PE2109/F: Halt any further pump storage hydro schemes on Scottish lochs holding wild Atlantic salmon

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The need for caution in the rush for pumped storage hydro in Scotland's mountains.

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Important questions are facing decision-makers in Scotland as regards plans for several pumped storage hydro (PSH) mega-projects, largely in the North-West Highlands. While there are some very good reasons to support each of them, there are also grounds to pause and consider alternatives.

In favour:

Pumped storage is a proven technology which can undoubtedly assist in the journey to net zero. Two schemes in Scotland (Cruachan, Foyers) and two more in Wales (Dinorwig, Ffestiniog) have already been contributing to grid balancing for several decades; proposals for more are now timely or overdue as the installed capacity of wind and solar schemes increases. Pumped storage capacity reduces the need for carbon emissionsⁱ.

Pumped storage assists with energy securityⁱⁱ. By allowing storage of potential energy in times of net surplus, the need for imported hydrocarbons is reduced, at a time of rising geopolitical tensions.

The construction jobs and economic benefit of expanding the existing pumped storage base will be considerable, with much of it in Scotlandⁱⁱⁱ.

Significant sums have already been invested in developing proposals, Environmental Impact Assessments, community outreach and more^{iv v vi vii} viii.

Against:

Protected species and habitats will inevitably be adversely impacted by the various PSH proposals under consideration. Terrestrial habitats will be inundated, existing freshwaters will be subject to substantial changes e.g. in water depths, and bodies such as the Ness District Salmon Fishery Board have raised objections owing to the already precarious state of the Atlantic salmon in particular^{ix}.

Lasting impact: the proposals for PSH schemes represent huge interventions in our landscapes and riverscapes, which must be expected to become permanent features. If any or all of these threaten the dwindling populations of e.g. Atlantic

salmon, the impacts will be cumulative year by year, and could ultimately lead to species losses.

Tourism may be affected negatively: while onshore and offshore wind is already flagged as a concern for international tourism, exposure of loch shorelines would be expected to increase in extent and frequency, adding to the pressures on a sector presently worth more than £5 billion annually^x.

Alternative technologies for energy storage are falling in price – and avoid the scale of damage to iconic landscapes and species which are necessary in forming new reservoirs or raising water levels in existing lochs. An international survey found that battery storage system costs fell by 40% between 2023 and 2024^{xi}. While not explicitly stated as a concern, the diminishing cost of alternative storage may have been one factor behind the decision of Drax Group, owners of the Cruachan PSH, to pause the development of their Cruachan 2 PSH, a scheme which has been in gestation for more than a decade^{xii} xⁱⁱⁱ.

Alternatives

Progress with demand management (e.g. with smart meters^{xiv}) and smart use of domestic battery installations (e.g. Powervault^{xv}) and electric vehicle batteries could reduce the demand for pumped hydro. In marginal situations, in which a PSH may be proposed for infrequent need, questions would need to be asked about the extent of need and the nature of alternatives.

A proposed new generation of small modular (nuclear) reactors^{xvi} may help diversify generation and provide baseload power which could help pump water for peaking generation in existing PSHs – in periods of low renewables availability, e.g. a blocking high pressure system in winter.

Given that the energy grid will always be in some form of continuing evolution, in a context of continuing technological innovation, it is worth considering whether existing or even new combined-cycle gas generation have some residual value for occasional use, if the alternative is to build more PSH schemes with lasting adverse environmental impact. A report to UK government^{xvii} has investigated the issue, assessing possibilities and also some technical and financial barriers.

Infrastructure decisions are rarely straightforward and typically require trade-offs to be made. The Glenmuckloch proposal for pumped hydro in a former open-cast coal mine is a rare example of a contribution to meeting peaking electricity demand without severely affecting natural habitats. Choices may often be seen as being between global impact vs local. Demand management is the ultimate key to reducing adverse environmental impacts in both domains. In the absence of dramatic reductions in Scotland's total energy demand, decision-makers will have to choose between adverse impact within Scotland vs adverse impact globally.

^{iv} Britain's biggest pumped hydro storage scheme in 40 years gets £100m investment boost | SSE

ⁱ <u>Pumped Storage Hydro - British Hydropower Association</u>

ⁱⁱ New scheme to attract investment in renewable energy storage - GOV.UK

^{III} Six pumped storage hydro projects to create up to 14,800 UK jobs, new report finds

- ^{ix} Pump Storage Hydro | Ness District Salmon Fishery Board
- * Tourism Performance | VisitScotland.org
- ^{xi} BNEF finds 40% year-on-year drop in BESS costs- Energy-Storage.News
- ^{xii} Drax will not bid for LDES cap and floor scheme Solar Power Portal
- xiii <u>Cruachan hydro power station output 'could double' BBC News</u>
- ^{xiv} Smart meters explained Energy Saving Trust
- ** On a Mission to Transform UK Energy Use | Powervault Powervault
- ^{xvi} What are small modular reactors and why does UK want to build them? | Nuclear power | The Guardian
- ^{xvii} <u>Assessing the deployment potential of flexible capacity in Great Britain an interim report</u>

 ^{vi} SSE submits planning to Scottish Government for Sloy pumped storage hydro scheme | SSE Renewables
^{vii} Cruachan-July-30-2024-Final-1.pdf

viii UK Government must invest in hydropower, industry tells Secretary of State for Energy Security and Net Zero