



Eden Geothermal is UK's first operational deep geothermal project to come online in 37 years

Eden Project Biomes, plus new state-of-the-art nursery, will be heated using a 4km geothermal system, the start of a new industry for the UK



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A landmark moment for renewable energy took place at the Eden Project in Cornwall today, Monday June 19, 2023, as the UK's first operating deep geothermal heating plant since 1986 was opened and is now generating heat.

The process of drilling deep into the granite at the home of the world-renowned Biomes in Cornwall was finished in 2021, and Eden Geothermal Ltd (EGL) has now completed the heat

main and plant and is ready to supply heat to the Eden Project and its new state-of-the art nursery, Growing Point.

The well has a vertical depth of 4,871 metres (just over 3 miles). The measured depth – the actual length of the well – is 5,277 metres (nearly 3.3 miles), making it the longest well under UK soil. The geothermal heat system is a single well coaxial system. A 4000m vacuum insulated tube has been inserted into the well, lifting hot water from deep below. This is passed through a heat exchanger and the cooled water is then re-injected into the well via the outer ring.

The heat is delivered via a 3.8km heat main, at around 85 degrees Centigrade, which will supply Growing Point and Eden's Biomes and offices.

The geothermal project has been delivered by Eden Geothermal Limited (EGL), a three-way partnership between Eden Project Limited, EGS Energy Limited, a geothermal development and consultancy group, and BESTEC (UK) Limited, affiliated with BESTEC GmbH, the specialist geothermal developer and drilling advisor.

To fund the research project, EGL secured £24 million funding from a combination of European Regional Development Fund, Cornwall Council and commercial funding from GCP Infrastructure Investments Limited, an investment trust advised by Gravis Capital Management Ltd.

The Growing Point nursery has been built between the geothermal site and the Biomes. It serves as a demonstrator of regenerative sustainability and a circular system in both its construction and operation, eliminating the need for a pre-existing off-site nursery, reducing food-miles and dependence on fossil fuels.

Sir Tim Smit KBE, Co-Founder of the Eden Project, said: "Geothermal is the sleeping giant of renewables: lying not under our noses, but literally under our feet. The Netherlands' geothermal industry started with heating for greenhouses, and they are now aiming for it to contribute to a quarter of all their heating by 2050."

Gus Grand, CEO of EGL, said: "This is a big moment for Eden Geothermal and renewables in the UK, but we've only just begun: in the race to decarbonise, progress has been slow for heat technologies, behind electricity and transport, but geothermal energy, with its small surface impact, can be used in urban areas and for large institutions, factories, hospitals, universities and schools. This project is a great demonstration, heating a whole rainforest and commercial nursery, with hopefully a distillery on the way."

Richard Day, Chairman of EGL, said: "Geothermal offers a real opportunity for the oil and gas industry to transform itself and become part of the solution. Not only are the expertise and technology for geothermal directly transferrable, but coaxial systems like this could be used to repurpose oil and gas wells"

Growing Point will enable Eden's Living Landscapes Team to produce all the plants for the Rainforest Biome, Mediterranean Biome Outdoor Gardens and retail, as well as food for the hundreds of thousands of visitors Eden welcomes every year.

Rob Chatwin, Group CEO of the Eden Project, said: "We are developing new ways to grow and new ways to encourage people to think differently about plants and the planet.

"We have built a landmark sustainable nursery - a pillar of our wider ambitions for the future impact and expansion of the Eden Project - and it will help us accelerate massively our mission towards a climate positive future."

Having a nursery on the main Eden Project site means crops can be harvested as required on the day of use and delivered in minutes to food preparation areas, greatly reducing transit distance, time and the need for packaging.

Philip Kent, Director at Gravis Capital Management, said "In other countries, like the Netherlands and France, geothermal is making a serious contribution to achieving net zero and energy security targets. With the right policy support, the UK has a huge opportunity to benefit from a resource that can meaningfully contribute to the decarbonisation and improved security of our electricity and heat systems."

Steve Double, MP for Newquay and St Austell said "The launch at Eden Geothermal Project marks a huge moment for Cornwall and is the culmination of years of hard work by the team to bring clean and sustainable energy to the Duchy.

"Cornwall is widely recognised as one of the best places in the UK to exploit deep geothermal electricity generation, with the potential to enable local homes and businesses to be powered through decarbonised heat.

"I am pleased that geothermal has already been identified as a key opportunity in Powering Up Britain - the Government's plans for net zero energy development. I look forward to working with Ministers to ensure the continued growth of the industry."

Glenn Caplin-Grey, Chief Executive of the Cornwall and Isles of Scilly Local Enterprise Partnership, said: "This is a landmark moment in the development of geothermal energy in Cornwall and the UK. It is further evidence of its huge potential role in the energy transition away from fossil fuels, and how Cornwall is leading the way in the development of renewable technologies, from floating offshore wind to critical minerals for domestic battery production."

ENDS

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Notes to Editors

Eden Geothermal

The system at the Eden Project is a single well heat exchanger with a heat main to link the geothermal site with the heat loads on the Eden Project site and new plant nursery. The single well heat exchanger has been created by installing a coaxial circulation system in the well itself.

- Vacuum-insulated tubing was installed to a depth of 3,850m in the centre of the well.
- The tubing serves as the conduit for hot water being pumped to the surface.

- At the surface, a plate heat exchanger extracts heat from the well water, and the newly-cooled water travels back down the annulus (outer 'ring') of the well to be reheated at depth, in a continuous circulation. (See attached illustration.)

The UK is in 29th place in Europe for geothermal installations. In the Netherlands, Germany, and France - countries that share our underlying geology - the technology is well developed and supports thousands of jobs and produces many GWh of renewable heat and electricity.

In the last 10 years, the installed capacity in Germany doubled from 200 MW in 2012 to 400 MW today. This is expected to approach 850 MW by 2030 with an investment of USD 1.5 billion. Since 2000, the geothermal industry in Germany has generated €16.7 billion and created 35,900 jobs. The Netherlands had 31 operational deep doublets at the start of 2022 (saving 342,000 tonnes of CO₂ compared to using gas) and a further 19 projects in development. It has just announced €2Billion in support for geothermal heat.

DESNZ (formerly BEIS) has commissioned a deep geothermal white paper, and this is in final stages of review. Northern Ireland and Scotland already have geothermal strategies and working groups, and NI is commissioning demonstration projects.

37% of greenhouse emissions in the UK are from heat. Geothermal direct heat is especially suitable for institutional and industrial use, and heat mains in urban areas. Direct geothermal heat can take the pressure off renewable electricity generation, and the grid, and is complementary to heat pumps. A higher input temperature from shallow wells improves heat pump performance enormously.

Growing Point nursery

Home-grown produce from Growing Point supplies Eden's '500m menu' – so called because of the short distance between where the plants are grown and eaten. These include herbs, salads, fruits, spices, and potatoes and provides the added benefit of supplying speciality foods that would otherwise have to be imported.

Growing Point will also be the new home for Eden's National Wildflower Centre, HotHouse – Eden's creative leadership and cultural change programmes – Eden Project Learning students and apprentices, and CHAOS, a Community Interest Company, formerly known as People & Gardens, helping people with learning disabilities and mental health issues to develop work and social skills.

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