



Author
Pablo del Río

Coal Transition in SPAIN

*An historical case study for the project "Coal Transitions:
Research and Dialogue on the Future of Coal"*

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*This is one of the 6 country case-studies commissioned to collect experience on past coal transitions.
The 6 countries are: Czech Republic, the Netherlands, Poland, Spain, UK, USA. Their role in the Coal Transitions
project was to provide background information for a Synthesis Report for decision makers, and provide general
lessons for national project teams to take into account in developing their coal transitions pathways for the future.*

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Author

Pablo del Río

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Contact information

Oliver Sartor, IDDRI, oliver.sartor@iddri.org

Thomas Spencer, IDDRI, thomas.spencer@iddri.org

Andrzej Błachowicz, Climate Strategies, andrzej.blachowicz@climatestrategies.org

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Executive summary

Spain has had a long tradition of coal mining at least since the XVIII century. However, it is also one of the jurisdictions committing to phase-out of subsidies and implementing it in recent times. This case study discusses the main features of the coal transition in Spain, the factors influencing this transition as well as the policies which both drove it and accompanied their detrimental socioeconomic effects on the workers and regions.

The analysis is based on a desktop research of relevant documents, including official communications from the Ministry of Industry (MINETUR) and the European Commission as well as statements of position from the industry association (CARBUNIÓN) and labour unions (UGT and CCOO). Documents on national coal from other institutions (Foundations, NGOs) have also been consulted. Finally, an analysis of articles in the mass media has been carried out. This contains useful statements from different types of stakeholders.

A strong reduction in production and employment in the coal industry has been experienced at least in the last two decades in this country. Successive plans by the government have aimed at reducing coal production, early retirement of workers and closing mines. Caught in the middle of the mining coalition on the one hand and EU legislation and public opinion on the other, the government has had to approve drastic measures leading to phase out. On the other hand, it has tried to accompany the phase out with measures which have tried to mitigate the negative impact on the affected zones, although effectiveness in this context has been limited according to many stakeholders.

The measures adopted by the government to reduce coal production and consumption have been effective. Coal demand has gone down as a result of the combination of lower electricity demand and increasing renewable

energy penetration. A drastic reduction in employment and production levels has been experienced.

Some measures have aimed at mitigating the impact in the zones, first through support for production, early retirement etc... and then with actions on the territory, i.e., through the provision of infrastructure. However, an alternative industry has not been created, i.e., a development model which absorbs the unemployed workers and avoids the economic downturn in the mining areas. The support measures have rather solved sporadically the problem of those being unemployed through income transfers, but not by relocating them in an alternative activity. Many miners are not only worried about their jobs but about the future of their children and this has not been addressed. There seems to have been an excessive emphasis on the provision of public infrastructure rather than encouraging directly the setting up of alternative industries which are both economically and socioeconomically sustainable in the long term. This is certainly a mistake to be avoided in the future. One lesson is that, once it is decided to phase out coal, governments should try to manage the negative socioeconomic and distributional effects in the most appropriate manner, e.g., both by compensating workers and creating alternative industries which provide a brighter outlook for the negatively affected regions.

1 Introduction

Spain has had a long tradition of coal mining at least since the XVIII century (Coll and Sudriá 1987, Rabanal 2009). However, it is also one of the jurisdictions committing to phase-out of subsidies and implementing it in recent times. This case study shows how the coal transition has been driven and managed. This can provide lessons on how to (or not to) manage coal transitions. A strong reduction in production and employment in the coal industry has been experienced at least in the last two decades in this country. Successive plans by the government have aimed at reducing coal production, early retirement of workers and closing mines. Caught in the middle of the mining coalition on the one hand and EU legislation and public opinion on the other, the government has had to approve drastic measures leading to phase out. On the other hand, it has tried to accompany the phase out with measures which have tried to mitigate the negative impact on the affected zones, although effectiveness in this context has been limited according to many stakeholders (see below).

The aim of this case study is to discuss the main features of the coal transition in Spain, the factors influencing this transition as well as the policies which both drove it and accompanied their detrimental socioeconomic effects on the workers and regions. This study is based on a desktop research of relevant documents, including official communications from the Ministry of Industry (MINETUR) and the European Commission as well as statements of position from the industry association (CARBUNIÓN) and labour unions (UGT and CCOO). Documents on national coal from other institutions (Foundations, NGOs) have also been consulted. Finally, an analysis of articles in the mass media has been carried out. This contains useful statements from the different types of stakeholders.

The next section provides a quantitative description of the coal sector transition, including data on the impact of the coal transition in terms of reduction in employment and production. Section 3 describes the main policies which have driven and accompanied the transition. The drivers of such transition are also discussed in this section. The last section concludes.

2 Quantitative description of the coal sector transition

Data on primary energy production from coal in Spain show a sharp reduction both in absolute and relative terms (Table 1). Its share in primary energy production is

only 4.7% (2014), down from 31% in 1990. The share of coal in primary energy consumption has also experienced a considerable reduction (20% in 1990, 10% in 2014).

Table 1. Primary energy consumption, primary energy production and final energy consumption of coal

	Primary energy production*		Primary energy consumption**		Final energy consumption**	
	Mtoe	%	Ktoe	%	Ktoe	%
1990	-	-	19212	20.2	3416	5.8
1995	-	-	18967	18.5	2234	3.1
2000	12	29	20936	16.8	1723	1.9
2005	9.5	24.7	20512	14.1	1833	1.7
2010	4.7	9.6	6857	5.3	1338	1.4
2011	3.8	8.3	12790	9.9	1609	1.7
2012	3.5	7.4	15492	12	1233	1.4
2013	2.5	5.1	11396	9.5	1523	1.8
2014	2.3	4.7	11975	10.1	1315	1.6

*Source: CARBUNIÓN (2015). **Source: MINETUR (2015b).

Its share in final energy consumption (1.6% in 2014) has also been reduced in the last decades, although not to the same extent as primary energy production and consumption (down from 5.8% in 1990).

Domestic coal production has experienced a decreasing trend in the last decades. This is so for all coal types (anthracite, bituminous coal, black lignite and brown lignite) (Table 2). Production of brown lignite ended up in 2008. Underground mining dominates production with respect to surface mining, with about 58% of the total coal production in 2013 coming from surface mining and the rest (42%) coming from underground mining (MINETUR 2013, p.15). Whereas a reduction in coal production from underground mining is expected until 2018, the mining companies

envisage an increase of surface mining over the period (a reduction of 64% and an increase of 7% in 2018 compared to 2013, respectively) (see MINETUR 2013 and section 3). The use of different types of coal in electricity generation has followed different trends (Table 3). Whereas the amount of bituminous coal has been constant in the last years, this has not been the case with black lignite and, especially, with anthracite.

Coal has a non-negligible role in electricity generation and demand in Spain (20% in 2015), although this share has been substantially reduced in the last decade(s), down from 30% in 2004. However, there has been an increasing trend during the present decade, from 8.3% in 2010 to the current level (Table 4). One of the reasons for

Table 2. Domestic coal production per coal type (thousand tones)

	Anthracite and bituminous coal	Black lignite	Brown lignite*	TOTAL COAL
1985	16184	6278	17292	39754
1990	14946	4578	16373	35897
1995	13599	4036	10776	28411
2000	11334	3628	8524	23486
2005	8553	3214	7587	19354
2010	5987	2444	-	8431
2011	4262	2359	-	6621
2012	3891	2254	-	6145
2013	2543	1827	-	4370
2014	2670	1231	-	3901

Source: CARBUNIÓN (2015). Production of brown lignite ceased in 2008 (2007: 6180 kt).

Table 3. Consumption of coal for electricity generation

Thousand tones	Anthracite	Bituminous coal	Black lignite	TOTAL
2011	3894	13916	2839	2603
2012	3991	18690	2203	2030
2013	2004	12864	1623	2950
2014	2057	13949	2124	2534
Thousand toe				
2011	1936	7605	902	10703
2012	2001	10168	667	13039
2013	1072	7479	519	9365
2014	1015	8249	678	10195

Source: MINETUR (2015a).

Table 4. Evolution of the electricity mix in Spain (%)

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Hydro	9,5	7,8	9,4	14,7	10,9	7,3	13,5	14,7	10,5
Nuclear	18,5	19,3	18,2	20,8	19,8	21	20,1	20,9	20,7
Coal	24,8	15,9	12,5	8,3	15,6	19,2	14,7	16,5	20
Fuel + Gas	3,5	3,4	3,3	3,1	2,5	2,5	2,4	2,4	2,5
CCGT	24,8	31,8	28,9	23,4	19,3	14,8	10,3	9,5	11,1
Wind	9,7	11	13,8	15,3	15,3	17,3	20,3	19,4	18,2
Solar PV	0,2	0,9	2,2	2,3	2,7	2,9	3,1	3,1	3,1
Solar thermal	0	0	0	0,2	0,7	1,2	1,6	1,9	1,9
Thermal renewable/Other renewable	0,9	1	1,2	1,2	1,6	1,7	1,9	1,8	1,7
Thermal non renewable/Cogeneration	8,1	8,9	10,5	10,7	11,6	12,1	12,1	9,8	9,5
Wastes	-	-	-	-	-	-	-	-	0,8

Source: REE (2016).

the increase in coal generation, in spite of overcapacity in the system, is the setting of the RGS procedure (see next section), which ensures preferential merit order for thermal generation plants using national coal versus other thermal plants as well as compensation payments to those plants¹. The increase in 2015 can also be attributed to the lower wind and hydro production due to adverse weather conditions for those technologies in 2015. According to UNESA (the electricity generation association), the increase in the share of hydro and wind is at the expense of coal (Servimedia 2016).

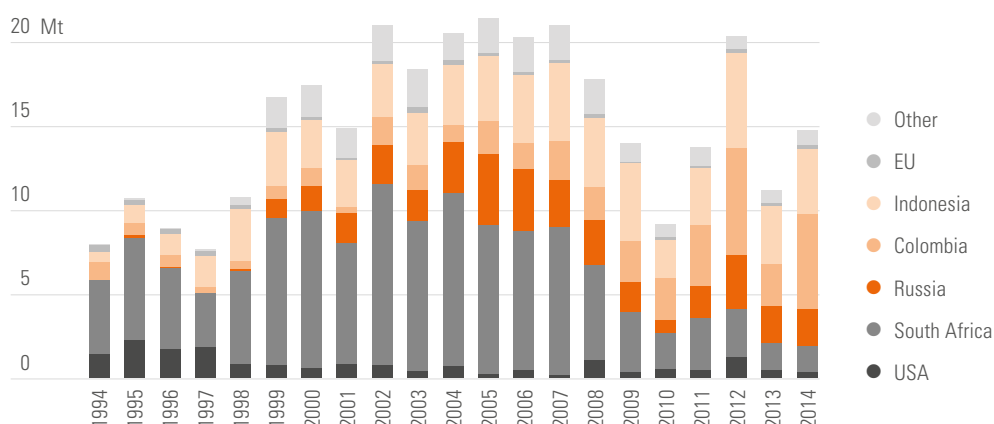
It is important to take into account that the Spanish electricity system is characterized by a considerable overcapacity. This is due to several factors, but mostly to skyrocketing investments in variable renewables (wind on-shore and solar PV) and combined cycle gas turbines (CCGTs) and sluggish electricity demand (see further details in section 3 and del Río and Janeiro 2016 for a detailed analysis).

Imports of coal have experienced an erratic, cyclic path in the last two decades. They increased in the late 90s, stayed constant in the first half of the 2000s and then plummeted to their lowest level in 2010. Since then, a saw-tooth pattern can be observed (Figure 1).

Regarding the origin of those imports, they are concentrated in four countries. Colombia is at the top of the list (38% of all imports in 2014), followed by Indonesia (26%), Russia (15%) and South Africa (10%). Substantial changes have occurred in this regard in the last two decades. The case of South Africa is particularly conspicuous and common to other European countries. Its relevance has been reduced over the years in both absolute and relative terms. In contrast, Colombia has become the largest exporter to Spain in the last few years, up from negligible figures ten years ago (Table 5).

¹ Other factors have also played a role in this increase in coal demand, including the Fukushima accident and the high gas price.

Figure 1. Imports of coal



Source: CARBUNIÓN (2016).

Table 5. Evolution of imports of coal from different countries

	% SHARE						TOTAL	
	USA	South Africa	Russia	Colombia	Indonesia	EU	kt	%
1994	17.9	54.7	0.7	13.1	8.0	4.7	7875	100
2000	3.4	53.7	8.3	6.5	16.3	1.0	17225	100
2005	1.1	41.2	20	9.1	17.9	1.0	21185	100
2010	5.3	24.1	8.0	27.5	25.0	1.4	9046	100
2011	3.4	22.5	13.6	26.8	24.4	1.0	13593	100
2012	6.1	14.0	15.8	31.2	28.0	0.9	20154	100
2013	4.2	14.1	19.9	22.8	30.7	1.4	11039	100
2014	2.2	10.7	14.8	38.4	26.3	1.4	14598	100

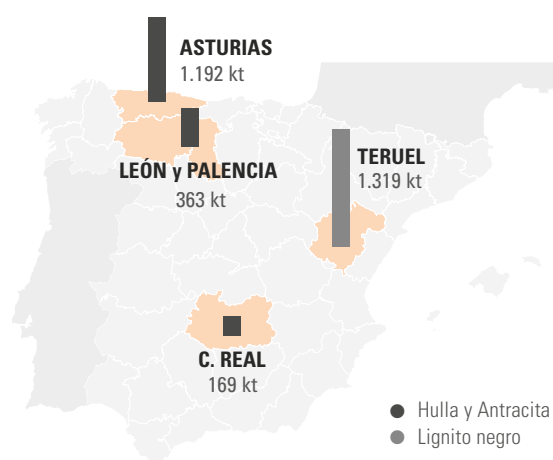
Source: CARBUNIÓN (2015).

Regarding imports of different types of coal, bituminous coal has experienced a considerable reduction. In contrast, anthracite has remained constant². Exports of coal from Spain remain at very modest levels with respect to imports, and have gone down in the last years (Table 6). Different coal types are imported from different countries. Anthracite comes mostly from Russia, whereas Colombia (and, to a lesser extent Russia) mostly supply bituminous coal. According to Red Eléctrica de España (2014), 70% of the coal used for electricity generation in Spain in 2013 was imported.³ About 85% of the coal used in Spain is for electricity generation in thermal plants, with the rest being used mostly in steelmaking (10%). Therefore, regulations encouraging the use of domestic coal in electricity generation have had a considerable impact on domestic coal production (see next section).

² This is probably related to the fact that all the coal for residential heating is anthracite. It is not subsidised and it is less exposed to market volatility.

³ Later documents updating this share are not available neither for 2014 nor 2015.

Figure 2. National coal production in 2014



Source: CARBUNIÓN (2016). Note: the coal mine in C. Real has already closed.

The price of those imports, which is obviously a crucial variable influencing the competitiveness of national coal, has trended downwards in the last four years. According to Bloomberg (2015), the price of coal in Europe has gone down from 120 \$/ton in 2011 to around 50 \$/ton in 2015 (Benchmark year-ahead contracts at Rotterdam). The regional production of coal in Spain is geographically concentrated in three areas: Aragón, Castilla y León and Asturias (Figure 2). According to data from CARBUNIÓN (2015), coal mining ceased in some provinces in the last decade: La Coruña and Barcelona (in 2007) and Córdoba (in 2010), although only the production in La Coruña was significant at the time (6180 thousand tones in 2007). Coal is important in a few areas, especially in the North of León. Data for the Asturias region shows a contribution of coal mining of 1% to the region's GDP and 1.04% contribution to regional employment (Caballero 2011). Note that coal mining is concentrated in the South of Asturias and North of the León province in the region of Castilla y León.

National coal is currently being used as a fuel by the largest five utilities in 8 electricity generation thermal plants which are the following in order of decreasing electricity generation: Teruel, Compostilla and Anllares (both in León), Puentenuevo 3 (Córdoba), La Robla 2 (León), Guardo 2 (Palencia), Soto de Ribera 3 and Narcea 3 (the last two in Asturias)(Martín 2014).

The revenues of mining companies have steadily increased until 2011, and have declined ever since. This is mostly due to the reduction of support (Table 7).

Table 6. Exports/imports (thousand tons)

	2012	2013	2014
Imported bituminous coal	22414	13663	14031
Exported bituminous coal	1861	708	600
NET IMPORTS OF BITUMINOUS COAL	20553	12955	13431
Imported anthracite	594	544	566
Exported anthracite	241	352	310
NET IMPORTS OF ANTHRACITE	354	192	256
NET IMPORTS TOTAL	20907	13147	13687

Source: MINETUR (2015a).

Table 7. Evolution of average revenues of mining companies (€cents/thermal unit)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total revenues (P+S)	1.478	1.466	1.497	1.581	1.569	1.545	1.597	1.566	1.732	1.782	1.932	1.910	1.963	2.439	2.040	2.361	1.852
Price (P)	0.775	0.739	0.775	0.823	0.811	0.789	0.838	0.903	0.971	1.003	1.172	1.279	1.131	1.338	1.439	1.647	1.598
Support (S)	0.703	0.727	0.721	0.757	0.757	0.755	0.759	0.662	0.761	0.779	0.760	0.631	0.832	1.101	0.602	0.724	0.254

Source: MINETUR (2015b).

Production is concentrated in a few firms, which survived among more than 200 companies. This sectoral concentration occurs for all coal types and has remained constant over the years (Table 8).

Employment in the coal sector has plummeted in the last two decades, from 32000 jobs in 1993 to 3715 jobs in 2014. These reductions have been experienced for all coal types (Table 9). Brown lignite ceased production in 2007. Currently, bituminous coal and anthracite account for the largest share of employment in overall coal production (93%), with black lignite accounting for the rest. Subcontracts have experienced a lower reduction and, thus, their share in employment in the sector has increased in relative terms, from 11% in 1999 to 35% in 2014.

Underground mining accounts for around ¾ of total employment, with strip (surface) mining accounting for the rest (MINETUR 2013). Firms in the sector estimate that employment in the sector will be 15% lower in 2018 compared to 2013 levels. A greater reduction of employment is expected in Underground mining, which is more labour-intensive than surface mining (MINETUR 2013)⁴.

⁴ For example, according to the Ministry of Industry (2006), the 9034 workers in the underground mining subsector in 2005 produced 7.5 million tonnes of coal (837 tonnes per worker), whereas the 766 occupied in the surface mining subsector produced 4.7 million tonnes (6220 tonnes per worker).

Table 8. Sector structure. Firms classified according to production (2014)

	Number of firms	Average production (thousand tonnes)	% Total
Bituminous coal and anthracite			
>100000 tonnes/year	6	416	96.6
50000 – 100000	1	66	2.6
25000-50000	0	0	0
<25000	1	22	0.9
Total	8	323	100
Black lignite			
>100000 tonnes/year	1	1156	94
50000 – 100000	1	74	6
25000-50000	0	0	0
<25000	0	0	0
Total	2	615	100
TOTAL COAL			
>100000 tonnes/year	7	522	95.8
50000 – 100000	2	70	3.7
25000-50000	0	0	0
<25000	1	22	0.6
Total	10	381	100

Source: CARBUNIÓN (2015).

Table 9. Employment in the coal sector (jobs)

	Bituminous coal and anthracite		Black lignite		Brown lignite		TOTAL COAL	
	Own production	Sub-contracts	Own production	Sub-contracts	Own production	Sub-contracts	Own production	Sub-contracts
1993	27956	-	1940	-	2013	-	31909	-
1995	24180	-	1805	-	1698	-	27683	-
2000	14592	1353	1085	105	903	298	16580	1756
2005	7772	1355	447	364	308	303	8527	2022
2010	4265	643	329	336	-	-	4594	979
2011	3654	1516	309	346	-	-	3963	1862
2012	3365	1083	290	316	-	-	3655	1399
2013	3094	847	185	245	-	-	3279	1092
2014	2544	766	196	209	-	-	2740	975

Source: CARBUNIÓN (2015).

3 Qualitative and quantitative description of the forces which drove it

A main driver of the coal transition in Spain is the policies put in place. Their relevance justifies starting this section with a description of those policies (3.1), followed by the drivers of those policies (3.2) and their consequences on the coal transition (3.3).

3.1 *The policies: a description*

Policies driving the transition, as well as those which were put in place to mitigate the negative impacts of the reduction in coal production can be broadly classified in two categories: those which target the mining companies, regions and workers and those which are directed to the electricity generation plants using coal.

3.1.1 *Umbrella regulations: EU legislation*

As it is well-known, support for the coal industry started to be regulated in the Treaty of the European Community for Coal and Steel (ECCS) and continued to be regulated by EU legislation. Regulation 1407/2002 on state aid to the coal industry envisaged the provision of state aid to maintain access to coal reserves and stressed the need to continue the restructuring of the coal mining industry (MINETUR 2013).

When Regulation 1407/2002 expired, Decision 2010/787/UE on support aimed at facilitating the closure of non-competitive mines replaced it. The main difference between both is that the support for current production disappeared. Whereas Regulation 1407/2002 established a strategic reserve and also subsidies for units to close, Decision 2010/787 does

not require a strategic reserve. Thus, since the passing of such Decision, aid was conditioned to the closure of the installation before December 31st 2018 (article 3.1a). Therefore, each Member State must have set a closure plan which includes all those production units which are expected to receive State Aid and those units will have to be closed according to the closure plan and will have to comply with the aforementioned deadline. Those mines which have reached competitive levels before 2018 will continue functioning after the date established in the decision, although they are required to give back all the support received in the period 2011-2018 (MINETUR 2016).

Therefore, until 2011, national support for coal was provided on the basis of Regulation 1407/2002. Since 2011, Decision 787/2010 provides the new regulatory framework on subsidized coal, changing its orientation and requiring the presentation of a Closure Plan for non-competitive mines and an ordered termination of mining activities which do not reach the profitability threshold.

3.1.2 Pre-1998 national regulation

Several plans for coal mining were approved before 1998 (see **Table 10**). From price support, the plans have tended to provide support for the closure of mines, including early retirement support and support for mining regions.

Two main coal plans were relevant in the context of coal transition: the 1998-2005 and the 2006-2012 coal plans and, thus, they deserve a more detailed discussion.

3.1.3 The 1998-2005 coal plan

In July 1997 labour unions and the government signed a plan for investments to revitalise the sector, modernize its infrastructures and encourage its competitiveness. This is the Plan 1998-2005 for the Coal Mining Sector and the Alternative Development of the Mining Regions (Plan 1998/2005 de la minería del carbón y desarrollo alternativo de las Comarcas Mineras), whose regulation was further developed by the Royal Decree 2020/1997 and a Ministerial Order published on February 18th 1998. ⁵

Motivation and continuity with respect to previous plans

The plan tried to make compatible the Directive 96/92/CEE on the Internal Electricity Market, which would put an end to the system of guaranteed supply, and the detrimental socioeconomic consequences that the strict application of this norm would have in some countries, Spain among them. The Directive (art. 8.4) allow Member States to privilege their indigenous energy sources

up to 15% of the total quantity of primary energy necessary to produce electricity in the country. In Royal Decree 2020/1997 the government clearly states this trade-off, mentioning that support and coal production will be reduced, while simultaneously providing support to encourage an alternative economic development in mining zones. A main motivation for this plan was to respond to the demands of the coal miners and their concerns about their future (González 2005).

This plan represented a continuation with respect to the previous plan in the sense that the coal mining companies were required to reduce their productive activity (and employment) in order to receive public support. A difference is that the reductions required were more drastic in this plan than in the former ones (Maurín 1999). And electricity firms were still committed to purchase national coal (with a reduction of 28% in the 1998-2005 period)(González 2005), although not through a *cupo* (quota) system, but through long-term contracts between electric utilities and the mining companies.

Automatic early retirement represented a discontinuity with respect to previous plans. On the other hand, the alternative development plan for the mining regions, which was also present in previous plans, was given a financial boost, with a strong increase in the funds provided for

⁵ Neither the coal industry association (CARBUNIÓN) nor the electricity industry association (UNESA) participated in the negotiation of the Plan (González 2005).

Table 10. A summary of the main features of coal plans between 1990 and 1997 in Spain

Plan	Period	Main features
Plan de Reordenación del sector	1990-1993	The Plan had five focal points of action: to reduce the production costs of national coal through a gradual reduction of public support, to increase the productivity of underground mining by 15%, to reach a production capacity of 0.6Mt of surface mining by the end of the period, to improve the level of mining security and to promote the regeneration of the industrial fabric in the areas affected by the closure of mining capacities. Change in the price-regulation system. Removal of the “authorized price” system. Replaced by the “New Contract System of Thermal Coals”. The European Commission (EC) requires Spain to reduce its “supplementary price” support and to reduce support for exploitation losses of firms. The Plan envisaged support for firms which reduced their capacity (at least by 40%) and support for labour costs (for job losses and early retirement).
Plan de Modernización, Racionalización y Reestructuración de la Actividad de la Industria del Carbón.	1994-1997	Support for the economic reactivation of mining areas (complementary support of 7.5% of amount received for capacity reduction). Price support mechanism: it covers the difference between the international coal price and the reference price (similar to an sliding feed-in premium). Support to cover the amortizations of operating accounts. Support for the costs of capacity reduction. Support for the economic reactivation of mining zones. Each firm had a guaranteed selling quota (<i>cupo</i>). Support funded by a surcharge in the electricity bill. However, the EC replied by the end of 1996 that the scheme violated the transparency criteria of Decision 3632/91/EC. Thus, the government had to change the financing scheme, which it did in 1998, leading to a new plan. Support for reindustrialization through the creation of an economic fund which would allow to support economic alternatives to mining in the areas affected by the reduction in activity levels. The total amount of support for reindustrialisation in the four-year period was 46 M€.

Source: Own elaboration based on UGT/CCOO (2015), González (2005) and relevant legislation.

this purposes (e.g., compare the average 11.5 M€/year in the 1994-1997 period with the 390 M€ year in the 1998-2005 period). According to Maurin (1999), recognition on the ineffectiveness of previous plans in providing a reindustrialization for the mining areas was a starting point in the new plan and entails the recognition of the special socioeconomic and territorial features of these zones⁶. This alternative development plan was included in order to meet the demands of the labour unions and the population and institutions in the mining regions, in a context of strong social tension in the affected areas.

Types of support

The 1998-2005 Plan envisages three types of support:

- 1.- Support for the development of business projects leading to direct employment creation (subsidies, soft loans, provision of collateral). It would represent 15% of total funds available.
- 2.- Support for training (specific training courses and grants for all types of education). About 7.5% of funds.
- 3.- Provision of infrastructures. Rest of funds (almost 80%).

Royal Decree 2020/1997 develops the plan and classifies the types of support in 4 main groups (art. 1):

(i) Support for the operation and reduction of activity of the mining companies

The aim of this support is to cover the difference between the operating costs and the revenues from coal sales for those firms which apply a modernization, restructuration and rationalization plan which leads to a reduction in costs, or to an activity reduction plan. Support for the operation and reduction of activity should be reduced by 4% each year for underground mines (6% for surface mines). This percentage would be applied after annually updating the support for inflation (consumer price index), with a maximum of a 2% increase. In order to benefit from this support, the mining companies should have signed contracts with electric utilities for the provision of coal and should have received support to cover the operation costs in 1997.

(ii). Support for exceptional burdens linked to the restructuration, modernization and rationalization of the mining activities. This included support for the reduction of staff (through early retirements or voluntary redun-

dancy) and support for a reduction of productive capacity above 15%. Support for early retirement and voluntary redundancy was regulated in a Ministerial Order on February 18th 1998. Workers which were at least 52 years old and had been employed for at least 3 years in the firm (seniority) could apply for the early retirement scheme. Workers with a one year seniority and having contributed to the Special Social Security Regime for Coal Mining for at least three years could apply for the voluntary redundancy scheme.

(iii) Support for infrastructures promoting an alternative development in the mining areas

Several characteristics of the mining regions justify the provision of support for infrastructures (Maurin 1999, MINER 1997, Vega 2000, Rodríguez 1999):

- High unemployment rates and a strong economic dependence on mining.
- A very low degree of economic diversification and an absence of entrepreneurial spirit.
- A special difficulty to adapt the professional capabilities of the miners to those required in other economic activities.
- The territorial dispersion, the isolation and the poor connection with the main communication links. The mining regions are located in places with difficult access and relatively far from large markets, which discourage the location of new firms providing an alternative to the mining activity.
- The high degree of environmental degradation and the shortage of industrial equipment and soil.

The Royal Decree 2020/1997 states that the support should be dedicated to improve the transport and communication system (roads and train connections), provide industrial land, health and educational infrastructures and environmental restoration of the places damaged by the mining activities, water supply and sanitation, agricultural, farming and touristic infrastructures and housing and territorial and urban planning (article 14). The beneficiaries are the local administrations where the mines are located (regions and municipalities). Most of the projects were to improve the transport and communication system (Maurin 1999, p.871).

(iv) Support for business projects leading to job creation

The beneficiaries could be either natural or legal persons in the municipalities of the mining areas. Support should be provided taking into account different criteria

⁶ Note that promoting a reindustrialization of the mining areas was an explicit aim in the 1990 coal plan for the first time.

(article 16), including the location of the investment, the ability of the project to create stable and "quality" jobs and the ability to induce ancillary activities or multiplier effects in the mining areas. Support is provided through soft loans, provision of guarantees, participation in the project equity and grants (Rodríguez 1999).

According to Rodríguez (1999, p.202), there is a change in the philosophy of the support with respect to the previous plan. The selection of projects aimed to be more targeted and rigorous. If the previous plan for reactivation of the mining areas supported all types of proposals located in the mining areas, this one would exclude projects in the service sector (such as opening of restaurants, taverns, car dealerships, retail trade shops, laundry services, hairdressing and dyeing), although not those in the tourist sector. An analysis of the projects being submitted in the first year reveals a dominance of farming, manufacturing, touristic and forestry projects carried out by small and medium size enterprises (Rodríguez 1999).

Worth mentioning is support for training. This involves the training of miners which could facilitate their adaptation to non-mining companies and grants to improve the educational level in the mining areas (Caballero 2011). The Foundation for the Development of the Training in the Coal Mining Areas is responsible for the execution/implementation of such support.

Quantities of support

The following table summarises the amounts being provided in the context of the Plan for the reactivation of the mining areas.

Rodríguez (1999) argues that the provision of support has been delayed due to the slow administrative process, at least in the first year. In addition, there were doubts about the additionality of support (which might have been redundant sometimes with respect to support which was previously envisaged by the regional government).

Table 11. Support in the Plan 1998-2005 for the reactivation of mining areas (M€)

Type of support	Annual support	Total support	Share (%)
Infrastructures	300	2400	76.9
Training	30	240	7.6
Business projects	60	480	15.3
Total	390	3120	100

Source: Author, based on Rodríguez, 1999.

Targets and compliance

Production and employment targets were set for 2005 (13 million tones (Mt) and 17500 jobs, respectively, down from 18Mt and 24500 jobs in 1997). The targets were overcomplied, with a production in 2005 of 11.7 Mt and an employment level of 8310 jobs.

3.1.4 The 2006-2012 Coal Plan

The National Plan for the Strategic Reserve of Coal 2006-2012 and New Model of Integral and Sustainable Development of Mining Zones (Plan Nacional de Reserva Estratégica del Carbón 2006-212 y Nuevo Modelo de Desarrollo Integral y Sostenible de las Comarcas Mineras) represented a continuation with respect to the previous plan. Further reduction targets were set (employment target in 2012: 5302 jobs, production target in 2012: 9.2 Mt). Production would be reduced by 1.674 Mt in the subperiod 2006-2007 and by 1.2 Mt in the subperiod 2008-2012 (0.79 Mt for underground and 0.43 Mt for surface mining).

It continued to provide sectoral support: production support, social support, early retirement support and support for the closure of mines. Support would be reduced by 1.25% per year for underground coal and by 3.25% per year for surface mining.

The following table summarises the targets for reduction in production, support and employment as well as the expected evolution during the period.

Reactivation support for the affected mining zones was also a main priority of the Plan and increased by 150 M€⁷. It continued to be provided under three categories: support for business projects, support for

Table 12. Production, support and employment targets

		2005	2007	2012
Production (Mt)	Underground	7.8	6.7	5.9
	Surface	4.2	3.6	3.2
	Total	12.1	10.4	9.2
Support (M€)	Underground	342	319	300
	Surface	29	28	24
	Total	371	347	324
Employment	Underground	7633	6708	4865
	Surface	677	599	437
	Total	8310	7307	5302

Source: Own elaboration with data from Plan 2006-2012. Data for the 31st of December for each year.

⁷ According to the Plan (p.7) "support for the reactivation of the mining zones has not been able to promote a sufficient level of activity and diversification in order to overcome the dependence that these zones have with respect to coal mining. It is thus necessary to persist in the effort to strengthen the economic base of the zones affected by the ordering of coal mining".

Table 13. Support for the reactivation of the mining regions

	2006	2007	2008	2009	2010	2011	2012	TOTAL
Business projects	150	150	150					
Infrastructures	250	250	250	350	350	350	350	2600
Training	40	40	40	40	40	40	40	280
TOTAL	440	440	440	390	390	390	390	2880

Source: Own elaboration with data from the Coal Plan 2006-2012.

infrastructure and training. A total amount of 2880 M€ for the whole period 2006-2012 was envisaged.

Table 13 disaggregates the amount of support provided under each category and for each year of the period. A change with respect to the previous plan is that a broader set of projects are considered eligible for support. These include industrial services for firms, health services, leisure-related, environmental-related and innovation-related activities (p.38 of the Plan). In addition, it envisages new instruments: venture capital funds, microloans and seed capital.

3.1.5 Activity framework 2013-2018 (Marco de actuación, MA)

The latest coal plan was signed in 2013. The Activity Framework 2013-2018 (Marco de Actuación para la minería del carbón y las cuencas mineras en el periodo 2013-2018, or "MA") envisages a decreasing path of aid granted to the production of national coal through annual decisions. It states that, all the mining production units which are not competitive without receiving support should be closed after December 31st 2018 and that all those units which continue their activity after 2018 will need to give back the aid received. The MA was signed by the government, the labour unions and the industry association (CARBUNIÓN) on October 1st 2013. In a press release on May 27th 2016, the European Commission announced the decision to consider such support as legal.

Main goals of the regulation

The main goals of the MA are stated as follows:

- To favor the maintenance of a national, competitive coal production which allows to ensure some level of electricity production which supports security of supply and contributes to the development of renewable energy sources. According to the MA (p.5), the intermittent character of wind and solar generation

leads to the need to maintain some non-intermittent local energy sources which ensure electricity supply in any circumstance. National coal is considered an appropriate alternative to play this role.

- To ensure a sufficient participation of national coal in the electricity generation mix, within the limits set up by EU regulation, and for the period covered by this MA.
- To channel the ordered termination of the non-competitive coal mines and to mitigate the impact on job losses as well as its impact on the regional economy. Given the concentration of coal mines in Spain, the aim is to address the detrimental effects that the closure of mines may have on regional labour markets, with a large share of unemployment from the mining sector.
- To encourage the development of business projects which lead to employment creation and to support the creation of infrastructures which are linked to those projects while simultaneously triggering the recruitment of workers which are unemployed due to the termination of the mining activity.

The end goal is "to promote the conditions for the competitiveness of the highest possible number of mining sites and the orderly closure of those which are not competitive" (p.5).

The MA states that, in the context of Decision 787/2010, and in the current context of the economic and financial crisis, the ordered closure of non-competitive coal mines is needed through a gradual reduction of the support aimed at covering the losses during production and a contribution to the coverage of the exceptional costs related to the closure.

Scope (time and geographical)

The agreement is valid from 2013 to 2018 for the regions of Asturias, Castilla y León, Aragón and Castilla La Mancha. Specific but exceptional actions can also be carried out in Andalucía, Cataluña and Galicia.

Types of support

(i) Support for coal production

Quantity of support

In the context of the MA 2013-2018, the following quantities of (decreasing) support for the whole period were agreed (**Table 14**). For surface mining, support would end in 2015. For underground mining, it would end in 2019.

Conditions to receive the support

In order to receive the support, a thermal plant has to buy the production of the mining companies. Otherwise, these companies will not receive the support per ton envisaged in the regulation (i.e., it is not enough to just extract the coal in order to receive the support). In addition, the MA sets a maximum amount of tones which are eligible to receive the support each year (**Table 15**).

(ii) Support for workers

Social support for labour costs through compensation for the voluntary termination of jobs

This aid aims to support employment reductions in those coal mines which close down. The amount of compensation has both a fixed and a variable component. The former is a 10000€ compensation for the voluntary termination of jobs. The later provides a compensation amounting to 35 days of wage per year worked (with a maximum of 30 monthly allowances). This will apply to those workers which are part of the own staff of the firms at December 31st 2012 with at least one year seniority (e.g., the period that the worker has been employed in a company). An additional compensation of 24000€ will be provided for workers suffering from silicosis.

Support for early retirement

Support for early retirement (i.e. "support due to restructuring and modernization for workers of old age", a minimum of 54 years old is considered, with at least 10 years labour seniority. They would receive 70% of the gross wage of the last six months worked. The annual updating of the wage will be the one that the government applies to update the pensions.

Placement of workers

Those workers who are affected by the closure of firms and who do not have the right to an early retirement, may opt to be relocated in other firms which benefit from the support envisaged in the MA.

Training support

The MA states that a specific training will be provided for those workers which need it in order to work in the firms setting up in the mining regions. On the other hand, the workers in mines will keep on receiving training on mining security.

Support for the mitigation of the environmental impact due to the closure.

This support aims to finance the closure of installations and the recovery of the natural space affected by the mining activity. The mining companies are required to provide environmental restoration for the area where their activities have been located. The aim of this support is to contribute to cover the expenses related to those restoration activities. In addition, this is expected to lead to some job creation during those activities, which will also mitigate the negative impact on employment. 15 M€ will be annually provided between 2014 and 2021. The deadline to finish the works is 36 months.

Table 14. Support levels in MA 2013-2018 (in € per metric ton)

	2013	2014	2015	2016	2017	2018	2019
Undergroundmining	30	25	20	15	10	5	0
Surface mining	1	0.5	0	0	0	0	0

Source: Authors, based on Activity Framework 2013-2018.

Table 15. Maximum quantities which can be granted support (thousand tons)

	2013	2014	2015	2016	2017	2018
Undergroundmining	2136	2719	2719	2668	1999	1789
Strip (surface) mining	3663	3786	0	0	0	0
TOTAL	5800	6506	2719	2668	1999	1789

Source: Authors, based on Activity Framework 2013-2018.

(iii) Support for the economic boost of mining regions

Two types of measures are envisaged in this respect (support for the reactivation of coal mining regions aimed at financing new business installations and to expand the existing ones and support for alternative development projects in the regions). 250 M€ will be provided for infrastructures and 150 M€ for business projects. The MA itself (p.25) admits that, in previous plans, the amounts of support dedicated to develop basic infrastructures for the mining regions have not achieved "the desired objectives". It is stressed that the current MA tries to encourage an alternative development of mining areas.

Measures for the reactivation of coal mining regions aimed at financing new business installations and to expand the existing ones

The promotion of location of business projects in the areas affected by the restructuration of coal mining aims at leading to new jobs or a maintenance of the existing ones. The beneficiaries of this support can either be firms or individuals as well as associations of workers. The projects need to be located in the towns which have been negatively affected by the restructuration and modernization of coal mining. Support of 100000€ will be granted for projects creating at least 3 jobs and at least 30000€ for projects creating at least one job or maintaining at least 3 existing jobs.

Support for alternative development projects in the mining regions

This support aims to encourage the alternative development of mining regions through the implementation of projects leading to infrastructures and the restoration of degraded areas due to the mining activities in the mining towns of four regions (Aragón, Asturias, Castilla y León and Castilla-La Mancha). Exceptionally, specific support will be provided for the three regions which were included in the previous plan (2006-2012): Andalucía, Cataluña and Galicia.

The development of infrastructure will include the following activities:

- Improvement, restoration, recovery and revaluation of dumps, degraded areas and, in general, places affected by coal mining activities.
- Improvement of equipment related to transformation and electrification centers and supply of gas, lighting and hydro infrastructures.

- Recovery of forests and silviculture in degraded areas as well as projects leading to an improvement in the quality of air, noise levels and regeneration of wastewater treatment plants.
- Provision and renewal of telecommunication lines and renewable energy projects in public buildings.
- Creation and equipment provision of business incubators and technological development centers.

(iv) Support for cleaner coal technologies

Support for new technologies (green coal, CCS) is envisaged. This will take place through technological and environmental agreements with public R&D institutions.

UE decision on support

The European Commission has stated on May 2016 that the support envisaged in the MA 2013-2018 is legal. It has approved the closure plan of the Spanish government and stresses that the Spanish government has committed to recover the public aid granted to mines which have not closed on December 31st 2018.

Expected impacts

It is also agreed that the share of national coal in electricity generation will be 7.5%, that coal production will be reduced from 6.55 million tons in 2012 to 5.87 tons in 2018. Employment will be reduced from 4894 jobs in 2012 to 4496 in 2018.

3.1.6 The Mechanism for the Restriction due to Guarantee of Supply (RGS)

"The Mechanism for the Restriction due to Guarantee of Supply" (Proceso de Resolución de Restricciones por Garantía del Suministro), approved by Royal Decree 134/2010 was implemented by the Ministry of Industry in order to encourage the purchase of national coal by electricity generation plants. It was approved by the European Commission on the condition that it would end in 2014. A financial compensation to ten thermal plants using coal was provided in return for their consumption of national coal. The plants are required to generate a given amount of electricity using national coal. Each year, a Resolution by the government indicated the amount of electricity to be generated (GWh) with national coal and its distribution per thermal plant. In return, they were provided with:

- A financial compensation of 1300 M€ in the 2011-2014 period to cover the unitary generation costs of each plant and the annual amount of electricity being produced.

- A preferential merit-order in the electricity market, against other plants using imported coal or other fuel sources.

The electricity generation with national coal was 19419 GWh. The RGS established this amount at 20054 GWh in 2013 and 22221 GWh in 2014. After that year, the mining companies and the electricity generation firms will need to agree on long-term contracts (UGT and CCOO 2015). Electricity dispatched through RGS was 13TWh in 2011, 12 TWh in 2012, 4 TWh in 2013 and 3.3 TWh in 2014

According to OCE (2016), the end of the RGS procedure in 2014 had a very detrimental effect on the coal mining sector in Spain⁸, leading to a significant reduction in the demand for national coal. The MA stated that the system operator (Red Eléctrica) was working at the time (2013) to set up a procedure which, from January 1st 2015 and without additional costs for the electricity system, would allow maintaining a quota for coal (thermal gap), given its indigenous character which contributes to the security of supply. Taking into account historical data on electricity generation with coal and the production of coal in mines, a 7.5% penetration of national coal in the electricity mix was deemed high enough.

3.1.7. Other support relevant for national coal.

Capacity payments

This is a regulated payment received by the CCGTs and coal plants (i.e., not only for generation plants using national coal). These payments serve the purpose of guaranteeing enough back-up capacity in order to reduce the risks of interruptions in electricity supply. This mechanism is financed through a charge to the direct consumers in the electricity market and electricity distributors, i.e., indirectly by electricity consumers in their bills. Unfortunately, information on the amount of capacity payments received by thermal plants burning coal is not available.

Exceptions to the Large Combustion Plants Directive

The government has asked (and allowed) for exemptions to the application of the maximum emissions allowed

under the Industrial Emissions Directive (IED). This clearly affects the electricity generation plants using coal in general and those using national coal in particular. 17 out of 19 plants which burn coal have been granted one of the following exemptions:

1. National Transition Plan, which allows these plants to emit more SO₂, NO_x and particles until July 1st 2020, under the condition that, by then, they will adapt to the most stringent emission values envisaged in the IED.
2. Exceptions to the limited useful lifetime (LUL), which allows them to be exempt from complying with the maximum emission limits and the sulfur index established in the IED, as long as they comply with some conditions. One of them is a commitment to run the plant for a maximum of 17500 hours between 2016 and 2023 (Greenpeace 2015).

Environmental regulation

The owners of the coal mine have some obligations aimed at mitigating the impacts of mining activities, including an environment impact assessment, the payment of deposits which ensure the rehabilitation of the environment as well as compliance with the recovery plan for the area. Finally, the owner is required to implement a project for the closure of the installations. In this context, Royal Decree 975/2009 on management of the wastes from mining industries and protection and rehabilitation of the areas affected by the mining activities has particular relevance as stressed in the MA 2013-2018.

Payment for NO_x emissions reductions

After termination of the RGS in 2014, the coal sector asked the government to approve a new mechanism to encourage the use of national coal in thermal plants. In 2015, the government designed a new support scheme "to regulate the capacity mechanism for the environmental improvement of specific electricity-generation plants". Those plants which bought national coal would be paid an amount of money to carry out environmental investments which would lead to a reduction in NO_x emissions. This reduction would be needed in order to comply with the IED since 2020. However, in 2015, the European Commission stated that such mechanism violated EU State Aid regulation and, therefore, it was not approved (Greenpeace 2015, OCE 2016).

⁸ The amount of this support was very high compared to other types of support. According to OCE (2016), the amount of support funded through the RGS was 1300 M€ between 2011 and 2014, whereas support for coal extraction was much lower: 459 M€ in the same period.

3.1.7 Latest developments

Two recent developments are worth mentioning:

1. In April 2016, Spain notified plans to grant public support to the operators of 26 coal mines that are due to be shut down until 2018. In a recent Communication, the European Commission has found Spanish plans to grant such aid (€2.13 billion) to be in line with EU state aid rules. The Communication stresses that the aid aims to alleviate the social and environmental impact of the mine closures without unduly distorting competition in the Single Market. The Commission concluded that the plans are in line with EU state aid rules, in particular Council Decision 2010/787/EU. This allows Member States to cover production losses and certain exceptional costs arising from the closure of uncompetitive coal mines, in order to alleviate the social and environmental impact. This requires in particular that mines receiving such aid must be wound
2. The European Commission has ruled in May 2016 that the Spanish government has been giving aid to mining companies in the period 2011-2015 (about €1.5 billion) without its approval (for a question of time). However, it has also concluded that the aid, though unlawful, was actually compatible with the internal market, i.e., it would have approved the aid if it had been notified on time. Because of this compatibility, the Commission could not order recovery of the aid from its beneficiaries (Clientearth 2016).

3.2 Drivers of the policies

This section discusses the arguments which have been put forward in the past to justify the policies, i.e., the theoretical or practical basis for designing the underlying policies. These policies show the resulting pressure and negotiation power of different stakeholders, which led to opposing forces, some trying to continue support for national coal, others for phasing out this support and for mitigating the socioeconomic impacts of phasing out such support. These three groups of stakeholders include the mining coalition (made up of the miners, represented by the labour unions, the industry association CARBUNION and local governments), the government and the EU.

3.2.8 Drivers for continuing support for national coal

Lower dependence on fossil fuel imports

Most coal being consumed in Spain (about 70%) is imported, since national coal is more expensive, due to its higher extraction cost. This is generally the case except for the black lignite coal in Teruel (Aragón, North-East of Spain), which has a reasonable quality (Fundación para Estudios sobre la Energía 2008). However, both the Spanish government and the mining industry have justified the use of national coal (and the support for it)

down by the end of 2018 at the latest. The Spanish authorities have given a commitment to recover any aid from mines that have not been closed by that date (European Commission 2016).

on the grounds of a "reliable and national" fuel source in order to avoid security of supply problems. Indeed, the external energy dependence of Spain is around 80% of primary energy demand. Coal is often regarded as a positive energy source to enhance the security of supply, since there are large reserves all over the world and in politically stable countries.

Ensuring back-up due to greater penetration of intermittent renewable electricity

It is also often argued that coal is an appropriate accompanying energy source to renewables, which need back-up capacity to ensure reliable energy supply, with operational flexibility and low fuel cost. Some argue that coal complies with these three conditions in a better way than the other thermal sources, be them nuclear (with a more rigid functioning and higher initial investments) or gas (with more expensive operational costs) (Fundación para Estudios sobre la Energía 2008). In fact, these arguments are put forward in the MA 2013-2018, which states that "the intermittent feature of renewable energy sources, given their dependence on meteorological conditions, has stressed the need and importance of maintaining non-intermittent national energy sources which guarantee electricity supply in any circumstance".

The text adds that, in order to comply with this goal, national coal is our only indigenous fossil fuel. Coal has been used in the past to cover electricity peak demand and they may also cover peak demand periods in the future (Martín 2014)⁹

Ensuring a competitive industry post-2018

According to MINETUR (2016), the aim is to have, by the end of 2018, a national mining industry which is competitive and which can continue to operate without public subsidies, in accordance with the Decision 787/2010 of the EU.

Socioeconomic impacts in mining areas and the creation of a sociopolitical constituency around coal

As stressed by MINETUR (2013, p.25), mining areas have been a monoculture of coal which, together with other factors such as the existence of a highly dispersed population, very small towns, lack of infrastructures and some environmental deterioration, has made it difficult to put alternative industries in place.

Thus, the mining areas have a strong dependence on coal mining, which is the basis of the local economy and a main activity contributing to local jobs. In fact, the reduction in support has led to a loss of 52000 inhabitants in the towns with mining activities in the last 15 years, with percentages that in some cases reach 40% of the population (Martínez 2016).

This has led to the creation of a strong constituency of different actors (labour unions, municipal and regional governments and the industry association) which have lobbied the national government in the past to continue support for national coal production. Fear for the protests of the affected groups may have also played a relevant role in this context. As elsewhere, coal miners' unions have been strongly mobilised in Spain. For example, after passing the new coal plan (MA 2013-2018), which was agreed between the government, the labour unions and the industry association, the government stressed that this would involve "peace and calm" in the mining areas (ileón 2013). However the MA entailed a substantial reduction in support levels and led to a large mobilisation of the miners, which marched to Madrid on foot in July 2012 to protest against the new plans of

the government for the mining sector (El Mundo 2016). In fact pressure from the sector, labour unions and local governments has been a barrier to cease support for coal. This seems to have weighed considerably, leading to attempts by the governments to maintain the support and even extend it, but colliding with the EU on this. This has sometimes led to the government proposing legislation whose drafts were against EU law (for example, payment for NOx emissions reductions, see section 3.1.5.4). Pressure has even been exerted on the regional governments. For example, in Asturias, the labour unions have urged the regional government to have a "less passive attitude", despite the fact that little can be done by this administrative level (El Comercio 2016). According to La Vanguardia (2016) the government in Asturias will start a "dialogue" with the electricity generation firms to ask them to buy national coal, although this government does not have the "instruments to persuade them".

This is deemed a typical case of political economy, whereby the noise made by the few beneficiaries with the continuation of support is louder than the silent complaints of millions of electricity consumers who are burdened with the costs of the policy.

3.2.9 Drivers for phasing out support for national coal

But there have been opposing forces working in the opposite direction, i.e. towards phasing out support for national coal.

EU legislation

EU regulations (in particular, Decision 787/2010) is the main driver which, in turn may be driven by other factors (i.e., climate policies). Complying with EU law has been a common argument of the government to propose Coal Plans in the past and present which have led to a reduction of such coal support and closure of mines. For example, the Minister of Industry in 2014 explained that the previous government approved a Royal Decree which set the requirements for electricity-generation companies to buy national coal until December 2014 (the RGS, see section 3.1.4). The Minister explained that such RGS was not extended because the European Commission does not allow this type of support, since they would be considered state aid.

According to Chinchetru (2016), it is well-known that the governments were trying to implement a closure

⁹ However, according to the electricity system operator (Red Eléctrica de España), coal only covered 2.5% of maximum peak power demand in 2014 (Red Eléctrica de España 2014).

plan for the non-competitive mines but all the attempts were unsuccessful. In fact, large subsidies continued to be provided. The Ministry of Industry, the industry association and the labour unions signed an agreement in 2012 in order to reduce the production in surface mines. However, the plan was rejected by the European Commission since it did not consider the closure of any mine, which would continue to live from the support. Therefore, the European Commission struggled to reach the current agreement.

High perceived costs and subsidies

National coal has been heavily subsidized. According to the Ministry of Industry, the costs of support for coal mining firms has been 22000 M€ in the 1992-2014 period (MINETUR 2015c). In the past, support levels were even higher. The annual average was 1000 M€. Chinchetru (2016) calculates that between 1998 and 2014 support amounting to 250000€ per job in the sector were provided. According to Martínez (2016), the average retirement age of a miner was around 44 years, and 51% of former workers earns a pension of between 1700 and 2500€. This amount has been increasing in recent times, since the average pension in 2015 was 2386€. This represents 1000€ more than the average pension in Spain in 2015. Many people, in spite of being aware of the hard and dangerous work carried by miners and the detrimental effects on their health, believe that this support is too high.

Therefore, the social acceptability and, thus, political feasibility of those subsidies by the general population has increasingly been called into question. In addition, the economic crisis has further eroded the political feasibility to continue such support. As stressed in the MA (2013, p.8), "in the context of the current economic and financial crisis, an ordered closure of uncompetitive mines is required through a reduction in production-related support".

National coal being more inefficient and expensive than imported coal

National coal generally has a higher cost than foreign one and also than other energy sources. An exhaustive assessment of the economics of coal by the Fundación para Estudios de la Energía (2008) led to the conclusion that national coal was reducing its share in energy supply in Spain due to several factors: the exhaustion of coal mines (in particular, of the brown lignite in Galicia) and

the high costs of coal extraction and production, which was clearly above the prices of imported coal. According to this study, the available reserves of national coal are not abundant, their quality is heterogeneous, but generally not very good (p.28). This low competitiveness, higher costs of national coal has been used as an argument by the Ministry of Industry (MINETUR 2015).¹⁰ The Minister himself admitted that national coal was more inefficient and expensive than imported coal (MINETUR 2015). The fall in the international coal prices has been mentioned by the Spanish government as one of the reasons for the coal crisis in Spain (Diario Teruel 2016). The general manager of the industry association confirms this, when he states that "the extraction costs in underground mining are above the costs of international coal, whereas the surface mines can be competitive, as long as their production levels go in tandem with the design of the mine" (op.cit.). The latter means that, given the significant economies of scale in the sector, higher volumes really make a difference in terms of the competitiveness of coal production.

Overcapacity in electricity generation

In the current situation of excess capacity in electricity generation in Spain, it is difficult to defend support for a single technology, whether directly or indirectly, whether using a foreign or an indigenous fuel.

Indeed, an excessive electricity generation capacity has been accumulated in Spain in the last decade. The electricity generation capacity installed in the last 15 years has increased significantly and virtually doubled between 2001 and 2014, from 55 GW in 2001 to 102 GW in 2014. Most new generation capacity came mainly from two technologies: wind power and natural gas-fuelled combined cycle gas turbines (CCGTs). Between 2003 and 2010, Spain installed 25.3 GW of natural gas-fuelled generation plants. From 2010 to 2014, the CCGT capacity has remained roughly constant. Over the same period 2003–2014, installed wind power increased from 6.2 GW to 22.8 GW. The gap between the evolution of the installed generation capacity and the hourly peak demand in the country (in the peninsular system) has been steadily growing

¹⁰ However, the claim that it is more expensive has been contested by the industry association. "National coal is paid at lower prices than imported coal. The former is around 60€/metric ton and the latter is around 90€/metric ton" (Martín 2014). However, the current international prices of coal are much lower nowadays.

in the last 10 years. More importantly, the excess dispatchable capacity has also increased significantly over the same period.

The Spanish system has a larger excess capacity than other EU countries. Following the methodology of the European Network of Transmission System Operators for Electricity (ENTSO-E), the Spanish Ministry of Industry determined that the “demand coverage ratio” of the Spanish system (1.73) was much higher than Italy (1.28), Germany (1.21), the UK (1.15), or France (1.09) (this study analysed values for the year 2011)(see del Río and Janeiro 2016 for further details).

There have been several causes of this overcapacity problem: (1) Risk of black-outs at the end of the 90s. (2) Expectations that electricity demand would be higher. (3) Cheap and easy financing. (4) The economic boom led to a considerable growth in demand. (5) Positive signals by the government for investments in renewable energy. (6) Positive signals by the government for investments in CCGTs. (7) Overcapacity is an inherent problem for electricity systems with a high RES penetration (see del Río and Janeiro 2016 for further details).

3.3 Consequences of the policies on the coal transition, managing socio-economic impacts

Policies to support national coal have sustained this economic activity in the past. The proof is that, when such support has gone down, production and employment levels have drastically been reduced.

According to Greenpeace (2015), without this support, the mining activity in Spain would have ceased, due to the reduction in electricity demand, the high price of national coal, its low quality and the low competitiveness of national coal versus other energy sources. There are a few competitive mines in Spain, however. Most coal in Spain (bituminous coal, anthracite and black lignite) is used for electricity generation and, after the termination of the RGS mechanism, the mining sector has been seriously harmed.

The importance of different types of mining policies has shifted overtime. Support for production has lost relevance, whereas those policies aimed at mitigating the impact of coal phase-out on the workers and regions have gained importance. However, somehow surprisingly, a detailed assessment of the impact of the support on the regions and municipalities directly benefiting has not been carried out, to our best knowledge. Although

3.2.10 3.2.3. Drivers for policies accompanying the transition

Policies accompanying the transition were designed to mitigate the negative socioeconomic impacts on the regions by supporting workers and alternative investments in the mining areas.

Mitigate the impact of the gradual closure of coal mines on unemployment

As shown in section 2, employment in the mines has been drastically reduced in the last two decades. Since alternative activities which could absorb those workers are not available, a considerable increase in unemployment and migration from the mining areas has resulted. The dark outlook for miners and their families has triggered policies to support the workers (compensations, training) but also the reactivation of the regions.

Support economic progress in the affected areas

Reactivation of the regions has mostly been undertaken through infrastructure provision and the other measures considered in the MA (see section 3.1).

it is obviously too early to judge on the local impacts of the Action Framework 2013-2018, it should not be so early for providing analysis of the previous coal plans. However, there is some anecdotal evidence and opinions on these effects. The main conclusion from this evidence is that the money does not seem to have allowed these zones to reconvert to alternative production activities, which was the aim of the policy. This might have been caused by two factors. First, the amount of funds was very low. But it is more likely that the main reason was that the funds were dedicated to non-productive activities. In particular, there has been criticism of too much emphasis on public infrastructures, but on the other hand, good infrastructures encourages the location of industries in the areas. For example, according to Martínez (2016), the labour unions have denounced that the funds for the transformation of the mining areas have not had the desired effect, leading to a pensioner economy. “There aren’t opportunities here. Firms able to create employment have not been set up, but we have the best sidewalks and streetlights” argues Angel, a pre-retired miner. According to Colinas, secretary general for UGT in the mining areas

in the North of Spain “the industrial estates in the mining areas are empty, the support funds have been used to build business such as a petrol stations or garages that do not provide jobs”. Nuño (2016) claims that the different stakeholders should closely collaborate in order to require that any support is intended to ensure a green future for mining areas, such as the creation of sustainable jobs, the replacement of dirty energy sources for cleaner ones or the improvement of energy efficiency. This author mentions that a fair plan for the transformation of the sector as well as positive examples on the correct use of the support funds are missing. It should also be taken into account that Spain has suffered a very deep economic crisis since 2008, with negative GDP growth rates and public funds for many subsidized activities have been reduced or even removed. Furthermore, the labour unions complain about non-compliance of the government with the agreed support in the framework of the MA 2013-2018. Both large labour unions complaint about:

- the support for mining companies not being published in 2016,
- support for environmental rehabilitation (support for the rehabilitation works needed after the closure of the mines) to firms in the process of closure has not been credited in 2015 and 2016.
- Non-compliance with the 7.5% share of national coal in electricity generation.
- A capacity payment mechanism has not been implemented.
- Support measures for electricity generation firms to carry out environmental investments have not been implemented.
- The fiscal exemption of the variable part of the special tax on electricity (green cent).
- They also encourage the government to speed up compliance with the social plan and the implementation of the mechanisms for the economic boost (reactivation and alternative development) of mining areas (Ojea 2016, UGT 2016).

Urgent proposal for the support of CCS technologies. The labour unions and the industry association complain that a Plan for the Closure of mines was sent to the European Commission in May, but that they do not know their content. The industry association and the labour unions have complained about the lack of dialogue between the Ministry and the coal-related stakeholders. This transition can be deemed sustainable in economic terms, given the comparatively low quality and higher

costs of national coal. Supporting a sector which incurs losses is not economically sustainable and, thus, gradually phasing out support can be justified. It is also not inequitable since the burden of support has either fall on electricity consumers or taxpayers to the benefit of a small set of actors. The transition has led to social backlash against the policies in the affected regions, but this could be an expected result when actors benefiting from support stop receiving this support. Although the mass media has overemphasized the violence of the protests, and certainly there have been protests, there is not a constant conflict on the streets of the mining areas. As explained in detail throughout this report, the socio-economic impacts were managed through compensations to different types of actors: workers, communities and firms.

4 Conclusions: what lessons can be learned from coal phase-out experience in this country?

The measures adopted by the government to reduce coal production and consumption have been effective. And demand for coal has gone down as a result of the combination of lower electricity demand and increasing renewable energy penetration. A drastic reduction in employment and production levels has been experienced. In contrast, measures to mitigate the negative impact on the affected zones have been less effective.

Some measures have aimed at mitigating the impact in the zones, first through support for production, early retirement etc... and then with actions on the territory, i.e., through the provision of infrastructure. However, an alternative industry has not been created, i.e., a development model which absorbs the unemployed workers and avoids the economic downturn in the mining areas. The support measures have rather solved sporadically the problem of those being unemployed through income

transfers, but not by relocating them in an alternative activity. Many miners are not only worried about their jobs but about the future of their children and this has not been addressed (Hernández 2016). There seems to have been an excessive emphasis on the provision of public infrastructure rather than encouraging the setting up of alternative industries which are both economically and socioeconomically sustainable in the long term. This is certainly a mistake to be avoided in the future. One lesson is that, once it is decided to phase out coal, governments should try to manage the negative socio-economic and distributional effects in the most appropriate manner, e.g., both by compensating workers and creating alternative industries which provide a brighter outlook for the negatively affected regions.

Table 16. Transition strategies — Typology (Spain)

Support	Compensation or grandfathering (backward-looking)	Structural adjustment assistance (forward-looking, narrow)	Adaptive support (forward-looking, broad)
Consumers/households			
No support	New policies that raise consumer prices or taxes have not been offset for households. No compensation for electricity consumers who have experienced an increase in their bills. No consideration of impact on low-income households.	Consumers have not been supported to adapt to the policy. In fact, consumers have been the ones paying for the policy	-
Workers			
Workers have been supported	Compensation for losing the job. Incentives for early retirement (see section 3.1).	Workers have not given cash or in-kind assistance to assisting them to retrain into new jobs and/or relocate. Relocation incentives, incentives to find new jobs and retraining policy have been weak (see section 3.1).	In Spain, workers have not been given strong support not only to find new jobs but to maintain existing or develop new valued attachments (of the kind that cannot easily be compensated), e.g. work of a similar social standing, in the same industry and/or same place (see section 3.1).
Communities			
No support	-	-	Communities in which industries have declined have been supported, mostly through public investment in infrastructure, but not through skills or industry policy (see section 3.1).
Corporations			
No support	Continuation of production support (decreasing)	-	-

Source: Table content by the author(s). Table concept by Fergus Green.

References

- BLOOMBERG (2015). European Coal Prices Slump to a Record Low. September 22nd, 2015 <https://www.bloomberg.com/news/articles/2015-09-22/coal-for-2016-declines-below-50-in-europe-as-glut-persists>.
- Caballero, E. (2011). Cambios demográficos y reconversión industrial asociados al cambio de modelo energético: fin de la actividad minera en Asturias. Revista Eubacteria, nº27, pp.1-7.
- CARBUNION (2015). Memoria de actividades 2014. Available at <http://www.carbunion.com/>
- CARBUNION (2016). Coal statistics.
- Chinchetru, A. (2016). En 2019 sólo quedará una mina de carbón abierta en España. O.K. Diario 3/5/2016
- Clientearth (2016). Analysis: Spanish mines paid to close, must close. <http://www.clientearth.org/spanish-coalmines-paid-to-close-must-close/>
- Coll, S., Sudría, C. (1987). El carbón en España (1770-1961). Turner. Madrid.
- Diario de Teruel (2016). Las Cortes defienden el carbón como sector estratégico para la generación eléctrica. Diario de Teruel 21/10/2016.
- El Comercio (2016). SOMA y CCOO piden "contundencia" al Principado en la defensa del carbón. 21/10/2016.
- El Mundo (2016). ¿Qué será del carbón a partir de 2018? El Mundo 30/5/2016.
- European Commission (2016). European Commission Press release. State aid: Commission clears €2.13 billion aid to alleviate social and economic impact of closing 26 uncompetitive coal mines in Spain. Brussels, 27 May 2016. http://europa.eu/rapid/press-release_IP-16-1910_en.htm
- Fundación para Estudios sobre la Energía (2008). El futuro del carbón en la política energética española. González, N. (2005). Importancia de los planes de reordenación en la reconversión del carbón en España. *Pecunia* 1, pp. 67-92 Greenpeace (2015). Las trampas del carbón. Informe sobre las centrales térmicas de carbón en España.
- Hernández, F. (2016). Interview with Félix Hernández, energy expert.
- Illeón (2013). Firmado el Plan del Carbón 2013-2018 esperando llevar "tranquilidad y sosiego" al sector minero. 1/10/2013.
- La Vanguardia (2016). Javier Fernández pedirá al Gobierno y a las eléctricas la defensa del carbón. 20/10/2016
- Martín, M. (2014). Situación del carbón en España. Una visión sostenible y de futuro. Jornada sobre energía geotérmica y otros recursos energéticos naturales. Cámara de Comercio My 7th 2014, Zaragoza.
- Martínez, V. (2016). Los últimos mineros del carbón. El Mundo. 20/3/2016.
- Maurín, M. (1999). Un caso especial de planificación regional: el Plan 1998-2005 de la minería del carbón y desarrollo alternativo de las comarcas mineras, Departamento de Geografía, Universidad de Oviedo, pp.867-875
- MINETUR (2013). Marcos de actuación para la minería del carbón y las comarcas mineras en el periodo 2013-2018
- MINETUR (2015a). La Energía en España 2014.
- MINETUR (2015b). Estadística Minera de España 2014.
- MINETUR (2015c). El Ministerio de Industria, Energía y Turismo anuncia una norma que facilitará el consumo de 6 millones de toneladas de carbón nacional. Ministry of Industry (2006). Plan Nacional de Reserva Estratégica de Carbón 2006-2012 y Nuevo Modelo de Desarrollo Integral y Sostenible de las Comarcas Mineras.
- Nuño, T. (2016). Futuro sostenible para las cuencas de carbón en España. Alternativas Económicas 17/6/2016
- Observatorio Crítico de la Energía (OCE)(2016). El carbón en España en 2016.
- Ojea, I. (2016). Los sindicatos y Carbunión presentan un manifiesto en Defensa de la Minería del Carbón. El Periódico de la Energía 2/6/2016
- Rabanal, N. (2009). Coal restructuring in Spain: Continuity and uncertainty? Energy Policy 37, 4373-4378.
- Red Eléctrica de España (REE)(2014). El sistema eléctrico español. <http://www.ree.es/es/publicaciones/sistema-electrico-espanol/informe-anual/informe-del-sistema-electrico-espanol-2013>
- REE (2016). Statistics from REE. <http://www.ree.es>
- Del Río, P., Janeiro, L. (2016). Overcapacity as a Barrier to Renewable Energy Deployment: The Spanish Case Journal of Energy, 1-16.
- Rodríguez, J. (1999). El Plan MINER como instrument de reactivación socioeconómica de las cuencas mineras de León. Polígonos nº8, 195-211. Servimedia (2016). La producción eléctrica a partir de carbón se reducirá un 40% en 2016 frente al incremento de las renovables. Leonoticias 20/10/2016
- UGT and CCOO (2015). La minería del carbón y las comarcas mineras desde 1986 hasta y después del 2019 en España.
- Vega, J. (2000). La minero-siderúrgica de Ponferrada y el Plan del Carbón. Facultad de Ciencias Económicas. Universidad de Valladolid.

COAL TRANSITIONS: RESEARCH AND DIALOGUE ON THE FUTURE OF COAL

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