

INNOSOC Case Study

(selected for Valencia 2017; extended version)

Case Study title:

Innovative Applications of ICT in the Energy Sector: An Industry Perspective

Keywords: digitalisation; energy economy; smart grids; data analytics

H2020 challenge addressed by the Case Study: Secure, Clean and Efficient Energy

Introduction to the Case Study

Digital technologies enable Energy companies to improve their services and to transform their business models [1]. A comparison with other industries shows regularly a lack of digital readiness of the Energy Industry. Nevertheless, both private and industrial customers demand for new digital services and a closer cooperation (i.e., integration) in their life and process models.

Existing ICT technologies like Smart Grids, Smart Metering and Smart Home differ in their impact on economic success, ecology and society [3][4][6]. Energy companies as well as ICT manufacturers are unsure, which of those new tools should be implemented soon. Are they all relevant? What does the customer expect? What are effects on profit, ecology and society?

To understand implications of existing and new ICT offerings in the Energy Sector, students will work on a Case Study. Every student will work on selected key questions and will sum up analysis and recommendations. In the final workshop, different working streams will be put together to one big picture.

INNOSOC students, supervised by INNOSOC lecturers, will collaborate on providing a possible solution to this Case Study. These activities will be conducted as a part of the ERASMUS+ blended mobility and will be finalized during the INNOSOC Valencia 2017 workshop in late May 2017.

How this Case Study is related to the selected H2020 challenge?

The Case Study refers to two research areas of the Horizon 2020: “New knowledge and technologies” and “Market uptake of energy and ICT innovation”. On the ground of an overview of existing ICT market offerings the Case Study Solution will: (i) elaborate a feasibility study regarding existing ICT tools using criteria like advantage for customers, investment, return on investment,

impact on energy efficiency, impact on society (and additional); and (ii) present a list of potential new ICT technologies that could enhance customer value.

Findings of the Case Study will help European Energy companies in the process of further introduction of ICT into their business processes. Namely, the Case Study development will result in a usable matrix for effective and efficient usable ICT technologies as well as a list of potential new ICT technologies that are worthwhile to do further research on them.

Impact for Energy companies: Where once size was an important driver of success, now small and medium-sized Energy companies are able to compete both locally and country- or Europe-wide.

Impact for ICT companies: ICT developers, manufacturers and providers will profit from client-focused ranking and new market potentials.

How this Case Study is related to the INNOSOC project?

New ICT solutions in the Energy economy are available for every sector of an Energy company: for the generation of power, for distribution, for sales, for the trading function as well as for Energy-related services. **ICT will innovate the Energy sector.** It will enable further productivity improvements and will **transform the industry** with the emergence of new business models and new players. A crucial outcome is the allowance for consumers and producers of electricity to **connect with one another** in new ways. Another important outcome is the possibility to **connect the offerings (and the data) of Energy companies with those of partner companies.**

With the support of ICT every Energy company can improve its **customer journeys**, the **productivity of its operational processes** and the **efficiency of the usage of energy** (i.e. optimized generation planning, optimized planning of feed-in generation units, usage-dependent tariffs). The resulting positive **impacts on the environment** [2] could outweigh the negative resource consumption for introducing ICT.

Regarding **ICT's impact on society**, there are a lot of positive impacts regarding the service offerings, the possibility to include client's suggestions and to improve the client's interaction quality and speed. On the other hand, ICT can reduce the necessity of jobs in the Energy sector. With the variety of the international and intercultural backgrounds of the InnoSoc lecturers and the InnoSoc students the Case study will have a close look on the **intercultural differences** of implementing ICT in European Energy companies.

With the results of the aforementioned Case Study, the InnoSoc project will get further **insights on the societal impacts of ICT usage** in the Energy sector.

Questions that need answers during the Case Study development

Questions that need answers include but are not limited to the following:

- **Status quo** of ICT technologies: What ICT tools (hardware, software, methods) are on the market – separated for Power Generation, Trading, Grids Operations, Sales, Energy-related Services Sector? What market size do those technologies have?
- **Feasibility study** of current ICT tools: Which impacts have current ICT tools on advantage for customers, investment, return on investment, impact on energy efficiency, impact on society (and additional criteria – within the sustainability segments of economy, environment, society)?
- **Business Models** for ICT services: How could the Business Models of at least 5 main ICT technologies could be described – using the methodology (and graphs) of the Business Model Canvas of Osterwalder/Pigneur [5]?
- **Potentials for new ICT technologies**: Which at least 5 new ICT technologies should be developed to improve the value of the Energy company for its customer (either new services or tools for improved product / service quality)? Have a look on Figure 3.
- **Intercultural differences**: What approach(es) use the Energy companies to implement ICT in different countries? What taxonomy of approaches does exist? What to be recommended?

References

- [1] M.E. Porter; J.E. Heppelmann. “How smart, connected products are transforming competition”, (November 2014). Harvard Business Review. Available: http://www.ptc.com/File%20Library/Topics/Harvard%20Business%20Review/HBR_How-Smart-Connected-Products-Are-Transforming-Competition.pdf
- [2] F. Mattern; T. Staake; M. Weiss. “ICT for Green – How Computers Can Help Us to Conserve Energy”. Available: <https://www.vs.inf.ethz.ch/publ/papers/ICT-for-Green.pdf>
- [3] Eurelectric. “The power sector goes digital - Next generation data management for energy Consumers”. Available: http://www.eurelectric.org/media/278067/joint_retail_dso_data_report_final_11may_as-2016-030-0258-01-e.pdf
- [4] McKinsey & Company. “The digital utility: New opportunities and challenges”. (May 2016). Available: https://www.duesseldorf.ihk.de/blob/dihk24/Industrie_Innovation_Umwelt/downloads/3496986/f6548910f625b28639260506419f1cb6/V5_smart_grids_digital_utility_Mohr_20160920-data.pdf
- [5] A. Osterwalder; Y. Pigneur. “Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers”. Wiley. 2010.
- [6] Ericsson. “ICT & the future of utilities”. Stockholm. 2014. Available: <https://www.ericsson.com/res/docs/2014/ict-and-the-future-of-utilities.pdf>

Knowledge and skills needed for developing the Case Study

(P: prerequisite; D: desirable, but not necessary)

- ICT Strategy (P)
- Interest in new technologies (P)
- Energy Economy (D)
- Strategic Management / Business Modelling (D)

Figures describing this Case Study

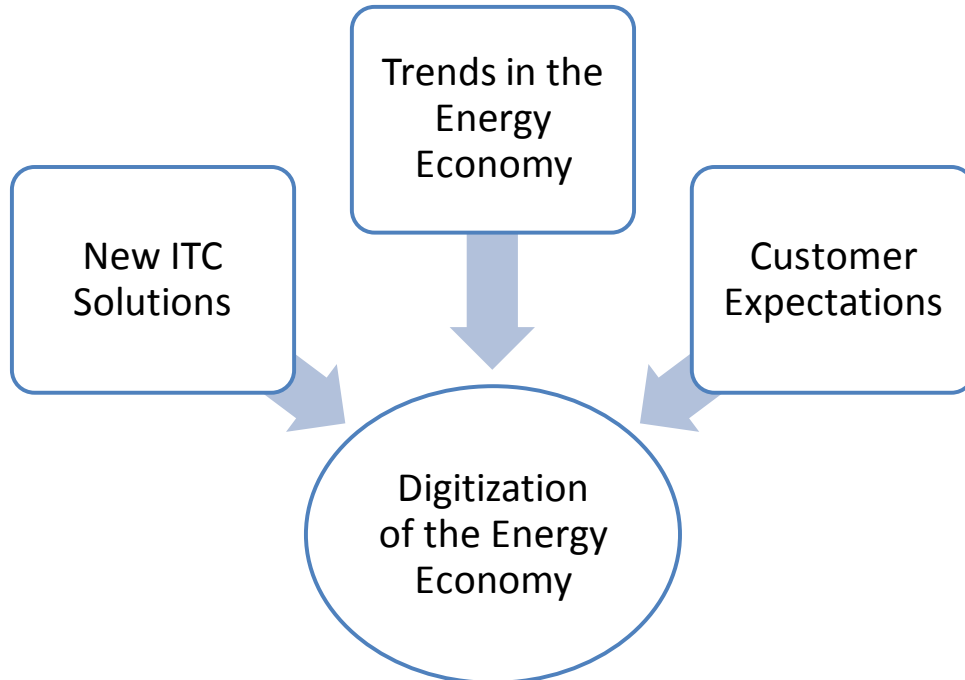
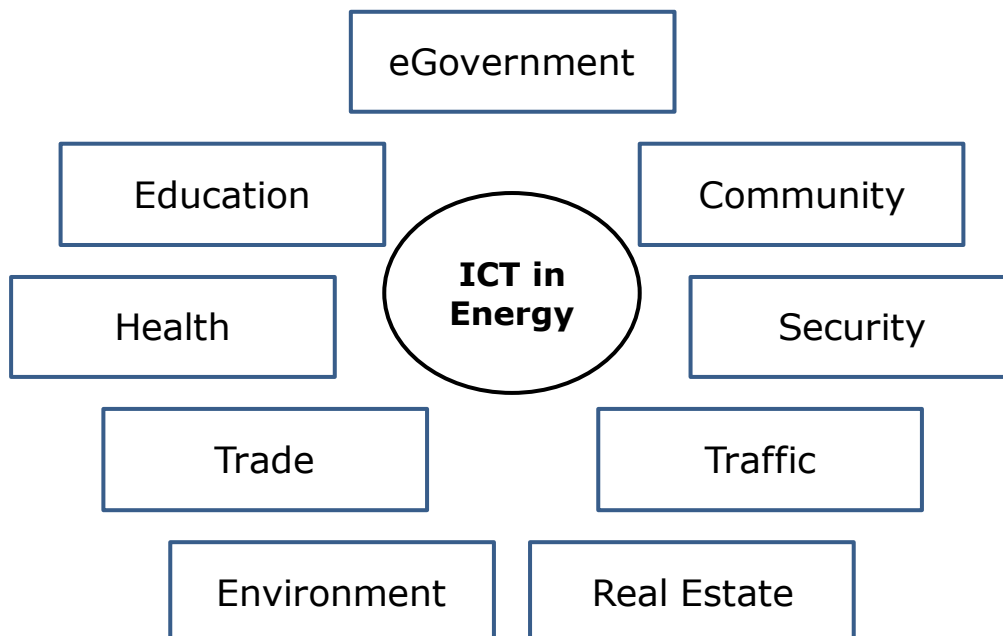


Figure 1. Influencing factors for Digitization of the Energy Economy

Generation	<ul style="list-style-type: none"> • Plant Maintenance • Plant Management • Spare-parts Management 	<ul style="list-style-type: none"> • Virtual Power Plant • Peer-to-Peer solutions (with/without Blockchain)
Trading	<ul style="list-style-type: none"> • Trading Simulation • Portfolio Management • Automated Trading 	<ul style="list-style-type: none"> • Weather data support • Storage optimization • Swarm storage solutions
Distribution	<ul style="list-style-type: none"> • Digital Grid Management • Smart Metering / Gateway-Administration • Smart Grids • Mobile Workforce Support • Preventive/Predictive Maintenance 	<ul style="list-style-type: none"> • Demand Side Management • Smart Grids Services i.e. for industry parks • Digital Customer interaction (i.e. Apps)
Sales	<ul style="list-style-type: none"> • Digital customer interaction / journey (Apps, social media etc.) • Load-based tariffs • Individual offerings (based on big data analytics) • Energy Data Management • Energy Management solutions • Bots for Customer Service 	<ul style="list-style-type: none"> • Online Sales Platform (for Energy / Services) • Management/support for Smart Home solutions • Integrated Solar/Storage Systems • Smart Lightning • Cross Selling (i.e. telecomm.)
Supporting Functions	<ul style="list-style-type: none"> • Automated processes • Document management • Knowledge Management 	<ul style="list-style-type: none"> • Web-Services (i.e. Controlling) • Online recruiting • Open Innovation

Figure 2. Examples for ICT usage in the Energy industry





InnoSoc

Innovative ICT Solutions
for the Societal Challenges



Co-funded by the
Erasmus+ Programme
of the European Union



Figure 3. Energy-related ICT as a part of the Digital City






University of Zagreb

Faculty of Electrical Engineering and Computing

 Unska 3, HR-10000 Zagreb,
Croatia
 innosoc@fer.hr

 sociallab.education/innosoc
 facebook.com/innosoc
 twitter.com/innosoc



University of Zagreb



Universitat Politecnica de
Valencia



Hochschule fur
Telekommunikation
Leipzig



Szechenyi Istvan
University



University of
Telecommunications
and Post



University of
Zilina



Institut Mines Telecom –
Telecom Bretagne



Technical University of
Kosice



University of Oradea



University of
Debrecen



Technical University
– Sofia

*This document has been prepared for the European Commission
however it reflects the views only of the authors, and the
Commission cannot be held responsible for any use which may
be made of the information contained therein.*



InnoSoc
Innovative ICT Solutions
for the Societal Challenges

Co-funded by the
Erasmus+ Programme
of the European Union

