Y.Q
THE YOUNICOS SOFTWARE PLATFORM
BENEFITS AT A GLANCE

UNIQUE EXPERIENCE
Y.Q combines over a decade of energy storage project experience and operational field data and has been installed in 37 projects worldwide with 99.6 percent uptime over the past few years. These deployments comprise projects ranging from 200 kW to 36 MW, and incorporate advanced lead-acid, lithium-ion, sodium-sulfur and flow battery technologies.

SYSTEM-WIDE INTEROPERABILITY
Y.Q ensures interoperability between all energy storage system components by integrating non-proprietary industry-standard protocols such as DNP3, Modbus, CAN bus and IEC 61850. We also enable a smooth external communication interface with existing distributed energy resources (DERs), customer SCADA systems, and other external devices.

SPEED, SCALE AND SECURITY
Thanks to integrated management of all data flows between components, Y.Q eliminates the need for bidirectional connections, enabling faster communication and easy integration of new components. Y.Q not only handles high volumes of data, but also maintains rigorous data and security management.

EASY CUSTOMIZATION
Depending on customer requirements, Y.Q is able to operate several ESS modes ranging from frequency response to island grid-forming and C&I demand management. Through systematic parameterization, Y.Q can easily be customized and quickly adapted when new market applications emerge.

LIFELONG HIGH PERFORMANCE
The operating logic of Y.Q is designed to ensure accurate, fast and dependable real-time operation at all times considering system-wide performance dependencies over the lifetime of the asset. Y.Q constantly works to maximize operational efficiency and to minimize the total cost of ownership of the ESS asset, preventing operations that may damage or prematurely degrade assets.

SYSTEM FLEXIBILITY
Y.Q enables the integration of multiple battery technologies, even within a single system. This hybrid functionality offers significant benefits, as different storage applications call for different chemistries and future battery innovations can easily be adopted. Y.Q is designed to readjust operating conditions to new requirements and to accommodate future components as the supply chain evolves.
Y.Q - THE YOUNICOS QUOTIENT

Based on more than a decade of battery storage project experience and our deep understanding of energy systems, we have developed a powerful integrated software platform and included it in all Younicos solutions. We call this unique intelligence Y.Q – the Younicos Quotient.

The Y.Q software platform supports multiple storage technologies and applications. It is powering more than 150 MW of energy storage projects worldwide with measured uptime and availability of more than 99.96 percent.

The brains behind our solutions
Y.Q ensures that you always get the most out of your system while guaranteeing full system availability and maximizing asset life. Combining advanced control algorithms with a robust communications architecture, it delivers best-in-class energy management. Y.Q safely and efficiently operates all system components to deliver the real and reactive power needed. In addition, it facilitates integration with external systems, such as existing customer SCADA systems and other on-site devices.

Multitasking at its best
Our software platform enables an energy storage system to handle a variety of services using a multi-mode priority stacking feature. The customer decides which functions are most valuable and intelligent Y.Q optimization sets up an automated control hierarchy to determine real-time operation according to grid conditions and market requirements. Y.Q can be quickly and easily adapted as new applications emerge.

MULTI-MODE PRIORITY STACKING
- Island grid-forming
- Frequency regulation
- Black start
- Demand charge management
- Capacity markets
- Voltage control and power factor correction
- Peak shaving
- Ramp rate control
FEATURES AND COMPONENTS

Y.Q delivers not only truly seamless integration of internal energy storage elements like battery BMS, inverters, HVAC, fire suppression and switchgear but also a seamless external communication interface with existing distributed energy resources (DER) assets and the customer’s SCADA systems.

Y.Q Architecture

Deploying advanced IoT technology, Y.Q is inherently flexible, easily maintained, and fast to deploy and operate. Our communication bus design allows for rapid response times and trouble-free scalability. Y.Q maps all components internal to the energy system using non-proprietary standard protocols. External interfacing with SCADA systems is possible over standard protocols, such as IEC 60870-5-104 or DNP3.
**ACBM: AC Battery Manager**
The ACBM manages local battery racks connected to a single power conversion system, managing local protection, control and monitoring of each battery rack connected to each PCS unit.

**BPPM: Battery Power Plant Manager**
The BPPM is a centralized controller that takes inputs from the Younicos system database, customer SCADA and grid measurements to deterministically deliver real and reactive commands to all power units.

Our optimization platform resides in the BPPM, constantly monitoring and controlling the energy storage system to meet application needs, maximize system returns and operate the system safely. It ensures that energy storage assets operate within their warranty performance parameters while minimizing auxiliary load losses and operating costs. In all of our deployments, we provide a number of standard optimization functions such as:

- Battery degradation management
- Efficiency optimization
- SOC balancing
- Auxiliary load management

**EM: Energy Manager**
In microgrid applications, we include the EM to dispatch multiple energy resources or manage transition to a grid-forming mode when necessary. It constantly forecasts, monitors, and optimizes the dispatch of assets under management, ensuring a stable and reliable microgrid.

**FC: Fleet Controller**
Fleets of energy storage systems like multiple Y.Cube units can be seamlessly aggregated and operated as a single consolidated resource under our Y.Q platform. By pooling various resources ranging from energy storage to demand-side management and renewable generation, we are able to deliver multiple services to the grid exactly when they are needed.

**WEB UI: Web User Interface**
Y.Q incorporates a multi-user interface for remote system monitoring and control. It provides multiple levels of user access control on a per-user basis, and all user-initiated commands are time-stamped and logged. The Web UI interfaces to the MySQL database and provides real-time and historical trending for user requirements, such as performance reporting and maintenance management. The Web UI is supported by any up-to-date web browser and device, including tablets and smartphones.
SELECTED PROJECTS

**Graciosa, Azores, Portugal**

Our Y.Q software platform is at its full grid-forming potential on the island of Graciosa in the Azores, where it provides real-time power management and energy dispatch for the entire island’s grid. Resources under Y.Q control include a 4 MW energy storage system, a 4.5 MW wind park, a 1 MW photovoltaic plant and a diesel generator. The system allows the island to be powered entirely by wind and solar, with the existing diesel units used only as backup power during prolonged periods of unfavorable weather.

Y.Q is fully responsible for maintaining the nominal voltage and frequency of the island grid stable at 50 Hz. Asymmetric load handling and short-circuit currents are also taken care of by our intelligent software.

The Energy Manager software constantly evaluates the load and dispatches all energy resources to match demand on the island. It guarantees the long-term stability of the power system on Graciosa by generating an operation schedule for each system component, constantly forecasting and monitoring the grid’s behavior.

**Notrees, Texas, USA**

Duke Energy is using Younicos controls technology to manage operations for a 36 MW energy storage system at the site of Duke Energy’s 153 MW wind farm in Notrees, Texas.

The Notrees battery park was the first resource to operate in ERCOT’s Fast-Response Regulation Service (FRRS) program and provide ancillary services. Managed by the Y.Q software platform, it automatically deploys its full capacity in less than half a second after a frequency deviation event.

In order to maintain its high level of performance and extend the life of the system, Duke Energy repowered the system, replacing the installed advanced lead acid battery technology with new lithium-ion batteries. Subsequently, the Y.Q platform was upgraded to operate both chemistries in parallel in a hybrid ESS mode while simultaneously managing the entire facility as a single unit on the ERCOT grid.

FOR MORE INFORMATION, PLEASE CONTACT US:

mail@younicos.com  +49 30 818 79 9010