Microgrid, Battery Energy Storage and Distributed Generation Solutions

Global Customer References
Global installed base
Microgrids and BESS

Worldwide: 470 MW

North America: 156 MW
South America: 20 MW
Africa: 2 MW
Middle East: 200 kW
Europe: 18 MW
Asia Pacific: 186 MW
Australia: 88 MW
Island Utilities
Island utilities
Porto Santo, PowerStore/PV/Wind

About the Project
- **Project name:** Porto Santo
- **Location:** Porto Santo Island – Madeira, Portugal
- **Customer:** Empresa de Electricidade da Madeira (EEM)

The resulting Microgrid system consists of:
- PowerStore Battery (4 MW/3 MWh)
- Microgrid Plus Control System
- Solar PV (2.25 MWp)
- Wind (1.5 MW)
- Diesel (4 x 4 MW)

Solution

Customer Benefits
- Increase the share of renewables in the energy mix from 15 to 30 percent
- Stabilize the power system to address frequency and voltage fluctuations
- Reliable power supply, supported by renewable energy
- Meet the enhanced electricity demand during summers with a high inflow of tourists

ABB’s Microgrid and energy storage technology to enable the island of Porto Santo to achieve clean-energy goals
Island utilities
Jamaica Public Service (JPS), Wind/PV

About the Project

- **Project name**: JPS Grid Stability
- **Location**: Jamaica
- **Customer**: Jamaica Public Services Company Ltd
- **Year**: 2018

Solution

The resulting Microgrid system consists of:

- PowerStore Battery (21.5 MW / 16.6 MWh)
- PowerStore Flywheel (3 x 1 MW / 16.5 MWs)

Customer Benefits

- Maximum utilization of solar and wind energy
- Reliable power to 5 million populace in the island
- Power availability during intermittency of renewable sources
- Reduced dependency on fossil fuels and lower carbon footprint

Press Release
The microgrid solution allows for integration of a complex energy generation portfolio and maximizes the use of renewable energy; enabling WEB Aruba to meet the peak demand (134 MW) of the tourist island.
Robben Island, PowerStore/PV/Diesel

About the Project
- **Project name:** Robben Island
- **Location:** South Africa
- **Customer:** Department of Tourism, South Africa
- **Completion date:** 2017

The resulting Microgrid system consists of:
- PowerStore Battery (500 kW/837 kWh)
- Microgrid Plus Control System
- Solar PV (667 kWp)
- Diesel (1 x 500 kW)

Customer Benefits
- Lower fuel costs and carbon emissions by 75%
- Enabling the island to run on solar power for at least 9 months of the year
- Remote monitoring of the entire system from Cape Town
- Remote set-up eliminates the need to maintain a workforce on the island

ABB's microgrid solution enables the Robben Island to run on solar power for at least 9 months in a year
Island utilities
Kodiak Island, PowerStore/Wind/Hydro/Diesel

About the Project

- Project name: Kodiak Island
- Location: Alaska, United States of America
- Customer: Kodiak Electric Association (KEA)

The resulting Microgrid system consists of:
- PowerStore Flywheel (2 MW / 33 MWs)
- Wind (6 x 1.5 MW)
- Hydro (3 x 11 MW)
- Diesel (1 x 17.6 MW, 1 x 9 MW, 1 x 3.6 MW, 1 x 0.76 MW)

Solution

- Stabilizing frequency regulation
- Provide frequency support for a new crane
- Help to manage the intermittencies from a 9 MW wind farm
- Reduced reliance on diesel generators

Customer Benefits

Two PowerStore Flywheels act in parallel in order to deliver optimal grid stabilization on Kodiak Island
La Gomera Island, PowerStore

**Island utilities**

La Gomera Island, PowerStore

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**About the Project**

- **Project name:** La Gomera Island
- **Location:** Canary Islands, Spain
- **Customer:** Endesa

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**Solution**

- The resulting Microgrid system consists of:
  - PowerStore Flywheel (500 kW/16.5 MWs)

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**Customer Benefits**

- Stable electricity to 22,000 Islanders
- Stabilizing - frequency and voltage regulation

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**Stable, reliable and uninterrupted supply of clean electricity to 22,000 people in the Island**

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Press Release

Video
Faial Island, Wind/Heavy Fuel Oil

About the Project

- **Project name:** Faial Island
- **Location:** The Azores, Portugal
- **Customer:** Electricidade dos Acores (EDA)

Solution

The resulting Microgrid system consists of:
- Microgrid Plus Control System
- Wind (5 x 850 kW)
- Heavy Fuel Oil (3 x 3.7 MW + 2 x 3 MW + 1 x 2 MW)

Customer Benefits

- Minimize diesel consumption - 3.5 million liters of fuel saved annually
- Minimum environmental impact - 9,400 tons CO₂ avoided annually

The microgrid solution helps to save cost (minimize diesel consumption) and protect the environment (reduction in CO₂ gas emissions)
Transmission and utilities
ESCRI, PowerStore/PV/Wind

About the Project
- **Project name**: ESCRI
- **Location**: Australia
- **Customer**: ElectraNet
- **Completion date**: 2018

The resulting Microgrid system consists of:
- PowerStore Battery (30 MW/8 MWh)
- Microgrid Plus Control System
- Wind (90 MW)
- Distributed rooftop solar

Solution

Customer Benefits
- Improve the overall reliability of power supply in the region
- Deliver enough power to run around 400 homes for 24 hours without the input from renewable generators
- Uninterrupted power supply during transmission line outage

The microgrid will connect the battery energy storage solution to the Electranet transmission system enabling the value stacking of storage in regulated energy market.
Remote Communities
Remote communities
Deering, PowerStore/Wind/Diesel

About the Project

- **Project name:** Deering and Buckland Microgrid
- **Location:** Alaska, United States of America
- **Customer:** NANA Regional Corporation, Inc
- **Year:** 2018

Solution

The resulting Microgrid system consists of:
- PowerStore Battery (200 kW/ 200 kWh)
- Microgrid Plus Control System
- Solar PV (30 kWp)
- Wind (1 x 100 kW)
- Diesel (2 x 170 kW, 1 x 100 kW)

Customer Benefits

- Stable, reliable and affordable power to the local community
- Maximum utilization of wind power
- Help communities achieve 100% renewable penetration
- Help customer to reach its goal - reduce reliance on imported diesel by up to 75 percent, by 2030

The microgrid solution will provide stable, reliable and affordable power to the local community by maximizing the adoption of wind power.
Remote communities
Buckland, PowerStore/Wind/Diesel

About the Project
- **Project name:** Deering and Buckland Microgrid
- **Location:** Alaska, United States of America
- **Customer:** NANA Regional Corporation, Inc
- **Year:** 2018

Solution
- The resulting Microgrid system consists of:
  - PowerStore Battery (400 kW/ 400 kWh)
  - Microgrid Plus Control System
  - Solar PV (50 kWp)
  - Wind (2 X 100 kW)
  - Diesel (2 X 475 kW, 1 X 175 kW)

Customer Benefits
- Stable, reliable and affordable power to the local community
- Maximum utilization of wind power
- Help communities achieve 100% renewable penetration
- Help customer to reach its goal - reduce reliance on imported diesel by up to 75 percent, by 2030

The microgrid solution will provide stable, reliable and affordable power to the local community by maximizing the adoption of wind power.
Remote communities
Marsabit Wind Farm, PowerStore/Wind/Diesel

About the Project
- **Project name:** Marsabit Wind Farm
- **Location:** Kenya
- **Customer:** Socabelec East Africa Ltd (SEAL)

Solution
The resulting Microgrid system consists of:
- PowerStore Flywheel (500 kW/ 16.5 MWs)
- Wind (2 x 275 kW)
- Diesel (2 x 800 kW)

Customer Benefits
- Reliable and stable power supply
- Off-grid power supply using renewables

Microgrid solution provides secured & stable power supply for 5,000 people in the Marsabit community, Kenya
Remote communities
Nullagine, PowerStore/PV/Diesel

About the Project

- **Project name:** Nullagine
- **Location:** Western Australia, Australia
- **Customer:** Horizon Power, Government of WA

Solution

The resulting Microgrid system consists of:

- PowerStore Flywheel (500 kW/ 16.5 MWs)
- Microgrid Plus Control System
- Solar PV (1 x 200 kW_p)
- Diesel (3 x 320 kW)

Customer Benefits

- Minimize diesel consumption - 400,000 liters of fuel saved annually
- Minimum environmental impact - 1,100 tons CO₂ avoided annually
- Reliable and stable power supply
- 60% of the day time electricity demand is generated by the PV plant

Marble bar and Nullagine are the world’s first high penetration, solar photovoltaic diesel power stations
Remote communities
Marble Bar, PowerStore/PV/Diesel

About the Project
- **Project name:** Marble Bar
- **Location:** Western Australia, Australia
- **Customer:** Horizon Power, Government of WA

The resulting Microgrid system consists of:
- PowerStore Flywheel (500 kW / 16.5 MWs)
- Microgrid Plus Control System
- Solar PV (1 x 300 kW)
- Diesel (4 x 320 kW)

Customer Benefits
- Minimize diesel consumption - 400,000 liters of fuel saved annually
- Minimum environmental impact - 1,100 tons CO₂ avoided annually
- Reliable and stable power supply
- 60% of the day time electricity demand is generated by the PV plant

Marble bar and Nullagine are the world's first high penetration, solar photovoltaic diesel power stations
Remote communities
Coral Bay, PowerStore/Wind/Diesel

About the Project
- **Project name**: Coral Bay
- **Location**: Western Australia, Australia
- **Customer**: Verve Energy

Solution
The resulting Microgrid system consists of:
- PowerStore Flywheel (500 kW/18 MWs)
- Control System
- Wind (3 x 225 kW)
- Diesel (7 x 320 kW)

Customer Benefits
- Minimized diesel consumption
- Reliable and stable power supply
- Allows high integration of wind energy

Press Release

Microgrid solution was implemented in Coral Bay to provide stable power supply for 140 permanent residents.
Industrial and Commercial sites
Industrial and commercial sites
Alinta Energy, PowerStore/Gas

About the Project

- **Project name:** Newman Power Station BESS
- **Location:** Newman, Australia
- **Customer:** Alinta Energy - Newman Power Station

Solution

The resulting Microgrid system consists of:
- PowerStore Battery (30 MW/7 MWh)
- Microgrid Plus Control System
- Gas Turbines (4 x 178 MW)

Customer Benefits

- Reliable and stable power supply
- Improved power quality and increased energy efficiency
- Ensure continuous operations of Roll Hill mining (Newman power station supplies power to the mine)
- Battery system provides spinning reserve as replacement for gas turbine operation

ABB’s solution, one of the largest battery energy microgrid installations, enables the Newman Power Station to provide high quality and uninterrupted power supply to Roll Hill mining operations
**Industrial and commercial sites**

ABB Vadodara, PowerStore, PV

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### About the Project

- **Project name:** ABB Vadodara Microgrid
- **Location:** Gujarat, India
- **Customer:** ABB

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### Solution

The resulting Microgrid system consists of:
- PowerStore Battery (500 kW MW / 1 MWh)
- Microgrid Plus Control System
- Solar rooftop (600 kW)
- Cloud-based remote service system

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### Customer Benefits

- Reliable and uninterrupted power supply
- Leverage solar energy supply to meet factory’s growing power needs
- Save 1400 tonnes of CO2 every year
- Generate 2 million units of clean energy per year

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ABB installed first-of-its-kind microgrid solution, harnessing solar power, in its manufacturing campus at Vadodara, India to meet the growing power needs of expanding the factory.
Industrial and commercial sites
Woodside (oil & gas), PowerStore

About the Project
- Project name: Goodwyn A
- Location: North West Australia
- Customer: Woodside Energy

Solution
The resulting Microgrid system consists of:
- PowerStore Battery (2.8 MW/1.43 MWh)
- Microgrid Plus Control System
- Gas Turbines (5 x 3.5 MW)
- Remote monitoring

Customer Benefits
- Providing ‘spinning reserve’ to aid short term backup
- Minimize the dependency on diesel generator
- Reduce fuel gas consumption by 2000 tons per year and CO₂ emissions by 5%

The microgrid solution will contribute to Woodside’s 2020 goal of reducing carbon emissions and will help lower cost of operations and maintenance
The microgrid solution enables ICRC logistics center to deliver food and other essential like medicines, relief supplies across the African continent.

About the Project
- **Project name:** ICRC Logistics Center
- **Location:** Nairobi, Kenya
- **Customer:** International Committee of the Red Cross

Solution
- The resulting Microgrid system consists of:
  - PowerStore Battery (150 kW/100kWh)
  - Microgrid Plus Control System
  - Solar PV (1 x 30 kWp)
  - Diesel (1 x 150 kW)

Customer Benefits
- Reliable and stable power supply
- Optimized renewable energy contribution
- Ability to island from the grid after an outage or faults
- Reduced diesel generator usage

Press Release
Industrial and commercial sites
Longmeadow, PowerStore/PV/Diesel

About the Project
- **Project name:** Longmeadow
- **Location:** South Africa
- **Customer:** Longmeadow Business Estate

Solution
- The Microgrid solution consists of:
  - PowerStore Battery (1 MW/380 kWh)
  - Microgrid Plus Control System
  - Solar PV (1 x 750 kWp)
  - Diesel (2 x 600 kW)
  - Remote Monitoring

Customer Benefits
- Stabilizing the grid for reliable and stable power supply
- Optimized renewable energy contribution to the facility
- Seamless transition from grid connection to islanding in case of an outage
- CO₂ reduction: over 1,000 tons/year
- Up to 100% renewable energy penetration

The microgrid solution is for the 96,000 sqm facility in Johannesburg that houses both ABB South Africa’s headquarters, as well as a manufacturing facility employing close to 1,000 employees.
Urban Communities
Urban communities

Odd soccer club’s Skagerak Arena, PowerStore/Solar

About the Project

- **Project name:** Odd soccer club’s Skagerak Arena
- **Location:** Skien, Norway
- **Customer:** Skagerak Energi

Solution

The resulting Microgrid system consists of:
- ABB Ability™ PowerStore Battery (800 KW/1000 kWh)
- Microgrid Plus control and automation system
- Remote monitoring
- Rooftop solar

Customer Benefits

- Power stadium floodlights during soccer games
- Meet the annual power consumption of the stadium - 375,000 kWh
- Provide electricity to 15 homes in the stadium’s neighborhood
- Facilitate utility to gather insights on prosumers’ power production and consumption pattern

First-of-its kind solar-powered energy lab that will use microgrid solution coupled with a battery energy storage system to power a soccer stadium, as well as gather insight about power grids of the future.
Urban communities
AusNet Services, PowerStore/Diesel

About the Project
- **Project name**: AusNet Services
- **Location**: Victoria, Australia
- **Customer**: AusNet Services
- **Completion date**: 2014

Solution

The resulting Microgrid system consists of:
- PowerStore Battery (1 MW/1 MWh)
- Microgrid Plus Control System
- Diesel (1 x 1 MW)

Customer Benefits
- Active and reactive power support during high demand periods
- Transition into isolated/off-grid operation on command or in emergency cases without supply interruption
- Mobile and transportable containerized solution

First embedded generation system with battery grid energy storage for distribution network support in Australia
Institutions and Campuses
Institutions and campuses
University of Chester, Wind/PV/Thermal

About the Project

- **Project name**: The Thornton Science Park Microgrid
- **Location**: United Kingdom
- **Customer**: University of Chester

Solution

ABB’s microgrid solution helps in maximizing the penetration of renewable energy in grid system. Also, the microgrid controller allows the university to connect or disconnect seamlessly from the main grid and operate in an islanded mode, ensuring continuity of supply in case of an outage.

Customer Benefits

- Maximize renewable energy penetration in grid system
- Helps to operate in off-grid (islanded) mode
- Continuity of power supply during outage

The microgrid at the Energy Centre, University of Chester is first of its kind in a UK university campus to demonstrate where new energy technologies can be developed and tested, bringing industry and academia together to drive innovation.
Battery Energy Storage Solutions
Battery Energy Storage Solution

Chitose Hokkaido

About the Project

- **Project name:** Chitose Hokkaido, Li-ion batteries
- **Location:** Japan
- **Customer:** Japan’s Energy Products Corporation and Korea Electric Power Corporation
- **Completion date:** 2016

Solution

ABB’s scope includes:

- 17 MW outdoor PCS
- PCS inverters, DC contactors, AC circuit breakers
- MV-LV coupling transformer
- MV switchgear
- Local controller integrating PCS, switchgear and MBMS
- Local HMI

Customer Benefits

- Enabling Shin Chitose Solar plant to adhere to the grid code requirements of local utilities
- Ensuring reliable integration of renewables into the main power grid
- Helping Shin Chitose plant to generate power to 11,000 local households

Enabling Japan’s significant renewable initiative to generate 35 gigawatt-hours (GWh) of power for 11,000 local households
Battery Energy Storage Solution

Yangguang Power Plant

About the Project

- **Project name**: Yangguang Power Plant,
- **Battery**: Li-ion batteries
- **Location**: China
- **Completion date**: 2016

Solution

ABB's scope includes:
- 9 MW Outdoor PCS
- PCS inverters, DC contactors, AC circuit breakers
- MV-LV coupling transformer
- MV switchgear
- Local controller integrating PCS, switchgear and MBMS
- Local HMI

Customer Benefits

- Integration with coal fired power plant 300 MW
- Achieve frequency regulation
Battery Energy Storage Solution

KIUC Anahola

About the Project

- **Project name:** KIUC Anahola
- **Battery:** Li-ion batteries (6 MW - 4 MWh)
- **Location:** Hawaii, USA
- **Completion date:** 2015

Solution

ABB’s scope includes:

- PCS rated at 6 MW integrated in (2) 20'ISO containers
  - 6 MW converters and HVAC
- EssPro controller
  - Frequency regulation
  - Voltage regulation
  - Firming

Customer Benefits

- Help integrate solar power on the network
- Frequency and voltage regulation; spinning reserve
Battery Energy Storage Solution
Southern Company BESS

About the Project
- **Project name:** Southern Company BESS
- **Battery:** Li-ion batteries (1000 kW - 2000 kWh)
- **Location:** USA
- **Completion date:** 2015

Solution
ABB’s scope includes:
- PCS 1000 kW / 1500 kVA integrated in (1) NEMA 3R enclosure
- EssPro Vantage Controller
  - Frequency regulation
  - Voltage regulation
  - Firming
  - Load shifting

Customer Benefits
- Achieve load leveling and peak shaving

Battery energy storage solution (1.5 MW) for a microgrid in USA
Battery Energy Storage Solution
BESS Integrator / PJM

About the Project

- **Project name**: BESS Integrator / PJM
- **Location**: USA
- **Battery**: Li-ion batteries
- **Completion date**: 2014

Solution

ABB’s scope includes:
- 20 MW outdoor PCS / 35kV
- Includes inverters, dc circuit breakers, AC circuit breakers, control, protection and external isolation / step-up transformer to 35 kV grid
- Metering / data management
- Noise suppression

Customer Benefits

- Achieve frequency regulation
- Enable to operate in the PJM regulation market

20MW BESS used for PJM Market Participation
Battery Energy Storage Solution

ENEL

About the Project

- **Project name**: ENEL
- **Location**: Italy
- **Battery**: Li-ion batteries
- **Completion date**: 2014

Solution

ABB's scope includes:

- Turnkey BESS providing 2 MW for 30 minutes including system studies and specification
- Containerized solution incl. converter, transformer, switchgear, control and protection systems
- Standard control algorithms

Customer Benefits

- Battery energy storage system connected to the distribution grid

BESS (2 MW) connected to the distribution grid for a well-known energy company
Battery Energy Storage Solution

Tehachapi

About the Project

- Project name: Tehachapi
- Location: USA
- Battery: Li-ion batteries
- Completion date: 2013

Solution

ABB's scope includes:
- 8 MW / 9 MVA PCS100 for BESS
- EssPro Vantage Controller
- DC bus and protection circuit breakers
- System models, RTDS and simulations
- Commissioning, training and installation supervision

Customer Benefits

- Establish smart grid program
- Assess the capability and effectiveness of storage to support 13 operational applications

Battery energy storage solution (8 MW) for BESS use case analysis and performance
Battery Energy Storage Solution

EKZ

About the Project

- Project name: EKZ
- Location: Switzerland
- Battery: Li-ion batteries
- Completion date: 2012

Solution

ABB’s scope includes:

- Turnkey BESS providing 1 MW for 15 minutes including system studies and specification
- Containerized solution including converter, transformer, switchgear, control and protection systems
- Standard and advanced control algorithms

Customer Benefits

- Battery energy storage facility connected to the distribution grid, with integrated solar panels and e-mobility charging stations

Turnkey BESS providing 1 MW for 15 minutes
Battery Energy Storage Solution

Utility

About the Project

- **Project name**: Utility
- **Location**: USA
- **Battery**: Li-ion batteries
- **Completion date**: 2012

Solution

ABB's scope includes:

- Supplied 500 kW PCS, including inverters, circuit breakers, isolation transformer, disconnect switch and metering cabinet
- Ongoing development of control algorithms with US utility and University in the area

Customer Benefits

- Helped in demand reduction
- Achieve smooth PV integration (firming)

Battery energy storage solution for a US based 500 kW Utility
Battery Energy Storage Solution

Hawaiian Utility

About the Project

- Project name: Hawaiian Utility
- Location: USA
- Battery: Li-ion batteries
- Completion date: 2012

Solution

- ABB’s scope includes:
  - 100 kW / 240 kWh BESS for two sites - West Health Civic Center and Koyo Bottling Company
  - Indoor 100 kW PCS including inverters, DC contractors, AC circuit breakers, control and isolation transformer
  - Dynamic control algorithms

Customer Benefits

- Demand reduction and voltage support
- Load shifting / PV integration
Battery Energy Storage Solution

Angamos

About the Project

- **Project name:** Angamos
- **Location:** Chile
- **Battery:** Li-ion batteries
- **Completion date:** 2011

Solution

ABB’s scope includes:

- 20 MW PCS containers
- Each containing inverters, circuit breakers, step up transformers, control, MV disconnect switch

Customer Benefits

- Achieve spinning reserve and frequency regulation

Battery energy storage solution (20 MW) to ensure the grid reliability against transmission or generation losses
Battery Energy Storage Solution
NYPA, Garden City

About the Project
- **Project name**: NYPA, Garden City
- **Location**: USA
- **Battery**: NaS battery technology
- **Completion date**: 2006

Solution
ABB’s scope includes:
- Powered gas compressors during the day and recharge at night
- Shift compressor demand to night, lowers daytime peak demand rates
- BESS provides backup power supply

Customer Benefits
- Achieve load leveling and peak shaving

Battery energy storage solution (1 MW) to provide back up power supply
Battery Energy Storage Solution

Fairbanks

About the Project

- **Project name:** Fairbanks, Alaska
- **Location:** USA
- **Completion date:** 2003

ABB’s scope includes:

- Turnkey BESS including converter, transformer, Ni-Cd batteries (battery supplier SAFT), metering, protection and control devices and service equipment
- 27 MW - 15 minutes / 46 MW - 5 minutes
- BESS operation at temperatures as low as -52°C

Solution

Customer Benefits

- Improve reliability of electricity services
- Emergency power source to feed energy to the grid until backup generation can come online
- 15 minutes power boost to get generators online, leading to 90 percent reduction of power blackouts due to grid faults
- Cost-effective and reduced carbon emission solution

World’s oldest BESS in service and also has held 2 world records in the BESS market
Distributed Generation Solutions
Global Key References

Plant + Fleet Monitoring + Controls solutions for Renewables: >7 GW track record globally.
Soposa & Cohesa
Plant SCADA for Valle & Nacaome PV plant

About the Project
- Supply of the complete monitoring and control solution of two 50 MW PV plants
- Completion date: 2015

Solution
ABB's scope includes:
- Plant SCADA
  ➢ MicroSCADA Pro
- Plant controller
  ➢ RTU500

Customer Benefits
- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level
Sputnic

Plant SCADA for Bugulchanskaya & Buribaevskaya PV plants

About the Project

- Supply of the complete motoring and control solution for (15 MVA) PV plants
- Completion date: 2015
- Location: Russia

ABB’s scope includes:
- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Solution

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level

Customer Benefits
Origis

Sumrall & Tallahassee PV plants, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 1 x 52 MVA + 1 x 20 MVA PV plants
- Completion date: 2018
- Location: USA

Solution

ABB's scope includes:
- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level
Vaughin
Ayrshire PV plant, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 20 MVA PV plants
- Completion date: 2018
- Location: USA

Solution

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level
FRV

Mafraq & Empire PV plants, Plant Controller

About the Project

- Supply of the control solution for (1 x 52 MVA + 1 x 52 MVA) PV plants
- Completion date: 2018
- Location: Jordan

Solution

ABB's scope includes:

- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
Green Source Investment

RJAF Mafraq PV plant, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 10 MVA PV plant
- Completion date: 2018
- Location: Jordan

ABB's scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Solution

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
Zacoalco PV plants (8MW and 6MW), Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 6 MVA PV plant
- Completion date: 2017
- Location: Mexico

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Solution

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
- String currents monitoring

Customer Benefits
Masdar
Toshka 1 and Toshka 2 PV plants, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 1 x 10 MVA + 1 x 10 MVA PV plants
- Completion date: 2017
- Location: Egypt

Solution

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
Sterling & Wilson

Benban 1, 2, 3, 4 PV plants, Plant Controller

About the Project

- Supply of the control solution for 4 x 50 MW PV plants
- Location: Egypt

Solution

ABB’s scope includes:
- Plant controller
  ➢ RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
About the Project

- Supply of the complete motoring and control solution for 1 x 6 MW + 1 x 6 MW + 1 x 17 MW PV plants
- Location: Jordan

Solution

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
Philadelphia Solar

Al Badiyah PV plant with BESS, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 13 MW PV plant
- Location: Jordan

Solution

ABB’s scope includes:
- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
- String currents monitoring
Toji Group JSC
Bac Phoung PV plant, Plant Controller

About the Project

- Supply of the control solution for 34 MW PV plant
- Location: Vietnam

Solution

ABB’s scope includes:
- Plant controller
  ➢ RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Grid Code Compliance
About the Project

- Supply of the complete motoring and control solution for 19 MW PV plant
- Location: Vietnam

Solution

ABB's scope includes:

- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
- String currents monitoring
EVN Group - Electricity of Vietnam
Thung Nam PV plant, Plant Controller

About the Project

- Supply of the control solution for 140 MW PV plant
- Location: Vietnam

Solution

ABB’s scope includes:
- Plant controller
  ➢ RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Grid Code Compliance
About the Project

- Supply of the control solution for 34 MW PV plant
- Location: Vietnam

Solution

ABB's scope includes:
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Grid Code Compliance
TTC Group
Duc Hue 2 PV plant, Plant Controller

About the Project
- Supply of the control solution for 50 MW PV plant
- Location: Vietnam

Solution
ABB’s scope includes:
- Plant controller
  ➢ RTU500

Customer Benefits
- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Grid Code Compliance
About the Project

- Supply of the complete motoring and control solution for 44 MW PV plant
- Location: Jordan

Solution

ABB’s scope includes:
- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
- String currents monitoring
Masdar

Romanville PV plant, Plant SCADA & Plant Controller

About the Project

- Supply of the complete motoring and control solution for 5 MW PV plant
- Location: Seychelles

Solution

ABB’s scope includes:
- Plant SCADA
  - MicroSCADA
- Plant controller
  - RTU500

Customer Benefits

- Central plant controller coordinates all inverters to achieve the required control command (active/reactive power)
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and/or weather stations
- Performance and Production Ratio (PR) at plant level
- String currents monitoring
About the Project

- Supply of plant automation solution to 37 renewable plants (more than 1300MW) in multiple US & Canada locations
- Completion date: 2015
- Location: USA and Canada

Solution

ABB’s scope includes:
- Plant SCADA
- Store & forward capabilities
- Redundant systems

- Plant layout simplified using a unique platform for collecting data and sending commands to the wind turbine generator and to the Substation
- Integrated plant monitoring with unified information model for the upper level system (Remote control centers)
- Allowing swift plant management even if connection with the upper level system is lost

Customer Benefits
Veronagest / Volta Green Energy

Plant SCADA for Wind Farms

About the Project

- Supply of the plant automation solution to the entire Veronagest wind fleet (more than 300MW)
- Completion date: 2011 (for Veronagest). Upgrade: 2019 (for Volta)
- Location: Italy (Sicily)

Solution

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA Pro

Customer Benefits

- Plant layout simplified using a unique platform for collecting data and sending commands to the wind turbine generator and to the substation
- Integrated plant monitoring with unified information model for the upper level system (Remote control centers)
- Allowing swift plant management even if connection with the upper level system is lost
- Upgrade of plant controls 8 years after installation with new features:
  - State of the Art SCADA, the same used for the Remote Control Center, that allows to reduce OPEX

Supply of the plant automation solution to the entire Veronagest wind fleet (more than 300MW)
- Completion date: 2011 (for Veronagest). Upgrade: 2019 (for Volta)
- Location: Italy (Sicily)
Enel Green Power

Plant SCADA for Wind Farms

About the Project

- Supply of plant automation solution to 26 wind farms (more than 500MW) in multiple locations
- Completion date: 2011

ABB’s scope includes:

- Plant SCADA
  - MicroSCADA Pro

Solution

Customer Benefits

- Plant layout simplified using a unique platform for collecting data and sending commands to the wind turbine generator and to the Substation
- Integrated plant monitoring with unified information model for the upper level system (Remote control centers)
- Allowing swift plant management even if connection with the upper level system is lost
Plant SCADA for Wind Farms

About the Project

- Supply of the plant automation solution to 6 wind farms (more than 700 MW) spread across Italy
- Completion date: 2007
- Location: Italy

Solution

ABB’s scope includes:
- Plant SCADA

Customer Benefits

- Plant layout simplified using a unique platform for collecting data and sending commands to the wind turbine generator and to the substation
- Integrated plant monitoring with unified information model for the upper level system (remote control centers)
- Allowing swift plant management even if connection with the upper level system is lost
**Veronagest / Volta Green Energy**

Remote control center – Wind farms

**About the Project**

- The entire Veronagest fleet (5 Wind Farms, more than 300MW) is controlled and monitored by a single remote control system
- Completion date: 2011 (for Veronagest). Upgrade: 2019 (for Volta)
- Location: Italy

ABB’s scope includes:

- Remote management SCADA
  - MicroSCADA Pro
- Redundant system
- Power Generation Curtailment

**Solution**

- Improved operations + maintenance reaction time through structuring and visualization of critical data in a high level display
- Effective real time monitoring, control and operations of fleet of plants in >1000 km distance btw plants and remote monitoring + control center with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
- Managing TSO requests
- Upgrade:
  - • State of the Art SCADA, same used for Plant SCADA (OPEX reduction)
  - • Advanced wind farm management and analytics through e-mesh applications: Wind Farm Efficiency (WFE) application for optimal performance management and minimal production losses per turbine
Remote control center – Wind Farms

About the Project

- The entire wind fleet of the customer is controlled and monitored by one remote control systems supervising 25 Wind Farms
- Completion date: 2016
- Location: Italy

Solution

ABB’s scope includes:
- Remote management SCADA in cloud
- Redundant system
- Power Generation Curtailment

Customer Benefits

- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
- Managing TSO requests
Remote control center – Wind farms

About the Project

- The entire Engie fleet (6 Wind Farms, more than 150MW) is controlled and monitored by a single remote control system
- Completion date: 2011
- Location: Italy

Solution

ABB's scope includes:
- Remote management SCADA
- Redundant system

Customer Benefits

- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
Enel Green Power

Remote control center – Geothermal plant

About the Project

- The entire Geothermal fleet of the customer is controlled and monitored by one remote control system and one disaster recovery system
- Completion date: 2016
- Location: Italy

Solution

ABB’s scope includes:
- Remote management SCADA
- Redundant system
- Disaster recovery solution

Customer Benefits

- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
Enel Green Power
Remote control center – Hydro Power Plants

About the Project
- The entire hydro fleet of the customer is controlled and monitored by five remote control systems supervising 400 hydro power plants and one disaster recovery system
- Completion date: 2011
- Location: Italy

Solution
- ABB's scope includes:
  - Remote management SCADA
  - Redundant system
  - Disaster recovery solution
  - Power Generation Scheduling

Customer Benefits
- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
- Managing TSO requests
The entire HDE fleet (23 HPPs, 1.8GW) is controlled and monitored by a single remote control system.

- Completion date: 2019
- Location: Italy

ABB’s scope includes:

- Remote management SCADA
- Redundant system
- Disaster recovery solution
- Power Generation Scheduling

About the Project

Solution

Customer Benefits

- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
- Managing TSO requests
Remote control center – Hydro Power Plants Perù

**About the Project**
- Remote Monitoring + Control for 7 hydro power plants in Peru
- Completion date: in progress
- Location: Peru

**Solution**
ABB’s scope includes:
- Remote management SCADA
  - MicroSCADA Pro
- Redundant system
- Disaster recovery solution

**Customer Benefits**
- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
Enel Green Power (Emgesa)
Remote control center – Hydro Power Plants Colombia

About the Project
- Remote Monitoring + Control for 9 hydro power plants in Colombia
- Completion date: in progress
- Location: Peru

Solution
ABB’s scope includes:
- Remote management SCADA
  ➢ MicroSCADA Pro
- Redundant system
- Disaster recovery solution

Customer Benefits
- Improved reaction time through structuring and visualization of critical data in a high level display
- Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
- Reduction in operational cost by managing all assets using a fully integrated automation system
CVA

Remote control center – Hydro Power Plants

About the Project

– The entire CVA fleet is controlled and monitored by a single remote control system
– Completion date: 2016
– Location: Italy

Solution

ABB’s scope includes:
– Remote management SCADA
– Redundant system
– Power Generation Scheduling

Customer Benefits

– Improved reaction time through structuring and visualization of critical data in a high level display
– Effective monitoring, control and operations of fleet of plants with scalable and versatile automation solutions
– Reduction in operational cost by managing all assets using a fully integrated automation system
– Managing TSO requests
ABB remote monitoring

Solar plants across Italy – different customers

About the Project

- Data related to more than 20 PV plants across Italy (more than 100MW) are collected in the Remote Service Portal. Each PV Plant is monitored by ABB
- Completion date: 2015
- Location: Italy

Solution

ABB’s scope includes:
- Remote Service Portal
- Data Collector

Customer Benefits

- System delivered as a service
- Remote monitoring and diagnostic system with integrated automatic reporting and a powerful web portal to present data to the customers