


EGEC
GEO THERMAL

GEO THERMAL HEATING AND COOLING IN EUROPE.. BEING THE WORLD LEADER IN RENEWABLE ENERGY TECHNOLOGIES

Miklos Antics,
Managing Director GPC IP / GEOLFLUID
Vice-President of EGEC




1

EGEC
GEO THERMAL

OUTLINE

- INTRODUCTION
- GEOTHERMAL ENERGY
 - FROM EXPLORATION TO DEVELOPMENT: AN INTEGRATED APPROACH
 - GEOTHERMAL TECHNOLOGIES
- INDUSTRIAL COMPETITIVENESS
- TECHNOLOGICAL CHALLENGES
- NEXT GENERATION GEOTHERMAL TECHNOLOGIES
- RESEARCH, DEVELOPMENT AND INNOVATION
- R&D FINANCING NEEDS FOR GEOTHERMAL
- GEOTHERMAL MARKET




2

EGEC
GEO THERMAL

Geothermal – the Heat of the Earth

A definition is given in the Directive 2009/28/EU (the „RES-Directive“)

‘geothermal energy’ means energy stored in the form of heat beneath the surface of solid earth;





3

EGEC
GEO THERMAL


GEOTHERMAL - THE HEAT OF THE EARTH

And the earth can show it is hot !

Geothermal manifestations in Tuscany, Italy

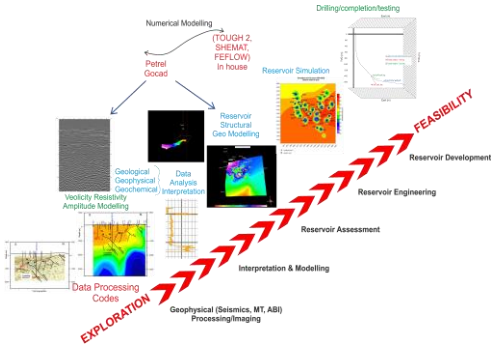
Thermometer in geothermal circuit of Szentes DH plant, Hungary



4

EGEC
GEO THERMAL

FROM EXPLORATION TO DEVELOPMENT: AN INTEGRATED APPROACH

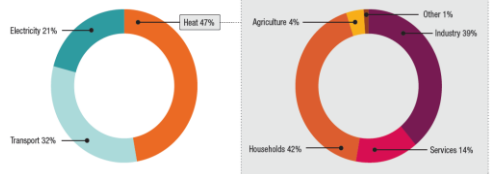


5


EGEC
GEO THERMAL

GEOTHERMAL HEATING - HEAT DEMAND

Why is heating so important - and where is it required ?



Industrial heat is a large share of the heat sector, with huge growth potential



6

GEOTHERMAL H&C TECHNOLOGIES

Heat pump

Underground thermal storage

District Heating

EGS and Cogeneration

Direct uses: ex. in agro-industry

7

INDUSTRIAL COMPETITIVENESS

- With 1.2 million units of GSHP installed, Europe is the world leader 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 200 geothermal DH systems in operation, Europe is also the global leader for geoDH. Global competition exists mainly for heat exchangers and pipes. Also direct uses of geothermal started in Europe, China is now leading the market due to the large demand there.
- EGS plants are only operation in Europe up to now. Projects are ongoing in the USA and Australia.

IP

GEOTHERMAL DISTRICT HEATING

Main geothermal district and greenhouse heating sites

NETHERLANDS MUNICH HUNGARIAN PLAIN PARIS

geoDH potential in Europe

9

GEOTHERMAL ENERGY IN EUROPE

The data sources for geothermal energy in the past were the country update reports of WGC and EGC, national statistics, Eurostat, etc. Since 2011, EGEC is preparing annually a geothermal market report for Europe:

December 2011

December 2014

IP

GEOTHERMAL ENERGY IN EUROPE

Geothermal Development as forecast in the EGEC Ferrara Declaration 1999

Hashed columns show actual development; heat includes both deep and shallow

EGEC Business Seminar 1999

11

GEOTHERMAL ENERGY MARKET IN EUROPE


Installed capacity in geothermal direct use in Europe, after data from WGC 2015

- others deep
- deep Agri/Aquaculture
- deep Balneological
- deep DH+heating

IP

TECHNOLOGICAL CHALLENGES

- Develop innovative solutions for refurbishing existing buildings with systems that are easier to install and more efficient at low temperatures.
- Develop geothermal District Heating systems in dense urban areas with a deployment of EGS.
- Contribute to the decarbonisation of the industry by providing competitive solutions for H&C.



13


NEXT GENERATION OF GEOTHERMAL TECHNOLOGIES... TO REMAIN N°1 IN GEOTHERMAL

- GSHP for retrofitting buildings
- Smart thermal grids with geoDH
- UTES with high temperature storage
- EGS for cogeneration and high temperature process heat

14

SMALL THERMAL GRIDS USING GEOTHERMAL ENERGY


Heat and Cold Production in Paris, FR (144 Rue de Rivoli, Paris, Louvre district
Issue: supply heat and cold to buildings where heated/cooled areas exceed land availability



7000 m² (offices + shops)
470 kW_{th} heating
850 kW_{th} cooling
Groundwater wells
Balanced consumption, with consideration of COPs of the heat pumps

15

CHARACTERISTICS OF SMART THERMAL GRIDS

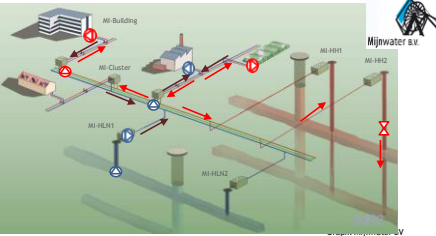


- Flexible and adapting
- Intelligent
- Efficient
- Integrated
- Competitive
- Sizeable
- Securing Energy Supply

16

TOWARDS SMART THERMAL GRIDS OF THE 2ND GENERATION

Example of thermal grid based on mine water
Several development stages towards a smart grid Minewater 2.0



17

RESEARCH, DEVELOPMENT AND INNOVATION

- Renewables for heating and cooling and flexible renewable electricity generation are important components of the future energy system and will contribute to achieving the objectives of the Energy Union. To this end, further R&I is needed, particularly in the following areas:
 - **Market uptake of small-scale renewable heating and cooling installations:** Geothermal small-scale systems are already competitive in some markets in Europe. There is the need to remove barriers for a market uptake all over Europe.
 - **Innovation for allowing the fuel switch in District Heating and for industrial process:** The industry and the DH sectors must switch to renewables, some innovations are needed for this transition: low temperature systems, energy efficient devices etc.

18


RESEARCH, DEVELOPMENT AND INNOVATION

- *Demonstration of flexible RES power plants: Some renewables, including geothermal plants, usually run as base load, but new technology such as binary turbines allow them to be flexible in their production. More demonstration plants must be installed in different market contexts.*
- *Research and Development of the next generation of RES technologies such as EGS: Breakthrough renewable technologies could be the future game changer for decarbonising the energy system. Enhanced Geothermal Systems (EGS) is a technology already demonstrated but an Action Plan must be launched for increasing its contribution to the electricity mix.*
- *Towards a smart integrated energy system: The future energy system should make a strong link between its three sectors: electricity, heating & cooling, transport. Smart energy grids will play an important role in the future smart cities and communities by ensuring a reliable and affordable energy supply to various customers with renewable energy carriers like geothermal energy*

IP

R&D FINANCING NEEDS FOR GEOTHERMAL

Budget overview to implement the geothermal RESEARCH AGENDA 2014 - 2020



The total amount of R&D money to be spent by industry within 2014-2020:	ca 400 Mio EUR
Horizon 2020 and member states	ca 740 Mio EUR
Total R&D investment needed between 2014 and 2020:	1140 Mio EUR

Public R&D support in form of grants, guarantees, insurance, risk finance (equity)...upfront !

IP

GEOTHERMAL MARKET IN EUROPE

In 2011, the EGEC market report announced resurgence in deep geothermal; the current situation in 2015, however, shows:

- the sector is on track for geothermal district heating
- the situation for geothermal electricity has also developed quite well, with preparation times being longer than expected
- for shallow geothermal, the development is not satisfactory at all, with several factors hindering the desired growth

We urgently need a stable political and regulatory framework to achieve the targets for 2020, 2030 and beyond!

IP

GEOTHERMAL MARKET IN EUROPE

For 2020, we need:

- more and dedicated support schemes for geothermal in nearly all member States
- the establishment of an EU geological risk insurance scheme (like the proposed EGRIF)
- the removal of (mainly non-technological) barriers, in particular for shallow geothermal energy
- more competitiveness with fossil fuels (gas) in the heating sector
- a strategy to switch from fossil fuels to renewables in order to improve security of supply.

IP

GEOTHERMAL MARKET IN EUROPE

For 2030, we need:

- a governance approach with ambitious measures at national level, as drillers, developers, and equipment manufacturers need security for investment
- a market design with more flexible renewable power generation
- a competitive and fair playing field for heating and cooling, considering both fossil fuels and an unlimited (and unjustified) strategy to "electrify the heating market".
- Geothermal heat and cold becoming a standard practice in building renovation

IP

Geothermal Energy:
renewable-sustainable-proven-achievable-realistic



Miklos Antics,
Managing Director
GPC IP / GEOPFLUID
m.antics@geoproduction.fr

THANK YOU! Köszönöm a figyeletemet !

IP