

Secure architecture for smart grid operation

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Distributed generation, volatile renewable energy, market attendance, data privacy and cyber security are serious challenges to the hierarchical operation of a power system. A decentralized overall model of power systems (Ilo, A., Energy supply chain net, 2013) created the fundament of the novel architecture. Three major components are designed: “Link”, “Producer_Complex” and “Storage_Complex”. Their interfaces are defined for all power system posturing processes like load-generation balance, n-1 security, demand response (Fig.1). The generic, base element is the “Link”. Being a standardized structure, defined by secondary control, the Link can be applied to any partition of the power grid, as a subset of a high, a medium or low voltage grid part, or simply a customer power plant.

KEYWORDS:

- Decentralized smart grid
- Cyber security
- Load generation balance
- n-1 security
- Demand response

IPR:

Patent pending

OPTIONS:

- License agreement
- Pilot projects
- R&D cooperation

INVENTOR:

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REFERENCE:

M052_14

TECHNOLOGY

The technical-functional model for the operation of a decentralized smart grid comprises:

- Links are grid parts defined by secondary control area and operating independently
- Links have contractual arrangements with other Links and are communicating through well-defined interfaces, minimizing the number of data to be exchanged

ADVANTAGES

- Security and privacy of data inside the Link
- Low IT costs and enhanced cyber security by minimizing data exchange
- All power system posturing processes (the (n-1) security, the active power balance, angular and voltage stability calculation, demand response, etc.) can be performed for each link

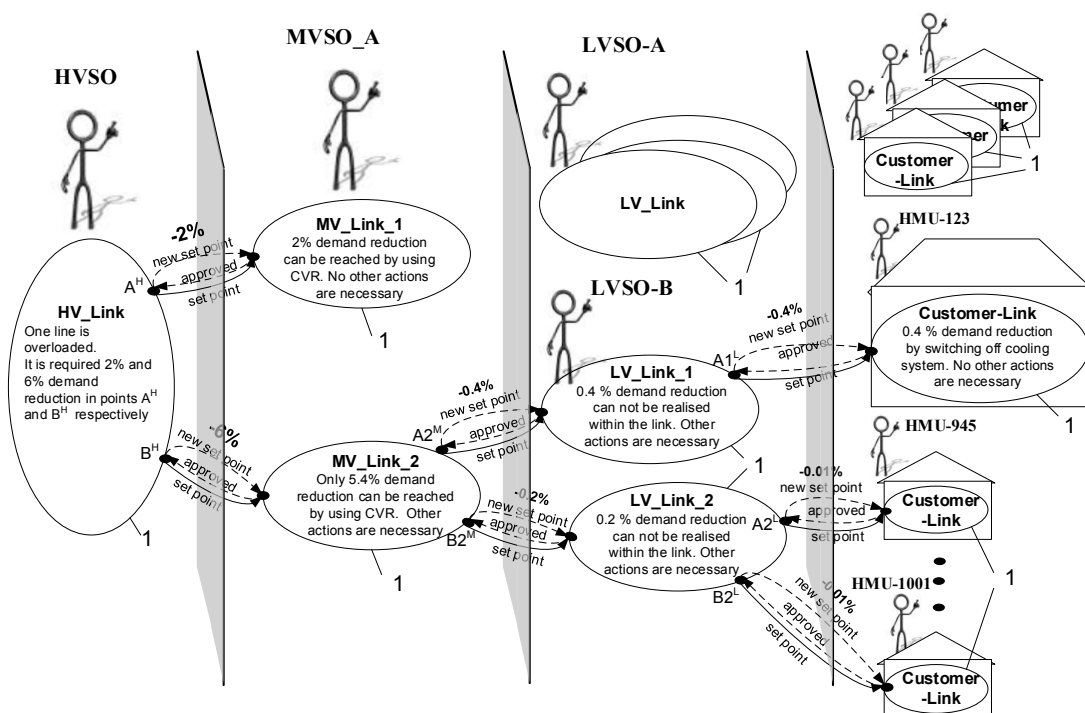


Fig. 1: Demand response process: line overload on high voltage grid

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