POLICY PAPER 106 MARCH 2014

ENERGY POLICY: EUROPEAN CHALLENGES, SPANISH ANSWERS

Eloy Àlvarez Pelegry | *Director of the energy chair at Orkestra-Basque Institute of Competitiveness. Fundación Deusto*
Macarena Larrea Basterra | *Researcher in the energy chair at Orkestra-Basque Institute of Competitiveness. Fundación Deusto*

SUMMARY

This Policy Paper aims to offer suggestions about energy policy in Spain. To do so, it first makes an analysis of policy objectives, targets and instruments from a theoretical point of view, referring also to the practical approaches in Europe and in the USA.

The Spanish energy system is within Europe not only physically, but also and mainly from the point of view of regulation and energy policies. Energy policies change over time. The economic and social situation, the technological development and the general trends affect, influence or determine energy policies. Therefore basic trends that referred mainly to Europe are described in the Policy Paper.

There can be identified energy transitions in Germany and France, the change of the electricity mix, the search for energy efficiency and the decarbonisation of economies among the main issues that concern European and national energy policies. Besides these aspects the development of distributed energy or the digitalisation and automation of the energy sector are also considered.

Once the main trends are described, the Policy Paper carries out an overview of the characteristics of the Spanish energy sector as well as of the evolution of the liberalisation process. For the past two decades there is a continuous search of a stable legal framework and a proliferation of rules that make difficult the overview of the sector. Although there are a greater number of agents that should contribute to competition, energy prices have increased. It is also considered and analysed the lack of a comprehensive and coherent vision on energy, as energy is most often identified with electricity.

"THE SPANISH ENERGY POLICY MUST BE AMBITIOUS BUT FLEXIBLE"

Today´s main trends do not take adequately into account the need of having a balancing energy mix, and the risks of depending only on a reduced number of energy sources. Furthermore, the Spanish energy policy does not fully consider the interrelation between energy and industry and the need of taking R&D investments into account.

The last section of this Policy Paper suggests that the Spanish energy policy must be ambitious but flexible, focusing on some special aspects such as competitiveness, final demand (i.e. transport energy consumption or energy efficiency in buildings) and the need for a real liberalisation.

Finally other suggestions are made, namely those referring to the development of national own resources, the promotion of energy R&D and the compelling need to design a comprehensive energy policy that responds to the Spanish energy sector challenges.

TABLE OF CONTENTS

INTRODUCTION 3

1. Policy objectives, targets and instruments 3

1.1. About policy, targets and instruments. A rather theoretical approach 3

1.2. Some references on objectives, targets and instruments 5

1.3. A proposal of final objectives, basic targets and instruments 6

2. An overview of general trends that referred mainly to Europe 8

2.1. Energy transitions in Europe 8

2.2. Decarbonising the economy: CO_2 pricing through markets and taxes 9

2.3. Energy efficiency and downturn in demand 11

2.4. Fragmentation of electricity and gas markets. Infrastructures development 12

2.5. Distributed energy and the permanent "wish" of an active participation of final consumers 15

2.6. Energy utilities trends: low value for the shareholder, high leverage, internationalisation and consolidation 15

2.7. Digitalisation, automation, externalisation and productivity 17

2.8. Energy R&D Investment 18

3. A personal view on the characteristics of the Spanish energy system 20

3.1. Looking for the Holy Grail: the assumption of the "perfect regulator" 20

3.2. Open market and competition 20

3.3. The lack of an integral vision in energy. Transport and tertiary sectors, the missing friends 21

3.4. A biased approach to the current account deficit and the energy dependency 22

3.5. A risky reversal from a balanced electricity mix to an emphasis in gas and renewable energies 25

3.6. The absence of a clear connection among energy, industry and R&D policies 27

4. Some suggestions on the Spanish energy policy in the European framework 29

4.1. Competitiveness, competitiveness, competitiveness 29

4.2. Energy markets. Liberalising prices for final consumers 30

4.3. Focus on final energy demand 30

4.4. Promotion and development of Spanish own resources 31

4.5. An efficient utilisation of a balanced electricity mix 32

4.6. Technological innovation, R&D and industrial development 32

ANNEXES 34

REFERENCES 36

The findings, interpretations and conclusions expressed in this Policy Paper are those of the authors and do not necessarily reflect the opinion of the Basque Institute of Competitiveness – Orkestra and of Notre Europe – Jacques Delors Institute.

INTRODUCTION

The present Policy Paper tries to analyse and discuss the Spanish energy policy. Firstly the Policy Paper deals with the matter of energy policy and a review of some definitions of energy policy as well as objectives and instruments. A brief analysis of energy policy examining different approaches to instruments, targets and objectives, is carried out.

The main objective of the Policy Paper is to address the characteristics of the Spanish energy system and propose some suggestions on energy policy. After reviewing the characteristics of the Spanish energy system a proposal with specific suggestions for the Spanish energy policy is performed.

The characteristics of the Spanish energy system cannot be fully understood, if they are not put into the context of the EU general trends. As a consequence the Policy Paper considers, in section 2, a brief summary of the main points of energy transitions in France and Germany as well as the general trends in Europe.

1. Policy objectives, targets and instruments

This section seeks to establish what is meant by policy, and tries to identify the objectives, targets and instruments that should be used, to move towards a low carbon economy. After a discussion of a rather theoretical approach some international references are given and a proposal of objectives, targets and instruments is made.

1.1. About policy, targets and instruments. A rather theoretical approach

It can be said that policy means a plan of action adopted or pursued by an individual, a government, a party or a business. Also means the way in which it is carried out a business or the means to achieve a particular purpose.

By policy it is also understood the guidance or guidelines that govern the conduct of a person, or an entity in a determined subject or a field, and also the enforcement of laws and regulations, to maintain public peace and safety and preserve the order. Finally, policy can also refer to the citizens' activity when involved in public issues with their opinion, their vote, or in any other way.

Another definition, more specific for energy policy, focuses on supply and demand and the different energy subsectors, and defines energy policy as the set of actions emanating from the authorities in order to influence subsectors and activities of the different energy sources, ensuring the adjustment between supply and projected energy demand, facilitating the implementation of efficient resource allocation mechanisms, and paying special attention to environmental protection[1].

In this regard, basic legislation or regulation provides the legal framework to be followed, so as to offer stable perspectives to the free economic initiative, and closely connected with regulation and the planning, whether binding or indicative, that develops the energy policy decisions and the indications of the prospective analysis.

1. Marin Quemada, 2000.

Energy policy can be structured as the set of goals or objectives, targets and instruments that determine the role that energy should play in society[2].

Any policy must have clear objectives and targets to achieve and the instruments that can be used for. The objectives are the goals that the government is looking for when designing a policy. In order to be able to reach them, each policy is accompanied by instruments, which are tools that allow making something to happen and to achieve a purpose.

In the definition of the ends or targets of economic policy the values or ideology are present so it cannot be said that the ends are "neutral", or fully technical, and that there is not influence of the values or ideology.

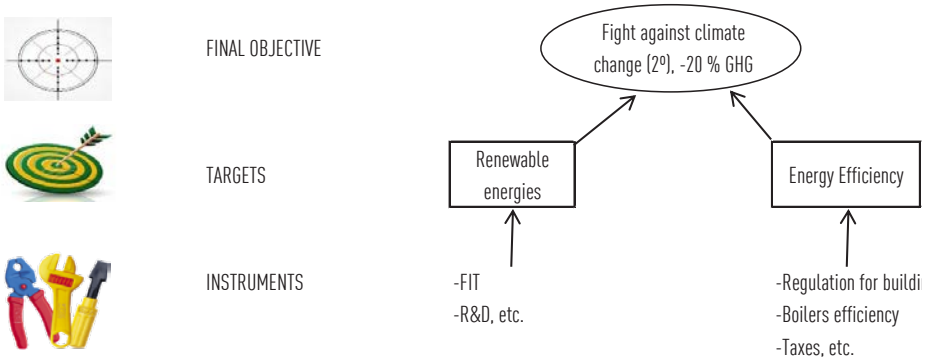
When turning to the ends a clear distinction can be made if a "monist" position is considered, in which a set of values are, so to speak, summarised in a unique or singular supreme objective that encapsulates the number of "partial values". In the energy policy the example that could be appropriate is the fight against climate change that paradoxically is not strictly speaking a concept specifically for energy; in economic policy the example that could be appropriate is social welfare.

A concept that can be drawn from economic policy refers to the interaction with other policies. In economic policy the other policies could be monetary, fiscal and labour; and in energy policy industrial, environmental and R&D ones. Some[3] refer to specific policies that could deal with intermediate targets that in turn can be classified as horizontal policies (applicable to a range of economic issues) and vertical ones related to a particular sector.

As an example, the European Commission in its green paper "A 2030 framework for climate and energy policies" recognises the interaction among climate policy and energy policy, identifying the fight against climate change as the big driver, with the main target of reducing 40% greenhouse gas emissions.

In relation to the targets, referring to the EU there could be different targets for instance on renewable technologies and/or on energy efficiency (see Figure 1), to achieve the final objective of the fight against climate change. However to obtain operability there must be instruments of practical nature.

FIGURE 1 ► Policy objectives, targets and instruments



Source: Own elaboration

As far as instruments are concerned, their principal characteristic is that they contain elements for action and that they are defined in such a way that the policy maker can work for modifying the facts of the reality. As instruments examples there are taxes, feed in tariffs and emissions limits[4].

2. Club Español de la Energía, 2013..
3. Fernandez, D. et al, 1982.
4. In this regard a useful consideration can be found in economics where the economic theory tries to model the economic facts, and the economic policy tries to influence the economic reality in order to obtain some ends.

Furthermore in this ample definition there is room for various instruments, which can be used by different policies. For instance, taxes can be used by energy and environmental policies, as well as by fiscal or industrial policies.

There are several ways of classifying the instruments; one of the most employed guideline is making a difference between compulsory and voluntary regulation instruments. Regulatory instruments can be laws, rules and standards. The main concern of these instruments is that targeted people have an established way to achieve the objectives[5].

Another classification may consider other types of instruments such as technological ones (SET-Plan), economic instruments (taxes, subsidies, markets), organisational instruments (design of the competencies of the industry, energy and tourism ministry, energy state secretary and CNE) or programmatic instruments (Renewable energy plan).

Related to these considerations it should also be noted that the emphasis on objectives changes along time and depending on each country circumstances. For instance, during the sixties and eighties of the last century the main objective was security of supply; however in the nineties, economy was more important. At present sustainability, security of supply and economy are being taken into account although competitiveness begins to be a priority over the others[6].

As in the economic policy one important issue is that the process of decision making should be came out based on the rationality and taking into account on scientific and technical grounds. Rational decisions taken with the assumption of acting in the general interest is a hypothesis, usually adopted but frequently contradicted by the facts. In the same way that it is assumed that market failures can be corrected by regulation and it could be assumed that the regulator makes no mistakes when trying to "repair" market failures.

Just to finalise these considerations, if there are final or superior objectives, targets (that could be classified as basic and secondary), and instruments, it could be thought that there is an objective function for all, and here the question is if society should optimise the global function or look for a particular optimisation of secondary targets (i.e. productivity of the existing energy system should be optimised or employment creation in the construction phase of energy facilities should be maximised?).

It constitutes, in short, the energy strategy to achieve the desired objectives, that should be very closely linked with national objectives, and coordinated indeed with other policies (at national and EU level), such as economic, environmental and industrial.

1.2. Some references on objectives, targets and instruments

Depending on the organisation (International Energy Agency, European Union, etc.), or the different stakeholders and governments, the objectives and instruments of the energy policy may be different.

The International Energy Agency considers the following instruments and objectives related to the development of energy policy: diversification and flexibility of energy sectors in emergency situations; environmentally sustainable and socially acceptable energy supply; improvement of energy efficiency; support to R&D&I; free markets and open trading; and energy cooperation between agents.

Looking for references from outside Europe, it can be observed that in the USA there is no approach of objectives, targets and instruments, but a panoply of topics related to energy and the main concerns of each moment. That is there are some main issues considered depending on the situation. Table 1 offers a general overview of

5. Velasco González, 2007.
6. Álvarez Pelegry, 2009.

the main issues of George Bush´s national energy policy from 2001 and in the most recently energy policy for the USA in 2011 (Obama´s policy).

TABLE 1 ► USA energy policy issues

GEORGE W. BUSH - 2001	BARACK OBAMA - 2011
Energy mix diversification	Security of supply. Safety in nuclear plants
New infrastructures	Renewable energy
Exploration and production of carbon, oil and gas.	Exploration and production of carbon, oil and gas
Improve citizens' welfare.	Energy efficiency in buildings
Protecting and enhancing the environment	Climate change: emissions trading scheme implementation
Using energy "wisely" to reduce its cost.	Transport: new generation fuels, hybrid vehicles
R&D investment: new carbon technologies.	R&D promotion: smart grids, carbon storage
Strengthening global alliances	Consumers Protection.

Source: Mosácula Atienza & Larrea Basterra, 2013.

The European Union advocates the following instruments and objectives: improving energy saving and efficiency; advance towards the internal energy market, consumer rights and infrastructure development; actions for sustainable, secure and competitive energy supply; and financing low carbon technology.

A vision of the basic objectives for the Spanish energy policy is the following[7], ensuring security of supply in terms of appropriate conditions of quality and price to the whole population, despite the high external dependency; promoting economic growth, so that the power supply is not a limitation to keep improving positions in convergence with the more prosperous countries, fostering the competitiveness of the national industry, and reconciling the energy use with an effective protection of the environment so as to meet a long term sustainable development.

The tool through which these objectives are reached is constituted by a combination of energy sources and technologies that lead to the primary supply structures and the electrical mix.

1.3. A proposal of final objectives, basic targets and instruments

Once questions about objectives, targets and instruments, and a survey about the main topics has been carried out, a non usual proposal about the objectives of energy policy and its main elements shall be proposed.

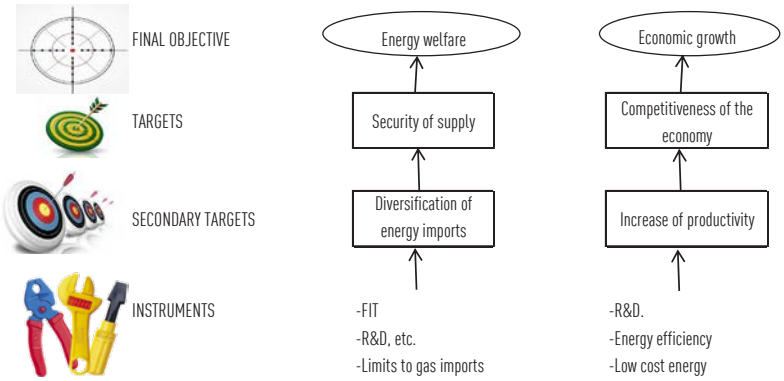
In this regard, energy policy should have two main objectives, citizens' energy welfare and economic growth, as there is a real connection between the energy sector and the economy. In fact, energy is a key issue in economic competitiveness, both as an input and as a driver of industrial development, through the proposal of technological and business programs.

Energy affordability, security of supply and environmental responsibility should be the basic targets for the citizens' welfare; while economic growth should sustain on the creation of sustainable firms in the energy field and keep competitiveness of the economy by assuring the competitiveness of energy.

In turn, each of these basic targets is a pillar that could be broken down into some secondary targets as presented in Table 2. These secondary targets represent specific aims that may help to achieve the basic targets. How can security of supply be achieved? Namely through the diversification of energy imports, developing transmission networks, etc. Figure 2 offers an idea of the energy policy proposal that Table 2 reflects.

7. Club Español de la Energía, 2013.

FIGURE 2 ► An example of the new proposal of energy policy



Source: Own elaboration

TABLE 2 ► A proposal of final objectives, basic targets and secondary targets for an energy policy

PRINCIPAL OR FINAL OBJECTIVES	BASIC TARGETS	SECONDARY TARGETS SOMETIMES RELATED TO OTHER POLICIES (INDUSTRIAL, R&D, ENVIRONMENTAL)	SOME INSTRUMENTS
Energy Welfare	Energy affordability	Affordable and equitable energy supply for final consumers	Social bonus for electricity consumers
	Security of supply	Diversification of primary energy imports	Royal Decree 1766/2007, which limits gas imports from a country to 50% of total gas imports; Royal Decree 1699/2011 that regulates the connection to the grid of small electricity facilities; Promotion of renewable technologies; Promotion of renewable technologies exploration of shale gas resources; Coal plan
		Transmission networks	
		Large and solvent domestic companies	
		Diversified and balanced electricity mix	
		Indigenous resources: renewable, gas, oil, coal	
	Environmental protection	Reduction of emissions: SO_2, NO_x, etc. (Environmental Policy)	Directive 2010/75/EU on industrial emissions; Pricing CO_2 emissions; Law 15/2012, establishes among others taxes on nuclear waste.
		Reduction of CO_2 emissions/ GDP. (Environmental Policy)	
		Nuclear waste storage resolution. (Environmental Policy)	
Economic Growth	Sustainable firms in the energy related fields	Cluster vision. (Industrial Policy)	EnergiBasque; Promotion of research and innovation in the energy field though grants and subsidies; Establishment of R&D expenses ratios
		Identified role of R & D & I. (R&D Policy)	
		Efficient incentives: tax, labor, FIT, public budgets. (Industrial Policy)	
	Competitiveness of the economy	Improved profitability of companies with internationally traded goods	Developing exemptions for companies that export and are big energy consumers; Promotion of renewable technologies; Preliminary draft law to balance electricity sector; Low cost of energy
		Improve balance of payments on current account (commercial balance of goods and services + balance of income and financial payments)	
		Primary energy promotion	
		Productivity increase	

Source: Own elaboration

2. An overview of general trends that referred mainly to Europe

2.1. Energy transitions in Europe

There is a new concept for energy policy that looks for the long term period of action, reaching the twenties, the thirties of this century and even the forties until 2050. This new concept, called "energy transition", was developed in the eighties in Germany and Austria, and connects the energy policy to economic and industrial policies as it takes into account the importance of energy costs as well as CO_2 prices to guarantee national competitiveness.

The concept of "energy transition" considers the option of transforming the energy mix of a country, passing from a non renewable mix to a renewable mix[8], in order to achieve a sustainable energy system in terms of environmental protection, industrial and technological development, reduction of foreign energy dependency and regional cooperation generally by the horizon of 2050.

In this framework, the document developed by the French Economic, Social and Environmental Council with recommendations to advance towards this energy transition can be considered, as well as the German government decision to replace fossil and nuclear energy with renewable energies (RES) and the Renewable Energy Sources Act (EEG)[9].

Among these proposals of energy transitions there are many common features. In all of them the evolution of the energy system to a low carbon economy through a greater presence of RES is clear, looking at the same time to a sustainable system with the lowest energy prices and assuring energy supply. Simultaneously these models consider that energy transitions will create employment and will foster R&D.

Nevertheless there are also differences, for instance, in the German transition Carbon Capture and Storage (CCS) is considered as an expensive and less interest option, however in the European Energy Roadmap CCS if commercialised will have to contribute significantly in most scenarios[10]. The same question arises for nuclear energy. In the Energiewende nuclear energy will disappear in the medium term, however in the European Energy Roadmap, this technology will play an important role in the evolution to a low carbon economy. In the French case, nuclear energy should be submitted to a period of reflection.

Table 3 offers a comparison of the energy transitions in France and Germany, including the European view.

8. The new energy mix should consider gas, biofuels, low temperature geothermal energy, and question the place for nuclear energy, among others.
9. Morris & Pehnt, 2012.
10. European Commission, 2011.

TABLE 3 ► Main objectives of energy transitions in Europe

FRANCE: *TRANSITION ÉNERGÉTIQUE*	GERMANY: *ENERGIEWENDE*	EU: ENERGY ROADMAP 2050[1]
Move from a non renewable to a renewable energy mix	Move from a fossil-nuclear system to a mainly renewable energy system (80% of RES by 2050). Wind and solar will assume a leading role	Move from high operational costs to an energy system based on higher capital expenditure and lower fuel costs. Move to a more renewable energy system. Gas and nuclear will play a key role in the transition.
Sustainable energy system	CO_2 emissions reduction (80% by 2050, referred to 1990)	Decarbonisation of the energy sector (80-95% by 2050, referred to 1990)
Industrial and technological development, R&D	Reduced energy costs	Competitiveness, however it is expected a higher energy expenditure on households
Reduction of foreign energy dependency	Guarantee system reliability and security of supply	Security of supply; increasing interaction of energy systems and improving infrastructure development
Ensuring French economy competitiveness	Energy efficiency: the kilowatt that is not needed is the most cost effective kilowatt	Energy efficiency and energy savings
Pricing CO_2 emissions	New market development: covering production costs as well as investment costs	European market integration
Creation of durable and qualified employment and avoid employment losses	Consider the European context and the European market integration	Increasing role of electricity

Source: Own elaboration

2.2. Decarbonising the economy: CO_2 pricing through markets and taxes

One of the main trends at the European Union and at national level, since the Río Earth Summit in 1992 and especially since 1998 when the Kyoto Protocol was adopted, is the fight against climate.

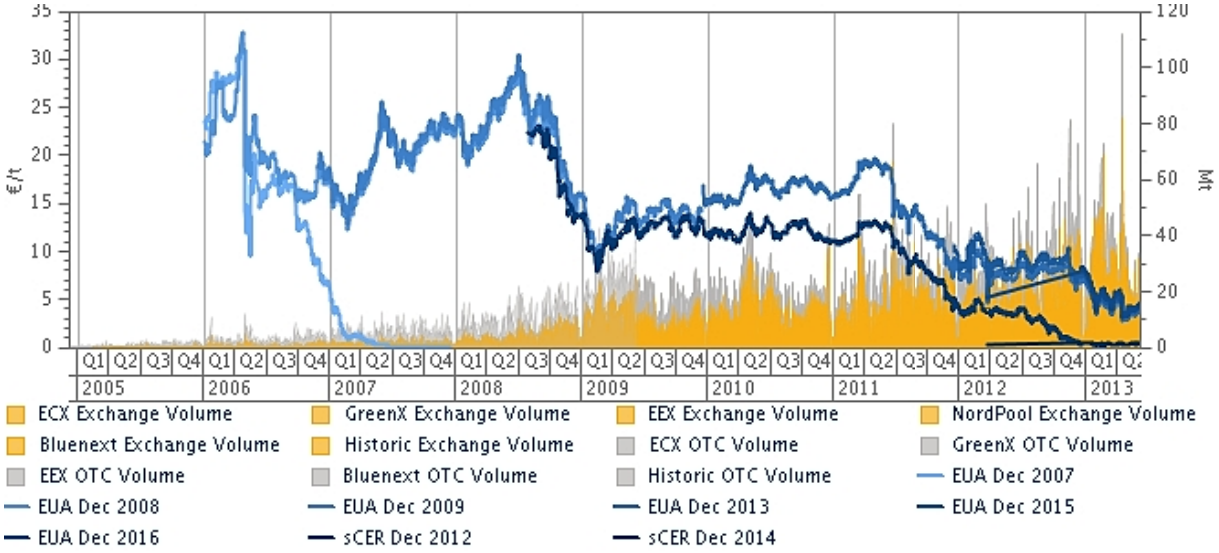
The European Union has played a leading role in the international framework developing some mechanisms to advance through a low carbon economy. Most of them are rules and directives that focus mostly on energy producers and consumers. In this regard there is a need to choose the best combination of measures and decisions, recognising where emissions are produced.

Among the main instruments pricing CO_2 can be employed to meet EU´s emissions reduction targets, whether through the European Union Emissions Trading Scheme (EU-ETS)[11] for industrial sectors and, since 2012, emissions from international aviation or through energy/environmental taxes, mainly for those so-called diffuse sectors: transportation and construction.

During these last years, CO_2 prices settled by the EU-ETS to the European Union Allowances (EUA) has dropped dramatically, as it can be observed in Figure 3.

11. The EU-ETS is based on Kyoto emissions trading.

FIGURE 3 ► Point Carbon EUA closing price assessment for different December expiry vintages



Source: Point Carbon, 2013.

It is supposed, that market prices are a signal to incentive investments in low CO_2 emissions technologies, but low EUAs prices do not offer enough incentives to promote cleaner and more expensive technologies, in the energy sector.

In November 2012 the European Commission tabled a draft amendment to postpone the auctioning of 900 million allowances from 2013-2015 (back-loading proposal). As a result of the economic crisis, the volume of allowances needed decreased and as the volume of EUAs auctioned was the same, prices went down. The objective of this proposal was to reduce the volume of EUAs auctioned in the following sessions in order to increase CO_2 prices (900 millions of EUAs[12]). In July 2013, the European Parliament passed the new amendment proposal document.

The second way of pricing CO_2 is by the way of taxes. There are taxes established by governments whose objective are those sectors that are not subject to the EU-ETS, that include transport, building, heating, etc. (Decision 406/2009/EC), which must also reduce their emissions on a certain level.

The problem appears when governments decide to set taxes on EU-ETS sectors, as it has been the case in Spain with the taxes on electricity production or on hydro power, specifically. It is just not a question of price signal to promote less harmful technologies, but a matter of economic and political consistency.

In France the experience with a carbon tax failed because it was supposed to levy not only on diffuse sectors but on EU-ETS sectors as well. In Ireland however it can be considered a partial success because of its design. The Irish carbon tax was structured following specific guidelines, for instance, not concerning EU-ETS sectors and paying attention to problems such as fuel poverty or the importance of agriculture.

In Spain, besides the problem mentioned before there is another element that complicates the situation, the competences of autonomous communities on environment and taxes. Most of the wide variety of energy/environmental taxes are found in the autonomous level and have mainly a raising funds objective as the funds obtained in this way are not invested in improving energy efficiency or low carbon technologies.

12. They would be reintroduced gradually and not at the end of the third phase.

In any way, all these mechanisms are not efficient enough, because of three main reasons[13]. First these taxes are not only beard by the most polluting technologies. Second they affect the market unity and third they create legal uncertainty.

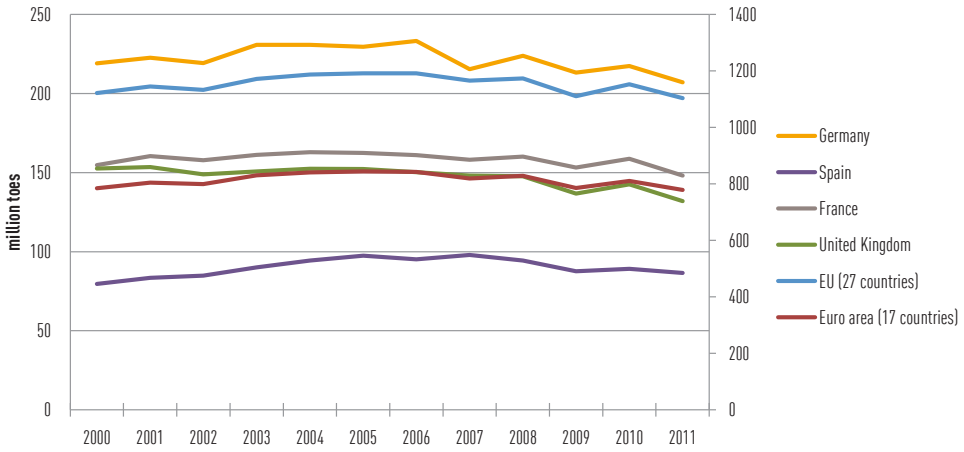
To summarise, energy transition to a low carbon economy employs different mechanisms. European pricing of CO_2 with markets, has failed incentivising emissions reduction and it should also be noticed that taxes establishment is unequal. Finally environmental taxes have not a finalist objective, environment, but a fund raising goal.

2.3. Energy efficiency and downturn in demand

During the last years, there has been a continuous bet on energy efficiency. As a consequence, governments and private initiative have made large investments on it that have had some satisfactory results. However it is not likely to achieve the 20% objective at the European level; 10% is considered now more realistic.

Improvements on energy efficiency of final energy consumption in connection to the economic situation have turned out on a decrease in demand. This trend is common to several European economies as Figure 4 shows. The turning point is previous to the economic and financial crisis, around 2005-2006. This could mean that the downturn in energy consumption is not only a consequence of the general situation but a trend of most European economies that are looking for efficiency.

FIGURE 4 ► Final energy consumption in Europe

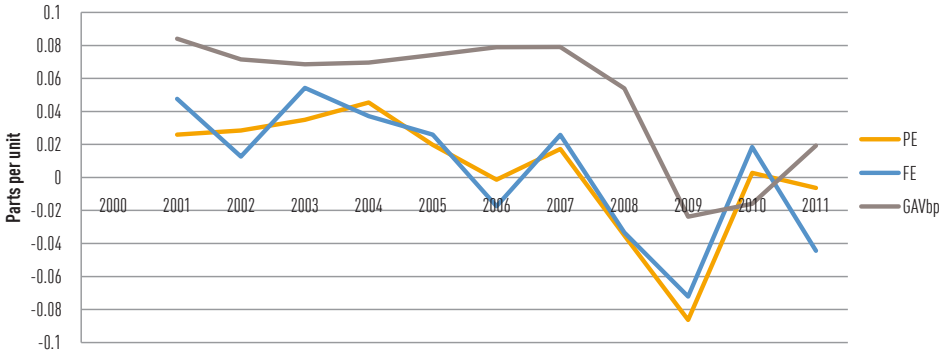


Source: Eurostat, 2013.

Figure 5 shows the evolution of the variation of primary and final energy (PE and FE) in relation to the gross added value at basic prices (GAVbp) in Spain. As it can be observed, from 2000 to 2005 PE and FE followed an increasing trend but diminishing the variation rate; however the gradient of the GAVbp was higher and more stable. In 2005 this trend changed for primary and final energy that until 2007 did not diminished. Since that moment reductions in PE and FE variation were more important than in GAVbp. In 2011 PE and FE show a negative rate but a recovery of the GAVbp.

13. Calleja Mediano, 2013.

FIGURE 5 ► Evolution of the variation rates in Spain



Source: Own elaboration from Secretaria de Estado de Energía and INE.

Even if there are variations, positives and negatives, on primary and final energy demand, there is a tendency to decline and hold back if compared to GAV evolution.

There is an important potential for energy savings through energy efficiency not only in the industrial sector but in the transport and tertiary sectors too. However these opportunities will require interrelated policies, more complicated to implement and showing no results in the short term. As an example, at present, it is generally accepted that most of the environmental problems in cities are due to traffic. The last report from the European Environment Agency[14] points at that most of the pollution-reduction measures taken by cities are related to traffic. In this sense, the future of car industry is intended to be cleaner as well as more fuel efficient and at the same time cheaper.

As a consequence, car industry is urged by regulation, which wants less environmental impact, and technology improvements, and these will result on more modern vehicles, pushed by natural gas, biofuels, hybrids or only electric cars and super-efficient petrol and diesel cars[15].

Reduction on consumption by more efficient vehicles, changes in the types of fuels used by the different means of transport will probably suppose a decrease on energy demand as well as changes on the energy mix, with possible impacts on energy prices, in particular on oil and petroleum products.

2.4. Fragmentation of electricity and gas markets. Infrastructures development

The creation of a market in Central and Northern Europe progressively has resulted in greater energy volumes traded, higher liquidity and closer interaction of different prices of energy, especially in electricity, in various regions in the framework of the internal electricity and gas market.

The fact that the EU Commission is trying to promote the creation of an internal gas and electricity market is a proof that both markets are far from the European vision. Therefore the fourth element of the general trends considered in this section is the fragmentation of electricity and gas markets.

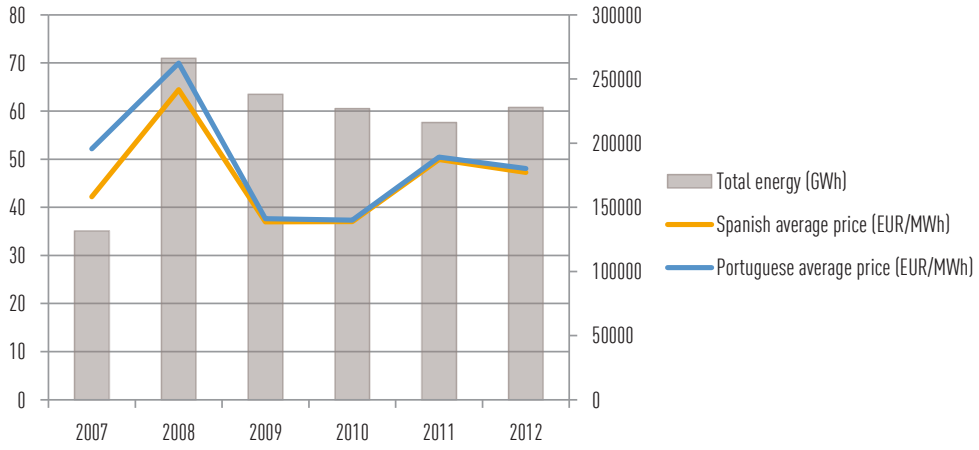
To make progress towards the internal markets, the development of infrastructures is needed to facilitate a considerable volume of energy traded and the progressing extension of price coupling (single price), which in turn allows consumers to have the best price in that area.

14. European Environment Agency, 2013.
15. The Economist, 2013.

In electricity, considerable progresses have taken place. In Spain and Portugal, the creation of the Iberian Electricity Market (MIBEL), in 2007, is the culmination of a process that began in 1998. MIBEL was born as the result of the coordination of both Iberian electricity systems, in order to offer benefits to consumers in a framework of guarantee access in terms of equality, transparency and objectivity to all the agents.

Since the creation of MIBEL there has been a trend to a single price, however there are still moments, when prices are different as Figure 6 shows.

FIGURE 6 ► Spanish and Portuguese electricity price (euros/MWh)

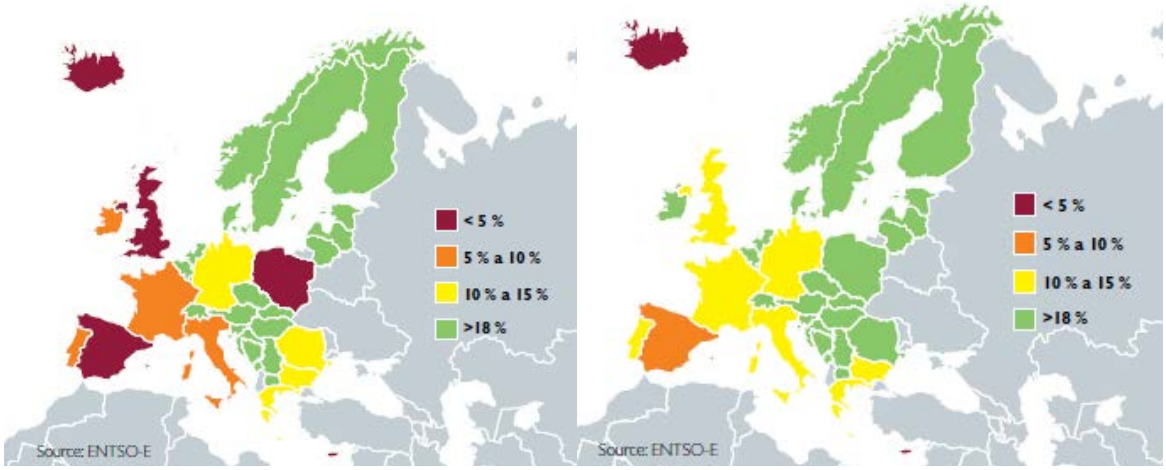


Source: OMIE, 2013a.

At present the Iberian Spot Market Operator (OMIE) is employing a new algorithm and the Price Coupling of Regions (PCR) systems which will allow coupling the Iberian electricity market with the rest of Europe by the end of 2013 and the first quarter of 2014[16].

Improvements of interconnections during the last decade have lead to a considerable increase of international electricity exchanges. Therefore it is expected that in the future they will grow again. However in Spain this improvement will be less than expected (less than 10%) needed to achieve the integration of Spanish market in the European one.

MAP 1 ► Interconnections ratios (2011 and 2020)



Source: ENTSO-E in Red Eléctrica de España, 2012.

16. OMIE, 2013b.

In the gas field there is a fragmentation due to the different pricing gas mechanisms that exist; i.e. oil price escalation, gas on gas competition and bilateral monopoly among others. Besides the development of connection infrastructures is also an important question.

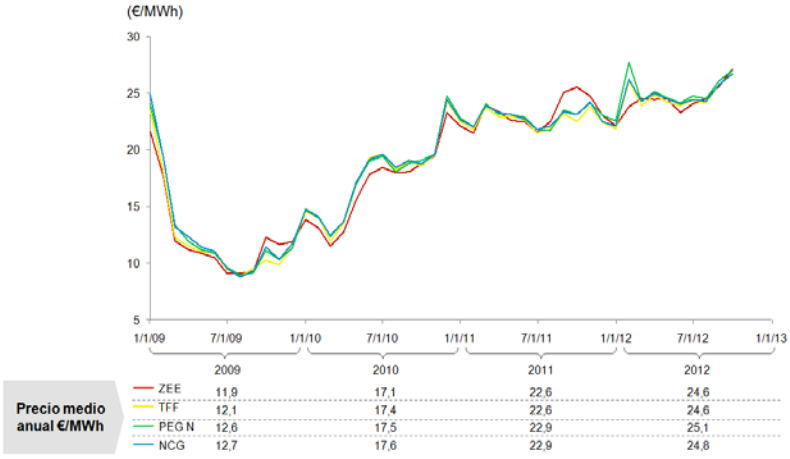
The Council of European Energy Regulators (CEER) settled in the document "Vision for a European Gas Target Model"[17] that Europe should develop by 2014 a European Gas Target Model, based on the completion of the internal market. To achieve this objective, there should be organised markets in Europe and enough infrastructures that will assure market liquidity and a certain degree of integration.

The development of gas exchanges in Europe will probably finish developing the hub to hub connection within the framework of the gas target model. At present there are several gas hubs[18] in the EU however they have not the same experience[19].

The average annual growth rate of gas traded in the European states shows an increasing tendency in the period from 2008 to 2010. In Germany the average annual growth rate has been 104%, in Netherlands 57%, 51% in Austria, in France 43%, in Belgium 21% and in the United Kingdom 8%.

Even if there are differences in the main characteristics of each gas hubs development, price signals look like the same, and prices evolve in the same way. In most of the European gas hubs, divergences in prices are small, as it can be observed in Figure 7. The variations could be related to the differences on transport costs in each market[20].

FIGURE 7 ► Price signal evolution in different organised markets



Source: Bloomberg in Álvarez Pelegry, Figuerola Santos et al., 2013.

To summarise, in both electric and gas sectors, there is a general trend of converging prices fostered by infrastructures development and organised markets, which will let the integration of the European energy market. Nevertheless markets are still far from each other and major developments are still needed in order to achieve the "unification" of markets.

17. Council of European Energy Regulators, 2011.
18. NBP (United Kingdom), GTF (Denmark), PSV (Italy), GASPOOL (Germany), PEG Nord, PEG Sud and TIGF (France), AOC (Spain), TTF (Netherlands), etc.
19. Álvarez Pelegry, Figuerola Santos et al., 2013.
20. Álvarez Pelegry, Figuerola Santos, López, Martén Uliarte, & Sarrado, 2013.

2.5. Distributed energy and the permanent "wish" of an active participation of final consumers

The incorporation of the small generation and the influence on final consumers is a clear trend that has been experienced and should continue in the next years. This is partially a consequence of the introduction of renewable technologies, with small installed capacity (i.e. solar and wind) in comparison to other technologies that exploit economies of scale of big facilities, like nuclear or coal.

These new technologies have been and will probably be developed in the following years as a way for reducing families' expenses in energy as well as to fight against climate change. This possible evolution settle a new target that the government must face, developing regulations that will "solve" the doubts about the distributed energy, facilitate the suppression of obstacles and the management of an increasing number of dispersed generation.

Due to the increase in production of RES from distributed generating units in Germany, there are back-flows permitted that occur sometimes. Therefore there is a need to design metering and protection for bi-directional flows[21]. Thanks to the correct planning of network connections and upgrades, back-flows do not cause overloads.

In Spain, the Royal Decree 1699/2011 of 18th November, regulates the grid connection to small power production facilities and according to the CNE in 2004, there were 5.175 generation points, four years later; there were 44.659, and this means that figures got multiplied by eight. In 2011 the CNE calculated that more than 60.000 points of electricity production existed in Spain. This means a yearly compound growth of almost 42%.

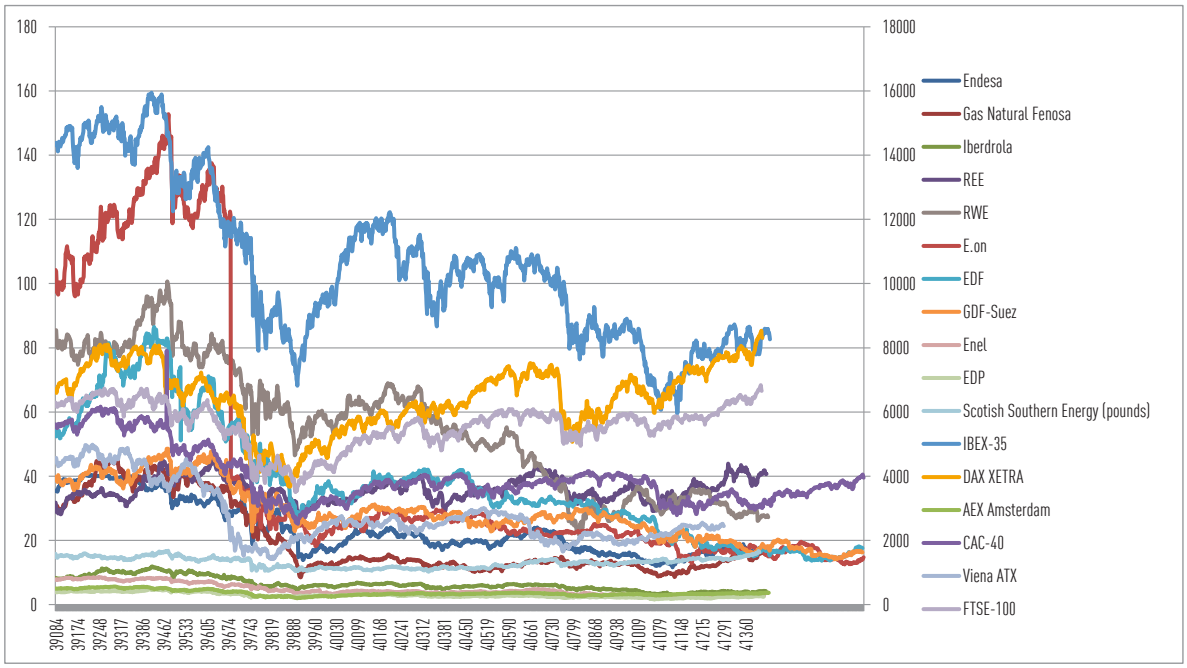
2.6. Energy utilities trends: low value for the shareholder, high leverage, internationalisation and consolidation

Since the bankruptcy of Lehman Brothers (15th September 2008), markets have shown a decreasing value of most of the utilities in Europe that has dropped dramatically. Energy companies have followed this trend.

In general this evolution is explained because of international financial and economic crisis and because energy demand has decreased. However there are other elements that have damaged the economic situation of energy utilities, the high level of leverage, the tariff deficit in Spain[22] and the instability of regulation. The most complicated period was between 2008 and 2010, since then, markets have observed a reduction on prices volatility.

21. Corfee, Korinek, & Cassel, 2011.
22. In the Spanish case, government has developed an inadequate remuneration policy for the electricity sector, and has included some aspects in the electricity tariff that should not be covered by the tariff but by State budgets. At present more that 50% of the electricity tariff covers costs that do not come from the electricity activity, but from feed-in-tariffs and taxes. It must be said that this deficit has become a political tool that has caused problems and imbalances with negative effects on the whole economy (Sallé Alonso, 2012).

FIGURE 8 ► Evolution of the market price of some European companies and national indexes



Source: Own elaboration

This trend is clear both at the European and the Spanish level. Nevertheless it is much clearer in the electricity utilities, being less in oil companies and in regulated monopolies as Red Eléctrica de España or Enagás.

TABLE 4 ► Market capitalisation of some European energy utilities (millions)

COMPANY	MARKET CAPITALISATION		VARIATION (%)
	02/05/2007	28/12/2012	
Enagás	4.271	3.853	-10
Repsol	20.244	19.433	-4
Gas Natural Fenosa	17.342	13.179	-24
Endesa	42.689	17.861	-58
E.ON	71.304	26.856	-62
Iberdrola	45.593	25.354	-44
Red Eléctrica de España (REE)	4.586	5.104	11
EDF	118.129	25.533	-78
EDP	12354	8.373	-32
GDF Suez	81.454*	37.206	-54,3
RWE	95.947*	19.205	-80,0

Note: GDF Suez and RWE market capitalisation from 15th September 2008

Source: Own elaboration

During "the old good days" these companies made big investments in new facilities, in a growing trend towards internationalisation too that forced them to ask for external financing requirements and increase its debt.

This trend towards consolidating bigger energy companies should certainly be borne in mind by national and European policies.

Companies usually chose the most adequate debt and equity structure to create the maximum value of the company. The leverage ratio calculated as the proportion among the debt and the sum of the debt and equity, shows at the end of each year for the period 1995-2005 a high level of debt. For the above mentioned companies in 2002 debt represented almost 70% of the sum of the capitalisation and debt. In fact company´s debt is twice market capitalisation[23].

Recently, in 2011, net debt of the electricity sector has been reduced in respect to 2010´s by 6.5% till 69,979 million euro. Unless Iberdrola and Hidroeléctrica del Cantábrico, electricity utilities, have also reduced their debt[24].

On the other hand, at present various electricity and gas companies are "converging", in the sense that most electricity companies have entered in the gas activity and vice versa (Gaz de France Suez; Iberdrola). Nevertheless there have also been merger processes (Gas Natural-Fenosa) and acquisitions among companies of both activities.

As it has been mentioned companies are also on the wave to internationalisation. This process can take different ways. On the one side companies are merging or buying other foreign energy companies (Iberdrola absorbed 100% of Scottish Power in 2008; EDP took control of the Spanish Hidrocantábrico in the early 2000). There are other cases where the holding company has not to take 100% of the control of the subsidiary (the Italian Enel has 92% of the share capital of the Spanish Endesa, Chine Three Gorges had 21% of EDP at the end of 2012). As a consequence, decision centres can be far away from the place where facilities and consumers are. Finally there are also other ways of internationalisation such as developing new facilities, alliances etc. in other foreign countries.

In short, energy utilities have suffered from the international financial and economic crisis. To face the new challenges, companies have internationalised themselves in different ways, have merged or converged in other energy activities.

2.7. Digitalisation, automation, externalisation and productivity

The trend in digitalisation and automation in all energy transformation sectors is taking place especially in the improvement in power generation in all type of technologies (CCGT, nuclear, etc.) as well as in the oil and refining industry.

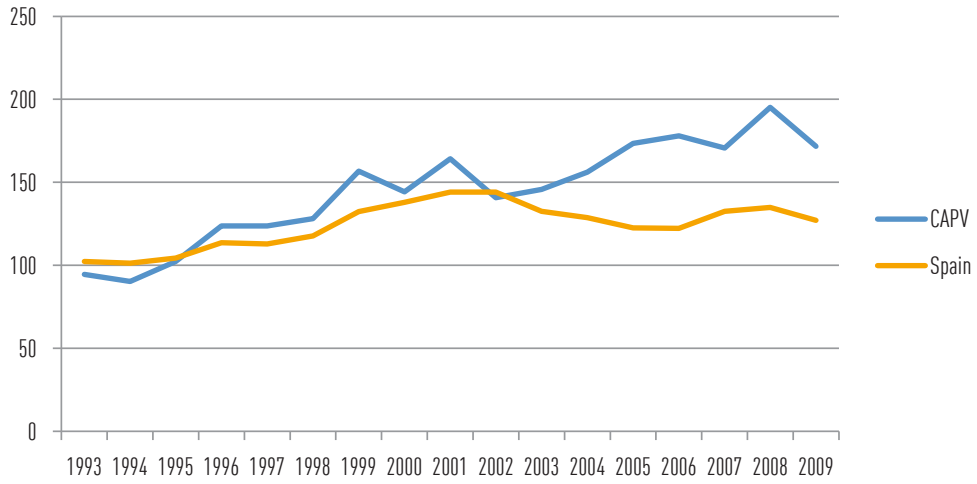
This trend is now focusing in the transport and distribution of electricity and would also have influence on gas transport and distribution. Improvements on electricity grids towards smart grids will have significant consequences.

Digitalisation that has taken place through the introduction of the Information and Communications Technologies (ICT) and organisational matters in energy companies, has given place to a clear improvement in productivity in the energy transformation sector. These ICT are being introduced in the electricity sector from generation to transmission and distribution.

It is supposed that digitalisation and automation can let labor productivity (LP) increase. For instance, the evolution of productivity of the Spanish and Basque energy sector shows a slight continuous growing trend. In the CAPV since 2003/2004 there is a gradual increasing tendency.

23. Salas Fumás & Rosell Martínez, 2006.
24. CNE, 2013.

FIGURE 9 ► LP evolution in the electricity, gas and water sector



Source: Álvarez Pelegry, Díaz Mendoza, Larrea Basterra & Mosácula Atienza, 2013.

Probably this improvement is also due to an increase of outsourcing of some companies' activities that cause a reduction in the number of employees, in particular in the electricity sector.

2.8. Energy R&D Investment

According to the European Commission *"the achievement of the goals of the European energy and climate change policy necessitates the development and deployment of a diverse portfolio of low carbon energy technologies [...] the EU will continue to rely on conventional energy technologies unless there is a radical change in our attitude and investment priorities for the energy system"*[25]. To achieve these goals, the EU Commission adopted, in 2007, the European Strategic Energy Technology Plan (SET-Plan) as a mean to improve the development and large scale deployment of low carbon technologies in Europe. In this sense the EU stands for innovation on a collective approach, large scale programs and international cooperation.

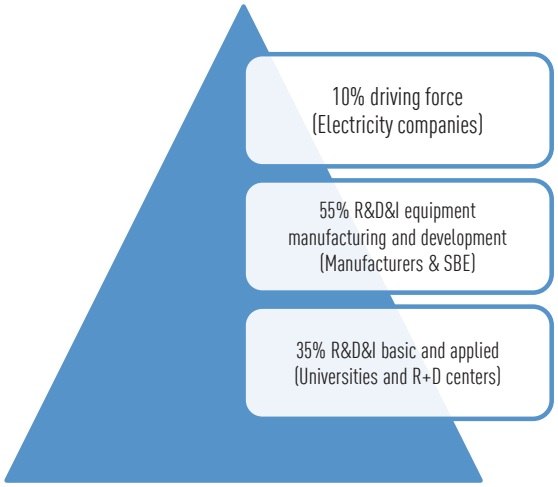
To attain 2020 objectives the European Energy Research Alliance[26] (EERA) tries to foster new energy technologies implementing Joint Research Programs in line with the selected SET Plan technologies.

The EU has also developed multiannual programs since 1984. The last one, the Seventh Framework Program (SP7) (2007-2013) is about to finish, and has had the highest budget of all the programs (50,521 millions € for the period, an average of 7,217 millions € per year)[27]. It considers energy and transport. The SP7 facilitates the application of the SET Plan objectives, both considering international cooperation as an instrument for improvement of the energy research.

Apparently all energy technologies are pursued employing R&D efforts. However this R&D is not focusing on cost competitive technologies. As a consequence the market is not driving the election of best technologies. In any case, innovation in the energy related manufacturers is the result of the driver effect of energy companies over them, research centres and universities.

25. Commission of the European Communities, 2009.
26. Born as a result of the SET Plan.
27. Europa, 2010 .

FIGURE 10 ► Technology driving force of the Spanish electricity sector R&D



Source: UNESA in Álvarez Pelegry, 2009.

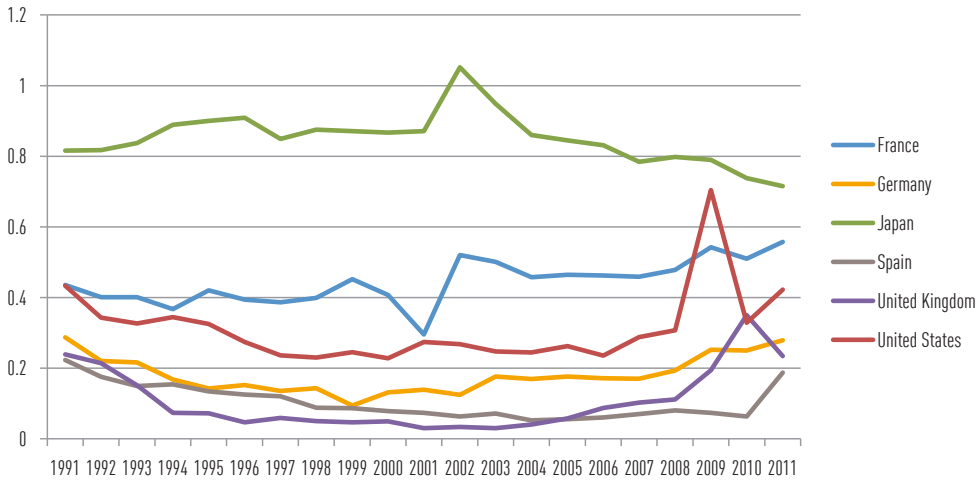
However at European level, in terms of expenditure on R&D it is interesting to note that even if public R&D investment has increased (148% during the last 30 years) in the energy field it has decreased by 32% since 1980[28].

Besides, due to the general economic situation public R&D risks to become of low priority for governments, especially in the energy field. Nevertheless private investment on R&D from European utilities has nearly doubled[29]. In order to improve the results public and private R&D should be coordinated.

However energy utilities in Europe have a higher level of R&D expenditure than those of Japan, Korea and USA. During this last decade the EU companies have invested in *"renewables and distributed capacity, grid management through smart grids and retail as well as business models beyond traditional electricity sales"*[30].

Since the nineties the Spanish volume of R&D in the energy sector is far from other OECD countries as Japan, USA or France. In 2011 R&D on energy was 0,187% the national GDP.

FIGURE 11 ► R&D per thousand units of GDP



Source: Own elaboration from International Energy Agency Data services.

28. Eurelectric, 2013.
29. Idem.
30. Idem.

To resume, R&D policy is not clearly focused on specific technologies or countries. On the contrary, it looks for promoting alternatives without targeting to those which are closer to be cost competitive that is with a "push approach" and not market driver. At once there is a tendency to diminish investment on R&D.

3. A personal view on the characteristics of the Spanish energy system

Within the framework of the general trends described in section 2, there are some features of the Spanish energy system that are described in the following pages that will allow to frame the suggestions on energy policy.

3.1. Looking for the Holy Grail: the assumption of the "perfect regulator"

Perhaps the most striking aspect of the Spanish energy policy is that even after the liberalisation that was supposed to imply less regulation; there is a continuous search of a stable legal framework that should give certainty to the agents.

It can be said that this is not exclusively a Spanish characteristic as the European Commission and other authorities, develop numerous rules, laws, programs and plans, related to the energy sector. This proliferation complicates the overview of the sector, whose main actors ask for a stable and clear regulation. As an example as environmental protection and fight against climate change worry has grown, policy makers have designed new rules like the ETS and energy taxes.

The search for regulation is strengthened in Spain by the binding planning and by instruments associated to the fight against climate change. It is even reinforced in terms of support to certain technologies with very long periods of time of subsidies as assurance for the investments, when the reality shows that those cannot be maintained when serious changes in economic conditions turn uncertain, even the assurance of the government.

Then there are laws, rules and regulations, government planning, etc. that cover the entire energy sector activities from electricity and gas to oil; from energy actors like consumers and policy makers to industrial manufacturers, and that goes from principles to the specific design of some energy subsectors.

It can be said that today regulation is in many cases considered the panacea for solving almost any problem in the energy sector, to such extent that market forces are the only realm of the organised energy markets. This situation clearly implies that there is a deep believe that regulation is better than markets and furthermore, that the regulator is an omniscient, fair and perfect institution that has the ability to design and enforce regulations to deal with market failures or to achieve energy targets.

Looking over the Spanish energy policy over the last three decades, which is summarised in Annex 1, it has generally been the result of the topics and worries of the moment, and the economic and energy environment prevailing at the time.

3.2. Open market and competition

Since the beginning of the liberalisation the number of agents has grown. In fact, it has been observed the entrance of new energy actors, national and international oil companies (BP, Galp), from different sectors like the construction sector (Sacyr, ACS, Acciona); as well as international funds (Qatar Investment Authority in Iberdrola´s equity) or companies where governments have very influential equity participations (Enel).

Some of these situations imply that the decisions centers are displaced from the "territory" and this also affects to the industrial sector because of the "pull" effect of the energy system indicated before. When decisions are taken overseas this may affect domestic companies. This situation could also be framed in the general trend of internationalisation and consolidation process referred in section 2.6.

Another point that should be mentioned is the fact that under the consolidation of the transmission system operator (TSO), the natural monopoly concept in transmission is becoming equivalent to a single and unique owner of the assets. This situation does not seem good for competition. The need of a single TSO is clear but not necessarily it has to operate on a grid in which there is a sole owner. Related to this when investments are carried out to meet the binding objectives set up by the company, there is not an open or clear concurrence system.

The liberalisation process has other positive results. The benefits of opening up the market allowing different owners as in the regasification plants are good examples of the benefits for the market to boost the sector.

Since gas market was opened to industrial concurrence in 1999, the number of agents has increased. Until 2003 the residential market was not opened. At present there are 32 shippers in it[31]. A potential positive result is that the increase in the number of agents in the market should emphasize prices competitiveness. However gas prices have increased due to the linkage of gas prices to oil ones. At the same time electricity prices have also increased not only for industrial consumers but for domestic consumers too; even when the wholesale electricity market is competitive. The reason of these increases will be explained in section 3.6 of this Policy Paper.

This rise in energy prices has been criticised by industrial companies that observe a deterioration of their competitiveness. This worsening is greater when CO_2 permit prices are considered, taking into account that competitive developing countries have not to fulfill Kyoto Protocol objectives of emissions reductions.

3.3. The lack of an integral vision in energy. Transport and tertiary sectors, the missing friends

There is a lack of comprehensive and coherent vision on energy. In fact the energy sector should be considered from two points of view. The first one supposes to take into account not only primary but final energy as well and the transformation processes from primary to final energy focusing in energy efficiency. The second is that energy is not only electricity but oil, gas, and coal too.

In relation to the first point, in energy efficiency there are possibilities not only in the transformation sector but also in the final use of energy such as transport and tertiary sectors. In this regard, the tertiary sector accounts for 40% of final energy consumption at European level; so transport and tertiary sectors are key areas in terms of energy savings.

As an illustration, over the last decade, several directives were designed to contribute to energy saving targets by 2020 with implications on energy efficiency of buildings. By the implementation of energy saving measures in the building sector, there is a significant opportunity to reduce energy consumption in the residential sector, mainly in building refurbishment.

The second point is the fact that energy is more than electricity. At present there is a strong emphasis on measures on the electricity sector[32], on its problems and possible solutions. The energy sector is wider and there are many other questions that must be taken into account, as the gas system deficit that is growing, oil imports and carbon emissions from the transport sector, due mainly to oil products. In this respect, the role

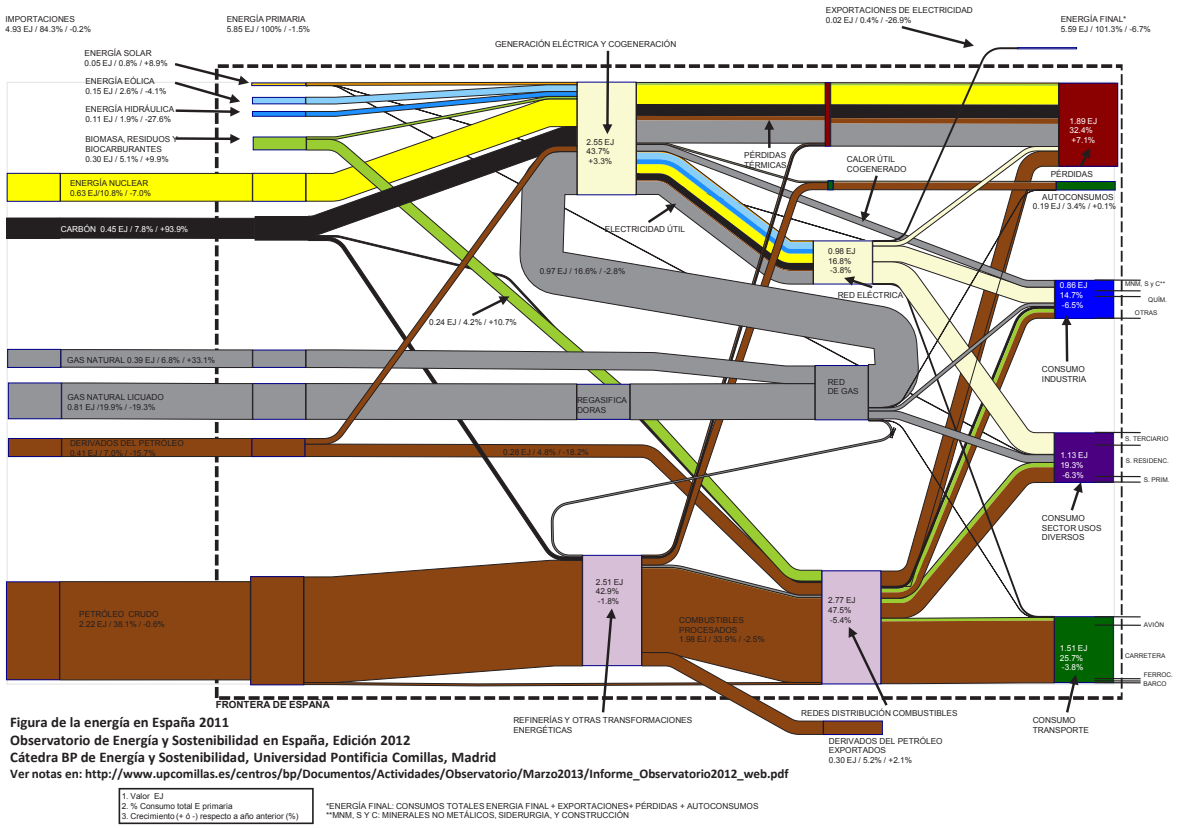
31. Yunta Huete, 2013.
32. The French case briefly referred previously is also illustrative of this trend.

of oil products in electricity generation has decreased in the last decades, thus this activity is not responsible in a significant way of oil imports.

In fact, in 2011 the Spanish energy system imported 84% of the primary energy. 53% of total imports were oil and oil products that are used mainly in the transport sector. Natural gas and liquefied natural gas (LNG) together were the second energy source imported, representing 24% of total primary energy.

26% of primary energy is consumed in transport sector. 20% is consumed in the tertiary and residential sector; almost 50% of it was electricity, however, electricity represents over 17% of total final energy demand. Industry is the most diversified sector considering that it uses different energy sources as oil products, gas, electricity, cogeneration, etc. Figure 12, a Sankey diagram offers a more complete overview of the energy system, which shows that electricity is just a part of the energy system.

FIGURE 12 ► Energy flows in Spain in 2011



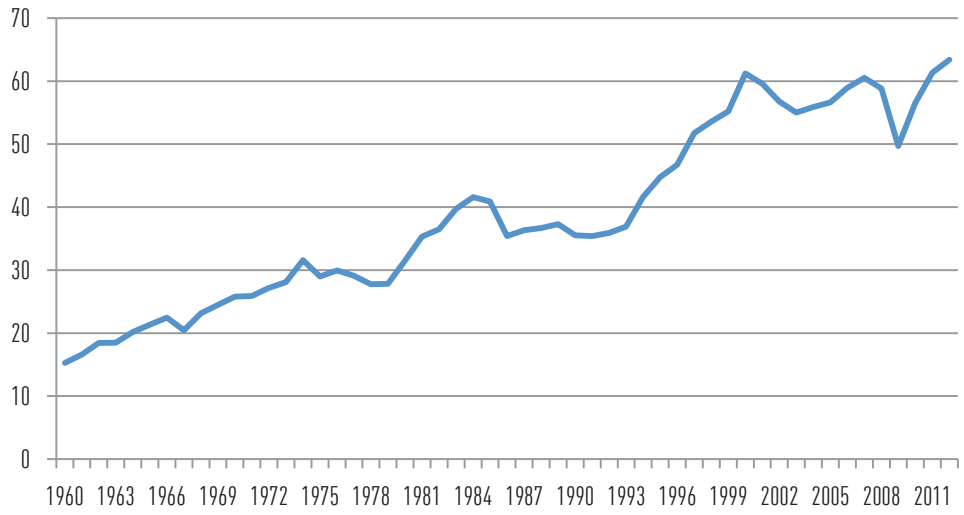
Source: Danesin et al., 2012.

3.4. A biased approach to the current account deficit and the energy dependency

From an economic point of view, Spain is praised to work in a global economy. In fact some economists support the idea that the openness of the economy has been a key driver for the improvement of productivity and growth.

The usual parameter to measure the openness of the economy is the sum of imports and exports in relation to the GDP. Spain has increased its import-export in a level to 60%, similar to France and Italy but clearly below Germany (95%), Holland (158%) and Belgium (178%). Figure 13 illustrates the Spanish situation.

FIGURE 13 ► Spanish economy internationalisation coefficient (exports+imports/GDP)

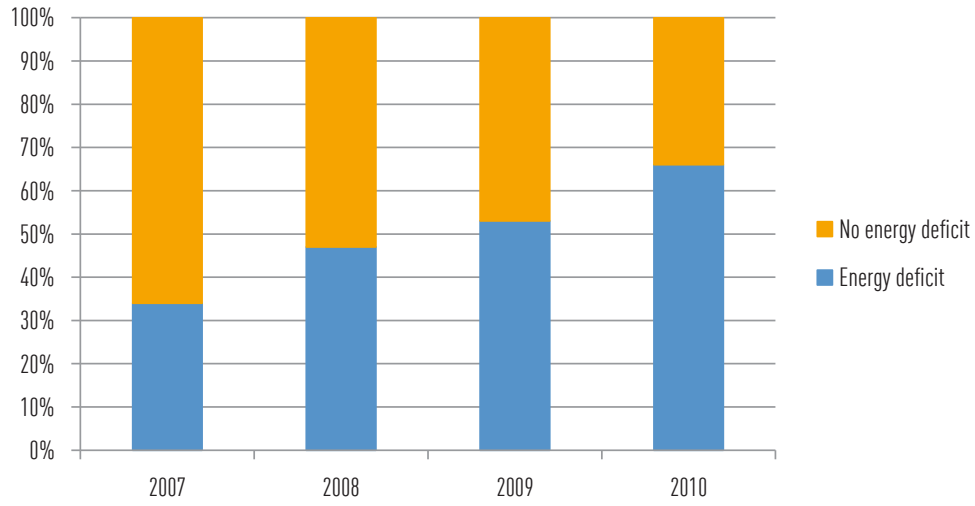


Source: Own elaboration from El Banco Mundial, 2013.

One of the main components of the balance of trade is energy, including all energy products. Although in 2012, food and manufacturing equipment of chemical products were not far from those of energy products.

One significant point is that energy figures show important energy imports (24.2%) and few energy exports (6.7%) in contrast with the equipment industry where imports are approximately 17% and exports 19.2%[33]. Therefore there is a clear imbalance of the energy products as imports are far from exports figures. In fact, energy sector should move towards more exports. However, it seems that this is not a trend of the Spanish energy sector in electricity and gas mainly due in part to the lack of adequate interconnections.

FIGURE 14 ► Energy deficit versus no energy deficit

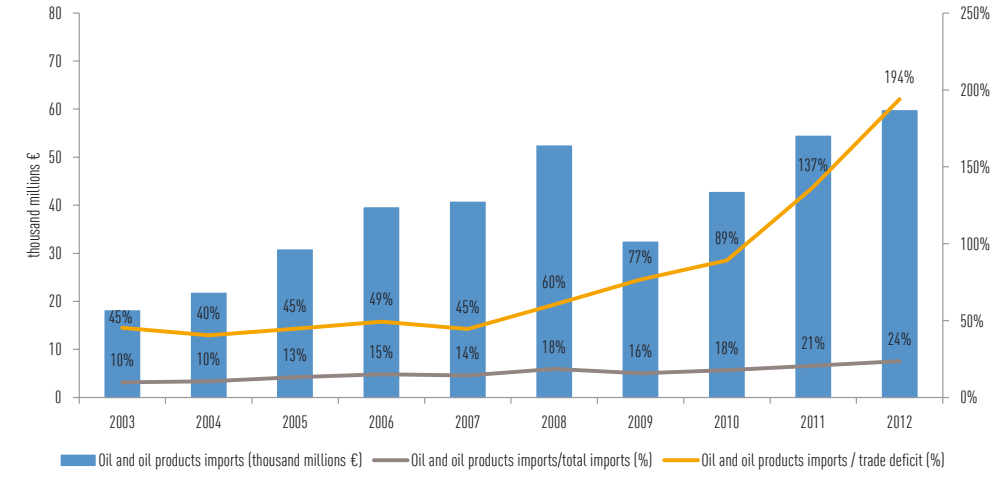


Source: Own elaboration from Ministerio de Industria, Turismo y Comercio, 2011.

Looking at the different components, the reader can observe that when talking about energy imports there are in the energy balance two main sources, oil and gas, whose evolutions show a steady increase.

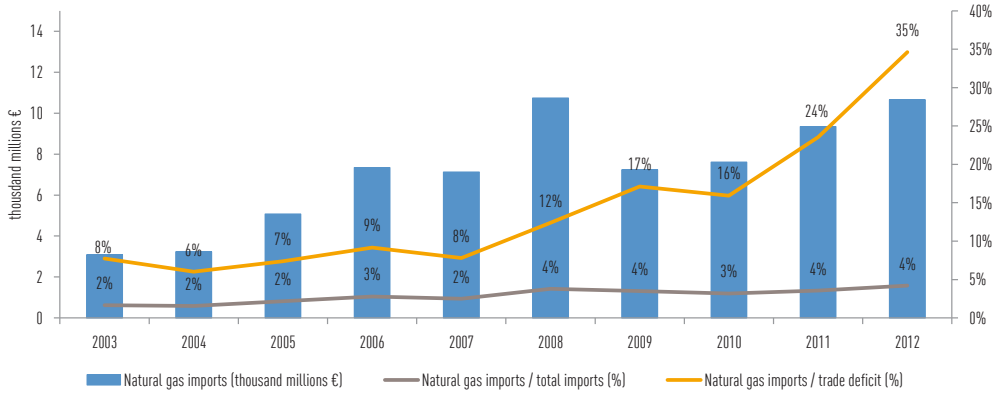
33. Martínez Estévez & Pallardó López, 2013.

FIGURE 15 ► Spanish oil and oil products imports evolution



Source: Own elaboration from DataComex and INE.

FIGURE 16 ► Spanish natural gas imports evolution

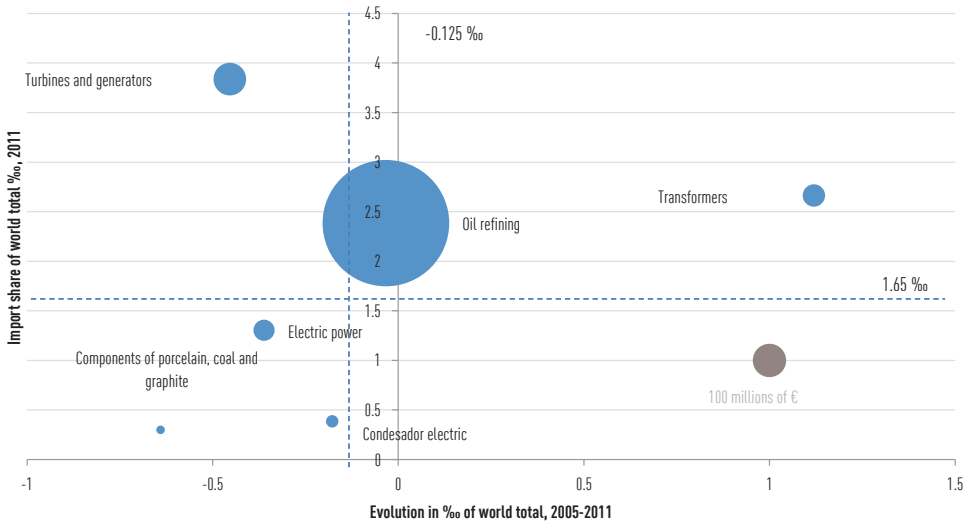


Source: Own elaboration from DataComex and INE.

The conclusions of Figures 15 and 16 are clear. Oil and oil products imports are higher than the current account deficit since 2011 when the current account deficit began to decrease. During the first part of the last decade this figure has been around 50%. Natural gas imports also contribute to the current account deficit in an increasing way. In both cases 2009 is a reference year, since the beginning of the economic crisis started with a sharp reduction of oil prices.

More exports of the energy sector could mitigate the differences and the deficit would decrease. In fact, Basque figures for oil products exports, especially from the refinery reveal the importance of exporting oil products.

FIGURE 17 ► Energy sub cluster exports in the Basque Country in relation to international exports



Source: Orkestra, from the Agencia Tributaria and UN Comtrade database.

Note:
This figure offers information about three variables. The first one is the size of the spheres; it represents the total volume of exports compared to the worldwide exports. The second is the variation of the market share (horizontal axis), in this regard when a sphere is on the right hand from the average of the Basque Country market share means that it has evolved positively. The vertical axis offers information about the market share of each activity. If the sphere is above the average of the territory, this means a positive evolution too.

Another possibility to improve the current account deficit is on the one hand by exporting goods with a higher added value and on the other one by trying to develop own energy sources, just as it is explained and advocated in section 4.

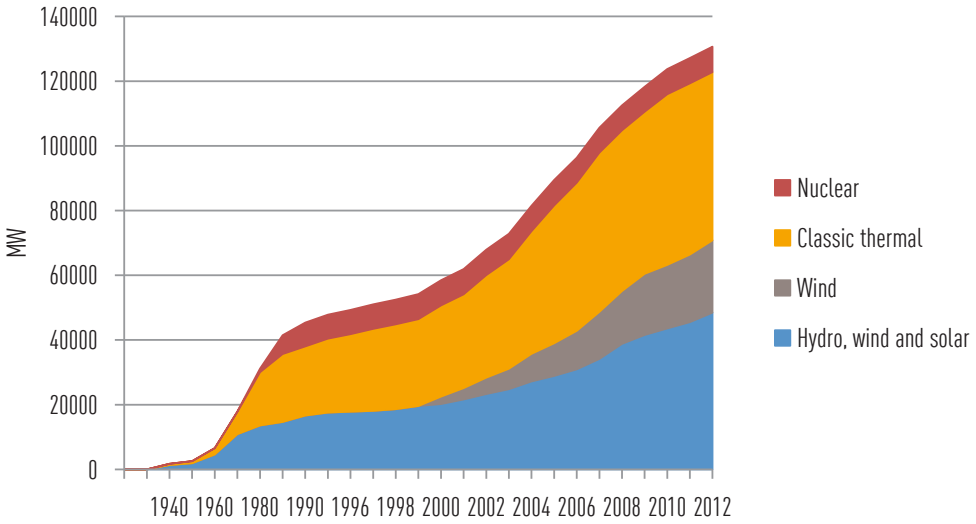
Due to the fact that an important part of the deficit is due to oil and oil products imports, generally employed in the transport sector, to mitigate oil imports, decrease the use of oil products in transport is a clear instrument.

There are different possibilities such as developing national energy sources or introducing modal changes in the transport sector, incorporating electric and gas vehicles and improving energy efficiency in internal combustion engines, to reduce oil and oil products consumption.

3.5. A risky reversal from a balanced electricity mix to an emphasis in gas and renewable energies

The electricity mix in Spain is the result of a continuous incorporation of technologies since the sixties as it can be observed in next figures.

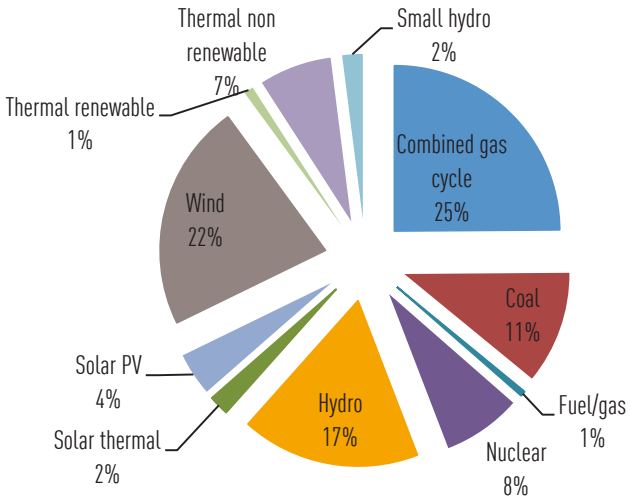
FIGURE 18 ► Spanish electricity mix evolution



Source: Foro de la Industria Nuclear Española, 2013.

This offers to the country a very good and enviable position among others in terms of diversification of technologies, operation modes and fuels.

FIGURE 19 ► Spanish electricity mix in 2011



Source: REE, 2013

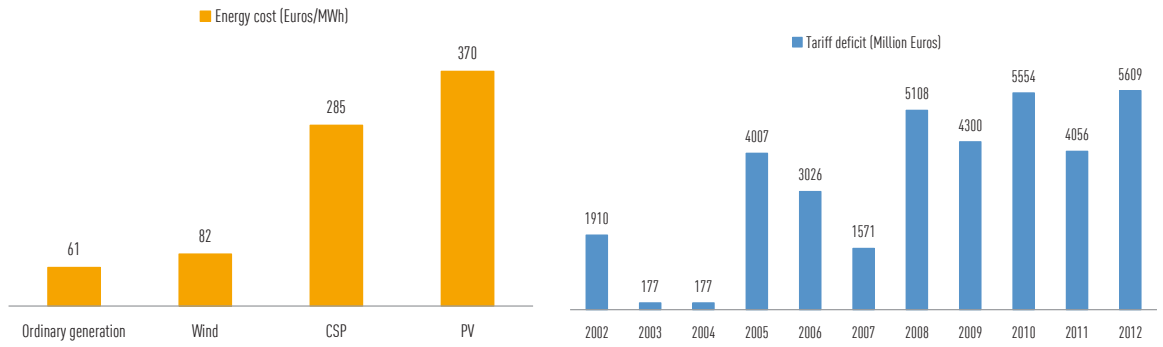
Looking into the future, the implications of the large combustion facilities directive, the continuous penetration of renewable energies (even with an excess of capacity) and the policy on nuclear, may have as a result an electricity mix in which coal could disappear[34] from the electricity mix by 2020 and nuclear could also not be part of the Spanish electricity mix by 2030[35].

If this trend became reality, the Spanish electricity sector will follow the same way as the German mentioned before in section 2.1, based on gas and RES. However in the German case, it seems that there is a better design and a relationship between energy and industrial policies.

34. The above mentioned directive asks for huge investments (2,000 millions in coal facilities in order to avoid NOx and SO2 emissions) or the end of coal facilities.
35. Casas Marín, 2012.

Incorporating significant quantities of more expensive energy technologies produce higher energy prices. As a consequence of FIT to those technologies there is an increasing electricity tariff deficit. Figure 20 shows both costs of some renewable technologies and the evolution of the Spanish electricity tariff deficit.

FIGURE 20 ► Average cost by technology in Spain and electricity sector tariff deficit evolution



Source: Sallé Alonso, 2012 and CNE.

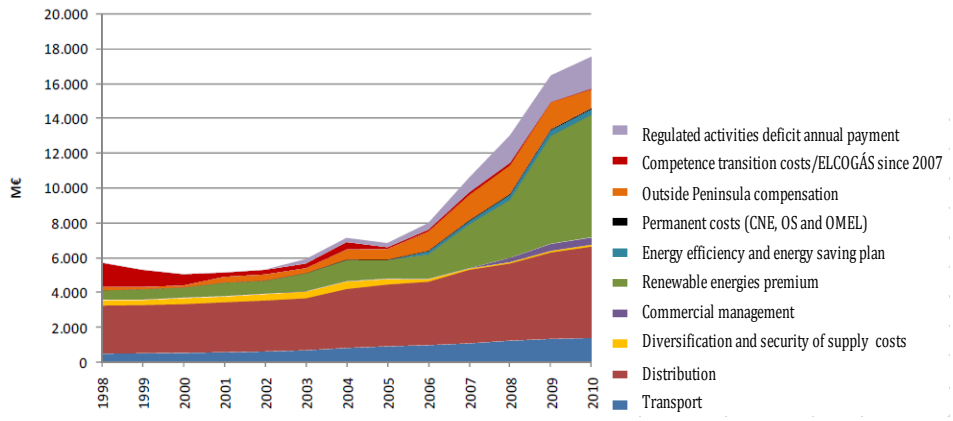
In addition there is a need to provide back-up to these intermittent renewable energies. Hence there must be a way to assure reliability and security of supply, an appropriate mix as well as an adequate return to investors on those facilities.

Taking into account this objective some European countries have adopted a "capacity system" in order to encourage investment in the sector. In Spain and Portugal, governments have opted for payments for capacity. Nonetheless there are other options such as the energy-only market (Germany and Austria) or the capacity mechanism (i.e. in Norway, Sweden and Finland)[36].

3.6. The absence of a clear connection among energy, industry and R&D policies

Recent experiences in renewable technologies show that Spain has developed them without taken fully into account market and industrial possibilities. Million of euros in feed in tariffs (FIT) have been employed, as can be observed in Figure 21, for some renewable energy but technology industries related have not been properly developed, i.e. photovoltaic.

FIGURE 21 ► Access costs 1998-2010



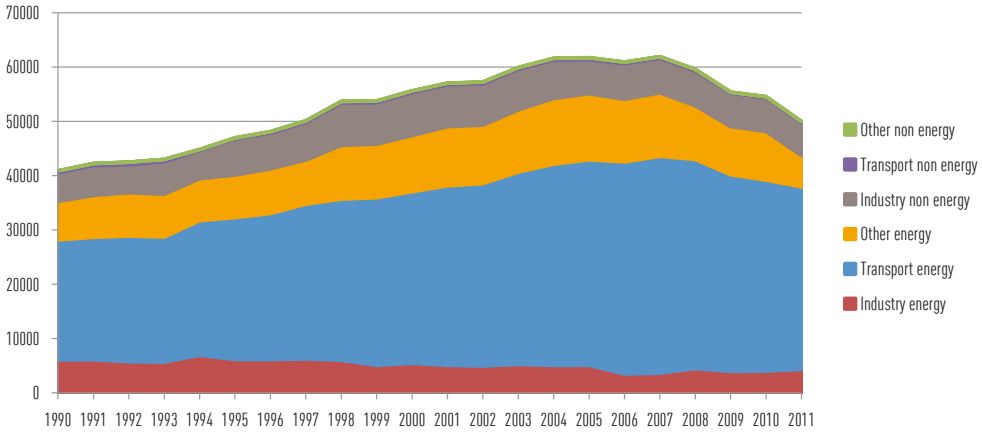
Source: CNE, 2012.

36. Pérez-Arriaga, 2013.

During the last decade, one of the elements to influence decisions about which energy technologies were to be developed has been the emphasis on employment creation during the construction phase. As a consequence, policy makers have forgotten the importance of productivity of different energy subsectors on the whole and once these technologies were in operation.

These types of development also imply a deterioration of the current account as imports for some equipment (i.e. solar cells) do not have a significant impact to substitute oil consumption as it can be observed in Figure 22.

FIGURE 22 ► Evolution of oil consumption in different economy sectors



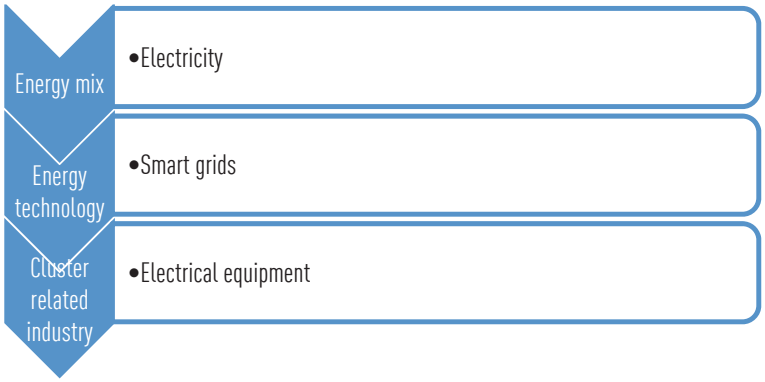
Source: Own elaboration from Ministerio de Industria, Energía y Turismo (MINETUR), 2012.

It seems that the Spanish energy policy does not fully consider the interrelation between energy and industry when it designs some of these policies. However it could be important to tie them in order to improve their results. Doing so would carry benefits because of the traction effect of the energy sector and its relation to other economy activities and policies in industry and technology.

For instance considering electricity, there are new energy technologies that are developed to improve its efficiency. Rather recently the sector and the industry have created the concept of smart grids. This new technology could be developed mainly by the electrical equipment industry.

This means that if energy policy is well designed and implemented there could be industrial development but to do so there is a real need to consider the interrelation between policies.

FIGURE 23 ► An example of energy pushing effect on related industry



Source: Own elaboration

Furthermore, looking for the link among industrial, energy and R&D policies, Figure 11 from section 2.8, tries to show that Spain has a weak R&D/GDP evolution below most of developed countries as USA, Japan, Germany or France.

4. Some suggestions on the Spanish energy policy in the European framework

Energy is basically a global issue in markets and in industry and, certainly, the growth in demand is going to be outside Europe. Therefore an energy and industrial policy should not miss this key issue for an adequate energy policy.

Spanish energy policy must be ambitious but flexible in objectives and instruments. It should also build a consensus and a long term vision on energy goals, looking at energy beyond Europe given the long term implications of an energy policy the consensus is needed and would benefit all energy agents.

The following suggestions on energy policy do not follow the structure of objectives, targets and instruments described in section 1. However an examination of consistency of these suggestions with the main objectives and basic targets can be observed in Annex 2.

Instead these points can be seen as key elements to take into consideration in the design and development of an energy policy. These suggestions try to offer a guide to respond to the problems that the overview of the Spanish Energy sector (sections 3 and, especially, 4) has shown.

In this regard there are suggestions about the importance of achieving competitiveness in the sector, as well as suggestions about the way of improving the current account, and the importance of focusing in final energy demand, because of the figures of energy consumption in transport and building sectors.

Taking into account the considerations of previous sections, six topics are suggested for the Spanish energy policy.

4.1. Competitiveness, competitiveness, competitiveness

The huge electricity tariff deficit must be solved without damaging, neither the competitiveness of industry nor the balance sheet of energy operators. This could be achieved by decreasing the cost of renewable technologies; passing "social costs" to public budget[37]; devising exemptions to the industries that have high costs of energy and are subject to international competition and liberalising electricity prices for all consumers, trying to avoid fuel poverty.

In this regard, gas deficit must also be solved trying to prevent that it takes the dimension of the electricity tariff deficit. Therefore, there are different measures that could be taken such as increasing access tolls or/and pushing forward some retribution of certain infrastructures (i.e. underground infrastructures).

In the gas field, the development of a gas hub in the territory should be supported and promoted. This gas hub would help to mitigate gas prices with persistent high oil prices. The energy mix must be cost efficient and that means that only mature and most efficient RES should go to the market with no subsidies.

37. For instance the Spanish electricity sector bears a higher weight of renewable technologies than it should according to the EU policy (40% against EU´s 20%). As a consequence electricity consumers support higher costs that could be leave the electricity tariff to the public budget.

It should also be considered that the availability and technical efficiency of the facilities such as refineries, gas and electricity transport, distribution and storage, generation technologies (coal, nuclear, hydro and other renewable) should be improved and utilised at the highest level of utilisation, with a criteria of technical excellence and in a cost efficient way.

Last but not least in order to improve competitiveness the Spanish economy must foster productivity. It has suffered from a low productivity in comparison to other countries, especially European countries. As a consequence in energy, facilities productivity must also be an objective. Productivity in the energy sector shows positive results[38], but this objective should be continuously considered and improved.

4.2. Energy markets. Liberalising prices for final consumers

The vision on energy markets (oil, gas, coal, CO_2, electricity) should be taken into account considering the rich variety of supply and demand arrangements (spot, OTC, terms, others). In this sense the wholesale market has to be reformed to a more modern electricity market as renewable energies with feed-in tariffs and priority of dispatch increase continuously its market share.

An electricity and gas Iberian market should be reinforced and developed, and gas and electricity infrastructures interconnections with France and Europe should also be encouraged. This would facilitate the progressive market competition and the development of internal gas and electricity markets. Competition on the determination of prices for new capacity, new technologies and new infrastructures can also benefit the energy system.

The great challenge is to liberalise final prices for all consumers (liquefied petroleum gas, electricity, and gas); however an appropriate mechanism of support for low income households, which suffer from fuel poverty, must be designed and implemented.

Energy prices are also affected by fiscal policy. A new fiscal policy on energy should be developed consistent with the environmental impacts and with the energy mix. The proliferation of mechanisms EU-ETS, taxes on electricity generation means an inconsistency and duplicity.

The recent Spanish tax on electricity generation affects electricity prices and the profit and loss sheet of the electricity companies too. In fact, a revision of the situation should be carried out, perhaps based in the principle that environmental taxes should have the purpose to improve the environment and R&D related, and not being used with other goals.

This implies a huge task and it is not going to be easy at all. However a revision is already necessary as it has an impact even in the value and the feasibility of companies. For instance taxes on generation technologies such as nuclear are implying the closure of some of these facilities.

4.3. Focus on final energy demand

The special focus on climate change and especially in renewable technologies has been mainly developed in industrial sectors, including electricity generation and refineries. Nevertheless it is time to focus on final demand.

38. Álvarez Pelegry et al., 2013.

FIGURE 24 ► Changes on the energy vision: from energy transformation to energy use

Source: Own elaboration

In this respect working intensively in energy efficiency in final uses whether in the tertiary sector or transport should be a goal to achieve. It must be taken into account that the work in final demand is quite complex, because the numerous points of energy consumption, and the difficulty of designing regulation, rules and incentives and the different accountabilities and responsibilities.

Focus on final energy demand should be one of the greatest challenges of the following energy policy. As a consequence a comprehensive analysis on how to improve energy use in final demand should be carried out. Once those measures are identified they should be integrated.

In relation to transport, a new energy policy should be considered as a key element on energy (and so modal analysis, electric transport, electric vehicles, gas use, internal combustion engines, as well as changes in cities and in consumer's behaviour should be analysed). The main guidelines to develop this point should be an analysis of the different means of transport, fuels and technologies available for the future; a future, where transport electrification could be emphasised.

Furthermore an analysis of economics of transport from the point of view of the influence of prices on demand and on taxation and fiscal consolidation should necessarily be addressed. Given that some trends in transport will require years or decades to be a reality, energy policy should necessarily consider these timing and schedules.

A new energy policy should work intensively on energy efficiency too in the tertiary sector. It is clear that energy efficiency is an imperative as it has been explained before. In this point they should also be analysed the possibilities of R&D, job creation and industry development. It is possible that this could be an important market niche for employment and industry development. In this field an adequate funding and incentives should be assigned at this point to buildings refurbishment, given the excess of stock of old buildings.

4.4. Promotion and development of Spanish own resources

One of the main components of the Spanish deficit of the commercial current account is oil and gas imports, as it has been mentioned in section 3.6. Nevertheless it does not seem realistic that at least in 15 or 20 years time Spain will not continue to rely on hydrocarbons. Therefore exploration, production and development of own resources, whether conventional or not, should be promoted.

This promotion should take into account other matters related to industry and R&D. Therefore an in depth analysis of the induced effects of promoting the own sources, on companies creation and employment should be carried out.

The key consideration is that energy is a wider issue. Spanish renewable energy resources, hydro, wind, solar and biomass are quite known and some of them, as hydro, have been considerably developed in the past. However there are many opportunities related to exploration, research on hydrocarbons, which Spain has not developed. The absence of a business and tradition in this field, and the permanent focus on renewable energies are, in part, responsible for the lack or insufficient attention made to oil and gas. Nevertheless the shale gas and shale oil revolution in the USA has raised interest in Europe and also in Spain.

In Spain, during the sixties, seventies and eighties there were between 150 and 250 exploratory drillings. Last two decades have witnessed an important decrease in this activity[39]. The prospective resources (based on indirect evidences and probabilistic analysis varies in an ample range from 8 Tcf for unconventional gas (AIE) in the "Dominio Vasco-Cantabrico" to 71 Tcf for the whole Spain[40].

The utilisation of Spanish resources should include the in depth assessments and eventual development of CO_2 storage. In this regard the country should promote in the medium term the development of carbon capture and storage that will offer the possibility to employ in a sustainable way conventional energy sources reducing emissions. In fact, conventional technologies are going to be necessary to design a competitive, secure and sustainable energy mix.

4.5. An efficient utilisation of a balanced electricity mix

Spain should maintain a balanced mix of energy and although some sources as coal can decrease its quota, it should not be recommendable to advance towards a future energy mix (2020/2030) that would rely only on gas and renewable sources. Therefore, diversification is an asset that should be maintained or even strengthened. In this regard, perhaps the most important is that Spain should develop a cost efficient and sustainable technologies mix. The energy mix and as a consequence the electricity mix is a prerogative of member states and therefore Spain should take benefit of this possibility.

The electricity mix has a very low utilisation factor, because of low demand, excess capacity and low technical factors in some technologies (wind, solar). This implies low utilisation rates of practically all technologies (unless nuclear), and has not economic sense.

There is no immediate need for more investments, and a critical revision of how to comply with 2020 should be convenient. On the first hand given the actual economic crisis and the drop of energy demand it is not time for investments. However Spain should pay attention because of a possible need for more/new investments in some infrastructures in the near medium term (i.e. international interconnections).

On this issue of electricity mix, two more points are relevant. First it seems clear that with a high penetration of renewable sources, the priority of their dispatch and the feed-in-tariffs, biding at zero should change. Second the matter of adequacy of resources is becoming more relevant and a new design must be defined and implemented, which included the issue of reliability of the system with the discussion on capacity payments and capacity markets.

4.6. Technological innovation, R&D and industrial development

Energy policy must be consistent with innovation and research policy. A definition of the best technologies, that the country should have, would be a first step, always being consistent with the energy mix. An open mind approach should be given to this issue in a new energy policy. The emphasis should be on final energy

39. In the last decade there were over 25 drillings. See ACEIP, 2013.
40. ACEIP, 2013.

consumption sectors, especially in buildings and transport, on electricity grids and on generation technologies consistent with the energy mix.

It is important to note that markets should be a driver for innovation and technologies development. The usual paradigm of basic research and products should be complemented by a vision in which the market, entrepreneurship, public and private research interact[41].

Money and funds should be assigned for this purpose. Incomes coming from taxes on energy could be used on this way. The money assigned should be consistent with the technologies that would be more appropriate.

Finally, smart specialisation strategies, territories and cluster concepts should also be considered to avoid investing huge quantities of money in technologies that fail or that are not able to be competitive.

41. National Endowment for Science, Technology and the Arts (NESTA), 2009.

ANNEXES

ANNEX 1

TABLE 5 ► **Spanish energy policy main periods**

	PIECES OF REGULATION	MAIN OBJECTIVES	ENERGY SOURCE PROMOTED
1978 - 1983	PEN 1978-1987	• Diversified energy balance • Face energy demand increase, despite the crisis: foster indigenous energy sources and diversify origins. Decrease external energy dependence • Contain energy waste • Improve energy pricing scheme • R&D on other energy alternatives • Exploration and exploitation plan	Indigenous resources: coal, nuclear, hydrocarbons, hydropower
1983 - 1992	PEN 1983-1992 • Gas Protocol, 1985 • Law 49/1984 (LOSEN) • Coal sector reorganisation plan, 1990-1993 • Energy research plan, 1989-1993 • Legal Stable Framework	• Diversify energy sources to reduce energy vulnerability • Energy efficiency industry • Natural gas introduction • Absorb excess of capacity: slowdown investments, nuclear moratorium • Reorganise financial situation of energy companies. • Creation of REDESA and ENRESA	Spanish coal natural gas
1991 - 2004	PEN 1991-2000* • Law 15/1992, (hydrocarbons reorganisation, monopoly end) • Law 40/1994,(electricity • Electric Protocol, 1996 • Law 54/1997 (electricity) • Law 34/1998 (hydrocarbons) • Legal Stable Framework ESEMA ESTELA 1995-2000	• Competitive energy costs • Foster industrial competitiveness • Energy policy that should be closely related to the industrial policy and the international promotion of energy companies • Security of supply, energy efficiency and R&D • Energy efficiency • Diversifying energy sources and develop own resources • Privatisation of Energy State owned companies • Liberalisation of the energy sector: Reduce energy cost achieving the best price (EU internal energy market), security of supply, quality service • Supply policy: infrastructures • Penetration of natural gas • Environmental objectives	Domestic coal and natural gas
	Plan for the development of renewable energies, 1999-2004	• Environmental protection • Promotion of own resources. • Security of supply	Renewables

2000 - 2010	Planning of the electricity and gas sectors: development of transmission networks: -2002-2011 -Review 2005-2011 -2008-2016 (remain in force)	• Supply policy: infrastructures	Electricity and gas
	Plan for the development of renewable energies 2005-2010	• Environmental protection • Promotion of renewable energy • Security of supply	Renewables
	Spanish Strategy for Energy Saving an Efficiency, 2004-2012 2005-2007 Action plan (PAE4) 2008-2012 Action Plan (PAE4+)	• Energy efficiency	
2010 - 2020	Planning of the electricity and gas sectors: development of transmission networks: • 2008-2016 (remain in force) • 2012-2020 (dismissed) • 2014-2020 starting	• Supply policy: infrastructures	Due to the economic crisis there is excess of supply
	Plan for the development of renewable energies 2011-2020	• Environmental protection	Renewables
	Plan for Energy Saving and Efficiency for the 2011-2020 period	• Energy efficiency	

Source: Mosácula Atienza & Larrea Basterra, 2013.

Note:
*. This is the last National Energy Plan. However as a result of it there are new different specific laws and programs/plans in different fields that were considered in the PEN 1991-2000, and that have been and are being developed.

ANNEX 2

This Table tries to offer a reflection of the proposal that the authors have carried out of the main objectives of a new energy policy in the country and the suggestions made in order to face the main challenges in the Spanish energy sector.

TABLE 6 ► Final objectives and basic targets versus suggestions on the Spanish energy policy

PRINCIPAL OR FINAL OBJECTIVES	BASIC TARGETS	SUGGESTIONS
Energy Welfare	Energy affordability	4.1; 4.2; 4.3; 4.4; 4.5
	Security of supply	4.3; 4.4; 4.5; 4.7
	Environmental protection	4.1; 4.6
Economic Growth	Sustainable firms in the energy related fields	4.3; 4.4; 4.6; 4.7
	Competitiveness of the economy	4.1; 4.2; 4.3; 4.4; 4.5

Source : Own elaboration

REFERENCES

ACEIP. (2013). Evaluación preliminar de los recursos prospectivos de hidrocarburos convencionales y no convencionales en España Gessal. Retrieved from www.shalegasespana.es

Álvarez Pelegry, E. (2009). Reflexiones sobre las energías convencionales en el «mix» energético del futuro y el papel de la captura de CO2.

Álvarez Pelegry, E., Díaz Mendoza, A. C., Larrea Basterra, M., & Mosácula Atienza, C. (2013). La transformación del sector energético vasco. Aspectos relativos a la competitividad. Bilbao: Retrieved from http://www.orkestra.deusto.es/index.php?option=com_fabrik&c=form&view=details&Itemid=264&fabrik=15&tableid=15&rowid=247&lang=es

Álvarez Pelegry, E., Figuerola Santos, S., López, D., Martén Uliarte, I., & Sarrado, L. (2013). In Cátedra de Energía de Orkestra, The Boston Consulting Group (Ed.), El desarrollo de los hubs gasistas europeos: factores clave de éxito e implicaciones para el sistema gasista español

Calleja Mediano, M. F. (2013). La imposición medioambiental en España en el marco energético. In Marcial Pons (Ed.), Energía y tributación ambiental (1ª ed., pp. 155). Madrid.

Casas Marín, J. (2012). Desequilibrios del sector eléctrico. retos a afrontar.

Club Español de la Energía. (2013). Regulación y Política Energética en España. Una reflexión.

CNE. (2012). Informe sobre el sector energético español. Parte I. Medidas para garantizar la sostenibilidad económico-financiera del sistema eléctrico. Madrid: Retrieved from www.cne.es

CNE. (2013). Información básica de los sectores de la energía, 2012. Madrid: Retrieved from www.cne.es

Communication from the commission to the European Parliament, the Council, the European economic and social committee and Committee of the regions on investing in development of low carbon technologies (SET-plan). A technology roadmap, SEC(2009)1295, (2009). Retrieved from http://eur-lex.europa.eu/SECMonth.do?year=2009&month=09

Corfee, K., Korinek, D., & Cassel, W. (2011). In KEMA (Ed.),
Distributed generation in Europe – physical infrastructure and distributed generation connection Retrieved from www.energy.ca.gov

Council of European Energy Regulators. (2011). CEER vision for a European gas target model.conclusions paper . Bruxelles: Retrieved from www.energy-regulators.eu

Danesin, A., Cruz Lascorz, M., Linares, P., López-Peña, Á., Pérez Arriaga, I., & Rodrigues, R. (2012). In Cátedra BP de Energía y Sostenibilidad, Universidad Pontificia Comillas (Ed.),
Observatorio e energía y sostenibilidad en España. Informe basado en indicadores. Edición 2012 . Madrid: Retrieved from www.upcomillas.es

El Banco Mundial. (2013). Datos. Retrieved 18 de septiembre, 2013, from http://datos.bancomundial.org/indicador/NE.EXP.GNFS.ZS/countries?display=default

Eurelectric. (2013). Utilities: Powerhouses of innovation. Full report. Bruselas, Bélgica: Retrieved from www.eurelectric.org

Europa. (2010). Seventh framework programme (2007 to 2013). Retrieved 4 de junio, 2013, from http://europa.eu/legislation_summaries/energy/european_energy_policy/i23022_en.htm

Communication from the commission to the European Parliament, the Council, the European economic and social committee and the Committee of the regions. Energy Roadmap 2050, COM(2011)885/2, (2011). Retrieved from http://eur-lex.europa.eu/COMByRange.do?year=2011&min=876&max=900

European Environment Agency. (2013). Putting clean air laws in to practice – report shows potential for improvement. Retrieved 6 de junio, 2013, from http://www.economist.com/news/special-report/21576213-motor-industrys-fortunes-are-increasingly-divided-says-peter-collins

Eurostat. (2013). Final energy consumption. Retrieved 2 de julio, 2013, from http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=ten00095

Foro de la Industria Nuclear Española. (2013). Energía 2013. Madrid: Retrieved from http://www.foronuclear.org/energia/2013

Marin Quemada, J. M. (2000). Política de Energía

Martínez Estévez, A., & Pallardó López, V. J. (2013). El déficit por cuenta corriente. La Gula. Los siete pecados capitales de la economía española (pp. 54). Oviedo: Ediciones Novel.

Ministerio de Industria, Energía y Turismo (MINETUR). (2012). Balances energéticos anuales. Período 1990-2011. Balance del consumo de energía final Retrieved from http://www.idae.es/index.php/idpag.481/relcategoria.1368/relmenu.363/mod.pags/mem.detalle

Morris, C., & Pehnt, M. (2012). In Heinrich Böll Foundationis (Ed.), Energy transition. The German Energiewende. Berlín: Retrieved from http://energytransition.de/

Mosácula Atienza, C., & Larrea Basterra, M. (2013). An overview of the Spanish energy policy. Unpublished manuscript.

Nesta (National Endowment for Science, Technology and the Arts). (2009). The innovation index. Measuring the UK investment in innovation and its effects. London: Retrieved from www.nesta.org.uk

OMIE. (2013a). Mínimo,medio y máximo del precio del mercado diario (€/MWh). Retrieved 20 de junio, 2013, from http://www.omie.es/files/flash/ResultadosMercado.swf

OMIE. (2013b). OMIE is the first market operator in Europe to be in a position to couple its daily market with Europe Retrieved from http://www.omie.es/en/home/publications/press-releases

Pérez-Arriaga, I. (2013). Wholesale market´s performance with high penetration of RES. Madrid.

Point Carbon, T. R. (2013). Point carbon EUA OTC assessment. Retrieved 5 de junio, 2013, from http://www.pointcarbon.com/news/marketdata/euets/forward/eua/

Red Eléctrica de España. (2012). Electricity interconnections: A step forward towards a single integrated European energy market. Madrid: Retrieved from www.ree.es

REE. (2013). 2012, El sistema Eléctrico Español. Madrid: Retrieved from http://www.ree.es/sistema_electrico/informeSEE.asp

Salas Fumás, V., & Rosell Martínez, J. (2006). El sector energético analizado desde los estados financieros de las empresas. Energía: del monopolio al mercado. CNE, díez años en perspectiva (pp. 533). Navarra: Thomson, Civitas; CNE. Retrieved from www.cne.es/cne/doc/publicaciones/coediciones/coed_thomson_cne1.pdf

Sallé Alonso, C. (2012). Desequilibrios del sector eléctrico. Retos a afrontar. Madrid: Retrieved from http://www.raing.es/es/actividades/las-jornadas-de-la-rai-desequilibrios-del-sector-el%C3%A9ctrico-retos-afrontar

The Economist. (2013). The future of cars. special report. Retrieved 5 de junio, 2013, from http://www.economist.com/news/special-report/21576213-motor-industrys-fortunes-are-increasingly-divided-says-peter-collins

Velasco González, M. (2007). Distintos instrumentos para un mismo fin. Los instrumentos de las políticas públicas como herramienta para el análisis. Unpublished manuscript. Retrieved 31 de mayo de 2013, from http://eprints.ucm.es/12184/

Yunta Huete, R. (2013). Recent developments in gas markets & network infrastructures. Madrid.

On the same themes...

ENERGY SOLIDARITY IN EUROPE: MOVING TOWARDS A EUROPEAN ENERGY COMMUNITY
Jerzy Buzek, *Tribune, Notre Europe – Jacques Delors Institute*, October 2013

WHAT CITIZEN DIALOGUES FOR WHAT TYPE OF ENERGY TRANSITION?
Sami Andoura and the EESC, *Synthesis, Notre Europe – Jacques Delors Institute*, August 2013

ENERGY SOLIDARITY IN EUROPE: FROM INDEPENDENCE TO INTERDEPENDENCE
Sami Andoura, Foreword by Jacques Delors, *Studies & Reports No. 99 , Notre Europe – Jacques Delors Institute*, July 2013

ENERGY POLICY: THE ACHILLES HEEL OF THE BALTIC STATES
Agnia Grigas, in A. Grigas, A. Kasekamp, K. Maslauskaite & L.Zorgenfreija, "The Baltic states in the EU: yesterday, today and tomorrow", Foreword by Jerzy Buzek, *Studies & Reports No 98, Notre Europe – Jacques Delors Institute, July 2013*

ENERGY TRANSITIONS AND PUBLIC DIALOGUE: NATIONAL AND EUROPEAN PERSPECTIVES
Jacques Delors & Henry Malosse, *Tribune, Notre Europe – Jacques Delors Institute/EESC*, May 2013

THE EUROPEAN ENERGY COMMUNITY IS NOW!
Sami Andoura, Jerzy Buzek, Jacques Delors and António Vitorino, *Tribune – Viewpoint, Notre Europe – Jacques Delors Institute*, May 2013

PROMOTING LOW-CARBON ENERGIES IN THE MEDITERRANEAN PARTNER COUNTRIES
Gonzalo Escribano, *Policy Paper no. 80, Notre Europe – Jacques Delors Institute*, March 2013

THE ROLE OF GAS IN THE EXTERNAL DIMENSION OF THE EU ENERGY TRANSITION
Sami Andoura & Clémentine d'Oultremont, *Policy Paper n° 79, Notre Europe – Jacques Delors Institute*, March 2013

MEETING EUROPE'S RESOURCE CHALLENGE WITHIN AND BEYOND EU BORDERS
Annika Ahtonen & Andrea Frontini, *Policy Paper No. 78, Notre Europe – Jacques Delors Institute*, March 2013

FRANCE PAVING THE WAY FOR A EUROPEAN ENERGY COMMUNITY
Jacques Delors, Sami Andoura & Michel Derdevet, *Tribune, Notre Europe – Jacques Delors Institute*, January 2013

FINANCING TRANS-EUROPEAN ENERGY INFRASTRUCTURES – PAST, PRESENT, AND PERSPECTIVES
Christian von Hirschhausen, *Policy Paper No. 48, Notre Europe*, November 2011

NUCLEAR ENERGY IN EUROPE: WHAT FUTURE?
Sami Andoura, Pierre Coëffé & Maria Dobrostamat, *Policy Brief No. 25, Notre Europe*, May 2011

TOWARDS A EUROPEAN ENERGY COMMUNITY: A POLICY PROPOSAL
Sami Andoura, Leigh Hancher & Marc Van der Woude, Foreword by Jacques Delors, *Studies & Research No. 76, Notre Europe*, March 2010

Managing Editor: Yves Bertoncini • The document may be reproduced in part or in full on the dual condition that its meaning is not distorted and that the source is mentioned • The views expressed are those of the author(s) and do not necessarily reflect those of the publisher • *Notre Europe – Jacques Delors Institute* cannot be held responsible for the use which any third party may make of the document • Original version • © *Notre Europe – Jacques Delors Institute*

Europe for Citizens
PREMIER MINISTRE
Compagnia di San Paolo
MACIF

NOTRE EUROPE JACQUES DELORS INSTITUTE

ISSN 2256-9944

19 rue de Milan, F – 75009 Paris
Pariser Platz, D – 10117 Berlin
info@notre-europe.eu
www.notre-europe.eu