



# ZIM Success Story

Central Innovation Programme for SMEs

Cooperation Projects 137



## A Constant Eye on Energy Grid Loads

**In planning the energy grids of the future, assembling distributed measurement systems that offer protection through constant monitoring is a key concern. Such systems track grid loads in real time, which enables them to identify vulnerabilities early on. They can then use the data generated to initiate corrective measures in a timely manner.**

For a variety of reasons, the energy sector is currently in a period of upheaval. In the face of all the changes on the way, however, one thing will remain the same: the absolute necessity of reliable energy sources. Conventional energy producers are increasingly running into problems that could put the continuous supply of energy at risk, including in incorporating alternative sources (such as wind power) into the overall supply system. The rapid expansion of renewable energy sources, the priority such sources enjoy, and the rising requirements being placed on energy supply systems have led to recurring instances of grid overload and the temporary deactivation of renewable energy plants.

This is why protecting grids through real-time monitoring is such a pressing matter. For future operations, one of the areas of focus lies in establishing

distributed measurement systems that make comprehensive monitoring possible.

In this transnational R&D project, Austrian and German partners from the realms of industry and science came together to come up with corresponding solutions.

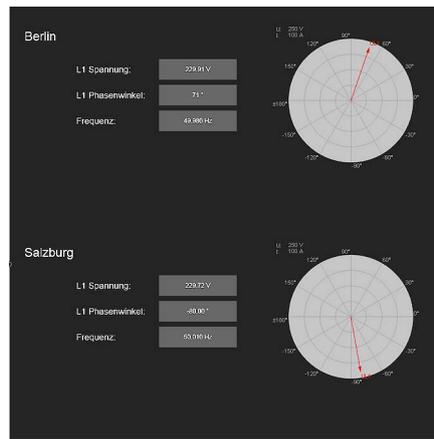
### The product and its innovation

In the IEC 61850 norm, the International Electrotechnical Commission has established an extensive family of standards related to the automation of energy grids. The IEC 61850-90-5 standard was added in early 2012 to cover the transmission of time-critical measurements – referred to as “synchrophasors” – over wide-area networks. With these measurements, it is possible to monitor the status of a given energy grid in real time, identify problems early on, and initiate appropriate measures in response.

To ensure that devices from different manufacturers will interact as intended on the grid, inspection and certification are required. The project thus concentrated in particular on the development of testing procedures pertaining to the IEC 61850-09-5 standard and the open implementation of these tests using TTCN-3 – a standardised programming language specifically developed for test solutions.

The primary results produced by this research cooperation include:

- Evaluation of whether these testing procedures would be applicable to energy protocols
- Implementation of a prototypical protocol stack (a conceptual architecture of communication protocols)
- Confirmation of this concept in a special testing environment



Synchrophasor measurements from Berlin and Salzburg



An OTITOS antenna atop the Gaisberg (Salzburg)

**Project coordinator**



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This project was carried out as part of an IraSME call for proposals for transnational R&D endeavours. [www.ira-sme.net](http://www.ira-sme.net)

**Market and customers**

In the course of the project, the German companies involved had the opportunity to develop key expertise regarding the communication protocols used in the energy sector. EANTC plans to use the knowledge it has gained as a basis for designing and providing special testing services for energy grids, especially in connection with the IEC 61850 norm. Testing Technologies hopes to expand its product portfolio in a similar fashion, which should improve the long-term market position of its TTworkbench testing platform.

Following the integration of the protocol stack developed for the IEC 61850-90-5 norm, the Austrian company COPA-DATA was given the opportunity to use its platform, zenon Logic, as an independent “phasor data concentrator” (PDC) for the two protocols established on energy grids: IEEE C37.118, and now IEC 61850-90-5, as well. A PDC functions as a redundant protection system that monitors elements of electricity grids. COPA-DATA is expecting these efforts to attract new business, particularly in the United States.

**The partners**

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The Central Innovation Programme for SMEs (ZIM) provides support for promising technologies and industries in a number of arrangements:

- Individual projects
- Cooperation projects
- Cooperation networks

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