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ETIP SNET

EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM
SMART NETWORKS FOR ENERGY TRANSITION

Storage technologies and sector interfaces

INVADE

About

INVADE aims to demonstrate how stationary batteries and “batteries on wheels” can be used to **optimize energy and power related operations** for the benefit of grid owners, private households and buildings, as well as the market.

At the core is a cloud-based **flexibility management platform integrated with EVs and batteries**.

Budget: €16 mill. | Period: 2017-2019
12 partners | 5 pilots

Smart Innovation Norway (Coord.- NO)
Universitat Politecnica de Catalunya (ES)
NTNU (NO)
VTT (FI)
ESmart Systems (NO)
Albena (BG)
Schneider Eletric Norge (NO
Lyse (NO)
Estabanell y Pahisa Energia (ES)
Elaad (NL)
GreenFlux (NL)
badenova (DE)

Key exploitable results energy system integration

Delivered a **cloud-based flexibility management platform** integrated with electric vehicles and battery storages at mobile, distributed and centralized levels. The platform is tested and verified in 5 pilots in Bulgaria, The Netherlands, Germany, Spain and Norway.

Developed new **business models** related to flexibility management at distributed storage facilities and smart EV charging facilities.
The **Flexibility Operator (FO)** is one of them.

Provided recommendations for **regulations** and **standards** for flexibility management using batteries and smart EV charging.

Exploited the INVADE results to **several exploitation pilots** where part of the INVADE results are implemented in different ways.

Lessons learned and barriers to innovation deployment

A major lesson is that the principal entry point for establishing a viable and economic flexibility regime for a FO is to **focus on the end-user first**.

At the outset of the project all **pilots addressed** Distribution System Operators (**DSOs**) and Balance Responsible Parties (**BRPs**) in addition to the end-user.

At the end-of the day it proved **less riskier and more profitable** to **concentrate on the end-user** for most of them. This is especially true when end-users are subjected to a **capacity tariff (kW) or Time-Of-Use (ToU) tariffs**.

Once a critical mass of end-users is established, DSOs and others are willing to come around and negotiate.

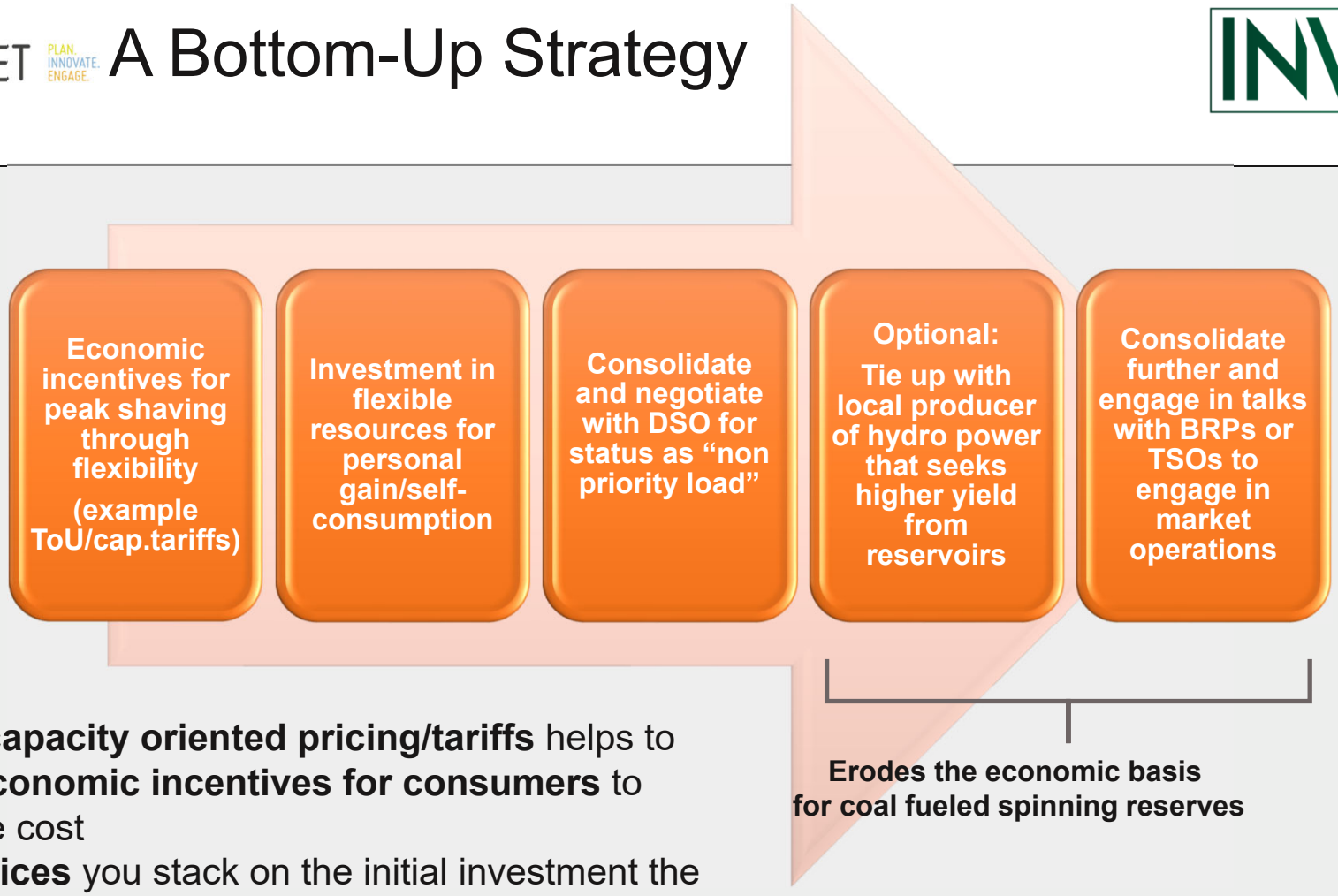
Lessons learned and barriers to innovation deployment

In addition to flexibility services for end-users such as Charge Point Operators (CPOs), building owners etc. we see that the **INVADE platform** has become attractive for harvesting and **aggregating** a diverse set of **data** and tie in **multiple systems and tools** that can use these data.

Another important lesson is that the **Flexibility Operator (FO)** can unleash a very significant market and **economic potential** by focusing on the end-user.

However, it has proven hard to **solicit stakeholders** that are willing to step up and seize the **FO role**. This happens despite players like ENTELIOS and Kiwi Power that actually do part of what the INVADE FO wants to achieve. Energy companies like Østfold Energi in Norway and badenova in Germany are two exceptions.

A Bottom-Up Strategy



Take-aways

1. A regime with **capacity oriented pricing/tariffs** helps to establish the **economic incentives for consumers** to invest and save cost
2. The **more services** you stack on the initial investment the **higher the economic gain** – but the demand for precise control increases too
3. **Savings in kW** will produce **savings in kWh**

Deployment prospects of the most promising solutions

Exploitation pilots

Externally financed projects which implement and commercialize some of the INVADE results.

Receive support from the INVADE Exploitation team.

Examples (videos):

Halden Smart Mobility

INSPIRIA Charge Court (Norwegian)

Rents out electric cars to inhabitants and tourists:
Municipality tests INVADE solution in new and groundbreaking mobility project

By Mari Kristine Buckholm, Smart Innovation Norway 25. January 2019

With the help of smart charging tools developed in the EU Horizon 2020 project, INVADE, Halden Municipality aims to reduce CO2 emissions, lower their costs – and even out social differences.

Read more https://h2020invade.eu/news/rents-out-electric-cars-to-inhabitants/

Launched Europe's first EV Charge Court:
"We are building the future EV charging solution"

By Mari Kristine Buckholm, Smart Innovation Norway 23. January 2019

A consortium of energy and technology companies, research partners and a municipality are building a revolutionizing charging concept for electric cars in Sarpsborg, Norway, based on the INVADE model. By the end of 2019, Inspiria Charge Court will be opened.

Read more https://h2020invade.eu/news/launched-europes-first-ev-charge-court/

Deployment prospects of the most promising solutions

Exploitation pilots
Albena (BG), Halden Smart Mobility (NO), INSPIRIA Charge Court (NO), Olsen Gården (NO), Jærhagen (NO)

INSPIRIA and Albena cases are designed to **scale up very easily**. Albena from 3 to more than 20 hotels at the Black Sea.

The **INVADE platform** can hook into many different **local IT systems**, like Local Energy Management Systems and Local Charge Point Management System.

Needs for future R&I activities coming out of the project

Vehicle-to-Grid/Building (V2G/V2B) based on open systems should be further investigated. So far only few suppliers of **V2G-chargers** can deliver something that works. Thus, further research is needed on integration of **EVs as flexible assets** into the smart grid using V2G/V2B.

One problem that we constantly face is the need for the INVADE platform with an array of **protocols**. Standards on **Battery Management Systems APIs** (Application programming interface) need to be developed.

Standardized data integration tools should be explored for easier data integration between the INVADE platform and the local IT systems.