Being the world leader in developing the next generation of Geothermal technologies

SET Plan Conference 2017

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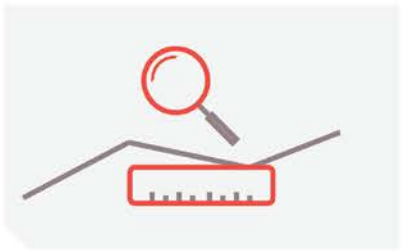
ETIP-DG

European Technology & Innovation Platform on **Deep Geothermal**

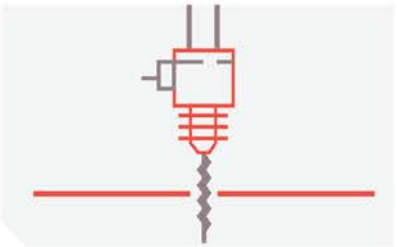
Co-funded by the European Union's Horizon 2020 Research and Innovation Programme [GA. N. 773392]

Technologies

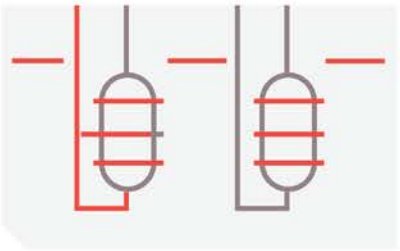
Exploration



Deep Drilling



Production Technologies



Surface

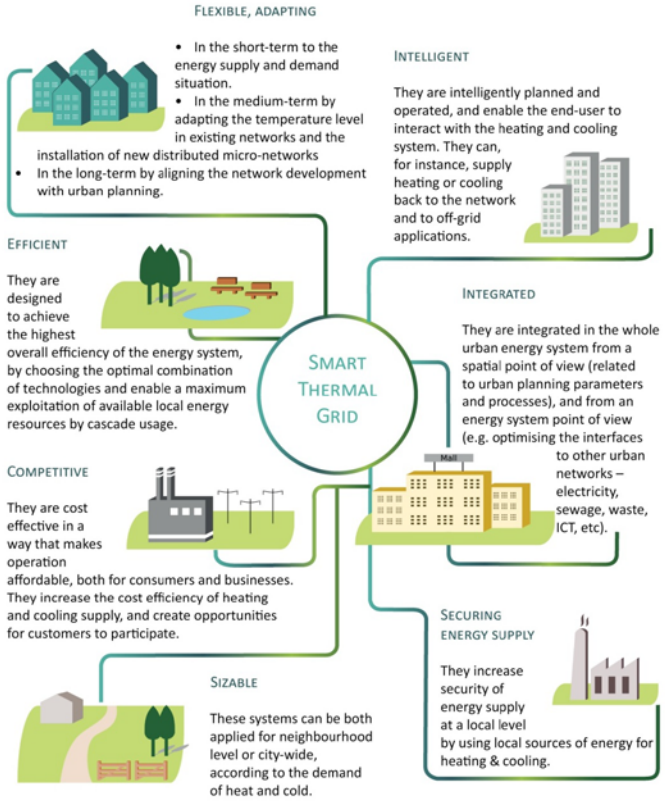
Non -Techincal

A Vision

CLEAN ENERGY FOR THE INDUSTRY

A DECARBONISED POWER SECTOR

NEW ENERGY SYSTEMS FOR NEW CITIES



Industrial competitiveness

With **1.7 million units of GSHP installed**, Europe is the world leader (installed capacity) on the shallow geothermal market. It is also leading in innovation such as underground thermal energy storage (UTES). Main competitors are for heat pumps manufacturers in China and the USA.

With **more than 250 geothermal DH systems in operation**, Europe was also the global leader for geoDH but China is now leading the market due to the large demand there. Global competition exists mainly for heat exchangers and pipes. But innovation brings us to develop smart thermal grids!

Supplying geothermal energy to the industry: started in Europe, mainly low T° for agri-food industry, and EGS breakthrough technology leads us to supply heat now at 165°C.

Since 1913, geothermal power production in Europe

Next generation of technologies: EGS plants are only operation in Europe up to now. Projects are ongoing in the USA.

Technological challenges

- Develop innovative solutions for refurbishing existing buildings with systems that are easier to install and more efficient at low temperatures.

- Deploy geothermal smart thermal grid systems in dense urban areas.

- Contribute to the decarbonisation of the industry by providing competitive solutions for process heat.

- Unlocking Geothermal power: reducing costs and increase performance, and complete deployment of geothermal resources with:
    - ❖ Improved capabilities
    - ❖ Improved adaptability
    - ❖ Improved reliability and durability

Next generation of geothermal technologies

Geothermal systems for retrofitting buildings

Geothermal high temperature for industrial process heat

Smart thermal grids with geothermal

Underground for thermal storage

Baseload and flexible geothermal power generation

Research, Development and Innovation Framework

→ Market uptake of small-scale renewable heating and cooling installations

→ Innovation for allowing the fuel switch in District Heating and for industrial process

→ Demonstration of flexible RES power plants

→ Research and Development of the next generation of RES technologies such as EGS

→ Towards a smart integrated energy system

SET Plan Declaration of Intent: deep geothermal targets

1	Increase reservoir performance* resulting in power demand of reservoir pumps to below 10% of gross energy generation and in sustainable yield predicted for at least 30 years by 2030; * Reservoir performance includes underground heat storage.
2	Improve the overall conversion efficiency, including bottoming cycle, of geothermal installations at different thermodynamic conditions by 10% in 2030 and 20% in 2050;
3	Reduce production costs of geothermal energy (including from unconventional resources, EGS, and/or from hybrid solutions which couple geothermal with other renewable energy sources) below 10 €ct/kWhe for electricity and 5 €ct/kWhth for heat by 2025; Costs have to be confirmed establishing at least 5 plants in different geological situations, of which at least one with large capacity (20 MWe or, if for direct use only, 40 MWth).
4	Reduce the exploration costs by 25% in 2025, and by 50% in 2050 compared to 2015;
5	Reduce the unit cost of drilling (€/MWh) by 15% in 2020, 30% in 2030 and by 50% in 2050 compared to 2015;
6	Demonstrate the technical and economic feasibility of responding to commands from a grid operator, at any time, to increase or decrease output ramp up and down from 60% - 110% of nominal power.

Non Technical Barriers:

A) Risk mitigation (Financial/project)

B) Social Acceptance

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