Dealing with power outages more efficiently

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Black ice can be an immense burden on the power grid. The power lines sag low enough to almost touch the ground. Credit: Fraunhofer FIT

When there is a power failure, the utility companies, public officials and emergency services must work together quickly. Researchers have created a new planning software product that enables all participants to be better prepared for emergency situations.

Power supply is the backbone of our modern economy. Nearly every aspect of life depends on electrically-operated devices. When the flow of

power stops, it is not just the lights that go out. In the supermarket, the automatic teller machines and cash registers stop working. Even telephones, radios and televisions become paralyzed. If the shortage lasts a long time the supply of hot water, gas and fuel and the functioning of respirators at intensive care units in nursing homes or at private homes is at risk.

The causes of this dreadful scenario can range from [natural disasters](#) to terrorist attacks or just technical problems. A few recent examples demonstrate how real the risk is in Germany where the last major event occurred in Hannover in 2011. The 650,000 people there went without power for up to 90 minutes after a blockage in a coal-fired power plant, and the power main connection at a transformer station failed. Even more far-reaching consequences were seen from the biggest [power outage](#) in post-war history, when extreme snowfalls in the Münsterland region in 2005 knocked out a series of high-voltage pylons. Some 250,000 people went without power, in some cases for up to five days. The financial damages exceeded 100 million euros.

Firefighters as process managers

In emergency cases, the utility companies, public officials and emergency services realize that they must contend with a variety of tasks: Who are the most seriously affected? Where is greatest need for action? How long will emergency power supply last? Who travels where, and how long will the fuel last? Theseare just a fraction of the issues that require rapid response. "To minimize the duration of the crash, the officers-in-charge at the fire, police and emergency services departments have to act like process managers," explains Dr. Thomas Rose, head of the Risk Management and Decision Support research department at the Fraunhofer Institute for Applied Information Technology FIT in St. Augustin.

Whereas process managers at companies have access to specialized software tools, rescue personnel have no modern IT-backed process management tools available for crisis situations. "Currently available solutions for industry and business are too complex, and do not fit the unique requirements that the police, the fire department and other emergency services have. Even programs like Excel rapidly hit their limits when there are constantly changing volumes of data. This is precisely the gap our IT safety platform covers," explains Rose.

The software from the Fraunhofer Institute FIT provides energy suppliers, public officials and rescue professionals throughout Germany with the opportunity to be prepared in advance – in other words, before the power goes out – for optimal joint collaboration in crisis situations. At the heart of this IT solution, developed under the auspices of the InfoStrom research project, are role-based checklists. These contain not only detailed action guidelines on what each individual site has to do, but also guidelines on which items have to be coordinated with other sites.

Tests in two local counties

For example, the technical relief organization knows exactly how many vehicles the local fire department plans to deploy. "Checklists are ideally suited for crisis management. But previously, they were only available on paper. Even the cross-organizational approach was missing. In addition, we integrated a glossary. Because different rescue personnel typically use different sets of terminology," says Rose. The operational capability of the software was successfully evaluated in the more urban-defined Rhein-Erft county, and the more rural setting of Siegen-Wittgenstein county.

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