CONTROL DEVELOPMENT AND MODELING FOR FLEXIBLE DC GRIDS IN MODELICA

Andreas Olenmark[1] Jens Sloth[2] Anna Johnsson[3] Carl Wilhelmsson[3] Jörgen Svensson[4]

[1]One Nordic AB, Sweden, andreas.olenmark@one-nordic.se.
[2]Gothia Power, Sweden, jens.sloth@gohiapower.com
[3]Modelon AB, Sweden, carl.wilhelmsson@modelon.com
[4]Industrial Electrical Engineering and Automation (IEA), Lund University, Sweden, jorgen.svensson@iea.lth.se

Abstract

This article will show a way of implementing different control strategies for power electronic converters in the Modelica modeling language. The different control modes were fitted into flexible models that could be interconnected in various power grid topologies. The power grid examples were controlled and kept stable during various load scenarios, using the developed controlled converter models. The work was performed using the Modelica tool Dymola. Modelica is an equation-based object-oriented modeling language. Electrical components in the Electric power library (EPL) from Modelon were used to model power electronic units, grids and other electrical infrastructure. The outcome of this effort was simulation results which clearly demonstrate that the developed controllers enables scalable and controllable DC power grids.