DEEP GEOTHERMAL UK – UNITED DOWNS PROJECT, REDRUTH

GEOTHERMAL ENGINEERING LTD

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www.GeothermalEngineering.co.uk

Ground Source Live. June 8th 2011

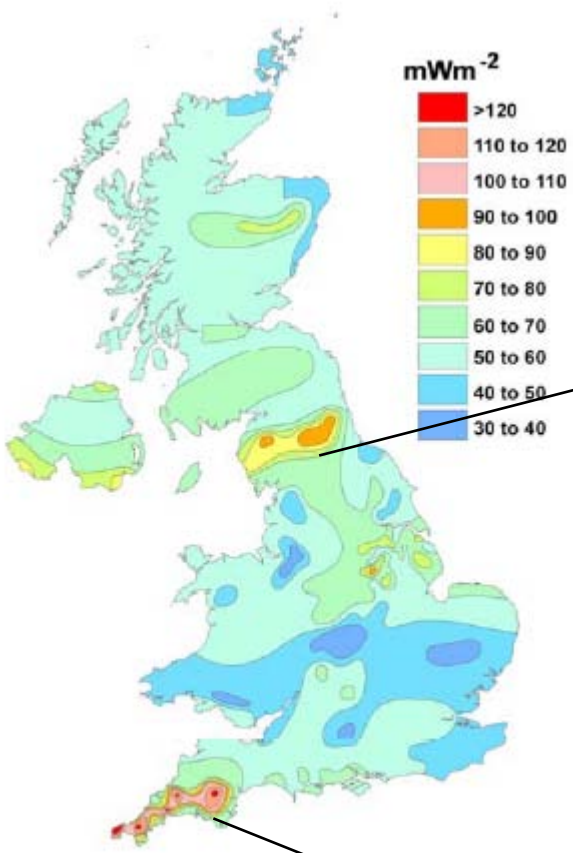
RESOURCE POTENTIAL - UK

Potential	• Electricity, 35 TWh (by 2050 - DECC) ~ 5GW • 10% of current UK demand • Heat – not fully assessed: up to 30% of UK demand
Location	• Cornwall potential 3GWe (DECC) • Scottish granites – NE (Newcastle) • Sedimentary basins • Grid connections/ Heat infrastructure?
Technology	• Review of resource potential to start in summer 2011 • Can HDR, EGS, Deep Geothermal deliver?

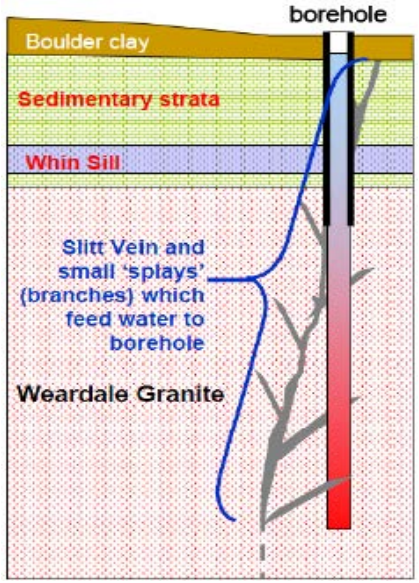
DEEP GEOTHERMAL – UK

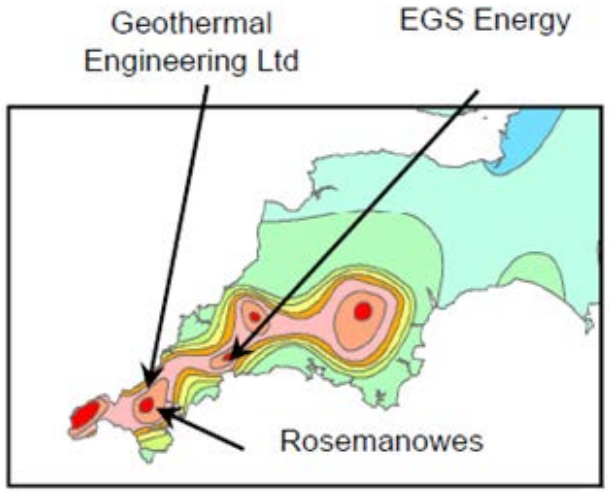
- Definition/ Resource
- Subsidies/ Grants/ Legislation
- Deep Geothermal Industry

RESOURCE AND DEVELOPMENTS (2011)



Heat flow map.

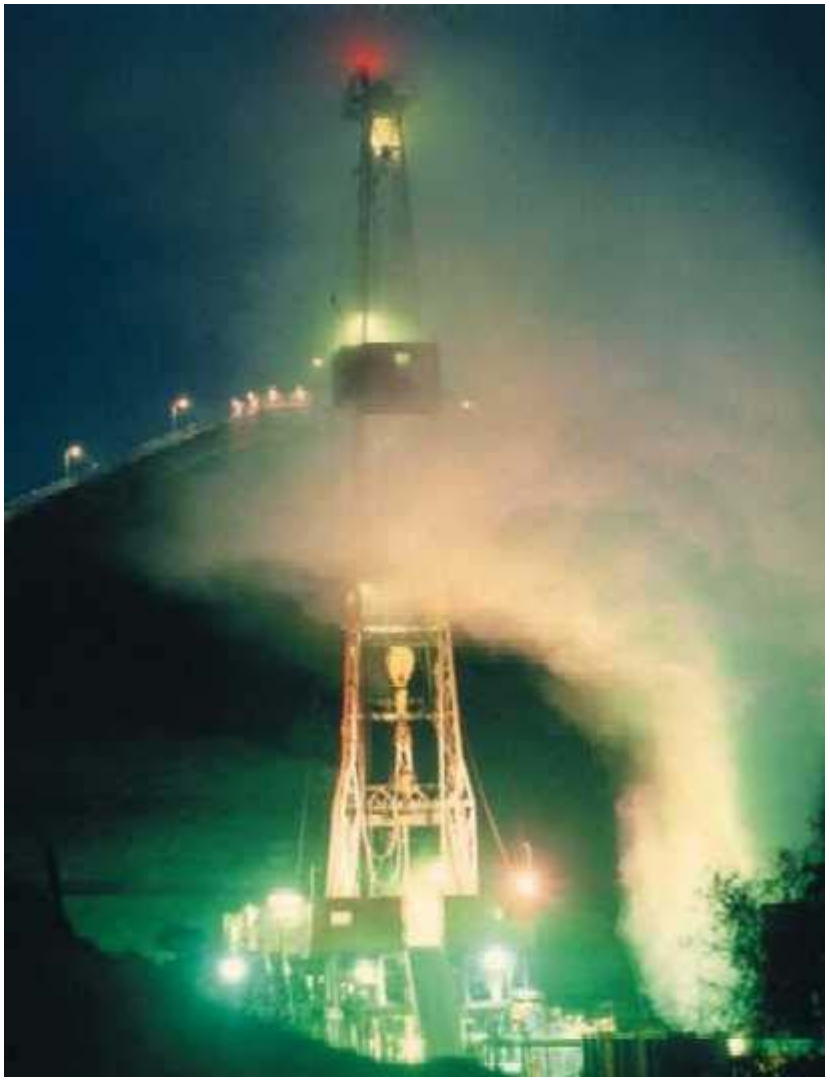




UK HISTORY – HOT DRY ROCK PROJECT (HDR)

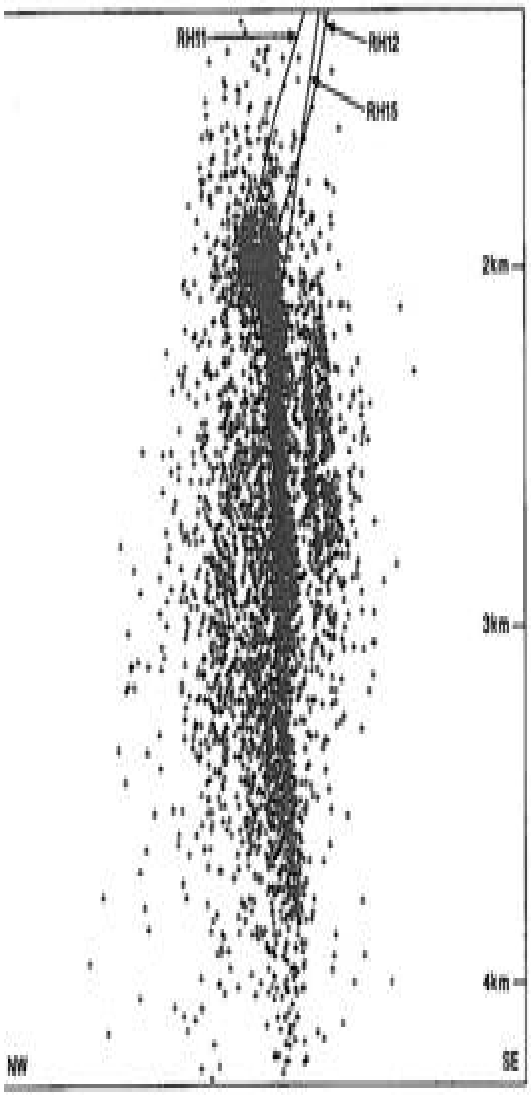
- Rosemanowes Quarry
- Early 1970s to early 1990s
- Govt and EU support (~£50m)
- Shallow system ~ 300m
- Deep system ~ 2,500m (3 wells)
- Full scale field experiment to develop reservoir creation and monitoring techniques
- Not commercial temperature

A DOUBLE EDGED SWORD?

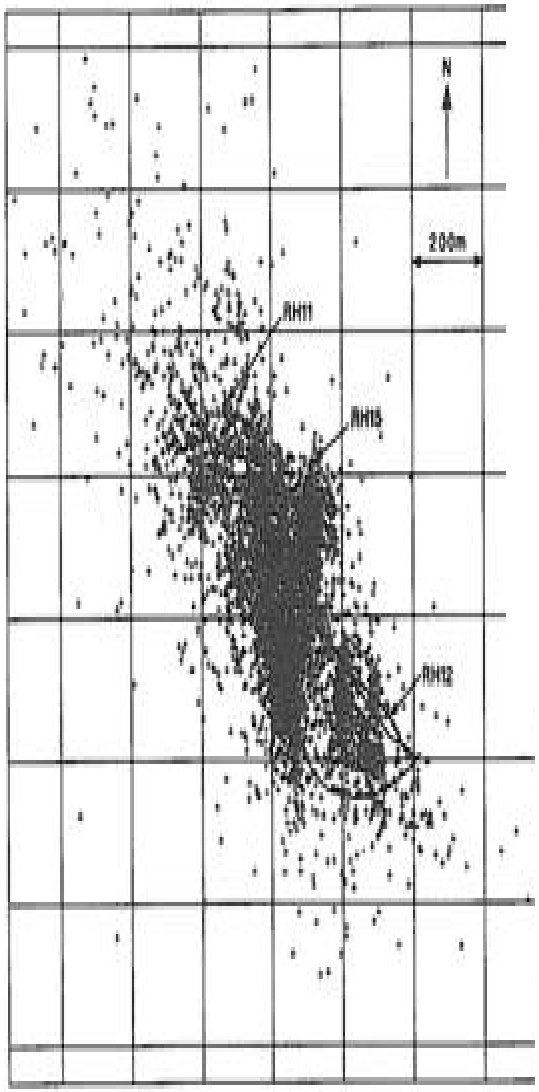


UK HISTORY – HDR PROJECT - EXPLORATION

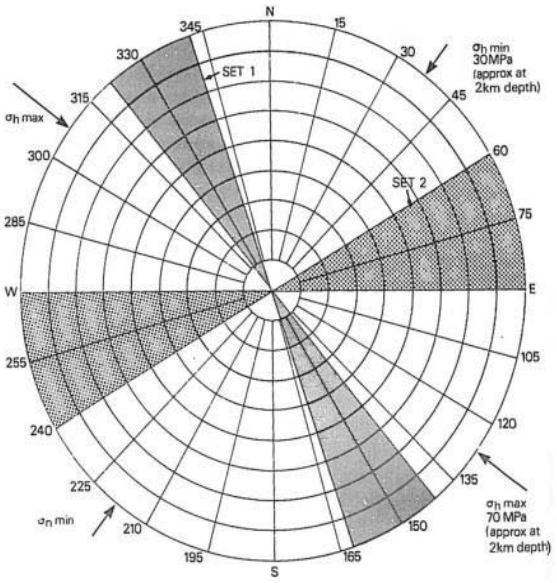
LESSONS LEARNT



Profile NE-SW

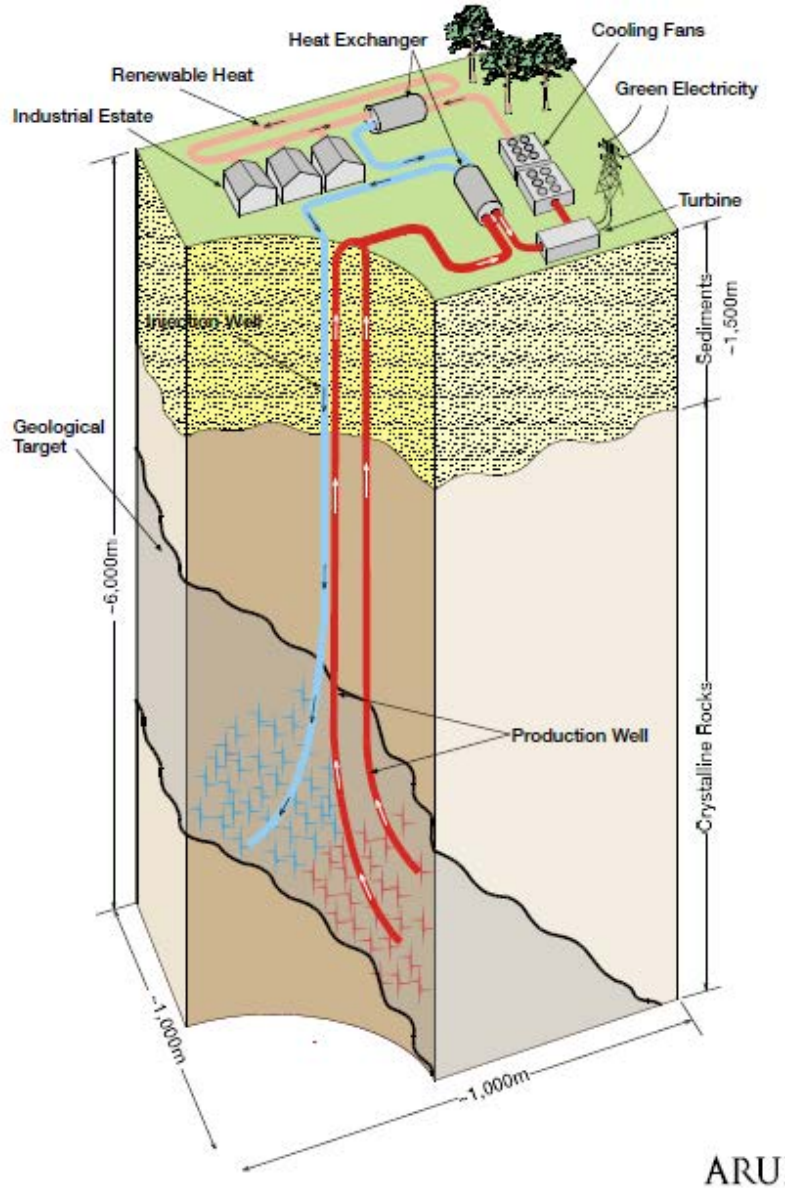


Map view



Shmax

UNITED DOWNS PROJECT – SCHEMATIC



ARUP

UNITED DOWNS POWER PLANT – MAIN FEATURES

United Downs Industrial Park, near Redruth, Cornwall

- 10 MW electric (7MW net) ~ 55 MW thermal

Target depth: 4.5kms

- Temperature ~ 190 C

Drilling 2012

- Power production 2015

Project cost ~ £50m

PROJECT STAGES

Pre-exploration	Exploration	Drilling	Power production
Site selection	Geophysics	Stimulation	Grid connection
Planning	Exploration wells	Reservoir creation	PPA
Permitting	Stimulation	Circulation	Renewable Heat
PR	Microseismic	Plant optimisation	

Decreasing risk

COMMUNITY RELATIONS

Local residents at the meeting at the site in United Downs who are concerned about noise.

Rocky start to 'green' energy from residents

By JULIAN RIDGE
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A PROPOSAL to produce large quantities of "green" electricity using heat from deep under the earth's surface was given a rocky ride at a public meeting near Redruth.

About 50 people gathered on a small plot of land on United Downs Industrial Estate for a demonstration of the noise levels likely to be experienced by residents living closest to the proposed drilling operation, should the project be given planning permission.

Geothermal Engineering Ltd

Ryan Law, MD of Geothermal Engineering Ltd (centre in the yellow jacket) listens to the concerns of the locals.

ioned rig. We have now narrowed down the rig we will use to a choice of two, both of which are more modern and should be even quieter.

Mr Ledingham also explained that a by-product of the electricity generation process would be hot water, which would be made available free of charge at the power plant site for any organisation that wished to exploit it.

"Cornwall has the opportunity to lead the country in the development of renewable energy and to develop its low carbon economy by capitalising on renewable heat for industry, agriculture and

- Community Involvement
- Consultations
- Media
- Finance
- Education
- Groups

UK – DEEP GEOTHERMAL FINANCIALS

ROC

- Renewable Obligation Certificate on NET electricity, in addition to wholesale
- ~£0.05 per kWh
- Deep geothermal currently 2*ROCs ~ £0.10 per kWh

RHI

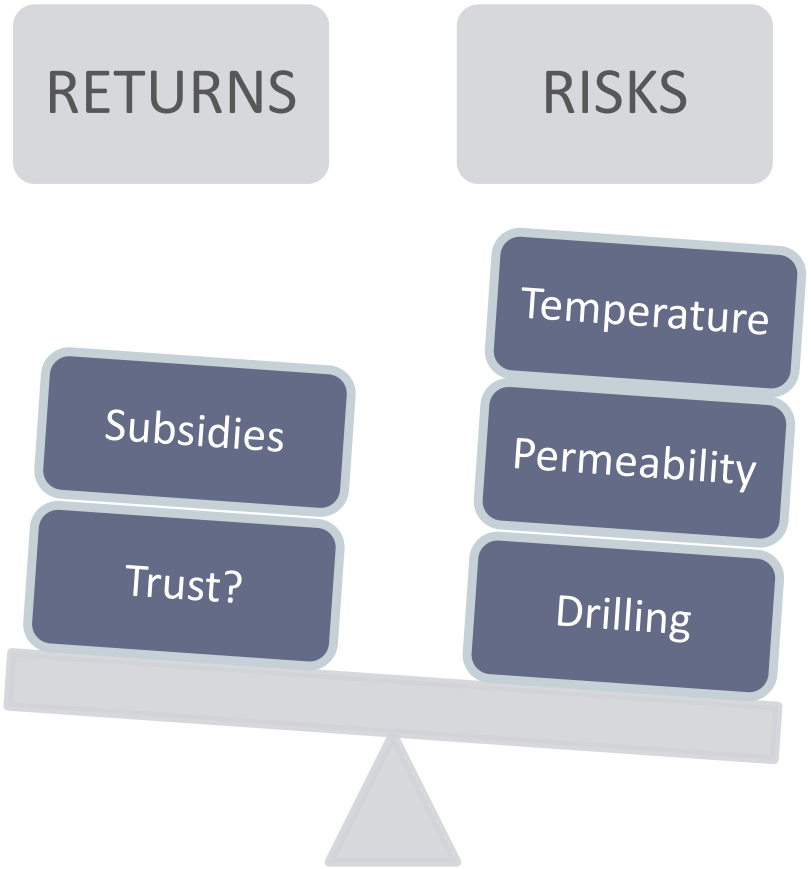
- Renewable Heat Incentive
- Subsidy for use of renewable heat at site. Potentially in addition to any heat sale
- Deep geothermal currently £0.03 per kWh

Total

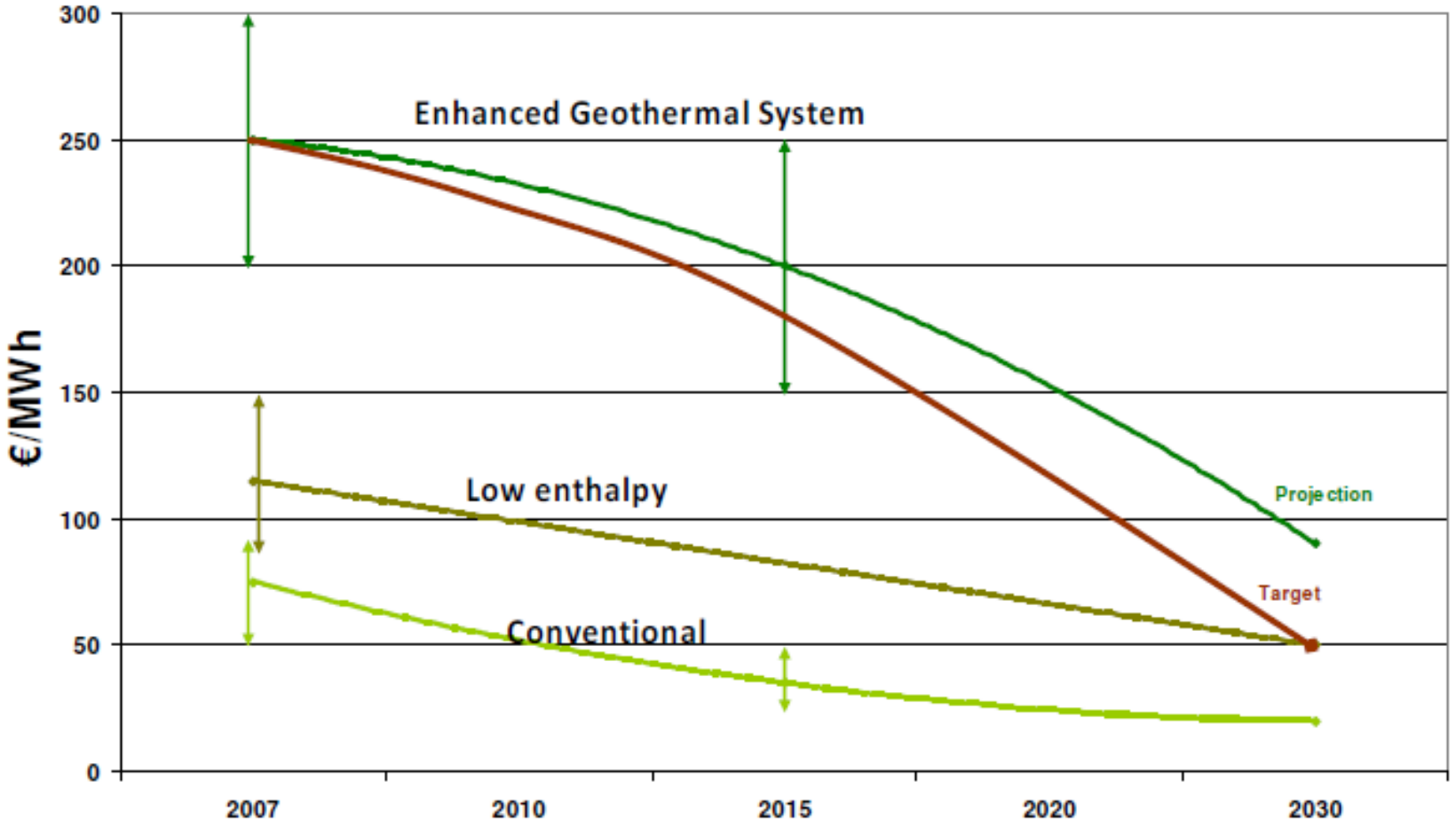
- Wholesale electricity
- 2*ROCs
- Electricity revenue £0.14 per kWh ~ €0.16 per KWh
- Heat sale on top

ECONOMICS

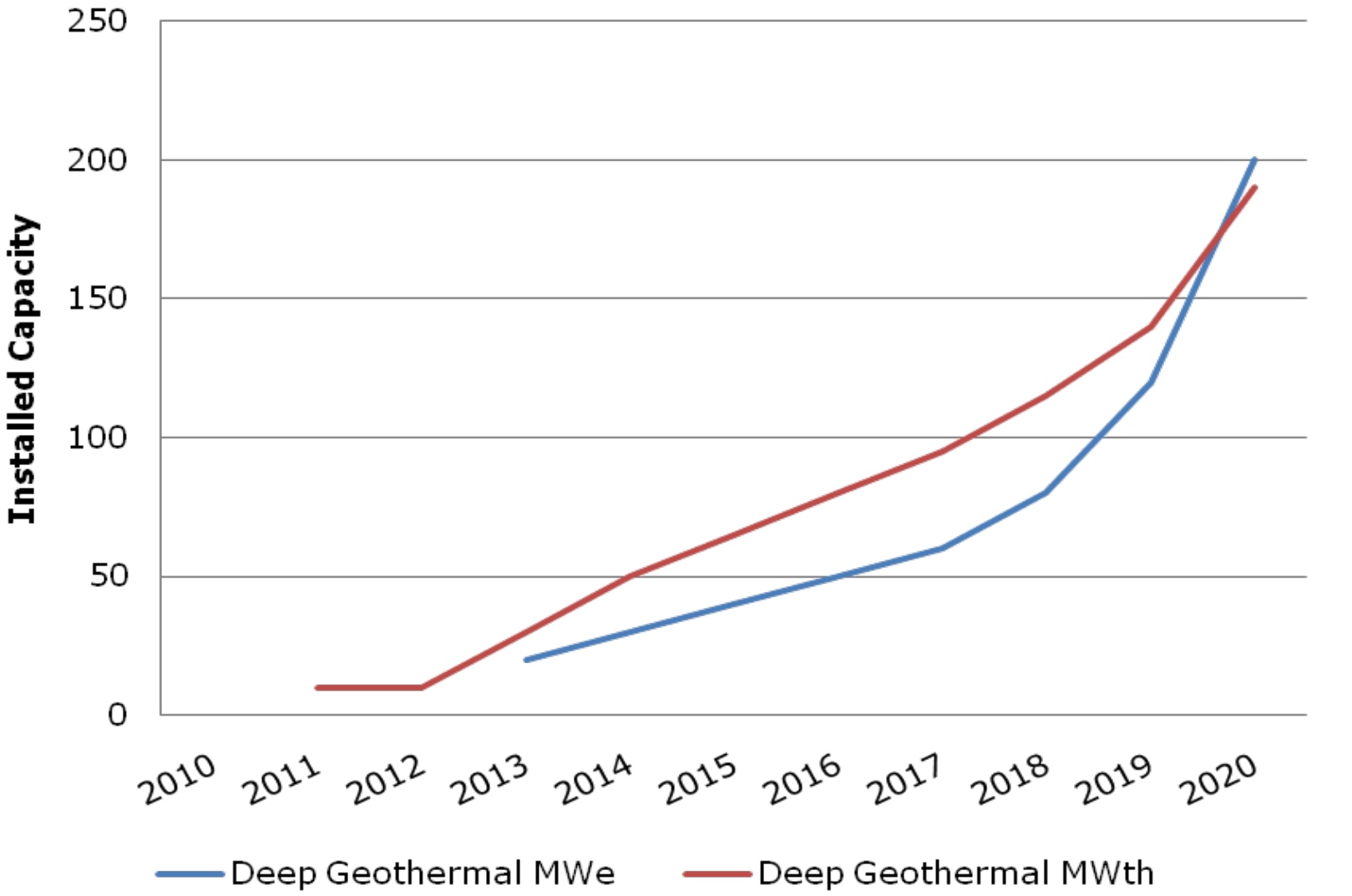
- Grants (match/ R&D)
- VC or Private Equity
- IPO/ Debt



FUTURE GEOTHERMAL COSTS



FUTURE CAPACITY



GEOTHERMAL FUTURE

European outlook

- Good resource/ technology base
- Dense network of towns and cities – community demands for heating and cooling
- Increasing consensus on industry needs – tariffs, geothermal licences, exploration risk insurance schemes

What needs to be achieved

- Reduction in drilling time and costs
- Manage all aspects of seismic risk
- Continue to convince politicians and community groups of project value
- PROVE large scale projects over meaningful time periods

UK needs

- Geothermal licences
- Appropriate tariffs: 4*ROCs + RHI of £0.05 to compete with other countries (notably Germany)