Energy storage modules
Supporting energy demand and optimizing cost

Opportunities to enhance grid performance

Customer challenges
Balancing generation and demand
In an ideal electrical system, generation capacity should be greater than the demand. Due to a sudden increase in demand or an unexpected loss of generation, the demand can exceed the generation. This causes difficulties regulating frequency resulting in an unstable grid.

Reducing variability of renewable generation
Renewable generation is far from consistent and continuous. This variable power being generated at renewable farms is not dispatchable which leads to difficulties integrating smoothly on to the grid.

Utilizing renewable generation peaks
The generation peaks of renewable generation do not align with the demand peaks. Typically there is a low demand on the grid when the renewable generation is peaking. Therefore, the excess renewable energy is not being utilized.

Managing peak demand
Infrequent and high peaks must be accounted for when sizing transmission, distribution and generation assets. Energy is more expensive during peak times and strains the existing equipment.

Increasing demand on infrastructure due to EVs
Current infrastructure will not be able to handle the large increase in load as electric vehicles (EVs) become more common.

Energy storage is the solution!
Balancing generation and demand
By responding quickly, the energy storage module can inject additional power on to the grid allowing for immediate frequency control as well as supplement the generation deficit so that balance is maintained.

Reducing variability of renewable generation
By injecting stored energy, the energy storage module acts as a buffer and smooths out the renewable generation allowing for seamless grid integration.

Utilizing renewable generation peaks
By storing excess power during the renewable generation peak, the energy storage module can inject it on to the power grid when demand is increasing.

Managing peak demand
By charging the energy storage modules from the grid during periods of low demand and injecting it back on to the grid during periods of high demand, the end user’s peaks are shaved and their loads are shifted. This reduces their energy charges and ultimately increases their load factor. In addition, utilities can defer new equipment investment because the grid has flatter loads.

Increasing demand on infrastructure due to EVs
By charging with renewable energy or with power during off peak time the energy storage modules can provide power to reduce the demand on the grid.
Definition
An energy storage module is a solution used to store energy in batteries for use at a later time. The system is sized to meet energy demands while optimizing cost.

ABB product portfolio

Community Energy Storage (CES) system
- 25 kw – 100 kw / 30 min – 4 hrs
- 2 enclosures
  - 1st: Batteries and Battery Management System (BMS)
  - 2nd: Inverter, switchgear

Distributed Energy Storage (DES) system
- 100 kw – 5 MW / 15 min – 4 hrs
- Containerized solution housing batteries, BMS, inverter, inverter PLC, switchgear, and transformer

Grid connection equipment
- 400 kVA – 20 MVA
- One container with inverter, inverter PLC, switchgear, and transformer

Battery containers
- Containerized solution to house batteries, racks, and management systems

Applications
- Demand management
  - Peak shaving
  - Load shifting
- Renewable energy integration
  - Reducing variability
  - Optimizing generation peaks
  - Ramp control
- Investment deferrals
- Frequency regulation
- Power back up

Features
- Enclosures with arc proof design
- Galvanized steel housing solutions
- Output voltage range from 120 V to 40.5 kV
- 50 or 60 Hertz
- Single or three phase system
- Custom designed enclosures available
- SCADA ready options
  - IEC 61850, DNP 3.0, Modbus, etc
- Designed according to ANSI, IEC, IEEE1547, and other relevant standards

How does energy storage benefit the grid?
Energy storage raises the efficiency of the grid at every level by:
- Maintaining generation and demand balance
- Providing smooth grid integration of renewable energy by reducing variability
- Storing renewable generation peaks for use during demand peaks
- Flattening demand peaks, thereby reducing stress on grid equipment
- Providing infrastructure support as loads increase with electric vehicle use

ABB’s added value
- Safety is top priority in system design
  - Arc resistant switchgear and containers
- Global footprint
- ABB can design solutions that meet standards in any country
- Local service personnel in over 120 countries
- Large investment in R&D
  - Nearly $1.1 billion USD in 2010
  - 3rd party battery supplier technologies tested in four global corporate research centers
- Energy storage pioneer
  - Over 10 years of energy storage experience
- Guinness Book of World Records, largest battery energy storage system (45 MW, 5 min)
  - GVEA, Fairbanks, Alaska

ABB Inc.
Energy Storage Modules
655 Century Point
Lake Mary, FL 32746
Phone: +1 407 732 2000
Customer service: +1 800 929 7947 ext. 5
                +1 407 732 2000 ext. 2510
E-Mail: customer.service.group@us.abb.com
www.abb.com/mediumvoltage

All sales are subject to ABB Inc. General Terms and Conditions of Sale.

While every effort has been made to assure accuracy, the information in this document is subject to change without notice.

© Copyright 2011 ABB Inc. All rights reserved.