

Integration of Battery Energy Storage Systems in Distribution Grids

Publieke samenvatting / Public summary

Aanleiding

In recent years, firstly the penetration rates of renewable energy sources like wind and solar that have an intermittent and variable character are dramatically increasing. Secondly, the introduction of new types of loads like electric vehicles or heat pumps is resulting in an increased and unpredicted demand of electricity. These two dramatic changes are creating severe technical problems like congestions, power quality, stability and reliability issues in distribution networks, which currently offer very low levels of flexibility. Also economically speaking, distribution system operators in the Netherlands become obliged to make large (but avoidable) investments to reinforce the grid. As a viable and cost-effective alternative, battery energy storage systems (BESSs) could be potentially employed to offer large levels of flexibility at the distribution side. BESSs not only provide crucial electricity services like congestion management and reliability, but also greatly provide distribution investment deferral.

Doelstelling

The main objective of this project is to create design rules, guidelines and techniques for the integration of battery energy storage systems (BESSs) in distribution networks. To achieve this, the specific objectives are summarized as follows: 1. The best size and place of BESSs across the distribution grid through sophisticated optimization techniques 2. Appropriate behavior (power and energy management) strategies and a novel control

Projectinformatie / Project information

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TEUE117013

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Algemene informatie / General information

Penvoerder / Secretariat
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platform, the so-called SmartBoxx, for the operation of BESSs 3. New methods to properly aggregate BESSs throughout the distribution network 4. Novel business and market models articulated for BESSs 5. Verification of the developed design rules, guidelines and techniques and validation in the FLEXbattery system in Woerden.

Resultaat

The project results in design rules, guidelines and techniques for the integration of battery energy storage systems in distribution networks.

Methodological outcomes for comprehensive evaluation of multi-service BESSs in AC and future DC distribution networks are: - Sophisticated optimization techniques and technical dynamic simulations as well as power and energy management - Advanced behaviour (control) strategies and a novel control platform, the so-called SmartBoxx, for BESSs in relation to the supply/demand and the grid capacity - New aggregation techniques for BESSs - Feasible business cases and market models for BESSs, which are experimentally verified and validated in real life by the FLEXbattery energy storage system in WP6.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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