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Territories and low-carbon economy

Province of Burgos, Spain

Applied Research

Case Study Report

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Territories and low-carbon economy

Regional Case Study:
Province of Burgos, Spain

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1 General description of the region

1.1 Location of region and characteristic

Burgos Provincial Energy Agency (AGENBUR) is a SAVE Energy Agency created and ruled by Burgos Provincial Government in order to promote renewable energies and energy efficiency in the province of Burgos.

Burgos is a province of northern Spain, in the north-eastern part of the region of "Castilla y León". "Castilla y León" has 2,553,000 inhabitants (2014 data) with an area of 94,223 km^2. "Castilla y León" is formed by 9 provinces, being Burgos the second in size.

The capital of the province is the city of Burgos, the home of the only cathedral in Spain which has been individually awarded the World Heritage designation by the UNESCO.

The province of Burgos has an area of 14,300 km^2 and a population of 364,002 inhabitants (2015 data). It has three main cities (Burgos, Aranda de Duero and Miranda de Ebro) and a large number of villages, (371 municipalities which sums 1,273 small towns).

This is the main characteristic of our province, it has the population too disseminated in a large number of small towns.

Figure 1.1: Map and location of the province of Burgos

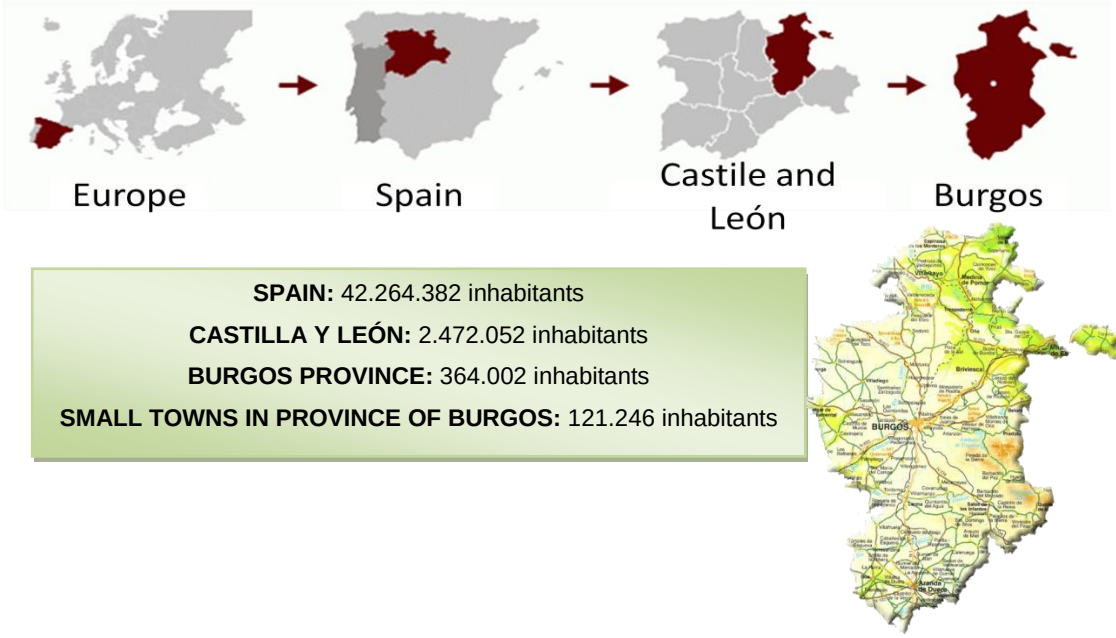


Table 1.1: Municipalities and inhabitants in Burgos Province (2015)

Municipality	Population	Municipality	Population
Abajas	29	Alfoz de Bricia	74
Adrada de Haza	221	Alfoz de Quintanadueñas	2,019
Aguas Cándidas	58	Alfoz de Santa Gadea	105
Aguilar de Bureba	68	Altable	51
Albillos	221	Altos, Los	190
Alcocero de Mola	33	Ameyugo	103

Municipality	Population
Anguix	134
Aranda de Duero	32,880
Arandilla	172
Arauzo de Miel	350
Arauzo de Salce	60
Arauzo de Torre	78
Arcos	1,566
Arenillas de Riopisuerga	179
Arija	146
Arlanzón	429
Arraya de Oca	45
Atapuerca	187
Ausines, Los	126
Avellanosa de Muñó	115
Bahabón de Esgueva	89
Balbases, Los	323
Baños de Valdearados	361
Bañuelos de Bureba	37
Barbadillo de Herreros	116
Barbadillo del Mercado	129
Barbadillo del Pez	77
Barrio de Muñó	32
Barrios de Bureba, Los	199
Barrios de Colina	52
Basconcillos del Tozo	291
Bascuñana	35
Belbimbre	69
Belorado	1,969
Berberana	74
Berlangas de Roa	185
Berzosa de Bureba	32
Bozoó	105
Brazacorta	73
Briviesca	7,129
Bugedo	175
Buniel	516
Burgos	177,100
Busto de Bureba	164
Cabañes de Esgueva	180
Cabezón de la Sierra	66
Caleruega	470
Campillo de Aranda	178
Campolara	74
Canicosa de la Sierra	514
Cantabrana	31
Carazo	34
Carcedo de Bureba	50
Carcedo de Burgos	388
Cardeñadijo	1,295
Cardeñajimeno	1,019

Municipality	Population
Cardeñuela Riopico	127
Carrias	23
Cascajares de Bureba	36
Cascajares de la Sierra	39
Castellanos de Castro	48
Castil de Peones	37
Castildelgado	43
Castrillo de la Reina	209
Castrillo de la Vega	636
Castrillo de Riopisuerga	61
Castrillo del Val	839
Castrillo Matajudíos	58
Castrojeriz	845
Cavia	247
Cayuela	180
Cebrecos	47
Celada del Camino	97
Cerezo de Río Tirón	598
Cerratón de Juarros	55
Ciadoncha	81
Cillaperlata	37
Cilleruelo de Abajo	237
Cilleruelo de Arriba	59
Ciruelos de Cervera	111
Cogollos	451
Condado de Treviño	1,362
Contreras	82
Coruña del Conde	124
Covarrubias	585
Cubillo del Campo	100
Cubo de Bureba	103
Cueva de Roa, La	99
Cuevas de San Clemente	49
Encío	46
Espinosa de Cervera	100
Espinosa de los Monteros	1,788
Espinosa del Camino	44
Estépar	664
Fontioso	54
Frandovínez	99
Fresneda de la Sierra Tirón	123
Fresneña	87
Fresnillo de las Dueñas	636
Fresno de Río Tirón	195
Fresno de Rodilla	49
Frías	265
Fuentebureba	54
Fuentecén	222
Fuentelcésped	213
Fuentelisendo	96

Municipality	Population
Fuentemolinos	97
Fuentenebro	139
Fuentespina	769
Galbarros	29
Gallega, La	54
Grijalba	104
Grisaleña	39
Gumiel de Izán	577
Gumiel de Mercado	344
Hacinas	166
Haza	26
Hontanas	67
Hontangas	106
Hontoria de la Cantera	157
Hontoria de Valdearados	201
Hontoria del Pinar	707
Hormazas, Las	106
Hornillos del Camino	56
Horra, La	366
Hortigüela	103
Hoyales de Roa	211
Huérmeces	131
Huerta de Arriba	128
Huerta de Rey	1,007
Humada	130
Hurones	73
Ibeas de Juarros	1,400
Ibrillos	55
Iglesiarrubia	44
Iglesias	140
Isar	331
Itero del Castillo	84
Jaramillo de la Fuente	52
Jaramillo Quemado	5
Junta de Traslaloma	136
Junta de Villalba de Losa	89
Jurisdicción de Lara	47
Jurisdicción de San Zadornil	51
Lerma	2,703
Llano de Bureba	63
Madrigal del Monte	169
Madrigalejo del Monte	181
Mahamud	123
Mambrilla de Castrejón	100
Mambrillas de Lara	48
Mamolar	31
Manciles	19
Mazuela	63
Mecerreyes	259
Medina de Pomar	5,983

Municipality	Population
Melgar de Fernamental	1,744
Merindad de Cuesta-Urria	366
Merindad de Montija	803
Merindad de Río Ubierna	1,456
Merindad de Sotoscueva	436
Merindad de Valdeporres	440
Merindad de Valdivielso	400
Milagros	460
Miranda de Ebro	36,173
Miraveche	79
Modúbar de la Emparedada	597
Monasterio de la Sierra	48
Monasterio de Rodilla	181
Moncalvillo	86
Monterrubio de la Demanda	64
Montorio	162
Moradillo de Roa	192
Nava de Roa	221
Navas de Bureba	35
Nebreda	70
Neila	173
Olmedillo de Roa	199
Olmillos de Muñó	38
Oña	1,088
Oquillas	59
Orbaneja Riopico	243
Padilla de Abajo	89
Padilla de Arriba	78
Padrones de Bureba	52
Palacios de la Sierra	744
Palacios de Riopisuerga	28
Palazuelos de la Sierra	79
Palazuelos de Muñó	54
Pampliega	332
Pancorbo	453
Pardilla	126
Partido de la Sierra en Tobalina	84
Pedrosa de Duero	455
Pedrosa de Río Úrbel	249
Pedrosa del Páramo	103
Pedrosa del Príncipe	175
Peñaranda de Duero	552
Peral de Arlanza	163
Piérnigas	40
Pineda de la Sierra	101
Pineda Trasmonte	126
Pinilla de los Barruecos	111
Pinilla de los Moros	42
Pinilla Trasmonte	176
Poza de la Sal	337

Municipality	Population
Prádanos de Bureba	58
Pradoluengo	1,282
Presencio	195
Puebla de Arganzón, La	519
Puentedura	129
Quemada	259
Quintana del Pidio	164
Quintanabureba	30
Quintanaélez	52
Quintanaortuño	281
Quintanapalla	110
Quintanar de la Sierra	1,845
Quintanavides	96
Quintanilla de la Mata	130
Quintanilla del Agua y Tordueles	419
Quintanilla del Coco	61
Quintanilla San García	88
Quintanilla Vivar	766
Quintanillas, Las	391
Rabanera del Pinar	121
Rábanos	96
Rabé de las Calzadas	228
Rebolledo de la Torre	122
Redecilla del Camino	136
Redecilla del Campo	71
Regumiel de la Sierra	367
Reinoso	11
Retuerta	65
Revilla del Campo	96
Revilla Vallejera	115
Revilla y Ahedo, La	114
Revillarruz	512
Rezmondo	15
Riocavado de la Sierra	59
Roa	2,373
Rojas	72
Royuela de Río Franco	212
Rubena	176
Rublacedo de Abajo	37
Rucandio	77
Salas de Bureba	133
Salas de los Infantes	2,091
Saldaña de Burgos	203
Salinillas de Bureba	48
San Adrián de Juarros	93
San Juan del Monte	139
San Mamés de Burgos	286
San Martín de Rubiales	142
San Millán de Lara	78
San Vicente del Valle	29

Municipality	Population
Santa Cecilia	105
Santa Cruz de la Salceda	152
Santa Cruz del Valle Urbión	103
Santa Gadea del Cid	155
Santa Inés	155
Santa María del Campo	595
Santa María del Invierno	63
Santa María del Mercadillo	114
Santa María Rivarredonda	94
Santa Olalla de Bureba	33
Santibáñez de Esgueva	99
Santibáñez del Val	50
Santo Domingo de Silos	287
Sargentes de la Lora	129
Sarracín	246
Sasamón	1,073
Sequera de Haza, La	34
Solarana	93
Sordillos	24
Sotillo de la Ribera	520
Sotragero	286
Sotresgudo	482
Susinos del Páramo	103
Tamarón	38
Tardajos	803
Tejada	28
Terradillos de Esgueva	86
Tinieblas de la Sierra	37
Tobar	27
Tordómar	343
Torrecilla del Monte	69
Torregalindo	136
Torrelara	37
Torrepadre	78
Torresandino	691
Tórtoles de Esgueva	498
Tosantos	56
Trespaderne	877
Tubilla del Agua	154
Tubilla del Lago	150
Úrbel del Castillo	79
Vadocondes	382
Valdeande	100
Valdezate	140
Valdorros	332
Vallarta de Bureba	45
Valle de las Navas	533
Valle de Losa	538
Valle de Manzanedo	132
Valle de Mena	3,826

Municipality	Population
Valle de Oca	159
Valle de Santibáñez	505
Valle de Sedano	472
Valle de Tobalina	1,026
Valle de Valdebezana	506
Valle de Valdelaguna	213
Valle de Valdelucio	309
Valle de Zamanzas	68
Vallejera	42
Valles de Palenzuela	89
Valluércanes	77
Valmala	28
Vid de Bureba, La	20
Vid y Barrios, La	274
Vileña	29
Villadiego	1,593
Villaescusa de Roa	113
Villaescusa la Sombría	69
Villaespasa	26
Villafranca Montes de Oca	129
Villafruela	209
Villagalijo	66
Villagonzalo Pedernales	1,774
Villahoz	320
Villalba de Duero	683
Villalbilla de Burgos	1,279
Villalbilla de Gumiel	93
Villaldemiro	68
Villalmanzo	450
Villamayor de los Montes	202

Municipality	Population
Villamayor de Treviño	76
Villambistia	46
Villamedianilla	12
Villamiel de la Sierra	40
Villangómez	239
Villanueva de Argaño	106
Villanueva de Carazo	32
Villanueva de Gumiel	284
Villanueva de Teba	48
Villaquirán de la Puebla	47
Villaquirán de los Infantes	146
Villarcayo de Merindad de Castilla la Vieja	4,372
Villariezo	612
Villasandino	192
Villasur de Herreros	265
Villatuelda	43
Villaverde del Monte	134
Villaverde-Mogina	86
Villayerno Morquillas	207
Villazopeque	57
Villegas	90
Villoruebo	85
Viloria de Rioja	39
Vilviestre del Pinar	616
Vizcaínos	49
Zael	115
Zarzosa de Río Pisuerga	31
Zazuar	242
Zuñeda	57

1.2 Socio-demographic structure and development

As we have explained in the before chapter Burgos Province has a very large number of municipalities and small towns. The 48.5% of the population live in Burgos capital, 33.33% live in rural areas, distributed in 1,273 small towns and the rest in two second main towns, “Aranda de Duero” and “Miranda de Ebro”.

The 75% of the population of the province of Burgos is placed in only 7 municipalities.

The population density in the rural areas of the province is about 9 inh./km^2

The population in the whole province of Burgos has increased during the last five years. In spite of this fact, there are several rural areas of the province having reduced their population.

Table 1.2: Demographic structure

Population distribution by size of municipalities (2015)

Inhabitants from – to	Number of municipalities	Inhabitants from – to	Number of municipalities
0-100	154	801-1000	6
101-200	92	1,001-2,000	16
201-300	30	2,001-5,000	7
301-500	35	5,000-10,000	2
501-800	26	10,000-200,000	3

Table 1.3: Demographic structure by sex

Population distribution by inhabitants sex (2015)

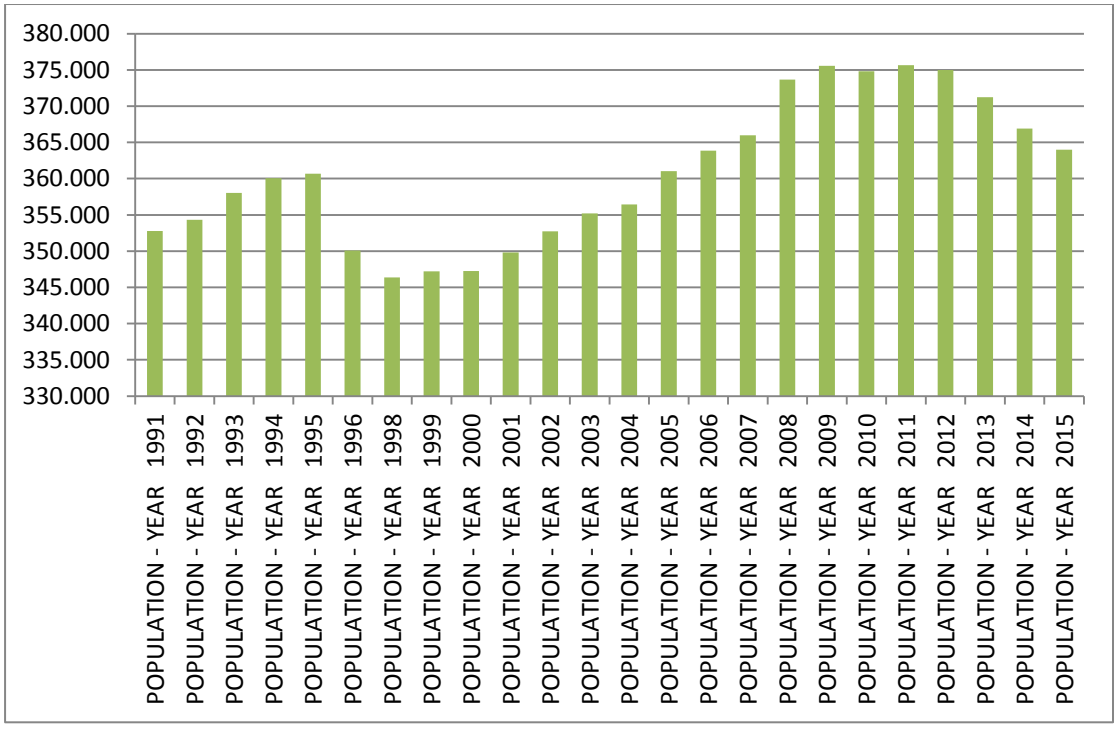
Female	Male
181,860	182,142

Table 1.4: Demographic structure by age

Population distribution by age (2015)

Age	Inhabitants	Age	Inhabitants
From 0 to 4 years old	15,368	From 45 to 49 years old	28,728
From 5 to 9 years old	16,648	From 50 to 54 years old	28,415
From 10 to 14 years old	15,723	From 55 to 59 years old	26,168
From 15 to 19 years old	15,002	From 60 to 64 years old	22,170
From 20 to 24 years old	16,523	From 65 to 69 years old	20,072
From 25 to 29 years old	19,022	From 70 to 74 years old	16,782
From 30 to 34 years old	22,567	From 75 to 79 years old	13,888
From 35 to 39 years old	27,949	From 80 to 84 years old	14,689
From 40 to 44 years old	28,371	More than 85 years old	15,917

Figure 1.2: Population development (2000-2016)



1.3 Settlement type and building stock

Collecting all the information from our buildings we can resume the next figures:

- Final energy demand in the consumption unit (MWh/yr): 133,799 MWh/yr
- Primary energy supplied by the all thermal sub-installations in the consumption units (MWh/yr): 232,863 MWh/yr

The main information is collected in the next tables:

Table 1.5: Type of buildings in Burgos Province

Type of building	Total
Single family	82,134
Multi-storey	7,503
Multi-storey with business premises	8,387
Commercial building	6,331
Building accommodations	453
Convents, prisons and head quarters	122
Schools	199
Hospitals	31
Other properties	107,046
Dilapidated buildings	1,886

Table 1.6: Age of buildings

Year	Total	Year	Total	Year	Total
Before 1990	unknown	1997	1,125	2004	523
1991	979	1998	1,137	2005	374
1992	1,081	1999	1,218	2006	266
1993	919	2000	1,540	2007	154
1994	903	2001	2,217	2008	241
1995	1,026	2002	1,456	2009	245
1996	993	2003	1,123	After 2010	488

Table 1.7: Dominating heat systems

Type of system	Number of buildings	Percentage
Butane	9,016	4.25%
Propane	30,288	14.27%
Piped natural gas	77,960	36.74%
Fuel	93,096	43.87%
Solar thermal	150	0.07%
Geothermal	25	0.01%
Biomass	1,520	0.72%
Other (heat pumps, carbon, electricity, ...)	151	0.07%

1.4 Transport system and modal split

The province of Burgos is an important logistical point in Spain. The province doesn't have enough kilometers of dual carriage road or highways. On these grounds, the number of kilometers of roads per 1,000 inhabitants is extremely low.

Our transport system is based in the use of private cars. It is so difficult to organize efficiently mobility in a province of 371 municipalities; being the 75% of the total population concentrated into only 7 municipalities and the average population density being 9 inhabitants/km^2.

This excessive reliance on private transport implies higher costs. The “transport on demand” is introduced and underused in several rural areas of the province. In small villages, the attitude of underusing available resources damages the future maintenance of public lines, declared unfeasible if there is a total lack of critical mass. The main figures are:

Table 1.8: Vehicles/Inhabitants

Vehicles Nº/1,000 inhabitants (2011)	
Type of vehicle	**Nº/1,000 inhabitants in target territory**
Cars	485
Motorcycles and mopeds	36
Trucks and vans	101
Buses	1
Other vehicles	40

Table 1.9: Total vehicles

VEHICLES (2011)					
Province	**Cars (nº)**	**Motorcycles and mopeds (nº)**	**Trucks and vans (nº)**	**Buses (nº)**	**Other vehicles (nº)**
Province of Burgos	182,496	13,668	38,054	503	15,139

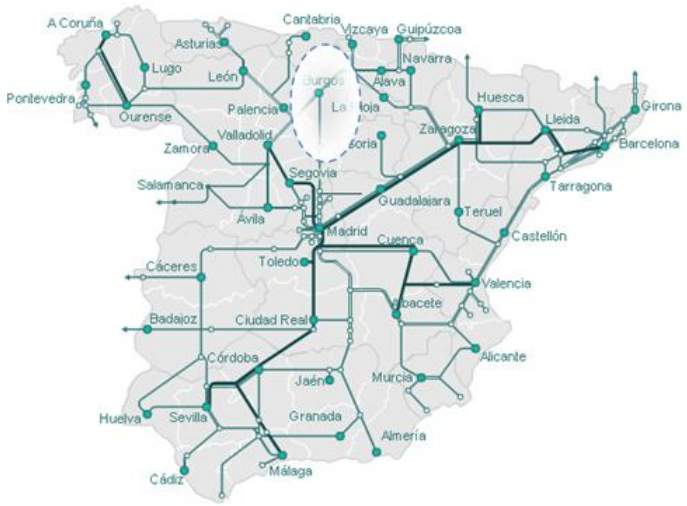
Table 1.10: Total driver census

Drivers census, nº (2011)	
	Nº in target territory
Males	131,796
Women	80,188
Total	211,984

The province of Burgos *does not have high speed infrastructures*. In spite of this, the communication by rail is very important for the connectivity of the territory. The province is – via rail – communicated with different regions at regional, national and European level.

The province of Burgos *has one airport* (closed to the capital city). The airport had permanent national flights and international ones only seasonally until 2015 and now it has only operative use of loads.

Figure 1.3: Map of train infrastructures in Spain, remarking Burgos Province



Concerning to the use of energy in mobility we have the next figures:

Table 1.11: Energy consumption in transport sector

Final energy consumption in transport sector (in equivalent tonnes of oil). (2011)	
Petroleum products	1,101,512
Renewable energies (biofuels)	59,890
Electricity	12,918
Total final energy consumption in transport	452,813
Total final energy consumption (overall)	1,174,320
% total energy consumption in transport/total energy consumption	38.56%
% petroleum products/total consumption in transport	93.8%
% renewable energies/total consumption in transport	5.1%

1.5 Regional economic structure and development

Basing on Regional Accounting of Spain the gross domestic product at market prices (GDP APM) in Burgos rose in the year 2013 to € 9,220,573 thousand, representing 17.69% of GDP "Castilla y León" and 0.89% of GDP; over the previous year.

The provincial economy is based on the services sector. This sector contributes with 56.43% to Value Gross added (GVA).

Although the GVA of Services in Burgos in 2013 decreased compared to the previous year, its importance in provincial economy has increased 1.17 percentage points.

Regarding to the employment in Burgos Province we can see the most important figures in Table 1.13 and Table 1.14, but probably the main characteristic is the increase of the unemployment as a result of the economic crisis in Spain.

Figure 1.4: GDP evolution in Burgos Province (2000-2013)

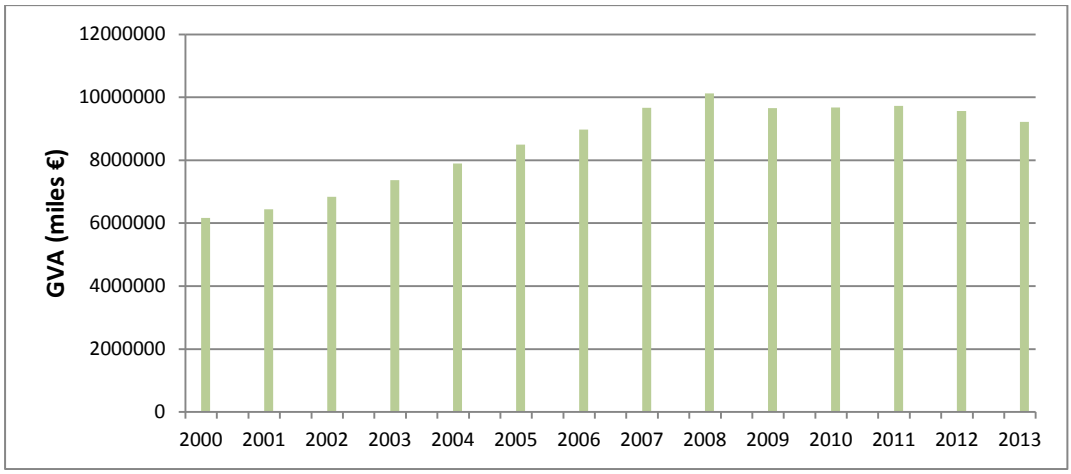


Table 1.12: GDP per sectors (2015)

Economic sectors	Burgos (miles €)	Castilla y Leon (miles €)	Spain (miles €)
Agriculture	413,318	2,446,839	26,560,000
Industry	2,809,354	10,169,745	161,040,000
Construction	444,426	2,857,070	52,452,000
Services	4,789,975	32,089,072	701,241,000
Total	8,416,073	47,562,726	941,293,000

Table 1.13: Unemployment in Burgos

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
12,404	12,197	14,812	22,495	25,421	26,278	30,663	32,540	30,326	27,383

Table 1.14: Regional economic profile(employment) (2009-2015)

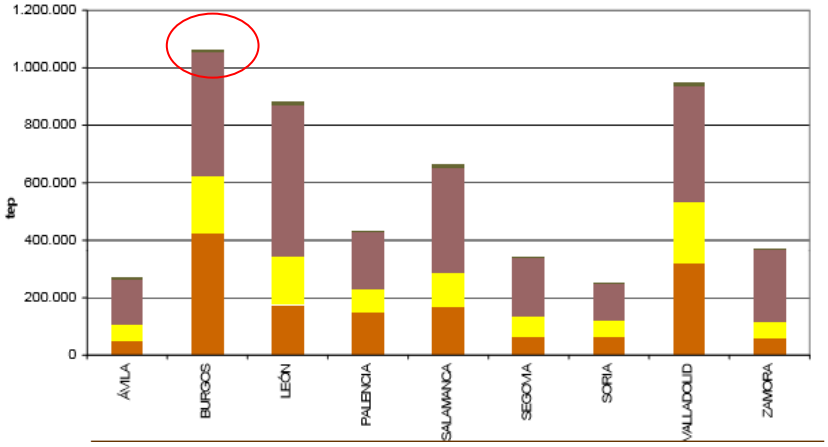
	2009	2015	change
Total General	113,518	105,090	-8,428
A Agriculture, forestry and fishing	10,766	8,259	
B Quarrying	625	443	-182
C Manufacturing	30,737	28,661	-2,076
D Electricity, gas, steam and air conditioning supply	593	558	-35
E Water supply, residues and decontamination	1,009	1,031	22
F Construction	14,939	9,021	-5,918
G Wholesale and retail trade and repair of vehicles	22,014	20,536	-1,478
H Transportation and storage	6,856	6,484	-372
I Accommodation and food service activities	9,865	10,284	419
J Information and communication	1,097	1,036	-61
K Financial and insurance activities	3,214	2,407	-807
L Real estate activities	425	554	129
M Professional, scientific and technical activities	5,076	4,738	-338
N Administrative and support service activities	8,093	8,363	270
O Public administration and defence	6,681	5,785	-896
P Education	6,251	7,973	1,722
Q Human health and social work activities	13,388	14,120	732
R Arts, entertainment and recreation	1,467	1,620	153
S Other service activities	4,078	3,779	-299
T Activities of households as employers	2,018	3,286	1,268
U Activities of extraterritorial organisations and bodies	0	0	0

2 Energy strategy, energy consumption and regional renewable energies

2.1 Regional highlights and challenges

Nowadays, Burgos is the province with the maximum consumption of energy in the region.

Figure 2.1: Final energy consumption (2014)



Due to the increasing energy needs, the external energy dependence in the UE and the environmental commitments of public bodies, Burgos Province Government promoted the creation of this Agency in 2003. *The purpose of this initiative was to establish a new culture in energy consumption, saving and promotion of RES.*

Currently four people are working in Burgos Provincial Energy Agency to fulfill the following objectives:

- Increase of the public awareness about the energy sources shortage and their rational and compatible with economical and environmental issues use.
- Promotion of Renewable Energies.
- Development of saving energy policies and promotion of the rational use of energy.

The main activities and services of Burgos Provincial Energy Agency are:

- Execution of structural actions aimed at the sustainable development of the Province (evaluation and analysis of the Province energy structure, assessment of the potential renewable sources, study of the availability of biomass in the province of Burgos, searching of investors in renewable energy sector, etc.)
- Training, diffusion and promotion activities: informative campaigns, good practices manuals, mass media, conferences, courses, workshops, spreading of the regulation and technological innovations in the fields of energy and environment, etc.
- Technical advising in RES and RUE technologies.
- Information to the public sector, companies and citizens in general about financing programs, economical incentives and subventions.
- Institutional support in order to work as the intermediaries between public organizations and the energy market actors and develop national and international contacts to promote the exchanges of information and energy technology.

- Development of European projects in different sectors (RES, energy efficiency, transport, biofuels, biomass, etc) and under different European Programmes.

Since 2003 Burgos province has got next achieves:

- Data collection of: potencial of biomass in the province, energy companies working in this field, energy balance and observatory of the renewables energies.
- Renewable installations property of Burgos Provincial Goverment: six solar thermal installations (1,728 MWh/year) and two photovoltaic installations (30 kW and 21 kW)
- Measures of efficiency energy in properties of Burgos Provincial Goverment: energy savings achieved (479,552 kWh)
- 35 infodays about different items of energy with more than 1500 people reached.
- 2 exhibitions, 2 trade fairs and 6 attendance at Expobiomasa fair as exhibitor, total amount 114,920 people reached..
- Different works with more than 3,500 students
- 9 European projects with an amount budget of € 1,318,885.
- Energy efficiency measures in municipalities achieving energy savings of more than 45M kWh with a budget of € 7,852,440.11.

2.2 Energy strategy of the region

Being conscious of the importance of implementing politics about sustainable development, Burgos Provincial Government developed in 2010 the Strategic Plan Burgos Rural. This plan covers not only energy field but also an integral plan to achieve an integral and sustainable province.

Within this global Plan there is a chapter dedicated only to energy, named “Energy, the way for a sustainable development”.

Main objectives of this chapter are:

(1) To develop concrete measures to optimize energy consumptions to get a more competitive province.

(2) To develop energy potential in renewable energy specially in biomass.

These objectives will be developed across two strategic lines: working with public sector and private sector.

Referring to public sector, Burgos Provincial Government has developed an ambitious plan. This plan is about to substitute street lighting in all the municipalities by LED street lighting. In the chapter 6 of this report we will give more details about it.

On the other hand, in private sector, Burgos Provincial Government works on generating a network of companies committed to energy savings. Moreover, it develops a programme to make energy audits in companies with a very high level of energy saving potential.

This programme counts with a budget of € 11 million.

2.3 Regional and local energy infrastructure

Investments in electricity and natural gas infrastructure are obligatory and follow a national infrastructure investment plan. The plan concerns the regulated section of the electricity and natural gas market, and therefore includes transmission networks, LNG facilities and oil and gas storage facilities.

The plan is prepared by the government in consultation with industry, transmission system operators (TSOs) and regulators, and is based on energy consumption and intensity projections. The plan also supports the government's quantitative goals for energy saving, efficiency and renewable energy. The plan for 2008-16 was definitively suspended in 2012, because the economic crisis had rendered the projections and assumptions outdated. A new Electricity Plan for 2015-20 is in preparation and would include updated projections for the planning period.

In Burgos, all municipalities have access to electricity infrastructure. But, only in some municipalities we have access to the natural gas infrastructure,

- Burgos
- Aranda de Duero
- Lerma
- Miranda de Ebro
- Salas de los Infantes
- Villarcayo

In the rest, heating demand is covered by gasoil, propane and biomass. Nowadays, there are 2 big biomass infrastructures, one in Burgos, in an industrial area and other in a small village, named Villadiego.

2.4 Patterns of energy consumption

Burgos Province has a complete energy-mix. It includes energies from renewable and from no renewable sectors.

In next data tables you can see energy consumption by sectors from 2006-2014.

Table 2.1: Resume of energy balance: TOTAL

** (Unit TOE)	2006	2007	2008	2009	2010	2011	2012	2013	2014
Oil									
Primary	5,397.00	5,529.00	6,482.00	9,381.00	4,682.00	7,329.00	7,084.00	4,996.00	5,109.00
Importation	695,023.00	710,957.00	653,955.00	655,762.00	663,599.00	619,039.00	591,034.00	484,647.88	473,120.00
Final use	692,226.00	707,698.00	655,887.00	646,241.00	660,157.00	609,694.00	573,511.00	470,124.88	465,233.82
Cogeneration	8,194.00	8,788.00	4,550.00	9,521.00	8,124.00	16,674.00	17,523.00	14,523.00	12,995.18
Gas									
Importation	555,160.00	610,956.00	583,059.00	555,350.00	588,030.00	552,748.00	551,679.00	510,203.17	424,284.87
Cogeneration	215,060.00	374,152.00	270,987.00	337,581.00	344,716.00	313,691.00	187,680.00	152,423.14	116,695.16
Final use	340,100.00	236,804.00	312,072.00	217,769.00	243,314.00	239,056.00	363,999.00	357,780.03	307,589.71
Electrical energy produced by cogeneration	80,758.00	90,632.00	96,653.00	67,697.00	67,832.00	77,329.00	85,684.00	74,144.99	55,081.04
Nuclear	3,842,320.00	3,482,287.00	4,020,950.00	3,579,849.00	329,996.53	322,288.00	333,653.00	0.00	0.00
Hydraulic	801,802.00	1,063,656.00	69,302.00	86,428.00	9,877.44	6,328.00	5,866.00	6,849.21	7,768.00
Wind power	1,291,988.00	1,567,867.00	1,577,960.00	2,506,129.00	237,184.22	268,644.00	340,569.00	386,596.66	363,934.00
Solar photovoltaic power	2,204.00	3,324.00	13,300.00	28,652.00	2,567.44	3,058.00	3,469.00	3,794.84	3,917.00
Electrical energy produced	591,453.00	616,791.00	585,263.00	600,989.00	647,408.00	677,646.00	769,245.00	471,385.69	430,700.04
Final use	182,427.00	194,853.00	265,566.00	187,033.00	208,016.00	250,935.00	333,331.00	300,857.08	299,905.00
Exportation	409,026.00	421,938.00	319,697.00	413,956.00	439,392.00	426,711.00	435,914.00	170,528.61	130,795.04
Final consumption	1,214,753.00	1,276,703.00	1,192,440.00	1,170,855.00	1,212,889.00	1,174,320.00	1,270,841.00	1,128,761.99	1,072,727.00
Consumption									
Service + household + primary sector	331,222.00	356,633.70	328,234.00	310,279.00	335,685.00				
industry	387,469.00	419,644.30	390,101.00	391,253.00	400,056.00				
transport	496,061.00	500,425.00	474,105.00	469,323.00	477,148.00				
Services + primary + industry						591,902.00	678,383.00	591,400.17	508,274.71
Households						129,605.00	127,854.00	127,843.13	113,520.09
Transport						452,813.00	464,604.00	406,325.00	416,039.00

Table 2.2: Resume energy balance: per capita

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Inhabitants	363,874	365,972	373,672	375,563	374,826	375,657	374,970	371,248	366,900
Oil									
Primary	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.01	0.01
Importation	1.91	1.94	1.75	1.75	1.77	1.65	1.58	1.31	1.29
Final use	1.90	1.93	1.76	1.72	1.76	1.62	1.53	1.27	1.27
Cogeneration	0.02	0.02	0.01	0.03	0.02	0.04	0.05	0.04	0.04
Gas	-	-	-	-	-	-	-	-	-
Importation	1.53	1.67	1.56	1.48	1.57	1.47	1.47	1.37	1.16
Cogeneration	0.59	1.02	0.73	0.90	0.92	0.84	0.50	0.41	0.32
Final use	0.93	0.65	0.84	0.58	0.65	0.64	0.97	0.96	0.84
Electrical energy produced by cogeneration	0.22	0.25	0.26	0.18	0.18	0.21	0.23	0.20	0.15
Nuclear	10.56	9.52	10.76	9.53	0.88	0.86	0.89	-	-
Hydraulic	2.20	2.91	0.19	0.23	0.03	0.02	0.02	0.02	0.02
Wind power	3.55	4.28	4.22	6.67	0.63	0.72	0.91	1.04	0.99
Solar photovoltaic power	0.01	0.01	0.04	0.08	0.01	0.01	0.01	0.01	0.01
Electrical energy produced	1.63	1.69	1.57	1.60	1.73	1.80	2.05	1.27	1.17
Final use	0.50	0.53	0.71	0.50	0.55	0.67	0.89	0.81	0.82
Exportation	1.12	1.15	0.86	1.10	1.17	1.14	1.16	0.46	0.36
Final consumption	3.34	3.49	3.19	3.12	3.24	3.13	3.39	3.04	2.92
Consumption	-	-	-	-	-	-	-	-	-
Service + household + primary sector	0.91	0.97	0.88	0.83	0.90	-	-	-	-
Industry	1.06	1.15	1.04	1.04	1.07	-	-	-	-
Transport	1.36	1.37	1.27	1.25	1.27	-	-	-	-
Services + primary + industry						1.58	1.81	1.59	1.39
Households						0.35	0.34	0.34	0.31
Transport						1.21	1.24	1.09	1.13

2.5 Regional potential of renewable energy

As you can see in the last chapter in the energy balances our province has potential in different renewable energies.

One of the main potential in our province is use of biomass. In that case we have a special study in which we have next conclusions.

The present study provides data on the annual use of the different pine and hardwood products, taking into account the physical and legal accessibility, as well as the silvicultural models applied in the forest masses. With this information, the analysis of different market niches is facilitated considering only the forest products most appropriate for the business to be studied.

The supply of forest use only usable for energy use, discards the biomass of crushing of species and thick branches, since they are currently used by the board industry.

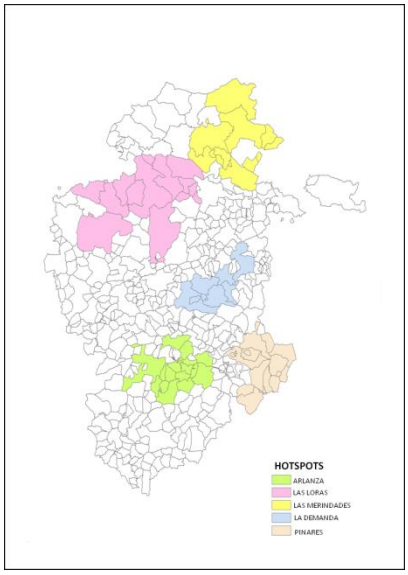
Burgos is the second province of Castilla y León that offers a greater supply of forest biomass for energy uses.

Considering the data obtained in analyzes of forest biomass availability, the cost study carried out and the spatial distribution of the areas with the highest amounts of available biomass at the lowest prices, the areas with the highest probability of developing biomass business with their corresponding hotspots are:

- Zona Urbión: Quintanar de la Sierra
- Sierra de la Demanda area: Villasur de Herreros
- East Zone of Las Merindades: Valley of Losa
- West Zone of the Merindades: Valley of Sedano
- Burgos Area Center: Nebreda

The potential of the forest resource in the province of Burgos, depending on its final energy use, is 570,669 MWh in electrical applications, or 2,054,409 MWht in thermal applications.

Figure 2.2: Most probable biomass business developing areas and their hotspots



2.6 Use of renewable energy in the region

In chapter 2.4 you can see inputs from renewable energies. As you can observe there are production from all renewable energies and it increases year by year. This reflects the importance of our local policies in the evolution of renewable energies.

3 Governance and important regional policies

3.1 Regional governance system

Spain's Ministry of Industry, Energy and Tourism leads energy policy formulation. Within the ministry, the responsible body is the State Secretariat for Energy whose main responsibilities include:

- Issuing regulations concerning energy and mining matters.
- Legislation on the tariff structure, prices of energy products, and levies and tolls.
- Legislation to save energy, promote renewable energy and support new energy and mining technologies.
- Legislation and, if needed, adoption of measures to ensure energy supply.

The autonomous regions have legal competences related to energy, primarily in authorizing power plants of less than 50 megawatts (MW), that is most renewable energy facilities, and distribution networks of electricity and natural gas. They are also strongly involved in designing and implementing climate change, energy efficiency and renewable energy policies at the regional level.

But, in province level, Burgos has not any legal competences in energy. Main activity is to promote installations with exemplary character. Local authorities of Municipalities manage and coordinate public services for citizens. They only have capacity to approve municipal regulations in order with national level.

In Burgos province, Municipalities need to be actively involved in the development of Local Energy Action Plans, contributing to reach the targets set by the European Union, 20% reduction in greenhouse gas emissions, 20% of energy savings compared to projections, and a share of 20% of renewable energies by 2020.

There are other target groups and key actor with some influence in Burgos Province. The main paper of these groups is to develop exemplary actions in coordination with local institutions. Some of these groups are: development Agencies and Centres, business associations, SMEs and citizens.

These groups can support the introduction of good energy management practices, advocate the concept of sustainability. They operate impartially on both energy demand and supply issues. They reflect local situations, economic and social circumstances and the geographical size of the relevant local area. So, they are keys in the dissemination of the energy projects and they have a role of promotion energy savings. Furthermore, along the time they receive a continuous feedback about the different implemented projects.

3.2 Involvement of private sector partners

Private sector in Burgos province are aware of the importance of invest in systems relation with energy saving. But the economic crisis backed away these actions.

Burgos Provincial Energy Agency has participated in some European projects which treat to involucrate private sectors and to overcome those barriers generated by economic crisis.

The projects are:

1. PROBIO – PROBIO Project (Intelligent Energy Programme 2005) was coordinated by Burgos Provincial Energy Agency and focused on encouraging the integration between production and consumption in the biodiesel supply chain in European countries. Different local partners (mainly energy agencies, local administrations and universities) of the provinces of Burgos, Ávila and Huelva (Spain) and the regions of Pomurje (Slovenia) and Abruzzo (Italy) were developing the Project. The promotion of the biodiesel supply chain in these areas was being achieved by means of a three-pronged strategy, based on the development of concrete new market initiatives on the local level, promotion/dissemination and training actions.

Although there were several initiatives to establish biodiesel plants in the participating provinces, it was important to face the weaknesses of the biodiesel of supply chain. The main barriers this project focuses on were the lack of knowledge and information among farmers (which means a lack of raw material supply for biodiesel plants) and the lack of general public awareness about biodiesel use in transport sector.

The main goals of the project were achieved carried out different activities and tasks which follow these lines of work:

- Improvement of raw material supply availability to the biodiesel plants (studies about energy crops in participant regions and promotion of these studies between farmers, promotion of waste-oil recycling between citizens, etc.)
- Supporting training initiatives for farmers (theory and practice courses)
- New market initiatives concerning biodiesel use (commercial agreements among the local actors of the biodiesel supply chain: public administrations, producers, distributors and potential consumers)
- Specific legal measures to facilitate the introduction of biodiesel in local markets (tax cuts, motions, local ordinances, etc.)
- Promotion of the final use of biodiesel among general public and specific sectors related to transport (exhibitions, promotional material, points card systems, etc.)

The expected result was a sensible increase of the energy crops, as well as and an increase in the consumption of biodiesel up to a 4-5% in 2010.

2. RESINBUIL – RESINBUIL Project (Intelligent Energy Programme 2004) was coordinated by Burgos Provincial Energy Agency and focuses on encouraging the introduction of small scale renewable energies in building sector. Energy agencies, universities and installers from the provinces of Burgos (Spain), Trapani (Italy, Harghita (Romania) and Pomurje (Slovenia) carried out diverse activities within the project from January 2006 to February 2008. The project achieved really good results by means of the implementation of three-pronged strategy

based on training, promotion and developing of new market and legislative initiatives in the participating regions.

The participating Agencies worked during the first semester of the project, showing an insight into the rate of use of the small scale RES appliances in the participating regions, along with the study of the barriers stopping a higher rate of use of these appliances. During the second semester of the project, RESINBUIL Consortium established a strategy based on the results obtained in both studies. Partners elaborated drafts in order to update and/or modify legal ordinances in their regions. Partners held meetings with City Councils representatives and key actors involved in order to enact the new ordinances with good results despite of the slowness of Public Administration to enact new regulations. Commercial agreements for the favourable purchase and/or instalment of RES in buildings were created and Agencies acted like intermediaries between banks and installers.

The promotion of RES in buildings started by means of the creation of the RESINBUIL Web site. Other promotional actions were launched such as the publication of semester bulletins and info-booklets, conferences and congress appearances and a four-month awareness campaign in mass media in Pomurje, Harghita and Burgos. It is remarkable, the creation of permanent small RES applications exhibits, with more than 2,000 visitors. Other successful action carried out within the project RESINBUIL was the Workshops celebrated in Pomurje, Harghita and Burgos, which had a high participation and very good quality of speakers.

Regarding to the training initiatives, the University of Burgos carried out a MA attendance course about RES appliances in buildings in 2006, the full duration of the course was nine months and it was a successful experience. Using approximately the same contents, the University of Burgos carried out an online course, which was developed without problems in the participating countries. There were 31 students registered in the online course.

3. BIOBUSINESS – BIOBUSINESS Project (Intelligent Energy Programme 2005 is a project coordinated by CEEI – Burgos (Spain), in which Burgos Provincial Energy Agency participated as partner in the province of Burgos. The consortium is formed by Business Incubator Centres and Energy and Development Agencies from Finland, Germany, Slovenia, Hungary and Spain.

The main objectives of the project, which started on December 2006 and its duration is 30 months, are:

- Promotion of entrepreneurship in biomass related sector, covering the whole chain.
- Promotion of SMEs development by fostering biomass related activities among existing biomass companies from other different sectors.
- New market and business opportunities in biomass chain.
- Establishment of the adequate legislative framework and corresponding instruments (ordinances, tax cuts...) for biomass initiatives.
- Promotion of technology transfer opportunities in biomass related sector.
- Economical development, employment and environmental benefits for the communities.

4. MOBI-NET – Mobi-NET Project "Mobility Centres Network" (Intelligent Energy 2005), developed under the Intelligent Energy funding programme since January 2007, aims to create a European Network of know-how on sustainable mobility. The project is based on the setting up of "Mobility Centres" with the objectives of approaching the public by establishing publicly accessible Info Points and addressing Companies (industries and services), schools and other local actors with activities and mobility management services offered by the Info Points.

Mobi-NET works on a local and on an international level, so to ensure coordinated planning of common local actions, customized local implementation and collect and analyze (at international level) the outcomes of the action implementation, to feed re-engineering of the same. The different partners of the project (mainly energy and development agencies and local administrations) have created different mobility centres in the cities of Biella (Italy), Evora (Portugal), Eskilstuna (Sweden), Thessalonica (Greece), Mieres (Spain), Aranda de Duero (Spain) and Miranda de Ebro (Spain). Burgos Provincial Energy Agency is in charge of the mobility centres of Aranda de Duero and Miranda de Ebro, running the Info Point offices in these two cities and working with the local actors in the development of activities to promote sustainable mobility at local level.

The project is expected to achieve different positive results in the participant cities: an effective involvement of the local actors, local mobility plans approved, implementation of the actions resulting from these mobility plans, an increase in the number of people with durable changes in their "mobility behavior", the development of Info Points as local mobility information offices, and a decrease in local mobility problems in general (emissions, noises, traffic jams, etc).

5. HYDROSOLAR 21 – Burgos Provincial Energy Agency participates in Hydro Solar 21 Project, which is the only project in the Spanish region of Castilla y León that was approved by the European Commission under the "LIFE-Environment 2004" funding programme.

The main objective of this demonstrative project is to achieve buildings energy self-supplying with environmental criteria. In this sense, the different partners of the project are refurbishing in Burgos a demonstrative building in which the project incorporates an adsorption-solar solar-cooling system and an automatic electric lighting system based on the combustion of wind and photovoltaically-generated hydrogen in a fuel cell. The development of this integrated system will obtain a zero-emissions renewable energy supply system for buildings.

Burgos Provincial Energy Agency is in charge of the promotion and dissemination activities of the Project and the obtaining of the different legal licenses and authorisations. The project, which started in December 2005, is coordinated by Burgos Strategic Plan Association and the rest of the partners are Burgos City Council, University of Burgos, Technological Institute of Castilla y León, the Construction Institute of Castilla y León and the European Business Innovation Centre of Burgos.

6. FOREST- IEE2010, FOsteRing Efficient long term Supply partnerships. (2010-2012) Burgos Provincial Energy Agency participated as partner in this project. FOREST's objective is to work directly with bio-businesses in this supply chain to develop and consolidate long term supply chain partnerships that will give the end user confidence in the total bio-heat system and encourage investment from larger non-domestic heat users.

The project was carried out by business support agencies from 7 regions in Austria, Ireland, Italy, Poland, Spain, Sweden and the United Kingdom. This allows the exchange of experience from businesses in more developed markets to those in less developed markets. It aims to work across the whole supply chain covering everything from the supply of the fuel to the installation and maintenance of the boiler systems. The focus is on non-domestic applications from 100 kW to 1 MW as well as small to medium scale CHP and district heating up to 10MW. The biomass fuels covered will be pellet and wood chip from all sources including forestry, arboricultural arisings, waste wood and energy crops.

The work to develop the supply chains will consist of three main types of activities:

(1) The development of a best practice toolkit focused on supply chain business models. It will also cover efficient and effective specification and design of bio-heat systems including both plant and fuel supply.
(2) Business to Business networking across a wide range of businesses to allow the exchange of knowledge between businesses in the supply chain and their clients. This will facilitate the development of new and more integrated supply chain partnerships.
(3) Building capacity in the supply chain directly through tailored advice to individual businesses. The aim is to develop new supply chain partnerships, consolidate existing partnerships and to improve reliability and confidence across the whole supply chain.
(4) These main tasks will be supported by a comprehensive communication strategy, including a project website providing on-line access to all the tools and services developed.

7. POLI-BIOMASS, Sub-project INTERREG IVC, Development of local policies among local governments that encourage the use of biomass. (2010-2012) Burgos Provincial Energy Agency has coordinated this project. The main objective of the project is to promote concrete, measurable and achievable policies across "MICRO-LOCAL ACTION PLANS FOR BIOMASS IN LOCAL AREAS". With this objective will be achieved following cross-cutting objectives:

- Promote financing lines and subsidies (fees, taxes, ...)
- To promote among the local authorities to assess positively the use of biomass in new tenders
- Raising awareness and train local technicians in the field of biomass
- Build a network of exemplary municipalities in the use of biomass

These projects *generated important energy efficiency awareness among private sector in our province.*

One *common barrier* is the fault of investment plans which includes budget for energy efficiency measures. This makes impossible to consider this item as a key for development private sector.

Moreover, *Regional Energy Agency of Castilla y León (EREN),* our supra-regional area, had different subsidies for private sector. These subsidies focused in implementing energy efficiency measures. Subsidies financed from 30% to 50% of the investment in energy field. These subsidies lasted from 2006 to 2013, getting more than € 35 million in investments in private sector in energy efficiency measures. Nowadays there is open a new line of financing measures in small and medium private enterprises (SMEs). This line counts with a budget of € 1 million, and it pretends to generate a movement of € 5 million in investments.

3.3 Regional policies

Our Province has an important and ambitious plan, Strategic Plan Burgos Rural. This plan used data from the *"Rural Development in the EU Statistical and Economic Information Report 2013".* First plan was developed from 2010 to 2015. Nowadays it is running the second plan, Strategic Plan Burgos Rural 2015-2020, named PEBUR 1520.

This plan is carry out by SODEBUR. SODEBUR is the Society for the Development of the Province of Burgos (Spain) which works to promote social and economical development of the Province. SODEBUR is a public company with 100% funding from the Provincial Government.

SODEBUR was created aiming to give service to the province and its municipalities. Its main government body is the General Committee. It is formed by all the elected representatives of the Province Government. On these grounds, SODEBUR has the possibility of implementing the different policies approved by its General Committee.

SODEBUR's Board of Directors is formed by relevant local agents in the main social and economic areas of the province. This composition provides to the entity a major dynamism and a better aptitude to mobilize to all provincial implied agents.

Some of implied target groups are:

- Burgos' Chamber of Trade, it reaches out to enterprises at the regional level.
- Federation of Burgos' Business Associations, acts as representatives of their members, articulate needs & requirements for improved innovation capacity.
- University of Burgos, Provide expertise, data information and knowledge on innovation transfer to the development of different projects.
- European Centre of Enterprises and Innovation (CEEI), Provide expertise, data information and knowledge on innovation transfer to the development of different projects.
- Main financial entities established in the province, they provide feedback and imputs on the financial support instruments.
- Provincial Association of Selfemployees, it reaches out to enterprises at the regional level.

This plan PEBUR 1520 is based in two axes:

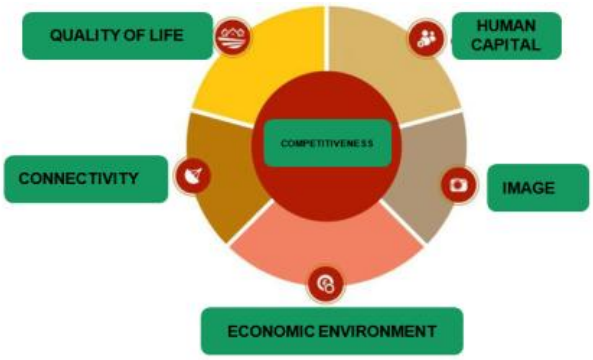
- Sustainability in the territory, looking for the correct balance among economic, social and environmental aspects.
- Active involvement of stakeholders

PEBUR1520 is based on the next four aspects:

Figure 3.1: PEPUR1520's aspects

This idea is reflected in five axes of work, you can see it in the next figure:

Figure 3.2: PEBUR1520's axes of work



These five programmes (quality of life, human capital, connectivity, image and economic environment) are divided in 25 specific projects. Within the economic environment there is a *specific project dedicated to energy.* This project is named *"Energy, a key for sustainable development".*

Main objectives of this project are:

(1) To develop concrete measures to optimize energy consumptions to get a more competitive province.

(2) To develop energy potential in renewable energy specially in biomass.

These objectives will be developed across two strategic lines: working with public sector and private sector.

Referring to public sector, Burgos Provincial Government has developed an ambitious plan. This plan is about to substitute street lighting in all the municipalities by LED street lighting. In the chapter 6 of this report we will give more details about it.

On the other hand, in private sector, Burgos Provincial Government works on generating a network of companies committed to energy savings. Moreover, it develops a programme to make energy audits in companies with a very high level of energy saving potential.

This project counts with a budget of € 11 million.

Moreover, energy is a transversal objective in the rest of the 24 projects, in all of them there is a premise in which we try to generate a global awareness about an efficiency use of energy among the target groups.

Two main barriers to establish concrete and quantificable objectives are:

- Burgos Provincial Government has not autonomy for establishing laws.
- Burgos Provincial Government has not an specific budget for energy.

For that, AGENBUR and SODEBUR, as important stakeholders, are in charge of developing PEBUR1520 projects.

3.4 Membership in low carbon programs and initiatives

Analysing last data from 2006 to 2015 there is not any municipality or territories involucrate in low carbon programs or initiatives.

Main reason is that our municipalities are so small to develop these plans. But, there are a few of them which had developed some municipal regulations to try to reduce their energy consumption or to improve the use of renewable energies in last years (2015-2017).

These municipalities are:

- Atapuerca, destinated to reduce energy consumption in street lighting and public buildings and to boost the use of biomass among citizens.
- Rubena, destinated to boost the use of biomass among citizens.
- Campolara, destinated to boost the use of biomass among citizens.

4 National and European policy background, complementarity

4.1 Relevant national low carbon policies, interrelation with regional policy

Spain's *Ministry of Industry, Energy and Tourism* leads energy policy formulation. Within the ministry, the responsible body is the *State Secretariat for Energy* whose main responsibilities include:

- Issuing regulations concerning energy and mining matters.
- Legislation on the tariff structure, prices of energy products, and levies and tolls.
- Legislation to save energy, promote renewable energy and support new energy and
- mining technologies.
- Legislation and, if needed, adoption of measures to ensure energy supply.

The ministry is supported by several bodies in the energy sector, including the following:

- The *Institute for Energy Diversification and Saving (IDAE)* does activities to increase public knowledge and awareness, provides technical advice, finances projects of technology innovation with potential for replication. It led in developing the 2004-2012 *Energy Saving and Efficiency Strategy (E4)* and the several subsequent National Energy Efficiency Action Plans.
- The *Strategic Reserves Corporation (CORES)* is the stockholding agency in charge of maintaining stocks of oil products and monitoring industry obligations to hold stocks of oil products, liquefied petroleum gas and natural gas. CORES also verifies the operators' obligation to diversify their natural gas supplies.
- The *Institute for Restructuring and Alternative Development of the Coal Mining Regions (IRMC)* is responsible for specific actions for the coal mining sector, in accordance with the EU legal framework.

In addition, Spain has the following regulators in the energy sector:

- The *National Commission of Markets and Competition (CNMC)* is an independent organisation that ensures fair competition and regulates markets and all productive sectors of the Spanish economy in order to protect consumers. The CNMC was created in 2013 by merging the functions and powers of the Spanish competition authority and sectoral regulators for electronic communications, audio-visual, electricity and natural gas (previously the National Energy Commission, CNE), postal, airports and railways. The aim was to avoid an overlap of competences, to take advantage of the experience and knowledge acquired in the various regulated sectors and to provide an integrated view of the regulatory activity.
- The CNMC is the *national regulatory authority (NRA)* for the gas and electricity sectors. The CNMC is financed from electricity and natural gas tariffs and a levy on the wholesale of oil. It co-ordinates the work of the competition authorities of the autonomous regions. It is completely autonomous and fully independent from the government, the autonomous regions and the market players. In accordance with EU rules on the electricity and natural gas sectors, the CNMC has the power to approve the methodology used for calculating the network access tariffs. The government, in turn, sets the tariffs for network access on the basis of the CNMC methodology. It also approves the CNMC methodology for calculating the charges of the electricity system and sets the level of these charges. System charges are used to cover system costs (including the remuneration for renewable generation).

- The *Nuclear Safety Council (CSN)* is the competent body in matters of nuclear safety and radiation protection. It is directly accountable to the Spanish Parliament, and formally independent from the Administration.

Other relevant ministries and bodies in the energy sector which co-ordinate policies with the Ministry of Industry, Energy and Tourism include:

- The *Ministry of Agriculture, Food and Environment* is responsible for several energy–related policies, such as air pollution and climate change.
- The *Ministry of Economy and Competitiveness* is in charge of Spain's research and development (R&D) policy. It co-ordinates the implementation of the national energy R&D policy with the Ministry of Industry, Energy and Tourism and the Ministry of Public Works and Transport.
- The *Ministry of Public Works and Transport* covers the development of transport infrastructure and is in charge of managing transport demand.

4.2 Complementarity of regional, national and EU low carbon policies

Spanish ratification of the Kyoto Protocol in 2002 implied the commitment of limiting emissions not above 15% regarding 1990's level, in the period 2008-2012. Since then, Climate Change policies are extremely important for Spanish Institutions, both for the Action plan of the Central Government so as for Autonomous Communities (AACC) and Local Entities. Today, Climate Change is a key element that involves the different Spanish sectorial policies.

In order to coordinate Climate Change Policies, the Coordination Committee for Climate Change Policies (CCPCC) was created. This advisory body assures coordination within the Central Administración, Autonomous Communities and Local Authorities, so as with the National Council of Climate (CNC), that is a participation body where besides the Public Administration, Social Agents, Non Governmental Organizations and Researchers also play a significant role. To a lesser extent, the Delegate Government Comission por Climate Change (CDGCC) and the Interministerial Group for Climate Change, coordination body of Climate Change Policies within the different Central Government Administration Departments. Furthermore, to guarantee the involvement of Trade and Labour Unions, some Social Dialogue negotiation Tables have been established in order to elaborate and monitor the National Allocation Plan and the mitigate measures in diffused sectors, relating competitiveness, stability and social cohesion.

In this framework, some planification instruments have been developed, such as the "Urgent Measures Plan", approved in 2007 which includes the "Strategy for Energy Saving and Efficiency in Spain 2008-2012 (PA E4)", the Strategic Lines against Climate Change, established by the CDGCC, and the Plans and Strategies set up by the Autonomous Communities.

In this term of office, the Spanish Government has kept going into Climate Change Policies in depth, setting up the priorities to fulfil the objective of curbing emissions. With this aim was created, in July 2008, the Delegate Government Commission for Climate Change, chaired by the Vice-President of the Government and integrated by the Ministries of Foreign Affaires and

Cooperation, Infrastructures, Education, Health and Social Policies, Industry Tourism and Trade and the Ministry of Environment, Rural and Marine Affaires, Housing, Science and innovation. Moreover, the Government Vice-presidencies and the Secretaries of State for the European Union, Defence, Economy, Treasury and Budgeting, Security, Planification and Infrastructures, Energy, Territorial Cooperation, Climate Change and Research. The objective of the Delegate Government Commission is to reinforce the politic action against climate change through cross cutting measures of the nine ministries involved. Since its first meeting, they have launched a range of urgent measures in the most relevant sectors regarding the need to reduce carbon dioxide emissions, identified such as "The Strategic Lines against Climate Change", six lines with the aim of being accomplished in two years time since July, 2008. The Strategic Lines affect a wide range of sectors such as transports, waste and manure management, residential, energy, forestry and innovation. Within this framework, we could highlight the start up of the "Strategy of Sustainable Mobility", the "National Integrated Waste Management Plan (PNIR)", the "Bio-digestion Plan of Animal Waste", the "Strategy for Energy Saving and Efficiency in the Central Administration buildings" or the works to set up an "Energy Certification System for new and old buildings".

The Spanish Energy Policy is based on three axes; Security supply, competitiveness and sustainability. Besides, some plans are being performed with regard to savings and energy efficiency, renewable energies such as the "Strategy for Energy Savings and Efficiency in Spain 2004-2020" (PER). Regarding Renewable Energies, Spain has the aim to meet at least 12.1% of the total primary energy demand in 2010. In this context, many efforts have been made, which sets Spain as a world reference regarding renewable energies. The investment effort in clean electric generation has been remarkable, both in cogeneration and renewable energies. The cogeneration installed power capacity has increased from 488 MW in 1991 to 6063 MW in 2007. Furthermore, the investment and support given to renewable sources have allowed that around 20% of the electricity generated, that is 7% of primary energy, comes from these renewable sources, which, besides, improves efficiency.

As regards transport, the Strategic Plan for Infrastructure and Transport (PEIT) is being developed. In this framework, a great investment effort is being made on the railway transport, which obtains almost 50% of the total investment, with the aim of being the key element of the merchandise and passengers transport system. In April, 2009, the "Spanish Strategy for Sustainable Mobility, was adopted, setting up the guidelines and measures regarding land use planning, transport and infrastructures, climate change and reduction of energy dependence, air quality and noise, security and health and demand management, giving special attention to fostering alternatives to private vehicles and the use of more efficient and sustainable ways of transport.

The main measures in the residential, commercial and institutional sectors are related to the normative preparation and regulation process to obtain more efficiency and energetic savings in buildings. Among those rules it has to be emphasised those linked with the approval of the

Technical Code for Building (Real Decreto 314/200), which sets the duty to include energy efficiency criteria and the use of solar, both thermal and photovoltaic energy in those new buildings or those which are being restored. Moreover, the new Regulation for Thermal Installations of Buildings, approved in July, 2007 and the Energetic Certification of Buildings (Real Decreto 47/2007), with a major target of improving energy efficiency in both, new and existing houses. In this sense, refurbishment and renovation works aimed to increase insulation, the use of renewable energy and increase efficiency on hot water systems and boilers, as well as high energy efficiency new subsidised housing, are prioritised in the implementation of the Plan. Moreover, in terms of the Housing Plan, the State Housing and Restoring Plan, approved in December, 2008 includes as one of its main axes, to improve energy efficiency in both, new and existing houses. In this sense, refurbishment and renovation works aimed to increase insulation, the use of renewable energy and increase efficiency on hot water systems and boilers, as well as high energy efficiency new subsidised housing, are prioritised in the implementation of the Plan.

On other hand, Spain keeps an active policy on forestry, inspired in the basic principle of sustainable forest system. It is framed by the Spanish Forestry Plan, and includes actions to increase carbon dioxide absorption in Spanish Forests, like reforestation, agricultural lands forestation and Hydrologic-Forest restoration. In terms of Research, Development and Innovation, it is highlighted the Strategic Action of Energy and Climate Change included in the 2008-2011 National Plan for Research, Development and Innovation. This strategy concentrates the main environmental objectives and the start up of the Research Institute of Climate Change in Zaragoza, as the cornerstone of a network of Excellence Centres, with the aim of fostering the existing Spanish know-how and the promotion within Germany and Denmark of the International Agency of Renewables Energies (IRENA), which is main objective is to support, promote and spread the use of renewable energies globally, to adequate the energetic system to the current challenges raise by climate change.

Many of the Mitigation policies and measures in diffuse sectors named at a state level are developed by the Autonomous Communities, which adapt the design and the implementation to the particular circumstances of each region and also may include additional measures. To be able to carry out these policies and measures, most AACC, have established strategies or action plans and have set up the necessary structure in their own administration to guarantee the implementation of these measures. The Autonomous Communities have assumed shared responsibility for the aim to fulfil national objectives and have set up a commitment to reduce emissions, most of them keeping national objectives as established in the National Allocation Plan (2008-2012).

Furthermore, Local Entities are also working to warn about Climate Change and adapt to its effects. Part of these activities are developed on a network framework, such as the Spanish Network of Cities for Climate Change (RECC), made up by Local Entities which are integrating the protection of climate in their municipal policies. This network was created in June,

2005, as a result of a collaboration agreement between the Spanish Federation of Provinces and Municipalities and the Ministry of Environment, in order to take advantage from the synergies and economies of scale due to the common methodologies and experiences.

Included in the cooperation strategy, on the one hand, there have been signed Memorandums of Understanding (MoU) with countries for the promotion of the Clean Development Mechanism. On the other hand, in order to obtain the necessary allowances on the international markets, the Spanish Government has signed various commitments related to Carbon Funds with different Financial Multilateral Institutions with the aim of acquiring carbon credits in the international markets coming from projects based in the Clean Development Mechanism (CDM). (Spanish Carbon Fund, Bio-Carbon Fund, Community Developing Fund, from the World Bank, Latin America Carbon Iniciative from the Andean Development Corporation, Multilateral Carbon-credit Fund from the European Investment Bank-European Bank for Reconstruction and Development). Moreover, since 2008, Spain takes part in funds addressed to acquiring post-2012 credits such as the Carbon Partnership Facility (CPF) and the Forest Carbon Partnership Facility, (FCPF) from the World Bank.

In this field, the Spanish General Administration also promotes the development of Green Investment Schemes, linked to buying and selling AAUs (Asigned Amount Units), according to the 17th Article of the Kyoto Protocol.

According to the adaptation measures, the Spanish Climate Change Bureau, trying to compile and review the studies related to climate changes impacts assessment, has promoted the carrying the ECCE project (Climate Change Effects in Spain). It was developed by a group of experts in different ecological systems, and economic and social sectors, whose main conclusions were published in an independent report called “Main conclusions of the Preliminary General Assessment of the Impacts in Spain due to the Effects of Climate Change”. After the publications of this report, the National Climate Change Adaptation Plan was set up, as a general framework for all the climatic evaluations, vulnerability assessment and adaptation measures in Spain. This plan has been launched with the aim of supporting all those administrations, private or public organizations, interested in evaluating climate change impacts in all sector and systems of their concern. Not only, providing the necessary knowledge and tools but promoting participation in all process which may improve as well.

The plan is developed through different work programs which include the main characteristics of the activities and impact evaluation, vulnerability and adaptation projects. The second Work Program has recently been approved for a 4 year period. This program follows the detailed studies already started and will also introduce new evaluation impact, vulnerability and adaptation lines to climate change in all those sectors included in the first program (coasts, water, biodiversity) so as new sectors such as agriculture, tourism, forests and land desertification.

Our region follows the same lines of our country policies, considering biomass and efficient energy as strategic points.

5 The role of cohesion policy for regional low carbon development

The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions.

The ERDF focuses its investments on several key priority areas. This is known as “thematic concentration”:

- Innovation and research;
- The digital agenda;
- Support for small and medium-sized enterprises (SMEs);
- The low-carbon economy.

The ERDF resources allocated to these priorities will depend on the category of region.

- In more developed regions, at least 80% of funds must focus on at least two of these priorities;
- In transition regions, this focus is for 60% of the funds;
- This is 50% in less developed regions.

Furthermore, some ERDF resources must be channelled specifically towards low-carbon economy projects:

- More developed regions: 20%;
- Transition regions: 15%; and
- Less developed regions: 12%.

The operative programme (OP) in our región, Castilla y León, is going to invest € 628.8 million since 2014 to 2020. The measures are structured in six actions:

- Action1: It consists of promoting research, technological development and innovation. It is endowed with € 183.9 million, 29.3% of the total, and its execution will be carried out by the ministries of Economy and Finance and Education.
- Action 2: It consists in improving the use and quality of ICTs and access to them. Consumes 7.8% of the budget of the OP, € 49.4 million, controlled by the Departments of Economy and Finance, Health, Development and Environment and Education.
- Action 3: Its objective is to improve the competitiveness of small and medium-sized enterprises, € 177.9 million of ERDF funds are foreseen, 28.3% of the global figure, it will be managed by the Ministry of Economy and Finance.
- *Action 4: It aims to promote the transition to a low carbon economy in all sectors, for which almost € 59.3 million are contemplated, 9.4%, it will also correspond to the Ministry of Economy and Finance.*
- Action 6: It seeks to protect the environment and promote the efficiency of resources through a € 154.4 million, 24.6% of the total, to which the Departments of Promotion and Environment and Culture and Tourism

There is no more other financial means of cohesion in region dedicates to low carbón development.

6 Good practices and successful approaches

Case study 1. PRIAP Project, dealing by The Society for the Development of the Province of Burgos (SODEBUR)

The Society for the Development of the Province of Burgos (SODEBUR) works to promote social and economical development in the rural areas of this Spanish province. SODEBUR is a public company with 100% funding from the Provincial Government.

The organization is structured in four main areas: Investments and Industrial Engineering, Economical and Social Promotion, Institutional Cooperation and Image and Tourism.

- *Investments and Industrial Engineering.* This department supports to the Provincial Government and all its Town Halls in the development of its installations and industrial projects.
- *Economical and Social Promotion.* It is in charge of the planning and strategic development of the economy and social activities in the province.

In this term, during the year 2015 SODEBUR developed the new strategic plan for the province. This plan contains different actions to be implemented from 2015 to 2020 in order to improve the quality of life of its citizens. There are 25 projects divided in five main axes: image and tourism, economic environment, connectivity, human capital and quality of life.

One of these projects promotes the development of a sustainable territory and the reduction of energy consumption. Below this programme SODEBUR is developing an ambitious project called “Integral Renovation of Provincial Street lighting Project”, PRIAP.

PRIAP is going to change the street lighting into LED system in 256 municipalities in our province.

PRIAP, will have a duration of *36 months,* ending in December 2018 and budget will be up to € 9,325,694.94 by the provincial corporation, and € 8,557,500.00 by municipalities, making a total of *€ 17,883,194.94.*

The project will consist of two phases:

(1) Feasibility studies and projects for the integral renovation of street lighting. This phase has finished.

(2) Public call for subsidies to municipalities with less than 20,000 inhabitants aimed to performance of street lighting renovations.

The main object is to get a reduction of energy consumption the approximately 53 M kwh during the ten years expected for the life of the LED technology, and 21 M kg CO_2 reduced during the same 10 years.

For an overview on the expected achievements per municipality see annex.

Case study 2. Centralized purchased of energy electricity and control of consumption, Burgos Provincial Government

Burgos Provincial Government developed a digital platform for the municipalities to offer them a Centralized Purchased in different services and goods.

One of these products was the energy electricity for the different consumption points of the municipalities.

With this plan we got to reduce the prize in different fares and to supervise the way in which the municipalities use the energy electricity.

Using this big data knowledge Burgos Provincial Government, helped by Burgos Provincial Energy Agency, has proposed to every municipality some options to reduce the energy consumption.

The main results are:

- 235 municipalities added to Centralized Purchased in electricity, (64% of the total)
- 25 M kWh contratacted, which sums a cost of € 7 million approx.
- Average economic saving of 4.85%.

This programme is nowadays opened and new municipalities are adding to it.

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Beatriz García Val, technician in SODEBUR Institution. Date: January 2017.

Santiago Diez Castilla, engineer in Energy Agency of Castilla y Leon, EREN. Date: November 2016.

Rafael Ayuste Cupido, responsible of renewable area in Energy Agency of Castilla y León. Date: January 2017.

Mónica Mediavilla Pascual, technician in juridical assessment to municipalities in Burgos Provincial Government. Date: February-March 2017.

Annex: PRIAP project, expected achievements per municipality

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
1	Aguas Cándidas	62	Bureba	78	17,082	32,001.21	275.52	516.15
2	Aguilar de Bureba	72	Bureba	61	13,359	17,897.11	185.54	248.57
3	Alcocero de Mola	45	Bureba	52	11,388	-	253.07	-
4	Alfoz de Quintanadueñas	1,733	Amaya Camino	521	114,099	230,633.83	65.84	133.08
5	Altable	54	Bureba	56	12,264	16,177.03	227.11	299.57
6	Ameyugo	100	Bureba	48	10,512	18,176.20	105.12	181.76
7	Anguix	155	Ribera	100	21,900	8,516.43	141.29	54.94
8	Arandilla	179	Ribera	96	21,024	40,384.11	117.45	225.61
9	Arauzo de Miel	333	Ribera	256	56,064	104,653.93	168.36	314.28
10	Arauzo de Salce	70	Ribera	47	10,293	19,616.83	147.04	280.24
11	Arauzo de Torre	97	Ribera	100	21,900	42,046.71	225.77	433.47
12	Arcos	901	Arlanza	346	75,774	182,668.30	84.10	202.74
13	Arenillas de Rio Pisuerga	188	Amaya Camino		-	55,000.00	-	292.55
14	Arlanzón	424	Demanda Pinares	309	67,671	167,285.62	159.60	394.54
15	Atapuerca	209	Demanda Pinares	19	4,161	9,323.27	19.91	44.61
16	Ausines (Los)	144	Arlanza	82	17,958	45,237.82	124.71	314.15
17	Balbases (Los)	357	Amaya Camino		-	94,500.00	-	264.71
18	Baños de Valdearados	407	Ribera	234	51,246	65,513.62	125.91	160.97
19	Bañuelos de Bureba	32	Bureba	23	5,037	8,292.96	157.41	259.16
20	Barbadillo del Pez	96	Demanda Pinares	66	14,454	29,481.46	150.56	307.10
21	Barrios de Bureba (Los)	236	Bureba	571	125,049	107,174.54	529.87	454.13
22	Barrios de Colina	68	Demanda Pinares	62	13,578	30,569.10	199.68	449.55
23	Basconcillos del Tozo	341	Amaya Camino	193	42,267	89,193.42	123.95	261.56
24	Bascuñana	50	Bureba	34	7,446	30,094.01	148.92	601.88
25	Belorado	2,190	Bureba	712	155,928	349,139.18	71.20	159.42

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
26	Berberana	73	Merindades	42	9,198	6,537.33	126.00	89.55
27	Bozoó	110	Bureba	83	18,177	27,163.05	165.25	246.94
28	Brazacorta	78	Ribera	50	10,950	22,354.30	140.38	286.59
29	Briviesca	7,776	Bureba	1,656	362,664	461,290.78	46.64	59.32
30	Bugedo	177	Bureba	141	30,879	41,485.46	174.46	234.38
31	Buniel	394	Arlanza	248	54,312	106,687.14	137.85	270.78
32	Busto de Bureba	201	Bureba	202	44,238	42,707.86	220.09	212.48
33	Cabañes de Esgueva	214	Ribera	65	14,235	30,461.51	66.52	142.34
34	Caleruega	494	Ribera	226	49,494	64,199.53	100.19	129.96
35	Campillo de Aranda	196	Ribera	126	27,594	39,015.72	140.79	199.06
36	Campolara	71	Demanda Pinares	56	12,264	34,251.64	172.73	482.42
37	Canicosa de la Sierra	587	Demanda Pinares	236	51,684	100,885.69	88.05	171.87
38	Cantabrana	32	Bureba	38	8,322	16,429.91	260.06	513.43
39	Carcedo de Burgos	291	Arlanza	501	109,719	221,884.17	377.04	762.49
40	Cardeñadijo	1,027	Arlanza	493	107,967	225,922.21	105.13	219.98
41	Cardeñajimeno	851	Arlanza	532	116,508	232,883.00	136.91	273.66
42	Cardeñuela Riopico	127	Arlanza	50	10,950	29,838.76	86.22	234.95
43	Carrias	36	Bureba	15	3,285	5,961.12	91.25	165.59
44	Cascajares de Bureba	45	Bureba	43	9,417	3,074.61	209.27	68.32
45	Castellanos de Castro	56	Amaya Camino		-	13,900.00	-	248.21
46	Castildelgado	60	Bureba	51	11,169	22,876.02	186.15	381.27
47	Castrillo de la Vega	674	Ribera	428	93,732	171,966.12	139.07	255.14
48	Cavia	270	Amaya Camino		-	80,300.00	-	297.41
49	Cayuela	163	Amaya Camino		-	58,300.00	-	357.67
50	Cebrecos	59	Arlanza	33	7,227	16,964.20	122.49	287.53
51	Cerezo de Río Tirón	669	Bureba	215	47,085	90,515.41	70.38	135.30
52	Cerratón de Juarros	62	Bureba	12	2,628	6,831.42	42.39	110.18

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
53	Cillaperlata	35	Merindades	38	8,322	779.85	237.77	22.28
54	Cilleruelo de Abajo	283	Arlanza		-	66,300.00	-	234.28
55	Cilleruelo de Arriba	63	Arlanza	50	10,950	23,937.43	173.81	379.96
56	Ciruelos de Cervera	123	Ribera	120	26,280	55,543.53	213.66	451.57
57	Cogollos	487	Arlanza	285	62,415	126,276.45	128.16	259.29
58	Condado de Treviño	1,399	Bureba	1,127	246,813	346,276.78	176.42	247.52
59	Coruña del Conde	147	Ribera	115	25,185	49,493.89	171.33	336.69
60	Covarrubias	643	Demanda Pinares	41	8,979	28,280.75	13.96	43.98
61	Cubillo del Campo	101	Arlanza	78	17,082	35,498.25	169.13	351.47
62	Cubo de Bureba	120	Bureba	81	17,739	17,060.27	147.83	142.17
63	Cuevas de San Clemente	50	Arlanza	62	13,578	27,933.77	271.56	558.68
64	Encío	45	Bureba	56	12,264	19,262.23	272.53	428.05
65	Espinosa de Cervera	108	Ribera	93	20,367	29,643.64	188.58	274.48
66	Espinosa de los Monteros	2,106	Merindades	549	120,231	175,975.13	57.09	83.56
67	Espinosa del Camino	37	Bureba	42	9,198	18,506.95	248.59	500.19
68	Estépar	754	Amaya Camino		-	244,769.69	-	324.63
69	Fontioso	65	Arlanza	53	11,607	21,444.35	178.57	329.91
70	Frandovínez	110	Amaya Camino		-	34,500.00	-	313.64
71	Fresneda de la Sierra Tirón	126	Demanda Pinares	71	15,549	33,614.86	123.40	266.78
72	Fresneña	114	Bureba	79	17,301	35,477.44	151.76	311.21
73	Fresnillo de las Dueñas	443	Ribera	276	60,444	81,842.63	136.44	184.75
74	Fresno de Rodilla	50	Bureba	32	7,008	15,051.19	140.16	301.02
75	Frías	279	Merindades	362	79,278	126,265.86	284.15	452.57
76	Fuentebureba	53	Bureba	80	17,520	28,558.96	330.57	538.85
77	Fuentecén	257	Ribera	100	21,900	4,457.64	85.21	17.34
78	Fuentelcésped	191	Ribera	146	31,974	62,621.13	167.40	327.86
79	Fuentenebro	174	Ribera	71	15,549	42,351.69	89.36	243.40

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
80	Fuentespina	707	Ribera	359	78,621	155,638.19	111.20	220.14
81	Gallega (La)	75	Demanda Pinares	62	13,578	21,083.71	181.04	281.12
82	Gumiel de Izán	641	Ribera	393	86,067	118,456.57	134.27	184.80
83	Gumiel de Mercado	382	Ribera	151	33,069	56,280.90	86.57	147.33
84	Hontanas	61	Amaya Camino		-	30,000.00	-	491.80
85	Hontangas	124	Ribera	63	13,797	29,395.06	111.27	237.06
86	Hontoria de la Cantera	126	Arlanza	104	22,776	47,967.50	180.76	380.69
87	Hontoria de Valdearados	234	Ribera	136	29,784	33,024.72	127.28	141.13
88	Hornillos del Camino	66	Amaya Camino		-	12,500.00	-	189.39
89	Horra (La)	396	Ribera	196	42,924	63,361.11	108.39	160.00
90	Hortigüela	117	Demanda Pinares	56	12,264	24,494.13	104.82	209.35
91	Hoyales de Roa	245	Ribera	148	32,412	63,129.78	132.29	257.67
92	Huerta de Arriba	154	Demanda Pinares	102	22,338	44,005.52	145.05	285.75
93	Huerta de Rey	1,136	Ribera	437	95,703	197,997.94	84.25	174.29
94	Humada	158	Amaya Camino	36	7,884	27,934.84	49.90	176.80
95	Ibeas de Juarros	1,323	Demanda Pinares	435	95,265	193,978.68	72.01	146.62
96	Ibrillos	82	Bureba	43	9,417	19,491.84	114.84	237.71
97	Iglesias	144	Amaya Camino		-	29,000.00	-	201.39
98	Isar	386	Amaya Camino		-	95,141.25	-	246.48
99	Itero del Castillo	104	Amaya Camino		-	30,000.00	-	288.46
100	Jaramillo de la Fuente	40	Demanda Pinares	59	12,921	35,619.13	323.03	890.48
101	Junta de Traslaloma	176	Merindades	126	27,594	-	156.78	-
102	Junta de Villalba de Losa	118	Merindades	56	12,264	13,908.02	103.93	117.86
103	Jurisdicción de Lara	53	Demanda Pinares	54	11,826	30,640.73	223.13	578.13
104	Jurisdicción de San Zadornil	102	Merindades	149	32,631	44,920.90	319.91	440.40
105	Lerma	2,808	Arlanza		-	192,571.54	-	68.58
106	Llano de Bureba	73	Bureba	44	9,636	17,927.86	132.00	245.59

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
107	Madrigal del Monte	196	Arlanza	75	16,425	34,481.32	83.80	175.93
108	Madrigalejo del Monte	194	Arlanza	146	31,974	67,060.77	164.81	345.67
109	Mahamud	151	Arlanza		-	44,400.00	-	294.04
110	Mambrillas de Lara	60	Demanda Pinares	71	15,549	36,880.73	259.15	614.68
111	Mamolar	52	Demanda Pinares	34	7,446	11,681.19	143.19	224.64
112	Manciles	32	Amaya Camino	16	3,504	11,130.53	109.50	347.83
113	Mazuela	74	Arlanza		-	-	-	-
114	Mecerreyes	283	Arlanza	102	22,338	60,494.56	78.93	213.76
115	Medina de Pomar	6,212	Merindades	4,155	909,945	1,214,825.74	146.48	195.56
116	Melgar de Fernamental	1,898	Amaya Camino		-	371,504.32	-	195.73
117	Merindad de Cuesta-Urria	463	Merindades	338	74,022	123,273.29	159.87	266.25
118	Merindad de Montija	866	Merindades	585	128,115	193,013.15	147.94	222.88
119	Merindad de Río Ubierna	1,391	Bureba	811	177,609	383,331.29	127.68	275.58
120	Merindad de Sotoscueva	495	Merindades	742	162,498	236,483.58	328.28	477.74
121	Merindad de Valdeporres	472	Merindades	583	127,677	185,552.40	270.50	393.12
122	Merindad de Valdivielso	451	Merindades	407	89,133	146,519.40	197.63	324.88
123	Milagros	498	Ribera	315	68,985	138,259.20	138.52	277.63
124	Miraveche	93	Bureba	115	25,185	29,085.74	270.81	312.75
125	Modúbar de la Emparedada	392	Arlanza	189	41,391	92,734.15	105.59	236.57
126	Monasterio de la Sierra	46	Demanda Pinares	32	7,008	9,516.08	152.35	206.87
127	Monasterio de Rodilla	214	Bureba	37	8,103	21,664.32	37.86	101.24
128	Nebreda	85	Arlanza	59	12,921	35,668.50	152.01	419.63
129	Neila	212	Demanda Pinares	192	42,048	68,795.41	198.34	324.51
130	Olmillos de Muñó	43	Arlanza		-	1,416.00	-	32.93
131	Oña	1,301	Merindades	699	153,081	212,759.40	117.66	163.54
132	Oquillas	63	Ribera	47	10,293	15,801.46	163.38	250.82
133	Orbaneja Riopico	168	Arlanza	34	7,446	19,132.25	44.32	113.88

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
134	Padilla de Abajo	86	Amaya Camino	51	11,169	26,024.00	129.87	302.60
135	Padilla de Arriba	87	Amaya Camino	60	13,140	29,196.83	151.03	335.60
136	Padrones de Bureba	47	Bureba	39	8,541	14,541.47	181.72	309.39
137	Palacios de la Sierra	856	Demanda Pinares	309	67,671	115,284.00	79.05	134.68
138	Palacios de Rio Pisuerga	39	Amaya Camino		-	11,181.34	-	286.70
139	Palazuelos de Muñó	64	Arlanza		-	13,718.69	-	214.35
140	Pardilla	125	Ribera	88	19,272	32,231.25	154.18	257.85
141	Partido de la Sierra en Tobalina	83	Merindades	93	20,367	1,120.20	245.39	13.50
142	Pedrosa de Río Úrbel	263	Amaya Camino	172	37,668	64,440.18	143.22	245.02
143	Pedrosa del Páramo	89	Amaya Camino	41	8,979	19,253.65	100.89	216.33
144	Piérnigas	43	Bureba	27	5,913	8,366.07	137.51	194.56
145	Pinilla de los Barruecos	113	Demanda Pinares	104	22,776	42,957.24	201.56	380.15
146	Pinilla Trasmonte	201	Ribera	102	22,338	42,359.44	111.13	210.74
147	Poza de la Sal	351	Bureba	318	69,642	31,249.60	198.41	89.03
148	Prádanos de Bureba	48	Bureba	45	9,855	15,405.24	205.31	320.94
149	Pradoluengo	1,503	Demanda Pinares	372	81,468	177,579.91	54.20	118.15
150	Puebla de Arganzón (La)	489	Bureba	244	53,436	60,704.67	109.28	124.14
151	Puentedura	120	Arlanza	91	19,929	44,921.37	166.08	374.34
152	Quemada	260	Ribera	182	39,858	80,556.48	153.30	309.83
153	Quintana del Pidio	183	Ribera	108	23,652	19,305.16	129.25	105.49
154	Quintanabureba	37	Bureba	32	7,008	10,719.93	189.41	289.73
155	Quintanaélez	77	Bureba	82	17,958	28,557.94	233.22	370.88
156	Quintanapalla	122	Bureba	55	12,045	25,076.65	98.73	205.55
157	Quintanar de la Sierra	2,088	Demanda Pinares	737	161,403	346,661.94	77.30	166.03
158	Quintanavides	99	Bureba	70	15,330	30,661.40	154.85	309.71
159	Quintanilla de la Mata	145	Arlanza		-	21,800.00	-	150.34
160	Quintanilla del Agua y Tordueles	560	Arlanza	263	57,597	145,007.01	102.85	258.94

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
161	Quintanilla San García	98	Bureba	124	27,156	36,528.69	277.10	372.74
162	Rabanera del Pinar	148	Demanda Pinares	114	24,966	60,211.09	168.69	406.83
163	Rabé de las Calzadas	212	Amaya Camino		-	52,800.00	-	249.06
164	Rebolledo de la Torre	150	Amaya Camino	48	10,512	20,648.81	70.08	137.66
165	Redecilla del Camino	133	Bureba	128	28,032	22,507.21	210.77	169.23
166	Redecilla del Campo	75	Bureba	84	18,396	37,378.11	245.28	498.37
167	Regumiel de la Sierra	433	Demanda Pinares	270	59,130	118,539.05	136.56	273.76
168	Retuerta	66	Demanda Pinares	40	8,760	17,690.88	132.73	268.04
169	Revilla del Campo	125	Demanda Pinares	112	24,528	49,788.02	196.22	398.30
170	Rezmondo	21	Amaya Camino	26	5,694	10,870.06	271.14	517.62
171	Roa	2,454	Ribera	942	206,298	269,722.23	84.07	109.91
172	Rojas	79	Bureba	57	12,483	20,709.17	158.01	262.14
173	Royuela de Río Franco	250	Arlanza		-	88,530.34	-	354.12
174	Rubena	186	Arlanza	61	13,359	33,644.20	71.82	180.88
175	Rucandio	92	Bureba	87	19,053	34,676.33	207.10	376.92
176	Salas de los Infantes	2,132	Demanda Pinares	849	185,931	235,111.60	87.21	110.28
177	Saldaña de Burgos	173	Arlanza	168	36,792	71,951.70	212.67	415.91
178	Salinillas de Bureba	52	Bureba	44	9,636	17,481.23	185.31	336.18
179	San Juan del Monte	151	Ribera	93	20,367	38,456.56	134.88	254.68
180	San Mamés de Burgos	286	Arlanza	113	24,747	64,146.23	86.53	224.29
181	San Martín de Rubiales	193	Ribera	115	25,185	49,186.80	130.49	254.85
182	San Millán de Lara	77	Demanda Pinares	70	15,330	31,040.37	199.09	403.12
183	San Vicente del Valle	41	Demanda Pinares	45	9,855	21,303.89	240.37	519.61
184	Santa Gadea del Cid	162	Bureba	116	25,404	41,339.29	156.81	255.18
185	Santa María del Campo	677	Arlanza		-	137,000.00	-	202.36
186	Santa María del Invierno	60	Bureba	63	13,797	29,361.86	229.95	489.36
187	Santa María del Mercadillo	156	Ribera	89	19,491	30,447.44	124.94	195.18

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
188	Santa María Ribarredonda	118	Bureba	93	20,367	29,942.72	172.60	253.75
189	Santibáñez de Esgueva	128	Ribera	63	13,797	3,831.36	107.79	29.93
190	Santibáñez del Val	67	Arlanza	42	9,198	17,151.87	137.28	256.00
191	Santo Domingo de Silos	311	Demanda Pinares	229	50,151	96,713.18	161.26	310.97
192	Sargentes de la Lora	161	Amaya Camino	43	9,417	19,290.99	58.49	119.82
193	Sasamón	1,248	Amaya Camino	336	73,584	148,002.98	58.96	118.59
194	Solarana	108	Arlanza	45	9,855	-	91.25	-
195	Sotillo de la Ribera	585	Ribera	258	56,502	54,321.20	96.58	92.86
196	Susinos del Páramo	120	Amaya Camino	33	7,227	11,191.22	60.23	93.26
197	Tamarón	47	Amaya Camino		-	21,700.00	-	461.70
198	Tardajos	816	Amaya Camino		-	103,016.91	-	126.25
199	Tejada	38	Arlanza	28	6,132	13,310.97	161.37	350.29
200	Terradillos de Esgueva	122	Ribera	53	11,607	22,375.08	95.14	183.40
201	Tinieblas de la Sierra	40	Demanda Pinares	41	8,979	18,615.68	224.48	465.39
202	Torrecilla del Monte	77	Arlanza	34	7,446	13,915.73	96.70	180.72
203	Torregalindo	140	Ribera	110	24,090	42,947.74	172.07	306.77
204	Torrelara	24	Demanda Pinares	25	5,475	12,200.19	228.13	508.34
205	Torrepadre	87	Arlanza		-	20,163.11	-	231.76
206	Tórtoles de Esgueva	508	Ribera	303	66,357	79,103.41	130.62	155.72
207	Tosantos	54	Bureba	36	7,884	17,627.04	146.00	326.43
208	Tubilla del Lago	139	Ribera	126	27,594	55,986.10	198.52	402.78
209	Vadocondes	426	Ribera	181	39,639	73,764.75	93.05	173.16
210	Valdeande	116	Ribera	102	22,338	25,297.78	192.57	218.08
211	Valdorros	254	Arlanza	334	73,146	124,704.29	287.98	490.96
212	Vallarta de Bureba	54	Bureba	51	11,169	10,903.01	206.83	201.91
213	Valle de las Navas	643	Bureba	472	103,368	216,103.73	160.76	336.09
214	Valle de Losa	629	Merindades	552	120,888	140,243.29	192.19	222.96

	Municipality	Number of inhabitants	Territorial area	Number of lights	Energy saving (kwh)	Total investment (€)	Energy saving per inhabitant	Investment per inhabitant (€)
215	Valle de Manzanedo	128	Merindades	118	25,842	41,175.33	201.89	321.68
216	Valle de Mena	3,838	Merindades	2,809	615,171	868,615.49	160.28	226.32
217	Valle de Oca	199	Bureba	127	27,813	59,797.72	139.76	300.49
218	Valle de Santibáñez	564	Amaya Camino	71	15,549	38,227.34	27.57	67.78
219	Valle de Sedano	527	Amaya camino	550	120,450	226,865.33	228.56	430.48
220	Valle de Tobalina	1,044	Merindades	1,140	249,660	400,866.38	239.14	383.97
221	Valle de Valdebezana	627	Merindades	599	131,181	211,432.33	209.22	337.21
222	Valle de Valdelaguna	207	Demanda Pinares	189	41,391	77,541.76	199.96	374.60
223	Valle de Valdelucio	352	Amaya Camino	378	82,782	136,995.41	235.18	389.19
224	Valle de Zamanzas	68	Merindades		-	30,380.00	-	446.76
225	Vileña	31	Bureba	27	5,913	14,269.34	190.74	460.30
226	Villadiego	1,820	Amaya Camino	1,094	239,586	524,494.51	131.64	288.18
227	Villaescusa la Sombría	73	Bureba	61	13,359	37,594.10	183.00	514.99
228	Villaespasa	19	Demanda Pinares	48	10,512	23,110.64	553.26	1,216.35
229	Villafranca Montes de Oca	136	Demanda Pinares	122	26,718	57,611.73	196.46	423.62
230	Villagalijo	78	Demanda Pinares	34	7,446	18,224.91	95.46	233.65
231	Villagonzalo Pedernales	1,425	Arlanza	907	198,633	389,999.94	139.39	273.68
232	Villahoz	380	Arlanza		-	133,000.00	-	350.00
233	Villalba de Duero	678	Ribera	189	41,391	14,330.30	61.05	21.14
234	Villalbilla de Burgos	879	Arlanza	235	51,465	124,336.88	58.55	141.45
235	Villalbilla de Gumiel	108	Ribera	89	19,491	33,466.95	180.47	309.88
236	Villaldemiro	71	Amaya Camino		-	22,600.00	-	318.31
237	Villalmanzo	454	Arlanza	236	51,684	105,033.32	113.84	231.35
238	Villambistia	51	Bureba	60	13,140	25,291.42	257.65	495.91
239	Villamedianilla	19	Amaya Camino		-	12,000.00	-	631.58
240	Villamiel de la Sierra	37	Demanda Pinares	42	9,198	3,025.00	248.59	81.76
241	Villangómez	281	Arlanza		-	52,500.00	-	186.83

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242	Villanueva de Carazo	31	Demanda Pinares	22	4,818	9,483.31	155.42	305.91
243	Villanueva de Gumiel	284	Ribera	145	31,755	62,549.50	111.81	220.24
244	Villanueva de Teba	50	Bureba	53	11,607	17,988.53	232.14	359.77
245	Villaquirán de la Puebla	52	Amaya Camino		-	12,200.00	-	234.62
246	Villaquirán de los Infantes	168	Amaya Camino		-	62,803.19	-	373.83
247	Villarcayo de Merindad de Castilla la Vieja	4,765	Merindades	1,972	431,868	753,293.30	90.63	158.09
248	Villariezo	507	Arlanza	308	67,452	151,292.73	133.04	298.41
249	Villasandino	229	Amaya CAMINO		-	38,400.00	-	167.69
250	Villasur de Herreros	307	Demanda pinares	168	36,792	57,976.91	119.84	188.85
251	Villaverde del Monte	169	Arlanza		-	33,300.00	-	197.04
252	Villaverde-Mogina	98	Arlanza		-	40,300.00	-	411.22
253	Viloria de Rioja	51	Bureba	32	7,008	14,656.25	137.41	287.38
254	Vilviestre del Pinar	751	Demanda Pinares	341	74,679	128,787.22	99.44	171.49
255	Vizcaínos	49	Demanda Pinares	55	12,045	19,926.28	245.82	406.66
256	Zarzosa de Río Pisuerga	42	Amaya Camino	31	6,789	17,553.01	161.64	417.93
257	Zazuar	257	Ribera	162	35,478	70,420.06	138.05	274.01

ESPON 2020 – More information

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