Grid Edge Solutions e-mesh
Customer stories
Grid Edge Solutions global footprint

CUSTOMER CHALLENGES
Energy autonomy, reliability and resiliency; new economic opportunities; and effectively manage an increased portfolio of distributed energy resources (DERs).

CUSTOMER OUTCOMES
✓ Improved reliability and resiliency
✓ Reducing energy cost & CO₂
✓ Unlocking new revenue streams
✓ Maximizing renewable integration

GLOBAL FOOTPRINT

250+ Projects delivered worldwide
30+ Years of experience
90+ Countries supported with Service and Sales organizations
Together with our customers and partners, we are co-creating global and local solutions to benefit society

Helping Woodside reduce dependence on fossil fuels

Achieving a resilient and sustainable energy future in Alaska

Advancing energy independence for the Gull Bay First Nation

First Nation microgrid accelerates Canada’s clean energy future
Together with our customers and partners, we are co-creating global and local solutions to benefit society

Developing Thailand's largest private microgrid

First smart microgrid successfully implemented in Indonesia

Reliable green energy in the mountainous terrain in Betong

Dalrymple ESCRI: The world's largest autonomous microgrid

Read more

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Customer Success Stories

Together with our customers and partners, we are co-creating global and local solutions to benefit society

Supporting the stability of Finland’s energy network and helping to meet its climate goals

Helping the Faroe Islands aim for 100% renewable energy by 2030

Accelerating sustainable mobility in Denmark

A Swiss-Army knife for the energy transition

Read more
Read more
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Read more
Utilities
About the project

- **Project name:** Golden Valley Electric Association
- **Location:** Fairbanks, Alaska, USA
- **Customer:** Golden Valley Electric Association
- **Completion date:** 2003

Customer benefits

- GVEA BESS has reduced outages in the Fairbanks area by over 60%.
- In 2017, the BESS responded to 72 events and prevented a total of 280,197 member outages.
- The power conversion system enables the BESS to power the city of Fairbanks for seven minutes and provides frequency regulation even for the larger Railbelt transmission.

Solution

- PowerStore Battery (40 MW / 10 MWh)
- e-mesh Control System
About the project

- **Project name:** EKZ Dietikon Battery System
- **Location:** Zurich, Switzerland
- **Customer:** Elektrizitätswerke des Kantons Zürich
- **Completion date:** 2012

Solution

- Community Solar PV
- Electric Vehicle (EV) Charging
- PowerStore Battery (1 MW / 250 kWh)
- e-mesh Control System
- e-mesh SCADA

Customer benefits

- PV Smoothing functionality for solar grid integration
- Peak shaving for an EV fast charger to manage demand
- Island mode with VSI for enhanced power quality and microgrid operation
AusNet Services: Utilities

Hitachi Energy and Samsung hybrid Grid Energy Storage and Diesel Generation System (GESS), for Victoria’s SP AusNet, was the first of its kind in Australia’s distribution network. It provides peak demand management, active and reactive power support, as well as other functions. The GESS can also supply power as part of a mini-grid when parts of the network become isolated.

About the project

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

Solution

- Diesel (1 MW)
- PowerStore Battery (1 MW / 1 MWh)
- e-mesh Control System

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
Tehachapi: Utilities

Tehachapi Energy Storage Project (TSP) is a lithium-ion battery-based grid energy storage system at the Monolith Substation of Southern California Edison (SCE) in Tehachapi, California. At the time of commissioning in 2014, it was the largest lithium-ion battery system operating in North America and one of the largest in the world and is today considered to be a modern-day energy storage pioneer.

About the project

- **Project name:** Tehachapi
- **Location:** Tehachapi, USA
- **Customer:** Southern Cal Edison
- **Completion date:** 2014

Customer benefits

- Establish smart grid program.
- Assess the capability and effectiveness of storage to support 13 operational applications.
- Sufficient to power between 1,600 and 2,400 homes for four hours.
- In 2020, SCE reported that TSP operated in the wholesale energy market with revenue exceeding operating and maintenance costs.

Solution

- System models, RTDS and simulations
- PowerStore Battery (8MW / 32MWh)
- e-mesh Control System
Cedartown: Utilities

The Cedartown research demonstration was created by Southern Company in collaboration with the Electric Power Research Institute, in order to develop a large, utility-scale lithium-ion battery system and evaluate how it can create value for customers.

The system is located on the site of a 1MW solar PV facility owned and operated by WGL Energy.

About the project
- **Project name:** Cedartown BESS
- **Location:** Cedartown, USA
- **Customer:** Southern Company
- **Completion date:** 2015

Customer benefits
Project to test different applications:
- Load leveling
- Peak shaving
- Frequency Regulation
- Voltage Regulation
- Firming

Solution
- Solar PV (1 MWp)
- PowerStore Battery (1 MW / 2 MWh)
- e-mesh Control System
KUIC Anahola: Island utilities

About the project

- **Project name:** KUIC Anahola
- **Location:** Anahola, Hawaii, USA
- **Customer:** Kaua‘I Island Utility Cooperative
- **Completion date:** 2015

Solution

- Solar PV (12 MWp)
- PowerStore Battery (6 MW / 4.63 MWh)
- e-mesh Control System
- e-mesh SCADA

Customer benefits

BESS value stacking co-located with solar PV, utilizing existing grid connection, thus increasing project value, revenue streams and grid stability:

- Frequency regulation
- Voltage regulation
- Capacity firming
Shanxi PuZhou: Utilities

About the project
- **Project name:** BESS Shanxi PuZhou power plant
- **Location:** Guangji, Shanxi province, China
- **Customer:** Ray Power
- **Completion date:** 2016

Customer benefits
- Increase the accuracy of AGC regulation
- Reduce the adjustment frequency of valve in turbine DEH and the probability of failure
- Extend the service life of the generator
- Increase earnings of plant on frequency modulation function
- Effectively improve the levels of energy conservation and emission reduction

Solution
- Coal fired Power Plant (300MW)
- PowerStore Battery (9 MW / 4.5 MWh)
- e-mesh Control System

Hitachi Energy, in cooperation with Ray Power, addressed the needs of PuZhou 300 MW coal fired power plant in Shanxi China province to provide fast response frequency regulations, and avoid continuous adjustments on the turbine valve. This extends the lifetime of the generator.
Shin Chitose Solar needed to comply with local grid codes to reduce power fluctuation and improve renewable integration. With e-mesh, Shin Chitose is now able to meet a significant Japanese renewable initiative to generate 35 gigawatt-hours for 11,000 households.

**Press release**
About the project

- **Project name:** ESCRI-SA Dalrymple BESS
- **Location:** Australia
- **Customer:** ElectraNet
- **Completion date:** 2018

Solution

- Wind (91 MW)
- Distributed rooftop solar (3+ MWp)
- PowerStore Battery (30 MW / 8 MWh)
- e-mesh Control System

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
Borrego Springs: Utilities

About the project

- **Project name:** Borrego Springs Microgrid
- **Location:** Borrego Springs, USA
- **Customer:** SDG&E
- **Completion date:** 2021

Customer benefits

- Contribute to grid stability and resilience by maintaining frequency and voltage magnitude during microgrid islanding
- Demonstrate how DER controls can improve local system reliability, resiliency, reducing PV curtailment due to islanding operations
- Attempt to island the Borrego Springs Microgrid with 100% renewable resources and blackstart without fossil generators

Solution

- Solar PV (26 MWp)
- Diesel (2 x 1.8 MW)
- PowerStore Battery (1MW / 3 MWh Samsung)
- PowerStore Battery (500kW / 1.5 MWh SAFT)
- U-Cap ride through transients (500kW)
- e-mesh Control

The first utility-owned, community microgrid in America has been upgraded so it can operate on 100% clean energy. The new PowerStore, controls and energy management system help to address the unstable voltage conditions, the solar PV output fluctuations and increase resiliency to acute weather, like the 2013 fall thunderstorm blackout.

In the media

The new PowerStore, controls and energy management system help to address the unstable voltage conditions, the solar PV output fluctuations and increase resiliency to acute weather, like the 2013 fall thunderstorm blackout.

In the media
Sembcorp MRF: Utilities

### About the project
- **Project name:** Sembcorp MRF BESS
- **Location:** Tuas, Singapore
- **Customer:** Sembcorp and NTU
- **Completion date:** 2021

### Solution
- PowerStore Battery (2 MW / 4 MWh)
- e-mesh Control System
- e-mesh SCADA
- e-mesh Monitor
- 10 years Service Level Agreement

### Customer benefits
- To provide ancillary services such as Frequency Regulation using Automatic Generation Control (AGC) and Primary and Contingency Reserves
- To schedule and dispatch BESS by a cloud based Virtual Power Plant digital platform.
- To store excess power generated from rooftop PV system and discharge to Sembcorp MRF load

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A flagship research project between Sembcorp and Nanyang Technological University (NTU) to develop a Virtual Power Plant (VPP) by deploying a battery energy storage system connected and powered by the grid and/or PV to provide ancillary services to Singapore Power Grid.

Press release
The Kalbarri microgrid provides a more reliable power supply for the 1,500 residents and more than 100,000 visitors to the town each year. It uses leading edge technology to minimize disruptions, and in the event of a network interruption can run independently from the main electricity network.

The modular design of the microgrid allows for future renewable generation sources to be integrated as they become available.

**Customer benefits**
- Seamlessly islands Kalbarri township to protect against power outages
- Network support services
- Increase renewable hosting capacity

**About the project**
- **Project name:** Kalbarri Microgrid
- **Location:** Kalbarri, Western Australia
- **Customer:** Western Power
- **Completion date:** 2021

**Solution**
- 1.6MW wind farm
- 1MW rooftop solar
- PowerStore BESS (5 MW / 2.5 MWh)
- e-mesh Control System
- Remote Monitoring
NEDO: Utilities

In order to improve reliability of electricity to their customers, NEDO added a battery energy storage system (BESS) that helps to prevent power outages during grid failure. The system ensures the quality electricity through voltage dips, mitigation measures, and provides frequency control to electricity transmission system operator.

Press release

About the project

- **Project name:** NEDO
- **Location:** Slovenia
- **Customer:** ELES d.o.o.
- **Completion date:** 2022

Customer benefits

Project with local TSO to test different applications in urban area:
- Slow active power response
- Voltage control
- Islanding
- Load Levelling
- Frequency containment reserve

Solution

- PowerStore Battery (4 MW / 8 MWh)
- e-mesh Control System
Energy Queensland is commencing a battery storage trial to support the continued uptake of rooftop solar across the state. The aim is to store the excess renewable energy generated by Queenslanders for sustainable, capturing the low-cost renewable energy during the day to distribute into the market in the high-use peak periods.

**In the media**

**About the project**
- **Project name:** Network connected Battery
- **Location:** Tanby and Torquay, Australia
- **Customer:** Yurika / Energy Queensland
- **Completion date:** 2022

**Customer benefits**
- Network support services
- Increase distributed rooftop solar hosting capacity
- Support Queensland’s energy mix targets, aiming 50% of renewables by 2030
- Contribute to the state’s economic recovery from COVID-19

**Solution**
- Distributed rooftop solar PV
- 2 x PowerStore BESS (4 MW / 8 MWh)
- e-mesh Control System
- Remote Monitoring
About the project

- **Project name**: Betong
- **Location**: Betong, Yala province, Thailand
- **Customer**: Provincial Electricity Authority (PEA)
- **Completion date**: 2022

Solution

- Utility Grid-connected
- Diesel Generators (7 x 1 MW)
- VSPPs (7.5 MW)
- Solar PV (150 kWp)
- PowerStore Battery (4 MW / 6 MWh)
- e-mesh Control System
- e-mesh SCADA
- Distribution management System (DMS600)

Customer benefits

- Overcome recent grid reliability challenges, as outages in the area have increased 20-fold due to terrorist activities, damaged equipment, unplanned maintenance or weather events.
- Improve the reliability and quality of power in the Betong coverage area
- Reduce peak demand and power losses in the distribution line
- Reduce levels of greenhouse gas (GHG) and carbon dioxide (CO₂)

The Betong district is a valley surrounded by mountains on the Malaysian border. With the power lines passing through forested areas, tree damage often causes interruption and outages, as well as challenges in power quality. It is difficult for PEA to identify the interruption causes and takes a long time to recover the system. The microgrid gives a new way to address the problems.

Press release
Creating one of the largest BESS in Europe and by far the largest BESS in the Nordic region, Finnish Utility TVO is adding to a 1.6 GW unit to the “OL3” plant in Finland. Fingrid, as the local grid operator, required approx. 300 MW system protection assets in combination with the “OL3” power plant. This very fast responding BESS (0-90MW in 200ms) will support the grid in case an of unexpected power dropout from the plant.

Press release

About the project

- **Project name**: TVO 90MW BESS
- **Location**: Olkiluoto, Finland
- **Customer**: TVO
- **Completion date**: Estimated 2023

Customer benefits

- Enables the 1.6 GW Powerplant to operate at 100% output power in combination with several Demand Response Assets:
  - BESS
  - Gas Turbines
  - Industrial plants
  - Reserve Market participation
  - Black start (option)

Solution

- Nuclear Power Plant (1.6 GW)
- PowerStore Battery (90 MW / 85 MWh)
- e-mesh Control System
- e-mesh SCADA
- e-mesh Monitor
- 3 Years Service Agreement
Hitachi Energy is collaborating with Territory Generation to deliver a high specification Battery Energy Storage System that will accelerate the transition to clean energy in the Northern Territory. Integrating intermittent renewable generation, enabling the energy system to be more sustainable, flexible and secure for 150,000 Territorians.

**Press Release / In the media**

### About the project
- **Project name:** Darwin-Katherine Battery
- **Location:** Northern Territory, Australia
- **Customer:** Territory Generation
- **Completion date:** Estimated 2023

### Solution
- Large 300MW Isolated regulated Utility Grid
- Power supplied by multiple Gas Turbines as well as distributed & central solar PV.
- PowerStore Battery VSM (34.7 MW / 34.7 MWh)
- e-mesh Control System
- e-mesh SCADA
- 10 Years Service Agreement
- Ability to operate entire network on VSM+Solar

### Customer benefits
- Replace gas turbine for spinning reserve with Virtual Synchronous Machine
- Less than 5 years payback; annual cost savings of around $9.8 MAud and emissions reductions of about 58,000 tones/year.
- Increased system stability and reliability from inertia allowing the connection of more central and distributed solar
The PICESS will be a permanent installation on the island and will mainly address the need for peak supply during summer and improve the resilience of supply in summer while also being available at other times for other network, market, or community services. It will improve the island electricity consistency and reliability, also enabling new technologies and trials, and increase the solar capacity on the island.

Customer benefits

- Peak lopping - Summer capacity relief to support network and defer capacity upgrades
- Network support services
- Increase renewable hosting capacity

About the project

- **Project name:** Phillip Island Community Energy Storage System (PICESS)
- **Location:** Phillip Island, Australia
- **Customer:** Mondo Power Pty Ltd / TEC-C
- **Completion date:** Estimated 2023

Solution

- PowerStore BESS (5 MW / 10 MWh)
- e-mesh Control System
- Remote Monitoring
In looking at new ways to enhance the energy network, AEW recently added a battery energy storage system (BESS), with intelligent automation software from Hitachi Energy.

The combined solution provides AEW with a BESS, advanced analytics, software, and digital capabilities to both meet the needs of today and what is ahead tomorrow.

**Press Release**

**About the project**
- **Project name:** AEW Battery System
- **Location:** Aargau, Switzerland
- **Customer:** AEW Energie AG
- **Completion date:** Estimated 2023

**Solution**
- PowerStore Battery (5.5 MW / 10 MWh)
- e-mesh Control System
- e-mesh SCADA
- e-mesh Monitor

**Customer benefits**
- Enhance grid stability
- Capacity to add more distributed energy resources (DERs) to their operations
- Orchestrate, optimize, and manage the utility existing infrastructure
- Identify capabilities that can address new market opportunities, including managing EVs within their grid, virtual power plants (VPPs), and energy trading.
Recap Energy is collaborating with VänerEnergi and Hitachi Energy where Recap installs a total of 3.3 MW battery energy storage solutions (BESS) in Töreboda and Mariestad. The BESS is expected to be in operation and contribute to the green transformation of both cities as early as April 2023.

About the project

- **Project name:** Töreboda and Mariestad
- **Location:** Sweden
- **Customer:** Recap Energy / VänerEnergi
- **Completion date:** Estimated 2023

Solution

- Distributed Solar PV
- EV charging infrastructure
- PowerStore Battery (2.3 MW / 2.6 MWh)
- PowerStore Battery (1 MW / 1.5 MWh)
- e-mesh Control System
- e-mesh SCADA

Customer benefits

- Enable “Battery as a Service” business model
- Reduce peak loads from Solar PV and EV charging
- Integrate more renewables into the electricity grid
- Increase grid stability and flexibility
- Sell frequency regulation to the grid
SNAP: Utilities

AboitizPower and Scatec have signed an EPC agreement with Hitachi Energy for it to build a 20MW/20MWh battery storage system at the 360MW Magat hydropower plant in Ramon, Isabela, in the north Philippines. The BESS is expected to be used primarily for ancillary services but will also dispatch to the grid at peak times.

Press Release / In the media

About the project

- **Project name:** SNAP Magat BESS
- **Location:** Isabela, Philippines
- **Customer:** SN Aboitiz Power Group
- **Completion date:** Estimated 2024

Solution

- Hydro (360MW)
- PowerStore Battery (24 MW / 32 MWh)
- e-mesh Control System
- e-mesh SCADA
- e-mesh Monitor with 4 years SLA

Customer benefits

- Provide primary frequency regulation (FR) / regulating reserve (RR) ancillary services and configurable for energy arbitrage services to the Luzon grid, to address the increasing variable renewable energy intermittencies.
Island Utilities
Faial Island: Island utilities

About the project
- **Project name:** Faial Island
- **Location:** The Azores, Portugal
- **Customer:** Electricidade dos Acores (EDA)
- **Completion date:** 2013

Solution
- **Wind** (5 x 850 kW)
- **Heavy Fuel Oil** (3 x 3.7 MW + 2 x 3 MW + 1 x 2 MW)
- e-mesh Control System

Customer benefits
- Minimize diesel consumption: 3.5 million liters of fuel saved annually
- Minimum environmental impact: 9,400 tons CO$_2$ avoided annually
- Reduced maintenance through automatic management of the wind farm power setpoint
La Gomera is one of the smallest islands in the Canary Islands archipelago located in the Atlantic Ocean. For a very long time, the inhabitants of the island have been struggling with problems of network stability and adverse weather conditions.

The PowerStore stabilize the operation of the 22MW isolated microgrid by quickly absorbing voltage surges from wind turbines or by providing additional energy during the windless period.

### About the project
- **Project name:** La Gomera
- **Location:** Canary Islands, Spain
- **Customer:** Endesa
- **Completion date:** 2014

### Customer benefits
- Stable electricity to 22,000 Islanders
- Reduced frequency and voltage deviations
- Reduced load shedding events

### Solution
- Load (22MW)
- PowerStore Flywheel (500 kW / 16.5 MWs)
- e-mesh Control System
This microgrid solution allows the integration of a complex energy mix and maximizes the use of renewable energy; enabling WEB Aruba to meet the peak demand (134 MW) of the island. The embedded software, automation and control technologies also facilitate 24-hour forecasts and enable a more resilient grid for the island.

**Press Release / Infographic**

### About the project
- **Project name:** WEB Aruba
- **Location:** Aruba
- **Customer:** WEB Aruba N.V
- **Completion date:** 2018

### Solution
- Solar PV (6 MWp)
- Wind (20 x 3 MW)
- Steam turbine (136 MW)
- Gas turbine (20 MW)
- Reciprocating engine (10 x 9 MW)
- e-mesh Control System

### Customer benefits
- Integration of complex energy mix - Wind, PV and Thermal
- Maximum utilization of renewable energy
- 24 hour forecast of both renewable output and system load
- Manage the peak demand, 134 MW
JPS: Island utilities

Jamaica Public Service (JPS) commissioned a PowerStore Hybrid Energy Storage System (HESS) is a “game changer for the renewable energy market” in Jamaica. The 24.5MW PowerStore ensures grid stability and supports Jamaica’s Vision 2030 Renewable Energy Goal. It is the largest hybrid flywheel/battery energy storage system in the world.

Press Release / In the media

About the project

• **Project name:** JPS Grid Stability
• **Location:** Jamaica
• **Customer:** Jamaica Public Services Company Ltd
• **Completion date:** 2018

Customer benefits

• Reliable power to 5 million populace in the island
• Provides renewable smoothing for four separate wind and solar sites
• Ensures island grid stability through frequency and voltage management
• Outages caused by solar and wind fluctuations, have been reduced by an average of 87.5%.

Solution

• Solar PV (20 MWp)
• Wind (101.3 MW)
• Hydro (32.5 MW)
• Conventional Thermal Plants (870.2 MW)

• PowerStore Battery (21.5 MW / 16.6 MWh)
• PowerStore Flywheel (3 MW / 16.5 MWs)
• e-mesh Control System
The grid modernization at the Grand Bahama Power Company (GBPC) with an e-mesh PowerStore solution address the frequency and voltage fluctuations that often strike Grand Bahama’s electricity grid due to the power requirements of the harbor operations and enable the Island’s electricity system to integrate additional renewable energy sources.

In the media

Grand Bahama: Island utilities

About the project

- **Project name:** GBPC Grid Stability
- **Location:** Freeport, Bahamas
- **Customer:** Grand Bahama Power Company
- **Completion date:** 2019

Customer benefits

- Improve power quality and provide load smoothing for the crane operation
- Help to manage the intermittencies of future solar PV
- Reduced dependency on fossil fuels and lower carbon footprint
- Stabilize the system by frequency and voltage support

Solution

- Solar PV (3 MWp)
- Diesel (2 x 13.5 MW + 1 x 18.5 MW + 6 x 8.7 MW)
- PowerStore Battery (9.5 MW / 7.3 MWh)
- e-mesh Control System
Electricidade de Madeira sought to increase the share of renewables in the energy mix from 15 to 30 percent, while meeting the enhanced electricity demand in the Summer when the population increases from 5000 to more than 20000. The BESS enables increased adoption of renewable energy while stabilizing the system and reducing voltage fluctuation.

Press Release / Video
Faroe Island utility, SEV, has a target to reach 100% renewable energy in 2030. To fulfill the target several new Wind parks are being planned and build as well as other renewable energy sources. In February 2021, a new 6MW Wind park was inaugurated at the island Suduroy, with 6MW BESS was planned to support the integration of wind power in the remote & isolated island.

Press Release / In the media

### Suduroy: Island utilities

#### About the project
- **Project name:** Suduroy BESS
- **Location:** Suduroy Island, Faroe Island
- **Customer:** SEV
- **Completion date:** 2021

#### Solution
- Solar PV (0.3 MWp)
- Wind (6.0 MW)
- Diesel (4 x 3.5 MW)
- Hydro (3.0 MW)
- PowerStore Battery (6 MW / 7.5 MWh)
- e-mesh Control System
- e-mesh SCADA

#### Customer benefits
- Enables integration of new 6MW Wind Farm
- Reduces the Diesel Power Plant running hours
- Reduces the CO₂ emissions
- Enables the 2030 renewable strategy
- Improves the Island Power Quality
- Black start & Islanding operation without Diesel
Industrial facilities
Woodside: Industrial facilities

The Woodside platform is located 135 km offshore in highly rugged conditions. An advanced grid edge solution was implemented to meet the complex needs of remote management, operations and service. This solution reduces dependency on diesel, lowering gas consumption by 2000 tons/year and CO₂ emissions by 5%.

Press release / In the media
Video / Infographic / Fact Sheet

About the project

• **Project name:** Goodwyn A
• **Location:** Northwest Australia
• **Customer:** Woodside Energy
• **Completion date:** 2017

Solution

• Gas Turbines (5 x 3.5 MW)
• PowerStore Battery (2.8 MW / 1.43 MWh)
• e-mesh Control System
• 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%
Port of Los Angeles: Industrial facilities

Pier 300, a container terminal in the Port of LA, had been unable to fully deploy their existing new high-powered cranes and could only operate them at a percentage of their design capacity, performance speeds, and acceleration rates, due to a lack of voltage support.

The Hitachi Energy’s solution provide high-intensity power for very short bursts of time when required.

Press Release

About the project
• **Project name:** Port of LA Flywheels
• **Location:** Los Angeles, USA
• **Customer:** Fenix Marine Services
• **Completion date:** 2017

Solution
• PowerStore Flywheel (3.2MW / 3.3MWh)
• e-mesh Control System

Customer benefits
• Flywheels allow for full use of existing cranes given power constraints from the utility distribution system
• Provide capacity for terminal owner to add additional cranes
ATCO: Industrial facilities

ATCO’s Clean Energy Innovation Hub (CEIH) primarily investigates the role hydrogen can play in the future energy mix. It integrates renewable hydrogen production with Solar energy in a “living lab” stand-alone microgrid. The CEIH microgrid also evaluates the commercial viability of microgrids with and without green hydrogen.

In the media

About the project

- **Project name:** ATCO Clean Energy Hub
- **Location:** Janderkot, Australia
- **Customer:** ATCO Gas
- **Completion date:** 2019

Solution

- Solar PV (300 kWp)
- Gas turbine (200 kW)
- Hydrogen electrolyzer (180 kW / 260 kVA)
- PowerStore Battery (300 kW / 400 kWh)
- e-mesh Control System

Customer benefits

It demonstrates a broad array of services:
- Seamless back-up
- Islanded operation
- Resynchronization & Black start
- Peak demand management
- Renewable integration/maximization
- Power factor correction
- Green hydrogen creation
- Ancillary grid services

2019 Innovation award runner up
DeGrussa Mine: Industrial facilities

About the project

• **Project name:** DeGrussa Mine
• **Location:** Western Australia, Australia
• **Customer:** Juwi RE & Sandfire Resources NL
• **Completion date:** 2016

Solution

• Solar PV (10.6 MWp)
• Diesel (27 MW)
• PowerStore Battery (2 x 2 MW / 1.4 MWh)
• e-mesh Control System
• e-mesh SCADA

Customer benefits

• This hybrid solar facility is the largest integrated off-grid solar and battery storage plant in Australia.
• 8S application – Stabilizing, Spinning Reserve, STATCOM, Smoothing
• Reduced CO₂ emissions by 12,000 tons/year.
• Diesel fuel saving is 5 million liters per year, cutting diesel consumption by 20%.

Built in 2016, the hybrid system has reduced Sandfire’s CO₂ emissions by 30,789 tons and offset 11 million liters of diesel. In addition to the environmental benefits, the project has provided a blueprint for the adoption of renewable energy at mine sites and remote communities around the world, being widely showcased as a case study on how to integrate renewables at mines.
Alinta: Industrial facilities

One of the largest microgrid installations in the world, Alinta’s Roll Hill remote mine needed a reliable and stable power supply to reduce interruptions and ensure worker safety. Hitachi Energy’s solution delivers a reliable and stable power supply that ensures continuous operation and increased energy efficiency.

Press Release / Infographic
In the media (1) / In the media (2)

About the project

- **Project name:** Newman Power Station BESS
- **Location:** Newman, Australia
- **Customer:** Alinta Energy - Newman Power Station
- **Completion date:** 2018

Solution

- Gas Turbines (4 x 178 MW)
- PowerStore Battery (35 MW / 12 MWh)
- e-mesh Control System

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
Bontang: Industrial segment

About the project

- **Project name:** Bontang PV Hybrid
- **Location:** East Kalimantan, Indonesia
- **Customer:** ITM Banpu Group
- **Completion date:** 2020

Solution

- Solar PV (3 MWp)
- STGs (2 x 7 MW)
- Diesel (8 x 0.8 MW)
- PowerStore Battery (2MW / 2MWh)
- e-mesh Control System
- e-mesh EMS energy management system

Customer benefits

- Renewable Smoothing (ramp rate control)
- Dynamic Stability:
  - Frequency Support
  - Generator overload/underload control
- Spinning Reserve
- Renewable Limits
- Feeder monitoring

Indo Tambangraya Megah (ITM)’s Bontang Mine in Indonesia had relied entirely on fossil fuels for their operations.

Now, the largest microgrid in the region, the integration of solar photovoltaic (PV) and a PowerStore battery energy storage system (BESS) dramatically reduced fuel consumption & CO₂ emissions.

It maximizes renewable penetration, driving both energy efficiency & sustainable growth, with improved reliability.
Phillip Creek Compressor Station: Industrial facilities

About the project

• **Project name:** Phillip Creek compressor station
• **Location:** Tennant Creek, NT, Australia
• **Customer:** Jemena Ltd
• **Completion date:** 2021

Customer benefits

• Reliability, affordability and sustainability of gas supply to Jemena customers
• ‘Digital twin’ simulating the PCCS system addressing the challenges of a remote operation
• System able to resist the corrosive environment and extreme weather conditions (0-45°C)
• Solution designed, delivered, installed and commissioned within 12 months, even with site remoteness and COVID-19 travel restrictions

Solution

• Gas Generators
• PowerStore Battery (1.2 MW / 1.48 MWh)
• e-mesh Control System
• Remote monitoring
• 20 years Service Level Agreement

Phillip Creek compressor station (PCCS) is the starting point of the 620 km long Northern Australia gas pipeline, and located 1,000 km south of Darwin. The remoteness of the site, the extreme weather conditions and the significance of the PCCS made the on-site battery system the best option to provide stand-alone and back-up power to ensure the reliability of supply.

Video
During the summer months, Thargomindah township bore potable water would come out of the ground at around 72°C, far from the 35°C or lower required supply temperature.

NRG Services built an energy efficient cooling system powered from Solar generation and supported by a 583kWh battery energy storage solution, for powering the site overnight or during periods of low sunshine.

Press Release

About the project

- **Project name:** Thargomindah Water Cooling
- **Location:** Toowoomba, Australia
- **Customer:** NRG Services
- **Completion date:** 2021

Solution

- **Solar PV (240 kWp)**
- **PowerStore Battery (3x 200 kW / 200 kWh)**
- **e-mesh Control System**
- **Remote Monitoring**

Customer benefits

- Operation in the extreme summer temperatures
- Seamless back up for on site operations
- Possibility to operate indefinitely in “island” mode
- Enable site to achieve net zero operations
- Increased solar PV hosting capacity
- Reduced energy costs
EPCOR identified the need to integrate renewable power to its existing water treatment operations as part of its smart grid initiative. The large-scale Solar PV is enabled by a battery energy storage system (BESS) will increase the system power reliability and improve efficiency through an uninterrupted supply.

**About the project**
- **Project name:** kīsīkāw pīsim BESS
- **Location:** EL Smith Plant, Edmonton, Canada
- **Customer:** EPCOR Water Services, Inc
- **Completion date:** 2022

**Customer benefits**
- Maximize usage of the large-scale solar plant
- Solar PV operational performance increase
- Improve the overall site power supply reliability
- Deliver power when there are interruptions to Water Plant’s electricity service
- Provide UPS during transmission line outage
- Gain understanding of large renewable energy and smart technology
- Reducing emissions by up to 14,000 tones

**Solution**
- **Solar PV** (12 MWp)
- **PowerStore Battery** (4 MW / 8.9 MWh)
- **e-mesh Control System**
TGN Energy is a fast-growing company who is rapidly shaping the electrical grid by rethinking and redesigning local energy communities to meet the needs of more electrification.

At Revac’s industrial recycling facility, TGN Energy has added Hitachi Energy’s e-mesh™ PowerStore™ Battery Energy Storage System (BESS) to enable integration of new rooftop bifacial solar panels within the OrcaGrid.

About the project

- **Project name:** Revac AS
- **Location:** Tønsberg, Norway
- **Customer:** TGN Energy AS
- **Completion date:** 2022

Solution

- High-efficiency bifacial Solar PV (0.8 MWp)
- PowerStore Battery (0.5 MW / 1.1 MWh)
- e-mesh Control System

Customer benefits

- Enables integration of new rooftop bifacial solar
- Reduces the CO$_2$ emissions
- Enables behind the meter renewable strategy
- Take part of emerging market for ancillary services, reserve power & peak shaving
- Improves the power quality & reduces reactive power
About the project

- **Project name:** Rio Tinto, BESS Spinning Reserve
- **Location:** Tom Price, Australia
- **Customer:** Rio Tinto
- **Completion date:** Estimated 2023

Solution

- Solar PV (34MWp)
- Load & Conventional Generation (~300MW)
- PowerStore Battery (45 MW / 12 MWh)
- e-mesh Control System
- Integration to Network Manager™

Customer benefits

- The largest off-grid energy storage system in Australia will provide virtual spinning reserve to switch gas generation off
- CO₂ reduction, reduced fuel and running costs and enhanced power system stability and reliability
- The solution will reduce CO₂ emissions today, make Rio Tinto ‘renewable ready’, and contribute to Rio Tinto’s 2050 carbon-neutral vision

Rio Tinto’s 45MW battery at Tom Price is purpose built to operate as a “virtual synchronous machine” (VSM). This critical element allows the operators of the private network to switch off expensive and highly polluting gas turbines currently used as a back up for existing fossil fuel generators.

The battery energy storage system (BESS) will be able to control the grid, hold it steady by itself if needed, and create a path to 100% renewables.

In the media (1) / In the Media (2)
Solomon & North Star: Industrial facilities

About the project
- **Project name:** FMG, BESS Spinning Reserve
- **Location:** Solomon & North Star Mines, Australia
- **Customer:** Fortescue Metals Group
- **Completion date:** 2022 & Estimated 2023

Solution
- Solar PV (34MWp)
- Load & Conventional Generation (~120MW)
- PowerStore Battery (26 MW / 8 MWh)
- PowerStore Battery (16 MW / 5 MWh)
- e-mesh Control System
- Integration to Network Manager™

Customer benefits
- The two Virtual Synchronous Machines will provide spinning reserve to switch gas generation off at Solomon mine and provide islanding capabilities at the North Star mine
- CO₂ reduction, reduced fuel and running costs and enhanced power system stability and reliability

FMG’s 42MW combined battery capacity at Solomon & North Start is a purpose built “virtual synchronous machine” (VSM).
The two VSM & BESS units will be integrated with a transmission network to distribute electricity from new gas and solar power facilities to Fortescue’s Pilbara mine sites.
The battery energy storage system (BESS) will be able to control the grid, hold it steady by itself if needed, and create a path to 100% renewables.

In the media

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Commercial facilities
Longmeadow: Commercial facilities

The innovative Hitachi Energy’s solution, at Longmeadow 96,000 square meter facility, includes a rooftop solar photovoltaic (PV) field and a PowerStore grid stabilizer, that helps to maximize the use of clean solar energy and ensure uninterrupted power supply to keep the lights on & the factories running even in the event of a main grid power outage.

Infographic / Fact Sheet

About the project

- **Project name:** Longmeadow
- **Location:** Johannesburg, South Africa
- **Customer:** Longmeadow Business Estate
- **Completion date:** 2016

Solution

- Solar PV (750 kWp)
- Diesel (2 x 600 kW)
- PowerStore Battery (1 MW / 380kWh)
- e-mesh Control System
- Remote Monitoring

Customer benefits

- Stabilizing the grid for reliable 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
ICRC Logistics Center: Commercial facilities

About the project

- **Project name:** ICRC Logistics Center
- **Location:** Nairobi, Kenya
- **Customer:** Int. Committee of the Red Cross
- **Completion date:** 2017

Solution

- Solar PV (30 kWp)
- Diesel (150 kW)
- PowerStore Battery (150 kW / 100kWh)
- e-mesh Control System

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

The largest logistics hub in Africa for the International Committee of the Red Cross (ICRC) is in Nairobi, a city exposed to frequent power outages and power quality issues. It is responsible for delivering food, medicines and other essential supplies across the entire continent. A hybrid microgrid provides an uninterruptable power supply (UPS) derived from traditional and renewable energy sources.
Vadodara: Commercial facilities

About the project
- Project name: Vadodara microgrid
- Location: Vadodara, Gujarat, India
- Customer: Hitachi Energy
- Completion date: 2018

Solution
- Solar PV (550 kWp + 650 kWp)
- PowerStore Battery (500kW / 1MWh)
- e-mesh Control System
- Remote Monitoring

Customer benefits
- Reliable and uninterrupted power supply
- Leverage solar energy supply to meet factory’s growing power needs
- Save 1,400 tons of CO₂ every year
- Generate 2 million units of clean energy per year

Hitachi Energy has installed an e-mesh PowerStore microgrid solution to power its High Voltage Direct Current (HVDC) factory in Vadodara, India with clean energy, while ensuring safe and reliable power supply. The containerized, plug and play solution uses battery energy storage and advanced stabilization technology to integrate solar power generated by a 14,000 m² photovoltaic (PV) field on the factory’s roof, into the electrical grid.

Infographic / Fact Sheet
Skagerak Arena: Commercial facilities

A first-of-its-kind project, Skagerak Energilab includes solar-powered grid edge solution. The system not only powers floodlights in the stadium, but also provides the neighborhood with locally produced electricity. Together this solution sets Skagerak up for new opportunities like Vehicle to Grid (V2G) integration.

Press Release

About the project

- **Project name:** Skagerak Arena
- **Location:** Skien, Norway
- **Customer:** Skagerak Energi
- **Completion date:** 2019

Customer benefits

- Optimal integration of renewables and energy management with advanced grid automation
- Optimal use of renewable (PV) assets even when sun light is low
- Reduced energy import and peak load cost
- Availability of locally produced electricity to the surrounding neighborhoods

Solution

- Solar PV (800 kWp)
- PowerStore Battery (800kW / 1MWh)
- e-mesh Control System
- e-mesh EMS energy management system
Magens Junction: Commercial facilities

In order to deliver low-cost, reliable power that would weather hurricanes to a new affordable housing development in the US Virgin Islands, E-Finity engineered a solution around an 820 kWh PowerStore BESS, to create a microgrid that not only provides 100% of the apartment complex’s electricity and hot water, but does so with minimal back-up propane. Recaptured waste heat from microturbines generates domestic hot water, while electricity generated by the microturbines, and solar PV is balanced by the BESS to ensure efficient reliability.

About the project

- **Project name:** Magens Junction Microgrid
- **Location:** U.S. Virgin Islands
- **Customer:** E-Finity
- **Completion date:** 2021

Customer benefits

- Saves more than $250,000 a year in energy costs
- Provides about 1000 MWh/yr. of clean, local power for residents of Magens Junction
- PowerStore provides power quality similar to an uninterruptible power supply (UPS), but also enables hybrid operation and high renewable integration.
- Eliminates over 320 tons of CO₂ carbon emissions per year

Solution

- Solar PV (150 kWp)
- Microturbines (7x65 kW)
- Combined Heat and Power (CHP)
- PowerStore Battery (500 kW / 820 kWh)
Saha Industrial Park: Commercial facilities

About the project
- **Project name:** Saha Industrial Park
- **Location:** Sri Racha, Thailand
- **Customer:** Impact Solar Limited
- **Completion date:** 2021

Customer benefits
- Maximized performance the integration of renewables and energy management with advanced grid automation
- Optimal use of renewable (PV) assets
- Energy Shifting (Charge during Off-peak and Discharge during On-peak)
- Power Quality support

Solution
- Rooftop & Floating Solar PV (14MWp)
- Gas Turbines (200 MW)
- PowerStore Battery (500 kW / 680 kWh)
- e-mesh Control System

Hitachi Energy's battery energy storage system (BESS) is a critical part of Impact Solar Group's plans to develop the largest private microgrid in Thailand, creating a more sustainable and resilient industrial park.

The model balances generation from various distributed energy sources, builds in redundancy for future data center demand, and lays the foundation for a peer-to-peer digital energy exchange platform among the industrial park’s customers.

Press Release / In the media
## Narara Ecovillage Smart Grid: Commercial facilities

NEV Power, subsidiary of Narara Eco-village Cooperative Ltd, operates a smart grid system that utilizes first-in Australia technology to reduce infrastructure costs, balance and optimize the use of solar PV and battery storage, and produce a net carbon neutral village.

A 450 kWh PowerStore Integrated, and the smart grid controls enable NEV Power to manage energy production and consumption loads across the day. This also minimize any need to draw power from the Ausgrid network.

### Press Release

**About the project**

- **Project name:** Narara Ecovillage Smart Grid
- **Location:** Narara, NSW, Australia
- **Customer:** NEV Power
- **Completion date:** 2021

### Solution

- **Solar PV (471kWp)**
- **PowerStore Battery (300 kW / 450 kWh)**
- **e-mesh Control System**
- **Remote Monitoring**

### Customer benefits

- Net carbon neutral community title subdivision of approximately 150 dwellings in total
- An ‘ecovillage’ model for sustainable living including social, economic as well as environmental outcomes
- Show how an urban community can increase energy resilience and sustainability
Hitachi energy is supporting Henschke wines to move the business towards grid independence as part of their goal to achieve a 100% renewable energy supply.

A 90KW / 180kWh battery energy storage system, coupled with real-time energy monitoring, helps to maximize the solar PV power generation and ensure power supply.

### About the project
- **Project name:** Henschke Winery
- **Location:** Barossa, SA, Australia
- **Customer:** Henschke wines
- **Completion date:** 2021

### Solution
- **Solar PV (47kWp)**
- **PowerStore Battery (90 kW / 180 kWh)**
- **e-mesh Control System**
- **Remote Monitoring**

### Customer benefits
- Supply resilience and sustainability
- Seamless back up for on site operations
- Increase on site solar hosting capacity
- Functions:
  - Standalone operation
  - Solar peak shaving
  - Renewable integration
The Western Australian town of Broome will become host to one of Australia’s largest shopping center solar installations.

The 1.3MW commercial solar installation will be paired with a battery energy storage system to satisfy the grid connection requirements imposed by Horizon power. It will provide additional power and greater protection against outages, thus relieving some load from the existing grid.

**About the project**

- **Project name:** Broome Boulevard Solar BESS
- **Location:** Broome, WA, Australia
- **Customer:** Broome Boulevard shopping center
- **Completion date:** 2021

**Customer benefits**

- Increase solar PV hosting capacity
- Reduce costs by supplying around 45 per cent of the center’s electricity need
- Cut greenhouse gas emissions by 2,000 tonnes per year

**Solution**

- Bifacial Solar PV (1.36MWp)
- PowerStore Battery (700 kW / 571 kWh)
- e-mesh Control System
- Remote Monitoring
Operating Pimpama Sports Hub is accompanied by major electricity consumption, but power costs will be reduced through the facility’s solar energy and battery storage. The 910kW solar capacity installed across the site rooftops, and the 300kW battery energy storage system will generate up to 50% of the electricity required on site.

**About the project**

- **Project name:** Pimpama Sports Hub BESS
- **Location:** Pimpama, QLD
- **Customer:** ADCO Constructions
- **Completion date:** 2022

**Customer benefits**

- Increase solar hosting capacity
- Decrease grid and energy charges
- Increase sites sustainability credentials

**Solution**

- Solar PV (910kWp)
- Gas-fired cogeneration system for electricity and thermal energy to heat the pools.

- PowerStore Battery (300 kW / 350 kWh)
- e-mesh Control System
- Remote Monitoring
e-mobility
SnoPUD: e-mobility

Snohomish County PUD (SnoPUD) developed a state-of-the-art microgrid with solar PV, generator and battery storage with electric vehicle-to-grid (V2G) integration. The Arlington Microgrid demonstrates all the things a microgrid can do to support an electrified future—from grid stabilization to V2G integration to ancillary services to operation on 100% renewable power.

In the media (1) / In the media (2)

About the project

- **Project name:** SnoPUD Arlington Microgrid
- **Location:** Washington, USA
- **Customer:** Snohomish Public Utility District
- **Completion date:** 2021

Customer benefits

- Reliability and resiliency for Clean Energy Center, North County Data Center, and Local Office
- Integration of community solar renewable generation
- Stacking multiple values from energy storage: microgrid, grid stabilization, renewable integration, peak shaving, renewable back-up
- Exploring the future of vehicle electrification
- Utility reliability maximizing the value of batteries

Solution

- Community Solar PV (500 kWp)
- Electric Vehicle (EV) Charging
- PowerStore Battery (1 MW / 1.4 MWh)
- e-mesh Control System
- e-mesh SCADA
- Back-up Genset
- Vehicle to Grid (V2G) Integration
Gigastation “Køge”: e-mobility

About the project

- **Project name:** Gigastation “Køge”
- **Location:** Køge – Denmark
- **Customer:** Clever A/S
- **Completion date:** Estimated 2023

Customer benefits

- BESS enables integration of 2.4MW EV charging
- BESS enables integration of Solar Power
- Revenue streams through Frequency Regulation
- Fast external P/Q control (<250ms)
- Modular BESS design which is simple to upgrade
- Li-Ion LFP technology with +15 years lifetime
- Top Class Safe and Sustainable BESS solution

Solution

- EV charging (8x 300kW)
- Solar (0.1 MWp)
- PowerStore Battery (1.2 MW / 1.5 MWh)
  - e-mesh Control System
  - e-mesh SCADA
- Solar Power & EV AC-home charging (aggregated assets)

Clever is the largest EV charge solution provider in Denmark with +2.300 public chargers and +20.000 private home chargers installed (2021). Clever has a target to expand the installed capacity with 500% in 2025 and enable the use of 100% renewable energy. Battery Energy Storage will be an integrated solution at all High-Power Charge locations in Denmark.

Press Release / Video

Clever
Brisbane Metro: e-mobility

The Brisbane Metro will set the model for how mid-sized cities can address public transport challenges with electrified metros. The Brisbane City Council is working with vehicle manufacturer HESS, Volgren, and electric infrastructure experts Hitachi Energy to ensure efficient, sustainable, and secure electricity usage, that minimizes total cost of fleet ownership and operation.

Web story

About the project
- **Project name:** Brisbane Metro
- **Location:** Australia
- **Customer:** Brisbane City Council
- **Completion date:** Estimated 2023

Customer benefits
- Fleet electrification including both fast terminal charging and slow overnight charging
- e-bus charging optimized to meet transit fleet schedule requirements
- Minimizes energy costs and peak demand charges
- Charging optimized for and integrated with solar PV to maximize use of clean solar energy

Solution
- e-mesh EMS (Energy Management System)
  - Manages more than 75 chargers, including 15 flash chargers spanning multiple terminal stations and a fleet of 60 x 50kW DC-DC chargers and pedestals
  - Charging integrated with solar PV
  - Charging optimized for solar PV

The Brisbane City Council is working with vehicle manufacturer HESS, Volgren, and electric infrastructure experts Hitachi Energy to ensure efficient, sustainable, and secure electricity usage, that minimizes total cost of fleet ownership and operation.
Remote Communities
Coral Bay: Remote Communities

Coral Bay stands at the gateway to the Ningaloo Reef World Heritage Area, 1,100 km north of Perth. With no electricity network nearby, the town must generate its own with a combination of diesel and wind turbines. Hitachi Energy helped to integrate and control the volatile wind generation, enabling a reliable power supply to the Coral Bay grid.

**Case Study**

**About the project**
- **Project name:** Coral Bay
- **Location:** Northwest Coast, WA, Australia
- **Customer:** Horizon Power / Verbe Energy
- **Completion date:** 2007

**Solution**
- Wind (3 x 225 kW)
- Diesel (7 x 320 kW)
- PowerStore Flywheel (500 kW / 18 MWs)
- e-mesh Control System

**Customer benefits**
- Minimized diesel consumption
- Reliable and stable power supply
- Allows high integration of wind energy
- Enabling Coral Bay’s wind turbines to supply up to 95% percent of its energy requirements, equal to a total annual energy contribution of 45% percent.
Ross Island: Remote Communities

New Zealand’s Scott Base and America’s McMurdo Station in Antarctica are home to about 1,200 people in the summer. These important research stations have always relied on fossil fuels for power, but with the installation of wind turbines and the PowerStore in conjunction with e-mesh control technology, the reliance on fossil fuels has been greatly reduced.

### About the project
- **Project name:** Ross Island
- **Location:** Ross Island, Antarctica
- **Customer:** The New Zealand Antarctic Institute and Meridian Energy Ltd
- **Completion date:** 2009

### Solution
- Wind (3 x 330 kW)
- Diesel (9 x 125 kW)
- PowerStore Flywheel (500 kW / 15 MWs)
- e-mesh Control System

### Customer benefits
- Integration of the southernmost wind farm in the world into a dual 50 Hz (NZ) and 60 Hz (US) microgrid.
- Around 463,000 liters of diesel fuel and 2,800 tons CO₂ emissions reduced every year.
- Up to 70% wind power peak penetration.
- Minimize the risk of damaging the natural sensitive environment with the diesel.
Marble Bar: Remote Communities

Remote locations such as Marble Bar, Australia’s hottest town with temperatures in excess of 45°C are common, would typically rely solely on diesel fuel for their power. Instead, a microgrid solution from Hitachi Energy is enabling multiple energy sources, maximizing the renewables integration and minimizing diesel fuel generation.

**In the media**

**About the project**

- **Project name:** Marble bar
- **Location:** Marble Bar, WA, Australia
- **Customer:** Horizon Power / Government of WA
- **Completion date:** 2010

**Solution**

- Solar PV (300 kWp)
- Diesel (4 x 320 kW)
- PowerStore Flywheel (500 kW / 16.5 MWs)
- e-mesh Control System

**Customer benefits**

- Minimize diesel consumption, 405,000 liters of fuel saved annually
- Minimum environmental impact, 1,100 tons CO2 avoided annually
- Reliable and stable power supply
- 60% of the daytime electricity demand is generated by the PV plant
Marsabit: Remote Communities

About the project
• Project name: Marsabit Wind Farm
• Location: Kenya
• Customer: Socabelec East Africa Ltd (SEAL)
• Completion date: 2016

Solution
• Wind (2 x 275 kW)
• Diesel (2 x 800 kW)
• PowerStore Flywheel (500 kW / 16.5 MWs)
• e-mesh Control System

Customer benefits
• Reliable power supply for 5,000 people.
• Integration and control of a wind/diesel hybrid plant
• Off-grid power supply using renewables

Marsabit is an oasis at the edge of the desert in a windy area of northern Kenya. The city has a population of 5,000 and is not connected to any national grid.

The PowerStore system interface with the diesel generators, maximizing the renewable energy penetration by stabilizing the grid connection and utilizing any excess wind energy generated.

Infographic
Kodiak Island: Remote communities

About the project

• **Project name:** Kodiak Island
• **Location:** Alaska, USA
• **Customer:** Kodiak Electric Association (KEA)
• **Completion date:** 2016

Solution

• 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)

• PowerStore Flywheel (2 MW / 33 MWs)
• e-mesh Control System

Customer benefits

• Stabilize grid and regulate frequency to achieve near 100% annual renewable energy contribution
• Provide frequency support to integrate highly dynamic crane loads at the port
• Help to manage the intermittencies from a 9 MW wind farm
• Reduced reliance on diesel generators

Expanding the crane operations at the port of Kodiak island posed a challenge because it meant that they would likely have to rely more heavily on fossil fuel generators. The e-mesh PowerStore BESS allow KEA to shave the peaks off their cranes’ load, while reducing the stresses placed on the battery systems and extend their lifespans.

Press Release / Infographic
Anchorage: Remote communities

The project will provide electricity to some 300,000 customers of Chugach Electric Association and help the utility cooperative maintain grid stability during peak periods. Moreover, Chugach Electric Association will use the pilot to improve its customer services through the provision of affordable, clean energy and a reduction in power outages.

Press Release / In the media

About the project

- **Project name:** Anchorage
- **Location:** Alaska, USA
- **Customer:** Chugach Electric Association
- **Completion date:** 2017

Solution

- Wind farm (17.6 MW)
- PowerStore Battery (2 MW / 0.5 MWh)
- PowerStore Flywheel (1MW / 16.5 MJ)
- e-mesh Control System

Customer benefits

- Wind farm ramp rate regulation (<2.5 MW/min)
- Frequency and inertia support
- Assist regulation of the Area Control Error (ACE)
- Enable integration of more renewables
- Flywheel for short-term applications: Smoothing the wind power
- Battery for long-term applications: Spinning reserve
- Reduce CO₂ emissions by 90,000 to 120,000 tons per year

The project will provide electricity to some 300,000 customers of Chugach Electric Association and help the utility cooperative maintain grid stability during peak periods. Moreover, Chugach Electric Association will use the pilot to improve its customer services through the provision of affordable, clean energy and a reduction in power outages.
Robben Island: Remote Communities

About the project

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

Solution

- Solar PV (667 kWp)
- Diesel (1 x 500 kW)
- PowerStore Battery (500 kW / 837 kWh)
- e-mesh Control System

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
Buckland & Deering: Remote Communities

The communities of Buckland and Deering developed microgrid solutions to manage the economic dispatch and sophisticated automation of their hybrid system, while ensuring secure power with optimal renewable contribution. Coupled with PowerStore’s grid stabilization technology, they can operate on 100% renewable generation.

**Press Release / In the media**

NANA

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**About the project**

- **Project name:** Buckland & Deering Microgrids
- **Location:** Alaska, USA
- **Customer:** NANA Regional Corporation, Inc
- **Completion date:** 2018

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**Solution**

<table>
<thead>
<tr>
<th>Buckland:</th>
<th>Deering:</th>
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</thead>
<tbody>
<tr>
<td>Solar PV (50 kWp)</td>
<td>Solar PV (50 kWp)</td>
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<tr>
<td>Wind (2 X 100 kW)</td>
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<tr>
<td>Diesel (1 X 475 kW, 1 X 400 kW, 1 X 310 kW)</td>
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<td>e-mesh Control System</td>
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<tr>
<td>e-mesh Monitor</td>
<td></td>
</tr>
</tbody>
</table>

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**Customer benefits**

- Coordination of complex distributed assets
- Stable, reliable, and affordable power to the local community
- Maximum utilization of wind and solar power
- Help communities achieve 100% renewable penetration and run with diesel gensets off
- Help customer to reach their goal to reduce reliance on imported diesel by up to 75 percent

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The communities of Buckland and Deering developed microgrid solutions to manage the economic dispatch and sophisticated automation of their hybrid system, while ensuring secure power with optimal renewable contribution. Coupled with PowerStore’s grid stabilization technology, they can operate on 100% renewable generation.

Press Release / In the media

NANA
Cordova Electric Cooperative: Remote Communities

About the project

- **Project name:** Cordova
- **Location:** Alaska, USA
- **Customer:** Cordova Electric Cooperative
- **Completion date:** 2019

Solution

- Hydro (7.25 MW)
- Diesel (2 MW)
- PowerStore Battery (1 MW / 1 MWh)
- e-mesh Control System

Customer benefits

- Reduce its dependence on diesel and move closer to its goals for sustainability (Diesel expect it to save between 40,000 and 50,000 gallons of diesel fuel a year)
- Maximize the use of locally produced hydroelectric power
- Recover the hydropower lost during transition periods

CEC established a hybrid microgrid to enable the adoption of renewable power, including two new hydro projects. One of the key components was a battery energy storage system (BESS) to regulate the electrical system and maximize the use of locally produced power. CEC was able to reduce its dependence on diesel and move closer to its goals for sustainability and reliability.

Web story / Video
The Gull Bay community is completely separated from the electricity grid and had relied on diesel for power for more than 60 years. Hitachi Energy worked side by side with Ontario Power and the Gull Bay team to understand their needs and engineer a microgrid that offsets diesel fuel with clean power.

Press Release / Video
In the media

## About the project
- **Project name:** Giizis ESS Micro Grid Facility
- **Location:** Gull bay, Canada
- **Customer:** Gull Bay First Nations community
- **Completion date:** 2019

## Solution
- Solar PV (300 kWp)
- Diesel (1 x 450 kW, 250 kW, 180 kW)
- PowerStore Battery (300 kW / 555 kWh)
- e-mesh Control System

## Customer benefits
- Since its commissioning, it has already delivered 79,000 liters in diesel offset
- That equates to approximately 400 T of carbon emissions avoided annually
- During periods of high solar production, the microgrid will operate on 100% renewable energy
Fort Chipewyan: Remote communities

About the project
- **Project name:** Fort Chipewyan Microgrid
- **Location:** Alberta, Canada
- **Customer:** ATCO & Three Nations Energy
- **Completion date:** 2019

Customer benefits
- Helps the community to be energy independent
- Reduces dependency on fossil fuels (a reduction in usage of 800,000 liters of diesel fuel per year)
- Reduces greenhouse gas emissions significantly (a reduction of 2,170 tons CO₂ emissions per year)
- Eliminates the noise and odor of the diesel generator
- Decreases the risk of accidents on the winter road and in the community
- Lowers wear and tears on the ice road as well

Solution
- Solar PV (2.6 MWp)
- PowerStore Battery (1600 kW / 1600 kWh)
- e-mesh Control System
- e-mesh Monitor with 4 years SLA
Nusa Penida: Remote communities

Hitachi Energy has successfully deployed a microgrid in Nusa Penida, an adjacent island to Bali. This 4MWp/3MW/3MWh microgrid helped meet the ~20% surge in electricity demand during the recent G20 Summit in Bali and will continue to support demand from local customers.

Press Release

**About the project**
- **Project name:** Nusa Penida Microgrid
- **Location:** Nusa Penida, Indonesia
- **Customer:** PT Indonesia Power
- **Completion date:** 2022

**Solution**
- Solar PV (4 MWp)
- Diesel Generators
- PowerStore Battery (3 MW / 3 MWh)
- e-mesh Control System

**Customer benefits**
- Secure additional reliable and sustainable power supply during G20 Summit in Bali
- Reduce CO$_2$ emissions by 3,200 tons year
- Smooth out fluctuations from the renewable generation and enable load sharing to ensure efficient operation of the gensets
- Short execution time of only 8 months on a steep limestone hill
Renewables
Veronagest & VGE: Renewables

Volta Green Energy, a wind farm operator in Italy with over 350 MW of wind farms and 16 MW of solar photovoltaic systems, implemented an e-mesh control and automation solution for distributed energy resources. As part of the project, VGE updated five wind farms and their remote-control center with advanced e-mesh monitoring solution.

Press Release

About the project
- **Project name:** VGE remote control center
- **Location:** Italy
- **Customer:** Veronagest / Volta Green Energy
- **Completion date:**
  - 2011 (Veronagest)
  - 2019 (VGE Upgrade)

Solution
- Wind farms (350 MW)
- Solar PV (16 MW)
- e-mesh SCADA
- Remote Management System
- 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
Vietnam: Renewables

TOJI is a major Vietnamese integrator and EPC for renewable power plants. With a booming solar PV market in 2019, compliance to Vietnam’s solar PV grid-code was of the essence to get a connection permit. To meet the very tight schedule for COD, Trung Nam requested EPC and suppliers to guarantee the project meet COD deadline of Jun 30, 2019.

About the project

- **Project name:** Trung Nam Tra Vinh
- **Location:** Vietnam
- **Customer:** TOJI Group
- **Completion date:** 2019

Solution

- Solar PV (140 MWp)
- e-mesh PPC
- e-mesh SCADA
- EBoP solution (Inverters, transformers integration) for solar plant
- Transformers, HV equipment and Automation products for 220kV Substation

Customer benefits

- By using one single SCADA platform for PV plant and Substation, the project was energized 5 days earlier than COD deadline, guaranteeing that Trung Nam met the target for FIT1 application for PV, the highest Vietnamese solar FIT ever.
- Compliance with Vietnamese grid-code
- Intuitive HMI to visualize all relevant process data from the plant, grid connection and weather stations
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level.
Al Badiya PV-BESS Hybrid: Renewables

About the project

• **Project name:** Al Badiya PV-BESS Hybrid
  • **Location:** Jordan
  • **Customer:** Philadelphia Solar
  • **Completion date:** 2020

Solution

• Solar PV (23 MWp)
• BESS (23MW/12.6MWh)
• e-mesh Control system
e-mesh SCADA

Customer benefits

• Central plant controller coordinates all inverters (both centralized and string) to achieve the required control command (active/reactive power)
• Intuitive HMI visualizing all relevant process data from plant, grid connection and weather stations
• PV panel string current monitoring
• Performance & production ratio (PR) at plant level
• PV time-shifting from noon into evening hours

Philadelphia Solar is the only MEA-based company that manufactures, develops, designs, constructs, owns and operates utility-scale photovoltaic plants. As an EPC contractor specialized in design and execution of solar power plants, Philadelphia Solar places special emphasis on the “on-time and on-budget” construction and delivery of its projects, optimized to deliver superior output.
On the Seychelles, Masdar has built the 6 MW Port Augusta wind park, supplying power to main Island Mahe since 2016 and was selected to expand the portfolio on the by a PV-BESS hybrid. Funded by the Abu Dhabi Fund for Development Fund (ADFD), the project is a contribution to the Seychelles’ goal of reducing fossil fuel imports by achieving 15% of Renewables by 2030.

**About the project**
- **Project name:** Ile de Romainville PV-BESS Hybrid
- **Location:** Seychelles
- **Customer:** Masdar
- **Completion date:** 2020

**Solution**
- Solar PV (5 MWp)
- BESS (5MW/3.3MWh)
- e-mesh Control system
- e-mesh SCADA

**Customer benefits**
- Central plant controller coordinating all inverters to achieve required control command (active / reactive power)
- Intuitive HMI visualizing all relevant process data from plant, grid connection and weather stations
- PV panel string current monitoring
- Performance & production ratio (PR) at plant level
- PV time-shifting from noon into evening hours

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**About the project**
- **Project name:** Ile de Romainville PV-BESS Hybrid
- **Location:** Seychelles
- **Customer:** Masdar
- **Completion date:** 2020

**Solution**
- Solar PV (5 MWp)
- BESS (5MW/3.3MWh)
- e-mesh Control system
- e-mesh SCADA

**Customer benefits**
- Central plant controller coordinating all inverters to achieve required control command (active / reactive power)
- Intuitive HMI visualizing all relevant process data from plant, grid connection and weather stations
- PV panel string current monitoring
- Performance & production ratio (PR) at plant level
- PV time-shifting from noon into evening hours
Angola Solar 1: Renewables

The Angola Solar 1 project, with 7 sites and 370 MWp, is expected to benefit around 1.2 million families, allowing access to cleaner and more economical electricity both in extremely populated regions and rural areas, while reducing the usage of diesel generators, supporting the UN's Sustainable Development Goal 7.

Press Release

About the project

- **Project name:** Angola Solar 1
- **Location:** Angola
- **Customer:** MCA Group & Sun Africa consortium
- **Completion date:** 2022

Solution

- Solar PV (370 MWp)
- Diesel Generators in 2 of the 7 Sites
- e-mesh PPC
- e-mesh Control system
- e-mesh SCADA

Customer benefits

- Intuitive HMI to visualize all relevant process data from the plant, grid connection and weather stations
- Highly granular PV plant monitoring + controls incl. PV inverters, PV solar irradiation sensors, combiner boxes, PV panel strings and Diesel GenSets
- Performance and Production Ratio (PR) at plant, section, transformation center and inverter level