

Peer Review Report

Review Report on The Geobattery Concept: A geothermal circular heat network for the sustainable development of near surface low enthalpy geothermal energy to decarbonise heating.

Original Research, Earth Sci. Syst. Soc.

Reviewer: Jon Gluyas

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EVALUATION

Q 1 Please summarize the main findings of the study.

The study demonstrates the vulnerability of heat extraction systems from both ground and mine-cavity to cooling caused by heat extraction outstripping natural heat inflow. It then offers a solution - the geobattery.

Q 2 Please highlight the limitations and strengths.

the strengths are the clear and well argued case for premature cooling and the solution which will allow sustainable use of subsurface natural and stored - time-shifted heat.

not a limitation but a potential to strengthen the impact of the paper would be to show how much carbon dioxide is not emitted with these systems in operation.

Q 3 Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

the methods are excellent, logically outlined and the calculations properly executed. Conclusions are supported by the content of the paper.

Q 4 Check List

Is the English language of sufficient quality?

Yes.

Is the quality of the figures and tables satisfactory?

Yes.

Does the reference list cover the relevant literature adequately and in an unbiased manner?

Yes.

Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)

Yes.

If relevant, are the methods sufficiently documented to allow replication studies?

Yes.

Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)

Yes.

Does the study adhere to ethical standards including ethics committee approval and consent procedure?

Yes.

If relevant, have standard biosecurity and institutional safety procedures been adhered to?

Yes.

Q 5 Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List):

This is an excellent paper. I hope it will become the touchstone for all projects in which near surface sediments/rock and or mine water is explored for heat. The approach meets exactly what the Coal Authority have been struggling with ahead of wide scale licensing of acreage for heat supply. This work should hasten what has been a sluggish process. The manuscript isn marked up with a small number of actions for the authors.

QUALITY ASSESSMENT

| | |
|---|---|
| Q 6 Originality |  |
| Q 7 Rigor |  |
| Q 8 Significance to the field |  |
| Q 9 Interest to a general audience |  |
| Q 10 Quality of the writing |  |
| Q 11 Overall quality of the study |  |

REVISION LEVEL

Q 12 What is the level of revision required based on your comments:

Minor revisions.