

**Distributed Renewable resources Exploitation in electric grids
through Advanced heterarchical Management**

| | | | |
|-----------------------|--|---------------------|------------|
| | <i>Control strategies for a decentralized, real-time operation of distribution grids</i> | | |
| Author | Elisabeth Drayer, Franziska Meyer, Jan Hegemann, Martin Braun | | |
| Event | IEEE Powertech Publication | Organisation | UNI KASSEL |
| Contact Person | Elisabeth Drayer | | |

ABSTRACT:

Compared to a centralized grid operation management for the distribution grid, a decentralized agent-based operation has many advantages. Two methods that are part of such a grid operation management are presented. Firstly, a method based on Particle Swarm Optimization (PSO) is developed. A suitable fitness function is derived to evaluate possible solutions with respect to their multi-dimensional implication for the situation in the grid, i.e. their effect on the voltage and current profile, reactive power flows, power losses, operating costs as well as complexity. Secondly, different local control strategies are evaluated for their potential as a complementary strategy to the above optimization and as an immediate countermeasure to voltage and frequency violations. It can also function as a fall back option in case of emergency. For both methods, simulation results for artificial and real grid data are presented that show their successful application.