Dresden’s electric utility adds energy storage to stabilize grid

**Project Summary**

Client: DREWAG public utility  
Project execution time: 9 months (from order to final acceptance)  
Application: Primary regulation control (PRL)  
Grid components: 2.7 MWh/2MW storage system with 2.4 MVA Active Front End AC/DC converter  
Load Peak Demand: 2MW  
Battery type: LG Chem JH2 pouch cells, working in SOC range of 10%-80% with a performance of more than 6000 full load cycles with 1C/1C @DOD 80%

**Nidec ASI’s role**

After working with DREWAG to define its needs, Nidec ASI provided electrical engineering services for the design of the Power Conversion System, which stabilizes the network by providing up to 2 MW primary control power to the grid. Nidec ASI manufactured and supplied both the PCS components as well as the battery containers and integrated the power management system software used to operate the system that was developed by a German sub-supplier under the leadership of Nidec ASI.

**The challenge:**

To improve the reliability of a municipal power utility  
DREWAG is the municipal utility responsible for bringing electricity, gas and water services to the more than half a million residents of Dresden, Germany. In recent years, the grid has seen a sharp increase of renewable energy such as solar and wind, which created some instability in the city’s power supply and the need for fast responding energy storage systems able to substitute the “must run power plants” for primary regulation. DREWAG sought a solution that would stabilize its power supply and reduce long-term energy costs while increasing the amount of energy produced by clean, renewable sources.

**The solution:**

Battery Energy Storage Systems (BESS)  
Working with Nidec ASI, DREWAG chose to develop and implement an innovative energy storage solution to stabilize the grid. The solution, known as BESS (Battery Energy Storage System), has a total initial capacity of 2.7 MWh of energy storage and a power of 2 MW. It includes a Power Conversion System that allows the utility to store electricity and use it as primary balancing power. The system is designed to ensure optimum battery service life and minimize energy losses while complying with the stringent German requirements of Transmission Code 2007.
System components supplied by Nidec ASI

• Storage system for the lithium-ion batteries
• Low voltage transformers
• Level 1 automation system
• Main and sub-distribution units for the LV switchgear cabinets for each system
• Cabling and cable way extension
• External cooling unit with free cooling mode including piping

Power Conversion System Converter technical data

<table>
<thead>
<tr>
<th></th>
<th>Grid Side (AC voltage)</th>
<th>Battery Side (DC voltage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>20kV</td>
<td>714-987 dvc</td>
</tr>
<tr>
<td>Power</td>
<td>2500 kVA</td>
<td>2000 kW</td>
</tr>
<tr>
<td>Cooling System</td>
<td>Water Cooled</td>
<td></td>
</tr>
</tbody>
</table>

Requirements for primary regulation

• Power regulation acting on network frequency deviations
• Full power activation within 30s
• Maximum time of 15 minutes to be bridged for a single fault event
• Operation range: 50Hz +/-200mHz with the option to use the deadband of 50Hz +/-20mHz
• Precisely defined qualification tests to be performed
• Meet transmission system operators (TSO) specifications for regulator settings