-project)	Equipment	500	75	157
33	42	Moripan Alex (1st sub-project)	Equipment	70	11	137
34	51	Biofarm	Equipment	265	40	11
35	44	Consumcoop	Equipment	60	9	2
36	33	Rio Bucovina	Equipment	333	50	36
37	27	Smart Impex	Equipment	268	40	8
38	20	Reva	Equipment and Buildings	279	42	282
39	59	Crilemar	Equipment	117	18	37
TOTAL A3				4425	665	1211
B. PROJECTS IN COURSE OF IMPLEMENTATION						
40	45	Excelent Prodimpex	Equipment	30	5	678
41	46	Bico Industries	Equipment and Buildings	950	143	79
42	47	Ambro (1st sub-project)	Equipment	729	109	2777
43	48	Avicola Gaiesti	Equipment	1128	169	38
44	49	Forsev	Equipment	287	43	202
45	50	Beta	Equipment and Buildings	729	109	325
46	52	Comalat	Equipment	258	39	76
47	53	Ambro (2nd sub-project)	Equipment	994	149	455
48	54	Port Bazinul Nou	Equipment	309	46	213
49	56	Sara (2nd sub-project)	Equipment	285	43	70

50	57	Flexo Graphic	Equipment	1925	289	57
51	58	Tipografia Everest 2001	Equipment	829	124	17
52	60	Conf Binale Impex	Equipment	123	18	8
53	61	Gerpen	Equipment	25	4	4
54	62	Vincon	Equipment	1165	175	64
55	63	Vrancart	Equipment	790	118	4022
56	65	Unio	Equipment	1150	173	119
57	66	Olanesti Riviera	Equipment and Buildings	663	99	169
58	67	Turism Covasna	Equipment and Buildings	383	57	79
59	68	Ronera Rubber	Equipment and Buildings	2082	312	1226
60	69	Delta Aluminiu	Equipment	125	19	1045
61	70	Robinia	Equipment	150	23	14
62	71	Electroprecizia	Equipment and Buildings	1220	183	319
63	25	Ductil Steel, Otelu Rosu	Equipment	2500	375	25415
64	37	Electrotel	Equipment and Buildings	557	84	268
65	18	Cableteam	Equipment	90	14	35
66	39	Sinteza	Equipment and Buildings	150	23	49
67	14	Timpuri Noi	Equipment and Buildings	2417	362	477
68	43	Mecanica Sighetu	Equipment	1610	242	263
69	29	Ardealul	Equipment	740	111	1395
70	31	Com-Sova	Equipment and Buildings	985	148	442
71	55	Eldon	Equipment	420	63	139
		TOTAL PROJECTS IN COURSE OF IMPLEMENTATION		25798	3871	40540
		TOTAL A+B		52849	7931	72908

Source: www.eeff.ro

Annex 5 Information used for calculating final energy savings in transports

Annex 5.1. Information used for calculating final energy savings in road transport

Table 1 Real road vehicle fleet in circulation

Real road vehicle fleet	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
buses and minibuses	40716	40791	40780	41947	43192	39273	32315	35762	41514	41165	40877
vehicles	2777594	2881191	2973390	3087628	3225367	3363779	3220682	3554404	4027367	4244922	4319701
mopeds and motorcycles (including mototricycles and quadricycles) (0.15)	239208	237901	238480	235850	234702	197401	43779	56476	71827	79990	85171
freight vehicles (4)	427152	437968	447299	463099	482425	493821	457012	587380	645340	661859	667219

Source : INS – Statistical Annuary of Romania

Table 2 Equivalent vehicle fleet

Equivalent vehicle fleet	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
buses and minibuses (coefficient 15)	610740	611865	611700	629205	647880	589095	484725	536430	622710	617475	613155
vehicles	2777594	2881191	2973390	3087628	3225367	3363779	3220682	3554404	4027367	4244922	4319701
mopeds and motorcycles (including mototricycles and quadricycles) (0.15 coefficient)	35881.2	35685.15	35772	35377.5	35205.3	29610.15	6566.85	8471.4	10774.05	11998.5	12775.65
freight vehicles (4 coefficient)	1708608	1751872	1789196	1852396	1929700	1975284	1828048	2349520	2581360	2647436	2668876
Total equivalent vehicles	5132823	5280613	5410058	5604607	5838152	5957768	5540022	6448825	7242211	7521832	7614507.65

Table 3. Final energy consumption and energy savings in road transport

[thousand toe]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
final energy consumption in road transport	2696	3537	3583	3847	4012	3851	3999	4054	4645	4773	4800
final energy savings in road transport calculated with the M5 indicator	531	-217	-182	-324	-342	-106	-516	0	-92	-44	-13

Source: EUROSTAT

Annex 5.2. Information used for calculating final energy savings in railway transport

RAILWAY TRANSPORT		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
passenger transit	millions of passengers - km	11632	10966	8502	8529	8638	7985	8093	7476	6958	6128	5437
freight transit	millions of tons-km	16354	16102	15218	15039	17022	16582	15791	15757	15236	11088	12375
gross passenger transit	millions of passengers -km	19774.4	18642..2	14453..4	14499..3	14684..6	13574.5	13758.1	12709.2	11828.6	10417.6	9242.9
gross freight transit	millions tone-km	40885	40255	38045	37597.5	42555	41455	39477.5	39392.5	38090	27720	30937.5
total railway transit	millions of tons-km	60659..4	58897..2	52498..4	52096.8	57239.6	55029.5	53235.6	52101.7	49918.6	38137.6	40180.4
energy consumption in railway transport	thousand toe	357	217	312	282	290	160	147	264	245	200	190
final energy savings in railway transport calculated with the M6 indicator	thousand toe	-49.64	81.43	-45.99	-18.02	0.03	118.84	122.75	0.00	7.94	-6.76	13.59

Source: INS - Statistical Annuary of Romania

INS – Transport of passengers and freight per transport ways - 2010

Annex5.3 Information used for calculating final energy savings within inland waterways

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
transport consumption on inland waterways	thousand toe	112	100	102	68	41	42	41	85	78	55	50
freight route	million tone-km	2634	2746	3641	3521	6956	8438	8158	8195	8687	11765	14317
Energy savings for transport on inland waterways calculated with the M7 indicator	thousand toe	-85	-72	-64	-31	31	46	44	0	12	67	98

Source: INS – Transport of passengers and freight per transport ways - 2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Energy savings for road transport	530..71	-217..39	-182..01	-323..71	341..89	-105..70	-516..31	0..00	-92..24	-44..46	-13..20
Energy savings for railway transport	-49..64	81..43	-45..99	-18..02	0..03	118..84	122..75	0..00	7..94	-6..76	13..59
Energy savings for inland waterways	-84..68	-71..52	-64..23	-31..48	31..15	45..52	43..62	0..00	12..10	67..03	98..50
TOTAL	396..39	-207..47	-292..24	-373..22	310..71	58..66	-349..95	0..00	-72..20	15..81	98..89

Source: ICEMENERG based on the primary information supplied by INS and EUROSTAT

Annex 6 Information used for calculating final energy savings within the services sector

	M.U.	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Final energy consumption in the "Services" sector	thousand toe	672	1122	555	1148	1261	1671	2409	2019	1698	1760	1750
Final energy consumption "Other sectors"	thousand toe	534	548	343	303	364	582	361	450	400	206	200
Total	thousand toe	1206	1670	898	1451	1625	2253	2770	2469	2098	1966	1950
Energy consumption in the "Services" sector	thousand toe	336	477	236	408	308	344	421	492	553	561	560
Energy consumption "Other sectors"	thousand toe	0	0	0	0	0	0	0	0	0	0	0
Total	thousand toe	336	477	236	408	308	344	421	492	553	561	560
Non-electrical energy consumption in the "Services" sector	thousand toe	336	645	319	740	953	1327	1988	1527	1145	1199	1190
Non-electrical energy consumption in "Other sectors"	thousand toe	534	548	343	303	364	582	361	450	400	206	200
Total	thousand toe	870	1193	662	1043	1317	1909	2349	1977	1545	1405	1390
Number of employees in the services sector	mii	3447	3474	3351	3301	3491	3512	3686	3914	4037	4113	4183
ADD	degree days	2774	2964	2861	3264	3008	3155	3072	2750	2776	2773	2772
MDD	degree days	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129	3129
Electricity savings in the services sector	thousand toe	97	-40	185	7	131	97	42	0	-46	-44	-34
Other energy savings (other than electricity) savings in the services sector	thousand toe	982	593	1127	599	464	-134	-497	0	556	758	816
Total energy savings in the services sector	thousand toe	1080	553	1312	606	595	-37	-454	0	511	714	782

Annex 7 Environmental fund

The environmental fund is an economical-financial instrument for supporting and implementing environmental protection projects and programs. The organization and administration of this fund are regulated by Government Emergency Ordinance (GEO) 196/2005 regarding the Environmental Fund.. published in the Official Gazette 1193/30.12.2005.. amended and supplemented by:

- Law 105/2006 published in the Official Gazette 393/08.05.2006
- Law 292/2007 published in the Official Gazette 758/08.11.2007
- GEO 37/2008 published in the Official Gazette 276/08.04.2008
- Government Ordinance (GO) 25/2008 published in the Official Gazette 628/29.08.2008
- Law 329/2009 published in the Official Gazette 761/09.11.2009
- Law 167/2010 published in the Official Gazette 504/20.07.2010
- GEO 15/2010 published in the Official Gazette 192/26.03.2010
- GEO 115/2010 published in the Official Gazette 862/22.12.2010

Several government decisions.. ministry orders and other normative legislative acts detail the provisions of GEO 196/2005.. with the subsequent amendments and addenda.

The Environmental Funds are formed of:

- a 3% contribution from income resulted from selling ferrous and non-ferrous waste by holders of such waste;
- taxes for pollutant emissions into the atmosphere.. due by the economic operators that own stationary sources that affect the environmental factors through their operation;
- taxes collected from economic operators that use new lands for storing recoverable waste;
- a 2 lei/kg contribution due by the economic operators that market packaging/ goods packaged.. according to the difference between the recoverable objectives and the waste quantities effectively recovered;
- a 2% contribution from the value of the substances classified as dangerous for the environment;
- a 2% contribution from the income resulted from selling wood masses obtained by the administrator.. respectively the owner of the forest.. except fire wood.. trees and ornamental trees.. Christmas trees.. wicker and saplings;
- a 2 lei/kg tax for tires.. due by the economic operators that nationally market new and/or used tires destined for reuse.. according to the difference between the annual management obligations foreseen by the legislation and the effectively managed quantities;
- a 3% contribution from the amount that is collected annually for managing hunting funds.. paid by the administrators;
- donations, sponsorships;
- different interest and penalties of any nature due by the debtors to the Environmental Fund;
- taxes for issuing environmental authorizations permits and approvals;
- amounts collected from events organized for the benefit of the Environmental Fund;
- a 100 lei/ton contribution due by the territorial administrative units in case of not fulfilling the annual objective of a 15% reduction in the municipality waste quantities and assimilable waste collected and sent for storage;

- the green tax worth 0.1 lei/piece applied to bags and market bags with integrated or applied handle;
- pollution tax for vehicles
- penalties paid by energy suppliers that do not fulfill the obligation of purchasing green certificates, etc.

The Environmental Fund is managed by the Environmental Fund Administration, a public institution with legal personality.. funded entirely from own income, coordinated by the central public authority for environmental protection (Ministry of Environment and Forests). The income and expenses budget of the Environmental Fund and the Environmental Fund Administration is approved by government decision.

The legislation states the environmental protection project and program categories that can be funded through the Environmental Fund.. among which:

- public education and awareness regarding environmental protection
- surveillance, studies and research in the environmental protection field
- increase the energy production from renewable sources.. as well as research-development in the climate change field
- incentive program for renewing the national vehicle fleet
- incentive program for renewing the national fleet of tractors and agricultural vehicles with automatic propulsion
- program for carrying out bicycle routes
- the increase of energy production from renewable sources
- the installation of heating systems that use renewable energy.. including the replacement or completion of classic heating systems

The Environmental fund finances projects and programs through one of the following methods:

- financial support for projects through non-refundable funding or co-funding
- Co-funding projects financed from European Union funds and/or other international funds.

The programs funded from the Environmental fund are the following:

- Incentive program for renewing the national vehicle fleet 2011
- Incentive program for renewing the national fleet of tractors and agricultural vehicles with automatic propulsion
- Program regarding the installation of heating systems that use renewable energy.. including the replacement or completion of classic heating systems(“Green House” Program) – Natural persons.
- Program regarding the installation of heating systems that use renewable energy.. including the replacement or completion of classic heating systems(“Green House” Program) – Legal persons.
- Program for improving the environment quality by foresting damaged agricultural lands;
- Program for increasing the energy production from renewable sources
- National Program for improving the environment quality by carrying out green spaces in localities
- Program for Works destined for preventing.. removing and/or reducing the dangerous environmental effects of the waters afferent to the state’s public domain over farm houses
- Program for public education and awareness regarding environmental protection
- Program for the protection of water resources.. water supply integrated systems.. treatment stations.. sewerage and purification stations

- Program for reducing the impact over the atmosphere.. including air quality monitoring
- Program for managing waste.. including hazardous waste
- Program for carrying out bicycle routes.