

Format and Duration Classroom - 5 Days

Instructor(s): Kevin Gray

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Summary

Geothermal energy is a growing sector within the renewable energy industry, offering clean, sustainable, and continuous power generation. This course provides a detailed introduction to geothermal energy, covering:

- The science of geothermal energy Understanding the Earth's internal heat.
- Technologies for harnessing geothermal power From direct use applications to power generation.
- Community engagement and environmental considerations Managing risk and public perception.
- Geothermal project development and financing Understanding the full lifecycle from exploration to operation.
- Global policy frameworks and regulatory considerations Learning from leading geothermal markets.
- Hands on geothermal project planning Developing real-world project roadmaps.

By the end of the course, participants will have a strong foundation in geothermal energy, enabling them to engage in the industry, participate in project planning, and understand the challenges and opportunities of geothermal development.

This course is delivered in partnership with Black Reiver Consulting Ltd.

Learning Outcomes

Participants will learn how to:

- I. Explain the fundamentals of geothermal energy and how it is harnessed.
- 2. Differentiate between various geothermal technologies and their applications.
- 3. Understand the environmental and social considerations of geothermal projects.
- 4. Assess the risks and public perceptions of geothermal development.
- 5. Engage effectively with stakeholders to support project success.
- 6. Understand the policy and regulatory landscape governing geothermal energy.
- 7. Develop a geothermal project roadmap, from concept to operation.
- 8. Analyse real-world case studies and compare different global approaches to geothermal development.

Training Method

This is a classroom course comprising a mixture of lectures, discussion, case studies, and practical exercises.

- Instructor led interactive sessions with real-world case studies and discussions.
- Step by step explanations of geothermal energy systems and project development.
- Group exercises and simulations to reinforce learning through application.



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- Roleplay activities to develop stakeholder engagement and risk communication skills.
- Final project challenge where participants develop and present their own geothermal project plan.

Who Should Attend

This course is ideal for:

- Professionals entering the geothermal industry who need a comprehensive introduction.
- Community stakeholders & policymakers looking to support geothermal projects.
- Local government officers charged with oversight of geothermal projects
- University students & recent graduates interested in renewable energy careers.
- Engineers, geoscientists, and project managers involved in geothermal energy projects.
- Investors & financial analysts assessing geothermal opportunities.

Course Content

1. An Introduction to Geothermal Energy

- What is Geothermal?
- Understanding Geothermal Energy The Earth's internal heat and its potential.
- Types of Geothermal Systems Shallow ground systems, deep petrothermal, and hydrothermal reservoirs.
- Global Geothermal Resources Key geothermal hotspots worldwide.
- Historical Uses & Modern Applications From ancient thermal baths to power generation.

2. Harnessing Geothermal Energy

- How geothermal energy is extracted and converted.
- Geothermal power plants Dry steam, flash steam, and binary cycle technologies.
- Direct use applications Industrial heating, agriculture, district heating, and spas.

3. Geothermal Technology Types

- Enhanced Geothermal Systems (EGS) Creating reservoirs in low permeability rock.
- Binary vs. Flash Steam Technologies Efficiency and operational differences.
- Ground Source Heat Pumps (GSHPs) Residential and industrial applications.
- Advances in geothermal drilling and reservoir stimulation.

4. Geothermal for the People – A Community Resource

- Risk and Perception
- Public concerns & environmental impacts Seismicity, land use, and water use.
- Risk assessment & mitigation strategies Managing environmental and operational risks.
- Health and safety considerations in geothermal projects.



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• The role of education & transparency – How to address public fears and misconceptions.

5. Stakeholder Engagement

- The role of local communities, governments, and industry stakeholders.
- Best practices for community engagement and trust building.
- Legal and regulatory requirements for public consultations.
- Participatory decision making in geothermal projects.

6. Making It Happen – Policy & Project Development

- Policy, laws and Regulation
- National and international geothermal energy policies.
- Regulatory frameworks Exploration, permitting, environmental impact assessments, and licensing.
- Incentives and subsidies for renewable energy projects Tax credits, feed-in tariffs, and carbon pricing.

7. Delivering a Geothermal Project

- Feasibility studies Geological, financial, and environmental evaluations.
- Project development phases Exploration, drilling, construction, and commissioning.
- Funding and financing models Government incentives, private investment, and risk sharing mechanisms.
- Risk management throughout the project lifecycle.

8. Planning a Geothermal Project

- Geothermal Geology basics
- Plate tectonics and geothermal energy Understanding heat flow and geological settings.
- Identifying potential geothermal sites Heat flow, permeability, and water availability.
- Geothermal exploration techniques Seismic surveys, well logging, and thermal gradient analysis.
- Reservoir engineering basics Maximizing heat extraction and reservoir sustainability.

9. Be the Developer (Interactive Project Simulation)

- Simulating the geothermal development process Geological exploration, risk management, stakeholder engagement, and financing.
- "Cheese is Life" activity Using real world data and scenarios, participants navigate geothermal project development challenges.

10. Geothermal Development in Action

- Seeing is Believing Heat, Power, and Lithium in Cornwall
- Real world geothermal projects in Cornwall, UK United Downs Deep Geothermal Power Project,



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The Eden Project, and The Cornish Lithium Project.

- Multiuse geothermal projects Electricity generation, district heating, and lithium extraction from brines.
- Economic and environmental benefits of integrated geothermal developments.
- The potential of geothermal powered lithium production for EV batteries.

11. Course Recap & Future Planning

- Summary of key lessons learned Technology, policy, project development, and stakeholder engagement.
- Q&A session for final discussions and clarification.
- Future trends in geothermal energy Emerging technologies and market developments.

This foundational training program provides participants with a practical understanding of geothermal energy and its real-world applications. Participants will leave with the knowledge and tools to engage in geothermal project development, policy discussions, and community engagement initiatives. This course can be tailored to regional policies, local geothermal resources, and specific industry needs.