



Contact

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Energy system benefits

Hydropower, if well planned in the context of a regional energy strategy, offers a high level of service to the energy system, and supports the better service of other energy technologies.

Issue

Hydropower projects occur on many scales and in several different project types, including run-of-river, reservoir and pumped storage schemes. If a hydropower project is not designed and planned in the context of a regional energy strategy, its optimal energy system benefits may not be realised.

Management

One of the key criteria in evaluating power schemes is to give priority to those that offer energy system benefits by adding value to the energy mix. In this context, hydropower offers a high level of reliability as well as a significant level of energy system benefits due to its unmatched level of ancillary services. These services include:

- Regulation and frequency response – the ability to meet moment-to-moment fluctuations in system power demand almost instantaneously;
- Voltage support – the ability to control reactive power, thereby assuring that power will flow from generation to load;
- Black start capability – the ability to start generation without an external power source, so offering a quick response to failings in the power grid;
- Spinning (or synchronous) reserve – the ability to run at zero load while synchronised to the electricity system; and
- Non-spinning reserve – the ability to enter load into an electrical system from a source not on line.

Pumped storage plants incorporate many of these facilities, and are excellent ancillary service providers in power networks because of their ability to provide frequency control, load levelling, reserve operation, and stand-by capacity.

These ancillary services provide a level of flexibility that is absent in other base load options, such as nuclear and thermal. Importantly, hydropower offers an ideal backup

for other more intermittent renewable energy sources such as wind and solar, and optimises the efficiency of less flexible fossil or nuclear generation options.

The usefulness of these services to the network can become even more important as the proportion of renewables connected to the power grid, such as wind and solar, increases.