

A) General Information



Acronym: DEMOC
Title of the User-Project: Distributed Electricity generation with Multi-Objective Control

TA Call: 7th Call of Proposals, 30th June 2012
Host Research Infrastructure: Centre for Renewable Energy Sources and Saving, Dept. of PVs and Distributed Generation, DG Laboratory

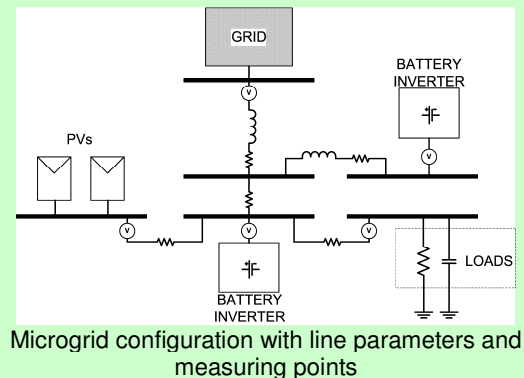
Starting Date: 23-04-2013
End Date: 30-04-2013

Lead User (Name-Institution-Country): Nis Martensen
Energynautics GmbH-GERMANY

Additional Users (Name-Institution-Country): Stanislav Cherevatskiy and Tom Brown
Energynautics GmbH-GERMANY

B) Summary of the User-Project

The project aims to implement multi-objective optimal control for distributed energy resources in a portable and accessible manner. The basic idea of the project is to have a dynamic assessment of the distribution system's state by using available measurement devices and a coordinated control approach when limits such as voltage boundaries or thermal capacity limits are approached. Where control priorities conflict, compromises can be made based on a priority weighting set by the operator.



C) Main Achievements

All test cases were carried out successfully and all minor problems encountered were surmounted. For this very simple system, representing a single household and a two-household network, the controller was able to maintain voltage and keep power set points, within the capabilities of the available assets. In the right screenshot, the controller operates in mixed mode with voltage band of $\pm 2\%$ of nominal and $P = -1750$ W and $Q = 0$ set points, with relaxation ratio 0.5. It can be seen that the two inverters are at the very limit of allowable voltage while the set points have been met.

MOB controller

Run has timestamp: 130430-1224 status: success!

Overall readings

P total	Q total	V worst	V worst location
-1754.0	70.000	0.98000	SI2

Individual asset readings

asset name	P	Q	V	SOC	Pset	Qset
GridConnection	-1540.0	144.00	1.0043	0.0000	0.0000	0.0000
Load	2824.0	854.00	0.98716	0.0000	0.0000	0.0000
SI1	-400.00	-462.00	0.98000	89.700	-401.00	-490.67
SI2	-590.00	-322.00	0.98000	89.700	-586.00	-363.33
pvt_1kW	438.00	0.0000	0.99869	0.0000	0.0000	0.0000
pvt_4kW	1622.0	0.0000	0.99869	0.0000	0.0000	0.0000

MOB controller screenshot in multi-household mode

D) Dissemination of the Results

The results of the tests performed in the infrastructure will be disseminated in appropriate journals such as:

- Elsevier, Electric Power Systems Research
- Elsevier, International Journal of Electric Power and Energy Systems

E) Use of the Resources

Access Days/Units (CRES): 6
Stay Days (CRES): 8