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Success stories:
- ENCE NAVIA
- GRUPO DANIEL
- TSK
- SAINT-GOBAIN

The energy sector in Asturias

The clear industrial nature of Asturias is closely linked to the energy industry binomial. One of the reasons this developed, competitive heavy industry has been able to rely on its energy supply to undertake iron and steel industry activities and to transform materials such as aluminium, steel, zinc and glass.

The extracted industry in Asturias, in particular the metal sector, capital goods industry, including wind power, offshore components and facilities, etc., is highly connected with municipalities and local governments in the region, as well as with the local and national administration to promote economic development.

The energy production in 2015 represented 6.75% of the regional gross value added, constituting the second branch of the industrial sector after steel and iron industry activities.

In Asturias, the energy sector is closely linked to the manufacturing sector, especially in the renewable energy business. The company has a Research Centre in Asturias (Aviles R&D Centre) which has worked on projects such as the development of glass for solar energy and highly innovative glass fusion procedures.

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Regarding the regional final energy consumption in 2014, there was a decrease with an annual variation rate of -4.8%, contributing to the national structure. Coal is the most demanded energy source, being coal and its derivatives.

### Energy Consumption

**2014**

- **Electrical energy**
  - Total consumption: 35,374 GWh
  - Production of electrical energy: 32,984 GWh
  - Importation: 2,390 GWh
  - Exportation: 1,084 GWh
  - Self-sufficiency: 92.7%

**2013**

- **Electrical energy**
  - Total consumption: 36,391 GWh
  - Production of electrical energy: 34,008 GWh
  - Importation: 2,388 GWh
  - Exportation: 1,102 GWh
  - Self-sufficiency: 94.1%

**2012**

- **Electrical energy**
  - Total consumption: 37,029 GWh
  - Production of electrical energy: 34,844 GWh
  - Importation: 2,389 GWh
  - Exportation: 1,103 GWh
  - Self-sufficiency: 93.1%

**2011**

- **Electrical energy**
  - Total consumption: 37,236 GWh
  - Production of electrical energy: 35,402 GWh
  - Importation: 2,387 GWh
  - Exportation: 1,105 GWh
  - Self-sufficiency: 93.4%

### Energy Production

**2014**

- **Hydraulic**
  - Production: 7,798 GWh
- **Anthracite**
  - Production: 2,502 GWh
- **Coal**
  - Production: 1,822 GWh
- **Electricity**
  - Production: 16,733 GWh
- **Other renewables**
  - Production: 378 GWh

### Energy Consumption by Sector

- **Electricity**
  - Household: 44.1%
  - Industry: 27.4%
  - Transport: 18.5%
- **Other end uses**
  - Heating & fuels: 8.9%
  - Air conditioning: 1.6%
  - Lighting: 0.7%

### Renewable Energies in Asturias

- **Wind power**
  - The region has 19 wind power parks and an installed power of 77 MW.
  - The Asturian Energy Foundation, FAEN, has developed the study of the potential of offshore wind energy in Asturias.

### Unique Infrastructures

- **The Asturian Energy Foundation, FAEN**
  - Acts as a regional Energy Agency of Asturias. It acts as a point of reference to disseminate information on energy and to promote savings and energy efficiency.

### Education

- **University of Oviedo**
  - Collaborates with the regional government on the development of educational programmes and training in the renewable energy sector.

### Research Centers

- **Instituto de Carbono y Energía, INCAR**
  - Specialises in research and development in the field of carbon and energy.

### Innovation & Infrastructures

- **Technology Centres**
  - Promote research, development, and innovation in the renewable energy sector.

### Projects

- **Wind Farms**
  - Numerous companies in Asturias already provide services for the installation of wind farms.

### R&D Cooperation

- **INNOVATION FOUNDATION**
  - Working with the regional government to promote innovation in the renewable energy sector.

### Did you know that Asturias produces surplus energy?

Asturias is a region that generates more energy than it consumes, making it an ideal location for renewable energy production.
The clear industrial nature of Asturias is closely linked to the energy industry binomial. One of the reasons it has developed a competitive heavy industry has been its ability to rely upon its energy supply to undertake iron and steel industry activities and to transform materials such as aluminium, steel, zinc and glass.

The energy production in 2015 represented 6.75% of the regional gross value added, constituting the second branch of the industrial sector after steel and iron industry activity.

- Asturias is a benchmark in the field of electrical energy within the Peninsular System, with 4.5% of installed power in 2015, 4% of the demand and 6.3% of net generation, with a clear electro-intensive profile.
- Nationally, the average consumption per capita is around 5.6 MWh/year, whilst in Asturias that parameter reaches values of 9.9 MWh/year.
- The clear predominance of coal in the structure of primary energy consumption (over 65% as a result of the high rate of thermoelectrical generation and the iron and steel industry application of coke).

SUCCESS STORIES

ENCE NAVIA

Grupo Daniel Alonso

TSK

Saint-Gobain

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Leading business group in engineering, construction, heavy industrial and representation of processes with open cycle and closed cycle thermoelectric generation and energy plants. Also leader in naval and offshore sectors. The company designs and constructs plants of this type, mainly in the wind markets in countries such as Portugal, Romania, Belgium, Egypt and South Africa.

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The energy sector in Asturias is based on engineering capacities.

Taking advantage of business opportunities deriving from the development and implementation of large energy facilities on a world scale.

FINAL ENERGY CONSUMPTION IN ASTURIAS BY SECTOR 2014

18.4% Transportation

17.6% Residential, Services and Primary

64.0% Industry

- Reliable and flexible transportation network, essential for meeting the high surges of electrical consumption as well as the high density of generator facilities.

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**SUCCESS STORIES**

**ENCE NAVIA**

**GRUPO DANIEL ALONSO**

**TSK**

**SAINT-GOBAIN**

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**THE ENERGY SECTOR IN ASTURIAS**

The clear industrial nature of Asturias is closely linked to the energy industry binomial. One of the reasons the industrial sector is so competitive is its ability to rely upon its energy supply to undertake iron and steel industry activities and to transform materials such as aluminium, steel, zinc and glass.

The penetration of industry in Asturias, particularly on the metal sector, capital goods industry (including wind power and automotive industry), aerospace and mechanical engineering, has led to the region being a benchmark in the field of energy supply. The region has a high energy consumption rate, which is partly explained through the high density of generator facilities in the province, as well as the high energy use in heavy industry activities.

- The iron-ore industrial field is the most important branch of the industrial sector, with 3.6% of the regional gross value added, followed by the metal sector (3.3%), the capital goods industry (3.2%) and the automotive industry (2.7%).

**FINAL ENERGY CONSUMPTION IN ASTURIAS BY SECTOR 2014**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Energy Consumption (TWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>64.0%</td>
</tr>
<tr>
<td>Residential, Services</td>
<td>17.6%</td>
</tr>
<tr>
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**D.L.:** AS-1729-2015

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The extraction of industry in Asturias, in particular the metal sector, capital goods including wind turbines, steel, coking plants, and solar and photovoltaic power plants, is treated in the book in a sector that has been highly significant in the region for a long time and which is still of considerable importance today.

In general, the energy production in 2015 represented 6.75 % of the regional gross value added, constituting the second branch of the industrial sector after steel and iron industry activity.

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**SUCCESS STORIES**

**ENCE NAVIA**

Leader in the pulp industry, paper and paperboard, the company manufactures various types of pulp with open cycle and closed cycle generation, and paper products, mainly tube and board, and water treatment systems. It is one of the main suppliers of the sector, with a presence in 17 countries on five continents. It also participates in the solar cell industry, both in the photovoltaic and highly innovative glass fusion procedures.

**GROUP DANIEL ALONSO**

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**TSK**

Leader in the energy sector, the company has constructed some of the largest photovoltaic and thermo-solar power plants in the world in countries such as Spain, the USA, France, Mexico, Puerto Rico, Morocco, Egypt and South Africa.

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**FINAL OUTPUT**

- **Electricity production per capita**: 6.0 MWh/year, which is in line with international standards.
- **Final electricity consumption per capita**: 8.0 MWh/year, which is well above the international average.

**The clear predominance of coal in the structure of primary energy consumption (over 65% as a result of the high rate of thermo-electrical generation and the iron and steel industry application of coke).**
FEATURES OF THE SECTOR focusing on industries with a high use of energy.

Regarding the regional final energy consumption in 2014, there was a decrease in its percentage to 25.9% of the total consumption of electricity from renewable sources – a variation rate of -6.2% with respect to the previous year – due mainly to a decline in wind power, particularly noteworthy:

- Wind power decreased its percentage to 25.9% of the total electricity production in 2014, with a production of 311 TWh, compared to 412.2 TWh in 2013.
- Natural gas produced 1,052 TWh in 2014, which represents 31.0% of the total electricity production.
- Coal production was 1,912 TWh in 2014, representing 58.7% of the total electricity production.
- Renewable energy sources accounted for 11.8% of the total electricity production in 2014.

UNIVERSITY OF Oviedo

The University of Oviedo cooperates with the companies in order to develop R&D projects on their specific fields of energy. It has different departments which collaborate with Technological Centres and companies, participating in European projects in different fields such as clean and efficient use of coal and derivatives, including new technologies to capture and store carbon dioxide. INCAR upholds its leading position in the field of coal and derivatives, investing in the development of new technologies to capture and store carbon dioxide.

FAEN is a Research and Development Centre. Its objective is to contribute solutions to the supply chain of marine energy on a regional and national scale, with the aim of promoting the development of this activity. It has different departments which collaborate with Technological Centres and companies, participating in European projects in different fields such as clean and efficient use of coal and derivatives, including new technologies to capture and store carbon dioxide. INCAR upholds its leading position in the field of coal and derivatives, investing in the development of new technologies to capture and store carbon dioxide.

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In 2014 new photovoltaic power plants were set up, ending the year with a total of 1,020.2 kWp. Furthermore, the ENCE company in Asturias has the largest electrical generation plant in the country with an installed power of 9.0 MW. The Asturian Energy Foundation (FENA) has undertaken the study of the potential of solar thermal technology in Asturias. The Asturian Energy Foundation (FENA) has undertaken the study of the potential of solar thermal technology in Asturias.

PRODUCTION OF PRIMARY ENERGY

The Principality of Asturias has 40 hydraulic facilities with a total potential of 518.5 MW. The production of wind power was 777.9 MW in 2014, a decrease of 35.0% compared to 2013, as a result of more adverse weather conditions.

The production of solar energy was 569.92 ktep, an amount which covered 9.5% of the regional primary consumption and 4.7% of the regional final consumption in Asturias.

INNOVATION & INFRASTRUCTURES

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FEATURES OF THE SECTOR

An annual decline of -0.3% of coal.

characterised by its industry of exploitation, transformation and end-use in Asturias, with a total weighting of 60.7% in 2014. The region is

The primary energy consumption structure in Asturias is vastly different

ENERGY CONSUMPTION

CONSUMPTION

IN ASTURIAS

PRIMARY ENERGY

CONSUMPTION OF

2014

IN ASTURIAS

FINAL ENERGY

(Raw data)

- Natural gas

- Primary energy

- Renewable

- Petroleum

- Petroleum products

- Other renewables

- Coal and smelting

- Geological syntheses and chemical techniques. Unlike coal, the region is

The Asturian Energy Foundation, ENASA, has developed the study of the energy sector in Asturias. The Asturian Energy baskets appear as an energy basket made up of various energy sources.

There are six, main point sources in Asturias capable of being captured. Asturias has energy baskets where a score of renewable energy sources can

The Pendant of Oviedo on the industrial belt in the field of ceramic manufacture is the largest location of this sector. Locally, the industry is manufacturing ceramics, structures and clay that comprises earthenware, which makes it the main product of this sector.

The Jovellanos Integral Maritime Security Centre is a technological centre specialising in research and development projects in Advanced Materials for high-added value products and laboratory technological services and support.

The University of Oviedo cooperates with the Academy for Higher Education of the Principality of Asturias in the development of academic programmes and other activities in the field of energy.

R&D&I INSTITUTIONS, CLUSTERS & TECHNOLOGY CENTRES, FOUNDATIONS & TECHNOLOGY FOUNDATION CENTRE

with an installed power of 777.9 MW.

The contribution of renewable energy to the primary energy balance in 2014 was 569.92 ktep, an amount which covered 8.6% of regional primary consumption and represented a variation rate of -4.7%, which contrasts with the previous year.

The Asturian energy strategy takes into account the development of activities in the field of savings and efficiency and the use of renewable energies. The regional energy strategy takes into account the promotion of renewable energies and the development of activities in the field of energy savings and efficiency.

DEVELOPMENT, wood technology and structural wood and

The Asturias Area of Logistical and Industrial Activities (ZALIA) - The

There are up to 18 maritime ports in the region capable of being base for renewable energies. Numerous companies in Asturias already provide services and products in the supply chain of renewable marine energy resources associated with the region’s favourable geographical conditions. The Regional government has implanted a small renewable energy resource resource for the promotion of renewable energies and the development of activities in the field of energy savings and efficiency.

The European Cluster Excellence Initiative and is coordinated by the

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Did you know that Asturias produces surplus energy? Asturias is a region reporting for the first time, having produced 4.8 TWh in 2013.

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The University of Oviedo promotes cooperation with companies, with the aim of developing R&D projects in their specific field of study. Among the main programs are: University Industry Partnership, University Industry Innovation Projects, and University Industry Innovation Technological Centre.

The Asturias Energy Foundation (FIMEA) was created by the Parliament of the Principality of Asturias in 1997. Its purpose is to promote, manage and run energy R&D projects at the regional level. FIMEA is committed to the development of renewable energy technologies and to the promotion of an energy policy oriented toward sustainability. It has been awarded the European bronze label for its work in the promotion of renewable energies. FIMEA is a private, non-profit foundation with financial support from the European Union. It is an autonomous public body and has the status of a legal entity of public interest.

FIMEA offers services in the following areas: renewable energy, energy efficiency, environmental impact assessment, energy management, energy strategy, and energy education. It has a staff of 120, of whom 70 are researchers. It has a network of more than 300 partners, including research centers, technology centers, companies, and public institutions. It has conducted more than 500 projects in the field of energy since its creation in 1997. Its headquarters are in Oviedo, where it has an area of 4,500 square meters.

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The primary energy consumption structure in Asturias is vastly different from the national total of electricity. In 2014, the production of renewable sources, which contributed 32.7% of the regional total electricity production, was lower by 9.5% compared to the previous year—due mainly to adverse weather conditions.

In Asturias, the region produces surplus energy. Asturias is a purely exporting region for electrical energy. The region produces surplus energy? Asturias is a purely exporting region for electrical energy.

The University of Oviedo offers new degrees and Master’s courses specialising in the practice of maritime security, survival, the fight against pollution, and the training of personnel bound to contribute to the supply of maritime energy as a result of the various projects and networks from the international sphere. The University of Oviedo has also contributed to theasturian energy scene.

The Asturias energy sector produces surplus energy. Asturias is a purely exporting region for electrical energy. The region produces surplus energy.

The regional government has included renewable energy in its regional Intelligent specialisation strategy (RIS3), showing its clear backing for energy transition and efficiency objectives.

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SUCCESS STORIES

ENCE NAVIA

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TSK

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THE ENERGY SECTOR IN ASTURIAS

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The energy production in 2015 represented 4.7% of the regional gross value added, constituting the second branch of the industrial sector after steel and iron industry activity.

- Asturias is a benchmark in the field of electrical energy within the Peninsular System, with 4.5% of installed power in 2015, 4% of the demand and 6.3% of net generation, with a clear electro-intensive profile.

- Nationally, the average consumption per capita is around 5.6 MWh/year, whilst in Asturias that parameter reaches values of 9.9 MWh/year.

- The clear predominance of coal in the structure of primary energy consumption (over 65% as a result of the high rate of thermo-electrical generation and the iron and steel industry application of coke).

INDUSTRY ENERGY ENGINEERING, MANUFACTURING AND ASSEMBLY

Taking advantage of business opportunities deriving from the development and implementation of large energy facilities on a world scale.

FINAL ENERGY CONSUMPTION IN ASTURIAS BY SECTOR 2014

- Reliable and flexible transportation network, essential for meeting the high weight of mineral conversion as well as the high density of generation facilities on a worldwide.