

Industrial regions and climate change policies: Asturias (Spain)

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ETUC



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1. Regional context

1.1 Socio-economic and industrial context

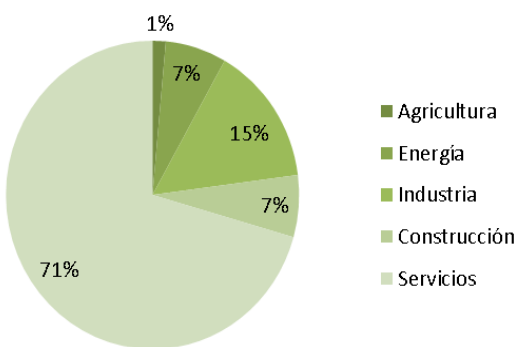
The region of the Principality of Asturias is located in the north-west of Spain between the regions of Galicia and Cantabria and is bounded to the north by the Cantabrian Sea. The region has a total area of 10,603.57 km² and, according to the most recent census, has a population of 1,050,917, with a slightly declining trend.

The central district of Asturias, comprising the municipalities of Avilés, Gijón and Oviedo, is home to 54.7% of the population, with the eastern and western areas less populated.

The region of Asturias contributes 2% of Gross Domestic Product (GDP) in Spain, far below other regions, such as Catalonia and Madrid, which both contribute 19%.

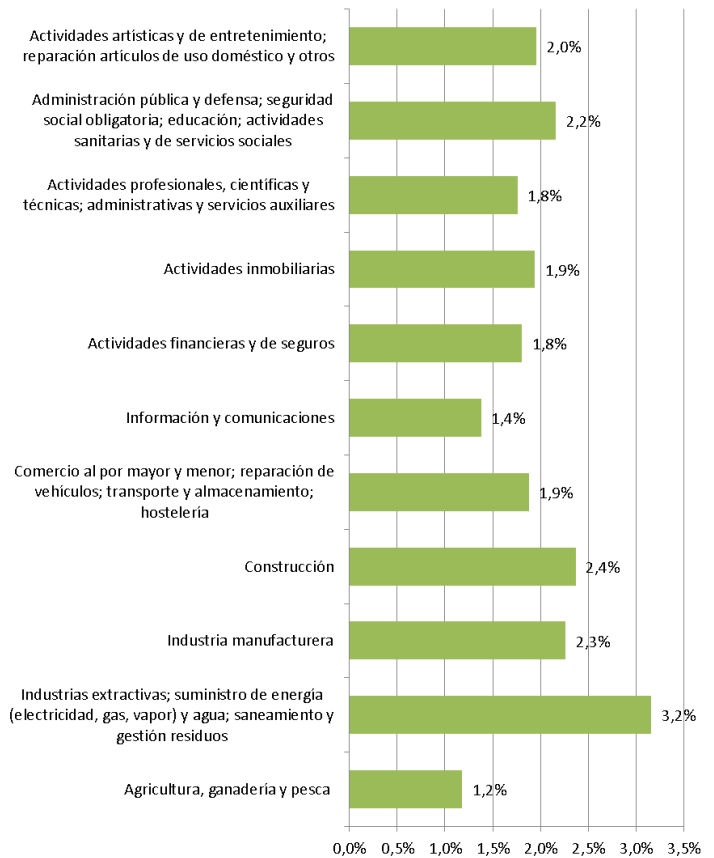
Historically, the region has had a strong industrial base, predominantly focused on the iron, steel and metallurgy sectors, which make up 28% of the Gross Value Added (GVA) of the region's industry. The total GVA from industry in Asturias represents 22% of total GVA for the region, comprising 15% from industrial activities and 7% from the energy sector and the extractive industry.

Distribución del VAB de Asturias por sectores de actividad en 2014 (%)



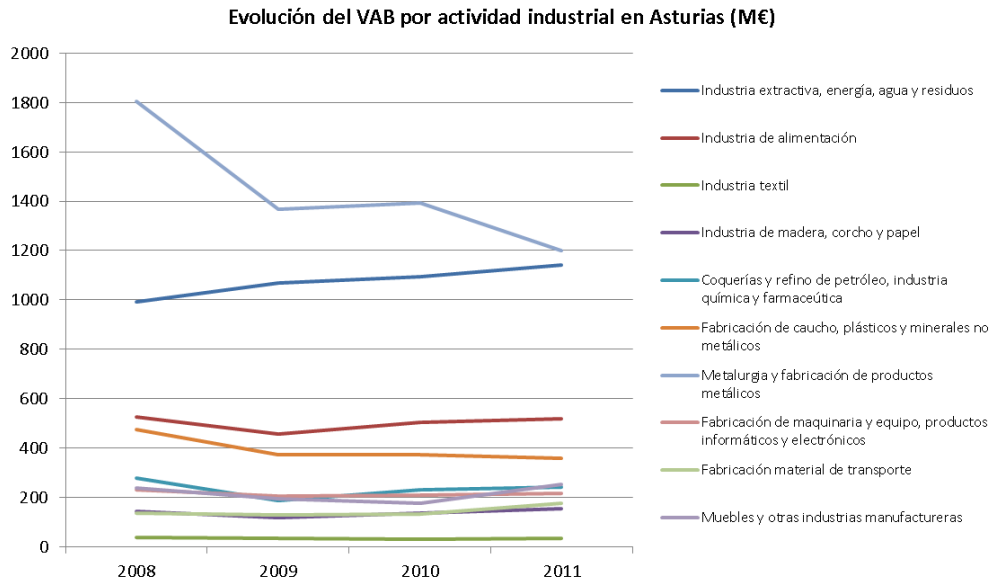
Source: Spanish National Statistics Institute (INE).

Contribución del VAB de Asturias a España por ramas de actividad en 2014 (%)



Source: Spanish National Statistics Institute (INE).

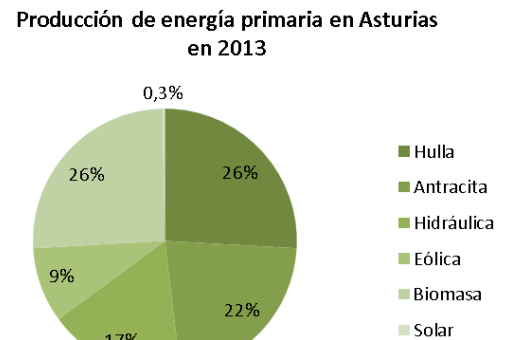
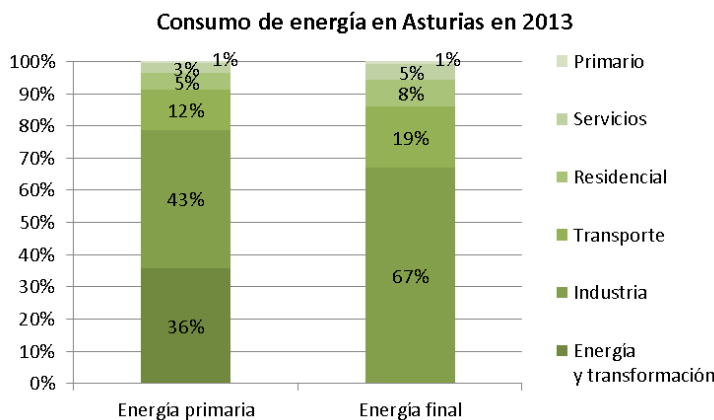
The metal sector has traditionally been the most important in the region, with a turnover of €9 billion and employing 30,000 people. The region is home to ArcelorMittal Asturias, which has two factories in Avilés and Gijón and is Spain's only integrated iron and steel plant, in addition to the presence of companies such as Xstrata, with a zinc plant, and Alcoa, Spain's largest aluminium producer. There are also manufacturers of goods and equipment, such as Duro Felguera, Grupo Daniel Alonso and Thyssenkrupp.



Source: Spanish National Statistics Institute (INE).

In terms of the energy sector, generation largely comes from the thermal power stations in Lada (Iberdrola), Narcea (Gas Natural Fenosa), Aboño and Soto de Ribera (both EDP), together with hydroelectric stations on the Navia and Nalón rivers (also EDP). There is also another thermal power station, La Pereda, which is owned by Hunosa, a public company that mines and sells coal. The company has a plant with 1,700 workers, a dramatic fall from over 20,000 in the 1980s.

Asturias has 250 companies operating in the energy sector, which employs around 7,000 people and has a turnover of over €2.6 billion a year.

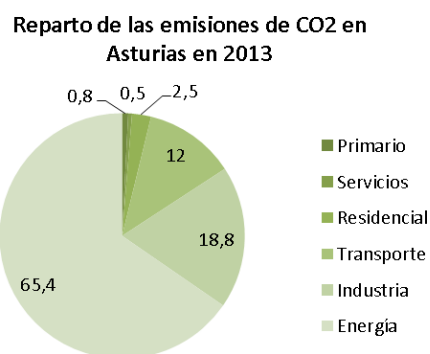


Source: Ministry of Industry, Energy and Tourism (MINITUR) and Asturian Energy Foundation (FAEN).

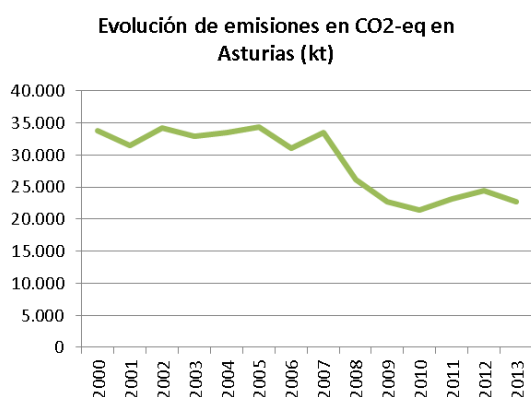
The chemicals sector has experienced considerable growth in recent years, both in terms of employment (over 2,700 jobs) and turnover (around €1 billion). Finally, the agrifood sector employs 8,500 people and has an annual turnover of €2 billion.

Asturias represented 4% of Spain's total electricity consumption in 2014 but 20.4% of consumption at the tariff for large consumers at the state level. This tariff covers the region's seven manufacturing plants, which represent 49.7% of its electricity consumption and 2% of the total national consumption. Heavy industry (iron and steel production and foundries) represents 66.4% of total electricity consumption, compared to 21.7% at the national level. The biggest consumers in Asturias are ArcelorMittal, Xstrata and Alcoa.

According to the latest Asturias energy report produced by the Asturian Energy Foundation, CO₂ emissions from activities in the region fell by 7.2% in 2013 from around 23,000 ktCO₂eq in the previous year. Asturias has the highest per-capita emissions, with a figure of 22.7 tCO₂eq per inhabitant. By 2012, the region had managed to reduce emissions by 11% with respect to the 1990 baseline according to Ministry of Agriculture, Food and the Environment.

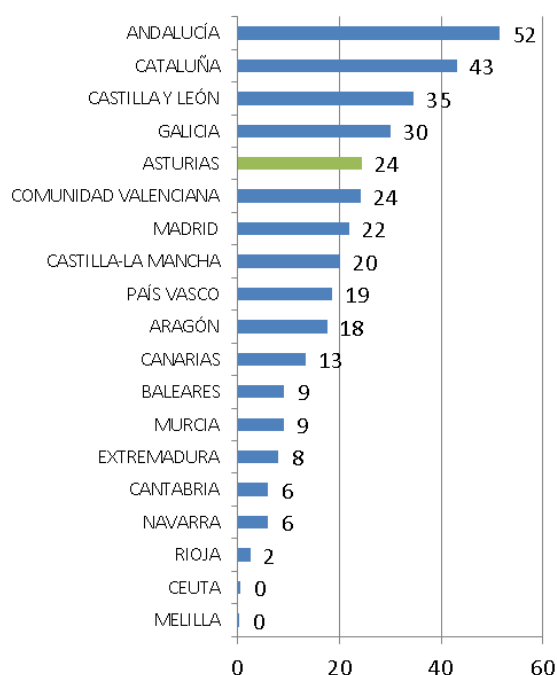


Source: Asturian Energy Foundation (FAEN).



Source: Ministry of Agriculture, Food and the Environment (MAGRAMA).

Emisiones regionales en CO2-eq en 2012 (Mt)

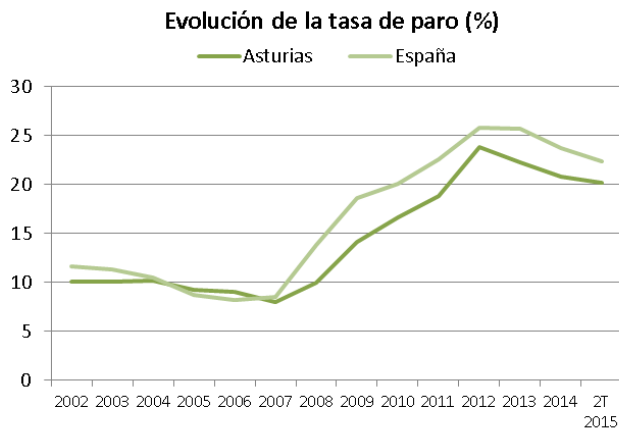


Source: Ministry of Agriculture, Food and the Environment (MAGRAMA).

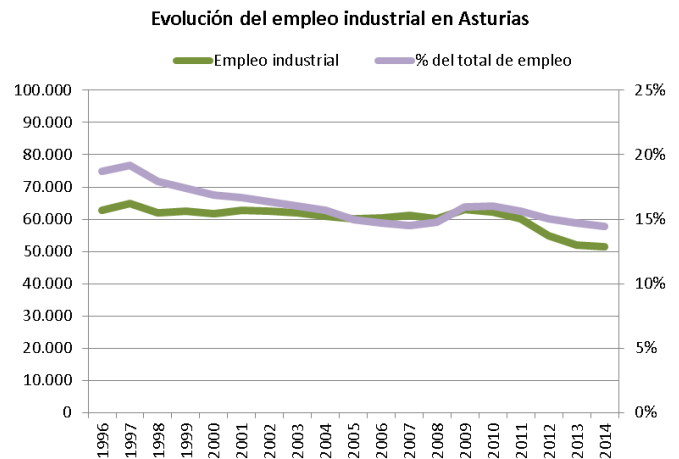
In 2012, 80 facilities in Asturias were subject to the European Integrated Pollution Prevention and Control (IPCC) scheme and the quantity of emissions was reduced by 4.3% to 19.1 Mt. The extraction of minerals and combustion make up 60% of the industries responsible for emissions.

According to the most recent report on the environmental state of Asturias,¹ in 2012, industrial businesses in the region invested €90.5 million in environmental protection as part of efforts to prevent, reduce and eliminate pollution caused by its activities. The figure is much lower than the annual figure of €200 million between 2006 and 2008. Investment by Asturian industry is focused on reducing atmospheric emissions (29% of investment in 2012), followed by managing waste water (24%) and waste management (9%).

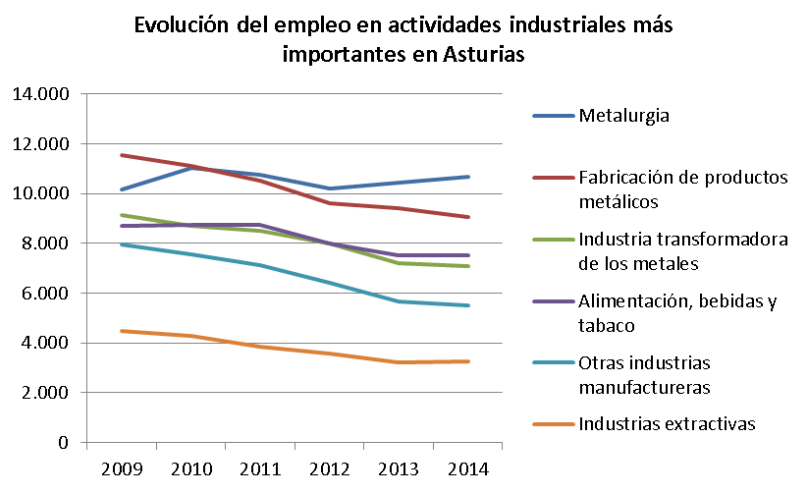
1.2 Employment



Source: Spanish National Statistics Institute (INE).



Source: Asturian Society of Economic and Industrial Studies (SADEI).



Source: Asturian Society of Economic and Industrial Studies (SADEI).

2. Low-carbon industrial strategies and policies

2.1 National initiatives

At the national level, the Spanish government has designed industrial policy strategies to mitigate temporary difficulties and to address some of the structural weaknesses of Spain's industrial base. The Integrated Industrial Policy Plan for 2020 (PIN2020) responds to these

¹ *Situación Medioambiental de Asturias 2012-2013* [Environmental State of Asturias 2012-2013], Economic and Social Council of the Principality of Asturias (CES).

issues, albeit without clear directives to address these problems, taking into account the environmental factor in the context of the environmental targets set by the EU. Government actions have sought to design plans and strategies that address issues in a relatively general way and without sufficient integration.

The Spanish Climate Change and Clean Energy Strategy seeks to ensure Spain meets its commitments for climate change and the promotion of clean energies while delivering improvements to welfare, economic growth and environmental protection. Its objectives also include reducing greenhouse gas (GHG) emissions. The framework established at the European level has seen Spain make a considerable effort to implement emissions trading, covering over 1,000 facilities and around 45% of the country's total GHG emissions. A fundamental part of the emissions trading system was the National Allocation Plan, which determines the rights to be distributed for different activities, the quota of rights for the new entrant reserve, expectations of the usage of flexible mechanisms and steps for compliance. From 2013 the National Plans disappeared and were replaced by European assignments.

The Energy Savings and Efficiency Action Plan 2012–2020 is derived from the first national action plan, which delivered savings of 9.2% in 2010, together with a reduction in CO₂ emissions of around 12,000 kt. However, the large-scale distortion caused by the financial crisis makes it hard to relate these outcomes to the savings and energy efficiency measures that have been implemented. The plan proposes a series of measures for industry, transport and energy transformation, aiming for the installation of 3,751 MW of new cogenerating capacity by 2020 and the renewal of up to 3,925 MW of cogenerating power over 15 years old.

The national government has produced a number of Renewable Energy Plans (1999–2010, 2005–2010 and 2011–2020) in line with the objectives of EU Directive 2009/28/EC. In Spain, the targets aim for renewable energies to represent 20% of gross final energy consumption, with a figure of 10% for transport, by 2020.

Spain has a Sustainable Development Strategy that aims to guarantee economic prosperity, ensure the protection of the environment, prevent the degradation of natural capital, promote increased social cohesion and contribute to global sustainability.

The State Waste Prevention Programme 2014–2020, derived from the National Integrated Waste Plan 2008–2015, sets out the waste prevention policy and a target of reducing waste by 10% between 2010 and 2020.

In terms of the restructuring of the mining industry, which has a major impact on Asturias, the most recent plan, launched in October 2013, is the Framework for Action for Coal Mining and Mining Regions 2013–2018. The agreement includes €400 million for reactivation plans and business projects. The measures include reducing the workforce in the sector by over 8% with a view to ensuring that only businesses that are solvent without government aid remain in 2019.

2.2 Regional initiatives

The regional government of Asturias devised the 2008 Energy Strategy for the Principality of Asturias with a horizon of 2012, which defines the regional priorities to meet the energy and environmental protection targets agreed internationally by Spain. The main objectives and priorities of this document are: maintaining coal as the main energy in the region, improving energy efficiency, developing renewable energies, improving infrastructure for transport and the balance of the primary energy structure.

The Sustainable Development Strategy for the Principality of Asturias was also created in 2008. Its objectives include: producing and applying a Climate Change Strategy for Asturias; making further progress in improving energy efficiency; promoting the adoption of technologies that contribute to mitigating global warming; promoting R&D&I in the energy sector in areas such as carbon capture; and promoting the achievement of renewable targets.

The Industry Strategy for Asturias 2013–2015, published in May 2014, stems from the Agreement for Employment and Progress in Asturias (AEPA 2013–2015), arising from the consensus achieved between the Asturian government and economic and social agents (General Workers' Union [UGT], the Workers' Commissions [CCOO] and the Asturian Federation of Business Owners [FADE]). The strategy includes a diagnostic of the current situation, which is used to define four objectives and 29 measures, in addition to various indicators for monitoring. The objectives include "achieving a more sustainable industrial base, reducing accidents in the workplace and ensuring industrial activity is compatible with high environmental quality."

There is also a Strategy for the Smart Specialisation of Asturias 2014–2020 (RIS3) prepared by the Asturian government in partnership with the Institute of Economic Development for the Principality of Asturias (IDPEA). The strategy sets out an integrated agenda for the region's economic transformation, prioritising certain sectors and technologies over others to promote the region's competitiveness in light of the specialisation of other regions in Europe. It includes sector diagnostics, together with objectives and priorities. For the materials sector, it proposes minimisation, valuation, reuse and recycling. In terms of reducing the carbon cycle, the focus is on secondary and alternative raw materials, and reducing the consumption of resources. It also proposes measures to capture GHGs, the sustainability of the energy supply and the improvement of efficiency in industry and construction.

Derived from the National Action Plan for Renewable Energies, the government of Asturias has produced a Regional Strategy for the Sustainable Use of Forest Biomass 2011–2020 whose targets include: the development and use of this material as part of an energy structure that makes a greater use of renewables; contributing to the reduction of emissions; incentivising the creation of employment and sustainable socio-economic development; improving the conditions of forest masses in the region; and promoting the integrated management of forest production. It sets out priorities for regulation on planning and forest management, direct support for production and consumption, and training, raising awareness and research, all accompanied by a series of measures to be taken.

European aid programmes such as the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD) have supported the development of

Asturias' Operational Programme 2014–2020, with €253.54 million of EAFRD funding. The program includes innovative actions for renewable energies, with a planned investment of €19 million through support for district heating systems, promoting energy efficiency among businesses and improving energy efficiency in infrastructure and public services.

In terms of environmental control, the Environmental Inspection Plan for the Principality of Asturias 2014–2017 and the Environmental Inspection Programme 2014 were approved in 2014.

2.3 Union strategy

Both CCOO and UGT back profound changes to Spain's industrial and energy policy in documents issued at their national conferences, agreeing on the need for a new production model that is more socially and environmentally sustainable. In terms of energy policy, they believe in the need for supply and access to be guaranteed to the whole population, environmental sustainability and the highest possible cost reductions.

Energy sustainability is a fundamental factor in industrial development, not just an economic measure. To be achieved it will be necessary to diversify the national energy mix, with renewable energies that can incentivise local economies and “democratise” access to energy playing a fundamental role. In this respect, the unions believe the development of renewable energies should be as distributed as possible, favouring many small facilities over fewer facilities occupying large surface areas. To achieve this, a stable, predictable and sustainable energy framework is required.

Spain is heavily dependent on raw materials for energy uses, which represent over 80%, compared to the European average of 56%, which should act as a target for the country.

Sustainable development must aim to tackle climate change, make efficient use of resources and ensure a fair transition. Industry support measures must come in the context of an integrated national policy to deliver a solid, strong, diversified and environmentally respectful industrial sector. However, these new industrial policies will only be valid if they are derived from social dialogue and permanent three-way instruments, both general and sector-specific. For both unions, it is fundamental that the improvement of industry involves promoting training, qualification and green jobs.

In terms of GHG emissions, they believe these should be reduced in Emissions Trading System (ETS) sectors, as well as a number of others (e.g. construction, transport, waste), as there is considerable room for improvement in both these areas.

3. Vision of local actors

3.1 The need for a long-term integrated strategy

In general terms, the regional actors that were interviewed believe Asturias lacks a clear regional economic, industrial and productive strategy for the medium to long term. While the public authorities have developed strategies such as those detailed in Section 2.2, these have not been implemented with sufficient depth and rigour.

Various actors believe there is a considerable level of non-compliance with the objectives of the Industrial Strategy for Asturias. At the time of writing, according to the most critical actors, proposals and projects of all types have been backed without ensuring the coherence of the various public and private initiatives.

This lack of coherence explains inconsistencies in projects, such as aiming to increase national coal while ports receive increasing volumes of imported coal driven by the low prices of imports, and the promotion of hydraulic fracturing in the search for gas in the region while supporting the activity of the local regasification plant (El Musel) for gas imports (the facility is currently not in use and regional sources claim that national government directives have prioritised the regasification plant in Bilbao over the Asturias plant due to the fall in demand for gas).

Situations such as these have led many actors to explain the lack of vision largely as a product of multiple changes of government at the national and regional levels, resulting in changes to plans defined by previous administrations and a lack of understanding between national and regional institutions, regardless of political differences. Others explain the lack of a coherent strategy by the lack of suitable and in-depth regulation, with current regulations produced by merely transposing directives without adapting them to regional circumstances. Some actors believe there should be a review of regulations at the regional level and above to unify and simplify their application. A bill for the Sustainability and Environmental Protection Law demanded by businesses was approved by the Asturian government in 2012 but has yet to come into force.

At both the national and regional levels, it is believed that one of the main priorities in changing the model should be the country's energy problem. The requirement to find a balanced energy mix clashes with some of the policies that are being implemented. There are numerous criticisms of the setbacks to renewables caused by recent regulatory changes that have stalled the installed capacity of renewables and resulted in developers rejecting new projects. Support for renewables has also fallen, down 22% in 2014 compared to 2013. Certain actors claim this stall came about when the structures no longer guaranteed a full return on investment, compounded by the lack of other policies for recovering costs, resulting in the stagnation of the sector. According to the most recent European Commission report on climate change and energy entitled "Trends and Projections in Europe 2015", although Spain currently meets the targets for energy efficiency and reducing GHGs, it nonetheless risks failing to comply with renewable energy targets, which must account for over 20% of the total energy consumption by 2020.

One of the most recent legislative initiatives has resulted in widespread criticism of the so-called "sun tax" approved by a recent decree, a tax on self-consumption with a series of different levels. Although the government claims this will allow phased penetration and maintenance of the system, the majority of agents believe it acts as a disincentive and should be scrapped.

At the regional level, there has been progress in the energy sector, such as the progressive decarbonisation during the last 15 years. However, recent legislative changes at the national level have discouraged the use of combined cycle and cogeneration. In Asturias, the competition between large electricity companies and combined cycle companies has had a negative impact on the latter, and the usage rate of combined cycle plants is currently below 10%.

A 2012 report by Capgemini Consulting² for the Asturian government on the possible effect of new energy projects on the region's industries forecast a recommended scenario of continuing with a €3.5 billion investment between 2007 and 2012 to deliver 3,700 MW of installed power in line with the region's energy strategy. However, the results have failed to reach the forecasts for the most conservative scenario.

Another serious problem, this time at the national level, is the requirement to restructure electricity tariffs, since successive mistakes in the model have resulted in a national pricing deficit that stood at €3.589 billion in 2014. The government's most recent reforms have resulted in a modest annual surplus but this has come at the cost of penalising renewable energies (among other consequences), meaning a full and carefully considered reform of electricity tariffs is still required. In this context, and given the region's high dependency on heavy industry and the high consumption of certain facilities located in Asturias, unions (specifically CCOO) put forward a proposal to regulate electricity pricing, which included long-term bilateral contracts between suppliers and consumers, specific measures on the cost of grid charges and differentiation based on the volume of capacity represented by Asturias in terms of contribution to the uninterruptable system.

In terms of environmental regulations in the region of Asturias, the actors demand improvements in communications and procedures. Businesses have advocated the promotion of voluntary agreements between the government and businesses to increase the minimum requirements for environmental regulations, although progress has yet to be made in this area. The streamlining of the management of permits and Integrated Environmental Authorisations (AAs) through improved coordination and the computerisation of procedures is also regarded as important. According to one actor that was interviewed, despite the presence of various IT modules, Asturias is currently the only region without a fully computerised system for all procedures. According to another actor, this inefficiency may have resulted in some AAs being awarded "under minimums" as a result of being processed in a rush and at the last minute.

3.1.1 Review of the CO₂ emissions trading market

In terms of emissions and the regulation of CO₂, some actors note that CO₂ regulations are lax. The reduction of emissions in Spain in recent years cannot be considered in isolation from the crisis in production. By 2007, Spain far exceeded the emission limit imposed by the Kyoto Protocol and the Spanish government has had to purchase a total of €800 million of emissions rights from third countries in order to meet Kyoto requirements. According to some actors that were interviewed, the current structure of the CO₂ emissions trading market is not conducive to reducing emissions and susceptible to speculative and dishonest trading.

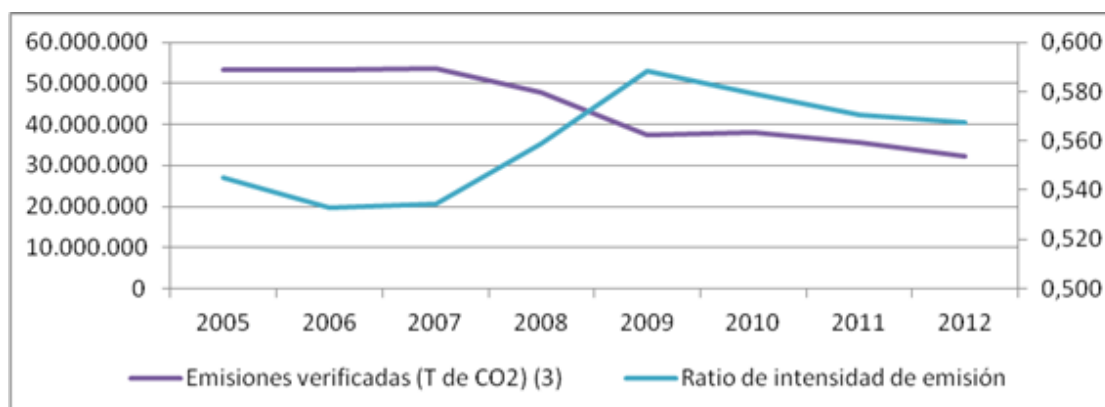
² *Estudio sobre la incidencia en las industrias asturianas de los nuevos proyectos previstos en el sector energético* [Study of the Effect on Asturian Industries of New Projects Planned for the Energy Sector].

The operation of the market has been subject to fierce criticism, largely, but not exclusively, by unions. Some of the problems derive from relating CO₂ to GDP, which is deceptive, since emissions indicators should be defined for each sector and activity. The low price of a ton of carbon and the fact that this has enabled the purchase of international credits derived from projects with environmentally questionable results is also a cause for concern. The real impact on GHG emissions is still unknown. Some actors firmly believe the market has not generated sufficient investment to help encourage the transformation of the industrial base to a low-carbon economy.

As part of a drive to find suitable indicators, the unions have used social round tables to propose a series of monitoring indicators that could be used to correctly evaluate the ETS to the business community and the government. The indicators aim to show the relationship between the reduction in emissions, the level of industrial production and employment. They were calculated for each of the industrial ETS sub-sectors, including the electricity sector.

They showed that although national emissions for the ETS sub-sectors fell by around 30% between 2005 and 2012, their intensity worsened by 4.1% in industrial sectors (excluding energy sectors). Indeed, in 2012, 4% more CO₂eq was emitted per ton of manufactured product compared to 2005, showing that the reduction in emissions was fundamentally linked to a fall in production.

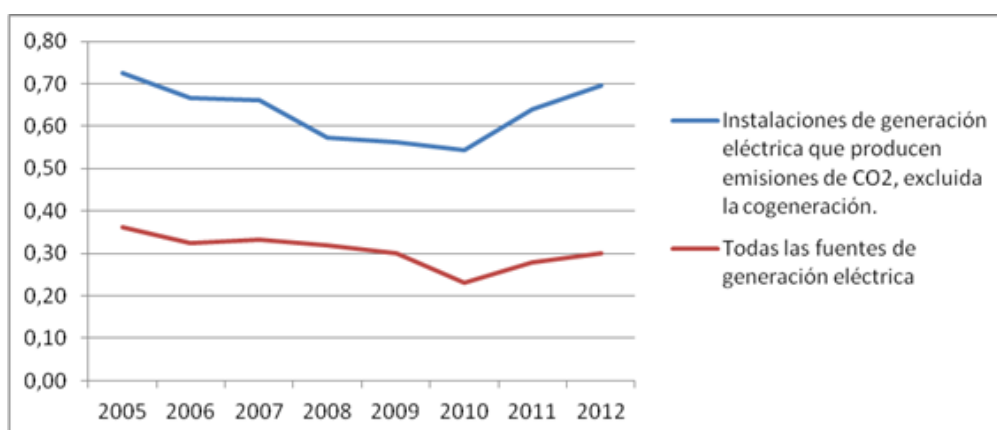
Overall change in total emissions intensity in industrial ETS sectors



Source: Ministry of Agriculture, Food and the Environment (MAGRAMA), Ministry of Industry, Energy and Tourism (MINETUR).

In contrast, in the electricity sector, the change in the ratio of the intensity of emissions followed an inverse trend between 2005 and 2010, the ratio of the intensity of CO₂ emissions per kWh decreased by 25% due to the replacement of coal by natural gas in power stations. From 2010 the input of coal grows again and the trend changes dramatically.

Emissions intensity ratio (kgCO₂/KWh) in the electricity sector



Source: Ministry of Agriculture, Food and the Environment (MAGRAMA), Ministry of Industry, Energy and Tourism (MINETUR).

According to the general state budget for 2014, 90% of revenue from ETS auctions is destined to reducing the pricing deficit without benefiting the development of renewables, with the remaining 10% spent on unspecified climate change policies.

In Spain, support for sectors at high risk of carbon leakage due to the impact of ETS on the price of electricity was €3 million in 2015 (compared to €1 million per year for 2013 and 2014).

In terms of carbon capture, despite being regarded as a priority objective by the majority of actors, a minority of interviewees expressed reservations regarding its effectiveness. According to a report by the CLIMAS expert panel³ for Asturias, the loss of net yield in electricity generation from applying capture technologies to the combustion system makes their application infeasible for the majority of existing power plants. Capture only appears to be feasible at new generation plants and only when emissions are expensive.

3.1.2 Correcting errors in restructuring mining

The Coal Restructuring Plans and the so-called Mining Funds are controversial and are examples of large-scale initiatives with ambitious objectives that were largely not implemented as they should have been. Since 1990, coal mining has received €24 billion, which, according to many actors, has been inefficiently used.

Since the 1990s, plans have focused on gradually reducing activity while implementing other economic and industrial bases in parallel to absorb the impact on employment and stimulate the economy. The plans include supporting mining companies for mining and transport, and support for electricity companies to maintain a high stock, together with other social measures such as early retirement, training and recovery plans for mining districts. The results show considerable room for improvement. The majority of funds were destined for infrastructure and public works (85% were spent on motorways) and not for projects to develop the business community.

³ *Evidencias y efectos potenciales del cambio climático en Asturias* [Evidence and Potential Effects of Climate Change in Asturias].

One of the biggest criticisms of these plans has been the lack of negotiation and the lack of appropriate development at the level of autonomous communities. The plans arose from a state agreement between unions, businesses and the Ministry of Industry without the participation of the government of Asturias. A report by the Audit Commission of the Principality of Asturias⁴ shows that in the period analysed by the report, there was limited control and enforcement of the use of funds. Part of the funds were destined for industrial estates and new businesses, although the arrival of the crisis has meant that these businesses, which are still under development, have not yet been able to bear fruit. At present, there has been a dramatic and excessive fall in funding as a result of previous poor management. Indirect support measures are under way, such as a royal decree to subsidise the denitrification of coal.

The actors agree that a lack of focus in measures and strategies is causing a poor transition. The unions believe it is necessary to devise a clear integrated strategy that includes the concept of a “fair transition” as its key directive and backs a new model: universal and linked to climate targets; in-depth and with real measures (regulatory, budgetary and tax related); planned, long-lasting, stable and predictable; involving all levels of government and sector areas; involving participation and dialogue; free from pressure from oligopolies and big business; and guaranteeing protection and quality jobs for workers.

3.2 Implementation of strategies and best practices

The evaluations and critiques brought up by the actors interviewed show that the strategies to follow for the future must be improved. However, they also underscore the success of low-carbon strategies, and reindustrialisation and transformation processes.

Key points at the national level include:

- Application of electric power in iron- and steel-making
- Penetration of renewable energies in the power mix
- Several reindustrialisation plan measures.

Key points at the regional level include:

- Implementation of wind farms
- Cogeneration plants in industrial facilities such as Reny Picot, CAPSA, and CEASA
- Development of mini-hydro plants
- The PELET IN project (manufacturing pellets using forest products) funded by MINECO and coordinated by the Asturian Energy Foundation (FAEN)
- Making use of iron-making gases
- New agricultural applications and the recovery of mining areas
- Strengthening ICT sectors
- Commitment to training in the form of programmes aimed at recertification and instruction for new technologies

⁴ *Informe definitivo de fiscalización: Ayudas para la minería del carbón y desarrollo de las zonas mineras, 2005-2008* [Report on Enforcement: Support for Coal Mining and the Development of Mining Areas 2005–2008].

- Actions aimed at promoting and developing new business activities as alternatives to mining (such as the Association for the Development of Mining Counties [SODECO]), created from the agreement between the Principality of Asturias, HUNOSA and labour unions.

Some Asturian businesses also have examples of best practices from the strategies of the regional government and private initiatives.

Businesses like HUNOSA and ENCE have developed business lines in renewable energy based on their original business activities.

HUNOSA has an experimental CO₂ capture plant at the Mieres power plant, the result of an EU research project in which INCAR,⁵ Endesa and Foster Wheeler are taking part. The objective of the project is to demonstrate the technical feasibility of achieving 90% CO₂ capture from coal burning, according to HUNOSA. Research will also be conducted at the plant into the co-combustion of coal, mine waste and biomass, another result of the above-mentioned programme (PELET IN). HUNOSA is coordinating a research plan (Carbolab) involving other European institutions, funded by the EU Research Fund for Coal and Steel, into storing CO₂ in coal seams and exploiting energy from methane gas.

In March of 2015 HUNOSA launched new business lines that are still in their early stages which currently employ about 25 people in fields such as:

- Biomass: In this field, in addition to the above-mentioned project, conventional boilers are being replaced with biomass boilers and maintenance services. Several contracts are already under way. The idea is to promote this business line for industrial and private clients. Savings from replacing traditional boilers are split 50-50 between the client and HUNOSA. Using this same business model, “heating districts” are also being promoted, aimed at supplying heat using large biomass boilers.
- Geothermal: Pumping mine water to provide air conditioning. Currently, this service is being provided to one hospital, and negotiations are under way with new clients.
- BioGaps: This is a monitoring and control project for biogas capture networks that uses software to track use and streamline production.
- Wind power: Studies and analyses to measure wind speeds using wind measuring towers with the initial objective of a self-sufficient system

ENCE is the number one producer of eucalyptus pulp in Europe. It is also involved in forest management activities and generating power from forest biomass. ENCE has incorporated Best Available Techniques (BAT) and Best Environmental Practices (BEP) into its production processes. It has two power plants in Navia and four more in the rest of Spain. The company currently has 220 MW of installed power from biomass, with annual production exceeding 1,600 GWh. It has 800 employees.

Asturias Bionorte, a biodiesel plant in Sotrondio that produces biofuels from recycled vegetable oils, faced a difficult situation due to a plant closure and laying off most of its workforce in 2013. This was caused by falling sales as a consequence of strong competition from imported biofuels

⁵ National Coal Institute

and the biofuel tax imposed by the Spanish government, which, according to its manager, demonstrated “the lack of any protection whatsoever from the government.”

On a smaller scale, some Asturian businesses have launched initiatives aimed at creating a low-carbon economy. Some examples include:

- CAPSA Food: CAPSA employs a strategy of low-carbon energy savings and efficiency applied to integrated purchasing management, production processes and transport. These and other measures cut 1,810 t of CO₂ emissions/year.
- Industrias Lácteas Asturianas (Reny Picot): As mentioned above, Industrias Lácteas Asturianas has an electrical-thermal cogeneration power plant. It also has planned investment to power boilers with natural gas instead of fuel.
- Masaveu Group: Policies to replace polluting fuels with biomass, with an investment of €2 million for its fertiliser plant.
- EDP: Investment of €600 million since 2009 in combined cycle systems for the project to increase gas consumption while reducing carbon. At the end of the year, EDP closed its Soto 2 plant because it did not meet environmental requirements.
- Thyssenkrupp Norte: Thyssenkrupp Norte is involved in activities such as automatic electrostatic paint systems, digital temperature regulation in boiler rooms, installing solar panels to assist in heating tap water, and installing chilled beam HVAC systems.

The chemical industry has also made efforts to invest to meet environmental prerogatives. However, in some cases this has required the involvement of the Occupational Inspector's Office to enforce regulation (such as with Chemastur in San Juan de Nieve).

Although industry in Asturias provides some excellent examples of best practices, many actors have indicated that these are lacking. A large part of the practices used in the field are limited and aimed more at meeting legal obligations than establishing a trend of commitment to transforming to a low-carbon industry.

There are some examples of best practices used by other actors, such as the Erenalón Foundation, that implements local initiatives for dissemination, training, monitoring electricity supplies, building audits, and consulting for biomass and biodiesel studies.

3.3 Impacts on employment

The impact of low-carbon policies and strategies on the workforce has been quite significant. Although it is true that since the end of the 1980s attempts have been made to find effective solutions and alternatives as part of changing the production model, the result has been far from good. Jobs that have been created after restructuring in the more traditional industrial sectors like iron-working, mining and the naval sector have not managed to equal the jobs that have been destroyed, far from it. Unemployment in affected areas has risen sharply, leading to a major exodus to other population centres, even outside the region, and other consequences. This primarily affects younger people, which in turn has caused the average age of populations in the region to rise.

Despite substantial funding from the EU for industrial recovery and modernisation, some actors believe that existing potential has not been exploited and very little foundation for new growth has been laid due to the need for a comprehensive and coordinated regional strategy.

Notable training and recertification initiatives to provide vocational training and job placement include an initiative by the Foundation of Mining Counties (FUCOMI), an organisation in which the regional and state governments take part as well as the miners' union, industry federations (CCOO, UGT, and HUNOSA) and the Metal Asturias Foundation, an organisation comprised of regional government representatives, trade unions, the Federation of Metal and Related Businesses of Asturias (FEMETAL), and the municipalities of Gijón and Avilés.

In contrast, other areas like renewables, energy efficiency, sustainable transport, waste and other activities in traditional sectors with the potential to convert to sustainable activities have provided an important source of employment nationwide since 2000. A 2010 report published by the Spanish Sustainability Observatory and the Biodiversity Foundation⁶ estimates that some 500,000 green jobs have been created in different sectors. Other studies conducted by CCOO and financed by the Biodiversity Foundation point to considerable potential employment.⁷

One of the sectors that has seen the sharpest increases in employment is renewables, favoured by legislation together with public and private ventures. However, measures put in place by recent administrations were watered down in 2009 and completely discontinued in 2012 leading to the loss of nearly half of the positions created up to that point. A total of 22,655 jobs were destroyed in the renewables sector in 2014, more than 50,000 since the beginning of the crisis.

According to a Spanish Sustainability Observatory study more than 10,089 green jobs were recorded in 2010, making it one of the communities with the least development in this aspect. Renewable energies employed 2,300 people in the region.

3.4 Drivers of the transition: goods, products and technologies

On the national level, goods and technologies that have stood out as the most important in guiding change towards a low-carbon industrial model are as follows.

Goods and products:

- Centralised and distributed renewable energies, and management of power networks and integration of renewables with these
- Industrial experience in rail (manufacture of rolling stock and construction and management of infrastructure)
- Sustainable construction and energy rehabilitation of buildings
- Shipyards and offshore wind
- Electrification of transport (rail and electric vehicles).

Technologies:

- Cogeneration in industry

⁶ "Green jobs for sustainable development: Spain."

⁷ "Creating jobs in energy rehabilitation and modernisation of buildings and homes," and "generating employment in public transport as part of sustainable mobility."

- Reuse and recycling of materials as a clean production measure, and circular economies
- Green chemistry with reduced use of petroleum products

Regional actors interviewed have underscored the following goods or products as key drivers.

- Energy is considered by all actors as the good that can best serve as a motor for change, especially since three of the five largest consumers in Spain are in Asturias.
 - The shift from coal to gas
 - The need to have the right energy mix
 - Regulation of electricity tariffs.
- Equally important are iron goods and products, which are currently the driving economic force in the region. Industry must implement best practices to remain competitive and efficient while meeting environmental requirements.
- Renewable energies and environmental consulting and management businesses.
- Mining must be transitioned in the fairest way possible.

Other areas referenced to a lesser extent by actors are the metal engineering sector, the manufacture of goods with high added value, waste and wastewater management, and agriculture and organic livestock raising.

The technologies considered most important at the regional level include the following:

- Biomass (especially important for Asturias due to its extensive forests), which is linked to the generation of heat and electricity, and industrial and agrifood processes
- In addition to biomass, all renewable energy technologies such as wind and mini-turbines, marine, and to a lesser extent, due to the region's weather, solar photovoltaic power
- Geothermal
- CO₂ capture, which most actors continue to consider the most feasible and of key importance
- Combined cycle power plants
- Fuel decarbonisation processes using coal gasification and CO₂ suppression to reform syngas
- Energy and industrial efficiency using, for example, gas recovery techniques and other processes
- Transport: electrification of rail transport, electric vehicles, etc.

3.5 Social dialogue

Public discourse is critical for designing industrial plans and strategies tailored to the socio-economic reality of each territory. Unions have been involved in shaping some of the strategies mentioned above at the national level (e.g. the Carbon Plan, the Energy Savings and Efficiency plan, and the Renewable Energies plan) as well as at the regional level (e.g. Agreement for Employment and Progress in the Principality of Asturias, Industrial Strategy of Asturias), but, as mentioned earlier, these plans were measures or parts of more comprehensive strategies without addressing any specific strategy.

At the national level, the unions have been informed and consulted through social round tables on emissions trading, the National Climate Council, and the Environmental Advisory Council.

The social round tables are considered an essential forum for monitoring and evaluating policies to combat climate change. This consists of a general round table and seven sectoral round tables in which regional representatives take part. The round tables were suspended two years ago, according to union actors, thanks in large part to a lack of involvement on the part of employers and the industry and environmental ministries. For the unions these round tables were critical for keeping up to date and for making proposals, although they never offered the forum for social dialogue and action that the unions had hoped for. There is a clear demand from trade unions for these bodies to be maintained and reconvened.

Reform of the EU ETS by adding new sectors, applying the auction system and other measures to ensure that the marketplace regains balance. This will require adapting the social round tables to changes in the system to make them more effective.

The industry observatories, considered to be important forums at the regional level, have also been suspended. The Sustainability Observatory of the Principality of Asturias, which has been inactive for over a year, is an advisory committee created by the government of the Principality of Asturias as an instrument for examination and participation to direct decision-making on issues that have a direct effect in the region on environmental sustainability, and as a forum to analyse the environmental situation in Asturias.

Another forum for social dialogue is the Carbon Plan tracking committees. There is also an environmental working committee the unions take part in that approves Economic and Social Council reports on the environmental situation of Asturias.

3.6 Obstacles and favourable elements

The actors interviewed believe that the most significant obstacles for attaining a low-carbon industry are as follows:

- The lack of clear political will that would lead to a comprehensive long-term industrial and environmental strategy
- Regulatory uncertainty and legal instability
- A lack of financial resources and funding that affects the region's economic development and impediments to investing
- The inefficiency of the ETS in changing the productive model
- The lack of effective social dialogue
- The need for a vocational training system that meets the needs of key sectors as part of a low-carbon strategy
- The lack of general awareness among all of the actors
- The question of the electricity market and the difficulty of regulating to satisfy all parties involved
- Regulatory asymmetry faced by companies based in Asturias compared to their competitors in other areas.

Favourable elements and factors that will drive change include the following:

- The role of the regions, which hold the power to enact legislation and negotiate
- The significant potential of biomass and the availability of natural resources in the region to develop it
- Opportunities for improvement in energy and industrial efficiency that have yet to be fully developed (as shown in a national study by the Deloitte consulting firm in 2011⁸ which showed improvements of 30% in transport, 9% in industry, 14% in services, and 9% in residences at the national level)
- The existence of participatory bodies and forums that should be strengthened to improve coordination between all actors and institutional entities
- The industrial base, energy resources and infrastructure already in place in Asturias
- The need to implement environmental officers throughout the business community as a tool for monitoring and communication.

Asturias is in a delicate position due to low-carbon policies that have had a major impact on core industrial and economic activities, but it is also true that there are great opportunities for development. Indeed, some of the factors viewed as obstacles are only obstacles to the extent that the steps needed or best-suited to finding a solution to them have not been taken. These can be turned into positives if the right measures are adopted with the support of firm political commitment and the joint efforts of all actors.

3.7 List of people interviewed

- Carlos Martínez Camarero, Deputy of the Confederation Secretariat of Occupational Health and the Environment, CCOO
- José Antonio Iglesias Vázquez, Secretary of Occupational Health and the Environment, CCOO Asturias
- José Luis Montes, Secretary of Labour, Industry Federation, CCOO Asturias
- Ruben García, Secretary General, f CCOO HUNOSA
- Begoña María-Tomé Gil, Energy and Climate Change Group, ISTAS CCOO
- José Luis Reyes Ávila, Secretary of Industrial Policy and the Environment, Asturias UGT
- Alberto González Menéndez, General Director of FADE
- Javier Sopeña Velasco, Director of Energy and New Developments, HUNOSA
- Mercedes Díaz Vázquez, ENERNALÓN
- Francisco Ramos, ECOLOGISTAS EN ACCIÓN
- Luis Colunga, Head of Industry, Government of the Principality of Asturias

⁸"Study of energy efficiency market in Spain"

ANNEX

EXPLANATION OF FIGURES

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Distribution of GVA for Asturias by sectors of activity in 2014 (%)

- Agriculture
- Energy
- Industry
- Construction
- Services

Contribution to Spanish GVA by Asturias by area of activity in 2014 (%)

- Artistic activities and maintenance; repair of household goods and other
- Public administration and defence; mandatory social security; education; health activities and social services
- Professional, scientific and technical activities; administrative activities and support services
- Property activities
- Finance and insurance activities
- Information and communications
- Wholesale and retail trade; vehicle repairs; transport and storage; hospitality
- Construction
- Manufacturing industry
- Extractive industries; energy supply (electricity, gas, steam) and water; sewage and waste management
- Agriculture, livestock and fishing

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GVA by industrial activity in Asturias (€ million)

- Extractive industry, energy, water and waste
- Food industry
- Textile industry
- Wood, cork and paper industry
- Coke, oil refining, chemicals and pharmaceuticals
- Manufacture of rubber, plastics and non-metallic minerals
- Metallurgy and the manufacture of metal products
- Manufacture of machinery and equipment, IT products and electronics
- Manufacture of transport material
- Furniture and other manufacturing industries

Energy consumption in Asturias 2013

- Primary
- Services
- Residential
- Transport
- Industry
- Energy and transformation

X axis: Primary energy, Final energy

Production of primary energy in Asturias 2013

- Bituminous coal
- Anthracite
- Hydro
- Wind
- Biomass
- Solar

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Distribution of CO₂ emissions in Asturias 2013

- Primary
- Services
- Residential
- Transport
- Industry
- Energy

[Graph below pie chart] CO₂eq emissions in Asturias (kt)

[Graph to right of pie chart] Regional emissions in CO₂eq in 2012 (Mt)

- (Regions left unchanged, except for País Vasco = Basque Country)

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Unemployment (%)

- Asturias
- Spain

Industrial employment in Asturias

- Industrial employment
- % of total employment

Employment in the biggest industrial activities in Asturias

- Metallurgy
- Manufacture of metallic products
- Metal transformation industry
- Food, drinks and tobacco
- Other manufacturing industries
- Extractive industries

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Overall change in total emissions intensity in industrial ETS sectors

- Verified emissions (t of CO₂) (3)
- Emission intensity ratio

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Emissions intensity ratio (kgCO₂/kWh) in the electricity sector

- Electricity generating facilities that produce CO₂ emissions, excluding co-generation
- All electricity generating sources