INTEGRATED SMART GRID CROSS-FUNCTIONAL SOLUTIONS FOR OPTIMIZED SYNERGETIC ENERGY DISTRIBUTION, UTILIZATION STORAGE TECHNOLOGIES

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Challenges and opportunities to inteGRIDy innovations

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ABSTRACT

This document offers an insight into the estimated effects of key external factors (political, economic, social, legal, technological and environmental) to the proposed inteGRIDy challenges (Demand Response, Smartening the distribution grid, Energy Storage Technologies, Smart Integration of grid users from Transport) starting from the pilot's deployment activities. The main drivers of R&D investment and obstacles to innovation in the energy industry in general and related to inteGRIDy are approached. The content presents the results of an in-depth analysis conducted by all involved partners.

Introduction

This document summarizes the impact of main drivers and obstacles to R&D investment in energy sector and external factors influencing inteGRIDy proposed innovations: Demand Response, smartening the distribution grid, energy storage technologies and electric vehicles.

An extensive analysis has been undertaken in order to provide valuable information for the Consortium in the implementation of cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform, connecting energy networks with diverse stakeholders. Within inteGRIDy project SIVECO coordinated this effort.

The outcomes presented in this document are based on two public reports *on Obstacles & Barriers related to inteGRIDy Framework* [1] and *Smart Grid Deployment, Infrastructures & Industrial Policy applicable to the inteGRIDy pilot cases* [2].

Challenges and opportunities

inteGRIDy H2020 project is an Innovation Action aiming at demonstrating demand response, smartening the distribution grid, energy storage distribution and Smart Grid transport integration in 10 pilot sites across Europe (UK, Spain, France, Greece, Cyprus, Italy, Romania and Portugal).

To assess the relevant aspects regarding the investment in innovation in the energy industry and also the major obstacles to innovation the strategies, policies, market demands, existing technologies each pilot country provided information about:

- Energy market structure and R&D investment
- Smart Grid relevance in partner countries
- Emergent structures sustaining energy innovative investment

Early assessment of drivers and obstacles sets the baseline for an appropriate planning and management of innovation expectations.

Even though the most important driver to innovation in energy industry is the common EU development strategy in energy for a long term each member state faces a different set of macro-environmental factors.

Innovation challenges in energy sector are country-dependent as the technological advancement sets a coherent framework for the communication between the R&D and public/business sectors.

With Demand Response the consumer itself seems to be the key factor for a successful implementation and the focus should be on awareness, engagement and identifying the possibilities of incentivizing the consumer.

The endeavour of smartening the distribution grid is supported by long term strategies because the costs with the infrastructure are high and the results are not visible immediately.

Looking into energy storage technologies and electric vehicles integration in smart grid regulation represents the main factor

limiting the innovation investments. On the one hand DSOs are not allowed to own and operate storage devices due to policies. On the other hand storage devices are very expensive and the viability of the investment on the long run is yet to be demonstrated.

Mainly, the efforts of EU and governments converge in an attempt to link business – academic – public – private institutions. An interesting example is provided by France with The Internet of Electricity which promotes a new business model via including Telecom operators in the deployment of Smart Grids; the role of Telecom being to provide the technologies needed to make the electrical system smarter.

As drivers, inteGRIDy partners have mentioned the importance of supporting with regulations the energy communities like aggregators, renewable energy cooperative and the regulation of such structures like feed-in tariff/green certificates and time of use.

EU-28 governments are committed to reducing carbon emissions and they make efforts to stimulate innovation but only partially support market access, i.e. the focus should be on deploying new technologies while also helping to make them part of the mainstream.

Going further with the identified obstacles to energy sector – the different price structures and inconsistent regulations are among the most mentioned by inteGRIDy partners. Beyond this there are some peculiarities that are worth mentioning.

Spain is the only country in the world to tax home renewable energy generation.

UK is the first country to claim the importance of interoperability of smart meters. Going large scale with SMETS 1, UK government faced the reality of meters reverting to classical meters when changing suppliers. It lead to a second deployment with meters that can be used in 'smart mode' if suppliers are switched (SMETS 2).

Italy completed a full roll-out in 2011 and is now working on replacing the smart meters with new generation ones that comply with the new set of functionalities and communication protocols.

Greece runs many demonstrators within R&D projects based on renewable energy sources while still using coal technologies on a large scale.

Cyprus, Portugal and Romania are among the countries that try to catch up with national strategies and cross-sector communication.

Macro-environmental analysis

The results of the macro-environmental analysis show on the one hand that the political, social and environmental factors support inteGRIDy-like innovations. On the other hand the economic, technological and legal factors vary from one country to another. For instance, the level of consumer engagement is affected by country specific indicators like gross domestic product, investment priorities and DSO particularities.

The economic factor may be a barrier considering the prioritization of investment and budget allocation.

An applied example for technological factor is the importance of the maturity level of smart metering solutions which reflects in the success rate of deployment.

But there are also exceptional cases. For instance, the smart metering architecture in place in Italy does not (yet) meet the minimum requirement considering 15' readings resolution even if Italy was one of Europe's forerunners in implementing smart metering systems (with 95% coverage in 2011) and is now deploying 2nd generation smart meters.

Alongside all mentioned macro-environmental factors the DSOs seem to set the trend in the energy market. From monopolistic to competitive markets, ancillary services are not easily promoted and integrated in the energy market due to inconsistent regulations.

Conclusions

Considering R&D impact inteGRIDy partners have scanned for existing or emergent structures supporting R&D investments in terms of contributing to research, disseminating results, making recommendations, accelerating business models or mandating for large demonstrations.

The issues faced to innovate in energy sector are similar for European member states with particularities based on smart metering roll-out status, renewable energy sources penetration, available infrastructure and political will.

The emergence of new business model and structures increases the importance of the active consumer in the value chain and the economical factor needs to consider how to motivate consumer behaviour to create the desired trends.

References

[1]. D1.1. Report on Obstacles & Barriers related to inteGRIDy Framework, http://integridy.eu/deliverables

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About SIVECO Romania

SIVECO Romania SA is a private shareholder company, established in 1992, located in Bucharest, Romania. During its twenty-five years of existence, SIVECO has become one of the most important Romanian providers and software integrators of Cybersecurity &Big Data, ERP, eLearning, eGovernment, eHealth, eBusiness, eAgriculture, eCustoms solutions and turnkey projects acting both on the internal and international markets. Moreover, SIVECO has gained a solid reputation on international markets by developing successful projects together with several international companies, collaboration that has blossomed into genuine partnership over the years. SIVECO can provide all services on the whole life cycle of the information projects: analysis of users' requirements, design, development, testing, implementation, end-users training and technical assistance, system maintenance. SIVECO has significant experience and an exceptional track record in R&D and R&I projects, having been involved as technological provider and as coordinator in many European and national research projects. In particular, SIVECO has established considerable experience and expertise in the implementation of large-scale user-centred systems at national level.

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