GEORISK

Risk mitigation frameworks for geothermal and other renewable energy technologies

Risk mitigation schemes are required to support the development of renewable energy technologies and market development. De-risking renewable energy lowers the cost of capital for project developers and provides more cost-effective renewable energy for consumers.

WHY DO WE NEED TO ESTABLISH RISK MITIGATION SCHEMES?

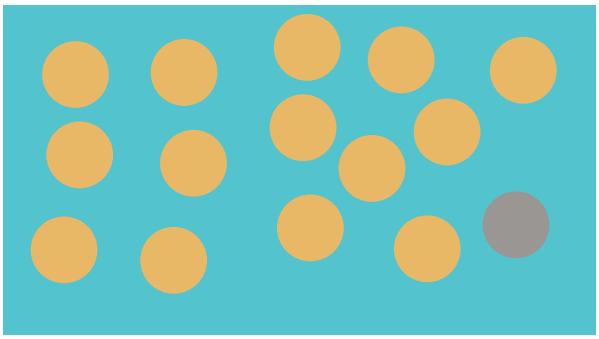
Large upfront capital expenditure (CAPEX), with low to negligible operational and maintenance costs, is the typical profile of renewable energy technologies. For geothermal, CAPEX is about 80-90% of total project cost. Up to half of a project CAPEX needs to be invested before the level of a risk of the project decreases significantly.

Geothermal energy projects also face a resource risk: the possibility of not finding an economically viable resource (e.g. the reservoir temperature is too low or flow rates are unsuitable for commercial exploitation). The impact of this geological risk may require additional equipment such as heat pumps or it can result in a dry well that cannot be exploited at all. Project developers need to manage these risks.

In a well-functioning market these risks can be easily addressed through private insurance products. In less mature markets different risk instruments are required. **That is why a risk mitigation framework is needed to develop a market for geothermal and other renewables.**

MATURE MARKET

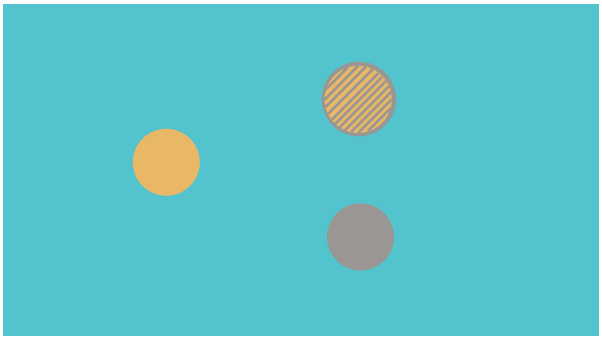
Low rate of failure, and high confidence on probability – Risk can be priced, cost borne by the portfolio of projects and insurance is profitable (e.g. here insurance is 7% of project costs)



Representation of a mature market with 1 failed project

EMERGING MARKET

Risk profile of the technology is not yet understood on a technical and financial level – It is not possible to price this risk, and therefore private insurance is not available (e.g. here insurance would be 75% of project costs)



Representation of an emerging one with 1 failed project and on partial failure.

CONTACT: Saanjev Kumar, EGEC Head of Policy, s.kumar@egec.org +32 499 53 97 31

GEORISK

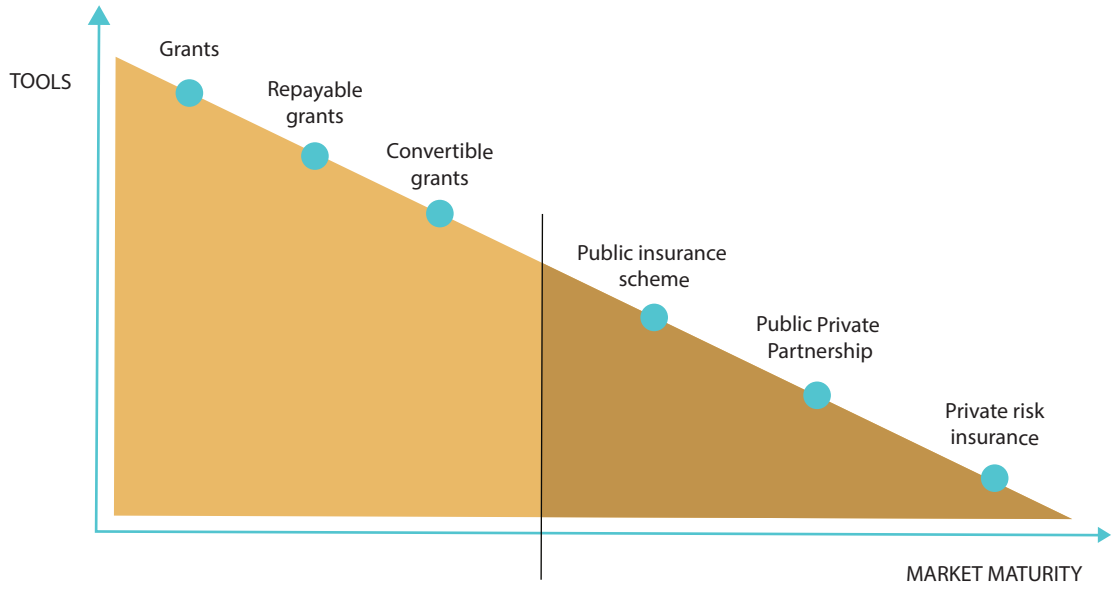
MATCHING RISK MITIGATION SCHEMES TO MARKET MATURITY

De-risking instruments can take many forms. This is dependent on the overall maturity of the market. They provide geothermal energy developers with a mean to reduce and manage their exposure to project risk. It is very relevant for small developers and vital for cities developing heat & power projects.

• **Grant schemes** are especially suitable for markets where there is little information about the geothermal resource and few projects for reference. In such instances grant schemes are needed for initial development of the market.

• **Convertible loans or grants** are also relevant at early market development, allowing investors to be shielded from the excessive amount of risk linked to the development of an innovative technology while the resource is not yet well understood.

• **Public-Private Partnerships and insurance:** Where there is a liquid geothermal market with many projects and plentiful information about resources and understanding of the risk, some forms of insurance schemes and public-private partnerships are the most appropriate. These schemes can be publicly funded initially. Private actors, providing traditional insurance projects, are likely to enter the market when it is mature.



Risk mitigation schemes can be set up at a regional scale, but it is more efficient to pool the risk of more projects. When possible, it is relevant to mutualise the risk over an entire reservoir, as Hungary is promoting in the Pannonian Bassin, or even to establishe a financing of geothermal de-risking at the European Union level. This allows to reduce the costs for policy makers and developers. In France for instance, the geothermal risk mitigation scheme unlocked 42 euros of private geothermal investment for each public euro invested into setting up the scheme.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [818232 - GEORISK]