



Intelligent Energy  Europe



# Energy Efficiency Policies and Measures in Spain

## Monitoring of Energy Efficiency in EU 27, Norway and Croatia (ODYSSEE-MURE)

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# 1 Executive Summary

The world energy context is featured by a continuous growth of energy demand and dependency on fossil imports, basically concentrated in geopolitically unstable countries. This involves a risk factor to the *status quo* of the economic activity and competitiveness in leading countries, one of which is Spain. As a matter of fact, Spain is one of the countries with greater energy dependency in the core of the European Union, even exceeding the one of some new Member States. In general terms, this circumstance becomes more complicated bearing in mind the economic expansion of the so-called emergent countries, and the ensuing demand of energy this entails.

Despite the above, the national energy context showed a satisfactory evolution in the year 2007, undergoing an improvement next to 2% of the intensity in terms of primary energy. This keeps the favourable trend change recorded since 2005 on the said indicator, as the improvement of accumulated energy intensity then reached 7%. At present, this trend to improvement goes on, as shown on the information available corresponding to 2008.

Moreover, the renewable energies in 2007 have overcome the barrier of 10,000 ktoe for the first time, with an increase of 11%. This has involved a contribution of almost 7% of the energy demand. Renewable energies represent the second source of electricity production, just after natural gas, and over nuclear energy, coal and oil. This relied on the positive contribution of gas and electricity infrastructures, in line with the forecasts of the *Planning of the Electricity and Gas Sectors 2002-2011*, and its *Revision 2005-2011*.

In general, this positive evolution of energy efficiency and of renewable energies in Spain is somehow due to the changes in Spain's productive structure. Nevertheless, this is not the sole reason to explain it, as it is a result of the implementation of important strategies and planning in the area of energy efficiency and production with renewable energies - as established in the frame of the *Strategy for Energy Saving and Efficiency (E4)* and in the *Renewable Energies Plan, 2005-2010 (PER)* - and which make up one of the strategic axes of Spain's comprehensive energy policy. This is just but the result of the engagement of Spanish energy policy with energy efficiency and renewable energies, as well as with the EU guidelines in this respect. Some of the former are Directive 2006/32/EC on Energy End-use Efficiency and Energy Services, the EU Action Plan on Energy Efficiency and the legislative package on Energy and Climate Change, which sets forth the threefold objective of 20% by 2020.

As regards the latter, the Action Plan 2008-2012 of the E4 Strategy, approved in July 2007, complies with *Directive 2006/32/CE*, establishing the bases to reach the energy savings target of 9 % by 2016. Additionally, the new Plan is integrated within the EU Action Plan on Energy Efficiency, which contributes to an energy saving of 20% in the 2020 horizon. The Action Plan 2008-2012 also involves a remarkable contribution towards the objectives on emission reductions stated in the National Emission Allocation Plan, 2008-2011, which in turn, represents the first national plan approved in relation to the Kyoto Protocol and the second one as regards the European Directive on the Emissions Trading Scheme (EU ETS).

This is supplemented with other strategies and Planning approaches of relevance, both at national level, such as the *Spanish Strategy for Sustainable Development*, the *Spanish Strategy for Climate Change and Clean Energy, 2007-2012-2020*, the *Strategy for Sustainable Mobility*, the *Planning of the Electricity and Gas Sectors 2008-2016*, the *Strategic Plan for Infrastructures and Transport, 2005-2020 (PEIT)*, and the *R+D+I Plan, 2008-2011*.

All of it, as a whole, is integrated within the National Reforms Programme, required by the *Lisbon Strategy* thanks to which it is meant to evolve towards a more competitive and sustainable European economy. Additionally, with a view to ensuring the achievement of the

said objective, in November 2008 took place the approval of the *Spanish Plan for Economic Stimulus and Employment (Plan E)*.

In this line, the energy efficiency and the renewable energies are going to make up the hinges of the change of Spain's economic structure. The activity in these sectors generate employment, boost innovation and technological export, thus contributing to sustainable economic development. In Spain, this is particularly evident in the area of renewable energies, where it holds a leading position at international level.

The variety of actions implemented in relation to renewable energies and energy efficiency, the institutional and entrepreneurial cooperation, the investments undergone and the number of awareness-raising actions carried out so far enable to foretell new successes in the future based on technological innovation.

Specifically in the area of energy efficiency, the evolution of the E4 Strategy, materialised in its Action Plans, is being favourable with a remarkable degree of collaboration reached along with the Autonomous Communities for the development of the respective measures. The implementation of the Action Plan 2005-2007 and the Action Plan 2008-2012 so far all along their annual fiscal years account for it, being remarkable the success of some given measures specifically aimed at the building sectors, domestic equipment, transport and industry. Some of the most outstanding measures are: the *Renove Plan* to support the replacement of electrical appliances; the improvement of energy efficiency in thermal installations in buildings; the rehabilitation of the thermal casing in buildings; the Urban Mobility Plans within the transport sector; and the Public Aids Programme aimed at the optimisation of energy efficiency in the industry sector.

In a nutshell, all of these actions involve a positive contribution to the maintenance of the change of trend recorded from year 2005 onwards on the energy intensity indicators in Spain. It is expected that this evolution will be kept and reinforced with the execution of the *Saving and Energy Efficiency Activation Plan*, within the framework of Action Plan 2008-2012.

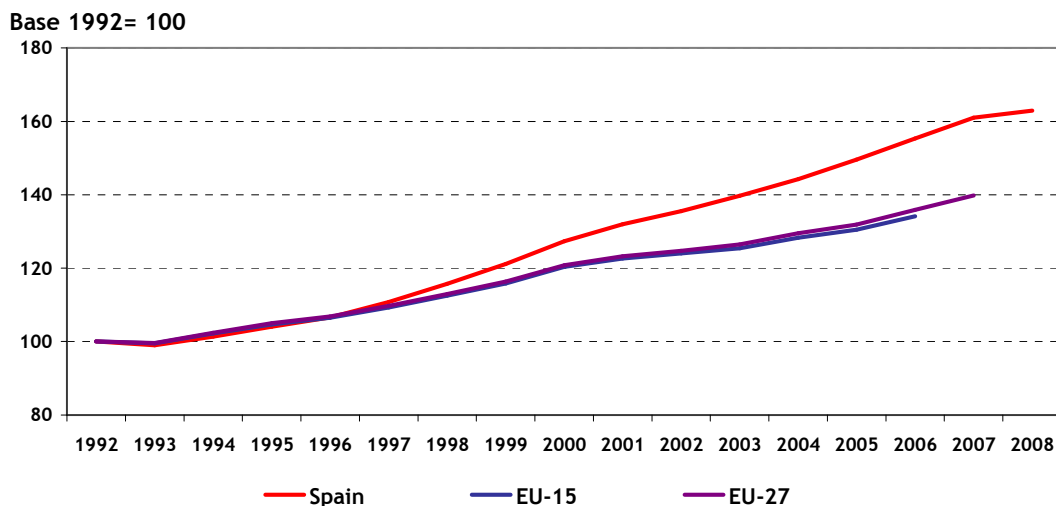
## 2 The Background to Energy Efficiency

### 2.1 Overall economic context

Spanish economy in the year 2007, as it happened in previous years, kept showing a strong dynamism, even if a slight deceleration in the growth pace could be noticed. Therefore, in 2007, Spanish economy grew at a rate of 3.66% slightly lower than the previous year, in line with the European Commission's macroeconomic forecast of 3.7% related to the Spanish situation in the said year.

The Spanish economy evolves thus over the average of 2.9% recorded in the EU, keeping an economic growth differential with respect to the EU. In global terms, the main drives of the growth recorded in Spain in 2007 remained the private consumption and residential investment linked to the building activity. Nevertheless, there was a decrease in the domestic demand, as well as a slight increase in the negative contribution of the external demand to the Gross Domestic Product (GDP).

*Figure 1: Evolution of the GDP in Spain and EU*

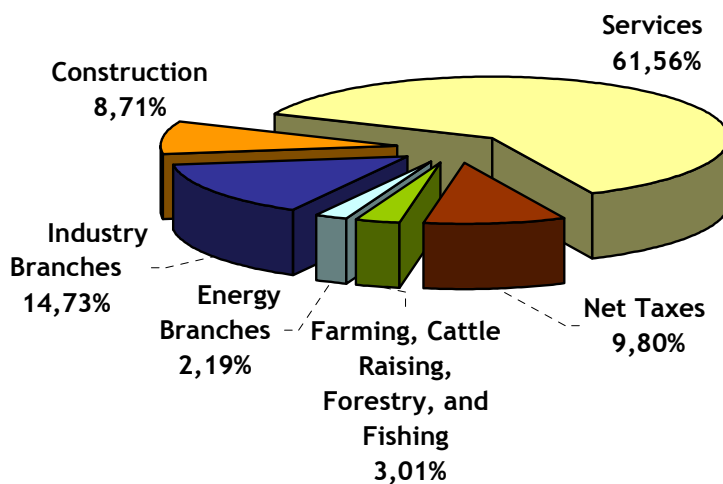


As regards the last issue, that is, with respect to the external balance, the structure of the external demand shows in 2007 an increase in imports, over Spanish exports. This, according to the European Commission, is due, among various factors, to the differential growth of the Spanish domestic demand with respect to its business partners, and to the inflation differential kept within the euro zone, which jointly account for the growth of domestic imports against exports, as well as for a gradual increase of the trade deficit. Nevertheless, in the fiscal year 2007, the contribution of the external demand to the aggregated economy growth improved remarkably. This improvement was due to the speeding-up of exports along with a moderation in the imports growth.

All the above takes place in a general context featured by the international financial crisis, which started towards the second semester of 2007, and basically brought on by the crisis of the *subprime* mortgages crisis. This crisis in Spain was made evident with a kind of deceleration, made evident in the construction sector. This sector shows an important contribution to the GDP, even if it is expected that this contribution should be lower from now on as it is deduced

from the decrease in investments associated to the construction, especially with relation to the residential buildings.

**Figure 1: Evolution of the GDP in Spain and EU**



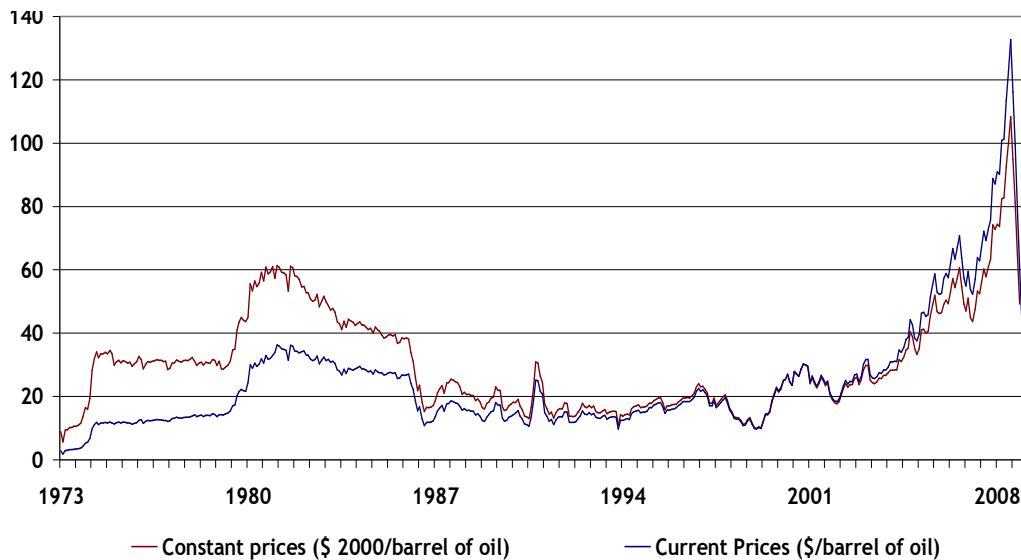
Source: INE/IDAE

This factor makes Spain one of the European countries where production dropped the most in the construction sector. On the other hand, perspectives are more favourable for the industrial production and the services sector, which both seem to be expanding with a joint increase of 5.3% in exports in the year 2007. In the first case, this is especially evident in extractive industries of energy products, in the manufacturing of products such as the electronic material, the machinery and mechanical equipment, as well as the motor vehicles. As regards the services sector, the most active branches are the services to firms, trade and transport, tourism and information technologies.

From the point of view of demand, the growth of private consumption in 2007 decreased slightly if compared to the previous year. As regards investments, even if there was some dwindling in residential investment, the opposite took place as regards consumer goods, where investments seemed to grow at a good pace. It is expected that this trend should continue for investments in equipment and infrastructures, so as to contribute to the partial compensation of the negative impact of the financial crisis in the Spanish economy.

As regards the external sector, as it was formerly stated, the goods trade underwent in 2007 an annual increase, stronger for imports. Therefore, it is expected that the external sector may keep contributing in a negative way to the GDP growth, even if it is likely that this trend could be softened if a moderation in the domestic demand growth is consolidated, as it seems to be the case. So it seems to corroborate the most recent information available, corresponding to 2008, which accounts for some given deceleration, both in exports and in imports, perhaps a little more for the latter.

The evolution of the energy prices, more precisely for oil, seriously jeopardizes the possibilities of economic growth a world level. This is remarkably evident in countries like Spain, with a large energy dependence, over 80%, and therefore, very sensitive to the fluctuations of petrol prices. This, along with the high petrol prices, leads to a high energy deficit in Spain, which in 2007 involved around 34% of the whole trade deficit. The rise in prices entails a negative contribution; such is the case of the oil price increases that took place last July 2008, where the oil price registered an historical maximum over 140 € per barrel, overcoming in 50% the maximum price reached during the oil crisis of the 70's.

**Figure 3: Annual Oil Price average**

Source: Ministry of Economy

To end up, the future forecasts, both on the Government and the European Commission, in a context featured by economic and financial crisis, uncertainty on the international markets and a rise in energy prices, lead to the contraction of the domestic demand, brought on by the stagnation of the construction sector as the main cause of economic crisis in Spain. Another remarkable factor is, at the beginning of 2008, a deceleration process of credit granted to firms and families. The employment, on the other hand, accounts for a decrease in the whole of the economy. To envisage this crisis, which also affects the main world economies, the Spanish Government approved in 2008 the *Spanish Plan for Economic Stimulus and Employment (Plan E)* which groups a set of 80 measures to boost the economic activity and employment. This Plan is in accordance with the action lines established by the Declaration of the Summit on Financial Markets and the World Economy, held on 15<sup>th</sup> November 2008 in Washington, signed by Spain and by the European Economic Recovery Plan, approved by the European Commission on 26<sup>th</sup> November.

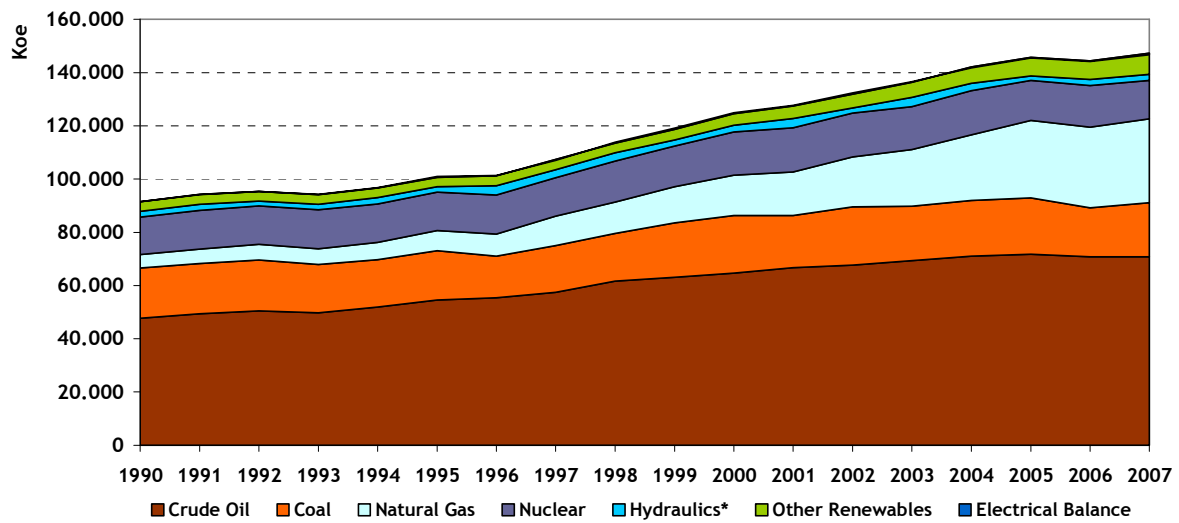
The Plan E is supplemented and structured by four action axes: support measures to firms and families; promotion of employment; financial and budgetary measures; and the modernization of economy. This last item considers a series of reforms, in addition to the ones stated in the *National Reform Programmes*, which materialize the Lisbon Strategy for growth and employment, and which are meant to improve productivity in fundamental sectors in economy, such as transport and energy, emphasizing the enhancement of energy saving and efficiency.

All in all, it is expected that this Plan should have a positive effect, fostering the conditions for the recovery of economic growth, in line with the trend recorded until the year 2007.

## 2.2 Energy consumption trends by fuel and sector

The **Primary energy consumption** in 2007 amounted to 146,779 Ktoe, which meant an increase of 1.84% with respect to the previous year. By energy sources, coal consumption increased by 9.52%, which compensates the lesser production of nuclear origin, which closed the year with a decrease of 8.35% as a result of 22 non-programmed downtimes in nuclear plants. The consumption of oil products, following the stabilisation trend that has been recorded since 2004, closed the year with a slight increase of 0.12%, whereas the natural gas demand increased by 4.31%.

**Figure 4: Evolution of Primary Energy Consumption by sources in Spain, 1990-2007**

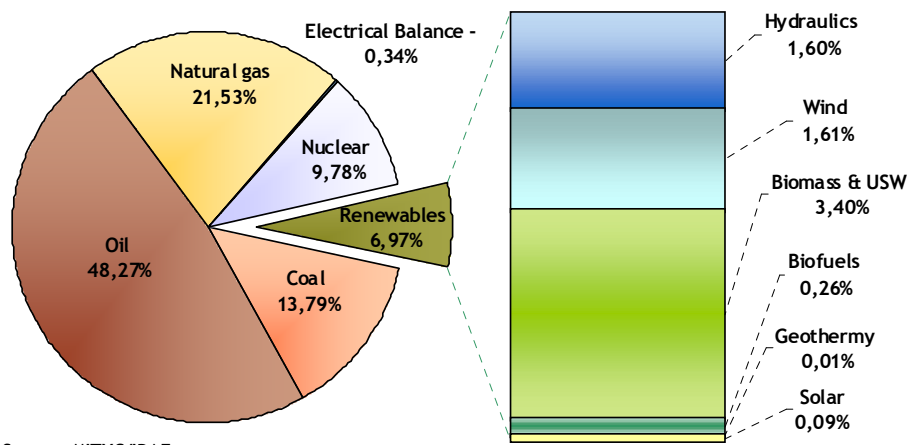


Source: MITYC/IDAE

\* Mini Hydraulic included

In turn, the consumption of renewable energies underwent an increase of 11.04% over the year 2006, exceeding, for the first time, the barrier of 10,000 ktoe, and reaching 6.97% of the primary energy demand. The wind production contributed to this, as well as biofuels and solar energies, which, in 2007, underwent increases of 17.66%, 123% and 52.26%, respectively, even if biomass is the renewable energy with greater relevance, with nearly 50% of all the coverage with renewable energy sources of the primary energy demand.

**Figure 5: Primary Energy Consumption by sources in 2007 in Spain**



Source: MITYC/IDAE

In general, it is important to stand out the continuous upward trend in the participation of natural gas and renewable energies to meet the energy demand. The positive contribution of the development of gas and electricity infrastructures account for it, in line with the forecasts of the *Planning of the Electricity and Gas Sectors 2002-2011 and its Revision 2005-2011*.

In the year 2007, the increase in primary energy consumption went along with an economic growth of 3.66%, which yielded a reduction of primary energy intensity of 1.8%. This indicator kept the change of trend started in the year 2004 for the third consecutive year.

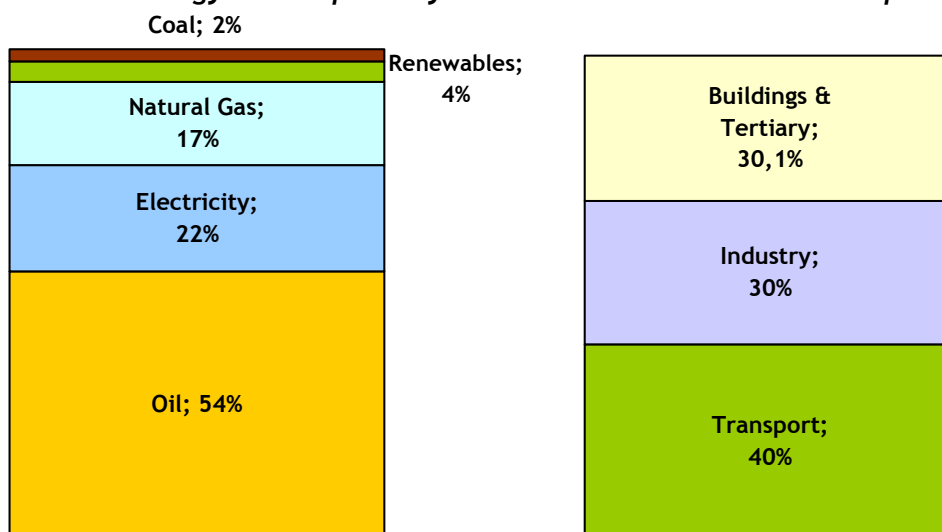
The comparison at European level enables to notice the most outstanding differences between the energy demand structure in Spain and in the EU-27 lies with the larger resource to crude oil and its derivatives, which entails almost half of the coverage of the whole demand - basically in the transport sector - whereas in the EU-27 this contribution does not reach 40%; and the largest presence of nuclear energy in the EU-27. The greater relevance of oil in the Spanish energy supply basically covered with imports, accounts largely for Spain's high energy dependence, over 80%.

As regards coal, natural gas and renewable energies, there are hardly any differences between the EU-27 and Spain. Renewable energies account both in Spain and in the EU-27 for nearly 7% of the coverage, which in Spain is partially met with wind energy and biomass, even if this latter source shows a lower contribution (3.4%) than in the whole of the EU. The share of wind energy, with 2% of the coverage of the demand, stands out against most of the EU countries, where this percentage is reduced to less than 1%.

Concerning the primary energy consumption, Spain holds the fifth place among countries of the EU, as it is in a more distant position in terms of consumption per capita, precisely in the twelfth position.

As regard **final energy**, with the exception of non-energy uses, the consumption reached 101,343 Ktoe in 2007, with an increase of 3.57% with respect to the previous year. This growth is due, on the one hand, to the lower average temperatures in the last months of the year regarding the same period in 2006, and the other hand, to the evolution of specific demands of the industry and transport sectors.

**Figure 6: Final Energy Consumption by Sources and End-Use Sectors in Spain, 2007**



Source: MITYC/IDAE  
 Note: Non Energy uses excluded

The analysis of the **final energy consumption by energy sources** shows that coal consumption reached 2,498 ktoe, 10.3% higher than in 2006, as a result of the increase in the demand of the sectors of the iron and steel and the cement industries. On the other hand, the consumption of oil derivatives increased by 2%, reaching 55,174 ktoe, a demand mostly absorbed by the transport sector.

The final consumption of natural gas has been recovered, after the decrease undergone in the year 2006, going back then to the growth rate of 8.21% which has been taking place since the beginning of this century. On the other hand, the electricity demand of end use sectors, has shown a somehow slowing-down process since 2006, with the progressive reduction of its growth

rate, which amounted to 2.7% in 2007. This reduction in the electricity consumption becomes particularly evident in the household and tertiary sectors. Last, the final consumption of renewable energies during 2007 increased by 6%, reaching 4,245 ktoe. This increase was basically led by the consumption of biofuels in transport, and to a lesser extent, by the demand of solar thermal energy.

## 2.3 The policy background to energy efficiency

Two important planning tools stand out at present in Spain to give a response to the energy and environmental problems: the *Spanish Strategy for Energy Saving and Efficiency (E4)* and the Renewable Energies Plan 2005-2010. What it is intended with them is to move to a more sustainable energy model where local renewable energies should attain a more relevant role in a more moderate energy demand thanks to the establishment of energy saving and efficiency.

As regards renewable energies, the Renewable Energies Plan, PER 2005-2010, represents the framework for the development of renewable energy resources in Spain, even if at present, and since 2008, a remarkable landmark has been the preparatory works of a new Renewable Energies Plan 2011-2020, according to the contents of Royal Decree 661/2007, *regulating the production of electricity under the Special Regime*.

As regards the energy saving and efficiency area, the *Spanish Strategy of Energy Saving and Efficiency (E4)* makes up the Government's priority strategic line. The E4, essentially aimed at the end use sectors, identified a primary energy saving potential in the year 2012 equivalent to 15,574 ktoe. With a view to coming to fruition the development of the E4, it was necessary to implement it into two Action Plans, the Action Plan PAE4 2005-2007 and the Action Plan PAE4 2008-2012.

The good results achieved and the gathered experience up to 2007 in the execution of the first Plan have been crucial to draft the second Action Plan 2008-2012, approved in Cabinet Meeting in July 2007, consolidating the effort undergone, and paying special attention to diffuse sectors (Transport, Residential, Services y Agriculture).

The new Plan falls within the EU Energy Efficiency Action Plan, contributing to the energy saving objective of 20% in the 2020 horizon. Likewise, it complies with the *Directive 2006/32/EC on Energy End-use Efficiency and Energy Services*, for which annual saving objectives of 2% have been established, even more ambitious than 1% as established by the said Directive. Regarding this, it is important to state that the energy objectives set forth within the framework of this new Plan involve an additional improvement as regards the initial provisions of the E4.

**Table 1: E4 and Action Plans: Summary of Objectives, Investments and Public Aids**

	E4 2004-2012	PAE4 2005-2007	PAE4 2008-2012
Investment (M€)	24,098	7,926	22,190
Public Aids (M€)	2,011	729	2,367
Primary Energy Saving (ktoe)	69,950	12,006	87,934
Final Energy Saving (ktoe)	41,989	6,862	59,454
Avoided Emissions (M tCO <sub>2</sub> )	190	32	238

Source: IDAE

The execution of the Action Plan 2008-2012 requires a definition of specific measures oriented to the considered sectors, where the objectives, instrumental and economic means should be clearly stated. The measures respond to a different typology: incentives to investment;

promotion; training; dissemination. These measures, in turn, go along with actions of a legislative kind as they require a complex administrative development, which make up as many as 59 measures. These measures can be enlarged as well by the ones the Autonomous Communities deem necessary to be applied in their territorial scope; therefore, the number of measures to manage can be considerably increased.

As regards the sectoral application of the Action Plan, each of the main sectors taken into account has been thoroughly analysed so that the envisaged measures are aimed at overcoming the existing barriers in each sector and achieving an energy saving volume with an acceptable cost/benefit ratio. In this sense, the experience gathered with the former Action Plan 2005-2007 has been essential to define and implement priority measures all along the period 2008-2012. According to this, the objectives and prevision stated above have been distributed at sectorial level as stated in the following chart:

**Table 2: Main Energy - Economic Parameters of the Action Plan, 2008-2012 by Sectors**

Sectoral Application		Investment (M€)	Public Aids (M€)	Primary Energy Saving (ktoe)
End use	Industry	1,671	370	24,750
	Transport	1,893	408	33,471
	Buildings	13,468	804	15,283
	Household and Office Automation Equipment	1,999	533	4,350
	Agriculture	683	94	1,634
	Public Sector	1,351	89	1,739
	Energy Transformation	1,085	29	6,707
Communication	40	40		
<b>Total</b>		<b>22,190</b>	<b>2,367</b>	<b>87,934</b>

Source: IDAE

The **largest savings** are in the **transport** sector, followed in order of relevance by industry, buildings, transformation, household equipment and office automation, the public sector, and agriculture.

In order to implement the actions envisaged in the Action Plan 2008-2012, it has been allocated a budget amounting to M€ 2,367, consisting of public aid funds which mostly (70%) correspond to electricity and gas tariffs. The Action Plan 2008-2012, as it happened with the former plan, takes place in a coordinated way by means of specific Agreements between IDAE and the Autonomous Communities. On the basis of these Agreements, it is envisaged a transfer of approximately M€ 1,290 to the Autonomous Communities for the entire period 2008-2012. Precisely, as regards the funds coming from electricity and gas tariffs, concerning the fiscal year 2008 of the Action Plan, these are respectively regulated by *Order ITC/3860/2007*, dated 28<sup>th</sup> December, which revises the electricity fees from 1<sup>st</sup> January 2008 on, and *Order ITC/676/2008, regulating the transfer of funds, at the expense of the access toll of third parties to gas installations*, which amounts to M€ 275.9 in the first case, and M€ 57 in the second one. These resources are territorially distributed in accordance with the amounts and criteria approved by the Consultative Commission on Energy Saving and Efficiency, and these respond to criteria of sectoral and territorial kinds.

The execution of this Action Plan 2008-2012 is expected to contribute to the performance of the *Spanish Strategy for Climate Change and Clean Energy 2007-2012-2020*, approved in Cabinet Meeting in November 2007, as it eases the achievement of the emission reduction objectives set forth by the *National Emission Allocation Plan 2008-2012 (PNA II)*. The PNA II, approved by *Royal Decree 1370/2006*, dated 24<sup>th</sup> November, is the second Plan drafted under this *EU Emission Trading Scheme (ETS)* and the first coinciding with the commitment period (2008-2012) established in the Kyoto Protocol.

The energy policy in the energy efficiency area is completed with the ***Saving and Energy Efficiency Activation Plan 2008-2011***, approved by Cabinet Meeting on 1<sup>st</sup> August 2008. This new Plan emerges as a need to face the strong rise of the oil price, after the approval of the Action Plan 2008-2012, and its negative effects on the Spanish economy. The Activation Plan entails an ambitious initiative of the Government's which includes 31 measures, meant to intensify energy saving and efficiency, and thus contributing to reinforcing the enactment of Action Plan 2008-2012 in the E4. Some of the proposed measures are an enhancement and acceleration of the measures already envisaged in the first Plan, whereas some others are just new.

The whole of the measures are framed within three Strategic Lines: sustainable mobility, sustainable construction and energy sustainability. The approved measures are aimed at all the end use sectors, even if there is a package of ***horizontal measures*** to be applied to all the sectors, which demands a special commitment on all the Public Administrations, and particularly, the State General Administration. Likewise, there is a set of measures intended to ***reduce energy consumption in transport and building sectors***, giving a special relevance to the first sector as they will yield a reduction in the demand of oil derivatives, and therefore, in the consequent imports. Finally, a group of measures has been devised aimed at ***reducing electricity consumption***, which is also expected to reduce the imports of fossil fuels.

Finally, the Activation Plan 2008-2011, with a total cost of M€ 245, will contribute to the enhancement and boosting of the energy saving and efficiency policy, establishing an objective of reduction of oil imports by 10% in 2011. This guarantees the certainty of supply and therefore, will facilitate the performance of the national engagements subscribed within the Kyoto Protocol.

All the above is supplemented and reinforced with new planning of a more general kind, keeping the synergy with the national planning approaches in force within the scope of renewable energies and energy efficiency: ***Planning of the Electricity and Gas Sectors 2008-2016*** of the Ministry of Industry, Tourism and Trade. This Planning, approved in Cabinet Meeting on 30<sup>th</sup> May 2008, means to guarantee the certainty and quality of the energy supply in the mid and long term, thus enabling economic growth and preserving global competitiveness and the protection of the environment in a more sustainable milieu.

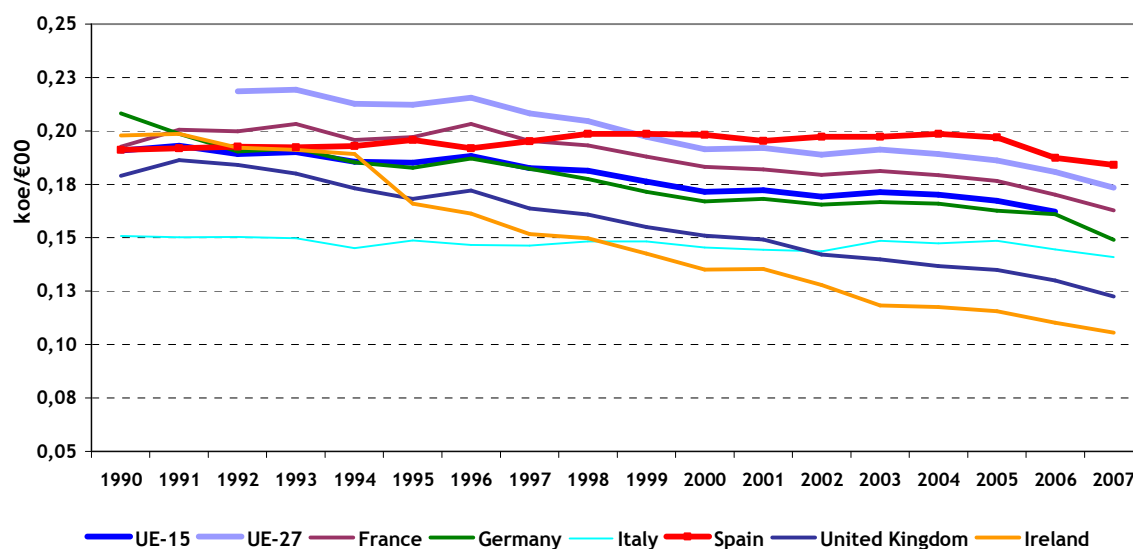
### 3 Overall Assessment of Energy Efficiency Trends

#### 3.1 Overall energy intensity trends

In the year 2007, the increase of 1.84% in the primary energy consumption was accompanied by an even higher Gross Domestic Product increase of 3.66%, which resulted in a 1.8% reduction of primary energy intensity. Therefore, this indicator carries on the trend change started in 2004 by the third consecutive year.

In comparative terms, this indicator is kept at a higher level than the EU-15 and EU-27 average, as well as the one of countries located around Spanish geographic area, which is translated into competitiveness differential. In any case, the favourable evolution recorded since 2004 places Spain in convergence with the trends shown for energy efficiency improvement in the countries mentioned above.

**Figure 7: Primary Energy Intensity in Spain and EU**

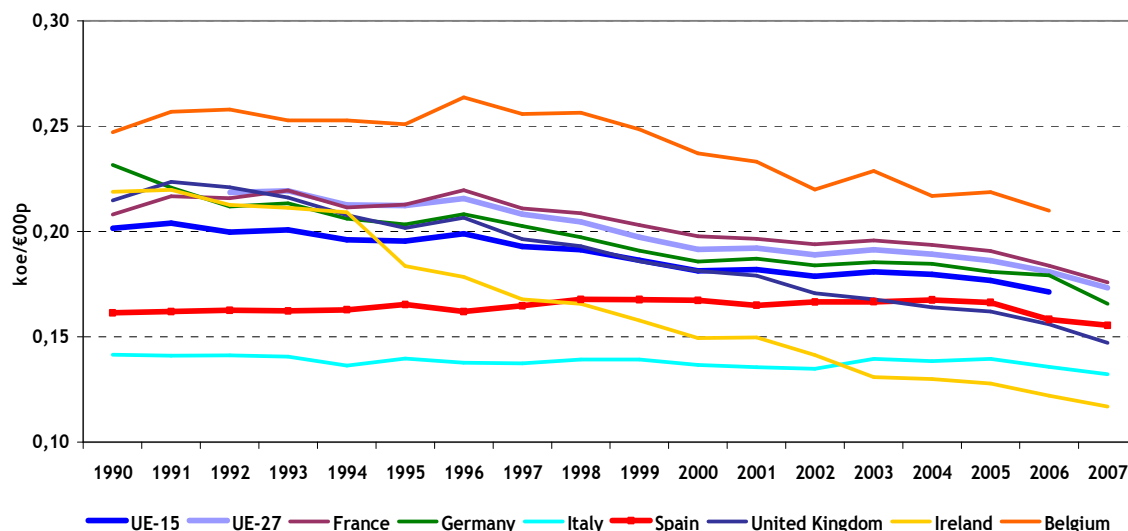


Source: EnR/IDAE

The indicator analysis in terms of **purchasing power parity** allows a closer assessment of the trend comparison in different EU countries. The purpose of this new indicator is to remove price level differences between countries, what results in a GDP adjustment for the various countries, thus decreasing intensity in countries such as Spain, with a lower cost of living, or increasing in those countries where the opposite occurs. In any case, the use of purchasing power parity does not affect intensity trends, resulting in a more realistic indicator for comparisons at an international level, and therefore, more useful in the face of community and national policies aimed at improving the energy efficiency and competitiveness of their economies - the latter being a priority in a context featured by crisis and vulnerability due to a price increase of energy raw materials given the political and economic instability of main crude-oil producing countries.

As a consequence, this indicator leads Spain to a better positioning due to existing relative lower prices with respect to European average. Likewise, this new indicator shows certain stabilisation for Spain with a slight trend downwards. This means a relative position closer to the European average level, which records inter annual improvements in energy intensity around 1% since 1990.

**Figure 8: Primary Energy Intensity at purchasing power parities (PPP) in Spain and EU**



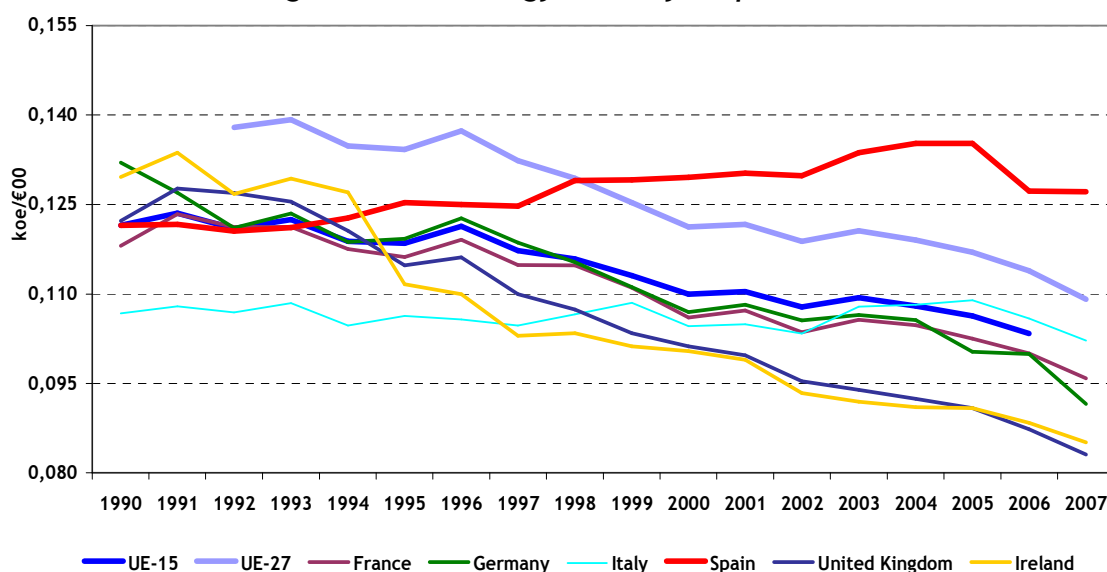
UE27 = Reference; Source: EnR/IDAE

This indicator, in the same way as the previous one, reflects a trend change from 2004 onwards, which in 2007 led to an accumulated reduction of 7% in the necessary energy consumption to obtain one Gross Domestic Product unit during said period. The structural changes taken place mostly in the industry may have contributed to it.

In terms of final energy, in 2007, the evolution of this consumption, under economic growth, implied a slight decrease of 0.1% in the final energy intensity, which seems to consolidate a given trend towards stabilisation.

The comparison indicator at EU level shows that it has been above the European average since the early 90s, what in turn justifies the differential observed between the respective primary intensity indicators: the higher energy consumption by *Gross Domestic Product* unit, in general, is explained by a higher national energy demand from different end use sectors with respect to their EU partners.

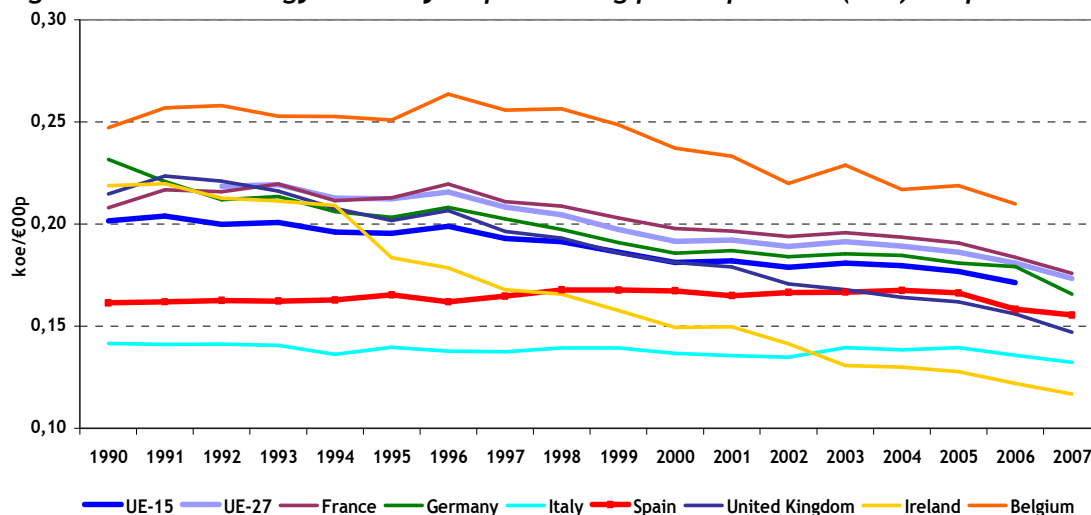
**Figure 9: Final Energy Intensity in Spain and EU**



Source: EnR/IDAE  
Note: Non energy uses excluded

The correction at purchasing power parity places the indicator at a similar level than the EU-15 and EU-27 average, although slightly above from the year 2000 onwards. As it happens with most EU countries, this indicator has shown certain stabilization with a downward trend in the last years.

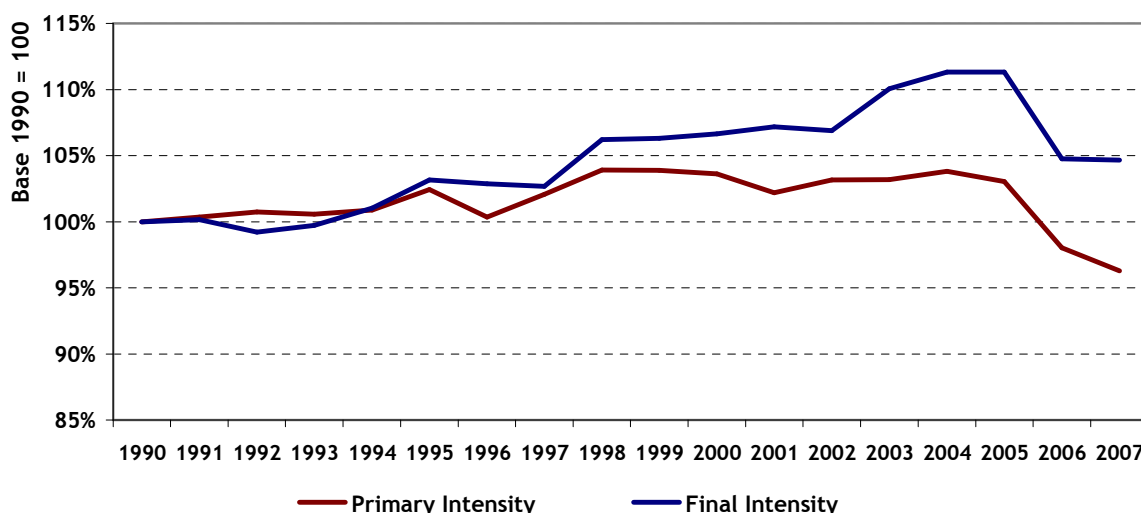
**Figure 10: Final Energy Intensity at purchasing power parities (PPP) in Spain and EU**



UE27 = Reference; Source: EnK/IDAE

Out of the comparison of the evolutions of the primary and final intensity indicators, where the first one, in general, records a more acute decrease than the second one, it can be noticed the effect of the efficiency improvement in electricity generation caused by the progressive penetration of renewable energies and natural gas into combined-cycle power plants.

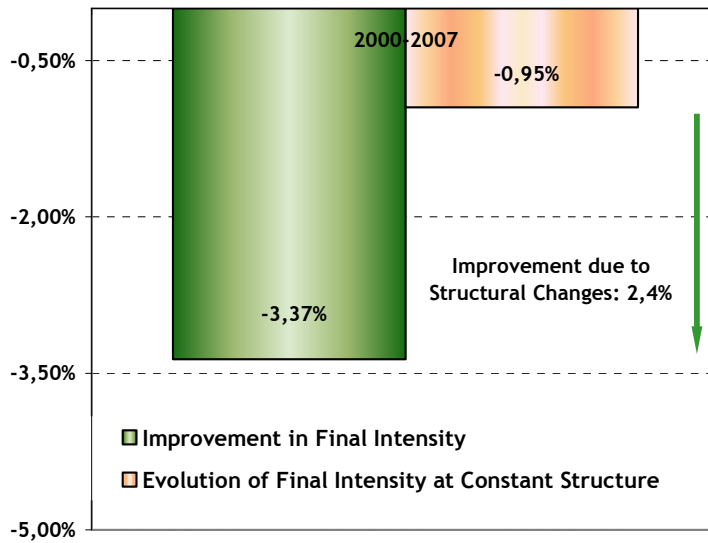
**Figure 11: Trends of Primary and Final Intensities in Spain**



Source: MITYC/IDAE

An additional analysis of the evolution of the final intensity indicator with climatic corrections and at the constant structure of the year 2000 enables to make a distinction between the improvement ascribable to structural effects from the one resulting from other causes such as the combined effect of likely energy efficiency technological and political improvements.

**Figure 12: Evolution of the Final Energy Intensity at constant GDP structure in Spain**

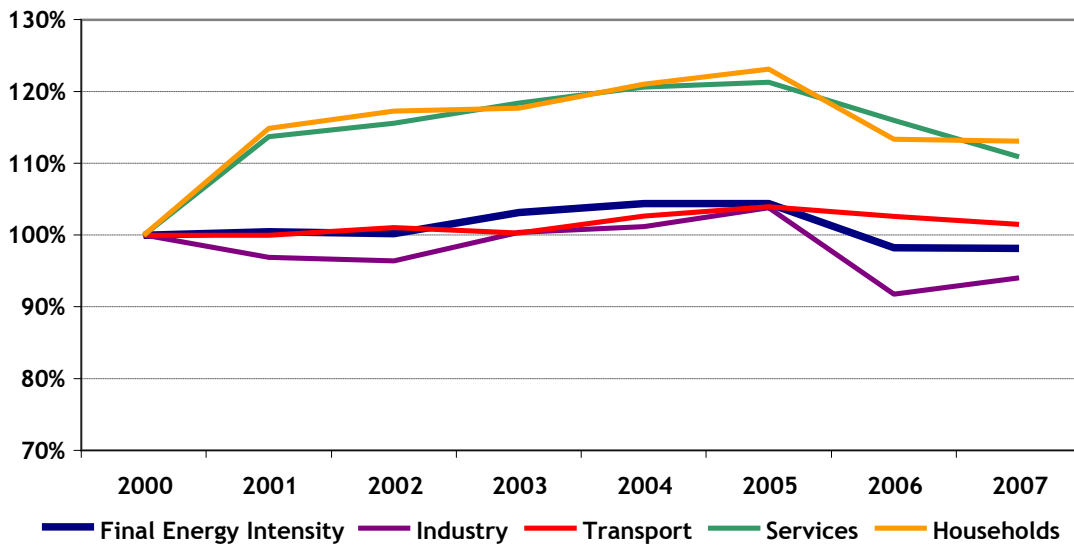


Source: EnR/IDAE

Note: Intensities with climatic corrections

Thus, in the period 2000-2007, it is observed an accumulated improvement of 2.4% due to structural changes in Spain’s economy, presumably in the industry sector.

**Figure 13: Evolution of Final Energy Intensity by End Sectors in Spain**



Source: MITYC/IDAE

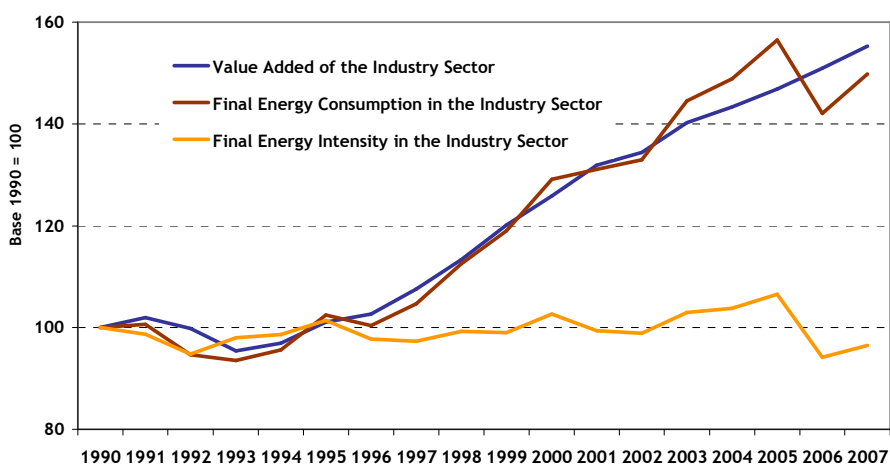
The above is confirmed once having observed the final intensity evolution of the whole of the economy and of the various sectors integrating it. It can be confirmed that in global terms, since the start of the new millennium, industry is the sector that has mostly contributed to the accumulated improvement of the final intensity.

### 3.2 Industry

During the year 2007, the final energy demand of the industry sector increased by 5.4%, reaching 30,038 ktoe, equivalent to 30% of the final energy consumption. Practically all electricity sources used in this sector underwent significant consumption increases. Such was the case of coal, demanded by the iron-steel and cement industries, as well as natural gas, and renewable energies for thermal use, whose consumptions grew from 7% to 10%. In contrast, the demand for electricity and oil products remained stable.

The increase in the energy consumption along with a lower economic growth in this sector in 2007 (2.87%) yielded an increase of 2.46% in the industrial energy intensity.

**Figure 14: Main Indicators in the Industry Sector in Spain**

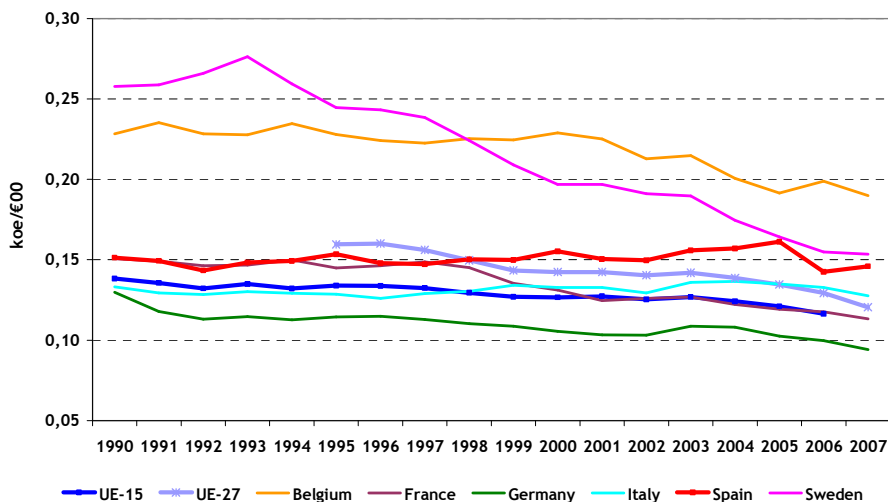


Source: INE/MITYC/IDAE

Nevertheless, since the beginning of the 21<sup>st</sup> century, in general, some improvement has been noticed in the energy intensity of industry, which has become evident from 2005 on.

A comparative analysis of this indicator at European level shows higher values than the European average, even though a convergence in evolution seems to occur. By countries, Germany, Italy and France are of interest, as they have lower intensities than Spain, and because they make up a referent as to the improvement of the competitiveness which Spain's economy should be inclined to.

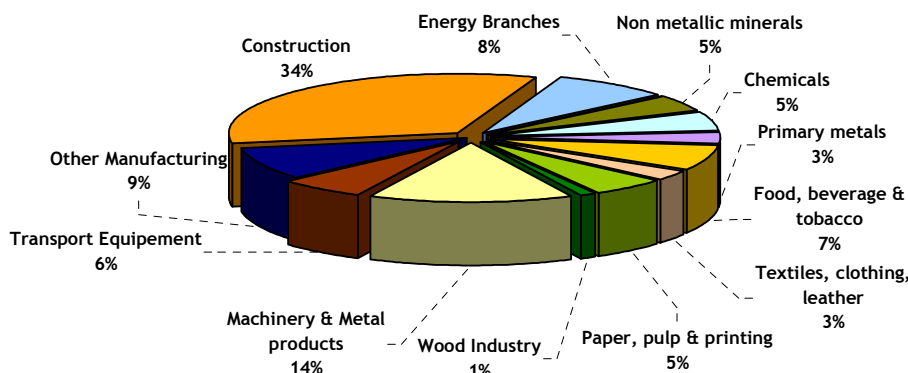
**Figure 15: Final Energy Intensity in the Industry Sector in Spain and EU**



Source: EnR/IDAE

A detailed analysis allows to conclude that the cause of the highest value in Spain’s industrial intensity points to the Non-Metallic Minerals branch, with high representativeness in the energy consumption of the sector, and in contrast, with a small contribution to the Gross Added Value of the said sector.

**Figure 16: Added Value of the Industry Branches in Spain, 2007**

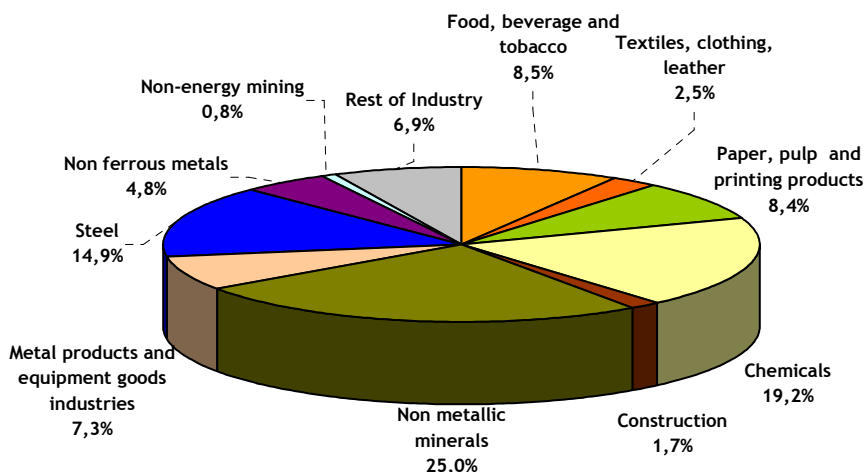


Source: INE/IDAE

This branch of industry, and specifically cement production, is linked to the construction sector, which unlike other countries in our neighbourhood, has a significant importance in the productive structure of the Spanish industry, with 34% of the Added Value of the industry as a whole. The construction expansion, especially since the 90s, and the demand associated with products as the ones stated above, of very intensive production from an energy point of view, is what ultimately explains the evolution of the intensity indicator as opposed to the average in the EU, where other less energy intensive industry branches prevail, such as the ones linked to equipment goods. Nowadays, in the context of juncture crisis which affects the construction sector, it is likely to have an impact on its energy demand and with this, on the intensity indicator.

The following industry branch with a decisive influence on the energy intensity of the sector is the chemical industry, absorbing 19% of the energy consumption. Nevertheless, if we consider non-energy applications, those used as raw material in specific productive processes, as for example naphtha manufacturing, the chemical sector representation rises to reach first place with 27% of the total final consumption.

**Figure 17: Energy Consumption in the Industry Sector by branches in Spain, 2007**

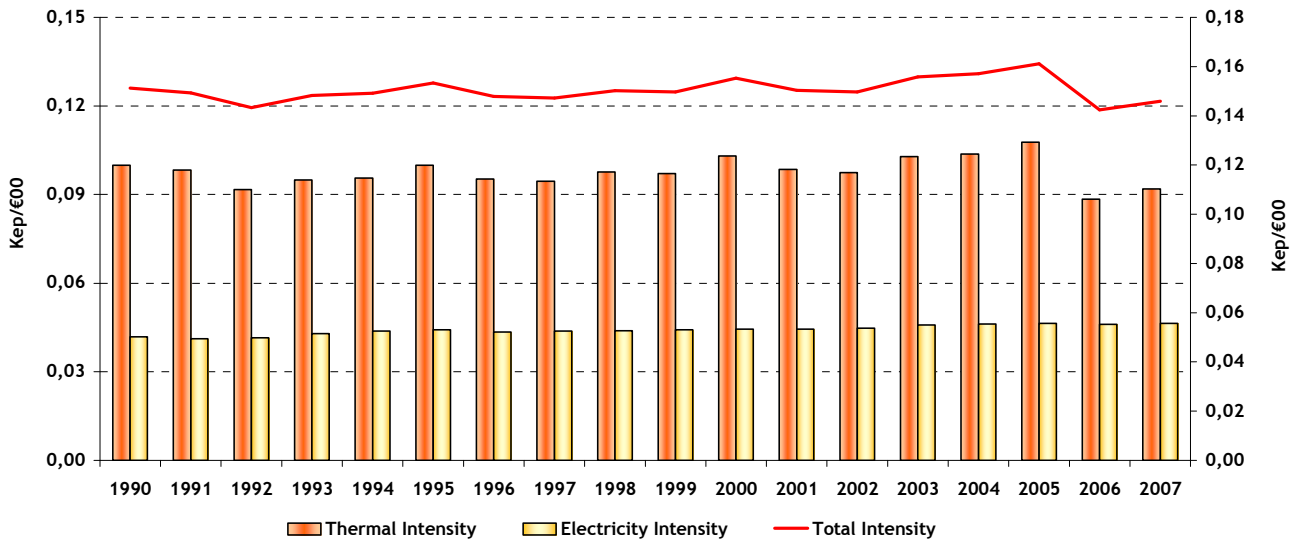


Source: MITYC/IDAE

Note: Non energy uses excluded

The breakdown of the industry intensity in its components, that is, the intensity associated with the electricity and thermal demands of the industry, allows observing, on the one hand, a higher representation of the intensity due to the thermal demand, covered mainly with fossil fuels, with an increasing contribution of natural gas. On the other hand, in general, it can be appreciated a trend towards stabilization in electricity intensity, so that the evolution of the final intensity in industry is closely linked to the thermal one.

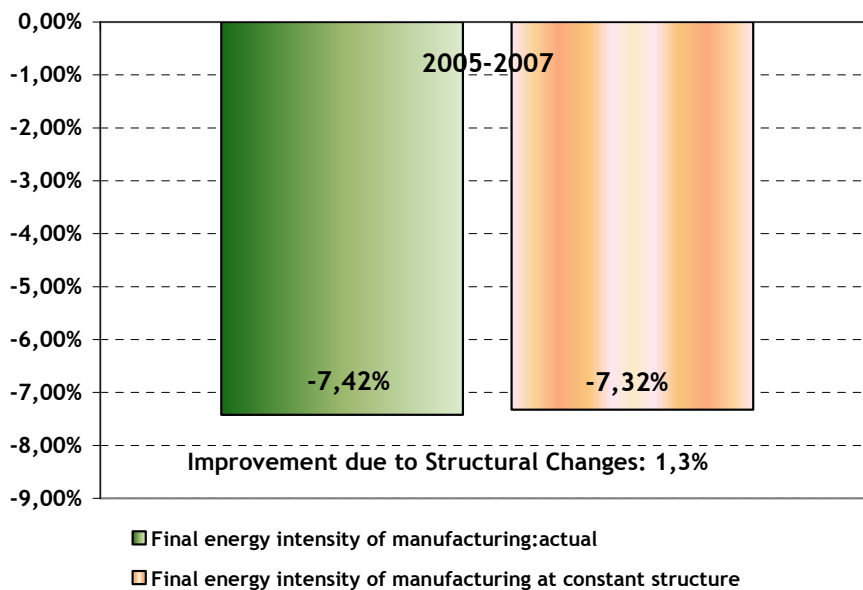
**Figure 18: Electricity Intensity in the Industry Sector in Spain**



Source: MTYC/IDAE

Finally, an analysis of the recent energy intensity evolution in the manufacturing industry in Spain shows the positive effect of technological improvements together with structural changes and/or productive processes in the whole of branches integrating this industry sector, especially after the year 2000.

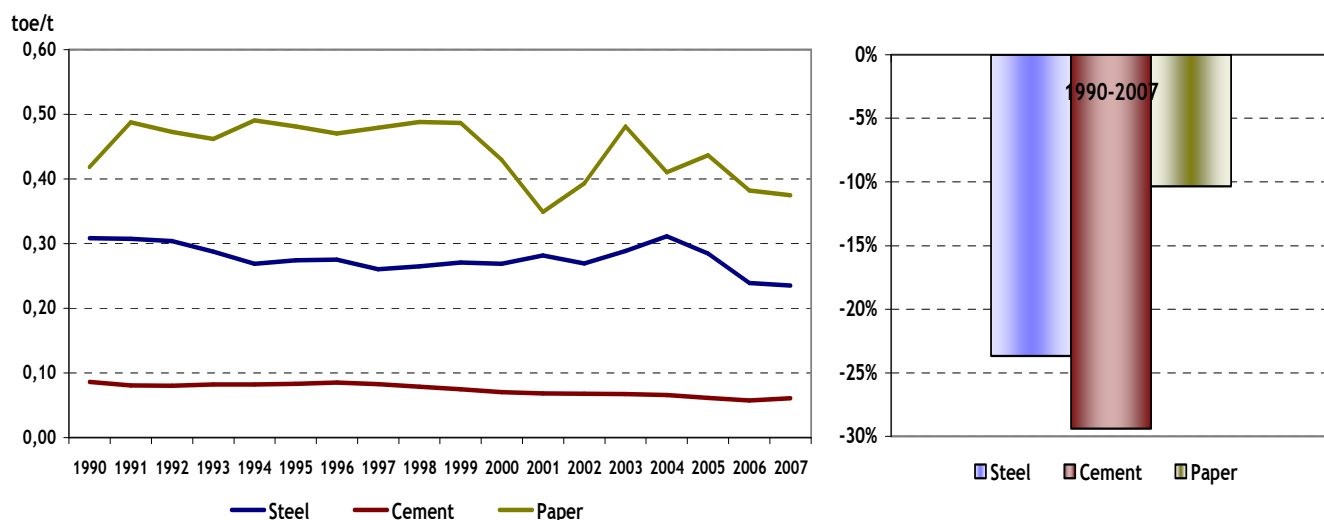
**Figure 19: Evolution of the Energy Intensity of the Manufacturing Industry at constant structure in Spain**



Source: EnR/IDAE

The evidence of the above mentioned may be obtained by observing the evolution of some of the more intensive industry branches, such as cement, iron-steel and pulp industries. These branches show a remarkable reduction of the unitary consumption associated with their production, which, among other causes, can be the result of incorporating some improvements into their productive process.

**Figure 20: Trends in Unit Energy Consumption in the Steel, Pulp and Cement Industries in Spain**



Source: IDAE

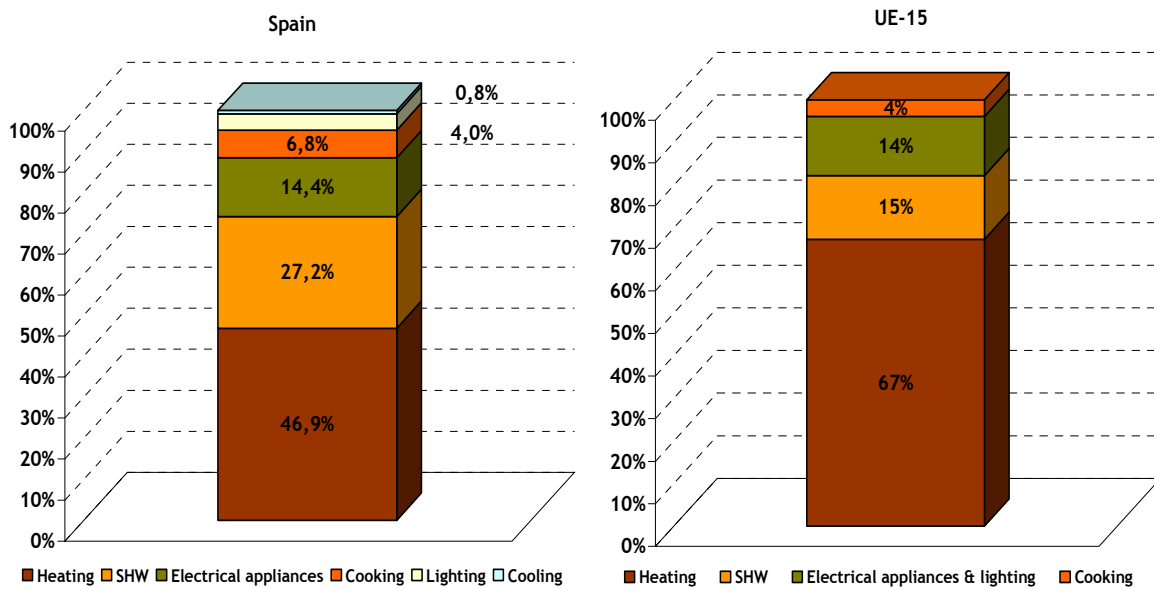
It is expected that industry-related measures undertaken within the framework of the current Efficiency and Saving Action Plan 2008-2012 may contribute to reinforce the energy efficiency improvement started in the previous Action Plan 2005-2007. Thus, already known measures such as the execution of *Voluntary Agreements* between representative associations of the industry sector and the Public Administration, intended to boost energy savings, and the *Public Aid Programs* for efficiency improvement, with budgetary allocations to the various Autonomous Communities, are supplemented in this new Plan with the implementation of *specific assessments of the energy impacts in all the industry projects*. It is likely that the said actions may jointly contribute to moderate the evolution of the final intensity indicator in the industry all along the Plan's execution period.

### 3.3 Households

As to the household sector, the energy consumption in 2007 increased by 2% to reach 16,868 ktoe, which amounts to 17% of the total final consumption.

The distribution of the energy consumption per uses in the said year shows the associated heating consumption (47%) as the top energy demander. This figure contrasts with the 67% quota that this use records as the European average, which is largely explained by Spain's soft climate in winter. Next in scale order are the consumptions linked to sanitary hot water and kitchen uses, with higher percentages than those shown by the European average. Finally, also remarkable is the consumption absorbed by cooling, which in spite of its scarce contribution to energy consumption — only 1% — remains a problem as regards its demand peaks, and therefore, its management, which is particularly acute in the summer periods. It is expected that the latest breakthroughs in legislation with regards to building (thermal casing, bioclimatic architecture, etc.) may lessen the occurrence of such consumption.

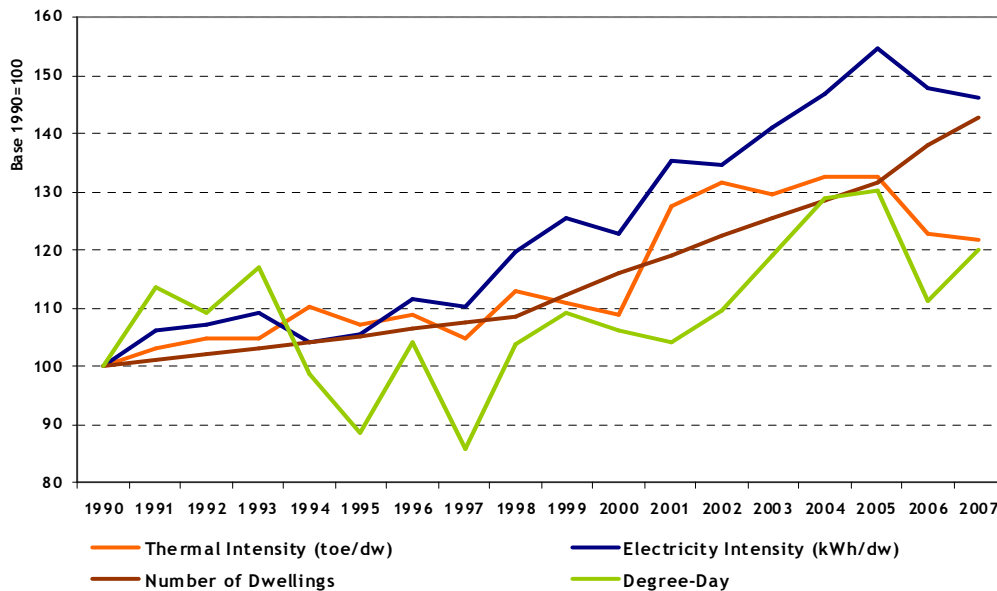
**Figure 21: Breakdown of the Energy Consumption by Uses in the Household sector, 2007**



Source: INE/IDAE/EnR

Concerning the evolution of the unitary energy consumption per dwelling, the latest data available corresponding to the year 2007, evidence a decrease in **thermal intensity** by 1%, resulting from the best climate conditions recorded. In turn, **electricity intensity** remains higher, as a result of the electricity demand associated with the household electrical appliances. Nevertheless, it equally showed a slight decrease in 2007, in line with the trend started in the year 2006, which could indicate certain saturation in the household electrical equipment in Spain.

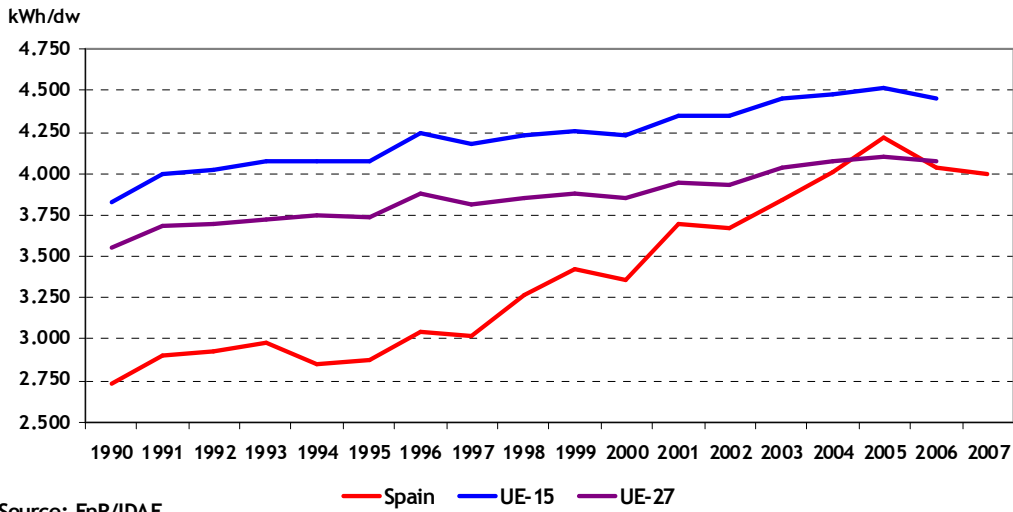
**Figure 22: Main Indicators of the Household Sector in Spain**



Source: INE/IDAE&MICYT

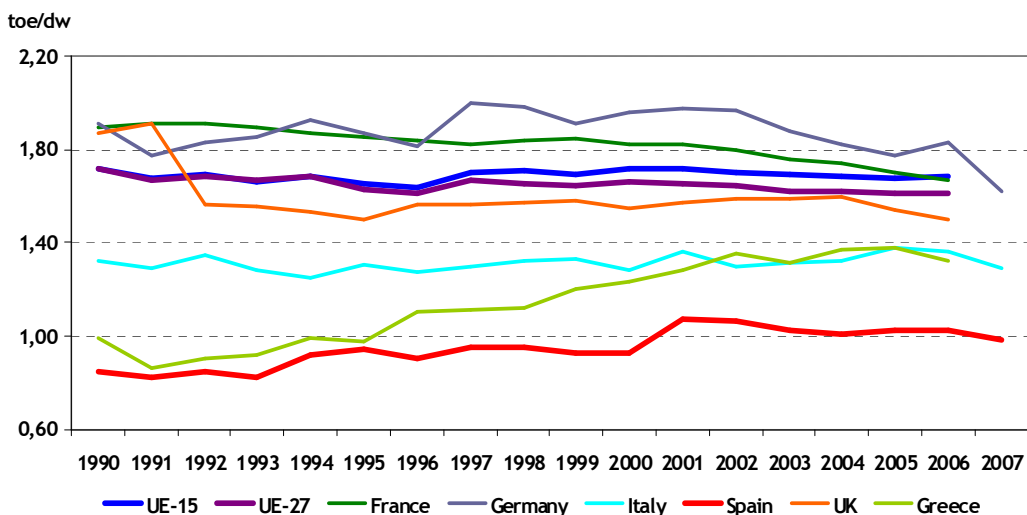
The above mentioned is confirmed by comparing the average electricity consumption per household at European level, where a progressive convergence is observed between Spain and the EU average. Thus, in the year 1990 the average **electricity consumption** of a Spanish household was of the order of 70% against the European average household, while in the year 2007 it was beyond 95%.

**Figure 23: Electricity Intensity in the Household Sector in Spain and EU**



The international comparison of the **energy intensity indicator in the household sector with climatic corrections**, measured in terms of unit energy consumption per dwelling, places Spain as the least energy intensive, with approximately 1 toe per dwelling, between 35 and 40 % lower than the average energy consumption of a European dwelling. The reason of this difference appears to be, among a number of causes, the scarce weight of energy prices in the household expenditure. In spite of this, it is expected that the measures associated with an increase of electricity tariffs, as established in recent regulations, may be translated into higher awareness for domestic users, and therefore, into a more responsible consumption, as well as into a moderation of the likely growth of this indicator.

**Figure 24: Unit Consumption of Households per dwelling with Climatic Corrections in Spain and EU**

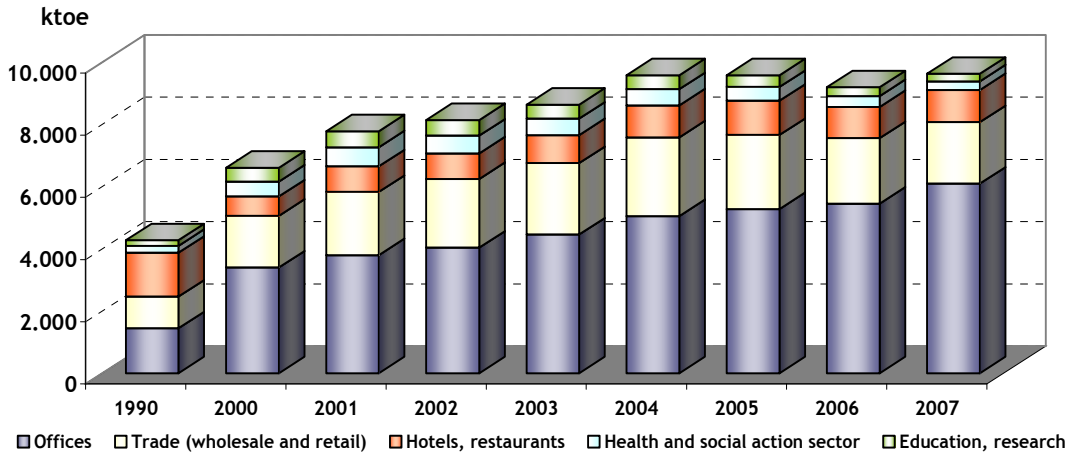


Last, a positive mid-long term effect is expected on the efficiency improvement of the buildings in the residential sector as a result of the application of the energy efficiency measures gathered on the Action Plan 2008-2012, as well as on the legislation related to the building sector, both for new and refurbished buildings.

### 3.4 Services

In 2007 the tertiary sector recorded a slight decrease in energy consumption of around 1%. This consumption rose to 9,764 ktoe in 2007, a figure representing near 10% of the total final consumption. In the past years stabilization has been noticed on the total consumption of the sector, which keeps largely concentrating on office buildings, and to a lesser extent, on commercial buildings and on the hotel sector.

**Figure 25: Energy Consumption in the Services Sector by sub sectors in Spain, 1990-2006**



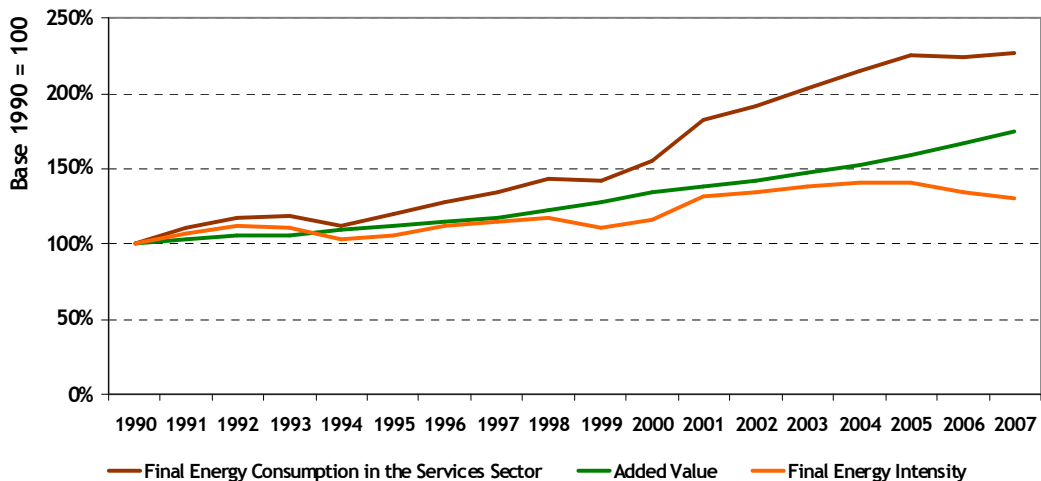
Source: MITYC/IDAE

Note: Non energy uses excluded

Addressing the consumption by energy sources, it must be highlighted the growing involvement of electricity consumption, which represents more than 60% of the total consumption in this sector. It is expected that the recently implemented regulations regarding building may contribute in the mid term to alleviate the electricity demand linked to the cooling and lighting needs in the tertiary sector.

As to the evolution of this sector's energy intensity, the situation for the year 2007 shows a 3.22% improvement, ascribable to both the decrease in the energy consumption of this sector and its economic growth of 4.5%.

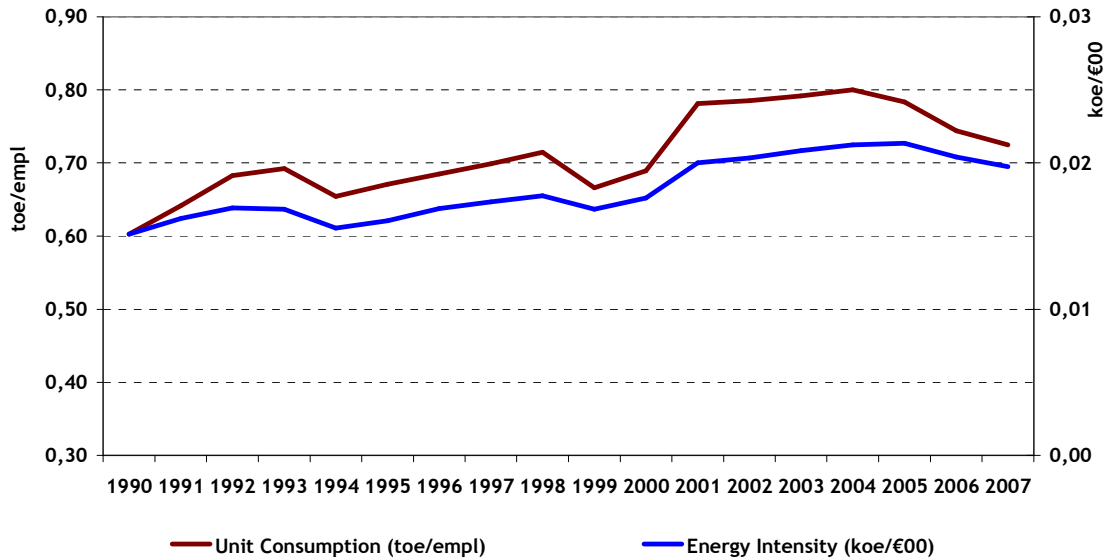
**Figure 26: Main Indicators in the Services Sector in Spain**



Source: INE/MITYC/IDAE

A similar analysis is derived from the indicator, expressed as the energy consumption per employee, in which case there was an improvement of 2.57%. On the other hand, productivity improvement of the sector has been noticed as a result of the evolution of both indicators since the year 2004.

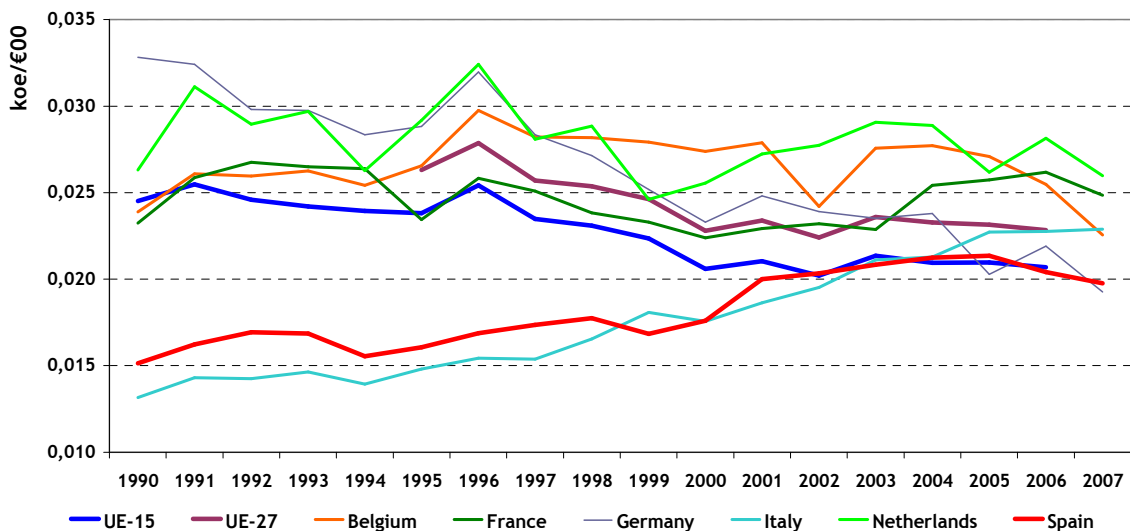
**Figure 27: Final Energy Intensities in the Services Sector in Spain**



Source: EnR / IDAE

The comparison at European level of the intensities in the services sector enables to contrast Spain's situation, currently at the level of the EU average and below the one of other countries such as Belgium, the Netherlands and Germany.

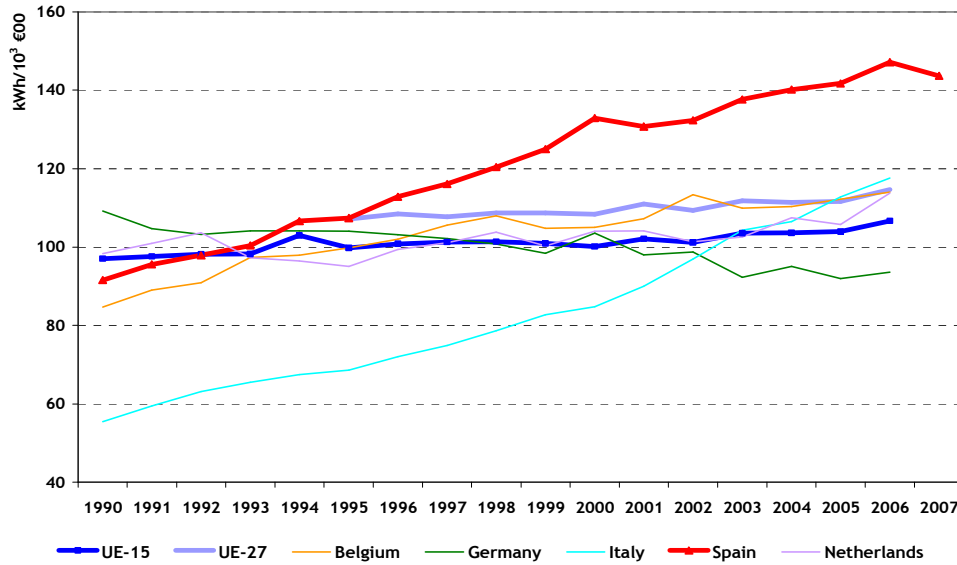
**Figure 28: Final Energy Intensity in the Services Sector in Spain and EU**



Source: EnR/IDAE

As already pointed out above, the electricity consumption, mainly due to the cooling needs, is the main determining component of tertiary sector's energy consumption evolution. Hence, unlike the average situation in European Union, the electricity intensity is so important in Spain. As the next graphic shows, this indicator is remarkably higher than the EU average as well as the one of most European countries, especially those in the north.

**Figure 29: Electricity Intensity in the Services Sector in Spain and EU**



Source: EnR / IDAE

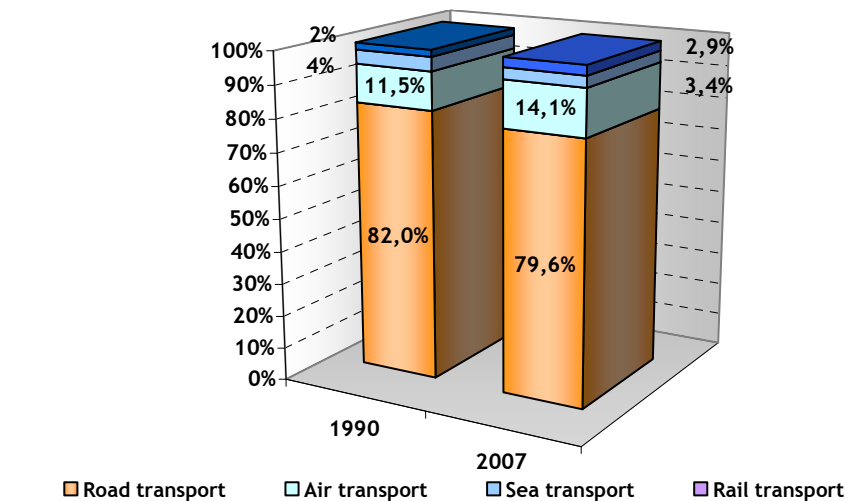
In any case, it is expected that the increasing significance of natural gas in the energy consumption of this sector may contribute from now on to lessen the evolution of this indicator.

### 3.5 Transport

The transport sector remains the most consuming sector with 40% of the whole final energy consumption, above industry and the rest of the consuming sectors. The global consumption of this sector during 2007 continued showing the same trend towards the stabilization made evident since the year 2005, with an increase of 2.84%. In practice, this total consumption has its origin in oil-derivative products. In an additional way, it must be remarked the registered growth in the bio-fuel consumption, which increased by 123% in 2007.

According to the last available data on consumption per transport modes, the road is the most energy intensive consumption mode, yet showing a slight loss on its contribution to the sector energy consumption, balanced with other transport modes such as the air and rail ones.

**Figure 30: Breakdown of the Final Energy Consumption by Transport Modes in Spain**

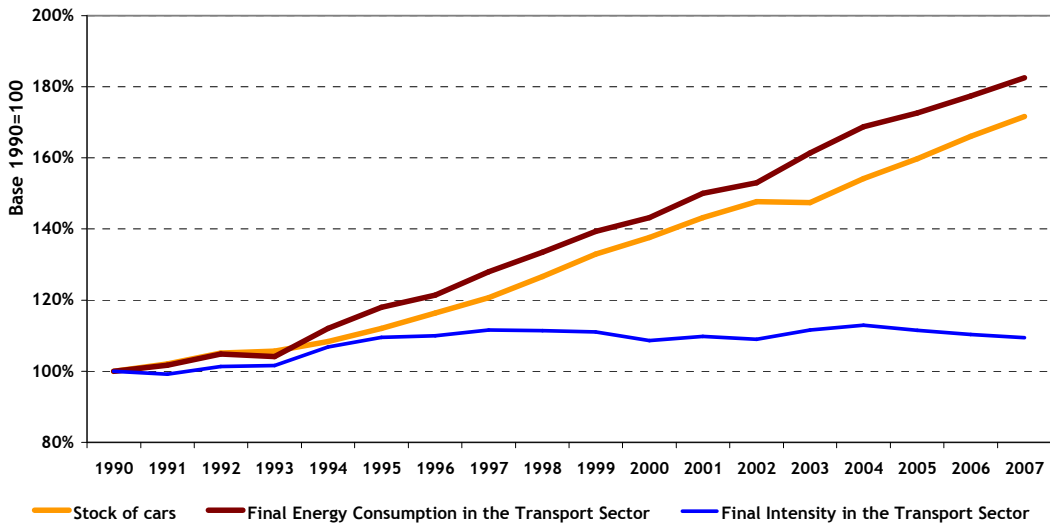


Source: MITYC/IDAE

It is expected that the involvement of more efficient transport modes such as the railway may increase in compliance with the objectives established within the framework of the *Strategic Plan for Infrastructures and Transport, 2005-2020 (PEIT)* and with the Action Plan 2008-2012. Specifically, the PEIT envisages an increase in investments on rail-associated infrastructures, which seeks to boost the contribution of this means of transport in both the passenger transport at interurban level and the goods transportation, thus gaining weight against road transport.

In general terms, the reason for the ongoing increase in the total energy consumption of the transport sector responds to a mobility increase as well as to the motorisation levels.

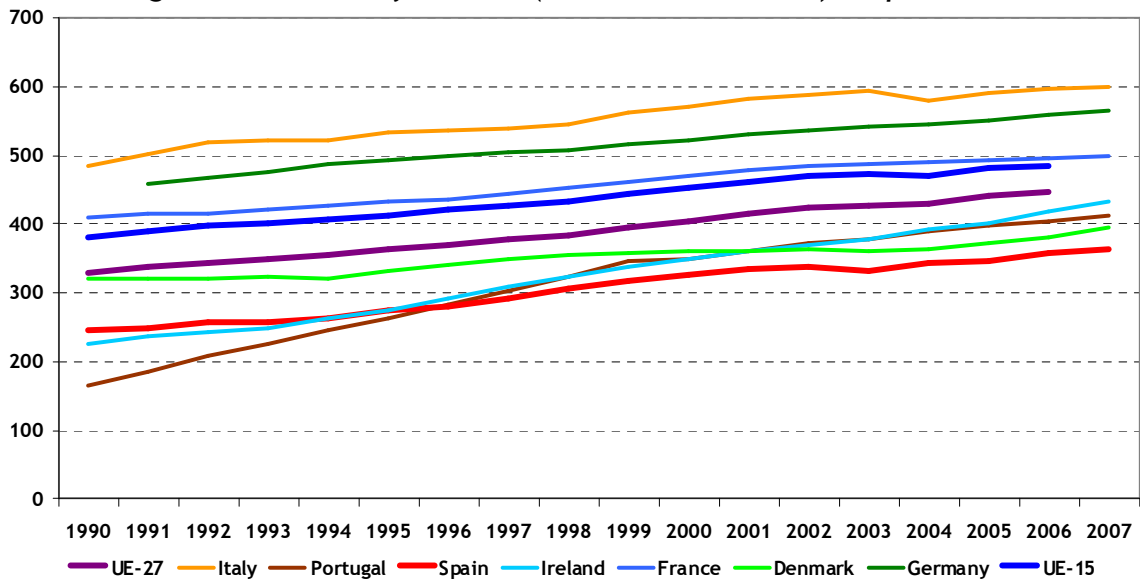
**Figure 31: Main Indicators in the Transport Sector in Spain**



Source: INE/MITYC/IDAE

Thus, the current vehicle stock on the road in Spain is over 15 million, which equals an approximate ratio of 350 vehicles per a thousand inhabitants, close to the Danish and Portuguese situations. This ratio is even below the average of the entire EU (500), as well as below the one of significant countries such as France, Italy and Germany - the two latter exceeding the 550 threshold.

**Figure 32: Number of Vehicles (Nº/1.000 Inhabitants) in Spain and EU**

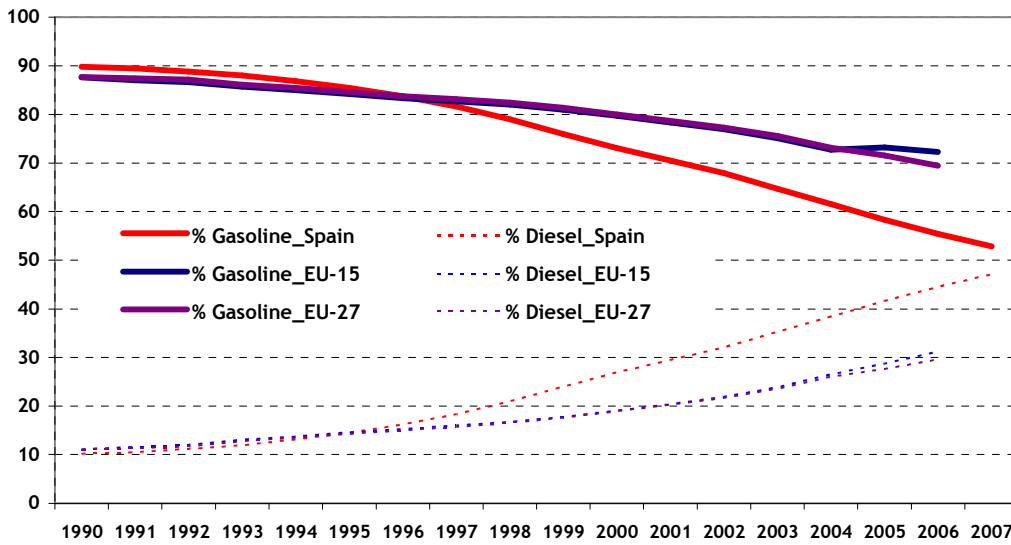


Source: EnR/IDAE

Note: Data based on the stock of circulating vehicles

An additional remark regarding the national private car stock is the growing diesel dependency, at a higher rate than the whole of the EU, with a current penetration of 47% for vehicles of this kind.

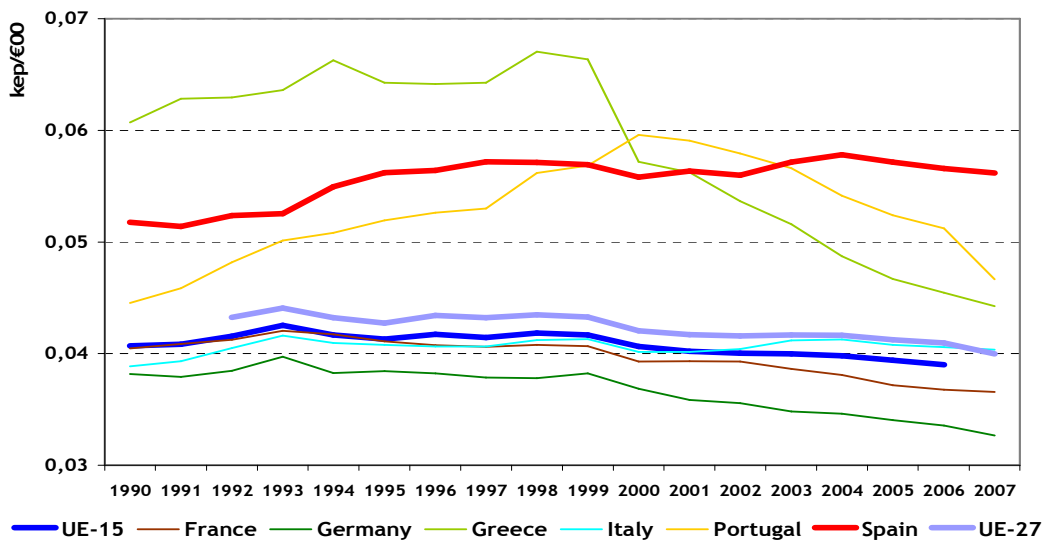
**Figure 33: Stock (%) of Private Cars in Spain and EU**



Source: EnR/IDAE

As to the above data, and in accordance with the especially significant entrance of diesel vehicles into the Spanish vehicle stock since the late 90s, it must be noted a trend towards stabilisation on the **transport intensity indicator** of around 0.0512 ktoe/€<sub>2000</sub>, which is specially evident since the second half of the nineties. This figure is about 40% over the EU average value. In spite of this, Spain shows a similar trend to the rest of the European countries. There are different causes that provide an explanation for the higher value of the transport intensity in Spain, although maybe the most remarkable ones are the Spanish geographic location, which makes it an access way for goods from northern Africa to the centre of Europe, and the older age of the Spanish private car stock.

**Figure 34: Energy Intensity in the Transport Sector in Spain and EU**



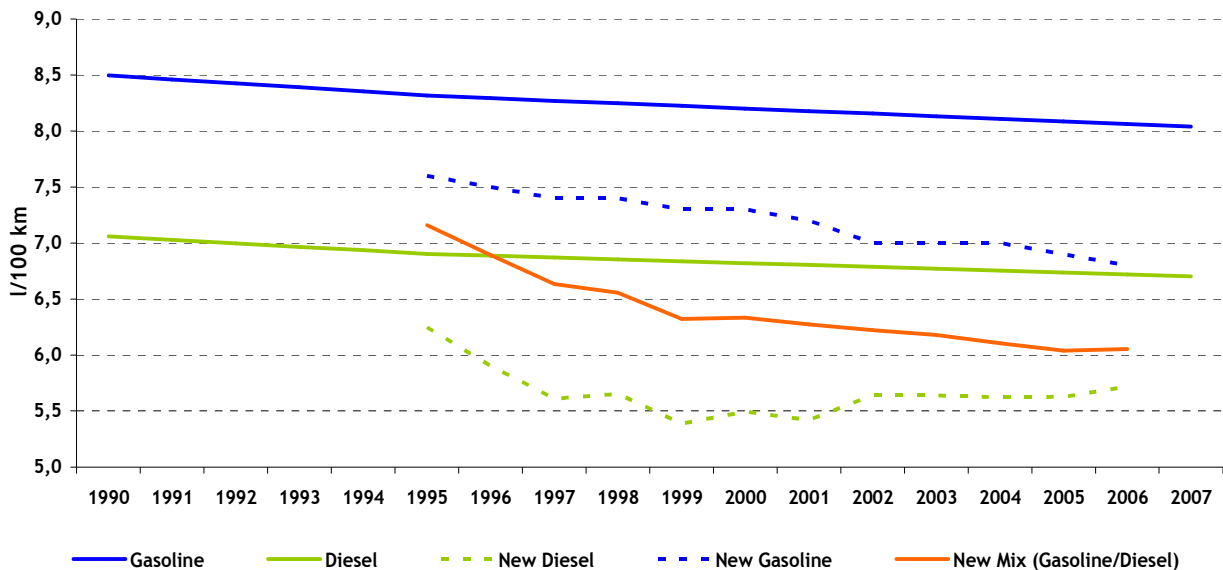
Source: EnR/IDAE

The main cause of divergence between the Spanish and the European indicators is the high energy consumption this sector shows at national level, due to factors such as mobility increase and motorisation levels. As to the latter, one particularity of the national vehicle stock is its increasing diesel-dependency, especially since the mid-nineties, and at a higher pace than the

whole of the EU. This factor may have contributed, if not to energy efficiency in the sector, at least to alleviate some worsening that otherwise would have been taken place, considering the very specific characteristics of the transport sector at Spanish level. As it has been mentioned before, some of these characteristics are the Spanish geographic location, which makes it an access area for goods and passengers by road, the age of the Spanish vehicle stock and the use of private vehicles. In particular, with respect to the geographic location, it must be remarked that, according to recent estimations, the share of the foreign consumption, associated with transit vehicles, in relation with the national consumption could be of the order of 13-14% in private vehicles and of the order of 17% in trucks. This circumstance, undoubtedly, has impact on the high value of the energy indicator in the transport sector in Spain.

Likewise, there are several factors expected to contribute in the short-mid term to an improvement of Spain's indicator. Some of the most relevant are the motor technological enhancements as well as the new private car designs. Currently and when compared to the average of most vehicles on the road, there are more efficient vehicles on the market from a technological and energy point of view.

**Figure 35: Specific Consumption of Cars in Spain**



Source: IDAE/ ACEA, JAMA, KAMA

With a view to taking advantage of these modern vehicles, the Action Plan 2008-2012 keeps boosting the vehicle stock renewal through such varied measures as the application of support systems to purchase more efficient cars, and the revision of the *Prever Plan* and of the fiscal system to levy the purchasing and use of cars in relation to vehicle fuel consumption and associated CO<sub>2</sub> emissions.

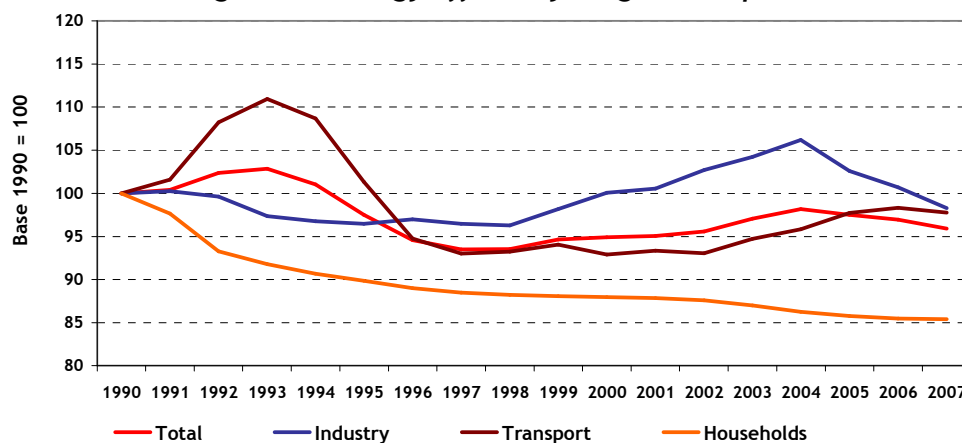
Other measures of interest, also within the framework of the mentioned Action Plan, are the ones related to the efficient use of means of transport such as the transport infrastructure and the road fleet management, as well as efficient driving programs. On the other hand, the measures aimed at modal change such as the implementation of Urban Mobility Plans and Transport Plans for Companies and Activity Centres, will contribute to a more efficient use of the private car, and therefore, reinforce the improvement of the intensity indicator.

### 3.6 Assessment of energy efficiency/savings through ODEX: Total and by sector

Considering a large observation period since the early 90s, it can be observed a positive net effect derived from the joint application of energy efficiency policies and measures, technological developments, as well as structural changes in Spain's productive structure. However, along such a long period, the contributions of the various sectors have affected the total net efficiency improvement in different ways. On the other hand, the efficiency progress assessed with ODEX indicator, based on *bottom-up* methods, shows an evolution according to the intensity stated in paragraph 3.1 *Overall trends in Energy intensity*, where it is appreciated an intensity worsening since the early 90s, and a further improvement, evident in the last 4 years, coinciding with the implementation of the Strategy for Energy Saving and Efficiency (E4).

Likewise, this is reflected on the ODEX indicator, and it is in the last 4 years that a more homogenous improvement has been observed regarding all the sectors integrating Spain's economy.

**Figure 36: Energy Efficiency Progress in Spain**

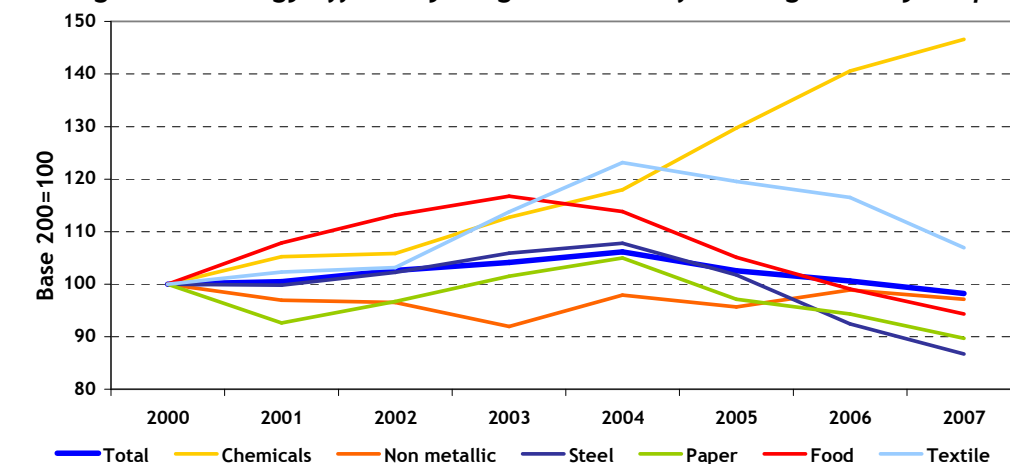


Source: EnR/IDAE

In conclusion, during the period 1990-2007, a net energy efficiency improvement was confirmed, which implied a reduction in the total energy consumption over 4%.

Focusing the analysis on the last years, it can be observed that the industry sector is the one showing a higher contribution to the global improvement in energy efficiency.

**Figure 37: Energy Efficiency Progress in Manufacturing Industry in Spain**



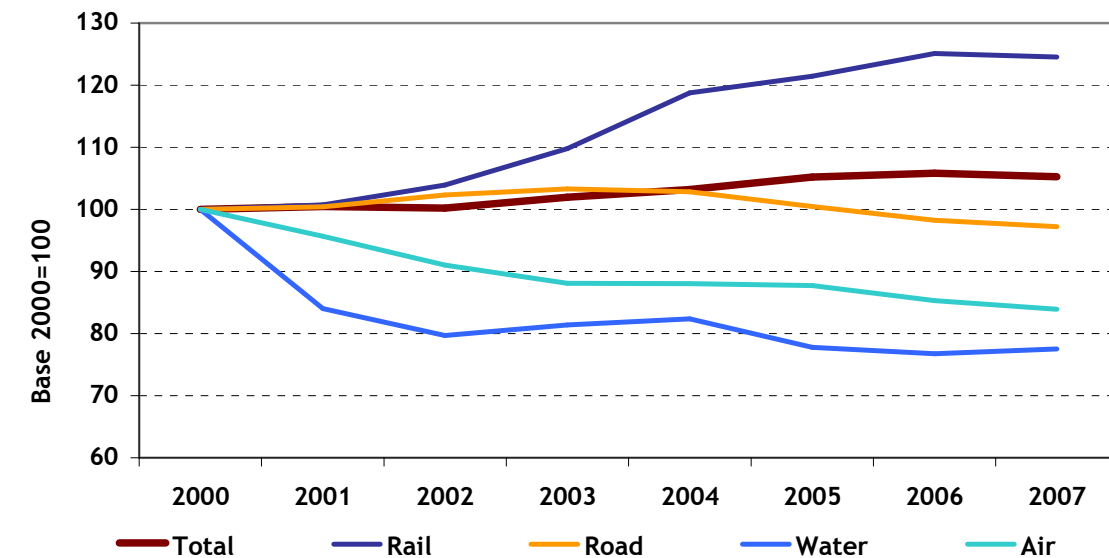
Source: EnR/IDAE

To this may have contributed some process improvements and structural changes in the various industry branches that jointly lead to a global improvement of the industry sector, and with it, to the efficiency improvement at global level. With the purpose of driving improvements such as the above mentioned, specific measures are envisaged within the framework of E4 Action Plans. The most remarkable are the Voluntary Agreements between the State General Administration and Industry Sectoral Associations, the endorsement of energy audits in the industry sector, the Public Aid Program for energy saving investments, and the inclusion of energy impact studies within feasibility studies of the projects to be developed in industry.

As to the transport and household sectors, these have shown stabilization in their efficiency progress, and therefore, a lower contribution to efficiency global improvement. Particularly, a longer term impact is expected in the household sector as a result of legislative changes affecting construction, of both existing and new buildings. As regards the new buildings currently under way, the derived efficiency improvements are expected to last longer in terms of service life.

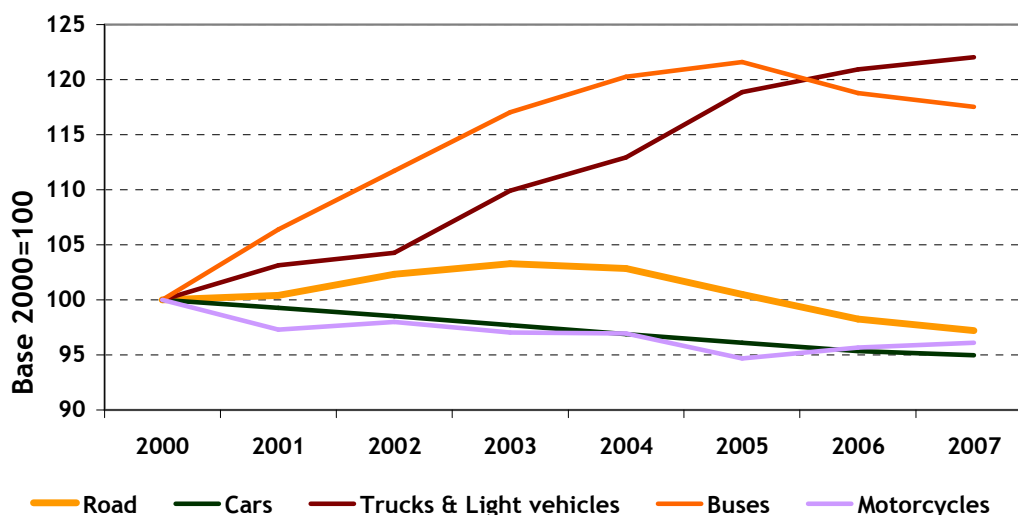
In global terms within the transport sector, the situation is characterised by certain stability. The 2000-2007 period shows an improvement associated with road, sea and air transport modes, while some worsening on railways, with still scarce presence in passenger transport (5%) and goods transport (3%). The combined effect of the observed trends in the different transport modes results in practically null net gain in global transport efficiency.

**Figure 38: Energy Efficiency Progress in Transport in Spain**



Source: EnR/IDAE

Focusing this analysis on road transport, where most part of the energy consumption for the sector is concentrated, an efficiency improvement of 3% is to be noticed. This seems to respond to relative improvements on private cars, accountable for approximately 50% of road transport consumption. At the same time, these improvements respond to a series of causes, and among which the progressive penetration in Spain's vehicle stock of more efficient cars from a technological and energy point of view, resulting in a renewal of the total vehicle stock and in an improvement of the energy efficiency associated with it. However, in practice this improvement is practically compensated by the worsening linked to Lorries and light duty vehicles, practically accountable for the total goods transport.

**Figure 39: Energy Efficiency Progress in Road Transport in Spain**

Source: EnR/IDAE

In any case, it is expected a solution to this issue in the transport sector in the mid-long term in view of the specific perspectives and measures envisaged mainly within the PEIT 2005-2020, and the Action Plan 2008-2012. As a consequence of the mentioned Plans it is expected an improvement in transport infrastructures for roads, rail and sea modes, fostering a better management in the use of transport modes, as well as a boost to goods transport with more efficient modes from an energy and environmental point of view, such as the railway and the sea ones. This will enable to change the current negative trend for Lorries and light duty vehicles in goods transport, and definitely a higher energy efficiency progress in this sector, which acquires a strategic relevance given the weight of this sector in the energy consumption, linked to fossil fuels, and in the energy dependency.

Therefore, it is essential to reinforce actions in the transport sector, and specifically goods transport.

### 3.7 CO<sub>2</sub>-emissions trends: Total and by sector

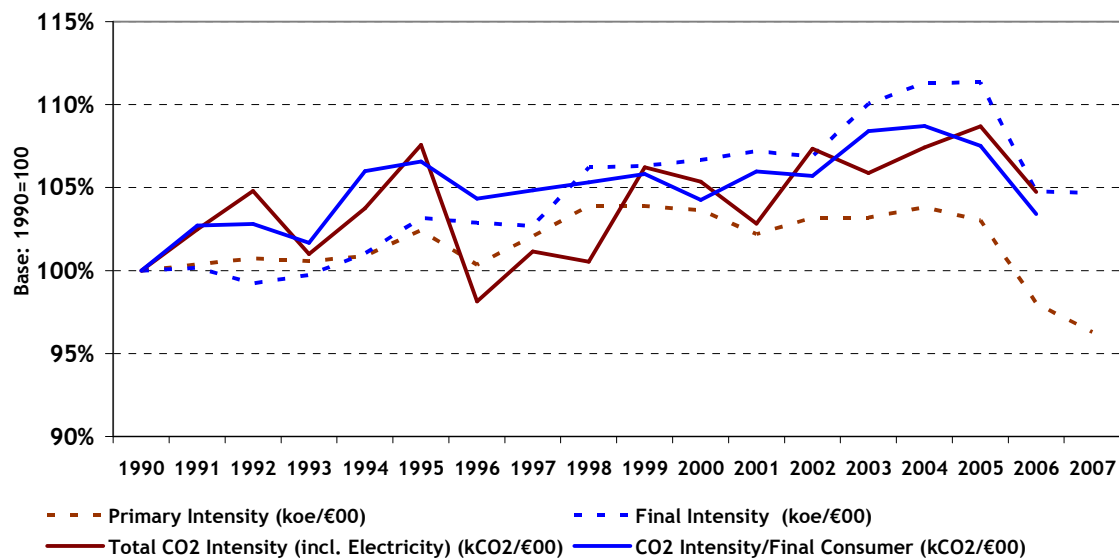
Taking as a reference the baseline year (1990), established by the Kyoto Protocol and the European Directive on Emissions Trading (EU ETS), it should be stated that CO<sub>2</sub> emissions per *Gross Domestic Product* unit in Spain have evolved over their respective energy intensities. This accounts for the still high presence of high carbon-content energy vectors within the national energy structure.

Nevertheless, the evolution of CO<sub>2</sub> intensities shows an inflection point from 2005 on, recording since then a reduction of emissions associated to economic activity. It is remarkable the positive effect that the growing contribution of cleaner and more efficient electricity generation technologies such as renewable energies and combined cycles based on natural gas may have on this, driven by the new Renewable Energies Plan 2005-2010, and Planning of the Electricity and Gas Sectors 2002-2011, and its Revision 2005-2011. The Planning of the Electricity and Gas Sectors Electricity 2008-2016 is expected to keep contributing to it.

All the above points to the need to reinforce the required policies for both energy supply and use, in line with actions already under way such as the already mentioned Renewable Energies Plan 2005-2010 and 2008-2012 Action Plan, in order to keep the CO<sub>2</sub> intensity indicator in the right trend, by means of, on the one hand, improving the efficiency in the final energy use and,

on the other hand, increasing in the contribution of cleaner energy sources, with which to meet the energy needs associated with the required economic development.

**Figure 40: CO<sub>2</sub> Intensities versus Energy Intensities in Spain**

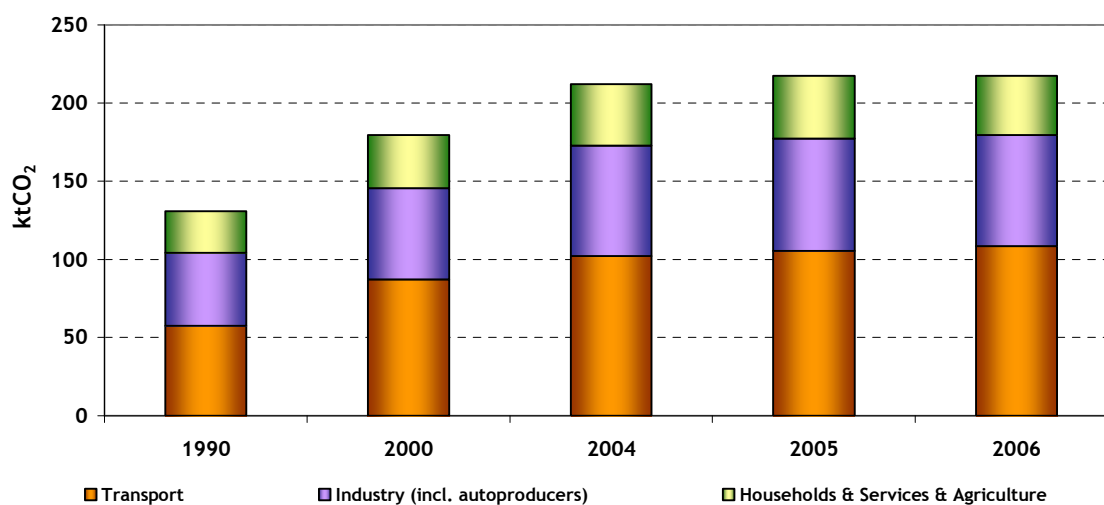


Source: EnR/IDAE

During the analysed period and considering the direct emissions, that is, excluding those due to electricity generation, the transport sector is the most accountable for the observed emissions increase, followed in importance by the industry sector. These sectors were respectively accountable for 50% and 30% of the total direct emissions in 2006.

Likewise it is observed that, in general, in all final use sectors, the weight of direct emissions on the whole is of the same range as energy weights on the total final consumption. In the case of the **industry**, this means that the possible savings of emissions induced by savings and efficiency measures and policies and/or fuel replacement are annulled by other effects linked to the activity, practices, behaviour, etc.

**Figure 41: Direct CO<sub>2</sub> Emissions by Sectors in Spain**

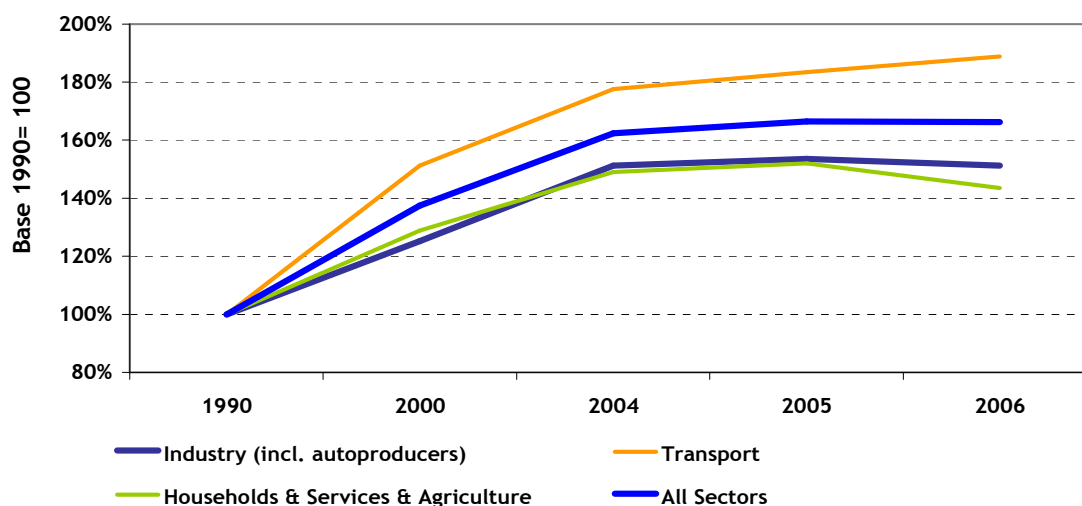


Source: Enr/IDAE

However, more recently in the year 2006, a reduction of the total emissions was recorded, being the industry sector the highest contributor to this reduction. This could be result of the effect of the *Directive 2004/101/CE on Emissions Trade*, in force since 2005, implemented in Spain

through the National Emission Allocation Plan, PNA 2005-2007. Large companies belonging to the six sectors covered by the said Directive, to which the PNA 2005-2007 has allocated trading rights for the 2005-2007 period, have been forced to make an effort to control CO<sub>2</sub> emission levels. This effort shall be bigger in the following years as a result of the need to adjust growth rate of GG emissions to the commitments acquired by the Spanish state within the Kyoto Protocol framework.

**Figure 42: Trends of Direct CO<sub>2</sub> Emissions by Sectors in Spain**



Source: Enr/IDAE

As to small companies belonging to industrial sectors not included in mentioned Directive, efficiency and emissions improvement seem more difficult. Currently there are a number of initiatives, some of which are being promoted by the European Commission. This is the case of the Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services, where actions related to the industry sectors not covered by the first mentioned Directive are envisaged.

As to the **transport** sector, even though a progressive penetration of diesel vehicles and other more technological efficient ones is taking place, with lower emissions associated, there are other factors linked to mobility, distances covered, traffic, behaviour, lower fuel prices, etc. that lead to a net increase of emissions accounted for in the 1990-2006 period. Precisely, traffic linked to goods transport acquires significance in Spain given its geographic location as a route of pass, which increases the necessary distance and related emissions.

Finally, in a similar way to the industry, the previous graphic shows in 2006 a net improvement in the emissions derived from the sector identified as *Diverse Uses*, which integrates the household, tertiary and agriculture sectors. In general, this improvement may be the result of an increase in electricity and fuels use with less carbon content such as natural gas, solar energy and biomass. To that, the positive effect of new more efficient and ecological buildings could be added at a longer term.

## 4 Energy efficiency measures

### 4.1 Recent Energy Efficiency Measures

The Action Plan 2008-2012, approved in July 2007, makes up the second plan of the *Spanish Strategy for Energy Saving and Efficiency (E4)*, and extends over the last five years of the period covered by the said strategy, coinciding with the time horizon envisaged by the Kyoto Protocol. Thanks to this new plan the effort undergone by the former Action Plan 2005-2007, and as it happened with the former, the measures and actions envisaged encompass the *Building, Residential and Office Automation Equipment, Transport, Industry, Public Services, Agriculture and Fishing, and Energy Transformation*. Nevertheless, on this new occasion, it is paid special attention to the so-called diffuse sectors (Transport, Residential, Services and Agriculture). All in all, the new Action Plan envisages as many as 59 measures of a different kind: investment incentives; promotion; dissemination; and legislative actions.

In a nutshell, the Action Plan 2008-2012 foresees primary energy savings for the entire period of 87.93 Mtoe, and consequently avoided emissions equivalent to 238.13 MtCO<sub>2</sub>. The public aids envisaged will reach M€ 2,367, which will mobilize investment worth M€ 22,190.

The Action Plan 2008-2012 is supplemented by the Saving and Energy Efficiency Activation Plan, 2008-2011, recently approved in Cabinet Meeting on 1<sup>st</sup> August 2008. The Activation Plan, comprised in the Action Plan 2008-2012, includes 31 measures intended to intensify energy saving and efficiency and thus, reinforce the achievement of the objectives stated in the Action Plan 2008-2012. Some of the stated measures by the Activation Plan involve an additional new approach as regards the measures included in the Action Plan 2008-2012 whereas others suppose intensification and speeding up of the ones already stated in the Action Plan.

Succinctly, the Action Plan 2008-2012 and the Activation Plan make up the main framework where the most recent and relevant measures on energy efficiency are developed.

#### Residential and Tertiary Sector:

##### 1. Buildings:

The action measures envisaged within the framework of the E4 Action Plan 2008-2012 for this sector seek to improve energy efficiency in buildings and in fixed installations, as well as to provide a more efficient use in buildings in general. The measures relate both to new and existing buildings in the residential and tertiary sector, even if the larger part of the actions are intended for existing buildings.

Moreover, the Action Plan 2008-2012 involves an additional effort with respect to the former Action Plan with a view to facilitating the performance of the *National Emission Allocation Plan 2008-2012, PNA II*, as regards the building sector.

More specifically, the measures taken into account are meant to *rehabilitate the thermal casing of the existing buildings, the improvement of efficiency of the existing thermal and indoor lighting installations*. As regards *lighting installations*, this Plan includes a more ambitious objective than the former Plan, which is meant to replace as many as 34 million bulbs in the residential sector, as well as working on 30% of the lit surface in the tertiary sector. Other additional measures are the *promotion of new buildings and the rehabilitation of the existing ones* in accordance with high energy-classification criteria.

All these measures will be backed with economic support which, as a whole and all along the Plan's application period will amount to M€ 803.6.

Additionally, other actions of a regulatory kind are also included in relation to the transposition of the Directive 2002/91/EC on the Energy Performance of Buildings. In this case it is meant to *revise and increase the regulatory demands* in the building sector. In this line it is included the revision of the Technical Building Code (TBC), approved by means of Royal Decree 314/2006 dated 17<sup>th</sup> March, and the procedure of the *Energy Certification of the Existing Buildings*, under way at present. The approval of this last procedure, along with a similar procedure related to new buildings, approved through Royal Decree 47/2007, dated 19<sup>th</sup> January, the new *Regulation on Thermal Installation in Buildings (RITE)*, approved through Royal Decree 1027/2007, dated 20<sup>th</sup> July, and also the TBC, will lead to the ultimate transposition of the Directive 2002/91/EC into the Spanish legislation. As regards these regulatory measures, it must be highlighted the new RITE, which establishes the minimum energy efficiency requirements that are to be met by thermal installations in the new and the existing buildings during their design, execution, maintenance and use. For this purpose a periodical inspection procedure of boilers and air-conditioning systems is defined. All of it will lead to the improvement of efficiency as well as to a better use thanks to an optimum maintenance.

All these measures are reinforced by the ones included within the Activation Plan as regards the building sector.

Taking into account the necessary time to substantiate these projects associated with the new and rehabilitated buildings, it is expected that these measures are to show ascribable effects to energy saving from 2012 on.

### **1.1. Residential Sector**

Additionally to the measures dealt with above, aimed at buildings in this sector, the Action Plan 2008-2012 includes actions in relation to residential equipment and office automation, even if the latter does not just relate to the residential sector. As regards the residential sector, it is envisaged that equipment energy efficiency is to be improved by means of the *Renove Plan for electrical household appliances*, which is intended for the following electrical appliances: fridges, freezers, washing machines and dishwashers. This measure seeks the annual replacement of 2.5 million electrical appliances with more efficient ones, classes A and B, which is equivalent to a final energy saving of 1,500 ktoe in the period 2008-2012. The implementation of this measure takes place along with the necessary training, information, and awareness campaigns addressed to both buyers and sellers. So as to encourage the replacement of electrical appliances, the measure relies on public aid amounting to M€ 523.5, expected to mobilise investments worth M€ 1,992.

### **1.2. Tertiary Sector**

In this case, apart from the very measures aimed at buildings in the tertiary sector, the Action Plan 2008-2012 also state others such as the *Plan for Equipment and Efficient Energy Use in the Public Administration*. This Plan follows the guidelines of the Directive 2006/32/EC as regards the exemplary role of the Public Administration regarding the adoption of measures to improve efficiency. Likewise, as it happens in this Directive, the Plan establishes the same saving final energy objective at 9% for the year 2012. These savings may be derived from the improvement of energy management in the buildings and premises of the Public Administration, as well as the incorporation of efficiency criteria in public procurement. So as to develop this measure, training, information and awareness-raising campaigns are envisaged, both addressed to users and managers of public buildings.

Besides the aforementioned measures, to be applied to the tertiary sector, the Action Plan 2008-2012 includes other actions intended for the *public services*: public lighting and water treatment (water purification, supply and sewage treatment). To this purpose, the Plan also considers measures related to technological improvement of both outdoor public lighting installations and water treatment installations, by replacing the existing equipment with more efficient one. This will be possible with public aids of M€ 56.7 and M€ 31.6 respectively. Other measures envisaged within the scope of Public Services are the *implementation of feasibility studies and audits* to improve efficiency in town and city hall installations, state of private utilities, and the implementation of *energy training courses* addressed to council technicians.

## 2. Transport Sector

The Action Plan 2008-2012 focuses its goals on energy saving in the transport sector, which represents 40% of the whole saving objective in terms of primary energy in the period 2008-2012. As regards the previous Action Plan, the new Plan considers additional saving and efficiency measures in the sector with a view to facilitating the performance of the objectives set forth by the Spanish Strategy for Climate Change and Clean Energy 2007-2012-2020 and the PNA II as regards the emissions reduction.

Following the former Action Plan 2005-2007 scheme, a package of 15 measures is included, aimed at the transport sector, grouped under: (I) *modal change* measures, towards more efficient modes, (II) measures for a *more efficient use in transport modes* and (III) and measures for *energy efficiency improvement in vehicles*. This time, a higher level of requirements has been introduced, joining the efforts to reduce the participation of the less efficient transport modes and with greater impact on the environment, such as it happens with the road transport.

In order to ease *modal change*, the Action Plan 2008-2012 considers carrying out *Urban Mobility Plans (PMU)* and *Transport Plans for Enterprises and Activity Centres*, a greater participation of *collective road transport modes* thanks to new modal interchange stations and specific corridors for collective transport, as well as a greater role of the railway in interurban transport, and of the sea mode in goods transport.

Likewise, to encourage a *more efficient use of the transport modes*, measures for the management of *transport infrastructure* and *road transport fleet*, *efficient driving* programmes aimed at private cars, Lorries, buses and air lines are considered. The implementation of these measures involves executing agreements with key agents in the sector.

Last, with a view to *improving the efficiency of the private car fleet*, a series of actions are promoted in support to: public passenger transport fleet and road goods transport fleet; aircraft fleet; sea fleet; and private cars. In like manner, in this line it is envisaged the promotion and use of biofuels in transport; this is the reason why the Renewable Energies Plan, PER 2005-2010 will involve a remarkable boost.

Anyway, of all the listed measures, the most remarkable ones are the PMU, the transport plans for enterprises and the efficient driving programmes oriented to cars, lorries and buses, and the management of transport infrastructures (which includes speed control on roads) because of their relevance in the performance of the Action Plan 2008-2012.

The cost associated with the measures will be meant to modify consumption habits, communication & training campaigns, as well as legislative actions entailing measures intended that more efficient vehicles should gradually penetrate the market.

These actions have a total public support amounting to M€ 408. The actions are expected to mobilise investments worth M€ 1,893.

Within the aforementioned legislative actions, the development of a sustainable mobility regulation as well as the *modification of the car taxation* depending on their efficiency and emissions is also envisaged. The whole is stated in *Law 34/2007*, dated 15<sup>th</sup> November, on *Air Quality*, which introduces a tax on vehicles with CO<sub>2</sub> emissions over 120 g/km, and it is also envisaged to approve a *Law on Sustainable Mobility*. It is expected that this will be boosted by the Spanish Strategy for Sustainable Mobility approved in Cabinet Meeting on 30<sup>th</sup> April 2009.

All These measures are supplemented with the ones included in the Activation Plan, which gives great importance to mobility, including the actions meant to strengthen sustainable mobility, among which it is worth mentioning the following: *MOVELE Plan*, a pilot project to promote electrical vehicles which means to introduce by late 2011 as many as 2000 units in the Spanish car stock; aids to renewal of the stock of vehicles; the regulatory development according to *Order ITC/2877/2008*, dated 9<sup>th</sup> October, establishing the mechanism to enhance biofuels, in order to grant the biofuels objective set at 5.83% by 2010; the introduction of *comparative energy labelling* for private cars; and the *VIVE Plan 2008-2010*, in support to the replacement of vehicles with more efficient and eco-friendly ones. This last Plan has been recently modified in accordance with the Resolution of the Under-Secretary of 18<sup>th</sup> November 2008, and has shown favourable results since then.

### 3. Industrial Sector

The measures to apply within the Action Plan 2008-2012 are the *Voluntary Agreements* between entrepreneurial associations and the Public Administration to achieve a series of saving objectives in various industry sectors, the *public support to energy audits*, which in the Plan's execution period amounts to M€ 2.85, and a large *public aids programme*, of M€ 367.43, to activate investments in efficiency improvement projects. Additionally, a *legislative measure* of large scope is also considered, which demands the implementation of an energy analysis in all the investment projects so as to choose the most energy-efficient technology.

### 4. Cross-cutting measures

The Activation Plan 2008-2012, integrated in the Action Plan 2008-2012, states a series of cross-cutting measures to be applied to all sectors. Some of these are the *public support line to Strategic Projects* in the scope of energy saving and efficiency, already under way, which stands out for its innovative approach and its great acceptance. It is also envisaged the boost to the energy service market where the *Energy Service Companies (ESCOs)* will have a particularly leading role, and the demand for energy efficiency accreditation in public procurement on the part of the State General Administration. Likewise, in the framework of the Activation Plan a package of measures is devoted to the *reduction in electricity consumption* in various sectors, such as the residential, tertiary and transport ones. Some of these various initiatives are particularly remarkable, as the ones recently applied and meant to promote low-energy consumption bulbs, and others as the ones intended to decrease the luminous flux in motorways, the recovery of electricity when trains brake, and the decrease in the electricity transport and distribution losses.

In general terms, other enforced measures with a large scope are the *Renewable Energies Plan, 2005-2010*, and the boost to cogeneration from the Action Plan 2008-2012. With the first one, it is expected to enhance the penetration of renewable energies with a view to increasing the share of these sources in order to meet the energy needs in all the end use sectors, mainly transport, residential and tertiary, with biofuels, solar energy and biomass. As regards the second one, the Action Plan 2008-2012 includes a large number of measures to promote cogeneration, such as the support to feasibility studies addressed to the industry and tertiary sectors so as to include this technology, the support to the establishment of cogeneration installations in buildings of the residential sector and business premises, the promotion of micro-

cogeneration installations in all the sectors, and the *Renove Plan of the existing cogeneration plants*.

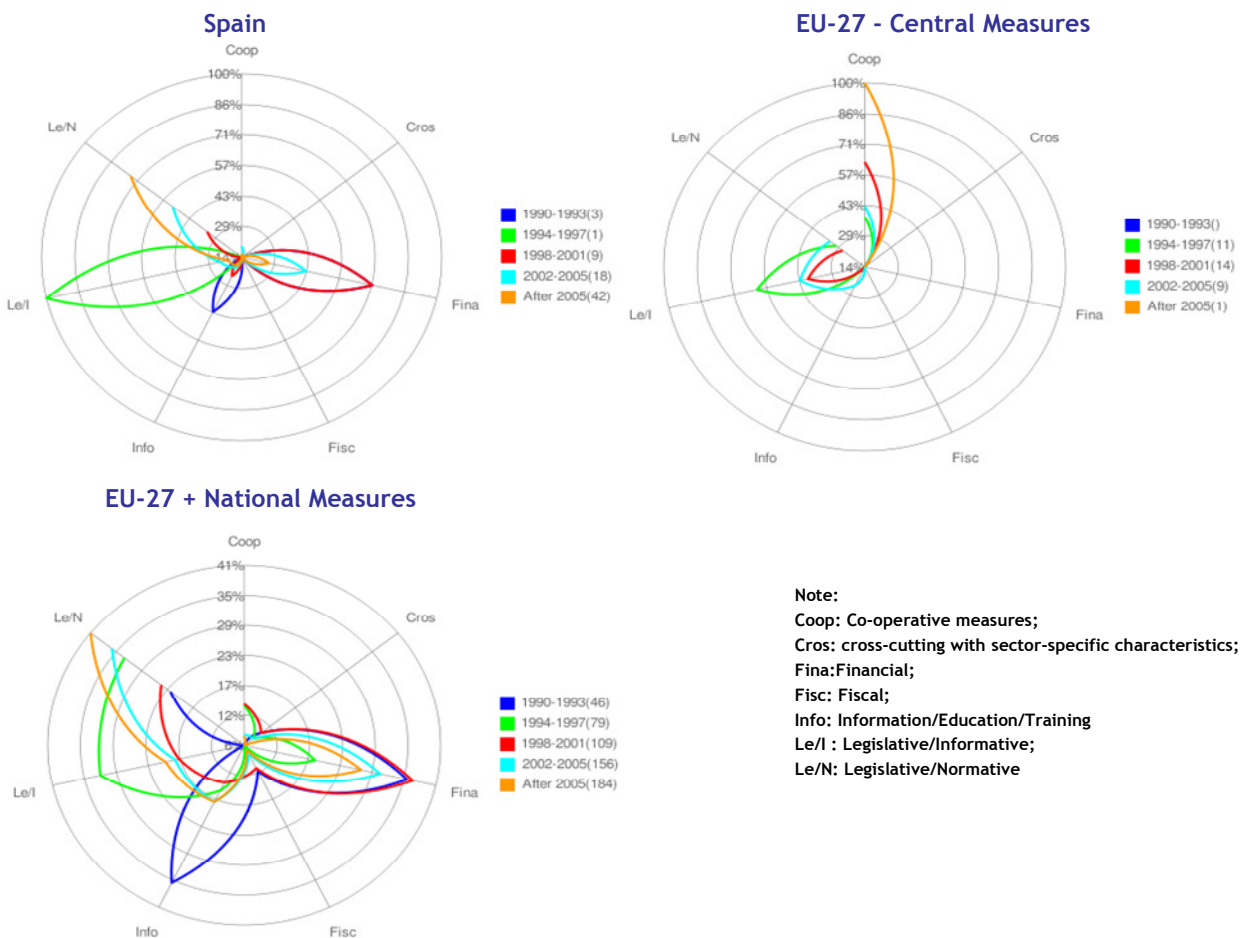
These actions go along with voluntary agreements between the public administration and sectoral associations or collectives, depending on the case, as well as with a public support worth M€ 29. Likewise, co-generation is backed by other legislative measures such as Royal Decree 616/2007, dated 11<sup>th</sup> May, on the promotion of co-generation, which transposes the *Directive 2004/8/EC*. Also, the approval of a specific regulation related to the network access and interconnection, under development so far, will entail an additional stimulus to cogeneration, particularly to small-scale cogeneration.

## 4.2 Patterns and Dynamics of Energy Efficiency Measures

### Residential Sector

In Spain, the actions oriented towards the efficiency of the residential sector are essentially based on measures of a financial, information, and legislative nature, being the legislative measures the most remarkable ones in the last years.

**Figure 43: Development of Energy efficiency measures by type over time in the Residential Sector**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

Some of the most remarkable measures recently included in this sector are the financial ones, such as the *Renove Plan* to replace electrical household appliances, envisaged by both the Action

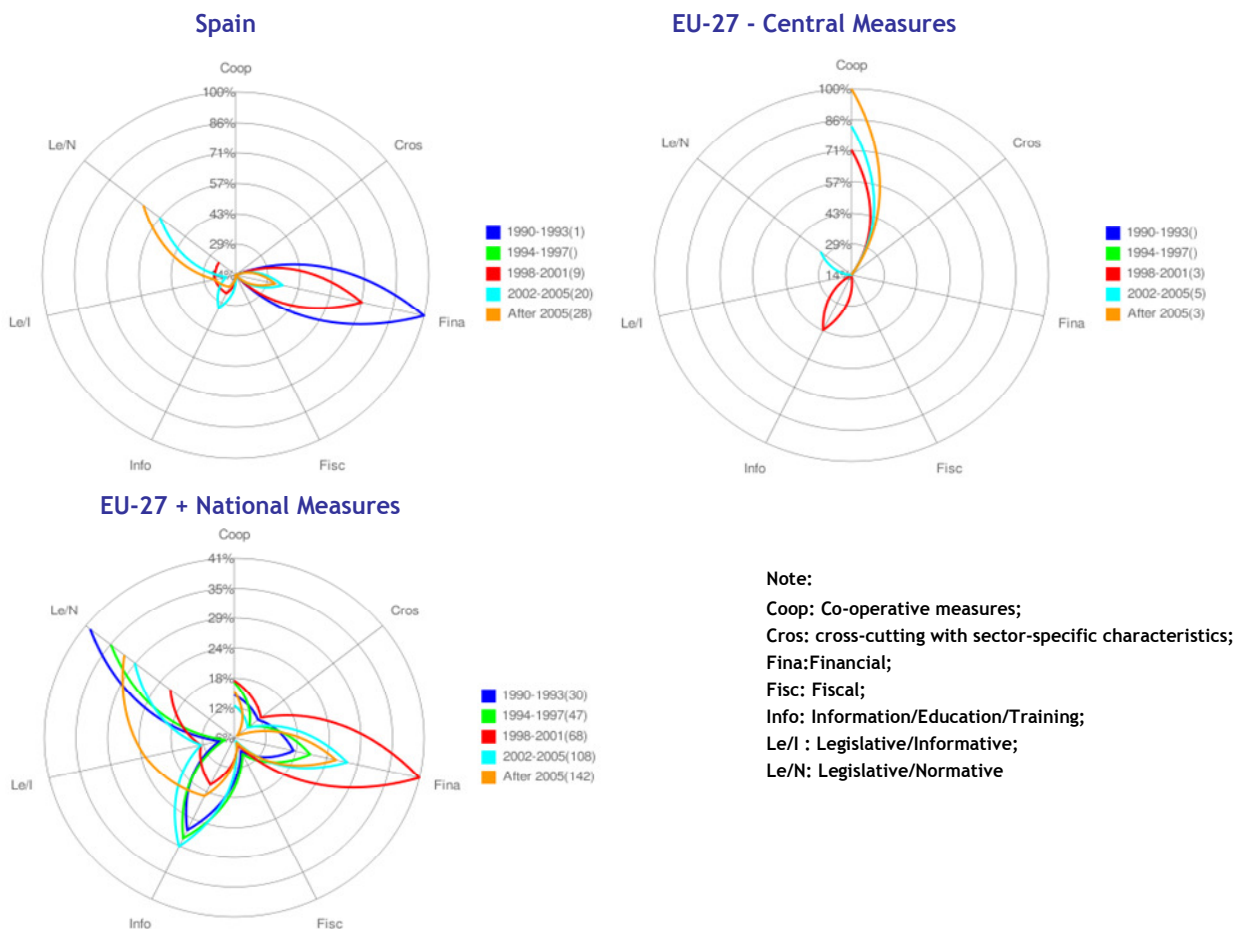
Plan 2005-2007, and the Action Plan 2008-2012, which proved a successful implementation and with a favourable impact on the household electric consumption. This measure is supplemented with other legislative and informative actions based on the energy labelling of household equipment. It is also very important for this sector the application of the national legislative measures linked to the transposition of the **Directive 2002/91/EC** on the Energy Performance of Buildings, such as the Technical Building Code (TBC), the revision of the Regulation on Thermal Installations (RITE), and the Energy Certification for new buildings, which will soon be supplemented by a specific certification for the existing buildings. At medium term, these measures will have a positive impact on the thermal and electricity demand of buildings in the residential sector.

At EU level, the profile of the central measures in the sector is different, with an increasing importance of the *cooperative measures*, and the ones of a *legislative-informative and legislative-regulatory nature*. Considering the ensemble of the EC partners, the measures are quite diversified among the various types, among which it can be highlighted the legislative-regulatory, the informative and financial ones, with presence of the cooperative measures as well as of other specific cross-cutting measures, which in Spain in general are virtually missing in this sector.

### Tertiary Sector

The main measures used at present in the services sector are of financial and informative-educational nature, along with supplementary legislative instruments.

**Figure 44: Development of Energy efficiency measures by type over time in the Tertiary Sector**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

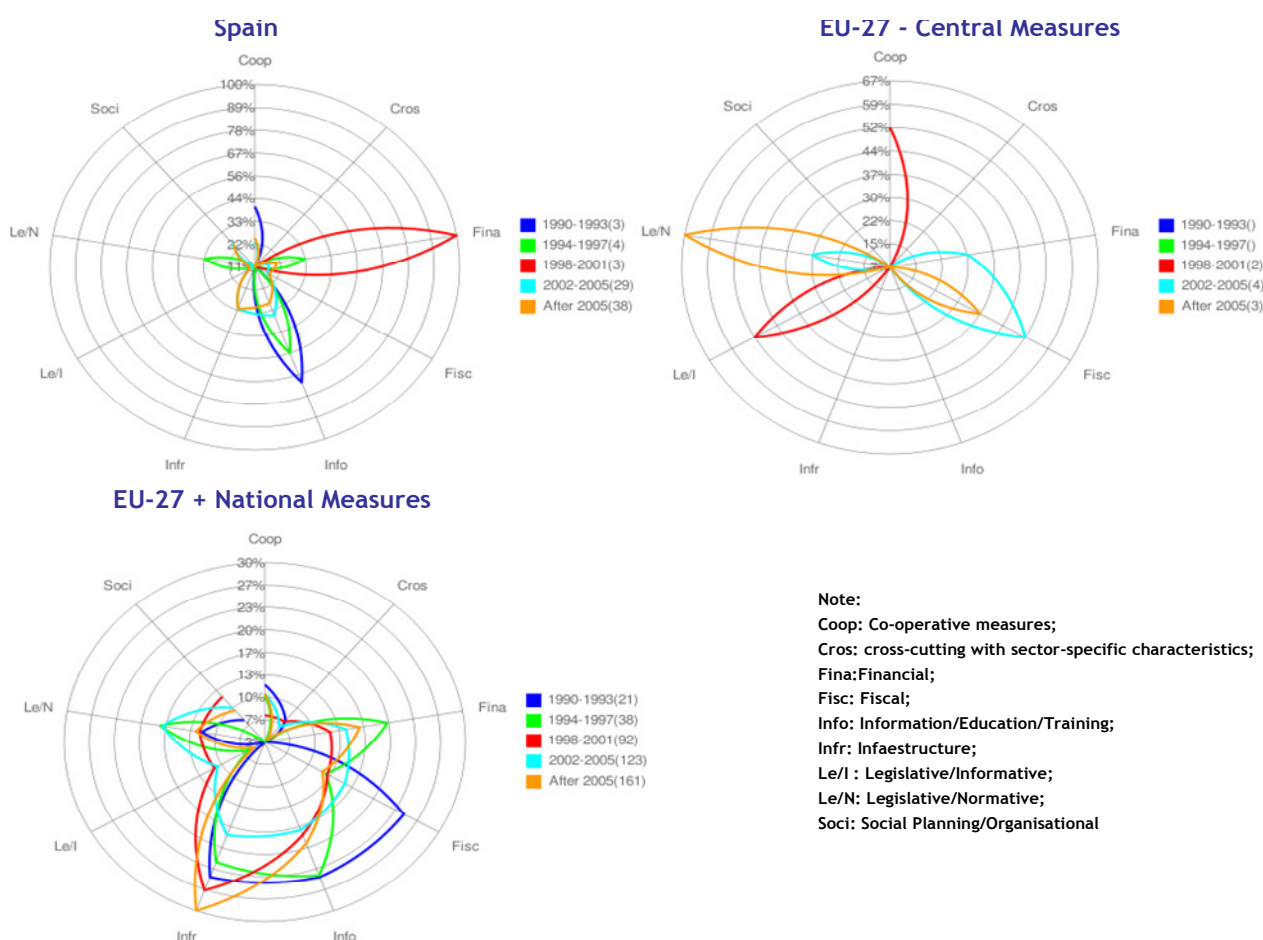
As it happens in the residential sector, the application of the national legislative measures related to the **Directive 2002/91/EC** is also relevant in the buildings of the tertiary sector.

Unlike central EU where cooperative measures stand out in bulk, and to a lesser extent, the informative and legislative-regulatory measures, Spain lacks cooperative measures for this sector, as the most predominant ones are the informative and legislative-informative ones, apart from the legislative-regulatory. On the other hand, and having Spain compared to the whole of the European countries, the latter show a more homogeneous distribution of the various measures. Likewise, there is a greater relevance of legislative-regulatory and informative measures, as well as two other measures, missing in Spain: specific measures, aimed at cross-cutting technologies in the service sector, and recourse to the agreements between the key agents of this sector and the administration or cooperative measures.

### Transport Sector

Traditionally, the most popular measures in Spain are the ones of informative and educational nature, even if the ones in support of infrastructures, of financial support and or organisational and planning nature are gaining relevance. The latter group consists of the Urban Mobility Plans, the Transport Plans for Enterprises, etc. among others.

**Figure 45: Development of Energy efficiency measures by type over time in the Transport Sector**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

Likewise, the cooperative measures, encouraged by the Action Plans 2005-2007 & 2008-2012, developed on the basis of agreements with key agents of the sector are also growing more important. Very recently, a fiscal measure based on the adaptation of taxes to vehicles by reason of their emissions has been established. It is expected that this measure may contribute

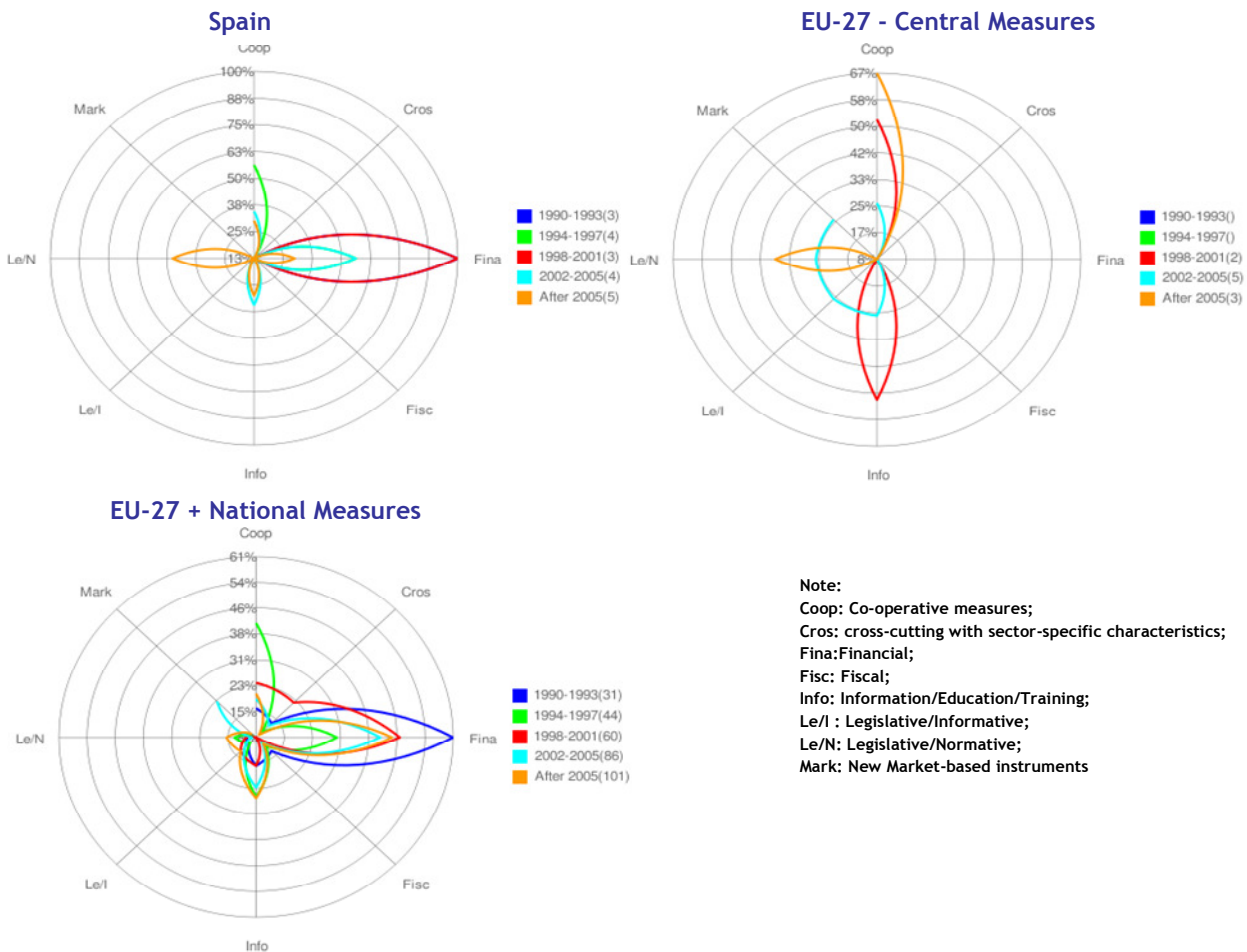
to the renewal and efficiency improvement of the Spanish car fleet with the progressive replacement of vehicles with more efficient and eco-friendly ones.

At EU level, some of the most outstanding measures are the ones of *legislative-regulatory* nature, and those of fiscal nature. However, the latter in Spain, compared to the rest, are less significant. A remarkable example of legislative-informative measure is energy efficiency labelling in the transport sector, regulated by Royal Decree 837/2002, dated 3<sup>rd</sup> August 2003, which transposes the *Directive 1999/94/EC* relating to the availability of consumer information on fuel and CO<sub>2</sub> emissions. So far, the labelling in Spain was restricted to providing information on the fuel consumption and CO<sub>2</sub> emissions for each new car model, whereas information related to the classification of the cars on the basis of comparative consumption is provided in a voluntary way. It is expected that, according to the measures envisaged in the Activation Plan 2008-2011, the contribution of labelling in Spain may improve with the foreseeable introduction of a mandatory *comparative energy labelling* for cars. This measure could be enhanced with the establishment of a European labelling. Last, if the measures in Spain are compared to the ones applied by other EU Members as a whole, a trend towards the support to infrastructure, legislative-regulatory measures, financial and fiscal ones, the latter ones with a larger contribution than in Spain.

### Industry Sector

The efficiency measures in the Spanish industrial sector have traditionally focussed on financial support measures.

**Figure 46: Development of Energy efficiency measures by type over time in the Industry Sector**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

Nevertheless, and in a progressive way, other measures have started playing an important role, such as the ones of cooperative nature, such as the Voluntary Agreements, and the ones of informative kind (energy audits). A new legislative measure has been added, which requires the energy analysis of every investment project with a view to choosing the most efficient technology.

And in comparison to the EU, the central measures are addressed largely to the measures of legislative -regulatory and cooperative kinds, which also include market instruments. As regards the EU members, a similar pattern to the Spanish one can be noticed concerning the typology of measures, with predominance of *financial* support measures. Nevertheless, unlike Spain, more importance is attached to the market instruments and to the improvement of cross-cutting technologies, which are absent in Spain.

### 4.3 Innovative Energy Efficiency Measures

On a general basis, the **Spanish Strategy for Energy Saving and Efficiency, E4**, and its respective Action Plans for the periods 2005-2007 and 2008-2012, make up the most innovative global development framework of the most recent measures on energy efficiency in Spain.

As regards the above, innovative measures within the transport sector are the ones to encourage modal change, and among these, the *Transport Plans for Enterprises* and the *Urban Mobility Plans (PMUs)*, which are being successfully developed in a large number of Autonomous Communities. Prior to the E4 Strategy, there have been some initiatives related to this measure but it is within the E4 framework that this measure is defined at its best. Precisely, to apply it properly, it is necessary to apply a series of actions entirely, which include policies offering efficient collective transport, the regulation of the use of private transport, criteria for urban development, and parking and infrastructures with a view to limiting traffic in sensitive areas. These Plans need a local council management team to guarantee that citizens and entrepreneurial associations alike take part in it, to provide support to technical actions and to prepare the necessary regulations. On the other hand, also innovative are the *efficient driving* programmes aimed at various transport modes and addressed to a large public, from students to teachers. As regards this measure, and prior to the E4, there has been an old initiative linked to a European programme (*European Programme on Efficient Driving - National Training Plan for Driving-Schools*), but it is within the E4 contexts and its Action Plans that the measure has received a larger boost and dissemination.

Apart from the measures stated within the E4 Action Plans, other innovative measures with impact on the transport sector have been recently added: the restructuring of the vehicle registration tax to be levied on vehicles with emissions over 120 g/km, and the promotion of the use of biofuels in transport aiming at using them from 2009 onwards.

As regards industry, the new feature is a new measure in the framework of the Action Plan 2008-2012 concerning the introduction of an energy and environmental analysis criteria in the investment projects within this sector.

As for the buildings sector, several innovations have taken place in the last years, from the technical and legislative point of view, intended to improve efficiency in this sector. One of the most outstanding is the *CALENER* software evaluation programme for the energy classification of buildings. This instrument has been promoted since 1997 by the Ministry of Industry, Tourism and Trade, through IDAE, and by the Ministry of Housing, in response to the requirements set forth by the Directive 93/76/EEC (SAVE). Since then, this instrument has been incentivised by the Directive 2002/91/EC, and has undergone a series of improvements. In Spain, this is materialised with the measures included in the E4 Action Plans related to the buildings sector, and especially

with the last Action Plan 2008-2012, which means to increase the regulatory demands for the buildings in the residential and tertiary sectors. This involves a favourable impact for the efficiency market in the building sector.

Another innovative measure to apply to buildings, both in the residential and tertiary sectors, is the *Solar Bylaw*. This measure has been given a boost since 2001 when IDAE published a Municipal Solar By-law model. On the other hand, the Technical Building Code for Building entails a stimulus for this measure.

Moreover and prior to the requirements set forth by the Directive 2006/32/EC, within the framework of the Action Plan 2005-2007, an *Energy Services Contract* has been defined, aimed at the procurement of energy services and maintenance in Public Administrations buildings. In this line, the Activation Plan intends to revitalize the energy services market, where the energy service companies (ESCOs) will play a key role.

On the other hand, and very specifically in the residential sector, the application of a line of aids intended to the renewal of the electric appliance stock (*Renove Plan*) has been really innovative. This measure, initially launched by the Action Plan 2005-2007, is to be continued in the Action Plan 2008-2012, and shows favourable results in terms of execution. This measure is supplemented with the information derived from the electrical appliances energy labelling, and more recently, with the approval of *Royal Decree 1369/2007*, dated 19<sup>th</sup> October, relating to the eco-design requirements applicable to energy consuming products, within which electrical appliances fall, apart from new Sanitary Hot Water boilers (SHW) and other equipment.

To end with, all the above is strengthened and supplemented with other measures that involve innovation in the area of energy efficiency, as they promote R+D+I in this field. Remarkable in this line is the *Strategic Action for energy and climate change, within the National Plan R+D+I, 2008-2011*. Specifically in the field of efficiency, public support is envisaged to encourage the development of: *technologies related to the optimisation of efficiency all along the production, transport, storage and end-use energy cycle; modal change projects* in the transport of goods and passengers; and projects on *sustainable building*, both in new construction and rehabilitated buildings, giving emphasis to aspects such as eco-efficiency in construction, the use of the terrain as a source of cold/heat for heating and cooling, the development of instruments and systems to certify sustainability, the use of new energies in construction, etc.

### Contribution to the Lisbon Strategy

*The Lisbon Strategy* shows the transition way towards a European economy featured simultaneously by growth, social cohesion and the respect to the environment, where innovation becomes a key element. To reach this purpose, the approval on the part of each State Member of national programmes for structural and economic reforms was agreed.

As for Spain, the aforementioned is fulfilled with the *National Reform Programme (PNR) 2005-2010*. Since 2005, the reform drive in Spain has been intense and continual. As regards the energy sector, the reforms carried out spin round three key axes: competition, security in supply and sustainability. Concerning the most relevant reforms, it is remarkable the important progress of the competition in the energy sector, which is accounted with by the liberalisation of gas and electricity tariffs and by the rooting of the Electricity Iberian Market (MIBEL). In the field of the security of the supply, the new planning of the transport infrastructures established in the Planning of the Electricity and Gas Sectors 2008-2016 are key elements. As for sustainability, advances have also taken place in the field of renewable energies and energy efficiency. Remarkable elements within this scope are the Action Plan 2008-2012 and the Activation Plan 2008-2011, included in the Plan on Urgent Measures of the Spanish Strategy for Climate Change and Clean Energy (EECCCL). On the other hand, this Strategy falls within the Spanish Strategy for Sustainable Development (EEDS), which is in time, supplemented by the Lisbon Strategy, focusing on the environmental, social, and global aspects of sustainability.

The PNR Programme also includes the *Strategic Plan for Infrastructures and Transport, 2005-2020 (PEIT)*, whose general aim is to establish a rational, efficient framework for the transport sector in the medium and long term. This is structured into four scopes: the efficiency of the system, social and territorial cohesion, environmental compatibility and economic development. With a view to improving the efficiency of the system, it is meant to develop an integrated transport system which spans the various transport modes and infrastructures and services, as well as to optimise the use of the existing infrastructures by means of demand management measures. These aims are, in time, in accordance with the ones considered by the Spanish *Strategy for Energy Saving and Efficiency (E4)*, and its respective Action Plans. Therefore the development of the specific measures included in the said strategy will be given preferential attention.

Last, the European Union has placed the science and technology policy on one of its central axes, and as a key element to the Lisbon Strategy for growth and employment. In this context, the R+D+I Strategy (INGENIO 2010) has a remarkable role in Spain and within the National Reform Programme, and has been used to draft the new R+D+I Plan 2008-2011.

As a supplement of the National Reform Programme, the Spanish Plan for Economic Stimulus and Employment (*Plan E*) was approved last November 2008.

### Contributions to other policy targets<sup>1</sup>

Energy saving and efficiency is one of the priorities in terms of energy and environmental policy, as it makes up one of the most efficient instruments to meet the objective established by the European Union to reduce emissions and curtail climate change. In this line, the Action Plan 2008-2012 (E4) means to facilitate the performance of the goals in emission reduction, established by the *National Emission Allocation Plan 2008-2012*, and so also contribute to the *Spanish Strategy for Climate Change (EECCEL)*. As a matter of fact, the Action Plan 2008-2012 is integrated within the Plan on Urgent Measures of the EECCEL Strategy.

Additionally, and in relation to the acid and eutrophying pollutant emissions and ozone precursors, the Action Plan 2008-2012 contributes to their minimisation and therefore, to the performance of the *Directive 2001/81/EC* on national emission ceilings for certain atmospheric pollutants, which is developed in Spain through the II National Programme on Emission Reduction.

On the other hand, the measures of the Action Plan 2008-2012 and of the Activation Plan 2008-2011, oriented to the transport sector, along with the registration tax according to CO<sub>2</sub> emissions, can contribute to the performance of the *UE Strategy to reduce CO<sub>2</sub> emissions from passenger cars and light-commercial vehicles (COM(2007) 19 final)*. The aim of the said strategy is to limit the average emissions of new vehicles to 120 g/Km in the year 2012.

The Action Plan 2008-2012 considers also measures within the transformation sector, and some of the most remarkable ones are those related to cogeneration, putting emphasis on high-efficiency cogeneration. This will involve various benefits, such as primary energy saving, the elimination of grid losses and avoided emissions, especially the ones related to greenhouse effects, thus contributing to the performance of the commitments undertaken within the Kyoto Protocol. Additionally, the efficient use of energy by means of cogeneration also contributes effectively to the security and diversification of electricity supply, in line with the goals of the *European strategy for sustainable, competitive and secure energy (COM (2006)105 final)*, and therefore, to the improvement of competitiveness of the economy.

Likewise, the energy efficiency measures aimed at the industry sector, such as energy audits and the obligation of carrying out energy and environmental analyses in investment projects, will contribute to the improvement of competitiveness in this sector.

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<sup>1</sup> i.e. related to green-house gas emissions; acidifying emissions; energy supply security; economic development (competitive industry); social / welfare (energy poverty).

## 4.4 Energy Efficiency Measure Evaluations

### 4.4.1 Semi-quantitative Impact Estimates of Energy Efficiency Measures

The evaluation of the impact of the measures has been done bearing in mind both the expected impact and the impact according to the “*Ex-ante*” evaluation criteria established within the ODYSSEE-MURE project. According to the latter, there are three impact categories according to the relation between the expected energy saving derived from the application of the measure in a given sector, and the energy consumption in that sector. According to this, three impact categories are achieved:

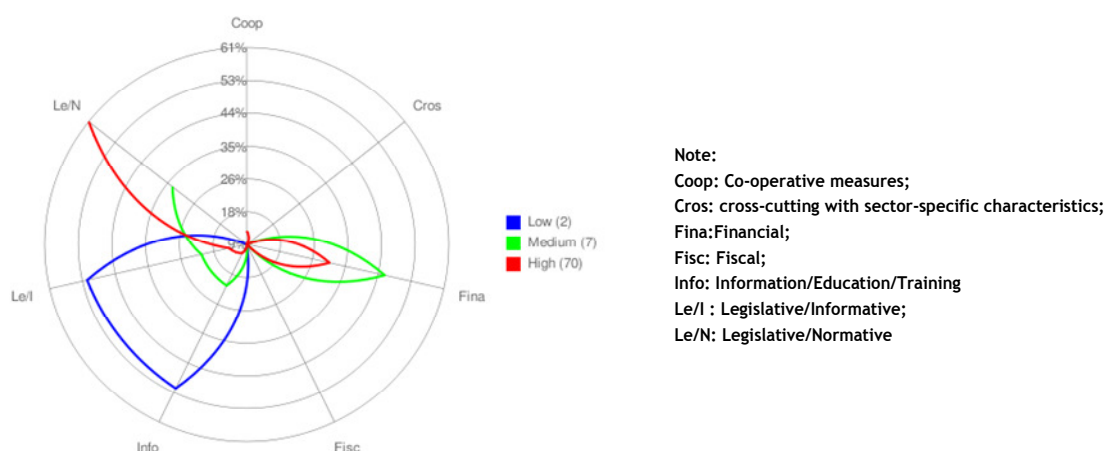
- Low: < 0.1%
- Medium: 0.1-0.5%
- High:  $\geq$  0.5%

According to the former statement, an evaluation of the impact of the national measures on energy efficiency to be applied to each end-use sector has been carried out. In the following, it is given a short summary for each sector, rather taking into account the measures with greater associated impact.

#### Residential

The measures showing a greater semi-quantitative impact are those of a legislative nature. Since the late 70s, this kind of measures has laid the bases for the improvement of design and energy efficiency in buildings and their thermal installations in Spain. Thus, since the approval of the *Spanish Basic Building Regulation for thermal conditions in buildings* (NBE-79), which makes up the basic legislation of national reference in the building sector, successive improvements have been progressively added such as the ones related to the *Regulations on Heating, Cooling and Sanitary Hot Water Installations* (Royal Decree 1618/80), and the *Regulations on Thermal Installations in Buildings and their Supplementary Technical Instructions* (Royal Decree 1751/1998). This legislation has been superseded at present with a more recent and demanding one, which takes into account the EU guidelines in line with the *Directive 2002/91/EC* on Energy Performance of buildings. Evidence for this is the last Technical Building Code (TBC), the revised RITE and the Energy Certification of both new and rehabilitated buildings.

**Figure 47: Development of measure by type over quantitative impact in the Residential Sector in Spain**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

The former legislative measures will be supplemented once an Energy Certification procedure is approved for existing buildings. This will ultimately transpose the Directive 2002/91/EC. In the

medium term, it is expected that the practical application of the said measures will yield a high impact on the buildings of this sector.

The following category of measures with a high impact on energy efficiency in the residential sector relates to financial aids. Some of the most outstanding are those envisaged in the Action Plans of the E4 Strategy, which are meant to boost the efficiency improvement in buildings of the residential sector in accordance with the criteria set forth in the aforementioned legislation. In like manner, as regards financial aids, the most outstanding are the ones under the Renove Plan, intended to replace household equipment with more efficient one. This Plan, promoted by the E4, within the Action Plan 2005-2007 and the Action Plan 2008-2012, is being developed in all Autonomous Communities, being one of the most successfully implemented measures.

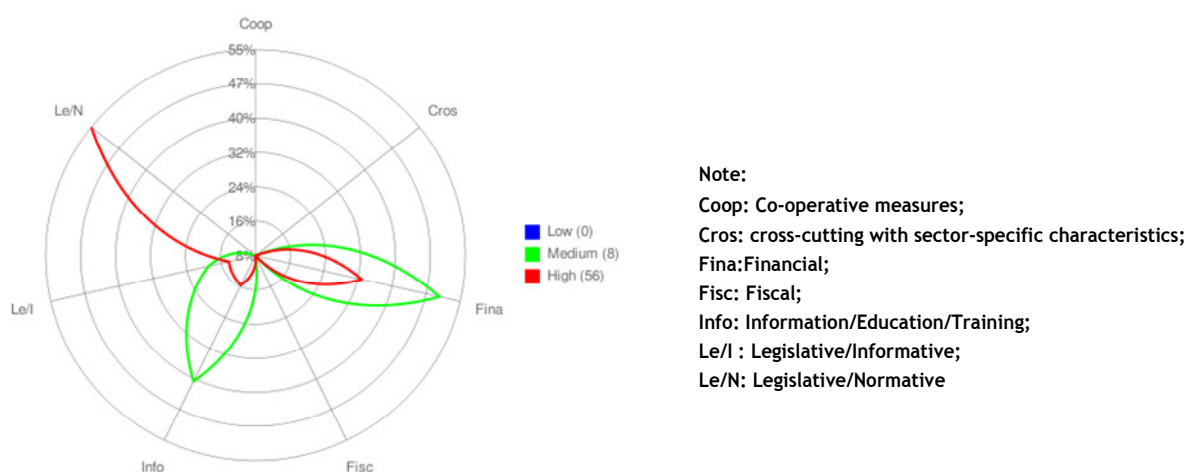
Finally, the rest of the measures, of an informative and educational nature, as for example, the ones relating to equipment labelling and eco-design, in general terms, show a lower level of semi-quantitative impact. In any case, as more experience is gained on the market with this kind of measures, its impact is expected to improve with the time being.

### Tertiary

As it happens in the residential sector, the legislative measures to be applied in this sector to buildings are the ones showing a larger semi-quantitative impact. Therefore, the above-mentioned legislation within the residential sector affects buildings in the tertiary sector alike. Thus, in the mid-term, a high impact is also expected in buildings in this sector as a result of the application of the measures in the Directive 2002/91/EC.

In like manner, the measures of financial support envisaged in the Action Plans in the E4 show a high impact. The most outstanding are, on the one hand, the aids aimed to the general improvement of buildings both in the tertiary and residential sectors, and on the other hand, in a more specific way, the aids to the improvement of current installation for water treatment.

**Figure 48: Development of measure by type over quantitative impact in the Tertiary Sector in Spain**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

The rest of the measures currently in application in this sector, as stated in section 4.5 *Patterns and Dynamics of Energy Efficiency Measures*, are, in general, of an informative and educational

nature and show a lower level of impact. Nevertheless, a couple of exceptions are to be underlined for the success of their implementation and their potential for replicability.

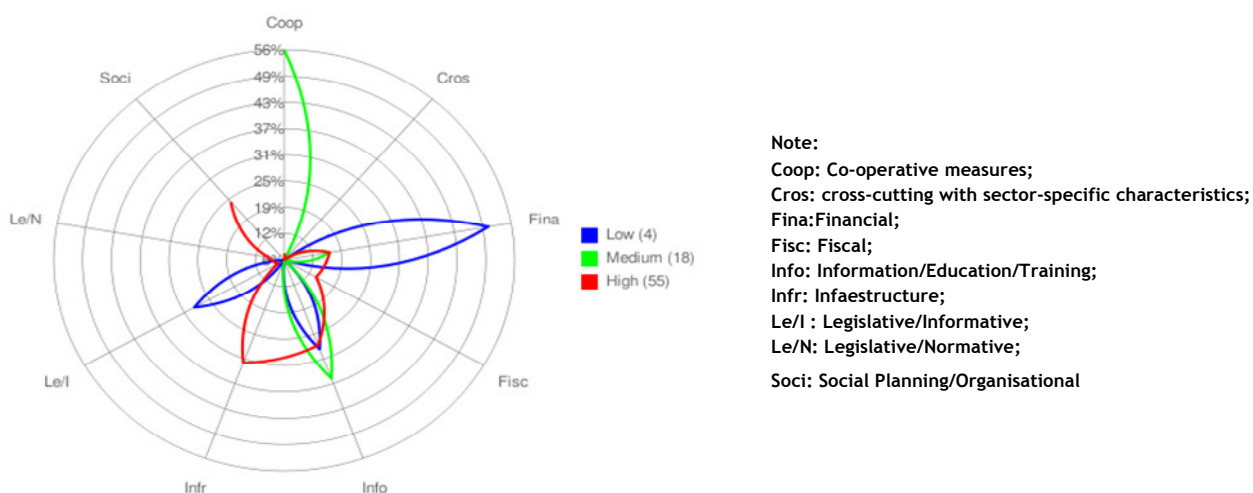
Hence, the Municipal Solar By-law model, published in 2001, along with other instruments of financial support, has happened to be a successful measure, as it has been progressively applied to an increasing number of municipalities. On the other hand, the *Energy Saving and Efficiency Plan in Public Administrations*, is a measure that falls within the Action Plans 2005-2007 & 2008-2012, and whose application is expected to have a high impact; so much so given the exemplary leading role of the Public Administration in terms of setting a precedent in relation to the introduction of energy efficiency criteria in public procurement for equipment, energy management, etc.

## Transport

Most of the energy efficiency measures linked to the Action Plans of the E4 Strategy show a high semi-quantitative impact in the transport sector. These measures are aimed at all the transport modes and respond to a large typology, being the most outstanding ones the measures aimed at modal change (Urban Mobility Plans, Transport Plans for Companies, etc.) which demand a social organisation and planning that should include various actions, as well as the measures aimed at the improvement in the use of the transport modes and at the efficiency improvement of the stock of vehicles. In turn, within the two last kinds of measures, the infrastructure management and the fleet management show a high impact, as well as the efficient driving programmes and the aids aimed at purchasing efficient cars, giving preference to road transport and the private vehicle, which is where the highest impact is expected.

As regards the rest of the measures envisaged within the Action Plans, the associated impact is lower. These measures include efficient driving in the air and the sea sectors, mainly of a cooperative nature, as well as the aids to renew the fleet in both transport modes.

**Figure 49: Development of measure by type over quantitative impact in the Transport Sector in Spain**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

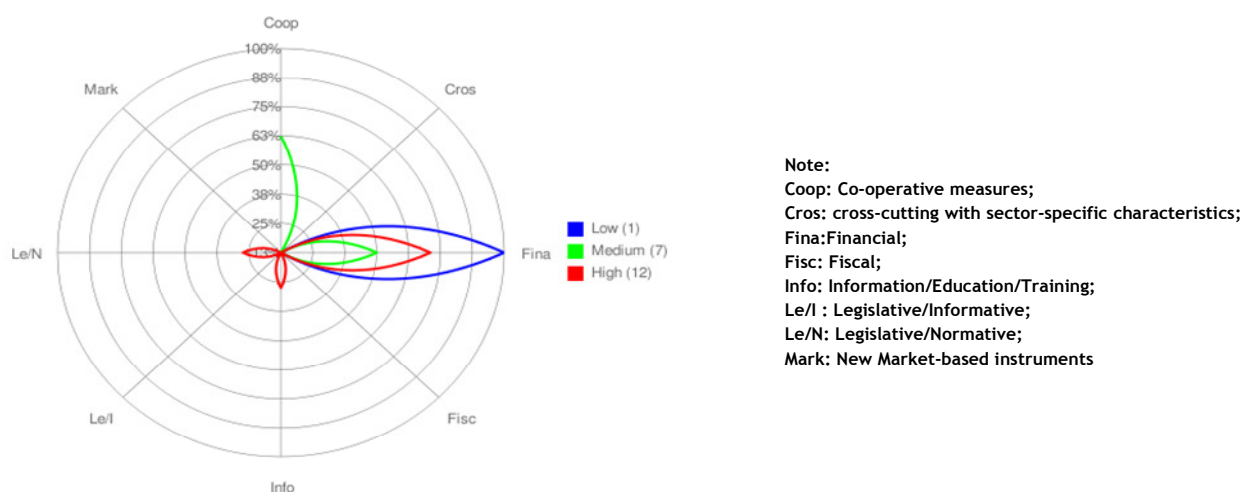
Regardless of the measures included in the Action Plans, there are other measures recently applied of a fiscal and legislative-regulatory nature that are also remarkable, and which so far were lacking in the sector, and which are expected to have a high impact. These measures are

the tax on car registration for new vehicles in relation to the CO<sub>2</sub> emissions and the compulsory use of biofuels in transport.

## Industry

Within the industry sector, the financial measures are the most widespread ones and the ones with higher semi-quantitative impact. At present, these measures envisaged within the Action Plans of the E4 Strategy, go along with other actions of educational, informative and legislative nature, which reinforces the expected impact.

**Figure 50: Development of measure by type over quantitative impact in the Industry Sector in Spain**



Source: MURE Data Base&IDAE/All the measures "completed" and "ongoing" have been taken into account in the Spider Graph

As regards Voluntary Agreements or cooperative measures, and despite the uncertainties that may be derived in relation to them, a medium semi-quantitative impact is expected.

### 4.4.2 Lessons from Quantitative Energy Efficiency Measure Evaluations

There was previous experience in the field of follow-up and evaluation of energy efficiency measures in the 1990's. It was the *Energy Saving and Efficiency Plan, PAEE 1991-2000*, included in the Mure Database. This Plan is remarkable for being one of the most relevant energy efficiency programmes of greater scope. This very framework saw the advent of public aids aimed at facilitating the execution of investment projects on energy efficiency in various sectors with a view to intensifying energy intensity. At the end of the execution period of the Plan, there was an evaluation so as to supervise the performance level. The procedure used to do it was assimilated to a "bottom-up" evaluation method, which established a relation between the economic variables regarding investment projects and energy variables linked to the energy saving derived from the said projects.

At present, the main referent of the energy efficiency policy in Spain is the Spanish Strategy for Energy Saving and Efficiency (E4), developed through the Action Plans PAE4 2005-2007 and PAE4 2008-2012. In this context, it is necessary to develop methodologies that carry out an evaluation and a follow-up of the associated energy efficiency measures. The said Action Plans take place through Collaboration Agreements with the Autonomous Communities. On the basis of these Agreements, Autonomous Communities receive a funds transfer to implement the measures related to the Action Plans. Apart from the Autonomous Communities, it is necessary the involvement of various ministerial departments, as well as a large number of private agents.

With a view to assessing the degree of execution of the Action Plans in a reliable way, as well as the likely barriers to implement them, it is necessary to rely on a single follow-up centre, being IDAE the responsible for this function, through the Consultative Commission on Energy Saving and Efficiency, with the collaboration of the ministerial departments involved and the Autonomous Communities.

As regards the first Action Plan PAE4 2005-2007, a follow-up has been done of its annual implementation, restricted to the financial aids and energy savings derived from the application of the measures in the various sectors. In any case, the follow-up carried out gets close to the “bottom-up” approach. The preliminary results ensuing the follow-up are favourable, among which the most outstanding ones are: the progress in the management of public funds, as IDAE works along with the very Autonomous Communities, and as it establish a joint co-management framework; a progressive increase of the number of measures under way in the various years of the Plan; an improvement in the knowledge on energy efficiency; as well as a more dynamic energy efficiency market derived from a boost to the penetration of efficient products (electrical appliances, vehicles, programmes, etc.). In terms of energy, predictions are favourable, and it is expected to reach the global objectives set forth for the period 2005-2007, which can be reinforced with the spreading effect of the applied measures, beyond the horizon established by this first Plan.

Nevertheless, the PAE4 Plan 2005-2007 lacked a methodological procedure of evaluation of the efficiency<sup>2</sup> of the measures as such. A remarkable advance has taken place within the framework of this second Action Plan PAE4 2008-2012, as regards the development of evaluation and follow-up methodological proposals. This has somehow been possible as a result of the EU guidelines stated by the *Directive 2006/32/EC* on Energy End-Use Efficiency and Energy Services (Art. 15, section 4), and the *EU Action Plan on Energy Efficiency* (COM (2006) 545 final), which urges the Member States to develop harmonised efficiency indicators with which to assess the progress of the National Action Plans on Energy Efficiency. For this purpose and within the sectoral analysis of PAE4 2008-2012, a follow-up proposal based on “bottom-up” indicators has been put forward with which to analyse the progress of the efficiency measures considered in each end use sector covered by the Plan. In general terms, the considered indicators cover a large typology of measures included in the Action Plan. Therefore, some of the considered indicators include equipment sales data according to efficiency class, energy consumption data stated in terms of unitary consumption (toe/dwelling; toe/employee; toe/m<sup>2</sup>, etc.), specific consumption (toe/ton), or final energy, thermal and electric intensities (Ktoe/€2000), even indicators linked to social-economic parameters for transport, modal change, efficient use, etc.

In a nutshell, this involves an advance in the improvement of the follow up of the effectiveness of the measures and the energy efficiency plans. Nevertheless, the need to adapt the Action Plans to the Member States in compliance with the Directive 2006/32/EC obliges to make an additional effort that will have to be specified in the definition of a harmonised methodology that will integrate “bottom-up” and “top-down” approaches to determine the energy saving ascribable to the energy efficiency policies.

The follow up of the Action Plans by means of procedures consisting in the evaluation of its measures will enable to optimize their effectiveness, enhancing the measures with a larger scope and impact, and introducing the necessary adjustments in the less successful measures. This will then ease the achievement of the EU and international objectives in the field of energy and climate change, and consequently, the transition towards a more economical and sustainable energy model.

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<sup>2</sup> What is understood by effectiveness evaluation is the efficiency of a plan/program in achieving specific intervention results or to what extent the achieved results can be exclusively attributed to the implemented policy as opposed to the influence of other factors.

## 5 National Developments under the EU Energy Efficiency Directive and the 20% Energy Efficiency Target of the EU

The national commitment regarding energy saving and efficiency promotion is so strong that on some occasions it has gone beyond the demands envisaged by some EC guidelines. Such is the case of the Action Plans demanded by the *Directive 2006/32/EC* on Energy End-Use Efficiency and Energy Services. The said Directive points to the need to develop *Action Plans in Energy Efficiency* in the Member States, something that relies on certain advantage at national level, thanks to the experience gathered through the Action Plan 2005-2007, within the Energy Saving Efficiency Strategy 2004-2012.

The **Spanish Strategy for Energy Saving and Efficiency (E4)** makes up one of the strategic priority lines of the Government in the field of energy saving and efficiency policies, and therefore it is meant to do a transition towards a more sustainable economic and energy model. The E4 was drafted in coordination with the Institute for the Diversification and Saving of Energy (IDAE) through a sectoral approach to spot the existing barriers in the various consumption scopes and then, evaluate the necessary tools to overcome the former. The E4, basically aimed at the end use sectors, identified an energy saving potential equivalent to 15,574 ktoe by 2012, in terms of primary energy. With a view to it, it proposed a set of various measures and a related number of investments and public aids which amounted to M€ 24,098 and 2,011, respectively. Nevertheless, the E4 did not account for a detailed specification of the actions to carry out in each sector, the terms, the responsibilities and identification of financing lines and the necessary budgetary items. It was then necessary to instrument and develop the E4 into two Action Plans: Action Plan PAE4 2005-2007 and Action Plan PAE4 2008-2012.

The **Action Plan 2008-2012**<sup>3</sup>, approved in July 2007, as it is stated in *Chapter 2 - The policy background to energy efficiency*, makes up the second plan of the E4 Strategy, and spans the last five-year period of the said strategy, coinciding in time with the Kyoto Protocol's horizon. This new plan consolidates the effort undergone by former Action Plan 2005-2007. The energy objectives established in the framework of this new Plan involve an additional improvement with regard to the initial provisions of the E4.

PAE4 2008-2012 falls within the *Directive 2006/32/EC*, laying the bases to reach the performance of the objective established by the said Directive of 9% of energy saving by 2016. On the other hand, with respect to the said Directive, PAE4 2008-2012 doubles the annual saving objective up to 2%.

Additionally, the new Plan falls within the EU Energy Efficiency Action Plan, contributing to the energy saving objective of 20% in the 2020 horizon.

The new Plan pays special attention to the diffuse sectors<sup>4</sup>, and therefore provides a potential contribution to the performance of the National Emissions Allocation Plan 2008-2012 (PNA II), which in time makes up the second Plan, drafted within the framework of the EU Emission Trading Scheme (ETS) and the first coinciding with the commitment period (2008-2012) established in the Kyoto Protocol. This contributes to the Greenhouse emissions reduction objective established by the *Spanish Strategy for Climate Change and Clean Energy, 2007-2012-2020*, approved in Cabinet Meeting in November 2007.

<sup>3</sup> The performance of the Action Plan 2008-2012 will be strengthened with the Saving and Energy Efficiency Activation Plan 2008-2011, approved in Cabinet Meeting on 1<sup>st</sup> August 2008.

<sup>4</sup> Diffuse sectors are defined as transport, residential, commercial and public administration, agriculture, waste management and fluoridated gases management.

This Strategy must be of help to orient the Spanish capacity in terms of assuming additional engagements to fight climate change beyond 2012. This is coherent with the EU Directives<sup>5</sup>, according to which it is expected to reach a 20% reduction in GHG emissions by 2020 with respect to 1990. The objectives set in terms of GHG emissions will need an increase in the EU energy efficiency of 20% and a contribution of renewable energies of 20% to the final energy consumption in 2020. These objectives are stated within an integrated energy and climate change package<sup>6</sup>, approved by the European Council.

Bearing in mind the above, currently, a new Renewable Energies Plan 2011-2020 is under development, which is expected to lead Spain to the achievement of the 2020 objective of a 20% contribution of the renewable energies. This will be reinforced with the approval of a *Law on Energy Efficiency and Renewable Energies*, under development at present.

In a supplementary way and at national level, other actions are also remarkable within the framework of EU Directives and objectives defined in the 2020 horizon. One of these actions holding an outstanding position is the Planning of the Electricity and Gas Sectors 2008-2016, approved in Cabinet Meeting on 30<sup>th</sup> May 2008. This planning is coherent with the EU objectives established by 2020, and constitutes a key element to achieve them as they involve an improvement in the energy infrastructures and interconnections, which will enable a greater penetration of renewable energies in the energy mix, and therefore, the associated reduction of emissions. Other important actions are the Strategic Plan for Infrastructures and Transport, 2005-2020 (*PEIT*), and the *Strategy for Sustainable Mobility*, which integrate issues related to transport and mobility, and therefore can contribute significantly to the 2020 objectives on emission reduction, given the relevance of the transport sector as the main emission-generating sector.

And last, the approval of the *Strategic Action on Climate Change and Energy*, within the National Plan for R+D+I 2008-2011, involves an additional boost to the objectives established in 2020, especially in the area of renewable energies, given the R+D+I support to less established renewable technologies, as well as to the effective integration of renewable energies in the transport and building sectors. This is expected to increase the contribution of renewable energies to the energy demand, and consequently, meet the objective of 20% share in the energy mix in 2020.

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<sup>5</sup> The European Union, in the Spring Council 2007, approved two essential objectives of a binding nature by 2020: reducing by 20% GHG emissions; and the contribution of renewable energies to 20% of final energy consumption.

<sup>6</sup> On 17<sup>th</sup> December 2008, the European Parliament approved a package with legislative measures on energy and climate change *COM (2008) 30 final*, setting the bases to perform the commitment assumed by the European Council in spring 2007.

## **Annex 1**

### **Energy Efficiency Measure Summary by Country**

**Table 3: Energy Efficiency Policies and Measures in the Households**

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA2	Energy Conservation and Efficiency Plan, EECF 1991-2000 (Plan de Ahorro y Eficiencia Energética, PAEE 1991-2000)	Completed	Financial, Information/Education	1991	2000	Unknown
SPA3	Basic Building Standards for Thermal Insulation (Norma Básica de la Edificación sobre condiciones térmicas en los edificios, NBE-79)	Completed	Legislative/Normative	1979	2006	High
SPA4	Heating, Air Conditioning and Sanitary Water Equipment Regulations	Completed	Legislative/Normative	1981	1998	High
SPA5	Financial help for Energy Efficiency (Law 82/1980) (Ley de Conservación de la Energía 82/1980)	Completed	Financial	1982	1988	Medium
SPA6	Aid Programme for the support of solar photovoltaic Energy	Completed	Financial	2000	2003	High
SPA7	Proposal of a Municipal Ordinance for thermal uses of solar absorption	Ongoing	Legislative/Normative	2001		High
SPA10	Aid Programme for the support of solar thermal energy	Completed	Financial	2000	2003	High
SPA11	ICO-IDAE Financing Line for Renewable Energies and Energy Efficiency Projects	Completed	Financial	2000	2008	High
SPA12	Energy Qualification of Buildings (Calificación Energética de Edificios, CALENER)	Ongoing	Information/Education	1999		Low
SPA13	Regulation of Thermal Installations in Buildings (Reglamento RITE)	Completed	Legislative/Normative	1998	2007	High
SPA14	Labeling and information on energy consumption of Domestic Use Equipment	Ongoing	Legislative/Informative	1994		Low
SPA15	Plan for the Promotion of Renewable Energies in Spain 2000-2010 (Plan de Fomento de las Energías Renovables 2000-2010)	Completed	Financial	2000	2005	High
SPA16	Norms and technical complementary instructions for homologation of solar panels	Completed	Co-operative Measures	1980	1998	High
SPA17	Norm on building thermal insulation in Catalonia region	Ongoing	Legislative/Normative	1987		High

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA18	Action Plan 2005-2007: Household Appliances Renewal Programme (Plan de Acción 2005-2007: Plan Renove de Electrodomésticos))	Ongoing	Financial	2005	2007	High
SPA19	Action Plan 2005-2007: Awareness raising and training of consumers and salespeople (Plan de Acción 2005-2007: Concienciación y formación de vendedores y compradores)	Ongoing	Information/Education	2005	2007	High
SPA20	Action Plan 2005-2007: Incorporation of efficient equipment in new homes (Plan de Acción 2005-2007: Incorporación de equipos eficientes en nuevas viviendas)	Ongoing	Co-operative Measures, Financial	2005	2007	High
SPA22	Action Plan 2008-2012:Renove Plan for electric appliances (Plan de Acción 2008-2012: Plan Renove de Electrodomésticos)	Ongoing	Co-operative Measures, Financial, Information/Education	2008	2012	High
SPA24	Ecodesign requirements for energy-using products (EuPs)	Ongoing	Legislative/Normative	2007		Medium
SPA25	Plan for Replacement of Electricity Meters	Ongoing	Information/Education	2008	2018	Medium
SPA26	Action Plan 2005-2007: Renovation of the thermal envelope of existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA27	Action Plan 2005-2007: Improvement of the energy efficiency of thermal installations in existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA28	Action Plan 2005-2007: Improvement of the energy efficiency of indoor lighting installations in existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA29	Action Plan 2005-2007: Regulatory measures for the implementation in Spanish law of Directive 2002/91/EC on the Energy Performance of Buildings	Ongoing	Financial, Legislative/Informative, Legislative/Normative	2005	2007	High
SPA30	Action Plan 2008-2012: Renewal of the thermal casing in the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High
SPA31	Action Plan 2008-2012: Improvement of the energy efficiency in the thermal installations of the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High
SPA32	Action Plan 2008-2012: Improvement of the energy efficiency in the indoor lighting installations of the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High

Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA33	Action Plan 2008-2012: Promotion of new buildings and renewal of the existing ones with a high energy certification	Ongoing	Financial, Legislative/Informative, Legislative/Normative	2008	2012	High
SPA34	Action Plan 2008-2012: Revision of the energy demands in the building regulations	Ongoing	Legislative/Normative	2008	2012	High
SPA35	Energy Performance Certificate (for new and refurbished buildings)	Ongoing	Legislative/Informative	2007		Medium
SPA36	Technical Building Code (CTE)	Ongoing	Legislative/Normative	2007		High
SPA37	Revised" Regulation of Thermal Installations in Buildings (RITE)	Ongoing	Legislative/Normative	2008		High

**Table 4: Energy Efficiency Policies and Measures in the Tertiary Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA1	Financial help for Energy Efficiency (Law 82/1980) (Ley de Conservación de la Energía 82/1980)	Completed	Financial	1982	1988	Medium
SPA2	Energy Conservation and Efficiency Plan, EECP 1991-2000 (Plan de Ahorro y Eficiencia Energética, PAEE 1991-2000)	Completed	Financial	1991	2000	High
SPA3	Energy Qualification of Buildings (Calificación Energética de Edificios, CALENER)	Ongoing	Information/Education/Training	1999		Medium
SPA4	Programme for the Energy Optimisation in the Central Administration Building	Completed	Information/Education/Training	1987	1992	Medium
SPA7	ICO-IDAE Financing Line for Renewable Energies and Energy Efficiency Projects	Completed	Financial	2000	2008	High
SPA9	Aid Programme for the Support of Solar Thermal Energy	Completed	Financial	2000	2003	High
SPA12	Norm on building thermal insulation in Catalonia region	Ongoing	Legislative/Normative	1987		High
SPA13	Heating, Air Conditioning and Sanitary Water Equipment Regulations	Completed	Legislative/Normative	1981	1998	High
SPA14	Regulation of Thermal Installations in Buildings (Reglamento RITE)	Completed	Legislative/Normative	1998	2007	High
SPA15	Basic Building Standards for Thermal Insulation (Norma Básica de la Edificación sobre condiciones térmicas en los edificios, NBE-79)	Completed	Legislative/Normative	1979	2006	High
SPA16	Proposal of a Municipal Ordinance for thermal uses of solar absorption	Ongoing	Legislative/Informative	2001		High
SPA17	Plan for the Promotion of Renewable Energies in Spain 2000-2010 (Plan de Fomento de las Energías Renovables 2000-2010)	Completed	Financial	2000	2005	Medium

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA18	Aid Programme for the Support of Solar Photovoltaic Energy	Completed	Financial	2000	2003	High
SPA19	Action Plan 2005-2007: Plan for energy efficient equipment and efficient energy use in government buildings (Plan de Acción 2005-2007: Plan de equipamiento y uso eficiente de la energía en la Administración Pública)	Ongoing	Information/Education/Training	2005	2007	High
SPA20	Action Plan 2005-2007: Improvement of the energy efficiency of existing street lighting installations (Plan de Acción 2005-2007: Mejora de la eficiencia energética en instalaciones actuales de alumbrado público exterior)	Ongoing	Information/Education/Training, Legislative/Normative	2005	2007	High
SPA21	Action Plan 2005-2007: Improvement of the energy efficiency of new street lighting installations (Plan de Acción 2005-2007: Mejora de la eficiencia energética en instalaciones actuales de alumbrado público exterior)	Ongoing	Legislative/Normative	2005	2007	High
SPA22	Action Plan 2005-2007: Improvement of the energy efficiency of existing installations of water potabilization, supply and treatment (Plan de Acción 2005-2007: Mejora eficiencia energética instalaciones existentes potabiliza, abastecimiento,	Ongoing	Financial, Information/Education/Training	2005	2007	High
SPA23	Action Plan 2005-2007: Improvement of the energy efficiency of new installations of water potabilization, supply and treatment (Plan de Acción 2005-2007: Mejora de eficiencia energética nuevas instalaciones potab, abastecimiento, depurac agua	Ongoing	Information/Education/Training	2005	2007	High
SPA25	Action Plan 2008-2012: Improvement of the energy efficiency of the existing public lighting installations (Plan de Acción 2008-2012: Mejora de la eficiencia energética de las instalaciones actuales de alumbrado público exterior)	Ongoing	Legislative/Normative	2008	2012	High

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA26	Action Plan 2008-2012:Improvement of the energy efficiency in the existing water purification, supply, treatment and desalination Installations (Mejora de la eficiencia de instalaciones actuales de potabilización.de aguas residuales y desalación)	Ongoing	Financial	2008	2012	High
SPA27	Action Plan 2008-2012: Studies, feasibility analyses and audits to improve the energy efficiency in installations (Plan 2008-2012: Realización de estudios, análisis de viabilidad y auditorias para la mejora de la eficiencia de las instalaciones)	Ongoing	Financial	2008	2012	High
SPA28	Action Plan 2008-2012: Courses on energy training for municipal technicians, which lead to the improvement of the energy efficiency in installations (Realización de cursos de formación energética de los técnicos municipales ...)	Ongoing	Information/Education/Training	2008	2012	Medium
SPA29	Action Plan 2008-2012:Energy Saving and Efficiency Plans in Public Administrations (Plan de Acción 2008-2012:Plan de Equipamiento y Uso Eficiente de la Energía en la Admón. Pública)	Ongoing	Information/Education/Training, Legislative/Informative	2008	2012	High
SPA30	Action Plan 2005-2007: Renovation of the thermal envelope of existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA31	Action Plan 2005-2007: Improvement of the energy efficiency of thermal installations in existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA32	Action Plan 2005-2007: Improvement of the energy efficiency of indoor lighting installations in existing buildings	Ongoing	Financial, Legislative/Normative	2005	2007	High
SPA33	Action Plan 2005-2007: Regulatory measures for the implementation in Spanish law of Directive 2002/91/EC on the Energy Performance of Buildings	Ongoing	Financial, Legislative/Informative, Legislative/Normative	2005	2007	High
SPA34	Action Plan 2008-2012: Renewal of the thermal casing in the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High
SPA35	Action Plan 2008-2012: Improvement of the energy efficiency in the thermal installations of the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA36	Action Plan 2008-2012: Promotion of new buildings and renewal of the existing ones with a high energy certification	Ongoing	Financial, Legislative/Informative, Legislative/Normative	2008	2012	High
SPA37	Action Plan 2008-2012: Improvement of the energy efficiency in the indoor lighting installations of the existing buildings	Ongoing	Financial, Legislative/Normative	2008	2012	High
SPA38	Action Plan 2008-2012: Revision of the energy demands in the building regulations.	Ongoing	Legislative/Normative	2008	2012	High
SPA39	Energy Performance Certificate (for new and refurbished buildings)	Ongoing	Legislative/Informative	2008		Medium
SPA40	Technical Building Code (CTE)	Ongoing	Legislative/Normative	2007		High
SPA41	Revised" Regulation of Thermal Installations in Buildings (RITE)	Ongoing	Legislative/Normative	2008		High

**Table 5: Energy Efficiency Policies and Measures in the Transport Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA2	Renove and Prever plans: Fiscal incentives to promote the renovation of the national vehicle stock	Completed	Financial	1994	2007	High
SPA3	Energy Conservation and Efficiency Plan, EECF 1991-2000 (Plan de Ahorro y Eficiencia Energética, PAEE 1991-2000)	Completed	Co-operative Measures , Information/Education/Training	1991	2000	Medium
SPA4	Energy efficiency labeling in transport sector (Etiquetado de eficiencia energética en el sector transporte)	Ongoing	Legislative/Informative	2003		Low
SPA5	Promotion of the Use of Biofuels in the Transport Sector within the Plan for Renewable Energies in Spain, 2000-2010	Completed	Financial	2000	2005	Low
SPA6	Financing Line with Interest Rate Bonuses for Renewable Energies and Energy Efficiency Projects	Completed	Financial	2000	2008	Low
SPA7	'ECOTEST' testing automoviles on energy efficiency (ECOTEST test de medidas de rendimiento en vehículos)	Completed	Information/Education/Training	1997	1998	Medium
SPA8	Ecodriving Europe Programme (Programa Europeo de Conducción Eficiente-Plan Nacional de Formación de Autoescuelas)	Completed	Information/Education/Training	2003	2004	Low
SPA10	Training plan for road haulage personnel in the reduction of energy consumption	Completed	Information/Education/Training	1994	1999	Medium
SPA11	Standards for the Technical Inspection of Vehicles (Estándares para la Inspección Técnica Vehículos, ITV)	Ongoing	Legislative/Normative	1994		High
SPA12	Electric vehicle promotion (Promoción del vehículo eléctrico)	Completed	Financial	1998	1999	Medium
SPA14	Action Plan 2005-2007: Urban Mobility Plans (Plan de Acción 2005-2007:Planes de Movilidad Urbana)	Ongoing	Information/Education/Training, Infrastructure, SocialPlanning/Organisational	2005	2007	High

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA15	Action Plan 2005-2007: Transport Plan in Enterprises and Activity Centres (Plan de Acción 2005-2007: Planes de Transporte en Empresas y Centros de Actividad)	Ongoing	Social Planning/Organisational	2005	2007	High
SPA16	Action Plan 2005-2007: Greater Share of Collective Transport used in Road Transport (Plan de Acción 2005-2007: Mayor participación de los medios colectivos en el transporte por carretera)	Ongoing	Infrastructure	2005	2007	High
SPA17	Action Plan 2005-2007: Increased Use of Rail Transport (Plan de Acción 2005-2007: Mayor Participación del Ferrocarril en el Transporte Interurbano)	Ongoing	Infrastructure	2005	2007	High
SPA18	Action Plan 2005-2007: Increased Use of Maritime Transport (Plan de Acción 2005-2007: Mayor Participación del Modo Marítimo en el Transporte de Mercancías)	Ongoing	Co-operative Measures	2005	2007	Medium
SPA19	Action Plan 2005-2007: Management of Transport Infrastructure (Plan de Acción 2005-2007: Gestión de Infraestructuras de Transporte)	Ongoing	Information/Education/Training, Infrastructure	2005	2007	High
SPA20	Action Plan 2005-2007: Management of Road Transport Fleet (Plan de Acción 2005-2007: Gestión de Flotas de Transporte por Carretera)	Ongoing	Information/Education/Training	2005	2007	High
SPA21	Action Plan 2005-2007: Management of Aircraft Fleets (Plan de Acción 2005-2007: Gestión de Flotas de Aeronaves)	Ongoing	Co-operative Measures	2005	2007	Medium
SPA22	Action Plan 2005-2007: Efficient Driving of Private Vehicles (Plan de Acción 2005-2007: Conducción Eficiente del Vehículo Privado)	Ongoing	Information/Education/Training	2005	2007	High
SPA23	Action Plan 2005-2007: Efficient Driving of Lorries and Buses (Plan de Acción 2005-2007: Conducción Eficiente de Camiones y Autobuses)	Ongoing	Information/Education/Training	2005	2007	High
SPA24	Action Plan 2005-2007: Efficient Driving of Aircraft (Plan de Acción 2005-2007: Conducción Eficiente en el Sector Aéreo)	Ongoing	Information/Education/Training	2005	2007	Medium

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA25	Action Plan 2005-2007:Updating of the Road Transport Fleet (Plan de Acción 2005-2007: Renovación de Flotas de Transporte por Carretera)	Ongoing	Financial	2005	2007	High
SPA26	Action Plan 2005-2007: Updating of the Aircraft Fleet (Plan de Acción 2005-2007: Renovación de Flota Aérea)	Ongoing	Co-operative Measures	2005	2007	Medium
SPA27	Action Plan 2005-2007:Updating of the Shipping Fleet (Plan de Acción 2005-2007: Renovación de Flota Marítima)	Ongoing	Co-operative Measures	2005	2007	Medium
SPA28	Action Plan 2005-2007:Updating of the Stock of Private Vehicles (Plan de Acción 2005-2007: Renovación de Parque Automovilístico)	Ongoing	Financial, Fiscal	2005	2007	High
SPA30	Action Plan 2008-2012: Urban Mobility Plans (Plan de Acción 2008-2012: Planes de Movilidad Urbana)	Ongoing	Information/Education/Training, Infrastructure, SocialPlanning/Organisational	2008	2012	High
SPA31	Action Plan 2008-2012: Transport Plans in Firms and Activity Centres (Plan de Acción 2008-2012:Planes de Transporte en Empresas y Centros de Actividad)	Ongoing	Information/Education/Training, Infrastructure, SocialPlanning/Organisational	2008	2012	High
SPA32	Action Plan 2008-2012: Greater Participation of Collective Road Transport Means (Plan de Acción 2008-2012:Mayor participación de los medios colectivos en el transporte por carretera)	Ongoing	Infrastructure	2008	2012	High
SPA33	Action Plan 2008-2012: Greater Participation of the Railways in Interurban Transport (Plan de Acción 2008-2012:Mayor participación del Ferrocarril en el transporte interurbano)	Ongoing	Infrastructure	2008	2012	High
SPA34	Action Plan 2008-2012: Greater Participation of the Sea Mode in the Transport of Goods (Plan de Acción 2008-2012:Mayor participación del Modo Marítimo en el Transporte por Mercancías)	Ongoing	Co-operative Measures	2008	2012	Medium
SPA35	Action Plan 2008-2012: Management of Transport Infrastructure (Plan de Acción 2008-2012:Gestión de Infraestructuras de Transporte)	Ongoing	Information/Education/Training, Infrastructure	2008	2012	High

## Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA36	Action Plan 2008-2012: Management of Road Transport Fleet (Plan de Acción 2008-2012: Gestión de Flotas de Transporte por Carretera)	Ongoing	Information/Education/Training	2008	2012	High
SPA37	Action Plan 2008-2012: Management of Aircraft Fleets (Plan de Acción 2008-2012:Gestión de Flotas de Aeronaves)	Ongoing	Co-operative Measures	2008	2012	Medium
SPA38	Action Plan 2008-2012: Efficient Driving of Private Vehicles (Plan de Acción 2008-2012:Conducción Eficiente del Vehículo Privado)	Ongoing	Co-operative Measures , Information/Education/Training, Legislative/Informative	2008	2012	High
SPA39	Action Plan 2008-2012: Efficient Driving of Lorries and Buses (Plan de Acción 2008-2012:Conducción Eficiente de Camiones y Autobuses)	Ongoing	Information/Education/Training	2008	2012	High
SPA40	Action Plan 2008-2012: Efficient Driving of Aircraft (Plan de Acción 2008-2012:Conducción Eficiente en el Sector Aéreo)	Ongoing	Co-operative Measures , Information/Education/Training	2008	2012	Medium
SPA41	Action Plan 2008-2012: Renewal of the Road Transport Fleet (Plan de Acción 2008-2012:Renovación de Flotas de transporte por Carretera)	Ongoing	Financial	2008	2012	High
SPA42	Action Plan 2008-2012: Renewal of the Air Fleet (Plan de Acción 2008-2012: Renovación de Flota Aérea)	Ongoing	Co-operative Measures	2008	2012	Medium
SPA43	Action Plan 2008-2012: Renewal of the Sea Fleet (Plan de Acción 2008-2012: Renovación de la Flota Marítima)	Ongoing	Co-operative Measures	2008	2012	Medium
SPA44	Action Plan 2008-2012: Renewal of the Private Car Fleet (Plan de Acción 2008-2012: Renovación del Parque Automovilístico de Turismos)	Ongoing	Financial, Fiscal	2008	2012	High
SPA45	Mandatory Use of Biofuels	Ongoing	Legislative/Normative	2008		High
SPA46	Registration Tax Link to CO2 Emissions	Ongoing	Fiscal	2008		High
SPA47	SPA47 VIVE Plan (Aids to purchase clean vehicles)	Ongoing	Financial	2008	2010	Medium

**Table 6: Energy Efficiency Policies and Measures in the Industry Sector**

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA1	Initiative towards the Support of Technology, Security and Industrial Quality (ATYCA)	Completed	Financial	1997	1999	Low
SPA2	ICO-IDAE Financing Line for Renewable Energies and Energy Efficiency Projects	Completed	Financial	2000	2008	High
SPA3	Plan for the Promotion of Renewable Energies 2000-2010 (Plan de Fomento de las Energías Renovables 2000-2010)	Completed	Financial	2000	2005	High
SPA4	Savings Programme of the Energy Efficiency and Conservation Plan EECP, 1991-2000 (Programa de Ahorro del PAEE 1991-2000)	Completed	Financial	1991	2000	High
SPA5	Cogeneration Programme of the Energy Efficiency and Conservation Plan EECP 1991-2000 (Programa de Cogeneración del PAEE 1991-2000)	Completed	Financial	1991	2000	High
SPA6	Substitution Programme of the Energy Conservation and Efficiency Plan EECP, 1991-2000 (Programa de Substitución del PAEE, 1991-2000)	Completed	Financial	1991	2000	Unknown
SPA7	Voluntary Cooperation Agreements with the Industrial Sector (Acuerdos Voluntarios con el Sector Industrial)	Completed	Co-operative Measures	1994		Medium
SPA8	Financial help for Energy Efficiency-Law 82/1980 (Ley de Conservación de la Energía 82/1980)	Completed	Financial	1981		Medium
SPA9	Energy Saving&Efficiency Strategy in Spain (E4) 2004-2012: Technologies in New Processes	Ongoing	Financial	2004	2012	High
SPA12	Third Party Financing (Financiación por Terceros)	Ongoing	Financial	1985		Medium
SPA13	IDAE-ERDF Programme for SME's (Programa IDAE-FEDER para PYMEs)	Completed	Financial	1997	2001	Medium
SPA14	Action Plan 2005-2007: Voluntary Agreements (Plan de Acción 2005-2007: Acuerdos Voluntarios)	Ongoing	Co-operative Measures	2005	2007	Medium
SPA15	Action Plan 2005-2007: Energy Audits. (Plan de Acción 2005-2007: Auditorías Energéticas).	Ongoing	Information/Education/Training	2005	2007	High
SPA16	Action Plan 2005-2007: Public Support Program (Plan de Acción 2005-2007: Programa de Ayudas Públicas)	Ongoing	Financial	2005	2007	High
SPA18	Action Plan 2008-2012: Voluntary Agreements (Plan de Acción 2008-2012: Acuerdos Voluntarios)	Ongoing	Co-operative Measures	2008	2012	Medium

Energy Efficiency Policies and Measures in Spain in 2007

Code	Title	Status	Type	Starting Year	Ending Year	Semi quantitative Impact
SPA19	Action Plan 2008-2012: Energy Audits (Plan de Acción 2008-2012: Auditorias Energéticas)	Ongoing	Information/Education/Training	2008	2012	High
SPA20	Action Plan 2008-2012: Public Support Programme (Plan de Acción 2008-2012: Programa de Apoyo Público)	Ongoing	Financial	2008	2012	High
SPA21	Action Plan 2008-2012: Inclusion of a specific assessment of energy impacts in all the Industry projects (Plan de Acción 2008-2012: Inclusión de una evaluación)	Ongoing	Legislative/Normative	2008	2012	High

## **Annex 2**

### **Country Profile**



# Energy Efficiency Profile: Spain

## Energy Efficiency Trends

October 2008

### Overview

The evolution of the Global ODEX in Spain has shown a favourable trend in the last two years as the result of the combined effect of the decrease in the energy consumption and of the GDP growth. The upward trend of previous years is therefore broken. Precisely, it is from the year 2000 on that the growth in index slowed down, showing signs of stabilisation until 2004, when a turning point in the upward trend of the previous years took place. As a whole, during the period 2000-2006 the Global index presents a worsening of 0.32% /year in contrast to the improvement of 1,21% undergone by the European average index.

### Industry

ODEX in industry has remarkably decreased with respect to the year 2005. The comparison at European level, in general, reflects since the early 90s a worse tendency of the Spanish index, with signs of stabilisation until the year 2000. Since then, in contrast to the European average, it's observed an upward trend which stops in the year 2006. In particular, along the period 2000-2006, while the average efficiency progress in UE-27 improves nearly 9%, the Spanish situation presents a worsening of 3%, for which some industrial branches like chemistry are responsible. In the short terms, it's expected that this situation changes for better through the implementation of the energy efficiency measures

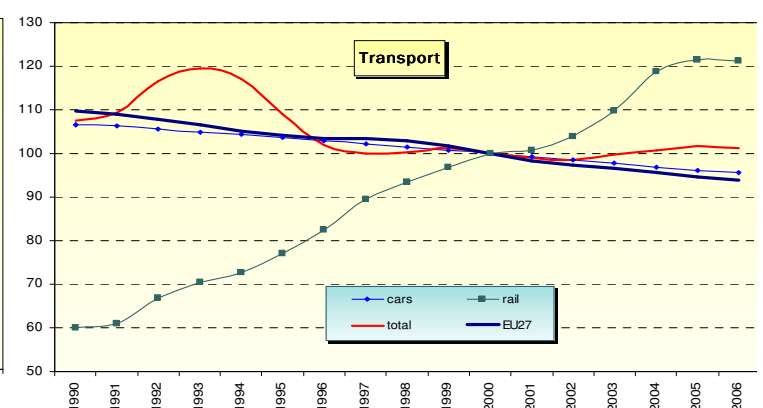
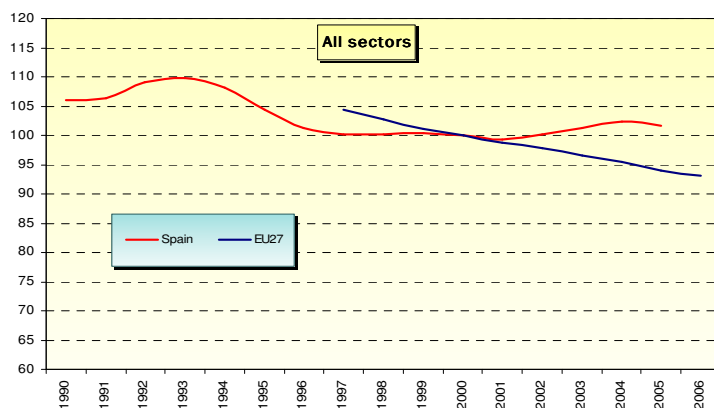
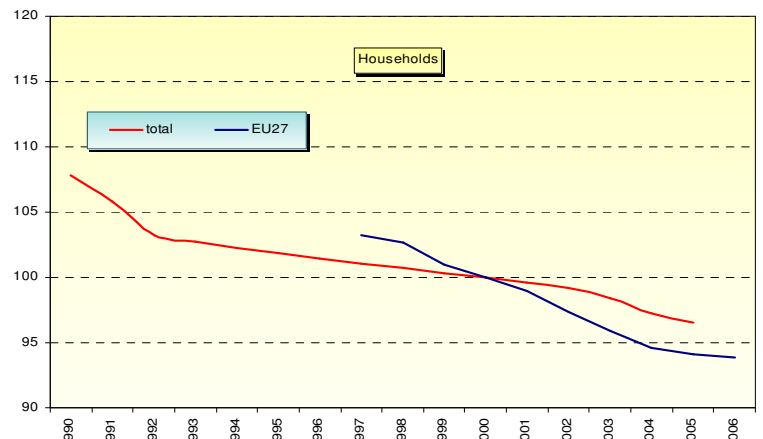
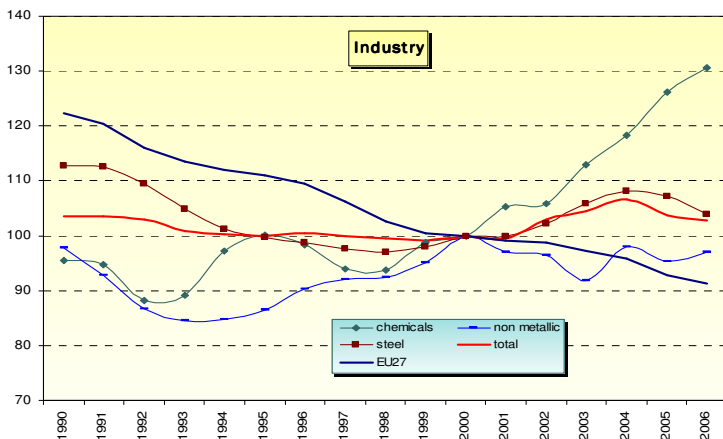
considered in the frame of the Energy Efficiency Action Plans.

### Households

Energy consumption per household in Spain is around 1.1 toe/household in 2006, that is, 35% less than the UE-27 average household energy consumption. The reason of this difference, mainly, responds to a lower equipment ownership of Spanish households as well as the scarce influence of energy prices on the households' expenses. However, both the income improvement and the progressive equipment ownership account for the worsening observed along the last years. This circumstance is also put in evidence through the ODEX index, which since the year 2000 evolves over the corresponding index for the European average, showing as a consequence a progress of 3% in the energy efficiency of this sector against 6% at European level.

### Transport

In Spain the transport sector shows values of the ODEX index, remarkably higher than the European average. The reason, on one hand, lies with Spain's geographical position that renders it an area for goods traffic from the North of Africa to the Centre of Europe, and on another hand, with the age of the national car fleet. Nevertheless, the index shows a tendency to stabilisation, which coincides with the significant introduction of diesel vehicles into the Spanish fleet of cars since the late nineties



Source: ODYSSEE Data Base

## Energy Efficiency Policy Measures

### Institutions and Programmes

IDAE is the national agency responsible for promoting energy efficiency and the increased use of renewable sources of energy in Spain. Royal Decree 1554/2004 of 25<sup>th</sup> June 2004, developing the basic organic structure of the newly created Ministry of Industry, Tourism and Trade (MICYT) and ascribes IDAE to this ministerial Department, through the General Secretary.

The Council of Ministers of 24<sup>th</sup> November 2006 approved, through Royal Decree 1370/2006, the **National Plan for the Allocation of Greenhouse Gas Emission Allowances, 2008-2012 (PNAIL)**. This Plan is the second one to be drafted within the ETS framework and the first one within the period established in the Kyoto Protocol.

The Council of Ministers of 20<sup>th</sup> July 2007 approved the **Action Plan 2008-2012 of the Energy Efficiency Strategy (E4)**, consolidating the effort of the Action Plan 2005-2007. This Plan pays special attention to diffuse sectors. As a whole, it joins together a set of measures that will enable a saving of 87.9 Mtoe all along the period 2008-2012. The new Action Plan is integrated within the **EU NEEAP** requested by **Directive 2006/32/CE**.

The Council of Ministers of 30<sup>th</sup> May 2008 approved the **Planning of the Electricity and Gas Sectors 2008-2016**, which aim is to grant the security and quality of energy supply at medium and long term.

### Industry

This sector relies on several measures within Action Plan 2008-2012, currently under way, to improve its energy efficiency. Among these, it can be highlighted the subscription of **voluntary agreements** between the representative entrepreneurial associations of each sector and the Central Administration, through the MITYC and IDAE itself. These agreements engage associations to reach the potential of energy saving detected in each sector. With the same aim, there is a **Public Support Programme** focused on energy efficiency with distributed funds according to a management

model shared between the State's General Administration (SGA) and the Autonomous Communities.

The approval of **Royal Decree 616/2007 on the promotion of CHP**, through which Directive 2004/8/EC is transposed to Spanish legislation, shall contribute to a better energy efficiency in the industry sector.

### Households, Services

Along the last years, there has been a series of improvements in the specific legislation as regards the efficiency of the building sector, among which stands out the approval of the **Technical Building Code (TBC)**, the revision of the Regulation on Building Heating Installations (RITE), and the approval of a **Building Energy Certification procedure for new buildings**, respectively approved by Royal Decrees **RD 314/2006**, **RD 1027/2007**, and **RD 47/2007**. At present, a procedure of **energy certification for existing buildings** is under development.

In like manner, the prominence of Bylaws on Solar Thermal Uses has been outstanding in the buildings sector after the first publication by IDAE of bylaws model in 2001. It's expected that this favourable trend continues as a consequence of the foreseeable impact of the application of the TBC and the RITE regulations.

The Council of Ministers of 24<sup>th</sup> July 2007 approved the agreement by which it's established an **Energy saving and Efficiency Action Plan for the buildings of the SGA** so that both the SGA and its dependent bodies should play an exemplary role through the incorporation of management and technological measures to save energy in their buildings.

### Transport

**Law 12/2007**, of 2<sup>nd</sup> July, modifying Law 34/1998 on the **Hydrocarbons Sector**, with a view to adapting it to the content of Directive 2003/55/EC on **common rules for the internal gas market**, which regarding **biofuels**, introduces the **obligation to use them in transport**.

## Selected Energy Efficiency Measures

Sector	Measure	Since	Final Energy Saving (ktoe), 2012	CO <sub>2</sub> emissions avoided (kt), 2008-2012
Industry	Public Support Programme	2008	7.904	26.932
Transport	Urban Mobility Plans	2008	1363	16.122
Transport	Transport Plans in Firms and Activity Centers	2008	454	5374
Transport	Greater Participation of Collective Road Transport Means.	2008	273	3224
Transport	Greater Participation of the Railways in Interurban Transport.	2008	1090	12898
Transport	Management of Transport Infrastructures.	2008	2272	26870
Transport	Efficient Driving of Private Vehicles.	2008	546	6449
Transport	Renewal of the Road Transport Fleet.	2008	454	5374
Transport	Renewal of the Private Car Fleet	2008	1090	12898
Building	Renewal of the thermal casing in the existing buildings	2008	404	5232
Building	Improvement of the energy efficiency in the thermal installations of the existing buildings	2008	469	6452
Building	Improvement of the energy efficiency in the indoor lighting installations of the existing buildings	2008	931	17937
Building	Promotion of the construction of new buildings and renewal of the existing ones with a high energy certification.	2008	438	5322
Public Services	Energy Saving and Efficiency Plans in Public Administrations	2008	423	8106

