Multiportgrid

Cross-Sectoral Energy Control through Interconnected Microgrids by Multiport Converter

For a new key element in the smart grid.

The local distribution grids have been facing not only technical, but also economic and regulatory challenges, because of the increased integration of renewable generation and electrification of vehicles. The traditional solutions to the grid expansion, e.g. to build an additional power line, are utility-centered solutions, i.e. the distribution grid operators (DSOs) are the only party being involved to tackle grid issues. This has to be changed! The DSOs have to engage grid users together with technology providers in order to develop innovative solutions, which should not only tackle one problem, but to overcome several problems in a cost-efficient way. This project aims to develop a holistic solution to optimally control cross-sectoral energy flow between different energy carries and demands within the electricity, transport and heat sector, assisted by developing an innovative multiport converter with innovative energy storage solutions by a multidisciplinary team.

Project Duration

01.09.2019 - 31.08.2022

Project Budget

Total Budget: € 1,517,119.-

Funding: € 1,125,859.-

Project Coordinator

Chalmers University of Technology (Sweden)

Project Partners

- Chalmers University of Technology (Sweden)
- Research Institute of Sweden (Sweden)
- ABB AB (Sweden)
- Azelio AB (Sweden)
- Akamediska Hus (Sweden)
- Vattenfall (Sweden)
- University of Padova (Italy)
- teknoCEA (Spain)
- CIT-CEA (Sapin)

Project Website

https://www.researchgate.net/project/Cross-Sectoral-Energy-Control-through-Interconnected-Microgrids-by-Multiport-Converter

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ERA-Net Smart Energy Systems

Smart Energy Systems ERA-Net

ERA-Net Smart Energy Systems Joint Call 2018

This project has been awarded funding within the ERA-Net SES Joint Call 2018 for transnational research, development and demonstration projects. EUR 33.4 Mio of funding have been granted to 23 projects from 16 regions and countries.

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Joint Programming for Flourishing Innovation from Local and Regional Trials towards a Transnational Knowledge Community

www.eranet-smartenergysystems.eu

Main Objectives

The main objective of this project is to develop a holistic solution to optimally control cross-sectoral energy and power flow between different energy carries and demands within the electricity, transport and heat sector. In order to achieve this, one of the key components is a multiport converter, which can provide both ac and dc connection, and can be located at a strategic location such as a fast charging station or a substation, depending on the specific layout of the local grid. Another objective of the project is to investigate various potential business applications and models for such a multiport-converter solution. One application of the multiport converter is to interconnect local distribution grids that have a weak connection to the main grid.

Another application is to interconnect microgrids/minigrids in rural areas of lower economic regions/areas/countries, with an innovative technology for collecting, storing and converting solar energy into dispatchable electricity to the users when needed.

Expected Main Results

Mapped local abilities within the electricity, transport and heat sector to manage variations in local generation and demand

Identifie cost-optimal option to interconnect multiple microgrids and develop overall system control function for a given business application

An evaluated and designed lab scale multiport converter

Analyze the overall performance of an integrated microgrids through a multiport converter

Data from a real-life microgrid to emulate their characteristics in the laboratory environment

Verified operation of interconnected microgrids operation through a multiport converter in the laboratory and then demonstrate it in the field