Enhanced geothermal system energy projects evaluation model based on multi-criteria decision-making

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1. Introduction

Geothermal projects, especially enhanced geothermal systems (EGS) projects present complex investments. Namely, EGS projects are highly site specific. When assessing the potential geothermal project, either as a greenfield or brownfield project, with respect to the sustainability, different aspects should be considered. The sustainability of the geothermal project deals with three main aspects: technology feasibility, environmental and social impact, and economic feasibility.

2. Objectives and hypotheses

Objectives: i) to investigate and evaluate the main influencing factors that need to be analysed when modelling technical, economic and environmental assessments of enhanced geothermal systems; ii) development of an integrated MCDM methodology that will allow potential investors to conduct preliminary comparative analyses of EGS technology usage at different potential locations; and iii) development of the evaluation model for selection of the best solution for the use of available geothermal potential and integration of the EGS into the heating and power systems. The research hypotheses are:



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Multi-criteria decision making (MCDM) methods have become increasingly popular in decision-making processes related to sustainable energy.



the evaluation model

- Standardized evaluation of influencing criteria when investing in geothermal energy projects with emphasis on EGS can enable preliminary identification of project potential and cost-effectiveness as well as comparison of several potential projects.
- Potential and profitability of investments in geothermal energy projects with emphasis on EGS is conditioned by geological and economic factors, social and environmental factors as well as the **subjective perspective of investors**.



Figure 2. Depiction of main features of the evaluation model

Figure 10. User interface of the standalone application

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