

# IMPONET

Big data technology for a more efficient electricity supply



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Reliability and consistency of electricity supply is critical to many industrial and service activities: when the power quality is inadequate, business suffers. To operate the power network in a more efficient manner, it is necessary to exploit data from a huge number of electronic devices involved in the control and protection of power systems in a systematic and standardised way. With issues such as smart metering and real-time monitoring becoming crucial, the ITEA 2 IMPONET project addressed the modelling, design and implementation of a comprehensive, flexible and configurable information eco-system to meet the most complex and advanced requirements in electrical energy management.

## Impact highlights

- > The IMPONET project enabled higher energy efficiencies for utilities of between 5 and 10% with cost saving for consumers of around 10% through benefiting from access to hourly energy information and therefore the ability to adjust consumption, depending on the price of energy.
- > Indra's Web Portal for Residential Customer Meter Data was deployed for the overall customer base of Gas Natural Fenosa, which is in excess of 3 million customers, representing a sizable portion of the total Spanish market. In the future, Gas Natural Fenosa will be rolling out this platform for other market segments and foresees future deployment in other parts of the world, mainly in South America.
- > Indra's iSPEED platform was implemented and is currently in use by Elektro (Brazil) for the monitoring and control of the entire distribution network, which is comprised of more than 170,000 transformers and serves more than 2.4 million customers in a rural and urban hybrid environment. Elektro is a subsidiary of Iberdrola, which is currently evaluating the extension of the use of iSPEED to other subsidiaries and to Iberdrola itself. In this future short-term scenario, the combined number of customers for the Iberdrola group indirectly served by this platform, will be in excess of 25 million worldwide.
- > Indra's advanced Meter Data Management platform which was built on top of the IMPONET results, has already been successfully implemented in the largest utility company in Uruguay (UTE) and is currently being deployed in ENEA in Poland.
- > Indra hired roughly thirty new analysts/programmers because of all these new business developments. These are conservative figures and INDRA plans to significantly enhance the business in the coming years.



## Project results

IMPONET investigated the business challenges and opportunities in the electrical distribution domain, identifying and describing requirements for Advanced Metering and Power Quality Monitoring. Elaboration of the system architecture focused on the ability to process massive amounts of information in real-time while maintaining bi-directional communications through the use of several communication technologies and common standards like IEC 61850 and CIM. The implementation of several Meter Data Management (MDM) use cases made extensive use of the storage and processing architecture for handling massive amounts of information. Several platforms for the visualisation of customer energy data were developed according to the needs of different stakeholders. The Power Quality concepts and use cases focused on short duration disturbances in four main sub-areas (processing, modelling, management and reporting) and the corresponding methods and tools for power quality monitoring in the electrical distribution domain were further developed. 15 demonstrations were carried out and produced the actual integration of the global architecture developed within the project in a controlled workbench

environment that covered several available scenarios of an electricity network.

The main innovation generated by IMPONET laid in the advanced real-time architecture that contained a dual model of publish/subscribe and request/response data exchange mechanisms in which data access allowed interoperability between the different data models, while making extensive use of big data technologies for the processing of huge volumes of information gathered from the electricity grid.

## Exploitation

Reusing part of the IMPONET results, Indra developed a Web Portal for Residential Customer Meter Data, which is implemented by e.g. Gas Natural Fenosa, the third largest utility company in Spain. Secondly, Indra's advanced MDM platform was built on top of the results of the IMPONET project, in particular the use cases related to smart metering, making extensive use of the expertise gathered in applying big data technologies to this domain. Furthermore, developing a real-time data integration platform as part of the IMPONET project has resulted in Indra's product iSPEED – a Smart Platform for Efficient

Electrical Distribution. It is being implemented in utility companies all over the world, such as Elektro in Brazil, or generating interest in organisations such as NRECA (National Rural Electric Organisation) or the SGIP (Smart Grid Interoperability Panel) in the USA, among others. Wooam used the project results to help establish a smart grid test bed in Jeju for the KEPCO (Korea Electric Power Corporation) consortium for the development of an Electric Vehicle Charge Infrastructure Unified Management System and the AMI (Advanced Metering Infrastructure). Kema (currently DNV GL) has benefited from lessons learned and value-added knowledge from IMPONET for its utility advisory services that include a Smart Metering & Distribution Automation lab, DMS & MDM Requirements Specifications and its integration. Answare has developed new services for the home user, applying its expertise in mobility technologies like Android and iOS to exploit new markets in mobile applications and expert systems applied to the energy sector. IMPONET has also enabled Answare to enter the Big Data sector. As co-founder of the Big Data Value Association ([www.bdva.eu](http://www.bdva.eu)), they are active in developing Data Visualisation and Data Analytics solutions for use in the energy industrial sector.

# IMPONET

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#### PROJECT LEADER

Eloy Gonzalez Ortega, Indra

#### PROJECT START

December 2010

#### PROJECT END

February 2013

#### PROJECT WEBSITE

<https://itea4.org/project/imonet.html>

#### PARTNERS

*Republic of Korea*

Wooam



*Spain*

Answare



Indra Sistemas



Indra Software Labs



Kema (currently DNV GL)



Prodevelop



Tecnalia



Technical University of

Madrid (UJM)



Unión Fenosa Distribución



University of Deusto



University of Girona



*Slovenia*

Kapion



University of Ljubljana



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LNL

