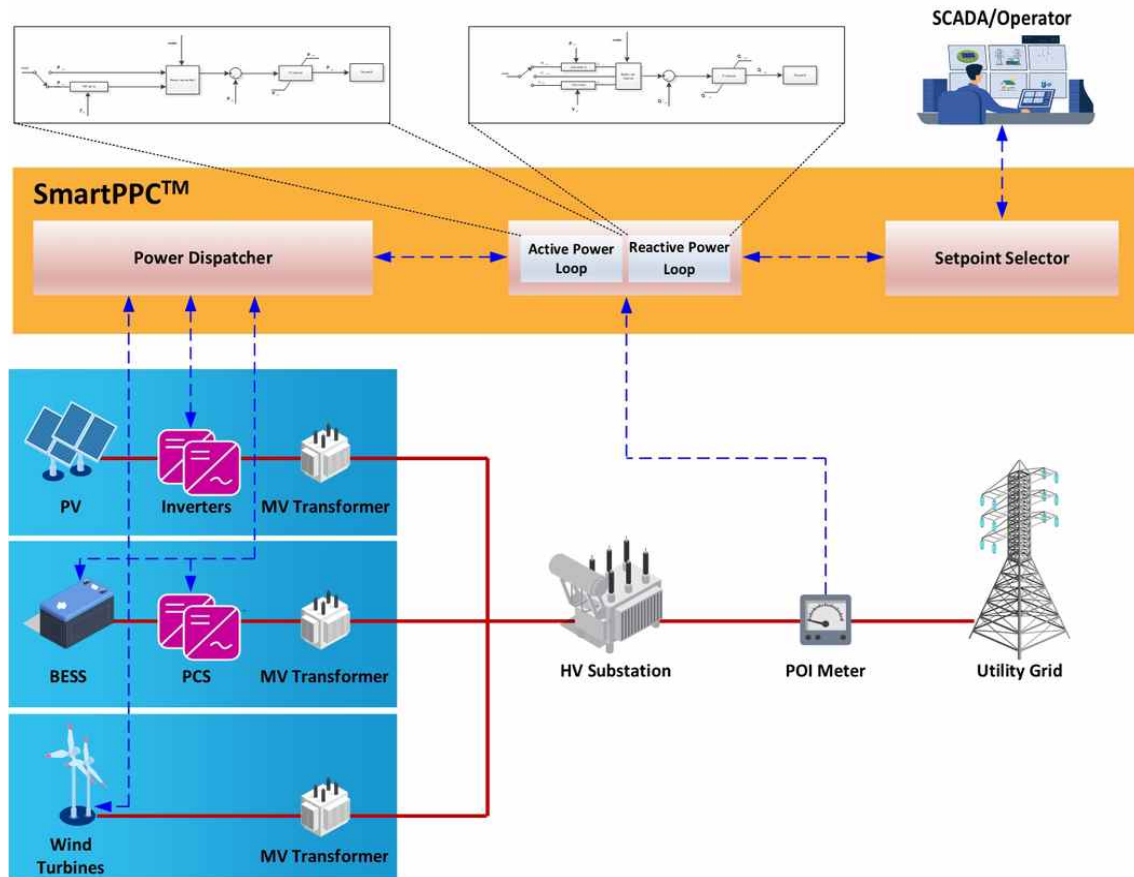


SmartPPC™, the cutting-edge Smart Power Plant Controller designed to revolutionize renewable energy projects. Seamlessly integrating with energy storage systems, SmartPPC™ optimizes power generation, enhances grid stability, and maximizes efficiency. Tailored for the dynamic needs of renewable energy plants, this innovative solution ensures reliable operation, real-time adaptability, and sustainable energy management—paving the way for a greener, smarter future



Overview of SmartPPC™

SmartPPC™: Efficient, scalable, and reliable renewable energy control:

- ◆ **Worldwide Grid Code compliance:** Australia (AEMC NER), Vietnam (25/TT-BCT, 39/TT-BCT, 30/TT-BCT, 05/2025/TT-BCT), Myanmar, Malaysia, Philippines, etc.
- ◆ **Multi Simulation Power System Models Supported:** EMT models (PowerFactory, PSCAD) and RMS models (PSS/E).
- ◆ **Supports multiple standard communication protocols:** IEC 61850, IEC 60870-5-104, IEEE C37.118, DNP3, Modbus RTU/TCP, etc.
- ◆ **Support different generation technologies:** Supports integration with top manufacturers like Huawei, Sungrow, ABB, SMA, Vestas, GE, etc for solar, wind, and BESS.
- ◆ **High Speed:** Support with a fast-sampling time of **20ms** for both P and Q loops, **10ms** for the power meter for precise regulation and fault-ride-through.
- ◆ **High Capacity:** Single SmartPPC™ can handle controlling up to **200 IBRs**.
- ◆ **High Scalability:** Modular design supports up to 8 PPCs in one device. Fits various plant sizes and configurations, with easy integration for future expansions.
- ◆ **Redundancy:** Dual controllers and 4 POI meters in Hot-Standby or Hot-Hot modes for minimal failover.

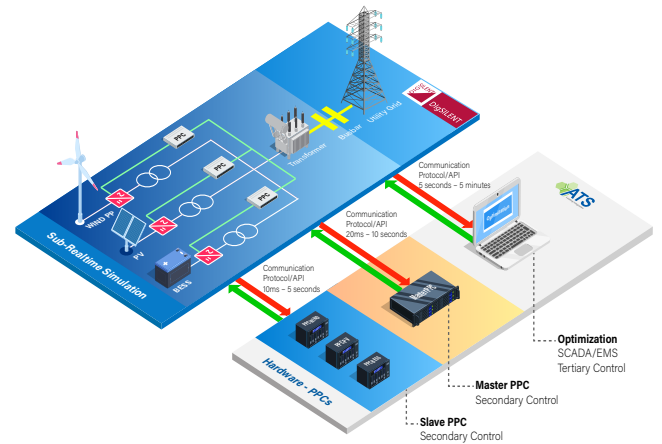
Intelligent Control Functions:

- ◆ **Active Power:** Adjusts output to setpoints or curtailment limits.
- ◆ **Reactive Power/Power Factor Control:** Maintains reactive power and power factor at the Point-of-Connection.
- ◆ **Voltage Control:** Provides dynamic reactive power support for grid stability.
- ◆ **Energy Management:** Balances resources for cost-effective supply with energy storage systems (ESS).
 - * **BESS Scheduling/TOU:** Optimizes charge/discharge cycles.
 - * **Energy Shifting/Peak Shaving Control:** Shifts energy usage to off-peak times to reduce costs and shave peak demand.
 - * **Firming Control:** Ensures a steady and reliable power output, compensating for the variability of renewable energy sources.
 - * **Smoothing Control:** Reduces short-term fluctuations in power output to provide a more stable energy supply.
- ◆ **Grid support control:**
 - * **Grid Frequency Control:** Adjusts power based on grid frequency deviations.
 - * **Frequency Control Ancillary Service (FCAS):** Delivers rapid frequency regulation.
 - * **Fault Ride-Through Support Capability:** Keeps IBRs operational during disturbances.

SmartPPC™ - Smart Power Plant Controller for Renewable Energies and Storage Systems

Multi-Platform Simulation Model Support:

- ♦ **SmartPPC™ Modeling Excellence:** Delivers tailored RMS and EMT models for utility and market operators, now enhanced with **Hardware-in-the-Loop (HIL)** simulation.
- * Comprehensive Compatibility: Supports **PowerFactory DigSILENT, PSS/E, and PSCAD** platforms for simulation testing.
- * Regulatory Assurance: Meets all grid/market operator standards for compliance and precision.
- * Seamless Integration: Provides accurate modeling and simulation for renewable energy projects, ensuring efficient incorporation into the power grid.
- * HIL- Powered Precision: Provides deep insights into transient stability, fault ride-through, and frequency response, as well as improving simulation accuracy, optimizing performance, lowering risks, and accelerating deployment through real-time testing.



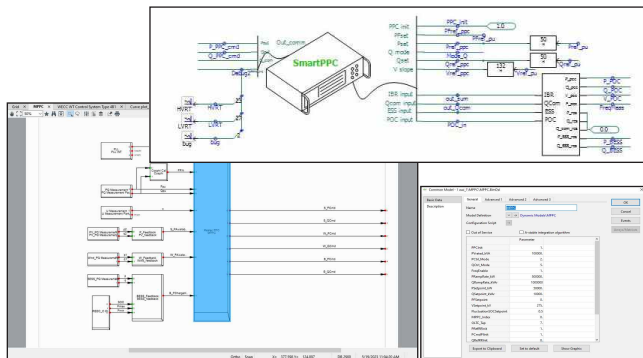
Hardware-In-the-Loop (HIL) co-simulation with DigSILENT sub-real-time mode

Institutive User Interface:

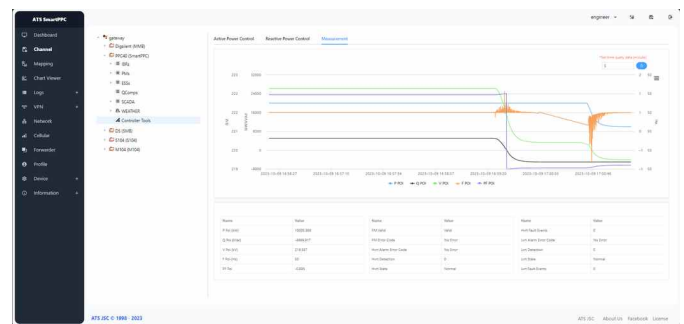
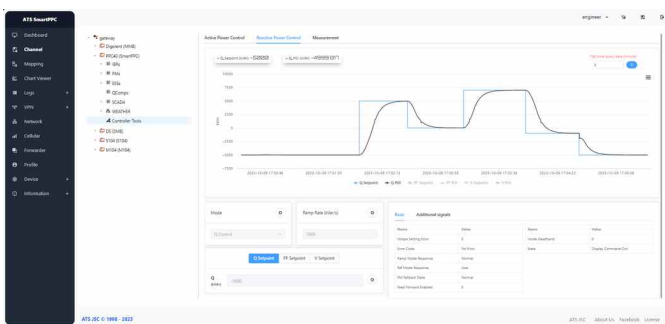
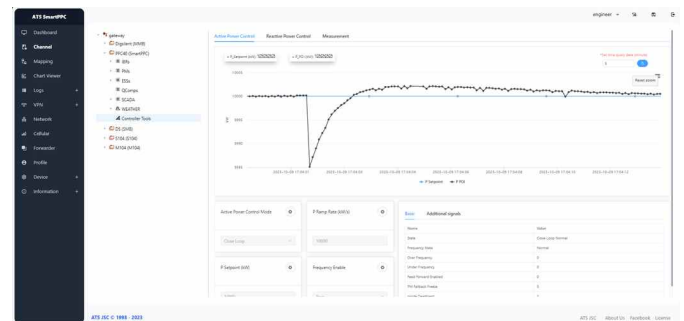
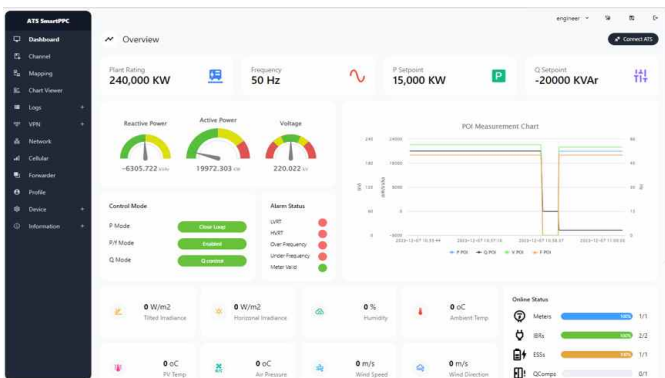
The SmartPPC™ provides a Local Web-based User Interface with quick response of visual control systems with well-designed "look and feel" and "point and click" displays.

Including main features:

- ♦ Dashboard display.
- ♦ Measurement monitoring and Chart Viewer
- ♦ Supervisory Control
- ♦ Configuration
- ♦ System and Data Logging.



SmartPPC™ Simulation Model



SmartPPC™ Integrated Web-based User Interface

