



DHI MARKET AREA: ENERGY

# HYDROPOWER

## Optimising production with forecasting, sediment management and auditing

The combined storage of large dams today amounts to 6,000 km<sup>3</sup>. However sedimentation causes significant losses to the storage volume each year, resulting in huge replacement costs. Other cost-intensive factors related to sediment are turbine damage, loss of hydropower production as well as downstream impacts. Also, like most renewables, hydropower too depends on natural forces. As such, their utilisation in the grid can be challenging. In order to enable efficient hydropower production, dam optimisation has become a necessity. Our expertise and technology help to increase hydropower production, enable more sustainable flood control and effectively manage multiple reservoirs.

### THE CHALLENGES

- Accumulating accurate knowledge of environmental conditions which affect hydropower production
- Overcoming significant sediment-induced losses to dam storage volumes
- Reducing damage to turbines and losses to hydropower revenue
- Mitigating adverse environmental and downstream impacts, including to irrigation
- Enabling mini-hydropower production in remote areas
- Providing accurate and reliable flow forecasts
- Managing water resources safely and efficiently – with real-time dam optimisation technology
- Ensuring regulatory compliance with accurate auditing

### OUR APPROACH

At DHI, we focus on the development of valuable software tools for the hydropower industry. We aim to provide accurate and reliable forecasts based on advanced numerical hydrological and hydraulic simulation models. This, in conjunction with efficient optimisation tools within real-time Decision Support Systems helps to radically improve hydropower operations.

### OUR SOLUTIONS

We have the solutions to support you in managing reservoir sediment and water quality. Our auditing services will help you comply with regulatory requirements. You can also benefit from our 25-year worldwide experience in operational flow forecasting. Our technology can be applied to single as well as multiple reservoir systems and can be used for planning as well as real-time operations. Our solutions allow you to:

- Optimise hydroelectric generation while maintaining flood control
- environmental and legislative constraints
- Minimise spill and loss of water
- Maximise production under operational, environmental and legislative constraints
- Maximise the economic value of the water

**THE ULTIMATE GOAL** OPTIMISING SUSTAINABLE HYDROPOWER PRODUCTION WORLDWIDE



Hydropower is currently being utilised in some 150 countries, utilising 11,000 stations with around **27,000 generating units.**

*International Hydropower Association (IHA) Activity Report 2010*

## OUR TOOLS & SERVICES

We offer a wide range of tools and services in order to optimise hydropower production, including:

- Derivation of optimal reservoir operation rule curves
- Effective operation of multiple reservoirs
- Optimisation of both short-term and long-term operations
- Sustainable sedimentation and water quality management
- Reliable inflow forecasting
- Optimised and balanced reservoir operation and flood protection strategies
- Water quality and sedimentation surveys
- Compliance audits
- Capacity building and training by THE ACADEMY by DHI
- Suite of water modelling tools with MIKE Powered by DHI, integrating powerful hydropower optimisation methods:
  - MIKE BASIN simulation and forecasting model with built-in optimisation tools
  - MIKE 11 Structures Operation module combined with a generic optimisation tool and a decision support framework for their application in real-time
  - MIKE FLOOD WATCH for real-time operation and management
- Decision Support Systems (DSS)

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