

# INVADE Large Scale Event

Barcelona, 20<sup>th</sup> of November 2019



*Smart system of renewable energy storage based on INtegrated EVs and bAtteries to empower mobile, Distributed and centralised Energy storage in the distribution grid*

**Catalan Pilot**

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This project has received funding from the *European Union's Horizon 2020 Research and Innovation programme* under Grant Agreement No 731148.

## **Agenda - Content**

- Aim of the Catalan pilot
- Catalan pilot setup
- Implementation
- Results and conclusions

## Aim of the Catalan pilot

### Invade purpose:

Make better use of energy storage systems in the electric system, to increase the share of renewables in the grid.

## Catalan pilot

Use case 2  
Centralized battery installed at  
secondary substation

Test and validate use of flexibility from one centralized battery to provide services to DSOs and BRPs, for:

- Grid congestion management
- Voltage control
- Controlled islanding
- Self-balancing portfolio optimizations

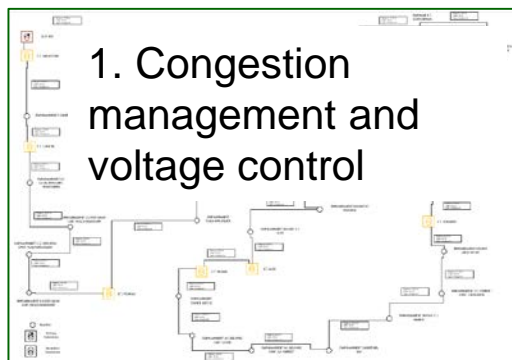
# Aim of the Catalan pilot

## INVADE platform



Optimization  
Operation  
Control

**DSO**



212 kWh battery

2. Backup services



**BRP**

3. Unbalance optimization



## Catalan pilot setup – location and stakeholders



 **estabanell**  
*distribució*

- network of over 1.100 km
- servicing more than 56.000 power customers
- distributes electricity for more than 800 secondary substations

DSO

 **estabanell**  
*energia*

- electricity retailer
- commercializing 100% electricity from renewable sources

BRP

# Pilot implementation setup



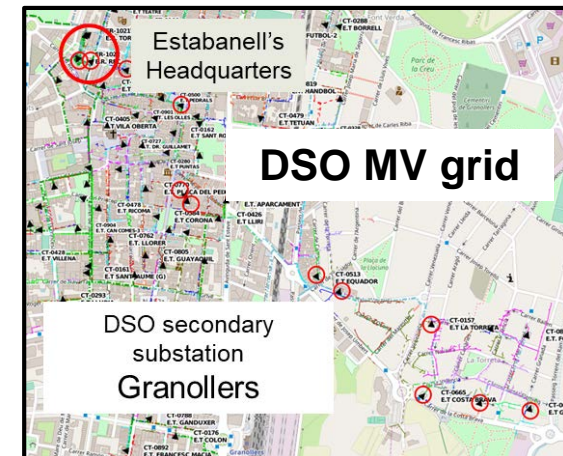
## Technology installed onsite



212 kWh battery



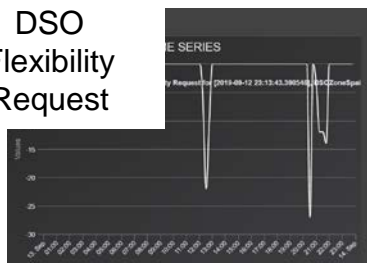
Power electronics device



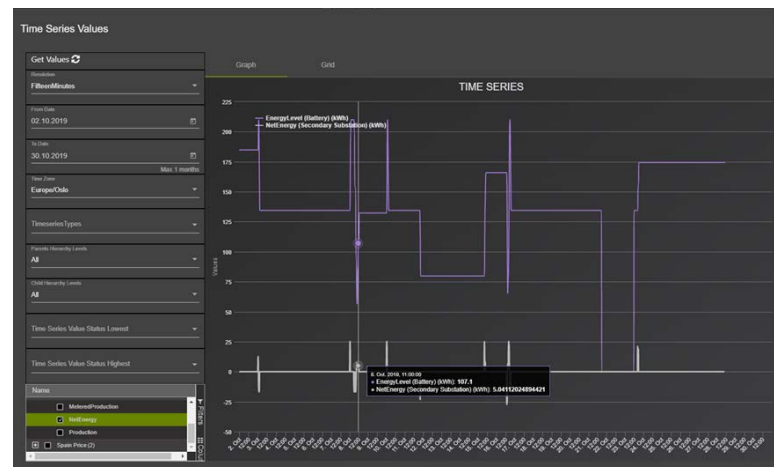
## BRP Flexibility Request



## DSO Flexibility Request



## Optimization and remote control of the battery with the Invade platform





## Results and conclusions

What has been achieved?

### KPIs Catalan pilot

Continuous testing and validation.  
Learnings very good to be applied  
for DSOs future grid congestion  
management techniques.

Technology validation  
for DSO congestion  
management

Congestion  
reduction issues

Savings from energy  
losses 4%

Energy and power  
reduction

Islanding time

BRP cost savings

Battery and PED technologies  
validated to provide backup services  
to critical building.

2h backup services  
provided by the battery

Assumptions considered:

- BRP flex. requests are always accepted  
by the FO and energy is always delivered;
- Costs of the flex. requests are neglected.

BRP savings up to 30%

# Results and conclusions

What has been achieved?

## KPIs Catalan pilot

### Learnings:

- Highly dependent on the BM applied.
- With current regulation DSO savings do not apply.
- Technology costs still very expensive but with prediction to diminish.

Potential for grid investment reduction up to 23,258.95 €

Grid investments reduction

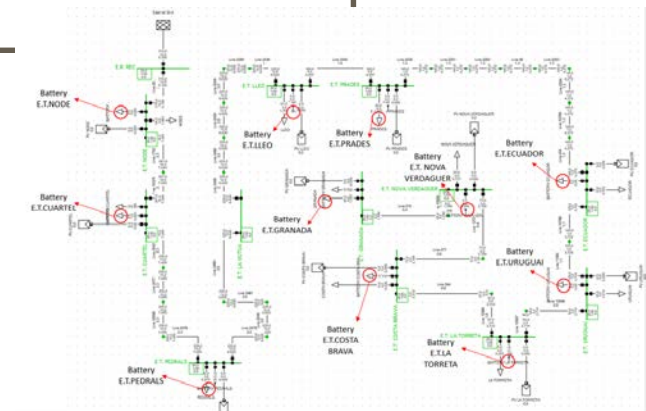
Optimization diesel generator

Validation of the technology for backup purposes instead of the diesel generator.

Decrease in CO<sub>2</sub> emissions by up to 144kg per year.

Potential of increase in grid hosting capacity by 1.6%

Hosting capacity of the grid





Any question or comment?

Thank you!



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