FREQCON Energy Storage System Deployed in Irelands DS3 Smart Grid Testbed

German Renewables Award 2014 winner FREQCON is the first company to deploy energy storage systems in accordance with Irelands DS3 grid standard. The company has deployed an energy storage system for the Tallaght Smart Grid Testbed in Ireland that uses Maxwell ultracapacitors and lithium-ion batteries to support grid stability in both residential and industrial settings. Freqcon's Microgrid Stabilizer addresses the electricity intermittency challenges that accompany high renewable energy penetration.

As Ireland works toward its goal of 40 percent renewable energy generation by 2020, the Tallaght Smart Grid Testbed, run by the South Dublin County Council and the Micro Electricity Generation Association (MEGA), will demonstrate how energy storage can minimize electricity distribution issues and grid instability. With multiple sources of energy generation, the grid network in Ireland must deal with voltage and frequency issues before distributing the electricity to end users.

"Smart grid projects are a priority in Ireland, and, depending on the local set-up, the grid challenges can vary greatly", said Dudley Stewart, secretary general of MEGA. "Freqcon's Microgrid Stabilizer can be customized for the individual projects, and the combination of batteries and Maxwell ultracapacitors is a promising solution. We are looking forward to seeing more of these systems deployed in the field in the near future."

GERMAN RENEWABLES 2014 AWARD
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The testbed uses Freqcon's Microgrid Stabilizer for voltage and frequency stabilization, with a combination of lithium-ion batteries and ultracapacitors for active power support in the grid's distributed network. The Maxwell ultracapacitors perform fast functions such as frequency response, while the batteries are used for peak shifting and operating reserve. Norbert Hennchen, CEO of Freqcon, said, "The market for grid-tied energy storage systems is growing, and fast frequency response is a valuable system service to the grid. Ultracapacitors are the ideal technology to do this. Based on our long-standing relationship with Maxwell and our experience with ultracapacitors in pitch systems for wind turbines, we're bringing this technology to the space of grid stabilization."

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Dr. Franz Fink, president and CEO of Maxwell, said, "As the European Union, China, the United States and other countries around the world work toward their renewable energy consumption and generation targets, ensuring optimal renewable energy production will be critical. With a reduced number of fossil-fuel-based synchronous generators in operation, grid stability is becoming a challenge, and we expect ultracapacitors will play an important role to address this issue."

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FREQCON Ultracapacitor Grid Stabilizer

One System offering a wide Range of Grid Support Services.

The UGS Ultracapacitor Grid Stabilizer combines the STATCOM capabilities of an IGBT-Power Converter with active power support based on high-power Maxwell Ultracapacitors. The UGS can provide voltage and frequency stabilisation in transmission or distribution networks with high renewable penetration.

The FREQCON NGC Power Converter is a MW-scale IGBT-based power converter that was originally developed for renewable energy applications, with more than 15 GW installed in the field. Based on this experience new models for new applications such as STATCOM converters or battery-to-grid converters have been developed, with the UGS Ultracapacitor Grid Stabilizer being the latest application for our NGC Power Converter.

Applications

Dynamic Reactive Response (DDR)
The ability to deliver ultra-fast reactive current response to compensate voltage dips

RoCoF-Support
The ability to deliver active power to compensate frequency dips within 5ms (inertial response)

Fast Frequency Response (FFR)
FFR supplements any inherent inertial response and delivers active power in the time frame 2 to 10 seconds to stabilise frequency

Primary Operating Reserve
Active power provision up to 15 seconds to stabilise frequency

Harmonic Filtering
Active filtering of harmonics based on ultra-fast IGBT-switching

UPS Capability
Providing transition power until a longer-term back-up source like diesel genset is up and running

Ramping for PV Plants
Smooth fast changes of power to the grid

Way Side Storage
Regenerative braking of trains

UGS Ultracapacitor Grid Stabilizer

40ft container can replace the inertial response of a 1500MW power plant generator

Short term energy backup system with extremely high cycle life time

Can also work as hybrid solution with batteries, fly wheels and giesel gensets

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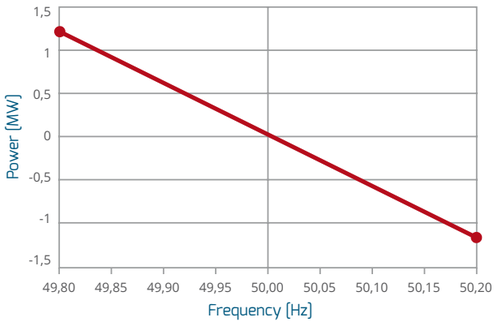
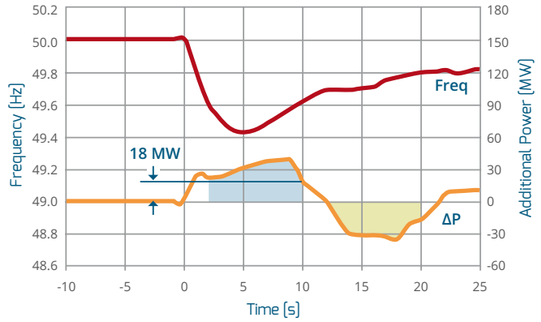
FREQCON Ultracapacitor Grid Stabilizer

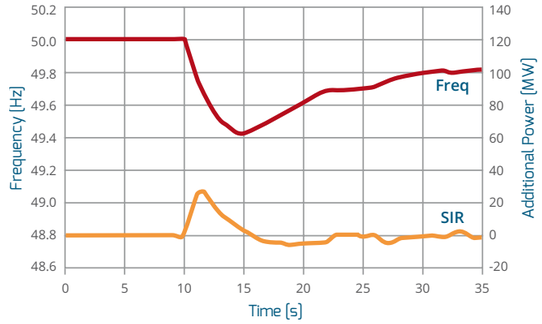
Frequency Regulation



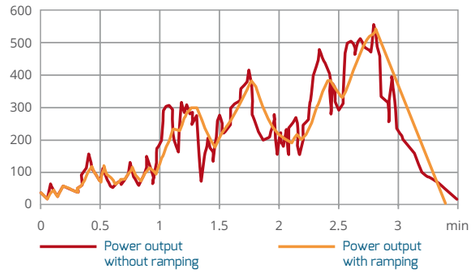
Fast Frequency Response



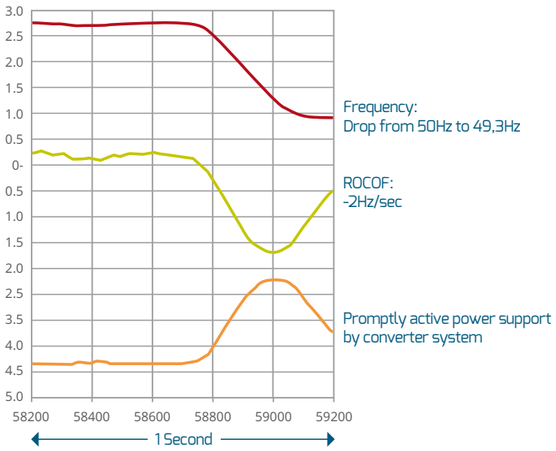
Inertial Response



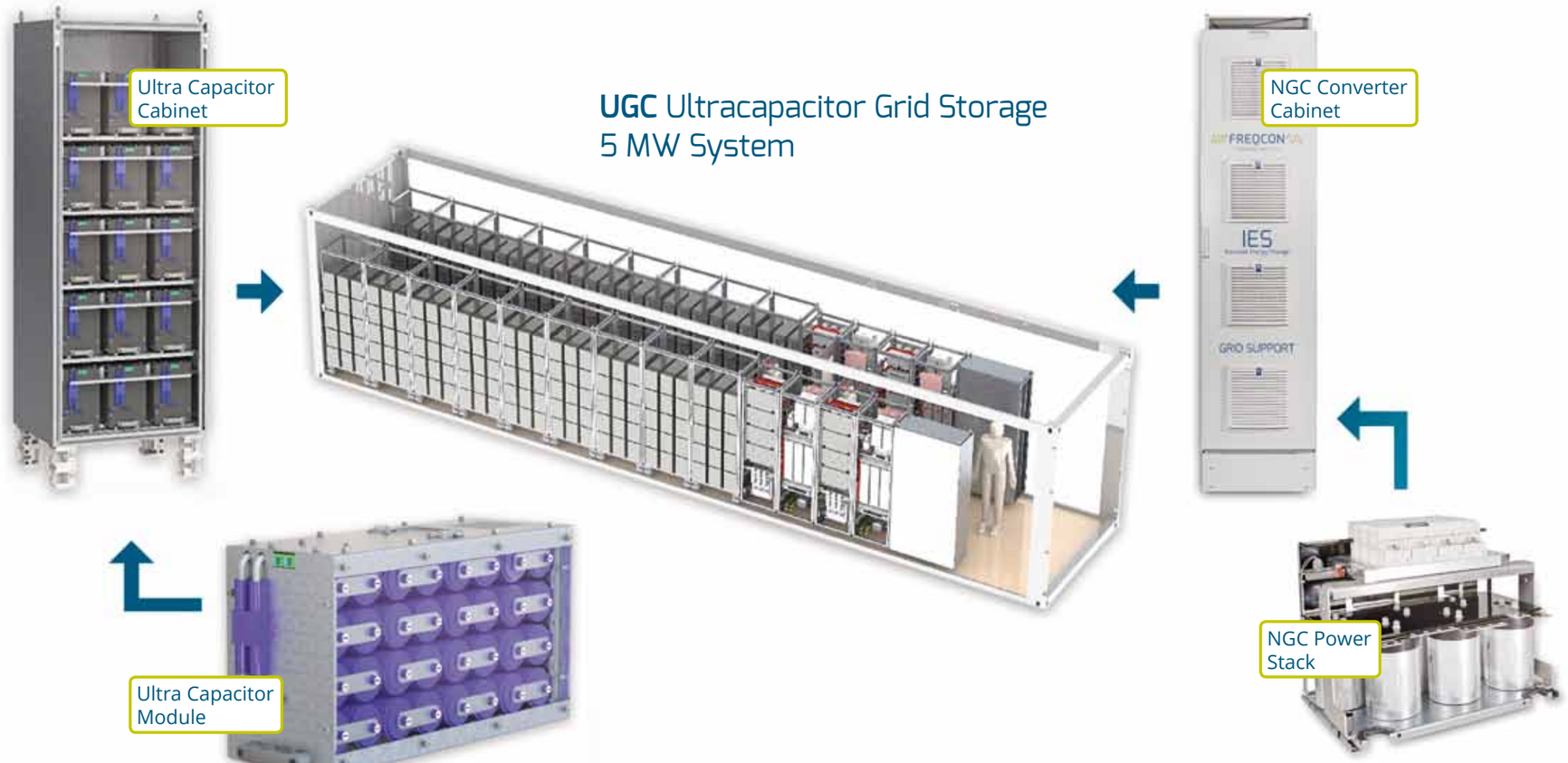
Ramping



ROCOF Test with Diesel Generator



UGC Ultracapacitor Grid Storage 5 MW System



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