

Towards a Vision document

Deep geothermal in 2030-2050



ETIP-DG

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

www.etip-dg.eu

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Process

- First draft prepared by Executive Committee: October 2017
- Comments from SC: November 2017
- Consultation members: 15 Nov 2017
- Final publication: December 2017

Structure

This VISION looks toward the future of Deep Geothermal energy development by 2030, 2040, 2050 and beyond, and highlights the great potential of untapped geothermal resources across Europe.

After the **Rising to the vision** and an **Introduction** sections, the document briefly describes

Actual Status of geothermal development

and the VISION's aim for

Unlocking geothermal energy

Increasing the Social welfare in Europe

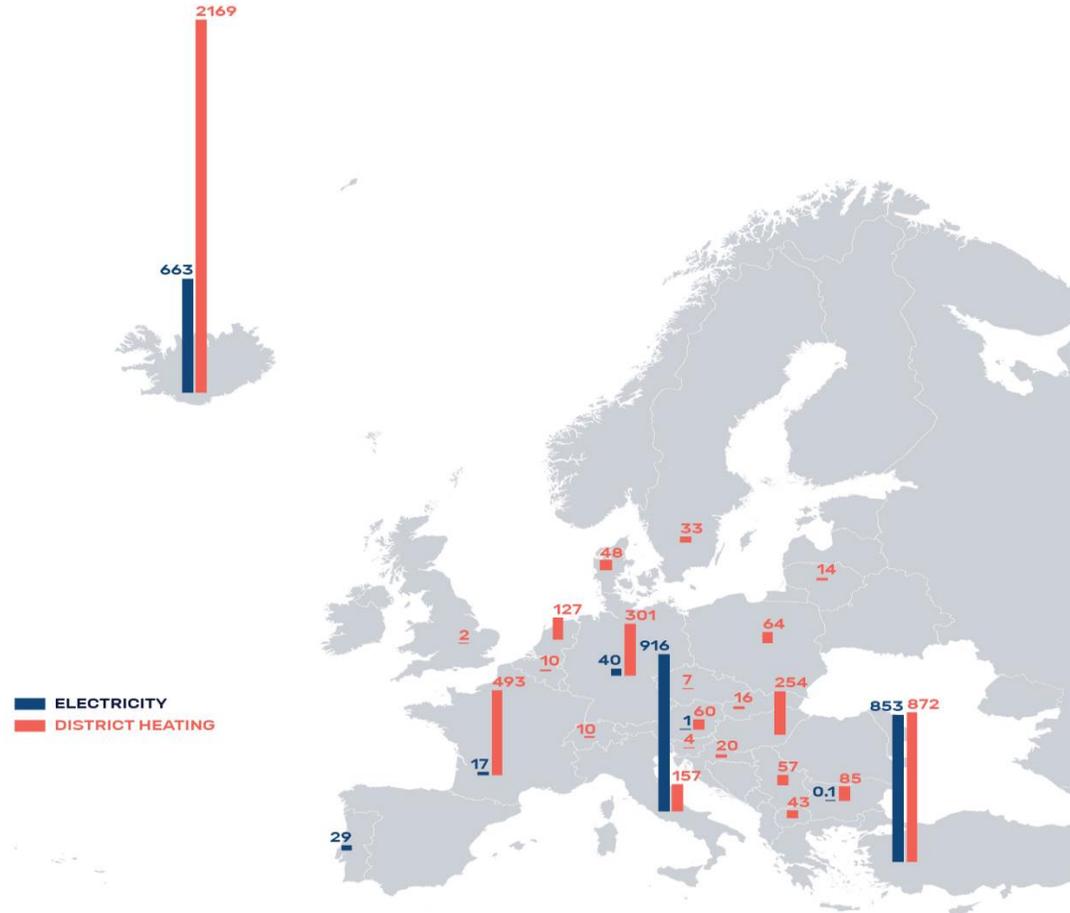
Novel technologies for full and responsible deployment of geothermal potential

Introduction & overview

- This document expresses the Vision of the ETIP on Deep Geothermal (ETIP-DG) on future development of Deep Geothermal technologies in Europe.
- Our VISION is to cover
 - (1) any **domestic heat demand** and
 - (2) a large part of **electrical power demand** in Europe by geothermal energy.

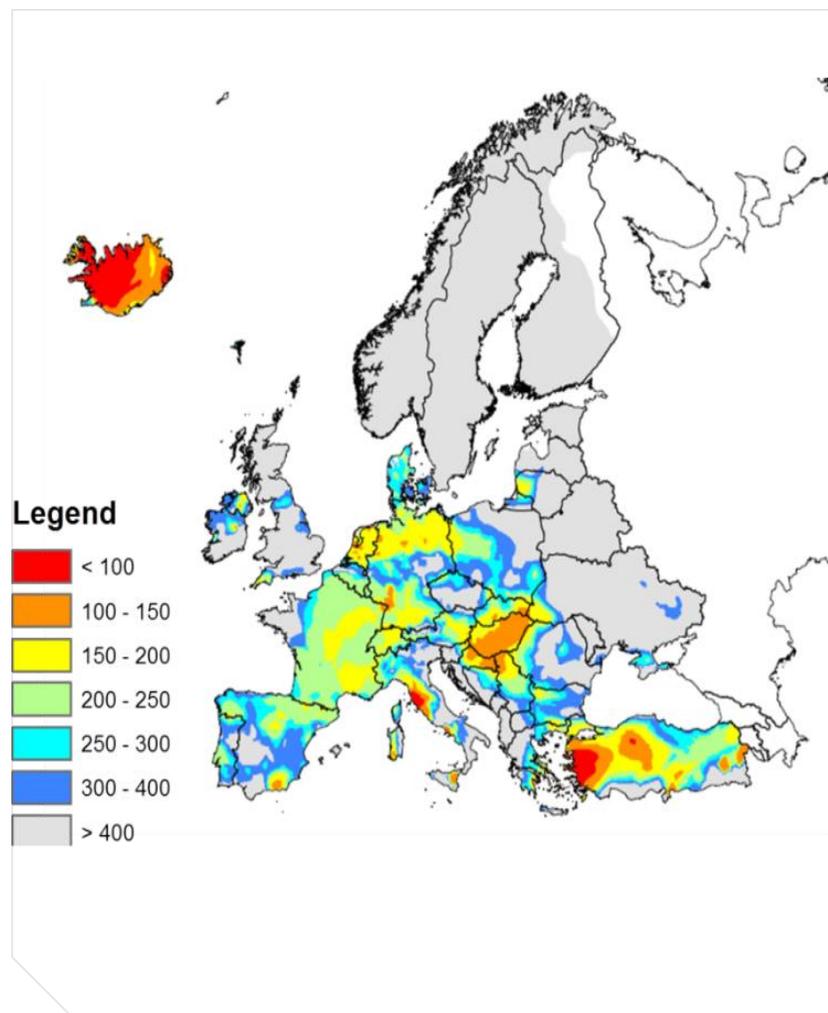
This includes taking the maximum advantage offered by the flexibility of geothermal production, providing large **centralized** as well as domestic and **decentralized** small scale options.

Status of geothermal development in Europe

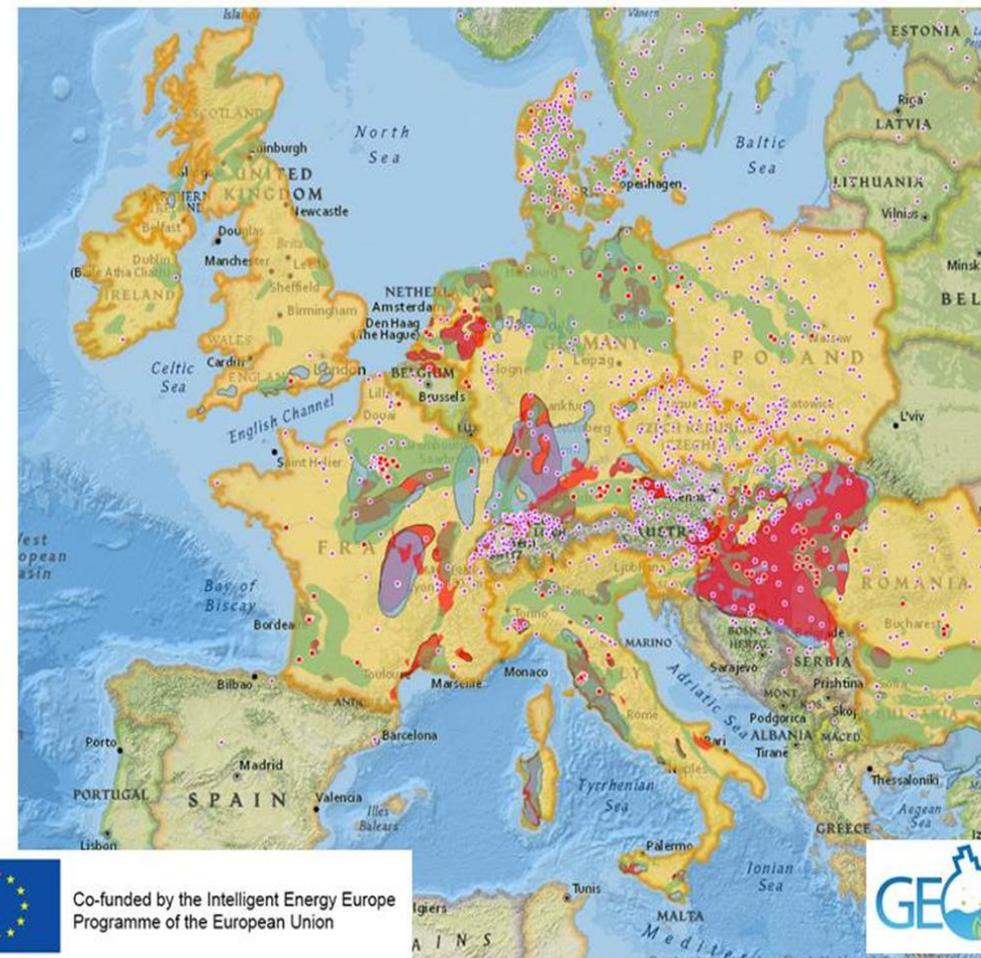


Developed starting from EGEC's last Market Report

Potential 2050: GEOELEC elec. power, geoDH for DH



and recent projects



Co-funded by the Intelligent Energy Europe Programme of the European Union

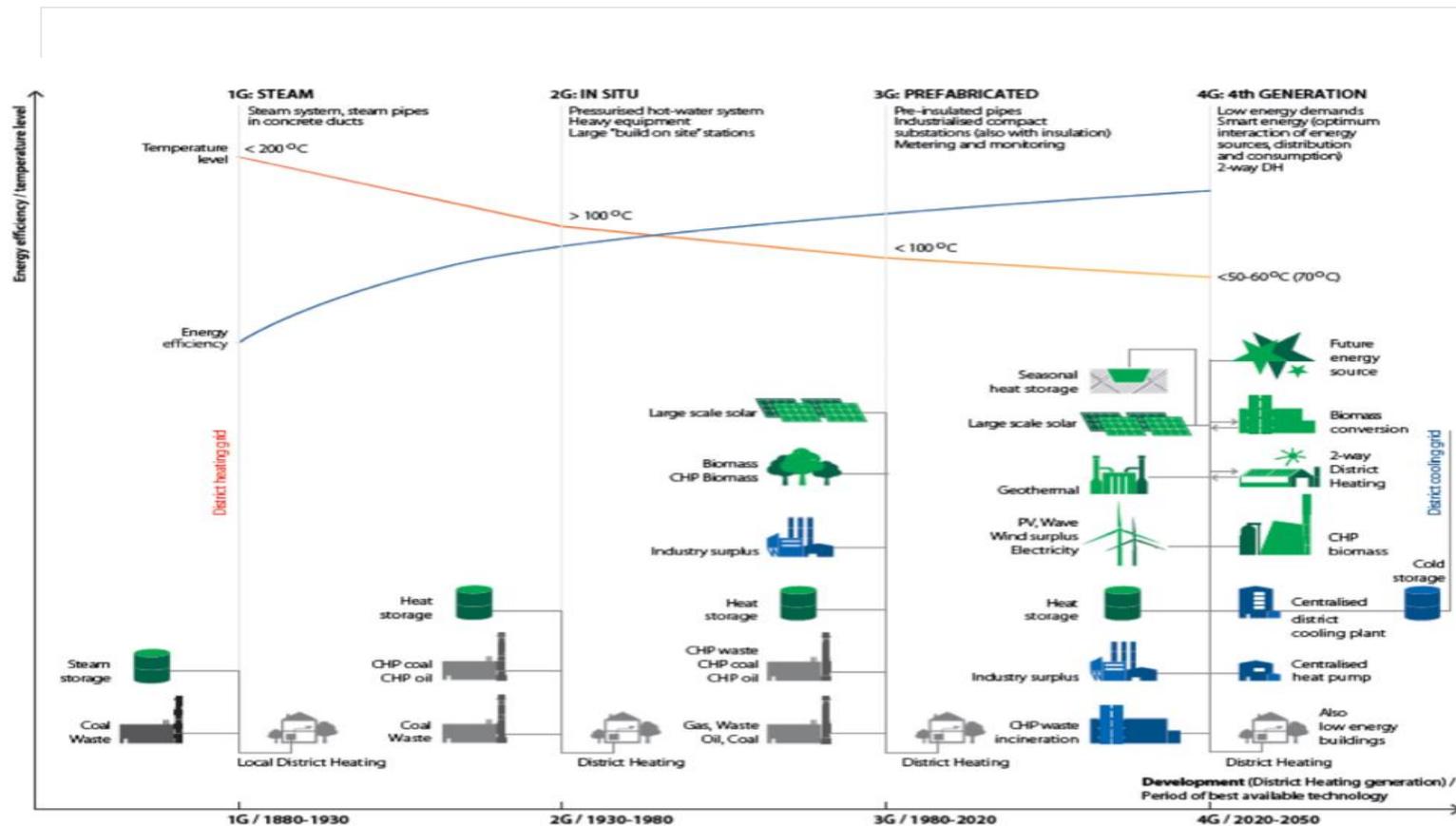


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Unlocking Geothermal Energy: Heat development

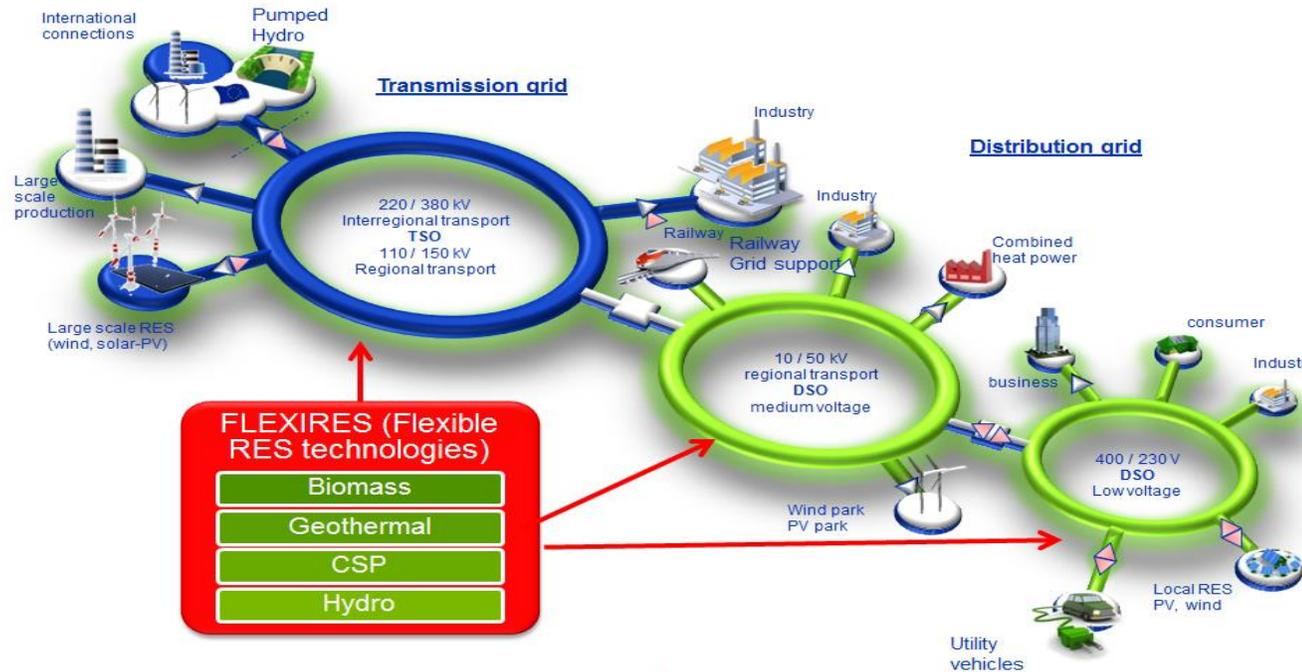


Graphs : some ideas to be further developed (e.g. Evolution of DH based on Lund 2014).

Messages:

- operative temperatures of the DHC network can be reduced
- By demand site management or by thermal energy storage it will be possible to balance heat demand and supply in a DH network.
- cascade applications
- CHP

Unlocking Geothermal Energy: Power development



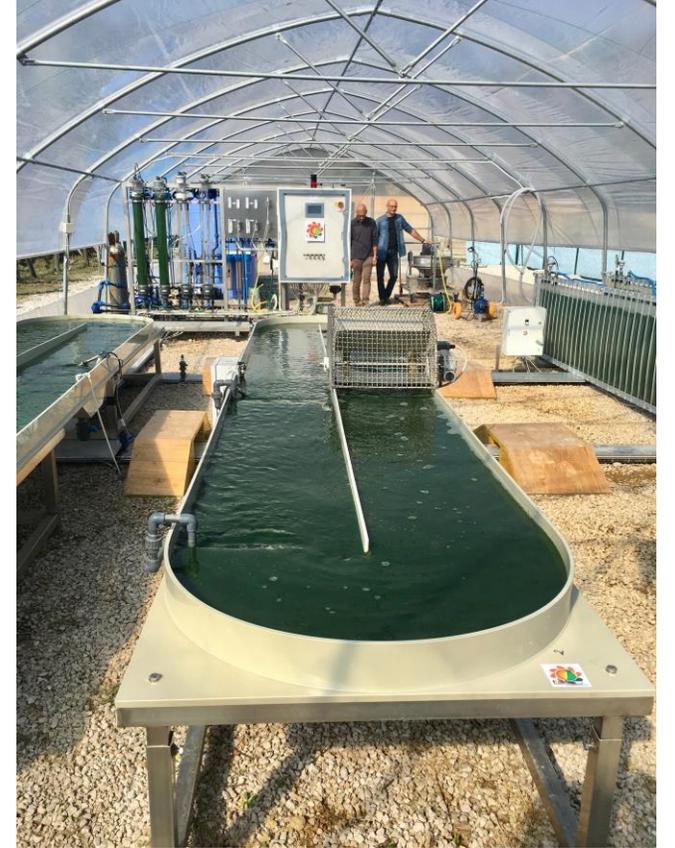
Graphs : some ideas to be further developed (e.g. grids).

Messages:

- improved efficiency, optimization of material, processes, cycle design
- hybrid, proper combination
- cutting edge technologies for any kind of resource (super-hot, off-shore, geopressurized) and any place (from remote islands to urban areas)

Unlocking Geothermal Energy: Coupling renewable heat and electricity sectors and markets for an optimal use of geothermal energy

- city of the future
- consumer-producer-prosumer perspectives
- thermal storage to help balance and to optimize production
- cascade, hybrid, synergy (e.g. geothermal-algae-biofuels-transport)



Alga Spirulina experimental production in the geothermal premises of Larderello, Italy

Increasing the social welfare in Europe



Increasing the social welfare in Europe

- achieve lower **environmental footprint**
- create **wealth**
- strengthen **dissemination, education and outreach**
- guarantee **protection and empowerment** of customers

Novel/New generation of technologies and full and responsible deployment of geothermal potential



Novel/New generation of technologies and full and responsible deployment of geothermal potential

Technologies beyond H2020

While targeting the EU long-term goal of **reducing costs** and **increase performance** of geothermal technologies and installations, R, D&I pursue all opportunities for complete deployment of geothermal resources, aiming at various advancements:

- **Improved capabilities**
- **Improved adaptability**
- **Improved reliability and durability**

Key messages

Ten strong messages, to be completed with a phrase, on outlook from industry and with societal impact perspective – focus in messages on the success and the outlook for further success.

- **Optimization:** Geothermal is a versatile energy, its multiple-uses that is optimized by cascade uses of heat
- **Growth:** Geothermal resources are yet to be developed in most parts of the world and is ready to become a local economic development booster
- **Feasibility:** Geothermal has a large margin of progress in geothermal use
- **Sustainability:** The geothermal environmental footprint is much lower than those of other energy sources
- **Flexibility & base load:** Geothermal may adapt to any energy demand, providing base load energy when needed and adapting to variable demand request
- **Stability & availability:** Geothermal energy is available around the clock and has a predictable output
- **Cogeneration & hybridization:** Geothermal can be combined with other energy sources to increase efficiency
- **Resource potential:** a widely available energy, since underground heat is available everywhere
- **Cool & appealing:** cool our “atmosphere” from the heat of our “planet”
- **Market penetration & social dimension:** a domestic and green resource, secure, stable, clean

Give us your ideas



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