VOITH

Hydropower.
Endless, ecological, efficient

Future technology from Voith – clean and cost-effective

Hydropower is one of the most attractive renewable energy carriers: low in emissions and independent from primary energies. Hydropower is endless, ecological and commercially viable: among all known types of energy generation, hydropower plants have the highest efficiency. Voith Hydro is one of the world‘s leading suppliers of turnkey hydropower stations and all relevant engineering services. And this for more than 140 years.

Voith HyEco – Sustainable technology

Utilizing hydropower is a claim and a commitment for Voith by tradition: We develop solutions that are both eco-friendly and efficient. And we even have a special name for this at Voith Hydro: HyEco.

All Voith HyEco products, systems and services provide improved efficiency, less input of resources and highest compatibility with the environment – always depending on how each component is used in a hydropower plant.

With HyEco we are looking at the complete life cycle of new and existing large and small hydro power stations. In order to document the minimum impact of our components and entire hydropower plants on the environment, for example their excellent payback ratio or their low CO_2 footprint, we are carrying out life cycle analyses (LCAs) in accordance with DIN ISO 14040. We offer solutions for turnkey hydropower stations and also for pumped storage power plants. In addition, we develop ecological solutions for the automation of hydropower plants and provide services for all plant components.

Voith has more than 140 years of experience in harnessing hydropower. Our research and development activities always focus on the aspects of technical excellence and eco-friendly technology. And this refers not just to the planning, the construction and the equipment of new power plants. Through modernization and the application of the latest technologies, losses of existing plant components can be reduced by up to 30 percent.

Seal for Sustainability

Voith HyEco stands for the latest technical solutions for sustainable energy generation from hydropower.
These solutions have an impact on energy usage, water consumption and eco-compatibility. The HyEco seal is awarded for particularly positive effects.

HyEco | SustainableTechnology in Hydro Power

Energy
Water
Environment

Saving energy.
HyEco makes hydropower even more efficient

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Energy
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Voith has the requirements to develop technical procedures keeping the usage of resources low. With Voith Hydro's new technologies at hand, power plants can reduce its energy consumption within the equipment section by up to ten percent.

- **State-of-the-art Control Sytems**
  HyEco products and services from Voith are always tailored to the requirements of energy producers: They are efficient and economical. And power units only consume a minimum of energy. This is made possible by modified control oil supplies. For this process, Voith relies on an additional jockey pump for normal operation mode instead of using large pumps that are overdimensioned for normal operation. This saves energy - day after day.

- **Avoiding Stand-by Mode**
  With HyEco, energy consumption can be minimized by decoupling the high-performance transformer from the network during a standstill. As a result, ‚stand-by' mode can be prevented. Standstill losses are no longer an issue.

- **HyCon Optimization Modules**
  HyCon optimization modules from Voith Hydro significantly increase the plant efficiency. With the Cam Curve Optimization Module (HyCon CCO) small deviations in the relationship curve between runner and wicket gate can be automatically corrected within the power station. As a result the turbine runs even more productively. The Water Management Control (HyCon WMC) can ensure improved operation of a barrage system and optimally manage entire cascades.

Saving water.
HyEco protects resources

HyEco | SustainableTechnology in Hydro Power

Energy
Water
Environment

Voith Hydro has committed itself to the sustainable utilization of water. When we design our power station components we make sure that each and every liter of water is utilized with maximum efficiency. In particular we develop eco-friendly turbines and generators.

- **HyCon Plant Optimization**
  The HyCon Plant Optimization (PO) of Voith helps to save water during the operation of the power station. The required outputs are thereby optimally divided between the operated turbines - dependent of turbine design, efficiency and water flow. These optimization methods apply to all hydraulic machine types.

- **Cooling on Demand**
  With ‚Cooling on Demand' the amount of water flowing through the cooling circuit is the actual volume required for the cooling process. This amount is significantly lower than that used in conventionally designed systems.

- **Auto-Venting Turbines**
  For this technology, the water below the hydropower station is enriched with oxygen. This is carried out by so-called auto-venting turbines, which are partially hollow and fitted with blades with specially shaped outer contours. The latter agitate the air bubbles in the water. The entire process improves the water quality and has a positive effect on the fish populations around the power station. Voith Hydro is the leading supplier of this auto-venting technology.

Preserving nature.
HyEco protects the environment

HyEco | SustainableTechnology in Hydro Power

Energy
Water
Environment

Voith is a pioneer in terms of construction design when it comes to excellent technical and ecological operating of hydropower plants. For example, with a minimum reduced usage of oil in the hydropower plant or with turbines allowing downstream fish migration.

- **Fewer Lubricants**
  Voith Hydro has the know-how to use as little oil as possible in the power station. Here, Voith HyEco offers solutions such as the oil-free hub. While the hub at the blade adjustment of Kaplan turbines is normally oil-lubricated, Voith replaces the oil by a non-freezing water mix. Additionally the generator bearings are oil-free. Voith even minimizes oil usage in power station areas that are not in direct contact with water. For example in the governor control system.

- **Fish-Friendly Solutions: Minimum Gap Runner (MGR) and Alden Turbine**
  Hydropower stations and turbines do not have to present an obstacle to migrating fish swimming downstream. The HyEco technology allows fish to pass safely through turbines. After the construction of the power plant downstream fish migration should thus be possible - with simultaneous cost and power loss minimizations. The fish-friendly turbine encourages the largely unrestricted movement of the fish.

- **Healthy and Safe Working Environment**
  In addition, Voith Hydro continuously improves the working conditions for employees in hydropower stations. This includes noise reduction, the application of formaldehyde-free varnish, as well as drive units that are more eco-friendly than diesel engines.

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VOITH
Engineered Reliability