The Scottish Parliament
Net Zero, Energy and Transport Committee
Scotland's electricity infrastructure: inhibitor or enabler of our energy ambitions?

Submission from Professor R A Williams, FREng FTSE, FRSE, Heriot-Watt University, 14 April 2023

Response to Question 3: "What role will dispatchable electricity sources - pumped hydro, battery technologies, thermal generation (hydrogen power, gas with CCS) - play in ensuring security of supply and system resilience? Should any other technology play a role in supporting Scotland's electricity system?"

It is important that any national review of infrastructure considers technologies that are scalable and can provide energy storage at scale and in a flexible manner. I would highlight that one such technology that is essential to consider is that of **cryogen energy storage**. This technology, based on patents of gas liquification dating back to 1875, needs to be considered in Scotland. It utilises well proven standard engineering and has potential to provide both storage a scale AND cooling. For example, co-location with sources of intermittent renewable energy and data centres would gain great competitive and environmental advantage. Further examples can be found in the primary provider of such technology a UK entity, Highview Power (https://highviewpower.com/).

On a separate topic, it should be recognised that large scale chemical battery installations and hydrogen technologies carry significant carbon footprints and issues with supply of rare earths and metals, there is inadequate consideration of the true cost and carbon footprints over their lifetime.

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