FLUENCE
A Siemens and AES Company

## FLUENCE OS

# Bringing unparalleled visibility and control to your storage system

The 6th Generation Fluence Operating System (OS) is a fully integrated operations platform that combines comprehensive controls, asset management, and system visibility at a single site or across an entire fleet.

Manage storage system operations according to pre-set modes and access real-time information through multiple system views, including control view, plant view, and fleet view.

## Fluence OS Features

### SYSTEM CONTROLS
Actively manage power and operational modes at the Array, Core, and Node levels with easy access to system KPIs.

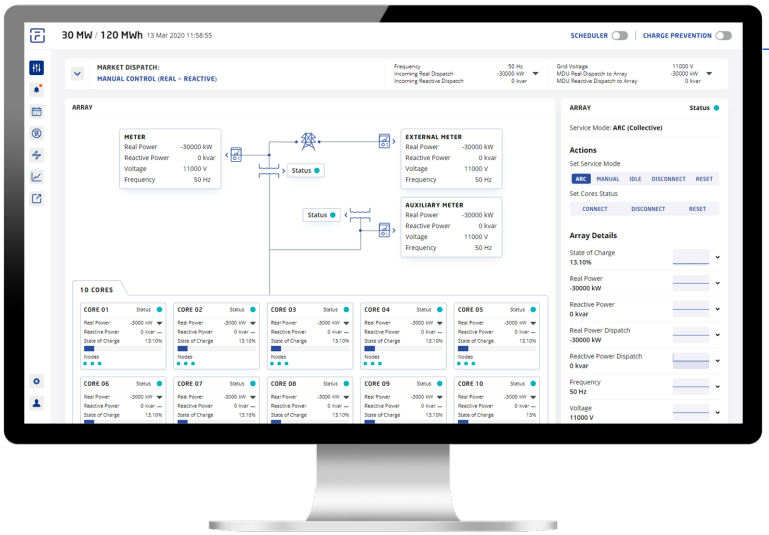
### APPLICATION STACKING
Increase revenue generating opportunity by stacking multiple dispatch applications on top of each other.

### REAL-TIME ALARMS
Alarms proactively notify operators to system issues and anomalies with time-stamped details.

### APPLICATION SCHEDULING
Schedule multiple market dispatch applications with all relevant timing and operating parameters.

### CHARGE PREVENTION
Prevent charging during select days and hours to avoid peak pricing or comply with network requirements.

### EMBEDDED SAFETY
Fluence OS continuously monitors, detects, and alerts operators to potential anomalies in the system.




**Comprehensive data collection at every level of the storage system provides real-time insights and enables 24/7 remote monitoring and support.**

## Fluence OS Monitoring

### DATA RETENTION
30,000+ data points are collected for a typical 20 MW system. Data is retained locally on-site and regularly backed up to the cloud per project requirements.

### SYSTEM LIMIT ANALYSIS
A range of system limits, including cell, BMS and PCS voltage, temperature, SOC, SOH, humidity and more, are continuously analyzed to ensure safe operation.

### REMOTE MONITORING
All systems are built with 24/7 remote monitoring and control capabilities to detect potential issues before they occur and alert operators for immediate action.

# Controls Architecture

The Fluence OS architecture uses embedded logic and application rules to turn outside market signals into efficiently dispatched power.

### FLUENCE IQ MARKET DISPATCH UNIT (MDU)

The Market Dispatch Unit dispatches real and reactive power to the Array controller as generated by the active applications.

### ARRAY CONTROLLER

The Array Controller presents the storage Array as a single battery to the MDU; aggregating all Cores in the system. Dispatch signals sent from the MDU are distributed to the Cores.

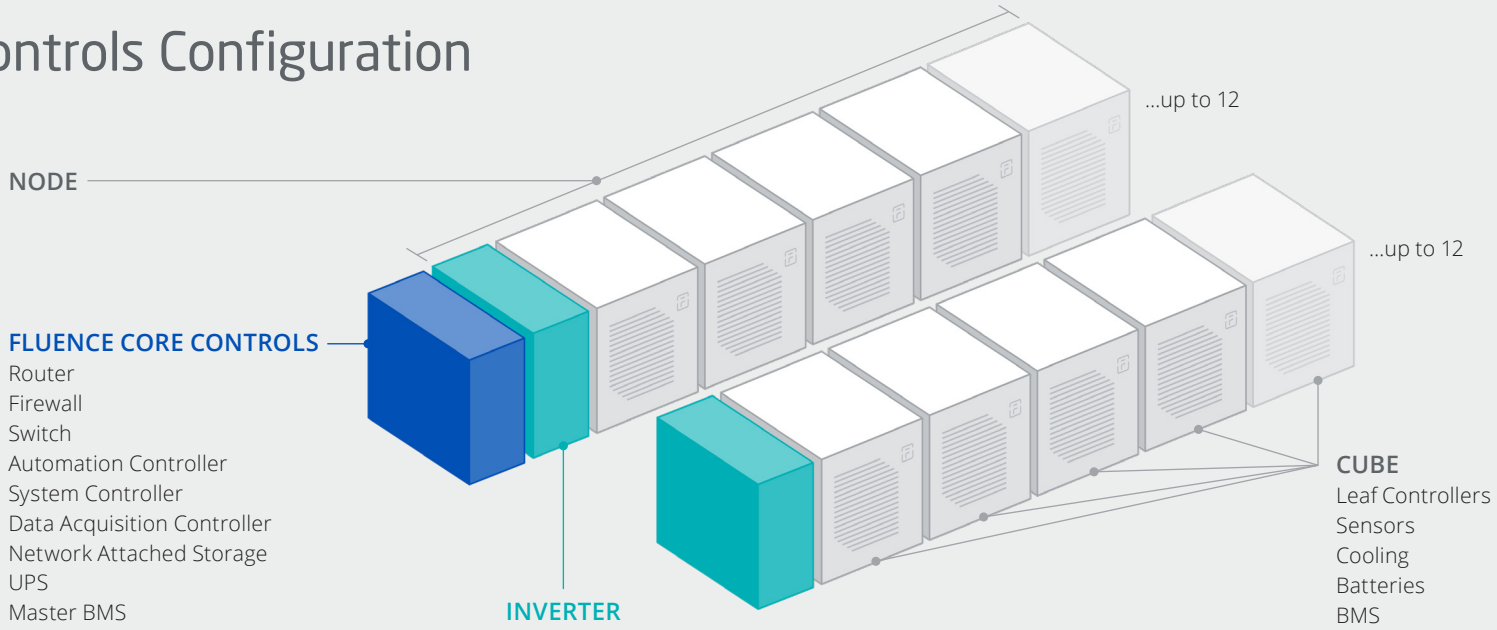
### CORE CONTROLLER

The Core Controller aggregates Nodes from the isolation transformer down, present/command collection of Nodes. Dispatch signals sent from Array are distributed to the Nodes.

### NODE CONTROLLER

The Node Controller directly connects to each PCS, BSC/BMS/Batteries system.

# Controls Configuration




# Controls Specifications

### NETWORK AND CYBER SECURITY

- VPN-based remote site access
- Multifactor authentication
- High grade, 256-bit encryption
- Enterprise-class network security
- Weekly vulnerability scanning
- Data transfer over secure VPN tunnels

### SYSTEM DATA POINTS

- 2,000 points collected per Array*
- 3,000 points collected per Core*

### SOFTWARE USER ROLES

- Observer
- Operator
- Lead Operator

### RTU PROTOCOLS

- Modbus
- DNP3
- IEC 60870-5-104

### SERVICE MODES

- Automatic Resource Control (ARC)
- Manual
- Idle
- Disconnect
- Reset

### IQ DISPATCH ALGORITHMS

- Power Factor Regulation
- Voltage Regulation
- Primary Frequency Control
- Secondary Frequency Control
- Peak Shaving
- Primary Fast Frequency Response
- Non-Spinning Reserve
- Renewable Firming
- Dynamic VAR Support

** Approximate, varies by system configuration*