



MINISTRY OF  
INDUSTRY, ENERGY AND  
TOURISM

STATE SECRETARIAT FOR ENERGY

2014–2020 NATIONAL ENERGY  
EFFICIENCY ACTION PLAN

**30 April 2014**



MINISTRY OF  
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## PREFACE

On 25 October 2012, Directive 2012/27/EU of the European Parliament and of the Council on Energy Efficiency (EED) was approved in order to create a new common framework to promote energy efficiency within the Union, establishing specific measures to ensure achievement of the target indicated in the 2020 Climate and Energy Package from 2007 to reduce Member States' energy consumption by 20%.

In recent years, Spain has made great efforts to implement energy efficiency policies aimed at eliminating the distance that has historically separated us from the average energy intensity of the European Union.

Approval of the 2004–2012 Energy Saving and Efficiency Strategy in November 2003 represented a turning point in regard to energy saving policies and the pursued standards of programmes and measures already in place, something which has been reflected in energy intensity rates ever since.

Through the combined efforts of public administrations and manufacturing industries, by 2010 the energy consumption reduction set out in the 2006 Directive for 2016 was achieved. Furthermore, such efforts have also brought the current energy consumption level in Spain to 17.6 Mtoe below the target level provided by the European Commission, representing a 23.1% saving with respect to the consumption envisaged in the Climate and Energy Package, placing us in a highly favourable position to help reach the ultimate goal of a 20% saving across the EU by 2020.

However, the new 2012 Directive lays down additional cumulative savings targets for the 2014–2020 period which, as Spain pointed out before and after its approval, not only places a disproportionate burden on countries which, like Spain, have already made significant efforts in this area in previous years and are going through a phase of economic recovery since emerging from a long period of recession, but the mechanisms arbitrated by the EED for their fulfilment do not offer the most technically and economically effective approach to promoting energy efficiency.

On the one hand, in order to achieve the additional targets deriving from the new Directive, Spain will have to reduce its consumption by 26.4% by 2020, which is far higher than the rate envisaged for the Union as a whole.

On the other hand, there is no doubt that Spain's building sector, for example, like in most of our surrounding countries, has an enormous potential for energy saving, with very positive medium and long term returns; however, under the new Directive only short term savings would be considered, driving away efficient investments which would have generated substantial economic activity.

In any case, Spain is fully committed to achieving the energy efficiency improvement targets established in all areas of Energy Efficiency Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012, and reiterates its commitment through the presentation of this new 2014–2020 National Energy Efficiency Action Plan.

The structure of the 2014–2020 NEEAP responds closely to the content required by the Directive, setting out the energy efficiency improvement measures being implemented in our country and those set to be introduced.

It contains information on fulfilment of the indicative target from Article 3, namely achieving a 20% primary energy saving by 2020 established as a target by the Climate and Energy Package, while it also evaluates the final energy savings achieved in the 2010–2013. As regards the binding



energy savings target set out in Article 7, Spain will make use of all the instruments and facilities it is afforded by the Directive, implementing not only a system of energy efficiency obligations for energy sales companies, but also alternative measures of action allowed under the Directive concerning fiscal and regulatory matters, training, communication campaigns, etc. This system of obligations will be backed by the creation of an Energy Efficiency National Fund.

These instruments will help ensure that new energy savings are achieved every year on annual energy sales to final customers of all energy providers, from 1 January 2014 to 31 December 2020. The Plan includes a wide range of energy saving and efficiency measures for all sectors, some of which are already being implemented in spite of the restrictions imposed by the current economic situation.

One example, with less than four months gone since the start of the obligation period, is the implementation of significant measures, with public support, in the building and transportation sectors. The more prominent of these measures are the Efficient Vehicle Incentive Programme (PIVE), the fifth instalment of which is being implemented with a budget of € 175 million; the Aid Programme for the Energy Renovation of Existing Buildings used in the residential housing sector and hotel industry (PAREER), with a €125 million budget; the 'Aire' Environmental Stimulus Plan (PIMA) with a €38 million budget for the purchase of commercial vehicles; the 'Sol' Environmental Stimulus Plan for the energy renovation of hotel facilities, and the 2013–2016 state incentive plan for rental housing, building renovation and urban regeneration. Supporting these initiatives are Law 15/2012 of 27 December 2012 on fiscal measures for energy sustainability, in effect since January 2013, and a broad-focused national communication campaign on energy saving and efficiency.

In conclusion, the 2014–2020 National Energy Efficiency Action Plan will serve as a central tool of Spanish energy policy and its implementation will help to achieve the energy saving and efficiency targets set by Directive 2012/27/EU, improving the competitiveness of the Spanish economy, which will be reflected in business and employment rates.



## TABLE OF CONTENTS

1.	INTRODUCTION.....	8
2.	2012 SITUATION: ENERGY CONSUMPTION AND PRODUCTION.....	14
3.	OVERVIEW OF NATIONAL ENERGY EFFICIENCY TARGETS AND SAVINGS.....	28
4.	MEASURES FOR ENFORCEMENT OF THE ENERGY EFFICIENCY DIRECTIVE.....	60



CHAPTER 1:  
INTRODUCTION



MINISTRY OF  
INDUSTRY, ENERGY AND  
TOURISM

STATE SECRETARIAT FOR ENERGY



## 1. INTRODUCTION

### 1.1. PURPOSE

The purpose of this **2014–2020 National Energy Efficiency Action Plan** is to satisfy the requirement set forth in Article 24(2) of Energy Efficiency Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 whereby all Member States of the European Union must submit such plans, the first of which **not later than 30 April 2014** and then every three years thereafter.

And, according to Article 24(1), Member States shall **report on the progress achieved towards national energy efficiency targets** by 30 April each year.

Given that the Plan and the annual report for 2014 are to be submitted before the end of April, **the decision was made to integrate both into this 2014–2020 National Energy Efficiency Action Plan.**

Meanwhile, in accordance with Article 4 of Directive 2012/27/EU, Spain has established a **long-term strategy for mobilising investment in the renovation of the national stock** of residential and commercial buildings, both public and private, which **will be published before 30 April 2014 and updated every three years** thereafter and **submitted to the Commission as part of the National Energy Efficiency Action Plan.**

This 2014–2020 National Energy Efficiency Action Plan therefore includes, as **Annex II, the Spanish Strategy for Energy Renovation in the Building Sector.**

### 1.2. METHODOLOGY

The structure of the **2014–2020 National Energy Efficiency Action Plan** responds closely to the content required by Annex XIV (Part 2) of Directive 2012/27/EU, giving details of the information which action plans must include, as well as to the template established by Commission Implementing Decision of 22 May 2013 (Brussels, 22.5.2013, C(2013) 2882 final), to ensure consistent presentation.

In general and within the meaning of Article 24(2), action plans shall cover significant energy efficiency improvement measures and expected and/or achieved energy savings within the Member State in view of achieving the national energy efficiency targets referred to in Article 3(1).

The **2014 annual progress report** has been drafted in accordance with the 'General Framework for Reporting' set out in Part 1 of Annex XIV to Directive 2012/27/EU, and contains information on the indicative national energy efficiency target set by the Member State for 2020, which must be expressed in terms of an absolute level of primary energy consumption and final energy consumption.

### 1.3. CONTENT

The document is structured into **four chapters**, the **first** being an introduction and presentation of the content and methodology followed to carry out the plan and the annual progress report.





The **second chapter** provides summarised statistical information on energy consumption in Spain in 2012.

It indicates the information which must be included in annual progress reports, which will serve as a platform for monitoring advancements towards the national targets for 2020, for which they must contain aggregate and disaggregate sector information on primary and final energy consumption; gross value added, household income and gross domestic product (GDP), and other additional variables which determine and explain consumption trends, such as passenger and freight transport or population. In addition to energy consumption, information must also be given on the generation of electricity and heat.

This second chapter therefore describes the most recent history of energy consumption and economic activity, including statistical data sets up to 2012 (year X (current year) - 2), in accordance with the Directive.

The **third chapter** focuses on presenting the energy efficiency targets and the progress levels reached in regard to their attainment.

The *first part* of the chapter presents the indicative target set by Spain in accordance with Article 3 and analyses the consistency of this target with that of the European Union, indicated in the text of the Directive as a primary energy consumption of 1 474 Mtoe by 2020 or 1 708 Mtoe of final energy.<sup>1</sup> It will serve to understand how the target of a 20% reduction in primary energy consumption is to be interpreted, both for the European Union and for Spain.

Final energy savings between 2010 and 2013 will also be evaluated, firstly using a bottom-up approach and subsequently with *top-down* approach, the latter until 2020 and using intensity indicators as *top-down* indicators.

The *second chapter* discusses how the 2020 binding energy saving target is calculated in accordance with Article 7, which requires that Member States set up an energy efficiency obligation scheme which ensures the achievement of new savings each year from 1 January 2014 to 31 December 2020 of 1.5 % of the annual energy sales to final customers of all energy distributors or all retail energy sales companies.

It includes an evaluation of savings up until 2020 from schemes that have already been tested and are currently in effect (incentives or support for financing) until the end of the established validity period or until all granted funds run out.

The *third part* of the chapter assesses the progress made in the attainment of the energy saving target from Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services. This Directive was repealed by Directive 2012/27/EU with the exception of Article 4, which established a national indicative final energy savings target of 9% by 2016.

Spain declared in the 2011–2020 NEEAP that it had already met the 9% savings target set for 2016 by 2010. And again, in this 2014–2020 NEEAP, Spain reiterates achievement of this target in 2013 and, ultimately, in 2016.

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<sup>1</sup> Article 3 of Directive 2012/27/EU has been amended by Article 1 of Council Directive 2013/12/EU of 13 May 2013 adapting the previous Directive on energy efficiency, by reason of the accession of the Republic of Croatia. As such, by 2020 the Union's energy consumption must not exceed 1 483 Mtoe of primary energy or 1 086 Mtoe of final energy.



The **fourth chapter** of this Plan revisits the various measures which led to the achievement of the savings targets required by Directive 2012/27/EU.

The *first part* focuses on horizontal measures affecting all energy end-use sectors, including those applied in the hotel industry. Following the template created by the European Commission to standardise the presentation of Member States' action plans, the measures taken to satisfy the requirements set out in the different articles of the Directive have been reviewed. Information is given on the establishment of the energy efficiency obligation scheme (Article 7), the obligation to carry out energy audits and implement energy management systems (Article 8), metering and billing information (Articles 9, 10 and 11), consumer information and empowering programmes (Articles 12 and 17), qualification, accreditation and certification schemes (Article 16), energy services (Article 18) and other horizontal energy efficiency measures, and particularly the constitution of the Energy Efficiency National Fund (Articles 19 and 20).

The *second part* reviews energy efficiency measures in the **building** industry; the third, those implemented in **public bodies**, such as the exemplary role of their buildings (Article 5) and purchasing by public bodies (Article 6); and the *fourth*, those aimed at end-use sectors, including **industry, transport, public services and agriculture**.

The *fifth part* of chapter four focuses on the promotion of high efficiency cogeneration and district heating and cooling systems, responding to the requirements set forth in Article 14 of the Directive.

The *sixth and final parts* of this chapter complete the review of the Directive with an analysis of energy efficiency in transformation, transmission and distribution and participation in demand response (Article 15).



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CHAPTER 2:  
2012 SITUATION: ENERGY CONSUMPTION AND PRODUCTION



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## 2. 2012 SITUATION: ENERGY CONSUMPTION AND PRODUCTION

### 2.1. MACROECONOMIC CONTEXT

The Directive asks Member States to provide an estimate for 2012, penultimate year (year X (current year) - 2), of certain statistical variables at the macroeconomic level to serve as a basis for calculating energy intensity indicators. These are GDP, value added by sector, number of households or population, disposable income of households and traffic. All of these variables are used to construct final and primary intensity indicators (at the aggregate and sector levels), indicators of per capita or per household energy consumption and indicators of consumption in tonne-kilometres transported or passenger-kilometres transported.

These indicators can then be used to calculate savings following the approach implemented extensively in the previous 2011–2020 NEEAP, obtained by multiplying the difference between the value of the indicator in the reference year (normally 2007) and the value in the year in which the savings are calculated, by the value of the of the activity variable (value added, population, households or other applicable variable depending on the sector) in the year in which the savings are calculated.

However, for some of the aforementioned activity variables, there is still no information available for 2013 (the Directive only requires this information for 2012, for which the calculation of savings in chapter three is based only on aggregate indicators of primary and final intensity and not on the full set of indicators, as was used in the previous plan) for calculating savings up until 2013 with which to offer the most recent results.

The main variable on which information is requested is **gross domestic product (GDP)**, which fell 1.6% in 2012, after 2011 closed with a slight increase of 0.1% (graph 2.1.1).

The most recent information for 2013 shows that economic activity in Spain has continued to decline, albeit at a slower rate than in 2012, at -1.2%, one tenth higher than the forecasted -1.3% envisaged for 2013 in the annual report submitted to the European Commission on 17 May 2013.

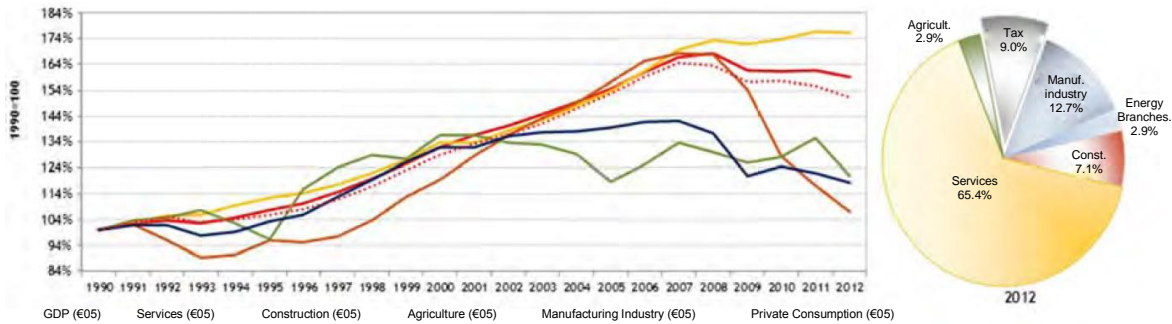
The drop in gross domestic product for the year 2013 masks the apparent recovery of the indicator in the latter half of the year. While the quarterly indicator for the first quarter of 2013 showed an interquarter decline of 0.4%, the third and fourth quarters showed the first positive interquarter rates since the first quarter of 2011. In terms of interannual rate, the signs were negative in all four quarters, as has been the case in all quarters since the third of 2011.

The decline in GDP continues to follow the shrinkage of the construction industry (dropping around 9% in 2012) and, albeit less severely, the industrial sector (around 3%). The tertiary sector in 2012 failed to continue the positive trend from the previous year with a value added at two tenths of a point below that of 2011.



**Graph 2.1.1. Evolution of main macroeconomic variables in Spain**

**1990–2012**



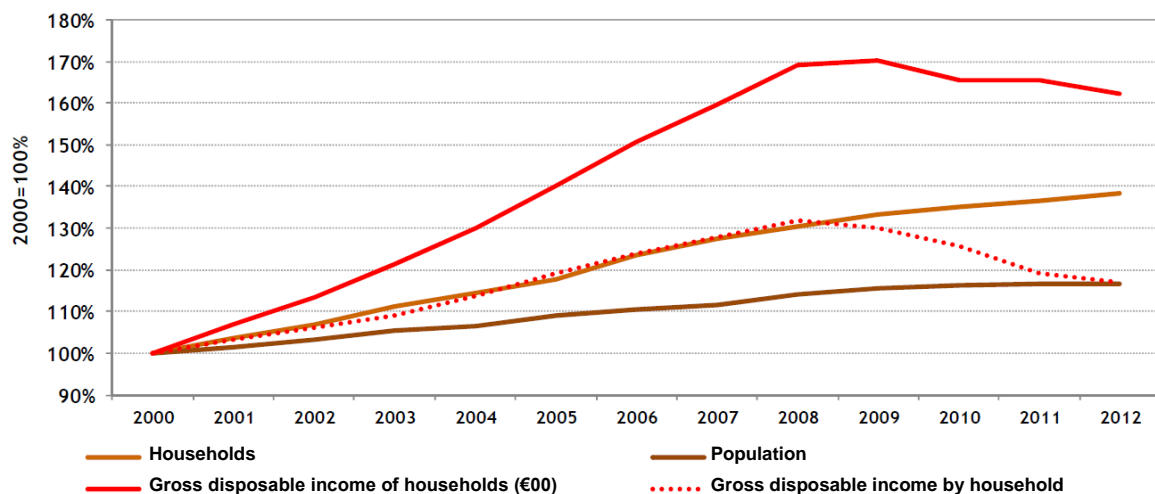
**Source: INE/IDAE**

On the demand side, domestic consumption fell at a rate of nearly 3% in 2012 (-2.8%) as a result of a drop of almost 4% in **gross disposable income by household** (graph 2.1.2).

By contrast, the foreign sector helped offset the falls in domestic activity. Net foreign demand made a positive contribution to GDP growth in 2012, which was at its highest level since 2009. This is largely thanks to Spanish exports, seeing a steady rate of growth which was consolidated in 2013 and continued into 2014 with an interannual rate recorded in January of 3.1% (5.4% in real terms). Of all Spanish exports, 65% were sent to countries within the European Union, although sales to third markets did increase, particularly to Asia and Africa and, more specifically, to emerging economies such as South Africa, Brazil, China and Turkey.

Export forecasts for Spanish companies at three and twelve months are upward, with the positive trend of the foreign sector compensating for a wilting domestic demand and resulting in a forecast growth in economic activity of 0.7% for 2014.

**Graph 2.1.2. Evolution of demographics and disposable income in Spain 2000–2012**



**Source: INE/IDAE**

The high rate of unemployment in Spain (at around 26%) and the ongoing recession have hampered the recovery of domestic consumption. Of the 5.9 million unemployed, 50% lost their job more than one year ago. This circumstance, coupled with the fact that in only 47% of Spanish



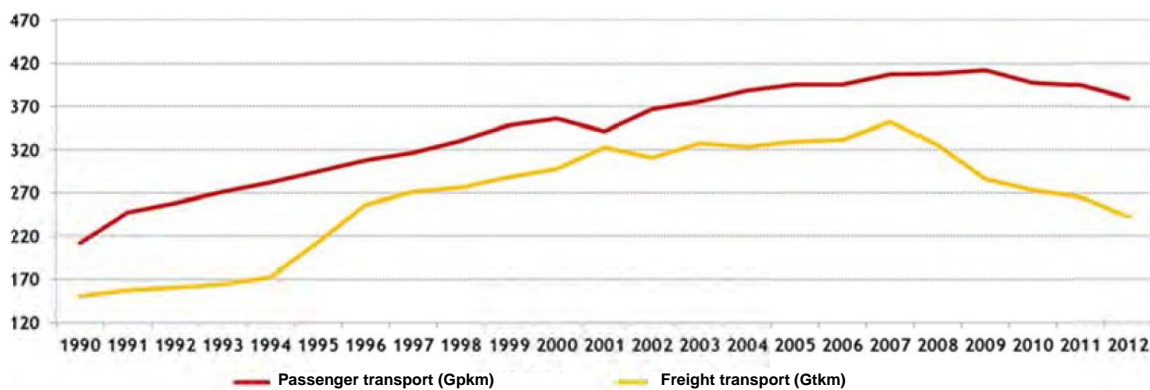
households were all active members in work, helps to explain the difficulties in recovering domestic demand and the need for foreign demand to act as a stimulus to economic activity in all sectors.

The remaining activity indicators to be included in annual reports also show a decreasing trend. **Freight transport** has fallen since 2008 in all methods of transportation (road, rail and sea), while **passenger transport** entered into decline in 2010, particularly in regard to road transport, with passenger rail traffic remaining stable since that year.

At the close of 2012, freight transport reported a fall of 8.3% (8.6% for transport by road alone) with a 4.9% drop in passenger transport (3.7% again for transport by road alone, with a sharp decline in air traffic).

The evolution of these indicators, particularly in relation to road-based freight transport (graph 2.1.3) confirms the recession of the national economy. In Spain, routes and, consequently, traffic (defined as tonne-kilometres transported), as well as the associated energy consumption, are a close reflection of the geographic position of the country at the periphery of Europe and of the need to transport manufactured goods, which are the backbone of Spanish exports, to consumption points in the centre and north of the continent.

**Graph 2.1.3. Evolution of freight and passenger transport by road in Spain  
1990–2012**



Source: MFOM/IDAE





## 2.2. CONSUMPTION AND INTENSITY OF PRIMARY AND FINAL ENERGY

This section supplements the information given in the previous one on variables or indicators required under the Directive, including information on **primary and final energy consumption by source and sector and final and primary intensity indicators**, providing a brief analysis not only of their evolution since 2000 but of their relative position with respect to other countries in the European Union.

The **primary energy consumption disaggregated by source** shown in Table 2.2.1 includes non-energy uses. Consumption for non-energy uses is presented separately in the table but in aggregate form for all energy sources, for which the totals, after discounting non-energy uses, may be compared with those shown in chapter three and with the 2020 targets referred to in Directive 2012/27/EU.

Primary energy consumption in Spain fell in 2012 at a rate of 0.3%, continuing the trend started in 2008. Since 2007 (reference year used to calculate the savings shown in the following chapter), primary energy consumption has fallen at an interannual rate of 2.7%.

The increased use of coal in electricity generation in 2012 (with a near 24% rise in electricity production from this source versus 2011) partly explains that the fall in consumption of primary energy in the last year did not coincide with the decline in economic activity, as occurred in 2011. In 2012, the lesser reduction in primary energy consumption with respect to the fall in economic activity resulted in a 1.3% rise in primary energy intensity.

In 2012, renewable energies made up 12.4% of all primary energy consumption, despite low hydroelectric production, which was partly responsible for the rise in the use of coal in electricity production. As such, coal, which made up only 6% of primary energy consumption in 2010, doubled its contribution to energy output in 2012. The contribution of wind energy is significant, having risen from 1.6% in 2007 to 3.3% in 2012, as is that of solar thermal and biofuel energy: the contribution of biofuel to total energy production has risen from 0.3% in 2007 to 1.7% in 2012.

The **reduction in energy end consumption** shown in Graph 2.2.1 explains the decline in primary energy consumption: by source, consumption of petroleum products has fallen at an interannual rate of 5.5% since 2007, while gas has dropped at a rate of 2.4%.

In terms of final energy, the interannual reduction in consumption between 2007 and 2012 reached 3.2%, a rate which exceeds the interannual reduction in primary energy. The difference between the two rates is explained by the consumption of energy to produce electricity and by the increased participation of electricity in covering final demand, rising from 22% of consumption in 2007 to nearly 25% in 2012. Despite the growing percentage of renewable energies in electricity production, the improved efficiency in electricity production brought about by this increase has been counteracted by the increased recourse to nuclear energy and the reduced recourse to combined cycle natural gas plants (with improved average outputs) recorded in 2012. Consequently, the reduction in energy intensity reported in energy end-uses has exceeded the reduction in primary consumption.

**Table 2.2.1 Structure of primary energy consumption by source (ktoe)  
2007–2012**

	2007	2008	2009	2010	2011	2012
<b>Coal</b>	20 037	13 504	9 663	7 248	12 698	15 510
<b>Oil products</b>	71 739	68 834	63 792	61 334	58 567	54 154

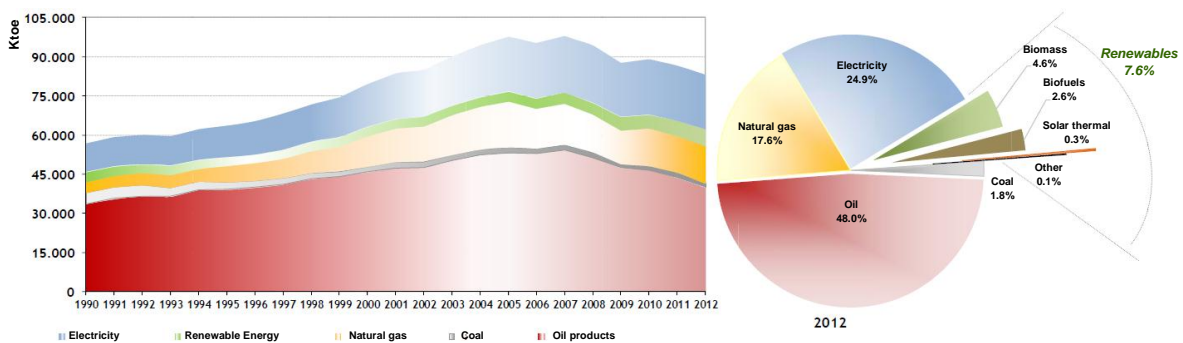


<b>Gas</b>	31 778	34 903	31 219	31 123	28 930	28 184
<b>Nuclear</b>	14 360	15 369	13 750	16 155	15 042	16 019
<b>Renewable energies</b>	10 007	10 552	12 465	14 944	14 728	16 004
Biomass	4 231	4 206	4 606	4 561	4 845	4 964
Biogas	217	207	194	277	275	291
USW	309	328	319	174	195	176
Hydraulic	2 349	2 009	2 271	3 638	2 631	1 767
Wind	2 371	2 833	3 278	3 807	3 691	4 255
Solar photovoltaic	43	220	513	553	640	705
Solar thermoelectric	2	4	42	299	508	1 482
L.T. solar thermal	93	125	155	183	205	220
Geothermal	9	11	14	16	17	18
Biofuels	384	609	1073	1436	1721	2127
<b>Balance (Imp-Exp)</b>	-495	-949	-697	-717	-524	-963
<b>TOTAL</b>	<b>147 426</b>	<b>142 213</b>	<b>130 193</b>	<b>130 088</b>	<b>129 441</b>	<b>128 909</b>
<b>Non-energy uses</b>	7 984	7 690	7 150	7 034	6 772	1 980
<b>TOTAL energy uses</b>	<b>139 442</b>	<b>134 523</b>	<b>123 043</b>	<b>123 054</b>	<b>122 669</b>	<b>122 928</b>

**Note:** Non-renewable waste included in oil products

**Source:** MINETUR/IDAE

**Graph 2.2.1. Evolution of final energy consumption by source 1990–2012**



**Source:** MINETUR/IDAE

Final energy consumption in 2012 fell 4%, which resulted in a 2.5% decrease in final intensity in that same year.

Consumption of energy from fossil fuels also declined in 2012 despite a slight increase in consumption of natural gas for heating: coal consumption fell 21% while oil products dropped 8.9%.

In the last year electricity consumption fell by 1.3% while renewable energy consumption rose 7.9%. In 2012 renewable energies made up 7.6% of final energy consumption, compared to 4.4% in 2007.



**Table 2.2.2 Structure of final energy consumption (excluding non-energy uses) by source  
(ktoe)  
2007–2012**

Source	2007	2008	2009	2010	2011	2012
Coal	2 114	1 933	1 410	1 603	1 915	1 507
Oil products	54 282	51 510	47 546	46 608	43 832	39 917
Natural gas	15 746	14 720	13 039	14 377	14 001	14 663
Electricity	21 568	21 938	20 621	21 053	20 942	20 661
Thermal renewable energies	4 279	4 409	5 005	5 367	5 815	6 273
<b>TOTAL</b>	<b>97 988</b>	<b>94 511</b>	<b>87 621</b>	<b>89 008</b>	<b>86 505</b>	<b>82 991</b>

**Source:** MINETUR/IDAE

The distribution of **final energy consumption by sector** (table 2.2.3) shows that the overall reduction of 4% was due mainly to the 7.4% drop in transportation demand and, to a lesser extent, to the decline of the industry sector. The reduction of consumption in the services sector was more moderate than in the sectors of industry and transport, at around 1.6%, due not so much to a fall in sector activity but to improved energy intensity.



**Table 2.2.3 Structure of final energy consumption (excluding non-energy uses) by sector (ktoe)  
2007–2012**

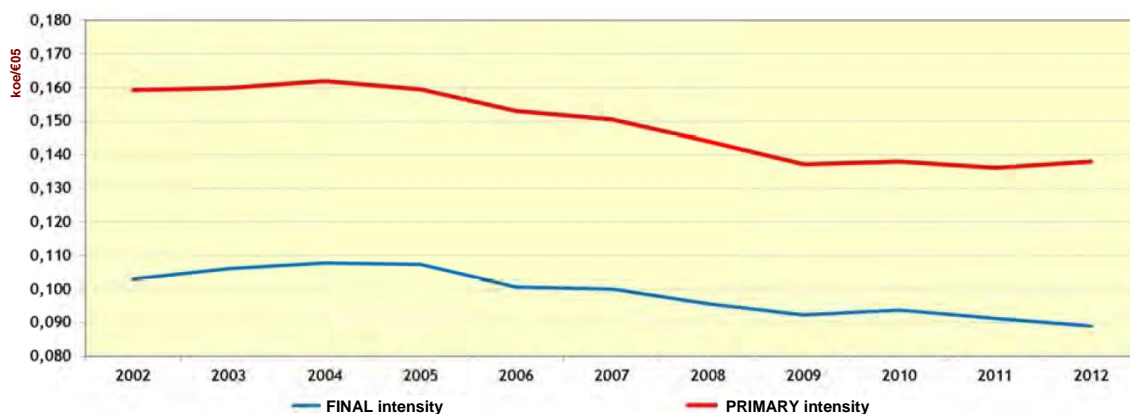
Sector	2007	2008	2009	2010	2011	2012
Industry	27 541	25 909	21 238	21 528	21 325	20 765
Transport	42 089	40 318	37 719	37 025	35 890	33 229
Other uses	28 358	28 283	28 664	30 455	29 272	29 007
<i>Residential</i>	15 628	15 498	15 928	16 924	15 617	15 466
<i>Services</i>	8 822	9 300	9 409	9 801	10 234	10 068
<i>Agriculture</i>	2 947	2 699	2 363	2 244	2 404	2 397
Others not specified	962	786	965	1 487	1 017	1 076
<b>TOTAL</b>	<b>97 988</b>	<b>94 511</b>	<b>87 621</b>	<b>89 008</b>	<b>86 505</b>	<b>82 991</b>

Source: MINETUR/IDAE

**Primary intensity** in Spain, despite the downturn in 2004 when the indicator began to fall, did not continue its downward trend. Since 2010 it has stabilised and even showed upward rates in 2012.

However, the **final intensity indicator** continues to fall (at a rate of 2.5% in 2012), with the rise in primary intensity explained by the short-term recourse to power generation using lesser-performing plants (coal or nuclear rather than natural gas or renewable energy sources).

**Graph 2.2.2. Evolution of primary and final energy intensity in Spain**



Source: IDAE

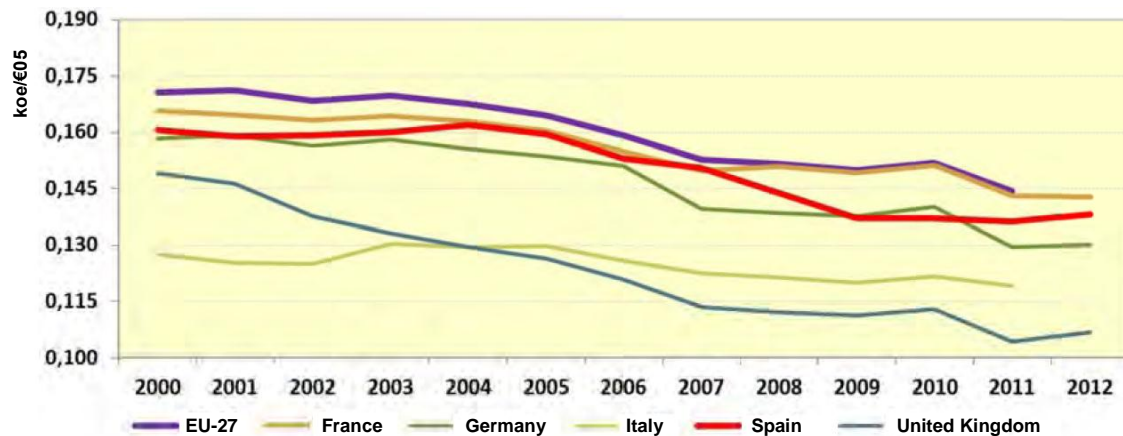


The **primary and final intensity indicators for Spain and the EU** (graphs 2.2.3 and 2.2.5) show the situation in Spain in comparison to other Member States of the European Union. These indicators, **calculated at purchasing power parity** (graphs 2.2.4 and 2.2.6), show that the primary intensity indicator in Spain in 2011 represented 83.9% of the indicator value for the European Union, meaning that Spain's energy requirement is over 16% less than the average requirement of the EU-27 to generate one Euro of added value (or production).

Likewise, the final intensity indicator in Spain (shown in Graph 2.2.6) in 2011 represented 86.6% of the indicator value for the European Union.

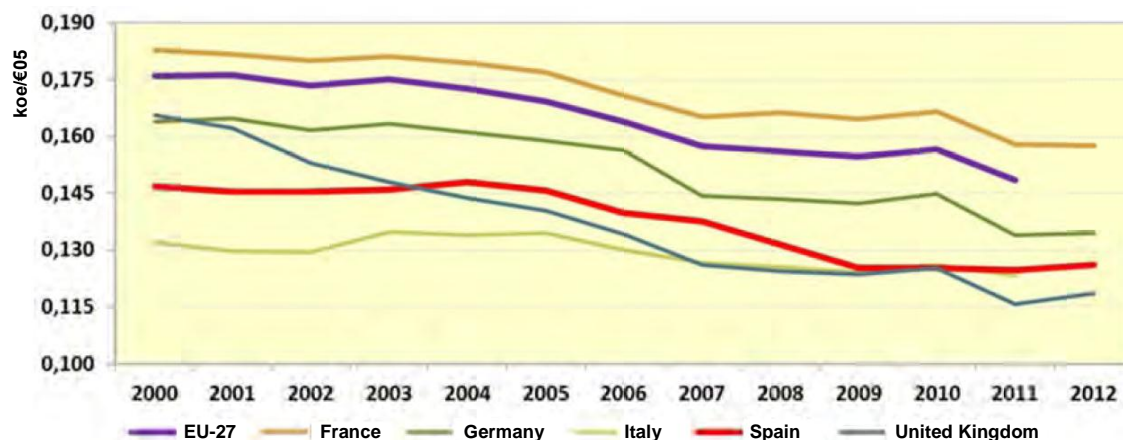
The evolution of this indicator since 2007 has been rather more favourable in Spain than on the EU-27 average: the average interannual rate in Spain fell 2.2%, while in the EU-27 it fell just 1.3% in the same period. The same goes for the primary intensity indicator, which is shown in Graph 2.2.3 below: while EU-27 intensity fell at an interannual 1.5% since 2005, Spain reduced its intensity by an interannual 2.7%.

**Graph 2.2.3. Evolution of primary energy intensity**



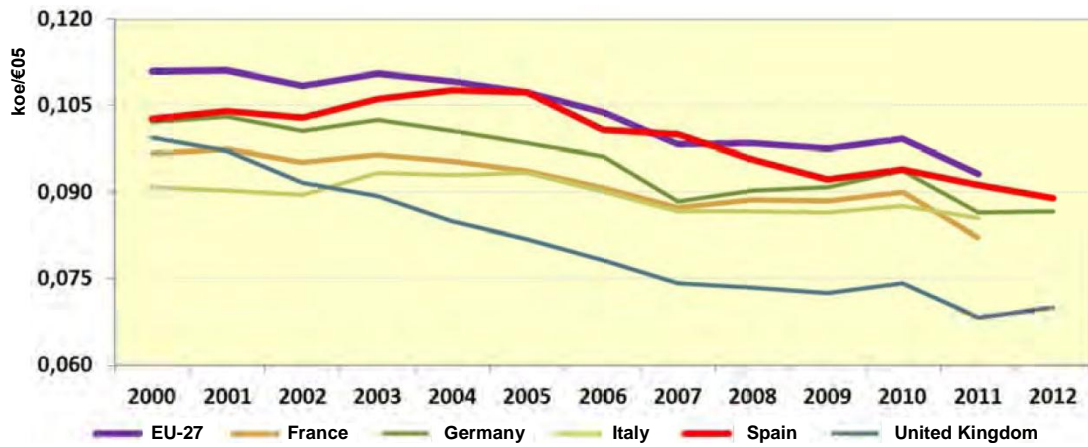
Source: EU (EnR)/IDAE

**Graph 2.2.4. Evolution of primary energy intensity at purchasing power parity**



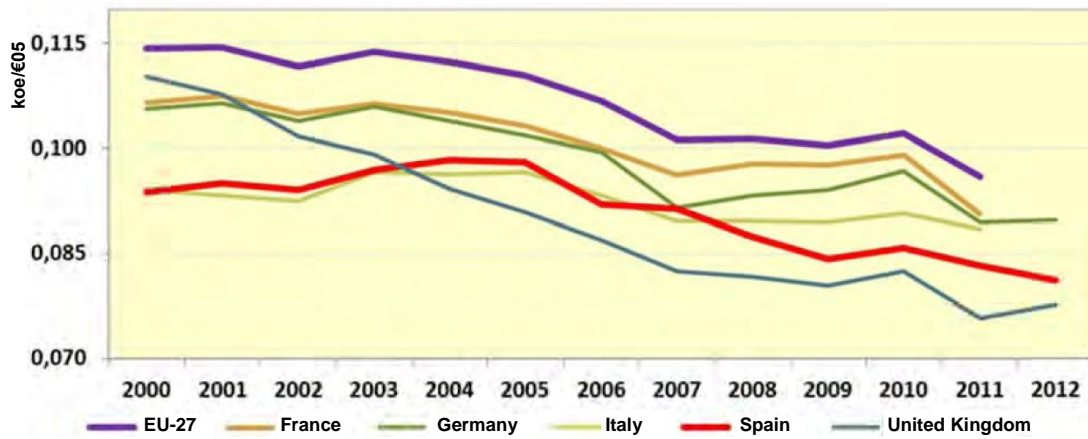
Source: EU (EnR)/IDAE

**Graph 2.2.5. Evolution of final energy intensity**



Source: EU (EnR)/IDAE

Graph 2.2.6. Evolution of final energy intensity at purchasing power parity



Source: EU (EnR)/IDAE



### 2.3. ELECTRICITY PRODUCTION

Electricity and heat generation data supplement those which, under the Directive, are to be included in annual progress reports. This section includes electricity production data and the next covers heat production.

The structure of electricity generation by source is presented in Table 2.3.1, which shows that the production of electricity from renewable sources made up 29.2% of all electricity generation in 2012 despite the decline in hydroelectric production.

The structure of electricity generation in 2011 and 2012 is in contrast to that of 2010, which registered a record renewable energy electricity production (around 100 000 GWh, making up 32% of total production); in the latter two years (2011 and 2012), the reduced renewable-based production was covered by the recourse to coal, to the detriment of natural gas usage.

Improving energy efficiency in electricity generation is considered a priority given the rise in participation of electricity in covering final energy demand. Whereas in 2007 electricity represented 22% of final consumption, by 2012 it accounted for 24.9% and, although to some extent this relative gain was due to the loss of ground in oil products due to the decline in traffic, electricity consumption remained stable, despite the drop in income and economic activity: while electricity consumption fell at an interannual rate of just 0.9% between 2007 and 2012, natural gas fell at a rate of 1.3%.

The growing contribution of renewable energies to electricity generation improves average power plant efficiency. In 2012, electricity production from renewable sources other than hydraulic (66 417 GWh) exceeded nuclear power production (61 470 GWh).

**Table 2.3.1 Structure of electricity generation by source (GWh)  
2007–2012**

Source	2007	2008	2009	2010	2011	2012
<b>Coal</b>	74 085	49 973	36 938	26 323	45 126	55 991
<b>Oil products</b>	18 508	18 002	19 242	16 562	14 692	15 321
<b>Natural gas</b>	94 799	120 798	107 746	94 851	85 508	73 308
<b>Nuclear</b>	55 103	58 973	52 761	61 990	57 718	61 470
<b>Renewable energies</b>	58 284	62 143	74 080	97 776	87 523	86 962
<i>Hydraulic</i>	27 309	23 364	26 411	42 304	30 596	20 545
<i>Other renewables</i>	30 975	38 779	47 669	55 472	56 927	66 417
<b>Pumping</b>	3 213	2 780	2 751	3 207	2 315	3 617
<b>Other</b>	1 061	1 089	1 102	818	966	890
<b>TOTAL</b>	<b>305 053</b>	<b>313 758</b>	<b>294 620</b>	<b>301 527</b>	<b>293 848</b>	<b>297 559</b>

Source: MINETUR/IDAE

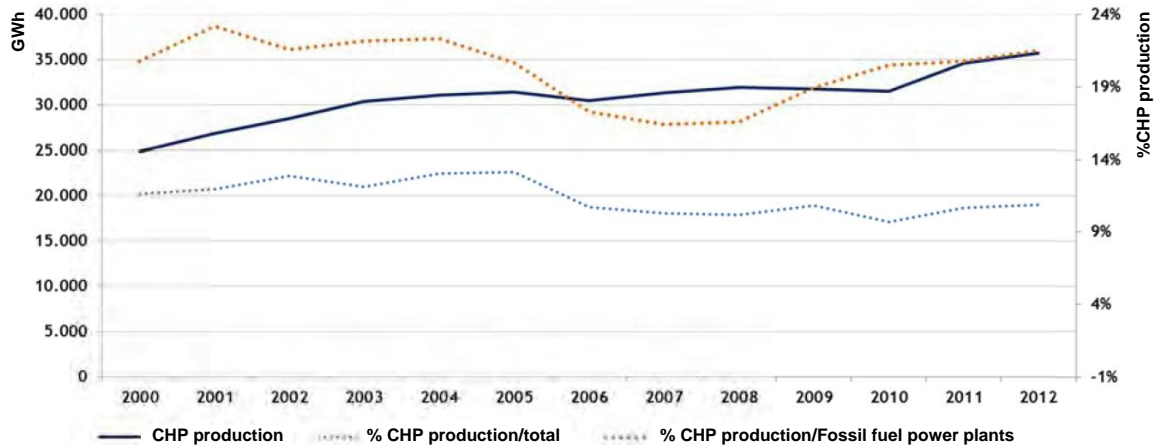
Electricity production through cogeneration makes up 11.6% of total global electricity production and 23.0% of electricity production in conventional thermal power stations.

Part 4.5.1 provides an analysis of the current situation in cogeneration and presents new installed power data from 2007. Since that year, accounting for newly installed cogeneration plants,



cogeneration power has seen a cumulative rise of 730.8 MW, of which only 65.9 MW were installed in 2012.

**Graph 2.3.1. Evolution of total electricity production from cogeneration facilities in Spain 2000–2012**



Source: MINETUR/IDAE

As required under Article 14 of the Directive, Member States shall carry out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling. Based on this analysis, States shall adopt policies which adequately promote - at both the local and regional levels - the potential use of efficient heating and cooling systems, and particularly those which use high-efficiency cogeneration.

Part 4.5.3 lays down the requirements applicable to this assessment, which shall start with the gathering of statistical data on residual heat and heating and cooling demand in all end-user energy sectors and finish with the development of a heat map. This heat map will use GIS tools to show points of heating and cooling demand, industrial zones with heating and cooling consumption, existing and planned heating and cooling infrastructures, residual heat production points and district heating installations.

Spain shall carry out this study and submit it to the European Commission no later than 31 December 2015, as required under the aforementioned Article 14(1).



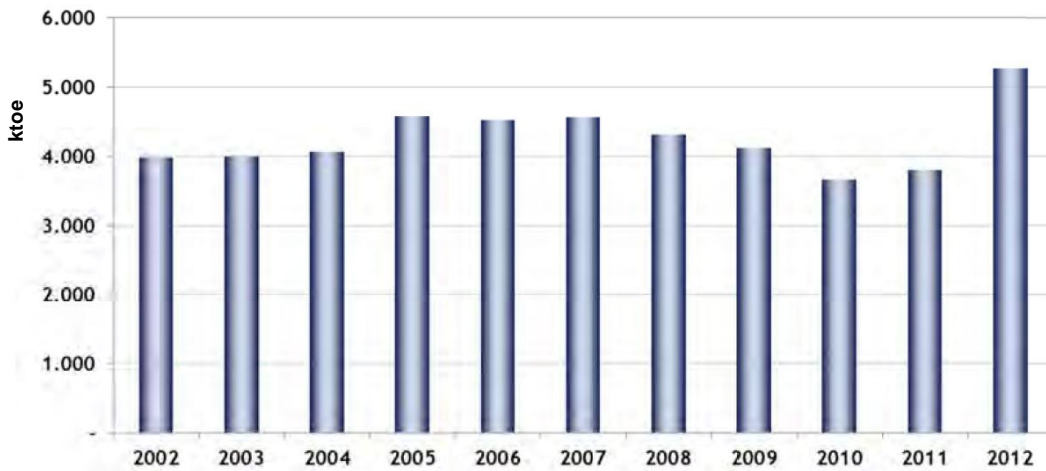


## 2.4. HEAT PRODUCTION

The statistical information required in the annual progress report is supplemented with information on the generation of heat using thermal power and the generation of heat using cogeneration plants, including industrial residual heat.

Graph 2.4.1 shows the evolution of useful heat production deriving from cogeneration plants, based on official statistics.

**Graph 2.4.1. Evolution of useful heat production from cogeneration facilities in Spain 2002–2012**



Source: MINETUR/IDAE

In regard to the production of heat by thermal power plants, understood as the production of heat in district heating and cooling systems, IDAE and the Association of Heating and Cooling Network Companies (ADHAC) signed an agreement in October 2011 allowing for an initial survey to be carried out which included networks and micro-networks. This study can be used to extract certain information of interest (200 existing networks with available data on 139 of those), such as total network range or installed power and its distribution by sector (in 2013, heating networks had an installed power of 608 MW and cooling networks 248 MW).



CHAPTER 3:  
OVERVIEW OF NATIONAL ENERGY EFFICIENCY TARGETS AND  
SAVINGS



MINISTRY OF  
INDUSTRY, ENERGY AND  
TOURISM

STATE SECRETARIAT FOR ENERGY



### 3. OVERVIEW OF NATIONAL ENERGY EFFICIENCY TARGETS AND SAVINGS

#### 3.1. NATIONAL INDICATIVE ENERGY EFFICIENCY TARGET FOR 2020 (ARTICLE 3.1)

##### 3.1.1. Setting the national indicative target for 2020.

The indicative energy saving and efficiency target for Spain by the year 2020 is consistent with the target of the European Union, in regard to which Article 3(1)(a) of Directive 2012/27/EU of 25 October 2012 states: 'the Union's 2020 energy consumption has to be no more than 1 474 Mtoe of primary energy or no more than 1 078 Mtoe of final energy'<sup>2</sup>.

This 2020 primary energy consumption target for the European Union means a reduction of 368 Mtoe in a **business-as-usual** situation, using 2007 as the reference year for the analysis.

This reduction represents a **20% drop in primary energy consumption** and, along with the 20% reduction in CO<sub>2</sub> emissions and 20% in renewable energy consumption, completes the set of quantitative targets taken from the Energy and Climate Change Package, which was presented by the European Commission on 28 January 2008 and approved by the European Council and Parliament in the December of that same year.

As the Directive states in its third recital, the energy efficiency target was included as one of the main objectives of the Union's new strategy for jobs and smart, sustainable and inclusive growth ('Europe 2020 Strategy'). Under the process defined in this Strategy, Member States are required to set national targets and to indicate, in their National Reform Programmes, how they intend to achieve them.

Accordingly, Spain established in its **2011 National Reform Programme**, presented in April, the objective to reduce primary energy consumption by 25.2 Mtoe. The sum of national reduction objectives for the 27 Member States amounted to a total reduction in primary energy consumption of 206.9 Mtoe, less than the 368 Mtoe set as the objective for the European Union as a whole.

The target set by Spain was consistent with the difference between trend-based consumption and forecast primary energy consumption considering an annual reduction target of 2 per cent of final energy intensity.

Following the announcement of this consumption reduction target, on 29 July 2011, the Council of Ministers approved the **2011–2020 Energy Efficiency Action Plan**, for submission to the European Commission as the second National Energy Efficiency Action Plan in accordance with the requirements pursuant to Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services.

The 2011–2020 NEEAP set a 2020 primary energy consumption target (excluding non-energy use) of 135.5 Mtoe which, in the trend-based scenario, represented a 27.5 Mtoe reduction by 2020.

In Spain's 2013 annual progress report, required under Article 24(1) of Directive 2012/27/EU and which it submitted on 17 May last year, the country reported an improved national primary energy

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<sup>2</sup> As already mentioned in the introduction to the Plan, Article 3 of Directive 2012/27/EU has been amended by Article 1 of Council Directive 2013/12/EU of 13 May 2013 adapting the previous Directive on energy efficiency, by reason of the accession of the Republic of Croatia. As such, by 2020 the Union's energy consumption must not exceed 1 483 Mtoe of primary energy or 1 086 Mtoe of final energy.

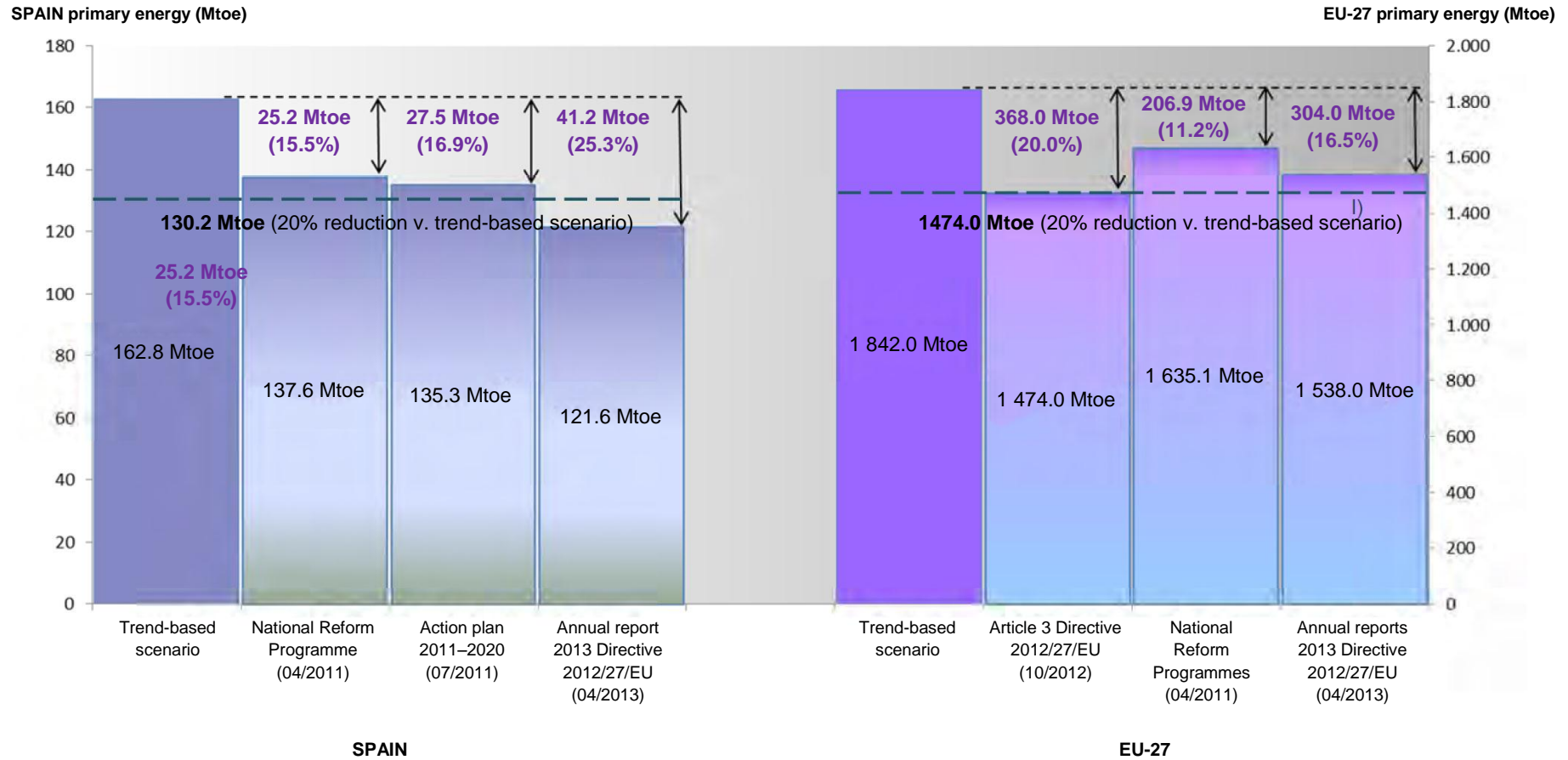


consumption target for 2020 of 121.6 Mtoe as an indicative target pursuant to Article 3(1). This target translated to a 41.2 Mtoe reduction with respect to trend-based energy consumption envisaged for 2020 and represented 11.2% of the primary energy consumption reduction target for the European Union as a whole (368 Mtoe).

With this reduction, Spain would be contributing to the European reduction target at a rate more than 2 per cent higher than the relative weight its primary energy consumption represents of EU-27 primary energy consumption: while primary consumption in Spain is below 9% of total EU-27 consumption, the reduction of consumption in Spain would be more than 11% of the reduction required for the EU-27 as a whole, which, in practice, means a **national effort which is far greater than the 20% target required on average for the Union** as it is **25.3% less** than the trend-based target, while **the EU average remains at a 16.5% reduction**, a pattern which is shown in Graph 3.1.1.1.



**Graph 3.1.1.1. Indicative target reduction in primary energy consumption (Mtoe) (2020: Spain and EU-27)**



Source: MINETUR/IDAE



In this new 2014–2020 NEEAP, the **change in the macroeconomic scenario** meant that the primary energy consumption forecasts for 2020 had to be revised, with **Spain notifying the European Commission of a new energy consumption target** expressed in terms of an absolute level of primary energy consumption and final energy consumption in 2020 in accordance with Article 3(1) of the Directive.

The gross domestic product growth scenario is shown in the following table. As we can see, the fall in economic activity was more marked in 2012, with definitive data indicated in last year's report: -1.6% compared to -1.4%. By contrast, the expected recovery after 2014 shall be more apparent: Spain's GDP will rise beyond 0.5% in 2014 (to 0.7%) and one tenth of a point above last year's forecast for 2016. However, from 2017–2020, the latest forecasts lower the expectations reflected in the last report with a 2020 GDP growth of 2.4% compared to the 3.2% indicated in last year's report.

**Table 3.1.1.1. Macroeconomic forecasts: interannual GDP variation (%)**

2012	2013	2014	2015	2016	2017	2018	2019	2020
-1.6%	-1.2%	0.7%	1.0%	1.4%	1.8%	2.0%	2.2%	2.4%

**Source:** Ministry of Economy and Competitiveness

In this new macroeconomic scenario, the improvement in final intensity on the horizon for 2020 is estimated on average at an interannual rate of 1.60% from 2013, calculated based on the indicator including non-energy uses. In primary energy terms, it is foreseeable that the intensity indicator will fall at an interannual rate of 1.14% between 2013 and 2020.

These forecasts set a higher energy intensity improvement target than the one notified to the European Commission in the 2013 annual report, which envisaged an energy intensity improvement of 1.5% in final energy terms.

Table 3.1.1.2 shows the estimated primary energy balance through to 2020. The situation envisaged this year shows an increased participation of renewable energies and natural gas in the coverage of demand, to the detriment of oil product consumption, basically resulting from the forecast decline in consumption of gasoline and diesel in the transport sector.

Primary energy consumption by 2020 is estimated at 125 280 ktoe including final non-energy consumption. Excluding these uses, consumption would be 119 893 ktoe. This again represents a downward revision and an **improvement by Spain of its 2020 primary energy consumption target** and, in terms of reducing primary energy consumption on the trend-based scenario considered by the European Commission, a reduction of 42.8 Mtoe (rather than the 25.2 Mtoe initially notified by Spain in its 2011 National Reform Programme), **representing a 26.4% trend-based reduction**.

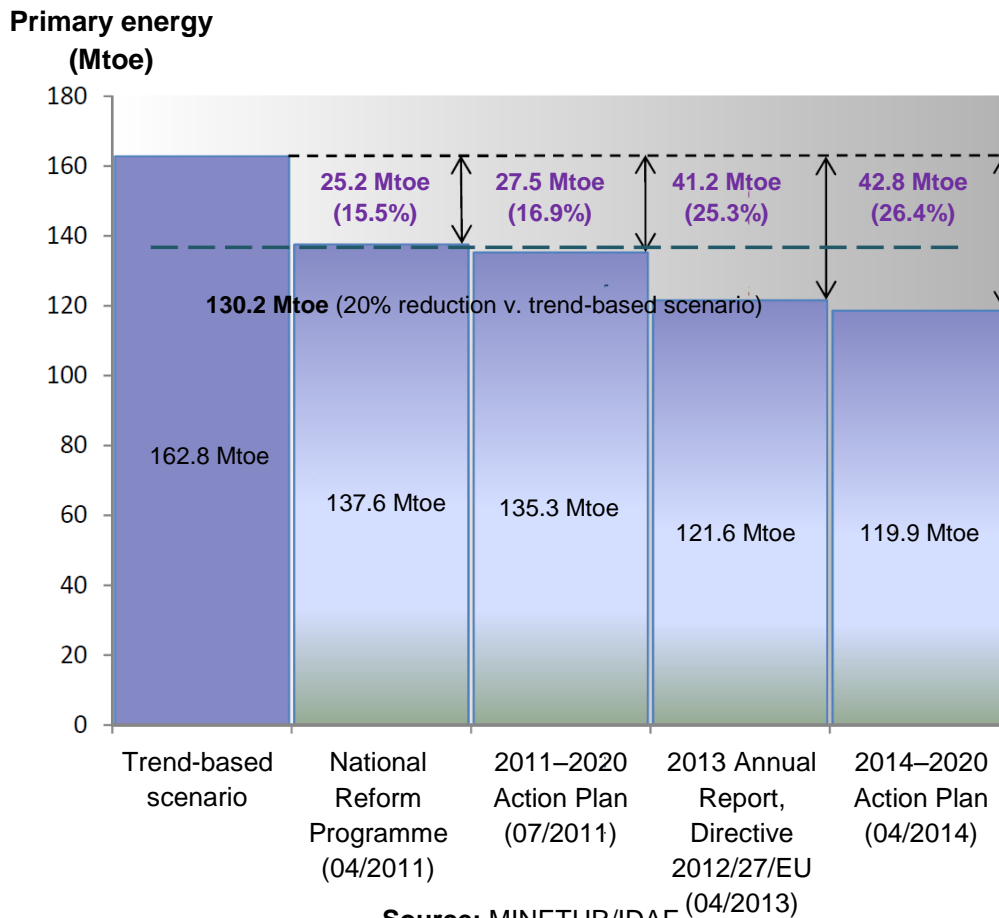


**Table 3.1.1.2. Indicative primary energy consumption target (including final non-energy uses) (ktoe)**

	2013	2016	2020
<b>Coal</b>	10 531	13 541	13 652
<b>Oil</b>	52 934	48 255	46 026
<b>Natural gas</b>	26 077	26 482	30 276
<b>Nuclear</b>	14 785	15 549	15 549
<b>Renewable energies</b>	17 209	18 519	20 406
<b>Non-renewable waste</b>	160	237	319
<b>Electr. balance (Imp.-Exp.)</b>	-579	-946	-946
<b>TOTAL</b>	<b>121 117</b>	<b>121 638</b>	<b>125 280</b>
<b>Total including final non-energy uses</b>	<b>116 262</b>	<b>116 609</b>	<b>119 893</b>

Source: MINETUR

**Graph 3.1.1.2. Evolution of the indicative target reduction in primary energy consumption, with a new macroeconomic scenario 2014–2020 NEEAP (Mtoe) (2020: Spain)**



It should be noted that, in Spain, the economic crisis has led to a significant decline in primary energy consumption, falling below the targets set for 2020. As such, setting additional savings





targets deriving from Energy Efficiency Directive 2012/27/EU could impede the economic recovery and in any case requires additional effort which is disproportionate to the Union's overall objectives for achieving the new targets.

**Final energy consumption** forecasts indicate an increased consumption of electricity and renewable energies and a fall in oil products. Total final energy for energy uses in 2020 is estimated at 80.1 Mtoe, compared to improved forecast of 82.9 Mtoe notified in the annual report submitted by Spain to the European Commission on 17 May 2013.

**Table 3.1.1.3. Indicative final energy consumption target (excluding non-energy uses)  
(ktoe)**

	2013	2016	2020
Coal	1 587	1 626	1 753
Oil products	39 061	35 696	33 771
Natural gas	14 653	15 097	15 710
Electricity	19 952	20 476	21 928
Renewable energies	5 329	6 024	6 977
<b>TOTAL</b>	<b>80 582</b>	<b>78 920</b>	<b>80 139</b>

**Source:** MINETUR

As indicated in the previous annual report, the final and primary energy consumption forecasts for 2020 presented in this 2014–2020 NEEAP may be reviewed to adapt them to other macroeconomic scenarios which may be officially adopted by Spain, in the next annual report which, according to Article 3 of Directive 2012/27/EU, is to be submitted before the end of April 2015.



### 3.1.2. Evaluation of final and primary energy savings to 2013.

The 2011–2020 Energy Efficiency Action Plan, drafted to satisfy the requirements of Directive 2006/32/EC, evaluated the savings obtained as a result of previous plans up to 2010, using the years 2004 and 2007 as references; the first for being the reference year for the 2004–2012 Energy Saving and Efficiency Strategy and the Action Plans deriving from it (2005–2007 Action Plan and 2008–2012 Action Plan), and the second for being the reference year commonly adopted by all Member States.

In that Action Plan, an integrated *top-down* and *bottom-up* approach was followed, in accordance with European Commission recommendations. In this new 2014–2020 NEEAP, to facilitate understanding and interpretation of the results in terms of savings, the calculations were made following a *bottom-up* approach.

To compare the savings shown in the tables included in this section with those provided by Spain in the annual report submitted in May 2013, it should be noted that they were calculated versus 2004 and versus 2007. For this reason, the savings shown in the past annual report reflected annual savings resulting from all measures introduced within the framework of action plans from 2004 or 2007, depending on the year of reference, provided that such measures continued to generate savings in 2010, 2011 and 2012. The savings shown in the following tables are, by contrast, **new and additional annual savings** and are not affected by the use of one year or another as a reference.

Savings for the years 2010, 2011, 2012 and 2013 are presented in terms of final and primary energy and CO<sub>2</sub> emissions avoided and are the result of measures managed, in some cases, directly by IDAE or the Ministry of Agriculture, Food and Environment and, in others, of measures co-managed by IDAE and the autonomous communities within the framework of collaboration agreements signed to implement the 2008–2012 Energy Efficiency Action Plan.

These can in turn be divided into economic assistance programmes (economic support without compensation and repayable loan) and training measures, such as training programmes on efficient driving techniques.

The different programmes are summarised in tables 3.1.2.1. to 3.1.2.3, with non-accumulated savings obtained in the year shown expressed in final and primary energy and CO<sub>2</sub> emissions avoided. Most of the savings are from 2010 and 2011, resulting from collaboration agreements signed between IDAE and the 17 autonomous communities (plus Ceuta and Melilla) for implementing the measures contained in the 2008–2012 Action Plan from the 2004–2012 Energy Saving and Efficiency Strategy in Spain (E4). These savings appear under **IDAE/AC programme** in the tables<sup>3</sup>.

The **Strategic Projects Programme** is a proposed measure authorised by IDAE entitled Strategic Energy Saving and Efficiency Project Assistance Programme as part of the 2008–2012 Energy Efficiency Action Plan. The 2010 instalment was assigned €120 million, aimed at energy efficiency measures in all areas of activity.

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<sup>3</sup> The 2011–2020 Energy Efficiency Action Plan included extensive details of the type of savings and energy efficiency measures introduced under these collaboration agreements, which were maintained until 2011 between IDAE and autonomous administrations. The years 2010 and 2011 saw the implementation - with public assistance - of a number of savings and energy efficiency projects in the industrial sector, energy audits, sustainable urban mobility plans, efficient driving courses, programmes for replacing vehicles with more energy-efficient alternatives (hybrid or electric), measures for restoring the thermal envelope of existing buildings and for improving the energy efficiency of heating and lighting installations in existing buildings, and programmes for renewing existing outdoor public lighting systems.



The **IDAE-DGT passenger vehicle efficient driving agreements** indicate the savings achieved by training drivers in efficient driving techniques through IDAE agreement with the Directorate-General for Traffic. Meanwhile, the **IDAE/CNTC and IDAE ANFAC/ANIACM agreement on efficient HGV and bus driving** indicates the savings obtained from training professional drivers in efficient driving techniques implemented through agreements between IDAE and the National Road Transport Commission (CNTC), the National Association of Automobile and HGV Manufacturers (ANFAC) and the National Association of Automobile, HGV, Bus and Motorcycle Importers (ANIACAM).

The savings included in the **MOVELE Pilot Project** and **MOVELE Project** (Royal Decree 648/2011 and Royal Decree 417/2012) derive from the concession of direct aid by the Ministry of Industry, Energy and Tourism for the purchase of electric vehicles during 2011 and 2012, as part of Spain's 2010–2014 Integrated Electric Vehicle Stimulus Plan.

During 2012 and 2013, several programmes were implemented directly by IDAE with a large amount of secured public funding, such as the **Efficient Vehicle Incentive Programme (PIVE)** in its different instalments. The first of these, with a budget of €75 million, focused on replacing 75 000 vehicles with more energy-efficient alternatives. This first programme from 2012 was continued in 2013 with a second instalment with a budget of €150 million (PIVE 2), a third instalment with € 70 million (PIVE 3), a fourth instalment with €70 million (PIVE 4) and a fifth with €175 million (PIVE 5), approved in January 2014 (Royal Decree 35/2014 of 24 January 2014; BOE 28 January 2014).

The Efficient Vehicle Incentive Programmes (PIVE) were public assistance programmes managed by IDAE which aimed to encourage the scrapping of passenger vehicles (M1) and commercial vehicles under 3.5 T (N1) at least 12 and 10 years old, respectively. The incentive was related to the purchase of new category M1 and N1 vehicles in energy class A and B, for category M1<sup>4</sup> vehicles, and with CO<sub>2</sub> emissions less than 160 g/km for category N1 vehicles, in line with the European average commercial vehicle emissions targets for 2020. In addition to petrol and diesel engines, incentives were also offered for the purchase of electric, plug-in hybrid and extended range electric vehicles, as well as those with LPG (liquefied petroleum gas) or natural gas engines, provided that their CO<sub>2</sub> emissions do not exceed 160 g/km.

The assistance to beneficiaries (individuals, micro-enterprises and SMEs) is at least € 2 000 applied as a final discount, including an incentive of € 1 000 for each vehicle purchased and the application by the dealership, manufacturer or point of sale of an additional discount of at least € 1 000.

The positive results from these programmes, which began in October 2012, led to the approval of subsequent incentive instalments. The second programme doubled the budget from the first and lowered the minimum age of scrapped vehicles from categories M1 and N1 to 10 and 7 years, respectively, as well as increasing the incentive for many families to €3 000 (€1 500 in public assistance and a further €1 500 applied by the manufacturer or point of sale). In the third and subsequent instalments of the programme the requirements remained unchanged, although the fifth (PIVE 5) received a higher budget: €175 million.

In the **energy-saving light bulb distribution programme**, savings were calculated from the replacement of incandescent light bulbs with energy-saving bulbs as part of the 2010 energy-saving light bulb distribution campaign.

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<sup>4</sup> Class C and D passenger vehicles (M1) also qualify provided that they do not exceed 120 gCO<sub>2</sub>/km.



As was anticipated in the annual report submitted to the European Commission on 17 May 2013, the following tables also include, under the item **JESSICA fund**, savings deriving from projects financed by the **Energy Diversification and Saving Investment Fund (F.I.D.A.E.)**, a €122 million fund for financing urban energy efficiency and renewable energy use projects. It is a JESSICA (*Joint European Support for Sustainable Investment in City Areas*) Holding Fund set up through a financing agreement signed between the European Investment Bank (EIB) and IDAE on 1 July 2011. This Holding Fund channels funding for eligible projects through an Urban Development Fund (UDF) managed by a financial entity.

The Spanish Climate Change Office, part of the Ministry of Agriculture, Food and Environment and with budgets deriving from the annual allocation of emissions pursuant to Decision No 406/2009/EC, has implemented the environmental stimulus programmes **PIMA AIRE** (Royal Decree 89/2013 of 8 February 2013; Royal Decree 631/2013 of 2 August 2013 and Royal Decree 831/2013 of 25 October 2013) and **PIMA SOL** (Royal Decree 635/2013 of 2 August 2013), which regulate the direct award of assistance for initial purchases of commercial vehicles and for securing future carbon credits through the carbon fund for a sustainable economy for building energy renovation projects in the hotel industry.



**Table 3.1.2.1. ADDITIONAL ANNUAL SAVINGS. 2010–2013. Final energy.**

	Final energy saving (ktoe)			
	2010	2011	2012	2013
<b>IDAE/AC PROGRAMME</b>	<b>341.5</b>	<b>278.5</b>		
<b>STRATEGIC PROJECTS PROGRAMME</b>	<b>47.1</b>			
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>76.8</b>	<b>7.3</b>	<b>17.2</b>	<b>86.6</b>
IDAE-DGT passenger vehicle efficient driving agreement	2.5			
IDAE/CNTC and IDAE ANFAC/ANIACM agreements on efficient HGV and bus driving	34.2	6.7	6.7	6.4
MOVELE Pilot Project	0.4	0.1		
MOVELE Project		0.4	1.5	0.7
PIVE 1			9.0	12.2
PIVE 2				43.8
PIVE 3				16.8
PIVE 4				3.2
Energy-saving light bulb distribution programme	39.8			
JESSICA fund				3.5
<b>OTHER PROGRAMMES</b>				<b>9.2</b>
PIMA Sol				2.8
PIMA Aire				6.4
<b>TOTAL</b>	<b>465.4</b>	<b>285.7</b>	<b>17.2</b>	<b>95.8</b>

Source: Compiled by IDAE



**Table 3.1.2.2. ADDITIONAL ANNUAL SAVINGS. 2010–2013. Primary energy.**

	Primary energy savings (ktoe)			
	2010	2011	2012	2013
<b>IDAE/AC PROGRAMME</b>	<b>531.1</b>	<b>440.6</b>		
<b>STRATEGIC PROJECTS PROGRAMME</b>	<b>76.0</b>			
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>135.0</b>	<b>7.8</b>	<b>17.9</b>	<b>97.1</b>
IDAE-DGT passenger vehicle efficient driving agreement	2.8			
IDAE/CNTC and IDAE ANFAC/ANIACM agreements on efficient HGV and bus driving	38.3	7.5	7.5	7.1
MOVELE Pilot Project	0.2	0.1		
MOVELE Project		0.2	0.6	0.3
PIVE 1			9.8	13.3
PIVE 2				47.5
PIVE 3				18.2
PIVE 4				3.4
Energy-saving light bulb distribution programme	93.8			
JESSICA fund				7.2
<b>OTHER PROGRAMMES</b>				<b>13.1</b>
PIMA Sol				6.0
PIMA Aire				7.1
<b>TOTAL</b>	<b>742.1</b>	<b>448.3</b>	<b>17.9</b>	<b>110.2</b>

Source: Compiled by IDAE



**Table 3.1.2.3. ADDITIONAL ANNUAL SAVINGS. 2010–2013. CO<sub>2</sub> emissions avoided.**

	CO <sub>2</sub> emissions avoided (ktCO <sub>2</sub> )			
	2010	2011	2012	2013
<b>IDAE/AC PROGRAMME</b>	<b>1 220.5</b>	<b>991.0</b>		
<b>STRATEGIC PROJECTS PROGRAMME</b>	<b>165.2</b>			
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>326.9</b>	<b>24.2</b>	<b>52.0</b>	<b>255.4</b>
IDAE-DGT passenger vehicle efficient driving agreement	8.3			
IDAE/CNTC and IDAE ANFAC/ANIACM agreements on efficient HGV and bus driving	117.0	23.0	23.0	21.8
MOVELE Pilot Project	0.8	0.2		
MOVELE Project		1.0	3.2	1.5
PIVE 1			25.8	35.0
PIVE 2				125.1
PIVE 3				48.1
PIVE 4				9.0
Energy-saving light bulb distribution programme	200.8			
JESSICA fund				15.0
<b>OTHER PROGRAMMES</b>				<b>32.5</b>
PIMA Sol				12.4
PIMA Aire				20.1
<b>TOTAL</b>	<b>1 712.5</b>	<b>1 015.2</b>	<b>52.0</b>	<b>287.9</b>

Source: Compiled by IDAE



### 3.1.3. Evaluation of final and primary energy savings in 2020.

This section gives evaluates the anticipated final and primary energy savings in Spain in 2020 on the basis of a *top-down* indicator.

The **evaluation (top-down)** uses final and primary intensity indicators, both calculated considering energy consumption for energy uses only. The **reference point for both indicators is the year 2007**, which is commonly used by all Member States and which served as the reference for calculating the savings in the previous 2011–2020 Energy Efficiency Action Plan.

The savings are therefore calculated as the product of the difference between the value of the indicator in the year 2013, 2016 or 2020 (depending on the year to be calculated) and the value of the indicator in the year 2007, having multiplied that difference by the gross domestic product for the year in which the savings are being calculated, expressed in constant euros for the year 2005 (table 3.1.3.1).

The forecast improvement in indicators of final and primary intensity in macroeconomic scenarios and of energy consumption presented in part 3.1.1 guarantees savings of 22.5% in 2020, in terms of final energy, and 18.6% in the same year in terms of primary energy (graphs 3.1.3.1. and 3.1.3.2.).

These savings were calculated following the approach shown in section 3.3, although that same section discounts consumption which falls outside the scope of application of Directive 2006/32/EC, which is essentially energy consumption by businesses associated with the categories of activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community (ETS Directive).

**Table 3.1.3.1. FINAL AND PRIMARY ENERGY SAVINGS IN 2013, 2016 AND 2020.**

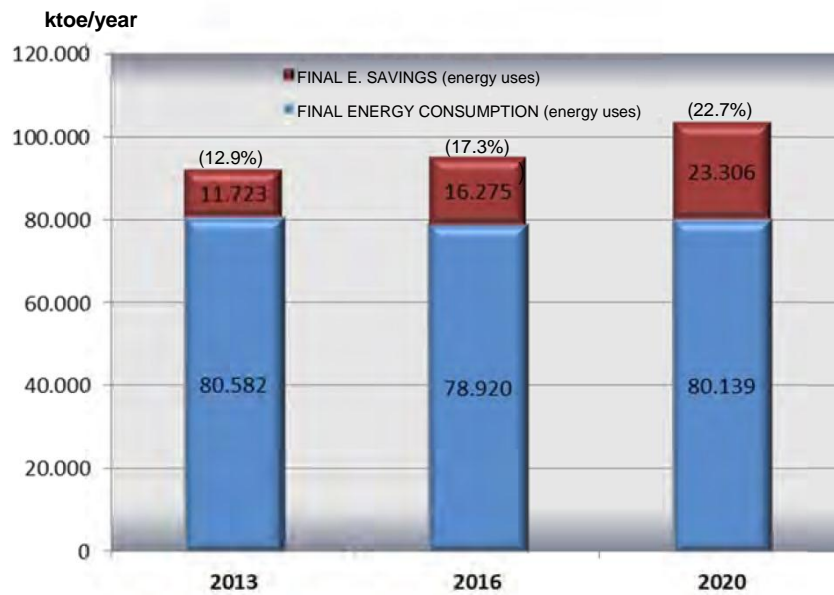
		2007	2013	2016	2020
<b>GDP</b>	€M at curr. prices. 2005	979 238	922 437	951 317	1 033 770
<b>FINAL ENERGY CONSUMPTION</b>	Total energy uses (ktoe)	97 988	80 582	78 920	80 139
<b>FINAL ENERGY INTENSITY</b>	(ktoe/€ million 2005)	0.100	0.087	0.083	0.078
<b>FINAL ENERGY SAV.</b>	2007 REF. (ktoe)		<b>11 723</b>	<b>16 275</b>	<b>23 306</b>
	(%)		<b>12.7%</b>	<b>17.1%</b>	<b>22.5%</b>
<b>PRIMARY ENERGY CONSUMPTION</b>	Total energy uses (ktoe)	139 442	116 262	116 609	119 893
<b>PRIMARY ENERGY INTENSITY</b>	(ktoe/€ million 2005)	0.142	0.126	0.123	0.116
<b>PRIMARY E SAVINGS</b>	2007 REF. (ktoe)		<b>15 092</b>	<b>18 857</b>	<b>27 315</b>
	(%)		<b>11.5%</b>	<b>13.9%</b>	<b>18.6%</b>

Source: Compiled by IDAE



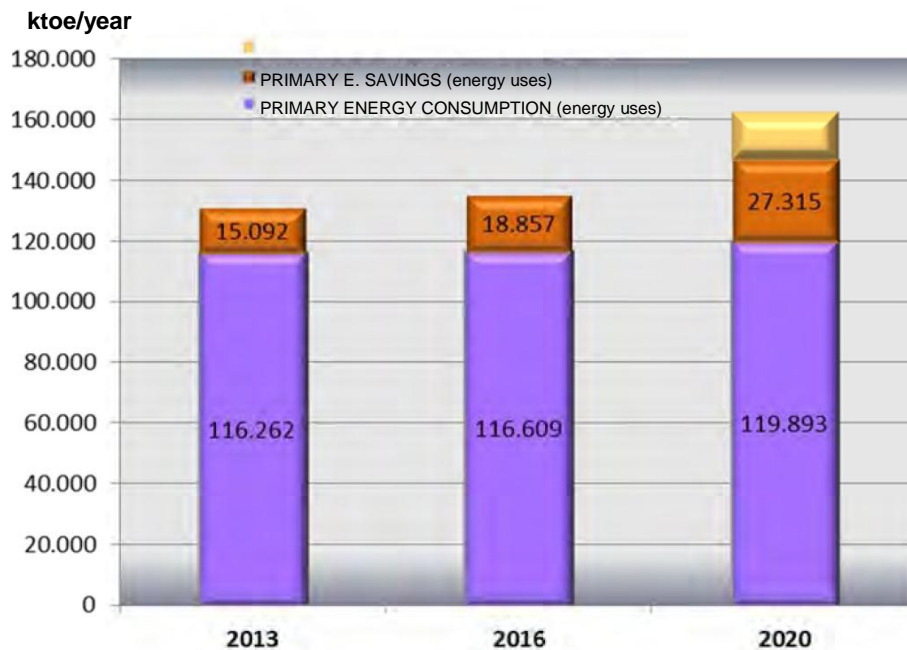


**Graph 3.1.3.1. Final energy consumption and savings in 2013, 2016 and 2020**



Source: Compiled by IDAE

**Graph 3.1.3.2. Primary energy consumption and savings in 2013, 2016 and 2020**



Source: Compiled by IDAE



## 3.2. BINDING FINAL ENERGY SAVINGS TARGET FOR 2020 (Article 7.1)

### 3.2.1. Calculation of binding savings target for 2020.

Article 7(1) of Directive 2012/27/EU requires that each Member State achieve a cumulative end-use energy savings target by 31 December 2020.

This target means achieving cumulative energy savings during the 7 year period between 2014 and 2020 (both inclusive) equal to the annual achievement of additional savings of 1.5% of annual energy sales to final customers, taken on average from the last three years, of all energy distributors or retail energy sales companies.

The target for Spain (excluding its transport sector) is **21 305 ktoe**, calculated by adding together, between the years 2014 and 2020, the average annual final energy consumption of the industry and other uses sectors from 2010, 2011 and 2012 multiplied by an incremental annual rate of 1.5%, i.e. 1.5% in 2014, 3.0% (1.5% + 1.5%) in 2015 and so forth, until reaching a rate of 10.5% in 2020<sup>5</sup>.

According to the possibility set out in parts 2 and 3 of Article 7 of the Directive, the cumulative savings target is reduced from 21 305 ktoe to **15 979 ktoe** for the period between 1 January 2014 and 31 December 2020 inclusive.

Before 5 June 2014, the Commission shall be notified of the elements of flexibility that will be taken into account in determining the final target, although the design of the energy efficiency obligations scheme and of the additional measures to be introduced is being implemented on the basis that Spain may reduce the target indicated in Article 7(1) by a maximum of 25%<sup>6</sup> as permitted by the Directive in part 3 of that same article.

**The previous savings target was 571 ktoe/year, following a linear distribution over the course of the obligation period (2014–2020).**

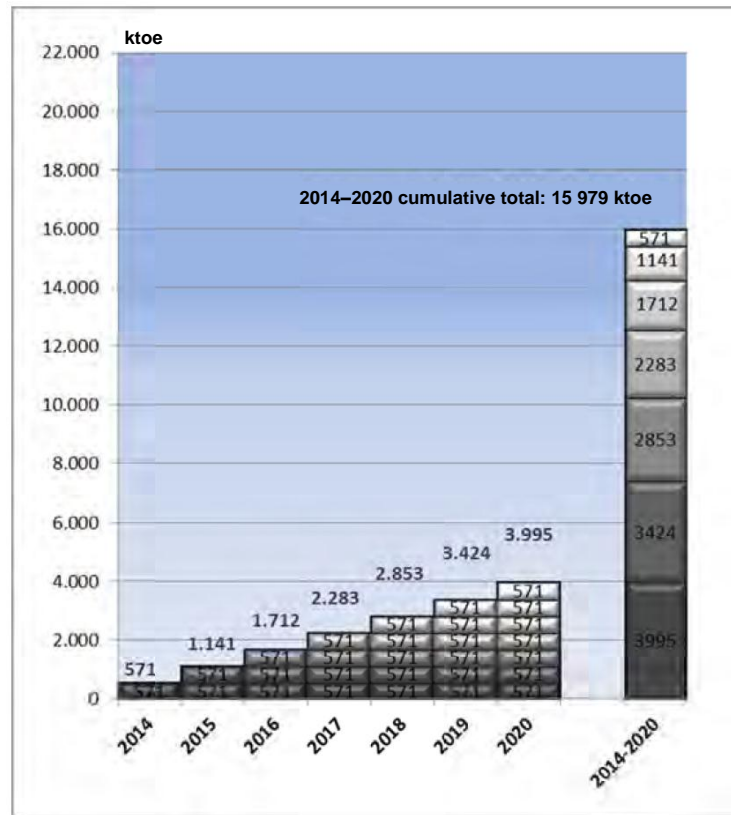
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<sup>5</sup> Despite the exclusion of final energy consumption in the transport sector from the target calculation, sellers of transport oil products shall be subject to the energy efficiency obligation scheme to be implemented in fulfilment of Article 7(1) of Directive 2012/27/EU (Article 7(4) of Directive 2012/27/EU).

<sup>6</sup> Using the flexibility mechanism described in Article 7(2)(a), the target is reduced by 20.8%; the additional use of the flexibility mechanism described in Article 7(2)(b), in conjunction with the previous one, would allow the overall target to be reduced by up to 42.9%; bear in mind that final consumption among the industrial activities included in Annex I to Directive 2003/87/EC represent 66.8% of the total consumption of the industrial sector. For this reason, and notwithstanding an official communication on the use of flexibility mechanisms prior to 5 June 2014, it is assumed that Spain could achieve the maximum 25% using the mechanism described in part 2(a) and any of those described in parts 2(b), 2(c) and 2(d) (preferably that described in 2(b)).



**Graph 3.2.1.1 Time distribution of final cumulative savings target**



Source: MINETUR/IDAE

### 3.2.2. Evaluation of fulfilment of the binding final energy savings target for 2020.

The evaluation of fulfilment of the binding final energy savings target in Article 7 of Directive 2012/27/EU is premature since we are only four months into 2014, which is the first year of fulfilment. Furthermore, both the measures deriving from the Spanish Strategy for Energy Renovation in the Building Sector, accompanied as an annex to this Plan, and the content of the imminent fiscal reform of the Spanish government which, as has been announced, will have a significant environmental focus, are yet to be finalised. This section therefore reviews the measures introduced this year.

Accompanying the notification of the transposition of Directive 2012/27/EU which will be issued before June, Spain plans to send the European Commission an update to its 'Report on the energy saving and efficiency policy measures in compliance with Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency', submitted in December 2013, which will provide an estimation of the savings deriving from each of the measures adopted to date, once there is a clear indication of any other measures to be adopted.

The evaluation follows a **bottom-up** procedure, recording savings measure by measure, and is consistent with the approach to be followed for reporting fulfilment of the binding savings target



set in Article 7 of this Directive. Furthermore, it supplements the savings evaluation described in part 3.1.2 above, showing the annual and additional savings which, up to the year 2020, will derive from existing programmes promoted by different administrations, assuming that such programmes remain active until their authorised budgets are used up or the validity period indicated in the regulations for the different assistance instalments expires.

Tables 3.2.2.1, 3.2.2.2 and 3.2.2.3 illustrate final and primary energy savings and measures as well as CO<sub>2</sub> emissions avoided (while the equivalent tables 3.2.2.4, 3.2.2.5 and 3.2.2.6, for comparison, show the same measures and savings in cumulative form).

Part 3.1.2 and Annex I, for the 2010–2013 period, include a list of public energy saving and energy efficiency programmes implemented by the general state administration. As observed in the programmes reported during 2014, in order to meet the target pursuant to Article 7 of the Directive, these may be recorded under 'other policy measures' in Article 7(9) of the Directive, promoted with public budgets and classified as financial instruments, training instruments, fiscal instruments, etc. Once the obligations scheme and the Energy Efficiency National Fund are put into effect, the savings obtained through these channels will be recorded in this section.

During this new period (2014–2020) and particularly in 2014, one of the measures soon to be implemented is a new instalment of the MOVELE Programme (for 2014), which offers subsidies for purchasing electric vehicles and has been active since 2010.

In January 2014, the fifth instalment of the Efficient Vehicle Incentive Programme (PIVE-5) took effect, with part of the measures from PIVE-3 and PIVE-4, referring to the stock renovation carried out in 2014, also being recorded this year.

In the residential building sector, the most significant measure implemented is the **Aid Programme for the Energy Renovation of Existing Buildings (PAREER)**, aimed at buildings used for housing and in the hotel industry. This programme, approved in September 2013 with a budget of €125 million, promotes integrated measures encouraging the improvement of energy efficiency and the use of renewable energies in the stock of existing buildings in the residential sector, and contributes to the fulfilment of Article 4 of Directive 2012/27/EU by awarding grants and repayable loans to projects involving the renovation of building envelopes and heating installations and to those which use biomass and geothermal energy rather than conventional energy sources. The measures included are for *the energy renovation of the thermal envelope of existing buildings, improving the energy efficiency of heating installations in existing buildings, improving the energy efficiency of interior lighting installations in existing buildings and renovating existing buildings with a high energy rating.*

In regard to the JESSICA financing fund, the **Energy Diversification and Saving Investment Fund (F.I.D.A.E.)**, a € 122 million fund for financing urban energy efficiency and renewable energy use projects set up by agreement between the European Investment Bank (EIB) and IDAE, covers numerous measures in all sectors of activity: industry, buildings, transport and services.

One measure promoted by IDAE in collaboration with the government of the Balearic Islands is the implementation of a pilot project for developing electric vehicle recharging infrastructure in the Balearic Islands (**Movele Balears Plan**), backed by a €2 million budget, which will see 2 000 recharging points installed in 2014. In **Isla de la Palma** in the Canary Islands, IDAE is set to carry out another **pilot project** with 200 electric vehicle recharging points. Both these initiatives fall under the measure *implementation of electric vehicle recharging infrastructure.*



In June 2014, the first institutional communication and publicity campaign from this Action Plan will be implemented nationwide. It has a budget of €4 million and a savings target of 6 ktoe/year, and is aimed at the 26 million domestic energy consumers.

The environmental stimulus plans of the Spanish Climate Change Office (Ministry of Agriculture, Food and Environment) **PIMA AIRE** (assistance for the purchase of efficient commercial vehicles) and **PIMA SOL** (assistance for energy renovation projects in hotel industry facilities) implement measures for the *renovation of passenger and light commercial vehicles and in the building industry*.

The **efficient driving permit** programme is the result of the mandatory incorporation of efficient driving into the training and evaluation of new drivers looking to obtain a driver's licence, taking effect on 1 January 2014.

2 December 2013 saw the publication of Order INT/229/2013 amending Annexes I, V, VI and VII to the General Driver Regulations approved by Royal Decree 818/2009 of 8 May 2009, and Order INT/2323/2011 of 29 July 2011 regulating training for progressive access to the class A driver's licence.

This order requires that, as of 1 January 2014, all new drivers must have been trained and have knowledge on efficient driving. In practice, this means providing efficient driving courses to all new drivers as they will all have to receive the relevant training in order to obtain a driver's licence and to pass knowledge tests. Assuming that 450 000 new drivers will obtain a driver's licence each year, the estimated annual and additional savings are 76.9 ktoe/year starting from 1 January 2014. These savings can be recorded within the scope of Article 7, given that the Ministerial Order mentioned above does not derive from any Community Directive requiring the adoption of this provision and the results are equivalent to those obtained from efficient driving courses taught as part of energy saving and efficiency action plans implemented to date.

Also included is the Ministry of Development's important **2013–2016 state incentive plan for rental housing, building renovation and urban regeneration**, which contains various specific programmes promoting building and urban energy renovation and is funded by the state. Given its publication date, Royal Decree 233/2013 only took effect in 2014 and it is yet to provide forecast savings for the period, for which it appears in the tables without data. The measures it affects are similar to the PAREER and PIMA SOL building measures.

Furthermore, Spain will also provide an evaluation of savings deriving from **fiscal measures** which may be measured starting 1 January 2014.

As the European Commission was informed in a report submitted in December 2013, starting 1 January 2013, **Law 15/2012 of 27 December 2012 on fiscal measures for energy sustainability** introduced a tax reform for internalising environmental costs deriving from the production of electricity and the storage of spent nuclear fuel or radioactive waste, with the aim that **it would serve as a stimulus for improving our energy efficiency levels** while at the same time ensuring better management of natural resources and continued progress under the new sustainable development model, from social, economic and environmental perspectives. This reform also helps integrate environmental policies into our tax system, which provides for both specific environmental taxes and the possibility of incorporating an environmental element into other existing taxes.

This law lays down three new taxes: tax on the value of electricity production, tax on the production of spent nuclear fuel and radioactive waste resulting from the generation of nuclear



energy, and tax on the storage of spent nuclear fuel and radioactive waste in centralised facilities; it establishes a fee for the use of inland water for electricity production; it amends the established tax rates for natural gas and coal, and it removes the planned exemptions for energy products used in the production of electricity and in the cogeneration of heat and power.

In this sense, the update to the *'Report on the energy saving and efficiency policy measures in compliance with Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency'* submitted in December 2013 shall determine and notify the elasticities used to estimate the savings resulting from this reform and from any other fiscal changes that may be approved during the 2014 and 2020 period and which affect final energy consumption.

Without considering fiscal measures, the cumulative savings by 2020 obtained through programmes implemented in the first quarter of 2014 are 1 715.8 ktoe (table 3.2.2.4), representing 10.7% of the cumulative target calculated in accordance with Article 7.



**Table 3.2.2.1. Forecast final energy savings (annual and additional) 2014–2020**

	Final energy savings (ktoe)						
	2014	2015	2016	2017	2018	2019	2020
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>84.0</b>	<b>3.9</b>	<b>3.7</b>				
MOVELE Project	1.6						
PIVE 3	3.5						
PIVE 4	17.1						
PIVE 5	51.0						
PAREER plan	1.8	1.8	3.7				
JESSICA fund	2.9	2.0					
MOVELE Balears pilot plan	n.a.						
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.						
Communication campaigns	6.0						
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>93.5</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>
PIMA Sol	8.4						
PIMA Aire	8.2						
Efficient driving permit	76.9	76.9	76.9	76.9	76.9	76.9	76.9
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.						
<b>TOTAL</b>	<b>177.5</b>	<b>80.8</b>	<b>80.6</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>	<b>76.9</b>

Source: Compiled by IDAE



**Table 3.2.2.2. Forecast primary energy savings (annual and additional) 2014–2020**

	Primary energy savings (ktoe)						
	2014	2015	2016	2017	2018	2019	2020
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>95.7</b>	<b>6.6</b>	<b>4.9</b>				
MOVELE Project	0.7						
PIVE 3	3.8						
PIVE 4	18.5						
PIVE 5	55.3						
PAREER plan	2.4	2.4	4.9				
JESSICA fund	5.9	4.2					
MOVELE Balears pilot plan	n.a.						
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.						
Communication campaigns	9.0						
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>112.7</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>
PIMA Sol	18.0						
PIMA Aire	9.2						
Efficient driving permit	85.5	85.5	85.5	85.5	85.5	85.5	85.5
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.						
<b>TOTAL</b>	<b>208.4</b>	<b>92.1</b>	<b>90.3</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>	<b>85.5</b>

Source: Compiled by IDAE





**Table 3.2.2.3. Forecast CO2 emissions avoided (annual and additional) 2014–2020**

	CO <sub>2</sub> emissions avoided (ktCO <sub>2</sub> )						
	2014	2015	2016	2017	2018	2019	2020
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>252.3</b>	<b>19.6</b>	<b>21.9</b>				
MOVELE Project	3.5						
PIVE 3	10.1						
PIVE 4	48.8						
PIVE 5	145.6						
PAREER plan	10.9	10.9	21.9				
JESSICA fund	12.3	8.7					
MOVELE Balears pilot plan	n.a.						
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.						
Communication campaigns	21.0						
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>318.6</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>
PIMA Sol	37.2						
PIMA Aire	25.9						
Efficient driving permit	255.5	255.5	255.5	255.5	255.5	255.5	255.5
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.						
<b>TOTAL</b>	<b>570.9</b>	<b>275.1</b>	<b>277.4</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>	<b>255.5</b>

Source: Compiled by IDAE



**Table 3.2.2.4. Forecast cumulative final energy savings**

	Final energy saving (ktoe)							
	2014	2015	2016	2017	2018	2019	2020	TOTAL 2014– 2020
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>84.0</b>	<b>87.9</b>	<b>85.6</b>	<b>85.6</b>	<b>85.6</b>	<b>85.6</b>	<b>85.6</b>	<b>599.8</b>
MOVELE Project	1.6	1.6	1.6	1.6	1.6	1.6	1.6	11.4
PIVE 3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	24.8
PIVE 4	17.1	17.1	17.1	17.1	17.1	17.1	17.1	119.7
PIVE 5	51.0	51.0	51.0	51.0	51.0	51.0	51.0	356.9
PAREER plan	1.8	3.7	7.4	7.4	7.4	7.4	7.4	42.5
JESSICA fund	2.9	4.9	4.9	4.9	4.9	4.9	4.9	32.5
MOVELE Balears pilot plan	n.a.							
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.							
Communication campaigns	6.0	6.0						12.0
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>93.5</b>	<b>170.4</b>	<b>170.4</b>	<b>170.4</b>	<b>170.4</b>	<b>170.4</b>	<b>170.4</b>	<b>1 116.0</b>
PIMA Sol	8.4	8.4	8.4	8.4	8.4	8.4	8.4	58.9
PIMA Aire	8.2	8.2	8.2	8.2	8.2	8.2	8.2	57.3
Efficient driving permit	76.9	153.8	153.8	153.8	153.8	153.8	153.8	999.8
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.							
<b>TOTAL</b>	<b>177.5</b>	<b>258.3</b>	<b>256.0</b>	<b>256.0</b>	<b>256.0</b>	<b>256.0</b>	<b>256.0</b>	<b>1 715.8</b>

Source: Compiled by IDAE



**Table 3.2.2.5. Forecast cumulative primary energy savings**

	Primary energy savings (ktoe)							TOTAL 2014– 2020
	2014	2015	2016	2017	2018	2019	2020	
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>95.7</b>	<b>102.3</b>	<b>98.1</b>	<b>98.1</b>	<b>98.1</b>	<b>98.1</b>	<b>98.1</b>	<b>688.7</b>
MOVELE Project	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.7
PIVE 3	3.8	3.8	3.8	3.8	3.8	3.8	3.8	26.8
PIVE 4	18.5	18.5	18.5	18.5	18.5	18.5	18.5	129.7
PIVE 5	55.3	55.3	55.3	55.3	55.3	55.3	55.3	386.9
PAREER plan	2.4	4.9	9.7	9.7	9.7	9.7	9.7	56.0
JESSICA fund	5.9	10.1	10.1	10.1	10.1	10.1	10.1	66.5
MOVELE Balears pilot plan	n.a.							
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.							
Communication campaigns	9.0	9.0						18.0
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>112.7</b>	<b>198.2</b>	<b>198.2</b>	<b>198.2</b>	<b>198.2</b>	<b>198.2</b>	<b>198.2</b>	<b>1 301.7</b>
PIMA Sol	18.0	18.0	18.0	18.0	18.0	18.0	18.0	126.3
PIMA Aire	9.2	9.2	9.2	9.2	9.2	9.2	9.2	64.2
Efficient driving permit	85.5	171.0	171.0	171.0	171.0	171.0	171.0	1 111.2
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.							
<b>TOTAL</b>	<b>208.4</b>	<b>300.5</b>	<b>296.3</b>	<b>296.3</b>	<b>296.3</b>	<b>296.3</b>	<b>296.3</b>	<b>1 990.4</b>

Source: Compiled by IDAE



**Table 3.2.2.6. Forecast cumulative CO<sub>2</sub> emissions avoided**

	CO <sub>2</sub> emissions avoided (ktCO <sub>2</sub> )							TOTAL 2014– 2020
	2014	2015	2016	2017	2018	2019	2020	
<b>OTHER PROGRAMMES DIRECTLY IMPLEMENTED BY IDAE</b>	<b>252.3</b>	<b>271.9</b>	<b>272.7</b>	<b>272.7</b>	<b>272.7</b>	<b>272.7</b>	<b>272.7</b>	<b>1 887.7</b>
MOVELE Project	3.5	3.5	3.5	3.5	3.5	3.5	3.5	24.8
PIVE 3	10.1	10.1	10.1	10.1	10.1	10.1	10.1	70.7
PIVE 4	48.8	48.8	48.8	48.8	48.8	48.8	48.8	341.6
PIVE 5	145.6	145.6	145.6	145.6	145.6	145.6	145.6	1 019.1
PAREER plan	10.9	21.9	43.7	43.7	43.7	43.7	43.7	251.5
JESSICA fund	12.3	21.0	21.0	21.0	21.0	21.0	21.0	138.0
MOVELE Balears pilot plan	n.a.							
Electric mobility pilot plan in Isla de la Palma (Canary Islands)	n.a.							
Communication campaigns	21.0	21.0						42.0
<b>OTHER PROGRAMMES AND MEASURES</b>	<b>318.6</b>	<b>574.1</b>	<b>574.1</b>	<b>574.1</b>	<b>574.1</b>	<b>574.1</b>	<b>574.1</b>	<b>3 763.4</b>
PIMA Sol	37.2	37.2	37.2	37.2	37.2	37.2	37.2	260.5
PIMA Aire	25.9	25.9	25.9	25.9	25.9	25.9	25.9	181.4
Efficient driving permit	255.5	511.0	511.0	511.0	511.0	511.0	511.0	3 321.5
State incentive plan for rental housing, building renovation and urban regeneration and renovation	n.a.							
<b>TOTAL</b>	<b>570.9</b>	<b>846.0</b>	<b>846.9</b>	<b>846.9</b>	<b>846.9</b>	<b>846.9</b>	<b>846.9</b>	<b>5 651.2</b>

Source: Compiled by IDAE



### 3.3. FINAL ENERGY SAVINGS ACCORDING TO DIRECTIVE 2006/32/EC

Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services, in Article 4(1), established an overall national indicative energy savings target of 9% for the year 2016.

The 2011–2020 Energy Efficiency Action Plan indicated the 2010 overall energy savings in conformity with the provisions of the same Directive. It was concluded that such savings, calculated as a percentage of the final energy consumption from the last five years immediately prior to the of the Directive, amounted to 9.2%, exceeding the 9% energy saving set as the national indicative target for 2016. It can therefore be affirmed that Spain had met the 2016 target before schedule, in the year 2010.

The previous action plan included a detailed and exhaustive study on a wide range of energy efficiency indicators. These indicators were proposed by the European Commission in its recommendations document, which Spain used as a basis on which to draw up an integrated approach for calculating savings based on a top-down and *bottom-up* approximation.

The results from the *top-down* indicators (see table 4, page 11 of the *Executive Summary* of the 2011–2020 Plan: [www.idae.es](http://www.idae.es)) for the different energy end-use sectors, modes (road, rail, sea and air) were used to determine the degree of fulfilment of the objective set by Directive 2006/32/EC. In all cases, the indicators were a measure of energy consumption in relation to level of activity: energy consumption per unit of value added, energy consumption per passenger-kilometres transported, energy consumption per tonne-kilometres transported or per vehicle, energy consumption per household or per m<sup>2</sup>, etc.

In summary, it can be said that the savings for 2010 were calculated (for each of the sectors of final use, modes or energy uses) as the difference between the value of the indicator in the reference year (2007) and the value of the same indicator in 2010, multiplied by the level of activity (value added, passenger-kilometres transported, tonne-kilometres transported, household stock, population, etc.) in 2010. If, as anticipated, the energy efficiency indicator is less in 2010 than in 2007 (i.e. the consumption per unit of product or value added or per household or inhabitant), the previous calculation offers a positive result (saving).

Directive 2006/32/EC also states that savings calculations should exclude companies related to the categories of activities listed in Annex I to Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community (ETS Directive).

Final energy savings in 2010, calculated according to the above, sector by sector, and discounting savings in ETS sectors (which represent 66.8% of the total consumption in the industrial sector) amounted to 6 682 ktoe which, above the average over the five years prior to entry into force of the Directive (6 390 ktoe), meant an energy saving of 9.2%.

This same calculation procedure has been applied in this section to determine final energy savings in 2013 and forecast savings for 2016, albeit reducing the extensive list of energy efficiency indicators that was used in the 2011–2020 Energy Efficiency Action Plan to a single aggregated indicator: the final intensity indicator. In this way, the period examined in this 2014–2020 NEEAP used gross domestic product (GDP) as the only activity variable given the high cost of drawing up forecasts using numerous activity variables at a time when the recession and the volatility of certain macroeconomic variables place greater uncertainty on prediction models.



Table 3.3.1 details the savings calculation procedure in accordance with Directive 2006/32/EC. Firstly, it shows final energy consumption for the years 2003–2007 with these five years considered as prior to the entry into force of the Directive, given that the reference year for calculating the savings was established as 2007, meaning that the savings would have to be recorded using measures implemented after that year; and final energy consumption for the years 2013, 2016 and 2020.

Subtracted from this final energy consumption, by sector, are energy consumption in air transportation (12.5% of transport sector energy consumption) and consumption by companies included in the trading of emissions allowances (66.8% of total industrial sector consumption). Accordingly, a new table shows final energy consumption within the scope of application of Directive 2006/32/EC with the title 'Final Energy Consumption (corrected) - Industry and Transport'.

Secondly, 3.3.1 shows the average consumption for the years 2003–2007 and the calculation of 9% of that amount.

Finally, the energy intensity indicator is determined and the savings are calculated for 2013 and 2016, using 2007 as a reference, by multiplying the value of the indicator in 2007 and the value of the indicator in 2013 (or the year in question) by the activity variable (GDP) in 2013 (or, again, in the year in question).

As shown, **in all of the years, the final energy savings of 9% envisaged in Directive 2006/32/EC is exceeded, achieving savings of 10.1% in 2013 and 15.5% in 2016** with respect to the average consumption from the last five years before the Decree entered into force.

With these detailed tables, Spain is responding to the European Commission's comment given in the *Progress report on the application of Directive 2006/32/EC* (SWD(2013) 541 final, 8.1.2014) and made by the Commission after examining the action plans submitted by the Member States in 2011, with clarification needed for the calculation of the 2016 target for Spain<sup>7</sup>.

For this reason also, to facilitate interpretation of the results in terms of savings, this 2014–2020 NEEAP uses a single energy efficiency indicator with just one activity variable (gross domestic product) given that the presentation in the 2011–2020 NEEAP of a high number of indicators made it difficult to interpret the results, including for those more familiar with the European Commission's recommendations on calculating savings using top-down indicators. When using *top-down* indicators, if the indicator decreases between the reference year and the year in which the savings are calculated, the savings will be positive (conversely, if the indicator shows a growing trend between the reference year and the year in which the savings are calculated, the savings will be negative, as occurred between 2007 and 2010 in Spain's industrial sector).

Use of the final intensity indicator, calculated according to GDP, as a single *top-down* indicator in this new Plan offers a single result for all sectors covered by Directive 2006/32/EC, aggregating

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<sup>7</sup> In the 2011–2020 Energy Efficiency Action Plan (see table 5, pages 15 and 16 of the *Executive Summary* of the Plan: [www.idae.es](http://www.idae.es)). Spain declared final energy savings of 4 720 ktoe in 2010, using 2007 as the reference year and for all energy end-use sectors (including ETS sectors). For calculating savings accountable under Directive 2006/32/EC, when subtracting savings for ETS sectors (i.e. negative savings), the final energy saving in 2010 totalled 6 682 ktoe. This figure represented 9.2% of the average consumption from the last five years prior to the entry into force of the Directive (6 536 ktoe/year).



the different potential evolutions that may occur in different sectors, modes or energy uses and, therefore, the savings in each sector, mode or use.

In conclusion, **Spain can again affirm that for the years 2010 and 2013, it has met and exceeded the savings target established in Directive 2006/32/EC of 9% of the average final energy consumption** for the five years before the Directive entered into force, after discounting the energy consumption of sectors not covered by the regulation.



**Table 3.3.1. Final energy savings according to Directive 2006/32/EC**

		2003	2004	2005	2006	2007	2013	2016
<b>FINAL ENERGY CONSUMPTION</b>	Industry	29 434	30 266	31 103	25 485	27 541	20 250	20 544
	Transport	36 626	38 347	39 670	40 829	42 089	32 118	30 057
	Residential, services and others	24 176	25 959	26 857	29 019	28 358	28 018	28 097
	<b>Total energy uses (ktoe)</b>	<b>90 237</b>	<b>94 571</b>	<b>97 630</b>	<b>95 333</b>	<b>97 988</b>	<b>80 386</b>	<b>78 698</b>
<b>Aviation/transport percentage</b>		<b>12.5%</b>						
<b>ETS/industry sector percentage</b>		<b>66.8%</b>						
<b>FINAL ENERGY CONSUMPTION (corrected) Industry and Transport</b>	Industry	9 772	10 048	10 326	8 461	9 144	6 723	6 821
	Transport	32 048	33 553	34 711	35 725	36 828	28 103	26 300
	Residential, services and others	24 176	25 959	26 857	29 019	28 358	28 018	28 097
	<b>Total energy uses (ktoe)</b>	<b>65 997</b>	<b>69 560</b>	<b>71 894</b>	<b>73 205</b>	<b>74 330</b>	<b>62 844</b>	<b>61 218</b>
<b>Directive 2003–2007 average annual consumption (ktoe)</b>		<b>70 997</b>						
<b>9% Directive 2003–2007 average annual consumption (ktoe)</b>		<b>6 390</b>						
<b>GDP</b>	<b>(€M at 2005 prices)</b>	850 484	878 125	909 298	946 352	979 238	922 437	951 317
<b>ENERGY INTENSITY</b>	<b>(ktoe/€ million 2005)</b>	0.0776	0.0792	0.0791	0.0774	0.0759	0.0681	0.0644
<b>FINAL ENERGY SAV.</b>	<b>2007 REF. (ktoe)</b>						7 174	10 993
	<b>% of 2003–2007 average annual consumption</b>						<b>10.1%</b>	<b>15.5%</b>
<b>Level of fulfilment of Directive 2006/32/EC</b>							<b>112%</b>	<b>172%</b>

Source: MINETUR/IDAE





MINISTRY OF INDUSTRY,  
ENERGY AND TOURISM

STATE SECRETARIAT FOR ENERGY



CHAPTER 4:  
MEASURES FOR ENFORCEMENT OF THE ENERGY  
EFFICIENCY DIRECTIVE



MINISTRY OF INDUSTRY,  
ENERGY AND TOURISM

STATE SECRETARIAT FOR ENERGY



## 4. MEASURES FOR ENFORCEMENT OF THE ENERGY EFFICIENCY DIRECTIVE

### 4.1. HORIZONTAL MEASURES

#### 4.1.1. Energy efficiency obligation schemes and alternative policies and measures (Article 7).

##### A. Energy efficiency obligation scheme.

In order to comply with the objective of Article 7 and in conformity with part 1 thereof, Spain will adopt an **energy efficiency obligation scheme**, which it will apply based on a standardised system of negotiable energy efficiency certificates that is sufficiently flexible and simple so as to limit the administrative burden both for the parties bound by the scheme and for the managing body, which is expected to be fully operative in 2015.

As already noted, the cumulative savings target is **15 979 ktoe** for the inclusive period between 1 January 2014 and 31 December 2020, which is equivalent to **571 ktoe/year** assuming it follows a linear distribution during the entire obligation period.

Reaching this savings target requires significant public and private investment in measures primarily for the renovation of equipment and processes in the industrial sector, the renovation of heating, cooling and lighting systems in the building sector (residential or tertiary use) or building envelope renovation, and measures for a more efficient use of modes of transport.

In accordance with Article 7(9), the application of this obligation scheme is to be combined with **other measures** from among those defined as alternatives in Article 7(9)(a), (b), (c), (d), (e) and (f) of Directive 2012/27/EU, such as financing schemes and instruments, fiscal incentives, regulations or voluntary agreements, standards and norms, energy labelling schemes, training and education, and information campaigns. As seen in the previous chapter, in 2014 so far, a number of important measures of this type have already been implemented using public funding.

Finally, to support the obligation scheme, an **Energy Efficiency National Fund** will be created in accordance with Article 20 of Directive 2012/27/EU.

The implementation of an energy efficiency obligation scheme that satisfies the objective of Article 7(1) of Directive 2012/27/EU requires that Member States designate **obligated parties** under paragraph 4, according to objective and non-discriminatory criteria.

For the energy efficiency obligation schemes implemented in Spain, the obligated parties shall be **electricity,<sup>8</sup>, gas and oil product (including for transportation) sales companies**. Obligations shall be established annually, with the overall target being distributed linearly over a 7-year commitment period.

The reference information for the initial distribution of targets by source is the sales of sales companies. The obligations applicable to energy suppliers operating in Spain shall derive from the application of each supplier's market shares to the previous savings target, by application of

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<sup>8</sup> With the entry into force of the last resort rate (Royal Decree 485/2009 of 3 April 2009 regulating the implementation of last resort supply in the electricity industry), electricity suppliers stopped providing sales services to concentrate on building, maintaining and operating networks, with sales companies being the only entities authorised to sell electricity to final consumers and classified into two groups: suppliers of last resort (only entity authorised to charge the last resort rate set by the government) and suppliers operating on the liberalised market.



Article 7(1) of Directive 2012/27/EU. Savings targets shall be set in terms of final energy and expressed in GWh.

To facilitate achievement of the savings deriving from the energy efficiency obligation scheme, a standardised energy saving certificate scheme shall be developed, based on a catalogue of measures and savings associated with each of these energy efficiency measures, with a preliminary version to be included in the update to the *'Report on the energy saving and efficiency policy measures in compliance with Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency'* submitted in December 2013. These certificates must all be issued and registered in complete transparency and shall be negotiable. IDAE<sup>9</sup> shall be the certifying body and manager of the energy saving certificate scheme.

At the end of each annual period, obligated parties should submit the certificates obtained in order to fulfil their obligation, or otherwise pay the equivalent amount into the Energy Efficiency National Fund. Diagram 4.1.1.1 shows the general functioning of the energy efficiency obligation scheme to be implemented by Spain.

**Obligated parties** under the applicable scheme shall include all electricity, gas and oil product suppliers which individually supply to final customers, without exception.

These companies shall be required to submit to the energy efficiency obligation scheme **managing body** (IDAE) energy efficiency certificates demonstrating sufficient fulfilment of the obligation by which they are legally bound. IDAE, as the regulatory body, shall monitor the fulfilment of energy efficiency obligations by obligated sales companies.

IDAE shall also be responsible for the issuance and registration of energy efficiency certificates. Any obligated party and/or energy services company (**bound** under the energy efficiency obligation scheme)<sup>10</sup> may request that IDAE issue energy efficiency certificates prior to accrediting the implementation of a measure aimed the achievement of energy savings among final consumers. Measures shall include energy savings and efficiency measures in **all energy end-use sectors**: industry, transport, buildings (residential and tertiary use, both public and private) and agriculture, considering all energy end-use sectors as covered sectors.

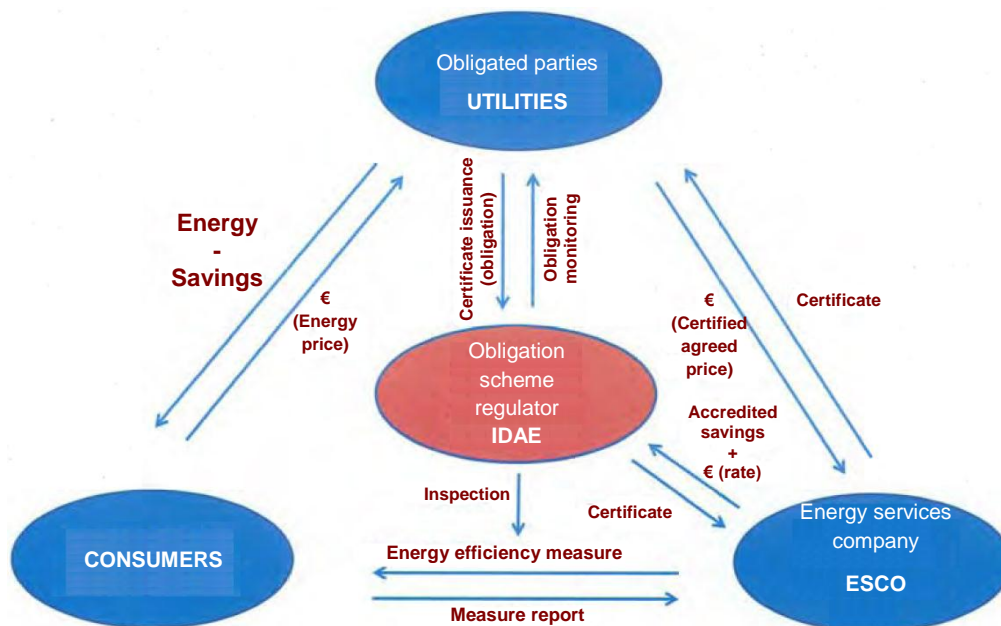
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<sup>9</sup> Institute for Energy Diversification and Saving (IDAE), a public business entity of the Ministry of Industry, Energy and Tourism.

<sup>10</sup> Obligated parties may measure certified energy savings obtained by energy service companies, for which energy service contracts can serve as a highly effective market instrument when it comes to fulfilling and monitoring fulfilment of savings targets.



**Diagram 4.1.1.1 General diagram showing the functioning of the energy efficiency obligation scheme**



The **energy savings target** deriving from the application of Article 7 for the 2014–2020 period shall be distributed linearly on an annual basis. By ministerial order, once the rules governing the functioning of the savings certificate scheme have received regulatory approval, savings targets will be set **annually** for each of the obligated parties, after discounting any savings obtained through the use of alternative measures.

**Eligible measures** shall be those included in the catalogue, which will be revised based on the evolution of market conditions. Without prejudice to the measures initially included in the catalogue, which is used for implementing the energy efficiency obligation scheme, ongoing technological improvements shall require the introduction of new measures for gathering and allowing for potential energy savings deriving from new end-use technologies. Measures shall be introduced into the catalogue whenever the resulting energy savings can be determined, in accordance with part 1 of Annex V to the Directive.

IDAE, as the managing body of the energy efficiency obligation scheme, shall have full powers of inspection and supervision to ensure the correct enforcement of energy saving and efficiency measures; any non-enforcement of measures according to the criteria established in the catalogue or failure to sufficiently demonstrate their enforcement by the company requesting energy efficiency certificates shall result in the refusal of such certificates.

IDAE may enlist the support of external entities specialised in monitoring the correct implementation of energy efficiency measures by energy service companies and/or obligated parties. Appointing IDAE as the body responsible for the issuance and registration of energy efficiency certificates and for monitoring and inspection activities guarantees its independence from obligated parties in its capacity as a public business entity of the Ministry of Industry, Energy and Tourism.

The obligation scheme to be implemented by Spain thus complies with Directive 2012/27/EU as it imposes upon obligated parties an overall target calculated in accordance with the calculation criteria included in Article 7(1) and in the explanatory note of Article 7 (SWD (2013) 451 final).



At the start of each obligation settlement period, the value of compensation to be applied to sales companies in the event of a deficit of certificates supporting the fulfilment of their annual saving obligation will be established. This value shall reflect an amount equivalent to the marginal investment incentive required by the scheme for fulfilment of the savings target in that period as was as any additional costs associated with the delay in achieving the savings.

Obligated parties shall be given the opportunity to fulfil their obligations under the scheme by means of a contribution, the amount of which shall be determined, to the Energy Efficiency National Fund. The Fund shall be established in accordance with Article 20, for which Spain shall draw upon its right under Article 20(6) of Directive 2012/27/EU (*'Member States may provide that obligated parties can fulfil their obligations set out in Article 7(1) by contributing annually to the Energy Efficiency National Fund an amount equal to the investments required to achieve those obligations'*).

Before 5 June 2014, Spain intends to submit to the European Commission an update to the *'Report on the energy saving and efficiency policy measures in compliance with Article 7 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency'* submitted in December 2013.

#### **B. Other policy measures, defined in Article 7(9) of Directive 2012/27/EU.**

Member States may opt to take 'other policy measures' to achieve energy savings in combination with the energy efficiency obligation scheme, as recognised in Article 7(9). Article 2 of the Directive defines 'policy measure' as a regulatory, financial, fiscal, voluntary or information provision instrument formally established and implemented in a Member State to create a supportive framework, requirement or incentive for market actors to provide and purchase energy services and to undertake other energy efficiency improvement measures.

Spain has implemented new measures of this type: on the one hand, financial and fiscal measures aimed at the application of energy efficient technologies or techniques and which help to reduce final energy consumption and, on the other, energy efficiency standards and voluntary agreements. An example of this are the programmes listed in part 3.2.2 and, in particular, Law 15/2012 of 27 December 2012 on fiscal measures for energy sustainability.

As mentioned in the previous section, an update to the information submitted in December 2013 is to be sent to the European Commission before 5 June 2014.

#### **C. Indicative scenario for achieving the obligation scheme final energy savings target.**

This section defines the indicative scenario for fulfilling the energy savings target of 571 ktoe/year, which is to be achieved through the implementation of an energy efficiency obligation scheme.

The energy savings achieved during the 2014–2020 period are to be measured and communicated to the European Commission following the **bottom-up** approach (using terminology from the previous 2011–2020 NEEAP).

The *bottom-up* approach requires calculating savings achieved measure by measure or project by project. In all cases, the **causal relationship** must be demonstrated between the measure promoted by the obligated parties or public authorities (where applicable), the investment made in the energy savings and efficiency measure, and the energy saving achieved.

The following criteria were used in selecting the scenario:



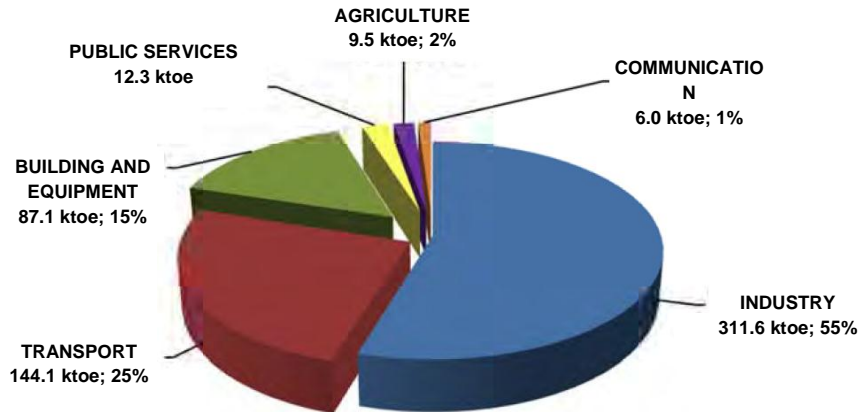
- **Sector-based distribution:** the distribution of energy savings and efficiency measures must include **all end-use energy consumer sectors:** industry, transport, buildings, services, etc.
- **Territorial distribution:** linked to sector-based distribution, given that certain sectors of activity are more concentrated less built-up geographic areas, such as industry or agriculture, whereas in large cities the service industry is predominant, for which a uniform regional distribution of measures must be encouraged.
- **Diffuse sectors:** measures must be promoted particularly in **diffuse sectors** given that, to ensure the full energy saving potential is realised, these require greater support than other sectors with faster energy saving measures in which such support is not needed.
- **Distribution according to energy used:** the energy savings target laid down in the Directive is primarily imposed on all types of final customers and energy sales companies, for which the consumption reduction target must apply to all conventional energy sources.

Distribution of the final energy savings target by sector (571 ktoe/year) resulting from the application of the above criteria and which must be achieved using the energy efficiency obligation scheme (Article 7) is shown in graph 4.1.1.1.





**Graph 4.1.1.1. Distribution of the final energy savings target (571 ktoe/year).  
Energy efficiency obligation scheme (Article 7 of Directive 2013/27/EU)**



Source: IDAE

The contribution of each sector to the energy savings target of 571 ktoe/year is as follows:

- 54.6% (311.6 ktoe/year) of the savings target must be achieved through energy saving and efficiency measures aimed at the **industry sector**. The most important measure is the adoption of the best available technologies in equipment and processes and, to a lesser extent, the implementation of energy management systems.
- 25.3% (144.1 ktoe/year) of the savings target must be achieved through measures in the **transport sector**, starting with mode changes, such as sustainable urban mobility measures and workplace transportation plans, followed by those pertaining to a more efficient use of transportation, such as road fleet management and efficient driving courses. Vehicle energy efficiency improvement measures, due to their particular nature, shall be implemented through specific programmes and are therefore not recorded in this part.
- 15.3% (87.1 ktoe/year) of the savings target must be achieved through measures in the **building and equipment sector**. In this scenario, savings would derive from the energy renovation of the thermal envelope of existing buildings, improvement in the energy efficiency of heating, cooling and domestic hot water systems, lighting, lifts and other transport systems and electrical installations. It would also derive from the restoration of existing buildings to a high rating. This also includes measures for improving the efficiency of commercial and industrial cooling systems and data processing centres. And, finally, the implementation of smart systems (home and building automation) and renovation of the stock of electrical appliances.

This distribution includes only those savings in the building and equipment sector promoted by the energy efficiency obligation scheme from Article 7, excluding those which may arise in application of the Spanish Strategy for Energy Renovation in the Building Sector (Article 4), as indicated in point 4.2.1.



- 2.2% (12.3 ktoe/year) of the target shall be achieved through measures in the **public services** sector, with measures pertaining to outdoor lighting holding significant weight and, to a lesser extent, the improvement in the energy efficiency of water purification, supply, wastewater treatment and desalination installations.
- 1.7% (9.5 ktoe/year) of the target shall be achieved through measures in the **agriculture and fishing sector**, particularly through the improvement in the energy efficiency of farms and in the use of farm machinery.
- 1.1% (6 ktoe/year) of the target through **communication** measures.

#### 4.1.2 Energy audits and energy management systems (Article 8)

Article 8 of Directive 2012/27/EU shall be transposed to the Spanish legislation through the approval of a Royal Decree, which has been subject to public consultation, concerning energy audits, accreditation of service providers and energy auditors, promotion of energy efficiency and energy consumption metering.

The obligation to perform an audit shall apply to large enterprises with more than 250 employees and with an annual trading volume in excess of €50 million or whose annual balance sheet exceeds €43 million. SMEs which, according to section I of the Annex to Commission Recommendation 2003/361/EC of 6 May 2003, fall under the definition of microcompanies or small and medium sized enterprises shall be excluded from the scope of application of the Royal Decree.

In accordance with the draft Royal Decree, large enterprises must be subject to an energy audit no later than 5 December 2015 and then at least once every four years after the date of the last energy audit.

Fulfilment of this obligation can be accredited by companies if:

- (a) They carry out an audit which adheres to the minimum guidelines established in the Royal Decree, which reproduces the minimum content of Annex VI to the Directive where such audits must: be based on up-to-date, measured, traceable operational data on energy consumption and (for electricity) load profiles; build, whenever possible, on life-cycle cost analysis; and be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement.

Energy audits performed in compliance with standards UNE EN 216501:2009 and the UNE EN 16247 series are considered to fall within the scope required by the Directive and its implementing Royal Decree.

- (b) They apply an energy or environmental management system, certified by an independent body in conformity with the pertinent European or international standards, provided that the management system in question includes an energy audit carried out in accordance with the criteria in Annex VI to the Directive.

The draft Royal Decree creates an Energy Audit Register in which to record all audits carried out by obligated large enterprises and those which undertake audits voluntarily. The Register will



contain information for identifying companies obligated to carry out regular audits, as well as information used for statistical purposes and for the sector or energy classification of companies.

The audit system shall be independent and audits shall be carried out by personnel from departments of the competent administration or, at the administration's discretion, by authorised auditing bodies or entities.

Energy audits shall be carried out by energy auditors qualified in accordance with the provisions of part 4.1.5 of this Plan.

The estimated number of large enterprises and establishments to be subject to energy audits is shown in the following table.

**Table 4.1.2.1. Estimated number of large enterprises required to carry out an energy audit, by sector (Article 8 of Directive 2012/27/EU)**

	No. of large enterprises	No. of establishments
Industry	931	5 813
Construction	192	1 474
Commerce	689	4 170
Other services	1 970	15 829
<b>TOTAL</b>	<b>3 782</b>	<b>27286</b>

**Source:** Compiled by IDAE

#### **4.1.3 Metering and billing information (Article 9, 10 and 11)**

The draft Royal Decree transposing Articles 9, 10 and 11 concerning energy audits, accreditation of service providers and energy auditors, promotion of energy efficiency and energy consumption metering is currently undergoing administrative processing by the Ministry of Industry, Energy and Tourism and will be approved by 5 June 2014, prior to the deadline indicated in Article 28(2).

In its current version it states that in existing buildings which have a central heating, cooling or domestic hot water system serving more than one user or in buildings supplied by a district heating network serving multiple buildings, individual consumption meters shall also be installed to measure the consumption of heat or cooling or hot water for each unit or final customer. It also adds that, in the case of the heating systems, where the use of individual consumption meters is not technically feasible, alternative systems shall be used to measure consumption.

Effective 1 January 2017, individual consumption measurement shall be obligatory for all existing buildings with a centralised system.

Meanwhile, the draft Royal Decree includes a transitory provision which establishes a period of six months for natural gas sellers and distributors to carry out the necessary changes to supply metering and reading equipment, affecting read frequency or the consequences of distributors not being able to read meters according to the frequency indicated in the law. It also provides for a periodic final customer automatic reading system whereby, if a customer does not report a meter



reading, the distributor can estimate its consumption based on the consumption profile of the supply point.

The law also regulates billing content and the obligation for all sellers to offer their customers free online billing and complementary information on historical consumption, within the terms of Article 10(2) of Directive 2012/27/EU. The law provides that the National Markets and Competition Commission - as regulatory body - carry out a cost-benefit analysis of the implementation of natural gas smart meters before 31 December 2016. However, in November 2011 this body already carried out an initial cost-benefit analysis on this implementation in accordance with the Directive.

Additionally, it should be noted that there is plan in place for the replacement of electricity supply metering equipment. Order ITC/3860/2007 of 28 December 2007 states that all electricity supply meters with a contracted power of up to 15 kW shall be replaced by new devices which offer time and remote management settings (known as 'smart meters') before 31 December 2018, **two years before the target set by Directive 2009/72/EC** of 13 July 2009 concerning common rules for the internal market in electricity. This change was to take place following a set of milestones which were subsequently amended by Order IET/290/2012 of 16 February 2012, with the schedule now as follows:

- (a) By 31 December 2014, 35% of each distributor's total stock of meters with a contracted power of up to 15 kW must be replaced.
- (b) Between 1 January 2015 and 31 December 2016, 35% of each distributor's total stock of meters with a contracted power of up to 15 kW must be replaced.
- (c) Between 1 January 2017 and 31 December 2018, 30% of each distributor's total stock of meters with a contracted power of up to 15 kW must be replaced.

The technical equipment requirements in Order ITC/3860/2007 on metering and remote management systems are set out in the unified regulation on electricity system metering points, approved by Royal Decree 1110/2007 of 24 August 2007 and Order ITC/3022/2007 of 10 October 2007.

#### **4.1.4 Consumer information and empowering programmes (Articles 12 and 17)**

This section provides information on the measures taken and envisaged to promote and facilitate an efficient use of energy by SMEs and households, as established in Articles 12 and 17 of the Energy Efficiency Directive.

According to Article 12, Member States shall take appropriate measures to promote and facilitate an efficient use of energy by small energy customers, including domestic customers. These measures may be part of a national strategy.

Meanwhile, Article 17 states that Member States shall ensure that information on available energy efficiency mechanisms and financial and legal frameworks is transparent and widely disseminated to all relevant market actors; establish appropriate conditions for market operators to provide adequate and targeted information and advice to energy consumers on energy efficiency, and promote suitable information, awareness-raising and training initiatives to inform citizens of the benefits and practicalities of taking energy efficiency improvement measures.



This Plan includes the implementation of citizen communication policies, covering all measures which encompass the communication initiatives to be carried out annually alongside plan policies.

The policies to be implemented are based on experience gained by the Institute for Energy Diversification and Saving (IDAE) through communication campaigns and information and training programmes for consumers and all other actors on the energy efficiency market.

As a result, many developments have been posted on the institute's website specialising in energy efficiency ([www.idae.es](http://www.idae.es)), including publications, online classes and an array of audiovisual content. The awareness-raising campaigns carried out over more than ten years have helped to track the evolution of the Spanish consumer profile and to better direct actions aimed at achieving quantifiable energy saving results.

The communication and information and training in energy saving and efficiency programmes designed for the transposition of Articles 12 and 17 are grouped into six parts:

#### **A. Communication and information**

A.1. Institutional advertising and communication campaigns.

A.2. Internet: IDAE website.

A.3. Period communications: IDAE online newsletter.

A.4. Internal audiovisual productions.

A.5. Citizen information service on energy efficiency and renewable energies (SICER)

#### **B. Training**

B.1. E-learning.

B.2. Attendance-based training.

These policies are described in more detail below, indicating the resources and experiences used as well as the general measure to be implemented.

##### **A.1. Institutional advertising and communication campaigns.**

The first institutional advertising and communication campaign on energy saving and energy efficiency under this Action Plan will be implemented in June. It will have national coverage. The campaign has a budget of €4 million, a savings target of 6 ktoe/year and is aimed at the 26 million holders of domestic energy agreements. This first campaign will run until 31 December 2014, with a similar campaign planned for each year during the entire 2014–2020 period.

The campaign is structured into three stages: permanent online presence through the creation of a citizen information site (search engine placement and social networks), mass media campaign (television, radio, press, etc.) accompanied by measures such as the distribution of 26 million leaflets with electricity bills, and the production and broadcasting of informative content on Spanish public television. It should be noted that, in 2011, an agreement was signed between Radiotelevisión Española (RTVE) and IDAE through which the former would grant IDAE a



television slot, free of broadcasting costs, enabling it to broadcast free of charge audiovisual products of public interest in energy saving and efficiency, development and use of renewable energies and innovative actions and projects in energy investment and sustainable development.

In regard to conventional public advertising and communication, public bodies act in accordance with Law 29/2005 of 29 December on institutional advertising and communication, which lays down the regulatory framework within which such campaigns are to be implemented. These campaigns must always be accompanied and backed by measures and programmes; energy saving and efficiency campaigns have always been included within National Energy Efficiency Action Plans (2005–2007 Action Plan, 2008–2012 Action Plan and 2011–2020 Action Plan).

Since 2004, IDAE has been running radio ('consumo' campaign), radio and television ('energía para todos, energía para siempre' campaign), press, outdoors and online ('ahorro de energía' campaign) campaigns, as well as periodic campaigns focusing on the efficient use of energy for heating (in winter) and air conditioning (in summer), aimed at the southern half of the peninsula and the Mediterranean basin as the areas which use the most energy for air conditioning.

On occasions, players from the Spanish national football team have been used to endorse energy saving (2009 and 2010 campaigns) and the wide distribution of the Vuelta Ciclista a España cycling race has been used to maximise the impact of communication.



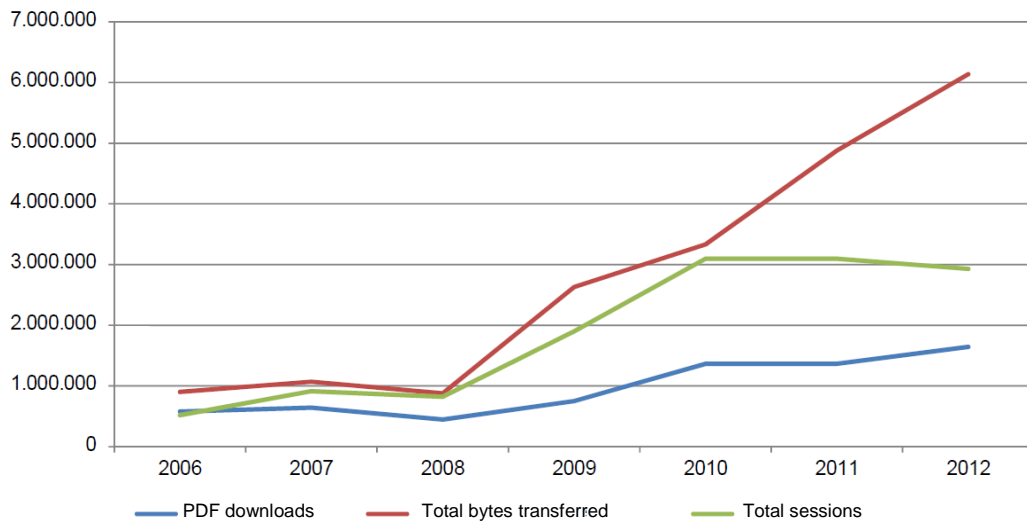
Special communications or direct marketing activities have also been carried out, consisting essentially of including informative leaflets giving advice on energy saving in the home with electricity bills sent out by different electricity sales companies to their customers.

## A.2. INTERNET: IDAE website.

Dedicated to the promotion of energy efficiency and renewable energies, [www.idae.es](http://www.idae.es) has been online since 1999 and provides information of public interest aimed at companies or citizens, ranging from news and meetings to planning documents, studies, training platforms, metering tools for energy installations or for calculating carbon dioxide emissions, internal audiovisuals for advertising and information, publications, reference databases for buying efficient cars or appliances, and many more. Traffic data for 2012 show 82 million hits and 1.6 million pdf downloads containing technical documentation.



**Graph 4.1.4.1. Evolution of IDAE website traffic**



**Source:** Compiled by IDAE

Site content includes:

- **The IDAE catalogue of publications:** available on the site, this contains more than 200 technical publications. One of IDAE's more prominent and informative publications is its 'Practical energy guide'. Aimed at citizens, this lay-language guide contains numerous tips on how to save energy on a daily basis both at home and in the car.

The first issue of the guide was published in 1994 and it has since been re-edited and updated numerous times. To date more than seven million copies have been edited and it has been widely distributed in Spain, with strong demand from different sectors (schools, colleges, consumer associations, companies, etc.), while it is also used as a reference in other Spanish-speaking countries such as Chile and Paraguay, which have produced adaptations to local situations. It is available both in print and electronic format, available through the website.

For this new period, the guide is being revised to include new features and tools that will make it easier to use and distribute in the digital environment.

**Informative documentation: statistical bulletins and reports:** drafting of various statistical bulletins on energy consumption by source and by sector (annual energy balance sheets), energy intensity, regulated pricing and cogeneration, with different frequencies (monthly or annual). This information is available under '*Studies, reports and statistics*':



- **Databases of energy service and renewable energy companies**, two of which from energy service companies (968 companies) and renewable energy companies (2 587 companies) are managed and kept updated.
- **Databases on high energy efficiency devices**, offering information to the public on the energy labelling of devices sold in Spain:
  - **Appliance, air conditioning and heating databases:** three databases on high energy efficiency devices have been available since 2006: electrical appliances, air conditioning systems under 12 kW and boilers. The following have been drawn up with the collaboration of industry associations with which IDAE holds agreements: ANFEL (*National Association of White Goods Electrical Appliance Importers*), ANGED (*National Association of Large Distribution Companies*), AFEC (*Association of Air Conditioning Equipment Manufacturers*) and FEGECA (*National Association of Heat Generator Manufacturers*).

These databases include over 8 000 electrical appliances, 1 800 boilers and nearly 4 000 air conditioning units. Besides serving as a public information tool, it has also been highly useful in the application of RENOVE plans promoted by the Spanish government in recent years.

- **Passenger vehicle energy labelling database:** since 2002, a database has been maintained which contains all models of passenger and commercial vehicles on the Spanish market, classified according to energy efficiency and CO<sub>2</sub> emissions. It has also been incorporating vehicles not subject to labelling obligations such as commercial and electric vehicles and those powered by alternative fuels. It currently contains nearly 15 000 models of passenger vehicles and vans, sorted by petrol and diesel, as well as other technologies: electric, LPG or CNG and biofuels. The database is being used in various government-funded programmes for restoring the national stock of vehicles, such as the *Efficient Vehicle Incentive Programmes* (PIVE), as well as being referenced in public procurement specifications for the purchase of vehicles by different public administrations.





The screenshot shows the IDAE website interface. At the top, there are logos for the Spanish Government and IDAE. Below the logos, there is a search bar with the text 'Buscador por marca y modelo'. The search criteria are set to 'Tipo de motor/tracción: Gasolina', 'Categoría: 307', 'Marca: Renault', and 'Modelo: Dinamo'. Below the search bar, there is a table titled 'Listado de Vehículos por Marca y Modelo'. The table has columns for 'Modelo', 'Consumo (l/100km)', 'Emisiones (gCO<sub>2</sub>/km)', 'Clasificación', and 'Consumo'. The table lists various Renault models and their corresponding CO2 emissions.

Modelo	Consumo (l/100km)	Emisiones (gCO <sub>2</sub> /km)	Clasificación	Consumo
Renault Caster 3 puertas 1.6 90cv Start&Start	4,6	113	100	100
Renault Caster 1.6 1.6 1.6 1.6	3,4	123	100	100
Renault Clio III - 3 puertas 1.6 1.6 1.6 1.6	5,1	126	100	100
Renault Clio III - 3 puertas 1.6 1.6 1.6 1.6	5,6	130	100	100
Renault Clio III - 3 puertas 1.6 1.6 1.6 1.6	3,1	119	100	100
Renault Clio IV - 3 puertas 1.6 1.6 1.6 1.6	5,5	127	100	100
Renault Clio IV - 3 puertas 1.6 1.6 1.6 1.6	4,5	109	100	100
Renault Clio IV - 3 puertas 1.6 1.6 1.6 1.6	5,2	126	100	100
Renault Clio IV - 3 puertas 1.6 1.6 1.6 1.6	4,9	118	100	100
Renault Clio IV - 3 puertas 1.6 1.6 1.6 1.6	4,5	114	100	100
Renault Clio IV Sport 1.6 1.6 1.6 1.6	5,5	127	100	100
Renault Clio IV Sport 1.6 1.6 1.6 1.6	4,5	109	100	100
Renault Fluence 1.6 1.6 1.6 1.6	4,8	115	100	100
Renault Fluence 1.6 1.6 1.6 1.6	2,7	118	100	100

In order to fulfil the obligations pursuant to Articles 12 and 17 of the Directive, these measures will continue to be implemented throughout the plan validity period. The citizen information service is to be expanded through the creation of an **online national citizen information platform on energy saving and energy efficiency**, which contains the practical energy guide and will be integrated into the existing citizen information service (SICER), offering online and telephone support.



### **A.3. Periodic communications: IDAE online newsletter.**

In 2004, IDAE began distributing a newsletter entitled 'Boletín Electrónico del IDAE', providing specialist information on IDAE activities in regard to energy saving and efficiency and renewable energies, which regularly reached more than 20 000 subscribers.

### **A.4. Internal audiovisual productions.**

Since 2005, IDAE has operated a dedicated line of communication on energy saving and efficiency and renewable energies based on the internal or third party creation of audiovisual productions targeting the general public. These productions are designed to be broadcast through different channels including television, internet and even cinemas.

Some of the more prominent content includes the educational documentary 'Energía 3D', which is being shown in 3D-equipped cinemas on an ongoing basis across the country. The documentary has two fundamental aims: to give value to energy, and to raise awareness among students of the importance of saving energy. The film is being targeted at all schools in Spain through a dedicated call centre from which calls are made to schools to explain the project to teachers.

A result of the agreement between Radiotelevisión Española (RTVE) and IDAE is the series '**Emprendedores Innovadores**' ('innovative entrepreneurs'), an informative 26-episode programme showing how different innovative Spanish entrepreneurs have created technology-based companies, some located in Spain and others abroad, related to energy saving and efficiency or renewable energies.

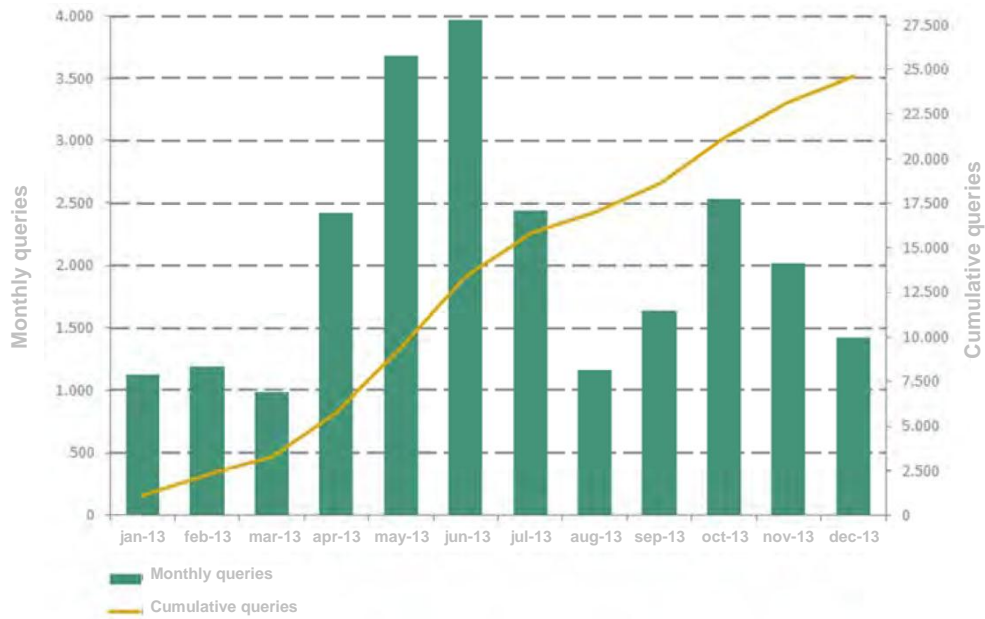
### **A.5. Citizen information service on energy efficiency and renewable energies.**

IDAE maintains a *citizen information service on energy efficiency and renewable energies* (SICER) set up in late 2008, which continues to run with a high satisfaction level among users.

In 2012, a total of 47 715 queries were attended to, with an average of around 3 500–4 000 queries per month. Graphs 4.1.4.2. and 4.1.4.3 show query statistics sorted by month and by autonomous community.



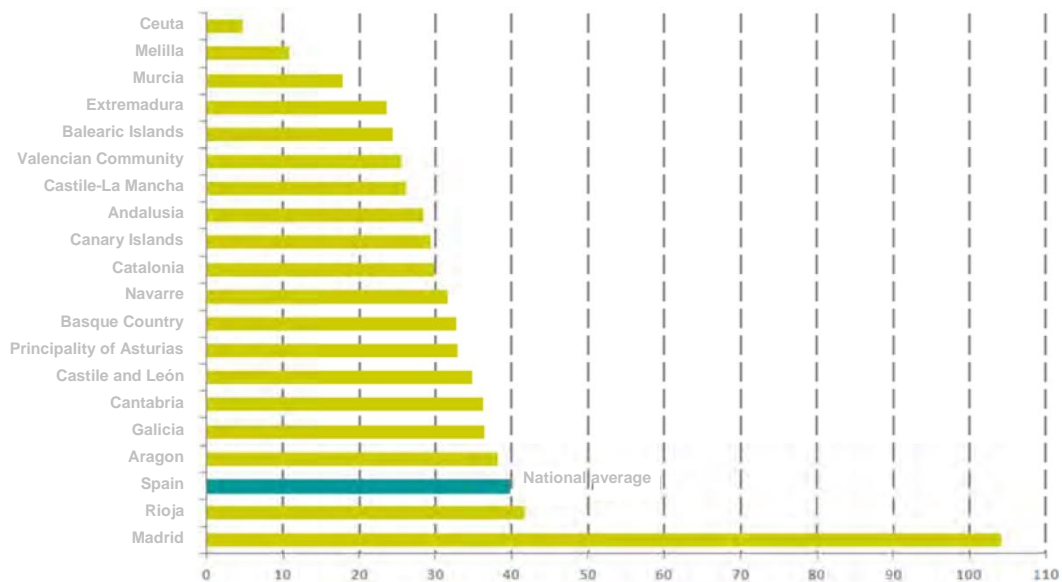
**Graph 4.1.4.2. SICER annual balance sheet**



**Source:** Compiled by IDAE

**Graph 4.1.4.3. SICER queries by autonomous community**

**(queries per 100 000 inhabitants)**



**Source:** Compiled by IDAE/INE



### **B.1. E-learning.**

Training content has been developed which aims to raise awareness and promote active collaboration among all citizens to reduce energy consumption.

The website [www.aprendecomoahorrarenergia.es](http://www.aprendecomoahorrarenergia.es) offers free e-learning courses and provides tips on how to save energy at home and at work, as well as how to make a home energy certified. These highly practical courses last around two hours and have been taught to more than 12 000 students already. The following titles are available:

- Save energy with your appliances.
- How to drive efficiently.
- Your home: Individual heating and domestic hot water systems.
- Residents' associations: central heating and domestic hot water systems.

Energy efficiency certification for existing buildings: users.

- Energy efficiency certification for existing buildings: estate agents.

### **B.2. Attendance-based training.**

Each year, IDAE participates in some 200 activities organised by third parties and itself organises around 12 workshops offering specific training on energy saving and efficiency.

IDAE collaborates in the Master of Renewable Energies and Energy Markets programme offered by the School of Industrial Organisation (EOI), in which the energy efficiency module has become one of the most important in recent years.

One of the most prominent features is the *Energy Certification Training Plan*, developed during the second half of 2012 and in 2013, having educated more than 8,000 professionals and organised over a hundred courses and workshops in different formats, both in-person and *online*. The Plan required the collaboration of both the Autonomous Communities, as competent energy certification bodies, and professional associations, for which collaboration agreements were set up with the Higher Council of Architects' Associations (CSCAE), the General Council of Technical Architecture (CGATE), the General Council of Official Industrial Engineers' Associations (CGCOII), the General Council of Technical Industrial Engineers' Associations (COGITI), the Association of Technical Telecommunication Engineers (COGITT), the Association of Forestry Engineers (CIM), the General Council of Official Technical Mining Engineers' Associations (CGCOITM) and the Association of Road, Canal and Port Engineers (CICCP).

A dedicated website on energy certification programmes has been created at [www.idae.es/PFCEE/certificacion edificios.html](http://www.idae.es/PFCEE/certificacion edificios.html), as well as another on the Energy Certification Training Plan at: [www.idae.es/PFCEE/plan formacion.html](http://www.idae.es/PFCEE/plan formacion.html).

To answer queries, a support service has been set up under SICER (IDAE citizen information service) which has responded to more than 2 300 queries.



#### **4.1.5 Availability of qualification, accreditation and certification schemes (Article 16)**

As indicated in part 4.1.3, the draft Royal Decree transposing Directive 2012/27/EU in regard to energy audits, accreditation of service providers and energy auditors, promotion of energy efficiency and energy consumption metering is currently undergoing administrative processing and will be approved by 5 June 2014.

In its current version, the draft Royal Decree lays down requirements for undertaking professional activity as an energy service provider and the applicable requirements for undertaking professional activity as an energy auditor.

In the former case, individuals must have a suitable technical qualification. Legal entities must have at least one employee with the necessary qualifications. In both cases, civil liability insurance must be taken out to cover activity-related risks and installers or maintenance personnel must be listed in the autonomous community register as companies qualified in their relevant speciality(ies) according to the area of activity in which the company provides the energy service (heating/cooling systems, lighting, etc.).

To undertake professional activity as an energy auditor, under the draft Royal Decree the interested party must hold a suitable academic title.

It provides for the creation of a register of energy service providers within the Ministry of Industry, Energy and Tourism. In conformity with Article 16(3) of Directive 2012/27/EU, the draft Royal Decree recognises the activity of energy service providers legally established in any other Member State of the European Union within Spanish territory. Likewise, energy auditors from another Member State may carry out their professional activity in Spain.

In relation to energy audits, it defines the area of application, the scope and the minimum criteria to be followed, lays down an independent audit system and creates an energy audit register within the Ministry of Industry, Energy and Tourism. This register shall be used to record audits carried out in large companies with more than 250 employees and with an annual trading volume in excess of €50 million or whose annual balance sheet exceeds €43 million.

#### **4.1.6 Energy services (Article 18)**

This section provides information on the measures taken or envisaged to promote energy services, as well as offering a qualitative study of the national energy services market and its present and future evolution.

##### **A. Legislative measures in the promotion of energy services**

In Spain, the measures to stimulate the energy services market imposed by Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 were aimed primarily at the public sector, which is also required to play an exemplary role in the application of energy saving and energy efficiency measures and in promoting the procurement of energy services. In our country, the private sector is considered too mature to adopt this business model, with multiple financing projects undertaken twenty years ago through savings in energy conversion processes, cogeneration and renewable energies.



As an illustration of the inclination of energy services towards the public sector, it is worth recalling the simultaneous approval of the *2008–2012 Energy Savings and Efficiency Action Plan* and the *Plan for Energy Savings and Efficiency in Buildings of the General State Administration* by the Council of Ministers on 20 July 2007.

Approval of the *2008–2011 Energy Saving and Efficiency Incentive Plan* by Agreement of the Council of Ministers of 1 August 2008 (which includes, as the first measure, stimulating the energy services market) led to the approval, on 11 December 2009, of the *Energy efficiency incentive plan in buildings of the general state administration (AGE)*, targeting 330 energy consumer centres, all through the implementation of energy saving and efficiency measures by energy service companies.

The role of the *energy service company* (ESCO) has been incorporated into Spanish legislation by Royal Decree-Law 6/2010 of 9 April 2010 on measures for stimulating economic recovery and employment, with the following definition: '*a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria*'. This definition complies exactly with that given in Directive 2006/32/EC.

To promote the activity of energy service providers among public administrations, the government extended the approved plan for 330 energy consumer centres in the AGE to all other regional public administrations with approval of the *Energy Service Procurement Incentive Plan*, known as *Plan 2000 ESE*, targeting 2 000 energy consumer centres: 1 000 pertaining to the autonomous and local administration and a further 1 000 to the general state administration (Agreement of the Council of Ministers of 16 July 2010). Potential targets under this plan included buildings with a surface area exceeding 30 000 m<sup>2</sup> and energy and maintenance expenses in excess of € 400 000/year.

As part of the plan, lines of economic assistance were approved for autonomous and local administrations for the procurement of technical support in programme management, and for the energy service companies eventually awarded contracts, such as economic support for making investments in energy saving and efficiency measures (the latter at a maximum of 20% of the eligible investment).

Implementation of the plan allowed for analysis of the barriers created by this procurement procedure under the Public Sector Contract Law. As a result of this trial, Article 35 of Law 2/2011 of 4 March 2011 on Sustainable Economy established the obligation for public administrations to adopt, inter alia, a plan for optimising the energy consumption of their offices and facilities through energy service agreements which help to reduce energy consumption, remunerating the procuring company in the form of lower energy bills and ultimately helping to achieve budgetary sustainability in public finances.

Alongside this legislative activity, IDAE has promoted working groups within various associations of energy service companies and air conditioning, lighting and outdoor lighting installation technicians in order to analyse and discuss the implementation of this activity by these companies on the market and mechanisms for penetration. At the same time, conferences and seminars have been held to promote energy service companies, along with a training plan offering courses through the School of Industrial Organisation (EOI).



As previously mentioned, measures for stimulating the energy services market have so far been aimed primarily at the public sector, given that the private sector is considered too mature for their application. As a result of ongoing work since 2007, various agreement models have been developed which are compatible with the two types of procurement allowed for this activity under the Public Sector Contract Law, namely the combined supply and services agreement and the public-private collaboration agreement.

The purpose of these models is to serve as a reference point in negotiations between parties and to reflect the scope of the service and the commitments, rights and obligations assumed so that, from the moment they are created, these long-term agreements will cater for any unforeseen circumstances and contingencies.

In both cases, the agreement term is to be agreed for a specified period based on the time needed to amortise the investments made by the energy service company or the lines of financing provided, and the payment of services rendered is based (wholly or in part) on the energy savings obtained through the improvement in the building's energy efficiency.

These models differentiate between general consumption centres (primarily buildings) and municipal outdoor lighting installations, the latter being a type of installation that, when managed entirely through an energy service company, is easier to articulate both in terms of renovation (as supported in the regulation on energy efficiency in outdoor lighting installations, published in 2008) and of measuring results.

More recently, Law 8/2013 of 26 June 2013 on urban renovation, regeneration and renovation proposes the participation of energy service companies in building energy renovation incentive programmes, taking on financing commitments from the operations through savings that are amortised over time, for the implementation of energy saving and efficiency measures.

Procurement models are available to the public on the IDAE website via the following links:

- Agreement model, experiences and success stories in buildings.

<http://www.idae.es/index.php/id.662/re/menu.357/mod.pags/mem.detalle>

- Agreement model, experiences and success stories in public lighting.

<http://www.idae.es/index.php/id.644/re/menu.355/mod.pags/mem.detalle>

## **B. Measures of economic support for the procurement of energy services**

Since the approval of the 2008–2012 Energy Saving and Efficiency Action Plan, all lines of support to the improvement of energy efficiency have included energy service companies as a potential beneficiary, with the aim of encouraging this type of procurement. The following are examples of those currently active:

- JESSICA Holding Fund/FIDAE (Energy Diversification and Saving Investment Fund), aimed at financing sustainable urban development projects which improve energy efficiency, use renewable energies and are implemented by energy service companies or other private enterprises. It was established in 2010 through an EIB-IDAE collaboration agreement with a budget of € 122 million.

<http://www.idae.es/index.php/id.728/mod.pags/mem.detalle>



- Aid Programme for the Energy Renovation of Existing Buildings in the residential sector (PAREER). Set up in late 2013 as a specific aid programme for the energy renovation of existing buildings to promote comprehensive measures for the improvement of energy efficiency and for the use of renewable energies in the stock of existing buildings, with a budget of €125 million, which may be carried out through energy service companies.

<http://www.idae.es/index.php/id.745/re/menu.409/mod.pags/mem.detalle>





### **C. Measures for the distribution of energy services**

As part of the measures taken to promote energy services, IDAE has dedicated a section of its website to providing a different type of information:

- Basic information on energy services:

<http://www.idae.es/index.php/relcategoria.1030/id.662/reلمenu.357/mod.pags/mem.detalle>

- Information on financial instruments, incentives, subsidies and loans to support projects undertaken by energy service companies:

<http://www.idae.es/index.php/idpag.33/relcategoria.1024/reلمenu.377/mod.pags/mem.detalle>

- Links to the three national associations of energy service companies:

- o Association of Integral Maintenance and Energy Service Company (AMI):

<http://www.amiasociacion.es/>

- o National Association of Energy Service Companies (ANESE):

<http://www.anese.es/>

- Association of Energy Efficiency Companies (A3e):

<http://www.asociacion3e.org/>

- Action plan for training energy service companies as part of the collaboration agreement between the Institute for Energy Diversification and Saving (IDAE) and the School of Industrial Organisation (EOI):

<http://www.eoi.es/portal/guest/inicio#5>

### **D. List of energy service suppliers**

In order to raise awareness of energy service companies, IDAE has created a database of energy service companies which contains their contact information, services provided and geographic coverage area. This list of energy service providers contains 968 companies and is available via this link:

<http://www.idae.es/index.php/mod.empresasservicios/mem.fbusquedaEmpresas/reلمenu.168>

### **E. Qualitative study of the national energy services market.**

The energy services market in Spain, in its current form, is based on plans and legislative and economic support measures promoted by the government as described in the previous sections above, and comprises the following key objectives:

- To create associations of energy service companies which represent, manage and protect the economic and professional interests of their members while opening up a channel of communication in the sector, as well as to facilitate access to the market and to promote and carry out educational and informative measures on the ESCO market.



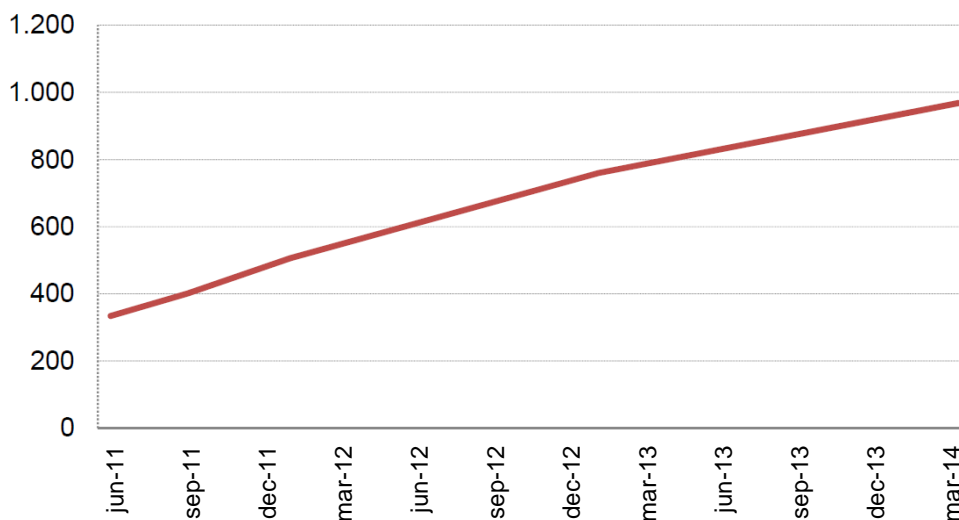
Three business associations have been created to date, bringing together almost the entirety of energy service companies operating in the country:

- o Association of Integral Maintenance and Energy Service Company (AMI)
  - o National Association of Energy Service Companies (ANESE)
  - o Association of Energy Efficiency Companies (A3E)
- To publish and promote, through IDAE, the models of energy service agreements drafted in collaboration with AMI and the Spanish Federation of Municipalities and Provinces, which were used in public competitions involving the different administrations. Working groups have since been established which continuously improve the wording of these documents, the models for which are publicly available on the IDAE website.

From a quantitative perspective, analysing the data stored in the IDAE database of companies registered as energy service providers, the following information can be used to measure the evolution of the sector and the current nature of these companies:

- In March 2014, 968 companies were registered as energy service providers, a number which has grown continuously since it started in 2010, thanks to the ongoing promotion and support of this business model in the Spanish market. This trend can be seen in graph 4.1.6.1.

**Graph 4.1.6.1. Evolution of the number of ESCOs registered in the IDAE database**



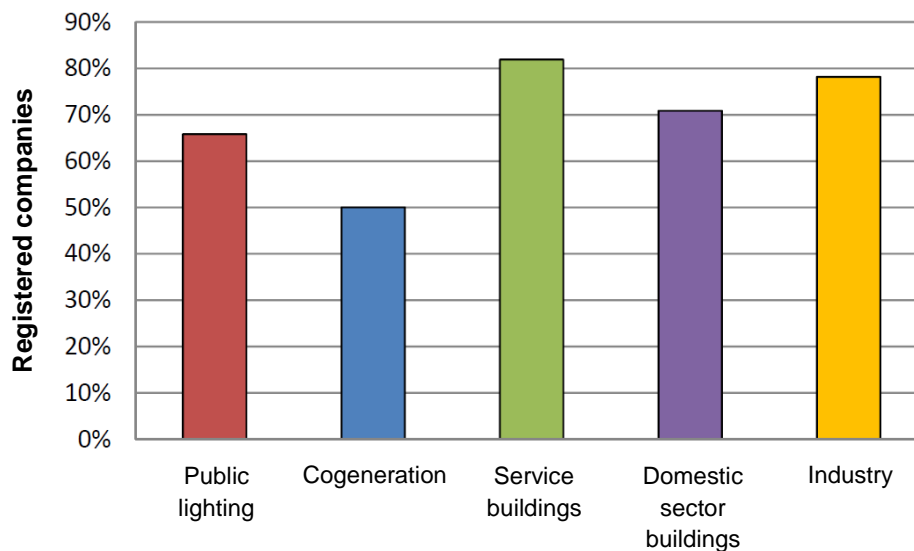
**Source:** Compiled by IDAE



- The profile of these companies is essentially that of engineering and installation and assembly companies, some of which are associated with building heating system maintenance companies (this latter activity being regulated in Spain through the Regulation on Building Heating Installations, RITE), as well as with subsidiaries of building companies and electricity suppliers, primarily.
- The most relevant data on their activity, size or geographic location can be obtained using the registration database given that their registration must contain a declaration of the activity or activities in which they are to provide their energy services, including: outdoor lighting, cogeneration, residential buildings, other buildings and industry.

The interesting finding from this declaration on the part of the 968 registered companies is that around 80% of them provide services in service buildings and industrial activities, 70% provide services in buildings in the domestic sector, 65% in outdoor lighting and just 50% in cogeneration (graph 4.1.6.2).

**Graph 4.1.6.2. Total activities declared by registered ESCOs: 968 companies**

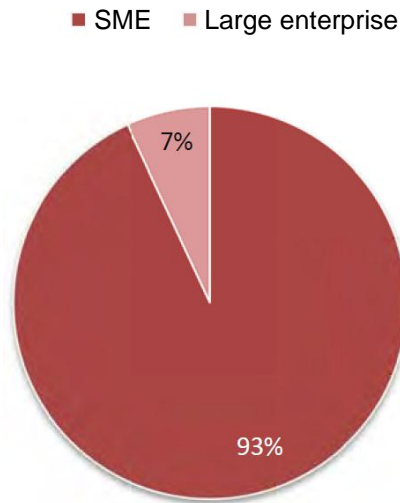


**Source:** Compiled by IDAE

- According to the number of employees in registered ESCOs and to their annual revenues, 93% of these companies are SMEs, that is, they have fewer than 250 employees and an annual revenue of less than €50 million, while 7% are large enterprises (Graph 4.1.6.3).



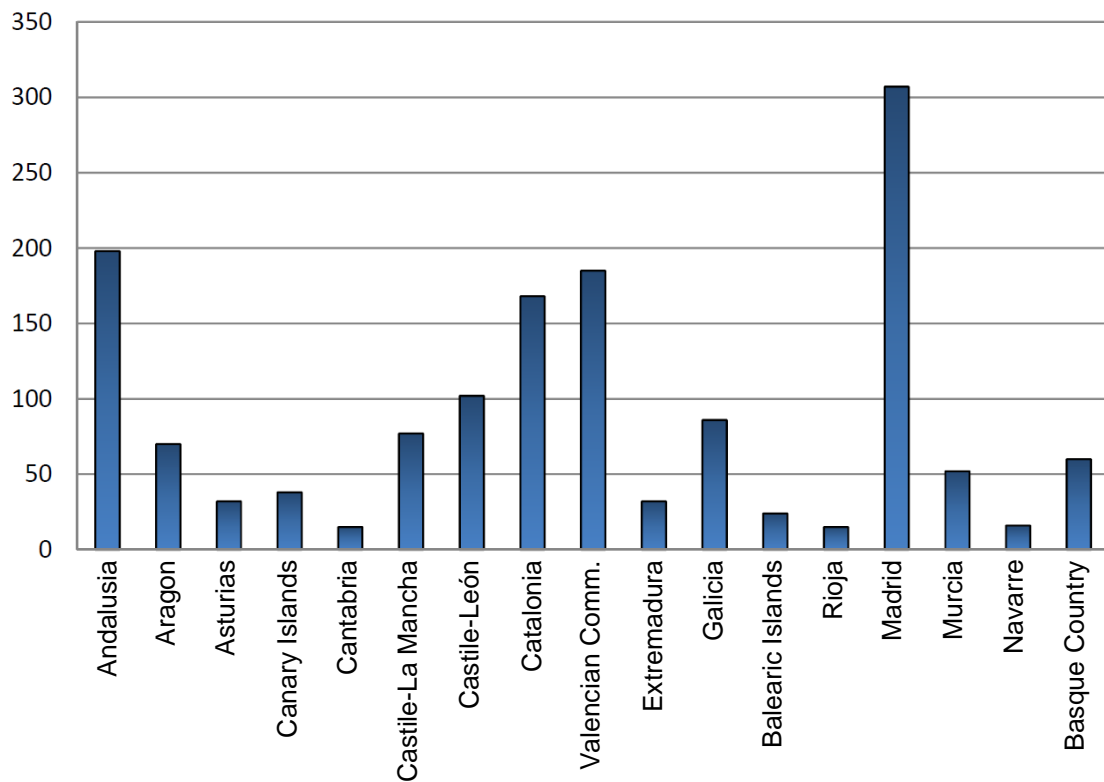
**Graph 4.1.6.3. ESCO size**  
**Total: 968 companies**



**Source:** Compiled by IDAE

- Finally, based on their head office (Graph 4.1.6.4), there are energy service companies in all autonomous communities, most of which are located (starting with the highest) in Madrid, Andalusia, the Valencian Community and Catalonia.

**Graph 4.1.6.4. Number of registered ESCOs per autonomous community**



**Source:** Compiled by IDAE



The following graph shows the system for searching for information on energy service companies in the IDAE database, which can be used freely by the public and searches can be performed by activity, number of employees, company size, revenues and place of business.

To search for energy service companies, or to find out if your company is registered and/or to edit its information, type your company name and click search.

[Register new company](#)

Company name	<input type="text"/>
Sectors of activity	--All-- <input type="button" value="v"/>
Number of employees	--All-- <input type="button" value="v"/>
Size of company by revenue (€ millions)	--All-- <input type="button" value="v"/>
Place of business	--All-- <input type="button" value="v"/>

To evaluate the penetration of the business in Spain, a sample of 36 energy service companies has been analysed and it is estimated that business volume in this activity grew by just over 10% in 2012, a rate of growth which was maintained in 2013, irrespective of the economic crisis affecting the country. Specifically, the emergence of this business has allowed for a more penetrative development of the activity given the need among owners of energy consumer facilities to optimise resources, cut costs and reduce their operating expenditure.

In the area of public procurement, ESCOs are heavily involved in the management of municipal lighting systems, with the preferred approach largely being to entrust full management to the ESCO, which not only handles the operation and maintenance of the installations but also supplies their electricity. This activity, in council outdoor lighting systems, is rapidly driving the growth of ESCO activity in Spain, and is backed by the publication of the Regulation on Energy Efficiency in Outdoor Lighting Installations (REEIAE) (RD 1890/2008) and by the influx of LED technology as a new lighting source.

In a future forecast based on these good results, the possibility is being analysed of reforming the aforementioned regulation (REEIAE) to require that cities with more than 25 000 inhabitants (of which Spain has 295) adhere to the requirements set forth therein within a maximum of 5 years. This regulation limits levels of lighting and light pollution, as well as requiring a new level of energy efficiency among outdoor lighting installations; any necessary investments can be made through an ESCO, following criteria of energy efficiency and economy.

This measure alone would involve changing more than 2 000 000 lighting points and would require an electricity consumption of more than 360 000 MWh/year, managing annual revenues exceeding €40 million in electricity supply and €90 million in maintenance operations, and an investment of more than €500 million in lighting equipment renovation.



It is difficult to establish a precise turnover figure, given that ESCO activity has been expanding not only among public administrations but also into new private sector business niches, both providing high energy performance equipment and in the development of new district heating infrastructures and the application of biomass, but it is no overstatement to suggest that the sector is worth almost €1 billion per year from activities in Spain.

#### **4.1.7 Other horizontal energy efficiency measures (Articles 19 and 20)**

This section on horizontal measures revisits the other measures to promote energy efficiency referred to in Article 19 of Directive 2012/27/EU and summarises the information provided by Spain in the report issued to the European Commission in December 2013 in relation to the formation of an Energy Efficiency National Fund (Article 20).

##### **A. Other measures to promote energy efficiency.**

Article 19 of the Directive states that Member States shall evaluate and, if necessary, take appropriate measures to remove regulatory and non-regulatory barriers to energy efficiency. It refers in particular to the potential barriers deriving from the legislation on property and furnishings, in relation to the split of incentives between the owner and the tenant of a building.

Owners of rented buildings are occasionally deterred from investing in energy efficiency improvements since the costs associated with the outlay must be assumed by the owner, who cannot transfer them to the tenant, even though it is the latter who will benefit from the energy savings deriving from the investments.

In a different sense, but with a view to eliminating the regulatory barriers which impede investment decisions regarding energy saving and efficiency, concerning decision-making in multi-property assets, Law 19/2009 of 23 November 2009 on measures to promote and speed up building rental proceedings and energy efficiency introduced several changes to the wording of the Horizontal Property Act 49/1960 of 21 July 1960.

Article 17(3) of the Act states that the installation or removal of equipment or systems which improve the energy efficiency of a property shall require a vote in favour from three fifths of the owners who, in turn, represent three fifths of the shares in the building. This new draft facilitates the adoption of agreements, where previously adopted in unanimity.

Article 19 of the Directive also refers to legal and regulatory provisions and administrative practices regarding public purchasing and annual budgeting and accounting, with a view to ensuring that individual public bodies are not deterred from making investments in improving energy efficiency and from using energy performance contracting and other third-party financing mechanisms on a long-term contractual basis.

According to Article 19(2), which states that such barriers shall be notified to the Commission in the first National Energy Efficiency Action Plan, Spain points out that the lack of a specific and binding interpretation by Eurostat on the consideration that must be given in national accounting to investments made by an energy service company in publicly-owned buildings or installations is impeding the development of the energy services market in countries which, like Spain, are subject to very tight fiscal controls.



It is important, therefore, that Eurostat make a decision regarding the national accounting of public-private collaboration agreements on integral measures for restoring buildings owned by public administrations (or others which affect publicly-owned installations), since applying the current general interpretation in relation to part VI.5 of the manual on government deficit and debt (ESA 95) leads to the application of the 50% criterion to the calculation of such investments as public debt, which under the current budgetary and fiscal restrictions acts as a deterrent from energy service procurement in the public sector.

Part 4.3.3 (purchasing by public bodies) describes the measures being taken to eliminate the barriers to establishing energy output agreements in the public administration.

## **B. Energy Efficiency National Fund.**

To support its obligation scheme, Spain, using the right it is granted in Article 20(4), shall set up an Energy Efficiency National Fund to guarantee fulfilment of its energy efficiency targets.

This fund shall be supplied, among other sources, from the compensation resulting from annual saving certificate fees, or, where applicable, from contributions made by obligated parties under national energy efficiency obligation schemes in order to fulfil their obligations pursuant to Article 20(6).

The funds needed for the renovation of buildings owned by the general state administration (Article 20(5)) may also be used in the percentage indicated in Article 5(1).

These shall be established by regulation, once authorised by the government in a superior rule of law, and shall serve as an important vehicle to achieve the binding energy savings target from Article 7, with particular focus on diffuse sectors: transport and housing.

## **4.2. ENERGY EFFICIENCY IN BUILDINGS**

The *building* sector covers, for the purpose of this Plan, all services which require greater energy consumption such as heating and air conditioning systems, ventilation and domestic hot water and interior lighting, as well as all other equipment commonly used in each sector (electrical appliances, commercial and industrial cooling, office technology, etc.).

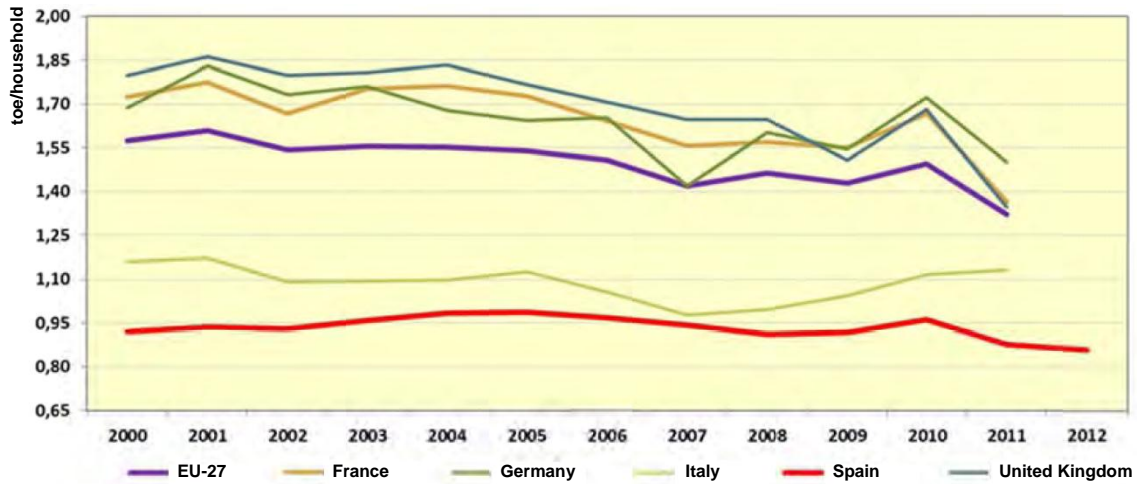
### ***Distribution and evolution of energy consumption in the building sector***

Final energy consumption in the building sector in 2012 rose to 25 534 ktoe with the total national consumption for energy uses of 82 991 ktoe, for which it represented 30.8% of the national final energy consumption for energy uses.

Of this consumption, 15 466 ktoe derived from the domestic building sector, making up 18.6% of the national energy consumption, while 10 068 ktoe derived from the services building sector, representing 12.1% of the total national energy consumption. The evolution of energy consumption in the residential sector is shown in graph 4.2.1 below, where it is observed that Spanish energy consumption is below the European average indicating a reduction in recent years to below 0.95 toe/household, while the European average, which also suffered a decline, is approximately 1.25 toe/household. Energy consumption in the services sector, expressed in terms relative to sector value added, are also below the EU-27 average (see graph 4.2.2).

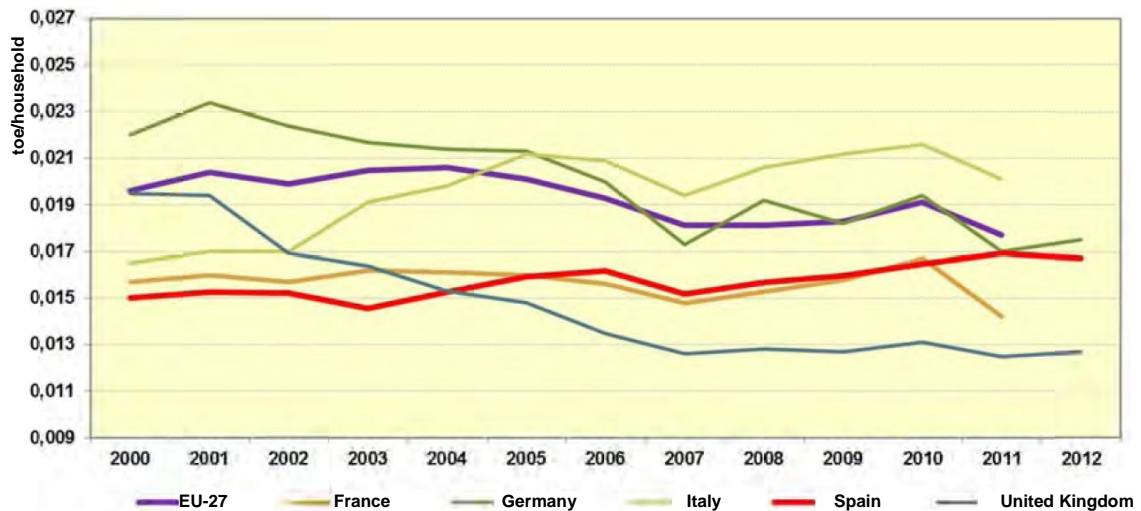


**Graph 4.2.1. Evolution of energy consumption in the residential sector (toe/household), 2000–2012**



Source: EU (EnR)/INE/IDAE

**Graph 4.2.2. Evolution of final intensity in the services sector (koe/€<sub>2005</sub>) 2000–2012**



Source: EU (EnR)/IDAE

According to data from the Ministry of Development, the stock of main dwellings in 2012 rose to 25 382 415 dwellings, of which 18 112 437 (71.36%) were main dwellings and 7 269 978 (28.64%) were not main dwellings.

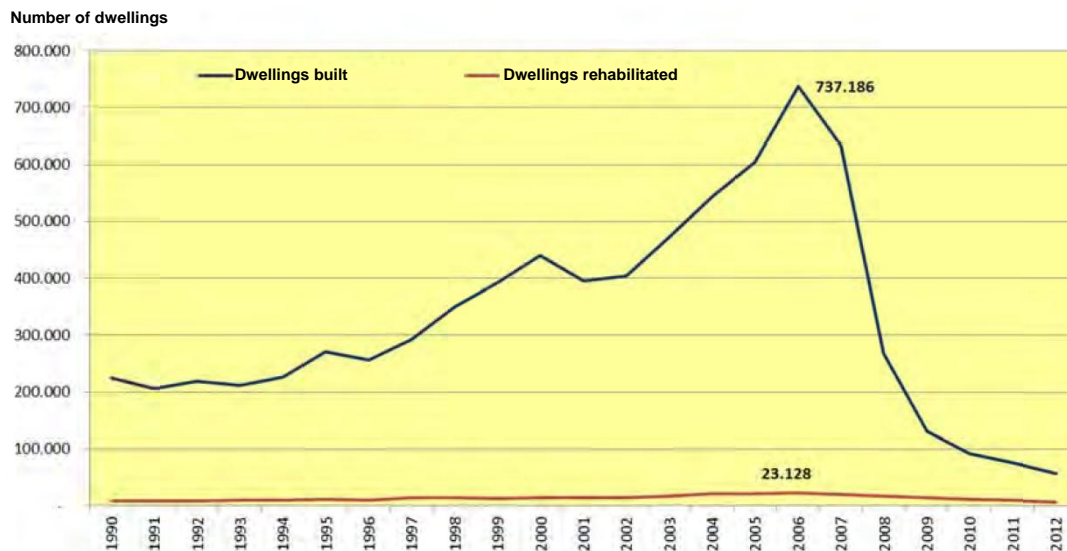
Based on information gathered from the latest INE census in 2011 and on area to be constructed according to the main intended use of new buildings from Ministry of Development statistics, it is estimated that the national stock in 2012 will comprise 10 million buildings, occupying around 2 500 million m<sup>2</sup> of usable space, 2 100 million m<sup>2</sup> of which for domestic use and 400 million m<sup>2</sup> for tertiary or service use, that is, a total stock of 9 720 304 buildings used as main dwellings or for domestic use and 393 956 buildings for use in the tertiary or services sectors.





From Ministry of Development construction statistics based on municipal construction, renovation and demolition permits by type of site and period, it can be concluded that the housing renovation market in Spain is very small, with renovation reaching its highest level in 2006 with 23,128 dwellings restored, while in that same year 737 186 new dwellings were built, therefore just 3% of all dwellings were restored.

**Graph 4.2.3. Evolution of the construction and renovation of dwellings in Spain, 1990–2012**



Source: MFOM

#### 4.2.1. Building renovation (Article 4)

In fulfilment of Article 4 of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency (EED), the Ministry of Development has drafted, within the framework of this 2014–2020 National Energy Efficiency Action Plan, a 'Spanish Strategy for Energy Renovation in the Building Sector'.

This is a long-term strategy (including forecasts for 2020, 2030 and 2050) which will be updated every three years, the aim of which is to stimulate investments in the renovation of residential and commercial buildings with a view to improving the energy performance of the national stock of buildings. With this in mind, it gives an in-depth analysis of how to take on exhaustive and cost-effective renovations which could potentially reduce consumption in terms of both the energy supplied to a building and its final energy level. According to the Directive, this strategy shall encompass:

- an overview of the national building stock based, as appropriate, on statistical sampling;
- identification of cost-effective approaches to renovations relevant to the building type and climatic zone;
- policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations;



- (d) a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;
- (e) an evidence-based estimate of expected energy savings and wider benefits.

Due to its nature, this strategy, since it proposes strategic building objectives that are more expansive than those established in the 2014–2020 National Energy Efficiency Action Plan, shall be implemented on a permanent basis.

The strategy contains a set of measures designed to encourage significant investments - both public and private - that are likely to create jobs, while at the same time facilitating in-depth building renovation projects, in economic conditions that are both favourable to the building owners and beneficial for the workers and companies carrying out the works. It will also create new opportunities that will allow the construction sector, which has been the most heavily hit by the crisis, to contribute substantially through renovation to economic growth and employment.

The strategy is therefore a long-term road map for companies in the construction and energy services sectors, professionals, building owners' associations, financial entities and even public administrations, in that it keeps them informed of the best options for ensuring they all realise their full potential.

From this perspective, the strategy expands upon the reforms initiated in 2012 and 2013, which resulted in the approval and implementation of Law 8/2013 of 26 June 2013 on urban renovation, regeneration and renovation and Royal Decree 233/2013 of 5 April 2013 approving the state plan for the promotion of rental housing, building restoration and urban regeneration and renovation for the 2013–2016 period. The first of these provided for new private financing opportunities, while breaking down significant legal barriers which did not prevent, but rather hindered, renovation, while the second provided public incentives to support such legal reforms.

Given its scope, this section will give a brief reference to its structure and main content, while deferring to the annex accompanying this national action plan for details on measures and the specific content of analyses carried out on the Spanish stock of buildings in order to define such measures.

The introduction is followed by an in-depth look at the renovation sector in Spain through analysis of the stock of buildings and of their current consumption.

This is then followed by a description of the measures already approved or which are currently in the process of being approved and analysis of the barriers and opportunities created by energy renovation in the building industry.

Part III of the strategy is perhaps the most fundamental as it describes its principal objectives, defines different strategic scenarios and lists the measures necessary for its implementation, including:

- Regulatory measures, intended primarily to adapt our legislation to that of the EU and to those of the forerunning countries in this area, promote the harmonisation of autonomous regulations, remove obstacles which artificially increase costs to help companies break into the business sector, and introduce greater flexibility to allow owners' associations to reach agreements to renovate their buildings.



- Administrative measures, intended to promote coordination among the three administrations, facilitate the oversight of renovation processes, promote the setting-up of single points of contact, speed up proceedings and licences and establish simple procedures which reduce costs deriving from the time and effort involved in current projects.
- Measures for improving financing, intended to guarantee the economic viability of operations, attract private capital, reduce costs for families and gradually reduce direct public subsidies.
- Information and communication measures, intended to ensure the public is better informed on the obligations and advantages associated with renovation, the latter particularly in terms of well-being, health and comfort, reduced energy bills and increased property values.
- And, finally, measures to ensure companies implement business strategies in the sector towards renovation and energy efficiency, aimed at designing standardised products which are recognisable to customers and offer a high added value, implementing protocols for evaluating the technical and economic viability of projects with which to obtain private financing more easily, formalising records of companies and professional individuals offering full guarantees to consumers, etc.

Its final part is an annex containing the documents on which the strategy was drawn up, with particular focus on the drafting approach, which divided the work into six groups involving all sectors, the macroeconomic impact of the renovation and essential statistical information.



#### 4.2.2. Other energy efficiency measures in the building sector

This section covers the legislative and economic measures which will contribute to the fulfilment of the target in Article 7, within the system of energy efficiency obligations in the building sector.

- **Legislative measures**

The measures aimed at improving the energy efficiency of buildings, with particular focus on the hotel industry, all fall under the provisions of Directive 2010/31/EC of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings, which lays down minimum energy efficiency requirements to be fulfilled by both new and existing buildings under development, the procedure for their energy certification and for performing periodic energy efficiency audits, and the construction of nearly zero-energy buildings. This Directive has been transposed to Spanish legislation by the following Royal Decrees:

- **Royal Decree 314/2006** of 17 March 2006 approving the **Código Técnico de la Edificación (CTE)** (Technical Building Code) which has been recently updated by **Order FOM/1635/2013** of 10 September 2013. This order has raised the level of the minimum energy efficiency requirements contained in the Basic Energy Saving Documents which will apply to new buildings and to the expansion and renovation of existing buildings for which work permits are requested starting March 2014.

Of its six components, the first three focus on energy efficiency and the last two on the incorporation of solar energy and renewable energies in buildings. Those on energy efficiency are as follows:

- o **Document DB HE0 - Limitation of energy consumption:** limits consumption of non-renewable primary energy in new buildings or existing buildings being upgraded used for private residential use. In the case of other-use buildings, the limitation is set based on energy rating using the primary energy consumption meter, which must achieve an efficiency rating of class B or higher.
- o **Document DB HE1 - Limitation on energy demand for heating and cooling:** toughens the insulation requirements for façades, roofs and hollows from the previous CTE and lays down criteria for procedures in existing buildings.
- o **Document DB HE3 - Energy efficiency of lighting installations:** provides that lighting installations must reach a certain energy efficiency level depending on their use. It also introduces obligations related to the regulation and control of lighting and, in particular, to the use of natural light in peripheral areas around the building. The energy efficiency of a lighting installation in a given area shall be determined using the installation energy efficiency value ('VEEI'); the installed lighting electrical power is also limited.

This regulation can be viewed at the following link:

<http://www.idae.es/index.php/id.45/re/menu.348/mod.pags/mem.detalle>

Under Directive 2010/31/EU Member States must ensure that all new buildings are nearly zero-energy buildings by 31 December 2020 and that, before the end of 2018, new buildings that are occupied and the property of public authorities are **nearly zero-energy buildings**. The update to the Basic Energy Saving Document, DB-HE and the requirements laid down therein constitute the first step forward towards the target of achieving buildings of this type.



- **Royal Decree 1027/2007** of 20 July 2007 approving the **Regulation on Building Heating Installations** (updated by **Royal Decree 238/2013** of 5 April 2013 amending certain articles and technical instructions of the RITE) regulates the minimum output requirements applicable to heating, cooling, ventilation and domestic hot water systems and periodic energy efficiency audits, as well as the design, size, assembly and maintenance of such systems. This can be found at the following link:

<http://www.minetur.gob.es/energia/desarrollo/EficienciaEnergetica/RITE/Paginas/InstalacionesTermicas.aspx>

- **Royal Decree 235/2013** of 5 April 2013 approving the **basic procedure for the energy efficiency certification of buildings** lays down the obligation to provide to the buyers or users of buildings an energy efficiency certificate which includes objective information on the energy efficiency of a building and reference values such as minimum energy efficiency requirements such that the owners or tenants of the building or a unit thereof may compare and evaluate its energy efficiency.

It also implements the basic procedure to be followed in calculating energy efficiency ratings, considering factors which have the most influence in terms of energy consumption, as well as technical and administrative conditions for building energy efficiency certifications.

The competent bodies of the autonomous communities must create a statistical inventory of measures related to certificates registered by them, which will serve as a crucial mechanism for planning measures to improve the energy efficiency of the existing stock of buildings and for monitoring compliance with the rule.

Moreover, information programmes on the energy rating of new buildings (called 'CALENER') and existing buildings (called 'CE3' and CE3X') have been made available to the public, alongside a training and information plan, which can be found at the following link:

<http://www.minetur.gob.es/energia/desarrollo/EficienciaEnergetica/CertificacionEnergetica/Paginas/certificacion.aspx>

In addition to this legislation, **Law 8/2013 of 26 June 2013 on urban renovation, regeneration and renovation**, which includes the obligation for housing block buildings for which any nature of public assistance is requested to draw up a **building evaluation report** comprising three documents, one of which is the building's energy certificate, promoting the renovation of buildings according to energy-based criteria. This report must be drawn up and an energy efficiency certificate obtained, by all collective residential dwellings more than 50 years old, within a period of five years, starting from the date on which they reach that age. Such documents are also required from buildings benefitting from public aid, such that in the 2014–2020 period a significant portion of the stock of existing buildings shall be required to obtain an energy certification. This will require some of those buildings to implement the energy efficiency improvement measures recommended in the energy certificate.

- ***Economic support measures***

Also of note, in addition to the foregoing legislative measures, are the **economic support measures** currently in force for the energy renovation of buildings, including buildings in the tourism sector, such as:



- **PAREER: Aid Programme for the Energy Renovation of Existing Buildings used in the residential sector (housing and hotel use)** approved by IDAE Resolution of 25 September 2013. Its goal is to encourage and promote the implementation of integral measures which favour energy saving, energy efficiency improvement and the use of renewable energies in existing buildings. Assistance is granted in the form of a monetary provision without compensation or repayable loan, depending on the type of measures (thermal envelope and heating and lighting installations). It has a budget of €125 million.
- **JESSICA-FIDAE** fund for financing the renovation of non-residential buildings, among other measures.
- **PIMA SOL** environmental stimulus plan, aimed at financing the energy renovation of hotels. Promoted by the Ministry of Agriculture, Food and Environment.
- **State plan for the promotion of rental housing, building restoration and urban regeneration and renovation, 2013–2016 (Royal Decree 233/2013)** of the Ministry of Development, aimed at promoting the energy renovation of residential buildings. Includes a residential building renovation programme aimed at improving energy efficiency. Measures eligible for subsidy include improving the thermal envelope of buildings to reduce energy demand for heating and cooling, installing heating, cooling, domestic hot water and ventilation systems and common building facilities such as lifts and lighting. To qualify for subsidies, the building's total annual energy demand in terms of heating and cooling must be reduced by at least 30% compared to the levels taken before implementation of the measures, as demonstrated by the energy certificate.
- **Contribution of the building and equipment sector to the final energy savings target under the energy efficiency obligation scheme.**

Part 4.1.1 C presented a general indicative scenario including distribution by sector of activity (industry, transport, buildings, etc.) to ensure fulfilment of the final energy savings target under the energy efficiency obligation scheme pursuant to Article 7 of Directive 2012/27/EU to achieve 571 ktoe/year.

While Directive 2012/27/EU on energy efficiency does not count savings after 2020, this scenario has a particular impact in the building sector where such measures have long periods of return but where there is considered to be a significant saving potential.

An analysis is then given of the building and equipment sector target of 88 ktoe/year, broken down into energy saving and efficiency measures, each of which is assigned an indicative target with which it is expected to contribute.

Building energy efficiency measures (table 4.2.2.1 and graph 4.2.2.1) are sorted into 11 groups, including residential use buildings, which are the most numerous, followed by the rest (administrative, commercial, teaching, hotel industry, etc.) from public and private sectors, including both large enterprises and SMEs, giving a total of 40 disaggregated measures.

Those considered of most importance are measures for the energy renovation of the thermal envelope of existing buildings with a saving of 16.28 ktoe/year and improvement in energy efficiency of heating installations with 17.31 ktoe/year, followed interior lighting measures, which have a savings target of 11.09 ktoe/year. These last three measures have a very impact on energy rating improvement. They have been set up as independent measures which will allow for an improvement in the efficiency level at any letter in the rating scale. Given the difficulty in



obtaining a high energy rating in existing buildings, since this requires a comprehensive renovation, such buildings shall be subject to measures which concern the thermal envelope, cooling and lighting, in addition to a specific measure for buildings opting for a high energy rating which applies integrally to the envelope and installations. In this case, the assigned saving target is lower, due to the challenges in implementing integral renovation measures for existing building stock in comparison to partial renovations.

Of the measures to be carried out, special focus will be placed on the industrial and commercial cooling sector, distinguishing between large centralised installations and renovation of conservation and freezing property. In total, the savings target is set at 5 ktoe/year. Another of the targets is to reduce energy consumption in lifts and another transportation systems, such as escalators and moving walkways, a sector in which there is still a significant potential for saving and where few energy efficiency measures (on lighting systems, energy recovery, etc.) have been introduced. The savings target is 7.36 ktoe/year. One measure showing great future potential is the use of ICTs to manage energy and to improve energy efficiency, related to the implementation of smart systems through home and building automation in existing constructions. In this case, the savings target is 9.3 ktoe/year. Finally, measures have been designed to improve energy efficiency in data processing centres (2.37 ktoe/year) and for the renovation of electrical installations (10.64 ktoe/year) and appliances (4.29 ktoe/year).

As already mentioned, this section only counts savings in the building and equipment sector promoted by the energy efficiency obligation scheme pursuant to Article 7, excluding any that may occur in application of the Spanish Strategy for Energy Renovation in the Building Sector (Article 4).



**Table 4.2.2.1. Contribution of the building and equipment sector to the final energy savings target under the energy efficiency obligation scheme (Article 7 of Directive 2012/27/EU)**

	Final energy saving (ktoe/year)
<b>BUILDING AND EQUIPMENT</b>	<b>88.01</b>
<b>Energy renovation of the thermal envelope of existing buildings</b>	<b>16.28</b>
Envelope renovation: Public buildings	2.38
Envelope renovation: SME buildings	1.75
Envelope renovation: Large enterprise buildings	4.76
Envelope renovation: Residential buildings	4.30
Envelope renovation: Residential buildings. Window renovation	0.72
Envelope renovation: Residential buildings. Renovation of façades and roofs	2.37
<b>Improvement of the energy efficiency of heating installations in existing buildings</b>	<b>17.31</b>
Improved heat installation eff.: Public buildings	1.48
Improved heat installation eff.: SME buildings	0.99
Improved heat installation eff.: Large enterprise buildings	2.17
Improved heat installation eff.: Residential buildings. Renovation of boiler rooms	3.73
Improved heat installation eff.: Residential buildings. Renovation of individual boilers	7.47
Improved heat installation eff.: Renovation of air conditioning systems	1.48
<b>Improvement of energy efficiency of interior lighting installations in existing buildings</b>	<b>11.09</b>
Improved interior lighting efficiency: Public buildings	2.66
Improved interior lighting efficiency: SME buildings	1.95
Improved interior lighting efficiency: Large enterprise buildings	5.32
Improved interior lighting efficiency: Residential buildings	1.17
<b>Renovation of existing buildings with a high energy rating</b>	<b>3.40</b>
Renovation with high energy rating: Public buildings	0.48
Renovation with high energy rating: SME buildings	0.35
Renovation with high energy rating: Large enterprise buildings	0.97
Renovation with high energy rating: Residential buildings	1.60
<b>BUILDING AND EQUIPMENT (continued)</b>	<b>88.02</b>
<b>Improvement of the energy efficiency of existing commercial cooling installations</b>	<b>2.22</b>
Improved eff. commercial cool. inst.: SME buildings	0.04



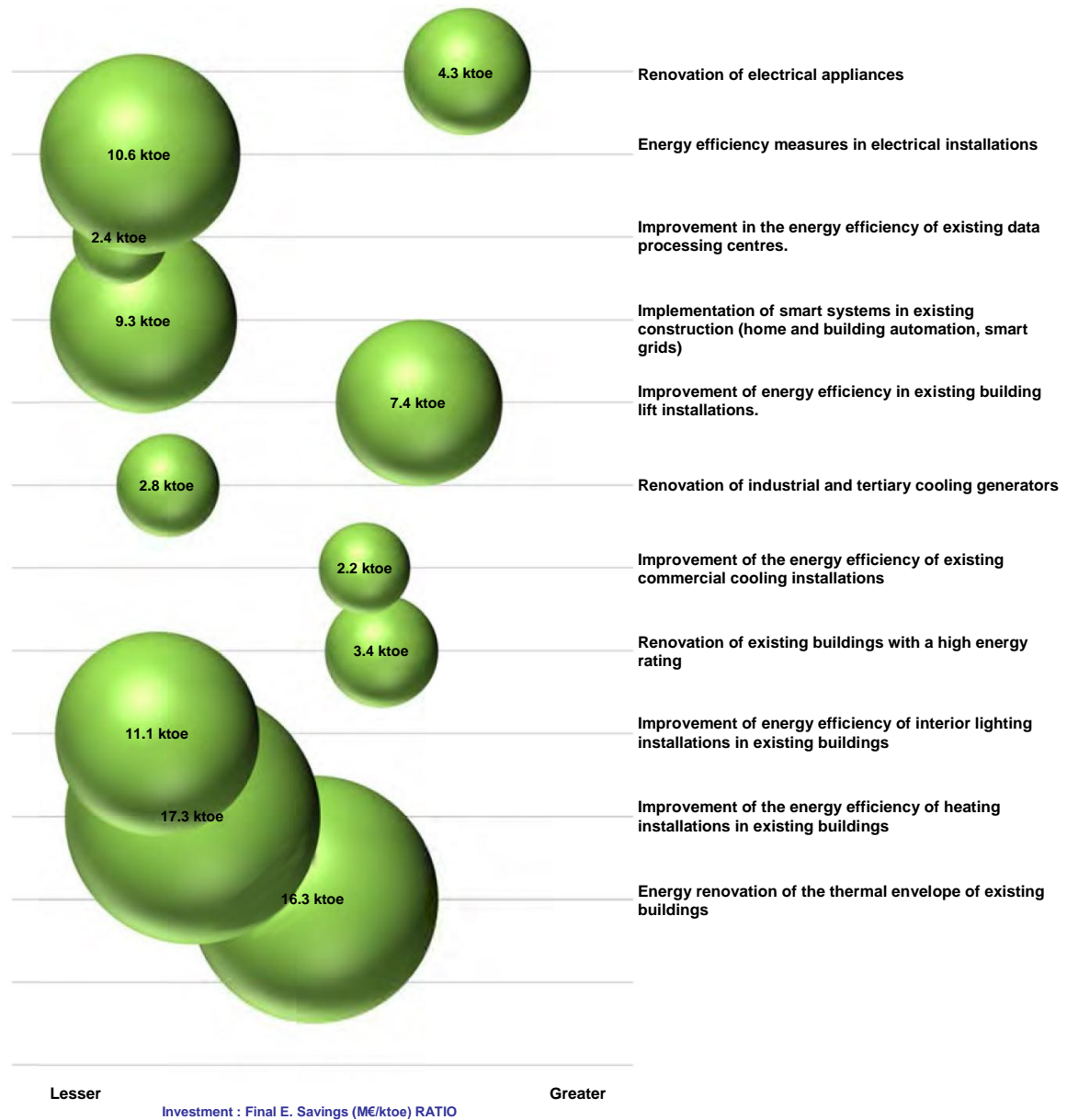


	Final energy saving (ktoe/year)
Improved eff. commercial cool. inst.: Large enterprise buildings	0.10
Improved eff. commercial cool. inst.: SME buildings Renovation of conservation and freezing property	1.04
Improved eff. commercial cool. inst.: Large enterprise buildings Renovation of conservation and freezing property	1.04
<b>Renovation of industrial and tertiary cooling generators</b>	<b>2.81</b>
Improved eff. industrial and tertiary cooling inst.: SME buildings	2.50
Improved eff. industrial and tertiary cooling inst.: Large enterprise buildings	0.31
<b>Improvement in the energy efficiency of lifts and other existing transport systems.</b>	<b>7.36</b>
Improved lift efficiency: Public buildings	0.14
Improved lift efficiency: SME buildings	0.12
Improved lift efficiency: Large enterprise buildings	0.06
Improved lift efficiency: Residential buildings	7.05
<b>Implementation of smart systems in existing construction (home and building automation, smart grids)</b>	<b>9.30</b>
Impl. building automation: Public buildings	1.65
Impl. building automation: SME buildings	1.21
Impl. building automation: Large enterprise buildings	3.29
Impl. home automation: Residential buildings	3.16
<b>Improvement in the energy efficiency of existing data processing centres.</b>	<b>2.37</b>
Improved efficiency of data processing centres: Public buildings	0.59
Improved efficiency of data processing centres: SME buildings	0.59
Improved efficiency of data processing centres: Large enterprise buildings	1.18
<b>Energy efficiency measures in electrical installations</b>	<b>10.64</b>
<b>Renovation of electrical appliances</b>	<b>4.29</b>
<b>Communication and information measures</b>	<b>0.93</b>

Source: Compiled by IDAE



**Graph 4.2.2.1. Contribution of the building and equipment sector to the final energy savings target pursuant to Article 7 (Directive 2012/27/EU): 571 ktoe/year (sphere volume).**



Source: Compiled by IDAE



### 4.3. ENERGY EFFICIENCY IN PUBLIC BODIES

#### 4.3.1. Central government buildings (Article 5)

According to Article 5(5) of Directive 2012/27/EU (Exemplary role of public bodies' buildings), by 31 December 2013, Member States shall establish and make publicly available an inventory of heated and/or cooled central government buildings with a total useful floor area over 500 m<sup>2</sup> and, as of 9 July 2015, over 250 m<sup>2</sup>, which includes information on floor area, the energy performance of each building or relevant energy data.

The inventory of buildings of the general state administration has been drafted and published within the stated terms and is available at the following link to the Ministry of Industry, Energy and Tourism website:

<http://www.minetur.gob.es/energia/desarrollo/EficienciaEnergetica/directiva2012/Paginas/directiva-2012-27UE.aspx>

#### A. Criteria and scope of the inventory of buildings

The inventory has been drafted in accordance with the following criteria:

- According to the definition given in Article 2(9) of the EED, 'central government' means all administrative departments indicated as part of the Administración General del Estado (AGE) (general state administration) by Law 6/1997 of 14 April 1997 on the Organisation and Functioning of the General State Administration (LOFAGE).
- The inventory only includes buildings which have heating and/or cooling systems and cover a total floor area of over 500 m<sup>2</sup>. The inventory of buildings with a total floor area of over 250 m<sup>2</sup> shall be drafted, as indicated in the Directive, by 9/7/2015.
- The selected buildings are the property of the general state administration, are occupied as of the date of compilation of the inventory, and have a heating and/or cooling system.
- The published inventory does not include buildings with any official levels of protection, established by the different down planning laws of local entities and by competent bodies in regard to the architectural or historical merit of the autonomous communities and of the general state administration, in accordance with the requirement pursuant to EED, Article 5(2). These protected buildings, not included in this published inventory, have been included in an energy inventory following the same method and may be the subject of specific energy efficiency improvement measures based on their architectural characteristics.
- This inventory also excludes, in accordance with Article 5(2) of the Directive, '*buildings owned by the armed forces or central government and serving national defence purposes, apart from single living quarters or office buildings for the armed forces and other staff employed by national defence authorities*'. However, the Ministry of Defence has developed its own asset and energy management system, called SINFRADEF, which contains information on the consumption and energy efficiency of all of its buildings. This way, while information related to the Ministry is not included in this inventory, for security reasons, property of the Ministry of Defence does have a system in place with targets similar to those established in Article 5 of the Directive. For this reason, buildings of the Guardia Civil Directorate-General have been considered as buildings serving national defence purposes, but have also been included in an energy inventory following the same method and may be the subject of specific energy efficiency improvement measures based on their architectural characteristics.



- Finally, the inventory excludes 'buildings used as places of worship and for religious activities', which are also excluded under Article 5(2) of the Directive, even though no buildings of this nature have been identified within the public stock of buildings.

## **B. Compiling the inventory**

Coordination for programming measures to create the inventory and for the gradual renovation of the portfolio of buildings established in the inventory is combined between the Ministry of Industry, Energy and Tourism and the Ministry of Finance and Public Administrations, while implementation of the reforms necessary to achieve the target set out by the Directive are under the duty and responsibility of the ministries or bodies to which the affected buildings are assigned.

The Institute for Energy Diversification and Saving (IDAE) was entrusted with implementing the inventory. To do this, it designed and developed an **electronic energy and asset management platform (PIGEP)**, the main purpose of which is the centralisation and use of asset and energy information on buildings belonging to the general state administration (AGE).

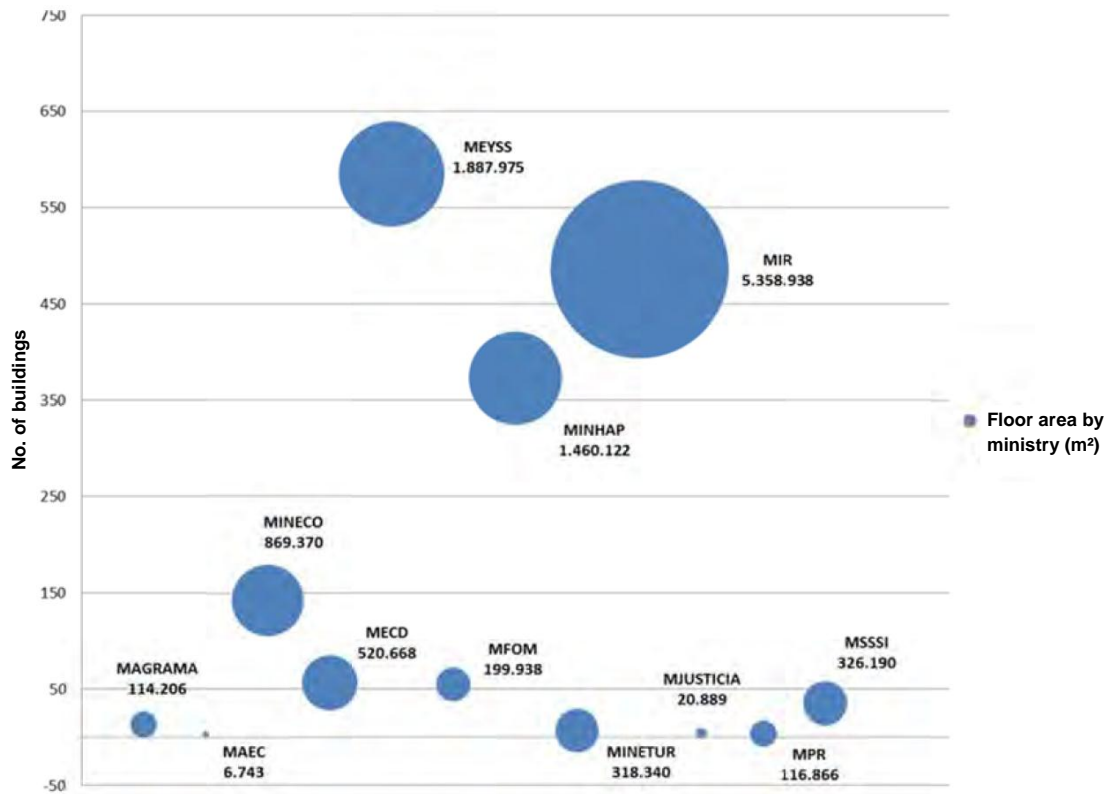
The inventory was eventually compiled in 2013, in collaboration with all affected ministries and bodies, using the PIGEP application. The selection of buildings and the energy and asset data it contains were provided by the energy departments of each ministry and by each building's energy manager, specifically appointed to fulfil the obligations of this directive. The ongoing operation of the PIGEP application in the future will help each building manager to keep the inventory updated.

## **C. Description of the inventory**

The inventory contains a list of 1 763 buildings, with a total floor area exceeding 11 200 244 million m<sup>2</sup> distributed among twelve ministries, with the exception of the ministry of defence due to the reasons set out above. The ministries which occupy the most floor area are the Ministry of the Interior with 5.3 million m<sup>2</sup> (47.8%), followed by the Ministry of Labour and Social Security with 1.8 million m<sup>2</sup> (16.8%) and the Ministry of Finance and Public Administrations with 1.4 million m<sup>2</sup> (13%). These three ministries occupy more than 77% of the AGE's total floor area.



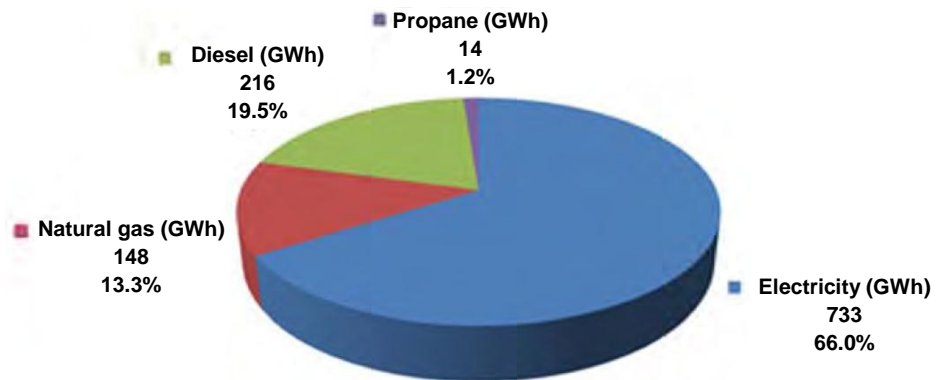
**Graph 4.3.1.1. Floor area of AGE buildings by ministry (m<sup>2</sup>). 2012 inventory**



Source: Compiled by IDAE

Total energy consumption amounts to 1 111 GWh/year, consisting mostly of electricity at 733 GWh/year (65.98%) and, to a lesser extent, diesel at 216 GWh/year (19.47%), natural gas at 148 GWh/year (13.33%) and propane at 13.5 GWh/year (1.22%). The average consumption ratio for the entire stock is 99.2 kWh/m<sup>2</sup> per year.

**Graph 4.3.1.2. Energy consumption of AGE buildings by source. 2012 inventory**



Source: Compiled by IDAE



#### **D. Energy renovation of 3% of the floor area of buildings**

According to Article 5 of the EED, on the basis of this inventory, 3% of the total floor area of buildings occupied by the general state administration must be renovated in 2014, and then every year thereafter during the 2014–2020 period, to meet at least the minimum energy performance requirements established in application of Article 4 of Directive 2010/31/EU on the energy performance of buildings.

Applying this requirement to the floor area of 11.2 million square metres under inventory, 3% of the renovation will require work on 336 007 m<sup>2</sup>/year. The inventory of buildings being renovated during 2014 and which shall contribute to the target set in this article is currently being compiled.

#### **E. Alternative approach and Plan for Energy Savings and Efficiency in Buildings of the General State Administration.**

The Directive provides for the use of an alternative approach in Article 5(6), provided that an improvement equivalent to the energy performance of the buildings from the first option is achieved. One of the possibilities is the metering of energy savings due to behavioural change of occupants deriving from training and awareness raising activities.

In addition to the renovation of this floor area, Spain has also adopted an alternative approach including measures to change the behaviour of the occupants of these buildings, which were already being implemented in relation to this population in recent years; also, during the 2014–2020 period, it may also use the Energy Efficiency National Fund, pursuant to Article 20(5) of the EED, if it considers it necessary to achieve its energy saving targets.

This alternative approach shall include the results obtained through the Energy Saving and Efficiency Plan for buildings of the general state administration (PAEE- AGE), approved by Agreement of the Council of Ministers dated 20 July 2007, the aim of which is to establish a programme of specific measures for each energy consumption sector, with a minimum energy saving target of 20% by 2016.

The PAEE-AGE is applicable to all buildings of the ministries, public bodies and companies covered under Article 166.1(c) and (d) of Law 33/2003 of 3 November 2003 on the assets of public administrations, as well as public state foundations.

The aim of the plan is to optimise energy consumption in both new and existing buildings, for which it includes measures in works procurement, purchasing of energy consumption or conversion equipment, project contest, asset management, building energy management and training, information and awareness raising of users and managers of public buildings. The Institute for Energy Diversification and Saving (IDAE) was made responsible for plan coordination and oversight.

With this objective, the electronic energy and asset management platform (PIGEP) has been developed and used for the entry, centralisation and use of all information provided by different bodies and institutions pertaining to the AGE. It is an online platform based on the client/server philosophy, which is accessible using standard web browsers on any internet-connected computer.

It can therefore be used from any location, facilitating data entry from any administrative brand of the AGE. This makes the tool a key asset in the gathering of information.



Some of the more prominent measures under the plan are:

- The creation of a network of building energy managers which monitor and control the energy saving and efficiency measures which may be implemented in energy consumer centres. The formation of this network has been essential in centralising and using energy information on the national stock of public property, while it has also provided additional benefits, establishing a path for direct communication with energy managers to provide training, information and awareness, offering technical/regulatory consultancy, etc. This network currently comprises around 2 000 individuals from different ministries and the main public organisations.
- Development of an online training platform on energy saving and efficiency for the general state administration (<http://formacion.pae-ae.es/>), offering training and awareness courses aimed at public building energy managers and at civil servants with recommendations on energy saving in the workplace. So far around 6 000 courses have been provided to civil servants.

### Electronic energy and asset management platform



- Organisation of in-person training courses on energy saving and efficiency for energy managers and civil servants.
- Publication of guides on energy saving and efficiency measures applicable to public buildings.
- Drafting of specific legislation for public buildings on operating conditions and functioning of energy consuming installations in public buildings.

Energy saving awareness campaigns for civil servants.



Both the fulfilment of the renovation target of 3% of the floor area to be renovated in AGE buildings and the impact of the additional information, training and awareness measures on energy managers and civil servants shall be monitored via the electronic energy and asset management platform (PIGEP).

#### **4.3.2. Buildings of other public bodies (Article 5)**

Article 5 of the Directive encourages the extension of the energy efficiency measures to be implemented in buildings of the general state administration to all other administrations, such as the autonomous communities and local governments, placing emphasis on measures aimed at social housing.

This section provides information on measures (already adopted or envisaged in Spain) for encouraging the adoption, by public bodies and social housing bodies governed by public law, of an energy efficiency plan which demonstrates the exemplary role of the buildings of public bodies.

The information is structured into three parts: energy inventory of other public bodies, energy efficiency plans in public buildings of the autonomous communities, and energy efficiency measures in social housing.

##### **A. Energy inventory of other public bodies**

In Spain, the transposition of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings includes the obligation for the competent body of each autonomous community to set up, as of 14 April 2013, a register of energy certificates implemented within its territory, as well as an inventory of certificates registered since the entry into force of the previous Royal Decree 47/2007 of 19 January 2007 approving the basic procedure for the energy efficiency certification of new buildings.

Royal Decree 235/2013 of 5 April 2013 approving the basic procedure for the energy efficiency certification of buildings states, in its second transitory provision, that existing buildings or units of existing buildings occupied by a public authority and which are commonly frequented by the public must obtain an energy efficiency certificate and display their energy efficiency label if their total useful floor area exceeds 500 m<sup>2</sup> (by 1/6/2013).

Public buildings larger than 500 m<sup>2</sup> are required to register their energy certificates, in accordance with Article 5 of the EED, which includes a compulsory document proposing measures for improving the energy efficiency of the building which, based on such information, would facilitate their enforcement.

While Article 5 of the EED only requires the establishment of an inventory of buildings of the general state administration, Spanish legislation goes a step further, extending the obligation to certifying and registering the buildings of autonomous and local governments.

Given its obligatory nature, the official registration of energy certified buildings naturally requires keeping an energy inventory of those buildings, an invaluable tool which facilitates energy audits and is used to implement energy efficiency plans in the national stock of public buildings.





## B. Energy efficiency plans in public buildings of the autonomous communities

Autonomous and local governments are pioneers in the procurement of energy service companies and in the use of energy performance contracts and public-private collaboration to finance measures adopted by the autonomous communities which coincide with the guidelines of Article 5(7) of the Directive.

All of Spain's autonomous communities are implementing or planning to implement energy efficiency plans in their public buildings. These can be split into three main groups: the adoption of an energy efficiency plan as an exemplary role of public buildings, the implementation of an energy management system which includes energy audits, and the use of energy service companies and energy performance contracts to finance renovations and to implement plans for maintaining or improving long-term energy efficiency.

The following is a summary of the main measures in place within each autonomous community:

- **Andalusia:** The Andalusia Government Energy Network (REDEJA) is an instrument which encourages energy diversification practices in public buildings. The *2007–2013 Andalusian Energy Sustainability Plan (PASENER)*, in its 'Energía y Administración' programme, establishes measures to be implemented within the administration which are split into four areas: optimisation of energy supplies and unified electricity service management (which includes around 5 000 supplies), performance of 400 energy audits in public buildings, consultancy in procurement for undertaking the savings measures identified in the audits and in new building projects (more than 250 centres), and a training programme offering 47 courses which have been attended by 1,000 students from the Andalusian government.
- **Aragon:** the measures established in the '*Action Plan for Energy Efficiency in Public Buildings of the Autonomous Community of Aragon*' include evaluation of the energy situation of energy consuming installations through energy audits and proposed measures (rationalising electricity, lighting, heating and domestic hot water, energy use control and management systems, improving the thermal envelope of buildings), promotion of energy service procurement, creation of an energy manager network and development of training and awareness programmes for civil servants.
- **Cantabria:** various measures have been implemented in the autonomous government's stock of buildings to improve the energy efficiency of building envelopes and of heating installations, including the installation of a building automation system in the government of Cantabria headquarters.
- **Castile-León:** the *Castile-León energy plan for 2020* is currently being drafted. In the case of public administrations, focus has been placed on: optimising electricity and natural gas supplies; performing energy audits and implementing savings measures, directly or through energy service contracts, and promoting this approach in autonomous and local governments; implementing pilot projects on exterior public lighting; setting up a line of financing for energy efficiency projects through the region's economic development agency (ADE), and implementing energy management systems which include metering, control and monitoring in government branches.
- **Castile-La Mancha:** the *2020 Castile-La Mancha Regional Energy Plan* is currently in operation, which envisages the implementation of an energy management system which includes the performance of energy audits on exterior public lighting installations. Energy audits and diagnoses have also been carried on autonomous government buildings for the



implementation (at a later stage) of energy performance contracts through energy service companies.

- **Catalonia:** the *Energy Saving and Efficiency Plan for buildings of the Generalitat de Catalunya* has been in effect since 2011 for reducing energy expenditure, optimising energy procurement and implementing energy saving and efficiency measures through energy service companies.

The results achieved are, inter alia: aggregated auction bidding for electricity and natural gas supplies to the Generalitat de Catalunya, creation of a fixed-term energy service contract template, and execution of projects following this model such as the San Cugat high performance centre. Development of an energy database with 550 buildings of the Generalitat and training and awareness programmes for energy managers and government workers.

- **Community of Madrid:** implementation of a '*plan for reforming the heating installations in government buildings*' is envisaged given that a significant number of buildings for educational, public or care use have been found to have a heating system that is more than 20 years old and a significant energy saving potential. These measures are expected to be undertaken through energy service contracts.
- **Valencian Community:** in 2012 it approved the *Plan for Energy Savings and Efficiency in Government Buildings of the Generalitat*, which envisages an energy saving of 20% by 2016 in a stock of 1 544 government buildings, having achieved the target of 5% by 2012.

The main measures are: implementing an energy management system, developing an energy manager network, awareness and information campaigns, performing energy audits, installing smart meters, implementing a tool for energy consumption and billing management, and encouraging energy service contracting.

- **Extremadura:** a *2020 Plan for Energy Service Contracting in Buildings of the Government of Extremadura* is currently being drafted, with the aim of achieving a 20% energy saving by 2020 through measures on energy saving and efficiency, renewable energies and promotion of the energy services market. Since 2012, through the action protocol of the public administrations of the autonomous community of Extremadura on energy saving, efficiency and new energies, more than 115 energy pre-diagnoses have been carried out in municipalities with less than 20 000 inhabitants.
- **Galicia:** a *Plan for Energy Saving and Efficiency in Government Buildings* is underway, which coordinates energy savings and efficiency policies in the autonomous and local governments, within which an energy diagnosis and optimisation programme has been implemented in more than 100 autonomous government buildings to determine their saving potential and the viability of energy service contracts, with several pilot projects in progress. The Xunta de Galicia Energy Network has been set up which centralises and coordinates measures for energy optimisation, management and contracting in the autonomous government, managed by the Galicia Energy Institute (INEGA), which also coordinates a programme of energy saving and efficiency measures and advice through the local government.
- **Balearic Islands:** an electronic system has been implemented for the control, monitoring and optimisation of energy billing in Balearic government buildings, with around 750 consumption points. A pilot plan has also been implemented with the hiring, in three government buildings, of an energy service company under a shared saving scheme.



- **Canary Islands:** a collaboration agreement is in place between the public and private energy service sectors to implement comprehensive measures which will improve energy efficiency in seven multi-departmental government buildings owned by the government of the Canary Islands.
- **Rioja:** works are underway to implement action plans for improving the energy efficiency of government buildings. The first stage is the compilation of an inventory to identify buildings that may be in need of renovation, on which energy audits will be performed to determine their condition and possible areas of improvement.
- **Navarre:** the '*3rd Energy Plan of Navarre - 2020*' and an '*energy saving and efficiency plan for health centres managed by the Navarre Health Service - Osasunbidea*' are currently in force. Both plans include the performance of energy audits to determine savings measures and the continuous control of energy consumption, along with the implementation of energy service contracts in government buildings.
- **Basque Country:** the '*Action plan for energy efficiency in government buildings of the autonomous community of the Basque Country*' was recently approved. The target is for 100 local council or Basque government buildings to achieve a 20% energy saving by 2020. Following the identification of potential savings through energy diagnosis and audits, the measures shall be implemented through energy service contracts.
- **Principality of Asturias:** a '*Working programme for improving energy efficiency in buildings of the regional administration of the Principality of Asturias*' is being drafted, which includes the performance of energy audits in government buildings.
- **Region of Murcia:** bidding is in progress on several energy contracts with councils and hospitals in the region and new energy audits are underway to analyse the viability of the application of these contracts in all regional government offices and other administrative buildings with large-scale consumption, such as the Murcia Regional Assembly.

### C. Energy efficiency measures in social housing

Legislative obligations incorporating energy efficiency criteria are not exclusive or targeted specifically at social housing, but rather affect the entire stock of buildings, irrespective of whether these are government property. They can be grouped into two parts:

1. **Building evaluation report:** governed by Article 4 of Law 8/2013 of 26 June 2013 on urban renovation, regeneration and renovation of the Ministry of Development, whereby the owners of **collective residential buildings** may be required by the competent administration to **accredit the energy efficiency level**, with an **energy efficiency certificate**, on the building's state of conservation or compliance with regulations on universal accessibility.

This evaluation report must be drawn up and an energy efficiency certificate obtained, by all collective residential dwellings more than 50 years old, within a period of five years, starting from the date on which they reach that age. It also applies to buildings whose owners intend to apply for government assistance in order to undertake conservation, universal access or energy efficiency works.



2. **Residential building renovation incentive programme:** Royal Decree 233/2013 of 5 April 2013 of the Ministry of Development, approving the state plan for the promotion of rental housing, building restoration and urban regeneration and renovation for the 2013–2016 period, includes a residential building renovation incentive programme aimed at improving energy efficiency. While this is not a programme which specifically targets government-owned residential buildings, such buildings are specified among the beneficiaries of the programme.

Beneficiaries of assistance from this programme may include owners' associations, groups of owners' associations or individual owners of residential buildings. Public administrations and bodies and other public-law entities are also included, as well as public companies and investee companies in which the administrations which own the properties hold the entirety or majority of the shares, where these are owners of dwellings used as rental units.

The measures eligible for subsidy include: improving the thermal envelope of the building to reduce energy demand for heating and cooling, installing heating, cooling, domestic hot water and ventilation/air conditioning systems, and common building facilities such as lifts and lighting. To qualify for subsidies, the building's total annual energy demand in terms of heating and cooling must be reduced by at least 30% compared to the levels taken before implementation of the measures, as demonstrated by the energy certificate.

#### 4.3.3. Purchasing by public bodies (Article 6)

In order to transpose Article 6 of the EED (Purchasing by public bodies), a new additional provision shall be incorporated into the draft law on rationalisation of the public sector and other administrative reform measures entitled 'Energy efficiency in purchases of public administrations integrated into the state public sector'.

This new provision will apply to the public administrations referred to in Article 3(2) of the Consolidated Text of the Law on Public Sector Contracts, approved by Royal-Legislative Decree 3/2011 of 14 November 2011, which pertain to the state public sector.

Any such administrations which purchase goods, services or buildings, with a focus on profitability, economic viability, sustainability (in a broad sense) and technical suitability and with sufficient competence, shall act as follows:

- (a) When a product is covered by a delegated act adopted by virtue of Directive 2010/30/EU or the Commission Directive by which Directive 2010/30/EU is applied, the administration must only purchase those products which satisfy the criteria of pertinence to the highest possible energy efficiency class, taking into account the need to guarantee sufficient competency.
- (b) When a product not covered by (a) is covered by an implementing measure adopted, following the entry into force of Directive 2012/27/EU, in accordance with Directive 2009/125/EC, the administration must only purchase those products which fall within the energy efficiency levels specified in that implementing measure.
- (c) Purchase office equipment covered by Council Decision 2006/1005/EC of 18 December 2006 concerning conclusion of the Agreement between the Government of the United States of America and the European Community on the coordination of energy-efficiency labelling



programmes for office equipment that comply with energy efficiency requirements not less demanding than those listed in Annex C to the Agreement attached to that Decision.

- (d) Purchase only tyres which satisfy the criterion of having, in terms of fuel consumption, the highest energy efficiency class defined in Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters. This requirement shall not disallow the public administrations to which this provision refers from purchasing tyres from higher wet grip or external rolling noise classes where this is justified for reasons of safety or public health.
- (e) Require, in their bids for service contracts, that the service providers use only those products which satisfy the requirements indicated (a)–(d) when providing the service in question. This requirement shall only apply to new products purchased partially or in full by the service provider for the purpose of providing the service.
- (f) Purchase only those buildings or sign new lease contracts which satisfy the latest minimum energy performance requirements set by the internal legislation, in accordance with Articles 4 and 5 of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.

To these effects, the energy performance of a building shall be accredited by the energy efficiency certificates regulated in Royal Decree 235/2013 of 5 April 2013 approving the basic procedure for the energy efficiency certification of buildings.

The provisions of the previous paragraphs shall not apply when the purchase or lease is made for any of the following purposes:

- Gut renovation or demolition of the building.
- Return the building to legal use even though it is not occupied by the public administrations referred to in this annex.
- Preserve it as a building that is officially protected as part of a designated environment, or because of its special architectural or historical merit.

The obligation established in the previous paragraph shall apply to supply, service and works contracts which resulted in the construction of a building, provided that the estimated value of such contracts is equal to or exceeds the thresholds for contracts determining subjection to a harmonised regulation established in Articles 14, 15 and 16 of the Consolidated Text of the Law on Public Sector Contracts. It shall also apply to the purchase or leasing of buildings.

The foregoing shall be only apply to contracts of the Armed Forces where their application does not result in any conflict whatsoever with their nature and with the basic aims of their activities. The obligation shall not be applied to contracts for the supply of military equipment, understood as equipment specifically designed or adapted for military purposes and intended for use as arms, ammunition or war material, the procurement of which is governed by Law 24/2011 of 1 August 2011 on Public Sector Contracts in the areas of defence and security.

The Ministry of Industry, Energy and Tourism shall promote measures to encourage the purchase of high energy performance goods, services and buildings through different entities in the autonomous and local public sector.



Furthermore, the Ministry of Industry, Energy and Tourism and the Ministry of Finance and Public Administrations shall take the necessary measures to help purchasing bodies, in bidding for service contracts with a significant energy component, to evaluate the possibility of entering into long-term energy performance contracts in which the energy saving for the entire life of the contract can be calculated. Along these lines, they shall provide procurement bodies (through publication on the public sector procurement platform) with the appropriate tools for the evaluation, as well as contract templates and administrative clauses with legal content which must be included in the specifications governing bidding on these types of contracts.

When purchasing a package of products which, as a whole, are subject to a delegated act adopted by virtue of Directive 2010/30/EU, the public administrations referred to in this provision may require that the aggregated energy efficiency of the products in that package be given primacy over the energy efficiency of the products considered individually, purchasing the package which satisfies the criterion of pertinence to the highest energy efficiency class.



#### 4.4. OTHER ENERGY END-USE EFFICIENCY MEASURES, INCLUDING INDUSTRY AND TRANSPORT

##### 4.4.1. Energy end-use efficiency measures in industry

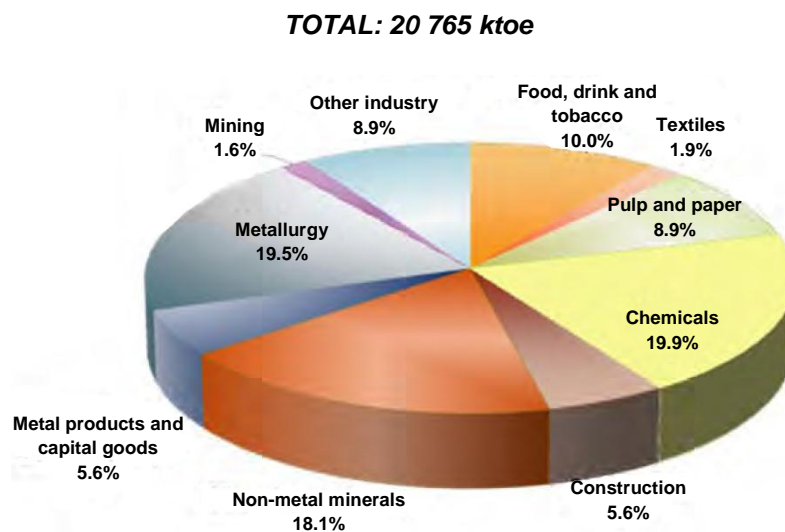
For the purpose of this plan, the industry sector includes the following branches: chemical industry, food, drink and tobacco, non-metal minerals, iron and steel industry, metallurgy and non-ferrous smelting, pulp, paper and card, textiles and tanning, metal processing, transport equipment and wood, cork and furnishings.

- ***Distribution and evolution of energy consumption in the industrial sector.***

In 2012, final energy consumption in Spanish industry rose to 20 765 ktoe, of a total national consumption for energy uses of 82 991 ktoe, representing 25% of the national final energy consumption for energy uses.

In the energy characterisation of Spanish industry, the most energy-intensive branches are non-metal minerals (18.1%), metallurgy (19.5%), chemicals (19.9%), food, drink and tobacco (10.0%) and pulp and paper (8.9%). These five branches make up 76.4% of the energy consumption in the sector. The portion of energy consumption by each of group of activity is shown in graph 4.4.1.1 below.

**Graph 4.4.1.1. 2012 energy characterisation of the industry sector by branch (excluding non-energy uses) as a percentage of energy consumption.**



Source: MINETUR/IDAE

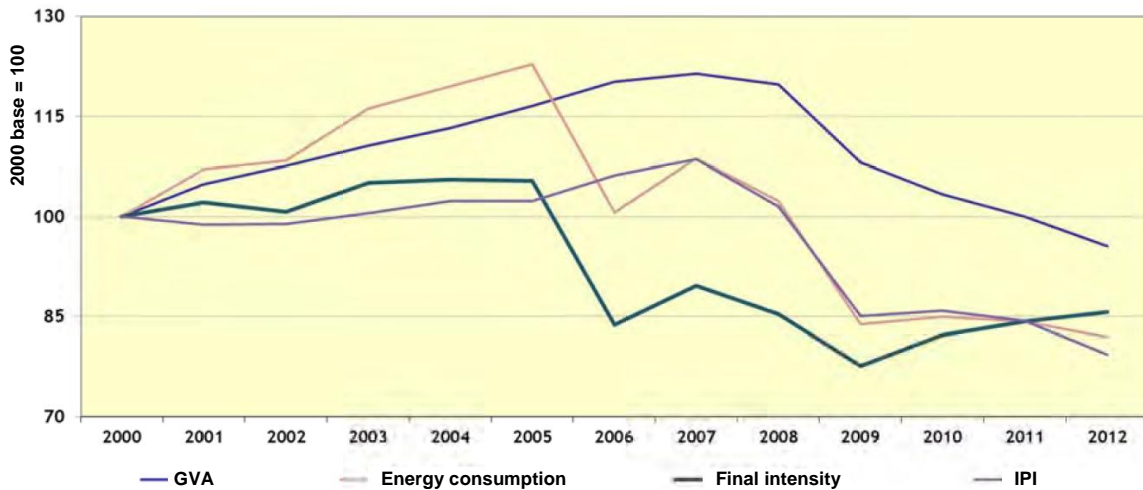
Final energy consumption fell from 21 325 ktoe in 2011 to 20 765 ktoe in 2012, equivalent to a drop of 2.6%. This reduced energy consumption is due primarily to the lower demand observed in 2012 from oil products, particularly linked to energy-intensive branches of industry, with oil products and gas responsible for 57% of the sector's total energy demand.

Regarding wealth generated by the sector, while it continues to show a negative growth, signs of a recovery have started to appear since 2009, when the sector suffered a sharp fall of 10.31% (graph 4.4.1.2). This would generally imply a tendency towards recovery in sector's economic activity, which in turn would be reflected in a resurgent energy demand after 2009. However, the



decline in demand observed in 2011 which exceeded the corresponding GVA meant that sector saw a slight improvement in energy intensity.

**Graph 4.4.1.2. Main indicators of the industry sector**



Source: MINETUR/INE/IDAE

• **Measures implemented in the industry sector**

In the industrial sector in the 2000–2012 period, measures for energy saving and efficiency, energy saving and technological changes were introduced, resulting in a total energy saved of around 13% by 2012.

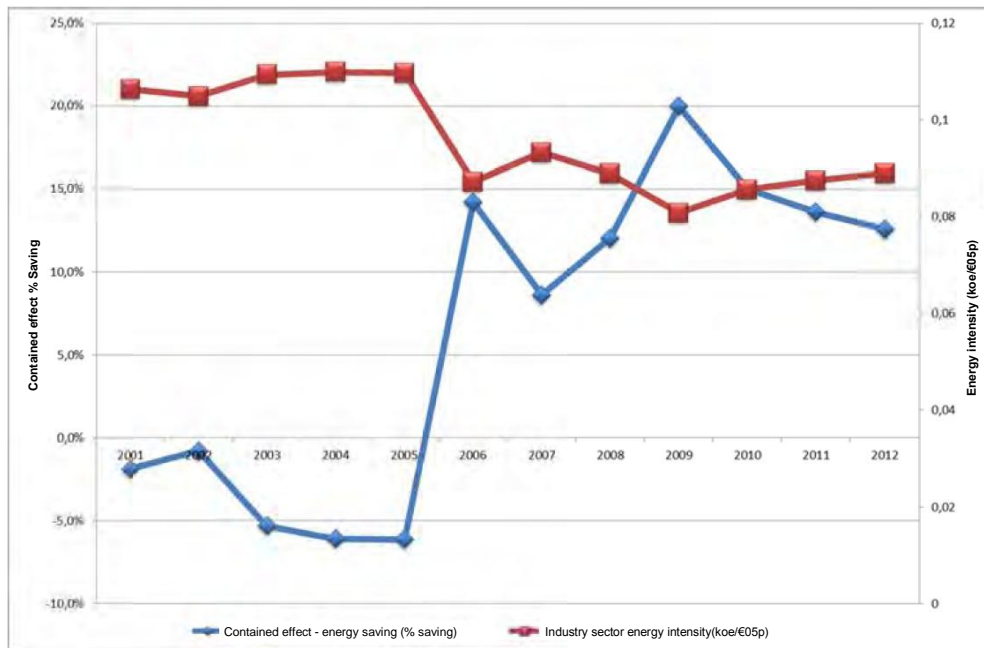
The energy saving and efficiency measures initiated in 2006 had a significant impact, resulting in an energy saving of 14% in that year. In 2007 and 2008 energy intensity rose, coinciding with a decline in energy saving measures, a situation which changed in 2009 when savings of 20% were obtained; this was also the period of lowest energy intensity in the entire 2000–2012 period. Between 2010 and 2012, energy intensity rose above the level recorded in 2009 as there was no increase in energy and efficiency measures in the sector.

Energy-intensive activity groups behave differently with the application of energy saving measures of technological changes. The food, drink and tobacco group promoted measures in its sector from 2005 to 2012. The chemical industry also implemented measures from 2006 to 2010. The pulp, paper and printing group showed uneven behaviour throughout the period; however, in 2012 it achieved an energy saving of approximately 4%.

The non-metal minerals group reduced its energy consumption by an annual average of 1.4% in the 2000–2012 period as a result of the downturn in housing construction and infrastructure, with its average annual energy consumption falling by 12% in the 2008–2012 period; regarding the adoption of energy saving measures or technological changes, behaviour was irregular, with some periods showing a significant number of energy saving measures and technological changes being made. Indeed, in the 2006–2009 period, measures were implemented which led to a 14% reduction in consumption by 2009.

**Graph 4.4.1.3. Energy intensity and saving (contained effect) in the industry sector**





Source: MINETUR/INE/IDAE

The metallurgy and metal product manufacturing group implemented energy saving measures during the 2006–2009 period, although it did not increase these in 2010–2011; however, this it changed this trend in 2012.

Final energy consumption in the industry sector fell during the 2000–2012 period at an average annual rate of 1.6%, while energy intensity also dropped 1.3%. Energy intensity at purchasing power parity in 2000 rose to 0.104 koe/€2005 and to 0.089 koe/€2005 in 2011.

The industrial sector's fall in value added between the two years caused the sector to lose ground in terms of GDP (or total value added) by around 4 percentage points: from 23.3% in 2007 to 18.2% in 2011.

This fall in final energy consumption coincided with a decline in the industrial production index (IPI) at an average annual rate of 1.9% between 2000 and 2012.

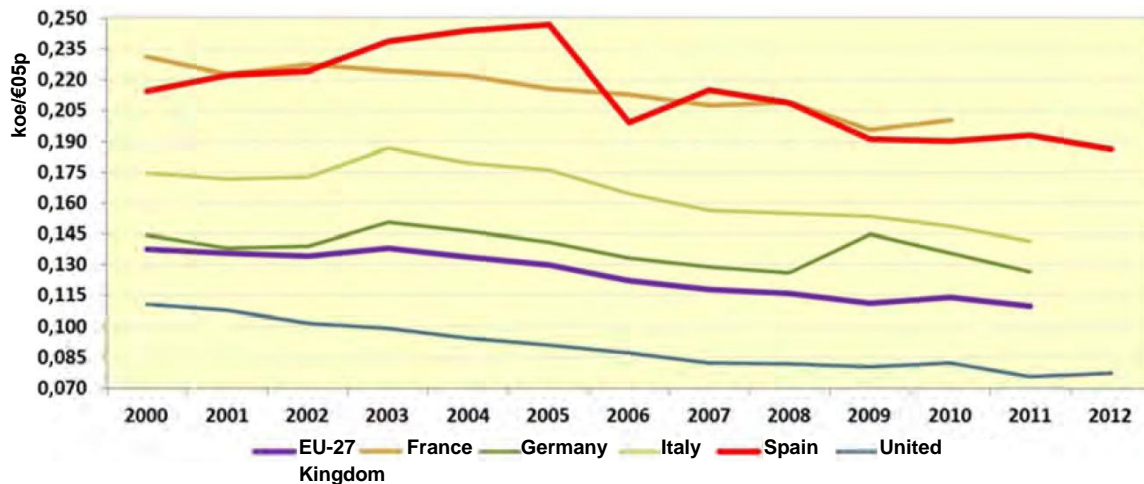
The evolution of industry intensity in 2012 is closely linked to its sector-based structure, as well as to the behaviour of its different branches. Looking at the most intensive branches of industry, the impact of metallurgy and metal product fabrication, chemicals, non-metal minerals and food, drink and tobacco industries on the sector's overall energy demand is significant.

As shown in graph 4.4.1.4, the energy intensity of the Spanish manufacturing industry is slightly higher than the European Union (EU-27) average; this is particularly significant in the branches of metallurgy and metal fabrication and non-metal minerals, in which the portion of the sector's total energy demand is four times greater than the sector's contribution to the gross value added.

This contributes to the giving Spanish industry an overall energy intensity which exceeds that of countries around us with a different industrial production structure. There is a close link between these two branches and the building and transport sectors. These sectors are vastly important to the national economy and help keep it competitive, but they are being seriously affected by the current crisis, which is having repercussions on the branches mentioned as well as on other activities related to those sectors.



**Graph 4.4.1.4. Energy intensity at purchasing power parity of the manufacturing industry**



Source: IDAE/CE(EnR)

- **Contribution of the industry sector to the final energy savings target under the energy efficiency obligation scheme.**

Part 4.4.1 C presented a general indicative scenario including distribution by sector of activity (industry, transport, buildings, etc.) to ensure fulfilment of the final energy savings target under the energy efficiency obligation scheme pursuant to Article 7 of Directive 2012/27/EU to achieve 571 ktoe/year. An analysis is then given of the industry sector target of 314.9 ktoe/year, broken down into energy saving and efficiency measures, each of which is assigned an indicative target with which it is expected to contribute.

Energy efficiency measures in industry (table 4.4.1.4 and graph 4.4.1.1) are sorted into 2 groups, including both large enterprises and SMEs, giving a total of 4 disaggregated measures. The proposed measures are: improve equipment and process technology and implement energy management systems.

This simplification has been given to facilitate the analysis, although the measures should be developed in their practical application given the specific nature of the industrial sectors in which they are to be implemented: chemical industry, food, drink and tobacco, non-metal minerals, iron and steel industry, metallurgy and non-ferrous smelting, pulp, paper and card, textiles and tanning, metal processing, transport equipment and wood, cork and furnishings. Energy-extractive industries, oil refinery and nuclear fuel treatment activities and electricity generation, transport and distribution companies are excluded.

The measures which contribute the most savings are improvement in equipment and process technology in SMEs (225.92 ktoe/year) and large enterprises (64.65 ktoe/year). This is followed by the implementation of energy management systems in SMEs (16.51 ktoe/year) and large enterprises (4.71 ktoe/year).

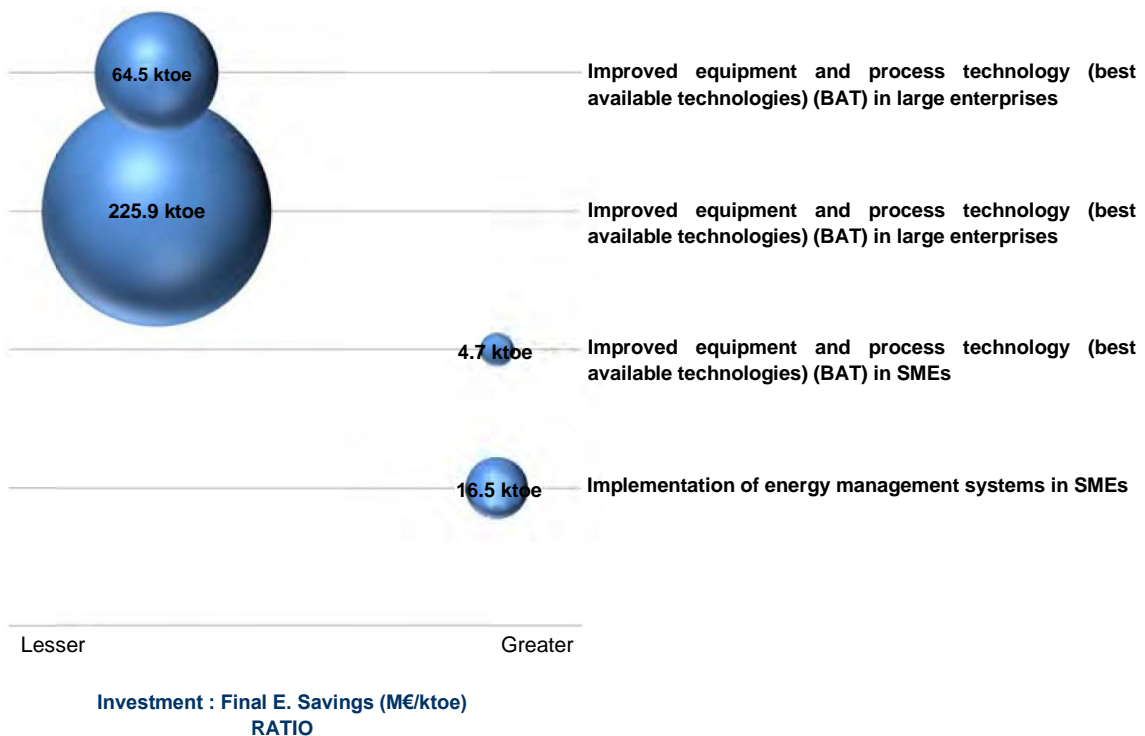


**Table 4.4.1.4. Contribution of the industry sector to the final energy savings target under the energy efficiency obligation scheme (Article 7 of Directive 2012/27/EU)**

	Final energy saving (ktoe/year)
<b>INDUSTRY</b>	<b>314.90</b>
<b>Implementation of energy management systems</b>	<b>21.22</b>
EMS in SMEs	16.51
EMS in large enterprises	4.71
<b>Improved equipment and process technology (best available technologies) (BAT)</b>	<b>290.37</b>
BAT in SMEs	225.92
BAT in large enterprises	64.45
<b>Communication and information measures</b>	<b>3.31</b>

Source: Compiled by IDAE

**Graph 4.4.1.1. Contribution of the industry sector to the final energy savings target pursuant to Article 7 (Directive 2012/27/EU): 571 ktoe/year (sphere volume).**



Source: Compiled by IDAE



#### 4.4.2. Energy end-use efficiency measures in transport

The transport sector includes vehicles, equipment and actions intended primarily to move passengers or freight. The forms of transport used include: Ground transport (by road or rail), air transport and sea/river transport. Modes of transport are combinations of networks, vehicles and operations. These include walking, bicycle, car, road network, railways, river and sea transport, air transport and even combinations of several or of the three types of transport. The combination of different modes of transport is known as intermodal or multimodal transport.

- **Distribution and evolution of energy consumption in the transport sector**

In 2012, final energy consumption in the transport sector rose to 33 229 ktoe, of a total national consumption for energy uses of 82 991 ktoe, representing 40% of the national final energy consumption for energy uses. Since 1996, the transport sector has been the largest energy consumer in Spain at a sustained rate of around 40%. In comparison to 2011 consumption (35 890 ktoe), 2012 showed a reduction of 7.4% (33 229 ktoe).

Among different modes of transport, in Spain, road transport makes up 80% of sector consumption, with air transport consuming 14%, railway 3% and with 3% by sea.

The sector is characterised by a high level of vehicle use, an ageing automobile stock and a low percentage of freight transport by railway. The sector's main risk is its high dependency on a single fuel source with 94.3% of demand being for oil products, a fact which, when also considering the sector's environmental impact, means significant action needs to be taken on energy efficiency in the sector.

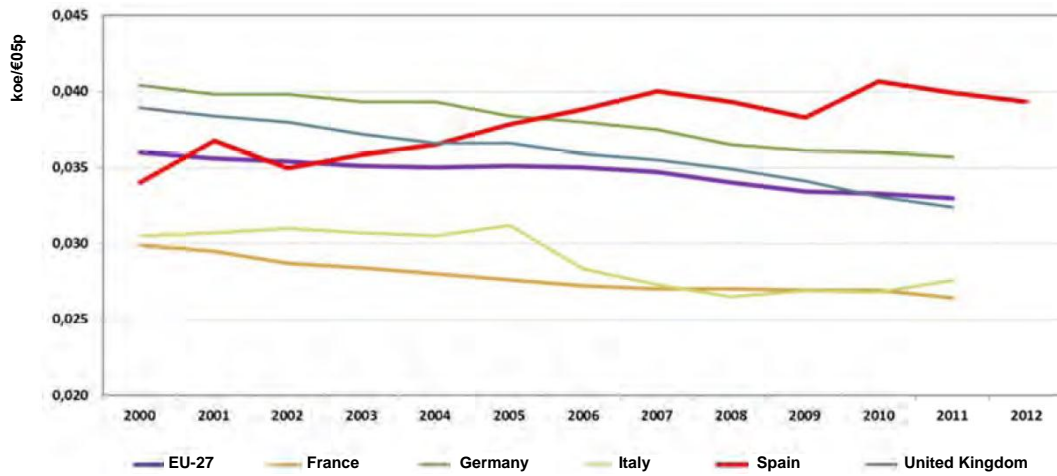
In terms of absolute variation, energy demand in the transport sector has declined in recent years. The sector's 2012 consumption of 33 229 ktoe represented a 7.4% drop versus 2011, surpassing the 3.35% reduction observed in 2011 versus 2010. This fall in demand is the result of a downturn in mobility and traffic deriving from the economic crisis suffered by the country since 2009. Electricity demand from rail transport suffered a slightly smaller decline of 2%.

Meanwhile, biofuel consumption was significant with demand continuing to rise in 2011 and 2012, with petrol and diesel consumption for road transport reaching 6.5% in 2011 and 8.5% 2012. These consumption levels coincide with the targets set for these years by Royal Decree 459/2011. It is important to note that, in 2013, this consumption dropped to 4.1% due to the new targets established in Law 11/2003 as a result of the zero taxation rate applied to biofuels in Spain.

In regard to road transport, there has been a gradual shift towards diesel among the national stock of vehicles at a rate which exceeds the EU as a whole, as well as a high mobility associated with the use of private vehicles and freight and passenger transport by road. Spain's geographic position is also influential, being displaced from the hub of economic activity situated to the north of Europe, which makes our country a thoroughfare for road freight traffic.



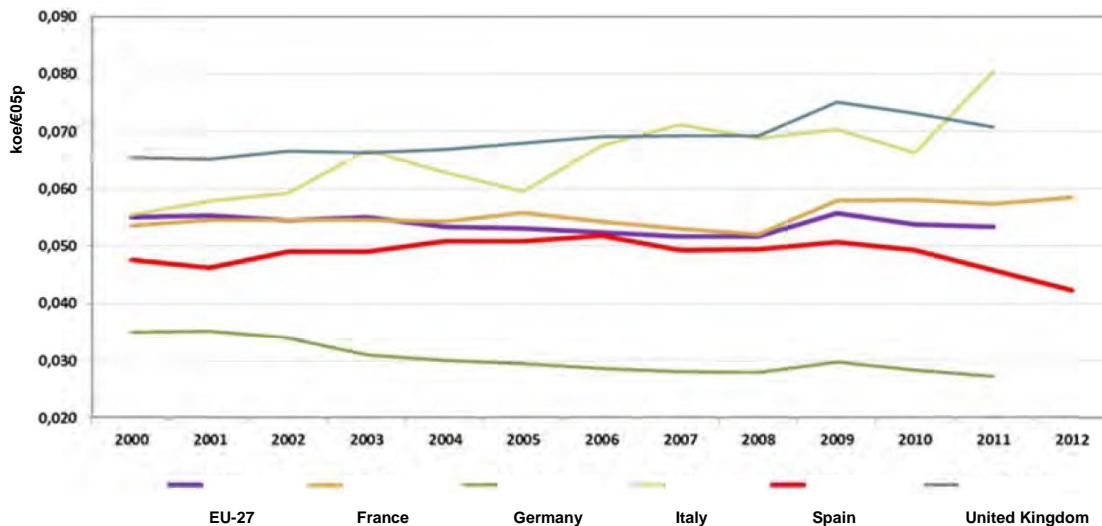
**Graph 4.4.2.1. Evolution of energy consumption in the transport of passengers by road (koe/pkm), 2000–2012**



Source: EU (EnR)/IDAE

As Graph 4.4.2.1 shows, up until 2006 energy consumption in road transport saw a very sharp growth, which tailed off from 2007–2009 following trends which were somewhat in line with GDP, and since 2010 it has suffered a more significant drop resulting from high energy prices and the slump in economic activity.

**Graph 4.4.2.2 Evolution of energy consumption in the transport of freight by road (koe/pkm), 2000–2012**

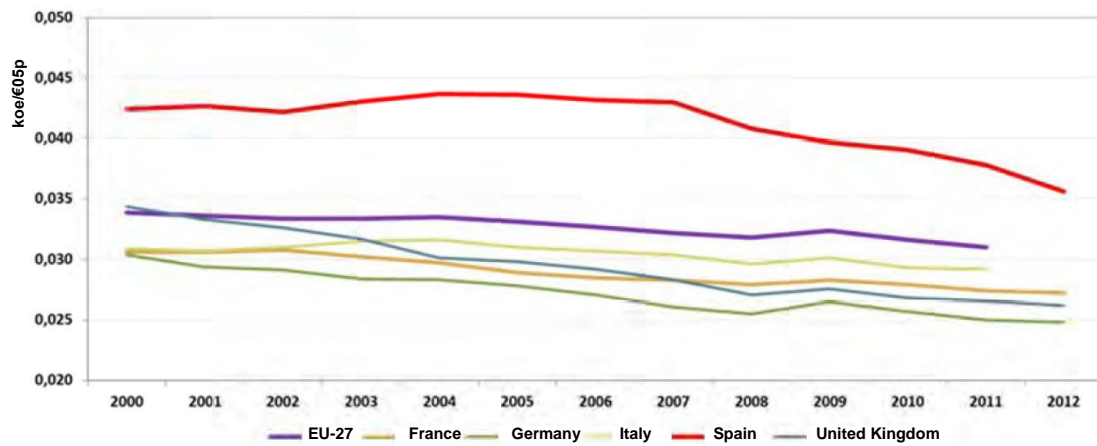


Source: EU (EnR)/IDAE



Regarding the evolution of freight transport by road, graph 4.4.2.2 shows consumption per tonne transported which, from a technical perspective, closely reflects the evolution of efficiency in road freight transportation, with the only variation being in energy consumption per unit transported, independent of the evolution of the stock of vehicles and mobility. The evolution in the graph therefore shows technological, logistical and training improvements. The evolution of intensity in Spain has shown a slight decrease due to technological advancements and the fleet management improvement measures introduced in recent years through the Action Plans for the Energy Saving and Efficiency Strategy in Spain (E4), with an evolution that is very similar to those of our surrounding countries.

**Graph 4.4.2.3 Transport sector energy intensity in Spain and EU**



Source: EU (EnR)/IDAE

In summary, graph 4.4.2.3. shows that the aforementioned factors lead to a high energy intensity in this sector, some 40% higher than the EU27 average. However, the downward trend which started in 2004 continued, largely as a consequence of the fall in activity in different sectors of the general economy, resulting in reduced mobility among freight and passenger transport in the industry and service sectors. This decline has been more marked than the EU average, suggesting a greater convergence between national and European indicators.

- **Measures implemented in the transport sector**

In Spain, energy saving and efficiency measures in the transport sector are categorised into three main blocks:

- **Actions intended to promote mode change** in the mobility of people and freight towards more energy-efficient modes.
- **Actions aimed at improving the efficiency of technologies** in transport by renewing fleets and incorporating technological advancements.
- **Actions to promote efficient use** of means of transport.

These actions, which are more specific for the different transport subsectors, will facilitate implementation of the set of technical measures to promote transport energy efficiency which will be included in the catalogue.



**A. Actions intended to promote mode change in the mobility of people and freight towards more energy-efficient modes.**

Spain has a markedly urban population. According to the Law on Sustainable Economy of 4 March 2011, there exists a legal framework for promoting sustainable mobility plans according to the **Spanish Sustainable Mobility Strategy (EEMS)** approved by the Council of Ministers on 30 April 2009.

This strategy is seen as the national framework of reference which integrates principles and coordinating tools to guide and give consistency to sector policies which facilitate sustainable, low-carbon mobility. Under this law, in recent years mobility plans have been implemented in practically all Spanish municipalities with more than 50 000 inhabitants, financed as part of the 2008–2012 Energy Efficiency Action Plan, implemented in collaboration with the autonomous communities.

More recently, in order to promote continuity in the application of these types of plans in municipalities with more than 50 000 inhabitants (municipalities obligated to provide urban transport services under Local System Regulatory Law 7/1985), Law 22/2013 on General State Budgets of 23 December 2013 includes, for the first time, the application of a mechanism for evaluation energy efficiency criteria in the concession of state aid to public transport systems. Accordingly, as of 1 January 2014, the concession of any aid or subsidy to autonomous governments or local entities included in the Law on General State Budgets for the purpose of urban or metropolitan public transport is dependent (at 5% of the amount assigned) on the beneficiary having a sustainable mobility plan and complying with the Spanish Sustainable Mobility Strategy.

The aims are to continue working on urban mobility, promoting sustainable mobility plans to achieve significant changes in transport modality, with a greater participation of more efficient modes in detriment to the use of private, low-occupation vehicles and to continue encouraging the use of modes which do not consume fossil fuels, such as walking and cycling. Further aims are to continue promoting plans for sustainable transport to the workplace and pushing to increase rail use in medium- and long-distance freight transport (based on trials and preliminary studies, the forecast savings with a 1% increase in passenger and freight rail travel would be 190 ktoe/year).



## **B. Actions aimed at improving the efficiency of technologies in transport by renewing fleets and incorporating technological advancements.**

In regard to measures aimed at **promoting the renewal of fleets and the national stock of vehicles**, Spain has taken a significant step by approving a set of plans that will receive an unprecedented budget: **the PIVEs** (Efficient Vehicle Incentive Plan) and **PIMA Aire** (environmental stimulus plan). These plans are in response to and bring forward compliance with municipal strategies for improving air quality, following the guidelines of Directive 2008/50/EC, as well as Article 106 of Sustainable Economy Law 2/2011 of 4 March 2011 on the public purchasing of clean and energy-efficient road transport vehicles, transposing Directive 2009/33/EC of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles. Between September 2012 and January 2014, the Spanish government implemented five Efficient Vehicle Incentive Programmes (PIVE, PIVE 2, PIVE 3, PIVE 4 and PIVE 5) and three PIMA Aire environmental stimulus plans.

The five PIVE programmes, with a **budget of €540 million** and with PIVE-5 currently in progress, pursue an overall target of **renewing nearly 540 000 vehicles**, saving 187 million litres of fuel and cutting CO<sub>2</sub> emissions by 385 000 tonnes/year. There are three types of requirements applicable to eligible vehicles: limitation by energy class (A or B), limitation by CO<sub>2</sub> emissions (< 160 gCO<sub>2</sub>/km) and limitation by maximum price (< €25 000 ), which are enforced whenever a vehicle (passenger car) more than 10 years old is taken permanently out of service.

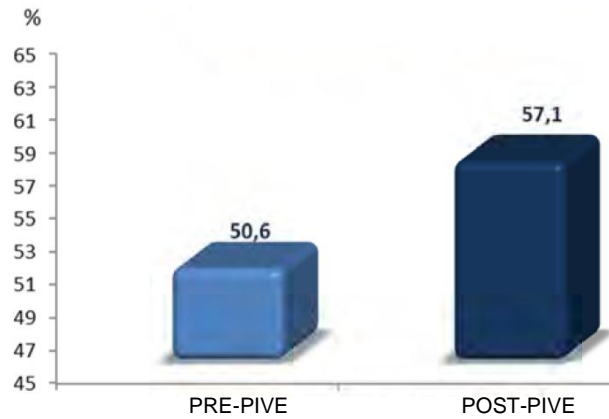
In order to verify the results of these programmes, a sample of vehicles was studied to compare the vehicle scrapped with the vehicle being promoted. The conclusions from the study show that **the new vehicles promoted under the PIVE programmes reduce fuel consumption and CO<sub>2</sub> emissions by an average of 30% compared to the scrapped vehicles**, from 166 grCO<sub>2</sub>/km to 116.3 gCO<sub>2</sub>/km. This means that the emissions reduction target pursuant to Regulation 443/2009 for 2015 is achieved ahead of schedule and that a stricter requirement is set compared to that for 2015 (130 gCO<sub>2</sub>/km) of a 10.5% reduction by 2013. This fact is particularly significant if we consider that the transport sector is responsible for 24% of all greenhouse gases (and especially CO<sub>2</sub>). Graph 4.4.2.4 shows the situation before and after introduction of the PIVE plans in terms of sales of light vehicles with emissions of 160 g/km or below, with a 7% increase in sales of lower emission vehicles.

In addition to the PIVE programmes, the government has introduced plans to encourage the renovation of commercial vehicle stocks through the PIMA-Aire programmes, the aim of which, with three phases already underway, is to renew more than 50 000 commercial vehicles and to encourage the introduction of electric motorcycles.





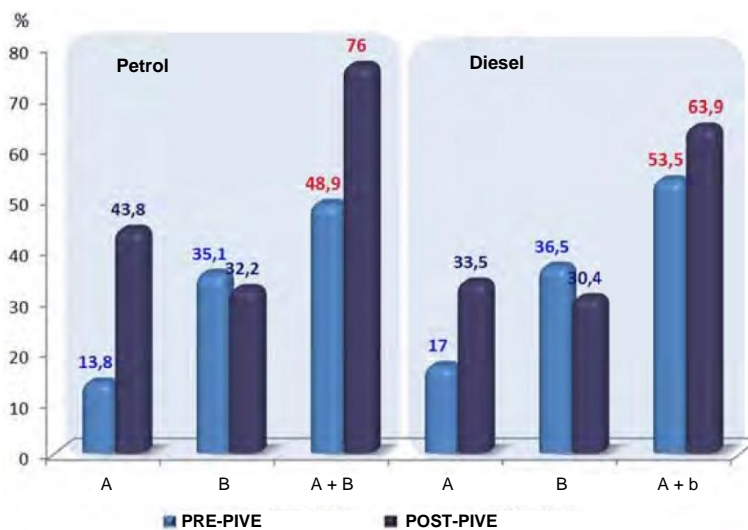
**Graph 4.4.2.4. Percentage of light commercial vehicles with CO<sub>2</sub> emissions of 160 g/km of less in pre-PIVE and post-PIVE scenarios**



**Source:** Compiled by IDAE/Asociación Nacional de Fabricantes de Vehículos

Another impact of renovation plans on the energy efficiency of the market is the increase in class A and B vehicles sold, as shown in graph 4.4.2.5, in relation to the percentage of vehicle sales in Spain, before and after the introduction of the PIVE plans:

**Graph 4.4.2.5. Percentage of vehicles in energy class A and B before and after PIVE plans**



**Source:** Compiled by IDAE/Asociación Nacional de Fabricantes de Vehículos

It should be noted that energy labelling has proven to be a highly useful tool in the management of these types of energy-saving programmes.

Regarding the promotion of new technologies in the transport sector, penetration of the electric vehicle has advanced significantly. With the approval of the **Integrated Electric Vehicle Stimulus Plan**, presented by the government in April 2010, Spain has become one of the few countries with an integrated strategy for promoting the development of these types of vehicles.

At the regulatory level, Royal Decree 647/2011 was approved governing the role of the system charge manager and introducing a new rate for time-based energy supply to encourage night time



recharging ('tarifa supervalle'). Thanks to this law there are now 11 registered charge managers in Spain which are authorised to sell electricity for recharging electric vehicles.

In addition, various incentives have been offered for purchasing electric vehicles since 2006. The more prominent are those granted under the Energy Saving and Efficiency Strategy and its Action Plans, as well as the IDAE's Strategic Energy Saving and Efficiency Project Assistance Programme which, in its 2008, 2009 and 2010 instalments, offered rental companies incentives to purchase electric vehicles. Since 2011, direct lines of aid for purchasing electric vehicles have been in place, managed by the Ministry of Industry, Energy and Tourism.

All of the above have incentives have resulted in the purchase of more than 6 880 vehicles and the installation of around 800 public recharging points in just the last few years. Spain has a cumulative total of around 9 000 registered electric vehicles. The introduction of these vehicles will prevent the emission of 127 500 tonnes of CO<sub>2</sub> during their life span, saving 225 000 barrels of oil.

In 2014, a new line of incentives for purchasing electric vehicles - **MOVELE 2014** - is to be introduced which, with a budget of €10 million, aims to encourage the purchase of around 3 500 electric, plug-in hybrid or extended range electric vehicles.

Spain will also consider measures to promote infrastructure which supports alternative transport fuels (LPG, natural gas, electric, hydrogen and biofuels).

In regard to LPG, there are currently around 280 automotive LPG public service stations with an estimated national stock of 11 000 vehicles. Primary uses include taxis, ambulances, student driver vehicles and distribution vehicles. These types of vehicles are eligible under the aforementioned PIVE and PIMA Aire programmes and, furthermore, through specific lines of assistance for purchasing taxis run by the autonomous communities.

As for natural gas-powered vehicles, Spain currently has around 50 private CNG filling stations and 39 public stations supplying LNG with 15 also supplying CNG. The national stock of vehicles is estimated at around 18 000, primarily comprising buses, waste collection trucks, minibuses, freight trucks and vans.

Regarding biofuel consumption, as previously mentioned, the 2013 targets are 4.1% of petrol and diesel consumption.

Spain shall continue to work on plans to renew its fleets, while measures to promote investment in alternative fuel infrastructures will be designed according to the requirements established in the future European Directive for ensuring development of alternative fuels on the European market, which is currently being drafted.

This proposed Directive falls under the 2010–2030 Transport White Paper under which the European Commission launched the Clean Power for Transport (CPT) package, an initiative comprising a communication (strategy) and the aforesaid proposed Directive. The aim is to create a homogeneous supply network which promotes mobility with these products and prevents 'technological boundaries' between countries.

The initiative, presented by the Commission on 24 January 2013, will likely include a provision for all Member States to draft national plans for promoting the set-up of minimum recharging infrastructure for three of the fuels included in the strategy: electricity, hydrogen and natural gas, and in two key transport sectors: road and sea.



### C. Actions to promote efficient use of means of transport.

Finally, **in relation to the package of measures for efficient use of means of transport**, significant advancements have been made in fleet management (for accurate route and load management) through audits, implementation of computer systems and ongoing training in efficient driving techniques for both general and professional drivers.

The Sustainable Mobility Strategy envisaged the dissemination and introduction of efficient driving techniques in driving tests and encouraged the development of driver training courses as one of the priority measures for achieving a more sustainable transport sector in Spain.

Within this framework, the Ministry of Industry, Energy and Tourism, through IDAE, collaborated with the Directorate-General for Traffic of the Ministry of the Interior and, on 1 January 2014, **efficient driving training techniques** were introduced into the Spanish driver licensing system for passenger and industrial vehicles through an amendment to the 'General Driver Regulations' (approved by Royal Decree 772/1997 of 30 May 1997).

This measure and its implementation as of January 2014 will generate significant savings bearing in mind the number of new driver's licences applied for each year (around 450 000 new drivers).

In regard to professional drivers, in recent years more than 85 000 professionals have been trained in efficient driving techniques aimed at drivers of industrial vehicles. This training was provided through two channels: agreements with the sector (30 000 professionals) and collaboration agreements with the autonomous communities signed to enforce the 2008–2012 Energy Saving and Efficiency Action Plan (around 55 000 professionals). The Ministry of Industry, Energy and Tourism, through IDAE, together with the Ministry of Development, has signed collaboration agreements with vehicle manufacturers and road haulage associations.

Spain intends to continue working on measures to improve road fleet management through audits and by incorporating computer applications which improve energy efficiency, as well as efficient driving programmes aimed at both professional drivers and passenger vehicle drivers (excluding new drivers).

#### **Economic support measures:**

Existing support measures for energy saving and efficiency projects in the transport sector are:

- JESSICA-FIDAE fund. Promoted by the IDAE, the aim of this fund, among other measures, is to finance projects for regenerative braking in trains, alternative fuel refilling infrastructure and the renewal of local transport company fleets.
- PIVE-5 plan promotes taking out of service and scrapping passenger vehicles (M1) and commercial vehicles (N1) at least 10 and 7 years old, respectively, combined with the purchase of new vehicles (also M1 and N1) from energy class A and B, or C and D with emissions less than 120 g CO<sub>2</sub>/km or powered by alternative fuels with emissions of < 160 g CO<sub>2</sub>/km. This has a budget of €175 million.
- PIMA Aire-3 plan of the Ministry of Agriculture, Food and Environment promotes renewal of the current stock of light commercial vehicles, M1 with AF multi-purpose body and N1, as well as L1e, L2e, L3e, L5e and electric bicycles, in order to improve urban air quality.



- MOVELE 2014 plan of the Ministry of Industry, Energy and Tourism, and managed by IDAE, offers incentives for the purchase of electric vehicles (EV), plug-in hybrid electric vehicles (PHEV) or extended-range electric vehicles (EREV). This has a budget of €10 million.
- **Contribution of the transport sector to the final energy savings target under the energy efficiency obligation scheme.**

Part 4.4.1 C presented a general indicative scenario including distribution by sector of activity (industry, transport, buildings, etc.) to ensure fulfilment of the final energy savings target under the energy efficiency obligation scheme pursuant to Article 7 of Directive 2012/27/EU to achieve 571 ktoe/year. An analysis is then given of the transport sector target of 145.68 ktoe/year, broken down into energy saving and efficiency measures, each of which is assigned an indicative target with which it is expected to contribute.

The transport measures (table 4.4.2.5 and graph 4.4.2.5) which contribute the most savings are sustainable urban mobility measures with a savings target of 90.36 ktoe/year, followed by efficient driving courses for drivers of industrial vehicles (29.53 ktoe/year) and drivers of passenger vehicles with existing licences (7.5 ktoe/year) and road transport fleet management at 12.42 ktoe/year. Plans for sustainable transport to the workplace for SMEs (2.17 ktoe/year) and large enterprises (2.17 ktoe/year) are also proposed.

The measures selected in terms of mode changes and more efficient use of transport are those which will help achieve savings through behavioural change. Measures for improving the energy efficiency of vehicles, such as renewal of the stock of automobiles or industrial and electric vehicles, are not included since, due to their nature and the high volume of public funding they require, these will be implemented through specific programmes, such as the Efficient Vehicle Incentive Programme (PIVE) or MOVELE for electric vehicles.

Energy saving and efficiency measures for the air industry are not included in this plan as airline companies themselves are implementing fuel saving measures as part of their restructuring and optimisation plans.

**Table 4.4.2.5. Contribution of the transport sector to the final energy savings target under the energy efficiency obligation scheme (Article 7, Directive 2012/27/EU)**

	Final energy saving (ktoe/year)
<b>TRANSPORT</b>	<b>145.68</b>
<b>Mode change measures</b>	<b>94.70</b>
Sustainable urban mobility measures	90.36
Measures for sustainable transport to the workplace: SMEs	2.17
Measures for sustainable transport to the workplace: large enterprises	2.17
Greater rail participation in passenger and freight transport	n/a
Greater participation of maritime sector in freight transport	n/a
<b>Measures for improving the energy efficiency of vehicles</b>	*

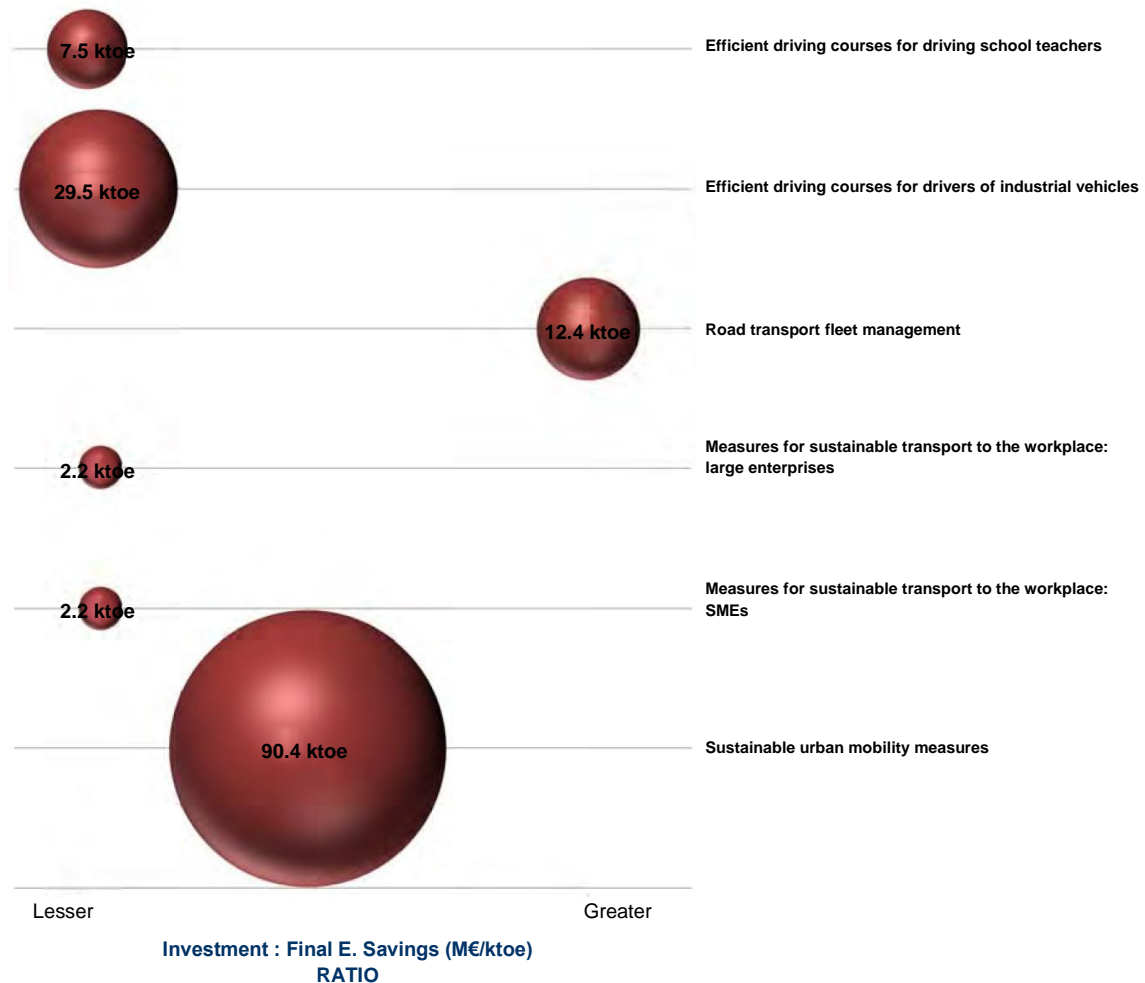


Renewal of industrial vehicle fleets: buses and trucks	*
Renewal of stock of automobile and light commercial vehicles	*
Implementation of recharging infrastructure for electric vehicles	*
Implementation of refilling infrastructure for alternative-fuel vehicles	*
Introduction of regenerative braking systems in rail transport	*
<b>Measures for more efficient use of means of transport</b>	<b>49.45</b>
Road transport fleet management	12.42
Efficient driving courses for drivers of industrial vehicles	29.53
Efficient driving courses for drivers of passenger vehicles (existing drivers only)	7.50
<b>Communication and information measures</b>	<b>1.53</b>

**Source:** Compiled by IDAE

\*Note: Due to their nature, these measures will be implemented through specific programmes such as the Efficient Vehicle Incentive Programme (PIVE) or MOVELE for electric vehicles.

**Graph 4.4.2.5. Contribution of the transport sector to the final energy savings target pursuant to Article 7 (Directive 2012/27/EU): 571 ktoe/year (sphere volume).**



**Source:** Compiled by IDAE



#### 4.4.3. Energy end-use efficiency measures in public services

In energy terms, the public services sector includes local outdoor lighting and water supply installations, with outdoor lighting referring to functional, ambient and decorative lighting systems on roads and public spaces and water supply referring to water purification and supply, wastewater treatment and desalination installations; which as a whole make up 1% of all final energy consumption, all in the form of electricity.

This sector has grown significantly in the last 15 years due to large-scale urban development in different municipalities around Spain and to the resulting installation of new infrastructures associated with such development.

In this context, energy saving and efficiency measures in the public services sector are categorised into two main blocks:

- Actions aimed at improving the efficiency of outdoor lighting technologies
- Actions aimed at improving the efficiency of water supply, purification and desalination technologies

##### **A. Actions aimed at improving the efficiency of outdoor lighting technologies**

The outdoor lighting of Spain's municipal roads consists of 7 964 000 points of light (PL) which, with an average power of 165 W/PL and 4 081 hours of annual use, generate an annual electricity consumption of 5 367 GWh/year at a cost of €697 million/year (2% of the national electricity consumption).

Added to this outdoor lighting consumption is that of existing traffic lights, of which Spain has more than 300 000 units, with a rate of consumption for units fitted with incandescent or halogen bulbs of around 1 250 kWh/year, whereas the same units would consume only 250 kWh/year if equipped with LED technology.

Energy saving and efficiency measures share the common goal of reducing installed light output through any, or all, of the following actions:

- Replacing the bulb for one with a greater luminous efficacy.
- Improving the reflective and directional quality of the light fixture.
- Implementing systems for regulating the luminous flux from points of light so that they can be adjusted at night as necessary.

This will help adjust excess lighting levels in many of our streets to actual public service needs, with the power saving being reflected in a directly proportionate manner on electricity consumption.

This set of measures are also backed by legislative advancements made by the Spanish government and by recent technological advancements, all milestones which are triggering a turning point for energy consumption trends in these installations:

- Publication of the Regulation on Energy Efficiency in Outdoor Lighting Installations (REEIAE) (RD 1890/2008)



- Influx of LED technology as a new lighting source
- Increase in the contracting of energy service companies by public administrations to reform outdoor lighting systems

In the area of traffic lights, in 2008, Spain adopted a programme for conversion to LED technology through which 600 local governments were supplied with a total of 462 300 optical LEDs to replace their existing traffic lights. The application of this programme and its effect on the renovation of these types of installation by local governments means that, now, less than 10% of Spain's traffic lights are to be converted to LED.

The establishment of energy service companies and their involvement in the renovation of outdoor lighting installations is demonstrating the high potential savings in electricity consumption from these types of installation by reducing light output, which is at its peak during night hours; improving the reflective quality of light fixtures and reducing their light emissions towards spaces away from the target object (light pollution); and improving their power on/off regulation and control.

As such, analysing projects carried out in economic terms, the energy savings allow for investments by energy service companies, with more than 150 local governments currently in the process of modernising their outdoor lighting installations through an ESCO. All of these envisage the same scenario: the completion of renovations that can be amortised by savings through the contracted company, with savings ranging between 45 and 80% depending on the chosen technology (sodium vapour, metal halogen or LED). It should be noted that the procurement procedure and its results are independent of the size of the municipality.

## **B. Actions aimed at improving the efficiency of water supply, purification and desalination technologies**

Demand for water for human consumption is estimated to range between 160 and 180 litres per person per day, with this water subsector having seen a rise in activity due not only to urban and population growth, but also to the stricter requirements concerning water quality and wastewater treatment contained in Directive 91/271 and the resulting National Water Treatment and Purification Plan, leading to the entry into service of numerous wastewater treatment stations ('EDAR') throughout the country.

The energy consumption of water supply to towns and, in particular, of the subsequent wastewater purification depends on the technology used, the size of the population served and the applicable waste quality and purification limits.

### **B.1 Water supply and purification**

Spain has an estimated urban water flow of 3 730 hm<sup>3</sup> per year and a treated wastewater volume of 4 450 hm<sup>3</sup>, a difference which is justified by the fact that, while the entire water supply does not end up in a drainage system, treatment plants also receive water from rain run-off and other potential effluents.

It is estimated that at least 95% of the Spanish population is connected to some form of treatment system.

Based on data from studies carried out by the IDAE (2012), it can be estimated that:



- The collection, supply and distribution of urban water has an electricity consumption of 447 GWh/y from pumping.
- In treatment, the mean specific consumption of waste water treatment plants was 0.5 kWh/m<sup>3</sup>, making up a total electricity consumption for all plants of 2 225 GWh/y.

In terms of saving measures, wastewater treatment plants (WWTPs) are seeing an improvement in their efficiency due to technological innovation and to grouping flows towards combined installations. Small treatment plants, which tend to lack aeration control systems and are designed on the basis of mechanical strength, are often oversized in terms of electromechanical equipment, for which their unit consumption is relatively high at around 50 kWh/inhab per year. Large treatment plants are optimised in terms of both design and size and they are controlled to reach energy consumption levels of around 20-30 kWh/inhab per year.

## B.2 Water desalination

In Spain, reverse osmosis is the most commonly-used of all installed desalination technologies and is expected to grow in the future, so the energy consumption of reverse osmosis plants was used as the reference point.

The most recent data on desalinated water production in Spain set a range of between 1.5 and 2 hm<sup>3</sup>/day (variation in demand is affected by annual rainfall) for the nearly 1 000 existing desalination plants. It is estimated that electricity consumption for desalination in 2012 rose to 2 460 GWh/year.

In regard to desalination saving measures, recent studies suggest that optimising the existing technology could result in energy consumption levels of around 2.5 kWh/m<sup>3</sup> of desalinated sea water, with measures such as replacing existing osmosis membranes with more efficient models, or replacing existing turbine-based wastewater energy recovery systems with isobaric pressure exchangers for brine.

This will not prevent the continued growth of energy consumption in this subsector due to the growth of infrastructures in Spanish municipalities and their drinking water demand, essentially among those located on the Mediterranean coast and islands.

- ***Contribution of the public services sector to the final energy savings target under the energy efficiency obligation scheme.***

The contribution of the agriculture sector to the energy saving target of 571 ktoe/year, under the energy efficiency obligation scheme in Article 7, is 12.44 ktoe/year. To this end, two technical measures are proposed: renovation of existing outdoor public lighting installations and renovation of water purification, supply, wastewater treatment and desalination installations. The first (outdoor lighting) offers a higher contribution to the savings target at 9.46 ktoe/year, with the second at 2.85 ktoe/year.

**Table 4.4.3.1. Contribution of the public services sector to the final energy savings target under the energy efficiency obligation scheme (Article 7, Directive 2012/27/EU)**

Final energy  
saving  
(ktoe/year)



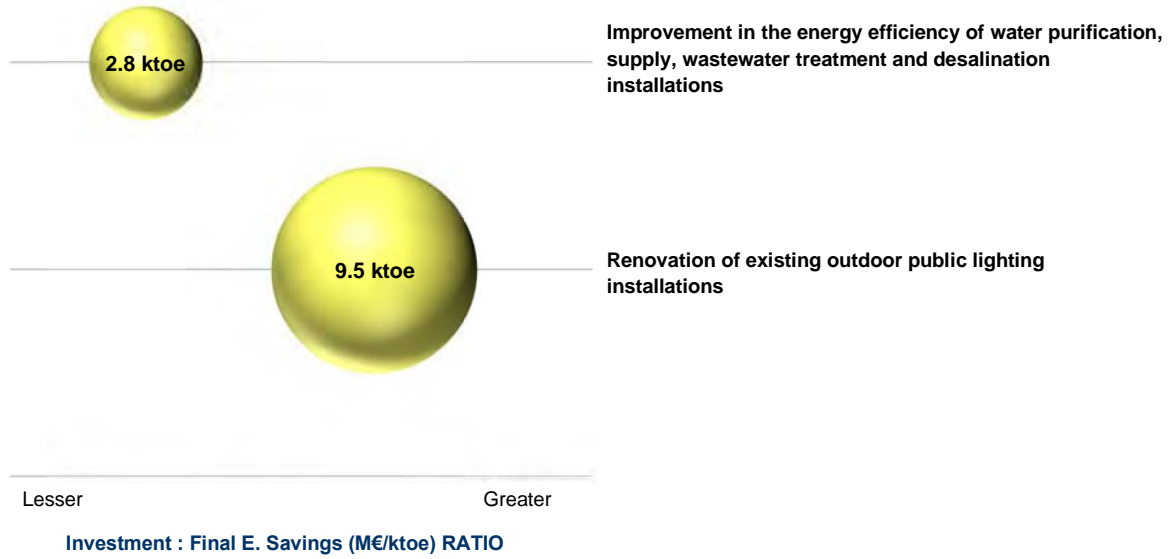


<b>PUBLIC SERVICES</b>	<b>12.44</b>
Renovation of existing outdoor public lighting installations	9.46
Improvement in the energy efficiency of water purification, supply, wastewater treatment and desalination installations	2.85
Communication and information measures	0.13

**Source:** Compiled by IDAE



**Graph 4.4.3.1. Contribution of the public services sector to the final energy savings target pursuant to Article 7 (Directive 2012/27/EU): 571 ktoe/year (sphere volume).**



**Source:** Compiled by IDAE



#### 4.4.4. Energy end-use efficiency measures in agriculture and fishing

Energy consumption associated with agriculture and fishing activities represents around 3.5% of final energy consumption in Spain.

Within this sector we have different lines of action for analysing and improving energy efficiency:

- **Machinery**, which covers energy consumed by tractors, harvesters and roto tillers on crop, forestry and livestock farms.
- **Irrigation**, covering energy used for the pump-based extraction and/or distribution of irrigation water.
- **Farms**, which covers the consumption of crop and livestock farms, as well as others such as greenhouses.
- **Fishing**, which covers the consumption of different types of Spanish fishing vessels and forms of fishing: Deep-sea, coastal and small-scale fishing. In regard to aquaculture, there are no calculations until 2010 given that marine aquaculture is considered to be part of the fleet and continental aquaculture, for the moment, is considered to use only minimal energy.

##### A. Machinery:

Energy consumption generally derives from the use of tractors for land cultivation, for which any variation in consumption shall be determined both by the variation in the land area to be cultivated in Spain and the nature of such cultivations, and by the number of tractors in use and their energy efficiency.

Machinery types include agricultural, livestock and forestry. Agricultural machinery consumption derives primarily from the use of tractors and is related to the cultivation surface area (17 203 324 ha) and the different farming practices used, where average diesel consumption is estimated at 62.5 l/ha, meaning a consumption of 925 ktoe. The consumption of all other machinery, harvesters, roto tillers and others is 154 ktoe.

Livestock machinery consumption is determined based on the correlation between consumption in litres of diesel and number of heads of livestock, distinguishing between ovine, bovine and porcine, producing a value of 334 ktoe. This consumption is also largely through the use of tractor-driven tools which, in turn, can perform agricultural functions, the consumption of which is calculated in the previous section.

For forest machinery, consumption is determined based on the variation in repopulated surface area, the quantity of lumber extracted and the results verified in relation to biomass obtained, with a value of 308 ktoe.

In this scenario, the energy saving is achieved by intensifying the promotion of direct-seeding techniques with minimal tilling, as well as by improving the energy efficiency of tractors which are renovated both as normal and under government incentives.

Direct seeding is based on a drastic reduction of the different tasks involved in conventional tillage (stubble plowing, fallowing, fertilising and seeding), all of which are performed in a single pass with a machine designed to seed on previously used crop land and which places the seed in



agricultural land without the need for prior tillage, performing the following steps in a single pass: furrow opening, seeding, burying and settling the soil.

From an energy perspective, numerous studies have shown the profitability and viability of direct seeding systems compared to conventional agriculture and highlighted the energy savings achieved.

Regarding tractor stock, it is envisaged that the energy efficiency improvement will be achieved with the renovation of machinery stock based on the results being produced in the sector through the energy labelling of tractors developed in Spain. This energy labelling and its classification are based on the results of tests carried out according to OECD codes. The methodology developed in Spain under the IDAE initiative has allowed agricultural tractors sold in the country to be classified according to their energy efficiency, for which power and fuel consumption data are recorded.

This classification has enabled the Ministry of Agriculture, Food and Environment to grant premiums to farmers who adhere to the RENOVE tractor plan, having updated this incentive scheme with RD 147/2014 of 7 March 2014 regulating the direct concession of assistance under the 'PIMA Tierra' environmental stimulus plan and which, for trading in a tractor more than 15 years old when buying a new one, the assistance amount may increase based on the new tractor's energy classification (€2 000 for category A or €1 000 for category B).

#### **B. Irrigation:**

Based on the results obtained from the assistance scheme for performing IDAE energy audits on irrigation systems in irrigation communities, and based on data regarding irrigated surface area and irrigation technology used (gravity-fed, sprinkler, pivot, localised, etc.), the 3 407 953 ha of irrigated area is found to have a total energy consumption of 425 ktoe. This consumption essentially comprises electricity at just over 80%, compared to diesel water pumps which make up barely 20% of consumption.

Savings measures envisage a 30% reduction in energy consumption, consisting of improving pump performance and adjusting pump power depending on load variation, as well as migrating from sprinkler systems to localised irrigation systems. This high rate of saving will occur naturally due to the price situation of the sector with the current electricity rates.



### C. Farms:

Spain has around 1 000 000 farms, 685 000 of which are livestock farms while the rest consist of various farming activities, including greenhouses.

Energy consumption involves the use of heat and cold generators for pasteurisation and conservation processes, temperature control of livestock buildings and greenhouses, lighting of buildings and surroundings, use of engines for mechanical activities and other related services, not including consumption related to the rural property or to self-powered machinery, the latter of which is included in the previous paragraphs.

Based on this and on the ratios and consumptions accounted for in the sector the estimated consumption is 640 ktoe.

The savings measures to be applied on these farms involve the renovation of existing installations, including both heat generators and systems for air conditioning, lighting, pumping, etc. which, as a whole, will reduce energy consumption by 20%.

### D. Fishing:

Spain's fishing fleet consists of some 10 000 vessels including deep-sea fishing boats, longliners and trawlers (7%) with an average power per vessel of 735 kW, coastal fishing boats with an average power of 175 kW (10%) and small-scale fishing boats with an average power of 25 kW (83%), which, combined, consume 484 ktoe of diesel and heavy fuel.

The reduction of energy consumption in this sector will be primarily through the coastal fleet conversion envisaged in the national strategic fishing plan, in addition to a reduction in the energy consumption of the remaining fleet to improve energy efficiency in the navigation of our boats through motor renovations, changing the geometry of propellers and improving fishing types and other measures currently undergoing research and development.

- ***Contribution of the agriculture sector to the final energy savings target under the energy efficiency obligation scheme.***

The contribution of the agriculture sector to the energy saving target of 571 ktoe/year, under the energy efficiency obligation scheme in Article 7, is 9.64 ktoe/year.

To this end, two technical measures are proposed: improve the energy saving and efficiency on farms and of farm machinery. The first (farms) offers a higher contribution to the savings target at 7.14 ktoe/year, with the second (farm machinery) at 2.4 ktoe/year.

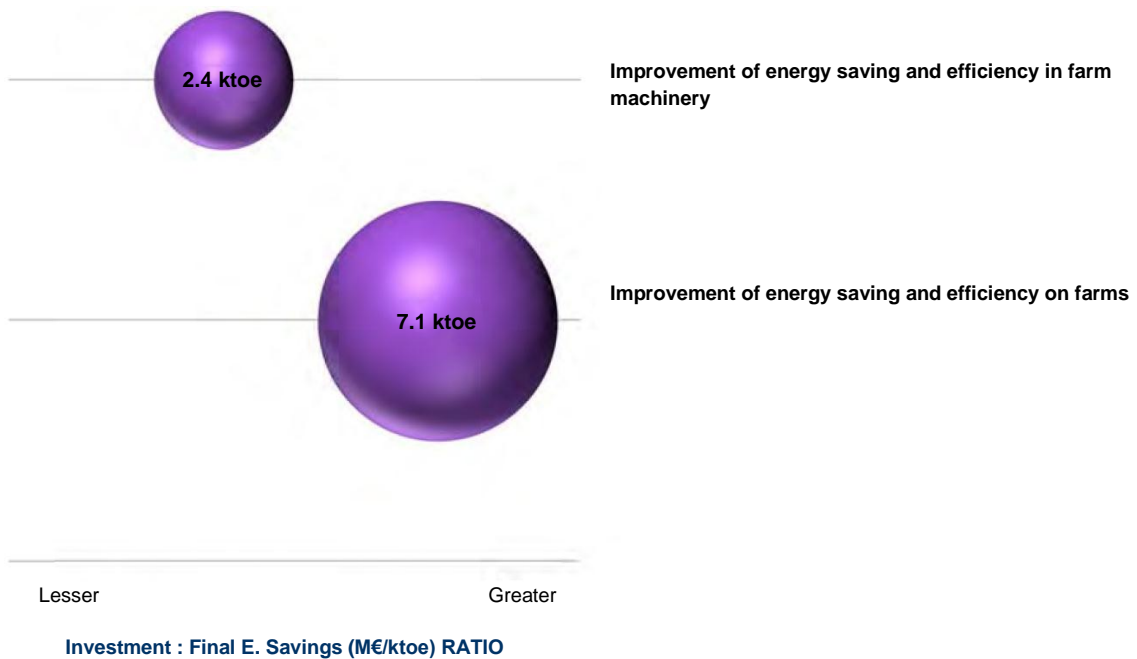


**Table 4.4.4.2. Contribution of the agriculture sector to the final energy savings target under the energy efficiency obligation scheme (Article 7 of Directive 2012/27/EU)**

	Final energy saving (ktoe/year)
<b>AGRICULTURE AND FISHING</b>	<b>9.64</b>
Improvement of energy saving and efficiency on farms	7.14
Improvement of energy saving and efficiency in farm machinery.	2.40
Communication and information measures	0.10

Source: Compiled by IDAE

**Graph 4.4.4.1. Contribution of the agriculture sector to the final energy savings target pursuant to Article 7 (Directive 2012/27/EU): 571 ktoe/year (sphere volume).**



Source: Compiled by IDAE



#### **4.5. PROMOTION OF HIGH-EFFICIENCY COGENERATION AND DISTRICT HEATING AND COOLING SYSTEMS (Article 14)**

As required under Article 14 of the Energy Efficiency Directive, Member States shall carry out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling systems.

This chapter illustrates the current situation with high-efficiency cogeneration and heating and cooling networks in Spain, with particular mention of their installed power and of issues associated with the development of cogeneration, and it describes the envisaged approach for carrying out a comprehensive assessment of the national efficient heating and cooling potential.

##### **4.5.1. Current situation of cogeneration**

Since the publication of Directive 2004/8/EC, repealed by Directive 2012/27/EC of 25 October 2012 on energy efficiency, legislative development in regard to cogeneration in Spain has been focused on ensuring that the source of the electricity produced from high-efficiency cogeneration can be identified according to objective, transparent and non-discriminatory criteria and that the support for cogeneration, for both existing and future units, is based on useful heat demand and primary energy saving, in line with the provisions of Directive 2004/8/EC.

In regard to Directive 2012/27/EC, work is ongoing into a draft transposing Royal Decree, although not much progress has been made due primarily to the fact that Spain is in the process of an in-depth reform of its electricity sector, affecting the legislative and economic system in which high-efficiency cogeneration has been developed. The change was initiated with the publication of Royal Decree-Law 9/2012 of 12 July 2012 adopting urgent measures to ensure the financial stability of the electricity sector in order to balance the annual income and expenditure of the system and thereby rectify the rate deficit accumulated in recent years, and was formalised with the publication of Law 24/2013 of the Electricity Sector, repealing Law 54/1997.

The new Electricity Sector Law 24/2013 continues to support electricity production from renewable energy, cogeneration and waste, an activity which will benefit from a remuneration system based on market share, with market revenues supplemented by a specific, regulated remuneration that will drive competition up to the same level as all other technologies. This specific supplementary remuneration will be sufficient to reach the minimum income level needed to cover costs which, unlike with conventional technologies, cannot be recovered on the market, making the sector adequately profitable.

The remuneration of electricity generation from cogeneration shall be established by royal decree. The Royal Decree which, until publication of Royal Decree-Law 9/2013 of 12 July 2013, regulated the production of electricity under the special regime was 661/2007 of 25 May 2007. A royal decree is currently being drafted for regulating the production of electricity from renewable energy sources, cogeneration and waste in line with the new Electricity Sector Law 24/2013.

With regard to guarantees of origin, the National Markets and Competition Commission is the responsible body, throughout Spanish territory, for issuing the guarantee of origin for electricity, as well as its management using an account entry system, enabling electricity producers which use renewable energy sources or high-efficiency cogeneration to demonstrate that the electricity they sell has been generated in accordance with such principles.



According to statistics from the Ministry of Industry, Energy and Tourism, at the end of 2012 Spain had an installed cogeneration power of 6 675.6 MW, which generated 35 786.4 GWh of electricity and 220 997.1 TJ of heat.

The evolution of installed power in recent years has been closely linked to the general economic situation, prices of electricity supplied to the network and prices of fuel, particularly in relation to natural gas. Using 2007 as a reference, the most recent data available show a rather limited growth of cogeneration, as indicated in the following table.

**Table 4.5.1.1. Installed cogeneration power in Spain for the years 2008–2012 (MW)**

	New installed power under the special regime	New installed power versus 2007
2008	69.9	69.9
2009	140.6	210.5
2010	287.5	496.1
2011	168.9	665.0
2012	65.9	730.8

**Note:** The data shown refer to new plants put into service in the 2008–2012 period and do not include plants taken out of service.

**Source:** MINETUR/IDAE

This reduced growth is attributable to a number of barriers which affect the perception of risk taken into account by investors and/or promoters of this technology when evaluating a new investment project. The main barriers currently impeding the developing of cogeneration are:

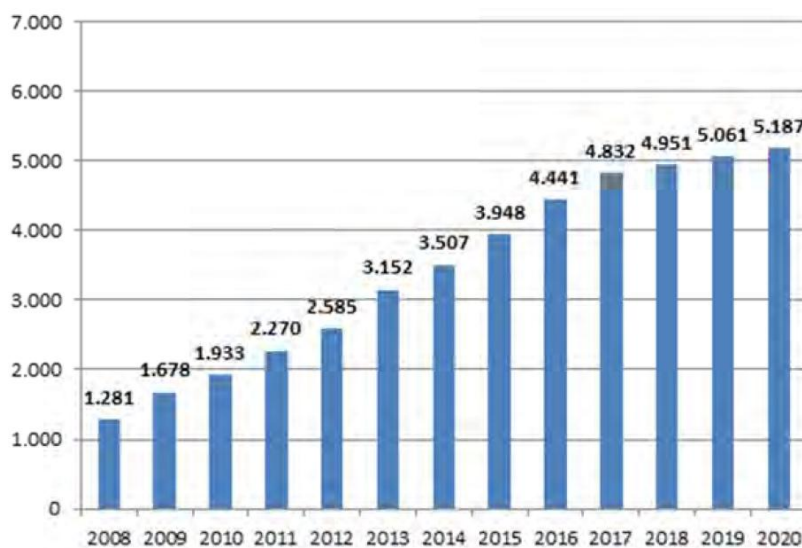
- Conditions of access and interconnection of new projects to the network
- Customer risk added to the implicit project risk, which is particularly significant in sectors more affected by economic cycles
- Administrative complexity associated with the processing of projects, and particularly low-power projects





Another important factor is the high number of cogeneration plants that are 15 years old or more. This presents both a challenge and an opportunity to improve the energy efficiency of the stock of existing cogeneration plants by modernising and/or replacing the main components depending on their useful life. The graph below indicates the age of the existing stock of cogeneration plants, showing that 3 152 MW of energy was produced in 2013 by plants 15 years old or more, as well as the envisaged evolution of the oldest stock until 2020.

**Graph 4.5.1.1. Installed cogeneration power in plants 15 years old or more for the 2008–2020 period**



**Note:** The data shown refer to new plants put into service in the 2008–2012 period and do not include plants taken out of service.

**Source:** Cogeneration energy statistics. Year 2012. IDAE/MINETUR.

#### 4.5.2. Current situation of efficient heating and cooling networks

Starting in October 2011 through an agreement between the IDAE and the Association of Heating and Cooling Network Companies (ADHAC), a survey was initiated to obtain an accurate image of the situation of district heating and cooling networks in Spain, including networks and micro-networks. The survey was able to identify 200 networks, of which data are available on 139. These networks, with a total length of over 220 km, satisfy the energy demand of a land area of 5 million m<sup>2</sup>, which is equivalent to around 65 000 homes.

In 2013 their installed capacity was 608 MW for heating and 248 MW for cooling.

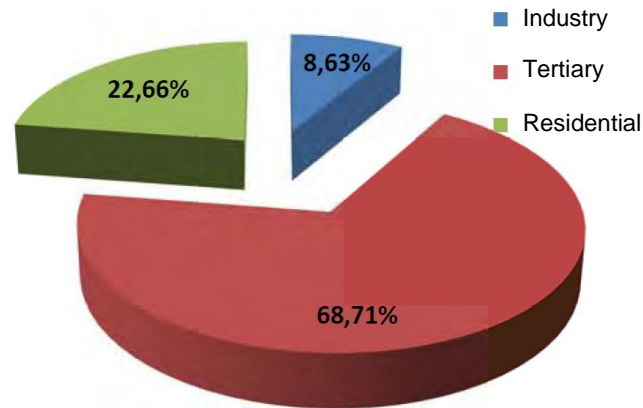
86% of the networks produce heat only, while 2% produce cooling only.

However, this distribution changes if we consider installed power in heating or cooling networks, as the installed power in heat-only networks is 31%, with the majority coming from networks producing both heating and cooling, therefore, according to production data, it can be said that in many cases the combined networks are only producing heat.



Regarding distribution of the number of networks by the sector of activity they serve, it is found that the majority are in the tertiary sector (68.71%), distantly followed by residential (22.66%), while industry accounts for only 9%, as per the distribution shown in graph 4.5.2.1.

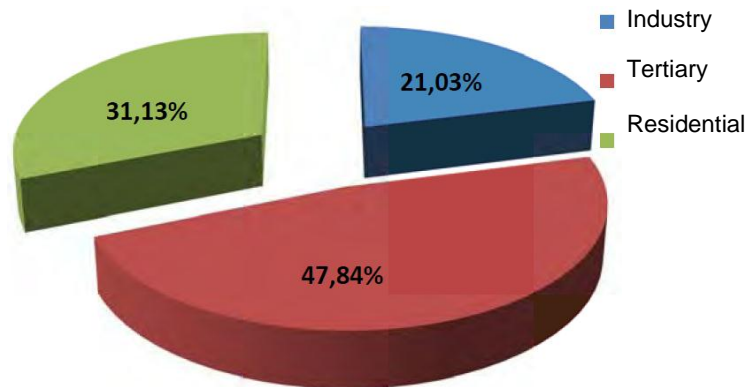
**Graph 4.5.2.1. Distribution of heating and cooling networks by sector**



**Source:** Association of Heating and Cooling Network Companies (ADHAC).

However, if we consider the installed power serving each sector, the distribution is as follows: tertiary (47.84%), residential (31.13%) and industry (21%), as shown in graph 4.5.2.2.

**Graph 4.5.2.2. Distribution of installed power in heating and cooling networks by sector**



**Source:** Association of Heating and Cooling Network Companies (ADHAC).

In regard to network ownership, the rates of public and private ownership are practically identical and, between the two, make up 85% of all installations. The remaining 15% pertains to mixed companies.

#### **4.5.3. Evaluation of the potential use of high-efficiency cogeneration and efficient district heating and cooling systems**

Article 14(1) of the EED states that, by 31 December 2015, Member States shall carry out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling systems.



A specific analysis is yet to be undertaken regarding a comprehensive assessment of the potential for the application of high-efficiency cogeneration, although, from a legislative perspective, a draft royal decree has been submitted for public consultation by the Ministry of Industry, Energy and Tourism, which transposes Directive 2012/27/EU concerning energy audits, accreditation of service providers and energy auditors, promotion of energy efficiency and energy consumption metering. Chapter IV of the draft royal decree transposes the obligation of Member States to promote energy efficiency in the production and use of heating and cooling, while Annexes III and IV describe the scope of the comprehensive assessment of the potential for heating and cooling and the cost-benefit analysis, respectively.

The technical specification under the comprehensive assessment of potential shall be based on the following points:

**A. Gathering statistical information on residual heat and heating and cooling demand in industrial, residential and tertiary sectors.**

Identification based on available statistical information on residual heat sources from heating installations larger than 20 MW powered by conventional, biomass and waste fuels, and cogeneration systems, as well as sources deriving from unexploited industrial processes. In this last case, given the lack of statistical information, specific surveys will need to be carried out.

As regards heating and cooling demand in the industrial sector, a summarised statistical analysis will be conducted in sectors and subsectors, following a NACE code and based on region and company size. The indicators used will be company size, energy consumption and location.

In the residential and tertiary sectors, data used will be taken from the Spanish stock of buildings and from preliminary sector energy studies, in addition to information obtained through surveys.

Data sources will include:

- Energy and industry statistics of the Ministry of Industry, Energy and Tourism
- The Spanish National Statistics Institute (INE)
- Land Registry Directorate General (Dirección General del Catastro)
- Regional energy agencies
- Chambers of Commerce, Industry and Navigation
- Industry associations



## **B. Characterising heating and cooling demand.**

For each industrial sector and subsector, consumption profiles will be defined based on their heating and cooling demand by temperature and usage frequency (daily, weekly and monthly).

Similarly, in the residential and tertiary sectors, different building types will be defined and an analysis by climate zones will be carried out to determine heating and cooling demand.

## **C. Determining potential for high-efficiency cogeneration in each sector of activity.**

Based on the heating and cooling demand for each of the types defined in each sector of activity, the cogeneration installation which provides the maximum primary energy saving will be determined by extrapolating the results to the sector level.

Any limiting factors which, depending on the process or nature of the company, prevent or hinder the implementation of cogeneration will be taken into account so that they may be discarded from the previous analysis.

Completion of this phase requires the use of simulation tools which facilitate the analysis and characterisation of the different types studied and which provide high quality results.

## **D. Determining potential for heating and cooling networks.**

In addition to the previous study, an analysis will be conducted of the potential of heating and cooling networks which, using either available residual heat or high-efficiency cogeneration systems, are able to satisfy the combined heating and cooling demand.

## **E. Developing a heat map.**

All of the information from the comprehensive assessment of the potential for cogeneration and efficient district heating and cooling systems will be displayed using a set of GIS (geographical information system) tools which include:

- Points of heating and cooling demand, including municipalities and conurbations with a constructed surface area to land surface area ratio of at least 0.3
- Industrial areas with heating and cooling consumption exceeding 20 GWh
- Existing or planned heating and cooling infrastructures
- Potential points of heating and cooling demand
- Residual heat output points, including thermoelectric power plants, waste incineration plants and existing and planned cogeneration plants
- District heating systems

### **4.5.4. Procedure and methodology for conducting a cost-benefit analysis**

Article 14(3) of the EED provides for a cost-benefit analysis in accordance with the criteria of Annex IX (Article 14(3), Annex IX, Part 1, final section and Annex XIV, Part 2(2), first sentence of the EED). The procedure and methodology used are described below.

In accordance with the reform of the electricity sector in Spain, the remuneration regime associated with high-efficiency cogeneration and renewable energies is being revised. This will be



used to define a number of economic and financial scenarios which will limit application of the technical potential identified in the comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling systems.

These scenarios shall include the following information:

- Costs of investment in cogeneration systems and heating networks according to their power and life span
- Set-up, operation and maintenance costs and their future evolution
- Health and environmental costs
- Evolution of fuel costs and energy rates
- Evolution of the growth of each of the industrial sectors
- Evolution of the stock of buildings according to types of construction
- Forecast structural changes in economic activity
- Forecast profits for each of the actors involved in energy investments
- Energy saving and efficiency incentives and promotion policies. The instruments needed (regarding legislation, economy, promotion, information, training, etc.) to stimulate renovation and to overcome any barriers shall be defined along with a schedule of targets divided into phases.



#### **4.6. ENERGY EFFICIENCY IN TRANSFORMATION, TRANSMISSION, DISTRIBUTION AND PARTICIPATION IN SATISFYING DEMAND (Article 15)**

Over the last two years, and this year in particular, Spain's electricity system has been completely overhauled with the aim of achieving economic sustainability and improving its economic and technical efficiency.

In the past year, a large package of reforms was introduced which began with the approval of Royal Decree-Law 9/2013 of 12 July 2013 and continued with the enactment of Law 24/2013 of 26 December 2013 of the Electricity Sector, along with the following royal decrees: Royal Decree 1047/2013 of 27 December 2013 laying down the methodology for calculating the remuneration of electricity transmission, Royal Decree 1048/2013 of 27 December 2013 laying down the methodology for calculating the remuneration of electricity distribution, and Royal Decree 216/2014 of 28 March 2014 laying down the methodology for calculating voluntary prices for the small electricity consumer and its legal framework for procurement. Several ministerial orders have also been approved, including Order IET/2013/2013 of 31 October 2013 regulating competition mechanisms for the allocation of interruptibility demand management service, and Order IET/346/2014 of 7 March 2014 which amends the previous order. Additionally, various royal decrees and ministerial orders are still being processed and are at different stages of completion.

The aforementioned norms contain measures aiming at stimulating the pursuit of several of the targets envisaged by the Energy Efficiency Directive.

##### **4.6.1. Energy efficiency criteria applicable to network tariffs and regulations (Article 15)**

This section describes the measures adopted or envisaged by Spain in regard to transposing Article 15 of the EED which states that Member States shall ensure the removal of those incentives in transmission and distribution tariffs that are detrimental to the overall efficiency (including energy efficiency) of the generation, transmission, distribution and supply of electricity or those that might hamper participation of demand response, in balancing markets and ancillary services procurement.

It also describes the measures to ensure that network operators are incentivised to improve efficiency in infrastructure design and operation. Finally, it covers measures to ensure that tariffs allow suppliers to improve consumer participation in system efficiency, including demand response.

In regard to network tariffs, the electricity sector regulations indicate that the government shall be responsible for establishing network remuneration methods, while the National Markets and Competition Commission will be responsible for establishing a methodology for the allocation of costs of access tolls taking into account the remuneration of such activities.

The now-defunct National Energy Commission conducted a public consultation on 'methodology for the allocation of the costs to electricity access tolls' Following the public consultation process, on 17 May 2013 the Commission submitted for comment to members of the Electricity Advisory Board a draft circular on the methodology for calculating electricity transmission and distribution tolls, in fulfilment of Royal Decree-Law 13/2012 of 30 March 2012 transposing directives on internal electricity and gas markets and electronic communications and adopting measures for



correcting errors due to discrepancies between costs and revenues in the electricity and gas sectors. While this circular is yet to be approved, it is being addressed by the national authorities and although the main focus is on improving toll structures, their allocation, which is currently in effect, contains no mechanisms which hinder the management of demand.

#### **4.6.2. Facilitation and promotion of demand response (Article 15)**

In regard to measures adopted or envisaged to facilitate and promote demand response, firstly, it is found that the recently-enacted Law 24/2013 of 26 December 2013 of the Electricity Sector, in Article 49 on demand management, provides that 'electricity companies, consumers and the system operator, in coordination with other agents, may draw up and apply measures which promote a better management of electricity demand and help optimise the load curve and/or energy saving and efficiency'. The same article lays down the possibility for consumers, either directly or through sellers, to participate, where applicable, in the services included in the electricity production market in accordance with the applicable regulations.

Approval of the aforementioned Royal Decree 216/2014 of 28 March 2014 represents a significant step forward in improving the participation of small consumers in system efficiency and demand response. This royal decree provides that electricity production cost shall be determined based on the hourly price of the daily market during the billing period in question, enabling the consumer to become more aware of wholesale market prices deriving from the system demand curve. This encourages consumption outside peak hours and, ultimately, leads to less aggregated demand. It is equally important to note that billing will be based on in-person readings and in consideration of consumption profiles, except for supplies which use metering systems which have integrated remote reading and remote management capability, for which billing shall be based on hourly consumption values. This fact will stimulate the development of smart networks and efficient consumption.

With respect to large electricity consumers, measures have also been taken with the approval of two orders in 2013 and 2014 regulating competition mechanisms for the allocation of interruptibility demand management service.

#### **4.6.3. Energy efficiency in design and regulation (Article 15)**

Described below are the advancements made in evaluating the energy efficiency potential of the national gas and electricity infrastructure and the measures adopted or envisaged for introducing cost-effective energy efficiency improvements into the network infrastructure.

- **National electricity infrastructure**

With respect to energy efficiency, the new Electricity Sector Law, in Article 50 on energy saving and efficiency plans, provides that governments, as part of their respective territorial jurisdiction, may implement energy saving and efficiency plans which establish rules and basic principles for enhancing the actions taken in pursuit of the following goals:

- (a) Optimise the output of energy transformation processes inherent to production or consumption systems.



- (b) Analyse and control the development of projects for the creation of energy-intensive industrial plants according to criteria of energy profitability at the national level.
- (c) Improve the performance of or replace the type of fuel in energy-intensive companies or sectors based on national interests.
- (d) Improve the energy efficiency of medium and large enterprises in all sectors.
- (e) Renovate the energy systems of the national stock of residential and commercial buildings to increase electricity savings and improve energy efficiency in heating, cooling, ventilation, lighting, elevator and other systems which use electricity.

In regard to networks, Royal Decree 1047/2013 of 27 December 2013 and Royal Decree 1048/2013 of 27 December 2013 implement a specific methodology which will remunerate each and every investment made by electricity transmission and distribution companies. These norms provide certainty to network companies that their actions will be compensated, which undoubtedly makes it possible for them to obtain the financing those actions require. Furthermore, the recently-approved Electricity Sector Law includes a clear provision for technological innovations on networks, stating that 'for assets which imply technological innovations, the introduction of which will give greater technical and economic efficiency to the system, such assets may be considered to have a significantly inferior useful life'. This fact will help stimulate investments in smart networks.

Meanwhile, the royal decree on the remuneration of distribution has introduced two incentives which will help to reduce network losses. The first is an incentive to reduce losses which results in either increased remuneration or the application of penalties. The incentive is set up in such a way that continuous improvement in the extent of losses is required in order to receive increased remuneration and to avoid penalty, thus fostering a process of ongoing improvement. Secondly, an incentive has been designed to reduce fraud given that energy theft represents an economic cost to the system and a 'statistical cost' since stolen energy is accounted as a loss, as it is energy which enters the electricity networks but which is never read on consumer meters.

Finally, the Electricity Sector Law provides that system operator remuneration may incorporate incentives (which may be positive or negative) to reduce system operating costs deriving from the calculation of adjustment services, to improve forecasts, and other targets.

- **National gas infrastructure**

In the Spanish gas system, both in transmission and distribution networks and in regasification plants, a mechanism has been implemented for detecting system losses which incentivises their reduction by facility owners.

Each type of installation has a set percentage of losses to be detected on the gas entering the installations, with the balance between the difference in actual losses produced and losses detected for each type of installation being calculated periodically. This balance is economically evaluated and distributed between the facility owner and its users.

Where the actual losses are less than those detected, the distribution facility owner will have a balance in its favour, which will be paid by network users; inversely, the distributor must pay network users for any actual losses which exceed those detected.

In the case of transmission and regasification facilities, the distribution for the facility owner, where fewer losses than those detected are incurred, is one half of the resulting balance, as the rest is used by the gas system as manoeuvring gas. In cases where there are greater losses than those detected, the facility owner shall pay the difference to its users.





Article 15(2)(a) of the EED states that Member States shall ensure, by 30 June 2015, that an assessment is undertaken of the energy efficiency potentials of their gas and electricity infrastructure, identifying measures to be introduced with a timetable.

To carry out this assessment, the draft Royal Decree for transposing the aforementioned Directive envisages a mandate to the National Markets and Competition Commission whereby, in collaboration with the technical system manager, transmitters and distributors, it undertakes an evaluation of the energy efficiency potential of its gas infrastructure, in particular regarding transmission, distribution, load management and interoperability.

This is in addition to identifying concrete measures and investments for the introduction of cost-effective energy efficiency improvements in the network infrastructure and regulatory proposals for their introduction. This study will provide fulfilment of Article 15(2)(a) of the Energy Efficiency Directive prior to the deadline set therein.



ANNEX I:  
ADMINISTRATIVE PROVISIONS  
SUPPORTING ENERGY EFFICIENCY



MINISTRY OF INDUSTRY,  
ENERGY AND TOURISM

STATE SECRETARIAT FOR ENERGY



## **ANNEX I: ADMINISTRATIVE PROVISIONS SUPPORTING ENERGY EFFICIENCY**

This Annex I lays down administrative provisions approving measures for the support of energy efficiency by the general state administration.

- Law 8/2013 of 26 June 2013 on urban renovation, regeneration and renovation.
- MOVELE: Royal Decree 417/2012 of 24 February 2012 amending Royal Decree 648/2011 of 9 May 2011 on the direct concession of subsidies for the purchase of electric vehicles, as part of the 2010–2014 Action Plan under Spain's 2010–2014 Integrated Electric Vehicle Stimulus Plan. These concessions were financed under budget entry 20.16.422B.785 of the 2012 expenditure budget of the Ministry of Industry, Energy and Tourism.
- MOVELE: Royal Decree 648/2011 of 9 May 2011 on the direct concession of subsidies for the purchase of electric vehicles during 2011, as part of the 2010–2012 Action Plan under Spain's 2010–2014 Integrated Electric Vehicle Stimulus Plan. These concessions were financed under budget entry 20.16.422B.785 envisaged in Law 39/2010 of 22 December 2010 on General State Budgets for the 2011 fiscal year, and in particular the 2011 expenditure budget of the Ministry of Industry, Energy and Tourism. BOE 10.05.2011.
- Order FOM/1635/2013 of 10 September 2013 updating basic document DB-HE 'Energy Saving' of the Technical Building Code, approved by Royal Decree 314/2006 of 17 March 2006.
- Order INT/229/2013 of 25 November 2013 amending Annexes I, V, VI and VII to the General Driver Regulations approved by Royal Decree 818/2009 of 8 May 2009, and Order INT/2323/2011 of 29 July 2011 regulating training for progressive access to the class A driver's licence.
- PAREER: Resolution of 25 September 2013 of the Secretary of State for Energy, publishing that of 25 June 2013 of the Board of Directors of the Institute for Energy Diversification and Saving, laying down regulatory principles and a call for the aid programme for the energy renovation of existing buildings used in the residential sector (housing and hotel use).
- PIMA AIRE: Royal Decree 631/2013 of 2 August 2013 amending Royal Decree 89/2013 of 8 February 2013 regulating the direct award of assistance under the 'PIMA Aire' environmental stimulus plan for the purchase of commercial vehicles.
- PIMA AIRE: Royal Decree 831/2013 of 25 October 2013 amending Royal Decree 89/2013 of 8 February 2013 regulating the direct award of assistance under the 'PIMA Aire' environmental stimulus plan for the purchase of commercial vehicles.
- PIMA AIRE: Royal Decree 89/2013 of 8 February 2013 regulating the direct award of assistance under the 'PIMA Aire' environmental stimulus plan for the purchase of commercial vehicles.
- PIMA SOL: Royal Decree 635/2013 of 2 August 2013 which, in implementation of the 'PIMA Sol' environmental stimulus plan in the hotel sector, for the energy renovation of its installations, regulates the acquisition of future carbon credits through the carbon fund for a sustainable economy.
- PIVE 1: Resolution of 28 September 2012 of the Secretary of State for Energy, publishing that of 24 September 2012 of the IDAE Board of Directors, laying down regulatory principles



for the call for aid under the Efficient Vehicle Incentive Programme (PIVE). BOE of 29 September 2012.

- PIVE 2: Resolution of 31 January 2013 of the Secretary of State for Energy, publishing that of 30 January 2013 of the IDAE Board of Directors, laying down regulatory principles for the second call for aid under the Efficient Vehicle Incentive Programme (PIVE-2). BOE of 29 September 2012.
- PIVE 3: Royal Decree 575/2013 of 26 July 2013 regulating the direct concession of subsidies under the 'Efficient Vehicle Incentive Programme (PIVE-3)'. These subsidies were financed by contributions received by the IDAE deriving from the budget of the Secretary of State for Energy of the Ministry of Industry, Energy and Tourism, entry 20.18.425A.747 'To the Institute for Energy Diversification and Saving (IDAE) for the Efficient Vehicle Incentive Programme (PIVE-3)'. BOE 27.07.2013.
- PIVE 4: Royal Decree 830/2013 of 25 October 2013 regulating the direct concession of subsidies under the 'Efficient Vehicle Incentive Programme (PIVE-4)'. These subsidies were financed by contributions received by the IDAE deriving from the budget of the Secretary of State for Energy of the Ministry of Industry, Energy and Tourism, entry 20.18.425A.746 'To the Institute for Energy Diversification and Saving (IDAE) for the Efficient Vehicle Incentive Programme (PIVE-4)'. BOE 29.10.2013.
- PIVE 5: Royal Decree 35/2014 of 24 January 2014 regulating the direct concession of subsidies under the 'Efficient Vehicle Incentive Programme (PIVE-5)'. These subsidies were financed by contributions received by the IDAE deriving from the budget of the Secretary of State for Energy of the Ministry of Industry, Energy and Tourism, entry 20.18.425A.746 'To the Institute for Energy Diversification and Saving (IDAE) for the Efficient Vehicle Incentive Programme (PIVE-5)'. These subsidies may also be cofinanced with community funds in some operational programmes of the European Regional Development Fund (ERDF). BOE 28.01.2014.
- Royal Decree 233/2013 of 5 April 2013 regulating the state plan for the promotion of rental housing, building restoration and urban regeneration and renovation for the 2013–2016 period.
- Royal Decree 235/2013 of 5 April 2013 approving the basic procedure for the energy efficiency certification of buildings.
- Royal Decree 238/2013 of 5 April 2013 amending certain articles and technical instructions of the Regulation on Building Heating Installations (RITE), approved by Royal Decree 1027/2007 of 20 July 2007.



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