

Project Abstract

The project aims to demonstrate advanced data analytics and processing for complex and big data sets in the **energy** sector. The project will have access to **large and complex data sets** in the whole energy field and to demonstrate how these data will be processed by existing technologies. The consortium will be built mainly from commercial ICT companies (technology providers, software developers and system integrators) and academic organizations with a **ready-to use (already developed high TRL) technologies** as well as organizations involved in the energy sector (energy producers, DSOs, Retailers, Aggregators, ESCOs, customer platforms) or other related sectors (smart transportation, buildings, manufacturing or cities) which continuously generate big amounts of data and where the potential of these generated data is not yet exploited. The solution will be replicable to other sectors. Expected consortium size is between 15-20 partners. Also the project will have to involve at least 100 other organizations involved in the demonstrations. The project will be technically underpinned by ATOS who will play the role of a system integrator and will provide an advanced big data analytics and integration layer using its Atos Codex for Utilities (Figure 1). Additionally operationally approved cloud solutions will be partially offered by ATOS. Benefit of big data analytics will need to be defined by demonstrator partners. The innovation potential of the project will be provided by the offered technologies in cross sectoral settings (such as correlation between weather and energy consumption).

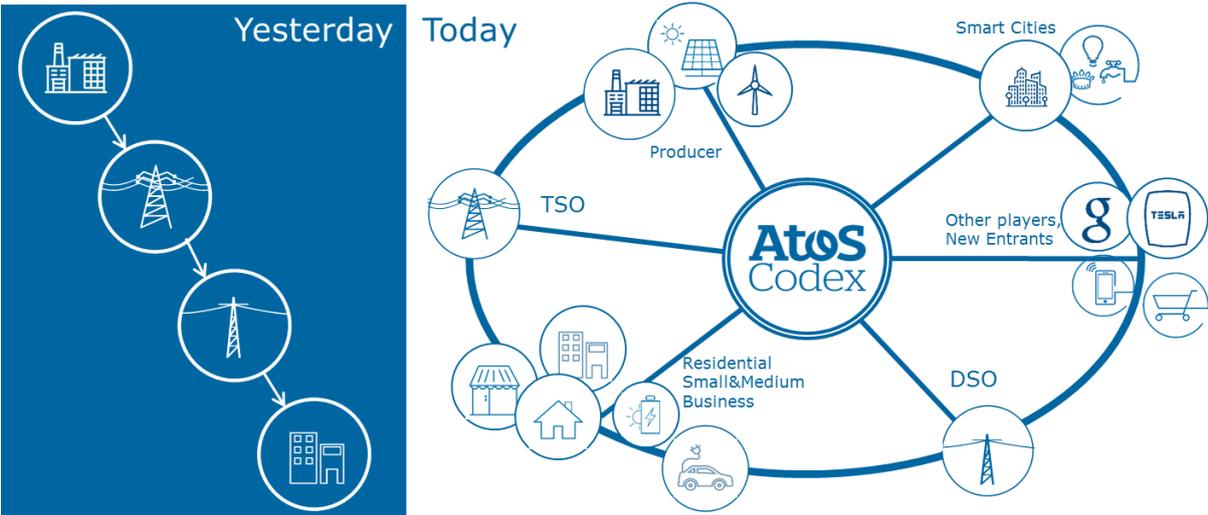


Figure 1: Energy value chain is changing - Business reinvention with Codex for Utilities

Motivation

Utilities are collecting unprecedented amounts of information from millions of smart meters installed in recent years. Unfortunately the capacity to process collected data seems largely to have overwhelmed companies and regulators. Processes designed for a world run on paper billing and planned excess capacity are of diminishing effectiveness in one defined by interactive usage and distributed generation. This is the starting point of the project to provide a better understanding and usage of the insights of energy related raw data.

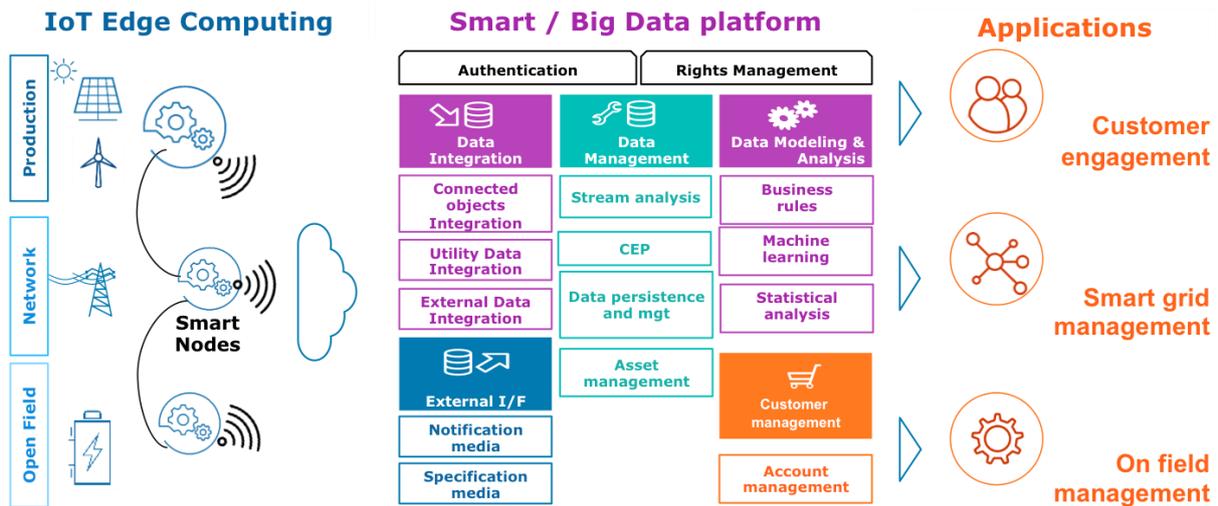


Figure 3: From Big Data Analytics to Edge Computing - Use machine learning on the field.

Demand side management program marketing is often felt to be wasted, but analytics and segmentation could greatly enhance them. Suitable advanced dynamic energy tariffs enable customers to save money by limiting use during certain energy usage peak events, the kind of initiative that has been in place around the EU for years, but adoption has been limited in part because “the conversation about tariffs at commissions and in utilities is very divorced from the reality on the ground, which is focused on “how much will I save?”.

The next step will be to coach customers through these peak energy use events. The installation of smart meters is set to accelerate and provide ever more detailed information to a wide variety of firms and customers in energy and beyond. The underlying project will be providing the next level of analysis and engagement based on that energy related data to help companies and regulators move forward with segmenting, prioritizing and putting into action their plans and objectives based on data-driven insights.

Open source technologies are envisaged to be widely used and implemented during the course of the project.

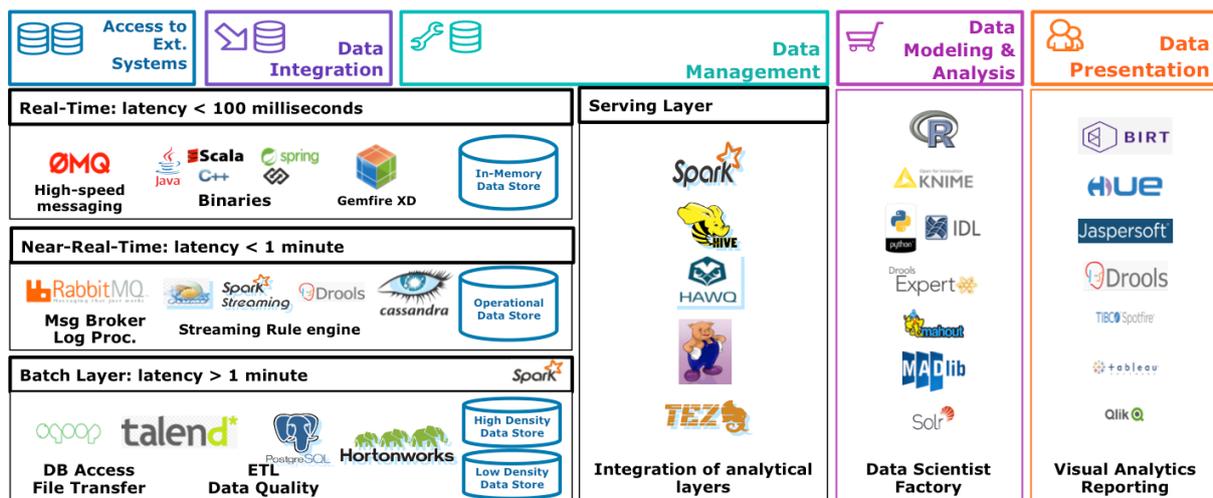


Figure 2: An end-to-end open source Framework - Power of communities at your service

The following consortium has been established in Slovakia and discussed with potential Austrian partners:

No.	Abbreviation	Organization full name	Country
1	ATOS	Atos Slovakia, optionally Atos Italy or Atos Research and Innovation, Spain (ARI)	Slovakia/ Italy/Spain
2	UI SAV	Institute of Informatics, Slovak Academy of Sciences	Slovakia
3	FIIT	Faculty of Informatics and Information Technology, Slovak Technical University	Slovakia
4	4ER	4ward Energy Research GmbH	Austria
5	UBI	UBIMET GmbH	Austria

Competences and technologies offered by Partners

1. ATOS

- Systems Integration services and Managed Services (hardware solutions)
- Cloud operations, Big Data & Cyber-security solutions
- Transactional services through Worldline, the European leader in the payments and transactional services industry
- Digital transformation, specially in the areas of Big Data and Cyber-security
- HPC center

2. UI SAV

- Cloud computing infrastructure (Hadoop/Spark cluster, H-BASE, MongoDB cluster, EGI Computing Grid cluster);
- Various BigData processing and analytics tools and methods;
- Tools for data extraction and categorization from unstructured texts;
- A large-scale marketplace for micro transactions based on real-time auctions;
- Methods and algorithms for processing of massive amount of streaming data;
- Semantic data modelling analysis and annotation framework.

3. FIIT

- The results of previous research include predictive modeling, cluster analysis, anomaly detection and resembling tasks, whereby we focus on intelligent adaptive approach. The methods range from statistics to machine learning methods, for some kind of problems we have also used biologically inspired computing.
- Processing of static as well as stream data, in both cases the datasets meet the requirements of Big Data.

4. 4ER

- Comprehensive data base in the energy field concerning electricity, heat and gas and for grid operators, energy service providers and producers.
- Various advanced modelling tools in the energy field with special focus on demand side management, demand response, hybrid grids, storage operation, RES integration
- Tools for the optimization of energy systems and city districts

5. UBI (Industry)

- Access to 58000 WMO weather stations, radar stations and Earth Observation data and access to Lightning Sensor Network (Nowcast), a system indicating global lightning in 100m resolution

- Use of GIS tools for spatial data and geographical data output
- Access to a consumer base of 9 Mio. App Users (Morecast App)
- HPC Clusters in Europe, USA and Australia

Relevant Work Programme and Topic

Topic: ICT-15-2016-2017: Big Data PPP: Large Scale Pilot actions in sectors best benefitting from data-driven innovation

Work Programme Link:

http://ec.europa.eu/research/participants/data/ref/h2020/wp/2016_2017/main/h2020-wp1617-leit-ict_en.pdf

Text from the Call:

Specific Challenge: European research and development in data technologies produces promising results, but these are not yet deployed at large scale in a systematic manner. The challenge is to stimulate effective piloting and targeted demonstrations in large-scale sectorial actions ("Large Scale Pilot actions"), in data-intensive sectors, involving key European industry actors. The Large Scale Pilot actions are meant to serve as best practice examples to be transferred to other sectors and also as sources of generic solutions to all data intensive sectors.

Scope: Large Scale Pilot actions should address domains of strategic importance for EU industry and carry out large scale sectorial demonstrations which can be replicated and transferred across the EU and in other contexts. Possible industrial sectors for Large Scale Pilot actions include (but are not limited to) health, energy, environment, earth observation, geospatial, transport, manufacturing, finance and media. Although Large Scale Pilot actions are required to have a strong focus in a given industrial domain, they may involve cross-domain activities where these provide clear added value. Large Scale Pilot actions will propose replicable solutions by using existing technologies or very near-to-market technologies that could be integrated in an innovative way and show evidence of data value (see the section "Expected Impact"). Their objective is to demonstrate how industrial sectors will be transformed by putting data harvesting and analytics at their core.

Large Scale Pilot actions are expected to exhibit substantial visibility, mobilisation, and commercial and technological impact. Proposals should demonstrate that they have access to appropriately large, complex and realistic data sets.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 and 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

- Demonstrated increase of productivity in main target sector of the Large Scale Pilot Action by at least 20%;
- Increase of market share of Big Data technology providers of at least 25% if implemented commercially within the main target sector of the Large Scale Pilot Action;

- Doubling the use of Big Data technology in the main target sector of the Large Scale Pilot Action;
- Leveraging additional target sector investments, equal to at least the EC investment;
- At least 100 organizations participating actively in Big Data demonstrations (not necessarily as partners of the projects).

Type of Action: Innovation action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

- - key statements
- - very important statements
- - important statements

Relevant H2020 Projects from Energy Sector



Flexiciency, a four year project, launched in early 2015, is part-funded by the European Commission's Horizon 2020 research programme, **with the aim of addressing flexibility and efficiency within the European energy market, putting focus on consumers and making use of data from smart metering.**

The FLEXICIENCY project addresses several critical components of the modernising steps required for the European electricity grids to better enable a low carbon electricity value chain. The FLEXICIENCY project involving four major DSOs from Italy, France, Spain and Sweden, will demonstrate large scale projects of new services based upon data accessibility in real time, i.e. advanced monitoring, local energy control and flexibility of aggregated customers (including demand response in action), together with an innovative solution building on the integration of existing systems towards offering such services at EU level to all players of electricity retail markets (e.g. Distribution System Operators, electricity retailers, aggregators, ESCOS and end consumers), either new or existing ones.

The demonstration will also test the new economic models and evaluate benefits in terms of possible achievements of 2020 energy consumption goals and CO₂ emission targets.

Coordinator: [ENEL](#)

Project Partners: [cyberGRID](#), [ENDESA](#), [ERDF](#), [Vattenfall](#), [Verbund](#), [SAP](#), [Siemens](#), [University of Ljubljana](#) and others

R&D Programme: [Horizon 2020](#)

Time Frame: 2015–2019

HOME PAGE: <http://www.flexiciency-h2020.eu/>



Designing eTrading Solutions for Electricity Balancing and Redispatching in Europe

The **FutureFlow project** will link interconnected control areas of four Transmission System Operators (TSO) of Central-South Europe, which today do face increasing challenges to ensure transmission system security. The growing share of renewable electricity units has reduced drastically the capabilities of conventional, fossil-fuel based means to ensure balancing activities and congestion relief through redispatching. There is a need to face future balancing and network security challenges with the help of a more intensive and joint approach at regional level. The project, as recently approved under the **Horizon 2020 framework of the European Commission**, proposes research and innovation activities **to validate that consumers and distributed generators can be put in a position to provide balancing and redispatching services in addition to conventional units, within an attractive business environment.**

cyberGRID amongst the other partners in this consortium have agreed to jointly explore the combination of two routes to provide solutions to such problems through a unique regional cooperation:

- The design of a regional cross-border techno-economic cooperation scheme: it is tailored to ensure the participation of advanced commercial and industrial consumers, prosumers and distributed renewable generators in the provision of advanced ancillary services in TSO environments with limited flexibility options.
- The development and pilot testing of a comprehensive prototype IT platform and the associated economic model(s) to support this cooperation scheme.

The research and innovation activities involve real energy market players (between 30 and 45 MW of balancing power expected to be made available in the control areas of the four TSOs), this in view of:

- Prototyping of innovative flexibility aggregation platforms within all four control zones,
- Prototyping of a regional IT platform enabling access of these flexibility aggregation platforms to the international markets
- Enabling optimization of relevant functionalities within the TSO environments from the regional perspective,
- Pilot testing of these platforms and connections, based on a set of progressively ambitious use cases involving real electricity market players.
- An ex-post impact analysis is proposed to deliver recommendations for the scaling-up and replication of the most promising use cases

cyberGRID will contribute to the project's results with its expertise and cutting edge technology for managing demand response (DR) and distributed generation (DG). The work will comprise on one side research of DR&DG technical characteristics and on the other research of TSO's requirements for Automatic Frequency Restoration Reserve (aFRR) with the ambition to ensure level playing field for all suppliers of this highly valuable ancillary service. Based on these findings **cyberGRID will prototype an innovative aFRR flexibility aggregation platform within all four control zones.** It will be seamlessly integrated with the regional market IT platform enabling efficient monetization of DR&DG flexibilities across national borders.

Coordinator: ELES

Partners in the FutureFlow project, which is 100% financed by the European Commission are: ELES (Slovenia), APG (Austria), MAVIR (Hungary), TRANSELECTRICA (Romania), cyberGrid (Austria), Gen-I (Slovenia), SAP (Germany), Gemalto (France), 3E (Belgium), EIMV (Slovenia), EKC (Serbia), Elektro Energija (Slovenia).

PRESS RELEASE: [FutureFlow_kick off press release](#)

R&D Programme: [Horizon 2020](#)

Time Frame: 2016–2020

