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## Status of Geothermal Development in the UK

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### Summary

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Geothermal energy is a constant and independent form of renewable energy and plays a key role towards the world's future energy balance. Conventional and unconventional geothermal resources are largely available across continents and can help countries become less dependent on energy imports and build a broader base in their future energy mix. However, despite its significant potential, the total contribution of the geothermal sector to global power generation and heat supply remains relatively small.

## Abstract

Geothermal energy is a constant and independent form of renewable energy and plays a key role towards the world's future energy balance. Conventional and unconventional geothermal resources are largely available across continents and can help countries become less dependent on energy imports and build a broader base in their future energy mix. However, despite its significant potential, the total contribution of the geothermal sector to global power generation and heat supply remains relatively small.

In the UK, heat alone represents ~50% of total UK energy demand. With summer 2018 being the joint hottest on record in the UK, geothermal cooling systems may also soon be in high demand. Agriculture is another heavy energy consumer and greenhouse gas emitter and is exposed to fluctuating energy prices; geothermal heating/cooling can play a key role in decarbonising this sector. Despite the potential of geothermal energy, the high technical and economic risk at the exploration stage limits development.

Geothermal energy has been explored in the UK since ancient times. In the 1<sup>st</sup> century AD, Romans conquered Aquae Sulis, now Bath, and used the hot springs to feed public baths and underfloor heating. The admission fees for these baths probably represent the first commercial use of geothermal energy in the world. The UK has several low- to medium-enthalpy resources. At the end of April 2018, 9,107 applications for domestic ground source heat pumps (GSHPs) had been accredited under the Government Renewable Heat Incentive scheme, or its predecessor. There is a commercial district heating plant in Southampton and there are a handful of operational schemes to recover geothermal energy from abandoned mines, e.g. in Shettleston, Glasgow. The UK also hosted the Rosemanowes 'hot dry rock' research site, where field trials started in 1977, following the earlier trial at Fenton Hill, USA.

Several studies have been carried out on the theoretical and technical geothermal potential of the UK. At the time of writing, geothermal exploration and development activities were ongoing in the UK, including the United Downs geothermal power project, the Jubilee pool in Penzance and the Stoke-on-Trent geothermal district heat network. The Natural Environment Research Council and the British Geological Survey are creating a £9 million UK Geoenergy Observatory to study low-temperature geothermal energy from the flooded mine workings below Glasgow; the first borehole was completed in January 2019. The UK also offers significant geothermal energy potential from its mature and abandoned hydrocarbon wells, although there are issues around infrastructure longevity and regulatory framework.

This presentation will review the state-of-the-art of geothermal development in the UK, vis-à-vis its ambitious targets to source 15% of final energy consumption from renewable energy by 2020.