

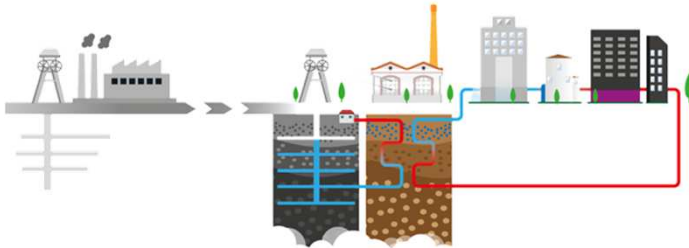
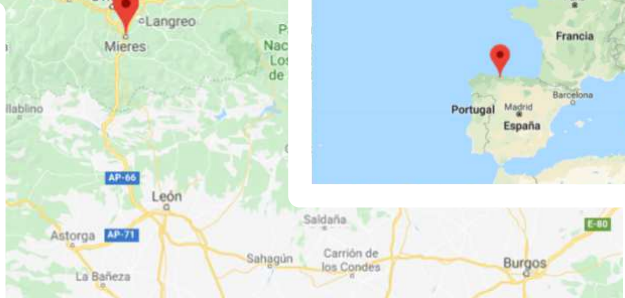
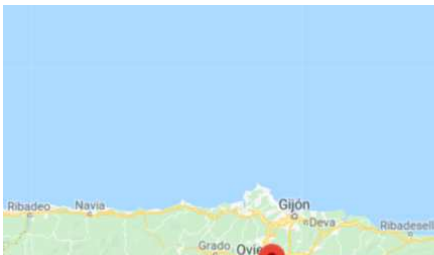
This Project was co-financed by

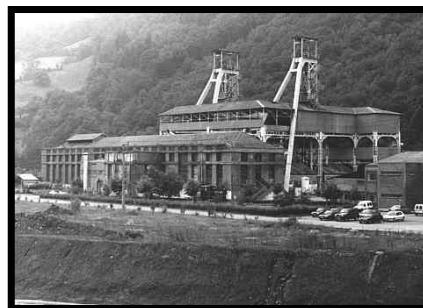
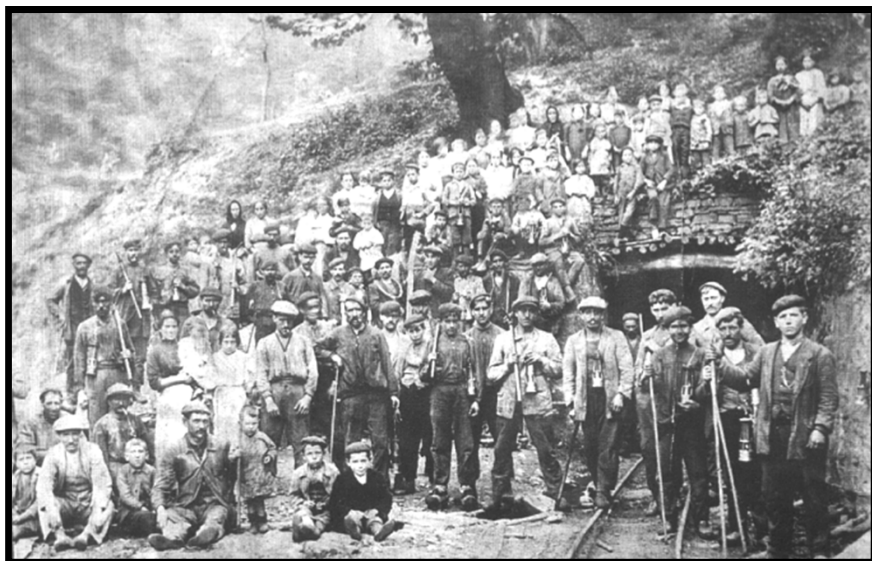


European Union
European Regional
Development Fund



Mieres, Asturias, Spain

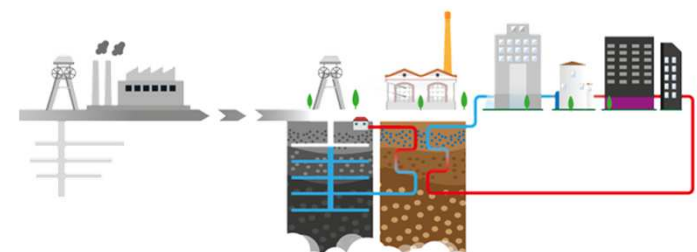




Where did we come from?

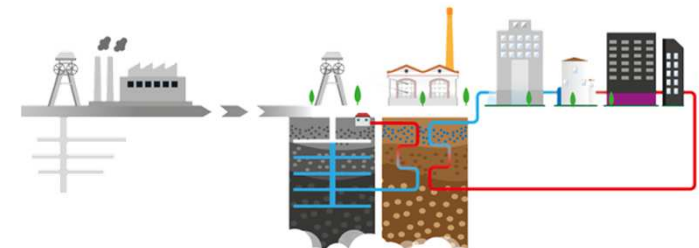
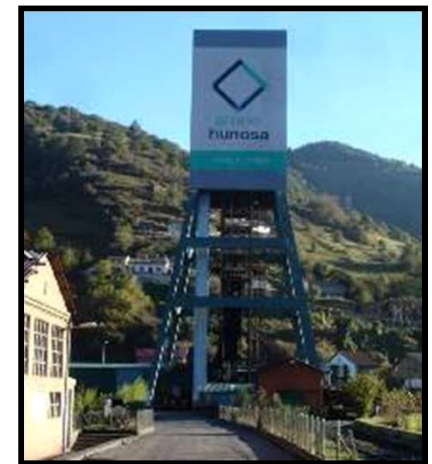
Mining with centuries of history. Arnao Mine (1591 - 1915)

- 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



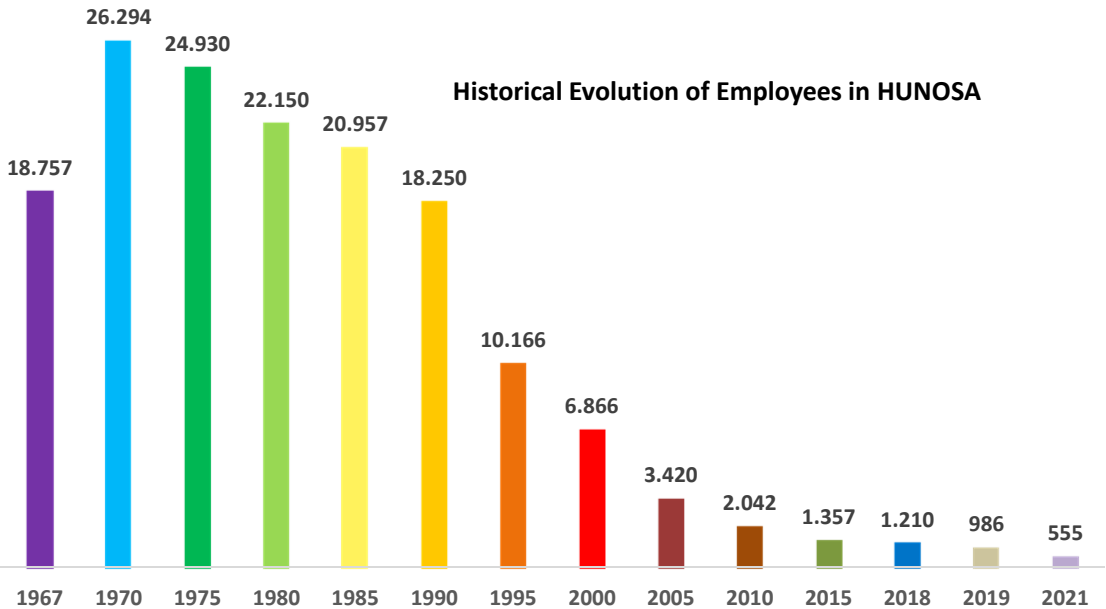
Colliery: *San Nicolás*



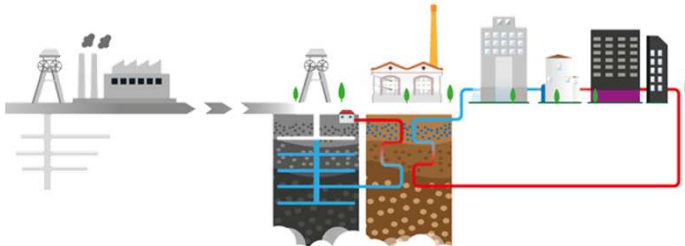
Generation plant: *La Pereda*



Coal washing plant: *Batán*



Continous reduction in the number of collieries and workers



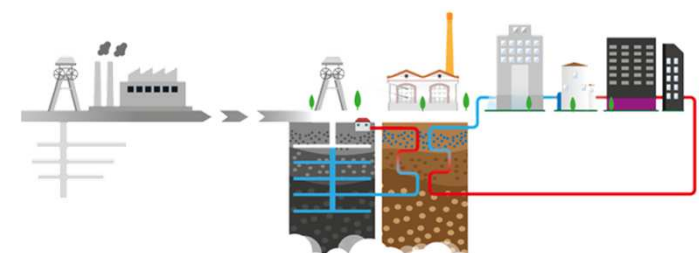


The keys of the transition



The objectives of Business Plan 2019/2027 are as follows:

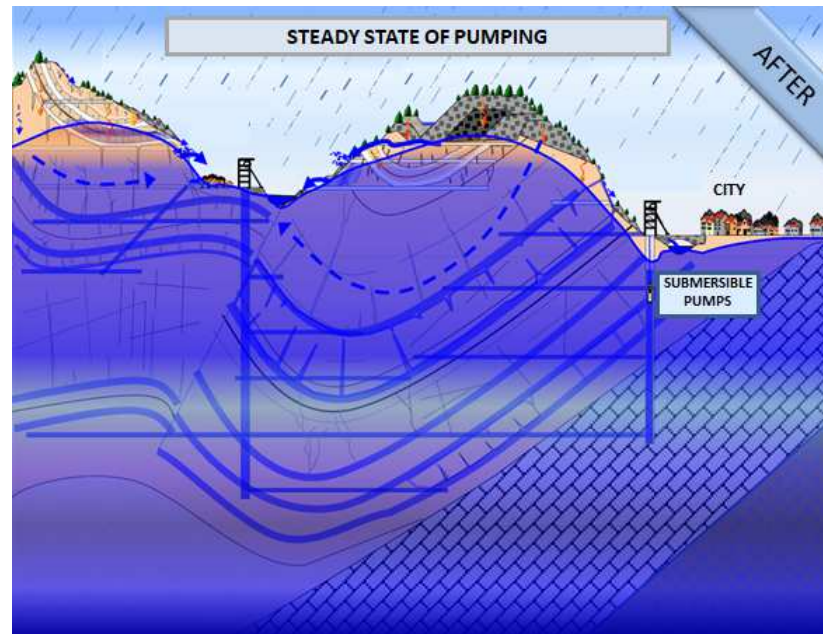
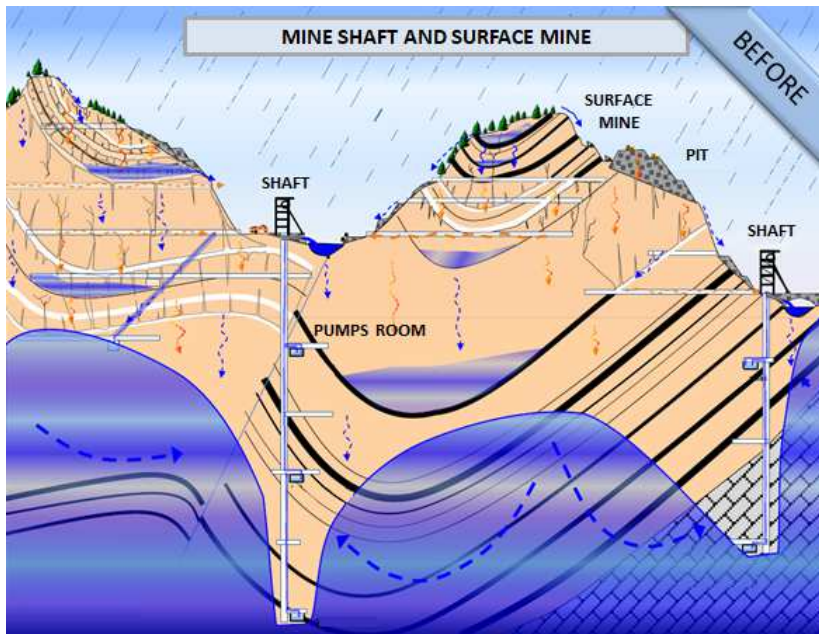
- ✓ To achieve the **transition of the Company's activity** from the current one, based on coal mining, towards a Company focused on energy, energy services and environmental restoration, which ensures its long-term viability in a stable manner.
- ✓ Promote the generation of new viable activities in the Company.
- ✓ Contribute to the reactivation policy of its implementation area.





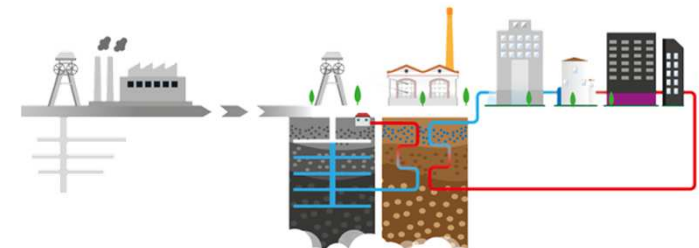
hunosa

Geothermal Energy: District Heating *Barredo Colleiry*



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.

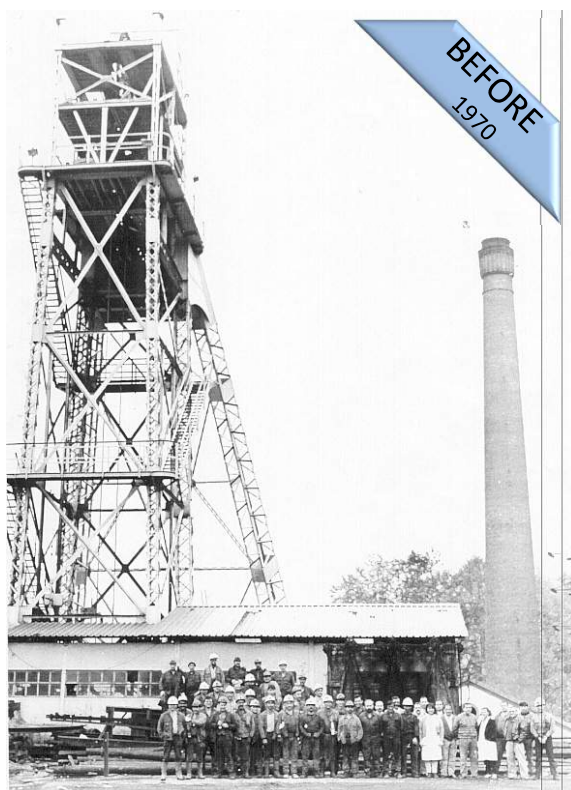
Once it was decided that underground mines should be closed, it starts the stage of flooding. This filling process happens until a security level that must be maintained pumping at a constant flow.





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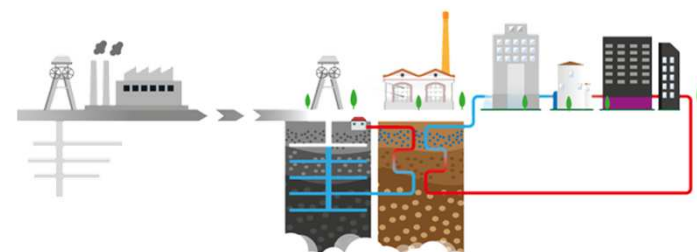
Geothermal Energy: District Heating *Barredo Colleiry*

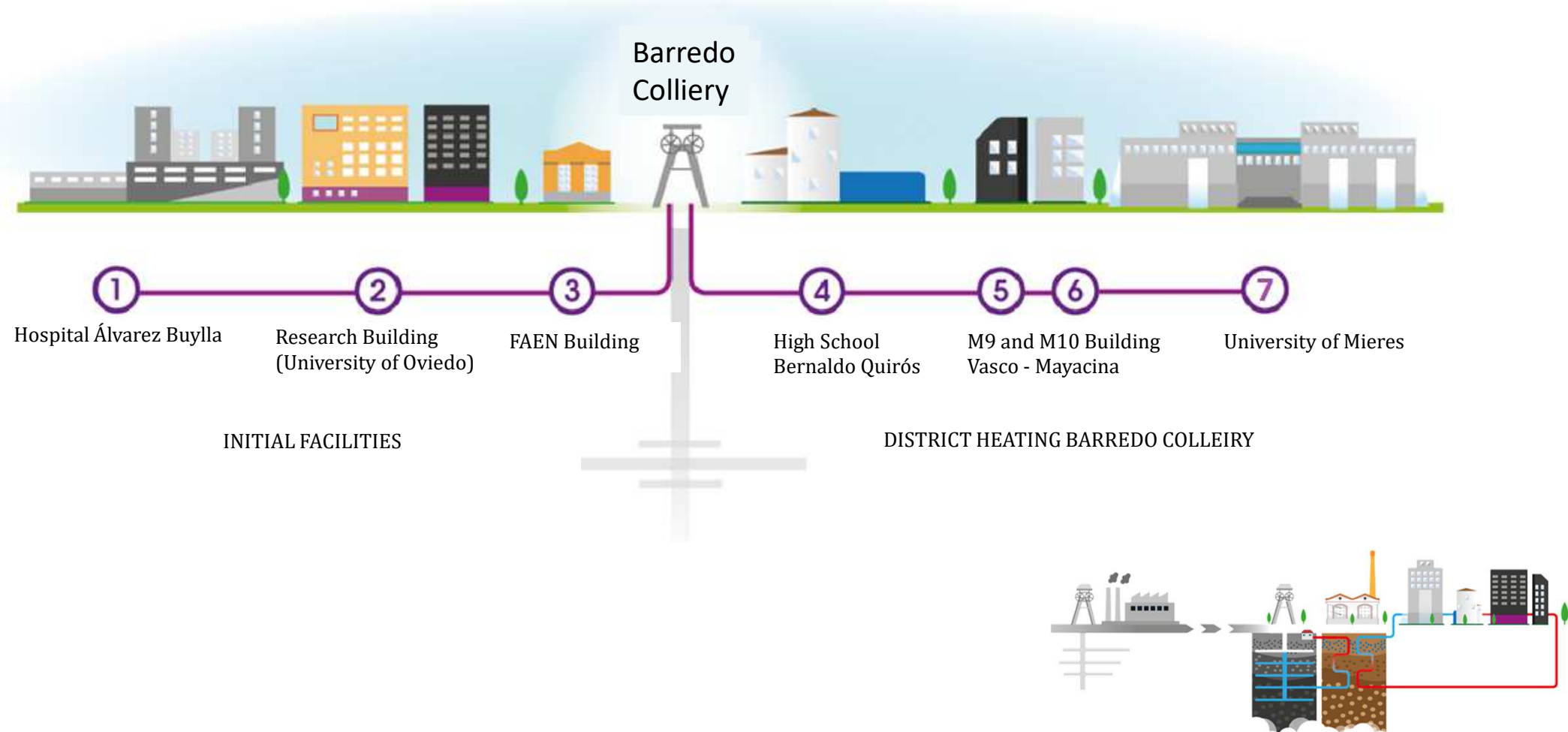


This resource is an innovative solution of Circular Economy creating from a problem (the eternal pumping costs) a source of wealth and a sustainable resource.

Key data:

- Barredo Colliery is situated in Mieres (population 38,000 people).
- **Annual pumped water** extracted from Barredo Colliery of **3.96 Hm³**
- **Average temperature of 23° C.**







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Geothermal Energy: District Heating *Barredo Colleiry*



INITIAL FACILITIES

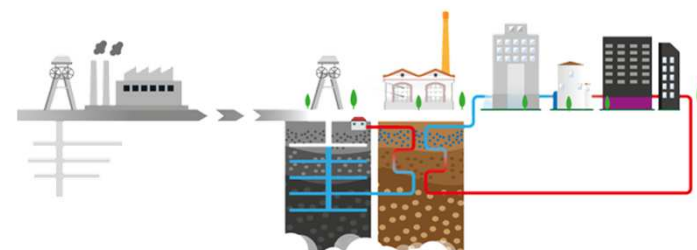
The initial facilities have three networks:

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

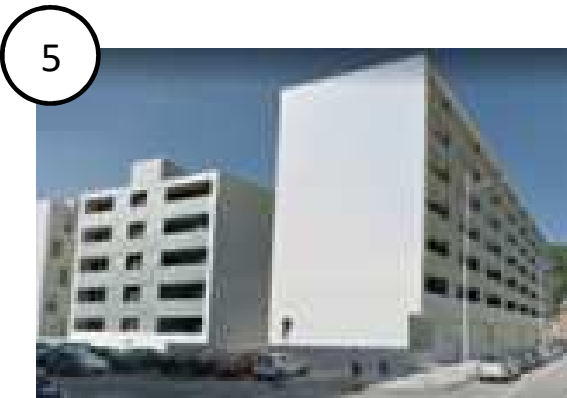
Four submersible pumps were required in the shaft of the well.

Total power capacity

4 MWt

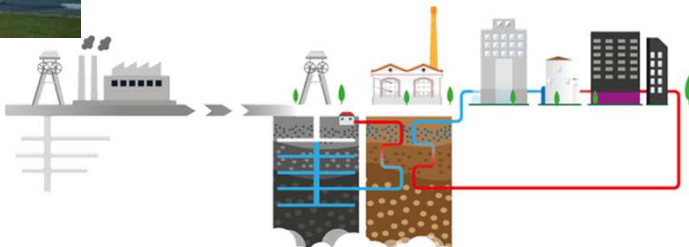


Geothermal Energy:
District Heating *Barredo Colleiry*



The new
District Heating *Barredo Colleiry*

- 4- SECONDARY SCHOOL
- 5- M9 BUILDING
- 6- M10 BUILDING
- 7- UNIVERSITY

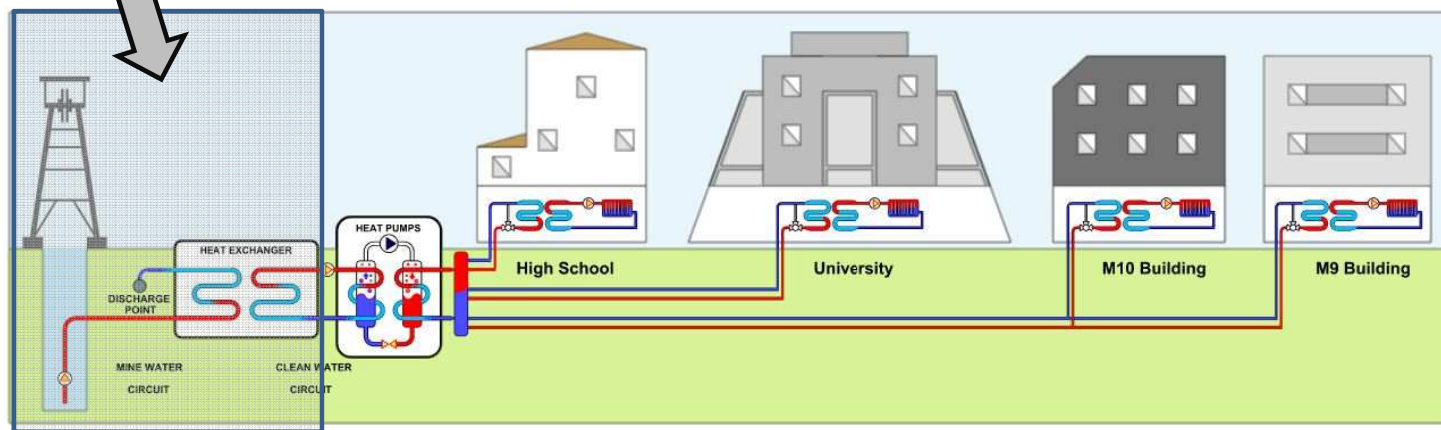


Geothermal Energy: District Heating *Barredo Colleiry*

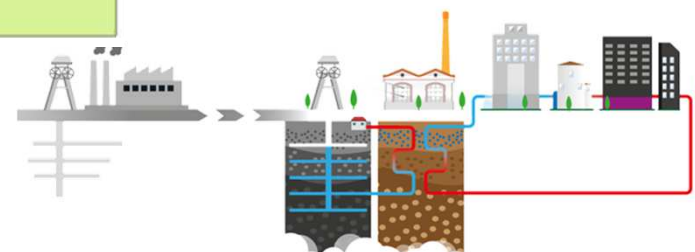


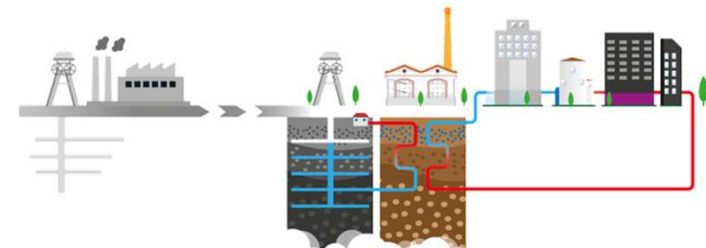
Investment (€)

1.421.541



- TWO NEW PUMPS: capacity: 83 kW each
Nominal flow: 330m³/h

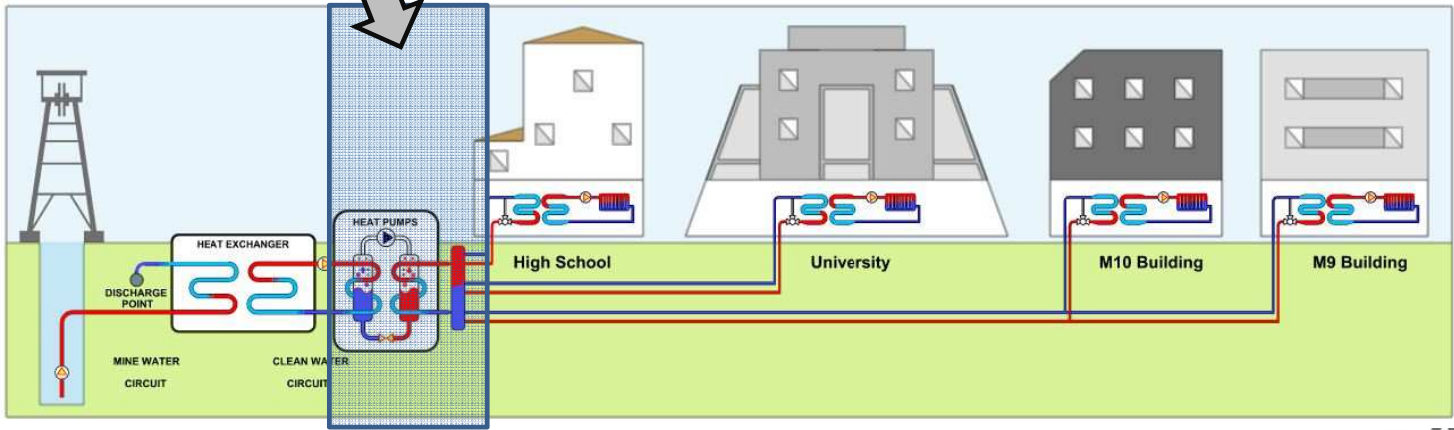




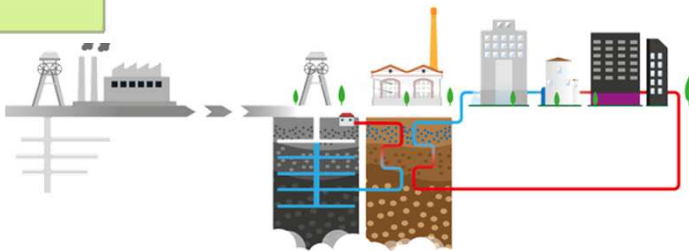
Geothermal Energy: District Heating *Barredo Colleiry*



Investment (€)
1.421.541



● TWO HEAT PUMPS: 2 MW

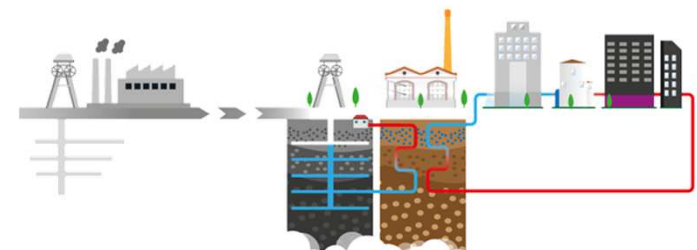




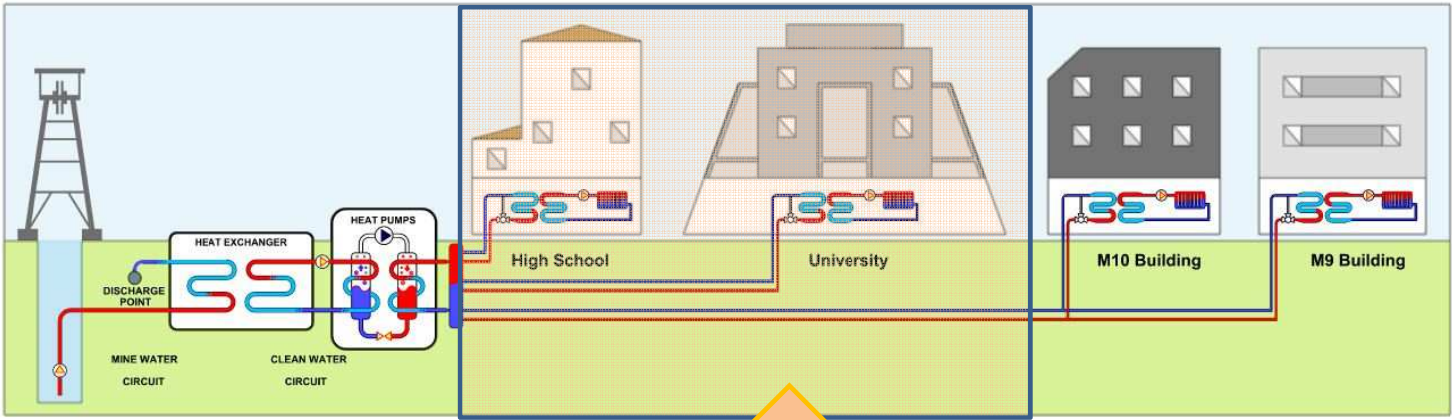
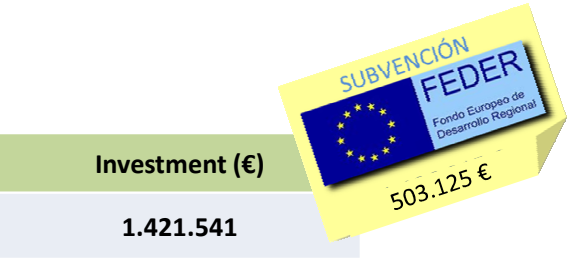
HEAT PUMPS TRANE MODELO RTWF300 HE
REFRIGERANT: R1234ze



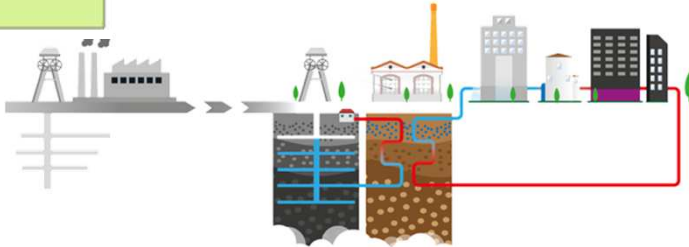
DISTRIBUTION SYSTEM



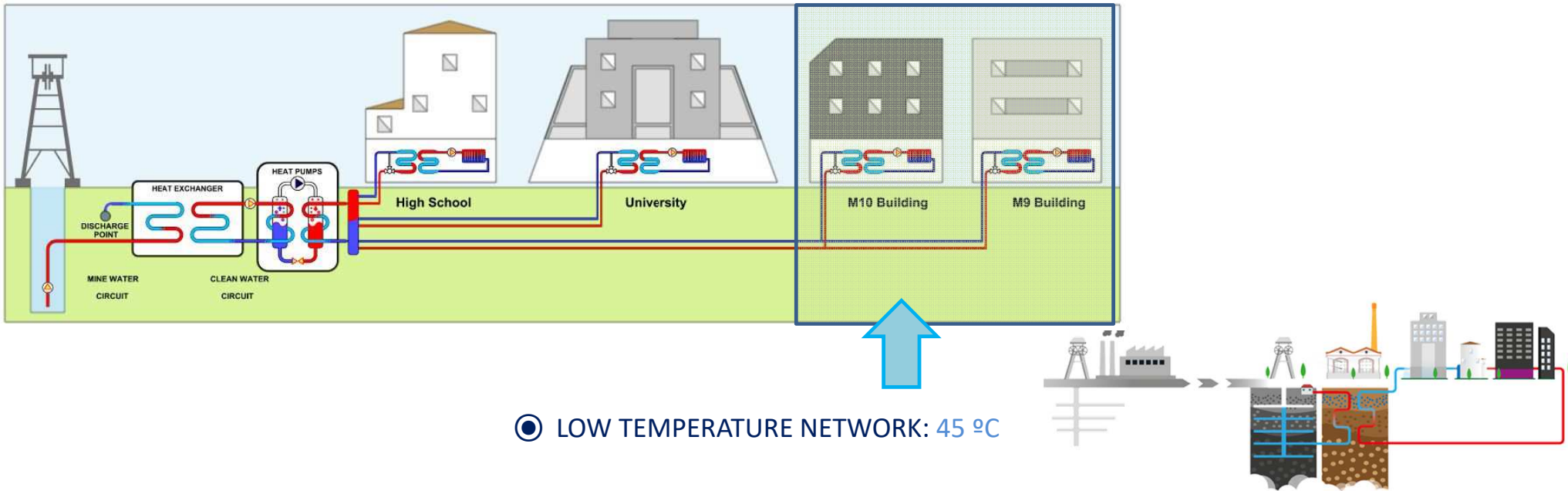
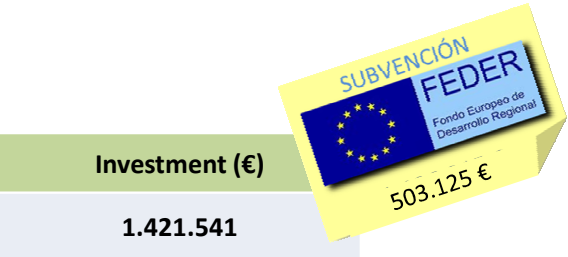
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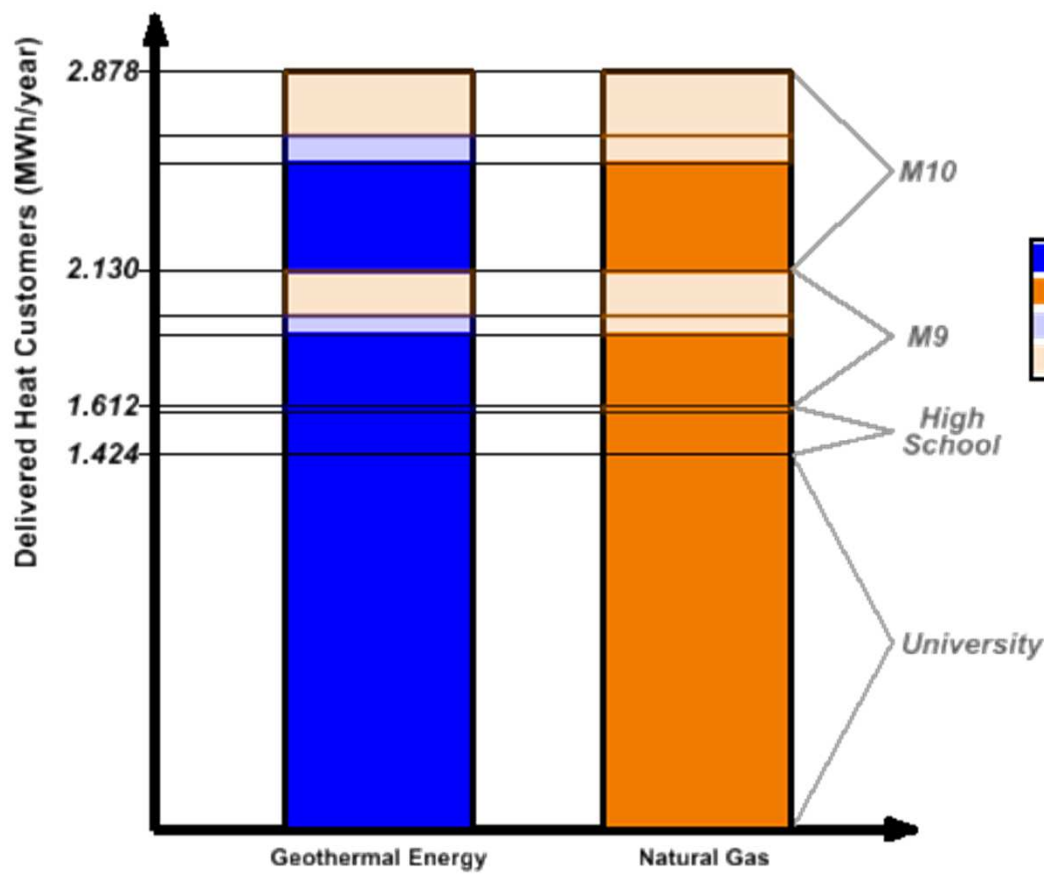


● HIGH TEMPERATURE NETWORK: 75-80 °C



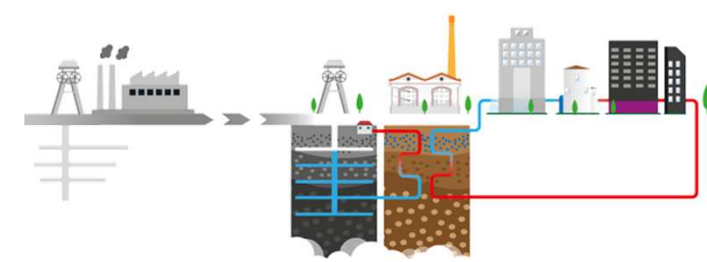
Geothermal Energy: District Heating *Barredo Colleiry*





Covered demand
86,5 %

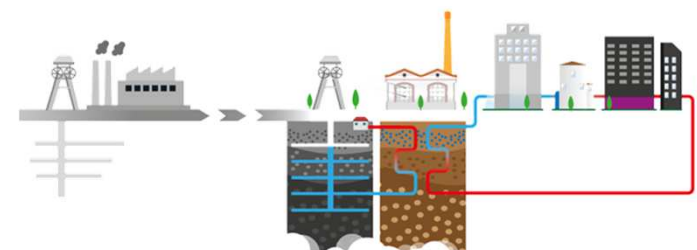
Total power capacity
2 MWt



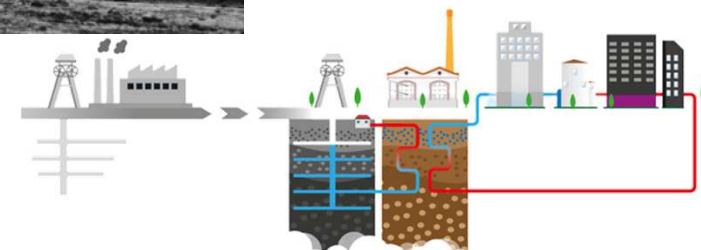
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	Reduced emissions (toneq CO ₂ /year)	Tree capture (kgeq CO ₂ /year)	Number of equivalent trees	Tree/ha	Area (m ²)
Barredo	653.27	200	3,184	400	79,606

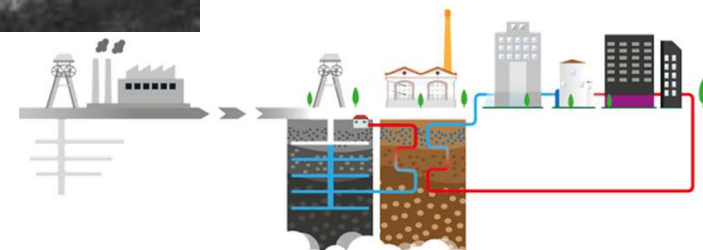
- PRIMARY ENERGY:
Electrical energy
(guarantee of renewable
energy)



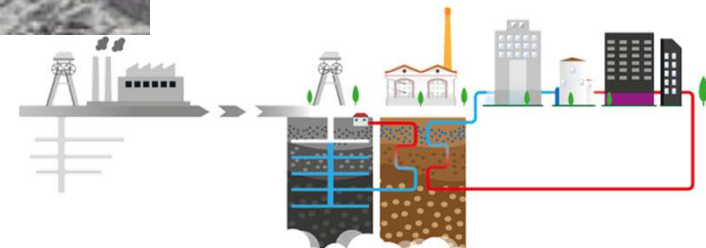
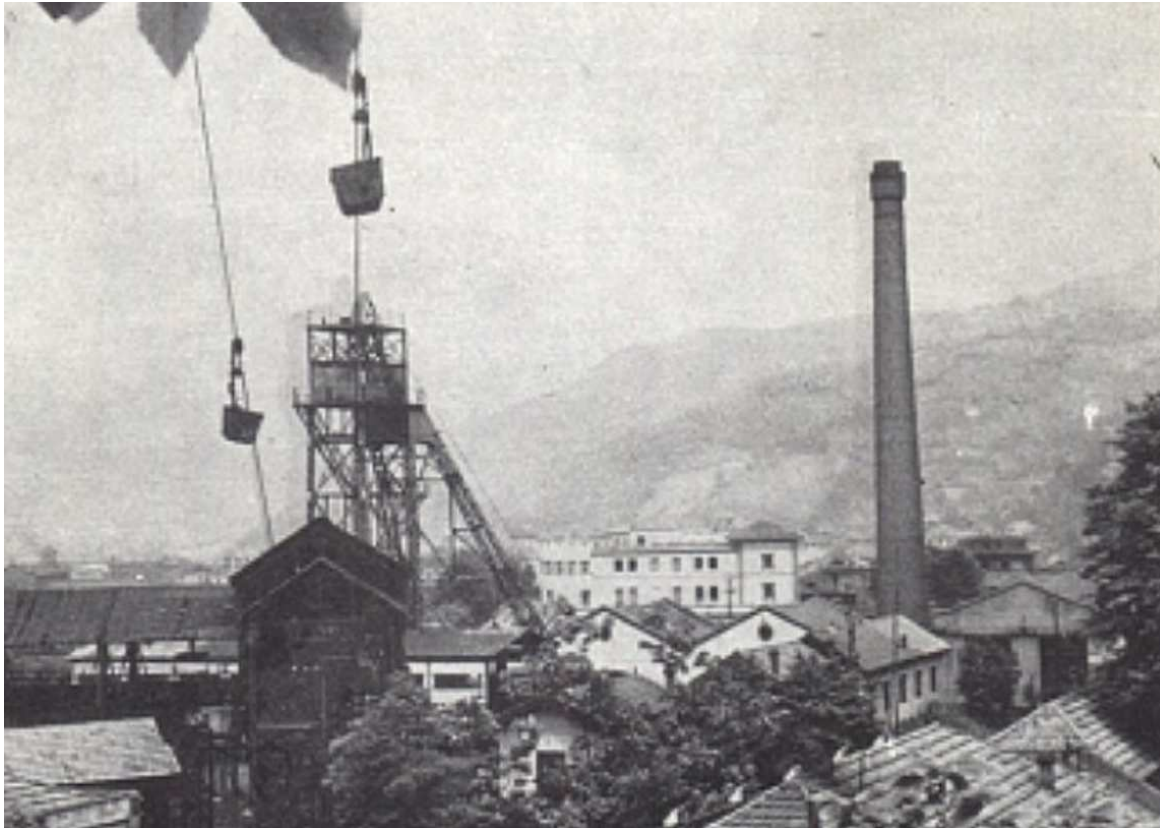
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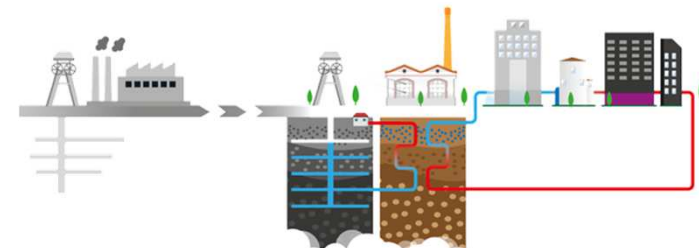
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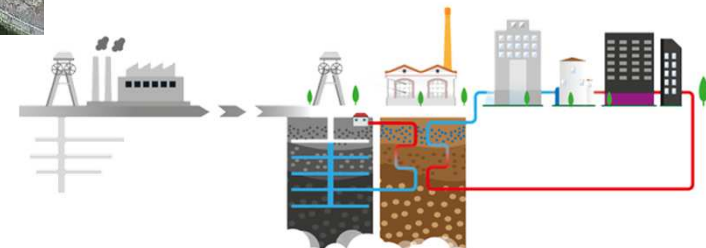
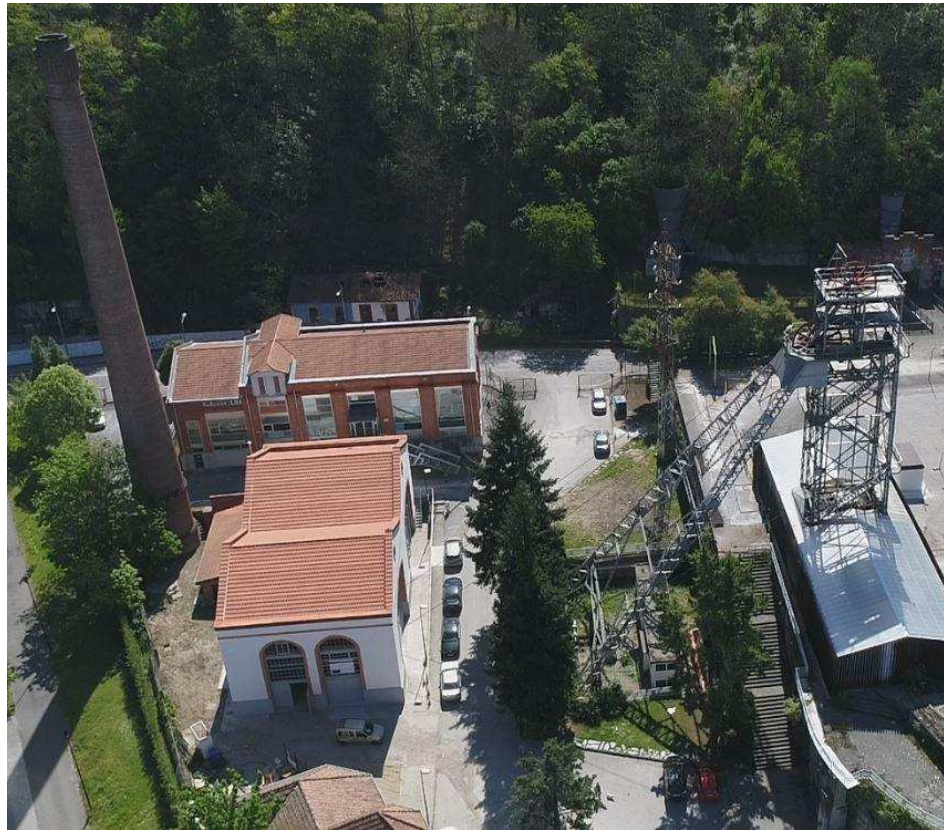
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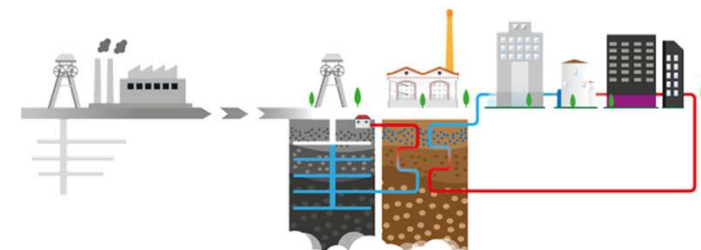


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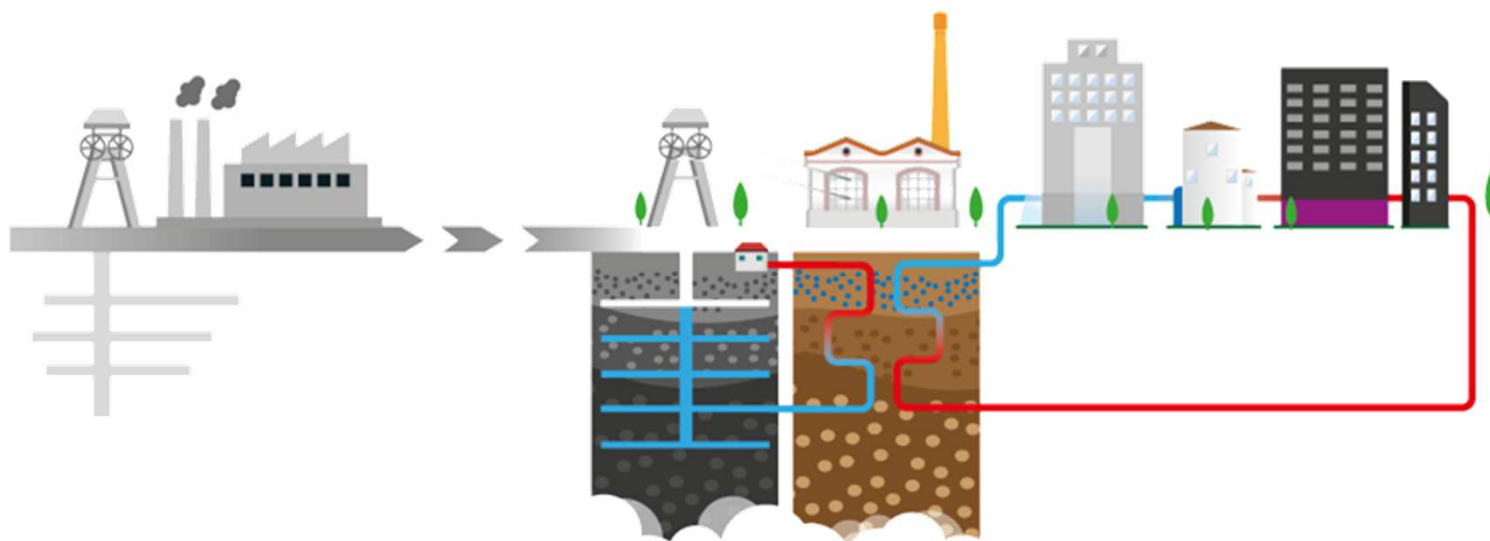


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thank you for your attention



Takk fyrir athyglina