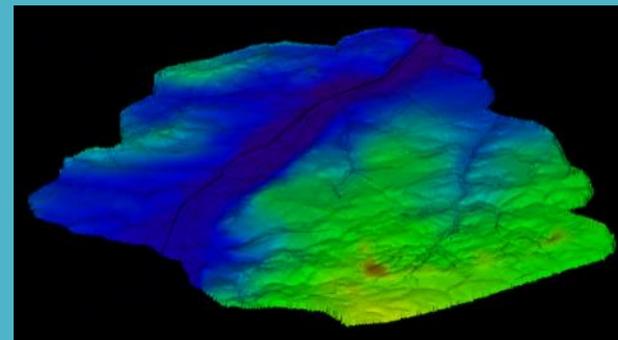


# Geothermal energy

STAKEHOLDER WORKSHOP: COMPETITIVENESS OF THE RENEWABLE ENERGY SECTOR

10:00 - 15:30 / 08 OCTOBER 2019



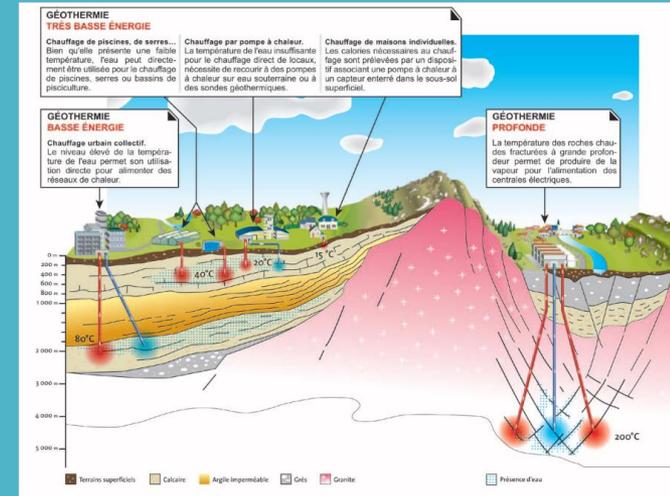
Estelle Petitclerc, Researcher, Geologist, Geothermal Energy  
Geological Survey of Belgium  
Royal Belgium Institute for Natural Sciences  
Email: [Estelle.Petitclerc@naturalsciences.be](mailto:Estelle.Petitclerc@naturalsciences.be)



# Competitiveness of the renewable energy sector study

'Deep' geothermal for heating and cooling (direct use/hydrothermal systems) isn't considered in the study despite representing a total use of 11,4TWh in EU?

GSHP market represents 16% of the overall market of HP referring to installed units and 20% referring to the estimated annual Heat production, GSHP have some common barriers with Air-air and Air water HP (high upfront costs, legal barriers, qualified installers).



More visibility, more awareness, more political support for GSHP? Why? \*

- ❑ The GSHP has better efficiency than Air-based HP (pay-back time around 15 years, COP and SPF are higher).
- ❑ The Air-based HP market doubled between 2006 and 2016, the annual sales of GSHP went down by 17% in the same period. This results in a loss of efficiency on an EU level when it comes to peak load electricity consumption for HP and grid capacities during the year.
- ❑ Decreasing the gap between Air based and GSHP from 2006 to 2016 means saving peak load electricity supply or more than 500MWe and reducing workloads of around 1 TWh each year without any loss of comfort!

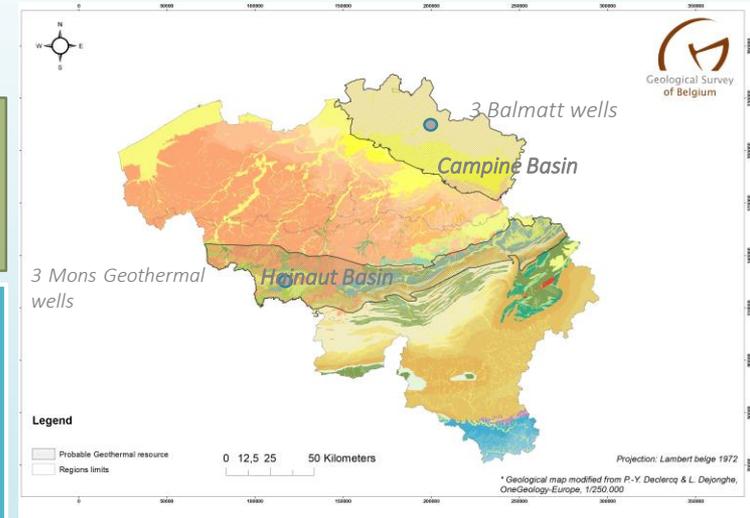
➔ This could displace 2 coal-fired power plants in the EU

# Towards a better inclusion of shallow geothermal energy in the BE heating and cooling market

Main challenges in Belgium and overall EU: Legal barriers (complex legal framework), high upfront costs, low awareness and visibility at decision makers and end-users, limited access to information (underground parameters are crucial) and qualified services....

## Belgium Case (Intraplate geological context-temperate climate)

➤ Every type of geothermal system is applied (except high enthalpy systems), this is mainly caused by the very diverse geological structure with big local differences and rapid succession of different sediments. Deep heating and cooling geothermal also exists and has a thermal capacity of  $34\text{MW}_{\text{th}}$  and new heating plants are planned in the next 2 years ( $8\text{MW}_{\text{th}}$ ).



Geological map of Belgium (modified from OneGeology map) and main deep geothermal zones of interest.

➤ GSHP market grows over 21% between 2017-2018 (second better market growth in EU) with slight legal incentives, various underground potential. Belgium has currently only 1,2 Installed units per 1000 inh., (Sweden: 55 units/1000 inh): a high market growth is expected in the coming years...

➤ Largest differences exists for the geological context between the North (Flanders) and the South (Wallonia) of the country with mostly sand/clay in Flanders and Brussels versus schist/sandstone/limestone in Wallonia implying differences of drillability, prices, types of installation, efficiency...

➤ Recent legal framework implemented is boosting the market: In Flanders: tightening of the E-level (max E40 from 2018) and the obligation to produce at least  $15\text{kW}_t/\text{m}^2$  renewable energy. This is also encouraged in Brussels where passive construction has been mandatory since 2015 with an obliged heat demand not exceeding  $15\text{kW}_t/\text{m}^2$ . GSHP appears logically to be an important contributor to achieved this goals.

➤ Past and ongoing R&D projects (EU and regional public funding) demonstrates the subsurface geothermal potential and are focusing more recently on affordable/sustainable use of the resource (Smart Geotherm, GeoHeat, ThermoMap, BruGeo, EstMap, MUSE, BeTemper).

➤ Public buildings (EU, regional, municipality buildings) show the example at Brussels: Geothermal systems are integrated in renovation and construction of the main EU buildings: Wilfried Mertens, Arlon street, House of Renewable Energy, House of EU History, EU creche, the Paul Herni-Spaak new project is under investigation in collaboration with RBINS...