

Whenever renewables are mentioned, hydropower is rarely considered. That is because it is a well-established technology and, taken purely as a source of generated electricity, it could be argued that it has not much more to offer in the UK.

However, that is a long way from the truth. The main problem the UK hydropower sector has is dealing with its success over the past 150 years. It is a proven technology: yes, the first water turbines were built in the mid 1800s but they have been developing ever since. Turbine efficiencies are rarely below 80%, which is about double that of a steam turbine.

Constant and continuing design improvements have brought efficiencies of over 90%. Research and development continues into providing new and more cost-effective solutions and improvements to the design and engineering of new schemes.

Most of the hydropower in the UK has been developed: yes again, but there is still 2-3GW of undeveloped potential (compared with approximately 8GW of wind). At present, 40% of the UK's renewable generation is provided by hydropower – a fact rarely mentioned!

Increases in wind-power capacity are complementary to hydropower, because hydro storage schemes are the renewable partner for supporting an increasing commitment to intermittent sources connected to a power network. In short, hydro reservoirs provide the firming capability to cover the fluctuating nature of the wind source.

Wind/hydro schemes are being developed to produce entirely renewable systems for power trading, the largest of which is a programme currently underway in Tasmania, which involves the development of 450MW of wind power over the next five years. The development is possible because it is supported by existing hydropower storage schemes.

That could and should be replicated in the UK.

Reservoirs store potential energy and release water for power generation when it is required.

Within a typical power system, the power demand can peak for short periods at twice the mean value. The capacity of hydro storage facilities to respond at short notice is a great advantage. When sites for traditional hydropower storage schemes are not sufficient, pumped storage schemes can provide the flexibility to ensure quality and security of supply. The EU has 134 pumped-storage schemes in operation in 12 of the 15 member states.

The present and the future There is significant potential for run-of-river and energy-recovery schemes in the UK. Unfortunately, water and energy policies have not been well coordinated in the past and authorities have been reluctant to engage in cross-sector activities. Only a small fraction of the reservoirs in the UK have any associated hydropower facilities (the majority have been developed for water supply and irrigation).

There is an increasing role to be played by 'micro hydro' schemes, which are typically sited at old watermills and on weirs on major rivers. They offer new opportunities to individuals and communities to benefit from long-term returns from a resource which is mainly ignored at present. That goes back to the ways in which the earliest hydro projects were developed.

Today we have a new political will in the shape of the Renewables Obligation (RO) and the emerging 'green power' markets have added an impetus to the possibility of exploiting the potential energy in water storage and transfer schemes.

Since its commencement in 2000, the RO has been the means by which new schemes have been built and old ones refurbished and upgraded.

Modern, technically advanced electro-mechanical equipment can be used to refurbish and upgrade existing schemes to utilise the same flows of water at greater efficiency. Existing hydropower generators have recently been engaged in large investment programmes to upgrade older schemes. This is expected to increase generation (qualifying for Renewable Obligation Certificates) by more than 1,000GWh.

A few hurdles more Life is never easy, especially when developing power projects in environmentally sensitive areas. Issues being debated at present are:

- The level of abstraction shares levied on new and existing schemes.
- Optimum ways in which the European Water Framework Directive is being implemented.
- A realistic approach to rates and planning throughout the UK.
- Continuation of the RO to enable all technically feasible hydro projects to be developed.

The British Hydropower Association (BHA) is leading on all these issues on behalf of its members and is involved on working groups for the operation of the Water Framework Directive in the UK.

Hydropower certainly has an important role still to play in the UK's energy future.