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Webinar: Understanding the Social Aspects of Geothermal Energy

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International experiences, case studies and lessons learned

Funded by the European Union

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The use of geothermal energy

Geothermal energy is **not new** and has been used for centuries for bathing, healing and heating.

Although this energy source has enormous growth potential, it still has a **niche market** compared to other energy sources.
- This is limited, among other things, by **less knowledge** about the technology
- The use of geothermal energy is still often a **controversial** topic.
- The installations are often **questioned** by local communities living close to the installation.

In general, there is **less experience** with geothermal energy. That is why there is relatively little research into the **social aspects** compared to other renewable sources.

Since society plays an **active** role in accelerating or slowing down the development of geothermal energy, it is important to research the **social aspects** when developing new projects.

Geothermal energy, where did it go well?

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Geothermal energy has been used in Paris for more than 50 years.

Geothermal projects have been developed since 1969 and there are currently about 50 heat networks in the city that heat almost 250,000 homes.

- Thanks to the **historical background** and **long tradition** of geothermal energy, the operators have a **proven strategy** and **communications plan** to convince various stakeholders.

- The **political context** is in favour of green projects. Many municipalities in the Paris region have set ambitious targets to align with energy transition policies.

In Munich, entire districts are already heated via heat networks with geothermal energy

How did this go?

- Munich recognised early on that they wanted to move away from coal and oil and looked for alternative solutions
- Extensive research has been conducted on the potential of geothermal energy, after which the city **heating vision** was successfully developed:

"Munich aims to be the first major German city to switch to 100% geothermal energy for heat extraction by 2040"

- The first project was completed more than 10 years ago. More than 7 geothermal heat projects have already been realised, with good public-private partnerships.

- Munich shows that a **long-term, well-considered concept, vision and long-term planning** can make a significant contribution to the heat transition.

Larderello

- The **oldest** geothermal complex in the world, with 34 geothermal power stations (6 billion kWh meeting 30% regional energy needs)
- Creates support in the region by **promoting sustainable development** in the region without disrupting the identity and culture of the landscape
- To further improve the acceptance and integration of geothermal power plants in the region, a number of projects have been started:

"Beer fully produced from ENEL's geothermal heat"

- The ENEL Geothermal Museum was founded in 2013 and has already attracted more thatn 25,000 visitors

- A number of geothermal power plants are open to visitors

- The geothermal power plants are not only a part of a sustainable energy portfolio, but also of **culture, tourism, food, wine and sustainable agriculture.**

- In addition to basil, cheese and salami produced using geothermal heat, the 'geothermal heat table' also includes beer.
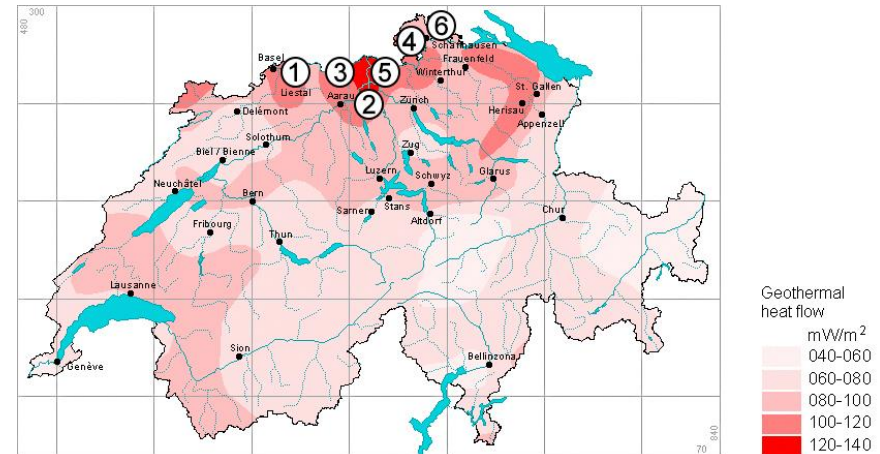
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Switzerland

Ambitious goals: Switzerland sees great potential in geothermal energy and aims to produce 8% of its total energy production from this source by 2050.

- Some cantons such as Geneva are aiming higher, with 20% by 2035

The Swiss federal system is organized into three hierarchical levels: municipal-cities, cantons, and the state.

Geothermal energy is considered **essential** at a national level, but on a local scale they often think about it Differently. Which then has an impact on national level development.

Development in Switzerland is proceeding along two paths: top-down for electricity production and bottom-up for heat production.

Switzerland case studies – failed examples

	Basel	Haute-Sorne
Energy form	Electricity	Electricity
Project developer	Joint venture between private developer and the local public utility, supported by the canton government	Project developed by a private operator, with political support from the canton government
Project vision	**Pilot project** to develop the world's first commercial 'petrothermal'* power plant to produce clean electricity (*Petrothermal systems are based on hot dry rocks beneath the earth)	**Pilot project** for the development of 'petrothermal' technology for electricity production in support of deep geothermal energy at the national level
Social engagement	• Project developers communicated through **press releases** and **exhibitions** • Its pioneering nature and potential benefits were emphasised, but no reference was made to **seismic risk** • Although the project received some national media attention, there were no active **information campaigns** aimed at the local population	• To ensure local support, the project started **early** with an **information campaign** related to the selected site

Switzerland case studies – failed examples

	Basel	Haute Sorne
What happened?	• In December 2006, an injection of water caused a 3.2M **earthquake** • Strong reactions from the public • There was **minor damage** to buildings	• The project started with **strong support** from all stakeholders • Nonetheless, a group of Haute-Sorne residents started a campaign **criticising** the permit procedure (*ie that this had not been conducted properly*)
Public reaction	• The public appeared to be **poorly informed** about the project • After the earthquake, reactions were **hostile** and demanded an immediate **end** to the project • The government withdrew its support from the project	• Opponents claim the project will cause **noise**, impact the **landscape**, create **risks** to groundwater supplies, and induce **seismic activity** • There is a **lack of local benefits**, and the additional heat benefit cannot be economically exploited
Status	Abandoned • The event sparked controversy over project communications, the **quality** of project management and the lack of a prior **risk assessment** study • The canton of Basel filed a lawsuit against the operator for causing the earthquake • The project <u>stopped</u> in 2009	On hold • In december 2018 the court rules in favour of the canton government and declared that the planning process had been conducted correctly • Citizens from the Jura canton launched a **petition** calling for a vote on a complete stop on DGE in the canton (protest in May '23 and Sept '23) • As of January 2019 the project's future remains uncertain

Basel case conclusions

Before the Basel earthquake, the public debate about geothermal energy was largely **positive** in Switzerland.

After this, a focus on **seismic risk** emerged. This became the **dominant frame** for reporting on geothermal energy and the response was more **hostile**.

Although the project involved a local operator and was supported by the city government, it failed to gain local acceptance, mainly due to the **lack of a public engagement** strategy.

The project developers' narrative emphasised that the project will be the first commercially operating petrothermal power plant in the world.

- It therefore mainly characterised the **pioneering role** of the project rather than the **local context**.

The project's failure raised **questions about future geothermal developments in Switzerland,** especially with regards to seismic risk.

Although the project in Haute-Sorne is in line with the federal objectives of the Energy Strategy 2050, there was **strong local opposition**.

This examples illustrates how challenging it is to gain local support for a project when they main goal is to serve as a pilot to scale up a technology, with **few perceived local benefits.**

Because the project was only used for eletricity generation and had no direct local use of heat, it gave the local population the impression that they would have to **bear the risks without receiving any direct benefit** themselves.

Haute-Sorne confirms the need to develop technological infrastructures that, from the start, can have a **strong and positive local impact** when working in collaboration with local actors.

Switzerland case studies – better examples

	St.Gallen	Genève
Form of energy	Electricity/heat	Heat
Project developer	Project initiated by the municipal administration of the city of St Gallen and the municipal utility company	Project jointly implemented by the canton government and the local public utility company
Project vision	Becoming a **pioneering community** in decarbonising electricity and heat production to meet CO2 reduction targets and reduce dependence on oil and gas imports	Decarbonise Geneva's heat production to **meet CO2 reduction targets** and **reduce dependence** on oil and gas imports. To develop a new local economic value chain around geothermal energy.
Social engagement	In parallel with the planning of the geothermal project, the city also launched a preliminary study into the **perceptions, hopes, fears** and **knowledge** of the residents.	• The program involved **stakeholders**, developed cooperation with **universities**, and promoted **transnational** consultation. • It was stressed that the project would contribute to **reducing oil consumption** • The project gained visibility and traction within the government through **direct contact** between cantonal and federal officials, discussing the benefits of the program and the possibilities to support it technically

Switzerland case studies – better examples

	St.Gallen	Genève
What happened?	• During production and testing in 2013, an injection caused a 3.5M **earthquake**. • This was a **setback** because it had been emphasised from the start that the seismic risk in St Gallen would be much lower than Basel	• Opponents of fracking in the region expressed concern that the project could eventually require fracking • **Opponents argued that this could also open the way to fracking for shale oil and gas**
Public reaction?	• **Support** remained high after the project caused an earthquake due to **strong social support**	• To prevent opposition to geothermal energy based on an incorrect comparison with fracking, the Geneva government **introduced a law in** 2017 banning the exploitation of fossil fuels as an underground resource.
Status	**Paused** • With strong public support, drilling resumed to the planned depth • This was certainly a result of the much **better local information and engagement strategy** • Due to **insufficient water production** and an increased risk of earthquakes the project was stopped in 2014	**Ongoing** • The strategy has been a **success** so far, as two wells were drilled without resistance as of March 2019 • In areas where projects have been completed or are underway, the public response has been **favourable**

Unlike Basel, the St Gallen municipal council had contacted the public **early on** and put the project to a public vote.

The project developer emphasised **the local character** of the project and the **potential for local use of generated heat**.

Although the project was set up as a local initiative, it also benefitted from **federal incentives**.

- This federal guarantee was an important argument during the public vote for financing the geothermal project.

This project focuses solely on heat and emphasises **the unique and favourable geological conditions of the environment.**

The project was designed as **local**, and is implemented and planned by local authorities. It gives priority to **direct use** for local heating.
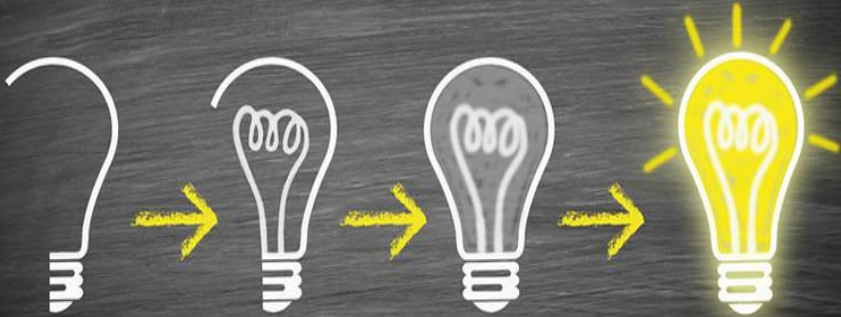
It has a good long-term **vision**.

Fracking '**frame**' was tackled.

The Geneva authorities were able to develop a strategy that suited their energy policy and also allowed them to **simultaneously address local problems and create local socio-economic benefits.**

A few lessons learned

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The perception of a project is **socially constructed**

The way in which a project is perceived and how the population respond to it depends on many factors

- Local collective norms and values
- The political agenda
- Media coverage
- Ongoing local social conflicts
- Past experience with other infrastructure projects

Reactions from local residents can also arise from **incorrect frames** that have been used (fracking)

In general, resistance to a geothermal project by residents is often a matter of **protecting their environmen or preserving a lifestyle**
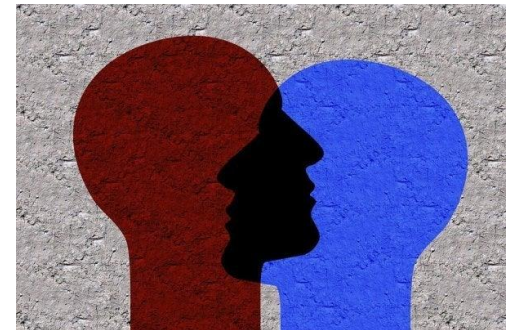
There is no 'one size fits all' strategy

Understand the **specificity** of an area (cultural, historical, political, economic, social)
- Project developers must see the area through the **eyes** of the residents:
- What do residents in the area value?
- How do residents **define** and characterise their area?
- *(e.g. do they see themselves as a region known for innovation or as a place to enjoy nature?)*

Transparancy
- Project developments must **identify** and **inform** residents of potential **risks**.
- They must be fully **transparent** about the pros and cons of projects and the potential impacts of projects,

Analyse the **energy policy and political program** of the area.
- Take into account the political calendar such as local elections.

Key point for operators

Strong **long term vision** is important (eg. München, Genève)

Interact with citizens **before** public inquiry

Good **public-private partnerships**
- Seek collaboration with government agencies at an early stage
- Local institutions should support projects by giving them a **sufficient political basis** and helping with processes.

Use a **trusted third party** to distribute communications (eg NGOs, associations)

Find and promote **local benefits** to local residents
- Heating, cooling, steam
- But also…. start a new innovative project surrounding the plant: **beer/wine/cheese** from geothermal heat?
- What could be other **socio-economic benefits** that would help further develop the area?

THANK YOU FOR YOUR ATTENTION

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Any questions or remarks?

- Feel free to contact me at
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