



## **Tecnologías Disruptivas: autoconsumo y generación distribuida**



**SISTEMAS DE ALMACENAMIENTO INTELIGENTE**



1. **CHALLENGE**, the new energy model

2. **SOLUTION & VALUE  
PROPOSITION**

3. **COMPETITIVE ADVANTAGE**

4. **WISE GRID PROJECT H2020**

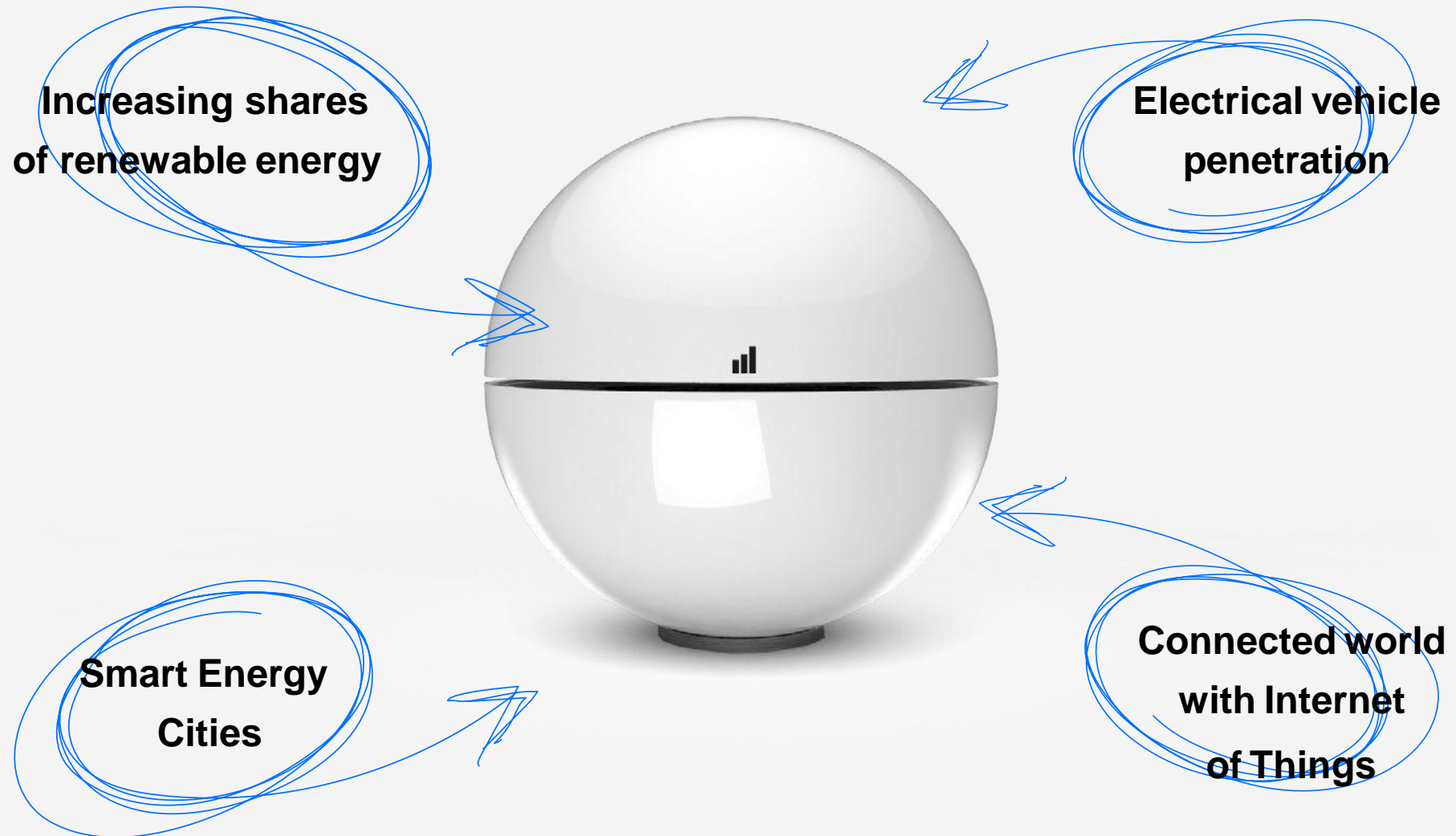
5. **STORAGE + PV: BUSINESS CASE**

6. **CONCLUSION**



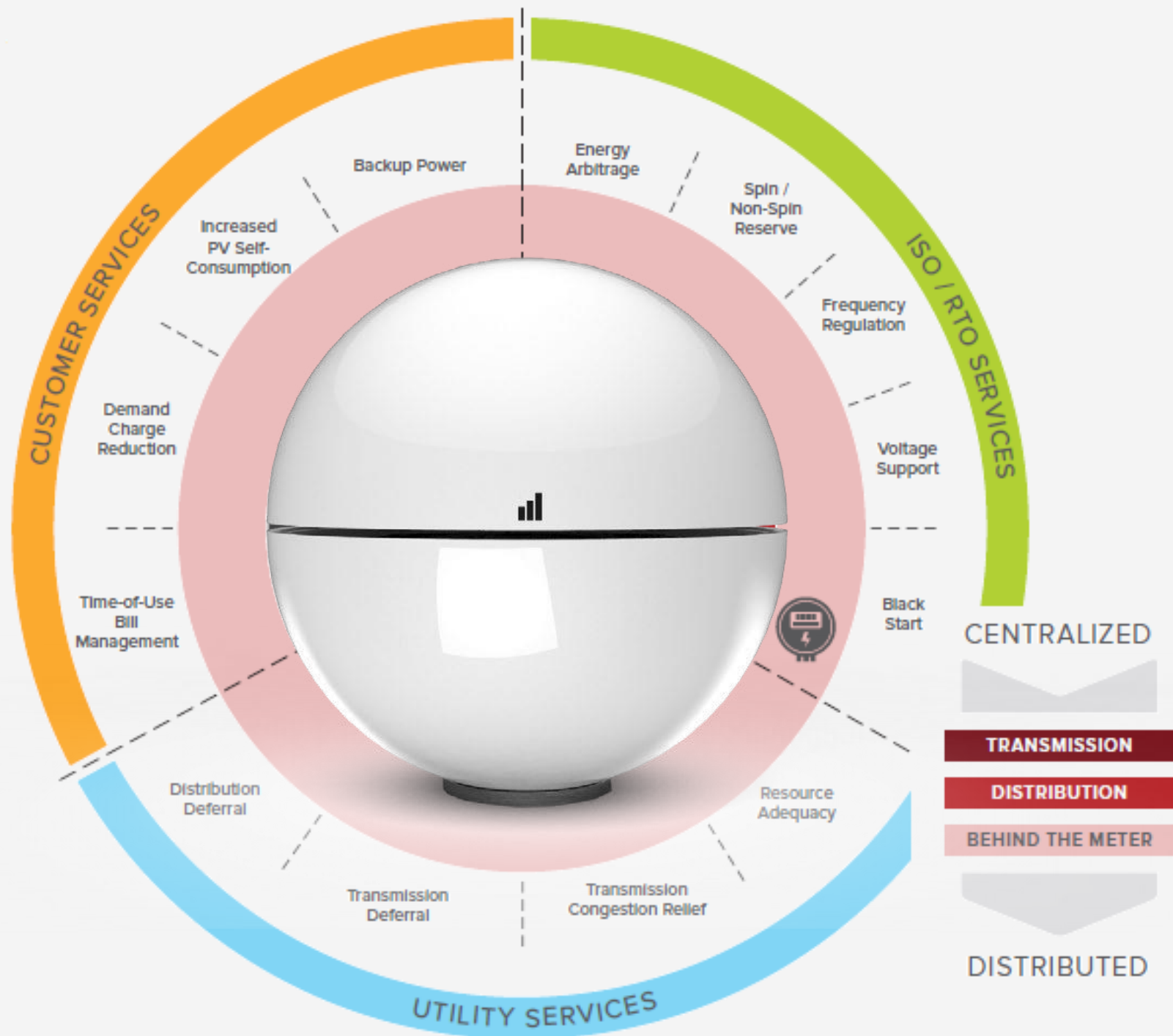
**CHALLENGE**, the new energy model

# CHALLENGE, the new energy model





# **SOLUTION & VALUE PROPOSITION**



# 1. CUSTOMER SERVICES

New Energy Model: We need the **tools** to make the change feasible.

It is important to develop Energy management systems with the use of Energy Storage Systems



# Solution and value proposition

## 1. **Energy Management System (EMS).** The harness of the battery.

- **Energy optimization Algorithm** The system learns the user's habits.
- **PV optimization Algorithm** Including variable weather.
- **Cost optimization Algorithm** Including variable time electricity pricing.
- **Aggregation platform for VPP (Virtual Power Plants) and micro-grids.**

## 2. All in One System

- Ease of installation
- Wireless connection
- Automatic firmware update
- High roundtrip efficiency
- Real Industrial Grade

## 3. End user friendly and attractive design, modular and scalable.

.....Using lithium ion battery energy storage systems

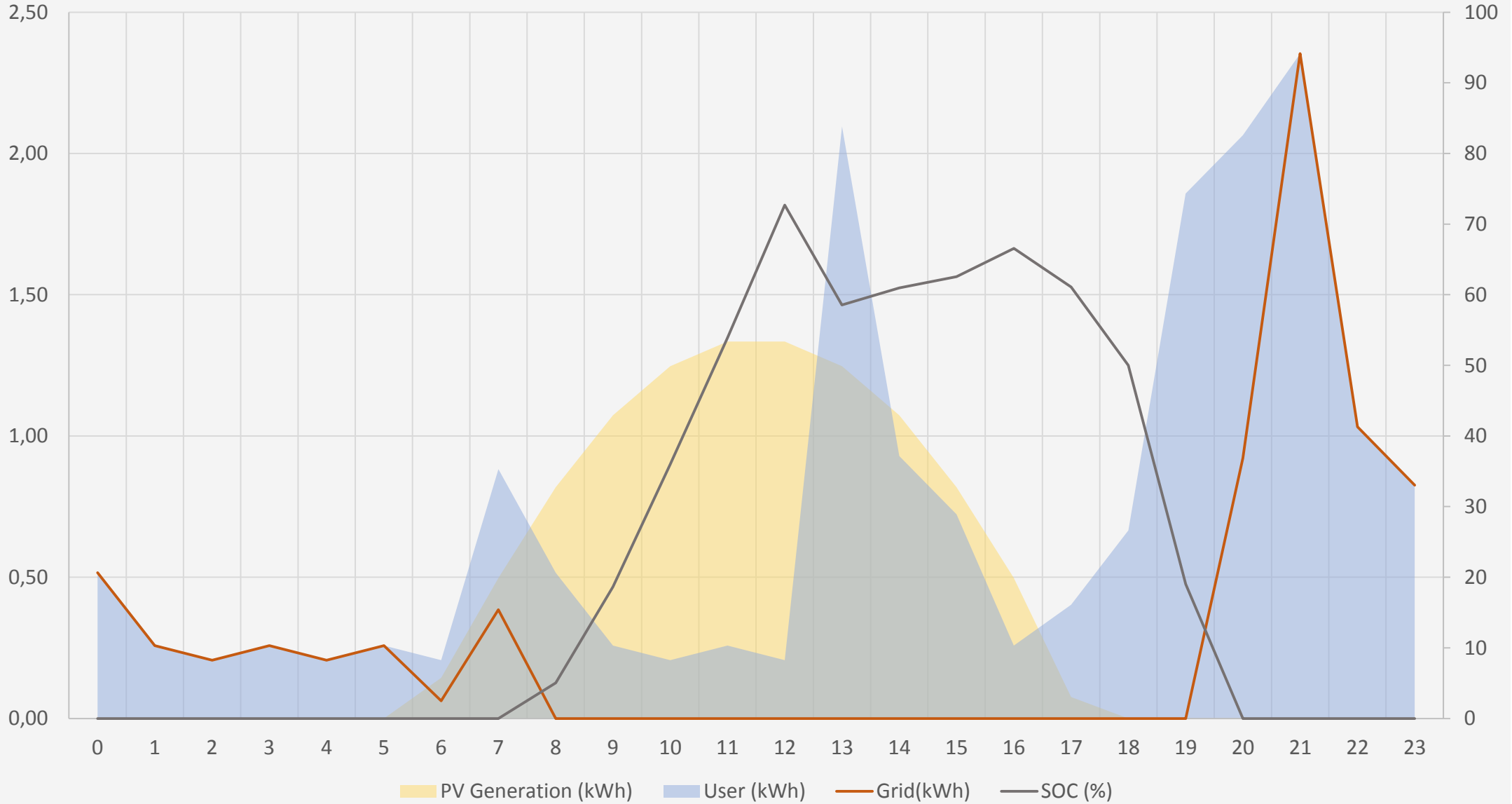


## ▮▮▮ Solution and value proposition



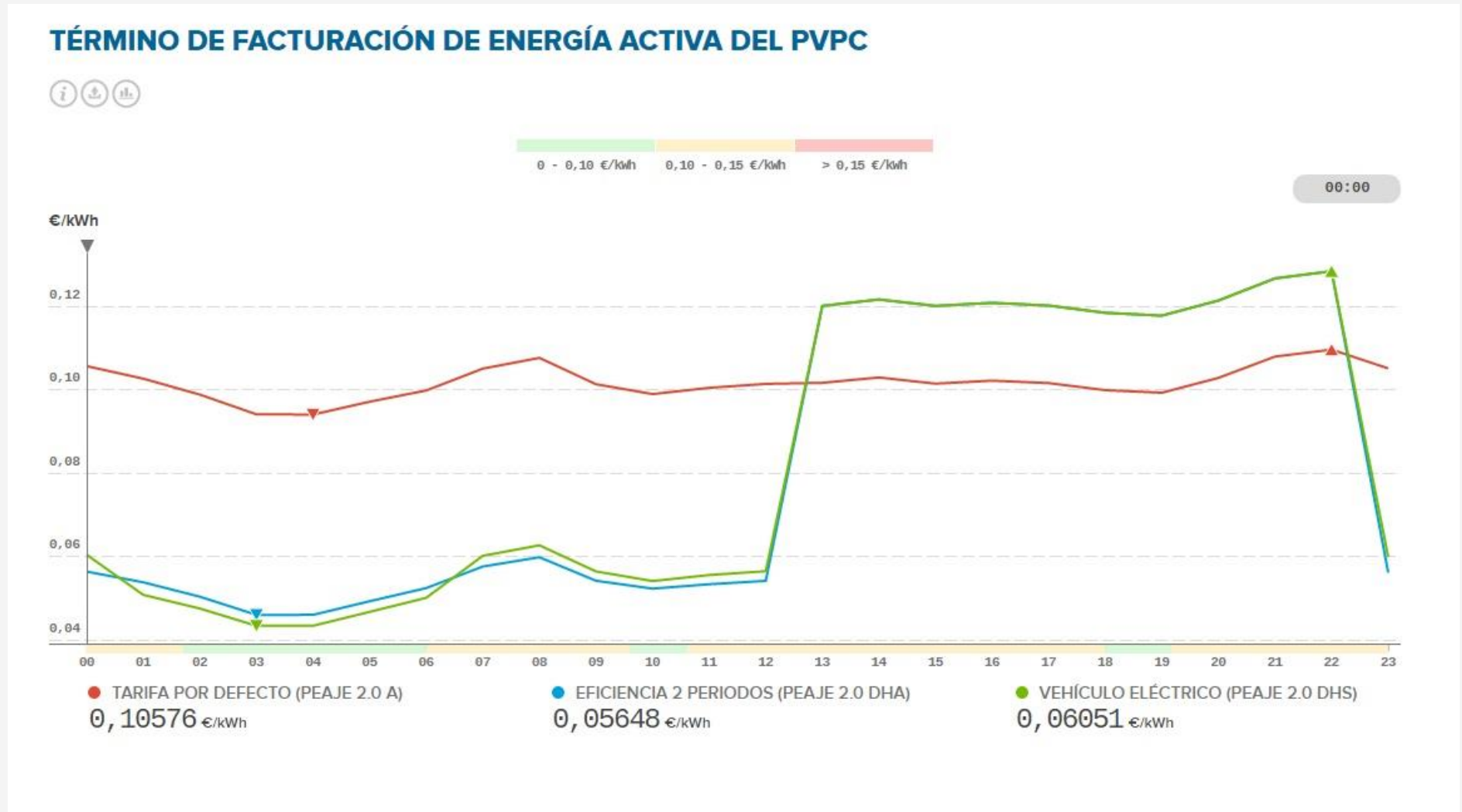
**Energy optimization Algorithm** The system learns the user's habits.

# Solution and value proposition



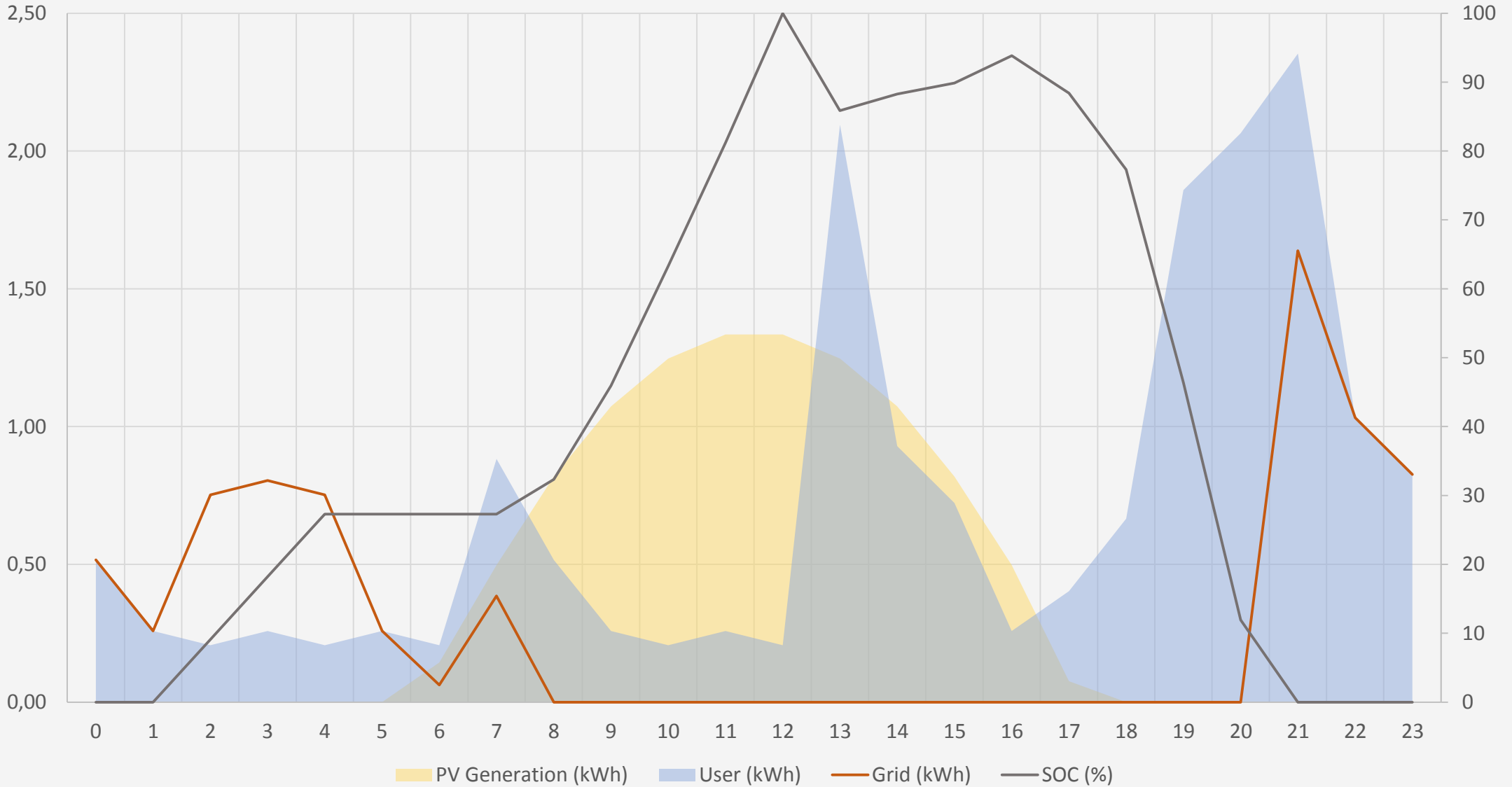
**PV optimization Algorithm. Including weather forecast**

# ■ Solution and value proposition




**Cost optimization Algorithm** Including variable time electricity pricing.

## ■ ■ ■ Solution and value proposition



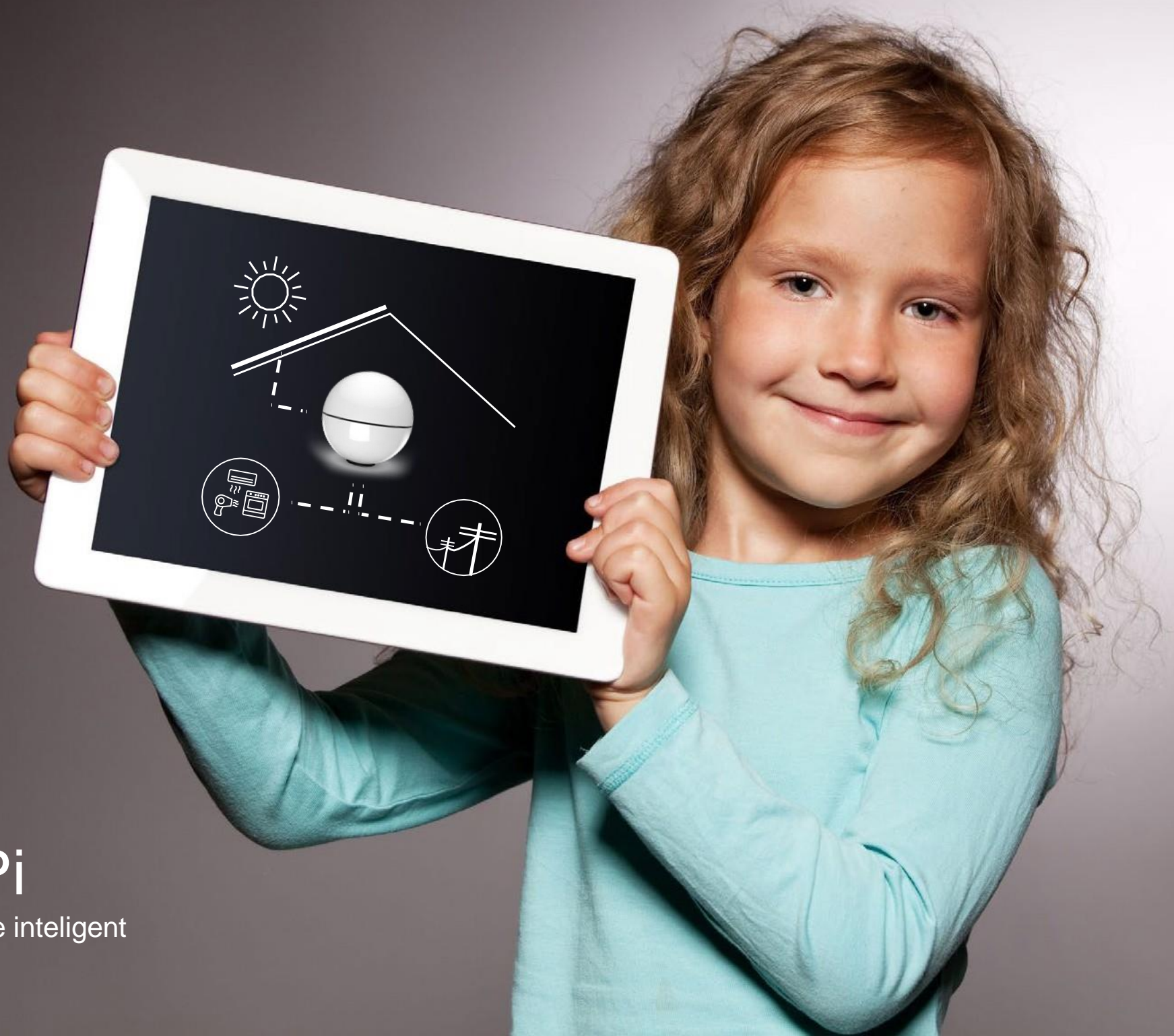
**Cost optimization Algorithm** Including variable time electricity pricing and weather forecast.



## Solution and value proposition

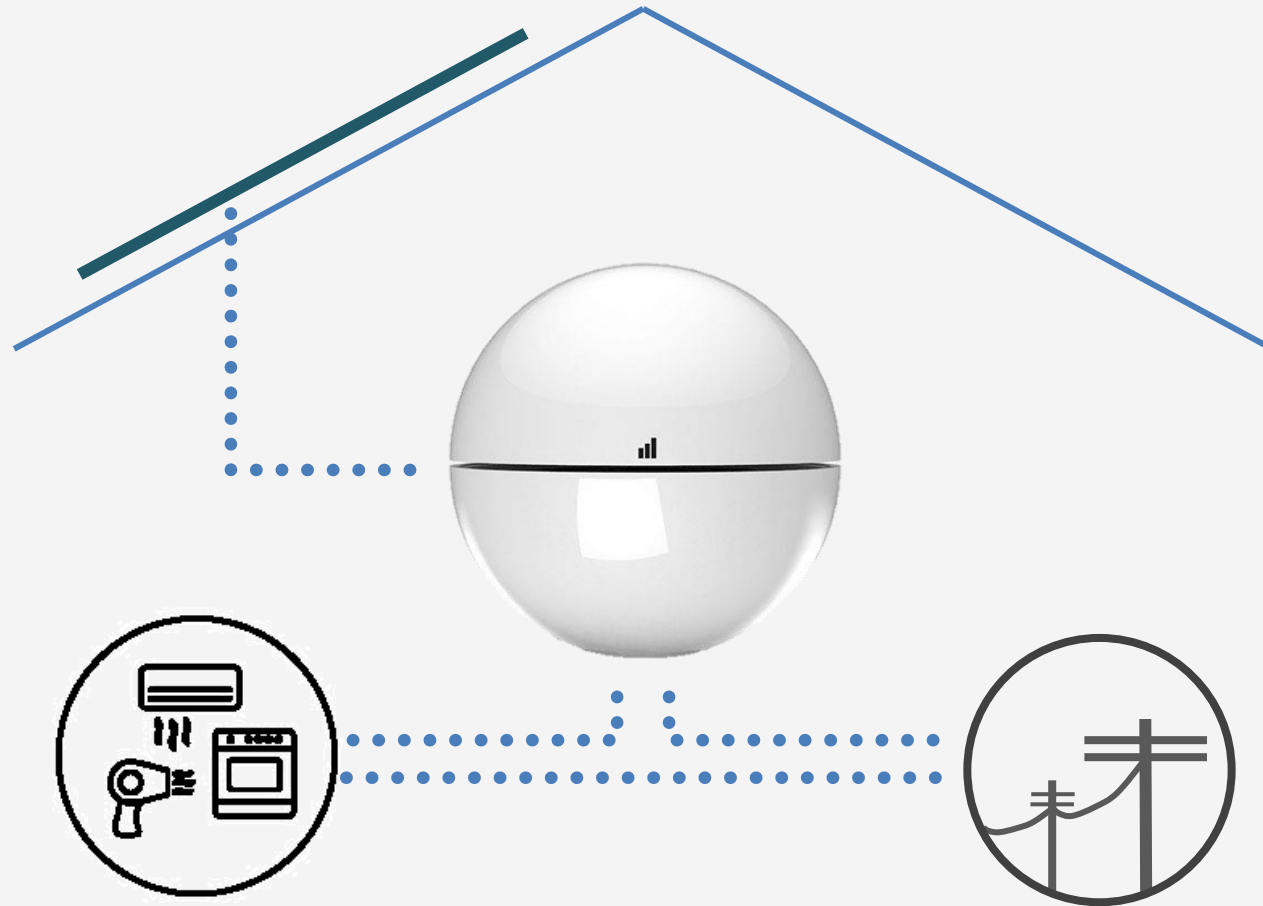
### **Internet of Things and Big Data combined with Energy Storage.**

- **Real time data monitoring and habits**
- **Gamification and empowerment of the user, achieving savings and efficiency**
- **Environmental friendly**
- **Suggestions and user needs satisfaction due to data analysis**
- **Possibilities to collaborative Energy and Aggregation in VPP**
- **Smart city integration**
- **More revenues from more uses of Energy storage.**

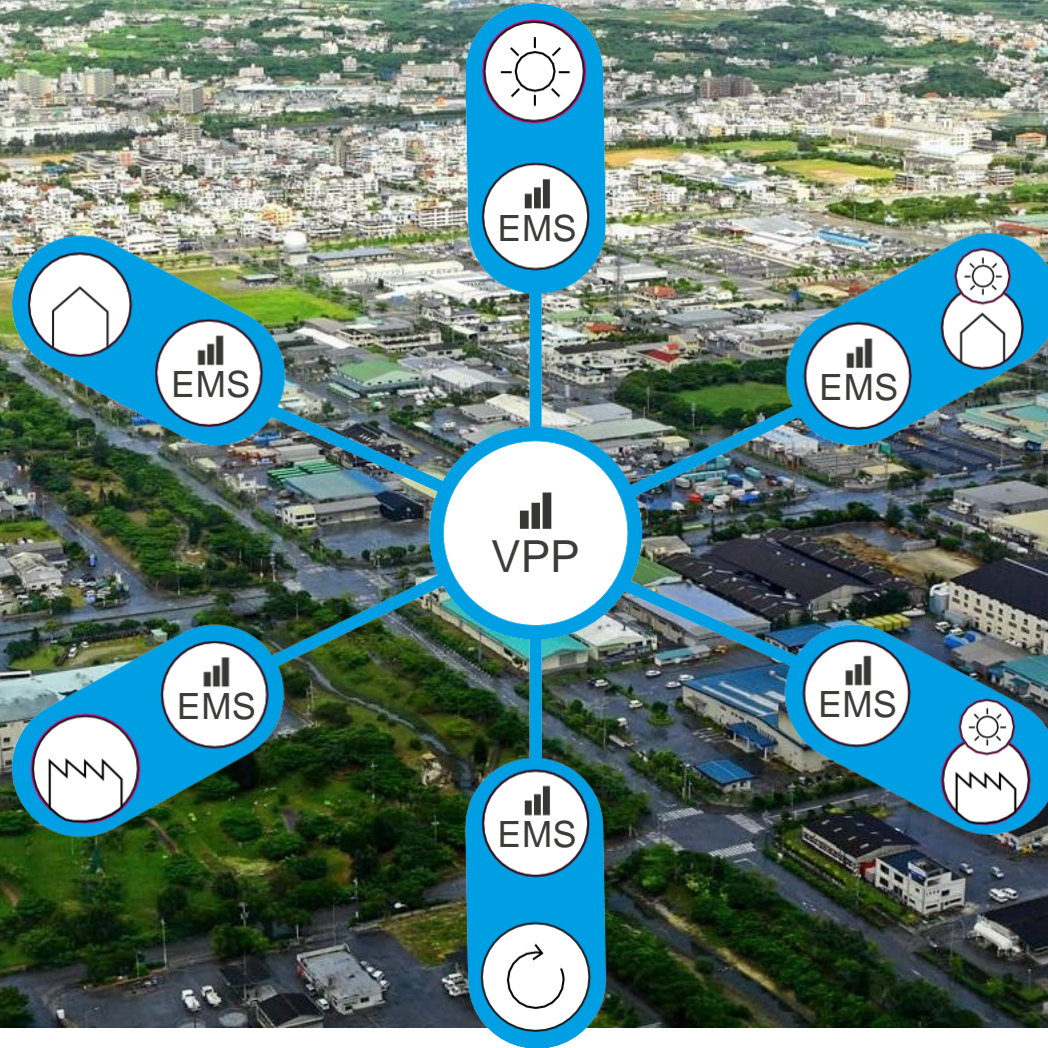


 **AMPi**  
Energy software inteligent

# ■ Solution and value proposition



# ▮ Solution and value proposition



**Aggregation platform for VPP (Virtual Power Plants) and micro-grids**



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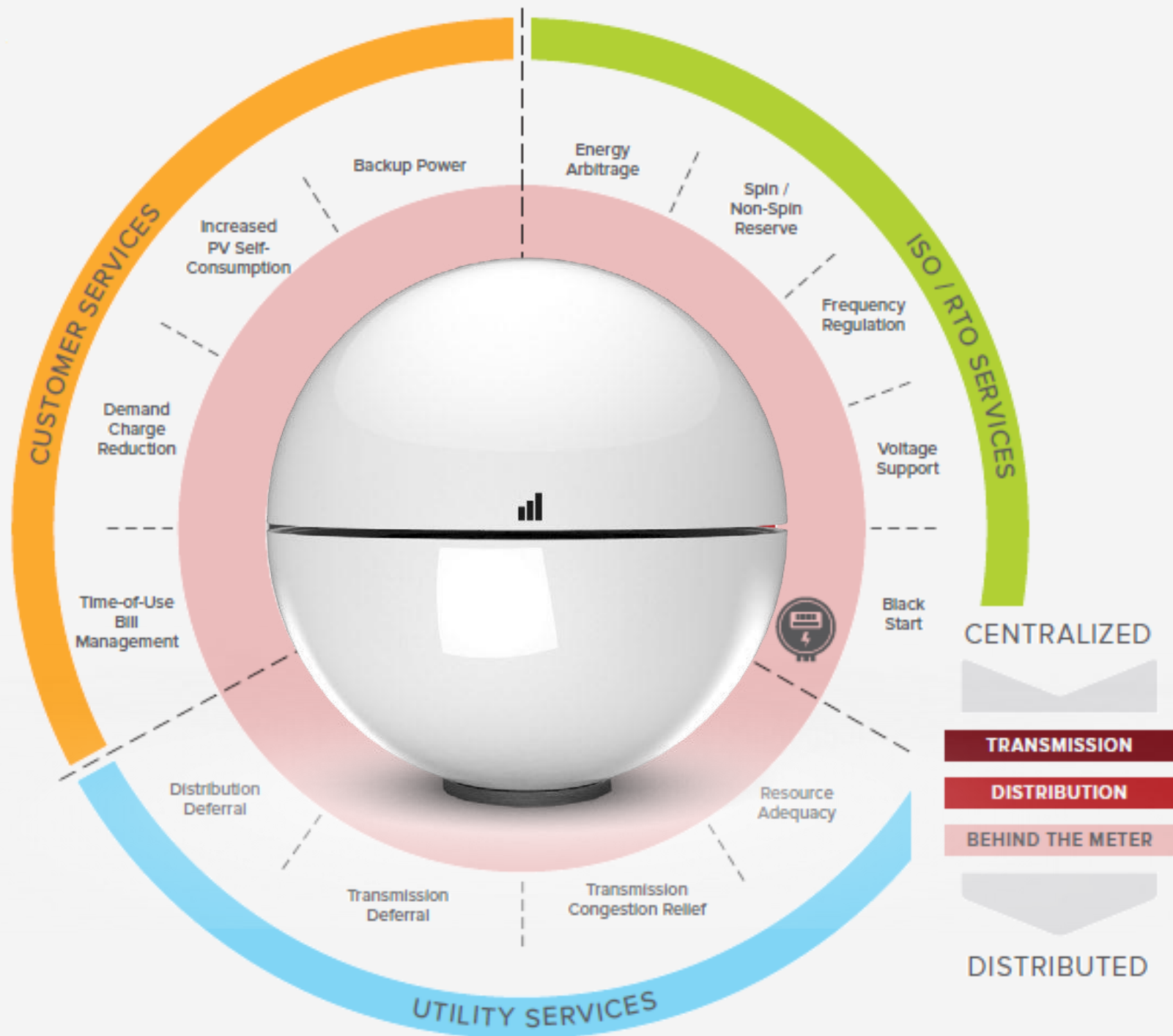
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# **FREQUENCY RESPONSE SOLUTION**

UK NATIONAL GRID ENHANCED

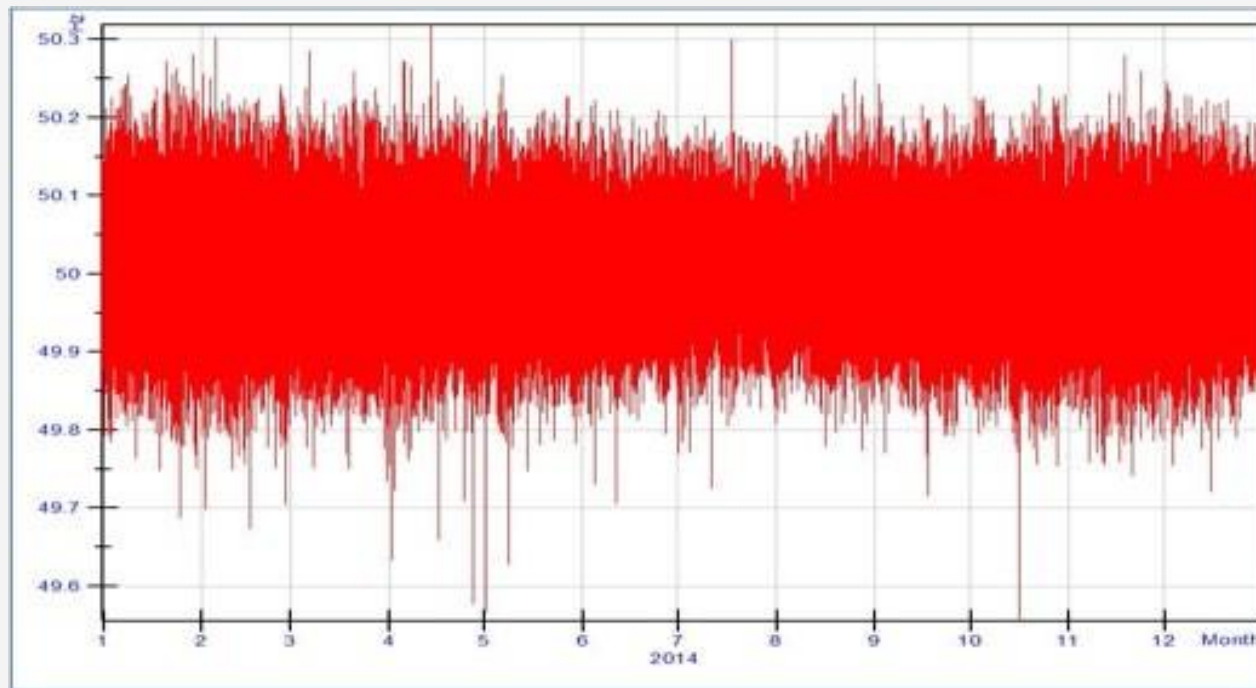
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**NATIONAL GRID**



## NATIONAL GRID

National grid has published the frequency data of the whole 2014 year. Data consists of 31.536.000 points, data is provided every second.

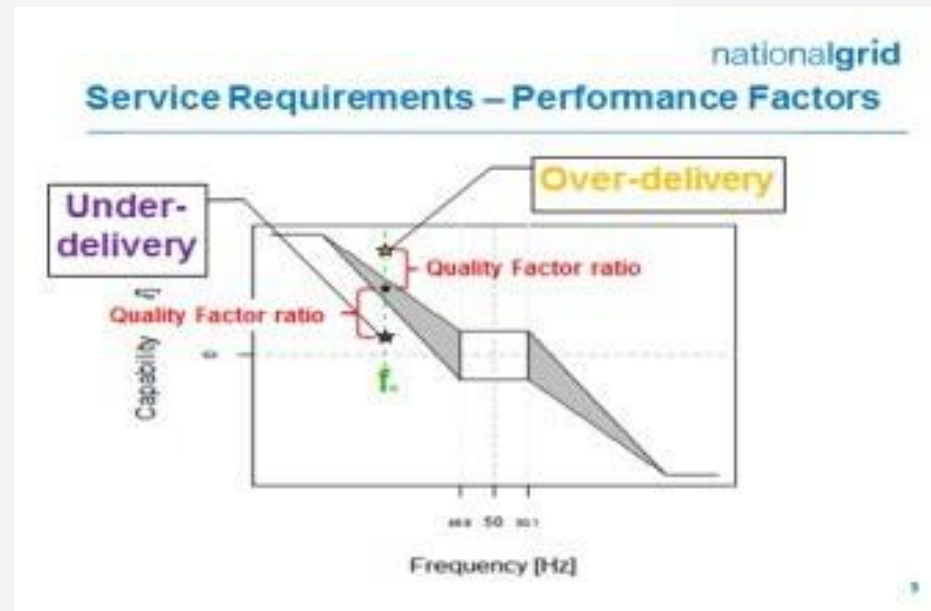




# NATIONAL GRID

Service requirements and performance factors.

National grid requires a linear control of the power of the storage systems. From a frequency deviation lower or equal to 0,1 Hz reaching full power of the system at 0,2Hz. Since there is going to be a lot of participants in the tender, they must operate in the same way in order to have the lowest disturbances between them.





# NATIONAL GRID

Service requirements and performance factors.

It is required to fulfill at least the initial 9 seconds and it is optional to participate in the other regulation markets.



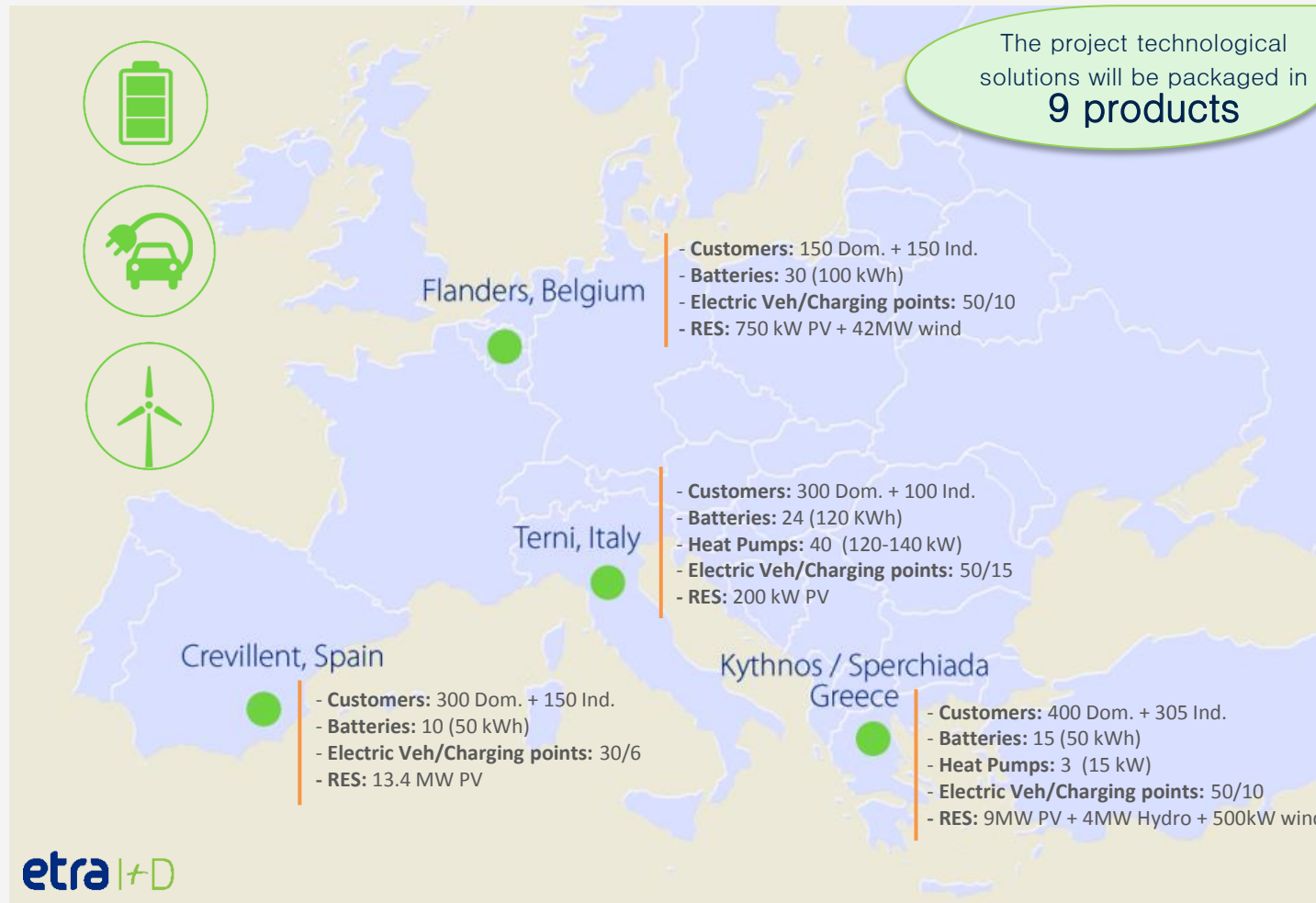


# **WISE GRID PROJECT H2020**



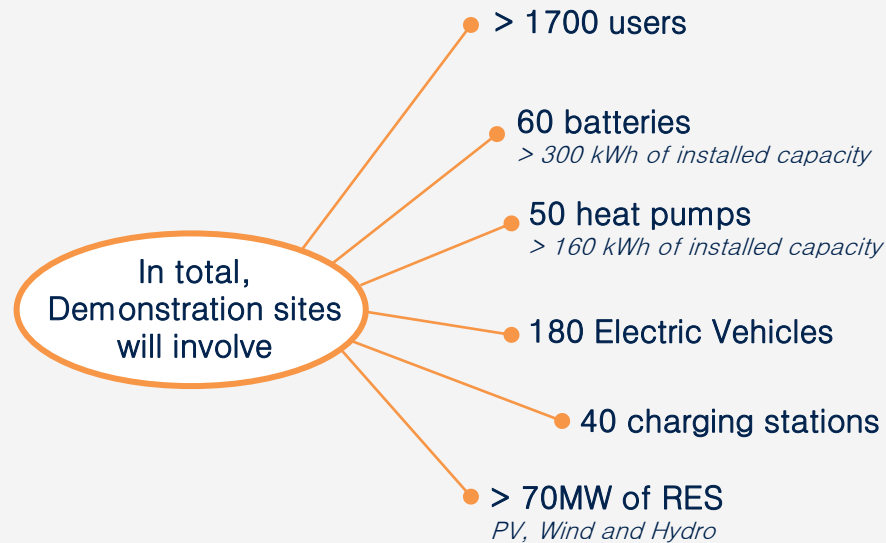


## WiseGRID – Wide scale demonstration of Integrated Solutions for European SmartGrid





## WiseGRID – Wide scale demonstration of Integrated Solutions for European SmartGrid



### LONG-TERM EXPECTED IMPACT

- Access to new **energy services of 860.000 citizens** and more than **23.000 public/private entities**.
- Saving of **20.769.060 MWh** of energy and **14.704.495 Tons of CO2**
- Preventing energy poverty, **reducing consumer energy bill by an 25%**
- Increase of **50% in the share of RES**
- Contributing with the **creation of more than 1.800 jobs**
- Yearly **turnover of 146,7 M€**
- **ROI for the partners of less than 30 months** after commercialisation of WiseGRID products.
- **IRR of 11.7%** for the first 5 years of commercialisation



# **AUTOCONSUMO CON ALMACENAMIENTO**



## Legislación aplicable

### **REBT ITC 40 (Sept 2013 R1)**

*“El presente documento aplica a todas las instalaciones generadoras de baja tensión, tales como:*

- Motores de combustión*
- Turbinas*
- Generadores fotovoltaicos (FV)*
- Generadores eólicos de BT*
- Acumuladores mecánicos o electroquímicos***
- Células de combustible*
- Otras fuentes de energía en BT”*

### **Real Decreto 900/2015**

El artículo 5 confirma que

*“podrán instalarse elementos de acumulación en las instalaciones de autoconsumo reguladas en este real decreto”.*



## Business Cases: PV + Storage

Cliente: curva de consumo Mediterráneo / Norte					
Nº Módulos PV	kW PV / kWh Storage	Solo PV Pay Back / Ahorro 25		PV + Storage Pay Back / Ahorro 25	
14 (Opt Solar)	3,6 kW / 12 kWh	9,14	22,5 k	10,42	36 k
24	6,2 kW / 12 kWh	9,34	34 k	9,46	57 k
36 (Opt Storage)	9,3 kW / 12 kWh	10,2	40 k	9,44	69 k



# CONCLUSIÓN



*El **almacenamiento** de energía a base de baterías, será **la llave del nuevo modelo energético** al ser capaz de reducir los costes de la red y las facturas de los clientes, el aumento de la capacidad de recuperación de la red, y el apoyo a un sistema de electricidad en gran parte generado por las energías renovables.*



# AMPERE ENERGY

CHANGE IS SIMPLE

