Feasibility Study for the utilisation of old depleted oil/gas wells for energy production in the City of Dolyna (Dolyna Geothermal)

Project Background

Name of applicant	Fenno Caledonian Oy, Beneficiary: Dolyna City Council
Project info/Project name	Feasibility Study for the utilisation of old depleted oil/gas wells for energy production in the City of Dolyna (Dolyna Geothermal)
Contractor	Fenno Caledonian OY
Project duration	May 2022 – March 2023
Contract value	€ 128,730.00

Project Summary

1 Project Summary

The project envisaged the development of a Feasibility Study to identify the technical and financial possibilities of using geothermal energy for municipal heating needs by using old oil wells in Dolyna city, including:

- Issues and concerns related to idle oil wells
- Assessment of geothermal potential at a specific location in Dolyna
- Utilisation of geothermal heat in the Dolyna DH system, comparing different alternatives
- Financial calculations and affordability
- Environmental assessment
- Project implementation plan and cost estimates
- General geothermal potential in Ukraine (similar systems)

2 Project Conclusions

An investment in geothermal energy using idle oil/gas wells could be made in a technically and environmentally feasible and sustainable way as it has the following benefits:

- Economic, political and social
- Reuse of idle industrial/infrastructural facilities
- Provision of distributed heat production, improving security of energy supply
- Provision of an alternative sustainable source of energy
- Reduction of reliance on fossil fuels
- Reduction of emissions of greenhouse gases (GHGs)

However, financially and commercially such an investment is challenging due to the following disadvantages:

- Investment costs and operation and maintenance costs are high using current technology, even though an existing well system would be used. The costs of producing heat and/or power are therefore high.
- Available heat flows from the studied reservoirs were substantially lower than anticipated. The temperature of the flux was also lower than expected, thus reducing possibilities for power production.
- As is common for geothermal energy, heat flow from the wells is constant throughout the year, thus it is important to find such a place where the heat demand is also constant and high enough during the summer

season. Such consumers might be greenhouses or specific process industries.

- Geothermal resources can be exhausted if the rate of heat extraction exceeds the rate of natural heat recharge.
- GHG emissions are reduced but the abatement cost is high.

3 Impact on Human Rights and the project's Sustainable Development Goals (SDGs)

The project would have a positive impact on human rights as it would support improvements in infrastructure and living standards, ensuring environmental sustainability and energy security so all consumers, including vulnerable groups, would have access to affordable, reliable and modern energy services.

Overall, the project could positively impact the following SDGs:

4 Project Deviations

No significant deviations over the course of the project. Issues related to local legislation were addressed more thoroughly than the ToR requirements.

5 Project Lessons Learnt

Lessons learnt

The Feasibility Study was important as it aimed for a thorough investigation and implementation of a concrete investment case. Worldwide there has been much discussion about geothermal energy in general and about the use of abandoned oil and gas wells specifically.

The expectations of the geothermal energy potential have varied and often seem to have been overoptimistic, especially as they disregard all related costs and risks. The results of this Feasibility Study appear discouraging, but this does not mean that geothermal energy using abandoned oil and gas wells should be fully ruled out. Rather, the Feasibility Study shows that a comprehensive set of strict criteria should be applied when screening potential wells and evaluating the importance of due technical, commercial and financial assessment before any investment decisions are made. It also shows that it is important to investigate other technologies for using geothermal energy and abandoned wells. This study sets a good benchmark for similar studies.

Benefits of the project

Projects like this can provide local solutions when conditions (reservoir, location, demand, etc.) are favourable. Technically, they are well suited for heat production but much less so for power production. At national level, using oil and gas wells for energy recovery does not appear to provide a large-scale solution. Potentially available geothermal resources are very small compared to the total volume of the energy sector.

Effectiveness of the project

The project was implemented successfully, and project deliverables comply with the FS targets, as well as FUTF objectives, including promoting cooperation between Finland and Ukraine and identifying opportunities for projects.