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Table of contents

Table of contents	ii
Figures.....	iii
Tables	iv
1 Executive summary.....	1
2 General description of Navarra.....	5
2.1 Geography	5
2.2 State of infrastructure	7
2.3 Demographics.....	10
2.4 Administrative structure and governance	11
3 Regional economy	14
3.1 Overall economy of the region.....	14
3.2 Overview of key green economy sectors in Navarra and their interrelation.....	18
4 Sectors relevant for the Green Economy in Navarra - MODERNA	20
4.1 Foreword.....	20
4.2 Renewable Energy	21
4.2.1 Performance of the Renewable Energy sector.....	21
4.2.2 Key milestones	24
4.2.3 Drivers, barriers and enabling conditions	26
4.2.4 Spatial dimensions of the development of the sector.....	29
4.2.5 Potential for development of the sector	30
4.3 Agro-food Industries	31
4.3.1 Performance of the Agro-food sector	31
4.3.2 Key milestones	33
4.3.3 Drivers, barriers and enabling conditions	34
4.3.4 Spatial dimensions of the development of the sector.....	38
4.3.5 Potential for the development of the sector.....	39
4.4 Sustainable Tourism.....	40
4.5 Environment and waste	43
4.6 Sustainable Vehicle	44
4.7 Sustainable Construction.....	47
5 Horizontal drivers, barriers and enabling conditions: MODERNA	50
6 Assessment of the regions' potential to develop green economy in the future	53
7 The road ahead: transferability and conclusions	55
8 References.....	57

Figures

Figure 1	Navarra's location (ES22).....	1
Figure 2	Navarra's location (ES22).....	5
Figure 3	Navarra's biogeographical areas, according to Floristán and Mensua. (<i>Source: García et al. 2011</i>)	6
Figure 4	Overview of land-use in Navarra in 2009. <i>Source: Eurostat (lan_lu_ovw)</i>	6
Figure 5	Spanish railway network. Left in the XIX th century. Right in 2012.....	7
Figure 6	Navarra's potential for freight transport. (<i>Source: Jiménez et al. 2012</i>).....	8
Figure 7	New railway lines foreseen in Navarra. (<i>Source: ibid.</i>).....	9
Figure 8	Overview of internet access in Navarra. <i>Source: Eurostat (tgs00047 and tgs00050)</i>	9
Figure 9	Overview of the evolution of birthrate in Navarra. <i>Source: Eurostat (demo_r_fagec and demo_r_pjangroup)</i>	11
Figure 10	Overview of services managed by the "Mancomunidades" <i>Source: García et al. 2011</i> ...	13
Figure 11	GDP per inhabitant in percentage of the EU average. (<i>Source: Eurostat; nama_r_e3gdp</i>)	15
Figure 12	GDP per inhabitant, in purchasing power standard, in 2009 (% of the EU 27 average) (<i>Source: http://ec.europa.eu/eurostat/statistical-atlas/gis/viewer/; nama_r_e2gdp</i>)	15
Figure 13	Employment by sector and gender (%) in 2012 (<i>Source: Instituto de Estadística de Navarra 2012</i>).....	16
Figure 14	GVA share by sector in 2011 (<i>Source: Instituto de Estadística de Navarra</i>)	16
Figure 15	The MODERNA tree. (<i>Source: http://www.modernanavarra.com/en/moderna-plan/vision-and-principles/#</i>).....	19
Figure 16	Cluster levels of MODERNA. (<i>Source: MODERNA 2011b</i>)	20
Figure 17	Wind energy production as a % of electricity consumption in 2006 (<i>Source: NATURE 2007</i>)	21
Figure 18	GVA of Navarra's Energy sector 2000-2011 in thousands € (<i>Source: Instituto de Estadística de Navarra</i>).....	22
Figure 19	Employees of Navarra's Energy sector 2000-2011 (<i>Source: Instituto de Estadística de Navarra</i>)	22
Figure 20	Navarra's installed renewable energy capacity in MW (<i>Source: Gobierno de Navarra 2010</i>)	23
Figure 21	Navarra's primary energy consumption in 2009 (in TEP and %) (<i>Source: Gobierno de Navarra 2011</i>).....	23
Figure 22	Key milestones of the renewable energy sector in Navarra.....	25
Figure 23	Investment support for renewables in Navarra. <i>Source: Gobierno de Navarra 2010</i>	27
Figure 24	Navarra's wind resources (<i>Source: García et al. 2010</i>)	29
Figure 25	GVA evolution of the agro-food sector in basic prices. <i>Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department</i>	31
Figure 26	Employment evolution of the agro-food sector. <i>Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department</i>	31
Figure 27	GVA and employment share of agro-food subsectors in 2011. <i>Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department</i>	32

Figure 28	Evolution of ecological agriculture from 1991 to 2006 in Navarra. <i>Source: CPAEN/NNPEK</i>	32
Figure 29	Key milestones of the agro-food sector in Navarra.	33
Figure 30	Arable land in Navarra in 2010 in hectares. (<i>Source: Gobierno de Navarra</i>).	38
Figure 31	Employees in the hospitality sector 2005-2011 (<i>Source: Instituto Estadístico de Navarra</i>). 40	40
Figure 32	GVA of the hospitality sector 2005-2011 in thousands € (<i>Source: Instituto Estadístico de Navarra</i>). 40	40
Figure 33	Navarra's touristic zonification (<i>Source: Dirección General de Turismo de Navarra</i>).	41
Figure 34	Final energy consumption by sector in 2009, in % and TEP. (<i>Source: Gobierno de Navarra 2011</i>).	44
Figure 35	GVA of the construction sector 2000-2011 in thousands €. (<i>Source: Instituto Estadístico de Navarra</i>) 47	47
Figure 36	Employees of the construction sector 2000-2011. (<i>Source: Instituto Estadístico de Navarra</i>) 47	47
Figure 37	Key milestones of MODERNA.	50
Figure 38	MODERNA's management board.	51

Tables

Table 1	Overview of Navarre's socioeconomic profile. (<i>Source: Bergera et al.</i>).....	14
Table 2	Employment by career (%) in 2012. (<i>Source: Instituto de Estadística de Navarra 2012</i>)	17
Table 3	Navarra's 2020 objective's vs. Europe 2020 objectives.	30
Table 4	Overview LEADER+ budget breakdown. (<i>Source: Gobierno de Navarra 2012</i>).	37
Table 5	Overview of Rural Development Plan 2007-2013 budget. (<i>Source: Gobierno de Navarra 2012</i>) 37	37
Table 6	Overview of the automotive industry (<i>Source: CCOO, Servicio Navarro de Empleo (2008), Erro Garcés 2002</i>).	44
Table 7	Task forces of the Plan VEN (<i>Source: Gobierno Navarro 2011</i>).	45
Table 8	Strategic actions for the development of the Sustainable Construction sector.	49
Table 9	MODERNA indicators to monitor the evolution of results.	54

1 Executive summary

Background

Navarra is a NUTS 2 region composed by one single NUTS 3 region located in north-eastern Spain. The western Pyrenees form a natural frontier with France, in the region's north. The river Ebro crosses Navarre in the south, and provides it with an extensive system of canals. Like the countryside, the climate is one of contrasts, snow-covered mountains, cool mountain valleys, rain forest in the north-west, temperate green in the centre of the region, and fertile gardening country in the south, where the climate already verges on the continental.

Along these lines, Navarra covers three different bio-geographical regions: Alpine, Atlantic and Mediterranean, which has led to a rich landscape and ecological diversity. It covers an area of 10,421 km².

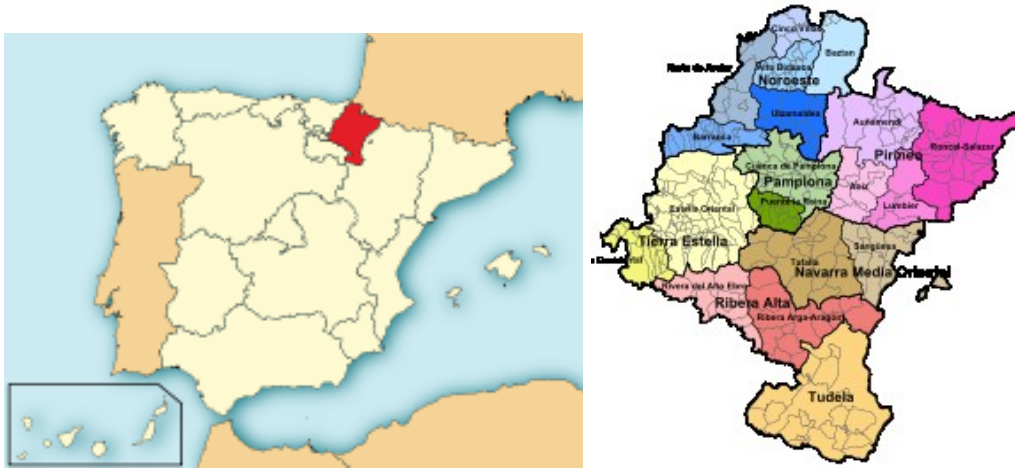


Figure 1 Navarra's location (ES22).

The population in Navarra is about 640,000 inhabitants, current population density of the region being 60.68 inh/km². It should be noted the population in Navarra has grown 30% from 1975. However, this growth has not been steady. Until the mid- nineties the increase was slow. The arrival of foreign population from the late 90's has boosted annual growth rates of the population to unprecedented levels, even in comparison with other European Union countries in their times of mass immigration.

Population density is below the national average, although the distribution is somewhat uneven. For instance, Pamplona and its metropolitan area account for virtually half the region's population (55%), even if it only makes out 3.4% of the territory (355 km²). In addition, it is the most important centre for services in Navarra and also accounts for most of the industrial workforce. At the other end of the scale are the Pyrenean areas, where hamlets predominate and employment is in animal husbandry and forestry, and population density is lower. To the South of Pamplona the population is spread over small villages of less than 5,000 inhabitants, except Tudela with 35,000 inhabitants.

Spain is a highly decentralised country, where autonomous communities have the authority for policy making, as long as it does not contradict national legislation. In the case of Navarra, the Law 6/1990 of July 2, replacing the Regulation for Municipal Administration of Navarra on 3rd February 1928, is the law regulating the Local Government of Navarra. This document organizes the local administration taking into account both, Navarra's historical peculiarities, as well as new approaches emerging from new laws. Currently, the administrative structure of Navarra comprises three levels:

- Top level: Navarra's government.
- Intermediate level: historically the "Merindades", nowadays the "Mancomunidades" for services. In addition, the "Facerías" and State Forestry, also take place in this intermediate administrative level.
- Bottom level: Municipalities.

Regional economy and the performance of key sectors

Navarre is one of the richest regions of the 27 countries that make up the EU, with a per capita gross domestic product (GDP) of 118 (being 100 the European average). Besides, Navarre's per capita GDP is higher than most of the Spanish regions.

The main feature of Navarre's economy is the preponderance of industry, which accounted for a 28.4% of the total GVA of the region in 2010, as opposed an 15.6% of the same sector in Spain as a whole (Bergera et al.) the main sectors for GDP and employment being the following:

- Industry: 28.4% of the GDP, 66,700 workers
- Construction: 9.5% of the GDP, 17,500 workers
- Farming and stockbreeding: 2.9% of the GDP, 8,100 workers
- Services: 59.3% of the GDP, 165,000 workers.

By 2012, the shares of Industry and Construction had decreased, 26.9% and 6.3% respectively, while the share in Services raised to 61.9%.

In 2008, Navarra started the process of strategic thinking, during which the regions strengths, opportunities, weaknesses, barriers, etc. were analyzed in a bottom-up way, looking the region's past evolution, defining present potentialities and developing realistic targets for the future. Over 5.000 stakeholders (regional and international) ranging from economic and social agents, public administrations, to educational and research institutions, participated in this process. The main aim was to analyse what areas (economic sectors) should leverage the RIS3 in Navarra. This process led to the approval of the MODERNA action plan in 2010. MODERNA is the new "Economic Development Model of Navarre", a strategic plan that promotes change towards a knowledge-based economy, specialized in the areas of health economics, green economics and talent economics, and which seeks to place Navarre among the top 20 European regions in GDP per capita.

With regard to Green Economy, MODERNA puts emphasis in six sectors: **(1)** Sustainable Construction, **(2)** Sustainable Vehicle, **(3)** Renewable Energy, **(4)** Agro-food industry, **(5)** Sustainable Tourism, and **(6)** Environment and Waste.

Renewable Energy

Over the last 15 years, Navarra has attained worldwide recognition in the renewable energy sector. The Spanish National Research Centre for Renewable Energies (CENER) is located in Navarra and has more than 200 researchers using cutting-edge technology facilities. Around 6,000 people work in the renewable energy sector.

In such a context, wind energy has become an active industrial and productive sector of the region, ranging from energy producers to industrial plans to produce type of equipment cover turbine assembly, the manufacture of blades, turbines, towers and control equipment, and other wind turbine components. In addition, the general objective of the new "Energy Plan of Navarra Horizon 2020" is to maximize the role of the production, transformation and consumption of energy in the sustainability of Navarra from social, economic and environmental perspectives. The specific objectives being:

- Increase self-sufficiency in primary energy above 21%.
- Generate 10% more electricity than is consumed, through renewables.
- Reduce final energy intensity by 18% in comparison to 2009.
- Exceed the energy objectives established by the European Union for 2020

This success in the development and growth of the renewable energy sector, wind-farms in especial, relies in a mix of the right government support measures, territorial assets and availability of stakeholders (industry, academia, government).

Agro-food industries

Agriculture has gradually lost importance in the region's economic structure, whilst continuing to provide a solid basis for the agro-food industry, which is expanding with a high level of productivity. Cereals, wine and market garden produce, together with beef and dairy produce, account for 70% of the agricultural sector's production. Most agricultural activity is in the upper Ebro valley and shows a level of productivity far superior to the national average. The

Spanish National Centre for Food-Processing Technology and Safety (CNTA) is located in Navarra.

Over the last decade, the number of jobs in the agro-food sector has increased around 6% and its GVA has increased almost 40%. Besides, agro-food plays a unifying and cohesive role in the territory of Navarra. The sector comprises over 500 companies. In terms of sector structure, meat industry is the subsector which contributes most to the GVA of the sector, followed closely by the preparation and preservation of fruit and vegetables. However, in relation to employment, the preparation and preservation of fruit and vegetables is ahead of the meat industry. In addition, the share of ecological agriculture in Navarra has been increasing since the 1990s. Even if this share is still low when compared to other types of agriculture, it is still growing in Navarra due to the increasing societal awareness on food quality and sustainability

Finally, the current challenges due to changing lifestyles, market globalization, demand becoming concentrated in large distributors, technological progress and increasing food safety, have led the sector stakeholders to elaborate a new strategy to increase its competitiveness. The aim is to position the agro-food cluster on the global market with the concepts of health, pleasure and natural food.

Sustainable Tourism

Navarra has a myriad of natural and cultural assets that make it an attractive tourist destination. From the beech forest of the Selva de Irati, to the alpine area in the Pyrenees, the desert-like landscape of the Bardenas Reales, Navarra holds a unique natural capital. The Pilgrim' Way to Santiago also goes through Navarre and it is home to the fiestas of San Fermín, which were made internationally famous by Ernest Hemingway. Besides, Navarra is also famous for its market gardens and their product (namely, chard, artichokes or asparagus, as well as, wines) and subsequently has a varied and rich gastronomy. On the other hand, the combination of tourism and leisure it is considered one of the sectors with better growth perspectives in Navarra. Tourism also holds the opportunity support productive and economic reorganization of the territory in Navarra.

Environment and Waste

To date, Environment and Waste has not been dealt with as a stand-alone sector in Navarra, but rather horizontal to all economic activities. Along these lines, environmental sustainability is also inherent in some of the sectors backed by Moderna (e.g. Sustainable Construction, Sustainable Vehicles and Renewable Energies).

However, in the context of the growing awareness and action towards environmental sustainability in all spheres (social, political, cultural) and governance levels (European, national, regional), MODERNA considers the Environment and Waste sector a green economic sector that poses a great growth potential through public-private collaboration, the provision of specific goods and services and subsequently, employment creation. The vision for 2030 is to strategically position Navarra in the fields of energy, water and waste recovery, in line with the strategies fostered by the EU, such as, the Resource Efficiency Roadmap and Europe 2020 objectives.

Sustainable Vehicle

Since 2006, transport is the most energy intensive sector in Navarra. The reason for this is that since 1993 it has been the sector with the highest annual growth rate. Even if the process has slowed down in the context of the current economic crisis.

The automotive industry started its development in Navarra in the 1950s, when the first automobile component manufacturers were established and by the early 2000s the automotive industry in Navarra consisted of over 80 companies and over 10.000 employees.

In such a context, Navarra's 3rd Energy Plan identified the below guidelines to reduce the energy intensity of the sector and foster its growth:

- Reduce the use of private vehicles and promote a more sustainable mobility
- Use biofuels as an alternative to fossil fuels
- Foster electric mobility

- Improve the energy efficiency of vehicles and promote energy labelling and efficient driving

Against this backdrop, MODERNA identified that if “*Navarra is to consolidate itself as a passenger vehicle manufacturing region, which also has a competitive ancillary industrial fabric, it must show a firm commitment to developing a competitive advantage based on sustainable vehicles*”. This shift of business model from the current transport sector in Navarra towards a Sustainable Vehicle sector is surrounded by a great deal of uncertainty, although some paths for action are starting to be envisaged, which will make it necessary to take sides (Moderna 2011b).

Sustainable Construction

The construction sector has been steadily growing in Navarra over the last decade, reaching its peak in 2008 and then decreasing slightly in the context of the EU wide economic crisis. However, this slow-down has been more accused in terms of employment. While the GVA of the sector has decreased by 4% between 2008 and 2011, employment has decreased by 34%.

In the context of the current economic crisis, MODERNA and sector stakeholders have identified the need for the sector to re-invent itself and become green. In doing so, the construction sector will become more efficient, increase the safety of its workers and improve its environmental performance. The long-term goal is that Navarra becomes the world reference in specific (to be defined yet) areas of sustainable construction, by seeking opportunities in the energy rehabilitation of existing buildings

Lessons learnt from Navarra

Navarra has certain competitive advantages to undergo such a transition, due to its inherent regional characteristics. In terms of territorial capital, Navarra’s climatic conditions hold a great renewable energy potential, its landscapes and natural areas are a great touristic asset, the cluster presence in the region is high, which facilitates knowledge spillovers and besides it has a cohesioned institutional structure to foster change. In addition, Navarra is one of the most R&D investing regions in Spain. It has Technology Action Plans in place to achieve the objective of becoming one of the 50 most innovative regions in the EU.

The most remarkable feature of Navarra is that over the last decades it has built a solid policy framework to foster its priorities (i.e. renewable energies in the 1990s, innovation) and monitored the evolution of measures adopted. In this regard, due to the fact that Navarra has its own tax regime, policies such as innovation and renewable energies have been complemented with tax incentives which boosted the growth of both sectors. In addition, strategic investment in R&D infrastructure and continuous support for technology commercialisation has led to a global recognition of Navarra as being at the cutting-edge of renewable energy production. Currently MODERNA is working to articulate such coordinated measures (policy priorities together with fiscal incentives) which have proved to be key to foster change (MODERNA 2013).

In addition, Navarra has already started the green(er) economy transition, by publishing MODERNA (a new economic model for Navarra) in 2010. The MODERNA action plan aims to achieve a smarter, more inclusive and more sustainable Navarra, which is a greener Navarra. MODERNA seeks to (MODERNA 2013):

- Increase GDP per capita, so that Navarra is among the top 20 regions in the EU.
- Increase well-being and quality of life, so that Navarra is among the top 10 regions in the EU in terms of HDI (Human Development Index).
- Increase environmental performance, so that Navarra is among the top 20 regions in the EU in terms of sustainability.

It is worth highlighting that MODERNA is considered by the European Commission as a good practice in the regional smart growth strategies (S3 “Smart Specialization Strategies”) (EC 2012b). That is why the MODERNA action plan is considered the key measure that could be transferable to other European regions to deliver green growth.

2 General description of Navarra

2.1 Geography

Navarra is an autonomous region located in north-eastern Spain. It should be noted that autonomous communities in Spain can consist of a single NUTS 2 region, or of a NUTS 2 region composed by two or more NUTS 3 regions (provinces). Navarra is a NUTS 2 region composed by one single NUTS 3 region.

The western Pyrenees form a natural frontier with France, in the region's north. The river Ebro crosses Navarra in the south, and provides it with an extensive system of canals. Like the countryside, the climate is one of contrasts, snow-covered mountains, cool mountain valleys, rain forest in the north-west, temperate green in the centre of the region, and fertile gardening country in the south, where the climate already verges on the continental.

Along these lines, Navarra covers three different bio-geographical regions: Alpine, Atlantic and Mediterranean, which has led to a rich landscape and ecological diversity. It covers an area of 10,421 km². The population in Navarra is about 640,000 inhabitants, current population density of the region being 60.68 inh/km².

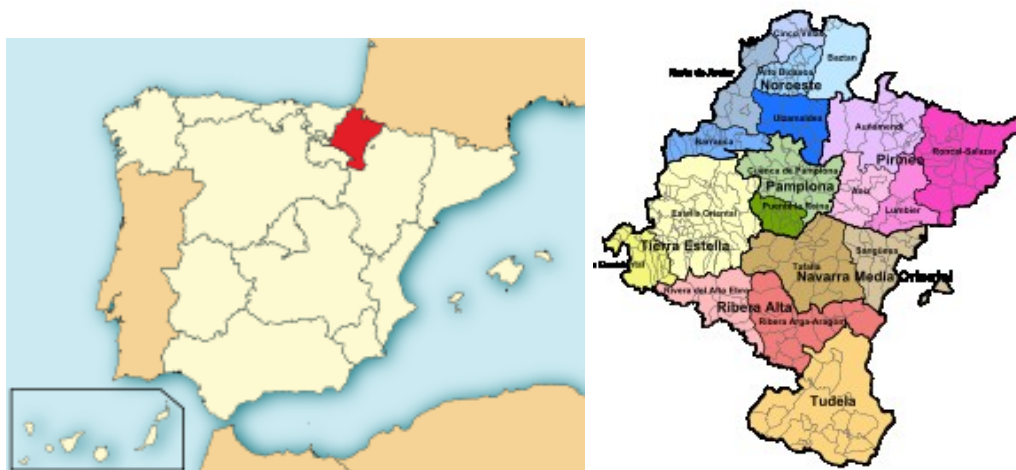


Figure 2 Navarra's location (ES22).

The above bio-geographical regions were defined by geographers Alfredo Floristán and Salvador Mensua in the 40s and it is widely accepted. This regionalization is based on criteria related to topography, climate, vegetation, and in some cases, to history. It distinguishes two distinct areas:

1. To the north, the Mountain, with oceanic and alpine features,
2. To the south the River Bank with continental-mediterranean features.
3. Between these two areas, the Middle Area is an area with mixed features.

This general characterization had been, to some extent, considered before, since the natural regions of mountains to the north and the Ebro valley to the south comprise very distinct realities. From this simplified characterization Floristán and Mensua further distinguished geographical characteristics and developed the below classification:

Mountain Area

Valleys of the Pyrenees
Northwestern humid Navarra
Pre-Pyrenees watersheds

River Bank

Estella River Bank
Tudela River Bank

Middle Area

Western Middle Area
Eastern Middle Area

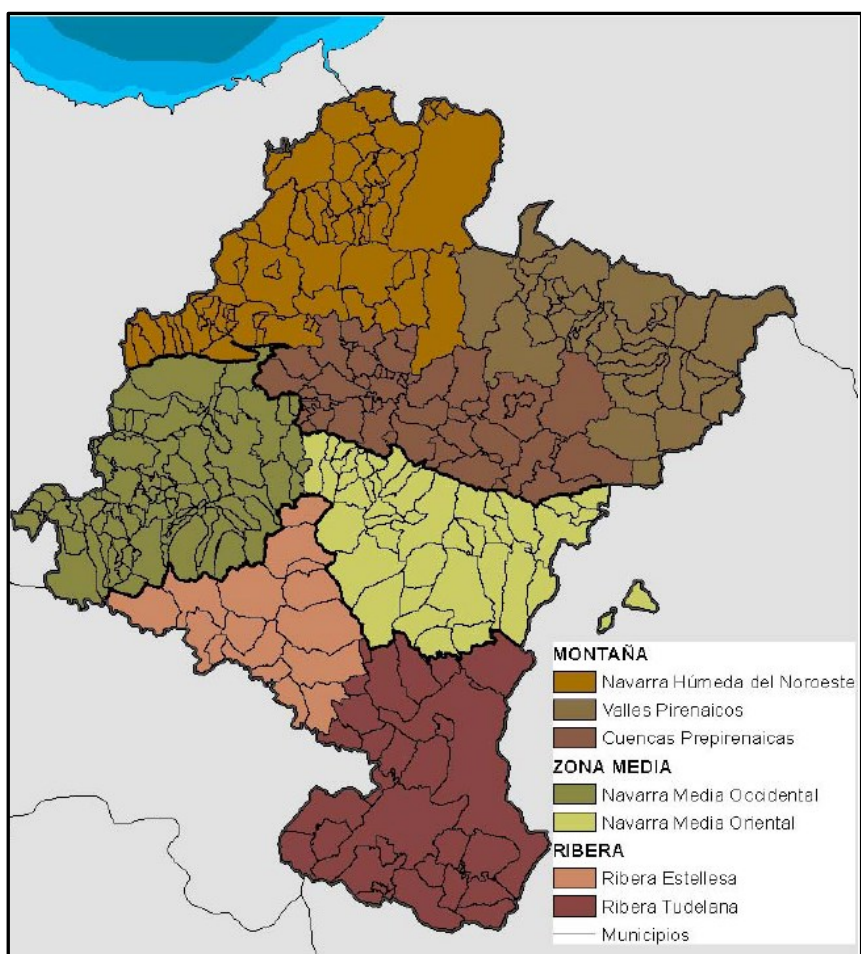


Figure 3 Navarra's biogeographical areas, according to Floristán and Mensua. (Source: García et al. 2011)

These boundaries were not easy to define as the transition from one landscape to another is progressive. For this reason, the divisions that were considered were based on climatic and geomorphological criteria. The border between the Mountain Area and the Middle Area is the natural barrier formed by the mountain chains of Urbasa, Andia, Perdón, Alaiz, Izco and Leyre. The border between the Middle Area and the River Bank is more difficult to define, due to the topographic and climatic continuity. In this case the border was based on geological characteristics: the presence of gypsum, irrigation and large towns. These three features characterize the landscape of the River Bank.

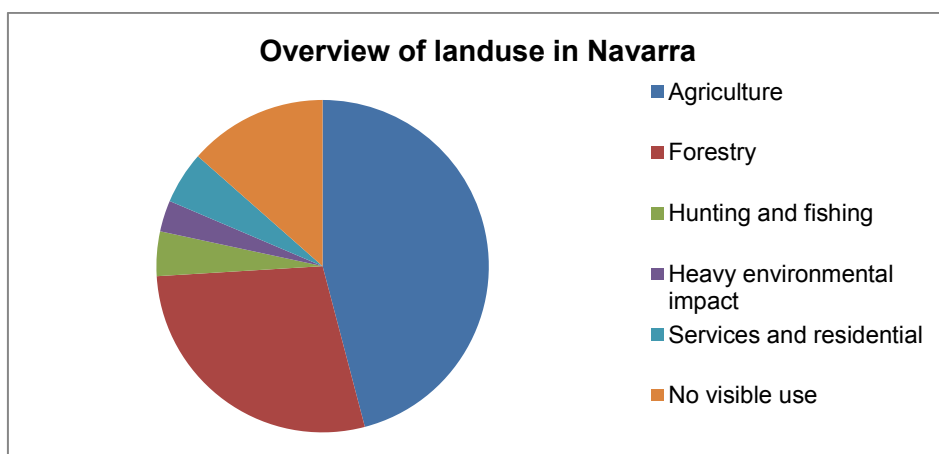


Figure 4 Overview of land-use in Navarra in 2009. Source: Eurostat (lan_lu_oww)

Finally, the strong commitment of Navarra towards renewable energy, has led to a rapid expansion of wind mills. By 2008, over one thousand wind mills stood in Navarra. This wind mills are located in wind parks scattered across the region, especially in the Central Zone and Ribera, because of their wind potential.

2.2 State of infrastructure

Navarre lies at the crossroads between the Cantabrian coast, the Mediterranean and the heart of the Iberian peninsula, but access has traditionally been difficult because of poor communications. Efforts are now being made to improve the situation, in particular by the construction of motorways and expressways linking the regional capital, Pamplona, with Saragossa, Madrid and San Sebastian. The region is linked to the main continental traffic routes via Irun. Moreover, most of the Navarre region lies in the broad valley of the Ebro, and its geographical position allows access from the Atlantic seaboard to the Ebro corridor, fronting directly on to the single market.

In Spain the density of infrastructures and of railway services is low when compared to other EU countries such as United Kingdom, Germany or Belgium, all of which contribute to a development model taking into account social and environmental responsibility aspects.

During the XXth century Spain's railway network remained almost the same as in XIX, that is to say no major investments were made. In Navarra, however, rail services were considered a paradigm of modernity. That is why investments were made in railway infrastructure, including international and interregional connections.



Figure 5 Spanish railway network. Left in the XIXth century. Right in 2012.

Nonetheless, these investments faced some challenges. On the one hand, there were difficulties in importing the materials necessary and this had an impact on the Spanish steel industry. On the other hand, once the infrastructures were built, management was not monitored. In addition, it could also happen that the policy framework changed making the service offered by the newly built infrastructures inefficient or expensive. For this reason, most FIEs (foreign investment enterprises) left the country after the construction of such infrastructure.

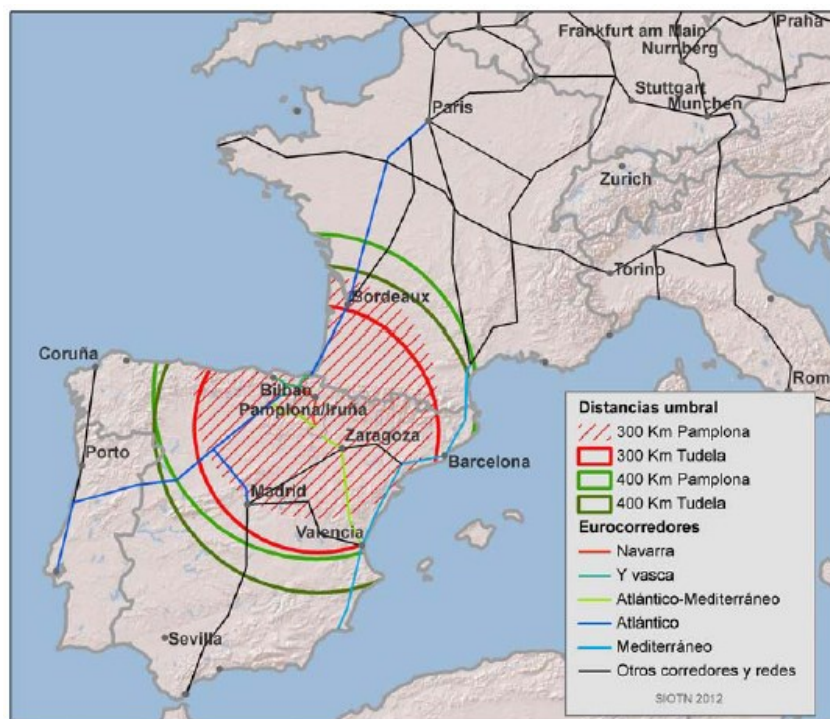
Then, in 1941, after the Civil War, RENFE was founded (Spanish National Railway Network) to manage the railway network and foster its modernization. In recent years RENFE ceased its activity, with the subsequent liberalization of the railway network management, according to EU directives.

The future railway model comprises infrastructure and transport services management, as well as, governance and cooperation mechanism. The goal is to build a 10 000 km long network by 2020, enabling that 90% of the population has a railway station no further than 50 km away. This would imply an investment of 1.5% of yearly GDP.

It should be noted that the railway network is a competence of national government. Nevertheless, Navarra has always has an active role when it comes to safety, equipment, etc. aspects of this network within its territory. Cooperation among national and regional

governments is fluent and has crystallized in agreements, as well as in the inclusion of such infrastructures in the eurocorridors network.

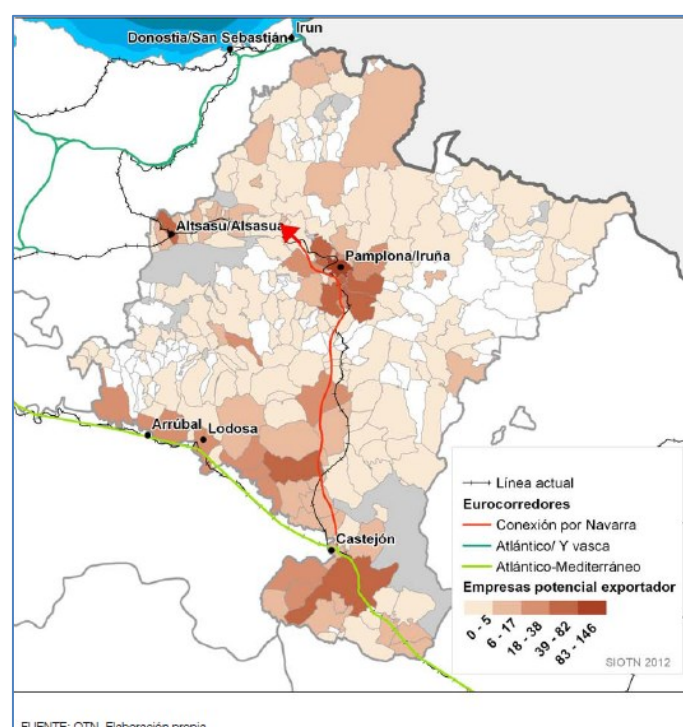
Regardless the efforts made already, Navarra needs to adapt its railway infrastructure to the new uses and railway models not to lag behind and become logistically isolated. Along these lines, due to its proximity to the French border, Navarra has a huge potential for freight movement, as exemplified in the figure below



FUENTE: OTN. Elaboración propia

Figure 6 Navarra's potential for freight transport. (Source: Jiménez et al. 2012)

Along these lines, the figure below shows the new lines foreseen (in red, light green) as well as the concentration of potentially exporting companies.



FUENTE: OTN. Elaboración propia

Figure 7 New railway lines foreseen in Navarra. (*Source: ibid.*)

Finally, with regard to the Information Technology (IT) infrastructure, 65% of the population are regular users, while 67% of the households have access to the internet. These shares have been increasing since 2006, with a slight slowdown in 2009.

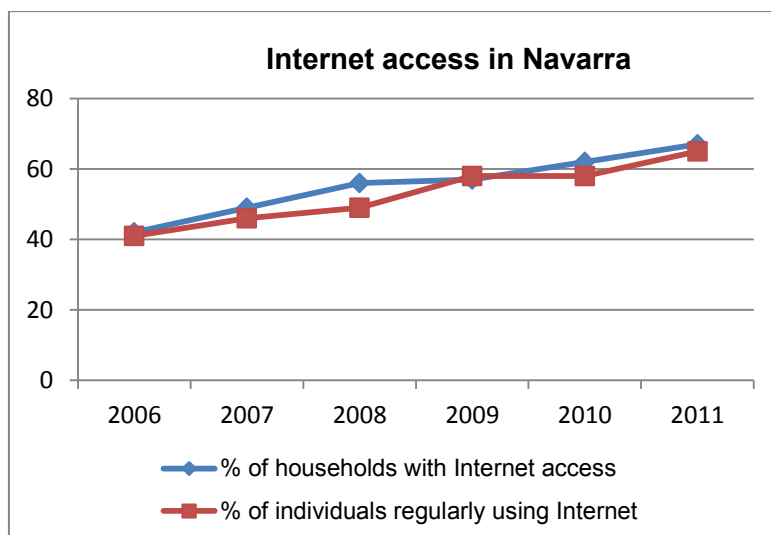


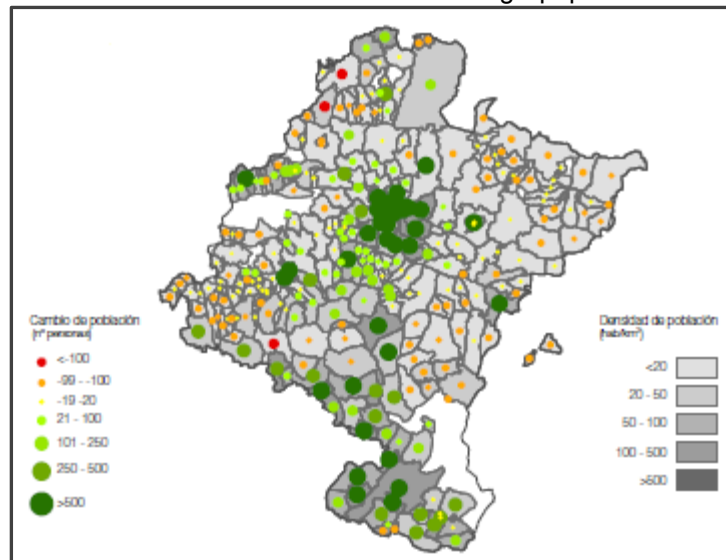
Figure 8 Overview of internet access in Navarra. *Source: Eurostat (tgs00047 and tgs00050)*

This share is above the EU average, where two-thirds of households have internet access (64%) (EC 2012).

2.3 Demographics

The population in Navarra has grown 30% from 1975. However, this growth has not been steady. Until the mid- nineties the increase was slow. The arrival of foreign population from the late 90's (showed in the map) has boosted annual growth rates of the population to unprecedented levels, even in comparison with other European Union countries in their times of mass immigration.

Population density is below the national average, although the distribution is somewhat uneven (red dots indicate smaller centres with decreasing population in the period 2000-2006). For instance, Pamplona and its metropolitan area account for



virtually half the region's population (55%), even if it only makes out 3.4% of the territory (355 km²). In addition, it is the most important centre for services in Navarre and also accounts for most of the industrial workforce. At the other end of the scale are the Pyrenean areas, where hamlets predominate and employment is in animal husbandry and forestry, and population density is lower. To the South of Pamplona the population is spread over small villages of less than 5,000 inhabitants, except Tudela with 35,000 inhabitants.

There are socio-economic differences between the different areas of Navarre, and each has its own problems. The regional capital and its surroundings suffer the typical problems of a large urban centre; the Pyrenean areas lack social facilities and infrastructures, and given the wide dispersal of the population, providing them is going to be very expensive. Meanwhile, the Ebro valley is fairly well-served, and of considerable agricultural importance, with a widespread system of irrigation canals which facilitate the cultivation of vegetables, cereal crops and vines.

Besides, without immigration, population growth would have stagnated in Navarre. As a result of low birth rates, the population of Navarre has entered an aging process and, therefore, an increasing dependency ratio (inactive people of working people dependent). This process is more present in rural areas of Navarre, as the Pyrenees, the Atlantic Region and the Central Zone.

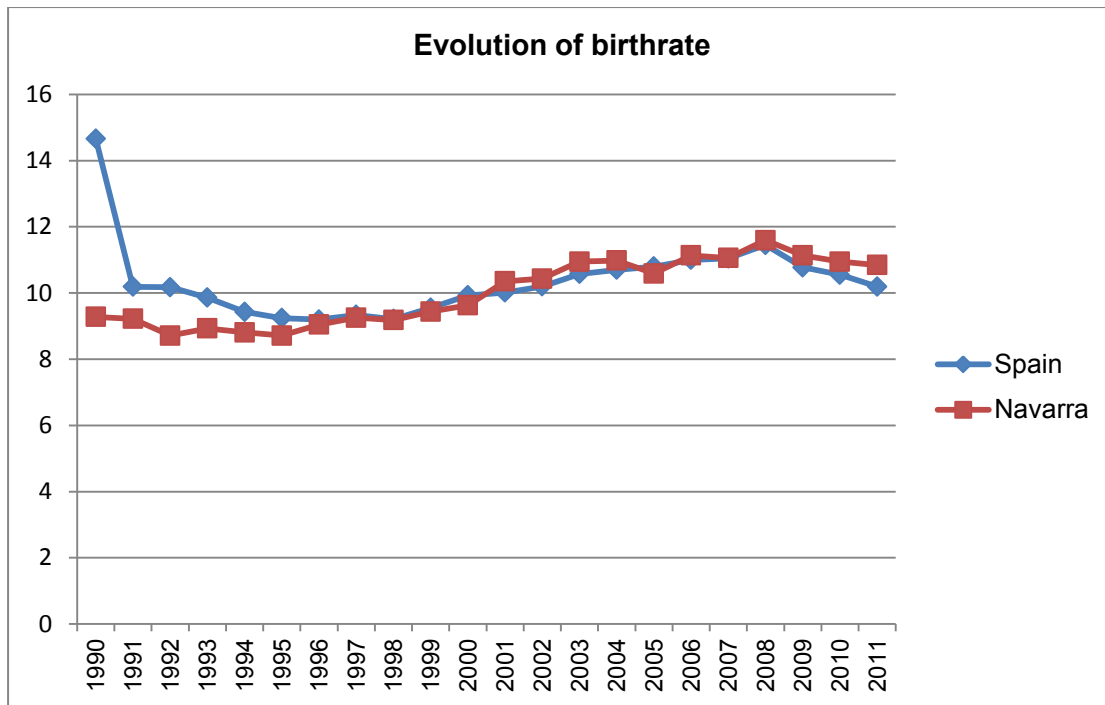


Figure 9 Overview of the evolution of birthrate in Navarra. Source: Eurostat (demo_r_fagec and demo_r_pjangroup)

The population growth prospects are not even across Navarra. The region of Pamplona is expected to keep growing, but areas such as the Pyrenees, the Atlantic and the Central Zone are under constant threat of depopulation and show a progressive aging.

Along these lines, this clear trend of population concentration is also related to economic activities being increasingly concentrated in urban areas. In addition, the development of the welfare and knowledge society has also led to an increase in demand for services, which, to date, are not sufficiently met in rural areas. This is the main driver for population to move from rural to urban areas.

2.4 Administrative structure and governance

Spain is a highly decentralised country, where autonomous communities have the authority for policy making, as long as it does not contradict national legislation.

The Law 6/1990 of July 2, replacing the Regulation for Municipal Administration of Navarra on 3rd February 1928, is the law regulating the Local Government of Navarre. This document organizes the local administration taking into account both, Navarre's historical peculiarities, as well as new approaches emerging from new laws.

It should be noted that territorial organization of Navarra is a dynamic process and in recent years it is being subject to change because of socio-economic changes.

E.g. societal evolution leading to land-use changes, makes it that in 2005, 11.4% of the population, lived in municipalities created in the 70s, and from this decade onwards population has started concentrating in a few areas of Navarra.

The administrative structure of Navarra comprises three levels:

- Top level: Navarra's government.
- Intermediate level: historically the "Merindades", nowadays the "Mancomunidades" for services. In addition, the "Facerías" and State Forestry, also take place in this intermediate administrative level.
- Bottom level: Municipalities.

Intermediate level:

It should be noted there has been the need to define an intermediate level of territorial administration between municipalities and the (i) Autonomous Region, (ii) Province or (iii) Kingdom of Navarra, depending on the historical moment. To meet this need, the so called "Merindades" were configured. These were administrative districts of the Kingdom of Navarre and were responsible for a wide range of functions and ensured territorial stability. The "Merindades" were:

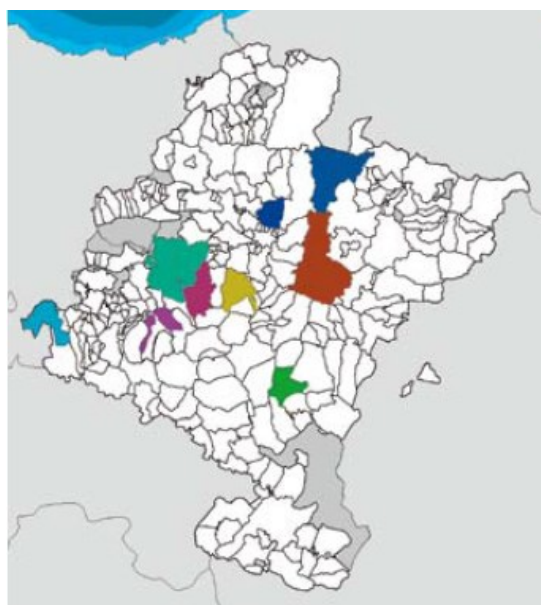
- Merindad de las Montañas o Pamplona
- Merindad de Sangüesa
- Merindad de Estella
- Merindad de Olite
- Merindad de Tudela

Nowadays the "Merindades" lack administrative competences and their role has been taken by the "Mancomunidades". Nonetheless, the "Merindades" are still present and relevant. According to Organic Law 13/1982:

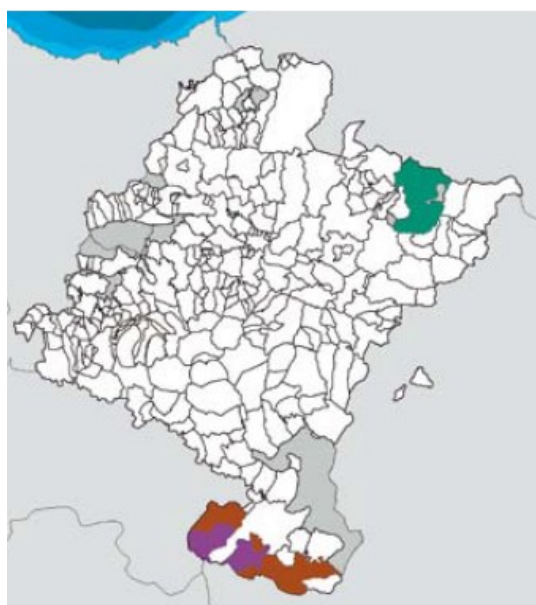
"The territory of Navarre is composed of the municipalities within its historical Merindades Pamplona, Estella, Tudela, and Olite Sangüesa".

Currently, the "Mancomunidades" are the intermediate level administrative figure. "Mancomunidades" are (voluntary) associations of municipalities which carry out the execution of works and provide local services. They have a local character and respond limited financial capacity of municipalities to individually deliver services within their jurisdiction. The association is voluntary and hence, new "Mancomunidades" could be created when new needs arise. There is no need for an upper level authority to develop any administrative or legislative act to sanction the creation of the "Mancomunidades".

These are ruled by the laws of organization and procedure adopted by the new Local Authority. 53 "Mancomunidades" exist in Navarre, 7 of which are plurifunctional. That is to say, they manage more than one service for their associated municipalities. On the contrary, other "Mancomunidades" manage only one service for their municipalities. The services managed by "Mancomunidades" are: 1- Administrative Services, 2- Water, 3- Culture and Sport, 4- Urban Solid Waste, 5- Social Services and 6- Plurifunctional.



1- Administrative Services



2- Water

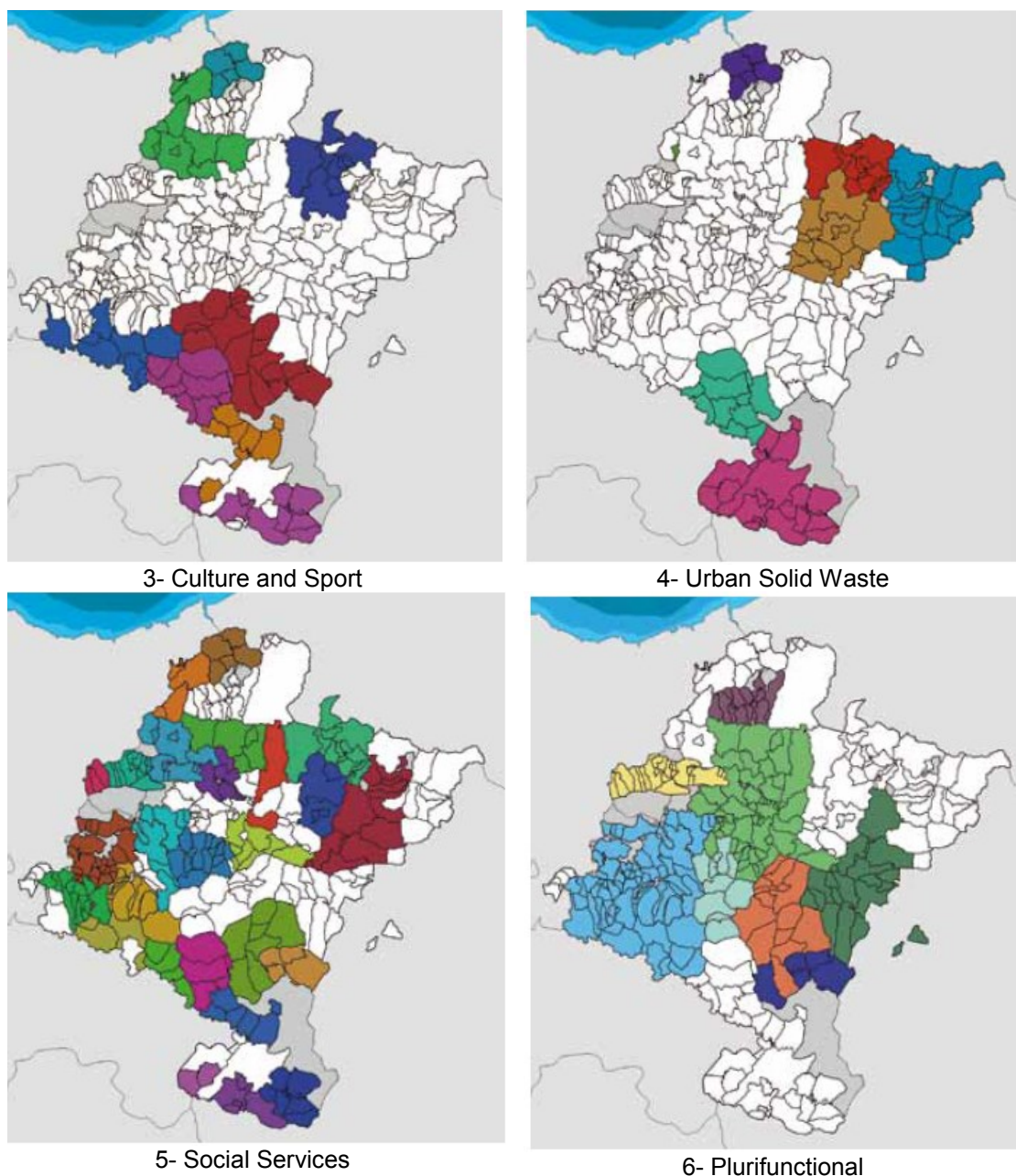


Figure 10 Overview of services managed by the “Mancomunidades” *Source: García et al. 2011*

“Facerías” and State Forestry

The so called “facerías”, are communal lands, which are shared by a number of municipalities upon covenants. Currently only 65 exist, compared to the 170 which existed during the XIX century.

As for the State Forestry, it comprises forest and mountain lands. The origin of the name is that in 1866, Navarra granted the control of such lands to the State. In 1987 the State gave it back to Navarra and in 1991, Navarra granted the control to local authorities. Nonetheless, the State Forestry name remains.

Bottom level: Municipalities

The territory of Navarra is divided into municipalities, which are the basic local entities for territorial organization. There are currently 272 municipalities in Navarra, which could be argued to be too many, considering the population and surface of the region.

The government and administration of the municipalities belong to the City Council as regulated by Provincial Legislation. When the inhabitants are less than 100, the management and administration of the municipality will be ruled by an open council system. Navarra's municipalities are small and thus face difficulties in terms of economic efficiency, management capacity, political leadership and coordination.

The competences of municipalities are established by national legislation and, when applicable, provincial laws. For those municipalities, where territorial councils exist, these keep the competences stated by Law 6/1990, article 39. Territorial councils may delegate their competences in City Councils.

Many of these basic territorial units (municipalities, councils, valleys ...) have reached its present form during the last two centuries, but it should be noted that the majority of entities have existed since at least the Middle Ages.

3 Regional economy

3.1 Overall economy of the region

Navarre is one of the richest regions of the 27 countries that make up the EU, with a per capita gross domestic product (GDP) of 118 (being 100 the European average). Besides, Navarre's per capita GDP is higher than most of the Spanish regions.

Table 1 Overview of Navarre's socioeconomic profile. (*Source: Bergera et al.*)

Indicator	Value (averaged over 2005-2010)
Regional GDP (in current EUR) (million of €)	17 100
Per Capita GDP (in current EUR) (€)	28 600
Growth of Regional per Capita GDP (percentage)	0,05
Share of Employment in Industry (including Construction) (in %) (share)	37,18
Unemployment Rate (in %) (share)	6,66
Gross Expenditure on R&D (GERD; in current EUR) (million of €)	316,87
Gross Expenditure on R&D per GDP (in %) (percentage)	1,85
Share of Business Expenditure on R&D in GERD (in %) (share)	67,06
EPO Patent Applications (by Priority Year)	42,96
Share of Knowledge Workers (Share of HRST in Economically Active Population) (in %) (share)	20,5

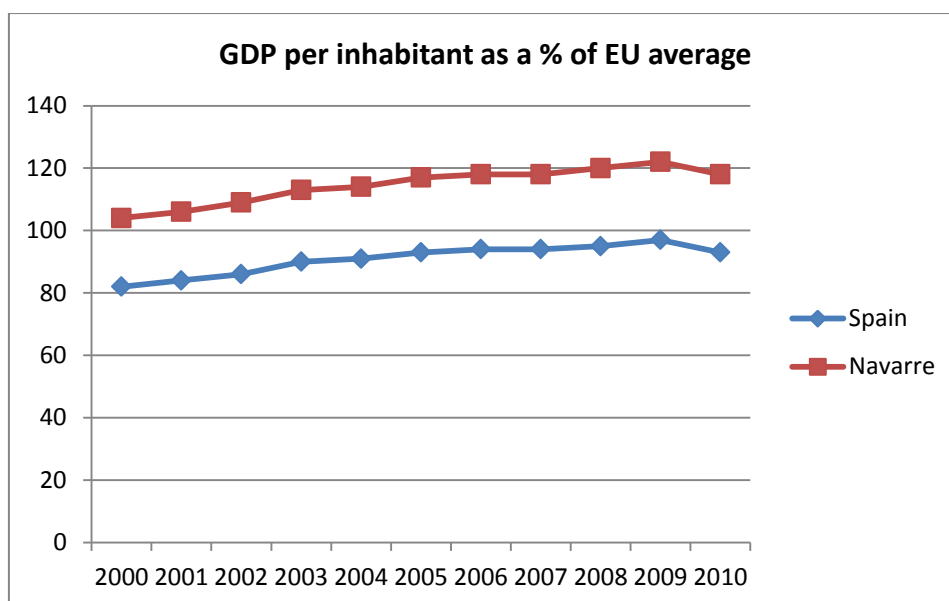


Figure 11 GDP per inhabitant in percentage of the EU average. (Source: Eurostat; *nama_r_e3gdp*)

Moreover, Navarre's GDP has been steadily growing over the 2000 – 2009 period, only suffering a slight decrease in 2010 in the context of the economic crisis. This economic growth in Navarra rests upon three main pillars: (1) accumulation of productive factors, especially capital equipment and qualified human resources; (2) Innovation efforts conducted by private and public sectors; (3) Interaction between productive factors and technological innovation (Ortega-Argilés).

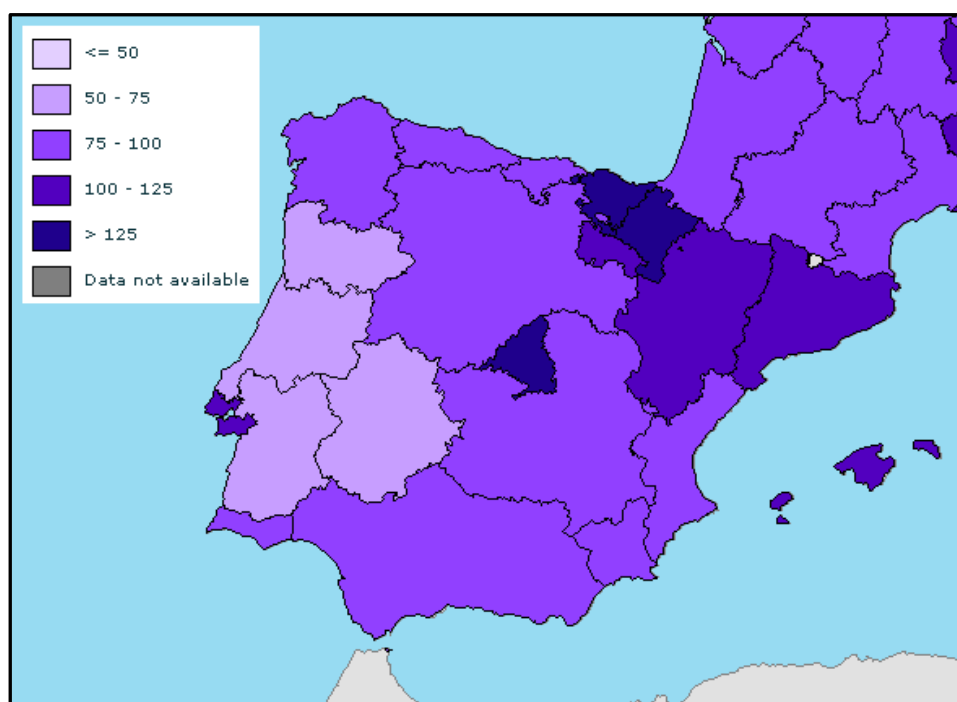


Figure 12 GDP per inhabitant, in purchasing power standard, in 2009 (% of the EU 27 average) (Source: <http://ec.europa.eu/eurostat/statistical-atlas/gis/viewer/>; *nama_r_e2gdp*)

The main feature of Navarre's economy is the preponderance of industry, which accounted for a 28.4% of the total GVA of the region in 2010, as opposed an 15.6% of the same sector

in Spain as a whole (Bergera et al.) the main sectors for GDP and employment being the following:

- Industry: 28.4% of the GDP, 66,700 workers
- Construction: 9.5% of the GDP, 17,500 workers
- Farming and stockbreeding: 2.9% of the GDP, 8,100 workers
- Services: 59.3% of the GDP, 165,000 workers.

By 2012, the shares of Industry and Construction had decreased, 26.9% and 6.3% respectively, while the share in Services raised to 61.9%.

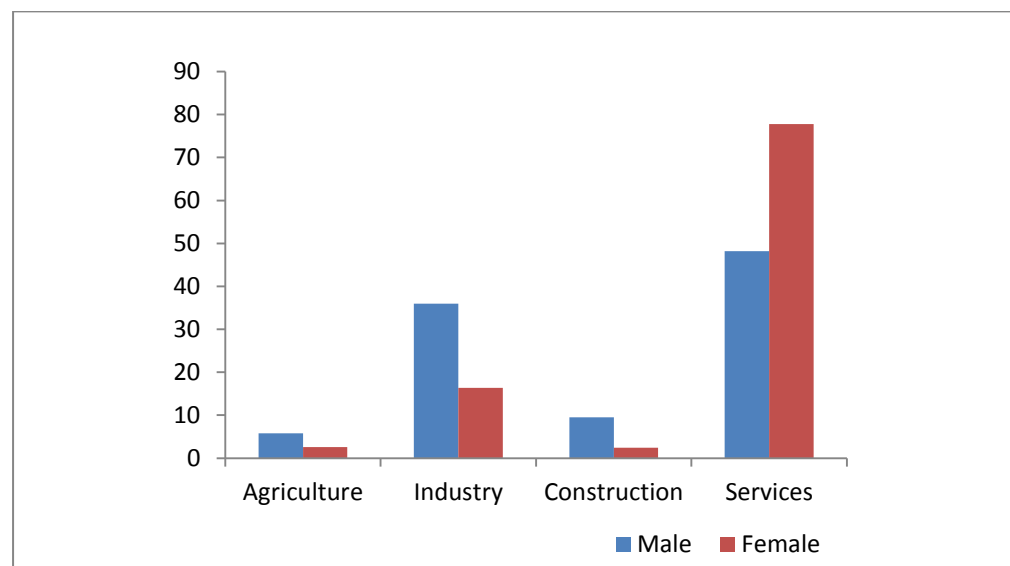


Figure 13 Employment by sector and gender (%) in 2012 (Source: *Instituto de Estadística de Navarra 2012*)

In Navarre, the industrial structure consists of a network of SMEs and also the significant presence of multinational corporations. These industrial plants are often characterized by employing cutting-edge technologies, a large export capacity and a spillover effect on the rest of sectors. Besides, these multinational plants belong to two of the most important sub-sectors in Navarre: car manufacturing (e.g. Volkswagen) and machinery and equipment. These two sub-sectors along with the third one, agro-food industry, provide over half of Navarre's industrial GVA. In addition, industrial production is distributed fairly evenly across the region. The main industries are car manufacturing in Pamplona; metal goods in Pamplona, Tafalla and Tudela, and ferrous and non-ferrous metals in the north-west of the region. In summary, the weight of industry, especially manufacturing, remains substantial in Navarre, in terms of value-added and employment, despite the general movement towards the services sector.

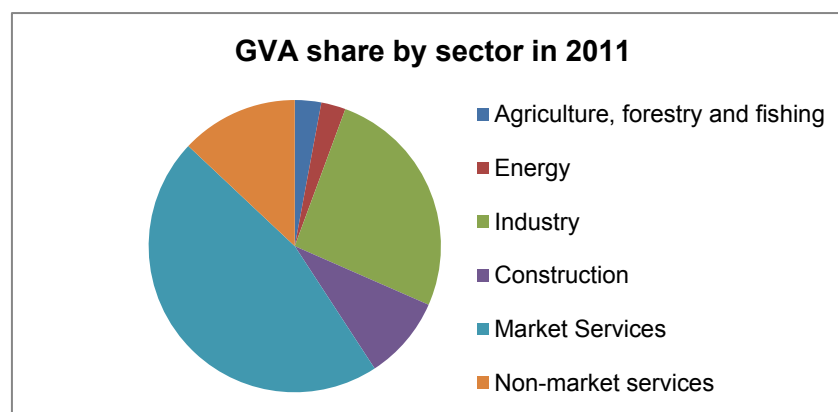


Figure 14 GVA share by sector in 2011 (Source: *Instituto de Estadística de Navarra*)

Agriculture has gradually lost importance in the region's economic structure, whilst continuing to provide a solid basis for the agro-food industry, which is expanding with a high level of productivity. Cereals, wine and market garden produce, together with beef and dairy produce, account for 70% of the agricultural sector's production. Most agricultural activity is in the upper Ebro valley and shows a level of productivity far superior to the national average. The Spanish National Centre for Food-Processing Technology and Safety (CNTA) is located in Navarra.

The distributive trades and hotels and catering are particularly well-represented in the services sector.

The Health Service Sector is highly regarded in Navarra thanks to its top quality and the innovative techniques of its regional public-private hospitals and university infrastructure, which have an excellent reputation in Spain and abroad.

It is also worth highlighting that in the last 15 years, Navarra has attained worldwide recognition in the renewable energy sector. The Spanish National Research Centre for Renewable Energies (CENER) is located in Navarra and has more than 200 researchers using cutting-edge technology facilities. Around 6,000 people work in the renewable energy sector.

Table 2 Employment by career (%) in 2012. (Source: *Instituto de Estadística de Navarra 2012*)

Position	% of total
Management of companies and public administrations	3.0
Technical, scientific, intellectual professionals	15.8
Technicians and assistants	10.5
Administrative employees	12.3
Hospitality sector, salesperson	18.2
Skilled workers in agriculture and fishing	3.4
Craftsmen, qualified manufacturing / construction / mining workers, except installation and machinery operator	19.0
Installation and machinery operator	9.3
Non-qualified workers	7.7
Total	100

Navarra's efforts on R&D in Navarra has experienced a remarkable growth over the last decade, the regional R&D expenditure as a percentage of GDP increasing from 0.9% in 2002 to 2.13% in 2009. The average Spanish rate was 1.38% and the EU27 rate was 2.01% (Bergera et al.). Furthermore, Navarra's private RTD expenditure is approximately 68.84% of total expenditure, with another 9.4% coming from public administration and 21.67% from higher education.

3.2 Overview of key green economy sectors in Navarra and their interrelation

In 2008, Navarra started the process of strategic thinking, during which the regions strengths, opportunities, weaknesses, barriers, etc. were analyzed in a bottom-up way, looking the region's past evolution, defining present potentialities and developing realistic targets for the future. Over 5.000 stakeholders (regional and international) ranging from economic and social agents, public administrations, to educational and research institutions, participated in this process. The main aim was to analyse what areas (economic sectors) should leverage the RIS3 in Navarra. This process led to the approval of the MODERNA action plan in 2010. MODERNA is the new "Economic Development Model of Navarre", a strategic plan that promotes change towards a knowledge-based economy, specialized in the areas of health economics, green economics and talent economics, and which seeks to place Navarre among the top 20 European regions in GDP per capita.

BOX 1: Vision and principles of MODERNA action plan (MODERNA 2011):

"We see a MODERN NAVARRA, integrated by creative and enterprising people who forming part of a society that moves forward in a dynamic and united manner, and who nourish an economy with their talents that is innovative, highly productive, open to the world, supportive, environmentally friendly, geared towards quality of life and based on trust."

1. To invest in people.
2. To create a flexible and open society, eliminating barriers.
3. To be connected and looking outwards.
4. To concentrate resources on what we do best and know how to market it
5. To collaborate with the best.
6. To maintain an entrepreneurial and persevering attitude
7. To favour design and creativity.
8. To attracting talent.
9. To be a laboratory for innovation and knowledge.
10. To seek the long- term socio-economic improvement of Navarra.

The Action Plan defines actions for the short, medium and long term to achieve a new economic model for Navarra (more sustainable and more productive) from 2010 to 2030 in order to tackle the challenges raised by the new conditions of the global economy in a knowledge-based society.

The roots of MODERNA lay their foundations in factors which have a decisive role, horizontal to all business sectors, such as, education, talent and human capital, R&D&I, entrepreneurship, globalisation, public administration, infrastructures and an environment of collaboration.

In order to achieve its main goals (increase prosperity, quality of life and sustainability), MODERNA puts the emphasis on three key areas of the economy, which are expected to develop substantially in the future:

- Healthcare economics
- Eco-friendly economics, i.e. Green Economy
- Talent economics

With regard to Green Economy, MODERNA puts emphasis in six sectors: **(1)** Sustainable Construction, **(2)** Sustainable Vehicle, **(3)** Renewable Energy, **(4)** Agro-food industry, **(5)** Sustainable Tourism, and **(6)** Environment and Waste. As aforementioned, these priority areas were selected during a stakeholder consultation process, which involved over 5.000 actors (MODERNA 2013).

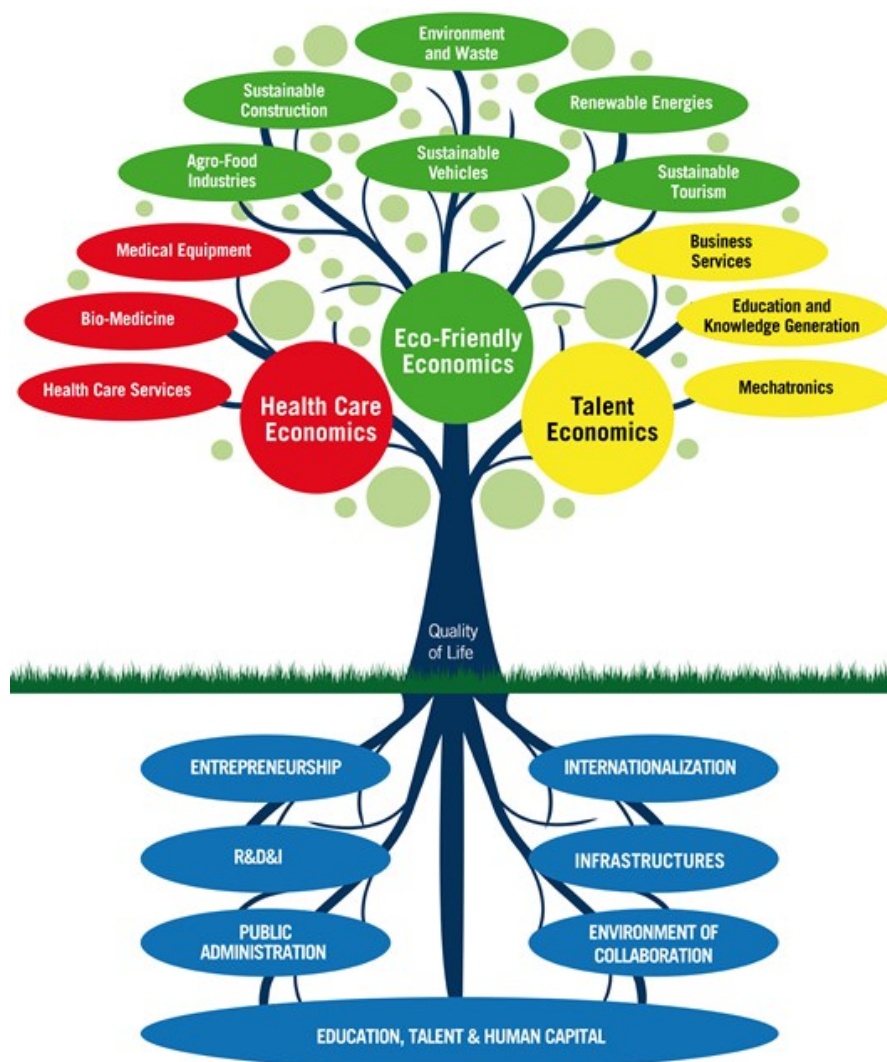


Figure 15 The MODERNA tree. (Source: <http://www.modernanavarra.com/en/moderna-plan/vision-and-principles/#>)

In the context of GREECO, the green economy sectors identified by MODERNA will be further developed in the following sections. It should be noted that the green economy sectors prioritised by MODERNA do not exactly match the GREECO classification:

GREECO green economy sectors	MODERNA green economy sectors
Manufacturing	} Agro-food industries
Bioeconomy (Fisheries, Forestry, Agriculture)	
Transport	Sustainable vehicle
Tourism	Sustainable Tourism
Waste management	} Environment and waste
Water management	
Energy	Renewable Energy
Building and Construction	Sustainable Construction
Green Research and eco-innovation	

4 Sectors relevant for the Green Economy in Navarra - MODERNA

4.1 Foreword

The current section will deal with the green economy sectors identified by the MODERNA action plan. It should be noted that MODERNA pursues a change in the productive model by working with sector stakeholders grouped in cluster levels as shown below. Against this backdrop not all green sectors identified by MODERNA have equivalent levels of development and tradition in Navarra. Some sectors, such as the Renewable Energies and Agro-food Industries, are well established in the region and the aim is to become world leaders. Others, such as, Sustainable Construction and Sustainable Vehicles, will evolve from traditional sectors in the economy of Navarra. They have the potential to grow while they become green. Finally, Sustainable Tourism and Environment and Waste are emerging green sectors and will be part of the future lines of action of MODERNA.

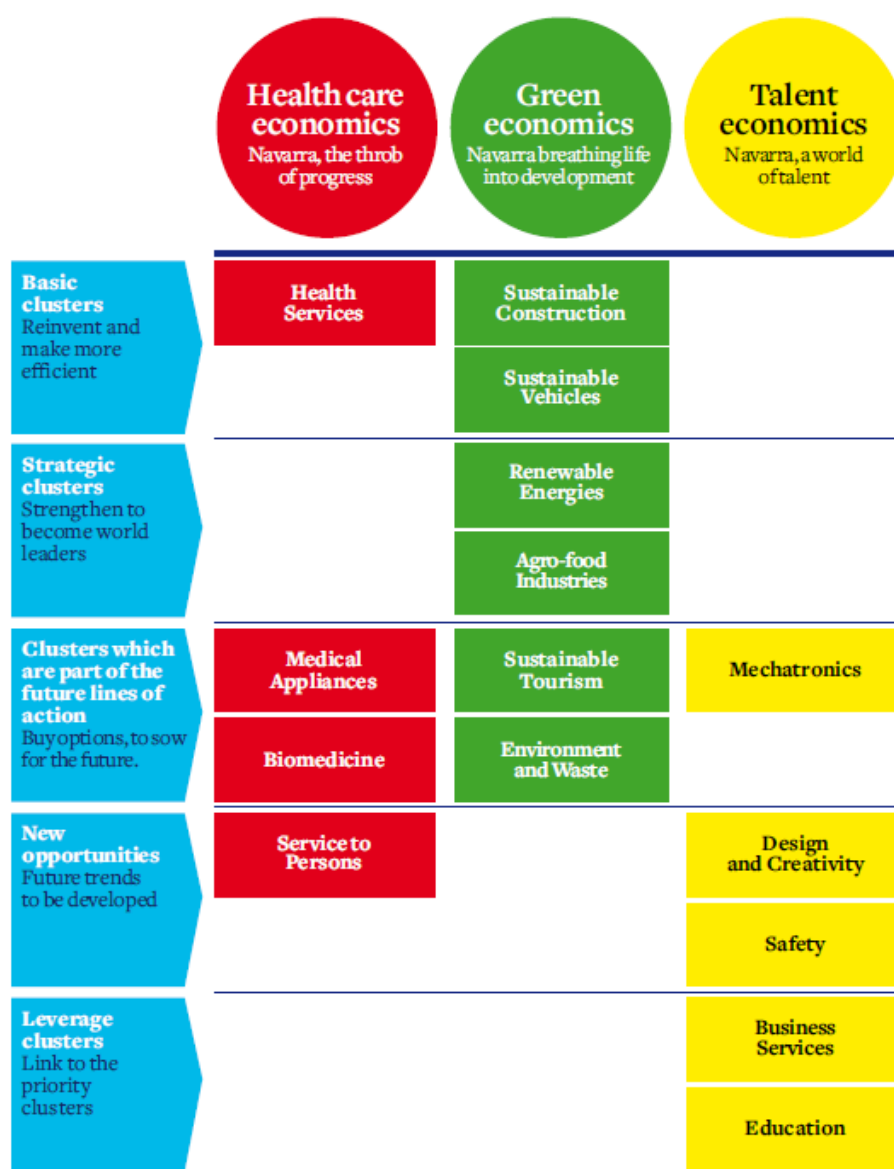


Figure 16 Cluster levels of MODERNA. (Source: MODERNA 2011b)

Accordingly and since the green sectors considered by MODERNA have a different degree of development in the region, the structure of the following subsections will be flexible to meet the characteristics and information availability for each of the sectors. Renewable Energies and Agro-food Industries will be analysed more in-depth than the rest of sectors, which will be introduced in a briefer manner due to being less developed at the moment.

4.2 Renewable Energy

4.2.1 Performance of the Renewable Energy sector

Over the last two decades, wind farms have transformed the Spanish landscape and Navarra, the least populated of the fifteen mainland autonomous regions, has been at the forefront. By 2003 the region had more than 50 companies active in diverse fields related to renewable energies and by 2006 its wind power generation in relation to electricity consumption was remarkable. In addition, the renewable energy companies of Navarra are now selling 17% of the world's wind turbines (MODERNA 2011B). In fact, Navarra will probably become the first renewable energy self-sufficient region in Europe.

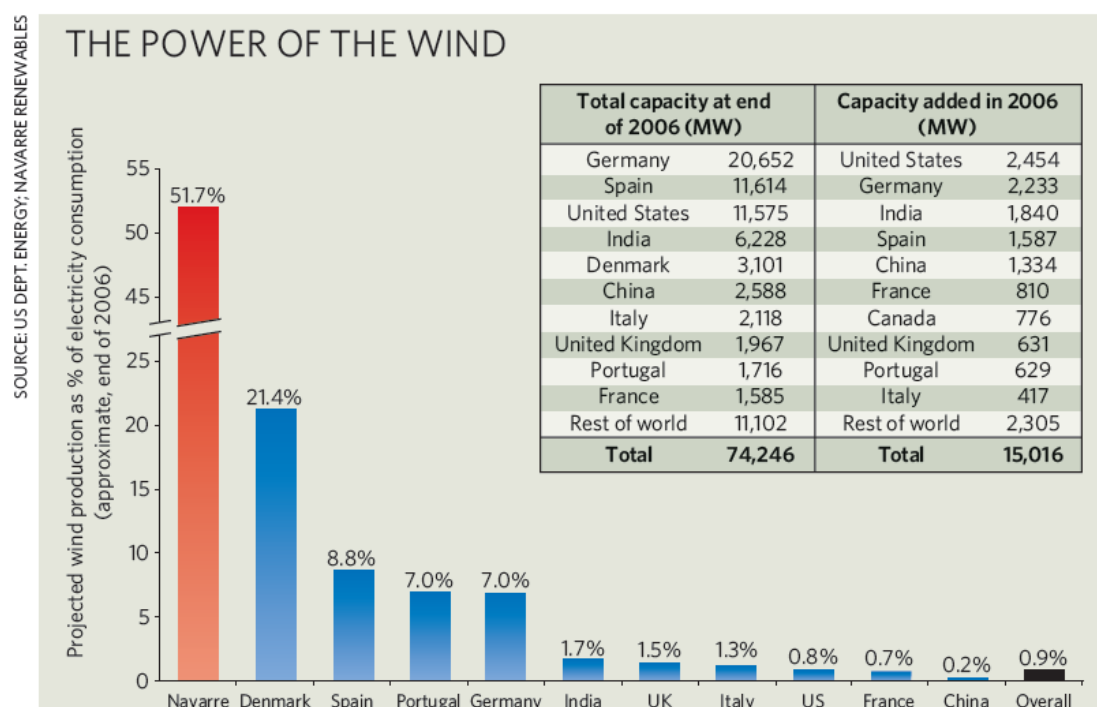


Figure 17 Wind energy production as a % of electricity consumption in 2006 (Source: NATURE 2007)

This remarkable evolution of the wind-power sector in Navarra, started in the early 1990's in the context of an economic crisis and significant unemployment rates. In such a context government, trade unions and business owners agreed to promote industrial development and employment in the region (Gobierno de Navarra 2009). It is worth highlighting that the growth of the sector and the growth of employment in the region have run in parallel.

BOX 2: Renewable Energy and Employment in Navarra (Gobierno de Navarra 2009):

"Navarre's first wind farm was erected at the end of 1994 when the unemployment rate was 12.8%. Four years later, in 1998, we reached the first 100 installed megawatts and employment dropped to 10%. In 2001, when the two centres dedicated to technological research and development and the training of workers was started up, CENER and CENIFER respectively, unemployment dropped to 6.8%. In 2007, before the start of the current financial, economic and worldwide employment crisis, 100 companies dedicated to renewable energies had been created in Navarra; they were 5% of the total GDP, 1.7% of Navarra's employment, with over 6,000 jobs created, with a total unemployment of 4.76% in the region. By then, 953 MW of wind power and 60 MW of photovoltaic had been installed.

Between 2002 and 2006, employment in renewable had increased 183% in Navarra, with an impressive reduction in total unemployment. Employment for young and qualified individuals (only 18% of the five thousand jobs created are low skilled)."

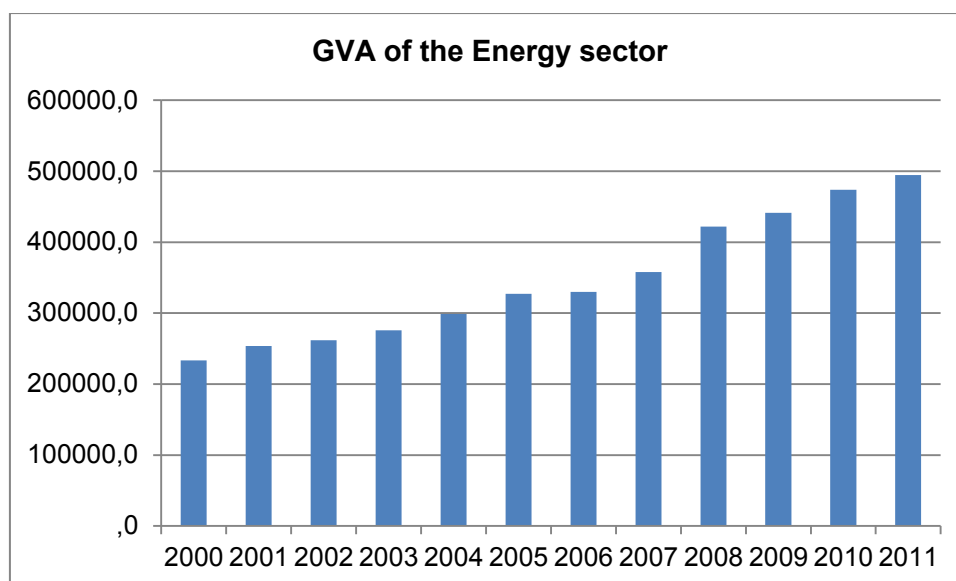


Figure 18 GVA of Navarra's Energy sector 2000-2011 in thousands € (Source: *Instituto de Estadística de Navarra*).

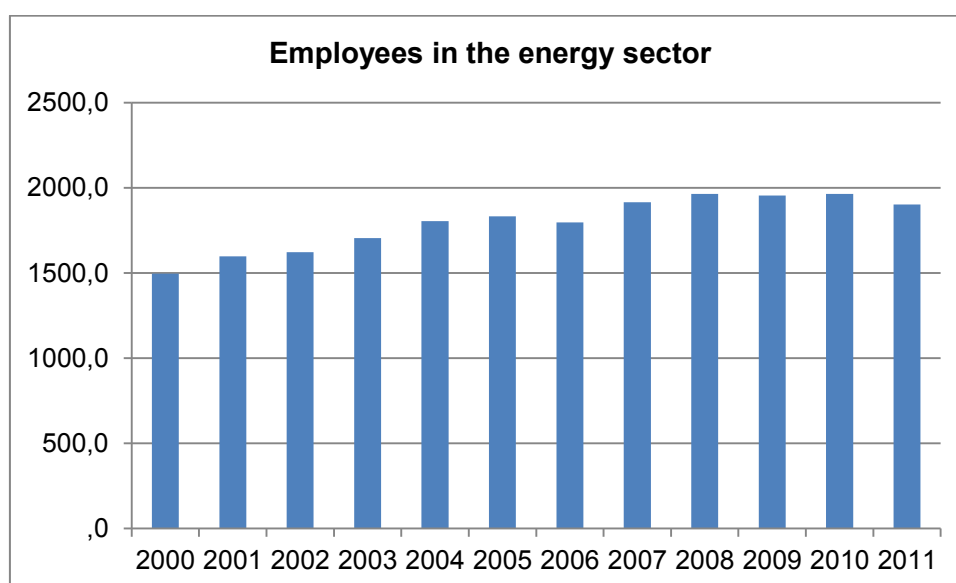


Figure 19 Employees of Navarra's Energy sector 2000-2011 (Source: *Instituto de Estadística de Navarra*).

Wind energy has become an active industrial and productive sector of the region, ranging from energy producers to industrial plans to produce type of equipment cover turbine assembly, the manufacture of blades, turbines, towers and control equipment, and other wind turbine components. As shown in the figures below, the major renewable energy source in Navarra is wind-power, which in 2010 responded for 1.400 installed MW.

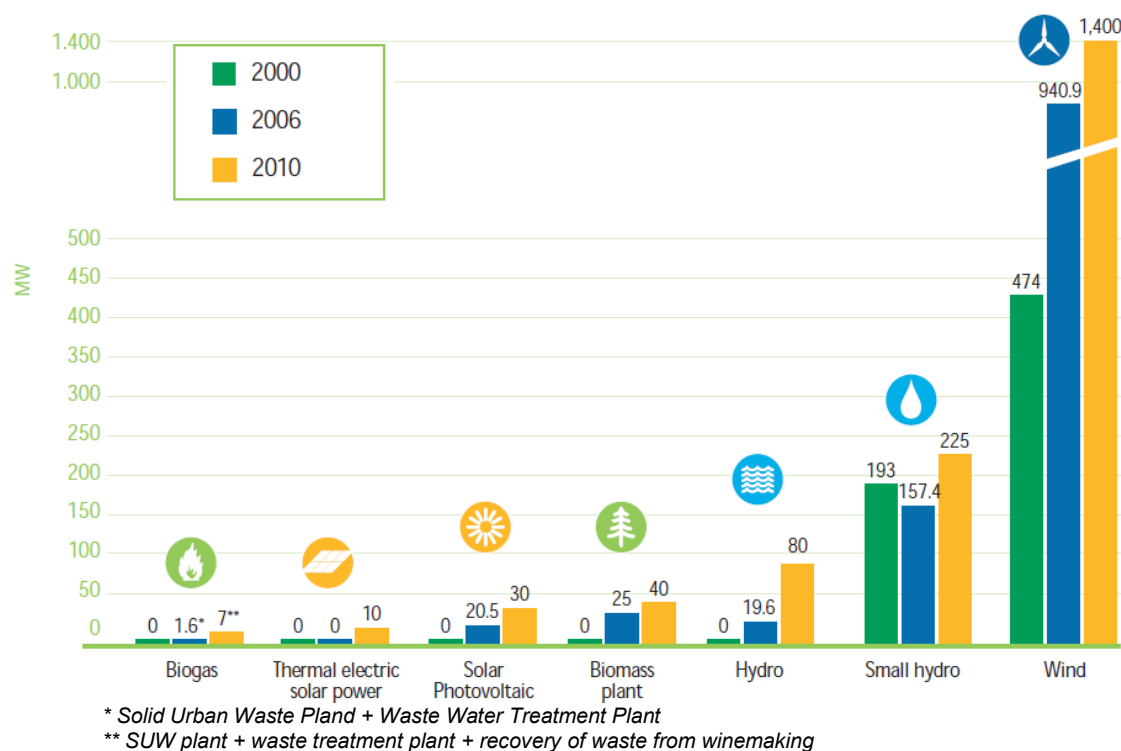


Figure 20 Navarra's installed renewable energy capacity in MW (Source: Gobierno de Navarra 2010).

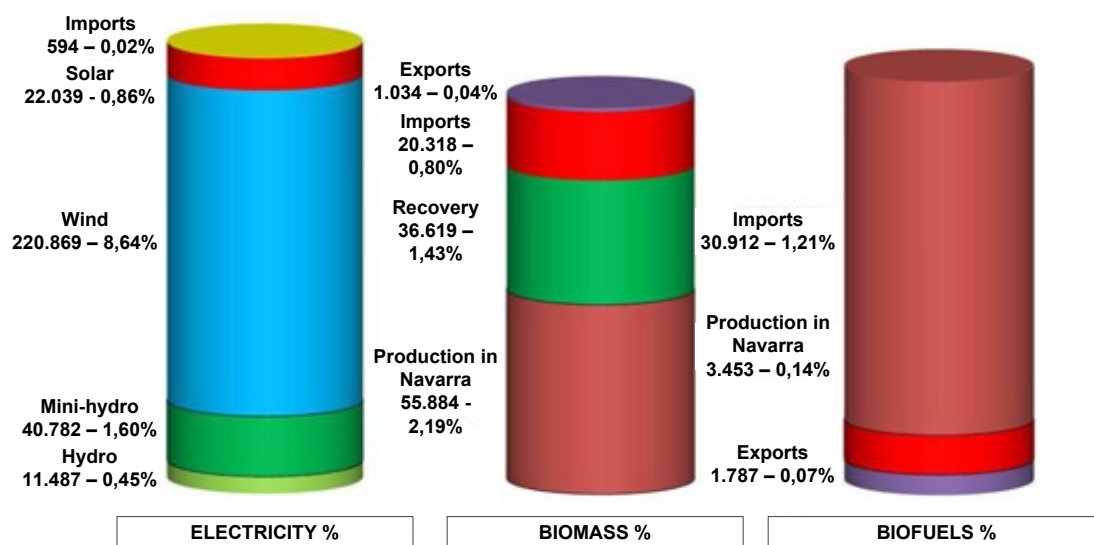


Figure 21 Navarra's primary energy consumption in 2009 (in TEP and %) (Source: Gobierno de Navarra 2011).

Furthermore, one of the EU's energy objectives was that by 2010, 29,4% of the electricity consumption was supplied by renewable energy (Directive 2001/77/CE). When it comes to Navarra this share stood for 8115% in 2009.

In addition to wind power, solar photovoltaic fields have been installed since the 1990s, the largest plant being installed in Tudela in 2001. However, wind power remains the most relevant renewable energy in the region.

4.2.2 Key milestones

The success of Navarra in the development and growth of the renewable energy sector, wind-farms in especial, relies in a mix of the right government support measures, territorial assets and availability of stakeholders (industry, academia, government). Therefore, it cannot be attributed to a single person. However, it is worth to mention the remarkable role played by Mr. Esteban Morrás, founder of EHN, which was sold to Acciona Energía, who promoted Navarra's commitment to renewable energy.

BOX 3: Esteban Morras' windy vision (NATURE 2007):

"Until the early 1990s, small, decentralized hydroelectric stations dotting the rivers that flow out of the Pyrenees were the only significant form of renewable energy in Navarre.

Morrás founded his company, originally called EHN, with the plan of buying up the existing mini-hydrostations, connecting them to the grid and building more. But, in 1994, on a trip to France, he saw the future: wind-turbines.

He took to the new technology with gusto and ambition. Morrás says that in his first meeting in the mid-1990s with Vestas, the Danish company Johannes Poulsen, that Spain would have 1,000 megawatts of wind-power capacity by the end of the century. At the time, it had virtually none.

His first wind farm, El Perdón, was built south of Pamplona in 1994; since then the government of Navarre has approved well over a thousand turbines in 32 wind farms. From 1995 to 2004, it invested more than €136 million in renewable-energy enterprises, contributing up to 30% of the initial funding and providing tax credits for investors. The 2005-2010 renewable-energy plan had earmarked an extra €240 million for investment in renewables. Navarre's installed wind capacity is about 950 megawatts — 8.5% of the country's total on 2% of its land, and nearly two-thirds that of its neighbour, France."

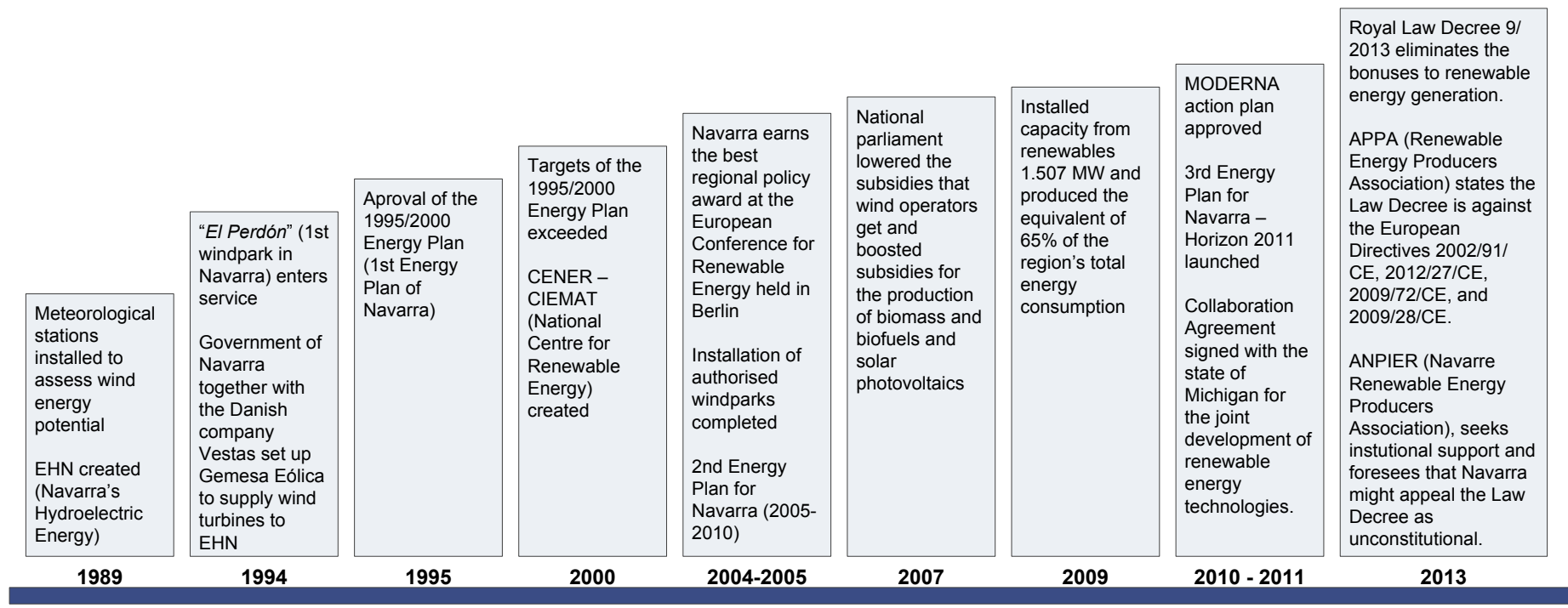


Figure 22 Key milestones of the renewable energy sector in Navarra.

4.2.3 Drivers, barriers and enabling conditions

4.2.3.1 Policies as a driver

It is a fact that EU policies influence the development of EU regions. However, in the case of Navarra and renewable energy sector, the transition towards renewables started before the 2005 mandatory and comprehensive energy policy was adopted. The decision to encourage renewable energies in Navarra began in the 1980s in the context of an economic crisis due to oil prices. In this decade, EHN was founded with 48% public investment.

In the 1990s, the economic crisis and unemployment were severe and the government of Navarra, trade unions and companies reached an agreement to foster competitiveness by means of worker training and promotion of industrial policies. At the heart of these efforts were the renewable energies; the long-term goal of Navarra being to become energetically self-sufficient.

The 1995/2000 Energy Plan promoted by the Government of Navarra was devoted to fostering energy conservation and efficiency, making the best use of renewable energy resources, making them compatible with the environment and increasing the size of the transmission and distribution network. The main funding mechanism for renewable energies has been a guaranteed feed-in tariff.

The current Energy Plan states that energy should contribute to the three pillars of sustainability: social, economic and environmental. It should be noted that it sets for Navarra objectives stricter than those of Europe 2020 (see the potential for development of the sector section).

Besides, environmental protection is relevant in Navarra. In such a context, Wind farms are subjected to the environmental studies and the government fixes their design by studying before they are authorized. For this reason, some sites have been ruled because of their impact on the environment and in some approved projects the wind-farm location has been modified to minimize impact. Moreover, Navarre has some advanced legislation about environmental monitoring dealing with wind farms, to ensure that there is space for birds to pass. In fact, wind farms have their own environmental monitoring program to assess the impact of the turbine on bird-life.

4.2.3.2 Institutions as a driver

Navarra has a remarkable landscaped of institutions operating in the field of renewable energies, which have enabled the leading role of Navarra in this field. These institutions are not restricted to public organization, but range from industry to research. The most relevant are briefly introduced below.

Research institutions:

→ CENER:

CENER is a national technology created in 2000 by the Government of Navarra, the Spanish Ministry of Education and Science and CIEMAT (the Centre for Energy, Environment and Technology Research). Over 130 researchers work in CENER on new energy applications. CENER is focused on four areas: wind energy, biomass, photovoltaic and thermal solar energy and bioclimatic architecture. CENER has an unequalled experimental rotor and turbine laboratory.

→ CENIFER:

CENIFER works together with the Employment Service of Navarra, the Spanish Ministry of Employment and Social Affairs and the National Employment Institute (INEM) to train professionals in renewables.

Public organizations:

→ FUNDACIÓN MODERNA:

MODERNA, in addition to the aforementioned action plan, is also a recently created foundation, with the goal of implementing the MODERNA action plan and fulfilling the vision for the Navarra of 2030, in terms of quality of life, sustainability and prosperity. As already mentioned, one of the cornerstones of the plan are the green economic sectors.

→ SODENA:

Sodena is a public institution of Navarra, which provides financial support for the entrepreneurial development of Navarra, through venture capital. It was created in 1984 and is focused on four strategic sectors: Agro-food, Biotechnology, Energy and Environment and ICT.

Companies in the field of wind energy:

- Gamesa Eólica.
- Acciona Energía.
- Production of wind turbine components: Fiberblade, S.A., Ingeteam, S.A.

One of the success factors of the renewable energy sector in Navarra has been the existence of private developers that have made a strong commitment to renewables and a high level of investment in the launch stage. In addition, the wide-ranging community acceptance towards wind-farm installation has also been determinant.

4.2.3.3 Financing as an internal driver

Over the last two decades, Navarra has supported the development of the sector, both with policies and with the creation of support institutions, but also with economic support as it can be seen in the table below:

INVESTMENT SUPPORT IN FIXED ASSETS

Concept	Economic aid to 31/12/06	Economic aid from 01/01/07	Tax credits to 31/12/06	Tax credits from 01/01/07
Wind			10%	10%
Isolated photovoltaic	up to 65%	up to 50%		
Connected photovoltaic	20% didactic installations	20% didactic installations	20%	10%
Thermal	up to 65%	up to 65%		
Biomass			20%	10%
Biomass	30%	up to 50%		
Small isolated wind	up to 65%	up to 50%		
Biodiesel			20%	10%
Geothermal		30%	10%	10%

Figure 23 Investment support for renewables in Navarra. *Source: Gobierno de Navarra 2010.*

In a less specific context, Navarra has also provided support for:

- Competitiveness support programme
- Contracting and mobility of technologists and doctors for R&D activities
- Stimulation and support for R&D business projects
- Identification and promotion of technological cooperation in R&D
- Support for new innovative technology-based companies

4.2.3.4 Description of problems and barriers encountered in the sector

The main barrier for the renewable energy sector not only in Navarra, but in Spain, is the Royal Decree-Law 9/2013. This Royal Decree-Law was adopted on 12th July 2013 in an attempt of the Spanish government to ensure the stability of the Spanish electric system. Along these lines, this Royal Decree-Law aims at reducing the annual tariff deficit (the difference between the electricity system costs and revenues collected through consumer bills) in Spain. The Royal Decree-Law has adopted energy reform measures such as the elimination of the regulated tariffs for renewable energy and the set-up of the Energy Self-supply Registry. It repeals all previous legislation in contradiction with it and it is also retroactive.

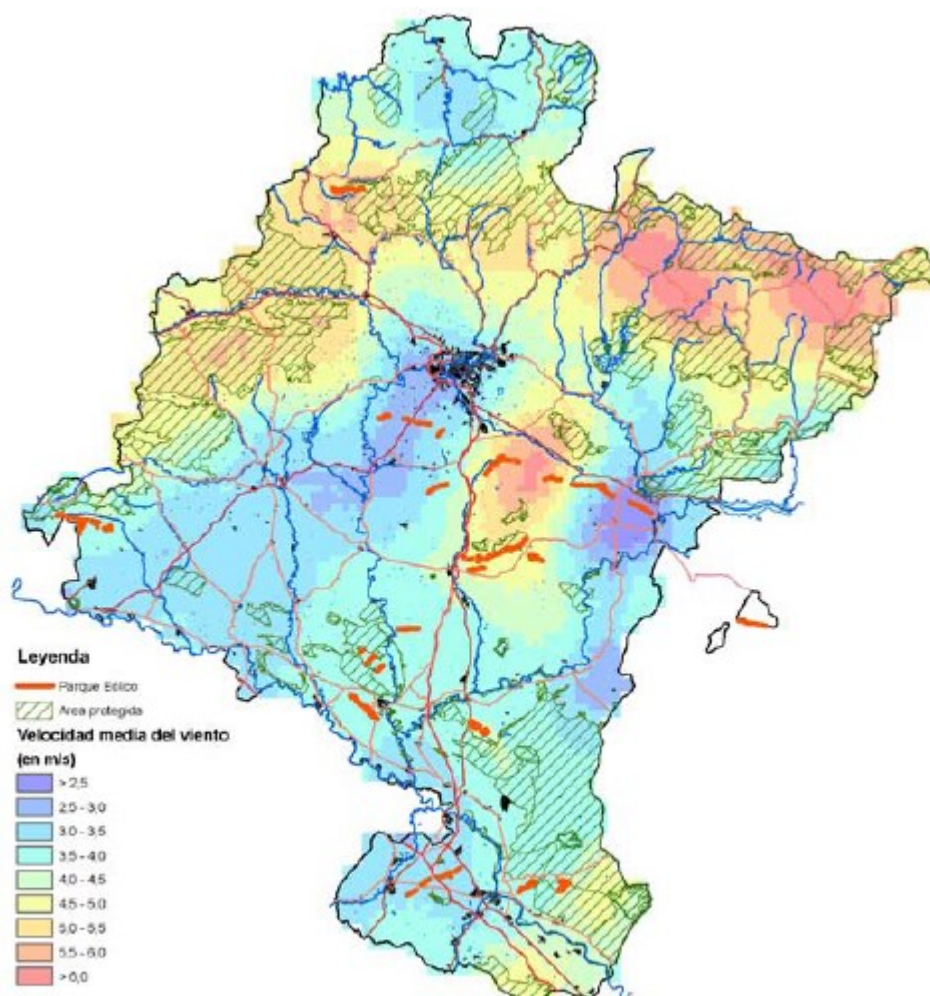
This Royal Decree-Law establishes a new compensation system for renewable energy installations, which will take into account the market price perception and a specific fee consisting of two components: power unit and operation. This new system eliminates the subsidies to renewable energy generation and leads to the establishment of retroactive taxes on existing operators of renewable energy installations.

In views of the APPA (National Renewable Energy Producers Association), this new legislative framework hampers self-consumption of the renewable energy generated and harms both companies and consumers. In addition, it is contrary to the European Directives 2002/91/CE, 2012/27/CE, 2009/72/CE, 2009/28/CE.

In relation to the situation in Navarra, ANPIER (the Association of Renewable Energy Producers of Navarra) considers that this decree puts in risk the almost 10.000 renewable energy producers of Navarra. For this reason they approached the regional government to request institutional support and analyze the current situation and potential implications. It could be the case that Navarra would appeal the decree as unconstitutional.

4.2.4 Spatial dimensions of the development of the sector

Wind resources are spatially sensitive. Therefore, wind power farms in Navarra are located in the Central Zone and Ribera (see figure below).



Fuente: Mapa de recursos eólicos de Navarra (CENER), áreas protegidas y parques eólicos (Departamento de Desarrollo Rural y Medio Ambiente), elaboración propia.

Figure 24 Navarra's wind resources (Source: García et al. 2010).

It should be noted that the location of these parks depends not only on the wind potential of the area, but is also conditioned by different standards of environmental protection and preservation. In addition, due to their impact in landscape, the implications these parks have on Navarra's landscape have set the ground for debate, e.g.:

Should these parks focus on a specific area to facilitate regional planning? Would it be better to spread them? Can wind parks be considered as an element of landscape improvement? Etc

Due to their effect on landscape, the regional government stopped approving proposals for new wind farms in 2004 (NATURE 2007). Nonetheless, it should be noted that wind-power capacity can grow without building any new farms.

4.2.5 Potential for development of the sector

The general objective of the new “Energy Plan of Navarra Horizon 2020” is to maximize the role of the production, transformation and consumption of energy in the sustainability of Navarra from social, economic and environmental perspectives. The specific objectives being:

- Increase self-sufficiency in primary energy above 21%.
- Generate 10% more electricity than is consumed, through renewables.
- Reduce final energy intensity by 18% in comparison to 2009.
- Exceed the energy objectives established by the European Union for 2020

Table 3 Navarra’s 2020 objective’s more ambitious than Europe 2020 objectives.

	Navarra 2020	Europe 2020
RENEWABLES IN FINAL ENERGY CONSUMPTION	31%	20%
RENEWABLES IN TRANSPORT	11%	10%
REDUCTION IN CONSUMPTION OF PRIMARY ENERGY	30%	20%
RENEWABLES / ELECTRICITY CONSUMPTION	110%	29.4%

In addition, among MODERNA’s goals for the renewable energy sector it is the consolidation of the international leadership position in certain areas of the renewable energies sector such as wind power and solar PV, and to diversify activity to emerging areas and new markets. The action plan proposed by MODERNA consists of the following pillars:

BOX 4: Pillars to foster renewable energy in Navarra (MODERNA 2011b):

- *Companies from the sector, together with Universities and Technology Centres, and based on a systematic international foresight, shall conduct research, technological developments and R&D&I projects in the traditional areas (wind power and solar) and in certain emerging areas (for example, distributed generation and microgrids, energy accumulation, smart grid management and energy efficiency).*
- *The scientific / technological institutions shall promote a highly specialised approach and shall establish alliances and collaboration agreements with leading international research centres.*
- *Within the cluster, we shall generate public—private collaboration (for example, institutional support for the achievement of emblematic projects or to exert influence in the international standardisation forums and in regulation amendments), collaboration between SMEs and large companies (for example for access to new international markets) and collaboration with other sectors in Navarra (for example, sustainable construction, electric vehicles, agro-food or ICT).*
- *We shall develop a business fabric for the creation of new companies (for example, consultancy services, energy auditing, training, design engineering and tests) and for the diversification of existing companies.*
- *We shall develop a fabric of differentiated, specialised training of international prestige, for renewable energies, closely related to companies and taking advantage of the infrastructures and knowledge already existing in Navarra and the Opportunities offered by the European Higher Education Area.*

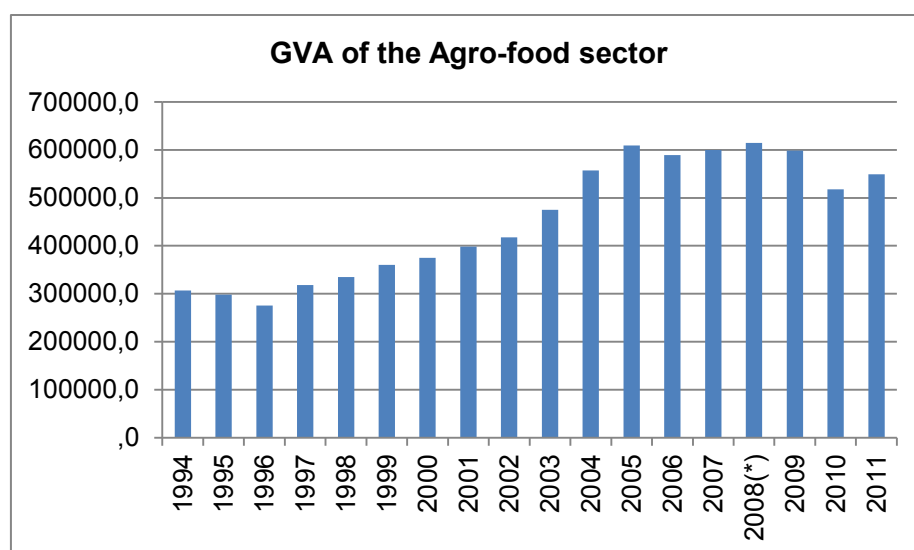
4.3 Agro-food Industries

4.3.1 Performance of the Agro-food sector

The agro-food sector is one of the key sectors in Navarra, both in terms of the variety of its business structure and its institutions. In addition, it is a sector that is territorially dispersed and hence contributes to an even development of Navarra.

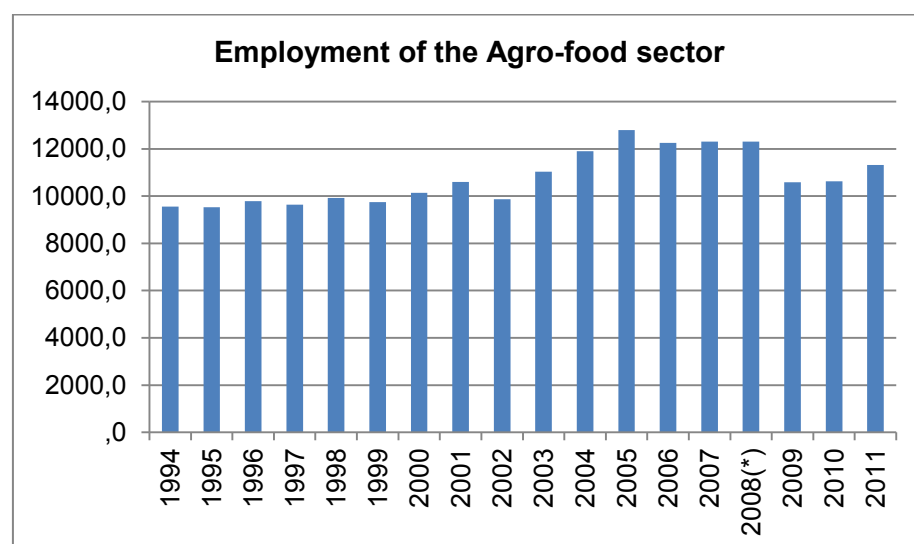
Over the last decade, the number of jobs in the agro-food sector has increased around 6% and its GVA has increased almost 40%. Besides, agro-food plays a unifying and cohesive role in the territory of Navarra.

However, GVA and employment in the sectors decreased in 2009 and 2010 in the context of the EU wide economic crisis. Nonetheless, a slight recovery might be noticed in 2011.



* Until 2007, NACE1993 codes were applied and then NACE2009. Therefore data are not strictly comparable.

Figure 25 GVA evolution of the agro-food sector in basic prices. *Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department.*



* Until 2007, NACE1993 codes were applied and then NACE2009. Therefore data are not strictly comparable.

Figure 26 Employment evolution of the agro-food sector. *Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department.*

The sector comprises over 500 companies. In terms of sector structure, meat industry is the subsector which contributes most to the GVA of the sector, followed closely by the preparation and preservation of fruit and vegetables. However, in relation to employment, the preparation and preservation of fruit and vegetables is ahead of the meat industry.

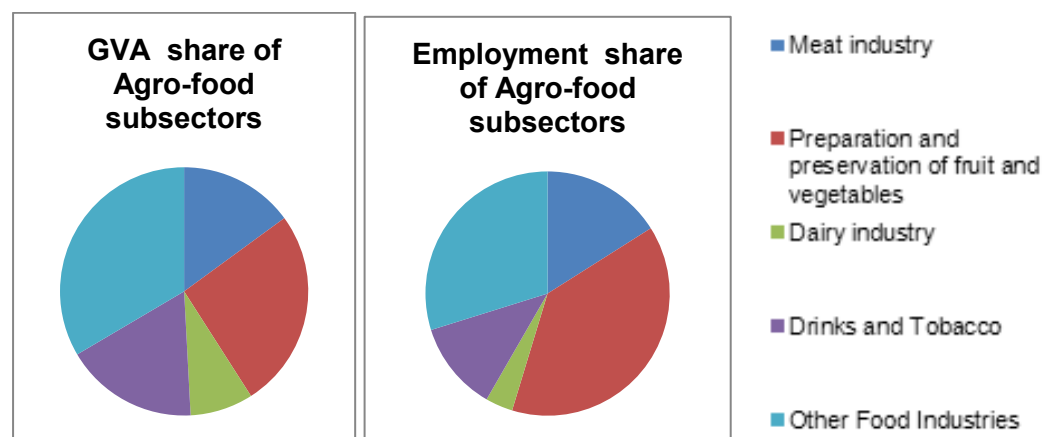


Figure 27 GVA and employment share of agro-food subsectors in 2011. *Source: Departamento de Desarrollo Rural, Medio Ambiente y Administración Local – Rural development, environment and local administration Department.*

It is remarkable that the sharpest increase in the sectors GVA took place from 2000 to 2005 in the context of the LEADER + initiative. This EU initiative aimed at fostering the long-term potential of rural areas and was funded with structural funds. When it comes to Navarra, it affected 85% of the territory, but only 45% of the population, because it was not applicable to Navarra and its surroundings.

In addition, the share of ecological agriculture (equivalent to organic) in Navarra has been increasing since the 1990s. Even if this share is still low when compared to other types of agriculture, it is still growing in Navarra due to the increasing societal awareness on food quality and sustainability.

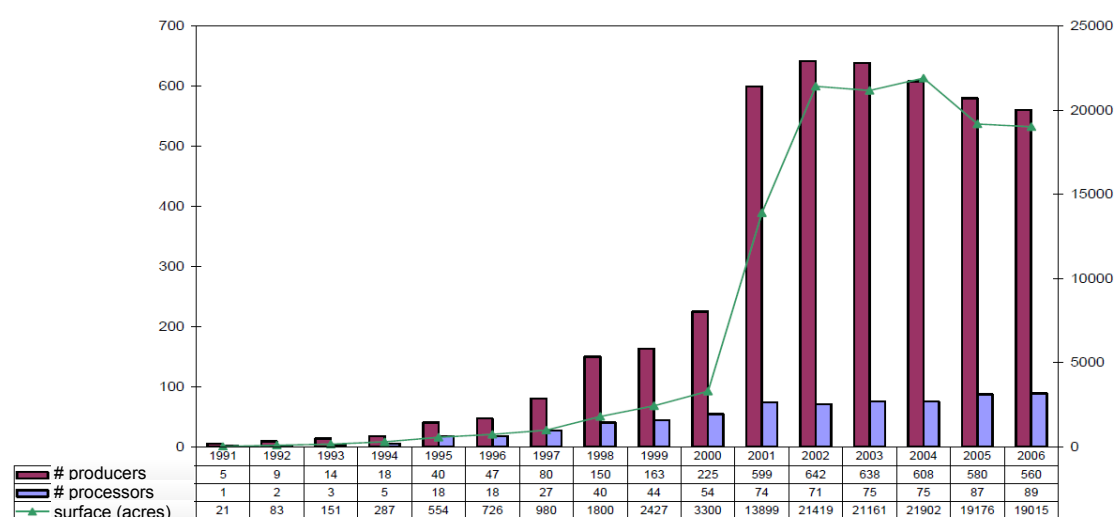


Figure 28 Evolution of ecological agriculture from 1991 to 2006 in Navarra. *Source: CPAEN/NNPEK.*

Finally, the current challenges due to changing lifestyles, market globalization, demand becoming concentrated in large distributors, technological progress and increasing food safety, have led the sector stakeholders to elaborate a new strategy to increase its competitiveness. The aim is to position the agro-food cluster on the global market with the concepts of health, pleasure and natural food.

4.3.2 Key milestones

The figure below synthesis the key milestones for the agro-food sector.

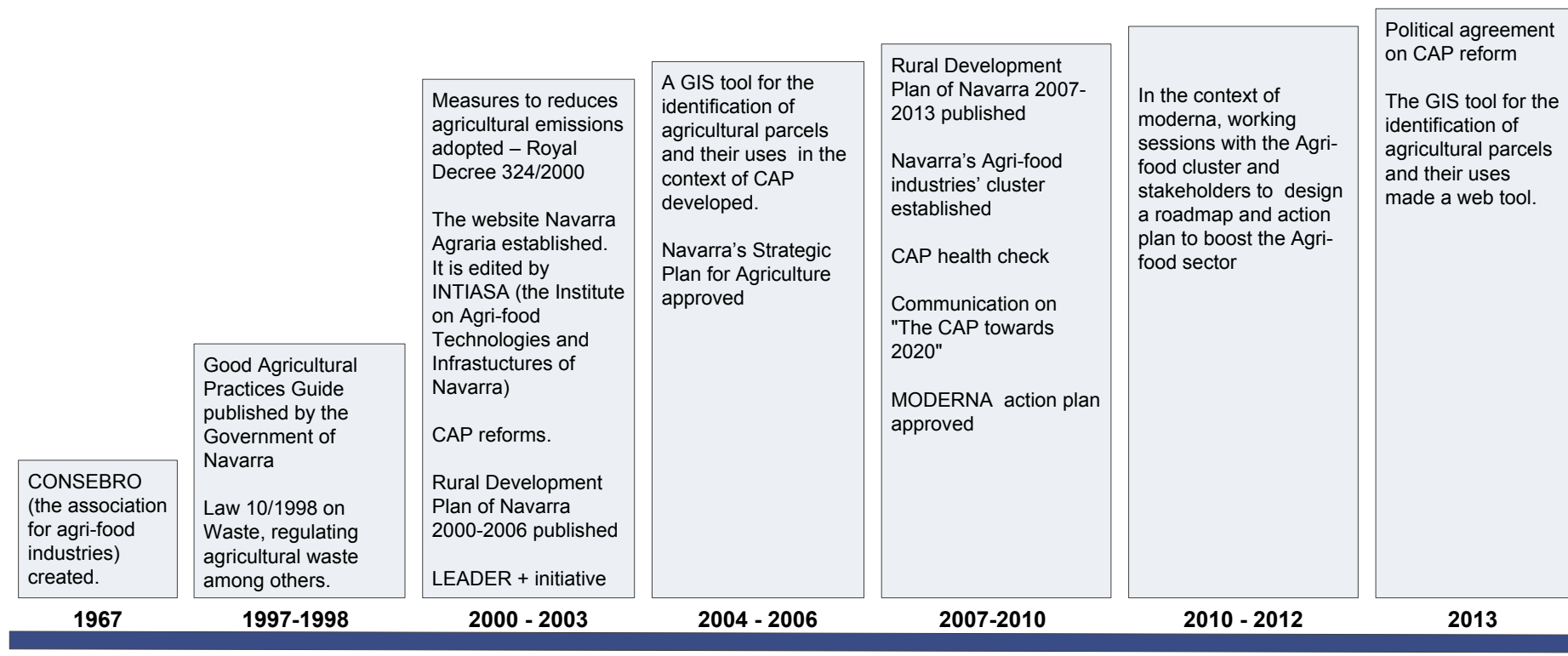


Figure 29 Key milestones of the agro-food sector in Navarra.

4.3.3 Drivers, barriers and enabling conditions

4.3.3.1 Policies as a driver

The agro-food sector has been supported and fostered by a number of policies over the years in Navarra. For instance, in 1997 an Agricultural Good Practice Report was published by the Government to provide guidance to companies and farmers. Then in 2006 the Strategic Agriculture Plan was published. Besides, support measures have been made available to foster ecological agriculture (e.g. Resolution 236/2013) and the modernization of farming, as well as, to foster the involvement of young employees in the sector (e.g. Foral order 163/2012), subsidies for sustainable livestock production (e.g. foral order 263/2011)

Nowadays the most relevant policy document for the agro-food sector is the Rural Development Plan 2007-2013. This plan has set the priorities for the current period and it consists of four axes and the below measures:

- Axis 1. Improving the competitiveness of agriculture and forestry
 - Supporting young farmers
 - Early retirement of farmers and farm workers
 - Advisory services to farms
 - Setting up of farmer advisory services
 - Modernization of agricultural holdings
 - Improve the economic value of forests
 - Adding value to agricultural and forestry products
 - Improving and developing infrastructure related to the development and adaptation of agriculture and forestry
- Axis 2. Improving the rural environment
 - Compensatory payments in mountain areas.
 - Compensatory allowances in areas other than mountain
 - Natura 2000 payments and payments linked to Directive 2000/60/EC.
 - Agro-environment subsidies
 - First afforestation of agricultural land
 - Restoring forestry potential and introducing prevention actions.
 - Support for non-productive investments in forestry → Sustainable forest management.
- Axis 3. Quality of life in rural areas and diversification of the rural economy.
 - Diversification into non-agricultural activities.
 - Support the creation and development of micro-SMEs in the sector
 - Conservation and upgrading of rural heritage
- Axis 4. LEADER .
 - Local development strategies on competitiveness
 - Local development strategies on environment and rural environment.
 - Local development strategies on quality of life and diversification of the rural
 - Support for the creation and development of micro-enterprises.
 - Encouragement of tourism activities.
 - Basic services for the economy and rural population.
 - Renovation and development of villages
 - Conservation and upgrading of rural heritage.
 - Training and information for economic agents involved in the shaft 3.
 - Transnational and interregional cooperation.
 - Operation of Local Action Groups , acquiring skills and animating

This development plan in combination with the recent progress between MODERNA and the Agro-food cluster, provide an unique policy support framework.

The suitability of the institutional framework has been acknowledged by stakeholders. However, it is considered that the policy framework is restriction-oriented, rather than incentive-oriented, which might hinder competitiveness (INTIA 2013).

In addition, although incentives are available, they are not necessarily adequate and often require specialized companies to capitalize such incentives (UPNA, 2013), which hinders average companies in the sector to make use of such subsidies.

4.3.3.2 Institutions as a driver

The myriad of institutions and organisations within the agro-food sector in Navarra, have played a key role in dynamizing stakeholders, exchanging good practice and providing support. Below a short overview of the most relevant institutions and associations is provided.

Agro-food cluster:

The agro-food cluster was established in 2008 and it comprises companies and research centres in the agro-food field. It is coordinated by CEIN (European Centre of Business and Innovation in Navarra), which is a public institution of the Government of Navarra. Its main goal is to strengthen the competitiveness of the sector with a bottom-up approach, in doing so it fosters R&D and productivity, increases presence in international markets, improves the competitiveness environment and provides networking opportunities to the companies.

Currently, this cluster is working together with MODERNA to develop a roadmap to address the new types of demand and to capitalize synergies with other sectors in Navarra, such as Sustainable Tourism, Biomedicine, Health Services, Renewable Energies and environmental sustainability.

Ecological agriculture council (CPAEN)

CPAEN depends on the Government of Navarra and it is responsible for the control of ecological agriculture in Navarra. Its main activities are to:

- Disseminate knowledge on how to implement ecological production system, providing technical guidance to companies in the field.
- Provide technical support for the development of studies and projects for the transition towards ecological agriculture of farms and food companies, as well as, for the development of improvement plans and productive process optimization plans.
- Promote the consumption and dissemination of ecological agricultural products.
- It also has a certification committee, inspectors, advisory services and a technical director to coordinate the mentioned services.

INTIA:

INTIA is a public company created by the Government of Navarra. It provides advanced services to companies to foster the development of the sector in terms of quality, efficiency, innovation and sustainability.

It was established in 2011 as a result of the merger of the public societies that had been providing support for over 30 years to the agricultural, agro-food and the irrigation infrastructure companies in Navarra.

Its main tasks are: dissemination of production techniques and systems, research, testing, consulting and training, provision of services (activities that promote and enhance agro-food industry, collaboration with public and private institutions, both national and international), development of irrigation and agricultural infrastructure, control, certification and promotion agribusiness.

It has recently been awarded a LIFE+ project to provide an advanced web service to provide guidance for farmers to manage crops sustainably: SigAGROasesor¹.

CEDERNA:

Cederna is non-for-profit association funded in 1991 and aimed at supporting the socio-economic development of the mountainous area of Navarra. It provides advisory services, information, technical support and helps to find financing.

¹ <http://agroasesor.es/es/>

Union of Farmers and Ranchers of Navarra (UAGN):

The Union of Farmers and Ranchers of Navarra is a professional agricultural organization, whose main objective is to represent the interests of rural Navarre. It was established in the 1970s and ever since it has provided support to its members and affiliates in order to enable the optimal development of their activity in the agricultural sector. It provides information on legislation, training, advisory services, etc.

Consebro:

Consebro is an association of agro-food industries from Navarra, La Rioja and Aragón and was established in 1967. Its main goal is to provide services to and represent its associates to protect and defend their interests.

They also provide technical advice, so that companies can adapt to the challenges of the sector. Consebro provides support in the fields of quality, environment, IT, management, human resources, training, food safety and occupational risk prevention.

4.3.3.3 *Financing as an internal driver*

In Navarra, public support has been provided to dynamize the agro-food sector and to help it face the challenges of increasing competition. In this section two remarkable examples of such support are provided.

LEADER + Initiative 2000-2006:

The LEADER + initiative affected 85% of the territory and 45% of the population of Navarra. This programme aimed at fostering socio-economic development of rural areas, while adopting a sustainable development approach. It established three priority axes and twelve measures:

- Axe 1: Pilot integrated territorial strategies for rural development
 - Measure 1.02. Management, administrative and technical assistance costs.
 - Measure 1.03. Services to population.
 - Measure 1.04. Natural heritage.
 - Measure 1.05. Valorization of local agricultural products.
 - Measure 1.06. SMEs and services.
 - Measure 1.07. Valorization of cultural and architectural heritage.
 - Measure 1.08. Tourism
 - Measure 1.09. Other investment.
 - Measure 1.10. Training and employment.
- Axe 2: Support cooperation between rural territories.
 - Measure 2.01 Inter-territorial cooperation.
 - Measure 2.02. Cross-border cooperation.
- Axe 4: Programme management, monitoring and evaluation costs.
 - Measure 4.01. Programme management, monitoring and evaluation costs

Table 4 Overview LEADER+ budget breakdown. (Source: Gobierno de Navarra 2012)

Axe / measure	Approved by Decission C(2001) 2184					
	Public cost	EU Contribution	National Administrations' contribution			
			TOTAL	Central	G.N.	Local
Axe 1.						
1.02	2.531.992	1.265.996	1.265.996	414.952	597.376	253.668
1.03	764.174	382.087	382.087	92.137	160.532	129.418
1.04	2.503.193	1.251.596	1.251.597	309.025	428.139	514.433
1.05	1.446.354	723.177	723.177	219.730	333.079	170.368
1.06	1.590.992	795.497	795.495	242.347	401.264	151.884
1.07	3.705.357	1.852.679	1.852.678	457.002	640.061	755.615
1.08	2.522.712	1.261.356	1.261.356	367.360	448.163	445.833
1.09	291.270	145.634	145.636	49.301	79.142	17.193
1.10	723.956	361.978	361.978	118.146	182.244	61.588
Total	16.080.000	8.040.000	8.040.000	2.270.000	3.270.000	2.500.000
Axe 2.						
2.01	432.709	216.355	216.354	108.177	108.177	0
2.02	367.291	183.645	183.646	91.823	91.823	0
Total	800.000	400.000	400.000	200.000	200.000	0
Axe 4.						
4.01	120.000	60.000	60.000	30.000	30.000	0
Total	120.000	60.000	60.000	30.000	30.000	0
Total	17.000.000	8.500.000	8.500.000	2.500.000	3.500.000	2.500.000

The overall assessment of the project implementation was positive. It improved the quality of life in rural areas and it enabled to identify and prioritize areas where further action was needed.

LEADER, EAFRD (European Agricultural Fund for Rural Development) funds and the Rural Development Plan 2007-2013:

The Rural Development Plan of Navarra is aligned with EU and national guidelines for rural development and builds on the outputs of the previous plan. Along these lines it continues to provide financial support to activities such as:

- Modernization and restructuring of the agro-food sector
- Fostering environmental services and animal friendly farming practices
- Strengthen the support to ecological agriculture
- Tackling climate change by preserving the carbon sink function soil plays
- Promoting territorial cohesion
- Etc.

In doing so, the current plan aims to maintain GDP and employment, contribute to biodiversity and also foster growth in non-agricultural activities.

Table 5 Overview of Rural Development Plan 2007-2013 budget. (Source: Gobierno de Navarra 2012)

Axe	Public contribution for the 2007-2013 period		
	Total public contribution (€)	EAFRD contribution (%)	EAFRD funds (€)
Increase competitiveness	173. 101. 057	30, 80%	53. 319. 411
Improve rural environment	81. 435. 712	55, 00%	44. 789. 642
Quality of life in rural areas and rural economy diversification	15. 405. 330	50, 00%	7. 702. 665
LEADER	23. 778. 000	55, 00%	13. 077. 900
TOTAL	293. 720. 099	40, 48%	118. 889. 618

4.3.3.4 *Description of problems and barriers encountered in the sector*

In the context of the Rural Development Plan 2007-2013 a SWOT analysis was carried out. This SWOT analysis spotted the following barriers and difficulties for the agro-food sector:

- Inadequate size and dispersed parcel structure;
- Low training level, i.e. 92.2% of farm manager have only practical training;
- Irrigation infrastructure unevenly distributed;
- High fixed costs and intermediate consumption costs;
- Aging of workforce;
- Low share of women employees in the sector;
- Low competitiveness of the sector;
- Difficulties to implement new technologies;
- Poor agro-food trade structure;
- Low export rate.

Nonetheless, it should be noted that these weakness are being addressed both by the Rural Development Plan and by the MODERNA action plan.

4.3.4 *Spatial dimensions of the development of the sector*

The agro-food sector, by definition, depends on the spatial on location. In 2010 there were 366 390 hectares of crop in Navarra, 35.3% of the total area. The vast majority are concentrated in the south of the region: Ribera Baja (23.7%) and Ribera Alta (23.2%).

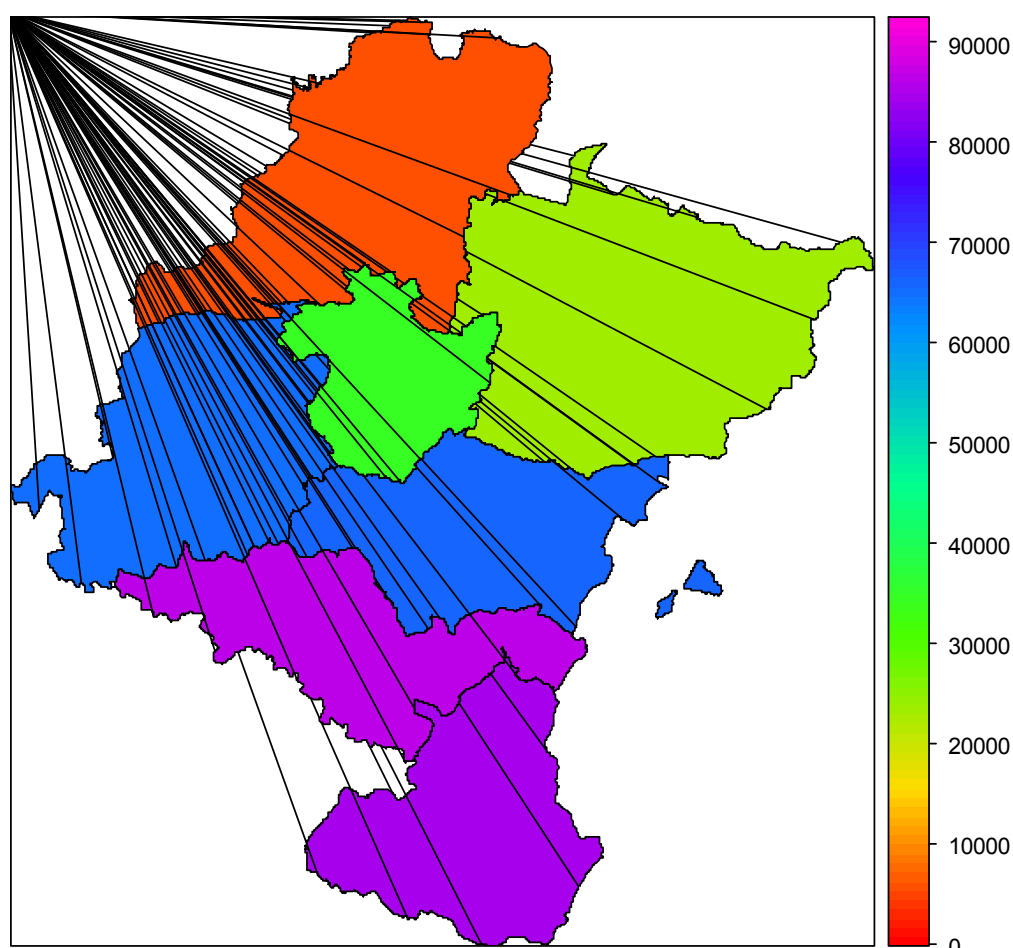


Figure 30 Arable land in Navarra in 2010 in hectares. (Source: Gobierno de Navarra).

The unique climatic conditions of **S**outhern Navarra have enabled the production of agricultural products of outstanding quality, which have been granted the protected designation of origin trademark. These products are peppers of Lodosa, asparagus, artichoke and wine. In addition, all the territory is protected designation of origin for Idiazabal cheese,

lamb and veal and in the Eastern Pyrenees, The Roncal cheese has also received the protected designation of origin.

The climatic variations from north to south also imply different irrigation needs.

4.3.5 Potential for the development of the sector

The vision for 2030 for the agro-food sector in Navarra is to develop products of greater added value, strengthen markets, to achieve more adequate business sizes and to promote positioning in the concepts of health, pleasure and natural food.

BOX 5: Pillars to foster the agro-food industry in Navarra (MODERNA 2011b):

- 1. We shall develop and market products with a greater added value, positioning ourselves in “healthy products” “Natural, sustainable products”, and “pleasure products” in both the mass consumption and niche segments.*
- 2. We shall be an international benchmark for healthy food, creating a network for agro-food sector companies and research centres, developing post-graduate training, with an international orientation.*
- 3. We shall achieve more adequate business sizes through production and marketing alliances, in order to strengthen our presence in mature and emerging international and national markets.*
- 4. We shall take full advantage of the new business opportunities created from new applications of raw materials and by-products, from hybridisation with other sectors, such as pharmaceuticals, tourism, logistics or energy, or of integration as far as distribution.*
- 5. We shall progress in the industrialisation and professionalization of the agricultural sector and we shall establish long-term alliances between this and the industrial sector*

This vision comprises the production of ecological goods with no increases in cost, the development and deployment of natural additives, biodegradable packaging and to position the sector in the emerging “well-being industry”.

Navarra faces challenges to be overcome to deliver such vision. However, it also poses unique features that will enable the transition, such as, a favourable policy context, availability of support institutions, awareness within the sector stakeholders and a roadmap with prioritized actions.

4.4 Sustainable Tourism

Navarra has a myriad of natural and cultural assets that make it an attractive tourist destination. From the beech forest of the Selva de Irati, to the alpine area in the Pyrenees, the desert-like landscape of the Bardenas Reales, Navarra holds a unique natural capital. The Pilgrim' Way to Santiago also goes through Navarre and it is home to the fiestas of San Fermín, which were made internationally famous by Ernest Hemingway. Besides, Navarra is also famous for its market gardens and their product (namely, chard, artichokes or asparagus, as well as, wines) and subsequently has a varied and rich gastronomy. On the other hand, the combination of tourism and leisure it is considered one of the sectors with better growth perspectives in Navarra. Tourism also holds the opportunity support productive and economic reorganization of the territory in Navarra.

Tourism is becoming a relevant sector for the economic and social development of Navarra. Some years ago, Navarra started a touristic marketing strategy to bring visitors beyond those looking for sun and beaches in the south-east of Spain. This strategy was successful and therefore motivated the launching of the "Navarra Marketing Plan" and the "Touristic Development Plan of Navarra" to capitalize the perspectives of growth of the sector.

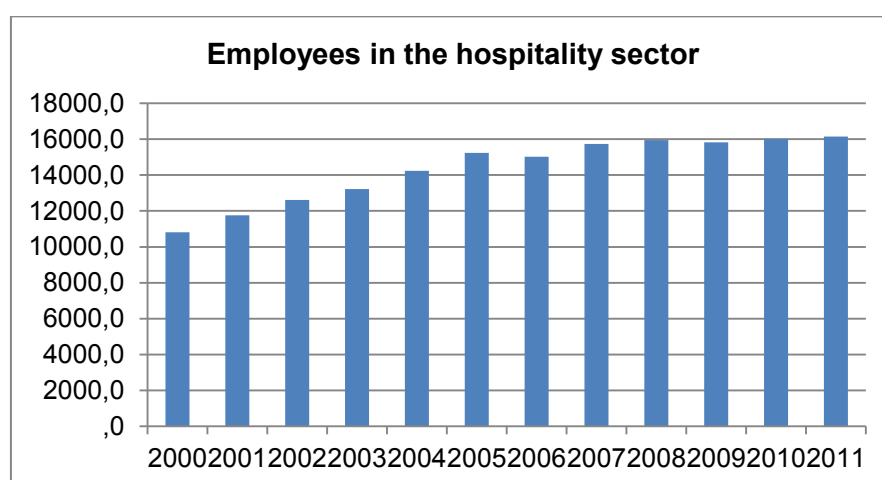


Figure 31 Employees in the hospitality sector 2005-2011 (Source: Instituto Estadístico de Navarra).



Figure 32 GVA of the hospitality sector 2005-2011 in thousands € (Source: Instituto Estadístico de Navarra).

The development plan seeks to manage and coordinate all efforts, strategies and actions towards a competitive, sustainable and innovative tourism sector, which becomes key for Navarra. Along these lines, the key objectives of the development plan are:

- To achieve a competitive and organized touristic offer;
- To define an integral coordination system with regard to tourism;
- To foster the efficiency of investments;
- To structure the territory of Navarra from the perspective of optimizing its touristic functionality;

The need for this plan relied on two distinct features of Navarra. On the one hand the wide variety of landscapes in Navarra that requires a complex planning. On the other hand - the different governance entities dealing with tourism, which lead to different management models and visions and strategies for each of the territorial units. These differences had already been acknowledged by the Foral Law 7/2003 on Tourism. This law relied on four principles:

- the characterization of Navarra as an unique travel destination,
- the necessary cooperation and coordination among agents,
- the need for quality and respect in the development of the sector and
- to ensure the sustainability of the environment and cultural heritage in the exercise of tourist activities.

The aforementioned Touristic Development plan identified fourteen touristic zones in Navarra to be capitalized.

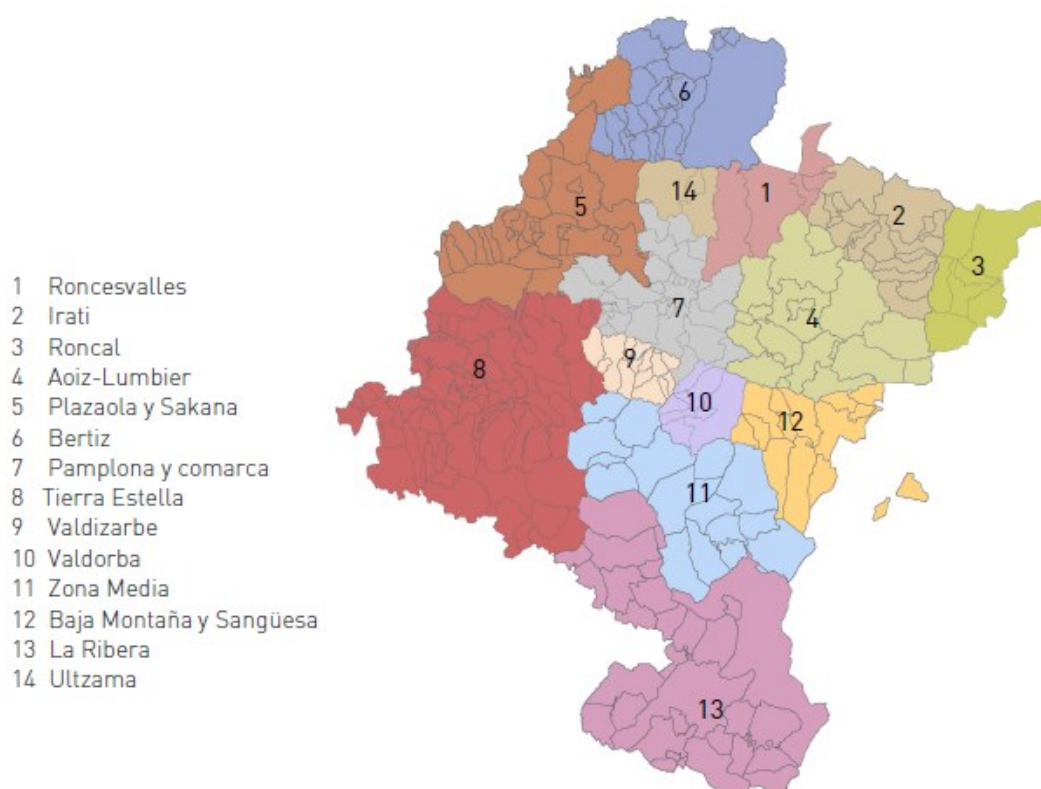
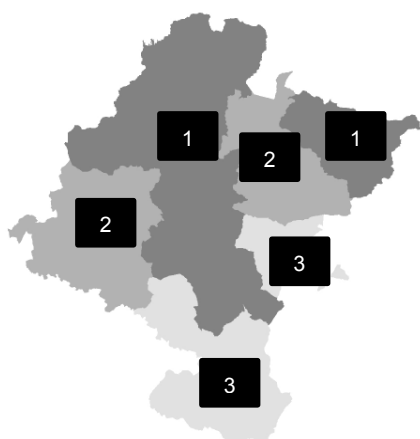


Figure 33 Navarra's touristic zonification (Source: *Dirección General de Turismo de Navarra*).

These distinct zones fall under three categories in relation to their development potential:



1. *Category 1:* These zones are the most developed in touristic terms (the most visited) and are best prepared to face the challenges of the current touristic development plan.

2. *Category 2:* These zones should improve managerial aspects and (touristic) product design to take advantage of the plan.

3. *Category 3:* These zones have a great potential for touristic development, but currently tourism is not one of their strategies for development.

For each of the touristic zones factsheets have been developed to summarize its main selling point (e.g. Pilgrim Way), the thematic positioning (e.g. Cultural Tourism), the target audience by origin and size (groups, couples, families etc.), length of the visit and type of activity and also complementary touristic assets to the main selling point (e.g. birdlife observation). That is to say, to describe the touristic product. These factsheets facilitate the identification of actions and planning for realising their potential.

In addition to these products by zone, horizontal products have been identified. This identification is work in progress and so far twenty products horizontal to all zones have been identified, such as, birdwatching, mycological tourism, biodiversity, snow sports, wine tourism, etc.

In 2009, the tourism sector, after acknowledging that through collaborative processes based on innovation it could grow, decided to establish the Association of Innovative Tourism Companies of Navarra: TURNAVARRA². TURNAVARRA includes companies, institutions and related organization and it aims to address the challenges of the tourism sector up to 2030. The website for TURNAVARRA is under construction.

This touristic development plan has been recently reinforced by the MODERNA action plan. Sustainable Tourism is one of the MODERNA clusters, specifically the clusters which are part of the future lines of action of MODERNA, because it is an emerging green sector. MODERNA aims to improve the tourist value offered to the client, boost the innovation and development of new touristic products and develop national and international markets for Navarra's touristic products.

All in all, the Sustainable Tourism sector has a great potential to grow in Navarra, now that all involved actors have been coordinated, a public organization specific to tourism (TURNAVARRA) has been established and that support measures, such as, the Touristic Development Plan and MODERNA action plan have become operative. In addition the identification of touristic products, either zone-specific or horizontal will drive the effective promotion and development of activities. Finally, the process will be complemented by the development of new innovative products for national and international markets, with the support of the stakeholders involved in the MODERNA Sustainable tourism cluster.

² The website for TURNAVARRA is under construction: <http://www.turnavarra.es/> (Accessed 10th September 2013).

4.5 Environment and waste

To date, Environment and Waste has not been dealt with as a stand-alone sector in Navarra, but rather horizontal to all economic activities. Along these lines, environmental sustainability is also inherent in some of the sectors backed by Moderna (e.g. Sustainable Construction, Sustainable Vehicles and Renewable Energies).

However, in the context of the growing awareness and action towards environmental sustainability in all spheres (social, political, cultural) and governance levels (European, national, regional), MODERNA considers the Environment and Waste sector a green economic sector that poses a great growth potential through public-private collaboration, the provision of specific goods and services and subsequently, employment creation. The vision for 2030 is to strategically position Navarra in the fields of energy, water and waste recovery, in line with the strategies fostered by the EU, such as, the Resource Efficiency Roadmap and Europe 2020 objectives.

Traditionally, environment has been considered a resource to be protected, but also as an additional cost for operating business (i.e. cost of environmental protection activities). Nonetheless, in recent years, businesses in Navarra have started to consider environment as a competitive factor, generating business opportunities, to produce new goods and services for all economic sectors.

MODERNA has grouped these business opportunities in three categories:

- Cleaner processes to generate less waste.
- Cleaner products: environmentally-friendly products, based on eco-designs and using new materials
- Resource efficiency: A sustainable use of all resources, involving the implementation of modifications in the entire life cycle of each and every product including relations with suppliers and customers (and, therefore, right from obtaining the raw materials, including re-used or recycled materials, the manufacturing process, packaging, transport and use by the consumer, up to the product disposal at the end of its useful life).

Navarra is already well positioned in some areas of the Environment and Waste sector. With regard to waste management, Navarra has developed an Integral Plan for Waste Management (2010-2020) to adapt the waste management procedures in the region to new European and national policies. This regional plan complements the National Waste Law and the National Packaging and Packaging Waste Law. In addition to the policy documents related to waste management, Navarra has also prepared guides, good practices, a waste journal, etc. to facilitate information exchange with stakeholders.

In relation to the environment, Navarra has one of the completest environmental legislative frameworks in Spain, dealing with air quality, hunting and fishing and water. In relation to the environment, Navarra also produces periodic reports on the status of environmental topics.

Besides, recently two relevant stakeholder initiatives have been fostered within this sector PRODEMA and Ecopolis. PRODEMA was established in 2010 and it is a cluster for the Promotion and Development of Environment in Navarra. It consists of businesses, public organizations, research centres and universities. It has the goal to foster projects and activities based on R&D and cooperation in the field of environmental management. Ecopolis³ is an industrial park specialized in companies dealing with the environment, with a special focus on resource efficiency, regardless their sector.

Finally, Economic growth, the environment and waste are increasingly being indissolubly linked. In Navarra, the public and private initiatives are in a leadership position in some of the spheres: wind power; waste water treatment; food by-product recycling, etc.

³ <http://ecopolisnavarra.com/>

4.6 Sustainable Vehicle

Since 2006, transport is the most energy intensive sector in Navarra. The reason for this is that since 1993 it has been the sector with the highest annual growth rate. Even if the process has slowed down in the context of the current economic crisis.

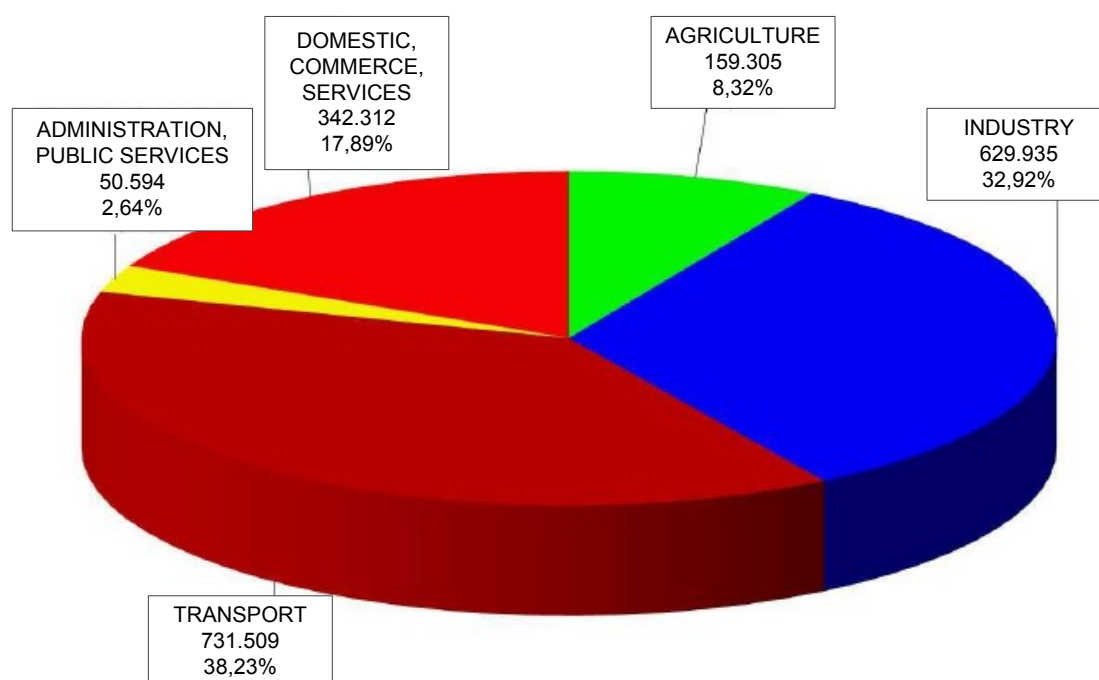


Figure 34 Final energy consumption by sector in 2009, in % and TEP. (Source: Gobierno de Navarra 2011)

The automotive industry started its development in Navarra in the 1950s, when the first automobile component manufacturers were established. Then in 1966 the first company for vehicle assembly settled in Navarra and by the early 2000s the automotive industry in Navarra consisted of over 80 companies and over 10.000 employees.

Table 6 Overview of the automotive industry (Source: CCOO, Servicio Navarro de Empleo (2008), Erro Garcés 2002)

	2002	2003	2004	2005	2006	2007	2008
Companies in the automotive industry	86	81	85	90	91	100	101
Employees	11.662	11.141	11.256	10.832	10.727	12.804	11.470
GVA in thousands €	667.956	677.073	711.140	712.404	745.403	690.122	N.A.

In addition to component manufacturers and vehicle assembly companies, Navarra also has research centres, such as, CITEAN, which are specialized in automotive mechanical and environmental testing and development, construction and testing of components and electro-mechanic systems.

The evolution of employment in the sector is affected by the sales and also by the internal restructuring of manufacturers. Over the last years, the EU wide economic crisis has been an additional factor affecting sales and employment trends.

In such a context, Navarra's 3rd Energy Plan identified the below guidelines to reduce the energy intensity of the sector and foster its growth:

- Reduce the use of private vehicles and promote a more sustainable mobility
- Use biofuels as an alternative to fossil fuels

- Foster electric mobility
- Improve the energy efficiency of vehicles and promote energy labelling and efficient driving

It is worth highlighting that in Navarra an Electric Vehicle Plan (Plan VEN) is in place, as well as, Sustainable Urban Mobility Plans. The Plan VEN aims to fulfil Navarra's energy goals and create growth through the specialization and differentiation of the automotive and renewables sectors. This plan consists of the below task forces:

Table 7 Task forces of the Plan VEN (*Source: Gobierno Navarro 2011*)

Task force	Measures
Infrastructure and management	Charging points
	Agreements with government
	Distributed generation and microgrids
	Electric gas station
Industrialization and R&D	Consolidation automotive cluster ⁴
	Support for business investment
	Investment Attraction
	R & D + I projects
	Utilisation of infrastructure in R & Dt
Demand and promotion	Provide subsidies for the purchase of vehicles
	Acquisition of electric vehicles ³
	Regulatory changes
Management and coordination	Coordination with government ⁴
	Support to management

Building on this, MODERNA identified that if “*Navarra is to consolidate itself as a passenger vehicle manufacturing region, which also has a competitive ancillary industrial fabric, it must show a firm commitment to developing a competitive advantage based on sustainable vehicles*”.

⁴ The automotive cluster is managed by CEIN, which is non-for-profit public company with the goal of supporting economic development in Navarra by fostering entrepreneurship.

BOX 6: Pillars to foster sustainable vehicle in Navarra (MODERNA 2011b):

1. *With regard to R&D&I, the design and manufacture of components: we shall co-operate seeking areas of new expertise (e.g. by co-operation projects between research centres in Navarra, energy companies and automobile companies) and we shall also attract technologies and companies related to the expertise of the said new sphere - niche (e.g. for the development of the infrastructures for vehicle recharging, or for manufacturing or mounting batteries).*

2. *With regard to the manufacture of the complete vehicle: we shall progress towards consolidating the regional industrial competitiveness (e.g. in the use of the high speed trains for freight transport and logistics, and in worker training) in order to make Navarra more attractive for the multinationals that are already present or that could come in the near future.*

3. *With regard to systems for the supply, distribution and management of the energy required for the electric vehicles: we shall progress through cooperation agreements, taking advantage of the possibility that the development of this particular type of vehicle may imply an increased share of renewable energies in electricity generation. Here Navarra could provide a differentiating factor (e.g. from the point of view of the micro-grids and the decentralized energy, and energy management through communication systems).*

4. *With regard to sustainable mobility: the Public Administrations shall work to:*

a) *Reregulate construction and spatial planning (e.g. relating to the parking and recharging infrastructure);*

b) *Encourage mobility (e.g. studying concession mechanisms for companies wishing to invest in public infrastructures, or offering tax subsidies for hiring vehicle);*

c) *Seek and attract competitive technologies and ancillary companies;*

d) *Use the early demand instrument, by incorporating sustainable vehicles in the fleets of buses, taxis and other service vehicles and, where applicable, joining initiatives already underway either within Spain or at an international level.*

5. *With regard to the capacity building of people: in Vocational Training and in the Universities we shall include the knowledge related to the new sustainable vehicles.*

Finally, it should be noted that this shift of business model from the current transport sector in Navarra towards a Sustainable Vehicle sector is surrounded by a great deal of uncertainty, although some paths for action are starting to be envisaged, which will make it necessary to take sides (Moderna 2011b).

4.7 Sustainable Construction

The construction sector has been steadily growing in Navarra over the last decade, reaching its peak in 2008 and then decreasing slightly in the context of the EU wide economic crisis.



Figure 35 GVA of the construction sector 2000-2011 in thousands €. (Source: *Instituto Estadístico de Navarra*)

However, this slow-down has been more pronounced in terms of employment. While the GVA of the sector has decreased by 4% between 2011 and 2008, employment has decreased by 34%.



Figure 36 Employees of the construction sector 2000-2011. (Source: *Instituto Estadístico de Navarra*)

In the context of the current economic crisis, MODERNA and sector stakeholders have identified the need for the sector to re-invent itself and become green. In doing so, the construction sector will become more efficient, increase the safety of its workers and improve its environmental performance. The long-term goal is that Navarra becomes the world reference in specific (to be defined yet) areas of sustainable construction, by seeking opportunities in the energy rehabilitation of existing buildings.

BOX 7: Pillars to foster sustainable construction in Navarra (MODERNA 2011b):

- 1. The Navarra actors in the construction sector shall work in collaboration, inside and outside Navarra, through all types of cooperation projects, which are specific, market-oriented and based on systematic foresight at an international level. (E.g. process optimisation; experimentation with new construction systems using waste or recycled materials; product R&D&I).*
- 2. We shall increase our collaboration with the renewable energies sector to develop energetically efficient projects (e.g. the integration of energy saving components into façades) and, likewise, collaboration with other sectors (e.g. agriculture, renewable energies and the environment, and healthcare).*
- 3. We shall set in motion and make available to the whole of the sector, a strategic intelligence and watch system.*
- 4. We shall develop a far-reaching programme for the complete upgrading of existing buildings, involving all the different sector actors.*
- 5. We shall promote officially recognised professional training programmes and a post-graduate programme that shall be an international benchmark for sustainable construction (e.g. bioclimatic architecture). We shall also contribute to the retraining and specialisation of the current workers in the sector and the evaluation of their vocational aptitudes.*
- 6. The Public Administrations shall convene specific, all-encompassing projects to promote the collaboration of the actors (amongst themselves and also collaboration with the Administrations) and to make the results visible to society (e.g. designing and constructing rentable residential buildings on public land, collaborating with certified companies). Likewise, we shall co-ordinate, bring into line and speed up the public instruments to regulate, promote, contract, process and control.*

Against this backdrop, the MODERNA foundation in collaboration with the Construction Labour Foundation⁵, are leading the elaboration of the Strategic Plan for the Sustainable Construction Sector. This Strategic Plan is being developed by a stakeholder consultation process. The stakeholders involved, range from representatives from Construction Associations, Universities, the Government and Local Entities; e.g. Obenasa, Azysa Construcción, Cementos Pórtland Valderrivas, Rockwool Peninsular, Jacar Navarra, Dynamobel, Astrawall, Ceder, Crana, Nasuinsa, etc. Their aim is to define an action plan comprising goals and activities for the short, medium and long-term.

The Sustainable Construction Strategic Plan has four overarching goals:

1. Achieve a Sustainable Construction Industry in Navarre, with innovative companies that operate in international markets.
2. Create a strong, competitive and knowledge-based, Sustainable Construction Industry, which enhances and attracts talent.

⁵ <http://navarra.fundacionlaboral.org/>

The Construction Labour Foundation was established in 1992 and aims at providing education and skills to companies and employees in the sector, so that they can better face the challenges of the future.

3. Achieve Sustainable Construction Industry in close cooperation with the Public Administration.
4. To promote the brand "Navarra Sustainable Construction", committed to sustainability.

MODERNA and Construction Labour Foundation have identified four subcomponents of the Sustainable Construction sector, namely:

- Sustainable Urbanism: focused on a sustainable urban planning, taking into account market needs, as well as, adjusting existing legislation to the development needs.
- Promotion: with a special emphasis on product design and marketing, to deliver higher quality products with a lower cost.
- Construction and rehabilitation: oriented towards developing more industrialized processes and new management procedures, which increase productivity while protecting the environment.
- Maintenance: the goal is to shift from a corrective maintenance to a preventive maintenance, enhancing the use of buildings and infrastructures.

These subcomponents and way forward are being identified in a stakeholder consultation process. Among the actions to be carried out, one of the most relevant is to identify the opportunities (e.g. subsidies, tax incentives) and barriers (e.g. complex bureaucracy) to foster the development of the sector. Along these lines, the table below summarizes the strategic actions identified for each of the subcomponents so far:

Table 8 Strategic actions for the development of the Sustainable Construction sector.

Subcomponent	Strategic actions
Sustainable Urbanism	1) Establishment of an exchange platform for the sector 2) Elaborate a proposal on how to increase flexibility of urban planning.
Promotion	1) Promote the trademark "Sustainable Construction in Navarra" 2) Establishment of the Sustainable Construction Observatory.
Construction and rehabilitation	1) Establishment of a platform to internationalize the sector 2) Establishment of a platform for the internal market 3) Establishment of an innovation platform 4) Design a new and positive image for the sector 5) Provide training and new skills to employees
Maintenance	1) Raise awareness (public and private) on the need for preventive maintenance and create business clusters to provide turn-key services.

The next steps in this process to deliver a Strategic Plan for the Sustainable Construction sector will be to involve the necessary participants to carry out each of the actions, plan and set up the those actions.

Finally, sustainable construction can be a growth opportunity for Navarre sector development, as long as it is a collaborative project and it takes advantage of the favourable global trends, while capitalizing the potential to cooperate with the energy sector, by completely upgrading the energy efficiency of existing buildings.

5 Horizontal drivers, barriers and enabling conditions: MODERNA

Navarra has certain competitive advantages to pursue the green economy transition and smart specialization strategies.

First, Navarra's institutions and stakeholders are aware of the need to become more innovative and sustainable in order to remain competitive and they are also committed to fostering this change. As early as the 1990s, Navarra changed its economy from an essentially agricultural structure to a modern industrial region, attracting considerable investment from Spain and abroad (the share of industry in the economy increased by 40% from 1960 to 1975). Then, in the 1990s a group of entrepreneurs and the Government of Navarra, enabled the region to become one of the key players in renewable energies. Over the 2000s Navarra's economic strategies have placed the region on 32nd place in the ranking of the 271 European regions in per capita income, due to the continuous growth of employment levels and quality of life.

Along these lines, in 2010 Navarra published a cross-sectoral action plan to shift from an industrial economy to a knowledge-based economy, the MODERNA action plan. MODERNA seeks an economic paradigm change, from a resource intensive economy to a resource efficient one. However, some stakeholders consider that this paradigm change is not as radical as it should be to achieve a green economy, because instead of pursuing breakthrough changes (e.g. sustainable mobility) it focuses on incremental changes (e.g. sustainable vehicle) (ISF 2013), thus continuing the current economic model.



Figure 37 Key milestones of MODERNA.

MODERNA is long-term strategic regional economic plan, with the overarching goal of achieving greater prosperity, greater quality of life and greater sustainability in Navarra by 2030.

In the definition of the MODERNA action plan, the guiding principles of European policies were incorporated, such as the European Sustainable Development Strategy, the European Territorial Cohesion Policy, Regional Development Strategies, etc. Then, MODERNA translated these guiding principles and general objectives into objectives specific to Navarra, that is, greater prosperity, greater quality of life and greater sustainability. In other words, Navarra pursues a smart, inclusive and sustainable growth (NASUVINSA 2013).

In order to achieve its overarching goal, emphasis has been placed on three economic axes, to be developed in the future: **(1)** healthcare economics, **(2)** green economics and **(3)** talent economics. In order to boost these economic axes and their related sectors, MODERNA is working with the involved stakeholders, grouped in cluster levels. Furthermore, MODERNA also targets factors that have a decisive, core effect on all business sectors of Navarra, namely, education, talent and human capital, R&D&I, entrepreneurship, globalisation, public administration, infrastructures and collaboration environments, with particular focus on macro-sectors and human capital.

Moderna has been promoted by the Government of Navarra (whose main political party is Unión del Pueblo Navarro – UPN) along with the Partido Socialista de Navarra (PSN), worker and employer associations (the Confederación de Empresarios de Navarra (CEN), the Unión General de Trabajadores (UGT), Comisiones Obreras (CCOO)) and universities (the Public University of Navarra (Universidad Pública de Navarra, UPNA) and the University of Navarra (Universidad de Navarra, UN)).

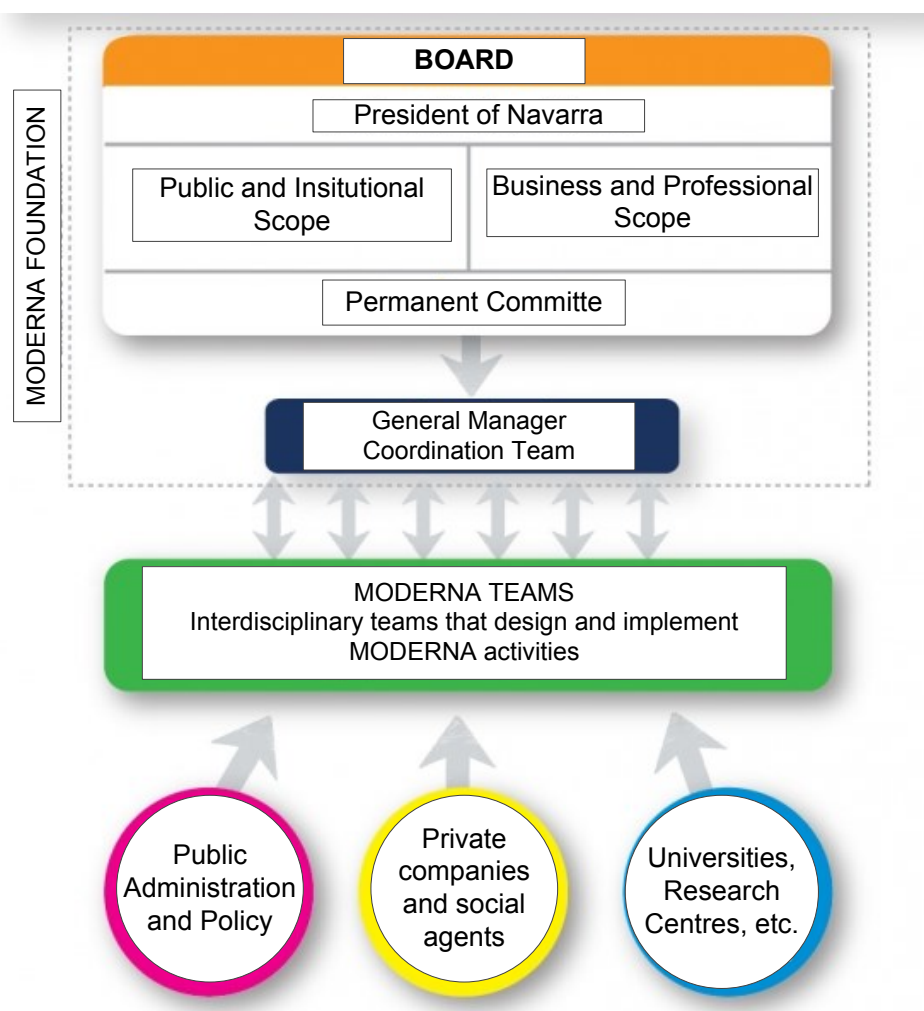


Figure 38 MODERNA's management board.

The BOARD is the main body of the Foundation. It has 31 members, with equal participation of the public-institutional sectors and the professional-enterprise sectors. It has institutional, representative and governance functions as well as monitoring functions and where required, general strategy adaptative functions.

The MODERNA Teams are working groups of professionals who meet to coordinate the design or launch of specific actions and projects, developed by the MODERNA Plan within its sectors or professional area. A Panel, on the other hand, is a sector specific team that periodically monitors each one of these strategic factors and sectors of the Plan, to carry out an on-going assessment of the situation.

It is worth mentioning that MODERNA is a very participative initiative, because any person can propose the creation of a Work team to develop any improvement idea for the sector or economic context, or to design or execute any of the actions described in the MODERNA action plan.

In summary, this regional development plan provides the framework and the tools for the smart, inclusive and sustainable transition of Navarra as a whole.

Stakeholders' views on how the green economic transition could be further supported:

- Introduction of green tax incentives sustainability criteria for public procuring and for awarding of subsidies. This way the sustainability requirements put forward by policy measures would become a competitive advantage, rather than an additional cost (NASUVINSA 2013).
- Set up a green administrative framework. That is to say, economically value (accountancy; e.g. tax incentives) the positive environmental procedures implemented by companies: emission control, ecological footprint decrease, etc. (NASUVINSA 2013).
- Increase loan flexibility in order to facilitate the access to funding of breakthrough innovations, innovative start-ups, etc. (MODERNA 2013).
- Orient the current institutional framework towards an incentive-based approach, rather than a restrictive approach. In doing so, prioritize the initiative which are both environmentally sustainably and economically competitive (INTIA 2013). Hence, a truly green economy will be achieved in Navarra.
- Increase awareness of business and social stakeholders on MODERNA, the green economy and the potential for growth. MODERNA has been designed in a highly participative and collaborative process, but still some relevant stakeholders have not been mobilized to their greatest potential (CONSEBRO 2013, ISF-NMGI 2013, UPNA/CSIC 2013, BASARTEA 2013). Along these lines, it is essential to increase the support (economic, but also advisory) to small enterprises (INTIA 2013)
- Avoid regulatory changes and discontinuity. Policy framework need to be stable and avoid uncertainty if they are to deliver successful results (SODENA 2013, INTIA 2013). For example, the recent changes in legislation, in the Renewable Energies sector, fostered by the national government have created an environment of uncertainty, which might hamper the growth in the sector, both in Spain and Navarra
- Strengthen knowledge transfer mechanisms from universities and research centres to businesses (MODERNA 2013) in order to facilitate the transition.

6 Assessment of the regions' potential to develop green economy in the future

This section provides an overview of Navarra's potential to perform the green economy transition in the years to come. As aforementioned, Navarra has certain competitive advantages to undergo such a transition, due to its inherent regional characteristics.

In terms of territorial capital, its climatic conditions hold a great renewable energy potential, its landscapes and natural areas are a great touristic asset, the cluster presence in the region is high, which facilitates knowledge spillovers and besides it has a coherent institutional structure to foster change. In addition, Navarra is one of the most R&D investing regions in Spain. It has Technology Action Plans in place to achieve the objective of becoming one of the 50 most innovative regions in the EU. In this context it also has grants' programmes to finance R&D.

As mentioned before, the green economy potential of Navarra will be developed by the MODERNA action plan, which focuses on in six green economy sectors: **(1)** Sustainable Construction, **(2)** Sustainable Vehicle, **(3)** Renewable Energy, **(4)** Agro-food industry, **(5)** Sustainable Tourism, and **(6)** Environment and Waste.

These green sectors considered by MODERNA have a different degree of development in the region and subsequently a different potential for development (Ortega-Argilés 2012):

- Basic clusters (automobiles, electric vehicles and sustainable construction). These are essential clusters for maintaining employment in Navarra at target levels (those that provide direct and indirect employment for the main core of Navarra's economy, i.e., those that are embedded in the region). Moderna seeks to reinvent them to make them more efficient, i.e. green.
- Strategic (renewable energies, agro-food industries). These clusters benefit from significant global growth trends, in which Navarra has a clear initial competitive advantage. Moderna seeks to further develop them.
- Future commitments (sustainable tourism, environment and waste). These clusters that seem to benefit from major global growth trends, in which Navarra has an emerging presence and significant capacities. Moderna wants to establish new roots for the future consisting of new business opportunities as yet underdeveloped in the region.

For the above reasons, Renewable Energies and Agro-food Industries have been analysed more in-depth than the rest of sectors, which have been introduced in a briefer manner due to being less developed at the moment.

The Renewable Energies sector is currently selling 17% of the world's wind turbines and today, 65% of the electricity consumed in Navarra is from renewable sources. Nonetheless, Navarra's vision is to consolidate this international leadership position but also diversify its activities to emerging areas and new markets. The specific objectives being to:

- Increase self-sufficiency in primary energy above 21%.
- Generate 10% more electricity than is consumed, through renewables.
- Reduce final energy intensity by 18% in comparison to 2009.
- Exceed the energy objectives established by the European Union for 2020

In addition, this sector shall also be boosted because of the synergies with the Sustainable Construction sector, i.e. energy efficiency in buildings, and with the Sustainable Vehicle sector, i.e. electric vehicle.

In relation to the Agro-food sector, the number of jobs in the sector have increased by 3.600 over the last decade and its activity acts as unifying and cohesive force in the territory. In such a context, Navarra's vision is to develop new products, of greater added value, to strengthen markets, to achieve more adequate business sizes and to promote positioning in the concepts of health, pleasure and natural food to adapt to the changing demand. This vision comprises the production of ecological goods with no increases in cost, the development and deployment of natural additives, biodegradable packaging and to position the sector in the emerging "well-being industry".

Navarra faces challenges to be overcome to deliver such vision. However, it also poses unique features that will enable the transition, such as, a favourable policy context, availability of support institutions, awareness within the sector stakeholders and a roadmap with prioritized actions.

Finally, the MODERNA action plan aims to achieve a smarter, more inclusive and more sustainable Navarra, which is a greener Navarra. The economic impact sought by MODERNA may be summarized in a sustained annual growth in employment of 1% once the recession is over, 1.5% mean annual growth in productivity, which entails a mean annual growth of 2.5% in regional wealth up to 2030, achieving more than 32,000 million Euros GDP (Ortega-Agilés 2012). Below an overview of the goals and monitoring indicators of MODERNA is provided.

Table 9 MODERNA indicators to monitor the evolution of results.

MODERNA ACTION PLAN. MONITORING INDICATORS.			
Area	Indicator	Starting point	Goal in 2030
Education	PISA score	502 (year 2006)	550
	Population 16, with a B2 level of English	7% (year 2010)	90%
	% Higher Education	36.0% (year 2007)	55%
Innovation	% R&D&i investments	1.92% (year 2008)	4%
	Patents	172 (year 2008)	844
	Innovation index and positioning in Europe	0,48 and 76 (year 2006)	0.7 and 35
Internationalization	Exports (M€)	5450 (year 2009)	10000
	# exporting companies	711 (year 2009)	2000
	# multinational companies	133 (year 2010)	200
Employment and Business	# of employees	284000 (year 2009)	365000
	Production per employee (€)	61000 (year 2009)	85000
	% companies with over 50 employees	1.3% (year 2009)	2.5%
	# new companies per year	943 (year 2009)	1600
Prosperity and social cohesion	Position in GDP per capita	32 (year 2007)	20
	GDP per capita in PPS	32900	43000
	Wealth distribution	28	23
	Quality of life (HDI)	0.9720	0.9870
	Environmental Sustainability	2132 (year 2008)	1450

7 The road ahead: transferability and conclusions

Navarra is a Spanish NUTS 2 region, consisting of a single NUTS 3 region. It is located in the border with France, and as such is a border and mountain area. In addition, it is a metropolitan region, in industrial transition and is also considered a coastal region by ESPON, although the sea is 10 km away from Navarra.

Navarra is an interesting case study region because it has already started the green(er) economy transition, by publishing MODERNA (a new economic model for Navarra), investing in wind energy, in (eco)-innovation and by strengthening its legislative framework. In addition, regional effort on RTD and innovation in Navarra has experienced a remarkable evolution since its regional R&D expenditure as a percentage of GDP has increased from 0.9% in year 2002 to 2.13% in year 2009. This can be attributed to a steady regional innovation support policy. That is to say it has both relevant enabling conditions and drivers for the transition.

BOX 8: Reflections of NASUVINSA team for LIVELAND Project as part of Baseline Analysis report towards Draft Final Report

Navarre has traditionally worked on the development of its territory through research, analysis and incorporation of environmental certification of the production process. The following documents identified in the green economy (MODERNA) have resulted in concrete actions that have created employment strategies and issues related to landscape and its components, for example:

- *Calculation of the ecological footprint at local and regional implementation of studies and ecological footprint analysis and public participation processes in environmental planning of Navarre.*
- *Sanitation Plan of rivers. Implementation of EU directives, sewage plan, recovery of biodiversity, participation, river parks.*
- *Innovative management of the primary sector and rural development: but gradually, the Geographic Information System of Navarre for the Common Agricultural Policy (SIGPAC), automated tasks, remote livestock, etc.*
- *The debate over forest management and production adapted to biomass production if not profitable timber production. With the objective of sustainable exploitation of forests but profitable for local institutions and population and entrepreneurial companies.*
- *Plans of Energy of Navarre. Installation of the first companies in renewable production and research (from implantation own weather network in the 80 to II Plan PE 2020).*
- *Projects on bioclimatic architecture and urbanism: CENÍFER, Zolina, Sarriguren. Since the early 90's.*
- *Economic valuation of biodiversity of Navarre.*
- *Primary sector social rating and its effects on environmental quality. Awareness on forests, agriculture and livestock (from the 70s).*

The most remarkable feature of Navarra is that over the last decades it has built a solid policy framework to foster its priorities (i.e. renewable energies in the 1990s, innovation) and monitored the evolution of measures adopted. In this regard, due to the fact that Navarra has its own tax regime, policies such as innovation and renewable energies have been complemented with tax incentives which boosted the growth of both sectors. In addition, strategic investment in R&D infrastructure and continuous support for technology commercialisation has led to a global recognition of Navarra as being at the cutting-edge of renewable energy production. Currently MODERNA is working to articulate such coordinated measures (policy priorities together with fiscal incentives) which have proved to be key to foster change (MODERNA 2013).

It is worth highlighting that MODERNA is considered by the European Commission as a good practice in the regional smart growth strategies (S3 “Smart Specialization Strategies”) (EC 2012b). That is why the MODERNA action plan is considered the key measure that could be transferable to other European regions to deliver green growth. The key features of MODERNA, which could be taken into account by other regions, may be summarised as follows:

- It has medium-long term duration, up to 2030, so that it provides a stable and durable framework.
- The plan was promoted by the main political, education, business and social institutions, grouped together in the management board of the Plan (i.e. institutional consensus).
- It was prepared by a stakeholder consultation process by involving business representatives, citizens, research institutions and public organisations
- The first step was to analyse the regional potential → Diagnosis. This diagnosis comprised over 1500 interviews. The objective of the diagnosis was to analyse Navarra's economy in the different macroeconomic magnitudes and the performance of its key economic sectors and to assess the contribution of regional competitiveness factors (human capital, infrastructure, innovation, entrepreneurship, etc.). Then, the main challenges to be faced and the strengths and opportunities to prosper in the global competitive environment were identified.
- Then a strategy (a vision) to develop regional potential was proposed by an expert committee. This second phase established the long-term vision and objectives of the Plan for Navarra's economy in the coming decades: more prosperity, more human development and environmental sustainability.
- Next, concrete actions were proposed to develop the strategy. These actions and specific targets were defined together with stakeholders, in discussion forums, and they were prioritised (short, medium, long term). For that purpose, 14 working groups were formed for each specific cluster and transversal factor, with the participation of 258 agents from the main companies, knowledge centres and public institutions.
- A set of indicators have been defined to monitor and evaluate the progress of the action plan as a whole and the evolution of the sectors prioritised.
- The MODERNA Foundation was established as an institution for the public-private cooperation in charge of the management of the Plan, with the main objective of carrying on with the previous work done by the agents implied in the design and development of the strategy.
- A specific funding model was defined with five tools designed to enhance the development of business projects aligned with the Plan for the different business stages: creation (seed stage), start-up and growth.
- It is aligned with EU policy: European Sustainable Development Strategy, Europe 2020, etc. In fact, in some cases it fixes stricter goals (e.g. renewable energies).

In summary, MODERNA is a smart, inclusive and sustainable growth strategy that aims at changing the economic paradigm of Navarra and by 2030 achieving a leadership position in terms of production, quality of life and environmental standards.

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