PERMITTING / DATA SHARING IN FRANCE

Pierre Durst (BRGM)
European Shallow Geothermal Days
June 14-15, 2022
Shallow geothermal testing platform at BRGM

Multiple underground exchangers installed and fully monitored

- Vertical probes and probes field
- Horizontal exchangers
- Compact exchangers
- Thermodynamic machinery

Available for testing

https://plateforme-geothermie.brgm.fr/

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More

Digital dimensioning tools
On-line data visualisation

...
Mining code

Does it have to be harsh?

Yes...

In France, geothermal energy is ruled by the Mining Code and subject to **authorisation**
- Requires impact study and public consultation
- Takes more or less one year (sometimes more)

... but no

For shallow geothermal energy, as long as
- You drill less than 200 m depth
- The installed capacity is under 500 kW
- You are not in red zone

Then, it is a simple **on-line declaration**

Less than 10 m does not depend on mining code
Shallow Geothermal Energy

Also known as « Géothermie de minime importance » which translates to:
• Low expected impacts
• We don’t have time to deal with that

Decree defines the terms of shallow geothermal energy. This is backed by 4 orders:

• order on **general requirements** for shallow geothermal energy activities: conditions relating to the layout of an installation, measures to the implemented on performance, conditions of sale and exploitation as well as the terms of surveillance and maintenance of the installation

• order on the **qualification of drilling companies** working on shallow geothermal energy systems: obligation to perform drillings by qualified companies

• order on the **cartography of statutory zones**

• order on the **expert approval**
Cartography of statutory zones

Preventing geotechnical and environmental damage
Based on 9 feared phenomena:

1. Subsidence/raising related to evaporitic levels
2. Subsidence/collapse related to cavities (excluding mines)
3. Subsidence/collapse related to mining cavities
4. Ground movements (or landslides)
5. Pollution of soils and groundwater
6. Artesian phenomenon
7. Aquifer communication
8. Injection issues
9. Saltwater wedge (only for regional cartographies)

Other specific exclusion areas will still apply (drinking water well protection area…)

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Table: Phenomena and Related Levels

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
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</thead>
<tbody>
<tr>
<td>Subsidence/raising related to evaporitic levels</td>
<td>0/1/5/7</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Subsidence/collapse related to cavities (excluding mines)</td>
<td>0/1/5/7</td>
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<td>2</td>
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<tr>
<td>Artesian phenomenon</td>
<td>0/3/7</td>
<td>0</td>
<td>4</td>
</tr>
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<td>Aquifer communication</td>
<td>0/1/4</td>
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BRGM — FRENCH NATIONAL GEOLOGICAL SURVEY — WWW.BRGM.EU
Cartography of statutory zones - Map construction

- Alea level cartography
- Projection on a grid: 500*500 m, 250*250, 100*100
- Alea level multiplied by aggravating factor and summed (difference between closed and open loop)
- Classification by threshold
  - "green" zone: on-line declaration
  - "orange" zone: on-line declaration + "certificate of compatibility" from an expert
  - "red" zone: back to authorisation
Cartography of statutory zones - Map evolution

2015 National maps 10-200 m

- Revisions on a regional scale
- 3 depth
- Mainland covered by the end of 2023
Cartography of statutory zones - Map consultation

http://www.geothermies.fr/
Data collect

Every well of more than 10 m depth drilled in France have to be declared

- Basic informations like location, depth, use, driller log should be provided
- More can be provided (pumping test, chemical analyses...)
- Data are collected in a data bank: BSS or underground database
- This database is public (minus owners personal info)

Geothermal on-line declaration are automatically versed in the BSS

On-line declaration system is currently being extended to water and geotechnical wells

Geothermies.fr: Thermal response test
Ressources atlas – Open loops

In some regions, Atlas of aquifer geothermal resources had been made.

Informations range from:

- Location of potentially useful aquifers to
- Resource qualification from 3D hygrogeological model

A good improvement would be shifting from productivity data to injectivity data.
**Ressources atlas – Closed loops**

In some regions, Atlas of thermal conductivity had been made:

- Most basic are based on geological map
- More advanced are based on the stratigraphy along the considered depth

Next step will be to fit theoretical conductivity to thermal response test data.
Potential atlas

In some urban areas, Atlas of geothermal potential had been made Combining:

- Ressource
- Need
- Constraints

Beginning of real planification and management tools

Energy that geothermal energy can provide for heating in each municipality in GWh/year.
Is the French system ideal?

It works

• Easy to use
• Provides required safety

But

The step between declaration and authorisation is huge:

• Excludes individuals from red zones (desired effect)
• Dissuades mid level projects from red zones
• Some projects limit themself to 500 kW of geothermal energy
• Heat storage limited to 40°C (good or bad….)

Drillers qualification ensures good practice, but few drillers want to qualify is there’s not enough projects and some projects are slowed by lack of qualified drillers