HyBaTec
GOING NEW WAYS

The modern energy market presents many challenges for power companies. Factors such as market liberalization, volatile energy prices, base- and peak-load demands, volatility of wind and solar energy production, and new consumption behaviors all affect the energy supply and demand balance.

These challenges are also infecting each and every hydropower plant, regardless of whether it is a plant that has been operating for decades or it was just commissioned. In today's market, responsiveness and flexibility of generation assets are becoming increasingly important economic factors.

HyBaTec is a hybrid energy solution that addresses these modern market challenges. Combining a hydro turbine generator unit with a battery, the system can be applied to "greenfield" applications, as well as retrofitted to existing facilities. The system as supplied currently covers battery capacities from 100 kWh up to 10 MWh. Compared with a conventional hydro application, and depending on the size of the battery, the operational range can be extended up to +/- 25%. This can even be achieved while reducing the mechanical stress impinging on the units. Due to sophisticated interactions between the generation unit and the battery, faster response times and very flexible operational profiles become available without the restrictions that may result from electrical, mechanical or hydraulic limitations.

HYBATEC FLEXIBILITY WITH THREE DIFFERENT OPERATIONAL MODES

The HyBaTec system is available in three separate operational modes: Lifetime, Grid, and Storage.

In Lifetime mode, the system stabilizes and balances fast and short-term grid frequency demands using the battery element. Movements of the mechanical parts, and therefore the mechanical stresses on the unit, will be reduced. This in turn ensures that the operational lifetime of the unit is dramatically extended.

At the same time, maintenance costs are also reduced significantly. Typically, for use in Lifetime mode, the battery will be dimensioned to about 2.5% of the generation capacity of the installed unit.

In the Grid operational mode, operators are able to explore new opportunities to participate in both primary and secondary energy markets. Grid mode provides a defined amount of energy over a limited period of time, allowing operators to participate in short-term capacity markets, peaking power markets and other emerging bidding opportunities. For operation in Grid mode the battery will typically be dimensioned to about 5-20% of the installed unit capacity.

HyBaTec – an integrated hybrid solution able to improve and expand your business case with a range of benefits.

In Storage mode, the system is able to shift energy over the day (base load to peak load; no demand to demand). This offers optimization possibilities for the whole unit/power plant during the design phase. For use in Storage mode, the battery would typically be dimensioned to about 15-25% of the installed unit capacity and have a storage capacity of two to four hours of full plant output.

In addition to these dedicated applications, HyBaTec is able to provide additional benefits such as black start capability, meeting self-consumption demand, virtual inertia, and virtual storage reservoir.

The HyBaTec batteries will be installed in a standard shipping container, integrated into the electrical power plant as well as the control system to optimize revenue from the system.

BENEFITS OF HYBATEC

Hyrid Battery Technology

- Extended energy storage
- New market opportunities
- Fast implementation
- Increased lifetime of mechanical components
- Reduced O&M costs
- Fast response times
- Flexible power
- High operational flexibility

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The HyBaTec-Concept: Modern hydrid solution for hydropower