

SAVING AND ENERGY EFFICIENCY ACTION PLAN

2011-2020

***(2nd NATIONAL ENERGY EFFICIENCY ACTION
PLAN IN SPAIN)***

EXECUTIVE SUMMARY



GOBIERNO
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Y COMERCIO



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1. CONTEXT AND MOTIVATION FOR THE 2011-2020 ACTION PLAN

This 2011-2020 action plan constitutes the second National Saving and Energy Efficiency Action Plan (NEEAP¹) which, in accordance with article 14 of Directive 2006/32/EC², by the European Parliament and Council of 5 April 2006 concerning the efficiency of end-uses of energy and energy services, the Spanish state must submit to the European Commission in 2011. This Action Plan was approved by resolution of the Council of Ministers on 29 July 2011, and further develops the energy saving and efficiency plans previously approved by the Spanish government within the 2004-2012 *Saving and Energy Efficiency Strategy in Spain* (E4), approved in November 2003.

The previous action plans, approved within the framework of the E4, have been the subject of analysis and assessment, according to the recommendations on methods for checking and measuring savings, made by the European Commission. These methods have also been used to determine new objectives for this 2011-2020 Action Plan and are described in chapter 2 of this document. Chapter 3 assesses the savings achieved as a result of the savings plans prior to this one, during the 2004-2010 period, and the tools and measures designed to achieve them. Finally, chapter 4 of this document presents the objectives put forward by this new Plan —estimated using the same methodological criteria as the savings calculated for the

¹ *National Energy Efficiency Action Plan*, in the terminology of Directive 2006/32/EC from the European Parliament and Council, of 5 April 2006, concerning the efficiency of the end use of energy and energy services

² Official Journal of the European Union, 27.4.2006.

previous period— and the measures and instruments proposed looking ahead to 2020.

The savings achieved during the 2004-2010 period are the result of the 2005-2007 and 2008-2012 Action Plans, approved, respectively, under agreement from the Council of Ministers on 8 July 2005 and 20 July 2007³. **The second of these plans, the 2008-2012 Action Plan, was submitted by the Spanish state to the European Commission as a first National Saving and Energy Efficiency Action Plan (NEEAP).**

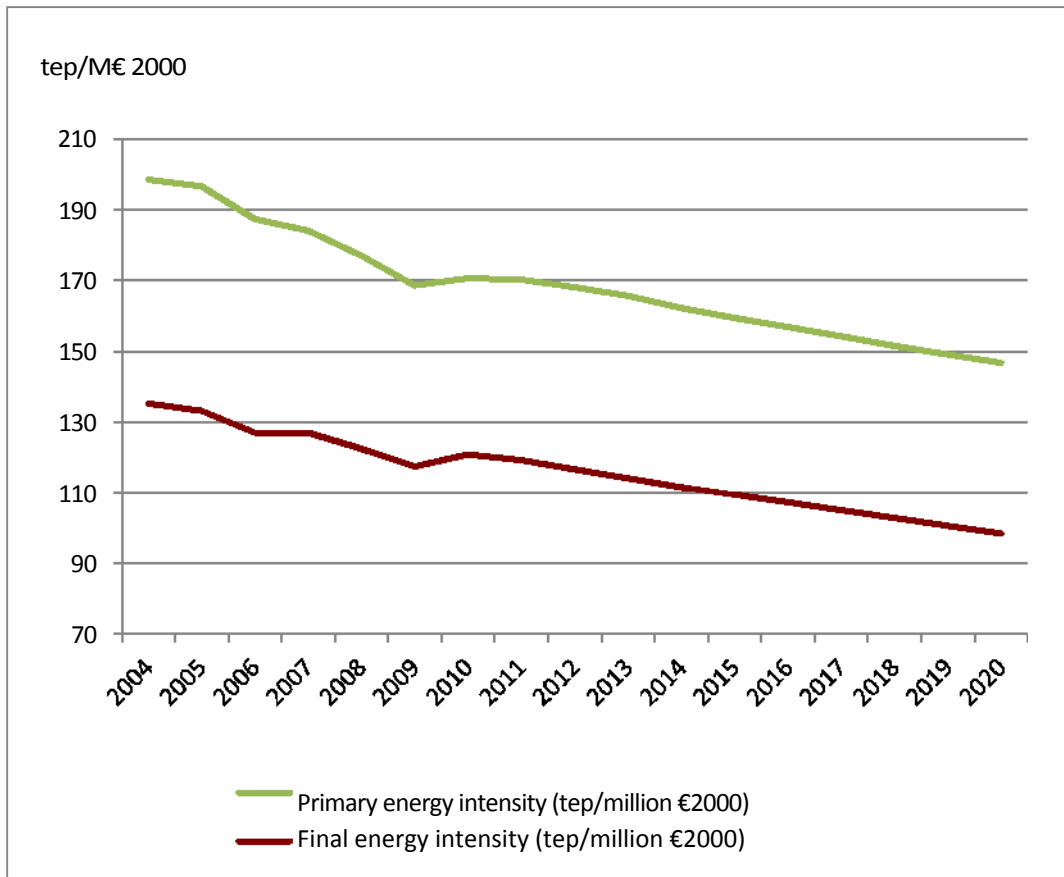
In this new 2011-2020 Action Plan, both the calculation of savings achieved up to 2010, as well as the objectives proposed for 2016 and 2020 have been performed in terms of final and primary energy⁴: despite the fact that Directive 2006/32/EC only requires reporting in terms of final energy and for the sectors expressly included in its scope of application, this Plan includes final and primary energy savings to the extent that it forms part of an **integrated supply and demand energy strategy** that also considers objectives relative to promoting renewable energies and more efficient processing technologies.

The final and primary energy savings estimated in this document are, therefore, in line with the final and primary energy consumption scenarios included in the indicative energy planning set out in article 79 of Law 2/2011 on Sustainable Economy and other planning instruments relative to renewable energies (in accordance with the obligations set out in Directive 2009/28/EC of 23 April 2009 concerning the promotion of energy use from renewable sources). Therefore, the planning, in energy terms, constitutes a coherent whole, conducive to the objective of improving final intensity by 2% year-on-year for the 2010-2020 period.

³This Council of Ministers also approved the ***Saving and Energy Efficiency Plan for the State General Administration's buildings.***

⁴"Final energy" is defined as the energy supplied to the consumer for use in the production of goods or services and, "primary energy" is defined as the energy available in nature before being converted or changed into final energy for use (this may be calculated as the result of adding final non-electrical energy consumption in the energy sectors —their own consumption and changing consumption— and losses).

Graph 1. Final and primary energy intensities(tep/M€2000)



The savings reported in this document are also in line with the objectives relative to reducing greenhouse gases set by Spain within the European Union's 20-20-20 strategy⁵, although there are differences in the approach and calculation methods with the emission projections made by the European Commission for 2020.

Likewise, this Plan is in line with other R+D+i, industrial policy or infrastructure strategies (specifically, the 2005-2020 Strategic Plan for Infrastructure and Transport —PEIT—) already approved, as necessary conditions for the achievement of the final and primary energy saving objectives proposed for 2020. This Plan also includes the objectives of the *Integral Strategy to Promote Electric Vehicles in Spain* and the objectives set out in the PANER (Plan for Renewable Energies in Spain) in line with the scenarios for the incorporation of renewable fuels for transport set out in Directive 2009/28/EC, of 23 April 2009, relative to the promotion of energy use from renewable sources (2.5 million electric vehicles in 2020).

The scenario considered as an objective for this Plan and scenario, therefore, relative to efficiency, is that shown in Table 1, which shows primary energy consumption by source and its evolution in 2020, with a primary energy objective of 142.213ktep in this year; this assumes a year-on-year increase of 0.8% from 2010 and an annual increase in primary intensity of 1.5% between both years - considering an annual GDP increase of 2.3% annually, between 2010 and 2020.

⁵Decision from the European Council on 17 June 2010, concerning improving primary energy efficiency by 20% in 2020.

Table 1. Primary energy consumption by source (ktep)

Sources	2004	2007	2008	2009	2010	2016	2020	2010-2020 (Year-on-year rate of variation)
Coal	20.921	20.354	13.983	10.509	8.271	10.468	10.058	1,98%
Oil	71.054	70.848	68.182	63.684	62.358	55.746	51.980	-1,80%
Natural Gas	24.671	31.601	34.782	31.096	31.003	37.147	38.839	2,28%
Nuclear	16.576	14.360	15.368	13.750	16.102	14.490	14.490	1,05%
Renewable Energies	8.854	9.976	10.942	12.165	14.910	21.802	27.878	6,46%
Elec. balance (Imp.- Exp.)	-260	-494	-949	-697	-717	-1.020	-1.032	3,71%
TOTAL	141.817	146.645	142.308	130.507	131.927	138.633	142.213	0,75%

In terms of final energy, this Plan's scenario-objective is that shown in Table 2 illustrating final energy consumption by sector, and in Table 3 illustrating final energy consumption by source, with a consumption objective in 2020 of 102.220 ktep, from which, final energy consumption with non-energy purposes (energy consumed as a raw material in certain production processes) is deducted, achieving total consumption of 95.355 ktep.

**Table 2. Final energy consumption by sector (ktep)
-excluding non-energy uses-**

Sectors	2004	2007	2008	2009	2010	2016	2020	2010-2020 (Year-on-year rate of variation)
Industry	29.855	29.878	30.241	26.468	28.209	26.034	25.777	-0,90%
Transport	37.736	40.804	39.313	37.464	36.744	38.670	38.752	0,53%
Residential, tertiary and others	29.030	30.448	28.886	26.975	28.470	30.016	30.827	0,80%
TOTAL	96.621	101.130	98.440	90.906	93.423	94.720	95.355	0,20%

**Table 3. Final energy consumption by source (ktep)
-excluding non-energy uses-**

Sources	2004	2007	2008	2009	2010	2016	2020	2010-2020 (Year-on-year rate of variation)
Coal	2.405	2.317	2.080	1.427	1.693	2.168	2.146	2,40%
Petroleum	54.244	55.277	52.867	49.032	48.371	43.026	39.253	-2,07%
Natural Gas	16.283	17.277	16.866	14.639	16.573	18.211	18.800	1,27%
Electricity	19.914	22.159	22.253	20.980	21.410	24.343	27.085	2,38%
Renewable Energies	3.774	4.101	4.374	4.828	5.375	6.971	8.070	4,15%
TOTAL	96.621	101.130	98.440	90.906	93.423	94.720	95.355	0,20%

2. METHODOLOGY FOR ASSESSING SAVINGS

The energy savings up to 2010 have been calculated—in the same way as the savings proposed as objectives for 2016 and 2020—in accordance with methodological recommendations from the European Commission.

The base year for the calculation of the savings is 2007, in order to be able to add the savings calculated for Spain within this 2011-2020 Action Plan, to those calculated for the rest of the Member States, within their respective action plans; therefore, a European assessment can be made and the coherence of the national action plans can be evaluated with the community objective of improving energy efficiency by 20% in 2020.

Therefore, the savings calculated up to 2010 take 2007 as the reference year, which also enables them to be compared with the saving objectives proposed for 2016 and 2020. Notwithstanding the foregoing, savings—in 2010—were also calculated using 2004 as a base year, to be included in the assessment of savings achieved, those derived from the 2005-2007 Action Plan, approved within the *2004-2012 Saving and Energy Efficiency Strategy in Spain (E4)*.

The assessment of savings achieved in 2010, calculated with both 2004 and 2007 as base years, is the result of the coherent combination of *top-down* or descending and *bottom-up* or ascending approaches.

Descending or *top-down* indicators define the total savings achieved, either as a direct result of saving and energy efficiency measures implemented, or as an indirect result of the same or as a result of other variables. Generally, the savings derived from these indicators are the result of the product of an activity variable by the difference between the unit consumption in the base year (2007 or 2004) and 2010.

Among the savings indirectly calculated as a result of the saving and energy efficiency measures, we can cite, in addition to those which are a result of autonomous technological progress, those derived from the effect of prices or, even, those derived from policy provisions—with distinct objectives in terms of saving and energy efficiency—which may have an effect on final energy consumption. In addition to the foregoing, the financial economic crisis has also affected the calculation of these indicators, either positively or negatively.

The results obtained from descending or *top-down* indicators (M: minimum ORP: preferred⁶) include, therefore, different effects which are not always linked, strictly, to improved energy efficiency—this is more pronounced when M indicators are used instead of P indicators.

Table 4 shows the relationship between the descending indicators used for each sector, means of transport or energy use in residential and tertiary sectors. Basically, P indicators are used, with some exceptions for the carriage of goods by road and the tertiary sector. Additionally, new indicators not directly proposed by the European Commission, are included to identify or clarify the effects of certain measures in public services and agriculture on savings.

On the other hand, ascending or *bottom-up* indicators enable the identification of direct savings attributable to each of the individually considered measures within the action plans and, often, they

⁶In accordance with the description of the indicators established by the European Commission in the methodological recommendations document which serves as a basis for the calculation of savings in this 2011-2020 Action Plan.

are determined by adding the savings achieved, project by project, for each of those having been the subject of aid, without considering indirect or induced effects.

As an example to illustrate this integrated *top-down/bottom-up* approach followed for the calculation of savings, the calculation of the saving associated with energy consumption for lighting in the domestic sector is shown, from the P5 indicator.

The indicator is determined as shown in the following expression, where C^{lighting} is the unit consumption (per household) for lighting:

$$\text{P5 savings}_{(\text{net})} = [C_{2004}^{\text{lighting}} - C_{2010}^{\text{lighting}}] \cdot \text{Households}_{2010}$$

Savings calculated in this way are also the result of two effects: the direct effect on the saving from the investments made to improve the efficiency of lighting systems, which can be approximated through *bottom-up* measures, and indirect effects (positive or negative) derived from other factors (energy prices, better or worse lighting equipment, that is to say, an increase or decrease in the number of light points per household etc).

$$\text{P5 savings}_{(\text{net})} = \sum \text{Direct Savings (BU)} \pm \frac{\text{Effects}}{\text{Savings}} (\text{direct and induced})$$

Table 4. Top-down indicators (descending) used to calculate savings

SECTOR			ENERGY INDICATOR	UNIT
INDUSTRY	Division 1 Parametric Method (LAS-PDM1)		T _{technology} PDM1 indicator of the technological effect by economic sector	ktep/10 ⁶ €
			S _{structure} PDM2 indicator of the structural effect by economic sector	ktep/10 ⁶ €
TRANSPORT	ROAD	PASSENGERS	P8 Energy consumption of private vehicles by number of passengers (passengers-km)	gep/pkm
		GOODS	M53/PB Energy consumption of buses per fleet	tep/veq
	RAILWAY	PASSENGERS	M52/A2 Energy consumption of lorries and light vehicles per fleet of equivalent vehicles	tep/veq
		GOODS	P10 Energy consumption of passenger rail transport by number of passengers (passengers-km)	gep/pkm
	MARITIME (GOODS)		P11 Energy consumption of the carriage of goods by rail by amount of goods (tons-km)	gep/tkm
	AIR (DOMESTIC PASSENGERS)		M7 Energy consumption of maritime goods transport (coastal and river) by amount of goods (tons-km)	gep/tkm
	MODAL CHANGE	PASSENGERS from private means to collective means	Mav Energy consumption of aerial passenger transport by means of domestic flights by operations (n° of flights)	gep/pkm
		GOODS from road to rail and maritime	P12 Transfer of passenger traffic from the private vehicle to collective means (bus, train and metro)	%
BUILDINGS	RESIDENTIAL	THERMAL ENVELOPE AND EQUIPMENT	P13 Transfer of goods traffic from road to rail and maritime	%
			P1 Domestic energy consumption of heating units by surface area of main homes (corrected by climatic conditions)	tep/m ²
		P2 Domestic energy consumption of cooling units by surface area of main homes (corrected by climatic conditions)	tep/m ²	
	TERTIARY	THERMAL ENVELOPE AND EQUIPMENT	P3 Domestic energy consumption of SHW per inhabitant	tep/inhabitant
			P5 Domestic energy consumption of lighting per main home	tep/household
			M311 Domestic non-electrical energy consumption for heating in the tertiary sector per employee (corrected by climatic conditions)	tep/employee
			M41 Electric energy consumption for heating in the tertiary sector per employee (corrected by climatic conditions)	tep/employee
		M412 Electric energy consumption for cooling in the tertiary sector per employee (corrected by climatic conditions)	tep/employee	
	LIGHTING	M312 Non-electrical energy consumption of SHW in the tertiary sector per employee	tep/employee	
		M413 Electrical energy consumption of SHW in the tertiary sector per employee	tep/employee	
	EQUIPMENT	RESIDENTIAL	DOMESTIC APPLIANCES	M42 Energy consumption of lighting in the tertiary sector per employee
P4 Domestic energy consumption of domestic appliances per appliance				tep/appliance
TERTIARY		DOMESTIC APPLIANCES	P41 Domestic energy consumption of cookers per appliance	tep/cooker
			M44 Electric energy consumption of domestic appliances and office equipment in the tertiary sector per employee	tep/employee
		COOKERS	M43 Electrical energy consumption of cookers in the tertiary sector per employee	tep/employee
			M32 Non-electrical energy consumption of cookers in the tertiary sector per employee	tep/employee
PUBLIC SERVICES	PUBLIC LIGHTING		MAP Energy consumption of public lighting per household	tep/household
	WATER DESALINATION		MAG _{desalination} Energy consumption of desalination by volume of desalinated water	ktep/hm ³ year
	WATER PURIFICATION		MAG _{purification} Energy consumption of water purification per inhabitant	tep/inhabitant
AGRICULTURE AND FISHERIES			M8 Energy consumption of agriculture and fisheries per unit of GVA	ktep/10 ⁶ €

3. 2004-2010 ASSESSMENT

3.1 Final and primary energy savings: 2010 results

The results of savings, in terms of final energy, achieved with both base years (2004 and 2007) are shown in Table 5, where we can see that the total savings equate to 4.720 ktep/year, for base year 2007, and 8.342 ktep/year for base year 2004. Note that industry has negative values for savings, both for base year 2004 and 2007, as a result of the increase in energy intensity in the sector due to the reduction in use factors relative to production capacities installed and the fall in production values as a result of the current economic crisis.

Generally speaking, sectoral savings have been calculated as the difference between the value of the energy efficiency indicators chosen for each sector, means of transport or energy use, in the base year and 2010. This difference determines whether the savings are positive or negative. If the indicator (normally consumption units) decreases up to 2010, savings are made and, alternatively, if the indicator increases, "negative savings" occur, which appear in the results tables as "negative savings". In the Industry Sector, the poor use of the aforementioned production capacities, derived from the fall in production, has caused an increase in consumption per unit of added value in the sector and translated into negative savings values in 2010. Logically, however, direct savings were achieved (positive) derived from investments in efficient equipment stimulated by action plans which were outweighed by the indirect effect (negative) attributed to the fall in production.

The saving achieved in 2010, calculated as a percentage of final energy consumption over the five years immediately prior to the application of Directive 2006/32/EC, that is to say, average final energy consumption for the 2003-2007 period —inclusive—⁷, is 9.2%. This means that Spain expected to achieve the Directive's saving objective for 2016 (9%) 6 years ahead of schedule (2010).

⁷The average final energy consumption (for energy uses) for the 2003-2007 period is 72.621 ktep/year —excluding sectors not included in Directive 2006/32/EC—, therefore 9% is equivalent to 6.536 ktep/year. However, the savings — using 2007 as the base year — excluded, basically, industry sectors within the ETS Directive and produced negative savings in 2010, equivalent to 6.682 ktep.

Table 5. Final and primary energy savings and emissions of CO₂ avoided by sector, 2010

	2004 BASE YEAR			2007 BASE YEAR		
	FINAL E. SAVINGS (ktep)	PRIMARY E. SAVINGS (ktep)	EMISSIONS OF CO ₂ AVOIDED (ktCO ₂)	FINAL E. SAVINGS (ktep)	PRIMARY E. SAVINGS (ktep)	EMISSIONS OF CO ₂ AVOIDED (ktCO ₂)
INDUSTRY	-799	-2.696	-5.282	-2.866	-5.717	-12.417
TRANSPORT	6.451	6.874	21.471	4.561	4.909	13.330
BUILDINGS AND EQUIPMENT	2.232	3.165	6.983	2.529	4.189	9.269
PUBLIC SERVICES	32	80	161	29	67	144
AGRICULTURE AND FISHERIES	426	535	1.526	467	580	1.673
TOTAL final sectors	8.342	7.958	24.859	4.720	4.029	12.000
ENERGY TRANSFORMATION		9.767	51.797		7.019	53.253
TOTAL final sectors +Energy transformation	8.342	17.725	76.656	4.720	11.047	65.253

Note: The calculation of emissions of CO₂ avoided as a result of the saving and energy efficiency measures included in this Plan are ad hoc calculations for the same and assume a translation of the savings calculated using different base years (2004 and 2007), in terms of final and primary energy, to emissions of CO₂ avoided - this calculation does not necessarily coincide, therefore, with those savings achieved with different approaches or accounting bases as part of the periodic reports produced in relation to the evolution of greenhouse gas emissions.

In terms of primary energy, the savings achieved in 2010 assume, two years from its completion, the achievement of 71.5% of the savings objective proposed by the previous Action Plan for 2012. However, the degree of compliance with the objectives in the previous Plan is conditioned by the results obtained in the industry sector: the saving forecast in this sector for 2012 is 6.207ktep, whilst the *top-down* indicator produced a result of -2.696 ktep as a result of the increase in unit consumption in the industry sector (using *bottom-up* indicators, savings in the industry sector might have been reported equivalent to 1.781 ktep).

In terms of final and primary intensity, both indicators recorded more pronounced falls in the 2004-2010 period than those set as an objective for E4 —and their successive action plans— for the 2004-2012 period.

Table 6. Compliance with objectives from the 2008-2012 AP (primary energy, ktep):

2012 objective	2010 result	%
24.776 ktep	17.725 ktep	71,5%

Table 7. Compliance with objectives from the 2008-2012 AP (energy intensity, % average annual variation):

	2004-2012 objective	2004-2010 result
Final Intensity	-1,0%	-1,9%
Primary	-1,8%	-2,5%

The following section shows the measures and strategies that have contributed to these results.

3.2 Action measures and mechanisms for improving energy efficiency

The 2005-2007 and 2008-2012 Action Plans have been running, basically, through a joint management and co-financing mechanism between the General State Administration and the Autonomous Communities. However, before describing the methods adopted within this collaboration mechanism —and the results of these measures— in more detail, we should mention two saving and energy efficiency plans which, on the initiative of the Ministry of Industry, Trade and Tourism — through the Secretary of State for Energy— proposed urgent measures or intensified the efforts —with new mechanisms— to make the achievement of the global objectives set out by the 2008-2012 Action Plan possible: The *2008-2011 Saving and Energy Efficiency Performance Plan*⁸ and the *Plan to Intensify Saving and Energy Efficiency*⁹.

These two plans, of special relevance when they were approved (marked by high political instability in the main countries of the origin of oil imports and increased oil prices), have been accepted in line with the 2008-2012 Action Plan.

The measures derived from these plans set out that the promotion of the market and *Energy Services Companies* (ESCOs) and the actions proposed to guarantee the necessary exemplary role of the public sector should be highlighted: the *Energy Efficiency Action Plan for the State General Administration's Buildings*¹⁰ and the *Plan to Promote the Contracting of Energy Services*¹¹, known as Plan 2000 ESE, which assumes extension to the rest of the territorial Public Administrations from the previous plan, affecting 1,000 energy consumption centres belonging to Regional and Local Administration and 1,000 belonging to the State General Administration.

Plan 2000 ESE¹² is perfectly integrated within the collaboration framework already started in 2005 between IDAE (Institute for Energy Diversification and Saving) and the Autonomous Communities. As previously indicated, the 2005-2007 and 2008-2012 Action Plans were executed in a joint and coordinated manner between IDAE and the Autonomous Communities. This collaboration was coordinated through the signing of agreements between the IDAE and each of them, with an annual character for each year of 2005, 2006 and 2007 and a multiyear character from 2008, covering the entire period of the 2008-2012 Action Plan.

These collaboration (or cooperation) agreements between Administrations defined the way in which the Autonomous Communities executed the measures contained in these plans.

These measures were, basically, of two types: 1) aid measures or 2) training, information and communication measures. In either of the two cases, IDAE set out, with a general character for the whole national territory, the characteristics and the way in which each of the Autonomous Communities should execute said measures in their own territory, setting the maximum aid intensities for the subsidised saving and energy efficiency projects, or the characteristics and content of the training courses that the Autonomous Communities should organise and run.

These agreements also set out the way in which the IDAE has transferred, to the Autonomous Communities, the resources that have been facilitated by the successive

⁸Approved under agreement from the Council of Ministers on 1 August 2008, as a result of the oil crisis in spring 2008.

⁹Approved under agreement from the Council of Ministers on 4 March 2011 coinciding with the geopolitical situation in North Africa.

¹⁰Approved under agreement from the Council of Ministers on 1 December 2009 with the aim of achieving a minimum energy saving of 20% in 2016 in 330 of the State General Administration's energy consumption centres, through the realisation of saving and energy efficiency measures executed by ESCOs.

¹¹Approved under agreement from the Council of Ministers on 16 July 2010.

¹²The results from Plan 2000 ESE —currently ongoing— may be observed in the medium and long-term, given the difficulty associated with its implementation due to the high number of intervening agents, from the different Public Administrations and the private sector.

Action Plans, from the General State Budgets, and the energy sector through electricity and gas prices, by the amount indicated in the plans themselves. In addition to the amounts transferred by IDAE, the Autonomous Communities have negotiated investments which, for the finalisation of the 2005-2007 and 2008-2012 Action Plans, have made their own autonomous budget.

Within the framework of these collaboration agreements, the Autonomous Communities negotiated—during the 2005-2010 period - a total budget of 1.500 M€, of which 1.165 M€ was transferred from IDAE —from General State Budgets or tariffs— and 348 M€ corresponding to the autonomous contribution.

In terms of savings, the results of this cooperation mechanism are shown in the table below. A final energy saving of 2.305 ktep/year was achieved and 3.221 ktep/year in terms of primary energy¹³, which assumes 68% of *bottom-up* savings estimated in 2010.

These savings were calculated using a *bottom-up* approximation for each of the public aid programmes established by the Autonomous Communities in each territory, to the extent that IDAE has individualised information on the savings and the characteristics of the subsidised projects.

For each of the measures contained in the agreements, Table 8 shows information on the results achieved: generally, the volume of the applicable public aid and, particularly for some measures, the number of replaced pieces of equipment —this is the case with the Household Electrical Appliances Renewal Programme¹⁴—, the number of subsidised electric or hybrid vehicles, the number of public bicycle systems - and bicycles- established within the framework of the 2005-2007 and 2008-2012 Action Plans in the national territory, and the number of drivers trained in efficient driving, both for private and industrial vehicles.

¹³Note the differences between the calculation of savings in 2010 using a *top-down* approximation (table 5) and a *bottom-up* approximation (calculations performed by measure/mechanism and shown in tables 8, 9 and 10). The differences comply, as explained in the methodological section, with the indirect and induced effects (due to the evolution of prices, autonomous technological progress and, in general, other factors which are not always associated with improvements in energy efficiency) which are included in *top-down* indicators but not in *bottom-up* indicators.

¹⁴The indirect effects of some of these measures proposed in the saving and energy efficiency action plans were more important, if that's possible, than the direct effects of the same. In the case of the Household Electrical Appliances Renewal Programme, the generalisation of the high energy rating (A+ and A++) in sales areas and generalised knowledge of the energy efficiency label are indirect effects of the programme established by the IDAE itself and the autonomous governments: between 2004 and 2010, there was an increase in the percentage of the population taking notice of the energy efficiency label when making a purchase, from 42.8% in 2004 to 83.8% in 2010.

Table 8. Summary of the *bottom-up* savings achieved in 2010 (base year 2004) through joint performance programmes from IDAE and the Autonomous Communities(2005-2010)

	Activity variable (2005 - 2010)	Final E. Savings (ktep)	Primary E. Savings (ktep)	Emissions of CO ₂ avoided (ktCO ₂)
INDUSTRY		1.069	1.586	3.469
Energy Audits	Number of audits: 1.415			
Public aid programmes for investment in industrial assets	Associated investment (M€) 1.645,7	1.069	1.586	3.469
TRANSPORT		948	944	2.978
Urban mobility plans and Carriage of workers plans	Number of public bicycle systems/n° of bicycles 254 / 3120	860	846	2.684
	Public aid (M€) 57,3			
Greater involvement of collective means in road transport	Public aid (M€) 9.3			
Road transport fleet management	Public aid (M€) 6.6	1,3	1,5	5,0
Efficient driving of private vehicles	Equivalent number of students trained 235.360	52	58	173
Efficient driving of lorries and buses	Equivalent number of students trained 63.594	30	34	103
Renovation of the private vehicle fleet	Number of vehicles replaced 8,064	2,7	3,0	8,6
Renovation of the road transport fleet	Number of vehicles replaced 806	1,5	1,6	5,0
BUILDINGS AND EQUIPMENT		195	439	899
Energy renewal of the thermal envelope of existing buildings	Public aid (M€) 111.5	22	42	89
Improved energy efficiency of thermal installations in existing buildings	Public aid (M€) 145,5	61	116	244
Improved energy efficiency of interior lighting plants in existing buildings	Public aid (M€) 22,5	30	74	150
Construction of new buildings and renovation of existing buildings with high energy ratings	Public aid (M€) 6.2	0,9	1,5	3,3
Improved energy efficiency of household electrical appliances	Public aid (M€) 282.3	81	204	412
	Number of electrical appliances 3,907,745 Indirect and induced effects:			

Table 8 (Continued). Summary of the *bottom-up* savings achieved in 2010 (base year 2004) through joint performance programmes from IDAE and the Autonomous Communities.(2005-2010)

	Activity variable (2005 - 2010)	Final E. Savings (ktep)	Primary E. Savings (ktep)	Emissions of CO ₂ avoided (ktCO ₂)
PUBLIC SERVICES		85	212	428
Renovation of existing external public lighting installations	Public aid (M€) 116	78	194	393
Studies, feasibility analysis and audits of existing external lighting installations	Public aid (M€) 9.4			
Training of municipal energy managers	Public aid (M€) 0.9			
Improved energy efficiency of current drinking water, supply, waste water purification and desalination plants	Public aid (M€) 10.8	7	18	36
AGRICULTURE AND FISHERIES		8	12	30
Promotion and training of technicians in the efficient use of energy in the agriculture and fisheries sector.	Public aid (M€) 5.0			
Incentives for migration from spraying or gravity irrigation systems to localised irrigation systems.	Public aid (M€) 6.9	2	5	10
Improved saving and energy efficiency in the Fisheries sector.	Public aid (M€) 2.1	4	5	14
Energy audits and action plans to improve farms.	Public aid (M€) 3.7	2	2	6
Aid for conservation agriculture	Public aid (M€) 0.4	0,2	0,2	0,6
TOTAL END-USE SECTORS		2.305	3.192	7.804
ENERGY TRANSFORMATION			29	40
Feasibility studies for cogenerations	Public aid (M€) 1.8			
Energy audits for cogenerations	Public aid (M€) 0.9			
Promotion of cogeneration plants in non-industrial activities	Public aid (M€) 3.4		10	12
Promotion of small-capacity cogeneration plants	Public aid (M€) 0.5		0,8	1,4
Promotion of cogeneration plants in industrial activities	Public aid (M€) 6.7		19	26
TOTAL END-USE SECTORS + ENERGY TRANSFORMATION		2.305	3.221	7.844

Note: The calculation of emissions of CO₂ avoided as a result of the saving and energy efficiency measures included in this plan are *ad hoc* calculations for the same and assume a translation of the savings calculated using different base years (2004 and 2007), in terms of final and primary energy, to emissions of CO₂ avoided - this calculation does not necessarily coincide, therefore, with that achieved with different approaches or accounting bases as part of the periodic reports produced in relation to the evolution of greenhouse gas emissions.

In addition to the measures applied within the collaboration agreements between IDAE and the Autonomous Communities, IDAE has negotiated funds directly within the 2005-2007 and 2008-2012 Action Plans applied to national plans and programmes and which were directed at final energy consumers not covered by public aid or by training and information undertaken by the Autonomous Administrations.

These plans and programmes include annual calls —from 2008— from the *IDAE's Grants for Strategic Projects Programme*, which amounts to 120M€/year¹⁵. This aid programme (direct subsidies) aims to promote the realisation of innovative strategic, sectorial and singular projects and actions that favour saving and improvements in energy efficiency, and are directed, basically, at companies with localisations or activity centres in more than three Autonomous Communities, or at companies wanting to carry out projects with a minimum eligible investment of more than 0.5 million Euros.

To the previous programme, we can add programmes for the distribution of 49 million low-consumption lamps through gift vouchers sent out with electricity bills¹⁶ and the distribution of 6 million low-consumption bulbs through a 2-for-1 programme¹⁷, as well as singular programmes within the *2008-2011 Saving and Energy Efficiency Performance Plan*, approved on 1 August 2008.

The programme for replacing traffic light optics with others with LED technology — which enabled the substitution of 461,791 Optics in 600 Spanish municipalities— and the pilot project concerning electric vehicles (MOVELE project)¹⁸ also constitute good examples of actions undertaken by the IDAE directly.

The results, in terms of savings, of these programmes -determined through a *bottom-up* approximation-, are shown in the following table:

¹⁵In 2008, the programme's budget amounted to 60M€. As a result of the approval of the *2008-2011 Saving and Energy Efficiency Action Plan*, approved on 1 August 2008, this programme's budget was copied in successive periods (2009, 2010 and 2011).

¹⁶The free distribution of low-consumption lamps took place in two separate annual campaigns, in 2009 and 2010: in 2009, 7.254.250 bulbs were exchanged out of a total of 20.276.976 gift vouchers distributed, an exchange rate of 35.78%; in 2010, the exchange rate was in the order of 29.96% (6.576.625 bulbs out of a total of 21.954.008 gift vouchers sent out with electricity bills to domestic customers). This programme achieved a final energy saving of 84,9 ktep in 2010, equivalent to the annual electricity consumption of 246,000 households. In addition, and together with communication campaigns, the programme contributed, in particular, to changing habits and focused the purchase of bulbs on those which are more efficient.

¹⁷The 2-for-1 programme made 1,200,000 packs of 2 bulbs available to consumers for the price of one, which meant the introduction of 2,400,000 additional low-consumption lamps on the market as against previous years.

¹⁸Within the framework of the MOVELE project, 1,110 electric vehicles were subsidised, accounting for a total budget of 3.313.891€, with average aid of 2.985 Euros per vehicle.

Table 9. Summary of the *bottom-up* savings achieved in 2010 (base year 2004) through joint direct action programmes from the Ministry of Industry, Trade and Tourism, through the IDAE

	Final E. Savings (ktep)	Primary E. Savings (ktep)	Emissions of CO ₂ avoided (ktCO ₂)
STRATEGIC PROJECTS PROGRAMME	199,9	337,0	722,5
OTHER PROGRAMMES DIRECTLY EXECUTED BY IDAE	140,5	302,2	653,8
Efficient driving of private vehicles	1,1	1,2	3,7
Efficient driving of lorries and buses	30,7	34,4	105,0
MOVELE project	2,1	0,9	4,6
Programme for the distribution of low-consumption bulbs	84,9	212,5	429,5
Programme for the 2-for-1 offer on low-consumption bulbs	13,0	32,5	65,8
Programme to replace traffic lights	8,7	20,4	43,7
TOTAL	340,4	639,1	1.376,3

Note: The calculation of emissions of CO₂ avoided as a result of the saving and energy efficiency measures included in this Plan are ad hoc calculations for the same and assume a translation of the savings calculated using different base years (2004 and 2007), in terms of final and primary energy, to emission of CO₂ avoided - this calculation does not necessarily coincide, therefore, with those achieved with different approaches or accounting bases as part of the periodic reports produced in relation to the evolution of greenhouse gas emissions. The emissions of CO₂ avoided assume an economic benefit of 20.6 million Euros/year (calculated based on a price per ton of CO₂ of 15€).

In addition to the foregoing, we have been able to estimate, through a *bottom-up* approximation, the savings derived from the renovation of the vehicle fleet - naturally or induced by the effect of fiscal discrimination in favour of vehicles with lower CO₂ emissions, and as a result of the programmes focused on the renovation of the fleet itself (Plan Prever, Plan VIVE and Plan 2000E, etc). **Globally the savings determined through *bottom-up* methods represent 40.5% of the total savings achieved in 2010¹⁹.**

¹⁹Note, once again, the differences between the calculation of savings in 2010 using a *top-down* approximation (table 5) and a *bottom-up* approximation (calculations performed by measure/mechanism and shown in tables 8, 9 and 10). The differences comply, as explained in the methodological section, with the indirect and induced effects (due to the evolution of prices, autonomous technological progress and, in general, other factors that are not always associated with improvements in energy efficiency) which are included in *top-down* indicators but not in *bottom-up* indicators.

Table 10. Summary of *bottom-ups* savings achieved in 2010 (base year 2004)

	FINAL E. SAVINGS (ktep)	PRIMARY E. SAVINGS (ktep)	EMISSIONS OF CO₂ AVOIDED (ktCO₂)
IDAE-AUTONOMOUS COMMUNITIES PROGRAMME	2.305	3.221	7.844
STRATEGIC PROJECTS PROGRAMME	200	337	723
OTHER PROGRAMMES DIRECTLY EXECUTED BY IDAE	140	302	654
OTHERS/RENOVATION OF VEHICLE FLEETS(Plan Prever, Plan VIVE and Plan 2000E etc Includes the effect of fiscal discrimination in favour of vehicles with lower CO₂ emissions)	760	813	2.328
TOTAL	3.375	4.673	11.547

4. 2011-2020 ACTION PLAN

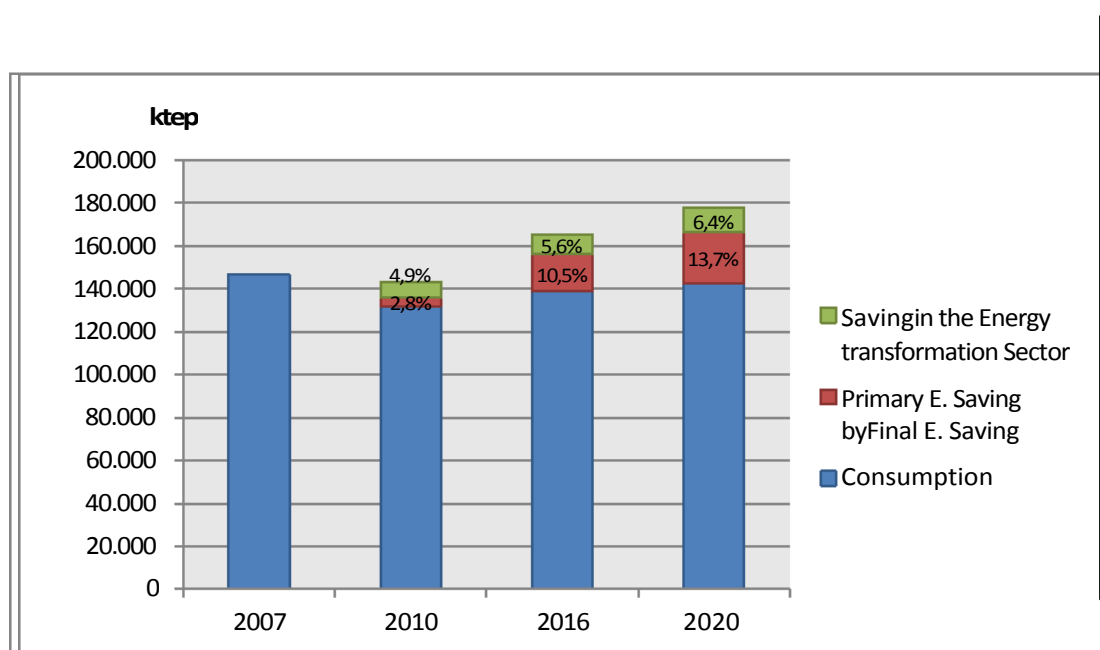
4.1 Final and primary energy savings: 2016 and 2020 objectives

The final energy savings for the 2011-2020 Action Plan were determined, for 2016 and 2020, in accordance with the same methodological criteria and indicators as for 2010.

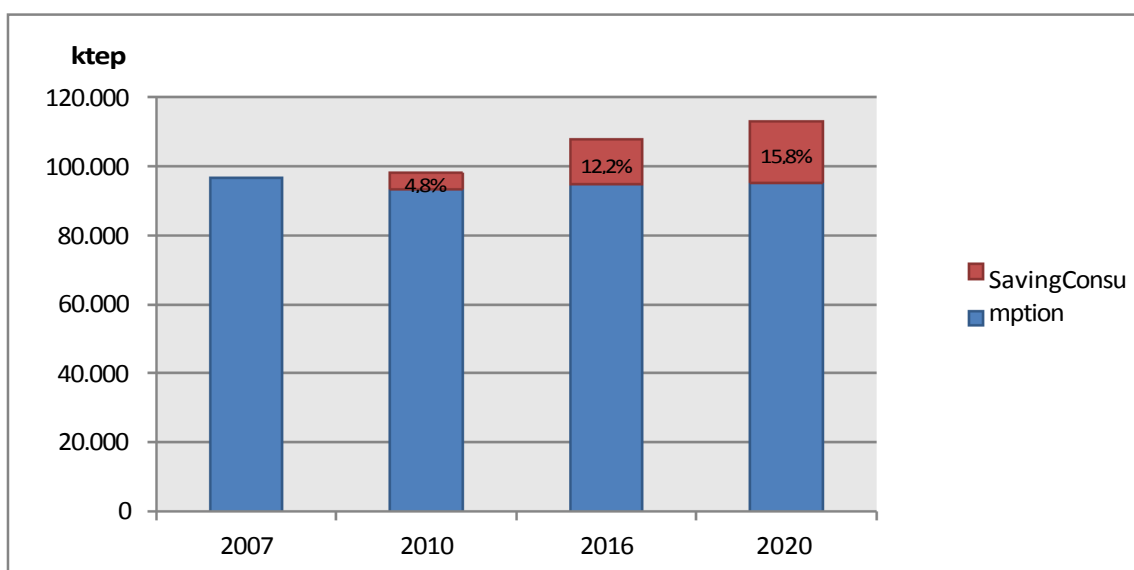
The measures included in this 2011-2020 Action Plan will provide a final energy saving of 17,843ktep in 2020 and a primary energy saving of 35,585ktep, calculated with reference to 2007 and using the methodology proposed by the European Commission. The savings, in terms of primary energy, include savings derived from the measures proposed for the Energy Transformation Sector in this Plan —mainly, through the promotion of cogeneration— and those derived from the change in the mix of electricity generation stimulated by other planning in terms of energy policy beyond the same and that which meets the obligations set out by Directive 2009/28/EC, of 23 April 2009, relative to the promotion of energy use from renewable sources.

The previous savings, in terms of primary energy, equate to 20% of primary energy consumption in 2020 in the absence of diversification and promotion programmes relative to renewable energies by the Spanish government and the present 2011-2020 Action Plan (this primary energy consumption—in the absence of measures— will achieve 177.798 ktep).

Graph 2. Primary energy consumption and savings (ktep)



In terms of final energy, the savings in 2016 are 13.176 ktep, which equate to 12.2% of final energy consumption for this year in the absence of the Plan (final energy consumption—in the absence of measures— will be 107.896 ktep in 2016).



Graph 3. Final energy consumption and savings (ktep)

This saving, once all sectors not included in the scope of the application of Directive 2006/32/EC are highlighted, decreases to 11.532 ktep/year in 2016. In terms of average consumption in the five years prior to the entry into force of the Directive, 15.9% of the total is assumed. It's worth remembering, in this point, that the non-binding objective set by the previous Directive for all Member States in 2016 is 9%²⁰.

Therefore, the 2011-2020 Action Plan complies with the saving targets set out by Directive 2006/32/EC and is in line with the global targets agreed by the European Council on 17 June 2010, in relation to improving primary energy efficiency by 20% in 2020.

The achievement of said objectives in the sectors included in this Plan (all end-user sectors plus the Energy Transformation Sector) will be possible with the application of aid to be managed by the public sector in the order of 4.995 M€ during the 2011-2020 period which, together with the policy measures, will mobilise total investment in the order of 45.985 M€. The cumulative final and primary energy savings achieved during the 2011-2020 period will be 120.967 ktep and 247.791 ktep, respectively.

Table 11. Savings and investments and cumulative aid negotiated by the public sector 2010-2020

	2020
Final Energy Saving (cumulative 2011-2020) (ktep)	120.967
Final Energy Saving (annual 2020) (ktep)	17.842
Primary Energy Saving (cumulative 2011-2020) (ktep)	247.791
Primary Energy Saving (annual 2020) (ktep)	35.585

²⁰This target for 2016 is calculated based on average consumption over the five years prior to the Directive entering into force, that is to say, the average consumption for the 2003-2007 period, minus the corresponding consumption for the sectors outside of the Directive's scope of application (basically, the ETS — Emission Trading System — and aviation sectors). The calculation which appears in this Plan was performed by taking 66.8% away from the savings calculated for the industry sector, it being understood that this percentage corresponds to the ETS sectors.

Associated Investment (cumulative 2011-2020) (M€)	45.985
Public Aid (cumulative 2011-2020) (M€)	4.995

Generally, and for summary purposes, the savings proposed as objectives for each sector are the result of adding the savings expected at a more detailed level, the five following areas being the final sectors included in the Plan: 1) Industry; 2) Transport; 3) Buildings and Equipment; 4) Public Services; and 5) Agriculture and Fisheries.

The savings —at the most itemised level possible- were determined, in all cases, as a result of the product between the unit savings for 2016 or 2020 (taking 2007 as a reference), and the activity variable concerned in any case, using the same indicators that served as a basis for the calculation of savings in 2010.

The above assumes the need to establish hypotheses, mainly on the activity variables that appear in the following table and mean, logically, that the absolute value of the savings shown in this 2011-2020 Action Plan are conditioned by the assumed evolution of the variable looking ahead to 2020.

Table 12. Hypotheses assumed for 2020 for the activity variables

SECTOR		ACTIVITY VARIABLE	UNIT	2010-2020 (Year-on-year rate of variation)	2020
INDUSTRY		GVA_{industry}	10 ⁶ €2000	1,66%	203.344
TRANSPORT	Road	Private vehicle traffic	10 ⁶ passengers-km	1,98%	427.007
		Lorries and l. vehicles	n°	0,20%	3.723.661
	Rail	Carriage of passengers	10 ⁶ passengers-km	10,50%	64.653
		Carriage of goods	10 ⁶ tons-km	18,03%	41.976
BUILDINGS, EQUIPMENT AND SERVICES		Population	10 ³	0,27%	48.295
		Total n° of households	10 ³	0,74%	27.755
		Total n° of main homes	10 ³	0,85%	18.838
		Total area of main homes	10 ³ m ²	0,37%	1.559.191
		N° of tertiary employees	10 ³	1,83%	16.068
AGRICULTURE		GVA_{agriculture and fisheries}	10 ⁶ €2000	2,43%	30.854

In addition, the objectives for improving energy efficiency set by each sector —and established on the energy efficiency indicators which will then serve to monitor compliance with the objectives in this Plan— can be seen in Table 13.

Table 13. Targets for improving efficiency by sector

SECTOR		ENERGY INDICATOR		UNIT	2007-2010 (Year-on-year rate of variation)	2010-2020 (Year-on-year rate of variation)	2007	2020
INDUSTRY		M8	Energy intensity (final e. consumption/GVA)	ktep/10 ⁶ €	2,74%	-2,52%	0,15	0,13
TRANSPORT	Road	P8	Unit consumption passenger-km	gep/pkm	-2,57%	-0,87%	38,20	32,37
		A2 _{lorrie}	Unit consumption of lorries-light vehicles	tep/veq	-8,05%	0,30%	1,19	0,95
	Railway	P10	Unit consumption passenger-km.	gep/pkm	-3,85%	-3,03%	11,24	7,34
		P11	Unit consumption per ton of freight-km	gep/tkm	10,44%	-9,22%	85,18	43,62
BUILDINGS, EQUIPMENT AND SERVICES		P1	Domestic heating consumption per surface area unit of main home (corrected for climatic conditions)	tep/m ²	-1,43%	0,11%	0,0050	0,0048
		P2	Domestic consumption of cooling per surface area unit of main home (corrected for climatic conditions)	tep/m ²	-3,10%	6,64%	0,00012	0,00022
		P5	Domestic consumption of lighting per unit of main home	tep/household	-2,63%	0,11%	0,0401	0,0374
		P4	Unitary domestic consumption of a domestic appliance	tep/appliance	-7,87%	-2,92%	0,0174	0,0101
		M3	Non-electrical unitary consumption of services per employee (corrected for climatic conditions)	tep/employee	-9,47%	-0,87%	0,25	0,17
		M4	Electrical unitary consumption of services per employee (corrected for climatic conditions)	tep/employee	-3,90%	-0,68%	0,45	0,37
		MAP	Unitary consumption of public lighting per household	tep/household	-1,13%	-1,39%	0,013	0,011
AGRICULTURE AND FISHERIES		M8	Energy intensity (final e. consumption/GVA)	ktep/10 ⁶ €	-4,30%	-1,93%	0,16	0,11

As a result of the previous hypothesis on the main activity variables and the unitary savings objectives set, for each sector, the savings which appear in Table 14 were achieved. Therefore, the savings reported in the Plan for each sector are the result of adding the direct savings derived from investments made to promote saving and energy efficiency in each sector plus indirect or induced savings (positive or negative) derived from other factors (price for example), which will be included in the hypotheses established on the general assessment of the indicators proposed.

Likewise, the final energy savings from the 2011-2020 Action Plan are concentrated in the Transport Sector, accounting for 51% of the total savings in 2020. Next is the Industry Sector, with savings equivalent to 25% of the total. These savings are a result of a decrease in final energy consumption between 2007 and 2020, in the order of 13% in the Industry Sector and 5% in the Transport Sector.

Table 14. Final and primary energy savings, by sector

	FINAL E. SAVINGS (ktep)			PRIMARY E. SAVINGS (ktep)		
	2010	2016	2020	2010	2016	2020
INDUSTRY	-2.866	2.489	4.489	-5.717	2.151	4.996
TRANSPORT	4.561	6.921	9.023	4.909	8.680	11.752
BUILDINGS AND EQUIPMENT	2.529	2.674	2.867	4.189	5.096	5.567
PUBLIC SERVICES	29	56	125	67	131	295
AGRICULTURE AND FISHERIES	467	1.036	1.338	580	1.289	1.665
TOTAL final sectors	4.720	13.176	17.842	4.029	17.347	24.274
ENERGY TRANSFORMATION				7.019	9.172	11.311
Oil Refining				39	-137	-88
Electricity generation (non-CHP)				6.909	8.169	9.701
Cogeneration				71	1.141	1.699
TOTAL of final sectors + Energy transformation	4.720	13.176	17.842	11.047	26.519	35.585

The improvement in final intensity set as an objective for the entire Industry Sector is 2.5% year-on-year, for the 2010-2020 period.

In the Transport Sector, the savings are attributed to road transport, 77%, and to rail transport, 22%, mainly, associated with the carriage of goods, where the 2011-2020 Action Plan assumes the objectives relative to modal change and an increase in rail traffic included in the 2005-2020 Strategic Infrastructure and Transport Plan (PEIT). More specifically, the Plan assumes that the amount of railway passenger traffic will double by 2020 (from 6% in 2011, up to 11% in 2020) and that freight traffic will multiply by 3 reducing unit consumption per passenger or ton-kilometre carried.

Likewise, the achievement of the objectives proposed for the Transport Sector is based on the technological improvement of vehicles and, specifically, on the introduction of electric vehicles in the terms set out in the *Integral Strategy to Promote Electric Vehicles in Spain*, this includes the objective of 250,000 vehicles by 2014. This 2011-2020 Plan also assumes the objectives set out in the PANER: 2.5 million electric vehicles in 2020, equivalent to 10% of all vehicles in 2020.

Table 15. Final energy savings in the Transport Sector (ktep) and percentage distribution of savings

	2010		2016		2020	
	(ktep)	Percentage distribution	(ktep)	Percentage distribution	(ktep)	Percentage distribution
TRANSPORT	4.561	96,6%	6.921	52,5%	9.023	50,6%
Road	4.916	104,2%	5.830	44,2%	6.926	38,8%
Rail	-207	-4,4%	1.121	8,5%	1.996	11,2%
Maritime	-100	-2,1%	-11	-0,1%	56	0,3%
Air	-48	-1,0%	-19	-0,1%	45	0,3%

In the *Buildings* Sector, savings are concentrated in the tertiary sector, since, in terms of household use, final energy savings relative to heating, derived from the measures proposed in terms of the building skin and for improving the energy efficiency of equipment (renewal of boilers and air-conditioning units, basically), will, practically, be compensated for by the increase in the penetration of domestic air-conditioning units. Likewise, there has been a significant improvement in the performance of installations due to the introduction of cold and heat networks in Spain, thanks to *Energy Services Companies*. Said installations will facilitate the introduction of renewable thermal energies and cogeneration, enabling the distributed generation of electrical energy through this technology, avoiding losses due to transport and distribution.

On the other hand, and generally speaking for all sectors, the development of intelligent networks ("Smart Grids") for the integration of the electrical energy generated in small installations will be required, together with the use of accumulation mechanisms, such as the electric vehicle, which may serve as consumers or generators at different times according to the convenience of the system. For all these applications, as well as for optimising management systems, significant developments in measurement and control elements will be required, together with the development and application of ICT.

Within the *Buildings and Equipment* Sector, considering buildings used as homes and those with tertiary uses together, savings are attributed, 73%, to improvements in the thermal envelope and thermal installations and, 29%, to improvements in energy efficiency relative to lighting—again, in this use, savings are focused, principally, on buildings for tertiary use.

Table 16. Final energy savings in the Building and Equipment Sector (ktep) and percentage distribution of savings

	2010		2016		2020	
	(ktep)	percentage distribution	(ktep)	percentage distribution	(ktep)	percentage distribution
BUILDING AND EQUIPMENT	2.529	53,6%	2.674	20,3%	2.867	16,1%
RESIDENTIAL	752	15,9%	119	0,9%	211	1,2%
Thermal envelope and thermal equipment	699	14,8%	85	0,6%	161	0,9%
Lighting	53	1,1%	34	0,3%	50	0,3%
TERTIARY	1.570	33,3%	2.497	19,0%	2.736	15,3%
Thermal envelope and equipment	1.322	28,0%	1.858	14,1%	1.944	10,9%
Lighting	248	5,3%	639	4,9%	792	4,4%
EQUIPMENT	207	4,4%	57	0,4%	-80	-0,4%

Finally, the final energy savings for the *Public Services* Sector represent 0.7% of the total, due to a reduction in the energy consumption of plants for desalination, drinking water and purification of waste water and due to a reduction in the energy consumption of public lighting. In the *Agriculture and Fisheries* Sector, the final energy savings are, for 2020, 7.5% of the total savings, due to a reduction in the sector's energy consumption per unit of added value.

Table 17. Final energy savings in the Public Services Sector (ktep) and percentage distribution of savings

	2010		2016		2020	
	(ktep)	Percentage distribution	(ktep)	Percentage distribution	(ktep)	Percentage distribution
PUBLIC SERVICES	29	0,6%	56	0,4%	125	0,7%
Public lighting	11	0,2%	19	0,1%	58	0,3%
Water	17	0,4%	36	0,3%	67	0,4%

In the *Energy Transformation* Sector and in terms of primary energy, the savings are derived from cogeneration, equivalent to 15% of the this sector's total savings, which are accounted for, likewise, by the savings derived from the increased penetration of renewable energies in the electricity generation field.

4.2 Action measures and mechanisms for improving energy efficiency

The complete relationship of the measures contained in this 2011-2020 Action Plan are included in Annex I, the final and primary energy savings and the emissions of CO₂ avoided as a result of this execution having been determined for each of these sectors. In Annex II, we can see those considered as a priority.

The Plan's application mechanisms will be similar to those in the 2005-2007 and 2008-2012 Action Plans. Firstly, IDAE's collaborative work with the Autonomous Communities will continue to be developed for the execution of a large part of the Plan's aid, training and communication measures. Secondly, IDAE's direct action programmes will be continued, consolidating, therefore, the Plan's co-financing and co-management model with the State General Administration and the autonomous administrations. Finally, policy and regulatory mechanisms will be implemented, which will enable the achievement of the savings objectives proposed by the setting of stricter energy efficiency standards, mainly, in the *Building and Equipment* Sector, in line with that set out in Directive 2010/31/EU, relative to the energy efficiency of buildings, and Directive 2010/30/EU, relative to the indication of energy consumption through labelling.

The maintenance of the Plan's co-management and co-financing model between IDAE and the Autonomous Communities involves maintenance of the direct and indirect aid mechanisms for the renewal of equipment, systems and processes. Notwithstanding the foregoing, this Plan also proposes—in addition or as an alternative to the aforementioned—the establishment of a new payment mechanism for energy savings which are measured, verified and certified.

In summary, the measures contained in the Plan refer to the promotion of technological improvement in the Industry Sector, encouraging the adoption of Best Available Techniques (BAT), the implementation of energy management systems and aid for the performance of energy audits.

In the *Transport* Sector, measures are proposed to promote modal change—conducive with better use of railway transport—, rational use of means of transport and the renovation of fleets.

In the *Building and Equipment* Sector, the improvement in the energy efficiency of the building skin, thermal installations and lighting in existing buildings and the improvement in the energy efficiency of cold commercial buildings; the construction—and complete renovation— of 8.2 million m²/year with high energy ratings and the construction of buildings with nearly zero energy consumption. In terms of Equipment, the continuation of the Household Electrical Appliances Renewal Programme with the target of renewing 500,000 units/year (out of an estimated total of 90 million appliances).

In the *Public Services* Sector, there are aims to improve the energy efficiency of existing external public lighting installations and current drinking water, supply, waste water purification and desalination plants, in addition to others for the training of municipal energy managers and the performance of studies, feasibility analysis and public lighting audits.

In the *Agriculture and Fisheries* Sector, the Plan includes measures to improve the energy efficiency of irrigation installations, aid for migration to conservation agriculture, and from spraying irrigation systems to localised irrigation systems, in addition to the promotion and training of technicians in efficient energy use in the agriculture and fisheries sector, and as well as renovating machinery.

Finally, in the *Energy Transformation* Sector, the target proposed is the installation of 3.751 MW of new cogeneration capacity by 2020, and the renovation of up to 3.925 MW of cogeneration capacity which is over 15 years old. With these objectives, specific aid is expected to promote small-capacity cogeneration and non-industrial cogenerations and policy-related developments for connecting small-capacity cogeneration to the network.

In addition to the direct aid mechanisms and incentives to replace appliances with other more efficient ones or through the training of drivers in efficient driving techniques, for

example, and policy mechanisms awareness, mobilisation and citizen action mechanisms are being considered relative to responsible energy consumption. The 2011-2020 Action Plan includes a **Communication Plan** with a total cost of 124M€ (12.4 ME/year) divided into three main sections: conventional communication and advertisement campaigns (TV adverts and radio slots etc), unconventional communication and advertisement actions which generate eco media (road shows etc) and enhancing participation and presence in communication media.

4.3 Financing of the 2011-2020 Action Plan: origin and application of funds

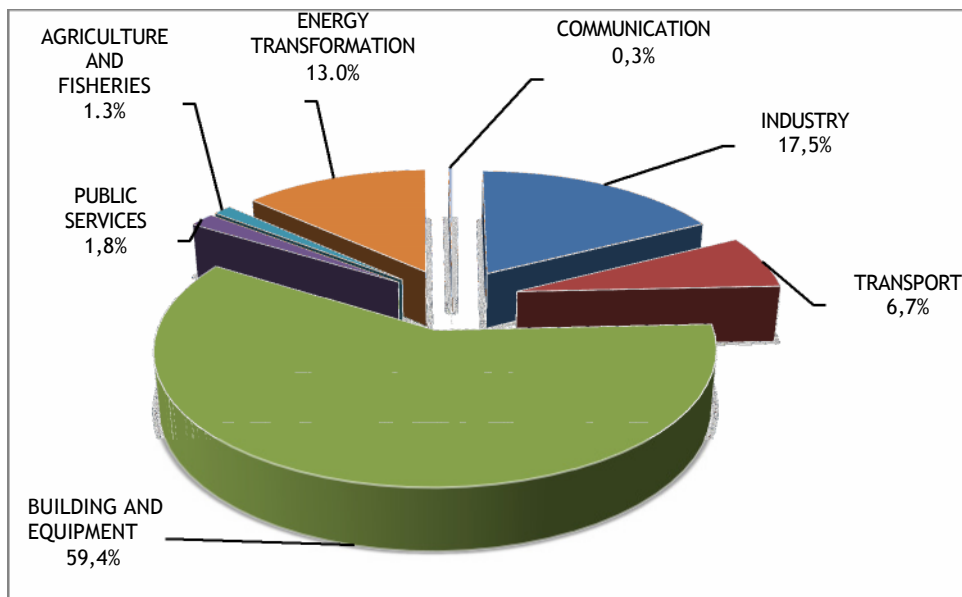
The final and primary energy saving objectives in this Plan will be possible as a result of investment equivalent to 45.985 million Euros during the whole of the Plan's period of validity and the application, from 2011 to 2020, as an annual average, of an investment of 4.598 million Euros.

These investments will correspond to autonomous investments made by private agents to adapt to the **new regulatory framework** which may be derived from the Plan and to investments which will be made as a result of the incentive effects which will have their aids managed by the public sector expected in the same for the whole period: in the order of 500 million Euros as an annual average.

The total investments are distributed, by sector, unequally: the *Buildings and Equipment Sector* absorbs 59.4% of the total investments, whilst the *Transport Sector* represents 6.7% of the total. This asymmetry responds to the items, included or not, in the total investments set out in the Plan.

In this 2011-2020 Action Plan, investments in infrastructures linked to modal change or any other links to the development of railway transport networks have not been evaluated, which may be necessary to enable an increase in railway traffic for the carriage of passengers and goods, it being understood that said investments are reported in the *2020 Strategic Infrastructure and Transport Plan (PEIT)*. Likewise, the investments reported for the *Transport Sector* in this Plan reflect the total cost (public or private) of the measures directly promoted by said sector and are, therefore, the subject of aid; these measures are largely focused on the design of *Sustainable Urban Mobility Plans and Workers' Transport Plans*, the development of pilot projects, the establishment of studies to improve management of road transport fleets or efficient driving courses, both for private and industrial vehicles. The investments —and, therefore, the aid— associated with the *Strategy to Promote Electric Vehicles*, required to realise the target of 2.5 million electric vehicles in 2020, have not been included in the same.

The investments corresponding to the *Industry Sector* and the *Energy Transformation Sector* represent, respectively, 17.5% and 13.0% of the total investments set out in the Plan.



Graph 4.Total

investment by sector

Note: The aids to be managed by the public sector do not include aid for investment in infrastructure —for this same reason, investment in infrastructure is not included.

The aids managed by the public sector made available in this Plan reflect the asymmetry that, by sector, is observed in the distribution of the total investment, in addition to the priority of the diffuse sectors and, by extension, of the non-ETS sectors (not included in the scope of application of Directive 2003/87/EC on the trading of greenhouse gas emission rights) as beneficiaries of said resources.

The *Building and Equipment* Sector represents 57.7% of the total aids. A large part of the investments required, associated with improving energy efficiency, must be made without aids, as a result of the policy changes already introduced and those scheduled for 2020 as a result of this Plan; another significant portion of the investments will be the result of autonomous technological progress and the renewal of buildings which occurs outside of the aid programmes established with this purpose, and, of course, a portion of the investments identified as necessary to achieve the savings estimated in the Plan will not be possible without quantifying the incentive effect of the aids to be managed by the public sector within this Plan and which, globally, reach 2.883 million Euros.

The *Transport* Sector, with a reduced relative weight in the total investment reported in the Plan for the non-valuation of investments in infrastructure, absorbs 20% of the Plan's aids, to the extent that a large part of the cost of the studies, feasibility analysis or pilot projects encouraging modal change or performed in order to improve fleet management will be aided, up to 50%, by this Plan.

The *Industry* Sector is second to the aforementioned sector, absorbing 15% of the applicable financing, with a total of 750 million Euros for the whole period — it should be noted that, in terms of the ETS sectors, the energy efficiency savings and improvements will be achieved, basically, as a result of the CO₂ trading right mechanism.

The greater or lesser weight of the actions with a policy or regulatory character included in the Plan justifies the greater or lesser application of funds to meet the savings objectives expected.

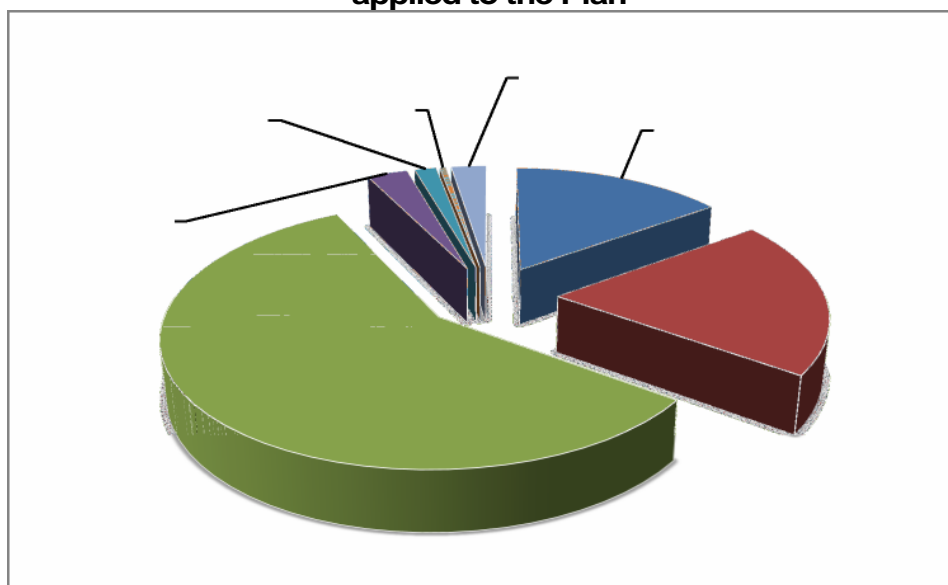
In the *Public Services* Sector, for example, the application or extension of the energy efficiency regulation relative to external lighting will allow a good part of the expected savings to be achieved which, together with the competition from the Energy Service Companies, will allow for a reduction in the intensity of the aids which will be applied to renewal projects and improvements to public lighting in Spain. A large part of the boost that this Plan seems to give to the energy services market is concentrated, at least initially, on renewal projects and improving municipal public lighting.

IDAE, as the entity responsible for monitoring the results of this 2011—2020 Action Plan, may modify the sectoral distribution of the funds available to the Plan to try to correct deviations and guarantee that the expected savings targets are met. These changes to the sectoral assignment of the Plan's resources will continue to respect, as far as possible, the priorities defined in said Plan.

It should be noted that all the aids managed by the public sector considered in this Plan will be applied guaranteeing the necessary incentive effect that should guide the application of funds to investment projects and in accordance with Community rules concerning State aids, in particular, through the application of community Directives concerning State aids in favour of the environment (2008/C 82/01).

Specifically, the 2011—2020 Action Plan evaluates the total aids required to achieve the savings set out of 4.995 million Euros, which is almost 11% of the total investments reported, 45.985 M€.

Graph 5. Sectorial destination of the funds negotiated by the public sector applied to the Plan



Note: The aids to be negotiated by the public sector do not include aid for investment in infrastructure —for this same reason, investment in infrastructure is not included.

Table 15. Resources managed by the public sector and investments and their sectorial application (10⁶ €)

	Aids negotiated by the Public Sector(10 ⁶ €)		Investments (Aids negotiated by the Public Sector +private contribution) (10 ⁶ €)	
	2011—2020	Annual average	2011—2020	Annual average
INDUSTRY	750	75	8.060	806
TRANSPORT	996	100	3.104	310
BUILDING AND EQUIPMENT	2.883	288	27.322	2.732
PUBLIC SERVICES	143	14	809	81
AGRICULTURE AND FISHERIES	77	8	596	60
ENERGY TRANSFORMATION	22	2	5.970	597
COMUNICACION	124	12	124	12
TOTAL	4.995	500	45.985	4.598

Note: The aids to be negotiated by the public sector don't include aid for investment in infrastructure —for this samereason, investment in infrastructure is not included.

The funds to be managed by the public sector quantified by the Plan (4.995Mwill come from various sources, copying the financing outline from the 2005—2007 Action Plan and the 2008—2012 Action Plan over to this Plan).

The funds to be managed by the public sector to be applied to the Plan will come from, in terms of almost aquarter, public budgets, either from General State Budgets (7%)²¹ or autonomous budgets (16%), the latter with anannual average application of 80 million Euros, equivalent to that which will be applied, annually,within the context of the cooperation programme established between the IDAE and theAutonomous Communities for the execution of the saving and energy efficiency measurescontained in the previous plans.Both the investment fromGeneral State Budgets and that from autonomous budgets isconditioned by budgetary availabilities and must be approved, annually,within the corresponding budgetary laws, by the State or theAutonomous Communities.

For the remaining 77% equivalent to 3.845 million Euros (or 385 million Euros asan annual average), once the period covered by the previous 2008—2012 Action Planis over, the Government will approve the most suitableformula to enable the Plan to be financed. The Plan may be financed bycontributions from the energy sector.²²

On the other hand, the preamble of Law 13/2010, of 5 July, modified byLaw 1/2005, of 9 March, regulating the regime governing greenhouse gas emission rights,reflects the commitment, without prejudice to the non-assignment ofincome to expenses, to allocatean equivalent amount of the financing to climate change policies through invitations to tender relative to emission rights.In this sense, we should point out that, among others,the International Energy Agency has recognised, that saving and energy efficiency policiesconstitute the most economic instrument to reduceemissions of CO₂. Therefore, and without expectingprevious resources from the tendering of emission rights to affect this Plan, andsubject to budgetary approval taking the limitations of the General Budgetary Law itself into account,recourse to the

²¹This 7% is the result of all the contributions from General State Budgets: 5% of the total funds managed by the public sector made available from the Plan correspond tothe allocation to the Ministry of Industry, Trade and Tourism/IDAEfrom General State Budgets, whilst 2% of the total funds made availablefrom the Plan come from budgetary allocations from other ministerial Departmentsdifferent from the Ministry of Industry, Trade and Tourism for actions completed in this 2011—2020 Action Plan.

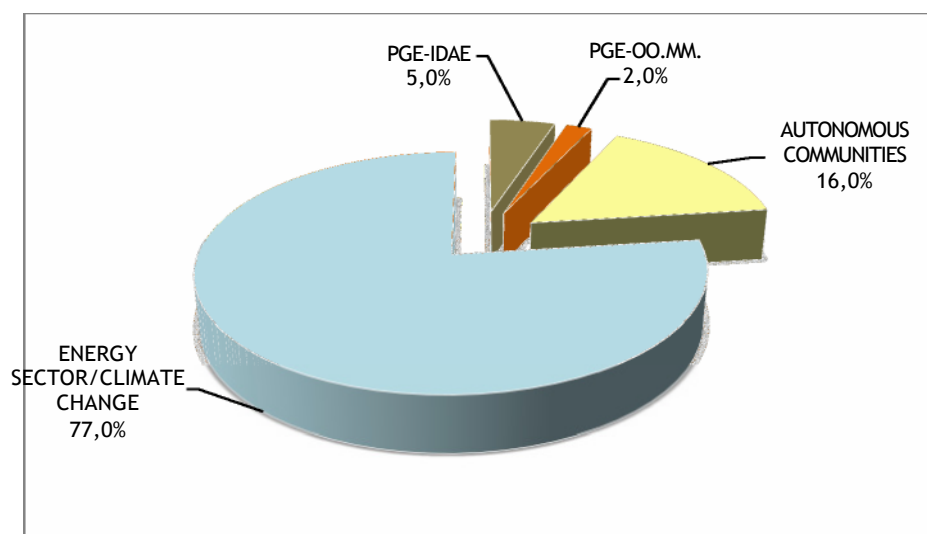
²²Royal Decree—law 14/2010, of 23 December, set out that the amounts charged to the electricity system assigned to the 2008—2012 Action Plan will be financed through contributions from each of the producing companies. This Royal Decree—law makes reference to the amounts projected for 2011 (270 M€) and 2012 (250 M€), and those relative to 2013, whilst, the latter refers to approval of this Plan. For this reason, and until 2013, the financing of the Plan charged to the electricity system will remain covered as described in this Decree-law.

resources for financing this Plan within the general framework of the policy against climate change may be required.

The resources to be managed by the public sector made available by this Plan will be managed by the Ministry of Industry, Trade and Tourism through the IDAE — except for when said resources relate to contributions from General State Budgets allocated to other ministerial Departments different from the previous one for the execution of specific measures²³ — and by the Autonomous Communities. The co-management and co-financing mechanism between IDAE and the Autonomous Communities which started with the execution of the measures contained in the 2005—2007 Action Plan, and continued with the 2008—2012 Action Plan, will continue being the main mechanism of application of the funds allocated to this Plan for its entire period of validity.

²³This was the case for the budget dedicated to the Agricultural Tractor Renewal Plan, for example.

Graph 6. Origin of public managed funds



Note: PGE—OO.MM. corresponds to budgetary contributions to other ministerial Departments differing from the Ministry of Industry, Trade and Tourism for actions considered in this 2011—2020 Action Plan.

Table 16. Origin of publicly managed funds (10⁶ €)

	2011—2020	Annual average
PGE—IDAE	250	25
PGE—OO.MM.	100	10
AUTONOMOUS COMMUNITIES	800	80
ENERGY SECTOR/CLIMATE CHANGE	3.845	385
TOTAL	4.995	500

Note: PGE—OO.MM. corresponds to budgetary contributions to other ministerial Departments differing from the Ministry of Industry, Trade and Tourism for actions considered in this 2011-2020 Action Plan.

4.4 Cost-Benefit analysis

The final and primary energy savings derived from the 2011—2020 Action Plan translate into direct economic benefits due to the reduction in crude imports and less greenhouse gas emissions. Other direct or indirect impacts, derived from saving and energy efficiency measures, associated with the creation of employment and the increase in *Gross Domestic Product*, are also subject to specific analysis in section 4.5.

Therefore, in this section, the economic savings derived directly from energy savings and lower CO₂ emissions will be subject to assessment. Being the easiest to quantify in economic terms — through the adoption of different hypotheses relating to the evolution of oil prices and tons of CO₂, respectively —, they are not the Plan's only positive impacts, in addition to the socioeconomic ones referred to in the previous paragraph. From the Plan, other positive environmental effects are derived associated with lower emissions of other contaminant gases different from CO₂ or, directly associated with improving air quality in cities which is derived from the reduction in traffic or consumption and, therefore, emissions per kilometre covered by new vehicles.

The positive environmental impacts, different from the reduction in emissions of CO₂ — the economic value of which can easily be determined by the existence of a market which gives an economic value to CO₂ which is not emitted or avoided, may be more difficult to quantify in economic terms due to the absence of obligations to reduce emissions of other contaminant gases or

due to the non—existence of a market similar to that of CO₂. In this case, the quantification of these positive environmental impacts should take place through methods which allow for the determination, in economic terms, of the negative impacts on health or on the economic activity avoided as a result of lower consumption of energy from fossil fuels, and that would have occurred in a scenario of more energy consumption due to an increase in the concentrations of contaminants in the natural environment.

Therefore, we will focus on economic analysis of the benefits derived from lower energy consumption and lower CO₂ emissions, the total cumulative savings during the period, equivalent to 133,4 million equivalent tons of oil—in terms of primary energy—and 394,7 million avoided tons of CO₂, translate into an economic benefit of 78.687 million Euros, as shown in the following table, which describes the economic benefit by sector.

The primary energy savings and emissions of CO₂ avoided taken into account in this analysis were calculated by not using 2007 as a reference year from the European Commission, but using 2010 as a base year, to take into consideration, solely and in as far as possible, the associated direct or indirect savings, to the investments and public aid set out during the Plan's validity period, that is to say, the 2011—2020 period.

The primary energy savings calculated equate to 977,9 million barrels of oil, 254% of petrol imports in 2010, therefore, annually, the primary energy saving is 25% of total crude imports, with the consequent expected reduction in the trade deficit and improved balance of payments.

Previous economic benefits (over 70,000 million Euros) were recalculated assuming a hypothesis relative to the evolution of the price of Brent oil barrels which was 109,6 \$2010 in 2020.

The cumulative economic benefits of emissions of CO₂ avoided equate to 8.330 million Euros, through the reduction of CO₂ emissions by 394,7 million tons. The price of a ton of CO₂ assumed as a hypothesis will increase to 25 Euros in 2020.

Table 17. Total economic benefits

	ECONOMIC BENEFITS (10 ⁶ €)					
	BY PRIMARY ENERGY SAVING		BY EMISSIONS OF CO ₂ AVOIDED		TOTAL	
	Cumulative	Annual average	Cumulative	Annual average	Cumulative	Annual average
INDUSTRY	38.436	3.844	3.447	345	41.884	4.188
TRANSPORT	13.345	1.334	1.370	137	14.715	1.471
BUILDINGS AND EQUIPMENT	2.024	202	164	16	2.188	219
PUBLIC SERVICES	430	43	38	4	468	47
AGRICULTURE AND FISHERIES	1.925	193	216	22	2.141	214
ENERGY TRANSFORMATION	14.197	1.420	3.094	309	17.292	1.729
TOTAL	70.357	7.036	8.330	833	78.687	7.869

4.5 Socioeconomic impacts of improved energy efficiency in 2020

In addition to the analysis of the final and primary energy savings derived from the 2005—2007 and 2008—2012 Action Plans, and the proposal of measures and action mechanisms to improve energy efficiency in 2020 set out in this Plan, an ad hoc study was carried out to determine the socioeconomic impact of saving and energy efficiency in Spain.

In this study, a series of products (insulation, lighting, high-efficiency boilers and speed variator setc) and services (consulting, engineering and certification services and services provided by Energy Services Companies etc) were identified, which characterize what might be called the energy efficiency sector. The study's methodology was based on the collection —

through surveys— of primary data directly from manufacturers of the products or providers of the services analysed; subsequently, through the use of input—output tables, associated indirect and induced impacts were derived, both in terms of production and added value, and in terms of employment.

In conclusion to the study, we can say that the energy efficiency sector in Spain represents 1.8% of GDP and 1.4% of total employment (considering total impacts, that is to say, direct, indirect and induced effects). The weight of the energy efficiency sector will be greater in 2020, in such a way that it is estimated that the size of the sector will increase from its current 0.8% — direct impact— to 1.6% in 2020 (from 1.8% of GDP to 3.9% in 2020, considering indirect and induced effects). In terms of direct employment, the sector will employ around 300,000 people in 2020 (over 750,000 in terms of total employment).

Table 18. Total economic benefits

	2009		2016		2020	
	(10 ⁶ € (employees))	(% for Spain)	(10 ⁶ € (employees))	(% for Spain)	(10 ⁶ € (employees))	(% for Spain)
PRODUCTION (10⁶ €)						
Sector size (direct effect)	21.462	1,0%	40.472	1,7%	58.154	2,3%
Total impact	50.247	2,6%	94.756	4,0%	136.153	5,3%
GROSS VALUE ADDED (10⁶ €)						
Sector size (direct effect)	7.431	0,8%	14.013	1,3%	20.136	1,6%
Total impact	17.771	1,8%	33.513	3,0%	48.155	3,9%
EMPLOYMENT (n° of employees)						
Sector size (direct effect)	106.393	0,5%	200.634	0,9%	288.290	1,1%
Total impact	281.473	1,4%	530.798	2,3%	762.698	3,0%

ANNEX I: SUMMARY OF MEASURES FOR THE 2011—2020 ACTION PLAN

	Final energy savings (ktep)		Primary energy savings (ktep)		Emissions of CO ₂ avoided (ktCO ₂)		Aids managed by the Public Sector (10 ⁶ €)			Investments (Aids managed by the public sector + private contribution) (10 ⁶ €)		
	2016	2020	2016	2020	2016	2020	2011-2016	2017-2020	2011-2020	2011-2016	2017-2020	2011-2020
INDUSTRY	2.489	4.489	2.151	4.996	5.233	11.641	450	300	750	4.836	3.224	8.060
Energy Audits							4,7	3,1	7,8	9,4	6,2	15,6
Improved technology of equipment and processes (MTD)	2.332	4.154	2.016	4.623	4.905	10.772	444,2	296,1	740,3	4.441,7	2.961,1	7.402,8
Implementation of energy management systems	156	335	135	373	328	869	1,2	0,8	2,0	384,9	256,6	641,6
TRANSPORT	6.921	9.023	8.680	11.752	22.922	31.177	598	399	996	1.862	1.242	3.104
Urban Mobility Plans	802	996	1.006	1.298	2.655	3.443	231,1	154,1	385,2	462,2	308,2	770,4
Transport plans for companies	408	508	512	661	1.353	1.754	53,2	35,5	88,7	106,4	70,9	177,4
Greater involvement of road transport in collective means	84	92	106	120	280	319	12,8	8,5	21,3	25,6	17,0	42,6
Greater involvement of rail transport	1.121	1.996	1.406	2.600	3.712	6.898	26,5	17,7	44,2	53,0	35,3	88,3
Greater involvement of maritime transport	—9	42	—11	55	—29	145	6,8	4,5	11,2	13,5	9,0	22,5
Transport infrastructure management	1.756	1.950	2.202	2.540	5.815	6.738	8,4	5,6	14,0	33,7	22,5	56,2
Road transport fleet management	401	445	503	580	1.327	1.538	32,2	21,5	53,6	128,7	85,8	214,6
Aircraft fleet management	—9	21	—11	28	—30	73	8,0	5,3	13,4	32,1	21,4	53,4
Efficient driving of private vehicles	497	493	623	642	1.646	1.703	12,0	8,0	19,9	23,9	15,9	39,8
Efficient driving of lorries and buses	607	602	761	784	2.010	2.080	9,5	6,3	15,8	19,0	12,6	31,6
Efficient flying of planes	—7	14	—8	18	—22	47	7,6	5,1	12,6	15,2	10,1	25,3
Renewal of road transport fleets	570	822	715	1.071	1.887	2.842	49,8	33,2	83,0	249,0	166,0	415,1
Air fleet renovation	—3	10	—4	13	—11	35	6,4	4,3	10,7	32,0	21,3	53,3
Maritime fleet renovation	—2	14	—3	18	—7	48	12,2	8,1	20,4	61,1	40,7	101,8
Renovation of the private vehicle fleet	705	1.017	884	1.325	2.335	3.515	121,4	80,9	202,3	606,9	404,6	1.011,5

Note for the Industrial Sector. Generally, the substitution of fossil fuels for electricity in the industrial sector yields lower primary energy savings —absolute value— than final energy savings.

	Final energy savings (ktep)		Primary energy savings (ktep)		Emissions of CO ₂ avoided (ktCO ₂)		Aids managed by the Public Sector (10 ⁶ €)			Investments (Aids managed by the public sector + private contribution) (10 ⁶ €)		
	2016	2020	2016	2020	2016	2020	2011—2016	2017—2020	2011—2020	2011—2016	2017—2020	2011—2020
BUILDING AND EQUIPMENT	2.674	2.86777	5.09613	5.5671	11.1162.	12.120	1.7306	1.1534	2.883	16.393	10.929	27.322
Energy renewal of the thermal envelope in existing buildings	775	5	191.546	3291.	9213.4	2.943	65,716	43,811	1.109,5	3.356,4	2.237,6	5.594,0
Improvement of the energy efficiency of thermal installations in existing buildings	908	908	1.58842	5581.	243.40	3.449	9,8115,	3,276,	283,0	4.354,8	2.903,2	7.258,0
Improvement of the energy efficiency of interior lighting in existing buildings	674	842	5	9864	0	4.251	2472,8	8315,2	192,0	5.257,8	3.505,2	8.763,0
Construction of new buildings and renewal of existing buildings with high energy ratings	224	247		73		1.002			788,0	2.920,8	1.947,2	4.868,0
Improved energy efficiency in cold commercial plants	0,8	1,6	1,9		901		3,0	2,0	5,0	12,0	8,0	20,0
Construction or renewal of buildings with practically nearly zero energy consumption	0,4	0,8	0,8	3,8	4,0	8,1	3,0	2,0	5,0	11,4	7,6	19,0
Improved energy efficiency of electrical appliances	92	92	216	1,5	1,6	3,2	300,0	200,0	500,0	480,0	320,0	800,0
PUBLIC SERVICES	56	125	131	295	281	631	8662	5741	1431	4854	324	8096
Renovation of existing public lighting plants	19	58	46	136	97	292	7,10,0	86,7	0451	1632	277,5	9383
Studies, feasibility analysis and audits of existing exterior lighting plants							4,3	2,8	6,77,	0,04,	13,3	3,37,
Training of municipal energy managers									1	3		1
Improvement of the energy efficiency of current drinking water, supply, purification of waste water and desalination plants	36	67	86	158	184	339	9,0	6,0			2,8	
									15,0	45,0	30,0	75,0

ANNEX II: CRITERIA FOR PRIORITISING THE MEASURES

The 2011—2020 Action Plan is a complete strategic plan concerning the final energy consumption sectors, as well as the Energy Transformation Sector. In this sense, the plan's global energy saving objective is a result of the addition of the individual savings of each of the measures plus a saving component derived from the expected development synergy together with the plan's different measures. However, these measures may be prioritised in accordance with the following criteria, with the aim of maximising global energy saving :

1. None of the Plan's 6 sectors are excluded, that is to say, at least, one measure should be carried out in each of the sectors.
2. Priority should be given to those objectives which depend on policy developments considered in the Plan, since in all cases these actions will contribute to the achievement of significant energy savings with less contribution of resources. In this sense, it is important to take into account the timing and extent of the policy provisions which will be approved and determine the permanence or maintenance of public aid mechanisms in the energy consumption sectors affected by said policies, favouring its reduction or even its disappearance.
3. The sectors which have the most difficulty undertaking energy efficiency measures, such as diffuse sectors, should be prioritised. In this sense, the priority sector is that of Building and Equipment, followed by the Transport Sector.
4. Generally, firstly, the measures which enjoy a better ratio of energy saving over aid, but with the exception of those which may interest but strengthen the role required from the public sector or affecting sensitive groups.

Taking the previous prioritisation criteria into account, the list of measures from the Plan, ranked from most to least important, is as follows:

1. Greater involvement from rail transport (Transport).
2. Energy renewal of the thermal envelope in existing buildings (Building and equipment).
3. Improved energy efficiency of thermal installations in existing buildings (Building and equipment).
4. Workers' Transport Plans (PTT) (Transport).
5. Sustainable Urban Mobility Plans (PMUS) (Transport).
6. Improved energy efficiency of interior lighting plants in existing buildings (Building and equipment).
7. Improved technology of equipment and processes (MTD) (Industry)
8. Renovation of existing public lighting plants (Public Services).
9. Promotion of cogeneration plants in non-industrial activities (Energy transformation).
10. Energy audits and action plans to improve farms (Agriculture and Fisheries).

PRIORITY MEASURES FOR THE 2011—2020 ACTION PLAN

	Final energy savings (ktep)		Primary energy savings (ktep)		Emissions of CO ₂ avoided (ktCO ₂)		Aids managed by the Public Sector (10 ⁶ €)			Investments (Aids managed by the public sector + private contribution) (10 ⁶ €)		
	2016	2020	2016	2020	2016	2020	2011—2016	2017—2020	2011—2020	2011—2016	2017—2020	2011—2020
INDUSTRY	2.332	4.154	2.016	4.623	4.905	10.772	444	296	740	4.442	2.961	7.403
Improved technology of equipment and processes (MTD)	2.332	4.154	2.016	4.623	4.905	10.772	444	296	740	4.442	2.961	7.403
TRANSPORT	2.331	3.500	2.923	4.559	7.720	12.095	311	207	518	622	414	1.036
Urban Mobility Plans	802	996	1.006	1.298	2.655	3.443	231	154	385	462	308	770
Transport plans for companies	408	508	512	661	1.353	1.754	53	35	89	106	71	177
Greater involvement from rail transport	1.121	1.996	1.406	2.600	3.712	6.898	26	18	44	53	35	88
BUILDING AND EQUIPMENT	2.357	2.525	4.453	4.872	9.746	10.643	951	634	1.585	12.969	8.646	21.615
Energy renewal of existing buildings the thermal envelope in	775	775	1.319	1.329	2.921	2.943	666	444	1.110	3.356	2.238	5.594
Improved energy efficiency of thermal installations in existing buildings	908	908	1.546	1.558	3.424	3.449	170	113	283	4.355	2.903	7.258
Improved energy efficiency of interior lighting plants in existing buildings	674	842	1.588	1.986	3.400	4.251	115	77	192	5.258	3.505	8.763
PUBLIC SERVICES	19	58	46	136	97	292	63	42	105	416	278	694
Renovation of existing public lighting plants	19	58	46	136	97	292	63	42	105	416	278	694
AGRICULTURE AND FISHERIES	14	18	23	29	58	74	5	4	9	27	18	45
Energy audits and action plans to improve farms.	14	18	23	29	58	74	5	4	9	27	18	45
TOTAL END-USE SECTORS (priority measures)	7.053	10.255	9.460	14.220	22.525	33.877	1.774	1.183	2.956	18.476	12.317	30.793
ENERGY TRANSFORMATION			265	388	445	653	13	3	16	912	444	1.356
Promotion of cogeneration plants in non-industrial activities			265	388	445	653	13	3	16	912	444	1.356
TOTAL END-USE SECTORS + ENERGY TRANSFORMATION (Priority measures)	7.053	10.255	9.724	14.608	22.971	34.529	1.787	1.185	2.972	19.388	12.761	32.149
COMUNICATION							74	50	124	74	50	124
TOTAL PRIORITY MEASURES	7.053	10.255	9.724	14.608	22.971	34.529	1.861	1.235	3.096	19.462	12.811	32.273