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"Pumped storage hydropower (PSH) is a fantastic tool that"s being used more and more by grids around the world to store excess amounts of electricity for when they need it," International Hydropower Association (IHA) senior energy policy manager Rebecca Ellis said during a recent episode of NCE"s The Engineers Collective podcast.

PSH involves two bodies of water at different elevations. During periods of low energy demand, surplus is used to pump water from the lower reservoir to the upper reservoir. When energy demand rises, stored water from the upper reservoir is released into the lower reservoir by flowing through a hydro-electric power station which produces energy.

There are two types of PSH: open-loop, when one of the reservoirs is connected to a naturally flowing water source; and closed-loop, when none of the reservoirs are connected to an outside body of water.

Arup director for energy Steve Saunders says it is a proven technology and that these assets have a long lifespan. This is evident in the UK market, as the four operational PSH plants in the UK - the 1.7GW Dinorwig, the 440MW Cruachan, the 360MW Ffestiniog and the 300MW Foyers, which have a combined storage capacity of 32GWh - have been in service for at least four decades. The oldest one, Ffestiniog, has been operational since 1963.

Ellis recently reviewed UK parliamentary debates and reports on PSH development dating back to 1942. She found out what was discussed when the development of Ffestiniog and Cruachan, completed in 1966, were being considered.

"These were seen as supporting nuclear, as it could be difficult and expensive to reduce the generation from a nuclear asset," she says. Ellis adds that in the 1970s there were discussions about the importance of long duration energy storage to provide for sudden heavy energy demands and to compensate for energy lost from

plant failures.

Stantec hydropower and dams sector leader Craig Scott says the majority of PSH schemes around the world were constructed before the 1980s, with limited private sector involvement. He believes deregulation of the electricity market and various financial shocks in the decades that followed led to a decrease in investment in new assets. However, he highlights that "a new wave" of such projects began around 10 years ago.

There is now a considerable pipeline of projects at various stages of development in the UK, with the British Hydropower Association estimating that they could boost installed capacity by 6.9GW and offer 135GWh of storage.

This year has seen several announcements from energy companies on proposed schemes: Glen Earrach Energy plans to build a 2GW facility at the Balmacaan Estate in Scotland, a consortium of Gilkes Energy and SSE Renewables announced that they are developing a 1.8GW project at Loch Fearna, while ILI Group submitted planning application for the 1.5GW Balliemeanoch scheme at Loch Awe.