

getech

Using the Subsurface
to Decarbonise:
Geothermal Solutions

Geothermal resources have astonishing energy potential: estimated at **2 terawatts** globally – about **15,000 times** more than estimated worldwide oil reserves – and offer versatile applications, capable of generating electricity, providing heating solutions or enabling cooling systems.

Pioneers are showing what's possible

The Peppermill Resort Spa Casino in Nevada uses geothermal energy to provide heating and hot water for their 2.1 million square foot facility, saving millions of dollars every year.

Procter & Gamble (P&G) has its own geothermal plant at Xiqing in China, where geothermal energy is used for heating process water.

And in Belgium, Janssen Pharmaceutica recently inaugurated its geothermal plant on its Beerse Campus, distributing heat over a 3.5 kilometre network.



The Benefits of Geothermal Power

Environmental Sustainability:

Geothermal energy, being a renewable resource, significantly reduces carbon footprint. It offers a clean, sustainable solution that mitigates greenhouse gas emissions and helps you deliver against Net Zero goals to meet government and corporate ESG targets. A 20 MW plant can mitigate 71,271 tonnes of CO₂ emissions annually compared to a conventional combined cycle gas power (CCGP) plants.

Reliability and Consistency:

Unlike solar and wind energy, geothermal power is not dependent on weather conditions, offering a constant and reliable energy supply. You can dial output up or down as needed, and easily switch your plant off, and back on again. Uniquely, certain geothermal plants can restart without the need for an external power source (a so-called 'black start') and will quickly ramp up to full load at any time. Being able to go off-grid means it can be used in remote (or secure) locations, or areas where power is unreliable and prone to blackouts or brownouts.

Economic Efficiency:

- Geothermal power provides long-term cost savings with low operational and maintenance expenses. For instance, a 20 MW geothermal power plant can save about US\$ 3 million annually in fuel costs compared to CCGP plants.
- It also offers a stable price point, independent of volatile fossil fuel markets. Initial capital investment is covered by savings on energy costs in as little as five years (depending on the scale and type of project).
- As geothermal energy is always readily available, there's no need to invest in energy storage, which can be bulky and expensive.
- If you produce surplus energy, you may be able to sell it to the grid, or to other businesses (or homes) by instigating a community initiative.
- As carbon pricing becomes more prevalent, geothermal energy's cost-effectiveness increases, offering a competitive edge over traditional energy sources.

- Policies like the IRA in the USA and the EU's Green Deal Investment Plan are enhancing the economic viability of geothermal energy through incentives and subsidies.

Longevity:

- Large scale plants have very long average life spans – from 30 to 80-100 years.

Smart Land Use and No Noise:

- Geothermal energy has the smallest land footprint of any major power source. Geothermal power plants produce negligible and imperceptible noise levels.

Global Applicability:

- With technological advancements, geothermal energy can be harnessed in various geographical locations, not limited to volcanic or tectonically active regions, widening its scope of applicability.

Geothermal plants can achieve high capacity factors near 90%



Geothermal Outperforms Alternative Renewables

When geothermal is compared to similar dispatchable options such as bioenergy, hydropower and solar or wind with storage; it shows competitive Levelised Cost of Energy (LCOE) values.

Geothermal plants can achieve high capacity factors near 90%, compared to the low values for weather dependent

renewable sources such as wind and solar. Capacity factor is a ratio of the actual output of a power plant over a period of time to its potential output if it were to operate at full capacity continuously during that time. It's a measure of how often a plant is running at maximum power.

When comparing land footprint to other renewable

energy sources, geothermal has the least impact as the energy is harvested in the underground and not in the surface.

Geothermal facilities can be placed where the energy is needed, avoiding having to connect to the electricity grid, which in many locations is overloaded.

Economic Model

- The key inputs to model the economics on a geothermal project are:
 - Geothermal gradient, usually measured in C/km
 - Flow rate achievable, which depends on the permeability and porosity of the subsurface layers. (Not relevant for closed-loop, for this technology the speed of drilling is critical).
 - Depth to Basement, which influences the drilling costs.

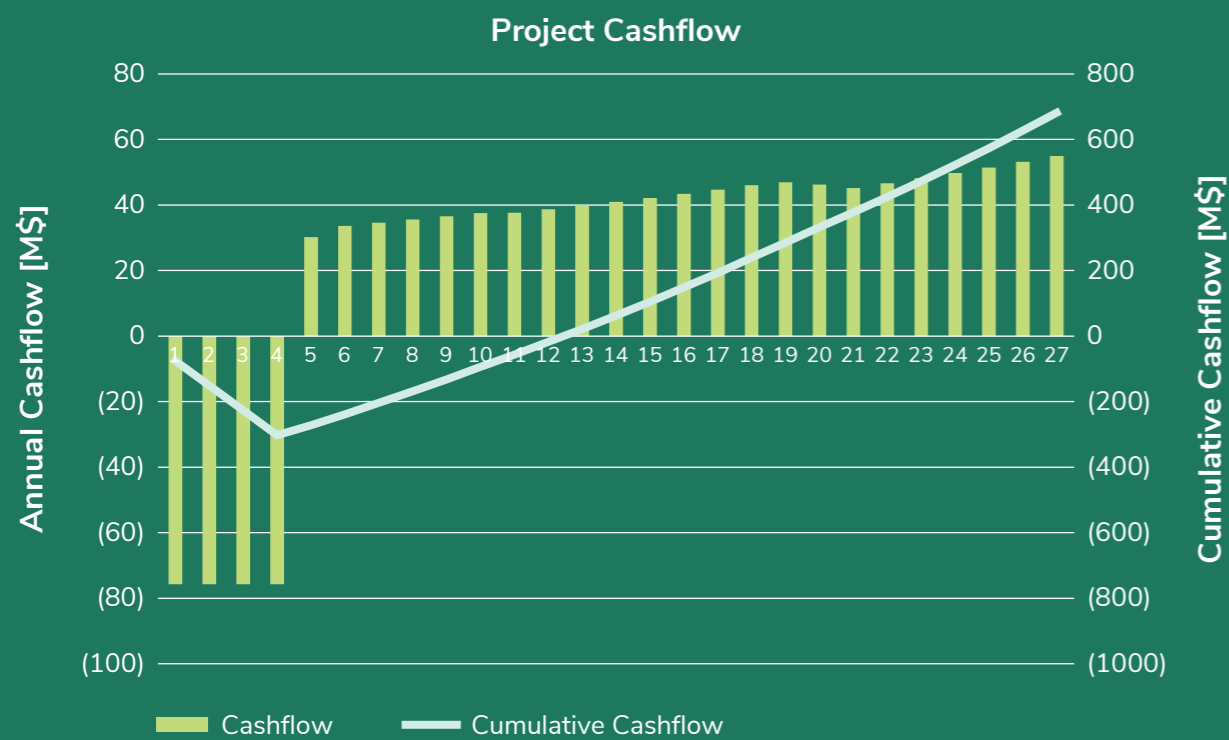


Table 1: Example of economic output

Geothermal Starts with Getech

Start smart with a low-cost subsurface study

To find out if geothermal is a viable option for your situation, you need to know what's going on beneath the surface.

Our geoscience professionals will carry out a high-level screening of all your locations. The result will be a global picture of where your business could best harness the power of geothermal energy.

You'll receive a report that shows the sites with the highest potential for using geothermal energy, and if it's favourable, you'll have your business case for moving forward at the most suitable locations.

As subsurface specialists, all our resources are in-house, which means we can deliver your global screening report at a price that will save you

the unwarranted expense of conducting individual feasibility studies for every single site: instead, you can focus on where the best outcomes can be achieved.

Move forward with the most promising sites

Low-cost pricing for preliminary investigation, saves wasting money on investigating unsuitable locations

High-level subsurface screening rules sites in or out and determines level of viability

Based on **unique and unrivalled** geological and geophysical data

Independent and technology agnostic advice on suitable technical solutions

If your screening report comes back with potential viable sites, we can then undertake pre-feasibility appraisals for you, by adding and combining as many layers of localised data as needed, such as geospatial (surface), infrastructure, policies, commercial and social factors.

We can also help you progress your geothermal project by advising on the best ways to adopt and scale geothermal energy sources.

We have great working relationships with a wide range of technology providers, and have established partnerships

with geothermal development companies, which enables us to be completely agnostic in any recommendations we make.

Geothermal is only one of a range of decarbonisation solutions for your business.

We work on a wide range of renewable energy and decarbonisation projects and can also advise if other solutions, including wind, solar, hydrogen power or carbon storage are appropriate for your specific setting.

Ready to explore the possibilities?

Getech is your logical next step towards achieving Net Zero.

Get in touch with us to find out more about how we work, and how we can help your organisation to achieve its decarbonisation goals.



Getech is a member of the International Geothermal Association.



Getech is a leading locator of the energy and mineral resources essential for the world's energy transition. Our unique data encompassing the most recent 300+ million years of Earth's evolution, coupled with our geoscience expertise, AI-driven analytics and extensive GIS capabilities, enables us to provide valuable and actionable insights to support resource discovery and development.

Contact us to find out about Getech and how our expertise can help you meet your business goals.

info@getech.com

Getech
Nicholson House,
Elmete Hall, Elmete Lane,
Leeds LS8 2LJ

+44 (0)113 322 2200

www.getech.com