Information system for multi-actor management of major disturbances in electricity supply

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Major disturbances in electricity supply have impacted the functioning of society and the well-being and safety of Finnish citizens in recent years [1, 2]. Official post-disturbance reports [3, 4] have highlighted the need for significant improvements in information exchange between distribution system operators (DSOs), rescue services and municipalities during power outages. An information system concept to notably enhance the information exchange and multi-actor management of major disturbances was developed in a research project carried out by VTT and TUT. [5]

Core of the system – simultaneous map-based presentation of outage information and user criticality

The system concept combines and presents DSOs' real-time outage information on a common map-based system together with criticality information of focal electricity users. Outage information comprises the extent, current duration and estimated remaining duration of an outage. Figure 1 presents an example of the situational overview provided by the system: the critical outage time of a pumping station has been exceeded (symbol red), while the outage time of a cellular network base station is still clearly below its critical value (symbol green); the symbol sizes correspond to the severity of the consequences of exceeding the critical outage time. [5]

Main benefits – formation of shared situational view and aligning of actors' repair and rescue operations

The developed system supports the actors involved in the management of disturbance situations, i.e. DSOs, rescue services and municipalities. The system helps actors to gain a shared situational view of the disturbance and its propagation and to align their repair and rescue activities so that disturbances are managed optimally. Ideally, the system is established so that it follows the geographical areas of responsibility of the rescue service organisations. This ensures that the rescue organisations responsible for commanding rescue operations get the critical information they need from a single source. [5]

Discussion

The system can enhance information exchange and the management of major disturbances notably. It would also fulfil the new legislative requirement prescribed for DSOs: [6] "*In disturb-ance situations DSOs shall participate in the formation of a situational overview and supply any information relevant to this purpose to the responsible authorities*." By expanding the system to cover other infrastructures such as telecommunications, water supply, district heating, etc., further benefits could be gained [7]. As regards the system realisation, practical implementation of the system and allocation of costs remain as challenges [5].

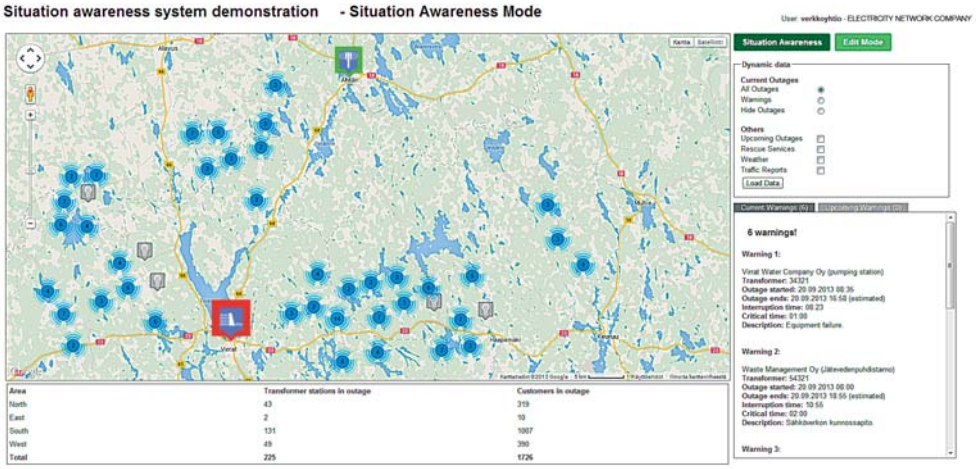

Figure 1. Example of the situational overview provided by the system.

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