

Water power on a large scale



Kielder Water is Northern Europe's largest man-made lake. It holds 200,000 million litres (44,000 million gallons) of water and its shoreline is 43.45km (27 miles) long. Below the Kielder dam sits the hydro-electric plant which was installed when the dam was built between 1975 and 1982. 1,300 million litres of water a day can be released from the reservoir on behalf of the Environment Agency to a programme they set to regulate the flows and improve the environment of the rivers North Tyne and Tyne. Whenever a water release takes place this water drives the hydro-electric power plant, which can produce up to six megawatts (MW) of electricity, and, over a year, is capable of generating enough to meet the average needs of about 4,000 homes.

Kielder hydro is England's biggest hydro-electric power station. It was opened by Her Majesty the Queen on 26th May 1982 and is owned by Northumbrian Water Ltd. In December 2004 RWE npower renewables bought the rights to operate, maintain and sell the energy until 2025 and have been operating it since then. Npower renewables' purchase of the operating rights to Kielder hydro enabled investments to be made into the plant and the turbines were refurbished in 2005-6 to improve efficiency and increase the generation of renewable energy. The controls were also updated so that the plant can be operated remotely from Dolgarrog in North Wales.

How does it work?

Hydropower technology turns the potential energy of falling or flowing water into electrical energy. Turbines are supplied with water drawn from either a reservoir or directly from an intake weir on a river. Most reservoir schemes make use of the change in water levels at the dam and capture the energy of the water as it falls from the reservoir into the river below.

Here the turbine house is located below the Kielder dam and is powered by dual turbines capable of producing just over 6 megawatts (MW) of green power. A 5.5MW Kaplan turbine operates whenever water releases take place. A smaller, 500kW Francis turbine generates electricity from the water that flows continually from the reservoir to maintain water levels in the river North Tyne (known as the "compensation flow").

Installation and costs

The civil engineering cost of the reservoir and dam were undertaken for the purpose of collecting and storing drinking water, not primarily for hydro-electric generation.

Following many years of planning, the Kielder Water Scheme was completed at a cost of £167,000,000. Adding the hydro plant at today's prices would cost in the region of £20,000,000. Hydro power is an attractive option to the power industry because many schemes run throughout the year and in some cases the water can be stored to enable electricity production to occur at times of peak demand and peak prices.

Environmental impact

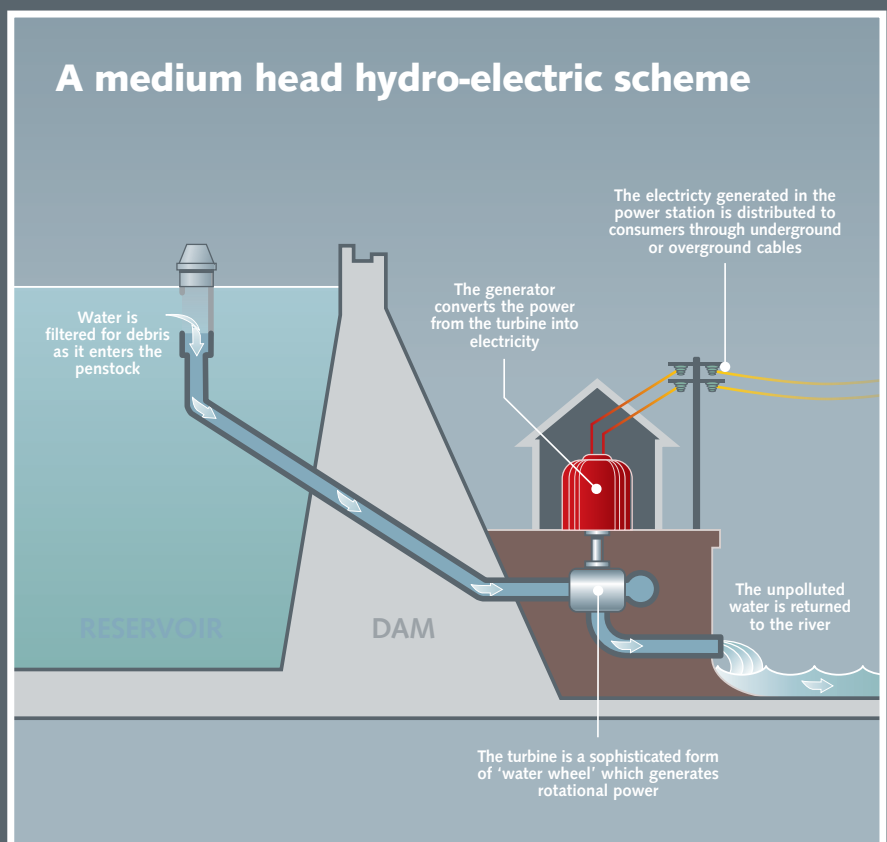
The Kielder hydro scheme generates on average 20,000MWh of electricity per year. This saves 8,600 tonnes of CO₂ emissions, compared to standard mains non-renewable electricity generation.

Further information

Visit the other renewable energy sites shown on the map overleaf.

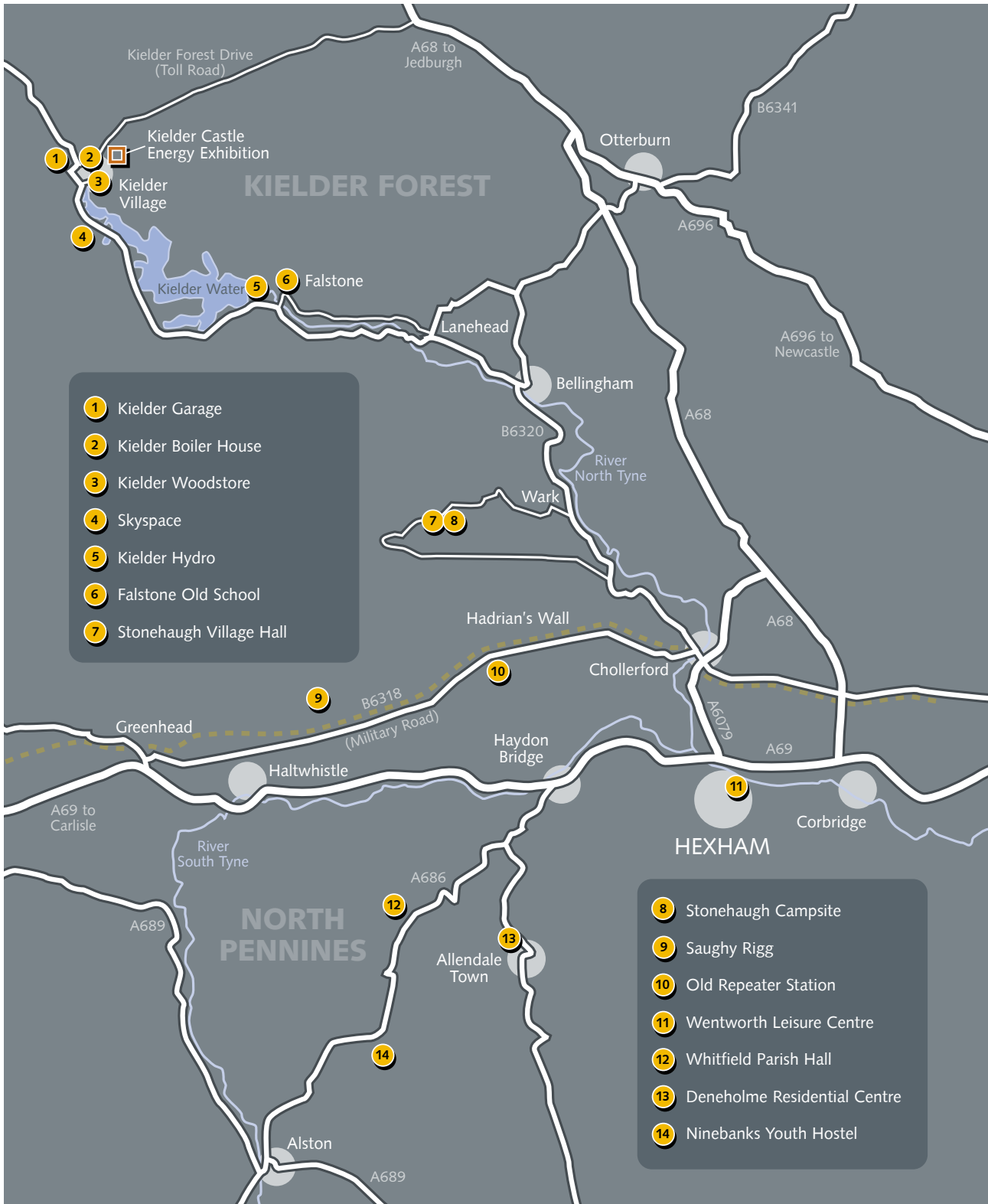
Kielder Castle renewable energy exhibition is open from Easter to October.

www.tynedalerenewableenergy.org.uk
www.npowerrenewables.com/opsites/hydro.asp
www.nwl.co.uk/2827_3078.aspx





Tynedale Renewable Energy Trail



The Tynedale Renewable Energy Trail and Exhibition show renewable energy providing energy for individual buildings and producing larger amounts of power for the National Grid. Organisations in Tynedale are benefiting daily from green energy and are helping to avoid further climate change by doing so. Why not visit some of the sites and see how to do it too?

Further information on using renewable energy and on the Tynedale Renewable Energy Trail can be found on :

www.tynedalerenewableenergy.org.uk.

The Tynedale Renewable Energy Trail was co-ordinated by North Energy (www.northenergy.co.uk) and North East Community Forests with design by Iain Kerr Associates.

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