

Joint press release by N-ERGIE Aktiengesellschaft and Caterva GmbH

For the first time: Frequency Containment Reserve by privately used swarm of Energy Storage Systems

- **Successful pre-qualification as part of the SWARM pilot project**
- **A contribution to the stabilization of the European power transmission grid system**

Nuremberg and Pullach im Isartal, Germany, 27 July 2015

On 20 July 2015, pre-qualification was for the first time obtained for a network of privately used solar Energy Storage Systems (ESS) for supply of Frequency Containment Reserve (FCR) in Germany. Prequalification was granted by the company TenneT TSO GmbH, in conjunction with all German transmission system operators. As a result, 65 ESS in the SWARM pilot project were allowed to immediately contribute to stabilization of the power grid. The joint project by the technology and system supplier, Caterva GmbH, and by the Nuremberg community utility N-ERGIE Aktiengesellschaft, is supported by a grant of the State of Bavaria. Siemens AG is a technology partner.

The special feature of the large-scale virtual storage system is the networking of the storage units of household size. The ESS feature lithium-ion storage batteries supplied by Saft Batterien GmbH. Siemens deliver the power electronics system.

Each ESS is provided with its own control unit, so that it can react on a stand-alone basis to grid frequency. The ESS, installed in private households, are connected via the UMTS network, with the control center at Caterva, which coordinates the households as a swarm. The control center acquires the latest individual data on storage-charging levels of the ESS and regulates the swarm such that the FCR, also known as frequency regulation or balancing power, on offer is actually available. At the TenneT control station, the data are forwarded online. The N-ERGIE power plant control station is responsible 24 by 7 for operator control and supervision of the large-scale virtual storage system, as it is for its own power generating facilities.

“The virtual large-scale power storage system symbolizes an intelligent and end-to-end decentral solution approach for the challenges of the German energy transition,” as emphasized by Josef Hasler, CEO of N-ERGIE.

Double benefits for households

The beneficiaries of the ESS developed by Caterva – each with a total output rating of 20 kW and a capacity of 21 kWh – are the operators of private roof-top PV installations. Thanks to the storage systems, these users can cover 60 to 80 % of their power requirements from their own solar systems – and can at the same time contribute to German energy transition (*Energiewende*) by providing balancing power.

As a result of the considerably larger storage-battery capacity of the ESS in comparison to conventional PV buffer-storage, participation in the FCR market means no restriction to users in the consumption of the energy that they themselves have generated. On the contrary: “The user even profits from marketing of the FCR, since this makes their ESS even more cost-effective,” explains Markus Brehler, CEO of Caterva.

The first 65 ESS installations are distributed throughout the entire distribution system area of N-ERGIE, which is over 8,000 km² in size.

Contribution to grid stability

With provision of positive and negative FCR, the swarm enhances grid stability. Power balancing is necessary to compensate for the imbalance in power generation and consumption in such a way that grid frequency remains constant at 50 hertz. Balancing power is provided by transmission system operators in three specifications: FCR, Frequency Restoration Reserve, and Replacement Reserve (minute balancing power).

Demands placed on FCR are the strictest, since it must be provided within 30 seconds. Before Restoration and Replacement Reserve power, FCR is supplied directly proportionally to the deviation of grid frequency by each ESS.

Swarm Energy Storage Systems satisfy strictest requirements

For pre-qualification, the swarm systems must pass the so-called double-hump test conducted by power transmission providers. This test examines the capability of the swarm to keep power output at a constant level, in positive and negative direction, for two consecutive periods of 15 minutes each. The test also confirms whether the system can provide primary balancing power within 30 seconds.

The ESS swarm system has impressively fulfilled all requirements. The lithium-ion storage batteries installed in the ESS units even enable a reaction period of just a few seconds. The large-scale virtual power storage system therefore balances fluctuation in the power grid within seconds and provides a key contribution to system stability.

Continuation of the SWARM project

Now, after successful implementation of the SWARM pilot project, the joint project by Caterva und N-ERGIE goes into the second phase.

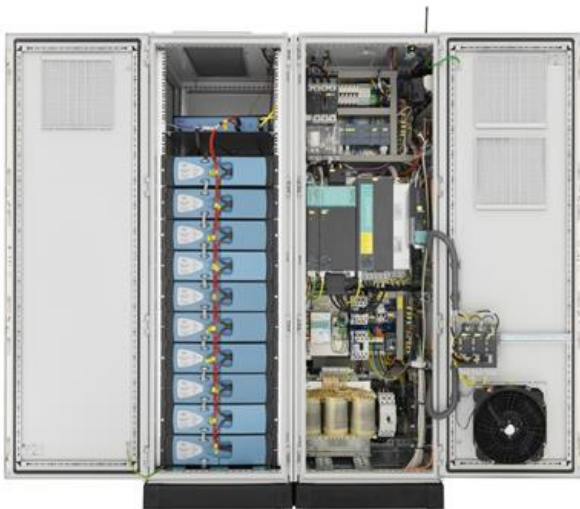
On the basis of its experience gained to date, Caterva is developing a more compact, second-generation swarm storage unit. Marketing of the new ESS system will initially also take place within the grid area of N-ERGIE.

Three faculties at Friedrich Alexander University, in Erlangen and Nuremberg (FAU) are supplying scientific support to N-ERGIE. This support is focused on work involving grid engineering and economic factors.

About Caterva GmbH

The company Caterva GmbH (Pullach im Isartal, near Munich/Germany), was founded in 2013 by Markus Brehler, Gabriele Ellenrieder, and Dr. Roland Gersch. The company Siemens Novel Businesses GmbH (SNB) supported formation of Caterva, in which it is now a minority shareholder.

Caterva has developed a revolutionary energy management system that makes Energy Storage Systems (ESS) in households cost-effective and that provides an important contribution to the German energy transformation program.



The Caterva Energy Storage System (ESS)

For further information / Press Affairs and Public Relations:

Caterva GmbH – Mr. Markus Brehler
Kirchplatz 9 – 82049 Pullach im Isartal, Germany
Tel.: +49 89 798934-60
info@caterva.de – www.caterva.de

N-ERGIE Aktiengesellschaft – Ms. Melanie Söllch
Spokeswoman and Director of Corporate Communication
Tel.: +49 911 802-58050
melanie.soellch@n-ergie.de – www.n-ergie.de

– In case of publication, please submit one copy to us of each of the published items for our archives –