

HORIZON
2020

SmartGrid Active Distribution Management System to accommodate Renewable Energy Sources and Low Carbon Emissions

Berichterstattung

Projektinformationen

ADMS

ID Finanzhilfevereinbarung: 730540

[Projektwebsite](#) 

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Projekt abgeschlossen

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RHEINISCH-WESTFAELISCHE
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Germany

Periodic Reporting for period 2 - ADMS (SmartGrid Active Distribution Management System to accommodate Renewable Energy Sources and Low Carbon Emissions)

Berichtszeitraum: 2017-10-01 bis 2018-09-30

Zusammenfassung vom Kontext und den Gesamtzielen des Projekts



ADMS (Active Distribution Management System) was a 2 year Horizon 2020 Fast Track to Innovation (FTI) project that productised and piloted an integrated family of low-cost products to assist electrical utility Distribution System Operators (DSO)s in the active management of Renewable Energy Sources (RES) by helping to (a) Improve their networks' stability and predictability, (b) Safeguard regulatory compliance and (c) Achieve their 2020 and 2030 Low Carbon Emissions Targets.

A critical challenge for Smart Grid ecosystems is to optimise the Return On Investment (ROI) for Power Utilities. ADMS is addressing this with product solutions to help DSOs to achieve their carbon reduction targets by enabling them to actively manage their networks in a disruptively innovative, but coherently distributed way, right down to low-voltages (LV) in support of lower carbon footprint technologies and new energy generation business models from green RES.

Project research identified that the challenges that DSOs face in managing their grids include (a) Capacity Demand Measurement, (b) Regulatory Compliance, (c) Fault Monitoring / Detection, (d) Renewable Energy Management and (e) Network Power Quality. The ADMS solution is addressing these by providing the DSO's with the following benefits: (1) Improved network stability, capacity and increasing RES penetration integration with reduced grid inertia (2) Cost effective tools, fast and a complete Active Distribution Management Solution, (3) Innovative cost competitive solutions and (4) A mass deployable cost-effective solution right to the grid edge.

ADMS provides these benefits by using a smart machine-learning Network Management System (NMS), that seamlessly monitors real-time data to the Grid Edge for LV/MV distribution systems, with (a) Smart LV/MV Power Quality Monitoring (PQM) that includes grid-edge processing of dynamic local event detection algorithms, (b) Low-cost micro Phasor Measurement Units (mPMU)s, in a high-accuracy Distributed Sensor Network (DSN). The NMS is a network modelling and predictive behaviour platform, that uses the real-time readings from the mPMUs and PQM units, together with Artificial Neural Networks (ANN) technology, to provide real and predictive analysis of grid behaviour, for all points of the network with a minimal number of measurement nodes deployed. Thus providing a fully integrated ADMS solution for Network Stability and Predictability.

ADMS will be a commercial operational product solution on the market within a year, and will be sold collaboratively to DSOs and System Integrators, by Altea BV, GridHound UG and MAC Ltd, to provide an unique service that. "Nobody else can take you from a passive grid to smart grid in one contract". This is more than any individual Partner could provide, and is to the mutual advantage of all Partners. The ADMS will support Europe's 2,400 DSOs in the active management and maximisation of RES in their grids, enabling more RES on existing distribution networks by improving network stability while safeguarding regulatory compliance.

Arbeit, die ab Beginn des Projekts bis zum Ende des durch den Bericht erfassten Berichtszeitraums geleistet wurde, und die wichtigsten bis dahin erzielten Ergebnisse



During the first half of this 24 month project the focus was on scoping the market potential of ADMS, setting up management, collaboration, dissemination and commercialisation planning procedures and productising the various elements of ADMS into a coherent operational solution for use in the DSO pilots. Then during the second half of the project the focus switched to the operation and evaluation of the 4 operational pilot sites of ADMS (Active Distribution Management System), and using those to direct the dissemination and finalise the business planning to begin the post-project commercial deployment and launch in the coming year. This led to 10 follow-on commercial pilots in Australia, China, Estonia, Germany, Ireland, Italy, Romania and the United Arab Emirates, that indicate the widespread need amongst Distribution System Operators (DSO) and the potential of future commercial sales of ADMS to Utilities across the world. The ADMS operational product solution will be commercially launched within a year, providing an unique innovative service.

The initial ADMS Market Analysis involved speaking with DSOs, investigating potential competitors and future collaborators, and prioritising high-potential future users of the commercial ADMS. This set the baseline for the project, to guide its productisation, operational pilot evaluation and subsequent market deployment across Europe. Based on this, much of the first year of the project was focused on productising and integrating the various ADMS components into a coherent solution to provide the reliable operational service required for the Innovation Demonstration Pilots in the second half of the project.

The year 2 work focused on the operation and evaluation of the ADMS operational pilot sites at 4 varied Operators' sites across Europe – ESB Networks (Ireland), e-distribuzione (Italy), RWTH Campus Smartgrid (Germany) and Bayernwerk Netz (Germany). The feedback, experience and results of these directed the dissemination and finalised the business planning to begin the post-project commercial deployment and launch in the coming year. A database of potential DSO customers was developed, resulting in over 80 contacts and 10 follow-on commercial pilots.

Fortschritte, die über den aktuellen Stand der Technik hinausgehen und voraussichtliche potenzielle Auswirkungen (einschließlich der bis dato erzielten sozioökonomischen Auswirkungen und weiter gefassten gesellschaftlichen Auswirkungen des Projekts)

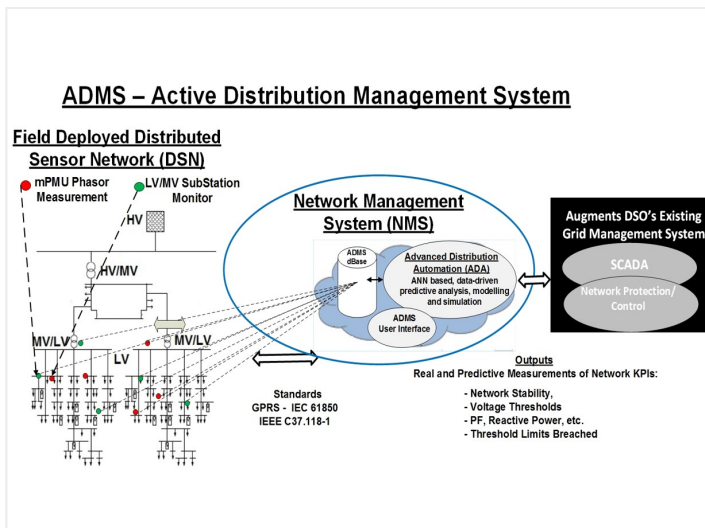
The ambitious ADMS solution is built on beyond state-of-the-art Distribution Sensor Network (DSN) products and a ground-breaking Network Management System (NMS) using Advanced Distribution Automation (ADA) data analytic/modelling technology that models and predicts Low Voltage (LV) (< 440V ac) and Medium Voltage (MV) (< 30kV ac) power distribution network behaviour and stability for an entire grid with a minimal number of monitoring nodes deployed on the network, helping DSOs achieve their 2020 and 2030 carbon reduction targets.

ADMS seamlessly integrates mass deployable, low-cost LV/MV Power Quality Monitoring (PQM) units with grid-edge processing of DSO-defined dynamic local event-detection algorithms and using

patented Flexible Magnetic Planer sensors, low cost micro Phasor Measurement Units (mPMU), and innovative patented data-driven Artificial-Neural-Networks (ANN) based NMS. These have been productised and tested by RWTH and UNIBO to meet the IEC61850 substation automation standard and mPMU enhanced with a patented TFT-WLS algorithm to meet the IEEE C37.118-1 standard.

The project completed pilot field trials that involved the deployment of the NMS and DSN of mPMUs and PQM units on networks, to monitor their dynamic behaviour using the ADMS platform. The results demonstrated, validated and indicated the readiness to commercially deploy an operational ADMS that:

- Provides synchronized high-accuracy real-time monitoring to improve a grid's performance and head-off faults, by augmenting the DSO's existing grid management system.
- Intelligently and continuously actively interacts with the DSO's network operators, to manage and better understand the behaviour and operation of their distribution network from MV to its LV grid edge.
- Is a high performance, fully integrated, scalable and low-cost mass-deployable interactive solution, that is in demand by DSOs globally, as indicated by 10 follow-on commercial pilots.



ADMS - Active Distribution Management System



ADMS Project Team, September 2017



ADMS Logo

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