

RENEWABLES

# Hydroelectric power generation made easy

One single package for control and safety of your assets



## Difference-making solution for your plant

With its long history and proven track record of both new and retrofit hydro power installations and services, ABB is considered an expert in the field. For years, we've empowered organizations by providing the best products in an easy-to-configure compact format to ensure safe and profitable commissioning, service, and maintenance of operations. Having an intimate knowledge of the sector's needs allows us to come up with solutions that boost performance and drive a competitive edge.

Being well familiar with the specific challenges that hydroelectric power generation may pose, ABB has developed a unique solution to facilitate control and safety of your assets. Now you can focus and automate all key processes of governor control and excitation in a single and flexible offering that includes all the necessary elements to build up a state-of-the-art system to efficiently operate a single or multiunit hydro power station. Additionally, this offering is part of ABB life-cycle support to ensure safe and reliable operations throughout the life cycle of your plant.

Our cutting-edge solution is easy to connect and integrate with existing control systems and auxiliary equipment. While it's custom engineered to support hydroelectric power plants around 50MW, it will easily

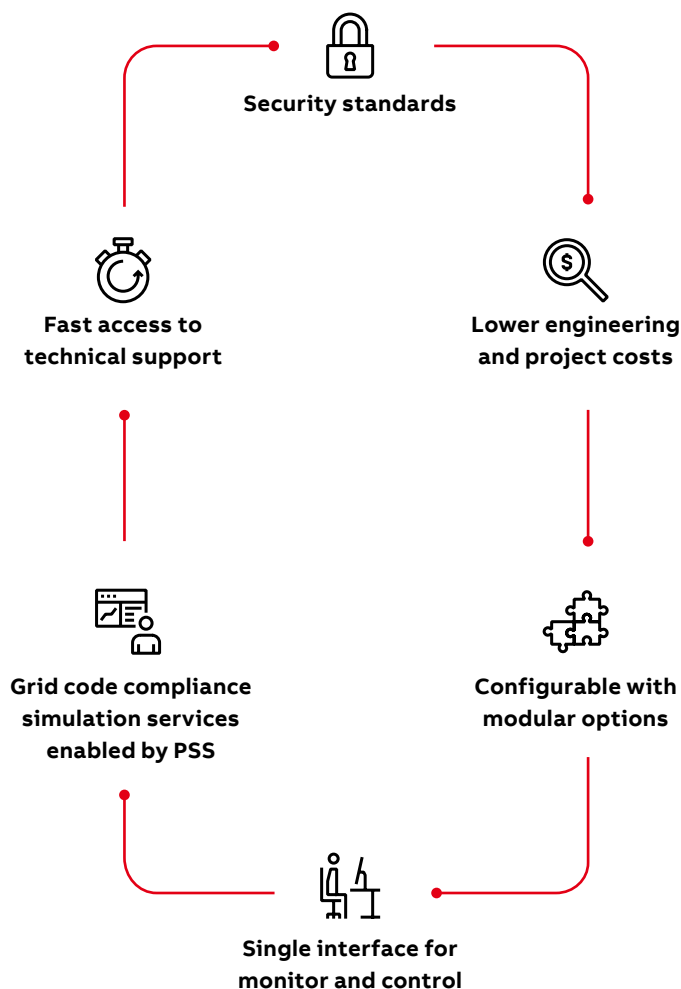
meet the needs and requirements of most units even up to 200MW. As option it can provide support for IEC 60870-5-104 and IEC61850 protocols but as standard it satisfies most open communication standards.

Redundancy options, with hot swap technology makes services easy, and should a system malfunction occur, it will run in independent mode with local operation. On top of connectivity and redundant design, a secure and preconfigured remote access enables you to seamlessly access the power station remotely.

The list of numerous benefits that your plant can gain with our solution is long, but to name just a few, you will have:

- A single interface for your project
- Optimized contribution to network stability
- Simplified grid code compliance services
- Enhanced connectivity for remote operations
- The generator staying always within safety limits
- Easy operation, monitoring, and maintenance systems
- High control integration ability
- Efficient product life-cycle management
- Technical support always within your reach.

# Keystones of the solution



## Key benefits

- Complete unit control with a single interface to plant operations, including governor control excitation system, with protection and synchronizer
- Safe and secure solution
- Remote connectivity via VPN or ethernet protocols
- Room for further digitalization with ABB Ability solutions and services
- High-quality products with life-cycle commitment

## Modular approach

The scalable and modular approach enables easy customization of the functionality with different building blocks, depending on the power and turbine control needed. Additionally, this modular approach allows for additional features to be deployed in phases to meet the investment capabilities, facilitating replacement of fleets or stand-alone units.

## Network stability and compliance

While grid codes allow for effective control of transmission system voltage and frequency variations, the excitation system provides stable and reliable control with full support for grid codes. The Power System Stabilizer (PSS) and fast detection of voltage dips secures a stable connection to the grid. System simulations with IEEE models and detailed computer representations of the internal control algorithm can be supplied in one package for the excitation and governor. Additional services are also available and include calculation of the PSS parameters, simulations of reference step responses, and stability simulations for different network conditions.

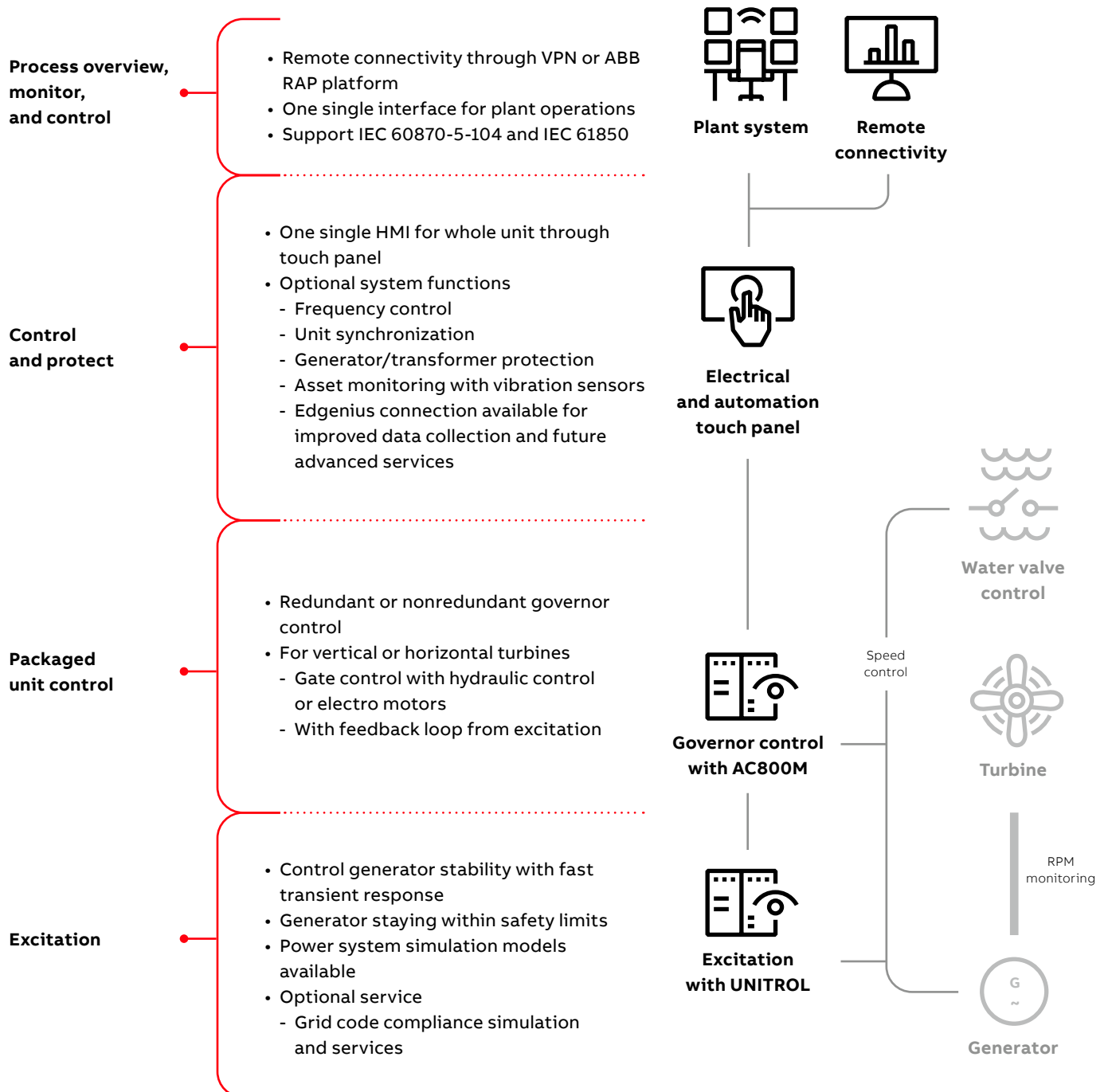
## Active life-cycle approach

Our solution only comprises products that are part of the ABB life-cycle program. This means that spare parts and system updates will be available during the whole life cycle.

## Cost efficiency

Our modular approach and a single interface for project execution allows for precise adaptation to your unit's specific needs. To ensure cost efficiency – when appropriate – reuse of your existing equipment is possible.

# Solution deployment architecture





---

# Values, knowledge, and experience

---

## Why ABB

- Safety and security as underlying value for technology and projects
- Innovation with continuity
- Global presence to support with project execution and upgrades
- World-class products.

---

## More than 100 years in business

- Extended capability with field-proven applications
- Expertise in integrated systems for hydropower segments
- Large installed base with leading companies worldwide
- Evolution and integration of automation systems
- ABB Service centers, including remote 24/7 support with collaborative operation centers globally available.