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Longevity of benefits

Hydropower schemes are long-lived assets. Appropriate operation and maintenance are required to ensure that they will generate electricity for decades, thus potentially providing energy services to several generations of people.

Issue

Hydropower schemes have the capacity, with appropriate operation and maintenance, to be long-lived generation assets. Where operation and maintenance have been inadequately undertaken, predicted electricity generation is not realised.

Reservoir siltation is a major issue for some hydropower schemes, and without careful assessment and management it can considerably shorten the life of a dam.

The long-term nature of hydropower developments should be recognised when undertaking cost-benefit analyses, funding arrangements and planning. Not only electricity generation capabilities need to be considered with a long-term perspective, but also associated benefits such as water supply and negotiated benefits such as housing and job creation.

Failure to realise the full life of a hydropower scheme can result in greater costs required to construct new generating infrastructure.

Management

The longevity of the benefits of hydropower schemes lies in the usually long-lasting nature of dams and the ability to extend the operational life of power stations through refurbishment and upgrade. It is not uncommon that refurbishment and upgrade after 30-40 years will extend the operational life of a hydropower scheme to more than 80 years. Increasing the generating life of an existing scheme is generally a preferred approach to construction of a new scheme.

The potential for refurbishment and upgrade depends on the age and condition of the plant, and the success of the original design.

Above dam wall capacity gains may include water optimisation to reduce spill, dam wall height extensions to increase storage capacity, and cloud seeding to increase rainfall. Below dam wall efficiency gains can be obtained from turbine upgrades and

replacement of turbine runners. Further, computational fluid dynamics as a tool in the field of hydro turbine design was first applied only 20 years ago, and equipment installed before this time may have the potential for efficiency gains that this technology offers.

High quality studies of catchment sediment yield are an essential requirement, and measures can be employed to minimise and mitigate the risk of reservoir siltation.

Funding for hydropower projects needs to be undertaken with the realisation of the long-term nature of the ensuing benefits.