Mieres, Asturias, Spain
Where did we come from?

Mining with centuries of history. Arnao Mine (1591 - 1915)
- More than 2,000 mines.
- More than 73 mining shafts.
HUNOSA

- HUNOSA was founded in 1967
- Integration of coal mining private companies
- Coal extraction: underground and open pit
- 26,590 employees in 1969
HUNOSA TODAY

Colliery: San Nicolás

Generation plant: La Pereda

Coal washing plant: Batán

Geothermal Energy: District Heating Barredo Colleiry

Historical Evolution of Employees in HUNOSA

Continuous reduction in the number of collieries and workers
The objectives of Business Plan 2019/2027 are as follows:

✓ To achieve the **transition of the Company's activity** from the current one, based on coal mining, towards a Company focused on energy, energy services and environmental restoration, which ensures its long-term viability in a stable manner.

✓ Promote the generation of new viable activities in the Company.

✓ Contribute to the reactivation policy of its implementation area.
The geothermal energy related to mining activity is a renewable resource that paradoxically has been created artificially. The very intensive mining development, has created a complex net of galleries, increasing water infiltration and generating a hydrological system that could be compared to a karst formation.

Once it was decided that underground mines should be closed, it starts the stage of flooding. This filling process happens until a security level that must be maintained pumping at a constant flow.
This resource is an innovative solution of Circular Economy creating from a problem (the eternal pumping costs) a source of wealth and a sustainable resource.

**Key data:**

- Barredo Colliery is situated in Mieres (population 38,000 people).
- **Annual pumped water** extracted from Barredo Colliery of 3.96 Hm$^3$.
- **Average temperature of 23° C.**
INITIAL FACILITIES

The initial facilities have three networks:

- **1- HOSPITAL ÁLVAREZ BUYLLA:** 6,916,300 kWh/año
- **2- RESEARCH INSTITUTE:** 208,158 kWh/año
- **3- FAEN BUILDING:** 72,317 kWh/año

Four submersible pumps were required in the shaft of the well.

**Total power capacity**

4 MWt
Geothermal Energy: District Heating Barredo Colleiry

The new District Heating Barredo Colleiry

- **4- SECONDARY SCHOOL**
- **5- M9 BUILDING**
- **6- M10 BUILDING**
- **7- UNIVERSITY**
Geothermal Energy: District Heating Barredo Colleiry

Investment (€)
1,421,541

TWO NEW PUMPS: capacity: 83 kW each
Nominal flow: 330m³/h
Geothermal Energy:
District Heating  Barredo Colleiry
Geothermal Energy: District Heating Barredo Colleiry

Investment (€)
1,421,541

TWO HEAT PUMPS: 2 MW
DISTRIBUTION SYSTEM

Geothermal Energy:
District Heating  Barredo Colleiry

HEAT PUMPS TRANE MODELO RTWF300 HE
REFRIGERANT: R1234ze

DISTRIBUTION SYSTEM
Geothermal Energy: District Heating Barredo Colleiry

Investment (€)
1.421.541

HIGH TEMPERATURE NETWORK: 75-80 °C
Geothermal Energy: District Heating Barredo Colleiry

Investment (€)
1,421,541

LOW TEMPERATURE NETWORK: 45 ºC
Geothermal Energy: District Heating Barredo Colleiry

<table>
<thead>
<tr>
<th>Reducted emissions (ton eq CO₂/year)</th>
<th>Tree capture (kg eq CO₂/year)</th>
<th>Number of equivalent trees</th>
<th>Tree/ha</th>
<th>Area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barredo</td>
<td>653.27</td>
<td>200</td>
<td>3,184</td>
<td>400</td>
</tr>
</tbody>
</table>

PRIMARY ENERGY: Electrical energy (guarantee of renewable energy)
Geothermal Energy: District Heating Barredo Colleiry
Geothermal Energy:
District Heating  Barredo Colleiry
Geothermal Energy:
District Heating  Barredo Colleiry
Geothermal Energy: District Heating  
*Barredo Colleiry*
Geothermal Energy: District Heating Barredo
thank you for your attention

Takk fyrir athyglina