

New Finnish solution shortens power cuts during storms

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VTT Technical Research Centre of Finland has developed a tool that can be used to shorten power cuts caused by storms and to reduce the resulting costs and damage, such as faults in household electrical appliances and frozen water pipes.

The tool can be used to simulate mutual dependencies between [mobile communication](#) networks and electrical grids in different fault scenarios, including damage caused by storms. This information assists in evaluating the length of power cuts experienced by consumers, improving the reliability of networks, and thereby shortening power cuts.

The simulation tool evaluates the interdependence of mobile [communication networks](#) and electrical grids in the case of failure, permitting study, for example, of how a storm damages the [electrical grid](#) and subsequently affects mobile communication networks.

Loss or quality degradation of telecommunications links makes remote control, maintenance, and repair of the electrical grid more difficult. Impaired mobile communication networks interfere with automation, slow down repair works on the electrical grid and lengthen power cuts significantly.

Examining different kinds of failures and analysing the operation of electrical grids and mobile communication networks enables identification of the critical entities in the networks, and hence to take measures to increase network reliability. At the same time, damages

payable by electricity and [insurance companies](#) to consumers can be kept to a minimum.

Launch planned for 2015

The simulation tool supports current mobile 2G/3G network technologies, but can also be upgraded to support future network technologies, such as LTE-A (Long Term Evolution Advanced), which is set to be the future standard of [mobile networks](#). The tool will be ready for operational use in 2015.

The majority of electrical grid isolator switches (disconnectors and reclosers) are still controlled manually. The simulation tool allows energy companies to study how and where in the electrical grid automation and remotely controlled isolator switches could be used, to minimise the extent of the power outage.

Electricity supply of mobile communication network components and consumers can be rerouted to decrease effects of the outage. This will prevent the failure from escalating, and speed up repairs.

Expectations placed on the reliability of data communication networks are growing due to automation and real-time monitoring of smart grids. Moreover, distributed electrical power generation requires a smart electrical grid, which makes electrical grids and mobile communication networks even more interdependent.

Also suited for evaluating power cuts resulting from cyber attacks and snow

In addition to damage caused by storms, the tool can be used to evaluate the effects of power cuts resulting from other causes. These include

cyber attacks against the electrical grid control systems, as well as snow loads and solar wind.

New applications for the simulation tool can also be found in the study of interaction between other infrastructures and critical services.

Examples include interaction between the electrical grid and water supply, and that between the electrical grid, mobile communication networks and banking services (or rescue services).

The [simulation tool](#) was developed as part of the SGEM (Smart Grids and Energy Markets) research programme. VTT Technical Research Centre of Finland's partners in the project included Viola Systems, ABB, Fortum, NSN and TeliaSonera.

Provided by VTT Technical Research Centre of Finland

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