



Risk insurance for geothermal projects

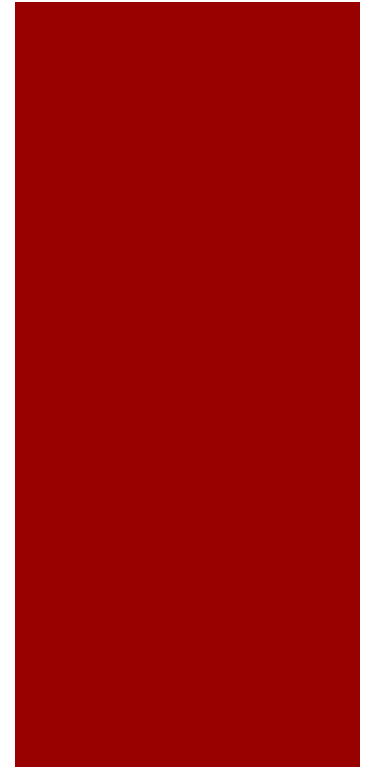
Foreword

- The notion of risk
- Risks associated with geothermal projects: a significant financial barrier
- Need of risk-adjusted financing:
 - assessment;
 - management;
 - mitigation;

Risk insurance for geothermal projects



- The risks associated with geothermal projects
- The perception of risk
- Risk management
- Existing insurance concepts to cover the geological risk in Europe
- Risk insurance scheme at European level



The risks associated with geothermal projects

The risks associated with geothermal projects (1/2)

❑ Usual business risks;

❑ Risks specific to geothermal:

- Drilling, the cornerstone of the geothermal resource economical assessment
- The geological risk
 - Flow and temperature
 - Short-term risk (drilling)
 - Long-term risk (exploitation phase)

The risks associated with geothermal projects (2/2)



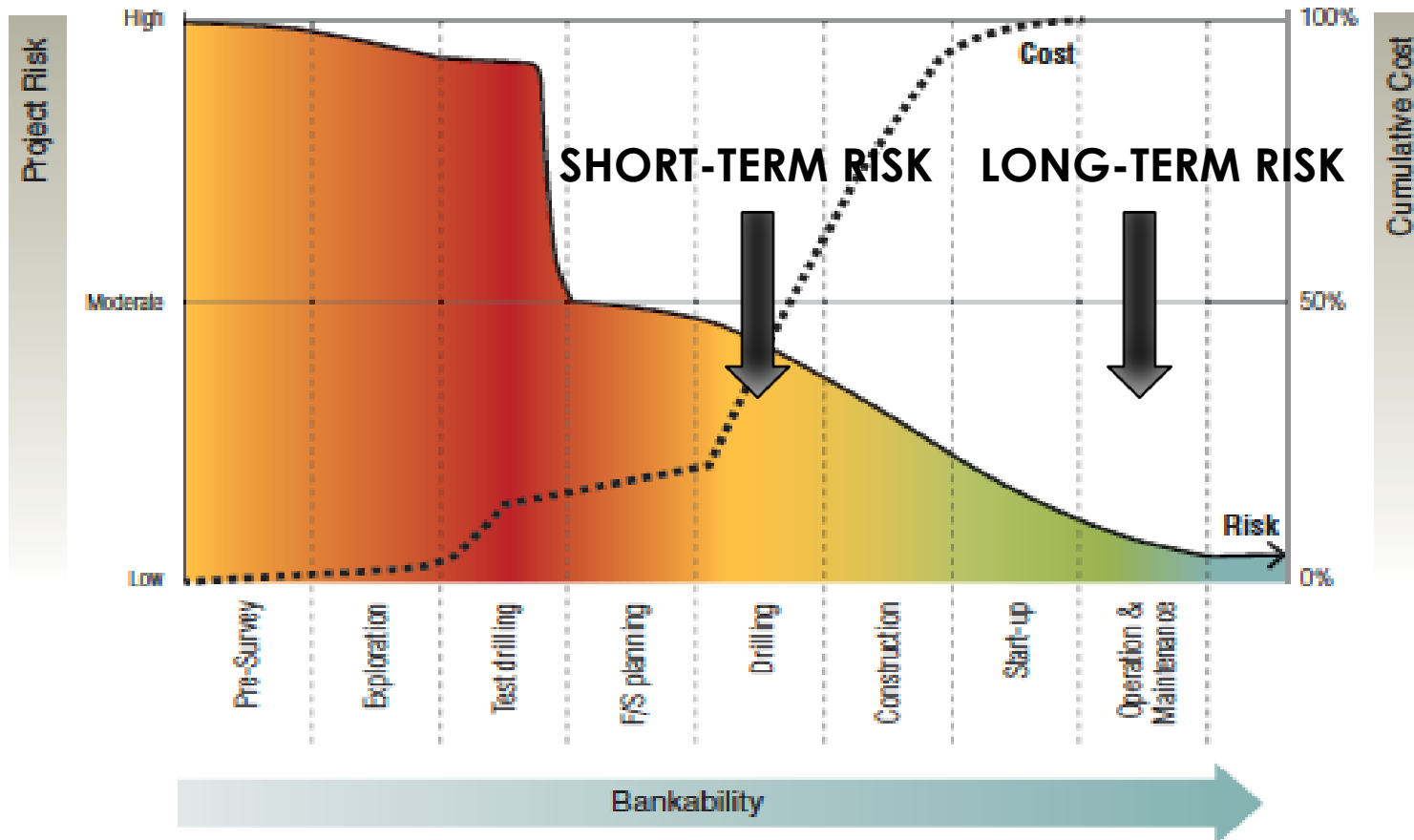
Financial dimension

Insurance availability

Phases of a geothermal projects – When may the risks occur?



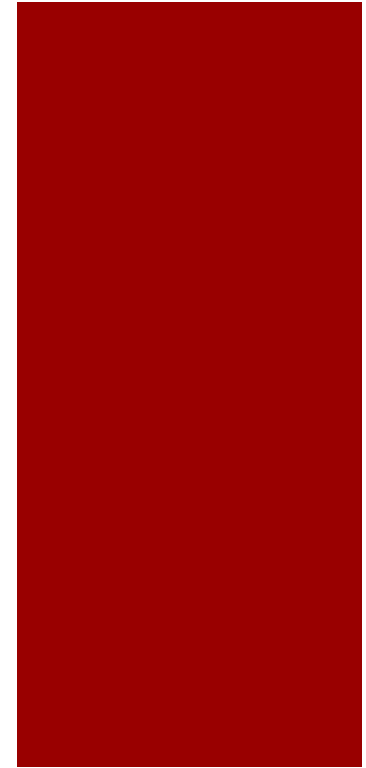
Geothermal Project Risk and Cumulative Investment Cost



Risk insurance for geothermal projects

- The risks associated with geothermal projects
- **The perception of risk**
- Risk management
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The perception of risk

The perception of risk

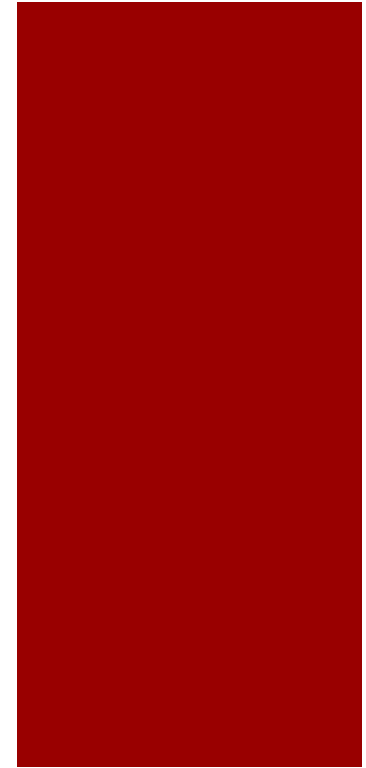


- ❑ Quantifying loss to reward
- ❑ Surrounding factors distorting the perception of risk
- ❑ The perception of risks associated with geothermal resources in Europe

Risk insurance for geothermal projects

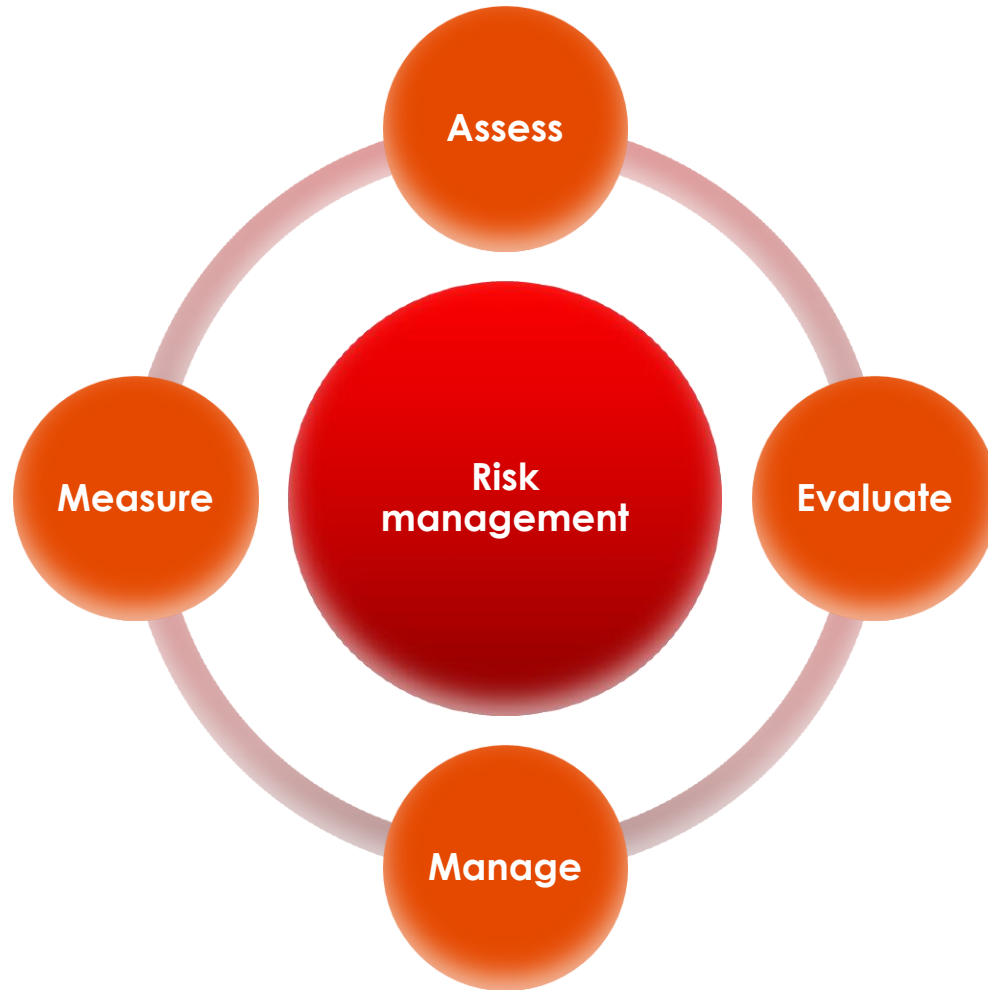
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Risk management

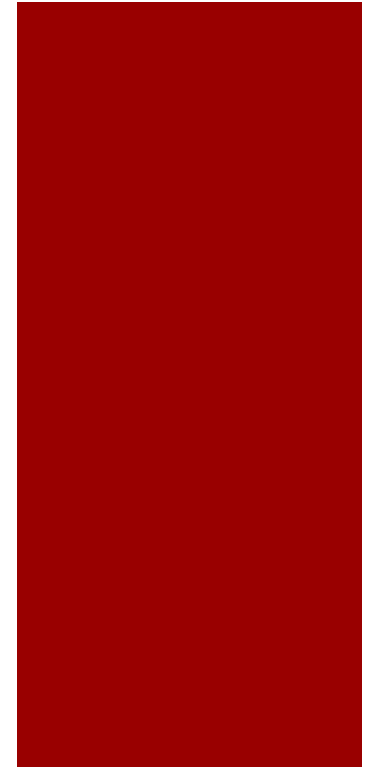
Risk management



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Existing insurance concepts to cover the geological risk in Europe

Existing insurance concepts to cover the geological risk in Europe (1/3)

□ Traditional means of excluding the geological risk

→ Pick out

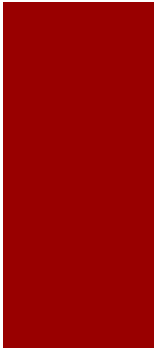
→ Share out

→ Transfer

Existing insurance concepts to cover the geological risk in Europe (2/3)

- Insurance patterns existing in Europe for the geological risk
 - Private insurance policies: the German exception
 - National insurance funds

Existing insurance concepts to cover the geological risk in Europe (3/3)



□ Insurance funds for the geological risk

→ The post-damage guarantee

→ The guaranteed loan

Market-based insurance policies



Existing insurance concepts to cover the geological risk in Europe

- German example
- Geothermal projects insured
- Eligible costs
- Criteria for compensation
- Information to submit to the insurance company
- Premiums
- The German experience

Insurance Funds

- The post-damage guarantee
- The guaranteed loan

Existing insurance concepts to cover
the geological risk in Europe

Insurance Fund: the post-damage guarantee (1/2)



Existing insurance concepts to cover the geological risk in Europe

- France, the Netherlands, Switzerland
- Scope of insurance
- Governance
- Expertise
- Applications

Insurance Fund: the post-damage guarantee (2/2)



Existing insurance concepts to cover
the geological risk in Europe

- Capital and financial structure
- Coverage ratio
- Agreement
- Insurance process

Insurance Fund: the guaranteed loan (1/2)



Existing insurance concepts to cover the geological risk in Europe

- Germany, Iceland
- Scope
- Governance
- Insurance process

Insurance Fund: the guaranteed loan (2/2)



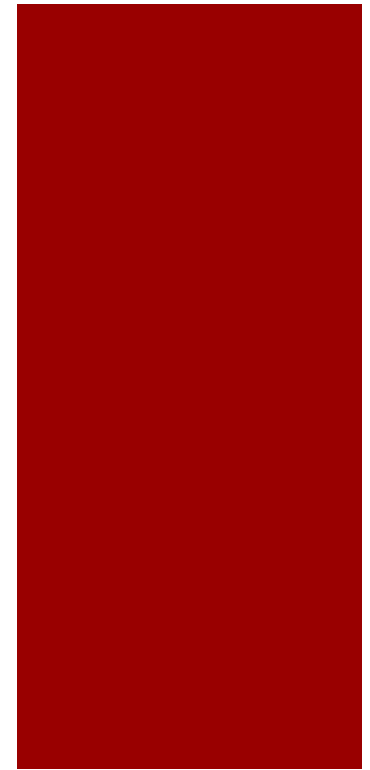
Existing insurance concepts to cover the geological risk in Europe

- Applications
- Capital and financial structure
- Coverage ratio
- Feedback

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- **Risk insurance scheme at European level**





Risk insurance scheme at European level

Risk insurance scheme at European level

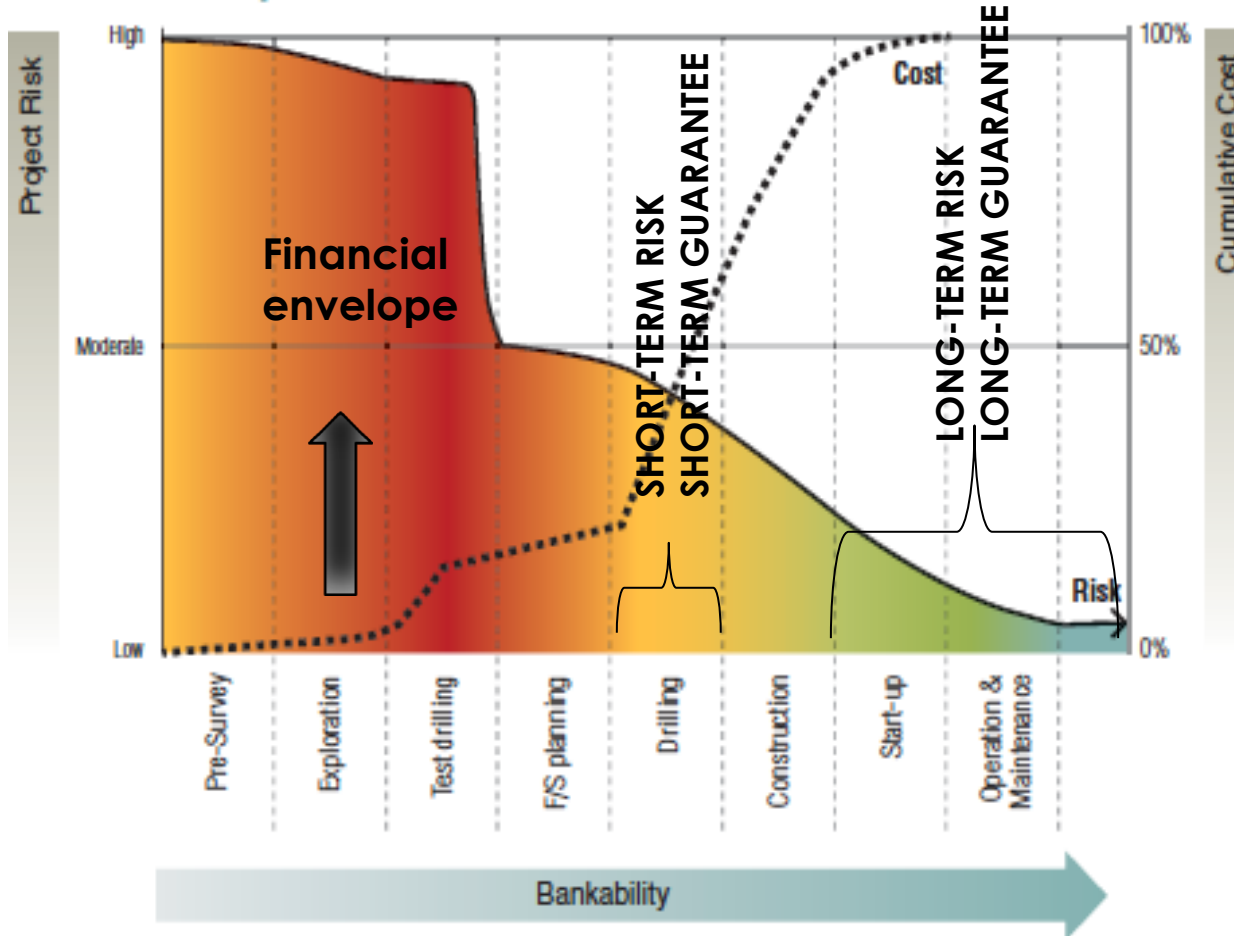


- The GEOELEC project
- Removing the financial barrier hampering geothermal development
- Scenarios for an EU insurance scheme

Risks insured by the European insurance scheme



Geothermal Project Risk and Cumulative Investment Cost



Conclusion

- ❑ The geological risk can be managed and mitigated
- ❑ Insurance concepts are developing in Europe
- ❑ European geothermal resources better harnessed thanks to European insurance scheme

THANK YOU FOR YOUR ATTENTION

