Sustainable geothermal heat vs district heating & cooling

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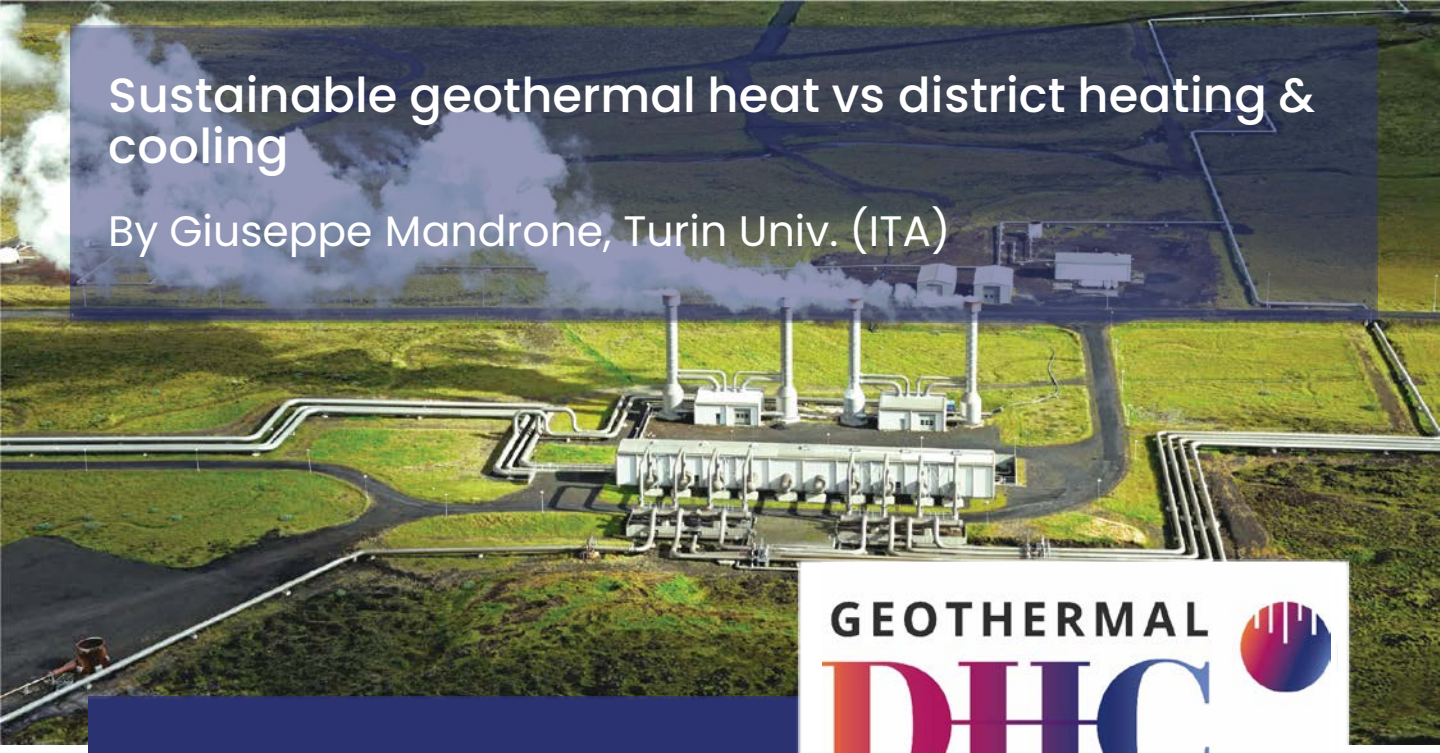

GEOTHERMAL DHC

Towards Decarbonized Heating and Cooling!

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- Renewable energies should still be subject to a sustainability assessment
- The overall impacts can be revealed by sustainability assessments of all relevant climate - affecting processes over the entire life cycle of a plant.
- If a sustainability analysis is carried out even before the start of the project, measures that improve the environmental balance of the plant can already be defined in the planning phase.

LIFE STAGES	Exploration	Construction	Operation	End of life
Space requirement		x	x	
Energy consumption	x	x	x	x
Material consumption		x	x	x
CO_2 emission	x	x	x	x
Water consumption	x	x	x	x

Sustainable Assessment improves communication with stakeholders as well as facilitating licensing and access to finance, and it leads to improved projects, procedures and performance, and therefore enhances public acceptance.

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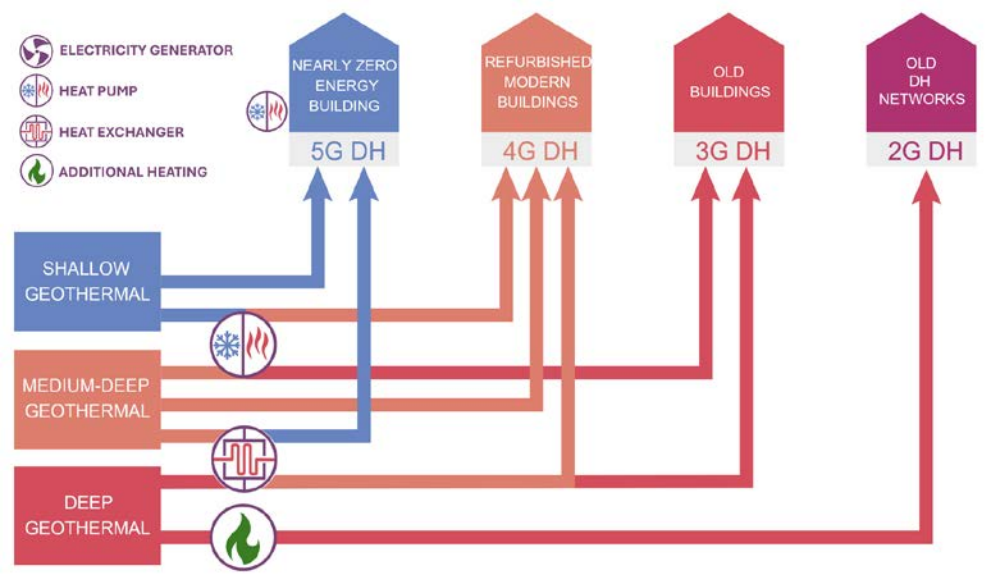
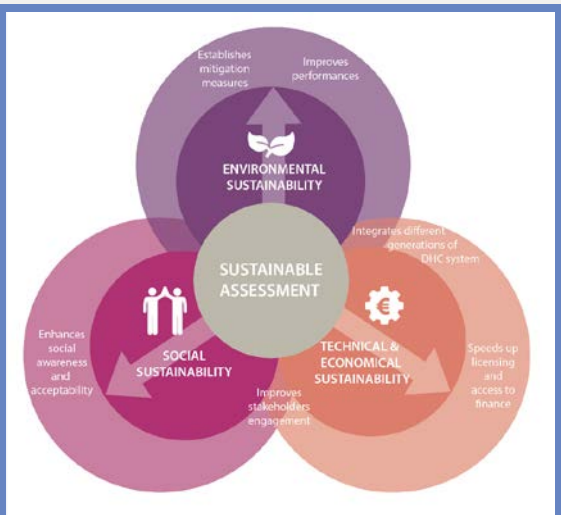
An opportunity to clean the cities!



- Geothermal should be a safe, reliable, and environmentally friendly renewable energy source.
- Manmade activities can have an environmental impact: infrastructure projects should be rightly considered as well as their operation phase and end of life.
- Recent developments in the building, district heating and cooling sectors, indicate the trends and efforts to more sustainable and climate-friendly space heating and cooling systems.

Because different temperatures occur at different depths, such a system can be used for different generations of DHC and buildings.

This concept may be a part of an energy hub and can help facilitate transformation from fossil fuel to geothermal energy.



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Sustainable Assessment

The Sustainable Assessment is used to assess and enhance the performance of geothermal projects, with the sustainability issues divided into four different sections:

1) environmental
2) social
3) economical
4) technical

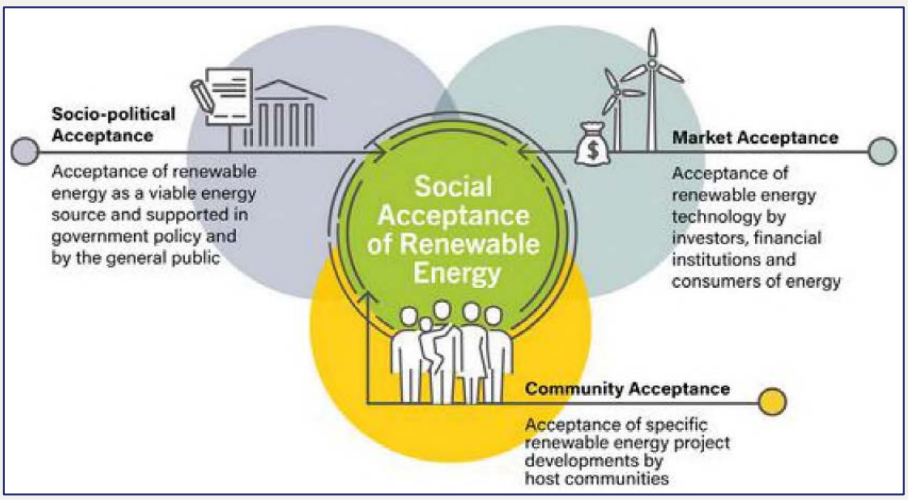
Key weaknesses & **threats**	**key strengths** & **opportunities**
high capital expenditures	sustainability
high risks	modularity
social acceptance	job creation
conflicts with other underground systems and infrastructure.	boost for technologies

Further research is needed as not all technologies used in the concept are yet mature.

The most important of them are quantitative assessment of the concept including:

- energetic, exergetic, economic & environ-mental evaluations
- elaboration of smart control
- operation
- geological investigations.

- Public acceptability of geothermal energy is an important topic.
- Access & dissemination of key environmental performance indicators for geothermal installa-tions are important when considering such public acceptability.



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