

# integrid

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**O Caminho da Inovação '18 – Fábricas de Água no Futuro**

**“Visão do tratamento das águas residuais no futuro”**

**Pedro Godinho Matos – EDP Distribuição**

**Lisboa, 26 de Setembro de 2018**

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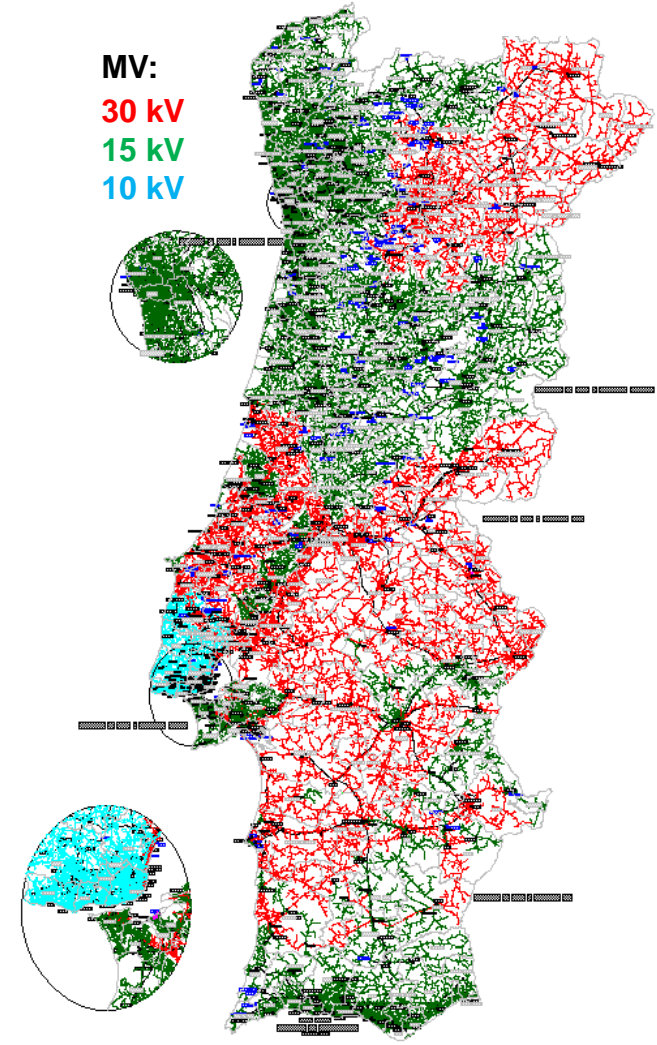
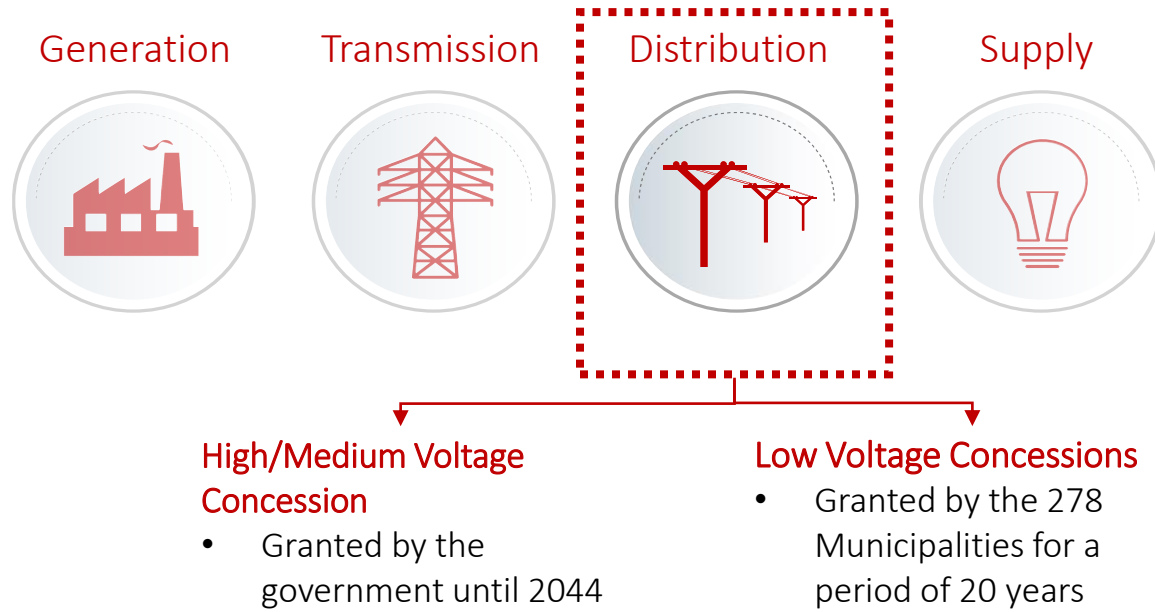


## 1. EDP Distribuição

## 2. Vision 2050

## 3. InteGrid

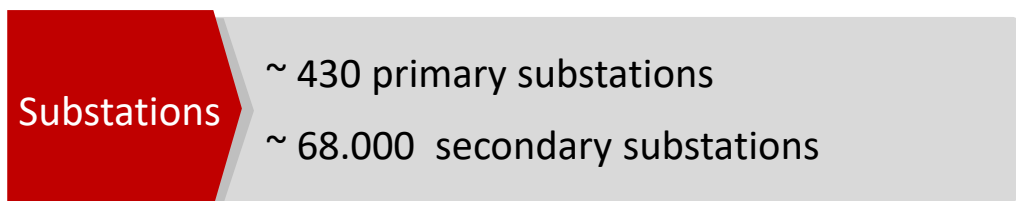
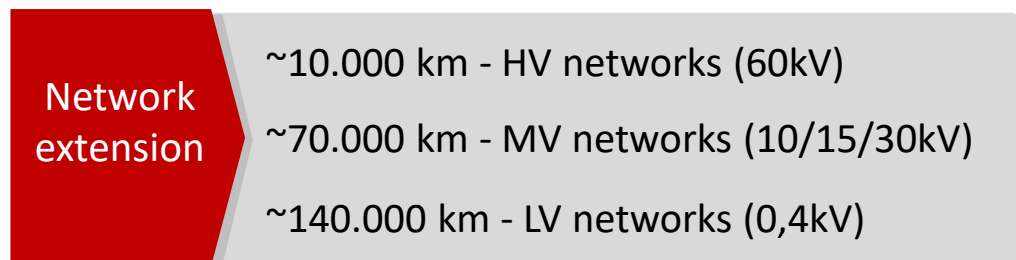
# EDP Distribuição: the Portuguese DSO



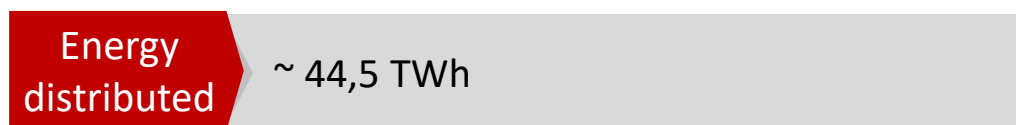
# EDP Distribuição: Main Figures



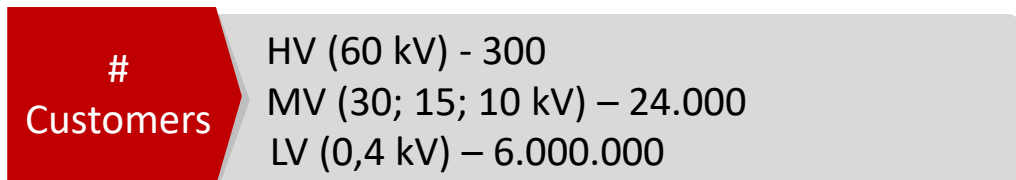
## Network assets



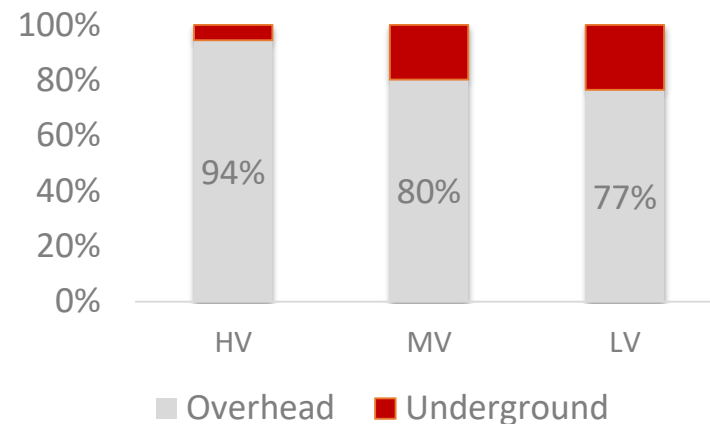
## Energy distributed



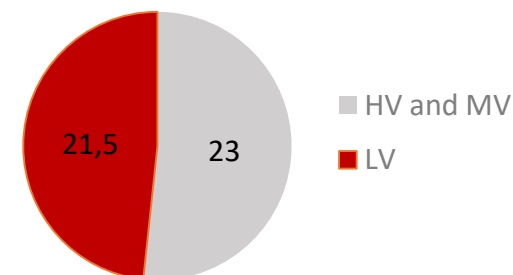
## Customers



Weight of each type of network



Consumption (TWh)



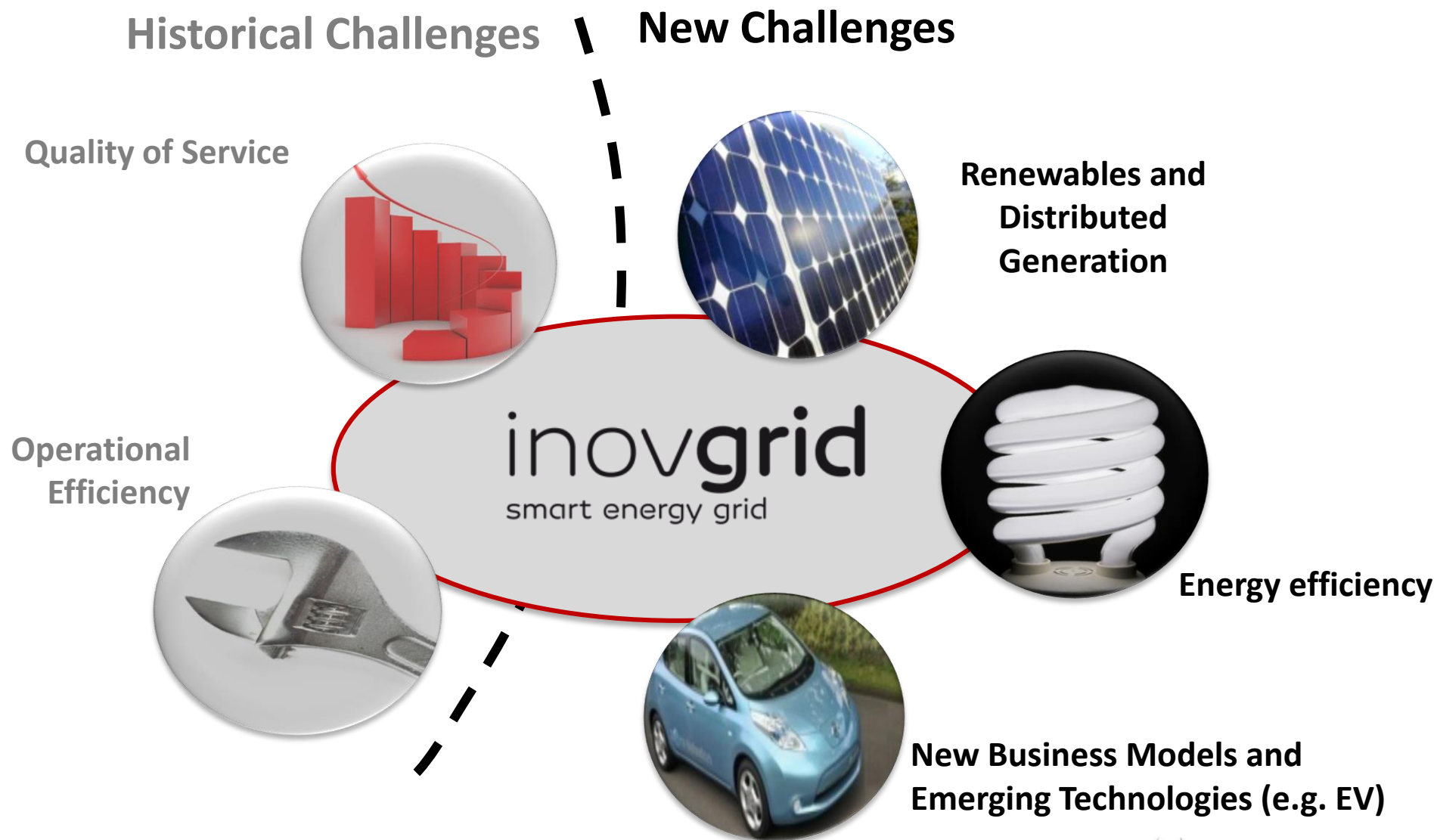
# EDP Distribuição: Smart Metering

	<u>Voltage Level</u>	<u># Grid Customers*</u>	<u>% Smart Meter*</u>
HV	High Voltage	<1k	100%
	Medium Voltage	24k	100%
LV	Low Voltage C&I	34k	100%
	Low Voltage Public Lighting	60k	100%
	Low Voltage Residential	6.000k	33%
	Low Voltage Micro generation	30k	100%

HV+MV+LV C&I amount for 60% of distributed electricity

No mandate for roll-out yet, but EDP has decided to only install smart meters from 2016 onwards

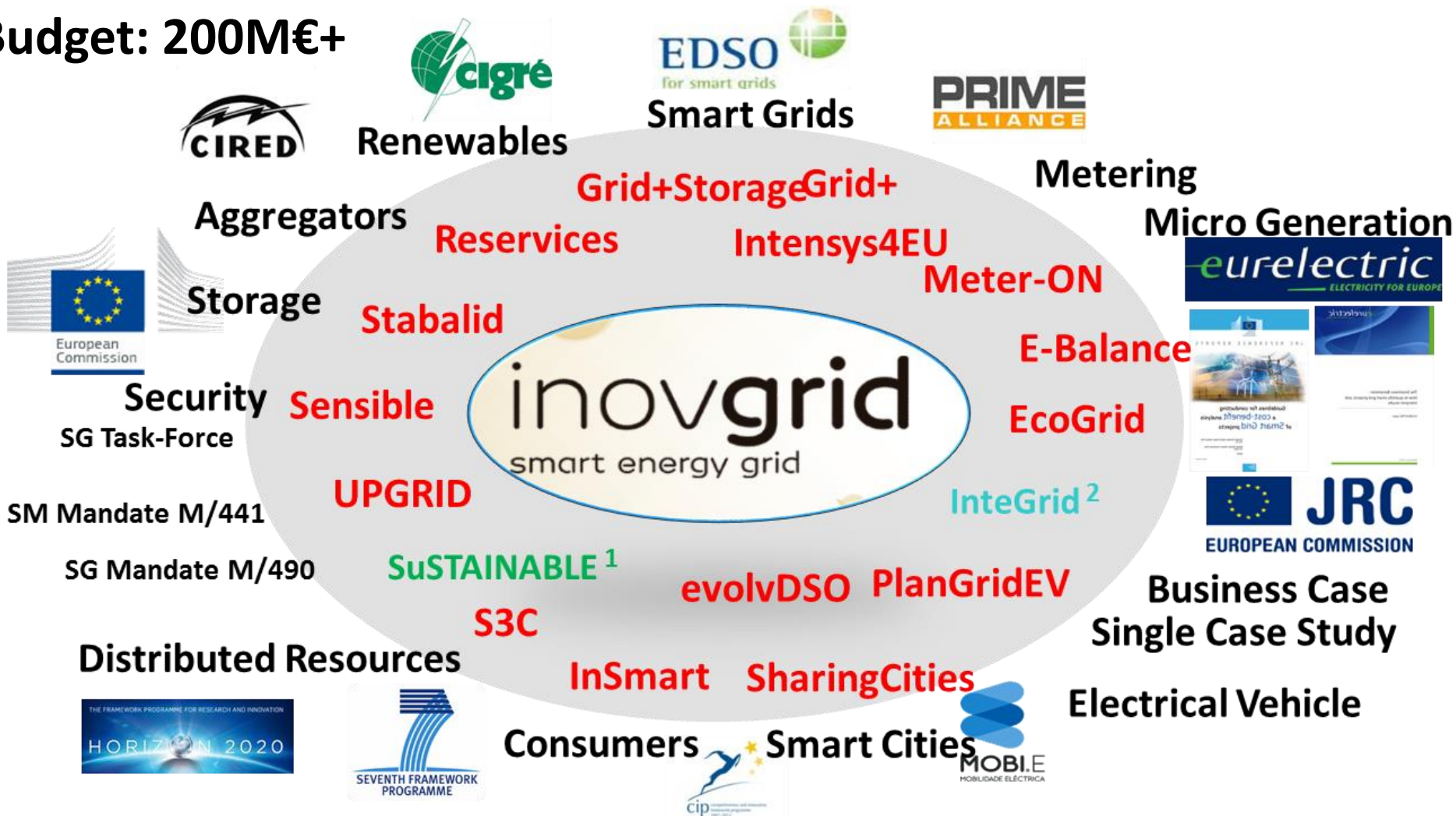
\* Approximate figures



# EDP Distribuição: jornada Europeia



Budget: 200M€+



(1) FP7 Project Coordinated by EDP Distribuição ([www.sustainableproject.eu](http://www.sustainableproject.eu))  
 (2) H2020 Project Coordinated by EDP Distribuição ([www.integrid-h2020.eu](http://www.integrid-h2020.eu))



@integridproject



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731218

# Agenda



1. EDP Distribuição

**2. Vision 2050**

3. InteGrid



# Energy Union: an ambitious Energy Strategy for Europe

 OBJECTIVES  
**Attain Energy & Climate Targets**

 OBJECTIVES  
**Complete the Internal Energy Market**

 OBJECTIVES  
**Give investors predictability and a stable regulatory framework**



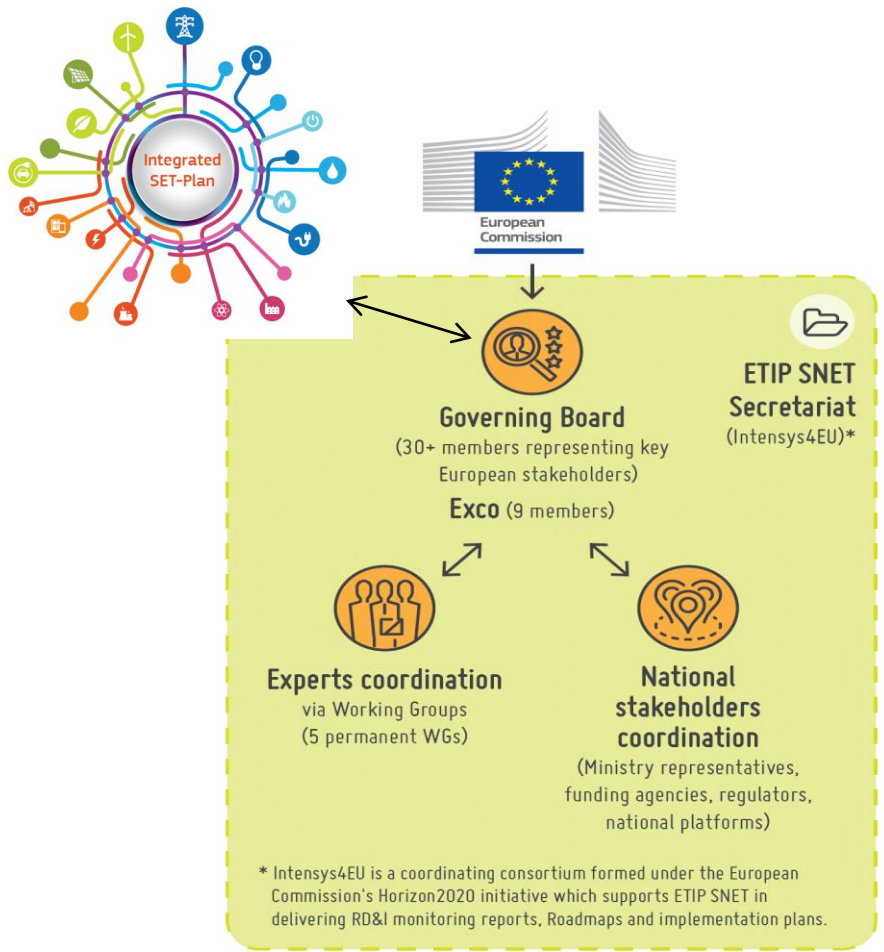
**PRIVATE BANKS AND FUNDS**



**PENSION FUNDS**



# ETIP Smart Networks for Energy Transition



**WG1**  
Reliable, economic and efficient smart grid system



**WG2**  
Storage technologies and sector interfaces



**WG3**  
Flexible Generation



**WG4**  
Digitisation of the electricity system and customer participation



**WG5**  
Innovation implementation in the business environment



**NSCG**  
National Stakeholders Coordination Group

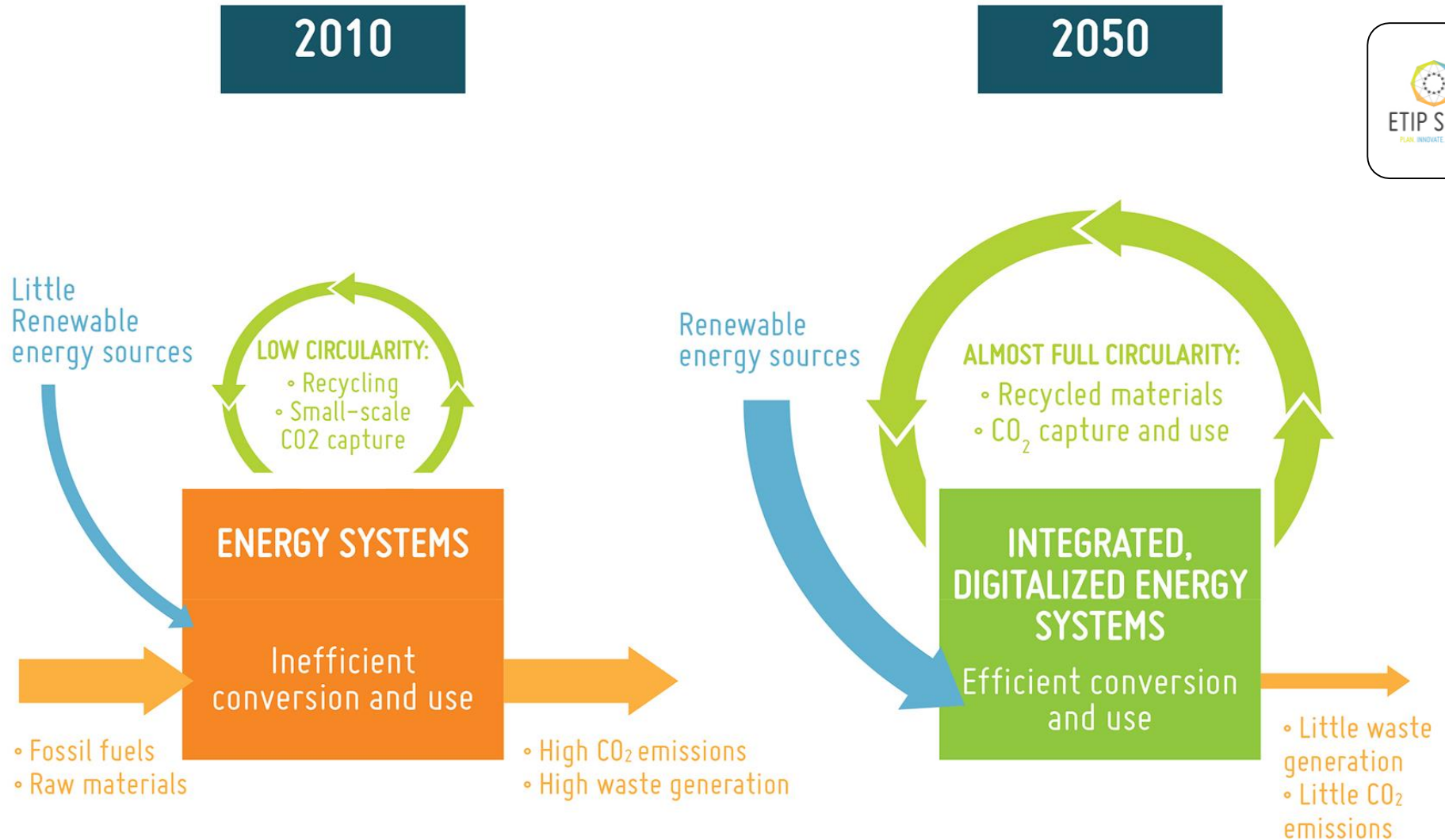
# 2050 VISION GOAL

A low-carbon, secure, reliable, resilient, accessible, cost-efficient, and market-based **pan-European integrated energy system**

supplying the whole economy and paving the way for a **fully CO<sub>2</sub>-neutral and circular economy by the year 2050,**

while **maintaining and extending global European industrial leadership** in energy systems during the energy transition.

# From 2010 to 2050...



# VISION 2050

A SYSTEM OF SYSTEMS



## NETWORKS

- Electricity
- Heating & Cooling
- Gas
- Data



Variety of generation sources in size, both centralised and decentralised, fully or largely circular

# VISION 2050

A SYSTEM OF SYSTEMS



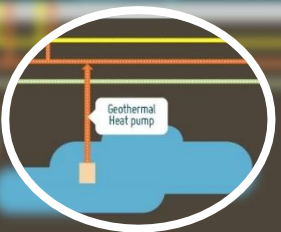
- NETWORKS**
- Electricity
  - Heating & Cooling
  - Gas
  - Data



# Variety of generation sources in size, both centralised and decentralised, fully or largely circular

## VISION 2050

A SYSTEM OF SYSTEMS



# In 2050 the Customer is fully engaged

# VISION 2050

A SYSTEM OF SYSTEMS

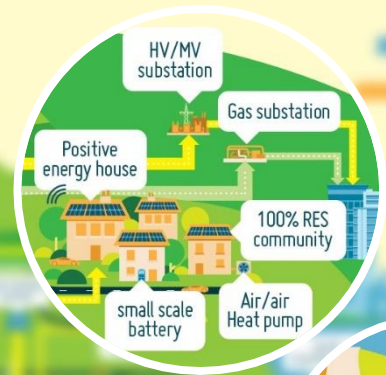
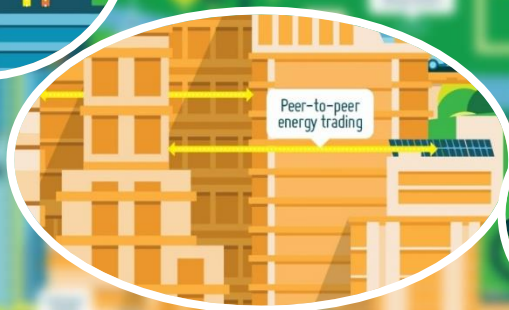




# In 2050 the Customer is fully engaged

## VISION 2050

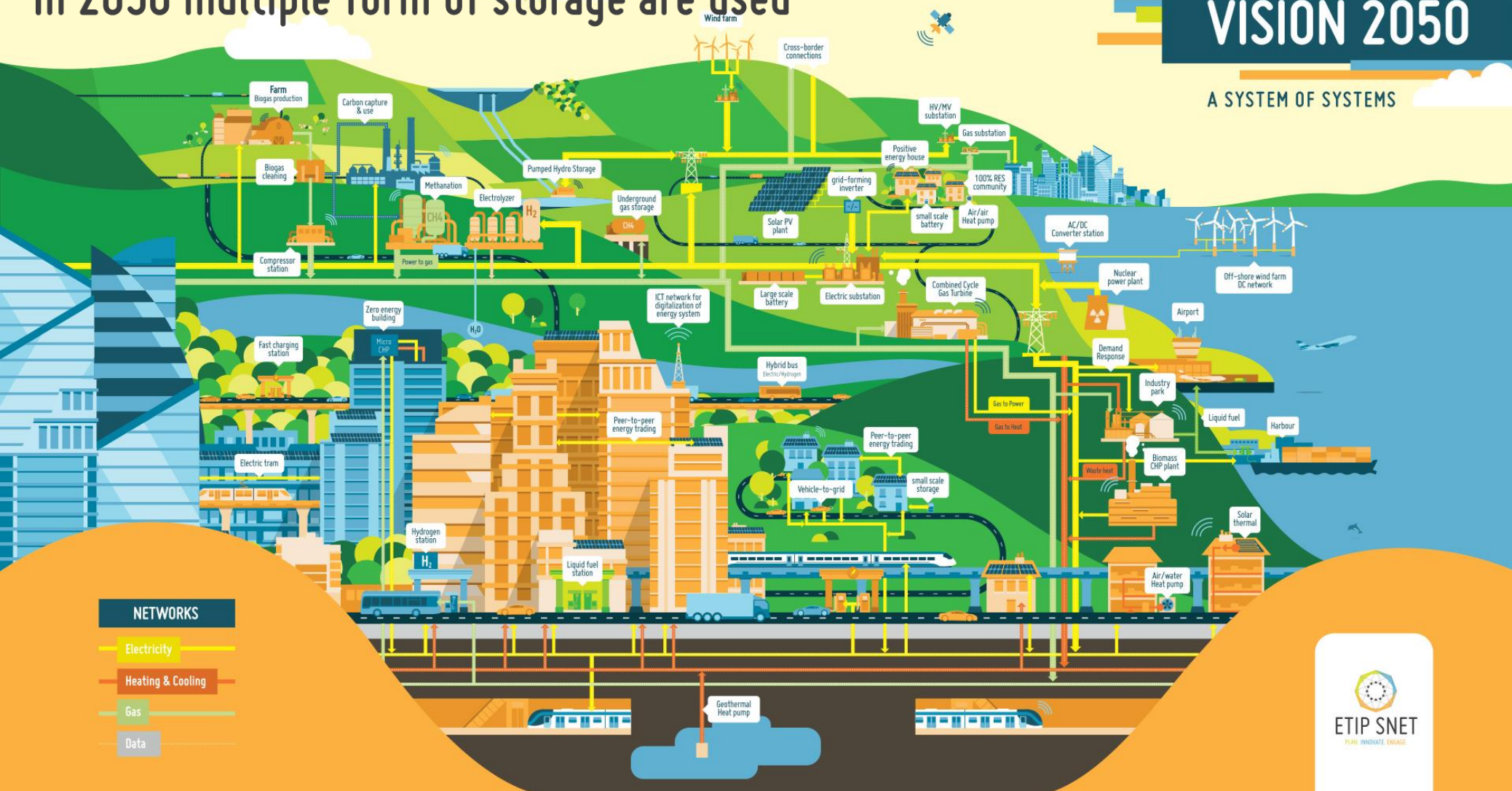
A SYSTEM OF SYSTEMS



# In 2050 multiple form of storage are used

# VISION 2050

A SYSTEM OF SYSTEMS



# In 2050 multiple form of storage are used

## VISION 2050

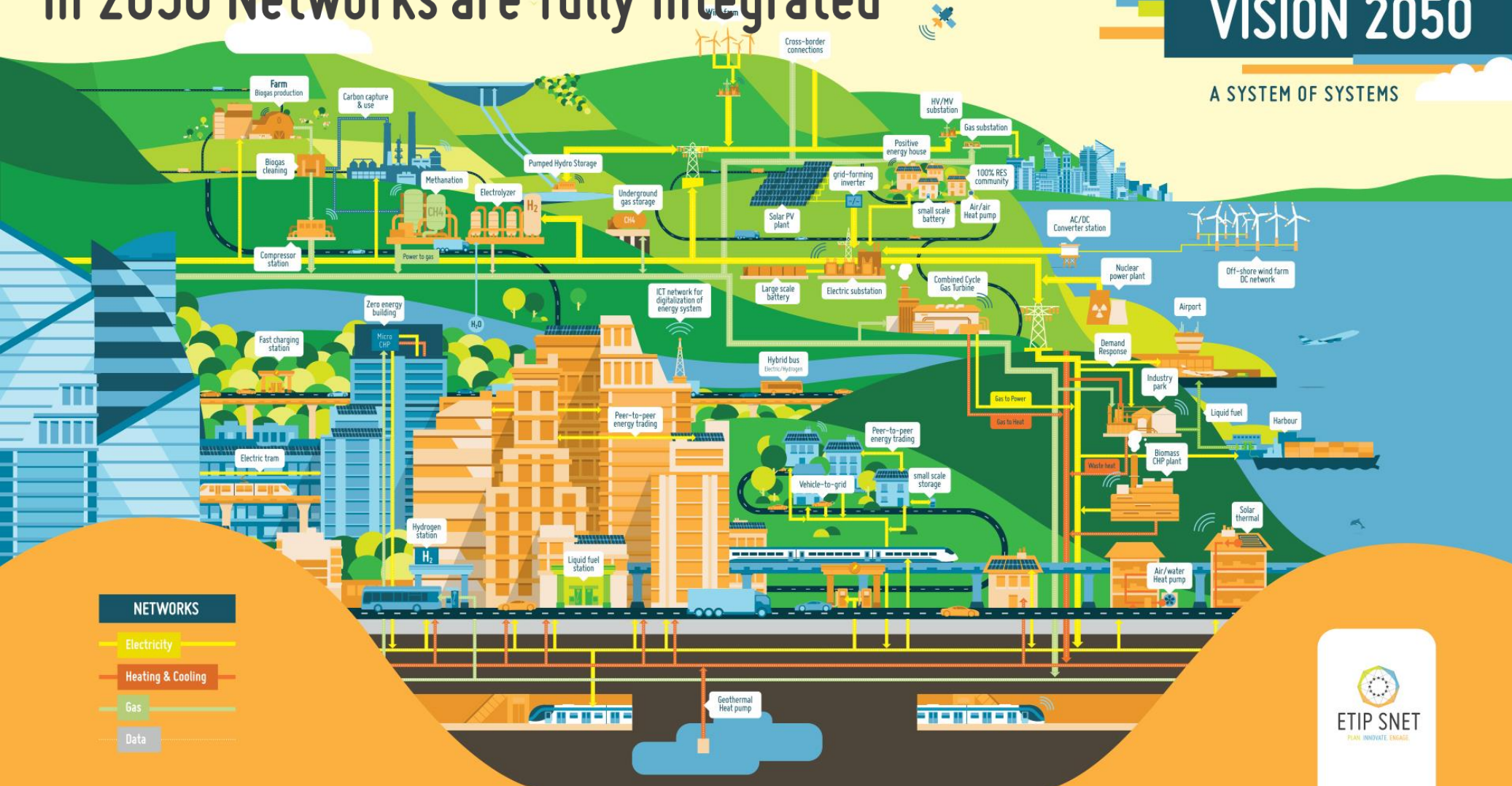
A SYSTEM OF SYSTEMS



# In 2050 Networks are fully integrated

## VISION 2050

A SYSTEM OF SYSTEMS



# Conversion technologies are widely needed

## VISION 2050

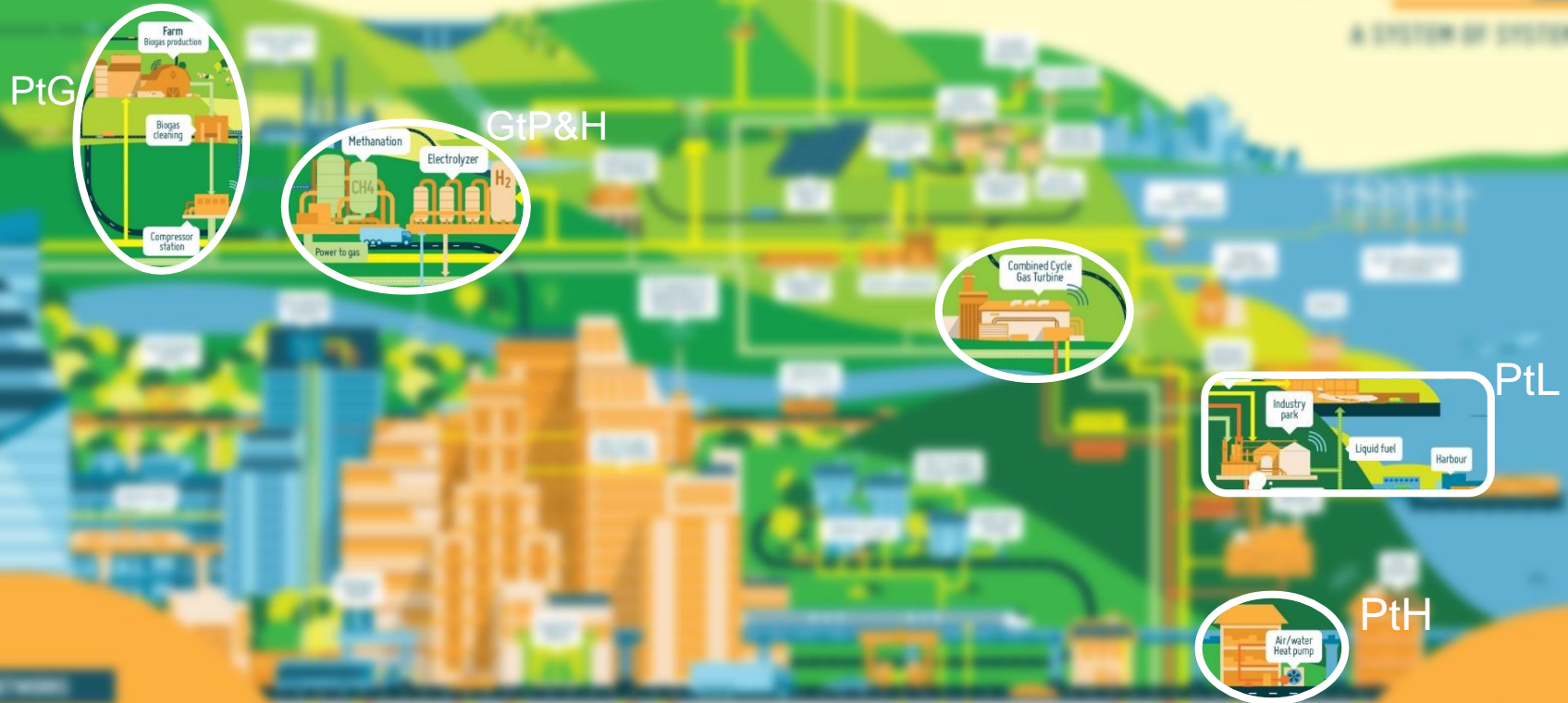
A SYSTEM OF SYSTEMS



# Conversion technologies are widely needed

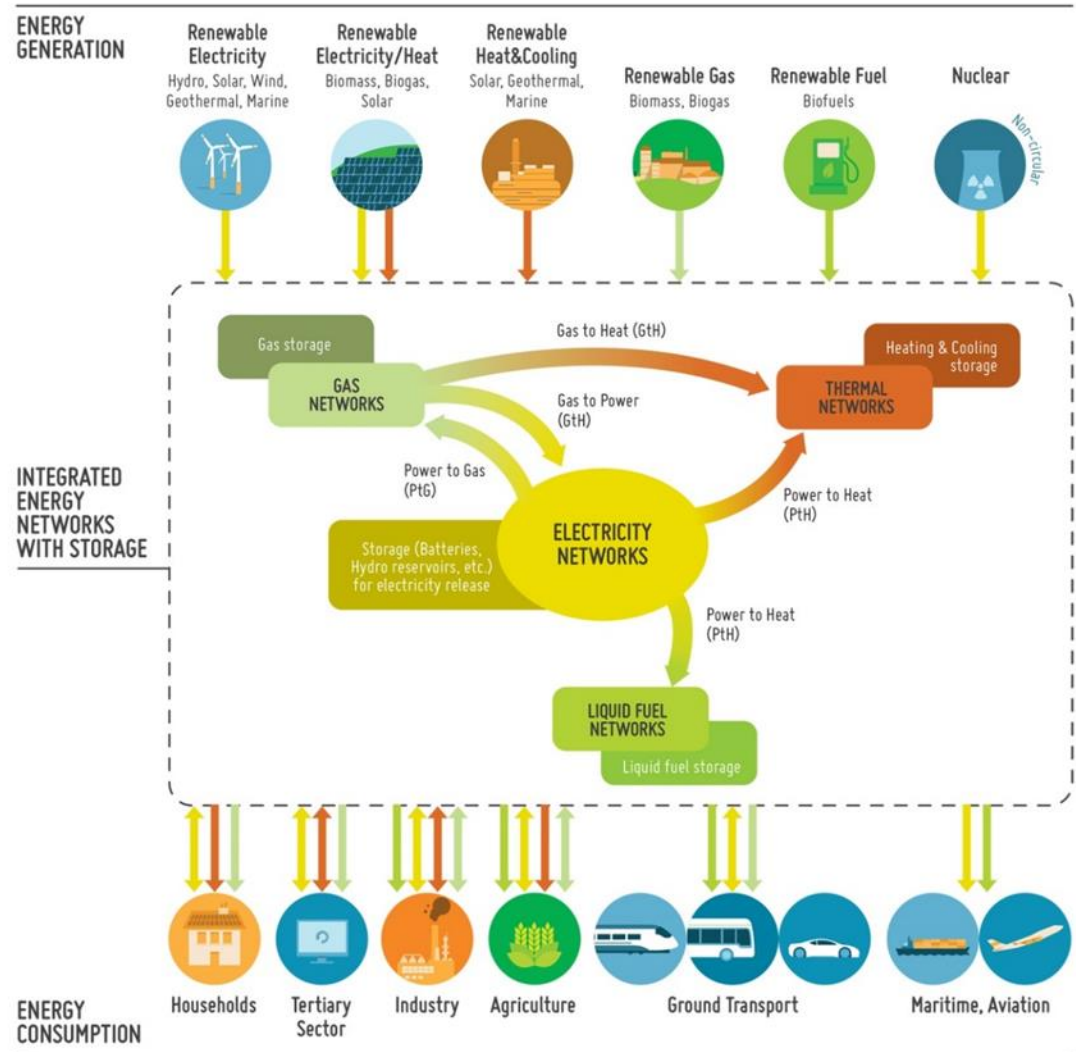
VISION 2050

A SYSTEM OF SYSTEMS



# Smart Grids are key for Energy Transition

Electricity network  
is the backbone of  
the integrated  
energy system



# Agenda



1. EDP Distribuição

2. Vision 2050

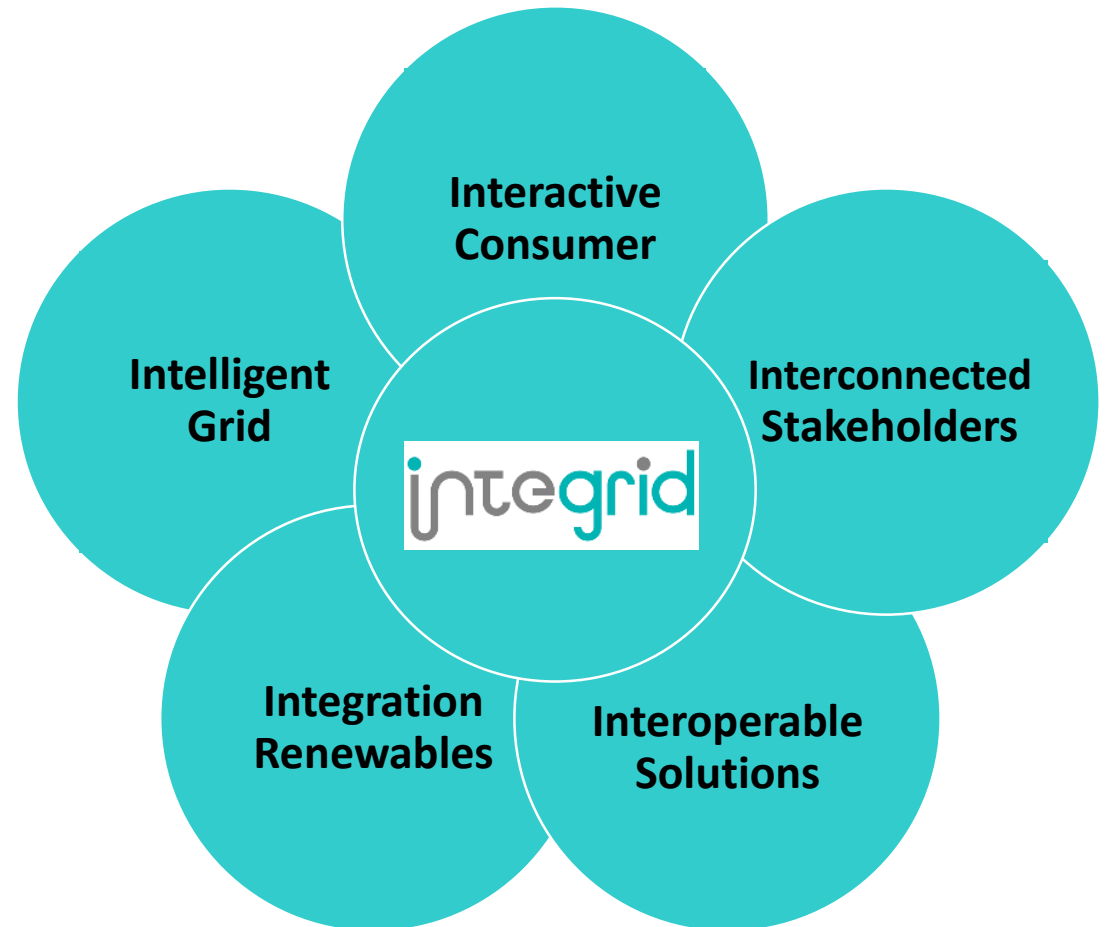
**3. InteGrid**



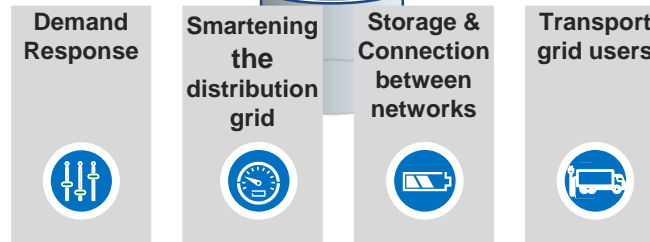
# Imagine InteGrid...

## In a nutshell

- Coordinator: EDP Distribuição
- Budget: 15 M€
- From January 2017 to June 2020
- 14 Partners from 8 Member States



# InteGrid Objectives



**Specific objective 1**  
Feasibility of smart distribution networks using available DER flexibility

**Main objective 1**  
Demonstrate how DSOs enable the different stakeholders to actively participate in the energy market and implement new business models

**Specific objective 7**  
Investigation of potential for replication and design of detailed exploitation

**Specific objective 2**  
Integrated concepts using the complementarity of different technologies

**Main objective 2**  
Test and validate solutions in an integrated environment enabling DSOs to plan and operate the network in a stable, secure and economic way

**Specific objective 6**  
Functional validation of the proposed solutions in a real environment

**Specific objective 3**  
Demonstration of smartened monitoring and automation

**Specific objective 4**  
Market hub concept for solving conflicting objectives

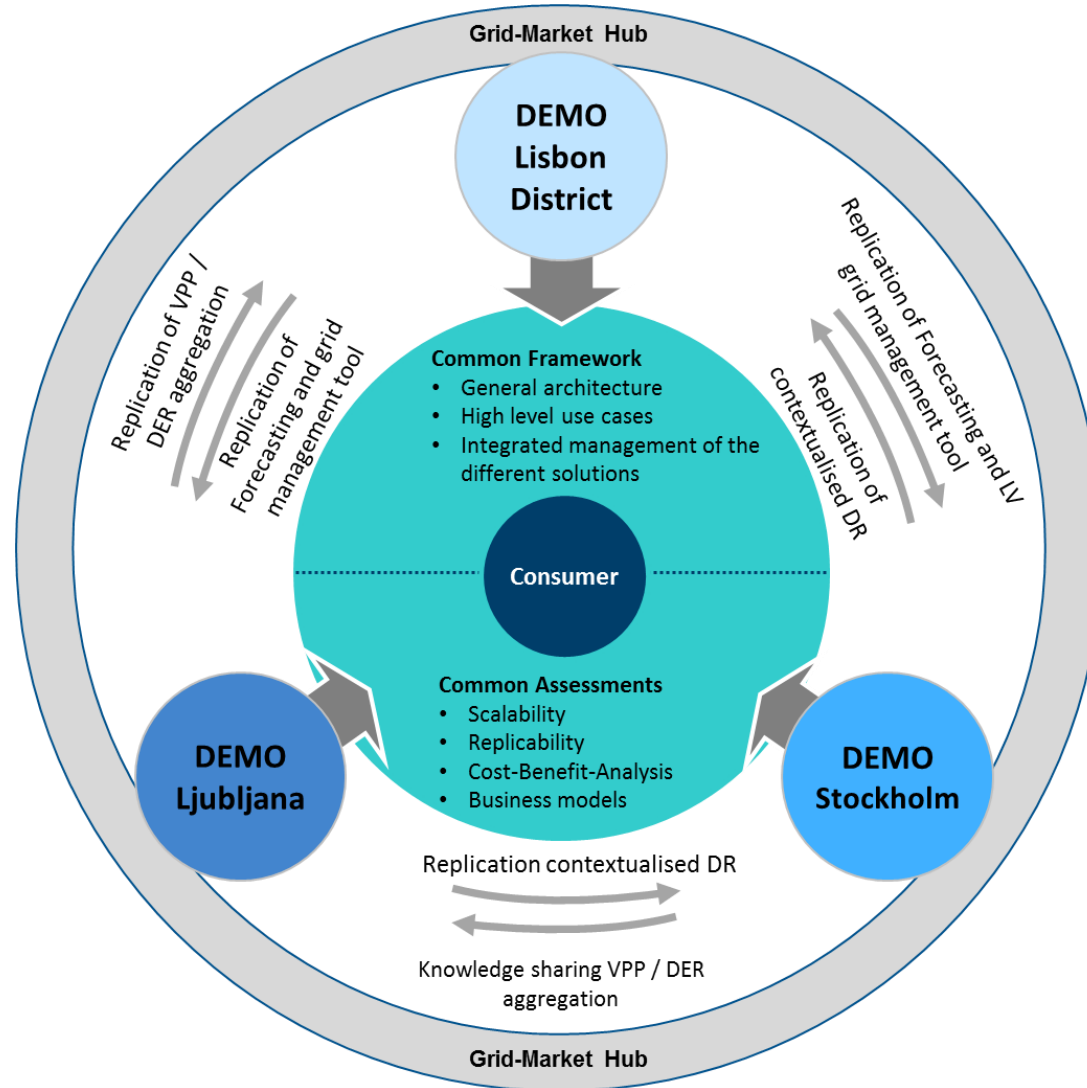
**Specific objective 5**  
Business models compatible for solving conflicting objectives

# InteGrid Demonstrations Cooperation

## PORTUGAL



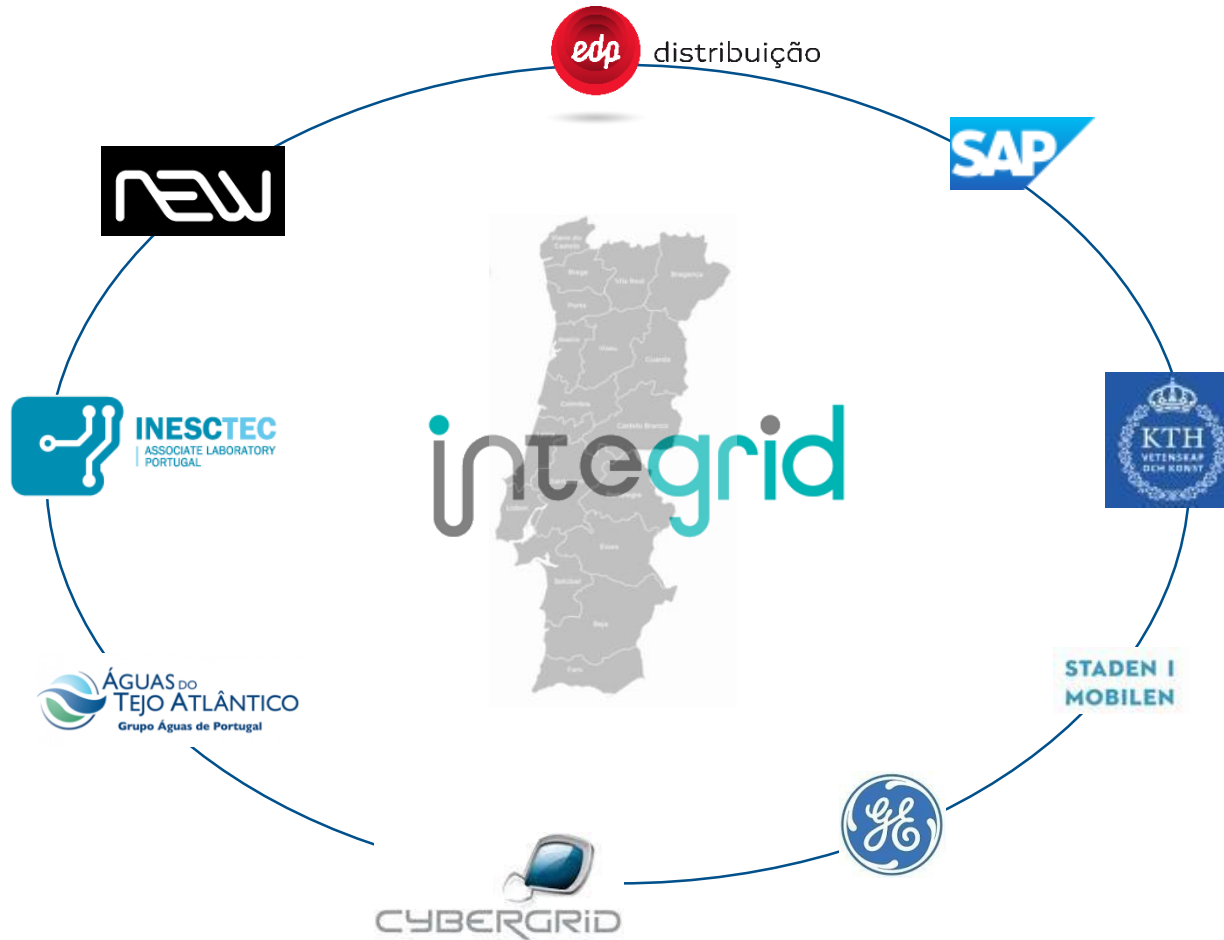
## SLOVENIA



## SWEDEN



# InteGrid Portuguese Demonstration



# InteGrid Portuguese Demonstration



## Alentejo

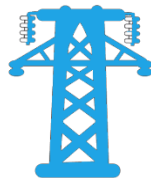
- Valverde (LV)

## Lisboa

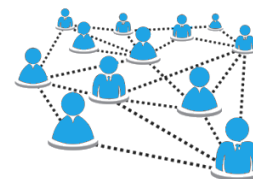
- Alcochete (LV)
- Caldas Rainha (LV)
- Mafra (MV)



Energy Services



Grid Operations



Grid Users



# 12 UC from 4 Business Domains will be tested...

## Grid Operations

HLUC01 - Operational planning of MV network to pre-book available flexibility

HLUC02 - Monitoring and control of LV network using available flexibilities

HLUC 03 - Perform asset health diagnostics for preventive maintenance

HLUC04 – Planning repair of unplanned outages based on sensors and remote diagnostics and historical data

## Grid & Market Hub

HLUC 05 - Manage the impact of flexibility activations connected to the distribution network

HLUC06 - Data management and exchange between DSO and stakeholders

HLUC07 - Manage flexibilities from DER to optimize operation and costs

## Grid Users

HLUC08 - Manage internal processes' flexibility to minimize energy costs and sell flexibility to system operators

HLUC09 - Home Energy Management

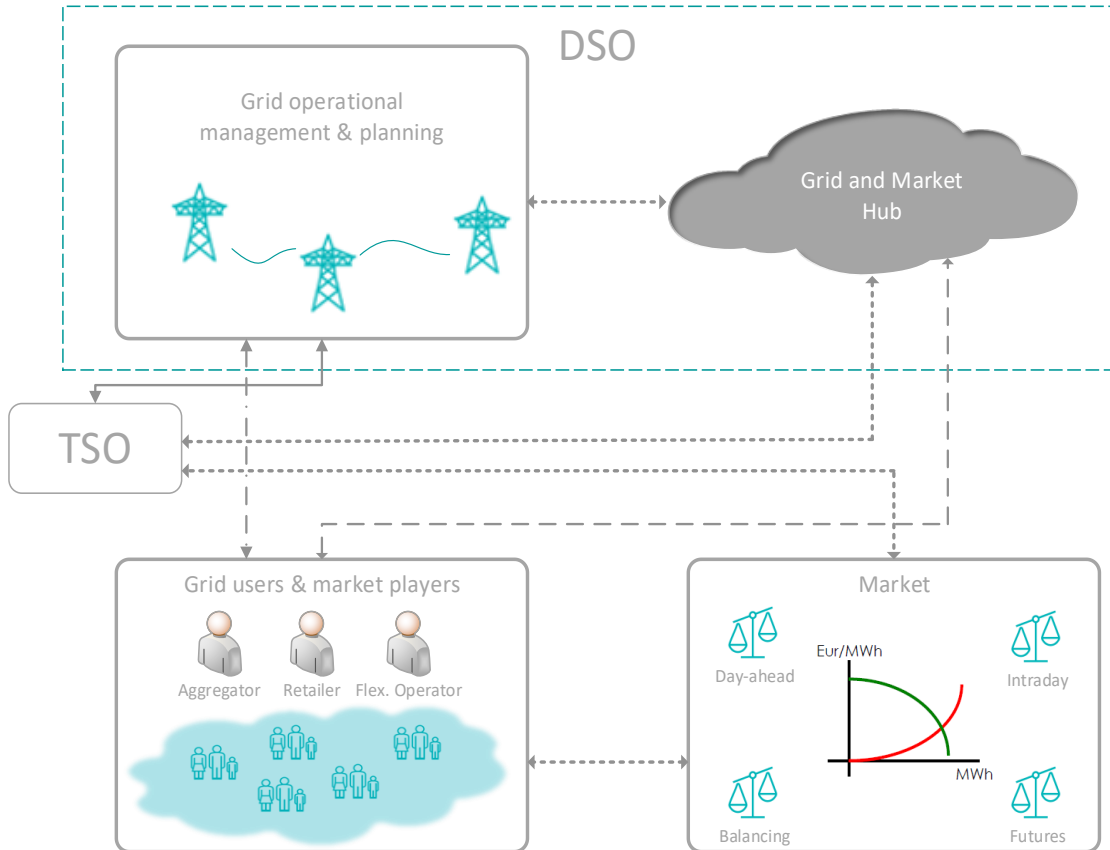
## Energy Services

HLUC10 - Aggregate and communicate multi-period behind-the-meter flexibility from LV and MV consumers

HLUC11 - Engage consumers in DSM programs considering contextualized feedback mechanisms

HLUC12 - Aggregate geographically distributed resources to offer ancillary services to TSO and DSO

# Innovation: Grid-Market Hub



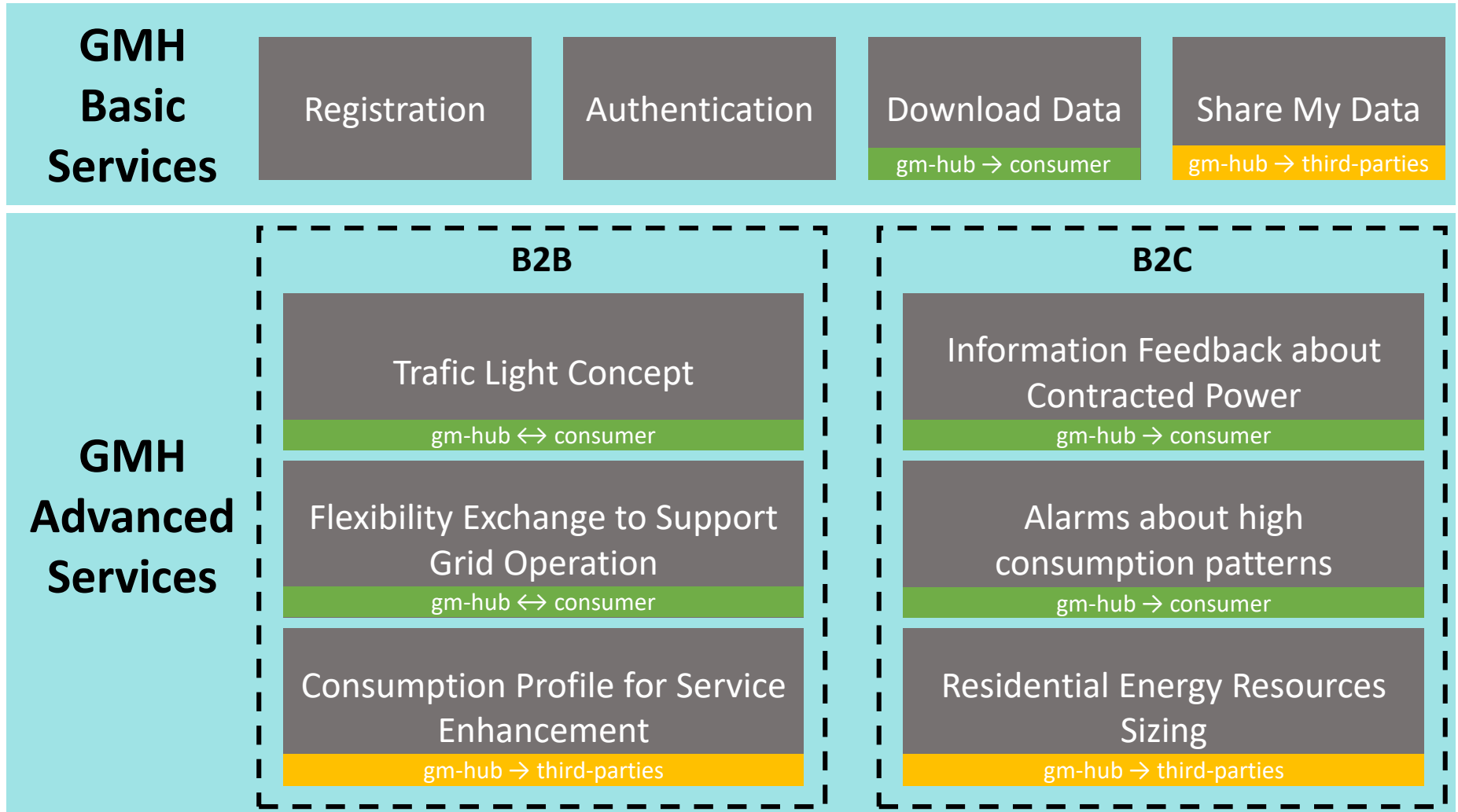
## Objectives

Enable advanced grid functions through cloud based solution

Establish link between stakeholders for implementing B2C and B2B services

Facilitate market evolution through access to new business models

# Innovation: Democratizing Access to Data

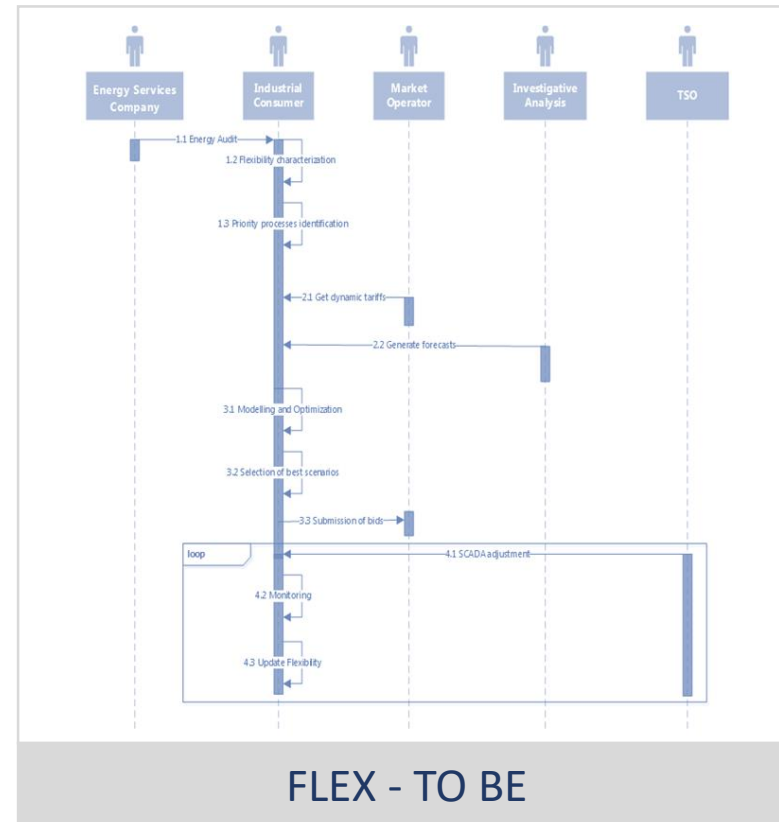




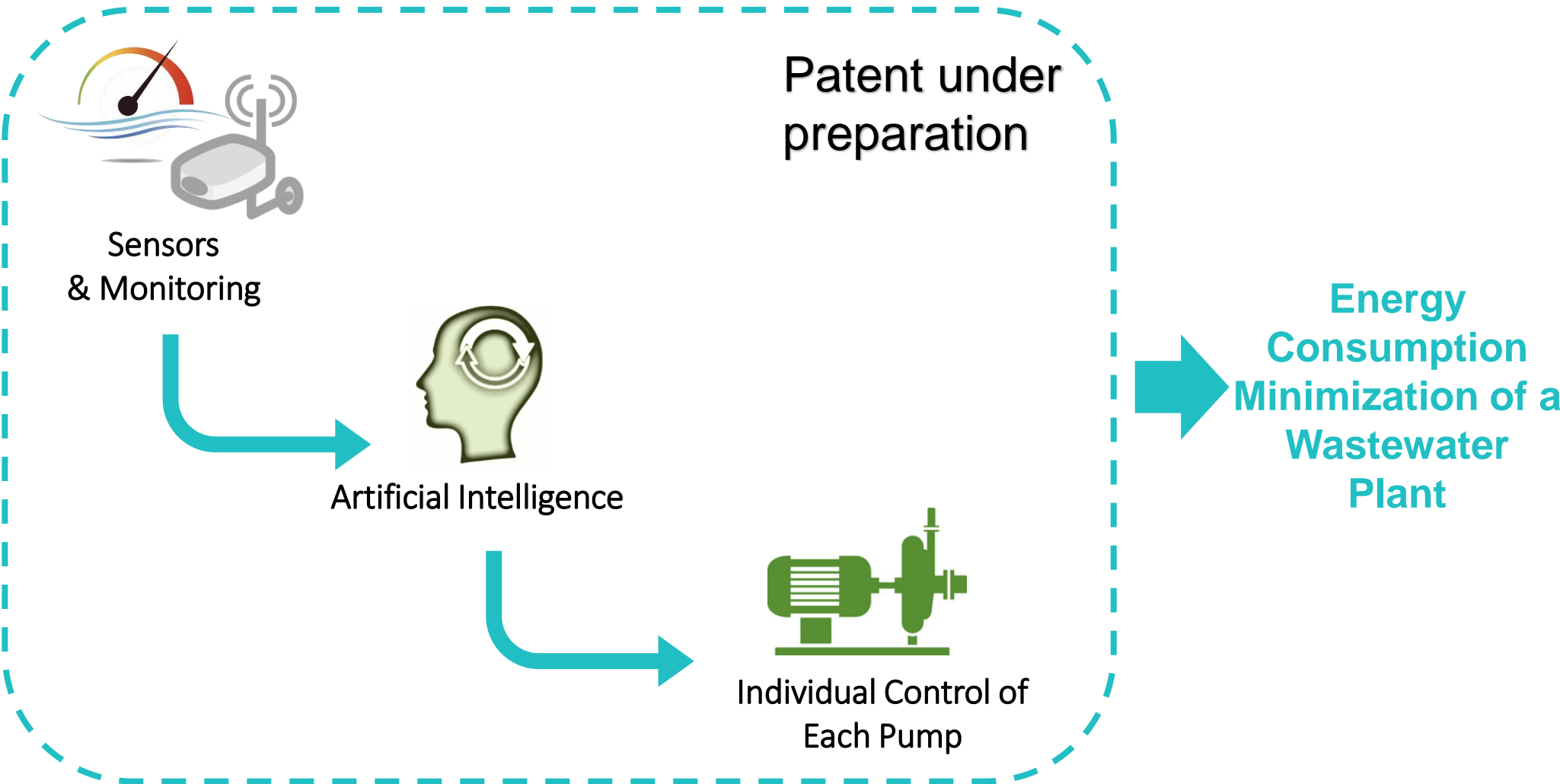
# Innovation: Industrial Consumers' Flexibility



From flexibility mechanisms to flexibility markets...



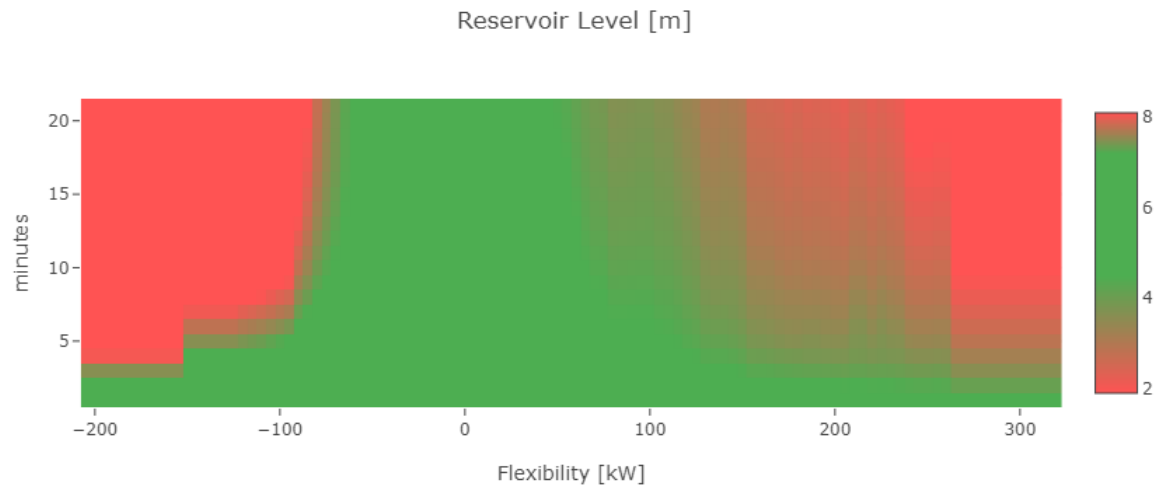
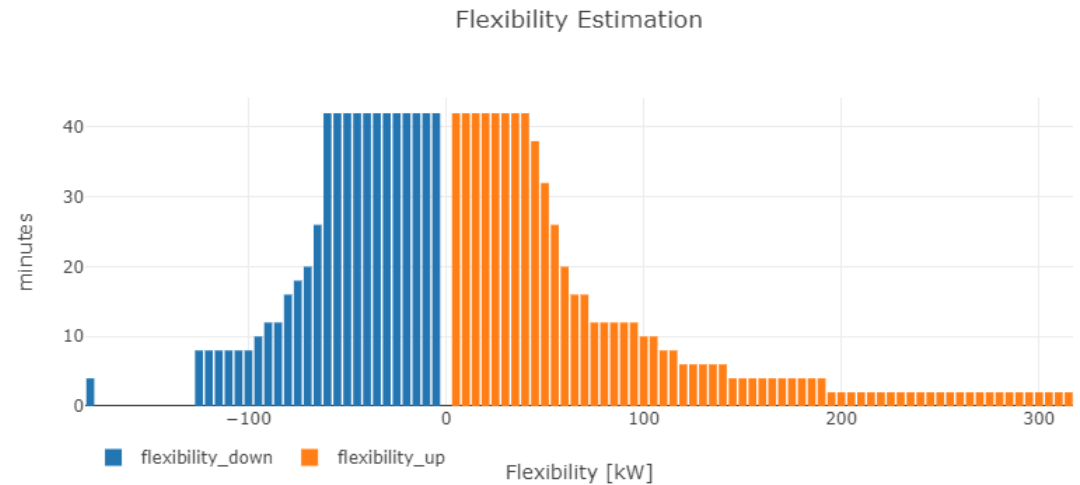
# Innovation: Wastewater to Energy



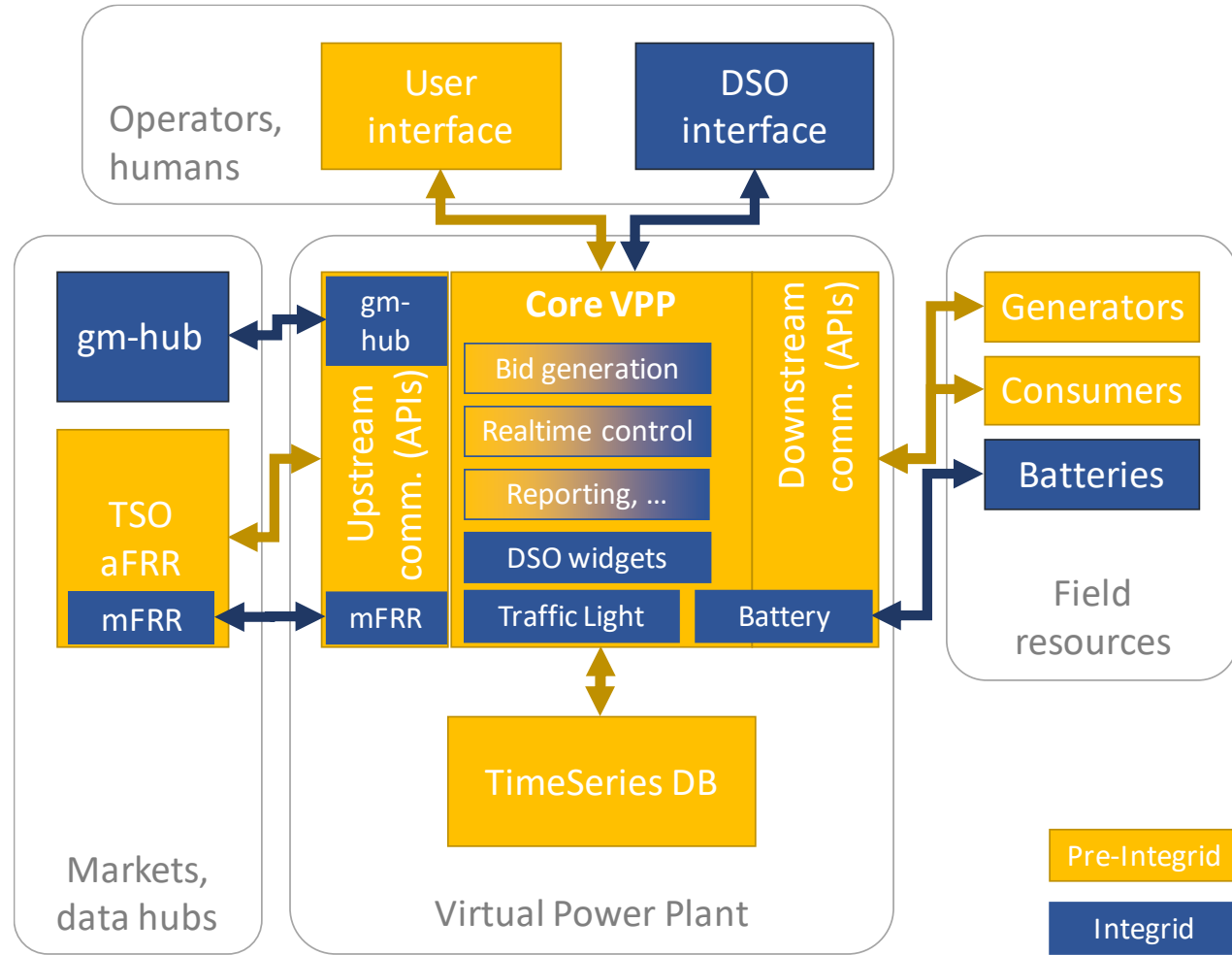
# Innovation: Wastewater to Energy



Real-time estimation of upward/downward flexibility for emergency conditions



# Innovation: Virtual Power Plant

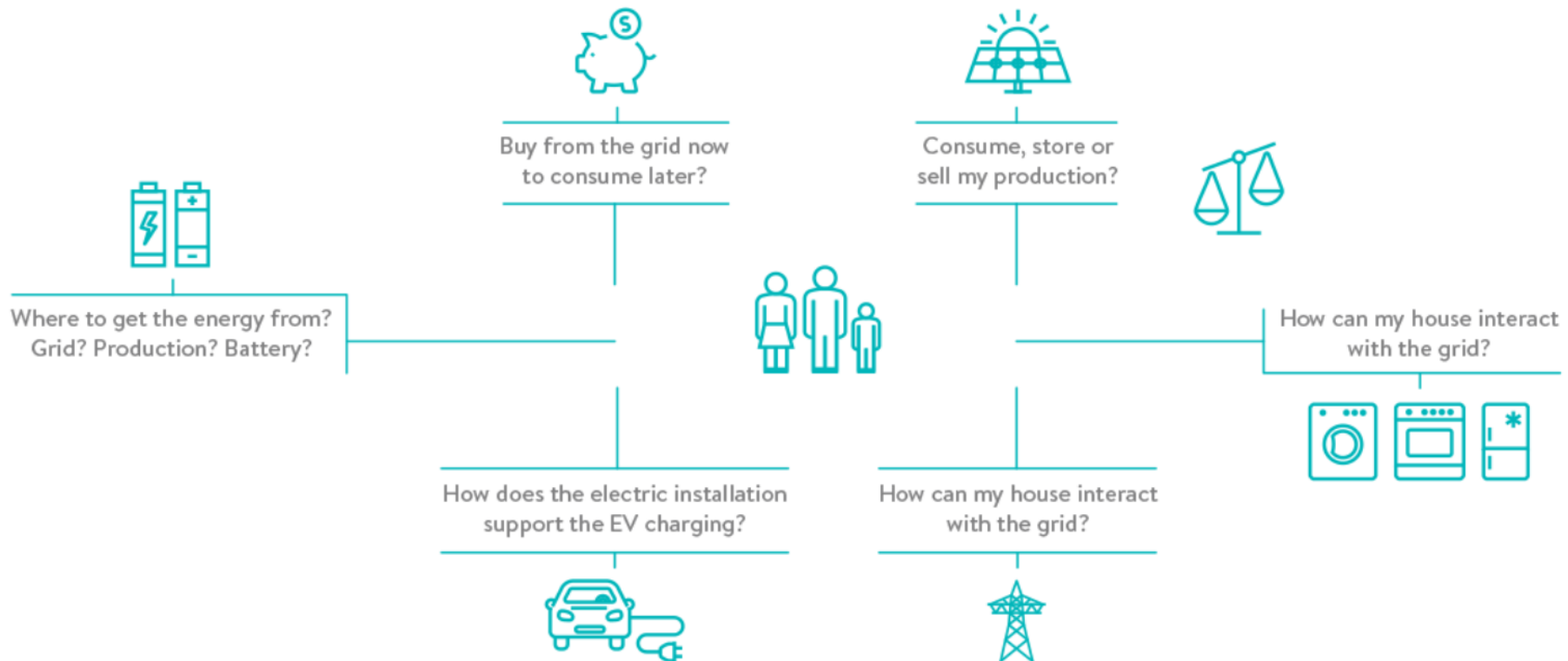


# Test VPP implementation with 6 real DER



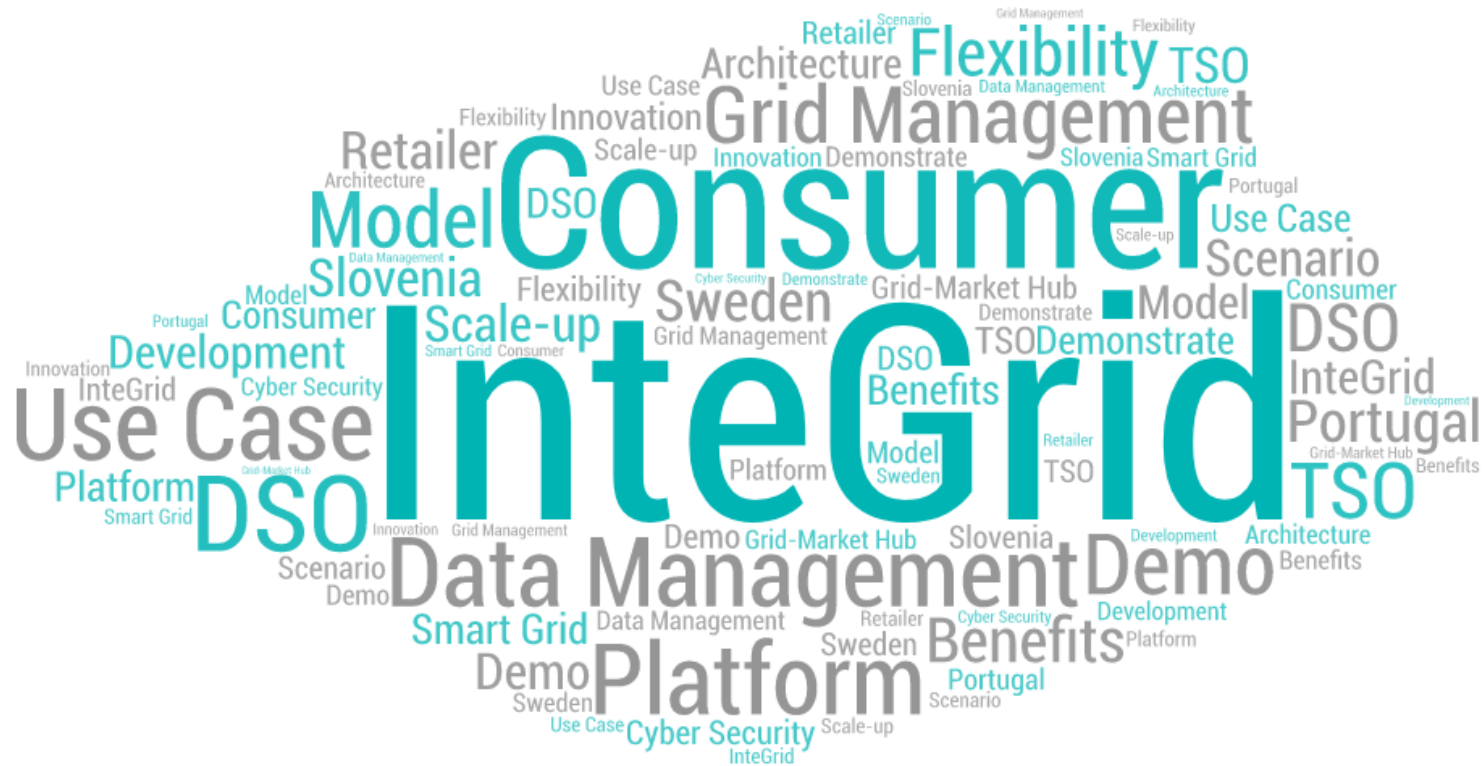
# InteGrid way forward...

InteGrid's vision is to **bridge the gap between citizens and technology/solution providers** such as utilities, aggregators, manufacturers and all other agents providing energy services, hence expanding from DSOs distribution and access services to active market facilitation and system optimisation services while ensuring sustainability, security and quality of supply.



***“Coming together is a beginning, keeping together is progress, working together is success.”***

**Henry Ford**



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Thank you!

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