



# An Update on the United Downs Geothermal Project: Construction of the UK's first Geothermal Power Plant

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SPE Geothermal 2025



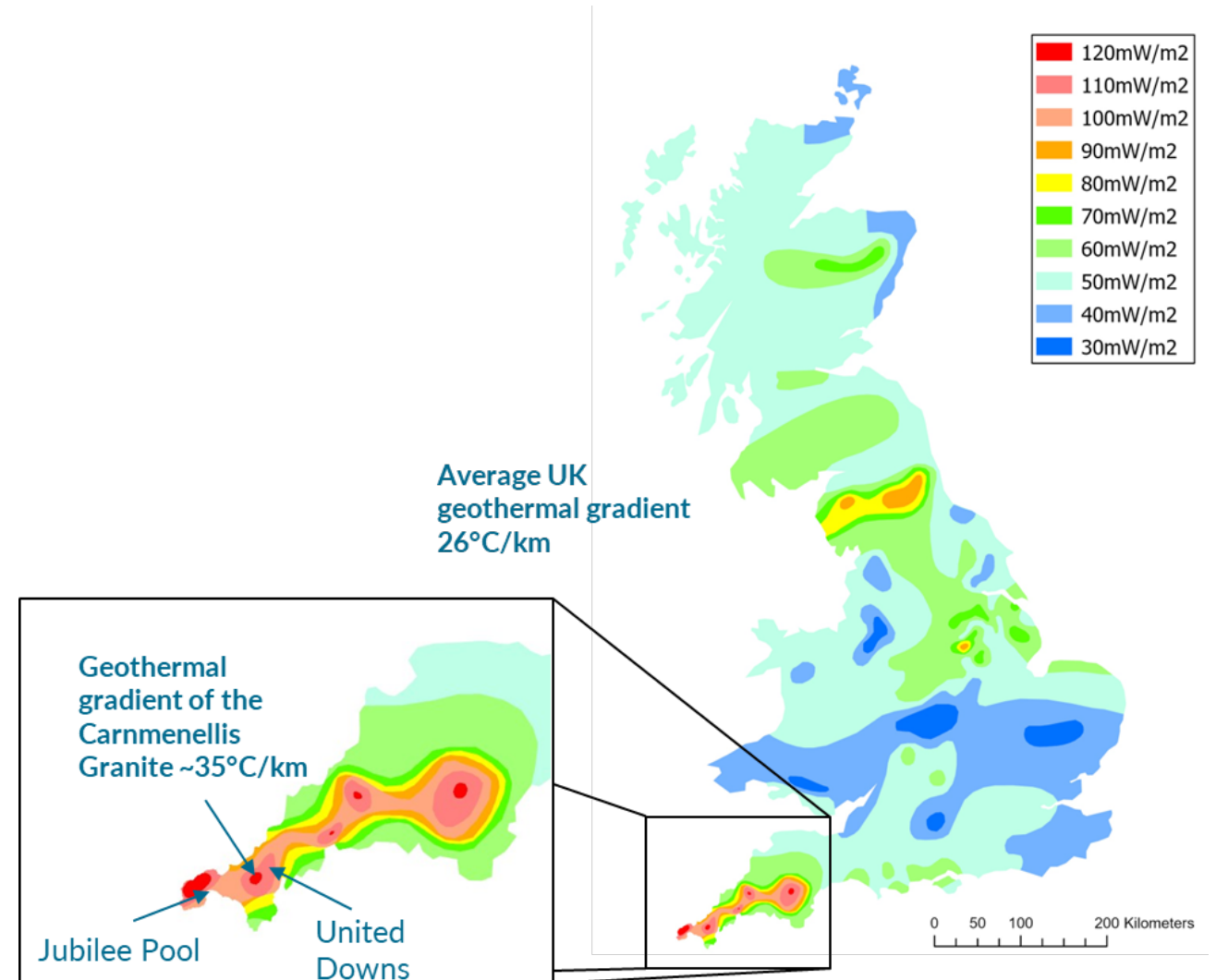
# UK Geothermal Potential

## Underutilised potential for power and heat generation across the UK.

- The highest surface heat flows are found in Ordovician-Devonian granites in the southwest of England and Carboniferous-Permian granites in the northeast of England, Northern Ireland, and Scotland.

The **Cornubian Batholith** underlies a large part of the southwest, outcropping across Cornwall and Devon.

- Enriched radiogenic isotopes produce geothermal gradients between 33 - 35 °C/km.
- The region is heavily faulted producing zones of natural permeability.
- NNW-trending 'cross courses' align with regional maximum horizontal stress and are associated with enhanced permeability.



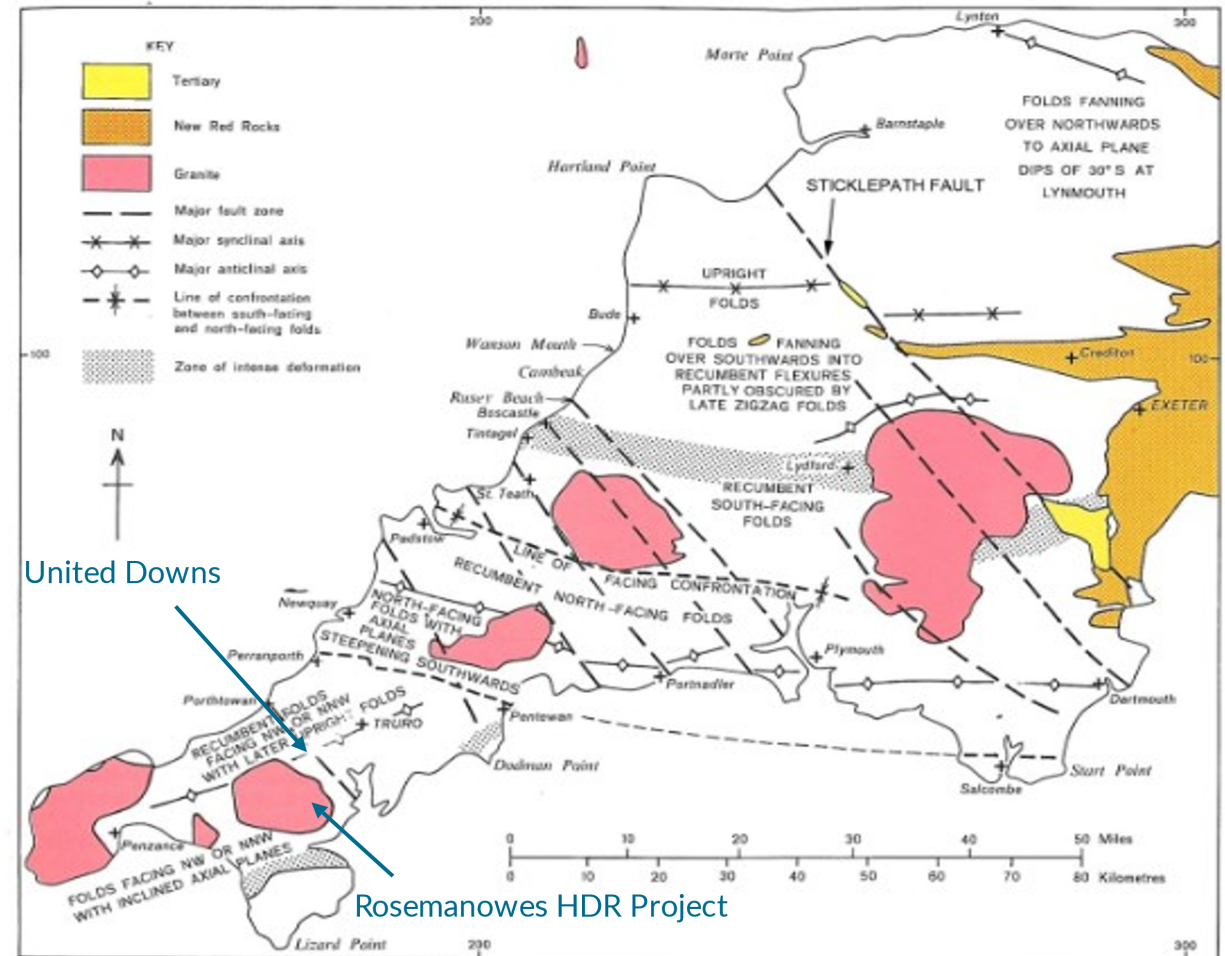
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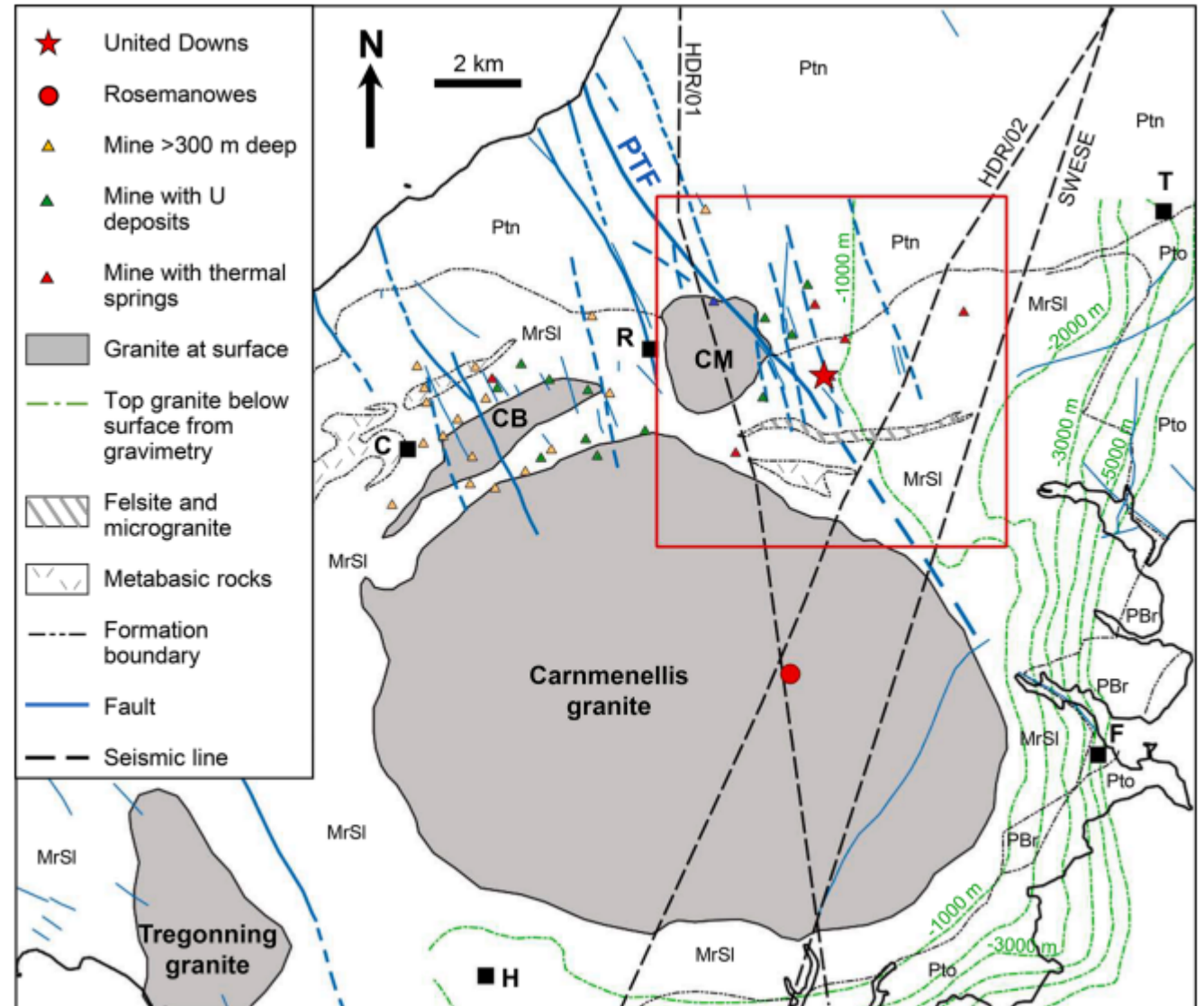
GEL was founded in 2008 and is the leading developer of UK deep geothermal projects. GEL's vision is to become a key enabler of the global energy transition and European critical mineral independence by developing **geothermal power, heat, and ultra-low carbon lithium projects** .

GEL's key competitive advantage is its extensive expertise in deep reservoir development in Cornwall. GEL successfully drilled and stimulated the deepest geothermal well in the UK and produced the **UK's** first geothermal steam.

# United Downs Project

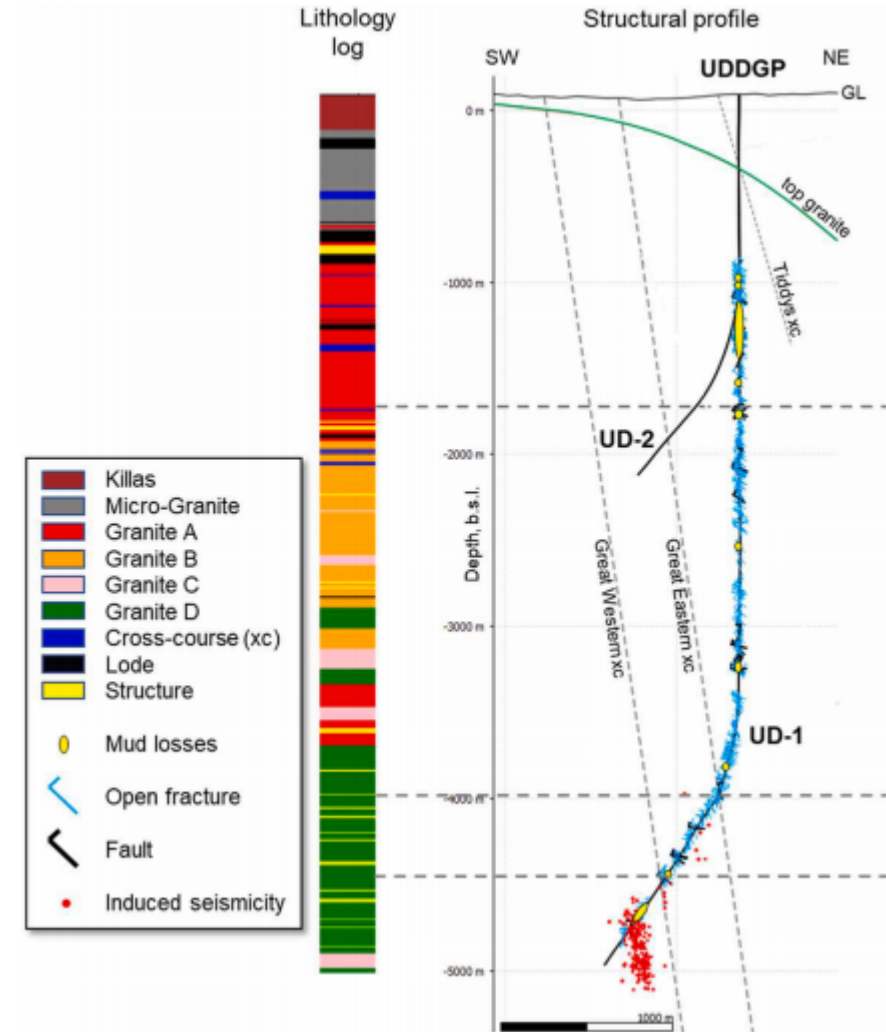
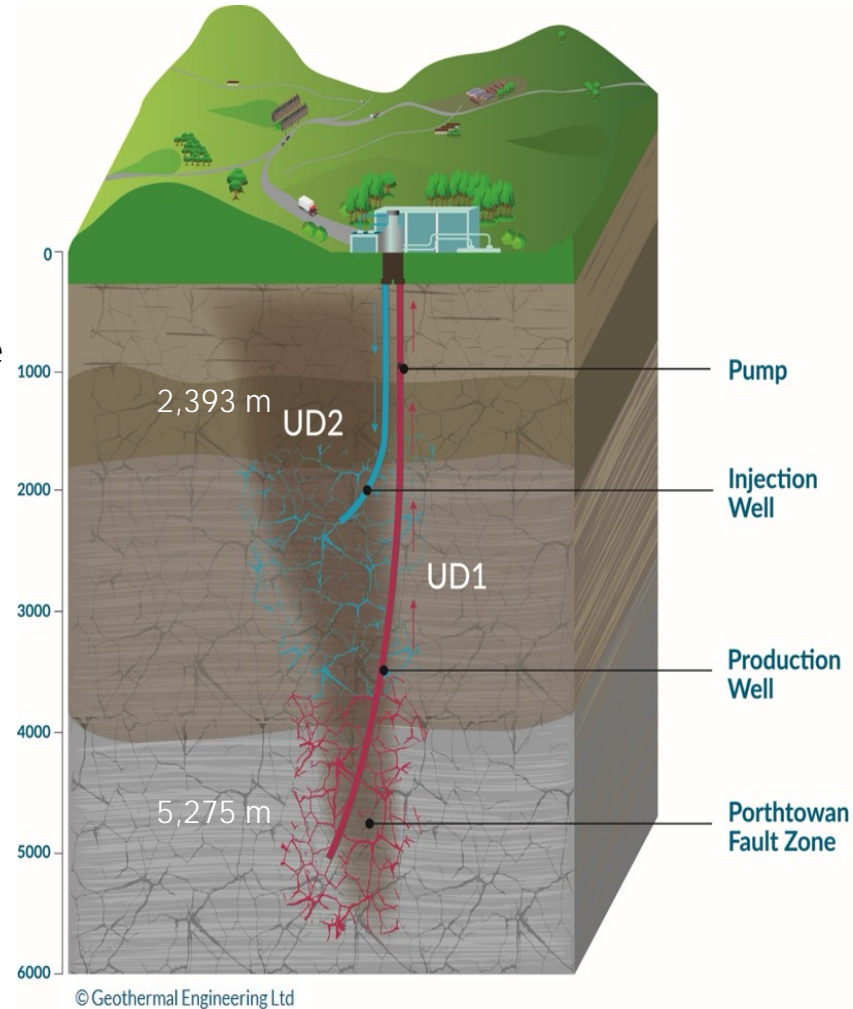
**Project Aim:** to demonstrate the potential for geothermal power generation in the UK. Confirm proof of concept and engineering techniques before expansion to future sites.

Utilise natural permeability in faulted Carnmenellis Granite in west Cornwall.

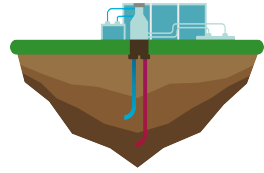


# United Downs Project

- Deep production well, 'shallow' re-injection well.
- Bottomhole temperature > 180 °C.
- Very high lithium concentration.
- Utilises natural permeability of pre-existing fault zones.



# Project Development



## Site acquisition and planning

Evaluation of potential sites and selection of United Downs following rigorous selection framework.

2008

2010

2012-17

## Drilling

Drilling of two deep, directional wells, a 5,275 m production well and 2,393m injection well.

2018-19

2020-21

## Plant construction and lithium plant development

Power plant construction throughout 2024. Progression on grant funded project to develop demo-scale lithium plant.

2024

2025

## Commercial scale-up of lithium production

Completion and testing of the 100 tpa lithium demo plant will inform scale-up.

2025 & Beyond

## Concept Development

Geothermal electricity production from a fractured granite reservoir. 24/7 generation of clean renewable power and heat.

## Secure funding

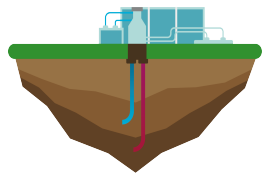
Fundraising for first of kind project in the UK, initially funded by the ERDF and Cornwall Council, and later, through investment from Kerogen Capital and Thrive Renewables.

## Well and reservoir testing/development

Testing and low-pressure stimulation of the geothermal reservoir provided vital data and improved hydraulic properties of the reservoir.

## Power & Lithium demo plants online

Power Plant will come online in early 2025 upon completion of commissioning. Lithium demo plant set to complete in Q2 2025.



# Project Development





# United Downs Power Plant

- Binary cycle ORC power plant.
- 3 MWe gross capacity.
- >95 % complete.
- Supplied by Exergy SRL.
- ESP supplied by Baker Hughes, designed for high temperature reservoirs (up to 225 °C).

**Early 2025 switch on/export to the National Grid.**



# Direct Lithium Extraction (DLE)



The United Downs geothermal brine is well suited to DLE - high lithium (> **300 ppm**) and **low TDS**.

Completed DLE pilot study as well as a technical and economic feasibility study for demonstration plant.

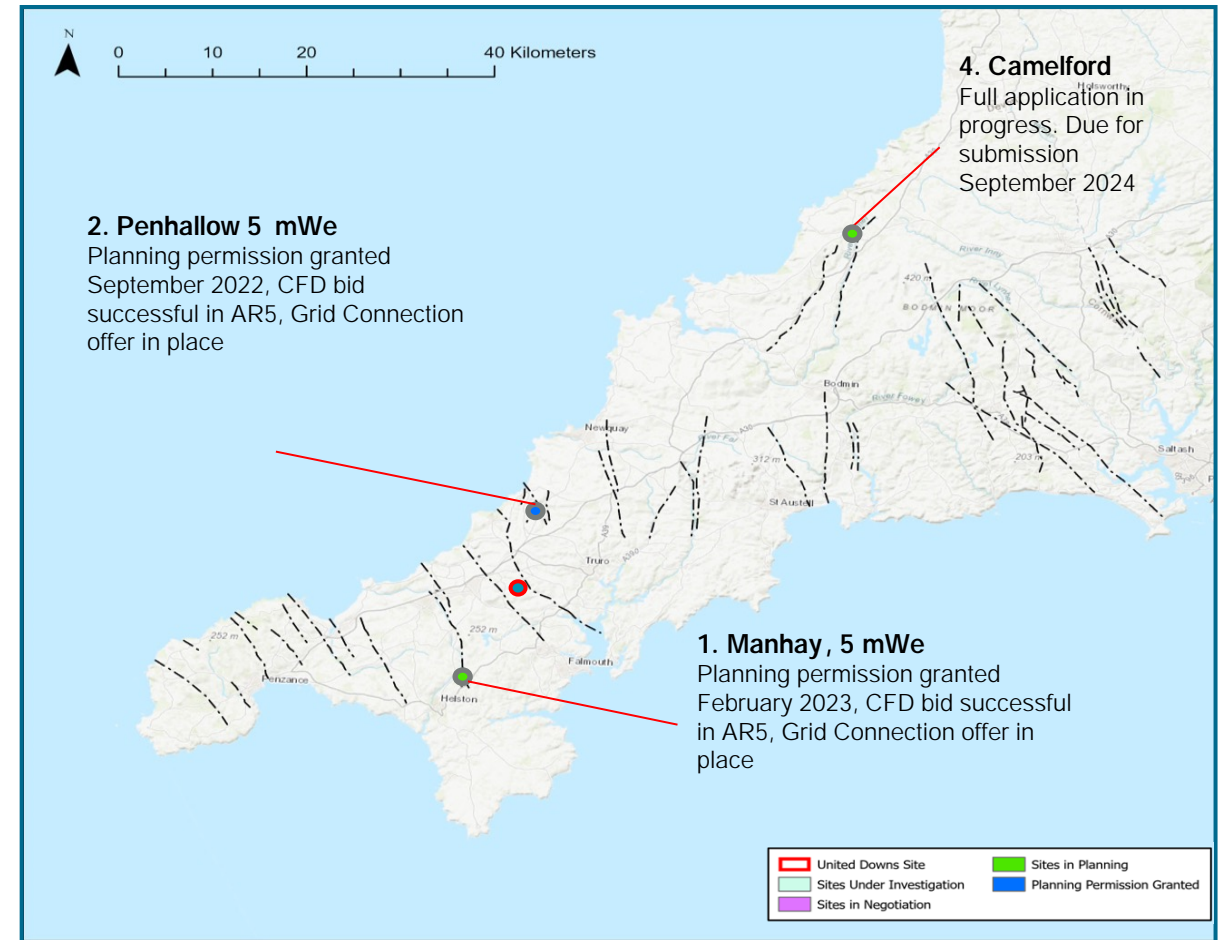
DLE plant development consists of two stages:

1. 100 tpa Lithium Carbonate Equivalent (LCE) demonstrator online **Q2 2025**.
2. Follow on full-scale expansion at United Downs **2025 to 2027**.

100 tpa plant part funded by the Automotive Transformation Fund.

# Next Steps

- Progress of two further sites in Cornwall for which full planning permission and Contracts for Difference for power have been obtained.
- Expansion of lithium production at United Downs.
- Progression on additional sites through various stages of permitting and planning.
- Investment decisions Q1 2025.





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