

GEL Cornish Geothermal Development FAQs

This fact sheet covers some of the most common operational questions raised during the planning and early stages of a new geothermal power project.

Why bother with geothermal energy?

Geothermal energy provides a source of low carbon, baseload electricity and heat, meaning it is generating 24/7, almost all year round no matter what the weather is like or the time of day. It also requires a much smaller land area per unit of power than almost any other type of energy generation.

Geothermal power production and heating is not new. The UK is a long way behind many other countries around the world who are using geothermal energy to help combat the serious issue of climate change. UK heating and hot water currently make up around 40% of the country's energy consumption, and almost a third of greenhouse gas emissions, so we must find new sources of clean, renewable baseload power and heat to help meet climate targets. Adding a brand-new source of green electricity to the UK national grid also helps increase the country's energy security.

Why are GEL developing in Cornwall?

Cornwall has the hottest rocks in the UK, making it a sustainable solution with the added benefit of a small footprint and green job opportunities.

Historically, Cornwall has exploited the rich resources that are abundant above and below ground, and as a Cornish company, GEL are excited to be able to build this brand-new industry. It will bring much-needed investment to the Duchy, both in pure capital expenditure as well as benefitting a variety of businesses which will be part of these exciting projects.

Why have you chosen sites close to residential housing rather than on an industrial estate?

Ideally new sites would be located on brownfield or industrial land. However, the reality in Cornwall is that there are very few brownfield sites, and almost none that are large enough for a drilling rig and within reach of a suitable fault structure for geothermal fluid flow.

A list of brownfield sites can be found on the [Council Register of Brownfield Land](#) or shown on the [Cornwall Interactive Map](#). During geothermal site selection, GEL must weigh up a huge number

of factors and where a brownfield site isn't available, GEL will do its best to limit proximity to conservation areas and densely populated locations.

How do you select a geothermal development site?

There are a huge number of criteria considered when looking for a suitable geothermal development site. Three of the major considerations are:

- 1) Suitable geology
- 2) Access from a main road to allow transport of equipment
- 3) Proximity to local power infrastructure.

However, ideally, we also require a site to have a good-sized level working area, low ecological and environmental sensitivity, and potential for renewable heat users.

What are the stages of geothermal development?

Development of a new site has five key stages:

- 1) Planning the site and achieving the relevant permissions
- 2) Preparing the site for drilling
- 3) Drilling two deep wells
- 4) Testing each well
- 5) Power plant construction and commissioning

Is Geothermal the same as 'Fracking'?

No, Geothermal is not the same as Fracking. The concept proven at United Downs relies on circulating water through natural fractures in the rock to generate low-carbon, renewable energy. This is not the same as fracking, where a large volume of fluid with a complex chemical composition is injected at extremely high pressures to create new fractures in intact rock, to drain the oil or gas from the reservoir.

Geothermal power projects simply circulate fresh water in pre-existing fractures and, once the heat has been used at the surface, the fluid is reinjected into the same formation to re-heat.

How tall is the drilling rig going to be?



The drilling rig chosen will depend on availability when contracts are being issued, which will be after planning consent has been given. GEL anticipate using a rig with a maximum mast height of 48m. For comparison, the Main Spire of Truro Cathedral is 76m high and the Carn Brea Transmitter is 152m high, both are permanent structures unlike the rig.

What will the power plant look like?

Every geothermal binary power plant will look slightly different as they are designed for the unique geological parameters available at each site. In general, the key features will include:

- 1) A single-story insulated building which houses the generator and turbine for power generation.
- 2) A small set of 10m-high air cooled fans; used to recondense the working fluid after the vapour has been used to generate electricity. These fans do not produce any visual plumes of steam or any odour.
- 3) Pipework connecting the wellheads to the plant.
- 4) A water storage lagoon which is used during well testing and routine maintenance.
- 5) Low-level, small-scale substation and transformer for connecting the power station to the grid.

There will be no cooling towers, no electricity pylons, no steam, and no emissions of any kind.

I've seen Geothermal Power Plants on the internet; they emit lots of steam, gases, and a bad smell.

GEL will use binary power plants which emit no steam, gases or smells. It can be difficult to find images of these when searching online as most conventional geothermal plants are associated with volcanic environments, where the water is so hot that a 'Flash' power plant is used. GEL will keep the geothermal fluid in a closed loop and reinject it, but many flash plants do not reinject the fluid, instead releasing it as steam from a large cooling tower. This steam may also contain volcanic gases, some of which smell like rotten eggs.

For a good example of a binary geothermal power plant, click on the link below and navigate to the second image to the left, titled "CENTRALE DE GEOTHERMIE PROFONDE DE SOULTZ-SOUS-FORETS". Click on the target symbol below the title and you will see an operational binary power plant at Soultz-sous-Forêts in France.

<https://www.ubi-light.com/pro/es/VISITE-ES-2/>

Will GEL be extracting Lithium at all geothermal sites?


The initial planning applications **do not** include lithium extraction, but the fluid at every geothermal site will be laboratory tested to identify any chemical and metal compounds present in the fluid. A high concentration of lithium was found at United Downs, so it is likely that other sites across Cornwall will have similar concentrations.

Lithium extraction from geothermal fluid offers an exciting opportunity for Cornwall. Lithium is a vital component of batteries, large and small, which we use in our everyday lives from mobile phones to electric vehicles. Britain is currently reliant on Lithium imports from China and the USA, so the UK needs a secure source of Lithium which Cornwall could provide.

However, extracting lithium from geothermal brines is in its infancy and so far, it has only been proven using small-scale Direct Lithium Extraction (DLE) plants similar in size to a shipping container. DLE plants do not need to be located on the same site as a geothermal power plant.

For more information, please visit our website geothermalengineering.co.uk or follow us on social media

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