

Pablo Astorga, Global Sales Manager Microgrids, ABB Sep 30, 2016

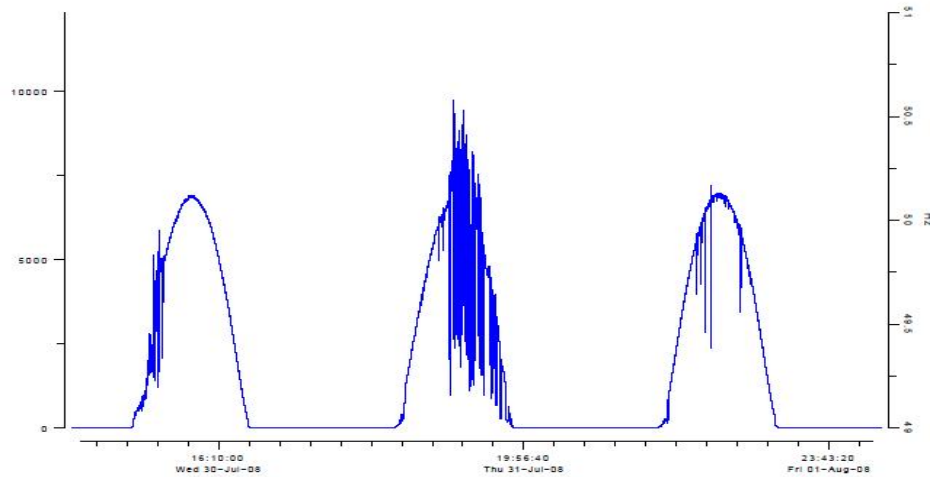
# IOREC 2016

## Emerging technology solutions for off-grid renewable energy systems

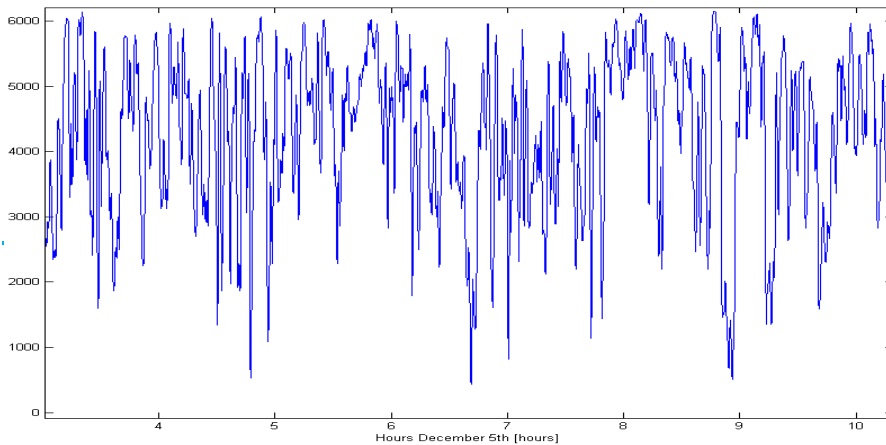
# Microgrid driver: uninterrupted power supply

## Managing power fluctuations

Solar power variations



Wind power variations

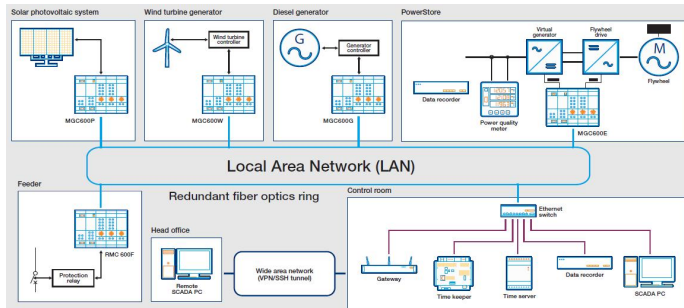


- § Inherent volatility of renewable energy can compromise grid stability
- § The renewable energy integration solution must address requirements traditionally fulfilled by diesel generation (base load)
- § Renewable energy generation capacity should be sized to maximize ROI\* and fuel savings

# Automation and grid stabilization M+ and PowerStore in microgrids

## Microgrid Plus system

Specially designed networked control system responsible for efficient and reliable power flow management



- Maximizes fuel savings
- Optimizes use of renewable energy
- Guarantees optimum loading and spinning reserve in fossil fuel generators
- Distributed logic enhances reliability and scalability for future system expansions
- Modular and scalable

## PowerStore™

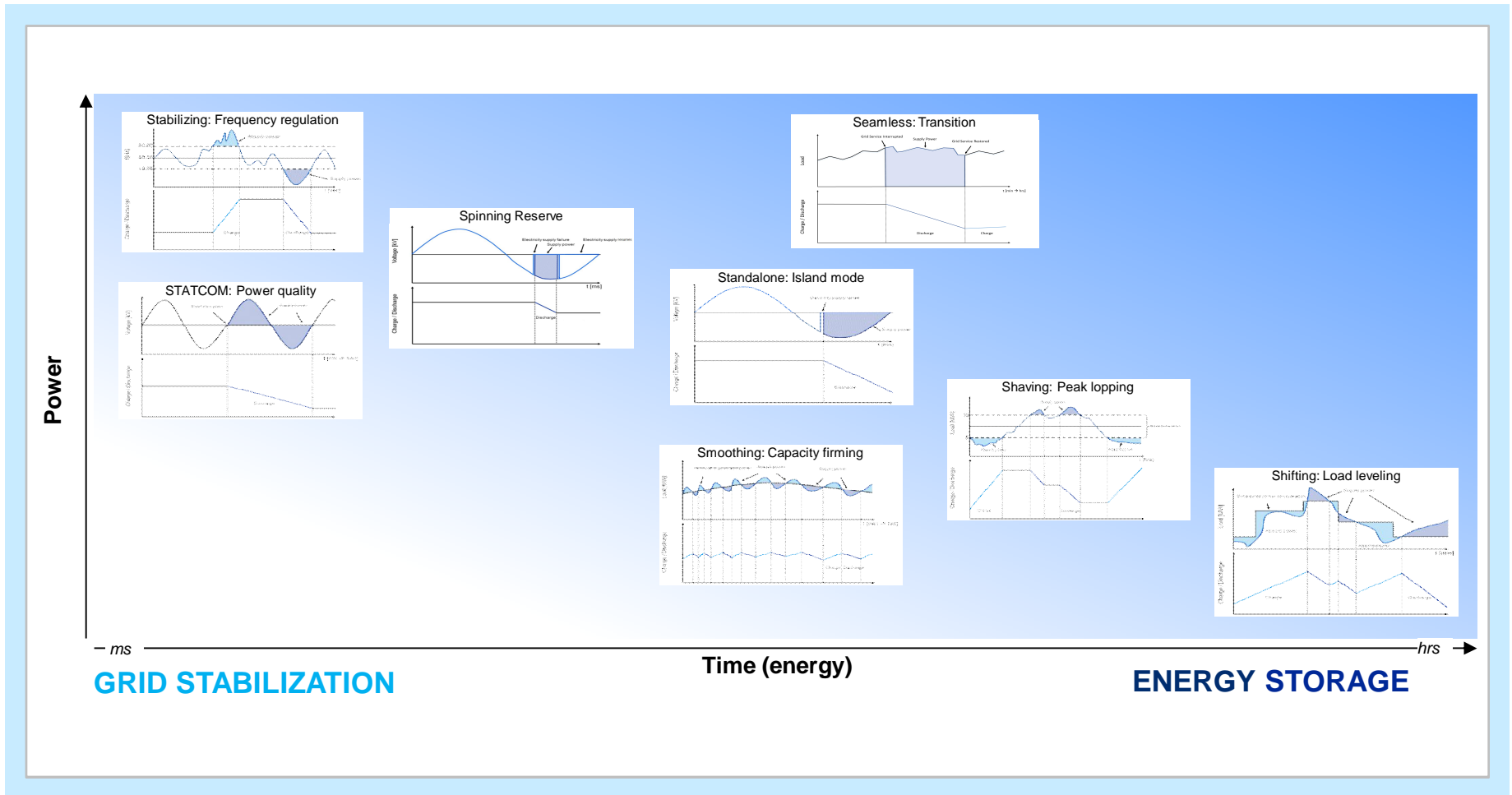
Compact and versatile grid stabilizing system capable of stabilizing power systems against fluctuations in frequency and voltage



- Can stabilize an electricity network by rapidly absorbing/injecting power in order to maintain voltage and frequency
- Battery or flywheel based. Includes state-of-the-art inverters and virtual generator control software
- Applicable to isolated grids or in grid support mode

# Power system functions drive choice of technology

## The 8S applications in microgrids



# Microgrid operational goals and power system functions drive choice of technology

## Operational goals

- Maximize reliability
- Resilience in the face of severe weather or natural disasters
- Resilience in the face of a weak, unreliable grid
- Meeting environmental targets
- Maximizing penetration of renewable energy sources
- Minimizing operating expenditures
- Energy independence
- Participation in regulation or ancillary services markets



## Power system functions – “8S”

1. Stabilizing
2. Spinning reserve
3. STATCOM (static synchronous compensator)
4. Seamless transition between islanded and grid-connected states
5. Standalone operation
6. Smoothing
7. Shaving
8. Shifting

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