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*THE ENERGY SECTOR AND THE JUST
TRANSITION IN SPAIN: THE ROLE OF
SOCIAL DIALOGUE AND LABOR
RELATIONS*

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Spanish National Baseline Report
Luis de la Fuente Sanz
Jesús Cruces Aguilera
Fundación 1º de Mayo**

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Direttore scientifico della collana

Paolo Terranova p.terranova@fdv.cgil.it

Responsabile dell'area Ricerca

Daniele Di Nunzio d.dinunzio@fdv.cgil.it

Coordinamento redazionale

Fabiana Lippa f.lippa@fdv.cgil.it

Progetto grafico e editing

Antonello Claps a.claps@fdv.cgil.it

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Per commenti e/o richieste di informazioni rivolgersi a:

Fondazione Giuseppe Di Vittorio
Via G. Donizetti, 7/b – 00198 Roma
Tel. +39 06 857971
wp@fdv.cgil.it
www.fondazionedivittorio.it

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REJEnerAXION Project National Report Spain

Abstract in English

This working paper, which is part of the European project REJEnerAXion, financed by the European Commission and led by FDV, analyses the processes of just energy transition in Spain and the role of social dialogue and labour relations in the management of this type of transitions. A first presentation of the energy sector in Spain and the energy transition policies carried out by Spain in the last decades is made. In addition, an analysis is made of the impact of the transition to more renewable energy sources on the Spanish energy system, taking into account the structure of production and consumption of energy, the evolution of employment in the sector, labour conditions and territorial impact. Similarly, a presentation is made of the Spanish social dialogue and labour relations system with special attention to the position of the social partners with respect to the just transition and the role of social dialogue and labour relations in the management of this type of transition. The methodology used for this working paper is based on desk research and interviews with national and sectoral key informants (academics, experts and trade unionists).

JEL Classification:

Keywords:

Energy transition, just transition, Social dialogue, labour relations, employment, Spain.

THE ENERGY SECTOR IN SPAIN¹

1. AN INTRODUCTION

The energy sector is a central sector in the social and economic development of a country, due to its dual role as an intermediate good for manufacturing industries and as a basic necessity for citizens. In addition, electric power is becoming a source of energy for current technological and scientific development. Since the 1980s, Spain has been experiencing a reduction in the use of oil as a primary energy source, which represented 73% of total primary energy consumption, in favour of other energy sources such as renewable energies, gas, nuclear energy or coal (CES, 2018).

The main activities of the energy sector are the generation of energy, the transport of this energy, its distribution and its commercialization. Since its origin, the energy sector was configured in Spain as a state monopoly, with few companies that had an important vertical structure (CES, 2018).

As a consequence of European Union regulations, in the 1980s in Spain there was a reconfiguration of the energy sector reducing that vertical structure and establishing a division between regulated and non-regulated activities, as well as pricing mechanisms. As a result of this differentiation, the main public electricity company (Endesa) was split into two companies, one focused on distribution and commercialization (Endesa) and the other on transmission and maintenance of the electricity system (Red Eléctrica). In the 1990s, as a consequence of European policies aimed at increasing competition and achieving a single market for goods and services, the main public energy company (Endesa) was privatized and is now 70% owned by a public company in the energy sector (Enel).

This process of liberalization of the energy sector has been reconfiguring the electricity and gas sectors, resulting in a small number of large companies that account for most of the market and a large number of small companies with a small volume of business. The large companies offer combined electricity and gas services. Specifically, according to data

¹ This paper is part of the project “REJenerAXion - Energy for a just and green recovery deal: the role of the industrial relations in the energy sector for a resilient Europe”, a European Union co-funded research project (101052341/SOCP-2021-IND-REL) aimed at analyzing and strengthening the role of innovative industrial relations structures, including social dialogue, to respond in a socially fair and balanced way to the main challenges and opportunities offered by a clean-energy transition at national and European level.

The project partners are: Fondazione Di Vittorio (Italy, project coordinator); Federazione Italiana Lavoratori Chimica Tessile Energia Manifatturo – FILCTEM CGIL (Italy); Fundacion 1° de Mayo (Spain); Association travail emploi Europe société-ASTREES (France); wmp consult – Wilke Maack (Germany); Laboratoire d’Etudes sur les Nouvelles formes de Travail, l’Innovation et le Changement, LENTIC, Université de Liège (Belgium); Instytut Spraw Publicznych (Poland); Central European Labour Studies Institute CELSI (Slovakia and Hungary). Supporters are: European Federation of Public Service Unions- EPSU (EU); European Trade Union Institute – ETUI (EU). Website: <https://www.rejeneraxion.com/>.

The aim of the paper is to provide the main results of research reports at a national level based on desk analysis and qualitative research (in-depth interviews with stakeholders) considering the transformations taking place in the energy sector oriented towards clean energy and their impacts on the world of work and the role of industrial relations and social dialogue for a just transition.

from the Spanish National commission of markets and competition (CNMC, 2022), in the gas sector there are 122 retailers in the retail sector in 2020, of which only 4 retailers have a percentage of customers greater than 5% of the total number of customers, with one of them grouping together more than 20% of the customers. In the electricity sector, the situation is similar, although market concentration is more pronounced, with only 3 marketing companies out of a total of 374 marketing companies having a percentage of customers exceeding 5% of the total number of customers in 2020, with one of them accounting for more than 30% of customers.

Spanish energy policy has been aimed at achieving greater diversity in the energy mix and less dependence on oil. This trend originated in the 1970s, when the country depended almost exclusively on oil, after which new coal, nuclear and combined cycle thermal power plants began to be installed. More recently, renewable and biofuel power generation plants have begun to be installed (Costa, 2016).

The objective of the report is to show the transformation that the energy sector is undergoing in Spain, paying special attention to the evolution of employment and to expose the role that social dialogue is playing in this transformation.

The report starts from a framework of national policies for the energy transition, exposing the institutional initiatives to support the just energy transition taking into consideration the geopolitical implications and strategic autonomy of this sector. It then shows the most important trends in the energy sector, taking into account its economic, environmental and employment structure and evolution, as well as the territorial impact of the transformation processes. Finally, special attention is paid to social dialogue, labor relations and innovative practices in support of just energy transitions.

From a methodological point of view, the report is based on two sources of information: (a) desk analysis, based in bibliography review and data analysis, (b) a qualitative research, based on semi-structured interviews, covering various profiles and organizations: trade unions representatives, experts from public administration and university.

2. NATIONAL POLITICAL FRAMEWORK FOR ENERGY TRANSITION

Spain's energy policy is framed within the EU energy policy, the international energy context, the 2015 Paris Agreement and the 2030 Agenda. The objective of this treaty is to limit global warming to well below 2 degrees Celsius compared to pre-industrial levels. To achieve this goal, countries have committed to a reduction of greenhouse gasses. Specifically, by 2030, Spain has committed to reduce its GHG emissions by 23% compared to 1990, to achieve a 42% share of renewable energy in total gross final energy consumption, to achieve a 39.5% improvement in energy efficiency and to establish a 74% share of renewable energy in electricity generation. All these targets lead to the goal of climate neutrality in 2050, with intermediate milestones in 2030 and 2040 (MITECO,

2022.b. p. 4).

2.1. Overview of relevant policy and legal framework

In 2019, in line with the European regulations², the Spanish government established the *1 Strategic Framework for Energy and Climate* by which the measures to favour the transition towards an economic, sustainable and competitive model that allows to fight against climate change were established. This strategic framework is structured on three pillars: the climate change law, the Spanish National Integrated Plan on Energy and Climate (PNIEC) (2021-2030) and the just transition strategy. The climate change and energy transition law aim for the electricity system to be 100% electric and GHG-neutral for the economy as a whole by 2050. The Spanish integrated national energy and climate plan 2021-2030 has laid the foundations for greenhouse gas reduction during the period 2021 and 2030. For its part, the just transition strategy aims for a solidarity roadmap to ensure that people and territories can take advantage of the opportunities of the energy transition by ensuring a socially just transition and that no one is left behind (MITECO, 2022.b.).

In 2020, the Spanish *Strategy for Science, Technology and Innovation (2021-2027)* was approved; one of the strategic lines is "Climate, Energy and Mobility". This strategic line includes climate change and decarbonization, sustainable mobility and sustainable cities and ecosystems (MCI, 2020).

Following the crisis that occurred after the COVID 19 pandemic, the EU proposed a plan for the recovery of the economy, which in Spain took the form of the National Plan for Recovery, Transformation and Resilience. This plan is based on four axes (ecological transition, digital transformation, gender equality and social and territorial cohesion) that are specified around leveraging policies and components that make up a reform and investment program. Specifically, 11 strategic projects have been approved, highlighting the *Circular Economy and Renewable energies, renewable hydrogen and storage* (Government of Spain, 2021).

In December 2022, the European Commission approved the *Spanish Territorial Just Transition Plan (2021-2027)* and the *Spanish Just Transition Program (2021-2027)*, aimed at reducing the impacts produced by the closures of coal-fired power plants and mining extraction areas, affecting a total of 9 Spanish regions, with an expected job creation of 6,000 jobs and a planned investment of 1,250 million Euros, partly from the EU Just Transition Fund.

Indeed, in the third chapter of the Spanish government's Recovery, Transformation

² The European Union has set the path to be followed by the different member states of the Union in relation to energy efficiency (Directive 2018/2002), the promotion of energy from renewable sources (Directive 2018/2001), the design of the electricity market (Directive 2019/944), or in matters of security of electricity supply or governance in energy matters (Regulation 2018/199). In 2019 the roadmap for the different countries was set through the European Green Pact and the mechanism for a just transition; adopting for this purpose a European climate law in 2021 (Regulation 2021/1119).

and Resilience Plan. The chapter includes the development of a decarbonized, competitive and efficient energy sector. Its chapter is aimed to mobilize significant private investment, with the objective of leveraging renewable potential and existing value chains to strengthen competitiveness for domestic and export markets. Also, the following 4 components are developed there: the deployment and integration of renewable energies; the development of electricity infrastructures, promotion of smart grids and deployment of flexibility and storage; the design of a renewable hydrogen roadmap and its sectoral integration; and the Just Transition strategy.

2.2. Institutional initiatives to support a just energy transition

The *climate change law* (7/2021) includes the obligation to approve five-year strategies with the aim of assessing the impacts and risks of climate change and the measures and policies aimed at increasing resilience and reducing possible vulnerabilities resulting from climate change in Spain. It also provides for the obligation to agree on just transition agreements between the central administration, regional administrations, local entities, affected companies, trade unions and other social actors, with the aim of promoting economic activity and its modernization, improving the employability of vulnerable workers and groups at risk of exclusion in the transition to a low-carbon economy, particularly in cases of closure or reconversion of facilities (BOE, 2021).

Specifically, the first *urgent action plan for just transition (2019-2022)* had the following objectives: a) to guarantee adequate compensation to those workers who lose their jobs in mining companies, b) to maintain employment in the affected mining areas through various plans, c) to offer just transition agreements in those territories affected by the closure of coal or nuclear power plants with the aim of not generating negative impacts on employment and population at the end of the process (MITECO, 2022.b.).

In order to provide institutional support to the just transition process, two specific public bodies have been created: the Institute for Just Transition (<https://www.transicionjusta.gob.es/>) and the Institute for the diversification and saving of energy (IDAE) (<https://www.idae.es/>).

As a starting point for the urgent action plan on energy transition, two agreements have been agreed between the state administration, the companies undergoing reconversion and the majority trade unions. Specifically, a framework agreement was signed in 2018 for a **just transition of coal mining and the sustainable development of the mining districts (2019-2027)** and in 2020 the **agreement for a just energy transition for thermal power plants in closure** was signed. These agreements establish tripartite monitoring structures that meet on a regular basis.

The framework agreement for a just transition of coal mining and the sustainable development of the mining districts (2019-2027). This framework agreement was signed in 2018 by the state administration, the trade unions CCOO, UGT and USO and the national federation of coal mining employers. This agreement has aimed

to finance initiatives so that the closure of facilities does not have impacts on employment and on the territory in terms of depopulation at the end of its implementation (MITECO, 2022.b, p 55). This agreement has made it possible to monitor the measures adopted by counting the results of each of the projects established in terms of jobs created, surface area recovered or investment planned, depending on the type of project.

Overall, it is estimated that from a total of 234 mining companies employing 45 thousand people with a production of 19.32 million tons in 1990, to a total of one company, with a workforce of about 1,700 people and about 3 million tons in 2017, which has led to a growth in unemployment in the mining districts especially youth unemployment, along with a high depopulation of these areas (ITJ, 2022.b).

The last plan (2019-2027) has an expected impact of around 1,700 workers in three regions (Aragón, Castilla y León and Asturias) and one municipality (Puertollano) that will be affected by the closure of the mining companies, among the aid contemplated in this plan are: (ITJ, 2022.b):

- a) A social plan with aid for early retirement (with a scope of 310 people and valued at €165.2 million) and incentivized leave (with an impact of 34 people and €1.2 million).
- b) Exceptional aid to cover the costs of companies that cease their activity, which includes aid to companies to compensate for losses due to coal not produced (26 million Euros).
- c) Other additional measures comprising job creation aimed at the environmental restoration of mining areas (approximately 350 jobs created) or the outplacement of workers through an outplacement company (430 people registered in the employment exchange of which 52% are employed).
- d) Economic stimulus measures for the reactivation of the mining districts aimed at financing new business activities, modernizing or expanding existing ones, valued at €18 million covering 130 projects and with the capacity to generate 625 potential jobs in the affected areas.
- e) Aid for the improvement of infrastructure in the mining areas, valued at 176 million Euros, aimed at 104 projects whose purpose is to improve services, infrastructure and the environment in these areas, including energy rehabilitation of buildings, improvements in industrial parks, the creation of social and health services, environmental restoration of damaged areas or projects for the tourist use of the local cultural and natural heritage. These last measures have had new funding through the National Recovery and Resilience Plan valued at 100 million Euros.
- f) Additionally, the facilities of one of the closed thermal power plants have been adapted to house a foundation (City of Energy Foundation) aimed at developing R&D&I initiatives focused on green hydrogen production and energy storage. Currently, within the framework of the National Recovery and Resilience Plan, expressions of interest are being launched with the aim of identifying lines of

action and agents interested in carrying out such projects.

The “Agreement for a just energy transition for thermal power plants in closure: employment, industry and territories” was signed in 2020 between the Ministry for Ecological Transition, the Ministry of Labor and Social Economy. This agreement aims to ensure adequate exits for workers who lose their jobs, implement Just Transition Agreements in the regions accepted by the closures, extend the scope of application of the Urgent Action Plan to coal-fired thermal power plants, establish a framework that can be extended to the closure of nuclear power plants and generate a framework for tripartite dialogue. The agreement contemplated the closure of 15 coal-fired thermal power plants of 4 different companies, with an installed capacity of 10.2 thousand MW and 2,740 people employed.

In terms of mechanism, the Just Transition process is articulated through Just Transition Conventions (JTC), which has as a priority objective the maintenance and creation of activity and employment, as well as the fixation of population in rural territories or in areas with coal mining, coal fired power plants or nuclear plants in closure. In particular, a diversification and specialization coherent with the socio-economic context is promoted, providing collective sectors with support in investments, restoration of the territories, support to industrial projects and development of SMEs, as well as retraining of workers. They are elaborated through participatory processes, with an assessment of potential job losses and a commitment based on various measures to maintain employment and population (ITJ, 2023).

Specifically, through the Institute for Just Transition (ITJ), resources have been mobilized to reactivate the areas included in the agreements. Most of these resources come from European Just Transition funds, Next Generation EU funds, the National Recovery and Resilience Plan and other national fundings. Between 2018 and 2022, these take the form of five lines of action (ITJ, 2022.c):

- Business projects: €33.2 M in aid to 270 business projects that will generate 1,258 jobs.
- Municipal initiatives to promote the economic activation of the territory: €5.5 M for 15 projects with the creation of 160 jobs.
- Improvement of municipal infrastructures (energy optimization, modernization of industrial parks, and creation of social facilities...): €108.6 M distributed among 102 projects and generation of 237 jobs.
- Restoration of land degraded by mining activity: 191.7 M€ of aid for 13 projects with a potential of 515 jobs.
- Social plan for coal mining workers (early retirements, incentivized leave, unemployment aid...): The ITJ has granted aid for the early retirements of 323 workers amounting to €19 million, approximately €126 million being the total cost of the permanence of these workers in the system. The figure for the compensated retirements as of December 31, 2021 is 540 thousand Euros.

In total, €338.9 million have been invested to help 400 projects in the territories with

Just Transition Agreements, with a potential impact on 2,170 jobs (ITJ, 2022.c). Most of these resources come from European Just Transition funds, Next Generation EU funds, the National Recovery and Resilience Plan and other national funding.

2.3 The geopolitical implications on energy transition

As a result of the energy tensions that have arisen following the Russian invasion of Ukraine, measures are being implemented throughout Europe to increase energy autonomy and reduce Europe's dependence on Russian gas. The main supply risk has been identified in natural gas, but the gas system also influences other energy markets such as electricity and petroleum products. For this reason, a coordinated response of energy saving commitments has been proposed for the EU as a whole. This commitment has been translated into a binding regulation applicable to the EU as a whole, with a voluntary commitment to reduce natural gas consumption by 15%, and in the event of an alert, this commitment would become mandatory, albeit with a lower threshold. Likewise, one of the commitments has been the decoupling of the electricity market from the natural gas market, introducing limits on natural gas prices and a limit on the price at which gas can be offered in the electricity system (Government of Spain, 2022).

To achieve these objectives, a strategic energy and climate framework is being implemented through the recovery, transformation and resilience plan. This plan has mobilized more than €5.2 billion public funds in calls for proposals aimed at the energy transition through various measures that have been accelerated through the +SE plan (Plan plus energy security). The package of measures is aimed at mitigating the impact of the reduction in energy supply on energy prices in the winter of 2022 and 2023, with energy saving measures and structural reinforcement of energy security (Government of Spain, 2022).

Specifically, the plan has 3 key objectives (Government of Spain, 2022):

- Increasing the protection of vulnerable consumers, households and companies with energy saving measures and support measures for the substitution of polluting energies with renewable energies.
- Strengthening energy autonomy by accelerating the implementation of measures already agreed in the strategic energy and climate framework and the implementation of additional measures.
- Solidarity with other EU member states, maximizing the use of existing energy infrastructures and favouring new infrastructures that are also compatible with the objectives of decarbonization in the medium and long term.

The + SE plan, published on October 19, 2022 (BOE, 2022), among other issues, includes measures to mitigate the impact of the escalation of prices in the retail gas market. Among other measures it includes the following: the possibility for communities of neighbours to benefit from the government's regulated price (TUR), the extension of the thresholds to access the gas and electricity social bonus, the flexibility of electricity and

gas free market contracts to benefit from the price safeguarded by the government, with facilities for households with elderly and/or minors, declaration of public utility of the direct connection lines of renewable gas production plants with the natural gas transport and distribution network, the deployment of smart natural gas meters; the administrative simplification of requirements for the construction of small self-consumption renewable energy facilities and tax deductions for energy efficiency improvement works in homes.

Specifically, this plan is based on 10 key measures (Government of Spain, 2022):

- More protection for consumers.
- More protection for neighbourhood communities.
- More renewable energy
- Greater commitment from the administration and large companies.
- Greater transparency in electricity and gas bills
- More tax rebates for the adoption of renewable energy.
- Green kit for SMEs, through financing from the Official Credit Institute (ICO).
- More support for the energy transition value chain, through the implementation of the Spanish Strategic Project for Recovery and Economic Transformation for renewable energy, renewable hydrogen and storage.
- Greater flexibility in energy planning
- Greater solidarity with the EU, through the expansion of gas export capacity to France by 18% and the extension of gas supply to Italy by ship.

To favour the coordination of this plan, a framework for dialogue and cooperation with the autonomous communities has been foreseen through a specific interministerial working group within the framework of the general state administration and the establishment of a sectoral energy conference with the participation of autonomous communities and local entities (Government of Spain, 2022).

3. MAJOR TRENDS IN THE ENERGY SECTOR

The energy sector has a central impact on the economic and environmental evolution of the country. The productive transformation capacity of this sector and its implications in other sectors of economic activity is one of the main factors to be taken into account in the processes of just transition.

The following is a review of the Spanish energy system, with special emphasis on the economic and employment dynamics of recent years. The sectoral delimitation defined in the project (coal, gas and oil) requires a certain methodological caution, due to the disaggregation of the available data³.

³ As general criteria, the following sectoral delimitation is taken as a reference (NACE, two digits): Mining and quarrying; Manufacture of coke and refined petroleum products; Supply of electricity, gas, steam and air conditioning; (NACE, 2 digits).

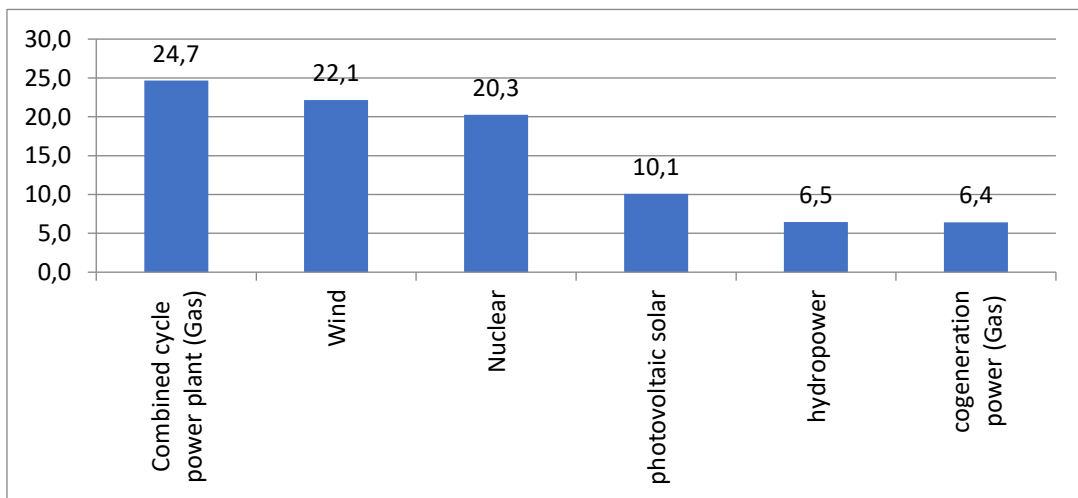
3.1. Main characteristics of the country's energy system

Spain's energy system is characterized by a greater diversity of natural gas supply sources and a growing renewable energy park, a situation that differentiates it from other member states. It could be said that Spain together with Portugal have a marked character of Energy Island configured in the Iberian Peninsula, it has as characteristics the reduced energy interconnection with respect to the whole of Europe (Government of Spain, 2022).

The 2019 energy balance showed a decrease in primary energy consumption of 2.9% compared to the previous year, which is higher than the decrease in final energy consumption -0.5%. Both declines in a context of economic growth mean a decrease in energy intensity. By energy sources, a significant decrease in coal consumption can be noted in 2019 compared to the previous year (-57.5%), followed by a decrease in consumption of petroleum products (-2.3%) and an increase in natural gas consumption (14.1%) (MITECO, 2022.a).

In 2022, there was a demand for electrical energy of 250,421 GWh, 2.4% lower than in the previous year. A production of 276,315 GWh was realized (6.3% higher than the previous year), with 42.2% of the total production coming from renewable energies. Among the most important energy sources in the year 2022, we can point out the combined cycle (24.7% of the total energy produced), wind energy (22.1%), nuclear energy (20.3%), photovoltaic solar energy (10.1%), hydraulic energy (6.5%) and cogeneration (6.4%). Among the energy balances with other countries, it can be highlighted net exports to Portugal (9,255 GWh), France (8,830 GWh), Morocco (1,429 GWh) and Andorra (285 GWh) (REData, 2023).

Figure 1. Structure of national energy generation by technology. 2022

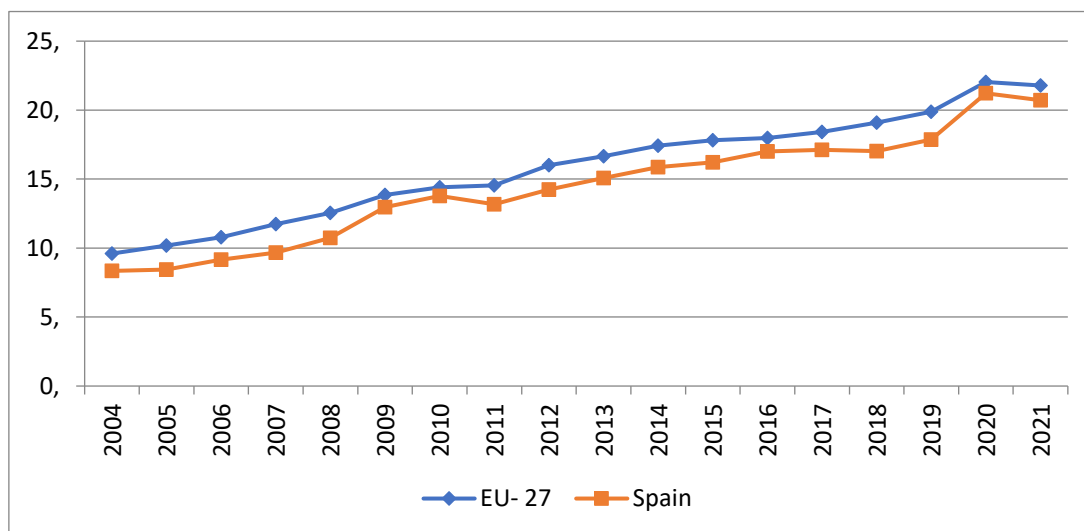


Source: REData, 2023.

In this sense, there has been an increase in energy from renewable sources in recent

years, in line with what is happening in the EU as a whole. Thus, the percentage of energy from renewable sources has risen from 8.3% in 2004 (9.6% in the EU 27 as a whole) to 20.7% in 2021 (21.7% in the EU 27).

Figure 2. Evolution of the overall share of energy from renewable sources – Spain vs. EU 27 (2004-2021)



Source: Eurostat, 2023

In Spain, in the electricity sector, a distinction is made between the transmission grid and the electricity distribution grid. Taking into account this differentiation, in 2019, there is a total of 44 thousand kilometres of electricity transmission lines, with interconnection with France, Andorra, Portugal and Morocco, in addition to submarine cables for connection with the islands (Balearic and Canary Islands). In addition to 784 thousand km of electric distribution lines, 63% of which are overhead lines (MITECO, 2022.a).

In Spain in 2019 there were 7 nuclear reactors operating with a net installed power of 7.7 thousand MW in and located in 5 sites, contemplating a cessation of nuclear power plants in operation with a time horizon of between 2027 and 2035. However, there is no centralized temporary storage facility for spent nuclear fuel and other radioactive wastes in Spain, although there are individualized temporary storage facilities for these wastes at the locations of the different nuclear power plants (MITECO, 2022.a).

Regarding the coal sector, in Spain, in line with the EU regulation (2010/787/EU), the closure of non-competitive companies in the coal sector has been adopted for December 31, 2018, ceasing the activity of the few mining companies that were still operating at that date (8 companies with a production of 2.6 million tons and 1,253 people in their own workforce, keeping a small part of the workforce to carry out restoration work in the affected areas (MITECO, 2022.a).

In Spain there are few crude oil extraction locations (in 2019 there were 5 extraction locations of which 4 are in the Mediterranean Sea off the coast of Tarragona), some of

these wells are in the process of being sealed for decommissioning, due to lack of production (MITECO, 2022.a). Similarly, natural gas production is very low, 1,502 GWh in 2019, there being at that date four extraction locations (three of them in the Andalusia region) with a production of 1,502 GWh, to which must be added a biomethane production plant in Madrid (100 Gwh in 2019). For this reason, the demand for petroleum products and gas is met to a greater extent through imports (MITECO, 2022.a). According to Eurostat Spain has an external dependency of 69% of the total energy consumption in 2021, this external dependence is much higher in Natural Gas (100%) and also in Oil Petroleum products (95,6%).

Chart 1. Energy imports dependency in Spain (% of total energy consumption)

	2020	2021
Total	67,892	69,094
Natural gas	97,474	100,074
Oil and petroleum products (excluding biofuel portion)	99,355	95,612

Source: Eurostat, 2023.

In 2019, the demand for oil products was 59.78 million tons, mainly from imports from Nigeria (15.2%), Mexico (14.2%), Libya (12.8%) and Saudi Arabia (12.4%). The demand for natural gas in that year was 398 TWh, most of which was for conventional use (287 TWh), with a smaller volume for combined cycle power generation plants (111 TWh). Among the main origins of gas imports in 2019, Algeria (51.2%), Nigeria (11.7%) or France (10.4%) can be pointed out (MITECO, 2022.a).

There are international gas interconnections with Algeria (unidirectional for imports), France, Portugal and Morocco, the latter with bidirectional import and export capacity, but since 2022 the connection with Morocco is only unidirectional for exports. Due to the difficulty of interconnection with the rest of Europe, Spain has 7 liquefied natural gas regasification plants in order to maintain security of supply and increase the diversification of supply sources. In this regard, these plants have a storage capacity of 3.3 million cubic meters of LNG, approximately 44% of Europe's storage capacity (Government of Spain, 2022, p 52).

Additionally, Spain has four subway gas storage facilities (one of them offshore) with a total storage capacity of 63 thousand GWh. In relation to the transport capacity of this gas, Spain has a network of gas pipelines with a backbone network of 11 thousand km and approximately 2 thousand km of regional transport network. (Government of Spain, 2022, p 52).

Chart 2. Forecast of thermal power plant closures

Plant	Location	Power (MW)
As Pontes	A Coruña	1,403
Carboneras	Almería	1,119
Compostilla	Ponferrada	1,030
Teruel	Andorra	1,050
Alcudia	Mallorca	510
Anllares	El Bierzo	350
La Robla	León	655
Narcea	Asturias	530
Meirama	A Coruña	580
Lada	Asturias	347
Velilla	Palencia	485
Aboño	Asturias	916
Soto de Ribera	Asturias	360
Puente Nuevo	Córdoba	300
Los barrios	Cádiz	570
Total		10,205

Source: ITJ. 2021 p. 6.

Energy diversification has promoted certain advantages to Spain in order to face, on the one hand, the closure of thermal power plants and, on the other hand, the consequences of the energy crisis caused by the war in Ukraine. The Iberian exception, with price intervention, has reinforced this position to a certain extent, although energy generation shows other difficulties.

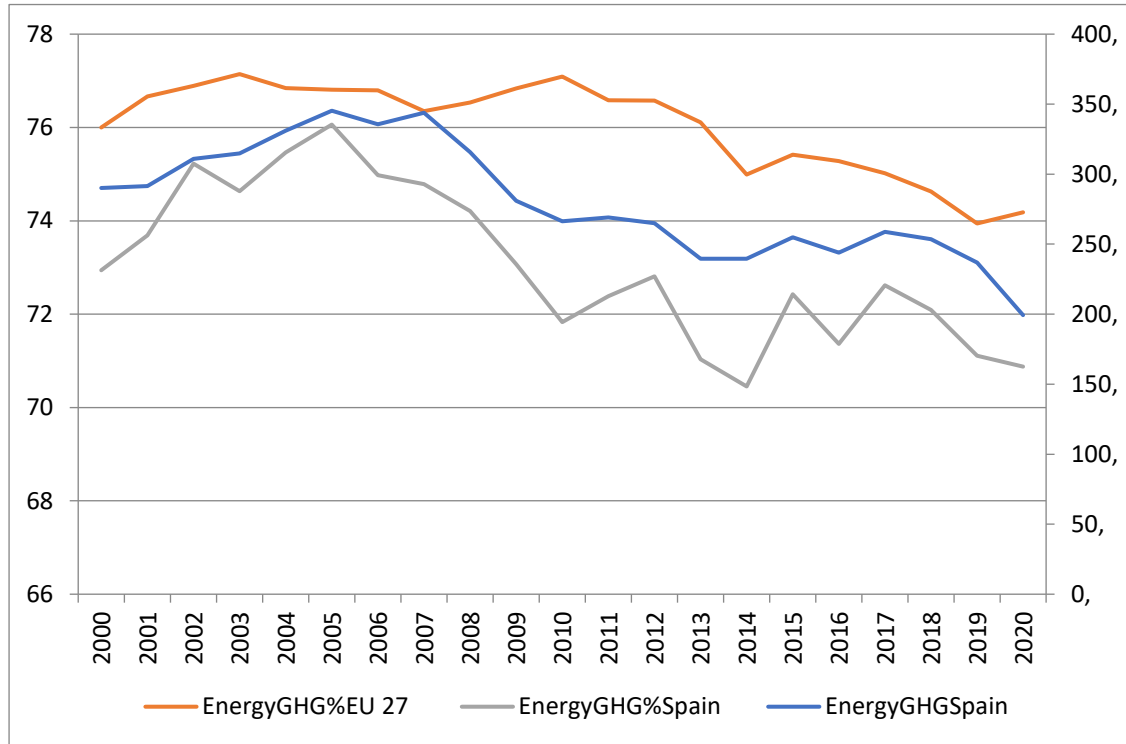
3.2. Environmental trends in the energy sector

The evolution of greenhouse gasses from the energy sector in Spain shows a downward trend since 2005, when 345 million tons were emitted into the atmosphere. In 2020, the amount emitted was reduced to 199 million tons. This represents a reduction of 42.3% in fifteen years, which is higher than the European average reduction (EU-27) for the same sector (-30.1%).

Looking at the weight in total emissions, in Spain the energy sector accounted for 70.9% of total emissions in 2020, a very relevant figure that reveals the importance of acting in this sector to achieve a significant reduction in emissions and decarbonization of the various productive activities. In any case, Spain has a lower weight than the European average (EU-27), where it reached 74.2% in the same year. It should also be noted that, in the case of Spain, this dynamic is more pronounced than in Europe, with a

reduction in the percentage of emissions of 5.2 points between 2005-2020, compared to the European average of 2.6 points.

Figure 3. GHG emissions by the energy sector in Spain and EU-27, 2000-2020 (Millions of tones and % of total gross greenhouse gas emissions by the energy sector)



Source: Eurostat, 2023.

* Red line: GHG emissions by the energy sector in the EU27 as a percentage of total GHG emissions (left axis). Green line: GHG emissions by the energy sector in Spain as a percentage of total GHG emissions (left axis). Blue line: GHG emissions by the energy sector in Spain in Millions of tonnes (right axis).

The highest energy intensity in terms of greenhouse gas emissions per person in Spain occurs in Manufacturing (1,475 kilograms per capita) followed by Transportation and storage (768 Kg per capita), followed by the energy sector (768 Kg per capita), Agriculture forestry and fishing (271 Kg per capita), Public administration (85,9Kg per capita) and construction (57.45 Kg per capita).

Chart. 3. Air emissions accounts by activity sector in Spain, 2021 (Kilograms per capita)

Total - all NACE activities	3,556.97
Manufacturing	1.475.47
Transportation and storage	768.13
Electricity, gas, steam and air conditioning supply	658.71
Agriculture, forestry and fishing	271.73
Public administration and defence; compulsory social security	85.92
Construction	57.45

Source: Eurostat, 2023.

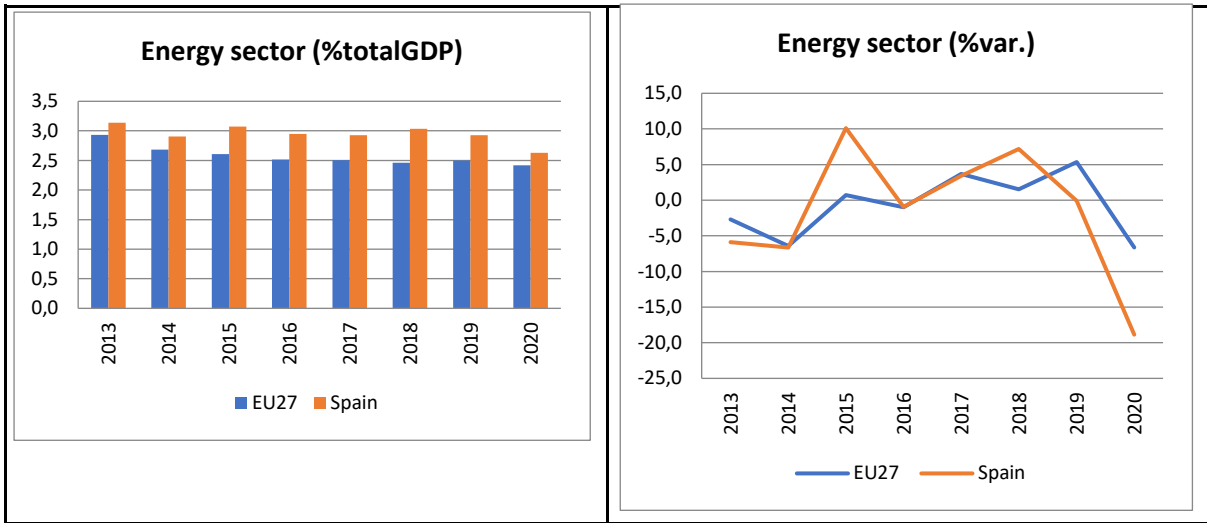
3.3. Economic trends in the energy sector

According to available data, the energy sector accounted for 2.8% of GVA in 2020, a lower weight than that recorded at the beginning of the last decade. In 2013, this sector concentrated 3.1% of GVA and since then it has been reducing its weight in the economy as a whole. This downward dynamic is shared by the EU-27 countries as a whole, although in the case of Spain with percentages above the European average.

However, the dynamics of sectoral value added in Spain show strong year-on-year fluctuations. On the one hand, it stands out that the energy sector recorded a remarkable growth of its value added in 2015 (10.1%), followed by a slight drop in 2016, which recovered in the following two years. In 2020, the sector reduced by 18.9% its added value, showing the strong impact that the beginnings of the pandemic caused on the productive and economic activity of this sector.

On the other hand, it can also be seen that the dynamics of the added value of the Spanish energy sector is much more elastic than the European average (EU-27), with higher percentages in years of growth and lower in those in which it is reduced (with 9.4 points of difference in 2015 and 12.2 points in 2020).

Figure 4. Contribution of the energy sector in EU27 and Spain, 2012-2020 (% total gross added value and %var.)



Source: Eurostat, 2023.

*It includes: Mining and quarrying; Manufacture of coke and refined petroleum products; Electricity, gas, steam and air conditioning supply; (NACE, 2 digits.).

As a result of the invasion of Ukraine, the energy sector has registered strong tensions throughout 2022. Within the European Union, Spain has positioned itself as one of the key countries to reduce energy dependence due to its gas and storage network. Specifically, Spain has a high storage and regasification capacity for liquefied natural gas (LNG), which guarantees diversification and reduces supply risks, but the scarce interconnection with the rest of Europe limits the opportunity this represents for the European Union as a whole (CES, 2022).

It should also be noted that the energy transition will have an impact on GDP as a whole. According to the National Integrated Energy and Climate Plan (PNIEC), the energy transition would generate an increase in GDP of between 16.5 and 25.7 billion Euros per year (1.8% in 2030). This increase would be generated as a result of investment along the production chains. 241 billion for the period 2021-2030, four-fifths of which will come from the private sector. Energy savings and the change of mix will also be factors with a multiplier effect on GDP (ESC, 2022).

In terms of the number of companies, the Spanish energy sector is made up of 14 thousand companies, most of them with less than 10 people employed, and less than 1 per cent with more than 50 people employed.

Chart 4. Number of enterprises in the energy sector in Spain and UE27 in 2020, (in %, by number of persons employed)

	EU27	Spain
Total (n)	190,418	14,277
Total (%)	100.0	100.0
From 0 to 9 people employed (%)	95.3	94.3
From 10 to 19 people employed (%)	1.9	3.0
From 20 to 49 people employed (%)	1.5	1.8
From 50 to 249 people employed (%)	0.3	0.7
250 people employed or more (%)	0.4	0.2

Source: Structural Business Statistics, Eurostat, 2023.

*It includes: Mining and quarrying; Electricity, gas, steam and air conditioning supply (NACE A64).

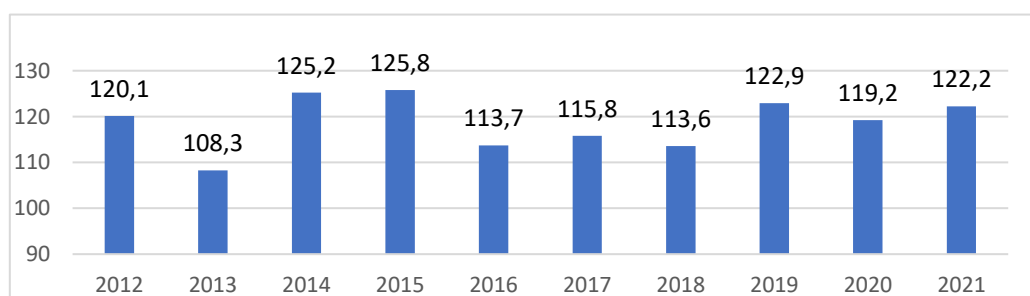
3.4. Employment trends in the energy sector

The energy sector employed 122.2 thousand people in 2021, which is 2.6% higher compared to the previous year. This dynamic contrasts with the average for the sector at European level, which shows a downward dynamic (-0.2%).

Linked to economic activity, employment in the energy sector also stands out for registering a dynamic that is much more subject to the change in the economic cycle than the European average, with sharper increases in employment in upturns (with year-on-year variations reaching 15%, as in 2014) and greater reductions in downturns (-9.6% in 2016). Within the energy sector, these employment oscillations are closely linked to the evolution of employment in the "electricity and gas branch" as opposed to "mining", which is much more stable over time.

In Spain as a whole, this sector will account for 0.6% of total employment in 2021. This is practically the same share as a decade ago (0.7% in 2012) and lower than the EU-27 European average (1.2% in 2012 and 1.1% in 2021).

Figure 5. Employment in the energy sector, 2012-2021 (thousands of people employed)



Source: LFS, Eurostat, 2023.

According to annual data from the Labor Force Survey, employment in the energy sector has several noteworthy characteristics. First, employment is characterized by being strongly masculinized. 70.5% of the 123.3 thousand people employed in 2021, were men; this is a lower percentage than that recorded in 2012 (79.6%). Secondly, this is full-time employment (95.5% in 2021), although there is a slight increase in the weight of part-time employment (from 4% in 2012 to 4.5% in 2021).

By gender, women working in the sector have a higher percentage of part-time employment (8.7%) than men (1.8%). Finally, employment in the energy sector is characterized by a concentration in the central age groups: people aged 29 to 49 accounts for 60.3% of total employment in the sector.

Chart 5. Employment in the energy sector, by type of working day, age and gender, (%) 2021

Total	123,3 thousand workers
Men	70,4
Women	29,68
Full time	95,46
Part time	4,54
16-29 years	12,65
29-49 years	60,26
50-64 years	26,2
65 and more years	0,89
Men Part time	1,78
Women Part time	8,68

Source: Spanish Labor force survey, INE. 2023

The data of 2022 (third quarter) from the Spanish Labor Force Survey also allows us to highlight other characteristics of employment in the sector. Thus, it can be seen, for example, that 97% of the people who work in the sector are employees and in the public sector. Of the salaried employees, 84.6% have an open-ended contract. In terms of educational level, 51.2% of employed persons have attained a secondary or professional education. There are also 44.8% of people with a university degree or doctorate.

3.4.1 The impacts of the energy transition on employment

In Spain, the impacts on employment and on the territory of the closure of coal-fired power plants have been quite well quantified. This quantification is framed within the framework of the Just Transition Agreements (JTAs). Due to the high territorial impact

on the areas affected by these closures in regions characterized by high depopulation, a set of agreements called just transition agreements have been reached to promote, through co-governance tools, mechanisms to monitor the effects on employment of the planned closures, to promote the retraining and relocation of the people affected and to promote territorial actions to create activity and employment, taking for this purpose a perspective of diversification of economic activity. However, the employment expected to be created in these affected areas does not match the employment lost due to the closures. In addition, in these areas there is a time gap between closures that have already taken place and future projects that have not yet been started.

On the job creation side, it is expected that the energy transition would create in the country between 253,000 and 348,000 net jobs per year during the period 2021-2030 (CES, 2022). According to the Spanish National Integrated Energy and Climate Plan (PNIEC) 2021-2030, this employment would be generated directly by investments in renewables (between 107,000 and 135,000 jobs), energy efficiency measures (52,000-100,000), networks and electrification (6,000-46,000 jobs), and savings on energy bills (14,000-118,000 jobs). Furthermore, it is also expected to indirectly boost employment in other activities. Trade, manufacturing and construction would be the branches with the greatest positive impact on employment, while the extractive industries recorded a net loss of employment, mainly concentrated in coal mining (Spanish Government, 2020).

The effort made to decarbonize electric power generation has meant that this sector, with 20.8% of total emissions, is no longer the most polluting in Spain, behind the transport sector. The electro-intensive industries stand out, together with the automobile industry, among those with the greatest interest in the challenge posed by the energy transition. Within the electro-intensive industry, metallurgy, iron and steel, cement or chemical industries, where the cost of energy can represent more than 10% of their production value, can be highlighted, which is why the trend for the reduction of emissions in these industries involves the development of carbon capture and storage technologies or industrial applications of green hydrogen (CES, 2022).

On the side of polluting energies, through the just transition agreements, the impact of the closure of coal-fired power plants on direct and indirect employment has been detected. In total, almost 3,000 people are affected by the closure of the thermal power plants in Spain, 1,278 people directly and 1,283 people indirectly, who work for contractor companies (ITJ, 2021). A territorial distribution of the impacts can be seen in the following chart.

Chart 6. Employment situation of coal-fired thermal power plants, as for the date of request of closure.

Plant	Location	Internal Staff	External Staff	Total Staff
As Pontes	A Coruña	197	169	366
Carboneras	Almería	137	132	269
Compostilla	Ponferrada	159	149	308
Teruel	Andorra	147	153	300
Alcudia	Mallorca	134	94	228
Anllares	El Bierzo	15	12	27
La Robla	León	78	42	120
Narcea	Asturias	81	48	129
Meirama	A Coruña	77	35	112
Lada	Asturias	95	55	150
Velilla	Palencia	83	60	143
Aboño	Asturias	117	82	199
Soto de Ribera	Asturias	79	28	107
Puente Nuevo	Córdoba	69	60	129
Los barrios	Cádiz	89	64	153
Total		1,557	1,183	2,740

Source: ITJ. 2021 p. 6.

The objective of these agreements is to support the workers and the territories of the areas affected by the closure of thermal power plants. Its priority action is focused on maintaining employment in the territories and their economic and industrial revitalization, linked to the deployment of renewable energies and other projects.

So, they include various employment measures including active employment policies, with measures that guarantee labor participation as job banks to which the affected workers can register to receive training and job offers. Specifically for the mining labor exchange, there are 365 people registered as of November 2021 (of which only 3 are women), most of them (267) are between 31 and 50 years of age. There are 657 people registered in the thermal power plant labor exchange, both from the plants' own personnel and from auxiliary companies' personnel.

On the renewable energy side, significant job creation is expected. Renewable energy has been identified as a fundamental pillar for the generation of employment. There has been detected an increase in employment associated with renewable energy, both direct and indirect, in the last years. According to the National Association of Renewable Energy Companies (APPA, 2022) employment in the renewable energy sector has increased from

76,874 people in 2014 (being 60% direct employment) to 111,409 people employed in 2021 (63% direct employment), with an increase of 20% over the previous year (92,930 in 2020).

Of the total of 92,930 people employed in 2020 in the renewable energy sector, 33% correspond to jobs in the biomass sector, followed by wind energy (29%) and solar photovoltaic energy (24%), with 14% of employment related to other renewable energies: solar thermoelectric, biofuels, mini hydro, solar thermal, geothermal, marine, or mini wind (APPA, 2021).

In the assessment of the lost jobs, according to the interviews conducted, it is necessary to differentiate between two types of processes in the reduction of employment: on the one hand, the coal mine closure processes and the coal-fired thermal power plant processes.

In the case of mining, there has been no anticipation, but rather the management has been reactive, mainly because it was not thought that the mines would finally close. In the case of coal-fired thermal power plants, there has been a little more anticipation and agreements, but participation in implementation has been insufficient (E1).

The processes of coal mine closures resulted in workforce restructuring processes based mainly on early retirements and large severance payments and, to a lesser extent, reconversion processes through employment exchange and training. The employment created in these cases is not equivalent in numerical terms to the employment destroyed and was mainly focused on the regeneration of tailings dumps and areas affected by the mines. This employment is considered temporary, as it is linked to the rehabilitation process and the salary conditions are not comparable to the employment destroyed. Another source of employment has been the reconversion of these people affected by the closures in other sectors such as tourism or the agro-industrial sector, but in numerical terms the creation of employment is considered anecdotal (E1, E3, E4).

In the case of coal plant closures, it is necessary to differentiate the effects of those people employed in the main companies, who have had options for early retirement, relocations within the same company and territorial employment exchanges with training (E1, E5). On the other hand, the effects on the employment of people in subcontracted companies have been mainly early retirements and employment exchanges with training. Some of these affected people have been able to relocate in the dismantling of the thermal power plants and in the rehabilitation of the areas occupied by these plants; however, the employment created is not comparable in terms of numbers or in terms of working conditions and employment stability with the jobs destroyed (E1, E3, E4, E5).

Job creation is expected in the new renewable energy and circular economy projects to be carried out by energy companies in the locations where the thermal power plants used to be located, however this creation has not yet occurred and is expected to start in the medium term (E5).

3.4.2 Skill needs and training

Linked to employment impacts of the closure of coal-fired power plants, the just transition agreements recognize the comprehensive support to workers in the affected areas to provide them with professional training. In particular, the following measures have been identified: Identification of the affected population for the closures and their qualifications in order to facilitate their entry into new business projects. Specific measures to facilitate the employment especially focused on people over 52 years of age and difficult to relocate; support plan for the professional training and labor insertion of workers in the affected areas. (ITJ, 2021).

According to the interviews conducted, the people affected by the mine closure processes and the closure of the coal fired power plants, who have entered the employment exchanges have had training, but this training has been done after the closure processes. Ideally, this training and retraining should have been done while these people were employed (E1).

In addition, taking as a reference a sectoral approach and the transformations that are taking place in occupations associated with the energy transition, there would be a grade of professions that may be in danger of disappearing or less demanded in the short term, that's why it would be necessary training for future professions/skills, as well as the identification and generation of bridges between current and future professions.

Taking as a reference the most relevant or strategic occupations associated with renewable energy production, it has been detected that hiring will increase in occupations related to project management, industrial engineering, installation of photovoltaic and wind power systems, financing, permit management or IT systems. The vast majority of these occupations already exist; however, most of them require a reorientation or transformation of some skills related to these occupations (IDEARA, 2023). Based on these most relevant occupations, a set of competences and knowledge required for each of the profiles has been established, according to the general and technical knowledge and competences needed, the skills and abilities required, or the official university and vocational training qualifications that can give access to these occupations.

Among the most sought-after professional profiles are university studies in engineering, architecture, environmental sciences and multidisciplinary profiles. Also, would be relevant assessment and monitoring, as well as intermediate training courses in computing, telecommunications, agriculture, security, environmental issues, building and maintenance.

Taking as a reference the required competences, knowledge linked to the environment and sustainability, competences linked to digitalization and new technologies, as well as

specific knowledge related to energy efficiency and installation of renewable energies will be required. This specific training required can be developed within the framework of university degrees and vocational training, as well as in non-formal training specialties and certificates of professionalism recognized on the basis of professional experience.

In addition, a set of new soft skills, related to new soft skills, related to social skills, organization, attitudes or professional attributes, as well as creativity, resilience, adaptability to changes or communication skills.

In relation to the valuation of these changes and training barriers, there is a certain lack of professional profiles linked to STEM areas (science, technology, engineering and mathematics), with a greater gender gap in this branch of studies. In Spain a lack of attractiveness of vocational training courses is detected with respect to other countries, with a greater lack of students in vocational training in STEM fields. There is also perceived a lack of systematic analysis of the qualifications that will be needed in the future. On the other hand, some barriers to retraining in rural areas have been identified due to the lack of training offer in rural areas. Likewise, we have detected a lack of generational replacement in some occupations, either due to the demographic structure of the country or because there are professions that the younger population does not want to perform (IDEARA, 2023).

For this reason, five lines of training are proposed (IDEARA, 2023): A general transversal training, linked to sustainability and the environment (basic knowledge of sustainability and environment for any worker in the sector), another transversal or intersectoral training of a non-technical nature (in areas not related to sustainability such as languages or mathematics), A specific or technical training (enabling training to be able to exercise the profession), training in digital skills (a basic or specific applied training for the job) and a training in *soft skills* (transversal training in personal skills and social skills).

3.4.3 The impact of the energy transition on work organization and working conditions

There are some studies that analyse the working conditions of workers in the manufacture, operation and maintenance of renewable energy generation equipment in the new renewable energy companies. As an example, some studies, (ISTAS, 2018.a, 2018.b) reflect that both the manufacture of new wind turbines and their operation and maintenance can pose health risks to workers.

Specifically, in the case of wind turbines, some of their components require high manual labor for their manufacture, such as, for example, the blades. These parts of the wind turbine are composed of epoxy-based resins and fiberglass, which are substances

and chemicals that, in case of use without adequate protection, can lead to diseases that are sometimes not identified as occupational diseases, such as allergies, dermatitis, dizziness or severe headaches. (ISTAS, 2018.a).

Similarly, some reports (ISTAS, 2018.b) point out the risks of thermal and ergonomic stress of wind farm operation and maintenance personnel, to which can be added the risks inherent to work at heights, in contact with electrical equipment or work in confined spaces.

According to the interviews conducted, *the new risks for workers in renewable energies are not perceived yet. For example, wind blades have risks not only in the placement, but also the dust they give off in their maintenance and recycling* (E1).

3.4.4 The territorial and regional impacts of the energy transition

Restructuring has been taking place in the coal production sector since the 1970s and, specifically, since 2010, following the European decision to close uncompetitive coal mines, the process of closing existing coal mines in Spain began to accelerate until their closure at the end of 2018. In the 90s there had been around 45 thousand people directly employed in mining but in 2018 there were 1.833 people directly employed and 565 indirectly. Consequently, the territories affected have suffered a significant population and economic decline linked to the energy transition process. Similarly, the 15 coal-fired thermal power plants that Spain had in 2019 are either closed or in the process of closure or with plans for closure in the short term. On the other hand, some nuclear power plant closures are also taking place.

These closures have generated major impacts on the affected territories in terms of economic activity and from a social perspective. These territories are mainly rural areas that are already affected by a growing depopulation, a high level of unemployment, an advanced process of aging and with a very concentrated economic activity, almost monopolistic, historically centred on the economic activity that has been closed.

According to the interviews conducted, the impacts on the territory have been great.

Mining and thermal power plants are economic activities that were generationally embedded in the life and culture of the population of these regions. These economic activities were the main economic asset of these areas and acted as driving forces of the economy of these regions; that is why the end of these activities has had a great economic impact on the territory, on employment and on the culture of the people of these regions (E1, E3, E4, E5).

The termination of these activities has meant a halt in the economic activity of these areas and a great uncertainty about the future potential effects of the implementation of

new economic activities in the area. (E1).

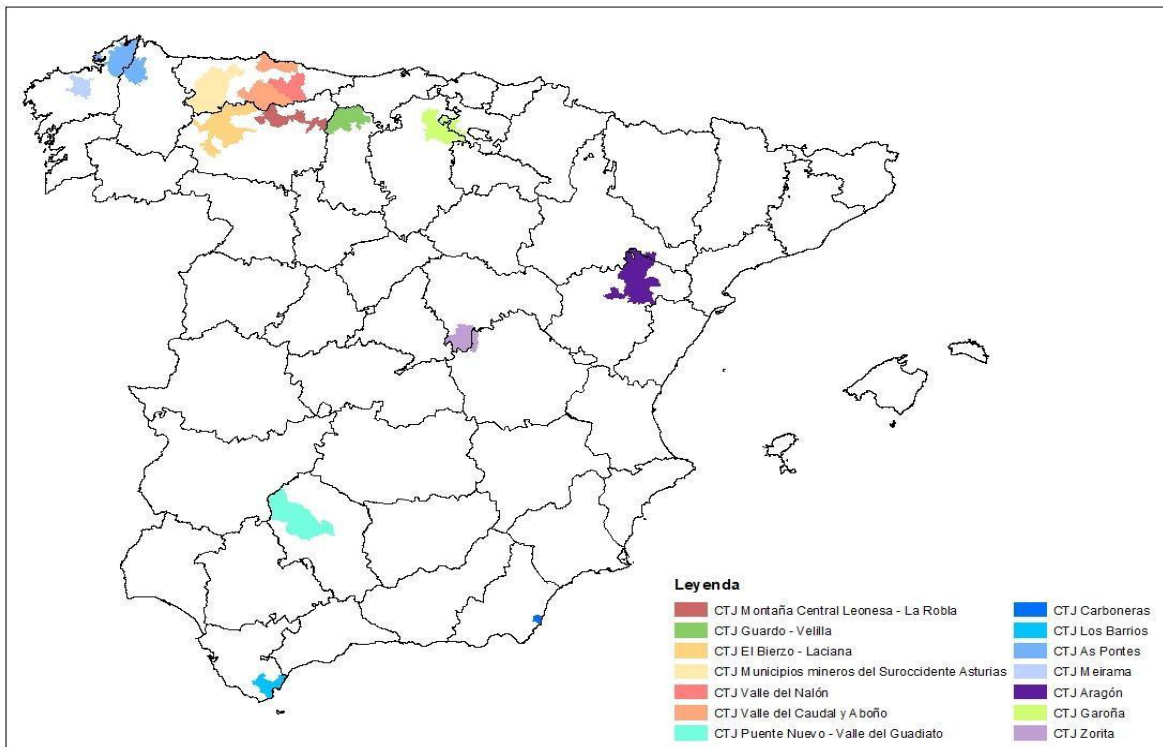
The process of job destruction is very clear, but the process of job creation is not so clear, and this uncertainty and time gap between one moment and the other generates a latent social conflict. (E3).

The regions with traditional coal mining and nuclear power plant activities are reluctant to replace these activities with renewable energies. *It is probable that the coal fired power plant is ugly for the landscape, but for the people who live in the affected areas it is something assumed, accepted and sometimes demanded. That is why for the people of these areas the new wind and photovoltaic plants seem to them to be a more aggressive activity* (E3).

On the one hand, renewable energies create little employment in the affected areas. Temporary employment is created during installation, but for operation and maintenance, employment is anecdotal and mainly male. The renewable energy plants are very extensive activities that are poorly complemented with other uses of the territory, something that clashes with the traditional livestock and agricultural uses of these areas and neither is compatible with touristic uses (E1, E3, E4).

In order to reduce the territorial impacts, two tripartite agreements at national level have been developed focused on the closure of coal mines and the closure of coal-fired power plants. This same scheme is being extended to the closure of some nuclear power plants. Linked to the implementation of these Just Transition agreements, 15 Just Transition Conventions are underway, comprising 184 municipalities in seven autonomous communities: Galicia, Asturias, the Basque Country, Castilla y León, Castilla-La Mancha, Aragón and Andalusia.

Figure. 6. Map of the Conventions of just transition, 2022



Source: ITJ, 2023.

Each Just Transition Convention includes the following actions and reports: a) Delimitation, characterization and definitive diagnosis; b) Public Participation Report and c) Action Protocol. In this chapter is included the main characteristics of this delimitation of the effects of the closures, and in the following chapters there are included the other two actions related with the social dialogue in these processes.

Thus, in the first place, the just transition Conventions linked to the closure of mining companies and coal-fired power plants include information on the delimitation of the just transition agreement based on: a) criteria related to the current economic impact of the closure, depending on the location of the facilities to be closed, the impact on local employment or the impact on local wage income. b) criteria of territorial coherence and cumulative impact, taking into consideration whether the affected municipalities represent 70% of the population of the area or 70% of the area of the region or whether it incorporates other neighbouring municipalities, the criterion of geographical continuity, the evolution of the presence of coal mining workers between 2001 and 2011. Taking these criteria into consideration, 16 municipalities in Andalusia, 34 municipalities in Aragon, 20 municipalities in Asturias, 43 municipalities in Castile and Leon, 19 municipalities in Galicia, 13 municipalities in the Balearic Islands were delimited (ITJ, 2022.e).

Regarding employment effects, also information on the number of people from the main company and subcontractors are affected by closures and their municipalities of residence are collected in these conventions.

The just transition Conventions linked to the closure of **nuclear power plants** include information relating to the delimitation of the municipalities affected, taking into consideration a) criteria relating to the current economic impact of the closures, considering the location of the facilities to be closed, the impact on local employment, the impact on local wage income or the impact on municipal income, and b) criteria of geographical coherence, such as the location of the municipality within a radius of 10 km from the nuclear power plant or geographical continuity. Based on these criteria, 18 municipalities in Castilla la Mancha related to the closure of a nuclear power plant in Zorita have been delimited. In addition, 24 municipalities in Castilla Leon and 3 in the Basque Country have been identified related to the closure of the Garoña nuclear power plant (ITJ, 2022.e).

In line with these conventions some new economic activities are being deployed in those affected areas, but also some controversy with the implementation is arising there. The main reason is the time delay between the closure of the activity already carried out and the future economic reactivation expected to be generated in the affected areas. Indeed, there is argued in the interviews that the little employment already created with renewable energies may imply a risk of acceleration of the depopulation process (E4).

In this sense, social partners identify that if in these already depressed areas, due to their low population, there is a population drain due to the closure, then there would appear problems of closure of services (education and health), which generates a greater depopulation and a lower capacity to attract new population (E3).

On the other hand, the implementation of renewable energy plants is not perceived as rewarding for the people as it could be considered. The reason is that part of the population estimates that these renewable energy plants not always leave benefits for the territory, since it is estimated that the energy created goes to the big cities and the profits of the energy companies also go to the big cities, not distributing their benefits in the territory and leaving only the consequences (E1).

Furthermore, for the future establishment of new economic activities in these areas, the prior establishment of public services in welfare services is considered as fundamental for attracting new inhabitants. It is considered that with educational, health and elderly care facilities and services could help to settle the population while generating quality jobs and fostering territorial cohesion. *Specifically, the need to guarantee educational, health and elderly care services is emphasized, given that this is mainly a public activity, which can maintain and fix the*

population to the areas. And from these bases promote the creation of public and private productive systems (E3).

3.5. Drivers, barriers and dilemmas to the energy transition

The energy sector is currently in the midst of a transformation, identified by 4 "d's": decarbonization, distribution, democratization and digitalization. The decarbonization of the energy sector is causing it to cease to be the most polluting sector. Likewise, one of the challenges facing the sector is that until relatively recently, the activities of generation, transmission, distribution and commercialization were clearly differentiated and unidirectional. Currently, with the transformation that the sector is undergoing, the boundaries between these activities are blurring, increasing local energy markets with a greater participation of renewable energies (CES, 2022, p133).

Among the challenges facing the sector are the need to increase electricity storage systems for renewable energies and new flexibility measures that allow the system to adapt to the dynamic conditions of both supply and demand. In line with this challenge, mention could be made of the development of green hydrogen storage or the storage of energy produced by photovoltaic solar power plants, whose generation capacity depends on the weather (CES, 2022, p133).

In addition, the high level of interest in new forms of renewable electricity production is generating a flood of requests for access and connection to the networks, which creates bottlenecks in the administrations, something that could delay the take-off of this energy transition. Administrations also face the challenge of differentiating viable and environmentally sustainable projects from others that could have a speculative nature or even a negative environmental impact, so it is necessary to achieve the integration of these renewable energy generation projects with environmental regulations and values, with the participation of local communities. (CES, 2022, p135).

Renewable energies are an opportunity to promote a more active role of citizens, SMEs and local entities in the energy transition, being able to store, manage and share energy through energy self-consumption. However, according to the Economic and Social Council of Spain, it is necessary to offer a more transparent and simplified framework that allows access to more information and aid to these consumer-producers (CES, 2022, p.135).

Another medium-term challenge is the obsolescence of the first renewable energy plants without the dismantling and renovation of these plants entailing a reduction in installed power, while developing a circular economy strategy that makes it possible to take advantage of the waste from these plants at the end of their production phase (CES,

2022, p136).

According to the **interviews** conducted, the main *driver* of the energy transition has been the decarbonization policy decisions of the European Union, which are transferred to the national policy of closing coal mines and thermal power plants (E1, E5). These decisions generate the economic paralysis of some territories and therefore a loss of economic and social fabric, whose impacts are tried to be reduced through European financing funds (E3, E4).

Another facilitator of change has been the existing institutional framework of tripartite dialogue at country level, which has served to reach commitments on the management of impacts on employment and on the territory. However, the social agents indicate that this participation at the state level has been reduced at lower levels and has been insufficient to anticipate the management of change, exemplified by the statement that the social agents *have been able to establish the margins of the game, but not the development of the game* (E4).

The trade unions consider that it is essential to bet on "tractor projects", mainly energy projects capable of stimulating local reactivation, generating quality employment and generating income. However, the fact that it is the large energy companies who are the protagonists of both the closure of the nuclear power plant and the most powerful renewable projects in the area generates conflict. Primarily, due to the fact that energy companies are private and there is no perception of effective public control and monitoring, something that is considered key to ensure that companies fulfil their commitments to generate quality employment in the long term.

However, in this process they are being diverse and often with arguments that sometimes conflict, making clear the existing tensions between the wide variety of actors involved. Trade unions at territorial level have participated in mobilizations together with other political and social actors in the affected areas in their claims for resources to combat depopulation, ensuring quality public services, promoting business projects and reindustrialization, in order to ensure alternative employment with good conditions of stable employment.

One of the main *dilemmas* in the clean energy transition in the affected areas is that the job creation generated by the implementation of clean energies does not equal in numerical terms the loss of employment, both direct and indirect, of the decision to close coal mines and thermal power plants (E1, E3, E5).

In addition, the main difficulty of the process is the time difference between the closure of economic activities linked to coal mines and coal-fired power plants and the future creation of economic activity in the affected areas (E1, E3, E5).

This is leading to disaffection and critical attitudes of part of the population of the affected areas towards the implementation of clean energies, which could hinder the pace of implementation of clean energies in these areas (E1, E3).

On the other hand, it has been detected that the implementation of wind farms and photovoltaic plants require environmental impact authorizations due to their extension in the territory and possible environmental impacts, which prolongs the time required for their creation and implementation (E5).

4. SOCIAL DIALOGUE, INDUSTRIAL RELATIONS AND INNOVATIVE PRACTICES IN SUPPORT OF THE ENERGY TRANSITION

Labour relations in Spain are deployed in two fields, the social dialogue, bipartite and tripartite (with the participation of trade unions, employers' organisations and the government) and collective bargaining system, which is led by the most representative trade unions and employers' organizations. The country's most important trade unions and employers' organisations: Comisiones Obreras (CC. OO) and Unión General de Trabajadores (U.G.T.), most representative trade unions; and the Spanish Confederation of Business Organisations (CEOE) and the Spanish Confederation of Small and Medium-Sized Enterprises (CEPYME), which are the most representative employers' organisations.

During the covid-19 pandemic period, social dialogue (bipartite and tripartite) has had an undeniable resurgence and impulse. Facing a growing political polarisation in recent years, social consensus has taken on a central role since the pandemic began in 2020. Policies and measures promoted by the government to deal with the economic consequences and the destruction of employment were the result of tripartite agreements, which have not only successfully mitigated the effects of the crisis, but have also minimised labour conflicts.

The impulse of social dialogue agreements have allowed the government to build a "social shield": agreements on furloughs between employers and unions; agreement on telecommuting; agreement on special Covid-19 benefits, II, III and IV (ASDE) Social Agreement in Defence of Employment; Agreement on Economic Reactivation and Employment; Agreement on Labour Aspects of Delivery Work via Social Platforms; Plan to Promote Vocational Training for Self-Employment and the Social Economy; Royal Decree-Law 6/2019, of 1 March on urgent measures to guarantee equal treatment and job opportunities for women and men; Royal Decree 713/2010 of 28 May on the registration and filing of collective bargaining agreements; Royal Decree 902/2020 of 13

October on equal pay for women and men; and numerous agreements reached by sectoral roundtables such as the social dialogue roundtable on vocational training for employment linked to the National Qualifications System; the social dialogue roundtable on vocational training for employment; the social dialogue roundtable on talent; the social dialogue roundtable on pensions; or the social dialogue roundtable on the dependent care system, among others.

Social dialogue has played a leading role in tackling the digital transformation of production and work processes, linked to working methods and the regulation of digital rights, as evidenced by the social partners' agreement on remote working (RD 28/2020) and the regulation of work sharing (RDL 9/2021). Finally, the efforts of social dialogue have been continued in the recent labour reform, which addresses central issues of employment and collective bargaining policies, such as temporary work, ultra-activity or wage regulation at the sectoral level (RDL 32/2021), impacting on precarious employment, temporary employment and sectoral collective bargaining on wages.

Labour relations in the collective bargaining system are based on National Cross-sectoral Collective Bargaining Agreements, which set the standards and recommendations for collective bargaining agreement negotiators. The standards set in these agreements have been effectively transferred to a large part of sectoral and corporate collective bargaining.

The Spanish collective bargaining system is conditioned by a productive structure with a predominance of small and micro-enterprises and the application of the “erga omnes” principle. Because of this, bargaining at the sectoral level (national, regional or provincial) takes on special relevance. In total there were 4.9 thousand agreements with economic effects in 2020, affecting 10.7 million of workers.

Chart 7. Collective agreements and workers covered in Spain by level of bargaining, 2020

	Agreements	Companies	Workers
Total Agreements	4,915	1,161,164	10,700,757
Company agreements	3,849	3,849	787,822
Sectoral agreements	1,066	1,157,315	9,912,935

Source: Collective Bargaining Agreements Statistics, 2023.

The number of workers covered by collective bargaining agreements at sectoral level is quite high: in 2020 (last published data), 92.6% of workers covered by a collective bargaining agreement were higher than company level. At company level, there were 3,849 collective agreements at company level, covering almost one million of workers, who

represent the 7.4% of workers covered by collective agreement in 2020.

4.1. Industrial relations systems in the energy sector

The energy sector has undergone several restructurings as a result of flexibility, competitiveness, efficiency and globalization, with several mergers between large distributors and privatizations of large public energy companies. In this sector, a large group of small companies coexist with a small group of large private companies in which there has been a great effort by negotiators to make the necessary structural adjustments compatible with the improvement of working conditions (Monereo, 2005).

Labor relations in the energy sector present different dynamics and actors depending on the subsector involved: mining, electricity or chemicals (refining and oil derivatives).

Similarly, in the refinery and hydrocarbon distribution sector, there is no statewide agreement of its own, but these activities are included within the statewide agreement of the chemical sector (XX General Collective Agreement of the chemical industry) agreed in 2021, between the Spanish Chemical Industry Business Federation (FEIQUE) and the trade unions CCOO and UGT. There are also a few collective bargaining agreements at provincial level (7) and company agreements.

- In 2020, there are a total of 26 agreements in the extractive industries sector, affecting a total of 5.6 thousand workers.
- In the electric power, gas, steam and air conditioning supply sector, there are a total of 25 agreements, affecting a total of 26.9 thousand workers.
- Most of the agreements in these sectors correspond to company agreements. Thus, there are 22 company agreements in the extractive industries sector and 15 company agreements in the energy supply sector (electricity, gas, steam and air conditioning).
- Of the total number of workers affected by these agreements in the extractive industries sector (5.6 thousand workers), most (3.6 thousand) are affected by sectoral collective agreements, while a smaller portion are affected by company agreements (2 thousand).
- Of the total number of workers affected by agreements in the energy supply sector (26.9 thousand), most are affected by sectoral agreements (25.3 thousand), with a smaller number of workers affected by company agreements (1.5 thousand workers)

Chart 8. Collective agreements and workers covered in Spain by level of bargaining and agreed wage increases, 2020

ACTIVITIES		TOTAL AGREEMENTS				COMPANY AGREEMENTS			AGREEMENTS WITH A SCOPE HIGHER THAN COMPANY		
		Agreements	Companies	Workers	Agreed wage increase s (%)	Agreements	Workers	Agreed wage increase s (%)	Agreements	Workers	Agreed wage increases (%)
B	Mining and quarrying	26	128	5.560	1,22	22	1.969	1,82	4	3.591	0,90
D	Electricity, gas, steam and air conditioning supply	25	6.259	26.850	1,54	15	1.534	1,31	10	25.316	1,56
	TOTAL	4.915	1.161.164	10.700.757	1,74	3.849	787.822	1,50	1.066	9.912.935	1,76

Source: Statistics on Collective Agreements, Spanish Labour Ministry, 2023

Considering the wage increase of existing collective bargaining agreements in 2020, in Spain as a whole this wage increase is 1.74%, being slightly higher in sectoral collective bargaining agreements (1.76%) than in company collective bargaining agreements (1.50%). In the sectors analysed, the average increase is lower than in the sectors as a whole (1.22% in the case of the extractive industries and 1.54% in electricity supply). Furthermore, the trend in the extractive industries sector is contrary to the average for Spain, with a higher increase in company agreements (1.82%) than in sector agreements (0.90%). In the energy supply sector, the trend is similar to that of Spain as a whole, with higher increases in sector agreements (1.56%) than in company agreements (1.31%).

According to the interviews carried out, the social agents recognize that there is a wide margin for improvement in the salary and working conditions of the new jobs created in renewable energies, especially when compared to the salary conditions of jobs in the polluting energy sector. It is indicated that this is partly because the previous economic activities had established collective bargaining processes that allowed for income and productivity sharing, while in the new activities such collective bargaining does not exist and has to be created. *In the previous activities, the starting point is salaries that are two or three times the minimum professional wage. Whereas in the new sectors we start from the minimum interprofessional wage and begin to negotiate.* (E3)

4.2. Position of social partners with regard to the energy transition

Social dialogue is present in the process of just transition in Spain, in which the social partners are involved to a greater or lesser extent, with significant results in various areas. Social partners express consensus on certain issues, with regard to the decarbonization process, building renovation, security of supply, circular economy, sustainable mobility and energy efficiency, among others. Trade unions are more aware of making the transition really fair for all, while employers are focused on the public support for the different sectors.

Thus, from trade union perspective, Just Transition Agreements should be elaborated, approved and implemented with the participation of the trade union organizations in all their phases and areas. In this line, the trade Union CCOO proposes in a guide on intervention in just transition processes that trade unions should be considered as a key player in these processes in order to promote stable and decent employment (CCOO, 2020).

Given the cross-cutting nature of these processes of Just Transition that can affect several sectors but also have a strong territorial component, from the trade unions perspective, it is necessary to articulate an appropriate coordination to combine the territorial and sectoral approaches of the affected territories with the aim of involving all stakeholders (CCOO, 2020).

In relation to energy, related to the recovery and transformation plan, the Spanish

Confederation of Business Organizations (CEOE) has proposed several measures⁴: 1) a greater boost to the decarbonization of urban mobility through a digital and sustainable transformation of the public transport sector as an alternative to the use of private vehicles, 2) the rehabilitation of the building stock in Spain and the increase of social rental housing in energy efficient buildings, 3) the development of a decarbonized, competitive and efficient energy sector, the improvement of the strategic autonomy and competitiveness of Spain, ensuring the security of supply and the circular economy. To this end, they propose a set of investment lines among which energy efficiency and sustainable mobility in the passenger transport sector, aid to the railway sector powered by green hydrogen, the deployment of a network of recharging points for electric vehicles, the promotion of the rehabilitation industry, the promotion of the industrialized housing construction, the promotion of the production and distribution of sustainable biofuels, greater investment in green hydrogen generation or the decarbonization of the steel industry, among other issues, can be highlighted.

According to the interviews carried out, the social agents recognize the energy transformation as an urgent objective to contain climate change as unavoidable (E3). Much of the union involvement has focused on managing the labor consequences of mining and thermal power plant closures.

This involvement of the trade unions has been mainly reflected in the two state agreements mentioned above. However, in the translation of these agreements into the just transition agreements, the proposals, made jointly by the ministry involved, the affected autonomous governments and the Spanish federation of municipalities and provinces, have been made through public consultations, where the level of participation of the social agents has been at the same level as other territorial organizations.

In this sense, trade unions state that this participation in the form of consultations is insufficient given that *it is not a full social dialogue* (E3). They point out that *these are macro-level agreements, where the rules of the game are established [...] but the space for interventions or negotiations is limited* (E3).

For this reason, union participation has focused on managing the labor consequences of the closures of the coal mines and thermal power plants, although these participation processes are considered by the trade union side to be positive in global terms, although with a limited scope.

4.3. Role of the social dialogue in support of a socially just energy transition

The role of the social partners and of the trade unions in particular, has been considered as a key in the strategy and development of the just transition processes in Spain. As mentioned above, two important tripartite agreements have been signed in connection with the Urgent

⁴ "Proposal of the companies for the Addendum to the Recovery, Transformation and Resilience Plan".

Action Plan:

(a) Framework Agreement for a Just Transition of Coal Mining and the sustainable development of the Mining Regions, 2019-2027, established between the Government of Spain, the trade unions CCOO, UGT, USO and the National Federation of Coal Mine Entrepreneurs (Carbuni3n);

b) Agreement for a just energy transition for thermal power plants in closure, signed by the Government of Spain, the trade unions CCOO, UGT, USO and the companies that own the plants.

These agreements reflect the role of the social agents in the process of just transition in Spain, which is structured with a sectoral and national approach through two commitments: a) to facilitate the fulfilment and follow-up of all the commitments of the agreements; and b) to participate in all the processes and commissions that are determined at all levels: state, autonomous and local in the following areas: training, occupational risk prevention, reindustrialization and dissemination, as well as all those that can be added in the achievement of the objectives of this agreement (ITJ, 2021).

Beyond these two agreements, the government of Spain through the Institute for Just Transition (ITJ) has developed the Just Transition Conventions. These conventions are developed as a tool of open participation and co-governance in order to guarantee the commitment and coordination of public administrations and to propose support instruments in the just transition process. These conventions are focused on the territory and their objective is the maintenance and creation of activity and employment, as well as the fixation of the population in rural areas or in areas with facilities in closure. To achieve this goal, this Institute promotes a diversification of the economic activity and a specialization of the economic activity coherent with the socio-economic context. Indeed, it supports investments to sectors and vulnerable population at-risk sectors, to restoration of damaged areas, to improvement of public infrastructures, to support industrial projects, and to retraining of workers and the development of SMEs.

The conventions contemplate a general framework for evaluation, collaboration and information exchange among the social agents at national, regional and local levels (the Ministry for Ecological Transition and the Demographic Challenge, the Administration of the Autonomous Community where the convention for just transition is located). This framework is called an **action protocol**. This protocol establishes a schedule of meetings between the administrations involved and the business organizations, trade unions, companies and other organizations of the affected areas.

The aim of this action protocol is promoting participatory processes of mobilization and consultation, facilitating access to diagnoses of vulnerability and socioeconomic and infrastructure analysis of the area, promoting a joint road map with measurable objectives,

making available to the parties economic, social and environmental feasibility analyses of the actions to be carried out in the affected areas and contributing jointly to the proposal of projects to be included in the Convention for a just transition.

Likewise, a joint monitoring commission is established for the supervision and monitoring of the protocol, its interpretation and the resolution of questions and controversies that may arise in the interpretation of the agreement.

As a result of these monitoring processes there were developed **participation reports** which include the results of 15 participatory processes in these conventions, in which 2,000 ideas, proposals or projects have been reached by more than 800 social agents, including public, regional and local administrations, companies and business organizations, trade union organizations, universities and educational centres, associations and NGOs, development agencies and local action groups, among other organizations (ITJ, 2023).

Regarding the development phases, the conventions are articulated through the following steps (ITJ, 2022.a).

- Delimitation of the geographic scope of the convention.
- Preparation of a characterization and diagnostic document.
- Carrying out a public participation process.
- Finalization of the characterization and diagnostic document.
- Analysis and evaluation of the projects and identification of support instruments.

Chart 9. Participation status of just transition agreements, 2022.

CCAA	Convention	Number of participants	Number of proposals (ideas & projects)
Aragón	Aragón	67	173
Asturias	Suroccidente	42	85
	Caudal Aboño	60	96
	Nalón	47	69
C. y León	Bierzo-Laciana	163	415
	Montaña Central Leonesa- La robla	69	160
	Guardo Velilla	71	247
CyL y P. Vasco	Garoña	48	147
Andalucía	Carboneras	24	60
	P. Nuevo - V Guadiato	38	182
	Los barrios	20	53
Galicia	Meirama	36	65
	As pontes	38	58
C. La Mancha	Zorita	42	77
		765	1.887
Baleares	Alcudia	In process of participation	

Fuente: ITJ. 2022.a.

Despite the institutional framework deployed with the open consultation processes, according to the interviews carried out, it is requested, from the trade union side, a greater participation in the design, implementation and evaluation of just transition processes.

They indicate that the open consultation processes are regarded as information forums but

not as full social dialogue procedures. For them tripartite social dialogue should have a predominant role in these processes because social partners have the knowledge, the capacity and the legitimacy to deal with these transitions.

it is important for the unions to participate because they are the representatives of people that the plans are trying to save. They are the representatives of the workers in affected work centres and therefore it is necessary to talk to the unions. [...] Indeed, due to the production process involved, unions have greater communication and level of involvement. The unions are established both in the work centres and in the territories, so there is greater knowledge for the evaluation by the unions. (E3)

5. CONCLUSIONS

The energy sector is currently facing an enormous productive transformation process, with important economic, social and environmental repercussions. The weight it represents in the economy and other sectors of activity means that the challenges are common to society as a whole. Among the main challenges, the sector faces the reduction of greenhouse gasses, the digital and productive transformation of the sector, the incorporation of new energy sources and producers of different types, the need to guarantee supply and transport, the guarantee of access to energy or quality employment and decent working conditions, among others.

The way in which all these changes are tackled is decisive for the transformation to be both socially and environmentally just. This depends on a variety of factors, including the degree of institutionalization of the process and the role of social dialogue in it.

Spain is an example of a country where both factors have been decisive elements in previous transformation processes. Derived from this previous experience, Spain has, on the one hand, an institutional structure that supports the productive transformation process (ministry, policies, measures, institute, etc.), guaranteeing its development in all its phases (design, implementation and evaluation), which allows the financing of projects of various types (employment, training, new activities, etc.) in the affected areas.

On the other hand, Spain could also be considered as an example in which social dialogue in general terms has been the lever of change in the processes of productive transformation of the energy sector. The tripartite social dialogue in the closure of the coal-fired power plants -with its lights and shadows- is a good example of this.

Among the results, the experience shows the importance of promoting lasting productive sectors, with stable employment and high added value, in which professional training and investment in new sectors is a key element.

However, the experience also reflects some points for improvement, such as anticipating the effects on employment before closures occur or improving social dialogue processes.

In particular, the participation of the social partners is deployed in an important way in the institutional framework at the highest level. However, this tripartite participation is being diluted at the territorial level through open participation with various territorial actors of different types.

The implementation of the New Generation European Funds highlights the potential of

these two factors (institutionalization and social dialogue) in the implementation of projects and resources. However, it is clear that the speed with which closures occur in the affected areas implies a time gap between the economic and social consequences of the closures and the expected job creation effects of the new projects. This time gap generates uncertainty among the affected population, which may accelerate the depopulation and aging processes in the affected areas.

In the process of replacing fossil fuels with renewable energies in those areas, there have also been detected effects on the territory from the point of view of competition for the use of the territory. It has been detected that the production of polluting energies has had a great acceptance in the territory from an economic, social and cultural point of view, due to its high capacity as a driving force and for the articulation of direct and indirect employment. This perception of loss caused by the closures can generate a certain rejection of the new renewable energy generation activity, which is seen as external to the territory. In addition, both photovoltaic solar energy and wind energy are considered extensive in the sense that their implementation is incompatible with other agricultural or livestock uses, which are traditional in these areas, furthermore whose employment generation capacity is considered less than that of the activity on polluting energies that has been finished.

In short, previous experience allows us to know the strengths and weaknesses when carrying out productive transformation processes, in order to achieve equity both in labor and social and environmental terms.

List of Acronyms

CES: Economic and Social Council

CEOE: Spanish Confederation of Business Organisations

CNMV: Spanish National Commission of Markets and Competition

IDAE: Institute for the diversification and saving of energy

ITJ: Institute for Just Transition

MITECO: Spanish Ministry for the ecological transition and the demographic challenge

PNIEC: Spanish National Integrated Energy and Climate Plan

ANNEX SPANISH QUALITATIVE REPORT

Spanish Qualitative Report

The project Rejeneraxion includes the preparation of a qualitative report in each of the countries, based on semi-structured interviews with key informants. For this report, seven people from the trade union, institutional and academic spheres were interviewed ⁵.

The main results are summarized below, organized according to the main thematic axes considered in the project's analysis scheme.

Just transition of the energy sector in Spain

Within the three polluting energy sectors analysed, coal, oil and gas, it is the coal sector where the greatest impacts have been detected and where the greatest work is being done on the just energy transition.

A) Employment

Conventional sources of statistical data on employment do not yet disaggregate activities related to energy production and supply according to their renewable or non-renewable nature; therefore, it is necessary to resort to data on employment forecasts from public bodies related to climate change and the circular economy or to employment forecasts from business associations of renewable energy companies (I6).

Among the impacts of the energy transition, we can point out those caused by mining closures, the closure of coal-fired power plants or the closure of some nuclear power plants. In addition, it is possible to point out the opportunities that arise from the creation of solar photovoltaic solar plants, wind plants or the development of new hydrocarbons based on biofuels and other technological innovations such as green hydrogen.

With respect to the **destruction of employment**, there is a certain consensus, based on the interviews conducted, in differentiating between the mining closures and the closures of the coal-fired power plants, according to their impact on employment and the alternatives proposed.

As a result of mine closures, the impact was mainly focused on early retirements and high severance payments, together with some relocations in the rehabilitation processes of the affected areas. In the case of coal-fired power plant closures, in addition to early retirements and severance payments, there have also been relocations.

⁵ See the profile of interviewees in the annex.

At first, these relocations have taken place in the dismantling of the plants and the regeneration of the areas where the coal-fired power plants were previously located, in addition to relocations within the main companies themselves. In a second stage, deferred in time, it is foreseen that these people will be hired in the new activities generated in these affected areas. These new activities are focused on new industrial projects, the installation of new renewable energies and infrastructures linked to public services.

The main difference between the first processes and the second ones is the alternative employment offered to the people affected. In the former, as a result of the mining reconversion, there were no employment alternatives in a generalized manner. The main reason was that the companies that owned the mines went bankrupt and disappeared for the most part, so they could not be held responsible for the costs (I7). However, in the most recent processes of closure of coal-fired and some nuclear power plants, there is a little more foresight, through just transition agreements, and employment alternatives are being proposed through European funds (I5). Moreover, this possibility of relocations within the same company and investments in the territory has been possible because the companies that own the coal fired power plants have continued to operate in other locations (I2, I5, I7),

In this sense, a **reorientation** of the sector's workforce from polluting energies towards renewable energies is expected. However, due to the time gap between the closure of coal mines and coal fired power plants and the expected creation of new economic activities in those affected areas, a migration effect of energy sector employment from polluting energy sources to renewable energy sources is not appearing in those areas. Closure is occurring, followed by a temporary gap and subsequent job creation is foreseen (I1, I5).

Therefore, **net job creation is expected in the future**, taking into account the effect of all the actions to be carried out in the territories. This includes the rehabilitation of the affected areas, the installation and maintenance of wind and solar photovoltaic energy production plants and the generation of new industrial activities and local services in the areas affected by the closures (I2). This job creation is expected to be much higher than the previous one (I7). However, due to the fact that many planned projects have not yet started, there is still perceived a net loss of employment in overall terms (I1, I5). In some locations there is already a higher demand for employment and what is detected is a lack of labour for some companies (I7),

With respect to existing **professional profiles** and those expected to be created, it should be noted that both mining and coal fired power plant jobs are considered qualified (technical). Likewise, employment in renewable energies is also considered qualified. In both cases, employment is mainly male and segmented by gender. It is mainly men who are in the field, while women are mostly employed in office departments (I1, I2).

Regarding the **training** that is being planned for the people and regions affected, two types of

training (I2) are foreseen:

- A first type of certified training, is related to the installation of renewable energies, mainly wind and solar plants, and to energy efficiency and green infrastructures.
- A second type of training with guaranteed recruitment, is oriented towards transversal subjects of the construction and rehabilitation sector, with an environmental orientation. It is mainly related to occupational risk prevention, the execution of construction processes or the environmental management of the company. It should be noted that this training is required to be able to work both in the rehabilitation of the affected areas and in the installation of renewable energies. After the training, there is a commitment to be hired in the rehabilitation of the areas affected by the closure of mines and thermal power plants.

B) Work organization and working conditions

The participation of the social partners has been oriented towards reducing the impacts of coal fired power plants and mining closures. With this orientation, the social partners have reached tripartite agreements with the administration on the closure of coal mining and coal-fired power plants, so it can be considered that participation at this level has been active (I5), although from this point on, participation at the territorial level has been diluted (I1).

This is why the interest of the social partners at the sectoral and territorial level has been oriented towards achieving viable alternatives for the people affected by the closures. Moreover, to the extent that there has been a time gap between the closures and the creation of new economic activities planned, there is no clear perception of how the work organization will be organized or what the working conditions of the new activities planned will be.

Regarding the *working conditions* of the new activities already established, mainly focused on the dismantling and rehabilitation of areas previously occupied by coal mines and coal-fired power plants. It can be pointed out that the working conditions of these activities are considered to be better than those of the mining activities, however, the salary conditions are inferior. This situation occurs, according to the trade union perspective (I3, I4) mainly because the new activities do not have a long history of collective bargaining, as was the case in the former coal-related activities, nor do they have an organizational culture as did the former activities, which means that working and wage conditions still have a lot of room for improvement (I3, I4).

With respect to *occupational risks* in renewable energies, in general terms there are risks associated with these activities, many of them related to risks already existing in other activities, such as risks associated with working at heights, risks related to electrical hazards, or the handling of work equipment, which has led the administration to prepare specific occupational risk prevention guides for these activities (I6).

The wind energy business association points out that the wind energy sector has lower accident

rates than other sectors such as industry or construction. The main accident rate occurs, according to this business association, during the manufacturing and installation phases. However, in 2021, the phases where accidents were concentrated were during the maintenance of the installations, mainly due to the reduction in the number of new installations during that year. Most of the accidents that year occurred as a result of a blow against a stationary object while the worker was in motion, or due to overexertion or a blow against an object in motion.

C) Sectoral level

Regarding the volume of employment in the sector, it can be noted that there has been a reduction of employment in polluting energies, mainly concentrated in the coal sector (extraction and production of energy from coal). Significant job creation is expected in the areas affected by these closures; however, this job creation is still incipient (I2, I3, I4, I5).

Due to the high link to the territory and population of coal extraction and energy production in coal-fired power plants; and the effects on the affected areas, the territorial perspective is the dominant perspective in the just energy transition (I1).

From the intersectoral point of view, the end of activity of the mines and coal-fired power plants has meant a reduction in the economic activity of the affected areas, with this loss of activity being more important in areas where coal-related activity was considered a monoculture from the economic point of view.

Taking into consideration the perspectives of the social partners, it can be pointed out that from the trade union perspective, the decision on the closure of mines and coal-fired power plants is considered an external decision (I5). Trade unions are aware of the loss of employment, economic activity and the social impacts of these closures. For this reason, they consider as a priority the proposal of economic and employment alternatives for these affected areas and people, so that there is territorial and social cohesion (I3, I4).

D) Territorial / Regional level

The closures of coal mines and coal-fired thermal power plants have led to a loss of employment in these affected areas, and therefore to a loss of investment and consumption capacity in these areas. It has also meant a loss of population, which implies a greater risk of aging and depopulation of those areas already affected by both trends (I3, I4).

This is why a territorial strategy for the promotion of economic activity linked to just transition agreements has been implemented. These agreements have identified these areas affected by closures as priorities for investment and employment. The promotion of economic activity in these just transition areas has focused on three issues: First, the decommissioning of coal mines and thermal power plants and the rehabilitation of affected areas has been promoted. Secondly,

incentives are being given to the companies that own them to invest in renewable energies, mainly wind and solar photovoltaic energy, but also in the production of green hydrogen.

Thirdly, the generation of new industrial activity is being promoted as a driving force for generating a new economic and labour ecosystem in these affected areas (I4, I5). In addition, due to the problems of high aging and depopulation of the affected areas, it is estimated that greater investment is needed in municipal activities focused on infrastructure and social services (I2, I3, I4) that allow to fix population in the territory, however, these investments must be oriented to the population, since there is a risk of investing in infrastructure that is then wasted (I1).

On the other hand, these new activities have the commitments of priority hiring of the personnel affected by the closures and of the population of the areas affected by the closures (I2). This is why European funds are seen as an opportunity to reactivate activity in the affected areas (I3, I4, I5).

A major effort is being made by public administrations to attract electricity-intensive companies to those areas affected by the closures, taking advantage of the implementation of renewable energy production plants in those areas (I2). To this end, the European financing funds for just transition are very important, which are articulated, in Spain, through different mechanisms created at the state level: the institute for energy transition, the institute for energy diversification and saving and the energy city foundation, in addition to other financing by the regional and local administrations themselves (I2).

In terms of social dialogue, it should be noted that the management of the just energy transition has been carried out in a tripartite manner with the agreements on the closure of coal and coal-fired thermal power plants, which subsequently gave rise to the just transition agreements, through the public participation of the territorial stakeholders.

In the tripartite agreements for the closure of the coal-fired power plants, signed between the administration, the trade unions and the companies owning the plants, there were commitments to relocate the affected people from the main companies, as well as to prioritize the hiring of the affected people in the subcontracting companies for the dismantling and rehabilitation phases. These agreements also included process monitoring and evaluation committees.

From the tripartite agreements, 15 Just Transition Agreements have originated, each of them related to mining closures, the closure of coal-fired power plants or the closure of nuclear power plants (I2, I5). These agreements made between the state administration and the regional and local administrations have a monitoring protocol that ensures the participation of the social partners and seeks the participation of other territorial stakeholders. This strategy of public consultation of the various territorial stakeholders among which are the business and trade union organizations, as well as other territorial organizations and associations, is seen from the

trade union perspective as not very participative, since it is appreciated as a consultation process but is not considered a full social dialogue, considering as such the bipartite or tripartite (I3, I4).

E) Socio-Environmental level

The inclusion of matters related to sustainability in collective bargaining is limited. In general terms, this relationship between new organizations and just transitions has not been translated into sectoral and company collective bargaining agreements, although there is some progress in larger companies linked to polluting sectors, such as the cement sector. (I1) Clauses related to sustainability in collective bargaining agreements do not focus on commitments with measurable objectives, but rather on generic commitment clauses, mainly related to sustainability, although clauses related to climate change commitments are beginning to be incorporated (I1). In general terms, the clauses are related to information rights and sporadically incorporating rights related to prior consultation (I1).

From the trade union perspective, it is pointed out that in the field of labour relations there is an innovative practice in relation to sustainability and that is the creation of an environmental delegate. This figure, created within the framework of some collective bargaining agreements, grants certain competencies in sustainability matters to some workers' representatives, collaborating with the company's management in the improvement of sustainability. It also allows, in some collective agreements, these workers to have a certain time credit (amount of hours recognized in their working time) to enable them to receive training and carry out their functions (I3, I4).

From academic point of view, its pointed out that this figure of environmental delegate is positive since it recognizes competences of vigilance and cooperation in compliance with the regulations; however, it is stated that since it is a figure created in some collective bargaining agreements, it is not generalized in all sectors and does not always carry an hourly time credit, which increases the workloads and competences of the existing prevention delegates without increasing the available hourly time credit; likewise, it is pointed out that training is not always included by the companies for these delegates, being very technical subjects that require previous specialized knowledge (I1).

Likewise, recognizing this innovative practice, from the trade union perspective, the convenience of its reformulation is pointed out, in order to have more competences not only in the compliance with sustainability regulations, but also to have competences in the future sustainability of the company, having competences in matters of investments and their repercussion on employment (I3, I4).

F) Drivers for and barriers to clean energy transition

Among the **main drivers** of the energy transitions, it is pointed out the development of an

articulated social dialogue at different territorial levels (state, regional, local), together with the development of the company's labour relations.

This articulation of social dialogue has taken the form of two tripartite agreements for the closure of mines and the closure of coal-fired thermal power plants.

In addition, 15 just transition agreements have been reached, each relating to areas affected by the closures of coal mines, coal-fired thermal power plants and nuclear power plants. These agreements involve the evaluation of the impacts through public reports and the establishment of collaboration commitments of the public administrations involved (state, regional and local) together with the implementation of a process of public participation of the territorial agents and evaluation and monitoring commitments.

In addition, social partners recognize as positive these practices that can be applied in other contexts and sectors (I5), although some adjustments are necessary, insofar as the trade unions demand greater participation (I3, I4).

Another driver of energy transition processes is the presence of financing from European Just Transition funds. These funds allow initially to mitigate the most negative impacts of mining and coal closures in the affected areas (I1, I3, I4, I5). In addition, these funds are expected to provide incentives for the generation of renewable energies, mainly wind and solar photovoltaic energy, but also for the production of green hydrogen in the areas affected by the closures. These funds are also allowing the attraction of industrial companies that act as a tractor effect for employment and for the establishment and emergence of companies from other sectors (I1, I2, I3, I4, I5, I7).

From the trade union side, the need to promote investment by local and regional administrations in economic activities linked to welfare state services such as education, health, or care for dependent persons, mainly the elderly, is highlighted, since these services are considered a priority for the population in the areas affected by the closures (I3, I4). The administration states that there is a line of financing related to infrastructures linked to these local services (I2, I7). In these local promotion activities, special emphasis is being placed on collaboration with women's associations to promote women's employment, given that both the coal and renewable energy sectors are highly male-dominated (I2, I7).

In addition, there are public investment initiatives in the cultural field with the aim of generating a new cultural offer in these affected areas to improve the tourist offer of these areas in order to complement the tourist activity and offer new economic opportunities to the affected areas (I2, I7).

Among the **barriers**, the main barrier identified is the *time gap* between the closure of coal mines and power plants and the creation of new economic activity in the areas affected by the closures

(I3, I4, I5). This time gap is motivated in part by the speed with which the closures have occurred (I1) and by the need for new permits and licenses for the new industrial activities that are planned. In addition, to the extent that these activities have an impact on the territory, they must have environmental impact assessments, which delays the execution of the works (I4, I5, I7).

This time gap implies uncertainty about the future possibilities for the implementation of new economic activities, which may promote aging and depopulation processes in the affected areas (I1, I3, I4) and may also favour the distrust of the populations affected by the closures in the face of the new generation of economic activity and the energy transition process in general (I4, I5).

This feeling of *mistrust towards the energy transition* is also found in the implementation of new wind and solar photovoltaic power plants. This increased distrust is motivated by several issues: on the one hand, the manufacture and implementation of these new plants is seen as something external to the affected areas. In addition, it is perceived that the benefits obtained from the energy produced at a lower cost, as well as the taxation originated by these benefits, do not revert to the territories, but they are transferred to large cities and large corporations, which are also taxed in large cities. In addition, these new wind and solar photovoltaic plants are considered extensive in the territory and incompatible with other traditional uses of the affected areas such as livestock or agriculture (I1, I3, I4).

On the other hand, given the lack of economic alternatives in the short term and therefore of employment, there is a risk of accelerating the already existing depopulation trends in these areas affected by the closures. This situation may imply that when new companies are to be established, they will have difficulties in finding lab or in these geographical areas (I3, I4).

Annex of interviews:

1	Expert form University
2	Institute for Just transition (government body)
3	Trade Unionist at national level
4	Trade Unionist at national level
5	Trade Unionist at sectoral level
6	Environmental expert
7	Institute for Just transition (government body)

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