

Net Zero via Geothermal energy - Your hospital is potentially suitable

Q&A 10th August 2023

No	Trust Member	Question	Answer
1	Xavier Hammersley	How does this combine with BGS' "open-loop GSHP screening tool"	Andres Gonzalez Quiros – BGS - This analysis is for deep geothermal, both are complimentary but different technologies. The open-loop screening tool for ground source heat pumps focuses on opportunities in shallow aquifers. Rik Evans - To echo Andreas' point - the approaches (between deep geo and Heat pumps) are very complementary. If the right rock, at the right temperature (depth) is not available then heat pumps give you an option to exploit closer to the surface. Even a 25C resource is better than an ASHP pulling air at 0-15C. It will give you a big boost on system COPs. And - because much shallower - the capital cost is much lower
2	LEIGHTON-JONES, Peter (MID YORKSHIRE HOSPITALS NHS TRUST)	Is a similar exercise going to be undertaken with respect to legacy coal mining infrastructure overlays in terms of flooded shafts and seams with high potential closer to the surface?	The Coal Authority is working on assessing the mine water heat resource at different scales (https://www.gov.uk/government/collections/mine-water-heat). In BGS we are also working on specific research questions related with the risks and the sustainability of the resource, and a research observatory has been constructed in Glasgow for at-scale experimentation (https://www.ukgeos.ac.uk/glasgow-observatory).
3	OKE, Abraham (THE PRINCESS ALEXANDRA HOSPITAL NHS TRUST)	PAH not on the list.	It is not identified on top of the deep basins evaluated in this study. Alternative geothermal solutions using ground

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			source heat pumps could be of interest. See for example https://mapapps2.bgs.ac.uk/gshpnational2/app/index.html
4	Martin, Andrew	I note that although Southampton was listed within BGS presentation Poole and Bournemouth were not?	Stephen Lowndes - I believe Poole and BGS are the BGS top 109 list as they are on Permotriassic sandstone. Andres Gonzalez Quiros – BGS - Both are, maybe symbols too small in the map shown but are in the list. The list in one of the slides was only for the top 30 but the complete list has 109, including these two.
5	Justine Alford	Can you send a copy of the 109 list?	
6	LEIGHTON-JONES, Peter (MID YORKSHIRE HOSPITALS NHS TRUST)	How expensive would a 5km borewell be to drill? I wonder what the risks of failure are? Difficult in a capital bereft system. Some of the shallow mine water drills have failed, which in theory should be simpler?	Rik Evans - Lots to discuss on this one.... In answer to your question - a 5km well is going to be £20m+ (and you generally need two in the designs we were discussing). In most locations in the UK we would not drill to this depth, so think half that (approximately). As described later on - typical project approach is to derisk the project as you progress - in order to become more/more certain that the resource is there, is extractable, and can be done safely, productively for long time. And - as described - some commercial models will have the developer taking that risk on, with a guaranteed heat price (and volume) - if the project is successful - in order to recoup that development. In this way the developer is motivated to maximise risk mitigation as they are bearing the downside if it doesn't play out. Andres Gonzalez Quiros – For the mine water drilling, although shallower it is not necessary less risky as the present day conditions of the mine workings after abandonment might be uncertain and old mine plans might be inaccurate.

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7	Josh Balmer	if the boreholes need to be at least 1km apart, will this require land purchases?	Rik Evans - the wells are 1-2km apart at "the foot" 9e.g. underground). At surface they will be perhaps only 10-15m apart
8	Pitman Alex	What is the assumed business model here? Is it NHS doing this as a capex project or acting as anchor customer?	
9	LAWRENCE, David (UNIVERSITY HOSPITALS PLYMOUTH NHS TRUST)	Will the BGS data and assessment be shared? At Derriford Hospital in Plymouth, we have previously had a geological assessment undertaken that identified the underlying geology onsite as Devonian slate for shallow geothermal, however would be interested to determine if there is granite resource deeper. I'm looking to commission a feasibility study into deep geothermal, therefore any previous analysis that would be helpful.	
10a	OKE, Abraham (THE PRINCESS ALEXANDRA HOSPITAL NHS TRUST)	What's the average lifespan of geothermal tech.	Rik Evans - Can be more than 100+ years if properly designed and delivered. Thats part of the challenge through the development phase to ensure that this happens
10b	LEIGHTON-JONES, Peter (MID YORKSHIRE HOSPITALS NHS TRUST)	Agreed. If the central NHS or gov set up an energy services company then that would appear to be the only way, via an SPV or entirely 3rd party private venture. Could a simple heat offtake at trust level then keep the capital costs off the balance sheet and avoid CDEL limits by association, by making it a straight up revenue based utility supply into specific trusts, i.e. heat as a service?	
11	OKE, Abraham (THE PRINCESS ALEXANDRA HOSPITAL NHS TRUST)	What are the likely downtime	Rik Evans - Utilisation will be 90+% (again if properly design/implemented). We generally think to reserve 2Wk downtime (at summer) for preventative maintenance activity. The pump that sits in the well is the only moving part - so potential for equipment failure is relatively low

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12	LEIGHTON-JONES, Peter (MID YORKSHIRE HOSPITALS NHS TRUST)	Would deep geothermal be cost effective as a solution for a standalone hospital campus, in terms of payback and revenue/capital implications?	Rik Evans - Depends on how big the hospital demand is. Generally hospitals are great anchor customers - because of the relatively flat profile (constant usage) - but it does need a site demand of about 15+ GWhrs per annum to justify the cost of drilling the wells in the first place in order to be cost comparable with other low carbon energy sources
13	Pitman Alex	You mentioned design work you are doing for a trust. Is that free / how is it funded?	Rik Evans - different approaches for different hospitals. Some are Grant funded - Some are funded by the developer
14	MITCHELL, Luke (ROYAL DEVON UNIVERSITY HEALTHCARE NHS FOUNDATION TRUST)	how many megawatts of heat does the munich installation provide?	Rik Evans - 9 MW capacity - production temperature of 105C
15	Pitman Alex	Your images look very like the fracking ones! What seismic risk is there?	Rik Evans - Definitely not fracking, rely very much on the natural cracks within the rock, targeting (1) sandstone (2) carbonite (limestones) – best way to consider this, if you have seen limestone pavement – rock with lots of cracks on it, some are mm cracks some cm and meters – as they already have the natural fractures in the rocks.
16	Neil Cartwright	Clive, for colleagues that are not on this call, where will the recording be hosted?	we will upload the video onto www.nhpower.net
17	Josh Balmer	can we get access to the excel spreadsheet that was shown detailing potential savings opportunities for the Trusts?	Clive Nattrass – this list will be published on the NH Power website
18	Justine Alford	Please can you send the list out directly to those invited or at least send us the link to the list directly so that we definitely see it - our Trust covers many different sites	