

RheEnergise Energy Storage:

Low cost power is used to fill the top storage tanks. At times of high demand power is regenerated for consumers.

RheEnergise uses small Hills, NOT Mountains

RheEnergise is innovating pumped energy storage¹, we call our new system High-Density Hydro™.

HD HYDRO™ uses our proprietary HD Fluid R-19²™, which has 2.5x the density of water. R-19 gives RheEnergise projects 2.5x the power and 2.5x the energy when compared to water.

RheEnergise's energy storage solution incorporates innovations, including new IP, across six critical sub-systems:



RheEnergise projects provide **10MW to 50MW** power and 2 to 10 hours of storage capacity. Other HD Hydro advantages include:

- Projects can be installed on hills 2.5x lower than a project using water and still achieve the same power - for example, there are so many more hills at 150m than at 375m.
- 2.5x smaller, by volume, meaning dramatically lower construction costs, faster build times, easier reinstatement and easier landscaping - projects can be entirely hidden.

Competition

RheEnergise solves the many disadvantages with other competing energy storage and grid flexibility solutions:

- Land use and construction times are comparable to both gas-peaking plants and Lithium-Ion battery projects and significantly shorter than the decade long construction associated with traditional pumped hydro.
- The CO2 immersions and pollution associated with both gas and diesel projects, and the end-of-life liabilities associated with batteries.
- The social and environmental issues associated with traditional pumped hydro of flooding valleys.

¹ Pumped energy storage is conceptually very simple, though not well known: At times of low energy prices, water is pumped from a lower reservoir to an upper reservoir (typically at an elevation at least 300m or higher), as energy prices rise the water is released, it is regenerated back into electricity and returned to the grid for use by consumers.

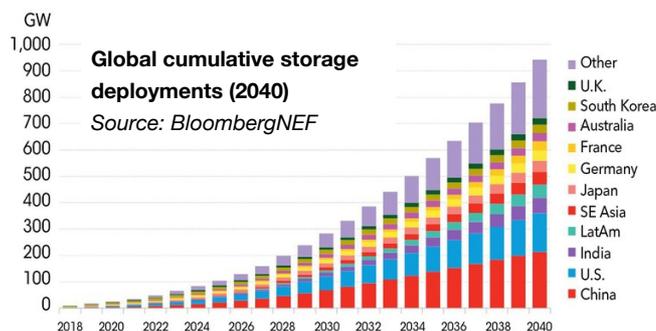
² R-19 is environmentally benign, non-toxic, non-corrosive, non-reactive. It is a suspended solid in water. A surfactant is used to keep the suspension

The problem

Energy systems need to decarbonise to prevent dramatic climate change. There are many solutions to generate energy without using fossil-fuels, such as, wind and solar power, which now generates electricity at significantly lower cost than new fossil-fuel generation. However renewable sources of energy are intermittent. There is a mismatch between the variability of supply from renewables and consumer demand.

The solution

Energy storage is the solution, however not all energy storage systems are the same in terms of costs and environmental impact. Energy storage has been around for decades in the form of pumped-hydro (used to balance constant base-load generation from coal and nuclear with variable demand). However there is nowhere near enough energy storage for a zero-carbon energy system that includes transport, power and heat. According to BloombergNEF about 100x more energy storage will be needed globally.



The smaller footprint and reduced costs means that RheEnergise projects more than challenge (on a levelised cost basis) other emerging technologies, such as batteries.

RheEnergise's High Density Hydro™ solution

Critical to any energy storage solution are costs, environmental impact and longevity.

Costs are compared using levelised costs. Analysis shows that RheEnergise's HD Hydro will be >40% below a Lithium-ion battery project, and >15% below gas peaking plants.

The environmental impact of batteries are principally measured in the effects of their disposal at the end of their usable life, while gas (and diesel) projects create significant emissions during day-to-day operations. On the other hand, HD Hydro projects have very few end of life liabilities and zero emissions in operation. In addition HD Hydro projects have no parasitic cooling loads associated with batteries.

HD Hydro projects have a predicted life in excess of 60 years, making them a true infrastructure asset.

How RheEnergise pumped energy storage works:

At times of low energy prices, the benign HD Fluid R-19™ is pumped up a small hill, using abundant low cost renewable energy, as demand rises the HD Fluid is released from the top (buried) storage tanks and electricity is regenerated by using a specialised HD Turbine™ and supplied to the grid for consumers to use.

Round-trip efficiencies are ~83%, without the parasitic cooling loads associated with batteries.

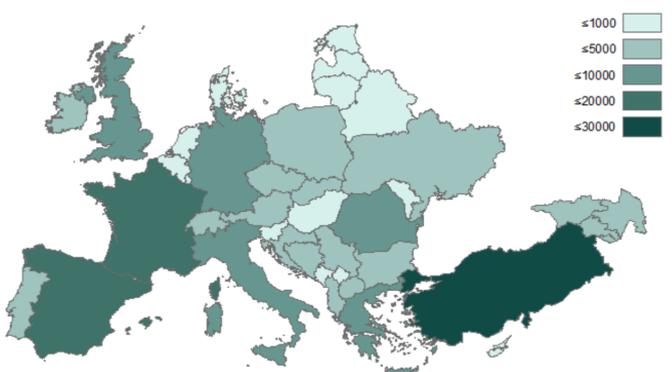
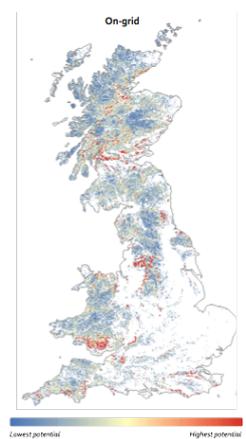
Opportunity:

Aurora Energy Research forecast a £6bn UK requirement for 13GW of new flexible assets by 2030.

BloombergNEF predict an energy storage market worth >\$620bn by 2050. The Committee on Climate Change states that energy storage is the key enabler necessary to achieve a net-zero carbon energy system.

RheEnergise's digital mapping analysis show that there are ~9,500 UK site opportunities, ~ 80,000 in Europe and ~160,000 in Africa. There are suitable sites nearly everywhere.

The HD Fluid R-19 in a closed system means we can install anywhere, including in areas short of water such as desert climates.



Summary:

Projects are smaller, faster to build, easier to reinstate and landscape. A typical project is 1 hectare (1.5 football pitches).

Projects cost less to build. Operation and maintenance costs are highly predictable meaning that levelised costs of storage are extremely low. Commoditised parts can dramatically lower costs further over time.

Opportunities to build projects nearly anywhere in the world even the 75% of the world too short of water for traditional pumped hydro.