

# BRIDGE

## *Storage services for network operators*

Minutes of the session

November 14<sup>th</sup>, 2019

EUW 2019 - Paris

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## EUW 2019, Paris

### EU project zone – 14 November 2019, 09:30 - 12:30

The session gathered representatives of seven H2020 projects to discuss which storage technologies they implement and how they contribute to the optimal functioning of the energy system. Business case for concrete storage solutions and digitalisation aspects facilitating the use of storage solutions were also touched upon.

The different PPT presentations of the morning are uploaded in the restricted area of the BRIDGE website. More information about the BRIDGE project presented can be found in the BRIDGE Brochure (<https://www.h2020-bridge.eu/>).

#### Part 1

09:30-09h40	<b>Welcome and policy context, (DG ENER) Aleksandra Kronberga</b>
	<p>55% of RES-electricity in the grid expected in 2030 in view of agreed RES target and progressive electrification of economy. This may further go up if EU reviews decarbonization target from 40% to 50/55% for 2030 as pledged by new EC President. Under any scenario, the need for flexibility will considerably increase.</p> <p>REDII, new CO2 norms for car and clean vehicle directive are driving the development of market for storage. Energy Performance Building Directive will facilitate charging in buildings, which should be predominant type of charging (slow and smart).</p> <p>Electricity regulation includes the prohibition of discriminatory grid charges, clear ownership rules, easy access to intra-day and day-ahead market. Strict rules on curtailment of renewables and abolition of price caps also favours storage/flexibility providers. Concerning the consumers, the directive includes the right to produce, store and sell electricity. Each consumer will have a right to dynamic electricity price contract. Enabling provisions for aggregators as well as tightened provisions on smart metering also facilitate flexibility. It will be important to see how MS will implement new provisions.</p> <p>Batteries R&amp;I field is the recent positive example of consolidation of different efforts throughout EU: H2020/HEU, Interregional partnership on advanced battery materials, two forthcoming Important projects of common EU interest on battery R&amp;I. All initiatives are federated by new Batteries Europe platform that covers the whole value chain and sets strategic research agenda.</p> <p>BRIDGE cluster works on cross-cutting subjects on smart grids and storage topics. It offered first attempt at mapping batteries-related projects in 2018. More in-depth mapping is considered for 2020.</p> <p>EC invited EDF to moderate the session in view of its increasing role in storage sector: different storage types are deployed by EDF at different</p>

	levels, including residential. EDF plays a key role as regards R&I coordination at EU level: within ETIP-SNET platform and Batteries Europe Platform.
09:40-09:45	<b>Moderator introduction (EDF), moderated by Eve Dufossé</b>
	EDF develops a storage ambition by 2035 (8 billion €), 70M€ were dedicated to R&D during 2018-2020.
09:45-10h45	<b>1<sup>st</sup> part Projects presentations and Q&amp;A – Flexibility solutions offered by storage</b>
SMILE, Giannicola Loriga	<p>The SMILE project develops solutions to enable demand response, smart grid functionalities as well as storage and energy system application. Overall scope is to demonstrate in real conditions, solutions targeting the distribution grid.</p> <p>Based on 3 large scale demonstrators on islands characterized by similar topographic structure but different regulation and market context. Different batteries technologies explored: power to heat (including PCM heat storage), power to gas, electric vehicles...</p> <p>The project develops a cross functional control and automation framework. The aggregator platform is managing both generator and demand side.</p> <p><i>Question: Would you consider the main challenges on the technical side or on interaction between different players and the business model side?</i></p> <p>The main challenges are on user side as it really impacts their everyday life. Convincing the people was the most challenging. The project is going to an end in 2021, it is actually in the evaluation phase.</p>
STORY, Andrej Gubina	<p>The main objective of STORY is to show the added value of different types of small-scale storage, study the impact of large number of storage devices in the energy system and investigate viable business models. Five demos in different locations developed in the project.</p> <p>Pure monetary savings are not enough for the energy communities, new business models have to be investigated. Benefits beyond energy bill deserve being considered too. Lots of IT communications issues have been faced –setting-up a stable communication is a deal breaker. Need to get the thing simple and consider a bottom-up approach. LoRa® devices are not market ready.</p> <p><i>Question: How could you tackle the IT communication issues/interoperability together with other projects?</i></p> <p>BRIDGE and the EC is ideal for this. Need clear questions from EC and worked on it. Sessions like this help to determine the questions. An interactive discussion or a survey could be a way to formulate the right</p>

	<p>questions. Public procurement may be a swiftest way how to promote interoperable solutions.</p>
<p><b>INVADE,</b> Dieter Hirdes</p>	<p>The INVADE project is about developing new business models related to flexibility operator (add new functionalities compared to usual business model of an aggregator). More than 1000 EV batteries integrated with the cloud-based platform for flexibility management of EV fleets. AI is used for prediction and optimisation. Airport provides <i>inter alia</i> peak shaving services through parked vehicles.</p> <p>A scalable architecture is key: to electrify private transport, you need a huge number of EVs and large capacity charging infrastructure. In Norway 60% of new cars are full electric. Need to find smart solutions for the charging. V2G solutions are not yet mature. Vehicle to home solutions are more mature. Insufficient standards to support communication between the Invade platform and local storage management systems at residential level.</p> <p><i>Question: How far you go for the scale of your flexibility operator? Local focus?</i></p> <p>Different kind of actors could take the role of flexibility operator.</p> <p><i>Question: For the end user: how did they react regarding the collection of data and the installation of INVADE device?</i></p> <p>Price is not a sufficient reason anymore. Climate, new technologies are good arguments/motivating factors.</p>
<p><b>RESOLVD,</b> Joaquim Meléndez</p>	<p>The RESOLVD project improves efficiency and hosting capacity of low voltage distribution grids. The challenge was to integrate all the RESOLVD components and validate the overall solution in a real environment. The project proposes the power electronic tool that manages the batteries in order to maximise the consumption of renewables produced locally and provide flexibility.</p> <p><i>Question: No struggles have been encountered related to digitalization issues?</i></p> <p>Focus on DSO level and use of SGAM standards preserved the project from the type of issues encountered in projects more focussed on flexibility devices at residential or commercial level.</p>
<p>10:45-11:00</p>	<p><i>Coffee break</i></p>

## Part 2

11:00-11:45	<b>Projects presentations and Q&amp;As – Flexible/dispatchable RES generation with storage</b>
<p><b>Gridsol,</b> Jose Miguel Estebarez Pelaez</p>	<p>Smart Renewable Hub developed in the Gridsol project involved hybrid power plants (PV/wind + storage and CSP). Flow, lead-acid-batteries used power to X are used with PVs and wind turbines. Modelling tool used to optimise plant's configuration/energy mix. Dynamic output manager dispatches the electricity as a single output according to availability and cost-effectiveness of each technology for a given moment.</p> <p><i>Question: regarding electricity prices of island, how much higher compared to continental prices?</i></p> <p>Two to three times the prices. Concentrated solar power - CSP technologies have been considered; they can be more competitive than PV with batteries (in good irradiation conditions), if required storage time is at least 6 hrs. Holistic model proposes the best combination of technologies for a given location.</p>
<p><b>Capture,</b> Fritz Zaversky</p>	<p>The Capture project focuses on an improved efficiency of a combined cycle and increased flexibility. Solar receiver and regenerative system were key components developed in the project. A dispatchable solar combined cycle has been tested via cost effective high-temperature thermocline thermal energy storage. Technologies allow to reach a solar to electric efficiency of 29.6%, but the conversion efficiency is not high enough to justify higher costs.</p> <p><i>Question: How can CSP could be complementary to other solutions? Actual power plant will be operational? When and how?</i></p> <p>The tower is available in South of Spain in a research facility. Operation will start in January. Now there is a need to think about industrialization and how to reach commercial level and be cost-competitive.</p>
<p><b>Next CSP,</b> Lucie Guilloteau</p>	<p>The Next CSP project is about the study of concentrated solar power plants with development of emergent technologies, to reach TRL5, in the field of heat transfer (heat transfer fluids which can be used for direct thermal energy storage). A high temperature fluidized particle have been developed, with benefits on temperature restrictions and high efficiency of the technology. Advantage is that there is no risk as with usual storage technology (molten salt) used with CSP – i.e. no risk of freezing as is the case for molten salt storage, but many other challenges are still to be worked on.</p>
11:45-12:20	<b>Panel discussion, with projects participants and European Commission</b>
	<b>Moderator:</b> question on interoperability issue for flexibility providers

	<p><b>STORY:</b> standardization in public tenders is key to promote wide market penetration of interoperable solutions. Proprietary solutions to be avoided. Should we all go for IEC 61850?</p> <p><b>EDF:</b> one standard for all PV assets</p> <p><b>INVADE:</b> standard is key. FIWARE - enabling platform for interoperable solutions supported by EC, we should start with this.</p> <p><b>SMILE:</b> reference standard referring to several markets could be relevant.</p> <p><b>STORY:</b> public money can steer the market to more open solutions.</p> <p><b>INVADE:</b> SGAM has to be used as a basis.</p> <p><b>Moderator:</b> next steps for the projects for higher TRL and next EU grant programme?</p> <p><b>GRIDSOL:</b> further R&amp;I important to reduce CAPEX/OPEX.</p> <p><b>EDF:</b> regarding customers, baseload plants are essential, but which country will use space for large CSP?<sup>1</sup></p> <p><b>GRIDSOL:</b> PV and wind are non-dispatchable and bring uncertainties to the system, combining them with CSP is a solution, at least in the long run.</p> <p><b>Moderator:</b> how cost of technologies will evolve?</p> <p><b>CAPture:</b> Difficult to say because depend on technologies. Economies of scale are key to decrease the price. CSP still remains a niche market.</p> <p><b>EC:</b> Next CSP, compared to CAPture, used fluid particles technology, what is the difference compared to molten salt storage?</p> <p><b>CAPture:</b> advantage is that it is not sensitive to temperature changes.</p> <p><b>Moderator:</b> next challenge for CSP sector and expectation for EU calls?</p> <p><b>CAPture:</b> Hybrid solutions, combination of different renewable solutions could be possible, CSP plants have a high potential. Today CSP are not yet flexible enough compared to gas power plants. Sometimes CSP competitive with baseload fossil generation (e.g. Chile)</p> <p><b>GRIDSOL:</b> CSP is safer for the stability of the system, but largely not competitive without subsidies today.</p> <p><b>Moderator:</b> what are the issues faced by the economic model?</p> <p><b>INVADE:</b> technology is immature, not business wise. For flexibility in EV, smart charging exists but, in the future, V2G and to building will be</p>
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<sup>1</sup> "CSP plants... need more space for large-scale applications and are associated with greater risks (e.g. higher investment, challenges with thermal storage, cooling)", source: <http://helioscsp.com/concentrated-solar-power-csp-vs-photovoltaic-pv/>

	<p>easier without issue with the grid. As regards new CO2 norms it would have been more efficient to fix targets on shorter term basis.</p> <p><b>EC:</b> In fact, all EU legal acts underpinning clean energy and clean mobility packages have both 2030 targets and interim targets. Interoperability is looked at, also in the context of the European Battery Alliance. It is important, for instance, to arrive at definition and use of open standardized application programming interfaces.</p> <p><b>Moderator:</b> what do you expect from digital twin aggregator?</p> <p><b>STORY:</b> interoperability platform built on recommendations is going out at the end of the project. Digital Twin approach is used.</p> <p><b>EC:</b> After counting votes, the audience sympathy prize goes to STORY project, thanks to a concise and provocative presentation!</p>
<p>12:20-12:30</p>	<p><b>Wrap-up</b></p> <p>The projects presented a number of complementary solutions and technologies to provide flexibility at distribution level.</p> <p>CSP technology is a longer-term option for dispatchable generation. Research is still needed on different types of CSP technologies to bring them closer to market/mass deployment. Some sort of a follow up is to be envisaged as regards interoperability issues. A more in-depth questionnaire on batteries is possible, especially given that batteries recently are being deployed in nearly every smart grid project.</p>