

Research Projects Finland

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INNOVATION WITH ENERGY

Research

- The most notable project entirety in Finland promoting DG and RES has been technology programme DENSY.
- During the DENSY technology programme, Tekes has funded a total of 123 enterprise and research projects in developing distributed energy systems. The program had a budget of 56,7 million.
- During the programme period, the need for versatile energy production has continued to grow, while a number of technological challenges were overcome. The programme has also noticeably improved the cooperation and networking between research institutions and companies.
- When the programme was inaugurated in 2003, the starting point was the liberation of the energy market.



Research

- Distributed energy systems comprise as well small scale production units for power, heating and cooling as related services. The segment covers a wide variety of energy technologies and fuels, associated by small-scale and customer on-site location. R&D funded by DENSY related to production, integration, automation, manufacturing and IT technology as well as system solutions and business model development.
- DENSY aimed at strengthening the knowledge-base and business excellence of Finnish companies and research centers.

Development environment for distributed generation. Research platform MULTIPOWER

2. What is integrated with DSM

DG

Energy storage

Smart grid technologies

3. What is the level of commercialization

Research project

Demonstration

Field test

Existing practice

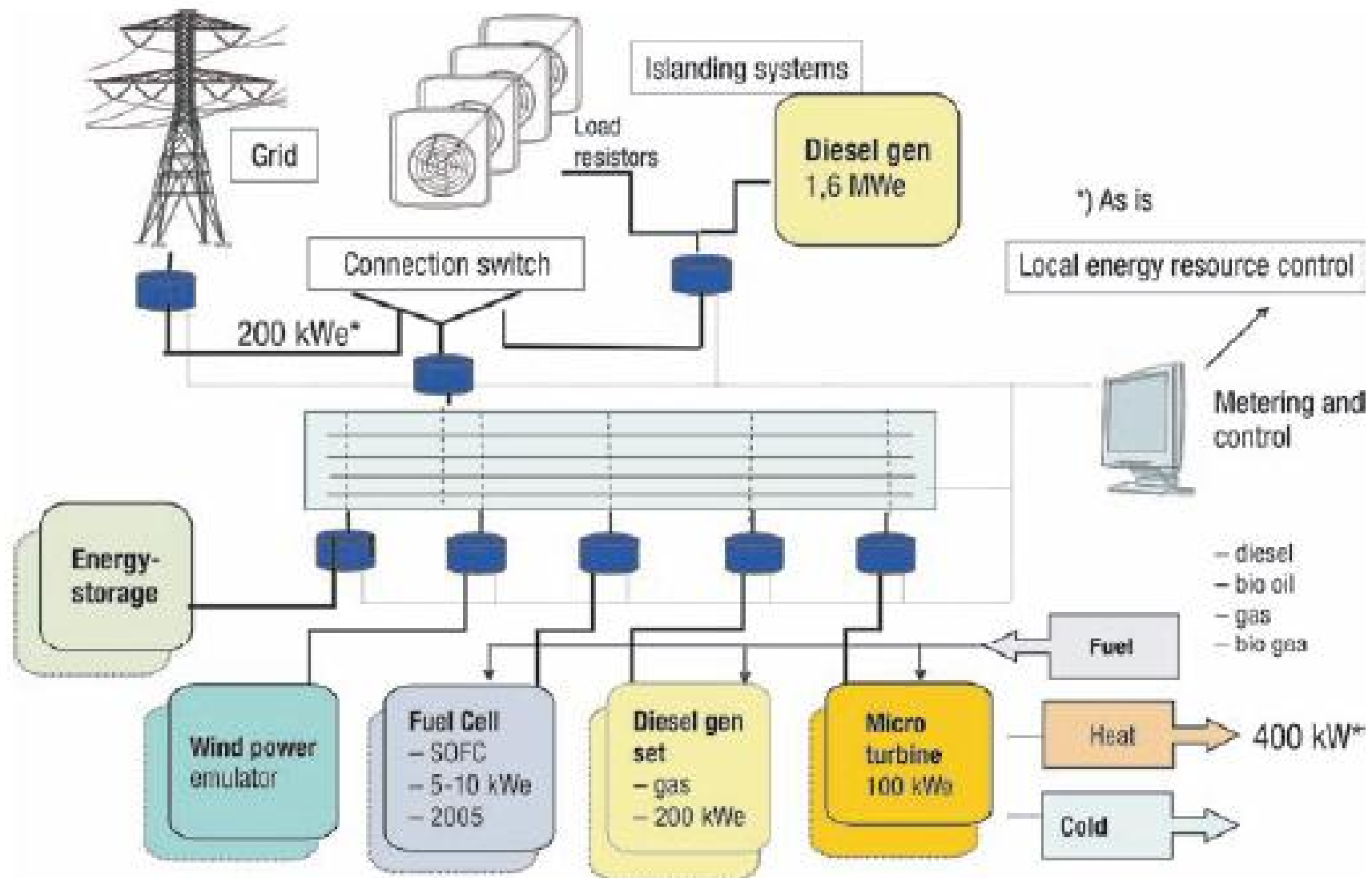
MULTIPOWER

- During the last years several different independent energy production and operational testing environment have been realised in different research projects at VTT. The target of this Multipower project was to integrate the existing separate testing systems to one complex DG testing environment so that in the future different technical solutions for distributed energy systems can be tested.

MULTIPOWER

- MULTIPower environment can be applied in studies related to the analysis and design of grid interconnection of various types of distributed generation.
- The primary aim was to create a collection of simulation models representing various types of networks and generators.
- The network models serve as a basis for the simulation environment, and the user will have a free choice to include a desired selection of various distributed generators into the network model. I
- In addition to these the aim was also to have a library of models representing the protection relays and control systems.
- The primary tool applied in the projects was PSCAD, which is a well-known power system transient simulation tool.

Multipower DG testing platform



Energy storage applications in distributed power system management

ENVATUULI

ENVADE and ENVADE+

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ENVATUULI ENVADE and ENVADE+

- Study different energy storages and their solutions in different power distribution tasks.
- research projects ENVATUULI, ENVADE and ENVADE+, which have included various technoeconomical studies, simulations and demonstrations of energy storage technology and its solution in different power distribution tasks.
- The main research areas have covered energy storages for the network management with wind power systems and UPS, with power quality systems/stations, in DC distribution systems and microgrids;
- The research has been made in cooperation between Helsinki University of Technology, the University of Vaasa and VTT.

ENVATUULI ENVADE and ENVADE+

- Environmental questions, open electricity market and the need for more reliable and efficient electricity distribution are among the driving forces for distributed energy generation and systems. Energy storage is seen as a key technology for promoting the wider implementation of distributed energy systems. The use of energy storages would provide a proper energy management, power quality and improve energy efficiency.
- Energy storages can also be a solution for different network management problems and can also improve the efficiency, flexibility and convenience of the overall use of electrical and thermal energy, and they can also support the existing qualifying standards, regulations and recommendations for network power quality and control.