ELECTRA REX

A Researcher Exchange Programme for Smart Grids

European Liaison on Electricity Committed Towards long-term Research Activity Integrated Research Programme

INTEGRATING SMART OBJECTIVE AGENTS IN THE POWERMATCHER FRAMEWORK FOR BALANCE RESTORATION CONTROL

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This exchange relates to the coordination and optimization of reserves activation in the Balance Restoration Control in the proposed web-of-cells architecture by ELECTRA IRP. In this web-of-cells architecture, the Control Cell Operator is responsible for correcting real-time imbalances (i.e. real-time deviations from the market determined setpoint) within his cell. To correct the cell imbalance, restoration reserves, provided by an aggregator, are activated.

The objective of the exchange project is to prepare the detailed functional architecture and specification of a multi-agent control system for such reserve provision based on the TNO PowerMatcher framework. This well-known open-source framework that has been used in various field-tests, is being used by multiple ELECTRA partners like Strathclyde in their smart grid test labs.

VITO has developed Sequential Decision Making Business Agent technology that distinguishes from more common Myopic Agents in that their decision making optimization takes into account forecast information, resulting in a decision plan or schedule rather than a decision point. Such forward looking Business Agents are essential assets for an effective stable multi-agent control system that is required for reserve provision.

During the research exchange it was investigated how such Business Agents can be integrated in the Powermatcher based multi-agent framework that is being used and evaluated in the Strathclyde smart grid test lab to extend the framework's capabilities from Myopic Decision making to Sequential Decision making. The two-week exchange was intended to kick of this work by learning about the Strathclyde PowerMatcher setup and related labo infrastructure and capabilities, and to agree on the best

way to integrate the Business Agents in the Strathclyde validation and demonstration environment.

Figure 1: The Technology & Innovation Centre at the University of Strathclyde.