



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

# WELCOME & INTRODUCTION



**Hans Kreisel**  
**CEO, Nordion Energi (SE)**  
**Chairman, GEODE**



**Albert Estapé**  
**Director, Anell**



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

# KEYNOTE SPEECH



**David Villar**  
**Head of the Energy Foresight**  
**and Sustainability Unit, ICAEN**  
**(Catalan Institute for Energy)**



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

# SPAIN'S ROLE IN THE EUROPEAN ENERGY TRANSITION



## INTRODUCTION BY SPANISH NATIONAL REGULATORY AUTHORITY



**Josep M Salas,  
Member of the Board of CNMC and  
BoR of ACER**

## RENEWABLE ENERGY AMBITIONS



**Javier Lázar  
Technical and Regulation Director,  
APPA**



**Franc Comino  
General Director,  
Sonnen Ibérica**



**Luis Ignacio Parada  
Director EU Energy Policy & Regulation,  
Enagas**



# Building tomorrow's grids today

GRANOLLERS  
18-19 October 2023

**Josep M<sup>a</sup> Salas**  
**Member of the Board of CNMC and ACER BoR**



# Building tomorrow's grids today

GRANOLLERS  
18-19 October 2023

**Javier Lázaro**  
**Technical and Regulation Director, APPA**



# Renewable Energies Development in Spain

**Javier Lázaro**  
**October 19th, 2023**



# What is APPA Renewables?

**Business  
Association**

**Born in  
1987**

**Active presence in  
Spain and Europe**

**All renewable  
tecnologies**

**Integrative vision of national renewable development**



**Self-consumption**



**Biofuels**



**Biomass**



**Marine**



**Wind**



**Solar Photovoltaic**



Permanent member of  
the Advisory Council  
of electricity



The only business  
association in its  
Governing Council



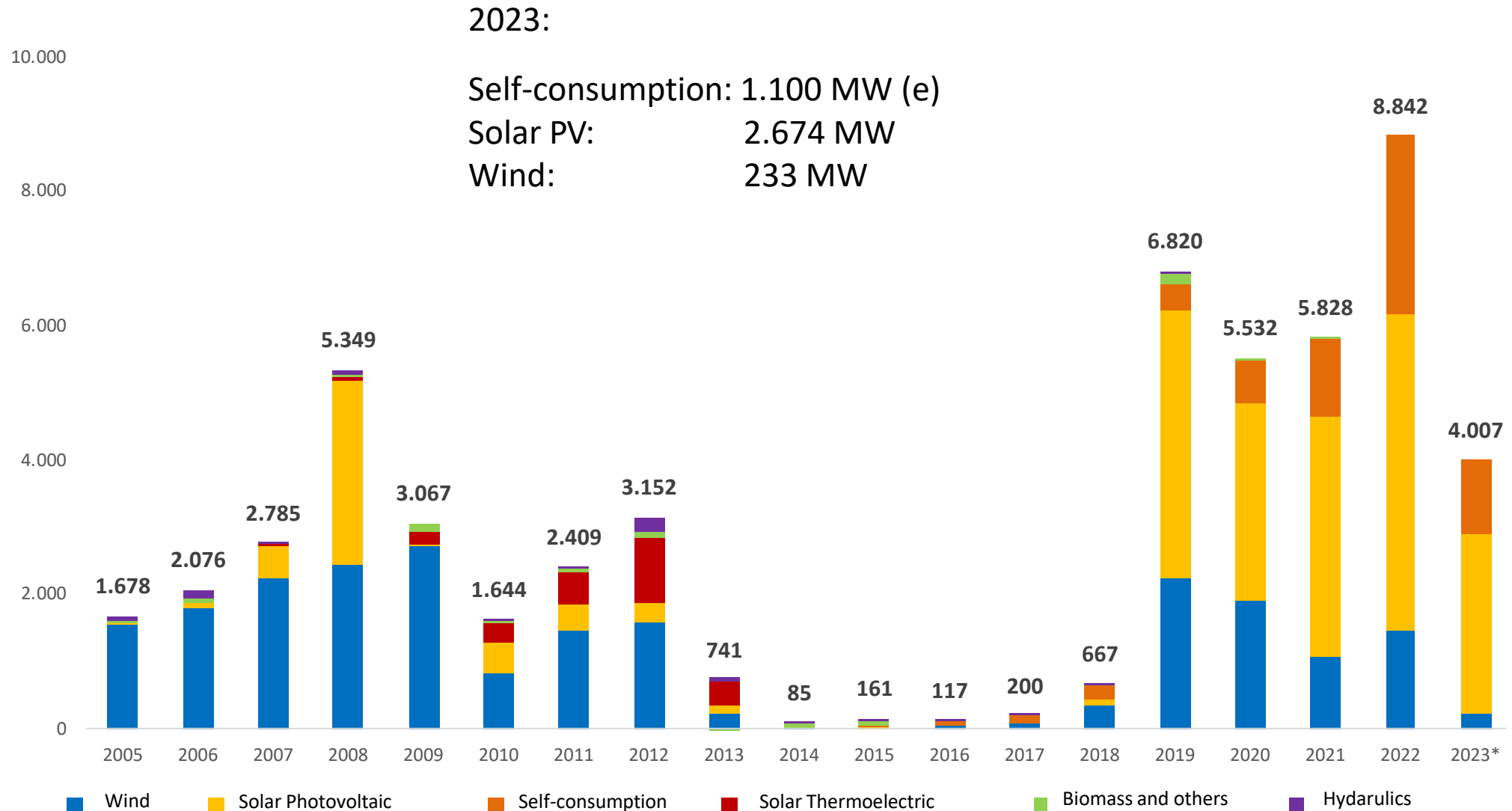
Founding member of the  
Electricity Market Agents  
Committee (CAM)



Head of several  
Certification  
Committees

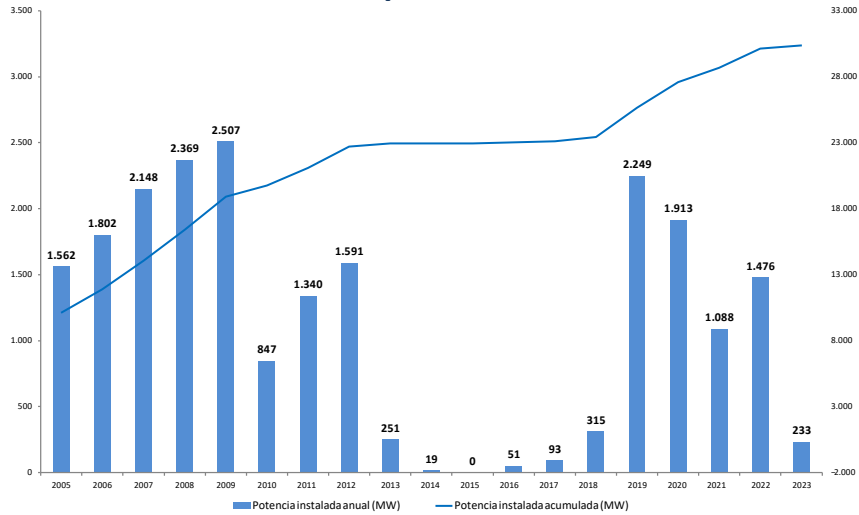
Present in many other public entities: regional energy agencies, technology centers ...

# Installed power

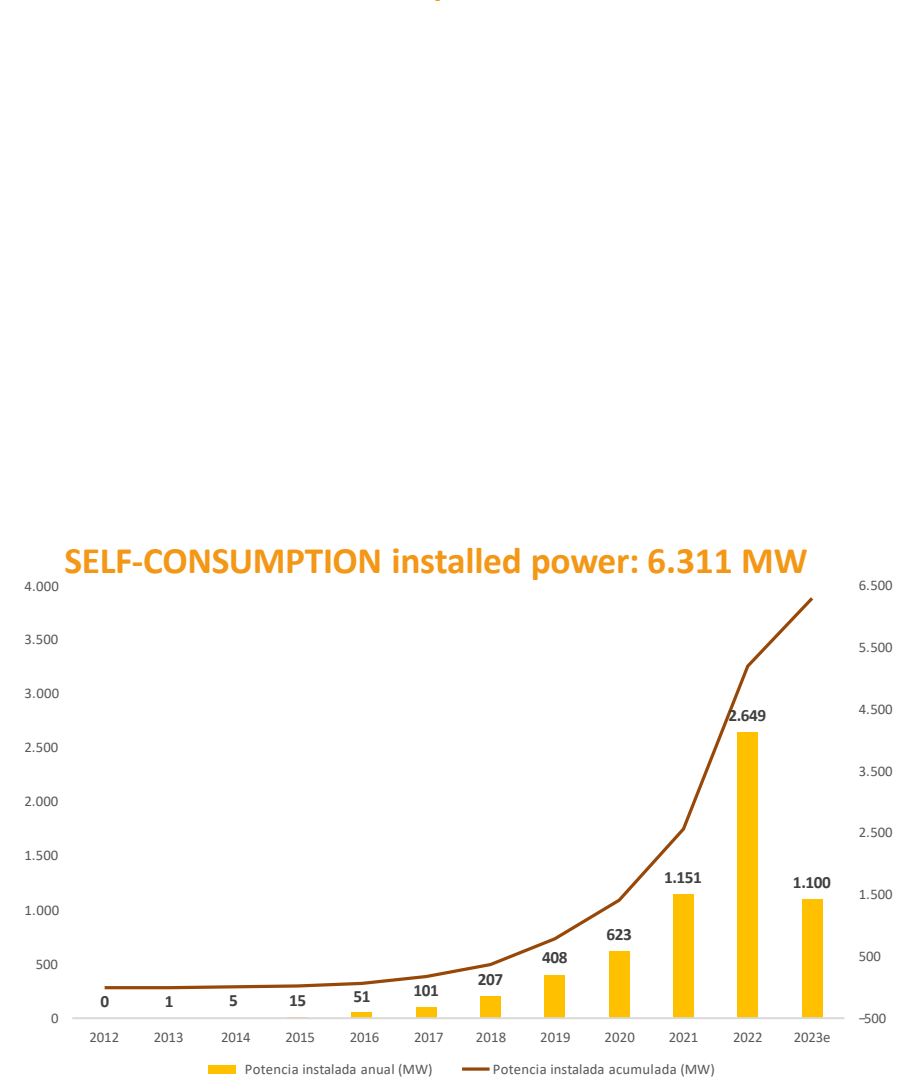


# Installed power by technology

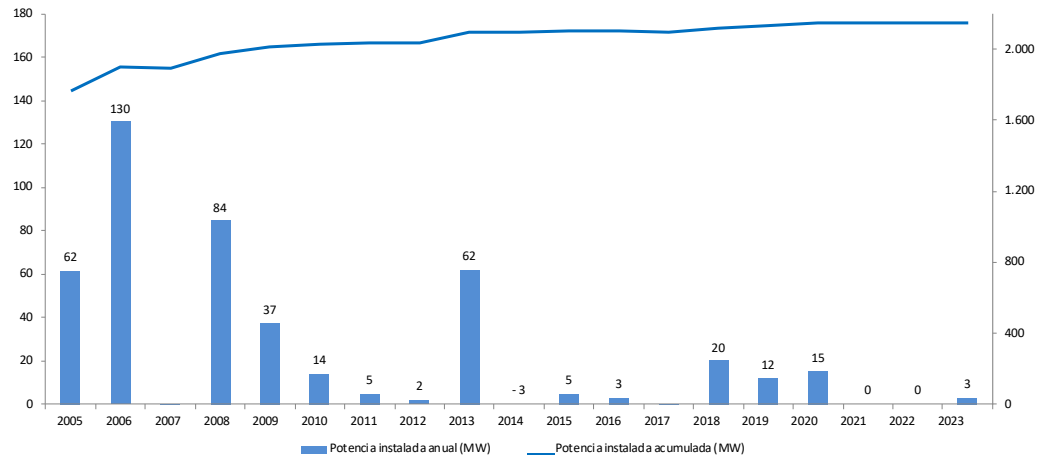
**WIND installed power: 30.387 MW**



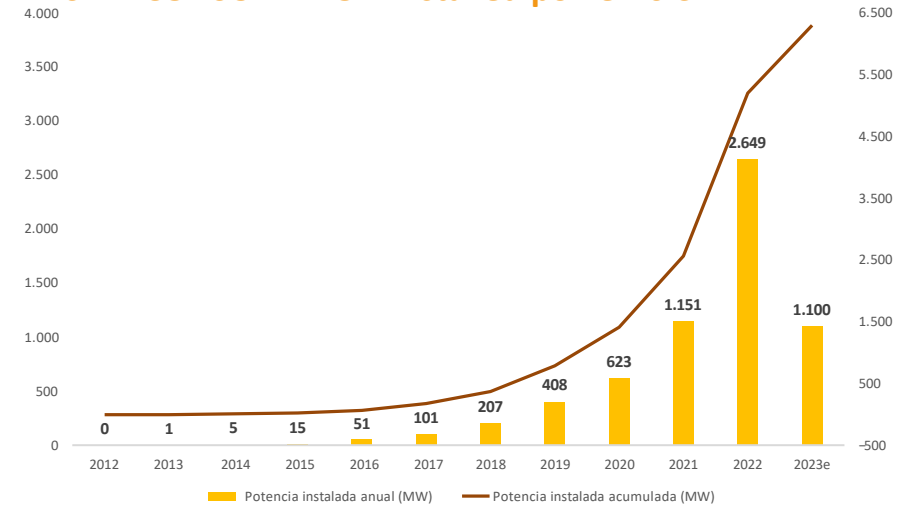
**PHOTOVOLTAIC installed power: 22.923 MW**



**MINIHIDRAULIC installed power: 2.148 MW**



**SELF-CONSUMPTION installed power: 6.311 MW**



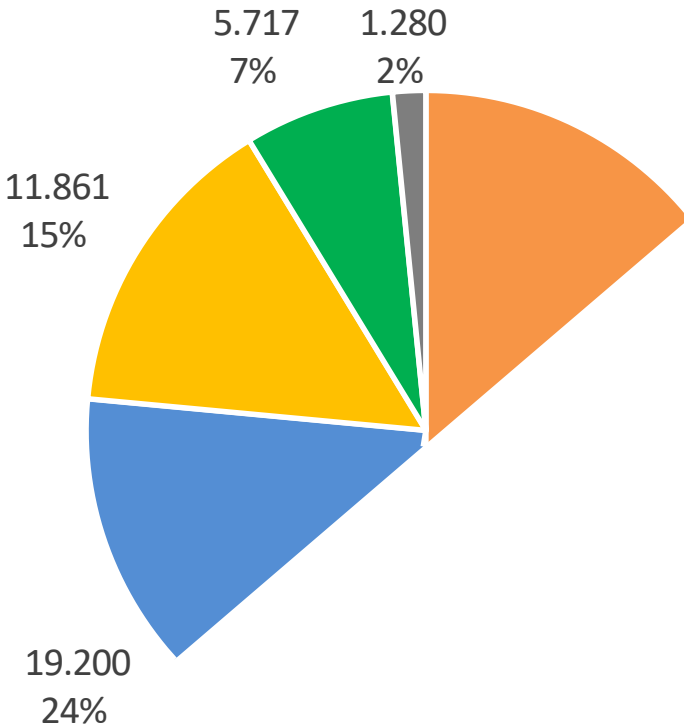
## DRAFT NATIONAL ENERGY AND CLIMATE PLAN (2023-2030)

Junio 2023

		Objetives to 2030	
		PNIEC 2020	PNIEC 2023
General	GHG emission reductions compared to 1990	23%	32%
	GHG emission reductions compared to 2005 - ETS Sectors	-61%	-70%
	GHG emission reductions compared to 2005 - Diffuse Sectors	-39,10%	-43%
	Share of renewables in energy production	74%	81%
	Number of electric vehicles	5 Millions	5,5 Millions
	Number of rehabilitated houses	1.200.000	1.377.000
	Total and renewable power in the energy mix	Total: 160 GW Ren.: 113 GW	Total: 214 GW Ren.: 160 GW
	Share of renewable energies in final energy	42%	48%
	Energy Efficiency. Reduction of primary energy consumption	-39,50%	-42%
	Energy Efficiency. Reduction of final energy consumption	-41,70%	-44%
	Energy dependence	61%	51%
Transport	GHG emissions intensity reduction transport	-	-16,60%
	Share of renewables in the transport sector	15%*	25%
Industry	Annual increase of renewable energy in industry	1,10%	5,10%
	Percentage of RFNBO over hydrogen in industry	25%**	74%
Building, heating and cooling	Final energy from renewables in buildings	-	73%
	Annual renewable percentage increase heating and cooling	0,83%(2021-2025) 1,19%(2026-2030)	1,27%(2021-2025) 2,07%(2026-2030)

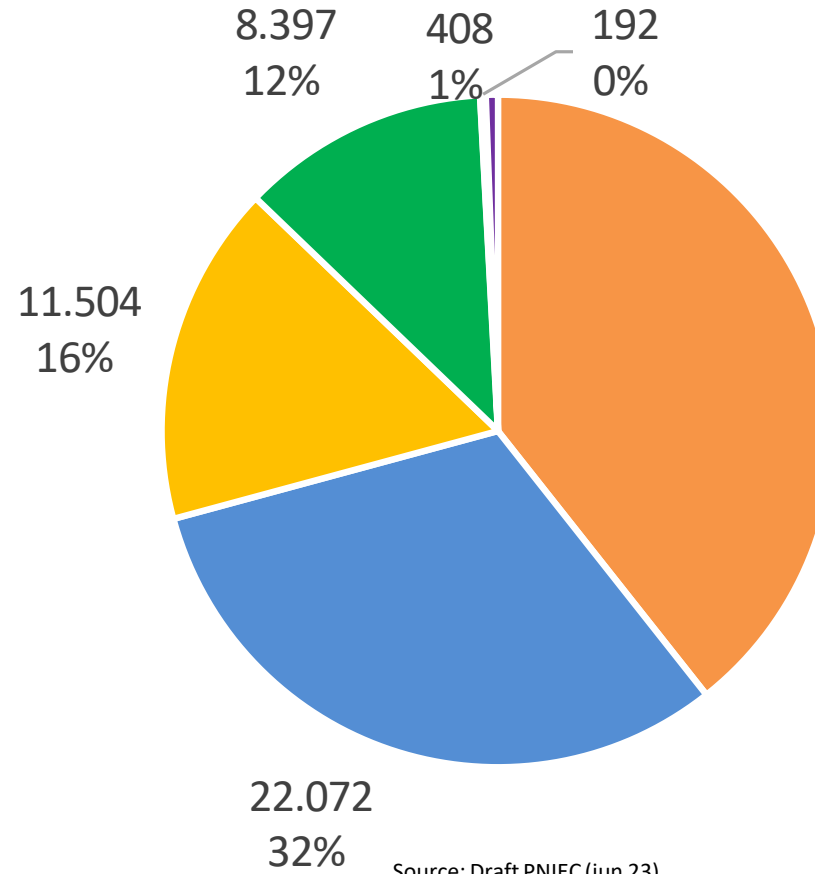
# Draft National Energy and Climate Plan 2023-2030

## Final Energy Consumption 2022

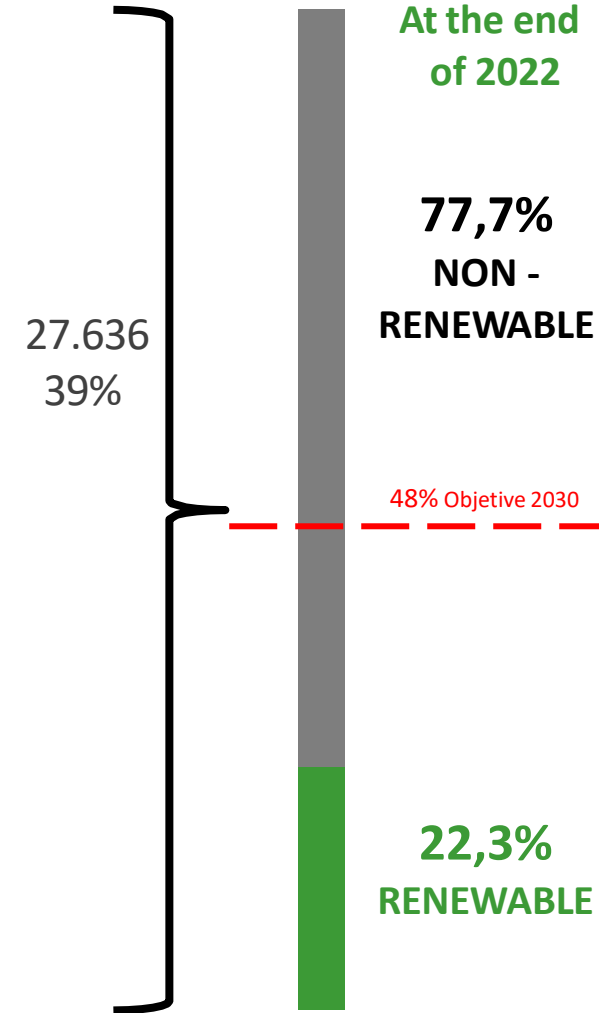


Source: Ministry of Spain energy balance 2022, APPA elaboration

## Final Energy Consumption 2030



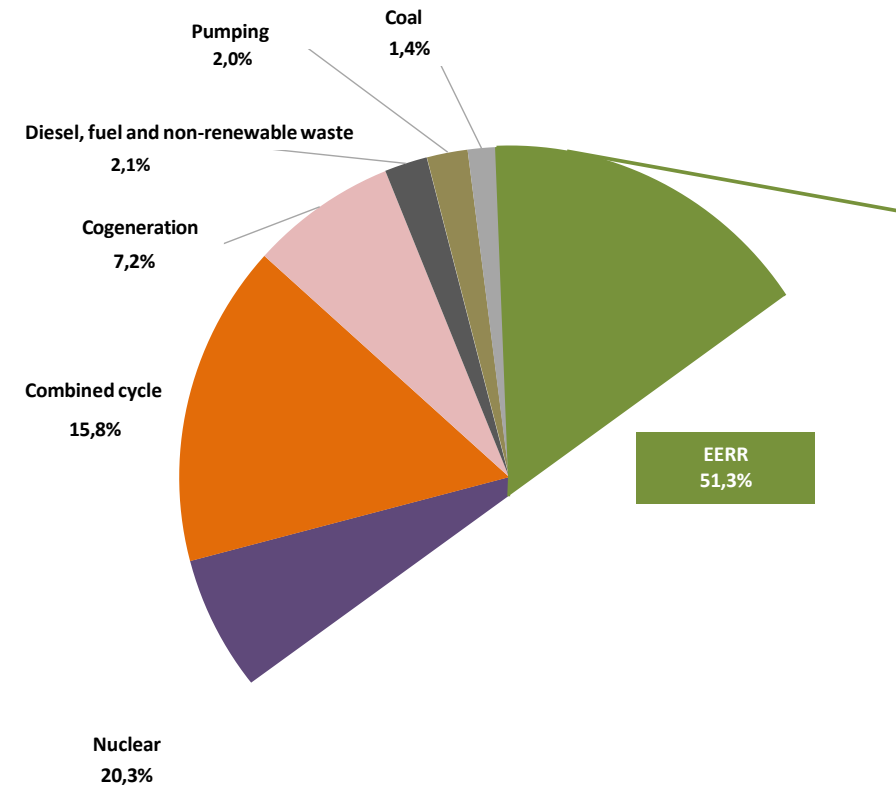
Source: Draft PNIEC (jun 23)



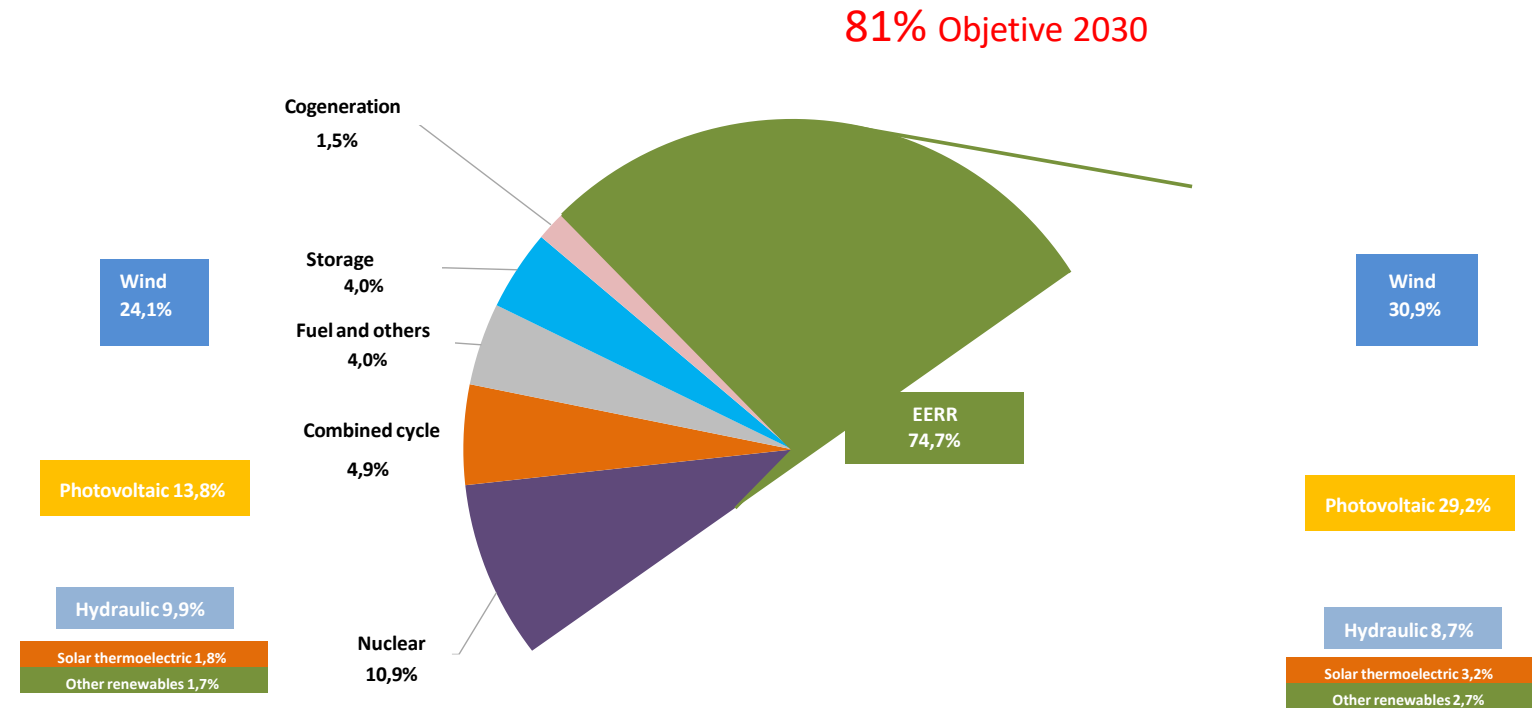
■ Petroleum products 
 ■ Electricity including renewables 
 ■ Gas 
 ■ Renewables Energies 
 ■ Coal 
 ■ Other Non-Renewables

# Energy Production in 2023 and 2030

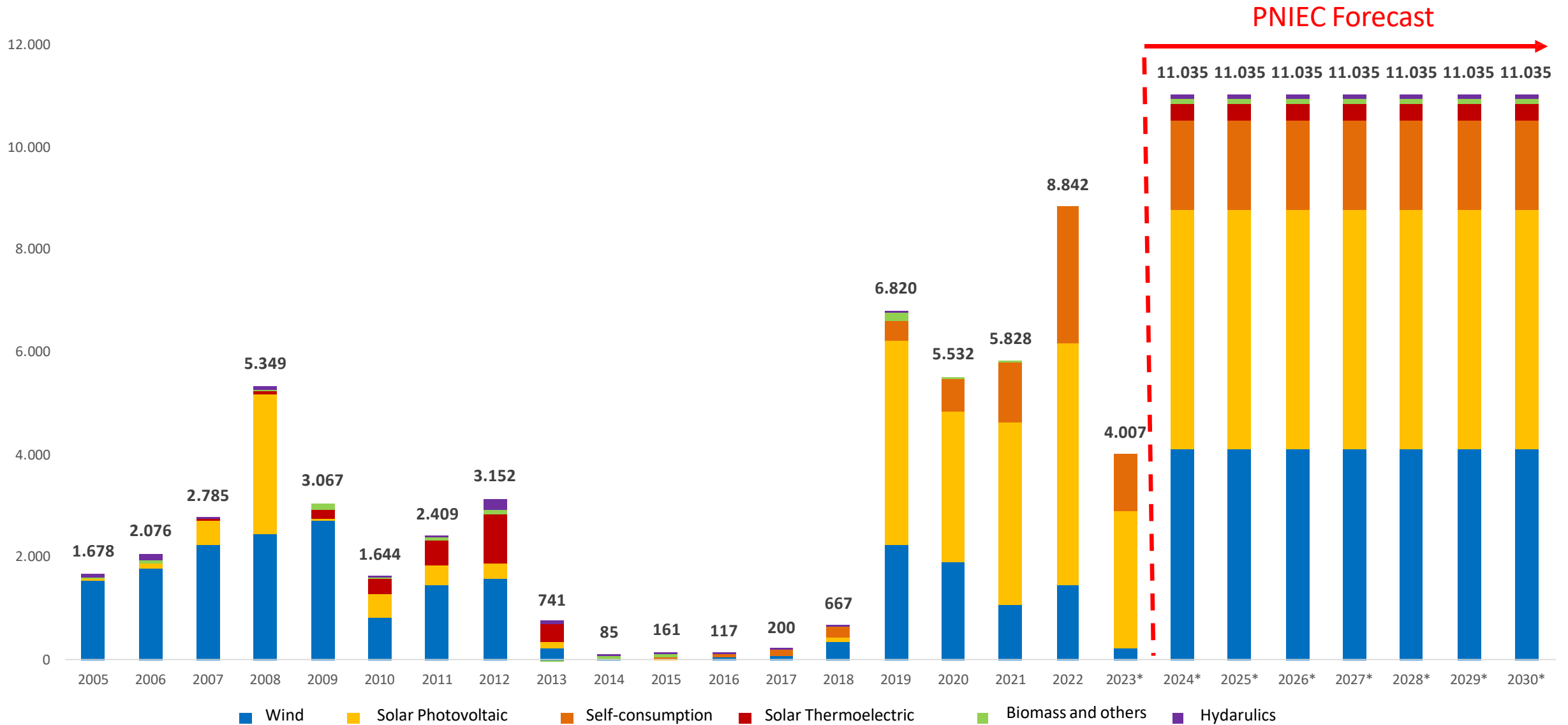
## Energy Production 2023



## Energy Production 2030

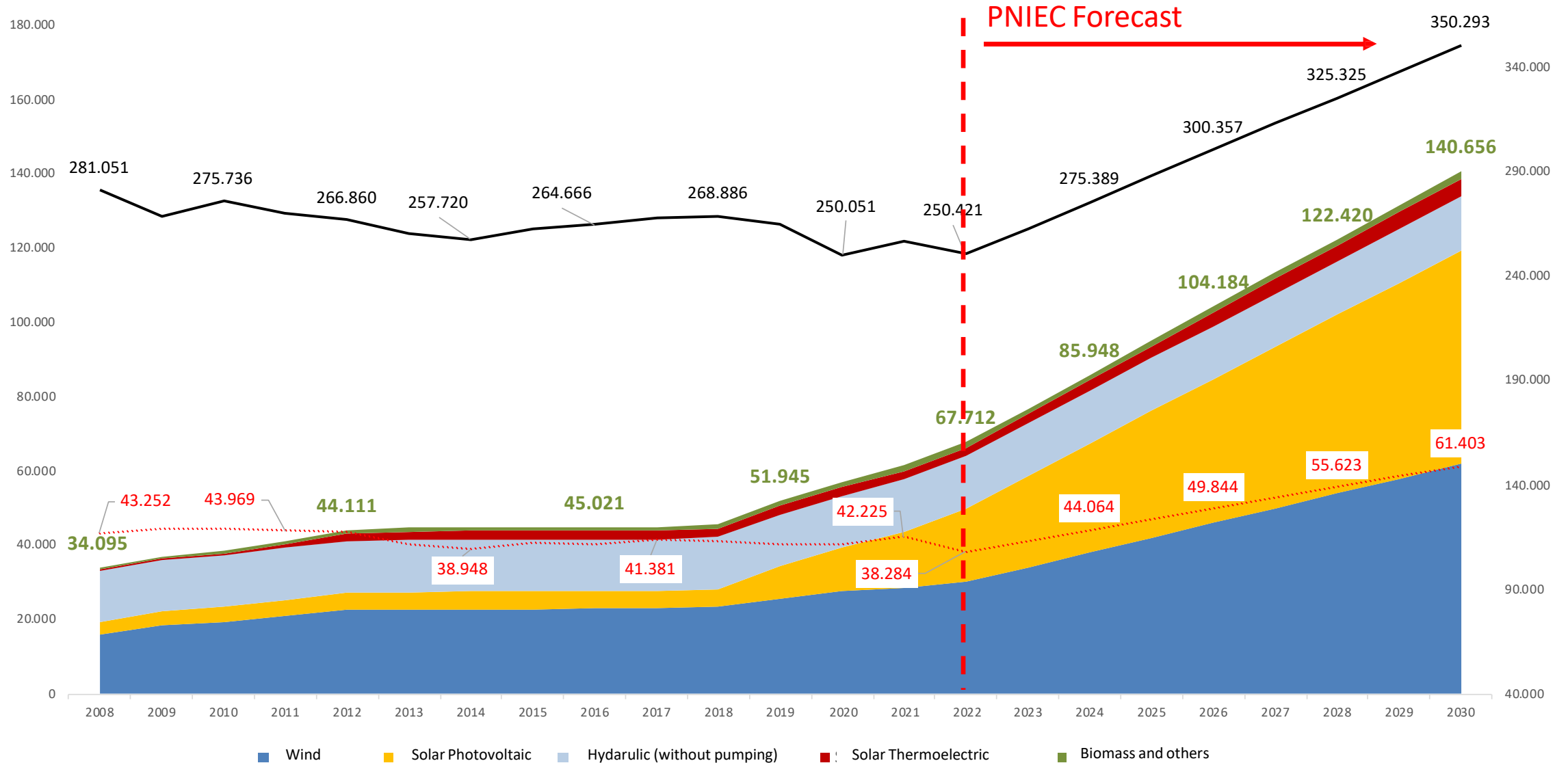


# Installed power and PNIEC forecast



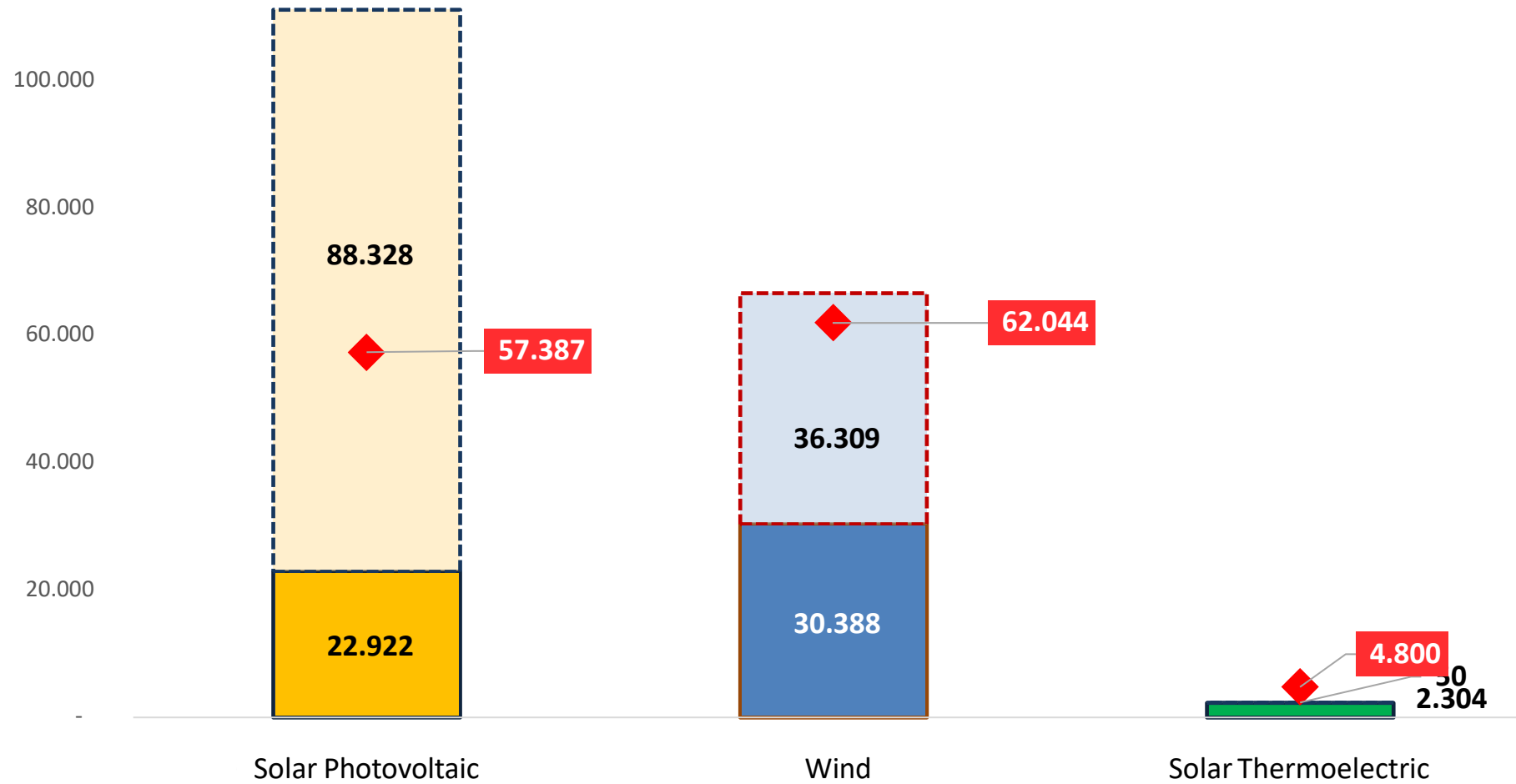


# Renewable installed power, demand, maximum power to 2022 and PNIEC forecast (MW)

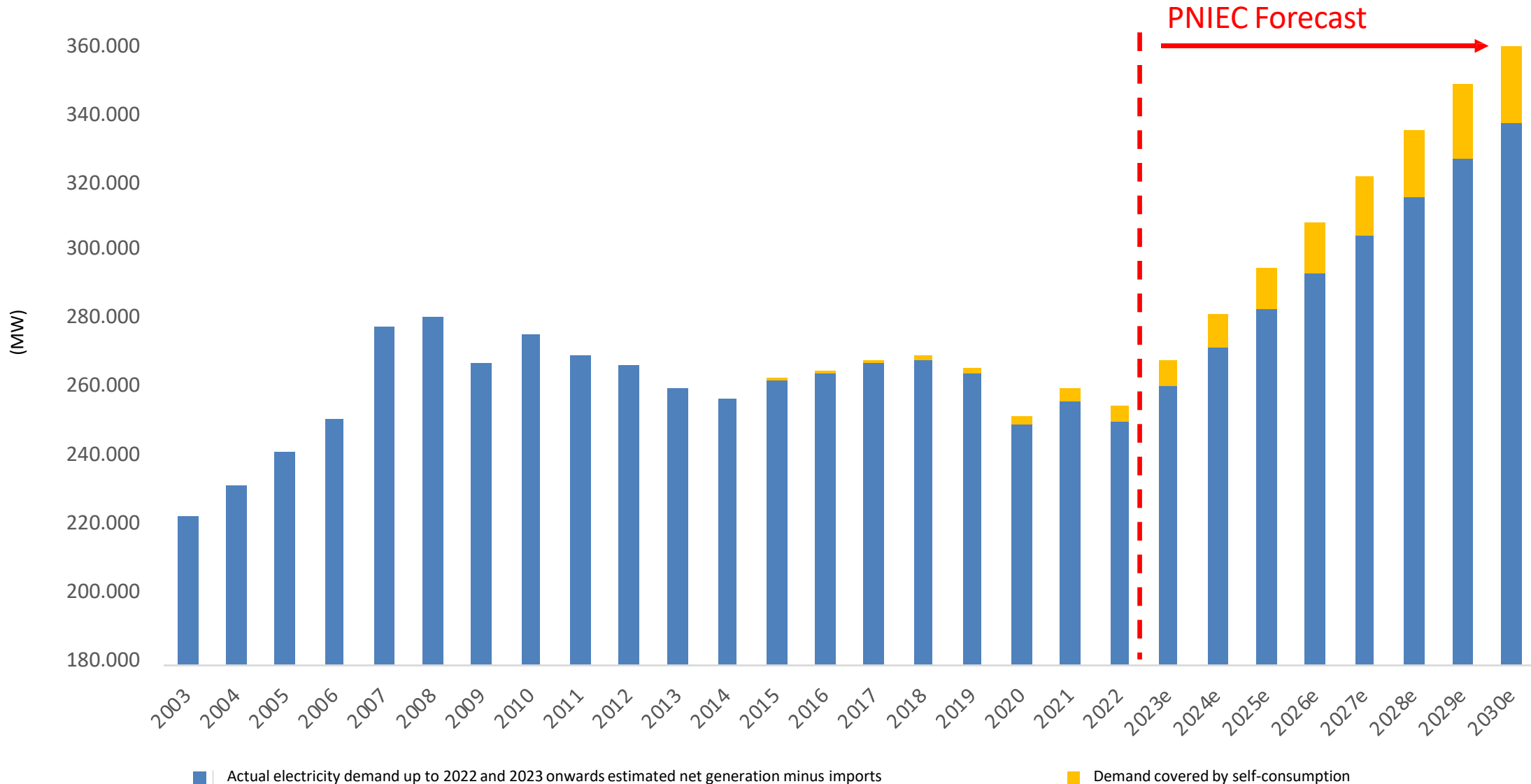


Source: REE and PNIEC (the maximum instantaneous power has been assumed to increase by 38%, similar to the increase in net generation considered in the PNIEC (including 63 GWh of exports and 17 GWh of storage)).

# Installed power and status access and connection



# Electricity demand 2003 - 2022 and forecast PNIEC (GWh)



# New opportunities in Renewable Energies

---

- Massive development of Self-consumption: competitiveness, promotion of the new tariff design.
- Deployment of the electric vehicle associated with Self-consumption and / or contracting of renewable energy.
- Significant development in Large-Scale Storage and hybridization projects (not only with storage).
- Aid program for thermal renewables or for use in air conditioning, challenges in terms of dissemination and pedagogy.
- Opportunity in the development of energy from the sea and offshore wind, but with excessive limitation of the Maritime Spatial Planning Plans.
- Apart from electrification, it will be necessary to deploy renewable gases (biogas, biomethane, green hydrogen) and urgently develop the circular economy.



***Thank you very much for your  
attention***

**[www.appa.es](http://www.appa.es)**

**[appa@appa.es](mailto:appa@appa.es)**

Follow us  

**Sede Madrid  
Dr. Castelo 10, 3ºC-D  
28009 Madrid  
Tel. 91 400 96 91  
Fax. 91 409 75 05**



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Franc Comino**  
**General Director, Sonnen Ibérica**



Franc Comino  
CEO sonnen Ibèrica

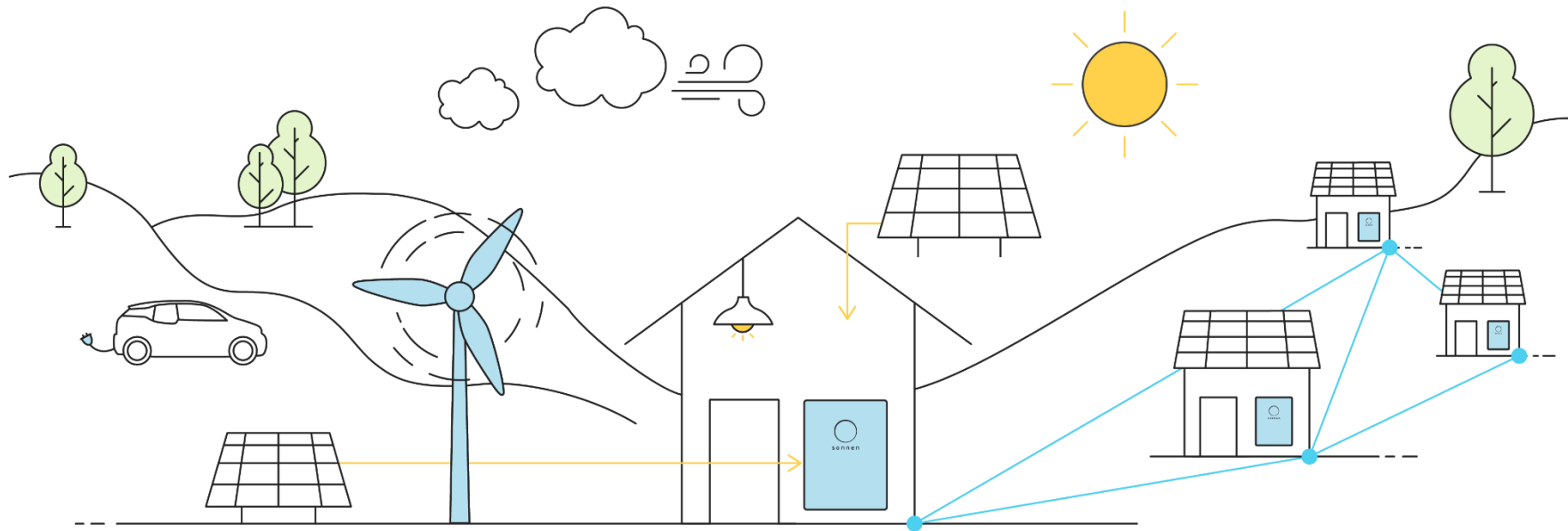


@franc\_comino



Franc Comino

# Empowering end user with storage flexibility







# sonnen Global



**1,500** employees worldwide




&



Thanks to the sonnenCommunity, we already **saved 183,000t** of CO<sub>2</sub> globally.

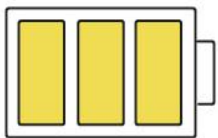
founded in **2010**

**> 1,000** Partners




World's unique VPP technology for home storage

We are operating our own battery labs



One of the world's leading manufacturers of smart energy storage systems



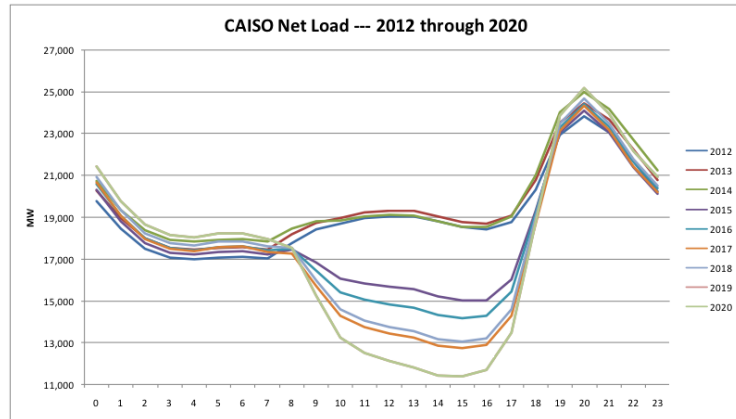
**100 ,000** sonnenBatteries installed

Current time

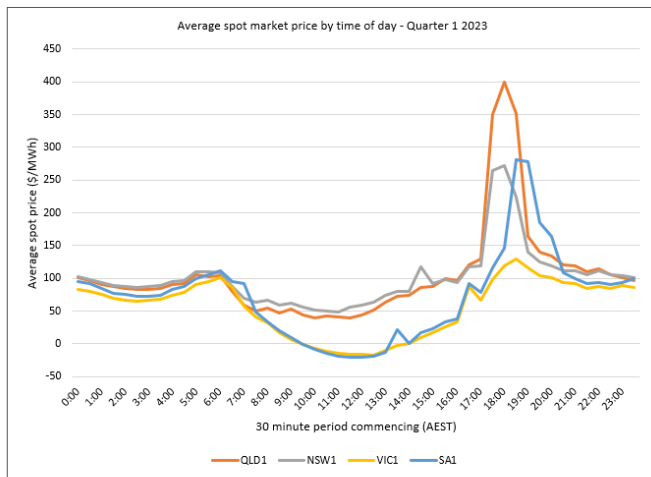
# Duck curve is here!



California Demand

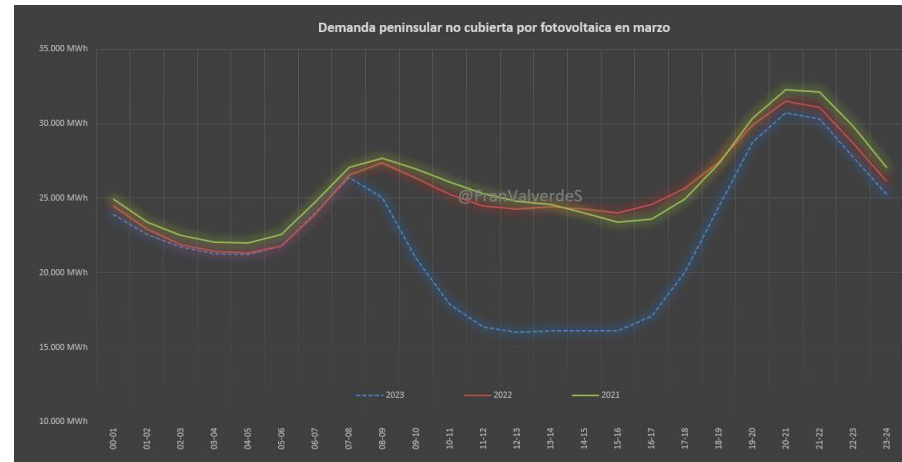


Average spot Market Price by time of day – Quarter 1 2023 AUS



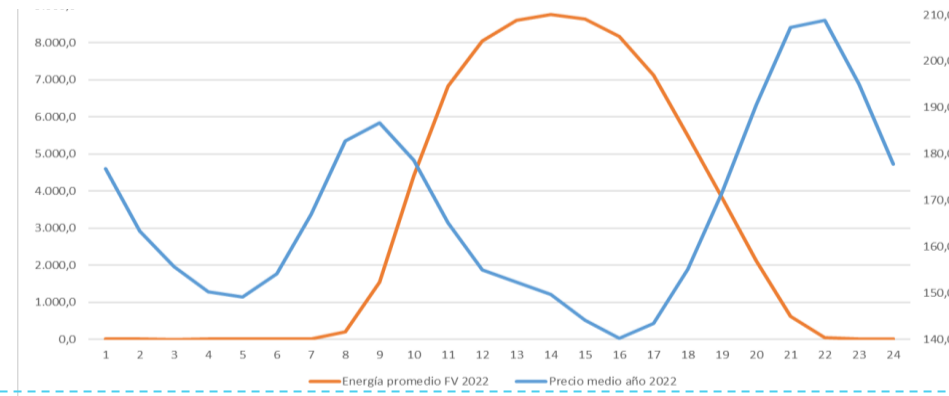
Fuente: elaboración propia con datos AEMO

Peninsular demand not covered by PV in March



Source: Self-prepared by Francisco Valverde, electricity market analysis

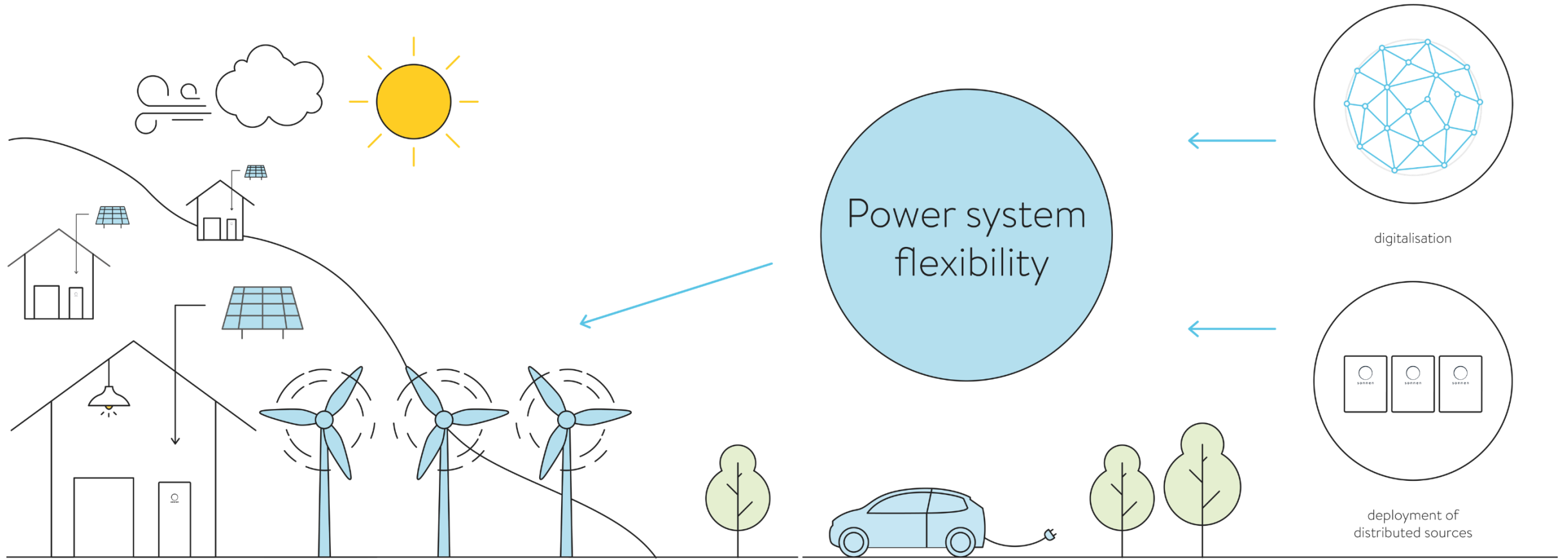
Comparison of average market price and solar generation for the year 2022



Source: Self-prepared with data from REE and OMIE

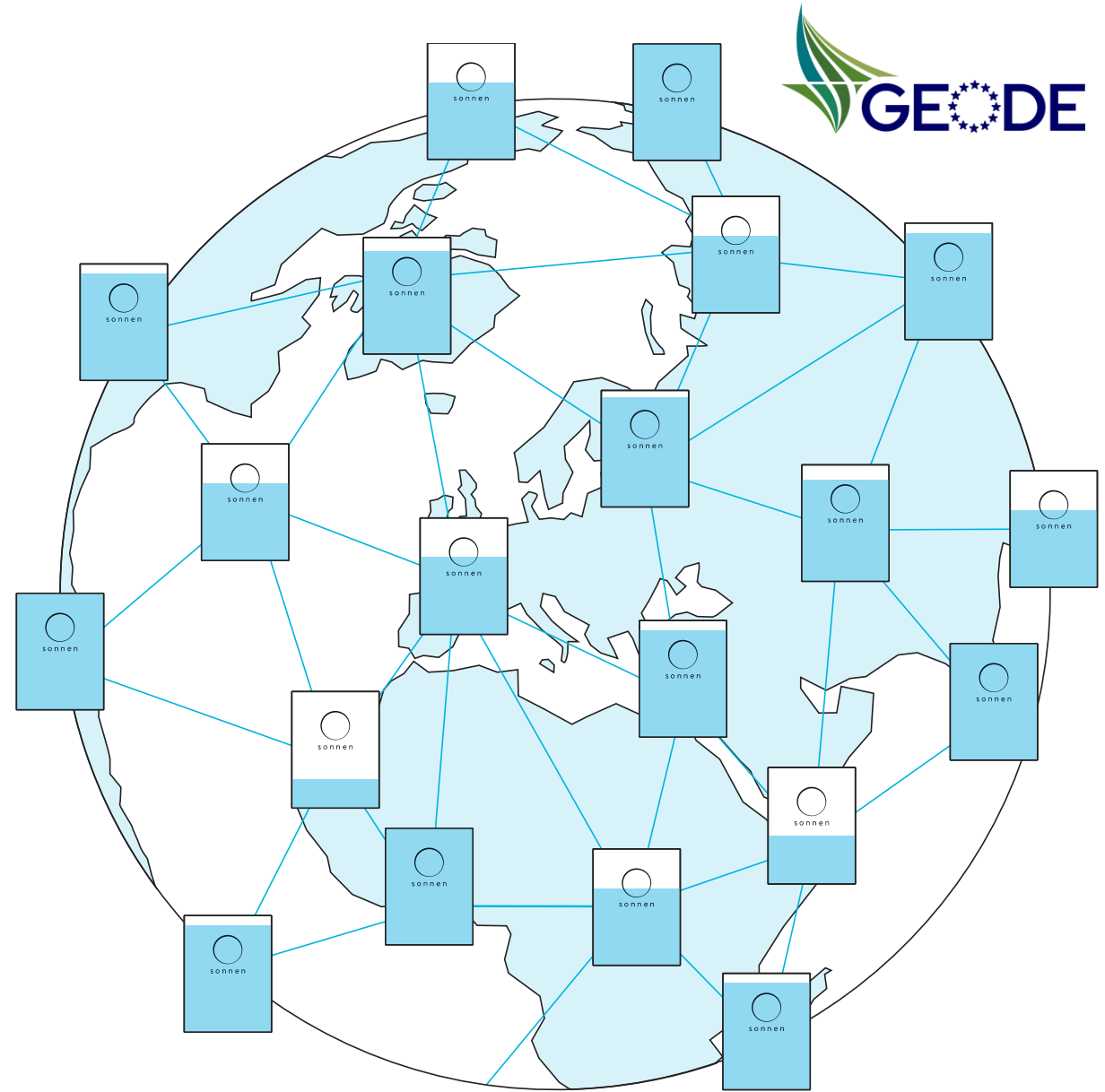
How to solve the energy crisis

# A new energy era of power system flexibility. NOW. DE



# Virtual Power Plants

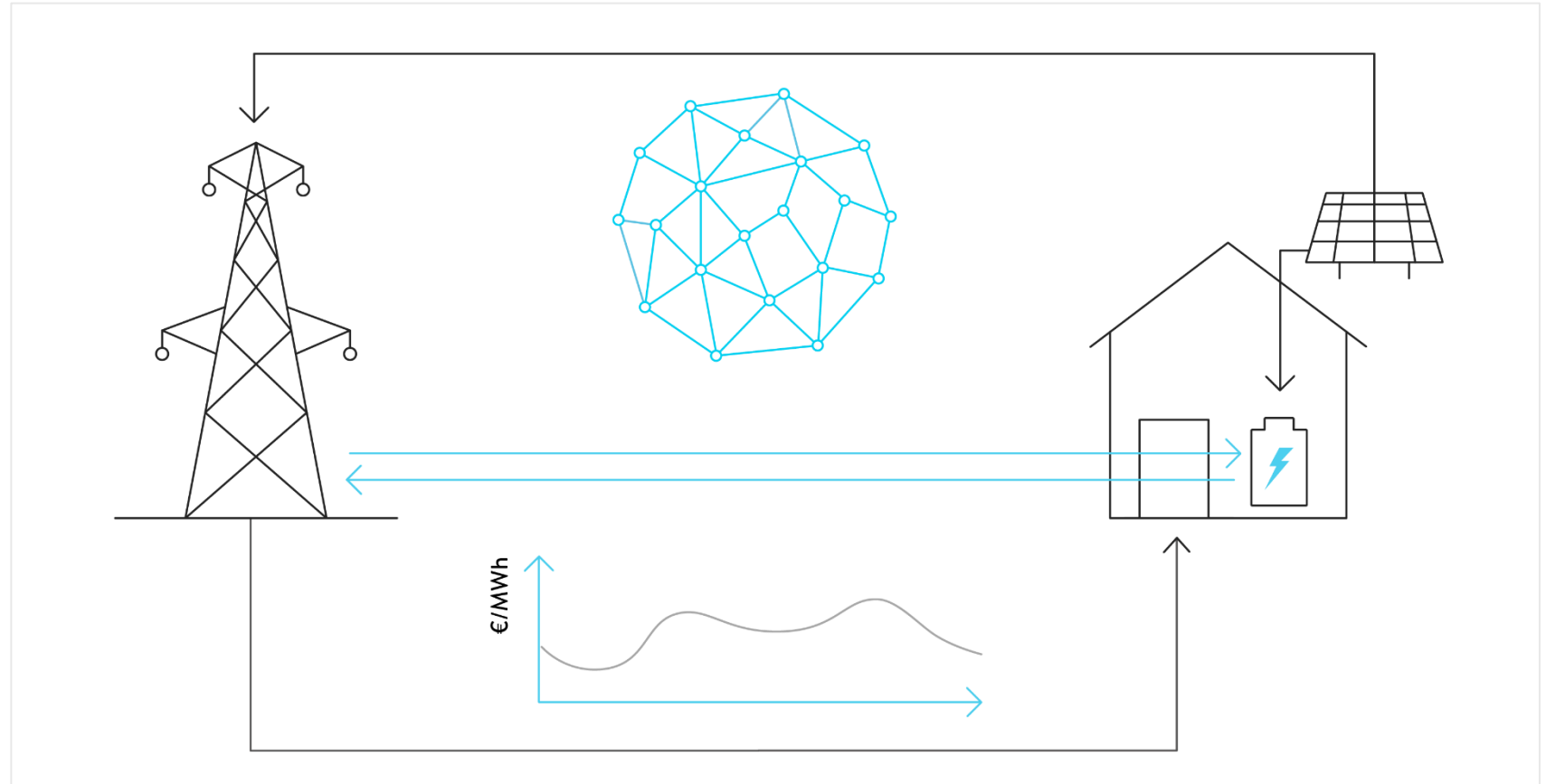
The sonnenVPP enables individuals to take on roles that, in the past, were reserved for conventional power plants



# sonnenVPP for Day-ahead, Intraday and Time of use.

The sonnenVPP intelligently reacts to electricity price changes by optimizing the sonnenBatterie's charge and discharge schedule.

When the energy price is low, the sonnenVPP charges. When the energy price is high, the sonnenVPP discharges.



# The sonnenVPP for Peak shaving.

The sonnenVPP keeps connection charges to a minimum by decreasing the peak load of a consumer or a bundle of consumers.

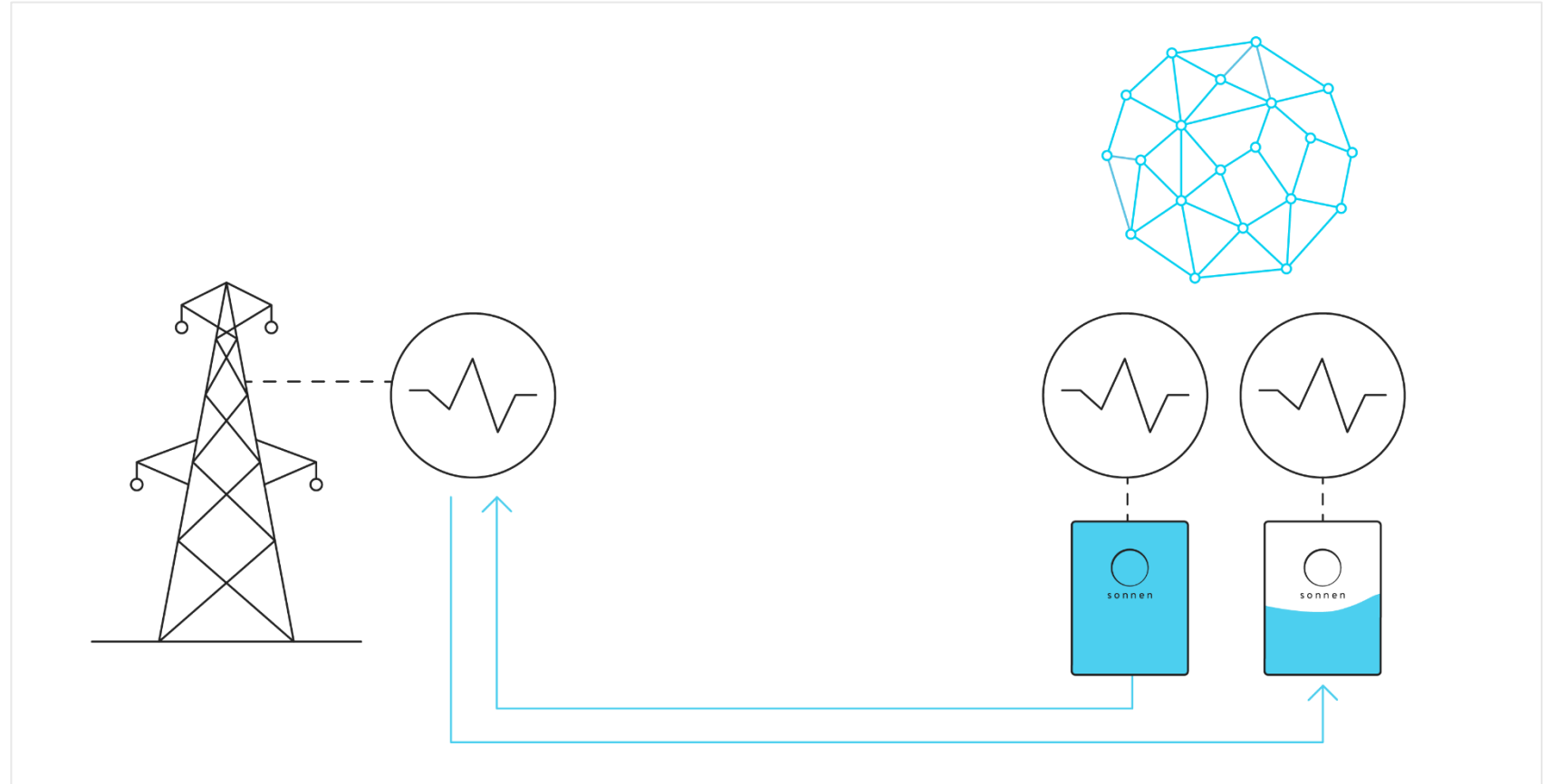
When consumption peaks, the sonnenVPP covers demand with sonnenBatterie power.



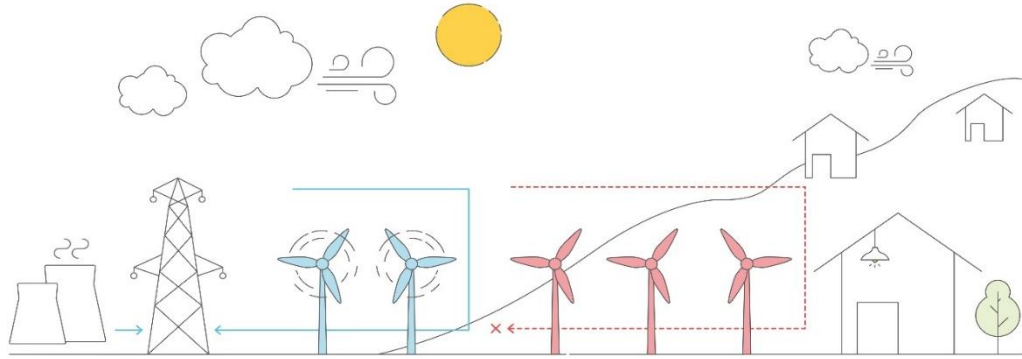
# The sonnenVPP for Ancillary services or Balancing.

The sonnenVPP contributes to keeping the grid frequency on a stable level.

Depending on the direction and degree of frequency deviation, the sonnenVPP charges or discharges sonnenBatteries.

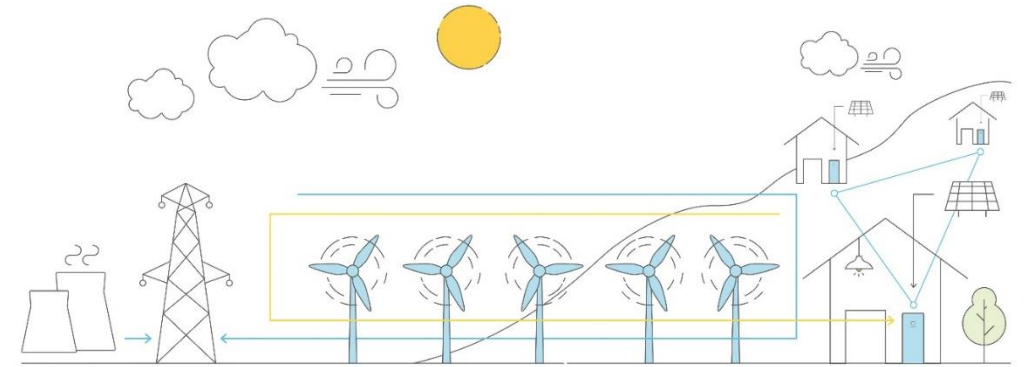


# Preventing renewable energy curtailment, Germany.



## Renewable energy curtailment

- The grid may experience congestion due to surplus renewables generation which forces grid operators to curtail solar farms and wind parks



## sonnen's solution

- sonnen, Energy Web Foundation (EWF) **and one of the biggest distribution system operators in Germany carried out a pilot project between 2019-2020** to prevent renewable energy curtailment
- sonnen's VPP charged sonnenBatteries in the vicinity of the grid congestion with the surplus green energy and contributed to resolving the grid congestion without the need of curtailing renewables production

## System specification

- EWF developed the **Blockchain flexibility** market platform for the system operator and sonnen to exchange information
- Financial compensation was automatically transferred in cryptocurrency



## Use Case

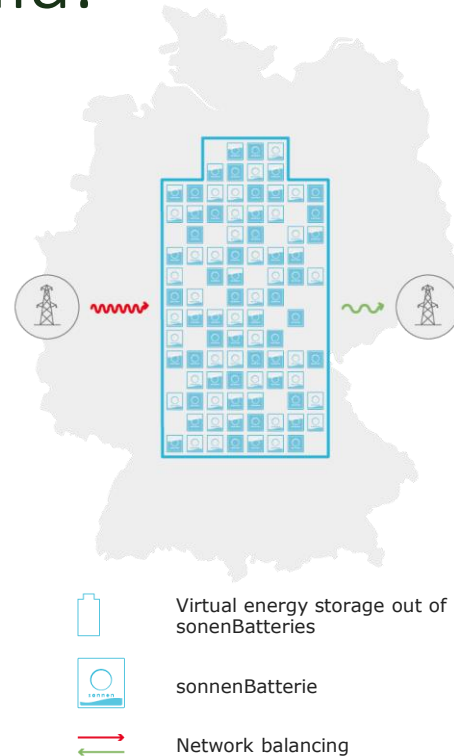
# FCR TenneT, Alemania.

### Frequency Containment Reserve

- FCR automatically regulates positive and negative frequency deviations in the grid with providers giving response within 30 seconds of a trigger event
- In the old energy world, FCR providers were mainly CO2-intensive power plants

### sonnen's solution

- Aligning with the high FCR security requirements, sonnen's VPP received official pre-qualification from the TenneT TSO GmbH
- The sonnenBatterie cluster intelligently reacts to frequency deviations by charging from the grid when the frequency exceeds the standard value of 50 Hertz and discharging when the grid frequency falls below 50 Hertz



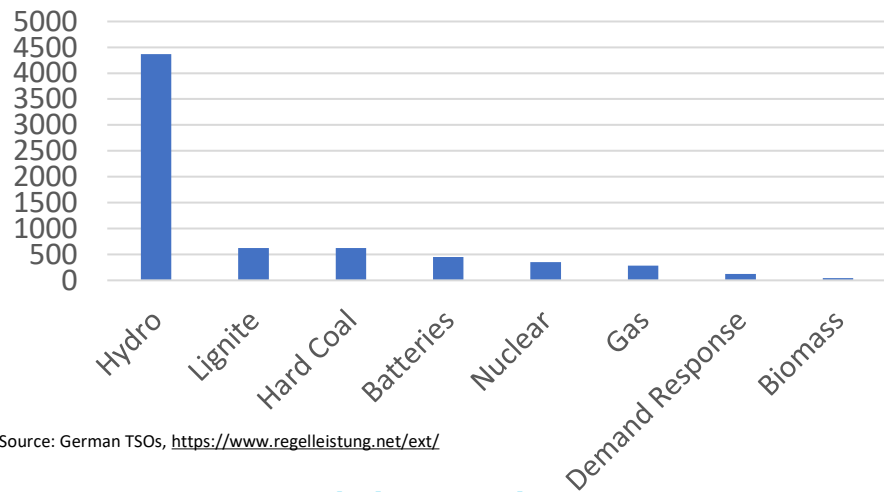
- ✓ Redundancy of the decentralized system.
- ✓ Liberalization, competition, and Market transparency

- ✓ Additional Income.
- ✓ Consumer involvement in the new energy model

Use case

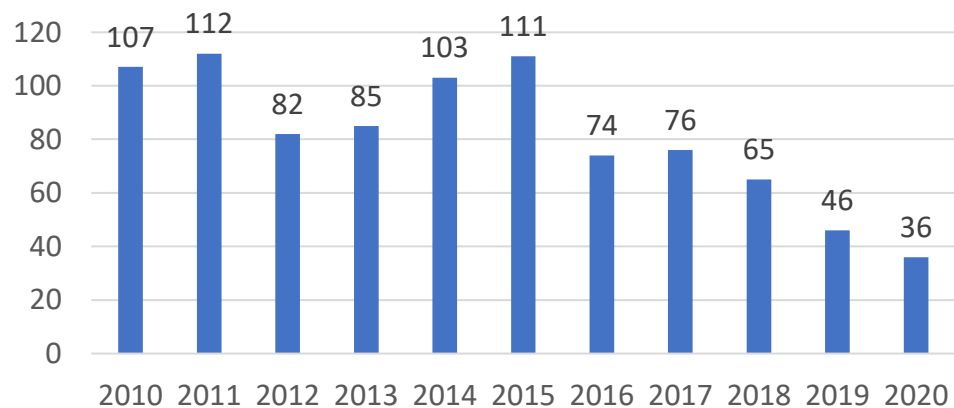
# FCR , Alemania.

FCR – Certified capacity (MW)



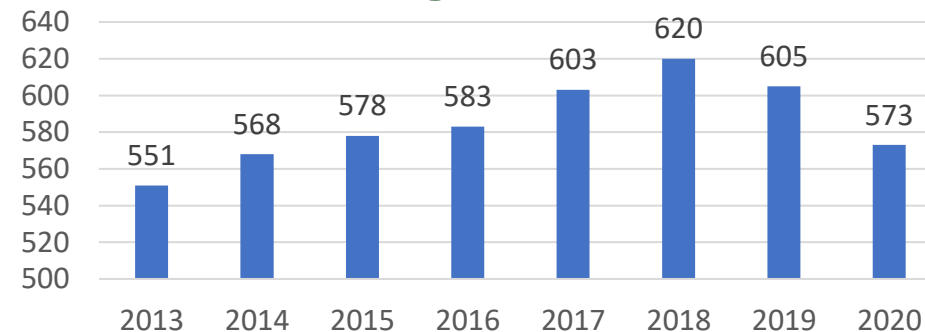
Source: German TSOs, <https://www.regelleistung.net/ext/>

Regulation capacity cost FCR M€



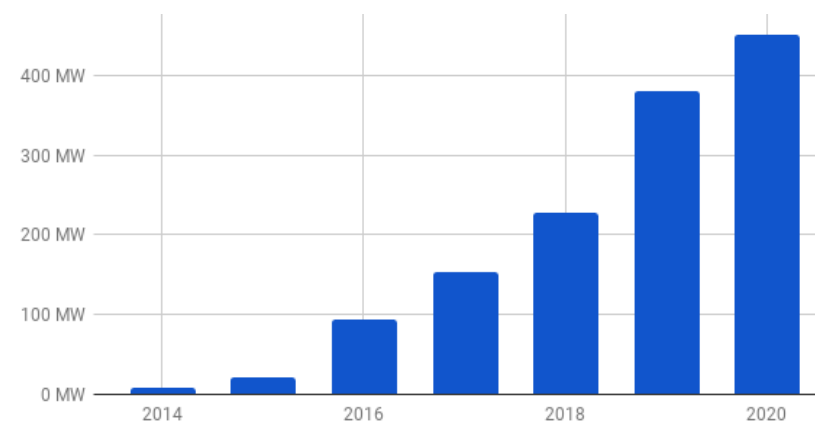
Source: German Federal Network Agency, Monitoring Report 2020, p. 202.

FCR – Regulation Power TSO



Source: German Federal Network Agency, Monitoring Report 2020, p. 202.

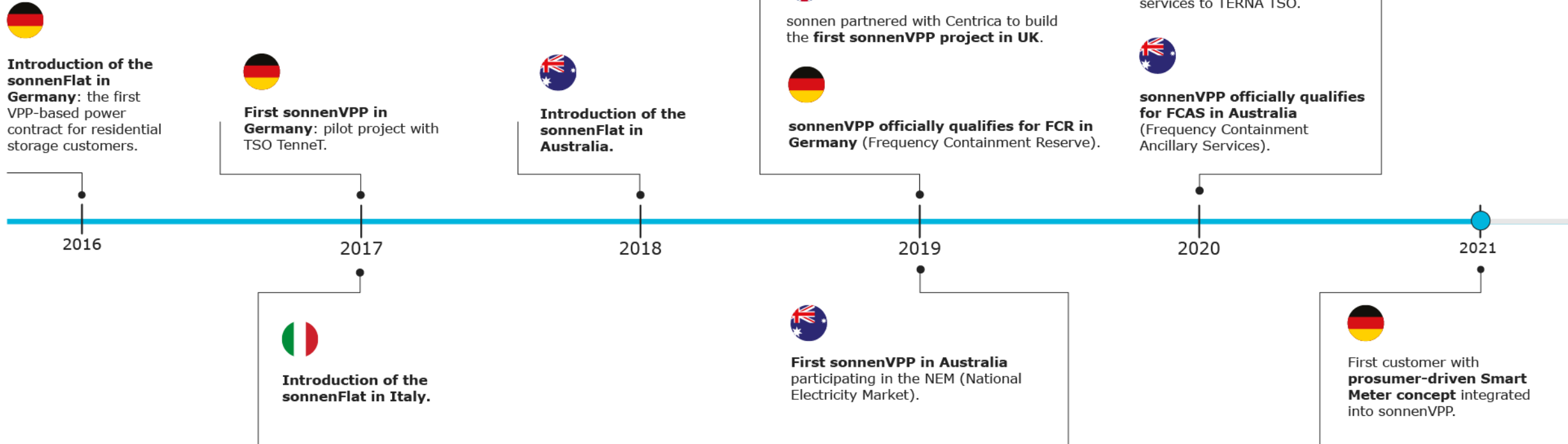
FCR – Certified Batteries MW



Source: [www.regelleistung-online.de](http://www.regelleistung-online.de)

# Live Projects

The goal of the sonnenVPP is to solve the problems of the energy crisis by utilising existing infrastructure to create power system flexibility. Over the years, the sonnenVPP has delivered economic and environmental benefits across 3 continents:



Use case

# La Ballena Alegre.

Camping Sant Pere Pescador



## Use case

# Soleil Lofts in Utah, USA.

### Problem

- 1.8 m people were affected by 346 outages between 2010-2017 in Utah
- How to securely power 600 apartments?

### Solution

- The world's first all-electric, carbon neutral residential apartment community VPP
- Apartment complex 100% powered by electricity using solar PV and a battery energy storage system (BESS)
- The systems switch into island mode and operate autonomously within outages
- Over its lifetime the VPP will save CO<sub>2</sub> equal to 33,000 cars off the road

### System specs

- 5.2 MW of solar PV across the buildings
- More than 600 Sonnen batteries offering a collective 12.6 MWh of storage
- More than 150 EV chargers minimise CO<sub>2</sub> output. Built between 2019-20



Live

Stories

Get-To-Know

Stuttgart, Alemania



sonnenBatterie

70499 Stuttgart

Capacity: 4 kWh

Autonomy: 64 %

PV size: 5 kWp

Join





**Our Vision**

“Our goal is clean and affordable  
energy for everyone.”

Christoph Ostermann, Co-Founder sonnen GmbH



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Luis Ignacio Parada**  
**Director EU Energy Policy & Regulation, Enagas**



# H2Med

An example of European energy cooperation



19 October 2023

Luis Ignacio PARADA  
EU Energy Policy & Regulation Director, Enagás



## Europe paves the way in H<sub>2</sub>

### Green Deal

Roadmap to a **climate-neutral EU** by 2050.

### Fit for 55

Package of measures to **reduce emissions** by at least 55% by 2030.

Europe continues to move forward on H<sub>2</sub> regulatory frameworks

Decarbonisation goals in the EU



**Carbon neutrality**  
**by 2050**

### REPowerEU

European plan to **reduce dependence on Russia** and accelerate the energy transition.



The focus of H<sub>2</sub> demand is on sectors that are difficult to decarbonise, such as **industry and heavy transport**

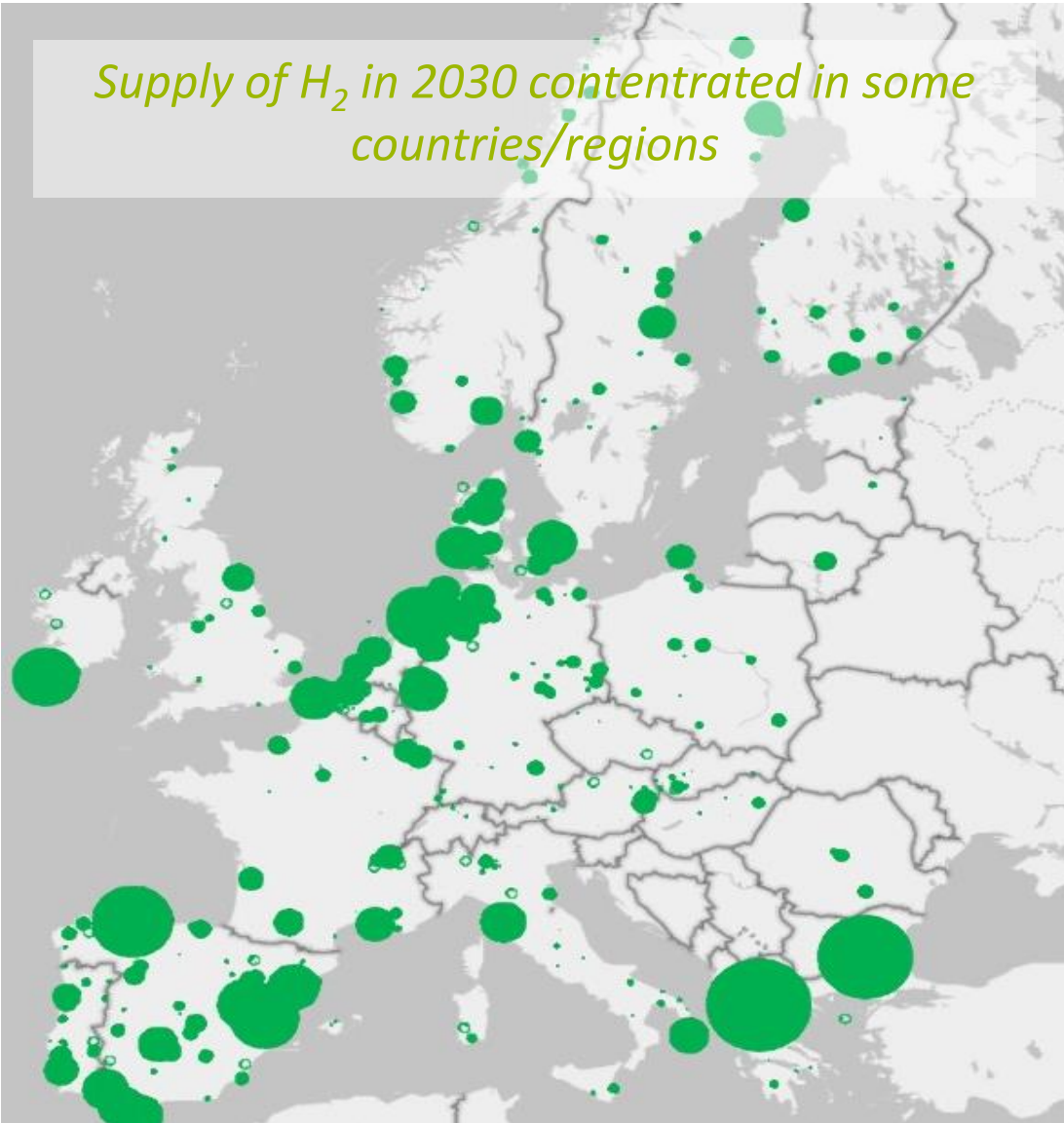


**Hydrogen as an energy carrier**

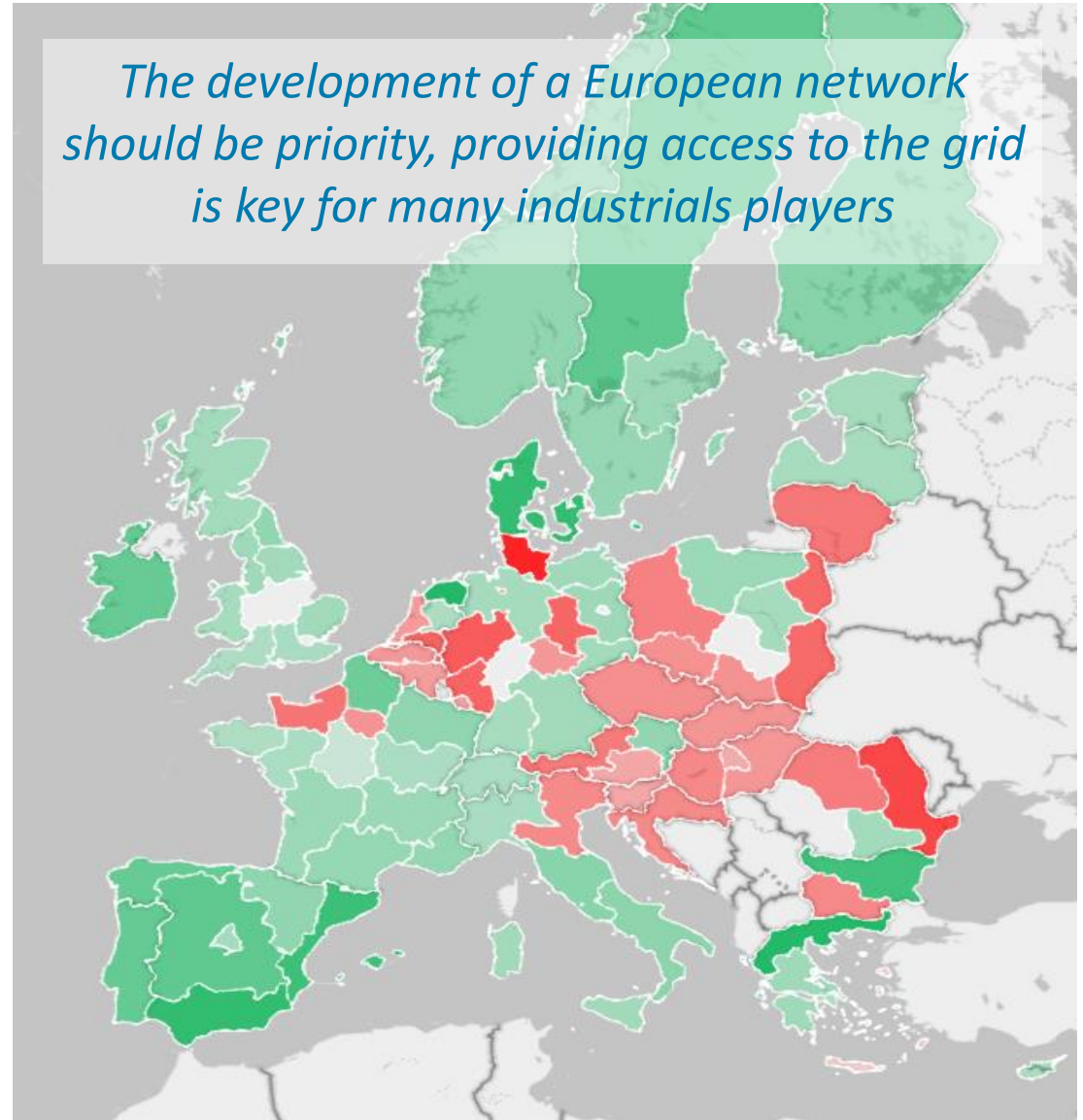
**2030 target: 20Mt of hydrogen consumption in Europe**

# Context

*Supply of H<sub>2</sub> in 2030 concentrated in some countries/regions*



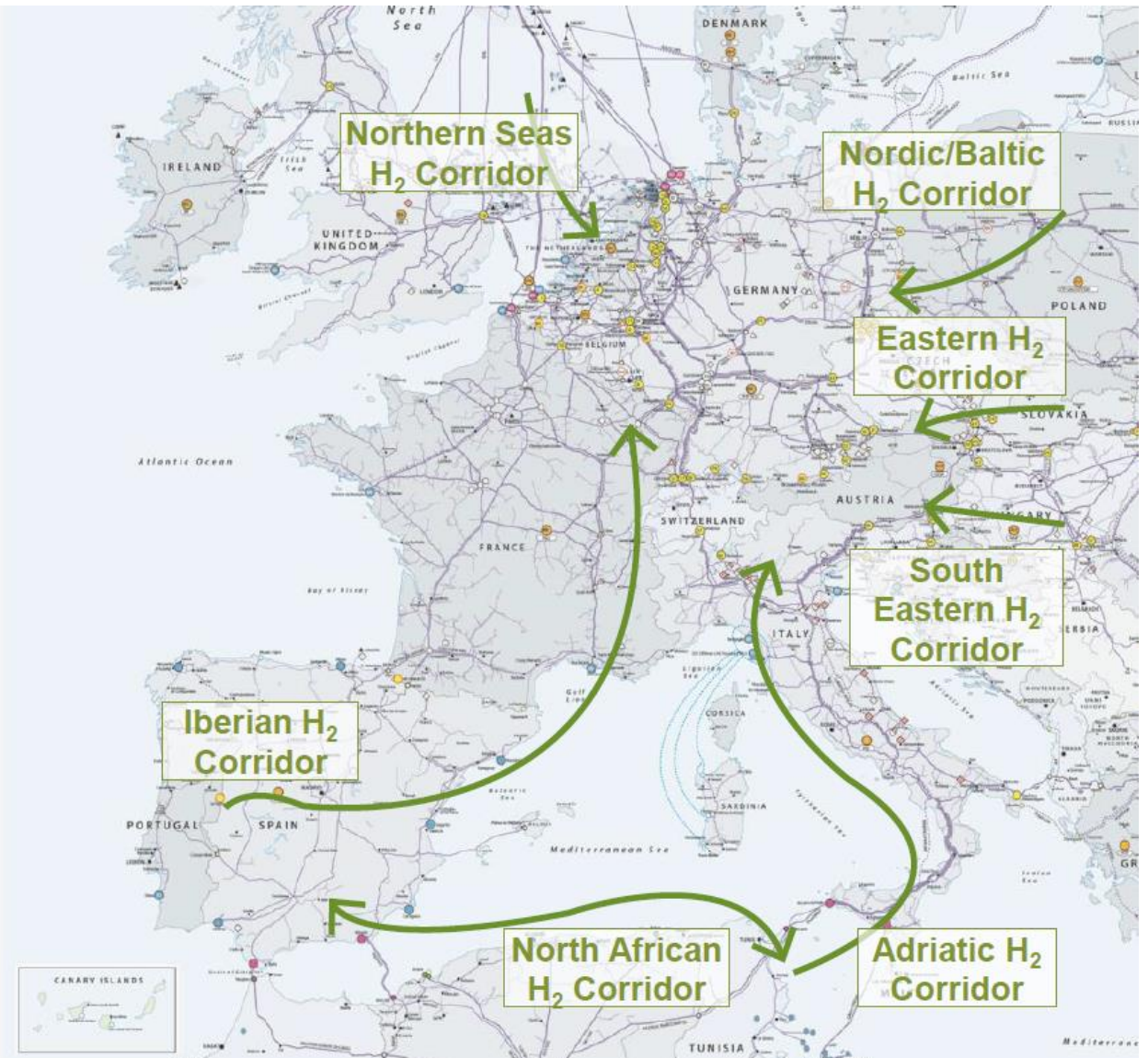
*The development of a European network should be priority, providing access to the grid is key for many industrial players*



## Europe paves the way in H<sub>2</sub>

### REPowerEU Corridors

- Lever for the integration of European markets, to **connect producer countries with centres of demand**.
- Keys to European **energy independence and security of supply**.
- The cost of H<sub>2</sub> transmission by pipeline over long distances is **2 to 4 times lower** than transmitting electricity over high-voltage lines to produce hydrogen at destination, according to a study by European Hydrogen Backbone.
- The transmission of hydrogen by pipeline **reduces energy losses and avoids over-sizing the electricity infrastructure** to get the same amount of hydrogen to the destination.



# Context

**New TEN-E Regulation** (cross-border energy infrastructures) in force since June 2022, aligned with the **EU Green Deal** → **“Projects of Common Interest”**



- ❑ **Deletes natural gas projects**



- ❑ **Includes Hydrogen infrastructures:** networks, storages and terminals.

- Electrolysers of at least 50 MW and with a network function may obtain the PCI category, but NOT get Access to CEF-E funds for works

**Sixth PCI list:** first one elaborated under new rules (PCI/PMI List).



- ❑ Candidates do not come from an European planning (TYNDP) elaborated in advance



- ❑ Uncertainty on projects eligibility and evaluation methodology



- ❑ Candidates presented by 15 December 2022

# H2med

- ❑ **Political agreement** on 20<sup>th</sup> October 2022
- ❑ **Presented by Portuguese, Spanish and French governments**, together with the European Commission, on 9<sup>th</sup> december 2022
- ❑ **Presented as PCI candidate** on 15<sup>th</sup> december 2022
- ❑ **German government** announces agreement to joint the project in January 2023



[Home](#) > [Government](#) > [News](#)

[Listen](#)

## Spain welcomes Germany's entry into the H2Med project

[News](#) - 2023.1.22


The strengthening of this pan-European dimension of H2Med places Spain, for the first time in history, at the forefront of being able to become a leading green energy hub for the whole of Europe.

The Government of Spain has welcomed the agreement for Germany to join the **H2Med**, together with France and Portugal. This is a definitive achievement in the necessarily European vocation with which Spain has been dimensioning and promoting this hydro-product since the **start of the project**, and to which the presence of the president of the European Commission, Ursula Von der Leyen, at the presentation of H2Med at the last Alicante Summit, on 9 December 2022, is testament.



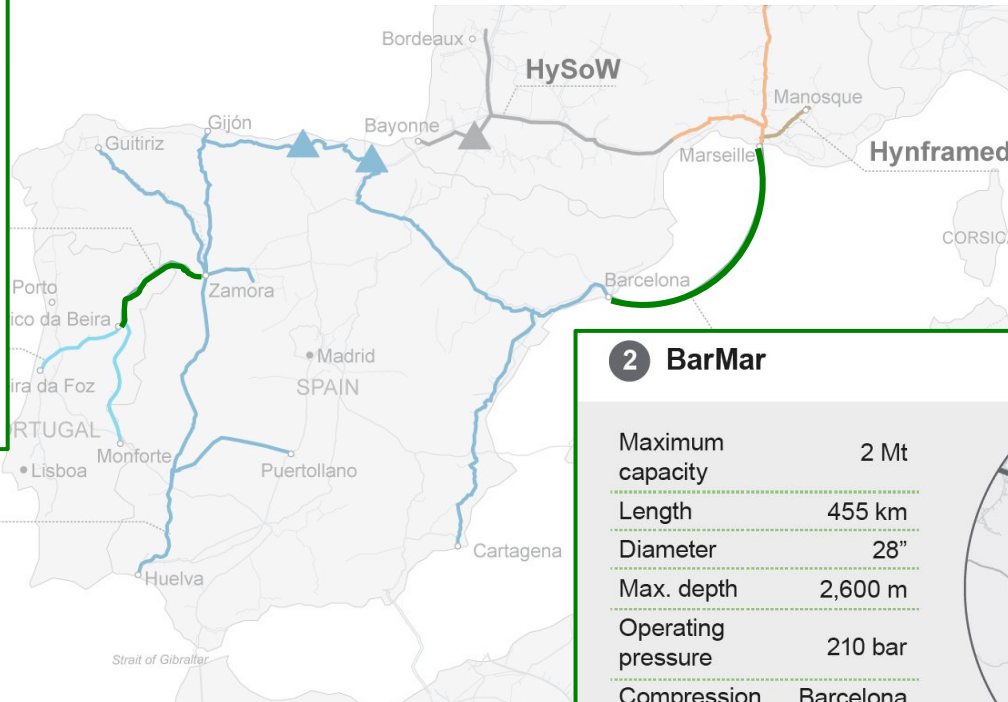
# H2med – the project

**H2Med** is made up of two interconnections, **CelZa** between Portugal and Spain, and **BarMar**, an offshore pipeline between Spain and France.



**1 CelZa**

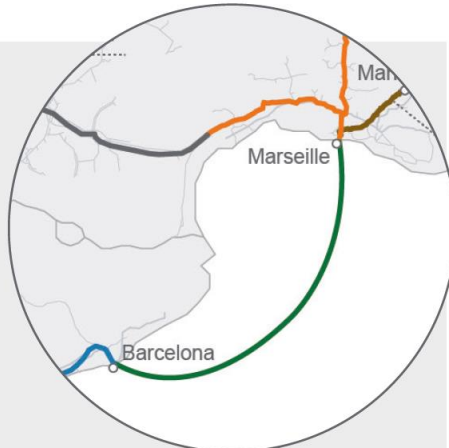
Maximum capacity	0.75 Mt
Length	248 km
Diameter	28"
Operating pressure	100 bar
Compression station	Zamora 24.6 MW
Investment	≈ €350 M



**Spanish Hydrogen Backbone**

Atlantic Ocean

Strait of Gibraltar



**2 BarMar**

Maximum capacity	2 Mt
Length	455 km
Diameter	28"
Max. depth	2,600 m
Operating pressure	210 bar
Compression station	Barcelona 140 MW
Investment	≈ €2,135 M

It will be able to transport **10%** of total European demand by 2030

**The joint investment of these two projects is estimated at €2.5 billion.**

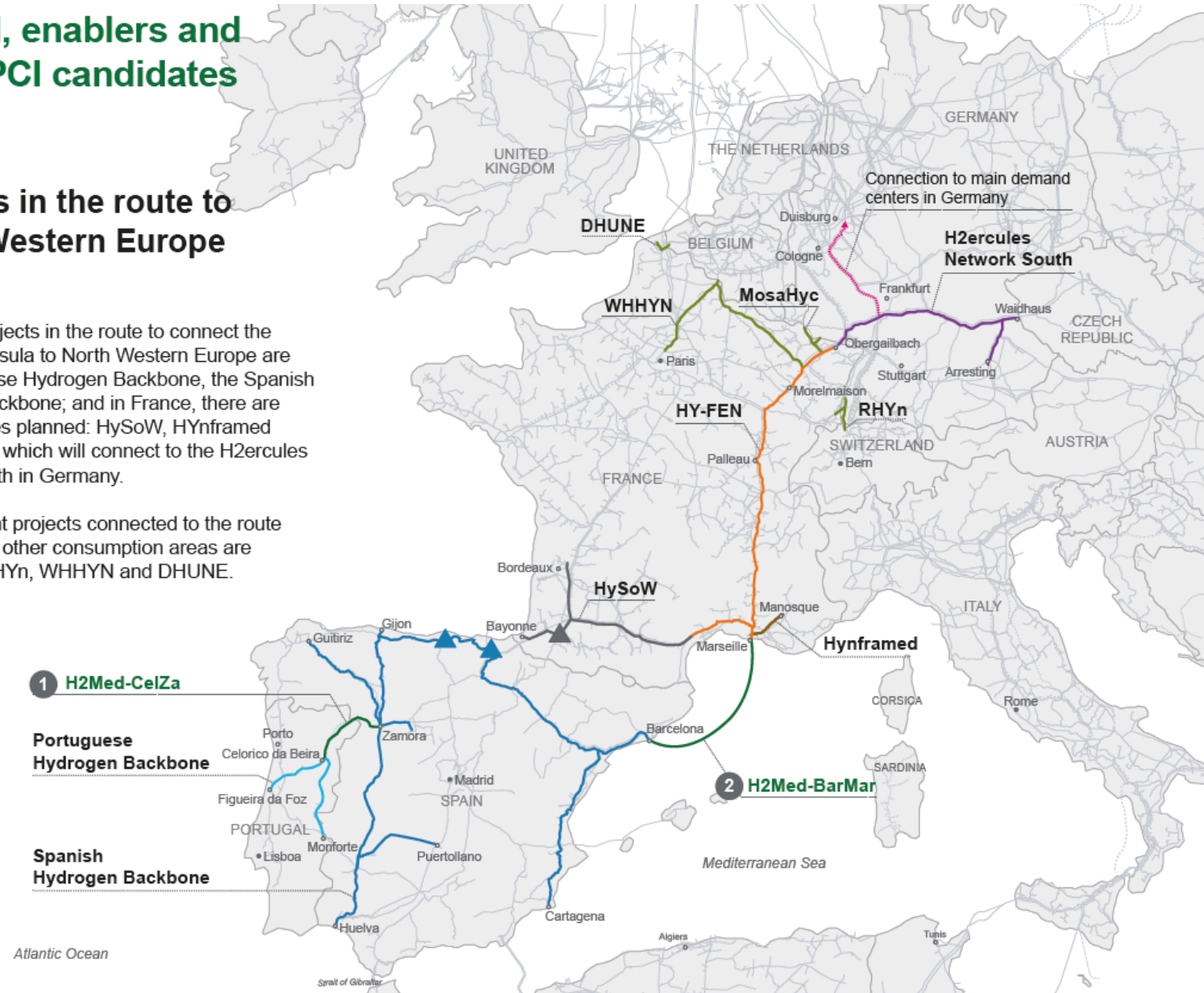
# H2med – the whole corridor

## H2Med, enablers and other PCI candidates

### Projects in the route to North Western Europe

The main projects in the route to connect the Iberian Peninsula to North Western Europe are the Portuguese Hydrogen Backbone, the Spanish Hydrogen Backbone; and in France, there are three pipelines planned: HySoW, HYNframed and Hy-FEN, which will connect to the H2ercules Network South in Germany.

Other relevant projects connected to the route and reaching other consumption areas are MosaHyc, RHYn, WHHYN and DHUNE.

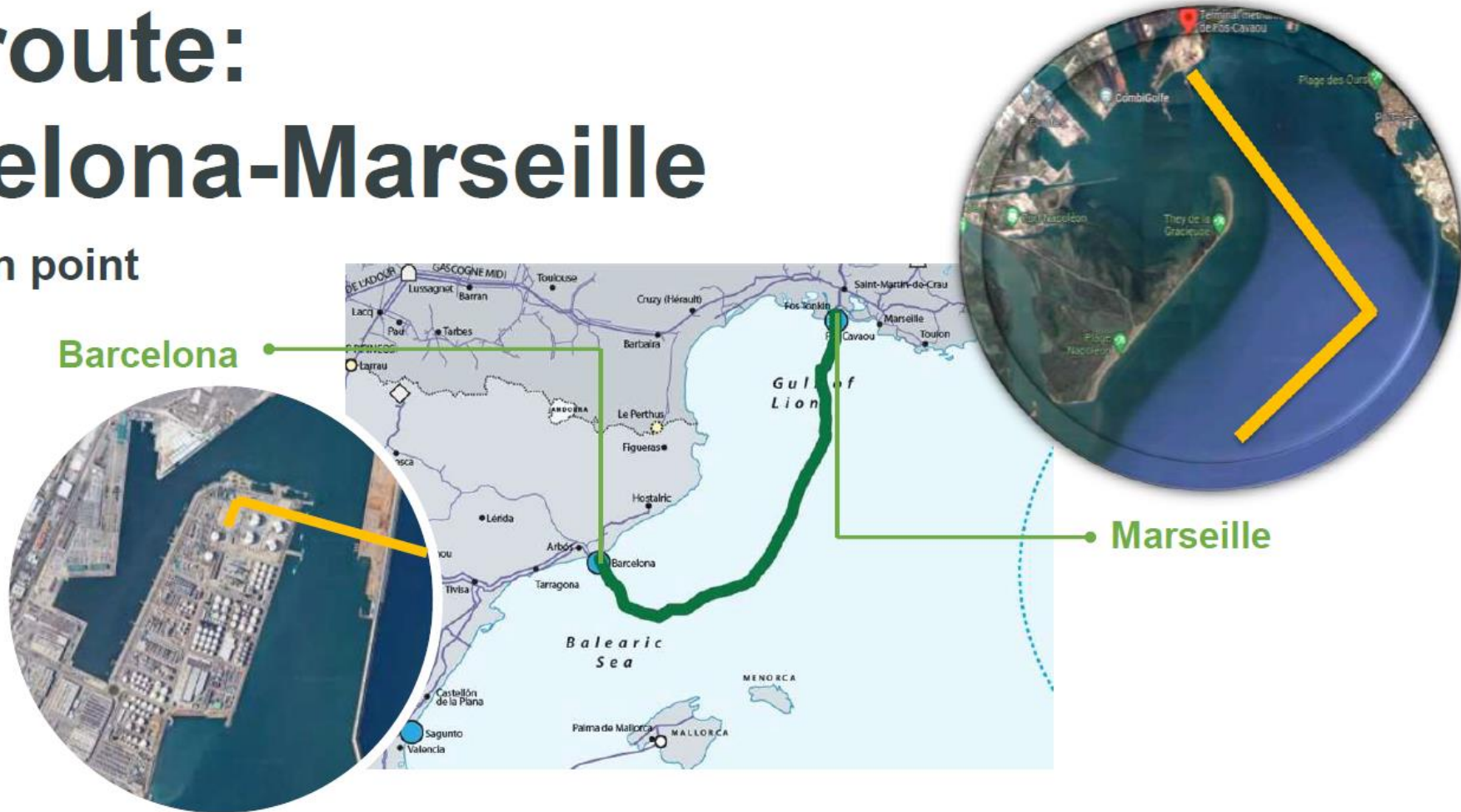




H2med – BarMar

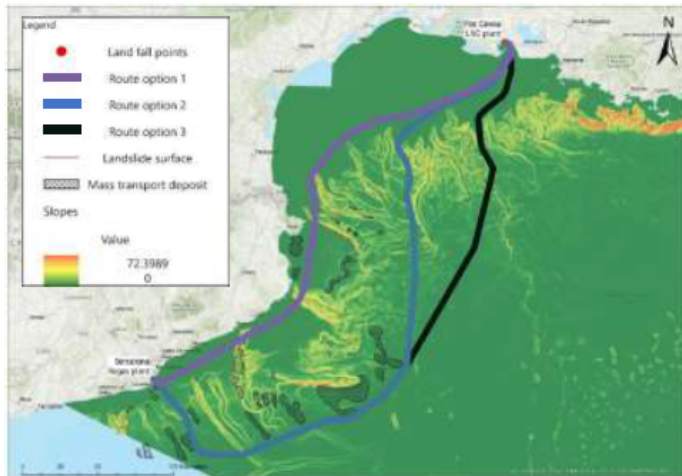
# The route: Barcelona-Marseille

Connection point



# The route: Barcelona- Marseille

## Alternative route analysis



**Route option 1**  
Submarine canyons

985 m  
Max. water depth

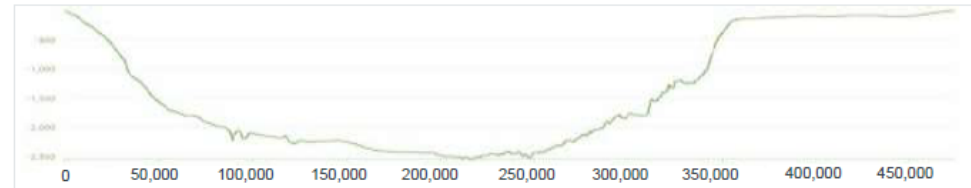
369 km  
Length



**Route option 2**

2,556 m  
Max. water depth

473.6 km  
Length



**Route option 3**

2,557 m  
Max. water depth

455 km  
Length

**Optimal route**  
Shorter than route 2 and more gentle slope up



Depth (m)

Length (m)

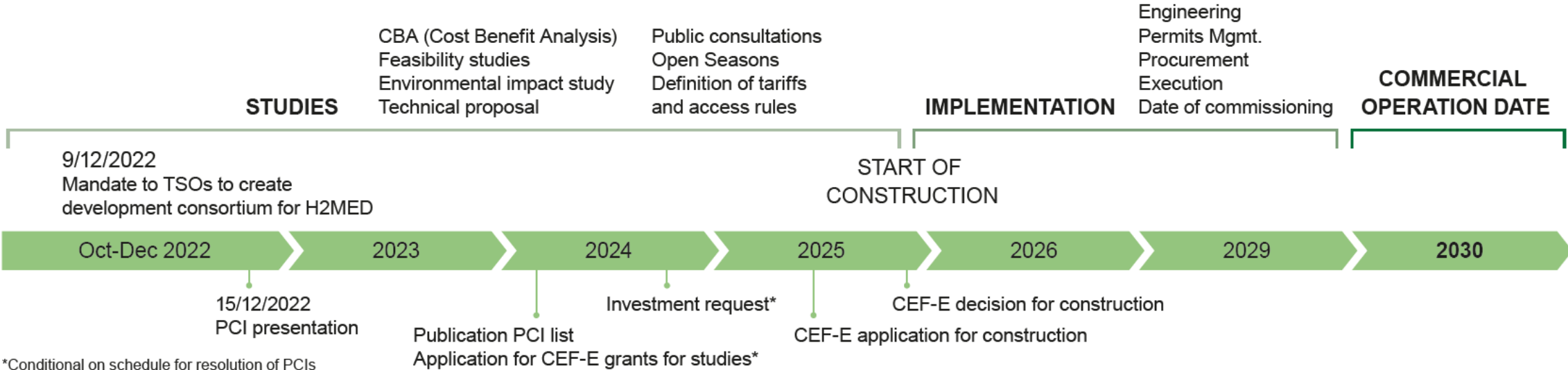
## Financing

≈ 2.5 billion euros

Preliminary cost estimation of the project, to be confirmed by future cost analysis studies

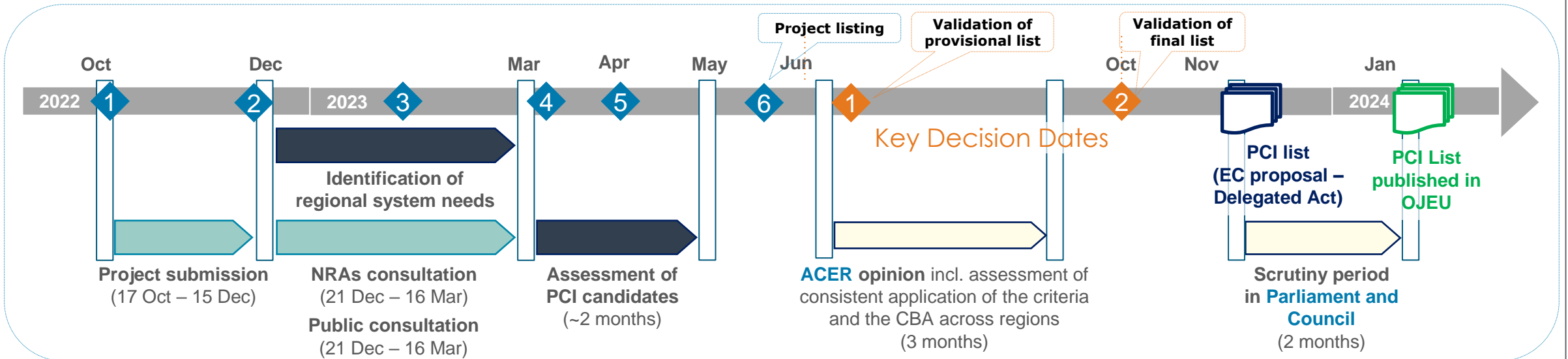
- 1 European funds: CEF-E programme for projects (up to 50%)
- 2 Open Seasons
- 3 Cross-border cost allocation. The Infrastructure Regulation provides for mechanisms to allocate the costs of PCIs to the beneficiary countries by mutual agreement
- 4 Fees

# H2Med schedule



# PCI process

- ❑ On **16 June** the European Commission announced the results from applying the Regional Groups methodology
- ❑ On **28 June** the Technical Decision-Making Body (European Commission and Member States) validated the PCI List received by the Regional Groups.
- ❑ On **26 September** ACER published its Opinion on the List
- ❑ On **25 October** the final validation by the European Commission and Member States will take place
- ❑ In **October/November** the European Commission will publish the list, which will enter the scrutiny period by co-legislators



## Regional Groups meetings – process completed

- ❖ 17 Oct – Cross-Regional Kick-off (all categories)
- ❖ 9 Dec – Cross-Regional Kick-off (H2 & electrolysers)
- ❖ 8 Feb – Regional System Needs Draft methodology
- ❖ 20 Mar – Regional System Needs Decision
- ❖ 17 Apr – Projects presentation by promoters (H2 & electrolysers)
- ❖ **16 Jun** – Final methodology approval and **Project listing** (H2 & electrolysers) ✓

## Decision-Making Body meetings (EC-Member States)

- ❖ **28 Jun 2023** – Technical – validation of provisional list ✓
- ❖ **25 Oct 2023** - High-Level – validation of final list

# Capacities of Spain

## Spain, first hub in Europe

### Capacities of Spain



Renewable  
generation  
potential



Robust  
infrastructure  
network



Industrial  
capabilities



Geographical  
position



Collaboration with  
public  
administrations

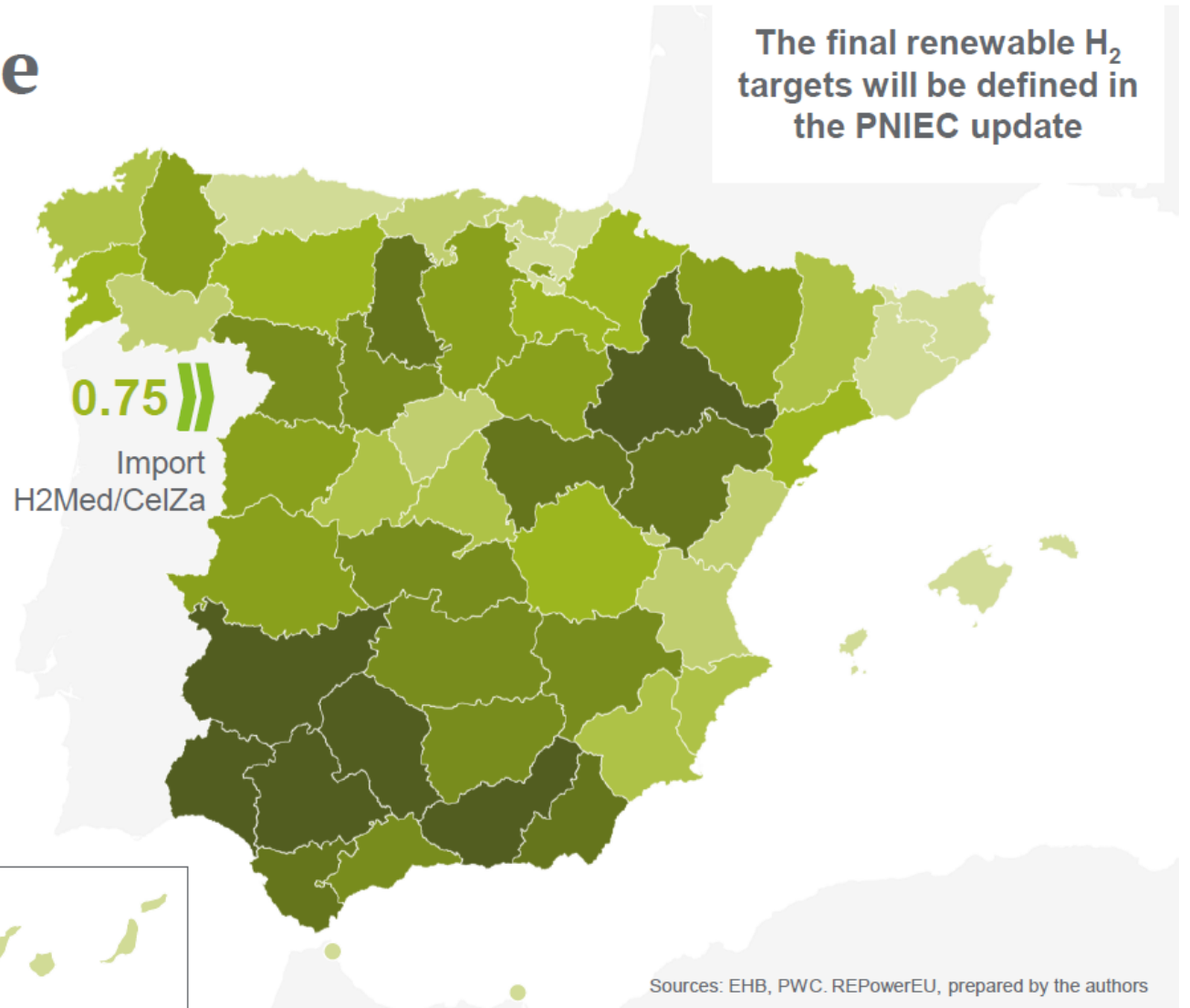
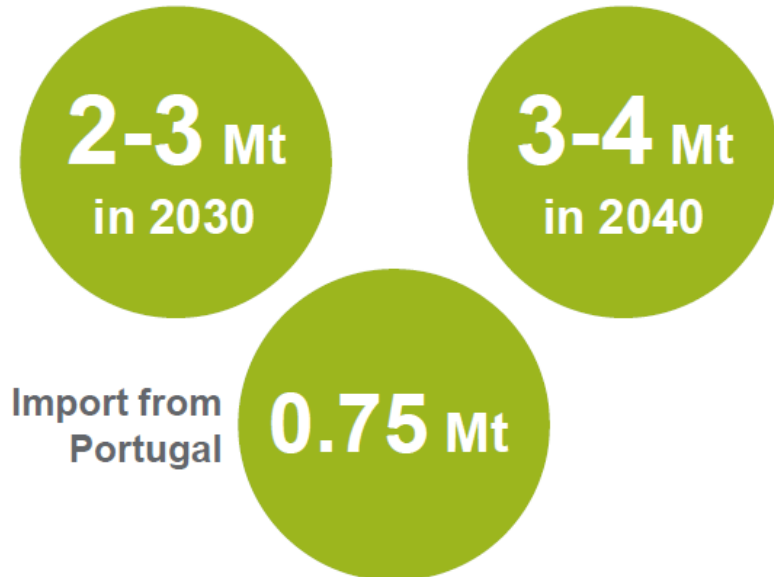
H2MED presentation at the Euro-Mediterranean Summit as the first European Green Corridor

# Production potential

## Spain, first hub in Europe

### Renewable H<sub>2</sub> production potential

The estimated renewable H<sub>2</sub> production potential in Spain in 2030 is between 2 and 3 Mt and in 2040, between 3 and 4 Mt



# Demand potential

## Spain, first hub in Europe

Potential renewable H<sub>2</sub> demand in 2030

1.3 Mt  
National  
demand

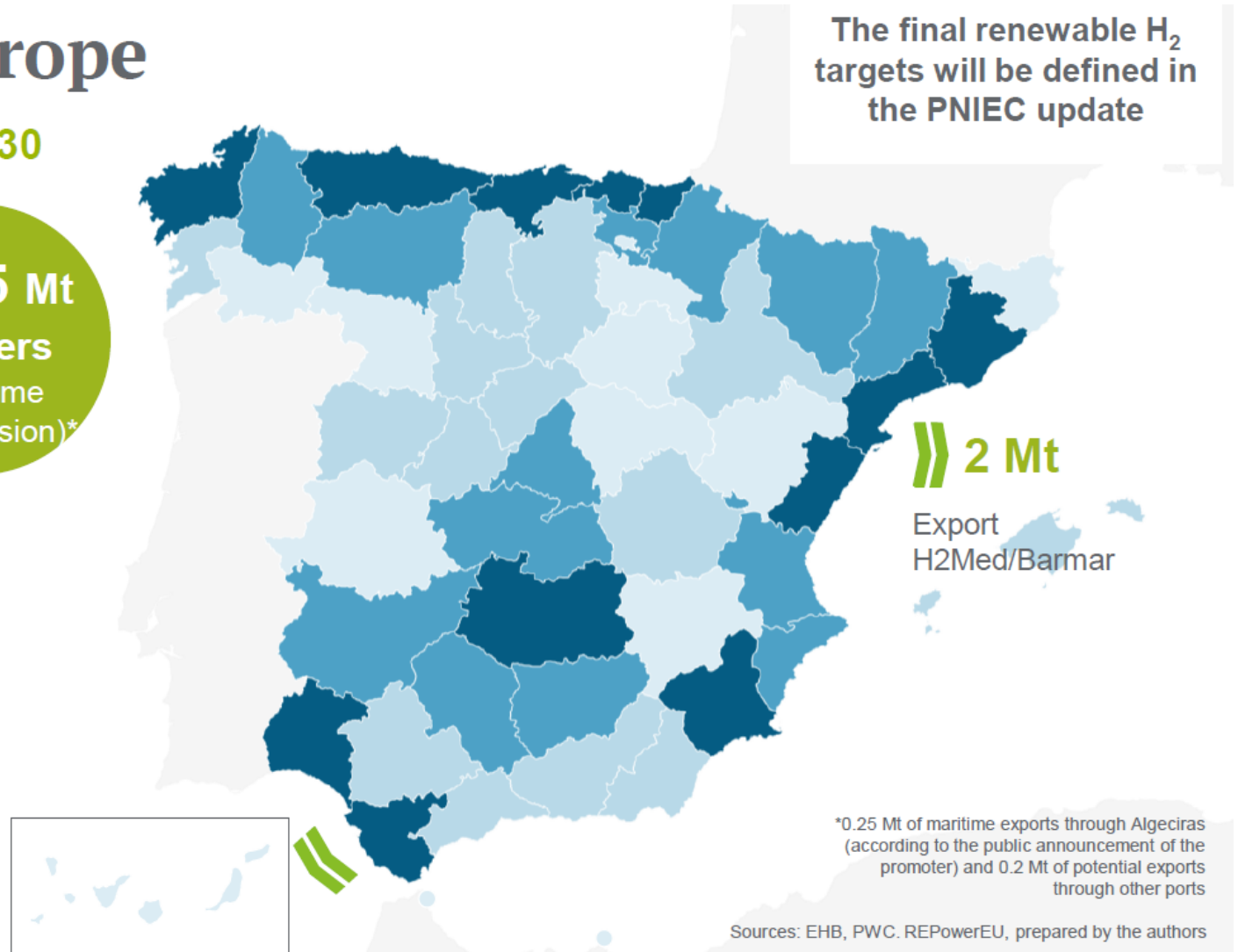
2 Mt  
Export  
H2Med/  
BarMar

~0.45 Mt  
Carriers  
(Maritime  
transmission)\*

■ Domestic demand includes industries that are difficult to decarbonise (**refining, chemicals, steel and ceramics**). Heavy transport, which could be a potential additional demand, is not included.

■ The unequal **distribution between production and demand** in Spain justifies the need for an **H<sub>2</sub> transmission network**

The final renewable H<sub>2</sub> targets will be defined in the PNIEC update



Sources: EHB, PWC. REPowerEU, prepared by the authors



# Spanish Hydrogen Network 2030

## Spain, first hub in Europe

### Spanish H<sub>2</sub> Backbone by 2030\*

Transmission and storage projects submitted to PCI call for proposals

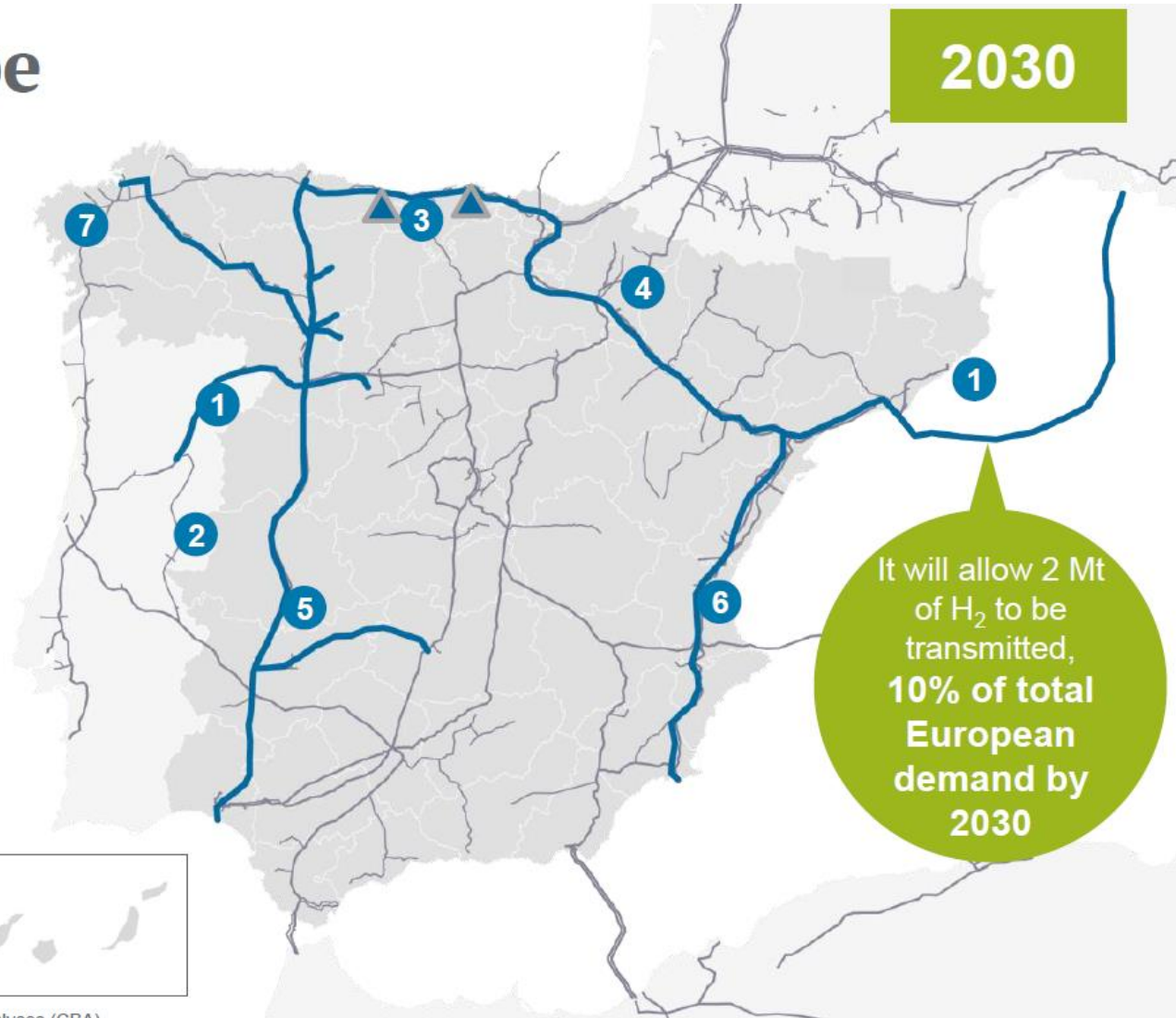
### High H<sub>2</sub> production potential connection with unmet local demand

- 1 H2Med (Barmar-CelZa)
- 2 Vía de la Plata Axis
- 3 Cantabrian Coast Axis
- 4 Valle del Ebro Axis

### Connection “H<sub>2</sub> valleys” for supply guarantee

- 5 Puertollano Connection
- 6 Levante Axis
- 7 Coruña - Zamora Connection  
Project submitted by Reganosa to the PCIs

Underground storage facilities



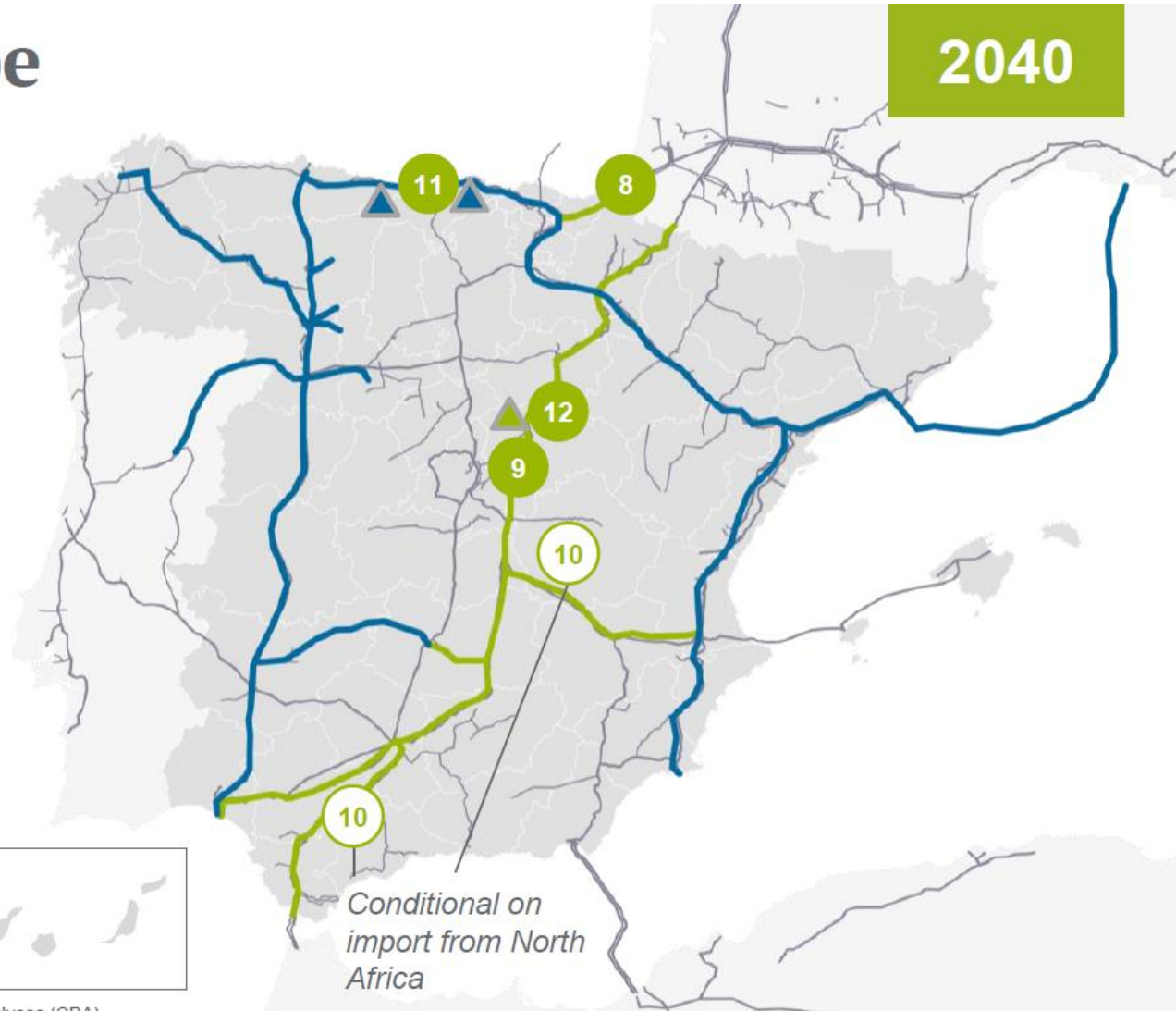
\*This network is subject to what is defined in the Government's Binding Planning and prior cost-benefit analyses (CBA)

# Spanish Hydrogen Backbone 2040

## Spain, first hub in Europe

### Spanish H<sub>2</sub> Backbone by 2040\*

- 8 **Irún and Larrau exports:** existing interconnections dedicated to H<sub>2</sub> to increase exports to France.
- 9 **Meshing of the Central Zone (Huelva-Córdoba-Madrid-Navarra):** meshing to satisfy demand in the central area, provide security of supply, and guarantee exports and imports North Africa-Europe.
- 10 **North Africa import, Tarifa-Córdoba and Alcázar de San Juan-Montesa:** the following interconnections exist to increase exports to the rest of Europe.
- 11 **H<sub>2</sub> Storage Facilities in Cantabria and Basque Country:** incorporation of storage facilities to guarantee supply to the H<sub>2</sub> transmission infrastructure.
- 12 **Yela H<sub>2</sub> storage facility.** (Other potential storage facilities in southern Spain are under study).



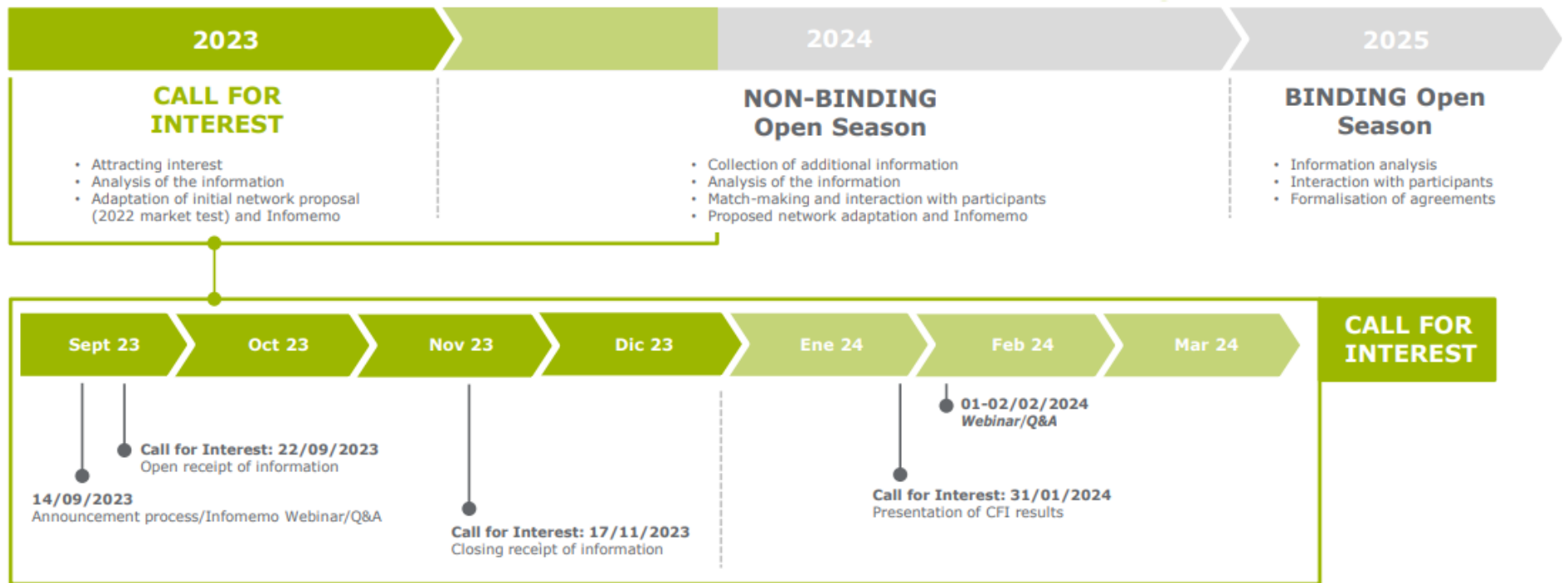
\*This network is subject to what is defined in the Government's Binding Planning and prior cost-benefit analyses (CBA)

# Spain: Call for Interest

Call for Interest for the development of a renewable hydrogen network in Spain

September 14<sup>th</sup>, 2023

**Call For Interest** Red Troncal Española de Hidrógeno



- ❑ **H2Med** is an essential element for the configuration of a Hydrogen corridor from the Iberian Peninsula to North Western Europe, connecting supply from producer countries to demand centres
- ❑ **Collaboration** between companies and institutions for the development of projects such as H2Med and the necessary national network will be key to achieve European targets

Thank you!





 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Coffee Break**

# DISTRIBUTION GRIDS FIT FOR PURPOSE OF ENERGY SYSTEM NEEDS



**Panel Moderator:  
Carmen Gimeno  
Secretary General, GEODE**



**Prof. Christian Held  
Partner, Becker Büttner Held**



**Ramon Gallart Fernandez  
Innovation Director, Anell**



**Ignacio Cuerva  
CEO, Cuerva Energía**



**Tommi Lähdeaho  
Head of Asset Management,  
Elenia**

# NO ENERGY TRANSITION WITHOUT THE DISTRIBUTION GRIDS



“There is no green future for Europe without an upgraded power grid”



SEPTEMBER 2023

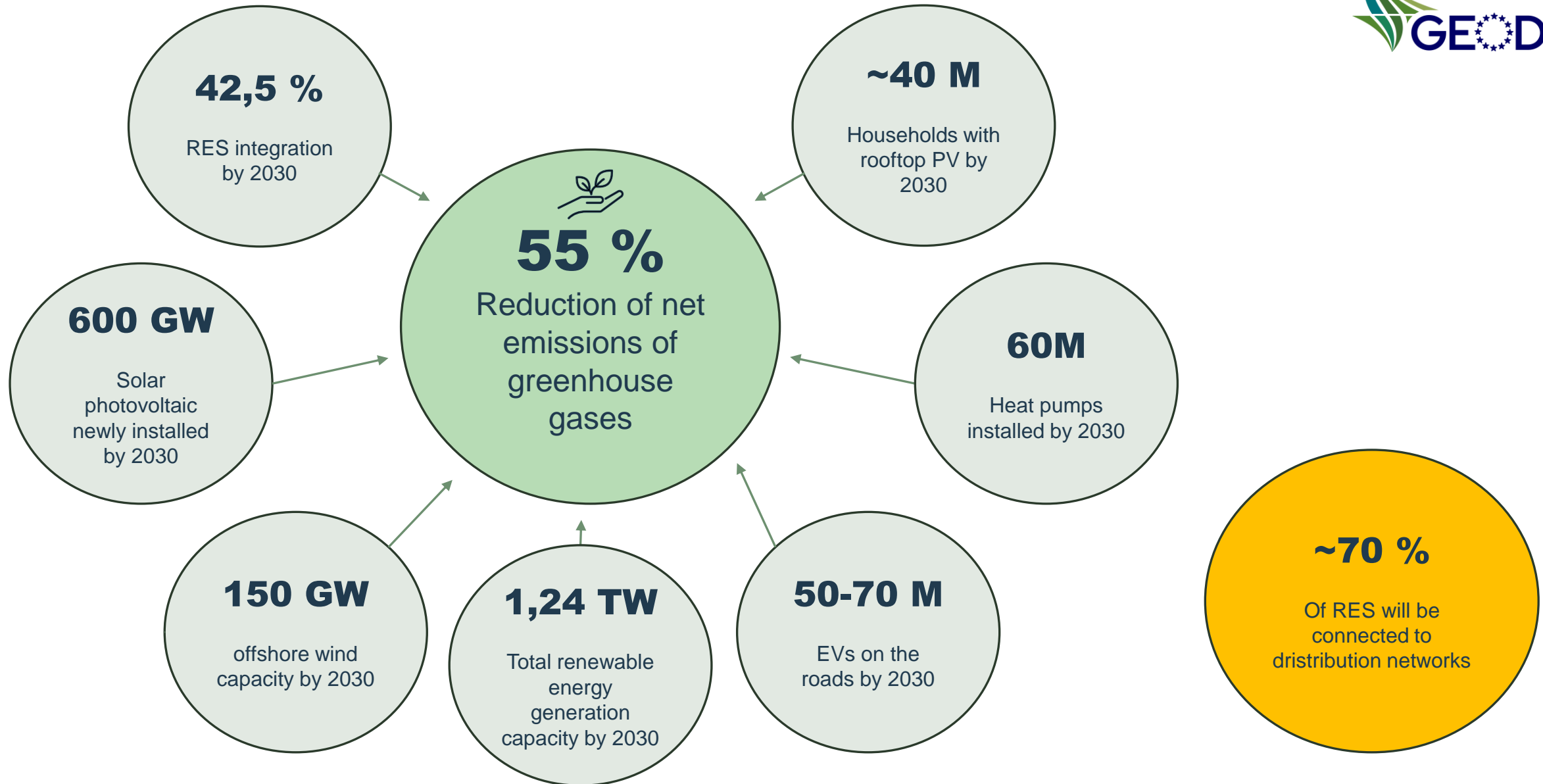
**Lack of ambition and attention risks making electricity grids the weak link in clean energy transitions**

OCTOBER 2023





# EU POLICY AND GOALS BY 2030



# GRIDS FIT FOR PURPOSE OF ENERGY SYSTEM NEEDS

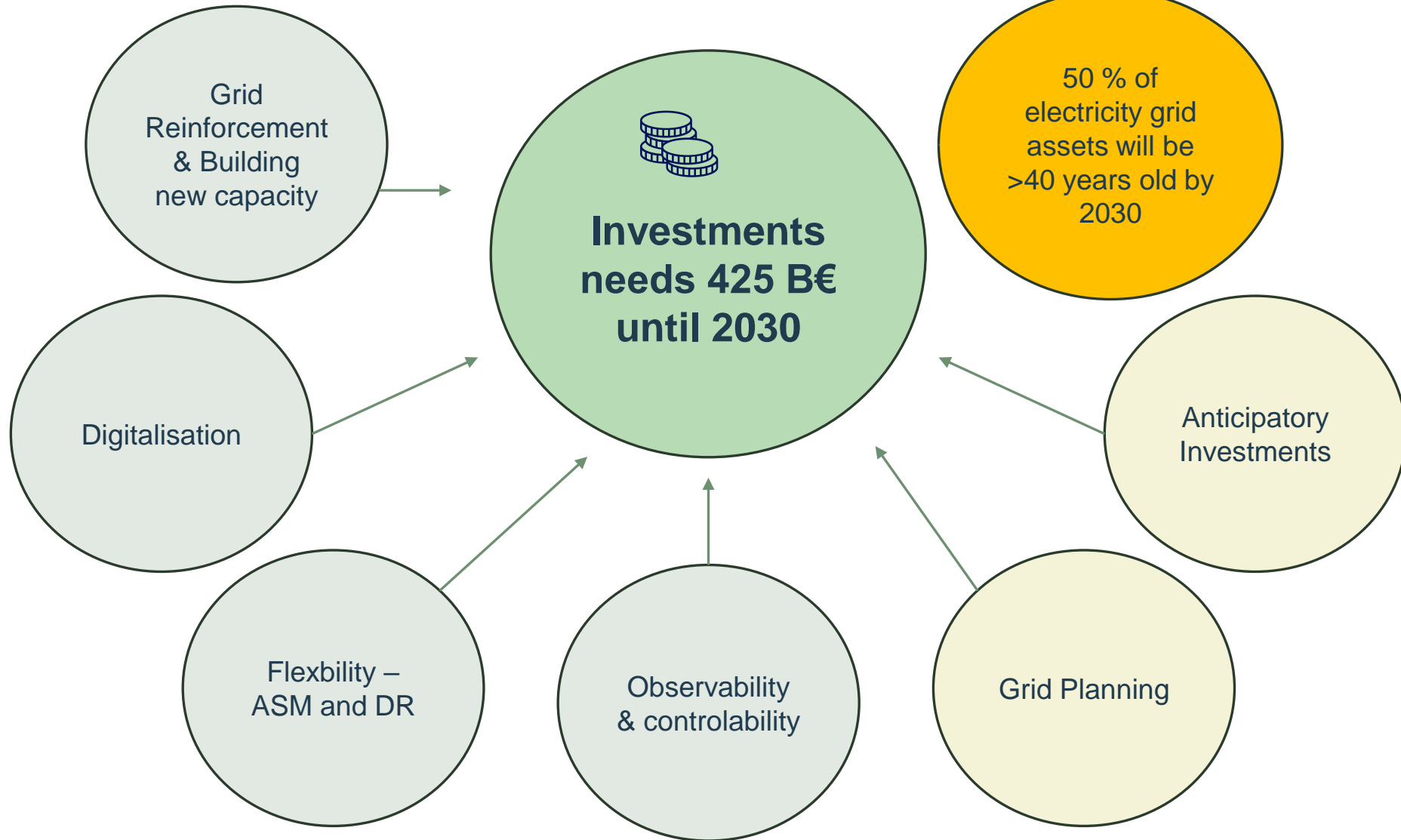
Stronger, more **digital**,  
**cyber-proof** and  
**resilient grids** are  
needed



Grid investments are  
needed **NOW**. Speed is  
the real challenge!

**+19%**

Connection requests  
between 2020 & 2021





# Building tomorrow's grids today

GRANOLLERS  
18-19 October 2023

**Tommi Lähdeaho**  
**Head of Asset Management, Elenia**



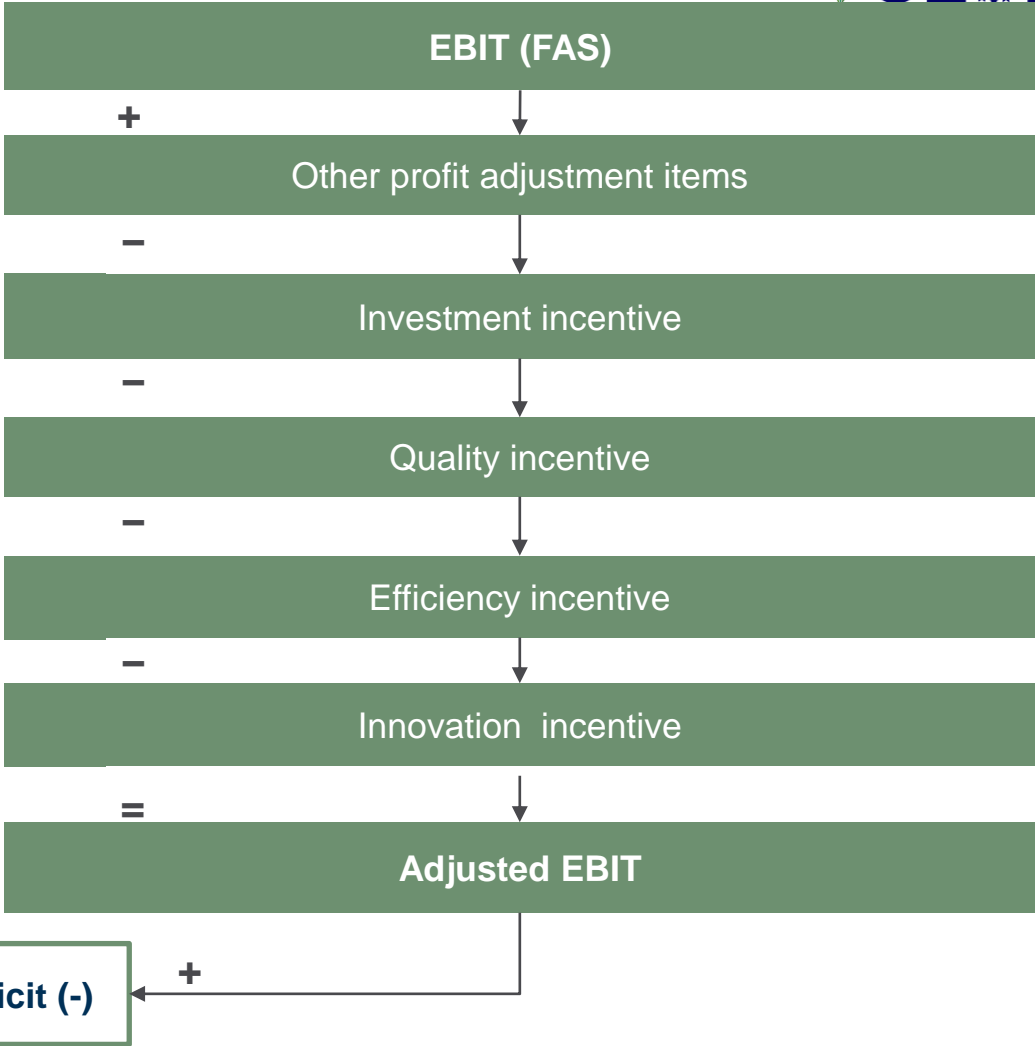
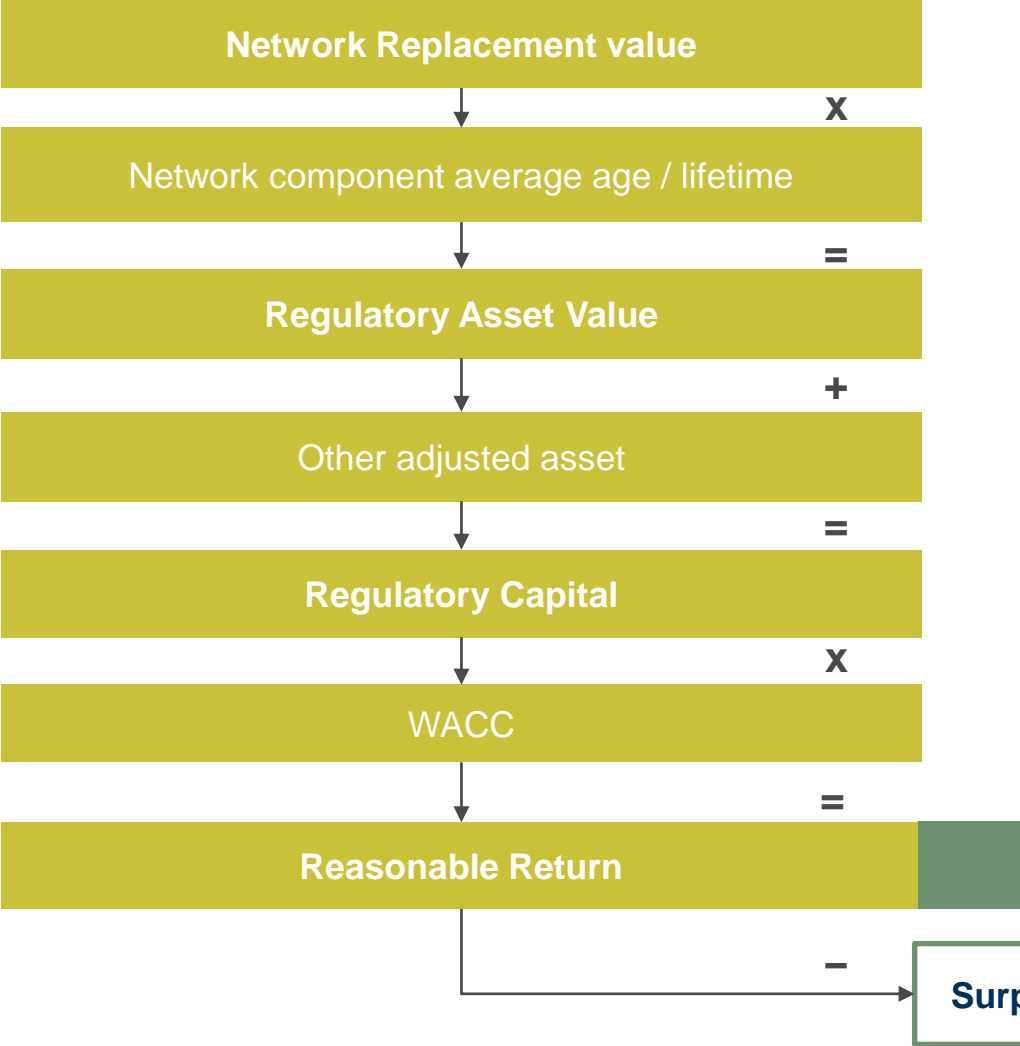
ELENIA

**DISTRIBUTION GRIDS FIT FOR  
PURPOSE OF ENERGY SYSTEM NEEDS**

19 November 2023

Tommi Lähdeaho  
Head of Asset Management  
Elenia, Finland

# Regulation in Finland 2016-2023



Surplus (+) / Deficit (-)

Fragmented DSO market in Finland with 77 DSOs in total  
 Elenia is the 2nd biggest DSO with 438,000 customers

# Elenia's network today



## City



Network length per customer 11 m  
Cabling rate 100%  
Customers 9,600 pcs

## Urban



Network length per customer 63 m  
Cabling rate 95%  
Customers 248,500 pcs

## Rural



Network length per customer 323 m  
Cabling rate 57%  
Customers 181,400 pcs

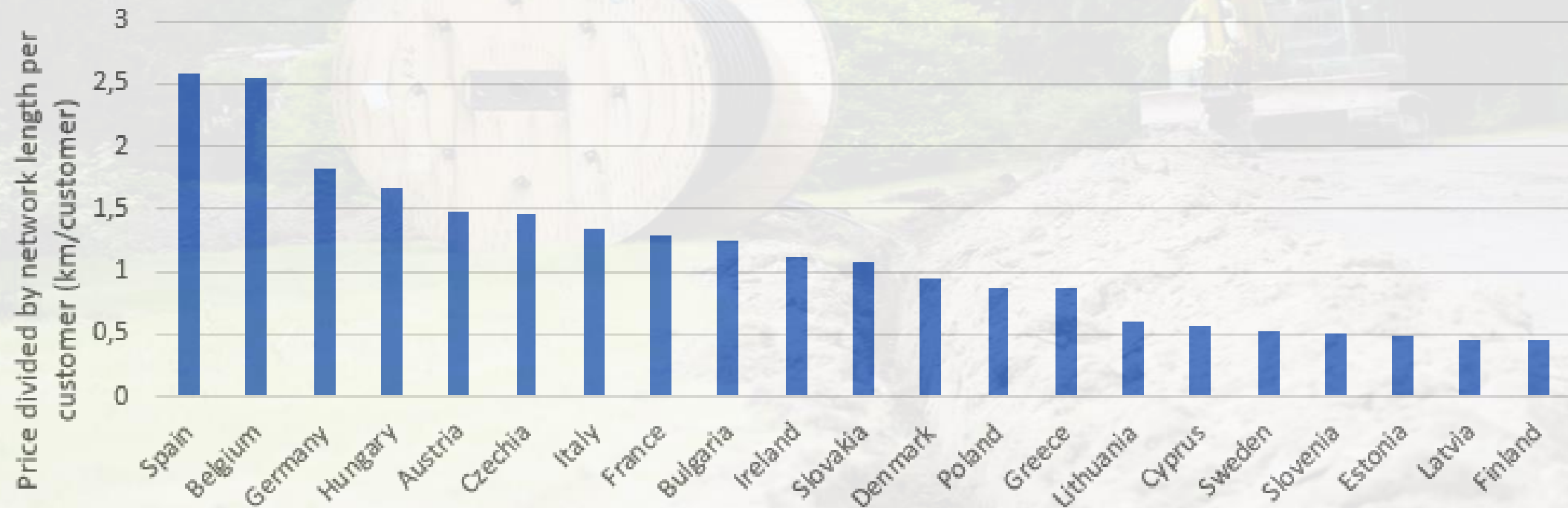
Cabling rate <20% in 2012

Over 1 Billion investments since 2012

> 30,000 km new cable network

# Investments tariff impact in Finland

Electricity distribution price per customer-specific network length  
(without taxes) 2022



**Regulation in Finland has enabled needed investments to Security of Supply and early steps of Green Transition + kept the tariffs reasonable**

# Elenia's Network Development Plan 2022-2036



## Wind Power



- Now over 1,000 MW of wind power connected to Elenia's 110 kV network
- The amount will at least double in next ten years
- 850 kilometres of new 110 kV network

## Solar Power and EVs



- Now over 15,000 solar panel systems connected to Elenia's low-voltage network
- The number of solar panel systems will at least triple in the next 10 years
- Huge amount of charging stations to be connected
- Flexibility services and solutions

## Security of Supply



- Underground cabling rate will grow from 62% to 90% by 2036
- Development of automation and ICT systems
- Tens of grid batteries to be connected
- Alternative solutions for the security of supply

## Smart Meter Ecosystem



- Smart meter renovation 2021-2025
- Already 180,000 next generation smart meters installed
- Enabling carbon neutral society and energy market
- Smart and reliable network is the basis for flexibility services



# Thank you

Tommi Lähdeaho  
Head of Asset Management, Elenia  
+358 40 820 2204  
[tommi.lahdeaho@elenia.fi](mailto:tommi.lahdeaho@elenia.fi)





 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Ramon Gallart Fernández**  
**Innovation Director, Anell**

A close-up photograph of molten metal being poured from a ladle. The metal is bright orange and yellow, creating a thick, glowing stream that curves downwards. The background is dark, making the bright metal stand out.

How an ell is tra  
organization and minds  
the challenges of the er

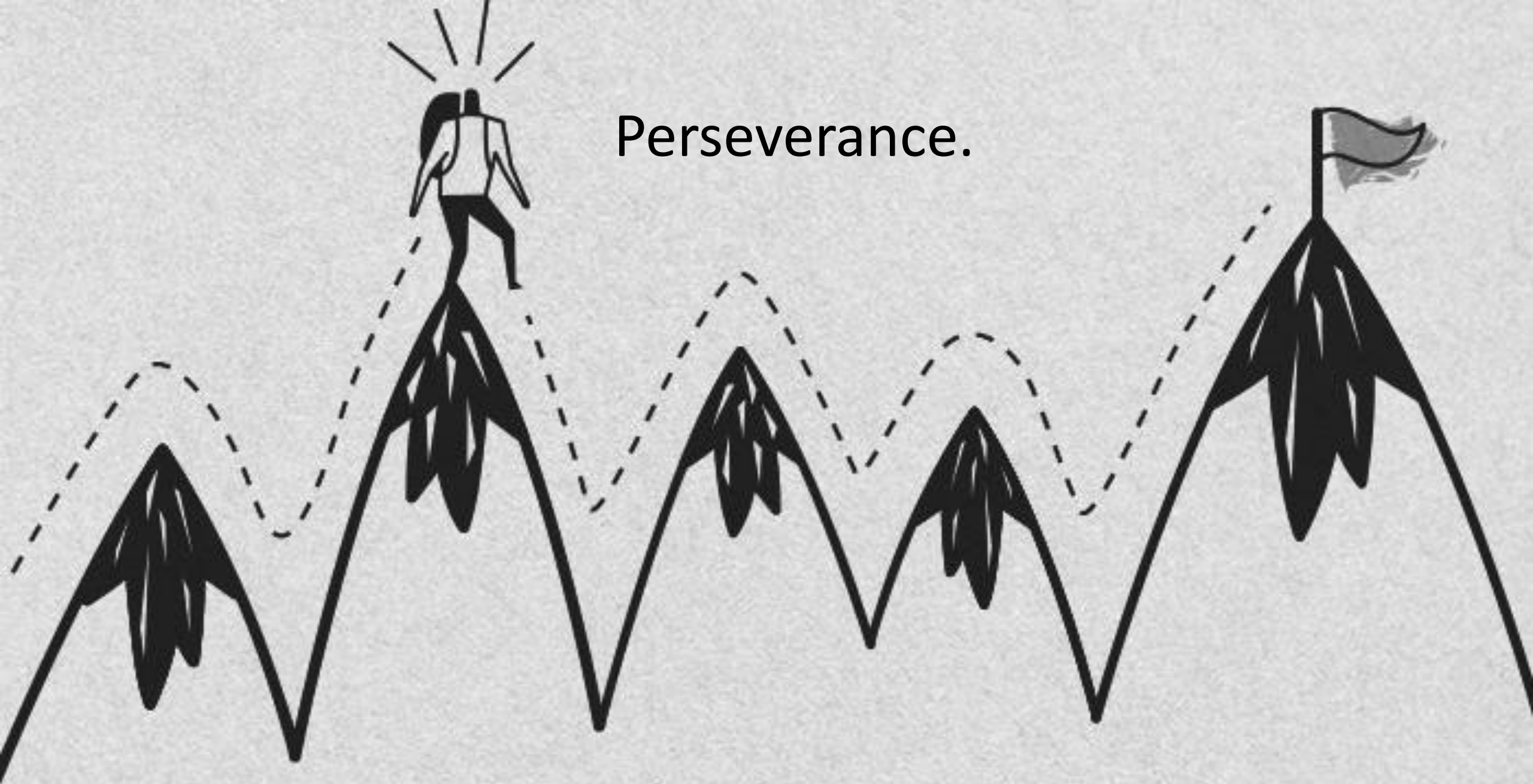


Creating Momentum.

Taking  
decisions



Perseverance.





 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Ignacio Cuerva**  
**CEO, Cuerva Energía**

# Cuerva\*

GEODE  
Autumn Seminar

Oct 2023





We are a family-owned company founded in 1939 in Granada (Spain) with a long and proven track record in the energy sector.

We have been living in the future for more than 80 years, focusing on innovation and searching for new and better ways of understanding and working with energy: we think, create and launch tools and technologies that ensure the transition to a new and better energy consumption model.

**Our goal is taking energy to the next level**

Key figures

**6**

Countries

**160**

Employees

**+23**

People in  
product and  
innovation

**7**

Business  
units

Who we are?

# More than 7 years looking for the disruption in the grids

- 132 kV connected to the Spanish TSO (REE)
- 500 secondary substation with real time-data
- 18,000 users connected to the grid, 36,000 inhabitants located in rural areas.
- Several renewable energy plants connected to the HV & LV grid: more than 120 MW in total



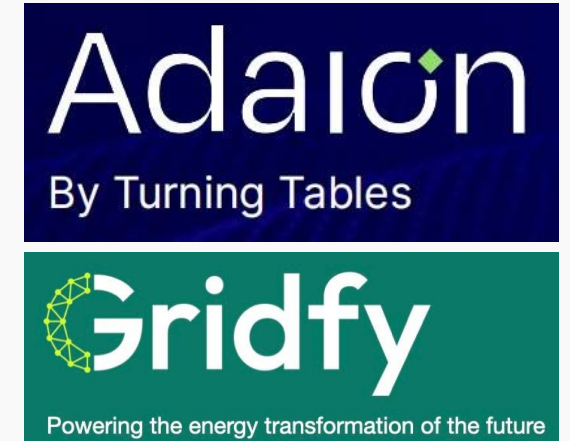
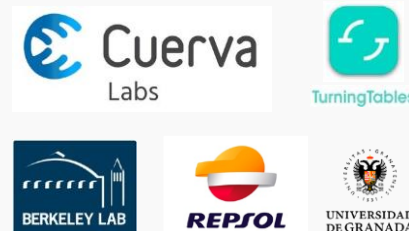
Cuerva\*

## Grid Digitalization:

- 100% Smart Meters penetration
- High-resolution measuring devices in MV & LV, data below a minute
- Digital twin for MV and all the LV grid in LL

## Flexible asset:

- Over 200 prosumers across the network: self-consumption, batteries, electric vehicles, etc.
- Over 750 kW of residential renewable self-consumption power
- Solar plants in MT with an approximate power of 95 MW



- The platform with analytical capabilities supporting network planning, operation, and maintenance.
- (Big) Data Integration
  - Digital Twin
  - **Grid Operating System**



Energy communities prioritize user flexibility, simplicity, short-term agreements, an enhanced user experience, and the development of services built upon the energy community framework

# Regulatory sandboxes

Network Codes are specific and technical binding rules for the operation of Europe's cross-border electricity networks as outlined in

Regulation (EC) 714/2009.

*Network Code on Demand Response* was requested in 2022 by the European Commission

As defined by RD 568/2023, is an experimental environment where tests or trials can be conducted within the framework of pilot projects, in a safe and controlled manner, to facilitate research and innovation in the field of the electrical sector.

— The development of a more flexible, decentralized, and dynamic energy system capable of efficiently and securely integrating new renewable generation.

— The creation of new innovative business models.

— The involvement of new players in the electrical system.

ACER 

DOO ENTITY   




BOE 

**S2F: Empowering DSOs with Flexibility Solutions.** Ten Spanish DSOs are collaborating to implement, test, and gain insights into new local flexibility markets and non-firm connections, harnessing flexibility to strengthen electrical grids.



# S2F | Flexibility solutions for DSOs

## Local flexibility markets

To test flexibility markets across three different time horizons based on the needs of our grid:

— **Long-term:** We can predict issues several years in advance, allowing us to plan our grid and consider user flexibility as an alternative to network expansions.

— **Short-term:** We can predict issues one day in advance, enabling us to create a market and determine the hours of the following day when we'll require flexibility.

— **Very short-term:** When we couldn't predict the power quality issue and need quick action from available resources to resolve it.

## Non-firm connection agreements

Flexible connections (Non-firm connection agreements) will enable the Distributor to grant access and connection to a new network user in areas where there isn't sufficient capacity for the requested power during certain times of the year, whether it's for demand, generation, or storage.

These flexible connections expedite the network connection of such users and reduce or even eliminate access and connection costs, in line with the decarbonization goals of the energy sector.

# S2F | Flexibility solutions for DSOs

## Local flexibility markets

- Testing how flexibility can assist us in our planning, operation, and maintenance.
- Testing the necessary tools for the distributor to be prepared to use flexibility.
- Work on the entire process that enables us to use flexibility to operate the grid: from identifying congestion to registering a product on the market platform to triggering active flexibility users and conducting the settlement.

## Non-firm connection agreements

- Developing the methodology to provide access and connection to new users in case the network is saturated using local flexibility markets or other solutions.
- Identify use cases capable of applying this methodology to increase renewable energy penetration without grid congestion



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

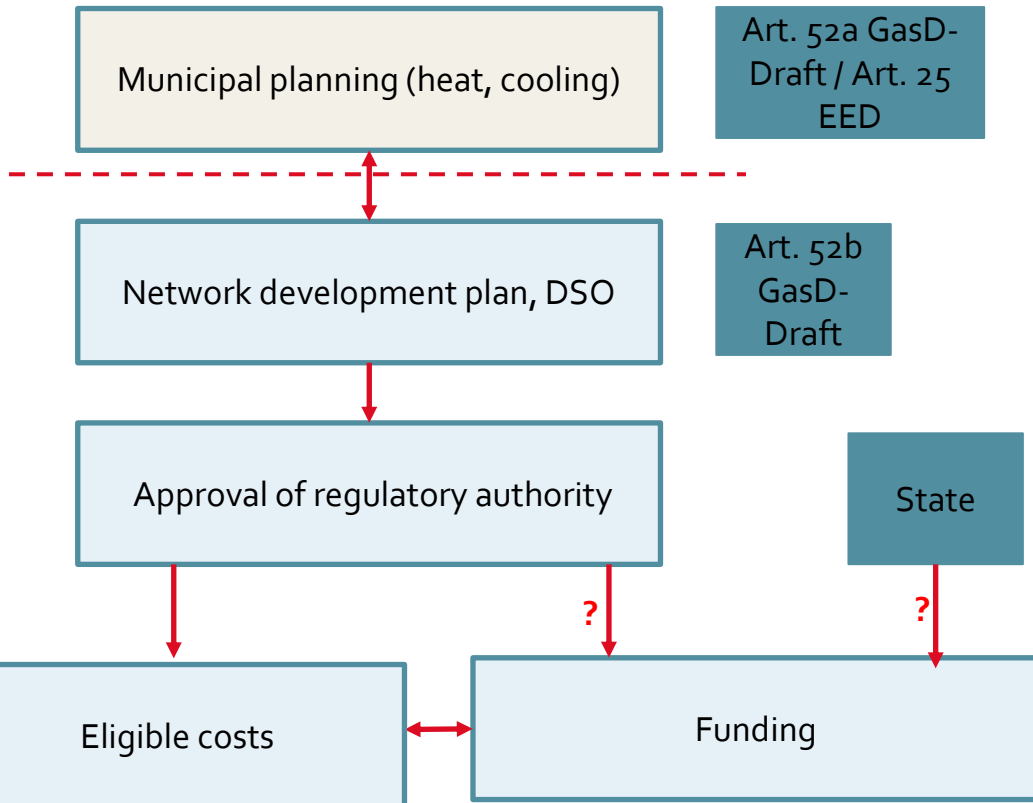
GRANOLLERS  
18-19 October 2023

**Prof. Christian Held**  
**Partner, Becker Büttner Held**

## **New situation for GEODE**

- GEODE traditionally deals with legal - regulatory developments relevant for gas and electricity grids
- Our association is now confronted with a massive shift: **Phase-out of natural gas use**
- **But:** Molecules are still needed particularly in the industry (95% of the industrial gas clients are connected to DSO grids) and transport sector and in some cases in the heating market
- What is our role in the energy system of the future? Questions:
  - How will the future infrastructure for hydrogen and green gases look like and how will it be financed?
  - What is in the transition phase period when natural gas is still necessary?
  - How is the phase-out financed and how do acceptable scenarios of decommissioning look like?
  - Which regulatory changes do we need?

# Municipal heat planning and network development plan (Gas Package EP draft and EED) as an opportunity for our members



EU gas package, inter alia relevant for:

- Regulatory framework for natural gas and H<sub>2</sub>
- Role of DSOs in H<sub>2</sub>
- Grid connection obligations for natural gas

- Extensive stakeholder participation
- Conversion, integrated planning (gas, H<sub>2</sub>, storage ...)
- Shortened depreciation (line-specific)
- Costs for dismantling
- Appropriate fees

**Gas Package is expected to be finalized before the end of the year - Open Ended Trialogue on 27. November 2023**



## **Future key areas for GEODE**

- Strategic and active involvement of DSOs in municipal heating and cooling planning
- Network development planning to manage the transformation of the gas networks
  - Processing of gas grids
  - Hydrogen infrastructure planning
  - Interplay
- Interaction of developments in the heating market with the expansion of the electricity grid
  - Massive expansion required at distribution grid level due to increasing use of heat pumps and other electricity applications in the heating and cooling market
  - Both in areas with and without a gas grid

## **New topic for GEODE**

- **District and local heating and cooling networks** will play an essential role in the transformation and decarbonization of the heating sector
- District and local heating networks are an attractive business model for gas and electricity DSOs
- Due to climate change: Especially in southern european member states district and local cooling will become increasingly important
- GEODE must deal with this topic to a greater extent in the future
  - Already an important topic for GEODE Germany
  - We must ensure that the topic has a permanent place in the structure of the european GEODE working groups.



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Lunch**

# NETWORK OPERATORS ENABLING THE ENERGY TRANSITION ACROSS SECTORS AND MARKET ACTORS – BEST PRACTICES



**Xavier Bou Torrent**  
**Deputy General Manager Business**  
**Development & Renewable Energy**  
**Communities Director, Electra Caldense**



**Marta Chillida**  
**Environment and Green Spaces**  
**Technician – Sustainability,**  
**Granollers City Council**



**Panel Moderator:**  
**Alicia Carrasco**  
**Executive Director Entra,**  
**Agregation & Flexibility**



**Mattia Barbero**  
**Co-founder, Bamboo Energy**



**Germán Medina**  
**Head of Advocacy, NEDGIA**

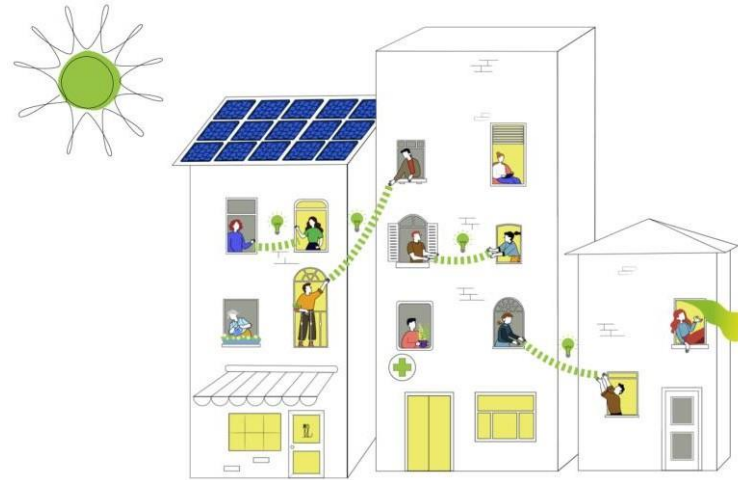


# Building tomorrow's grids today

GRANOLLERS  
18-19 October 2023

**Xavier Bou Torrent**  
**Deputy General Manager Business Development & Renewable Energy Communities Director, Electra Caldense**

# Renewable Energy Communities: Ready, steady, Go!



Xavi Bou

# Spain: Collective self-consumption of renewable energy (RD 244/2019& RD 20/2022)

- ✓ PV generated energy from rooftops free of DSO charges or taxes **within 2000 meters radius from rooftop (500 mts ground mounted).**
- ✓ Energy coefficients to be distributed on a **fix** or **hourly base**.
- ✓ **Excess energy compensation** from each member is to be compensated by energy retailers ( PV Plants <100 nominal Power).
- ✓ **Energy Data Access:** Smart meters are fully deployed and **Datadis** provides access to users and authorised parties.
- ✓ **Anyone can be providing renewable energy services** (Public Administration, private companies, individuals).

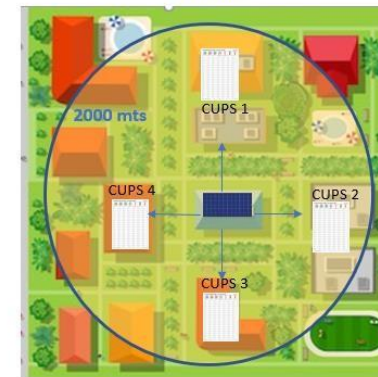


FIX COEFFICIENTS



Same % at 8760 hours  
(assigned power)

HOURLY COEFFICIENTS  
*ex ante*



Different % at each of  
8760 hours (assigned  
power)



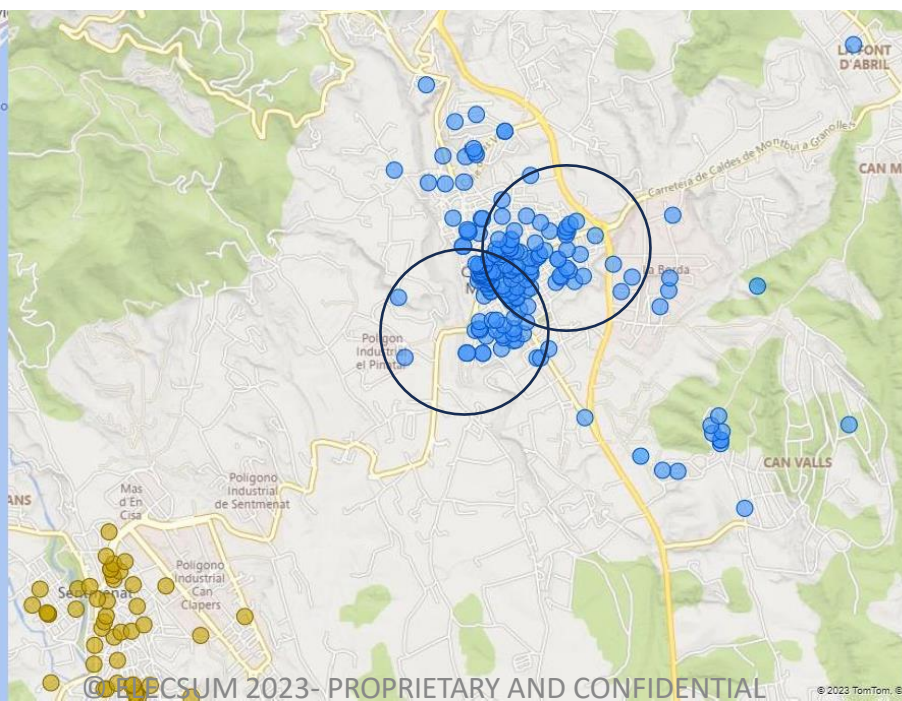
REC & CEC Pending RDdraft May 2023



## Temptative REC members onboarding.

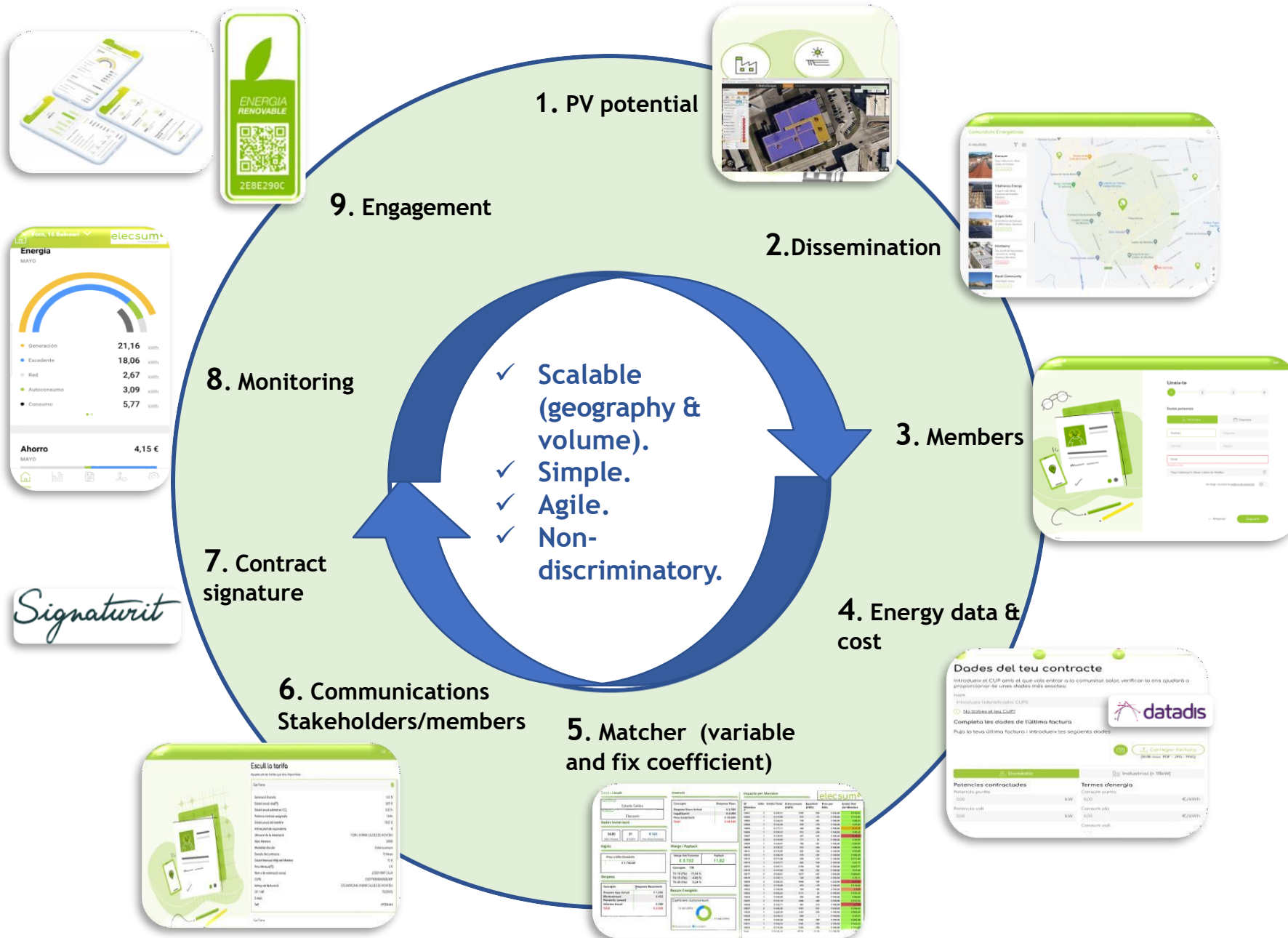
- ✓ Energy data (consumption curve and cost).
- ✓ Preliminary information about power & savings.
- ✓ Available radius -> available RECs.
- ✓ One member connected to multiple RECs radius.
- ✓ Multiple DSOs in one RECs radius.


**IDAE** <https://informesweb.idae.es/visorccee/>  
 Instituto para la Diversificación y Ahorro de la Energía



Generació lliurada:	15 %
Potència nominal assignada:	15 kWn
Modalitat d'accés:	Dret exclusiu
Estalvi anual total(*1):	2914.21 €
Estalvi anual del membre:	739.21 €
Estalvi Mensual Mitjà del Membre:	61.6 €
Preu Mensual:	181.25 €
Durada del contracte:	12 Meses
Estalvi anual estimat en CO <sub>2</sub> :	4.82 Tn
Arbres plantats equivalents:	201
Ubicació de la instal·lació:	Avinguda Pi i Morgall, 138 08140 CALDES DE MONTBUI
Núm. Membre:	004007





No condition on Energy retailer



> 1300 kWn



> 1300 members

Video: <https://share.elecsun.com/es>

# Any challenges in Spain?

- Missing EU Directives' transposition.
- Energy Data
- Permitting DSO (Access points + bureaucracy)
- REC Manager. User connected?
- PV Installers expertise



Yes, you can!



**Caldes (June 2022)**  
Members: 20 (residential and commercial)  
Power: **100 kWn**



**Gallifa (June 2022)**  
Members: 39 (residential)  
Power: **50 kWn**



**St Eulàlia (Nov. 2022)**  
Members: 2 (industrial)  
Power: **10 + 250 kWn**



**Sentmenat (2023)**  
Members: 4 (industrial)  
Power: **40 kWn**



**Caldes (July 2022)**  
Members: 100 (residential)  
Power: **100 + 200 kWn**



**El Prat del Llobregat (October 2023)**  
Members: + **1000** (residential and commercial)  
Power: + **500 kWn**

# Many thanks!

Xavier Bou

E-mail: [xbou@electracaldense.com](mailto:xbou@electracaldense.com)

Phone: +34 621221927



# **REC** Renewable Energy Community

## **Directive (UE) 2018/2001 (Article 2.16)**

1. Legal entity required.
2. Voluntary and open participation.
3. Effective control of stakeholders or members located in the proximity of renewable energy projects owned/developed by the entity.
4. Owners/members must be:
  - Natural persons
  - Micro, small, medium, large enterprises
  - Local authorities
5. Autonomous
6. Primary purpose: provide environmental, economic and social benefits to its stakeholders/members or the local areas where it operates, rather than financial profits.

**All energy sectors | Renewable technologies**



# **CEC** Citizen Energy Community

## **Directive (UE) 2019/944 (Article 2.11)**

1. Legal entity required.
2. Voluntary and open participation.
3. Effective control of stakeholders or members.
4. Owners/members must be:
  - Natural persons
  - Micro, small, medium, large enterprises
  - Local authorities
5. Primary purpose: provide environmental, economic and social benefits to its stakeholders/members or the local areas where it operates, rather than financial profits.
6. May engage in: generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders

**Electric sector | Neutral Technology**

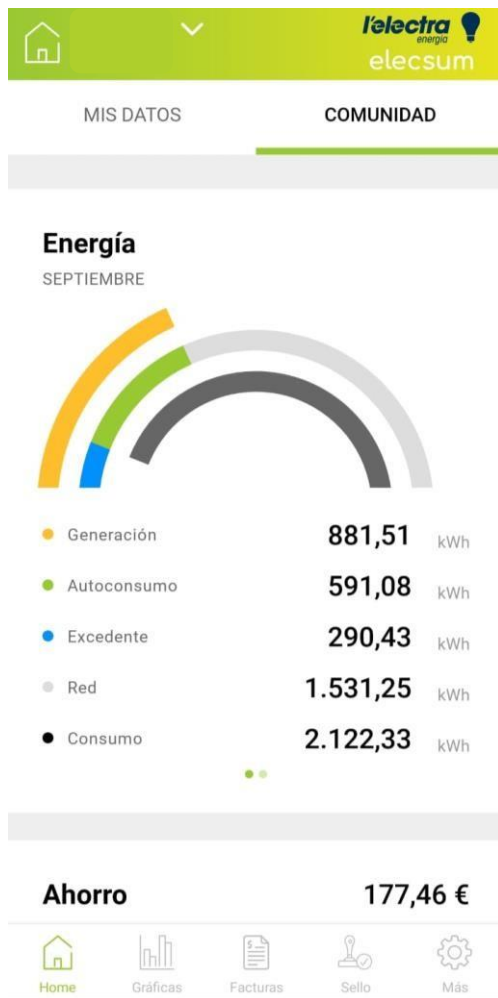
**Pending transposition!! Royal Decree Draft under public consultation from May 2023**

Individual and community PV data

Members list and Energy coefficients

Energy advice and follow up

DIGITAL REN Certificate



**Elecsun Green**

¿Qué es el sello renovable?

**COMPARTIR SELLO**

- Elecsun Green ofrece a nuestros clientes poner en valor la generación de energía fotovoltaica y consumo de energía 100% renovable para entrar a formar parte de una comunidad de empresas, comercios y profesionales comprometidos con combatir activamente los efectos del cambio climático y cumplir los objetivos de Responsabilidad Social Corporativa respecto al medio ambiente.
- Elecsun Green acredita a tus clientes y personal que toda la energía con la que fabricas/consumes tus productos/servicios es 100% renovable.

ENERGIA RENOVABLE  
D025IFC1

# Members' digital guarantee of origin





 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

**Marta Chillida**  
**Environment and Green Spaces Technician – Sustainability,**  
**Granollers City Hall**

# Developing heating networks in Granollers

## Local authorities' perspective enabling energy transition



### Building tomorrow's grids today

GEODE Autumn Seminar

Granollers, 18 – 19 October 2023



Ajuntament de Granollers



Geode - The Voice of Local Energy Distributors across Europe

estabanel·l distribució  
és ara  
**anell**



2030-2050  
Long term objectives

# Energy transition

NET ZERO



**2024**  
Action plan for long term objectives



**2023**  
PEEEG  
ENERGY MAPS



**2022**  
Futureproofed  
part of Sweco



**2021**  
Second report



**2016-2030**  
Adaptation



**2015**  
First report



**2009-2020**  
Mitigation



**2009-2019**



**1999-2009**



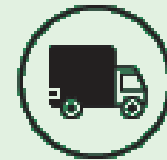
Ajuntament de Granollers



# Granollers' main emissions



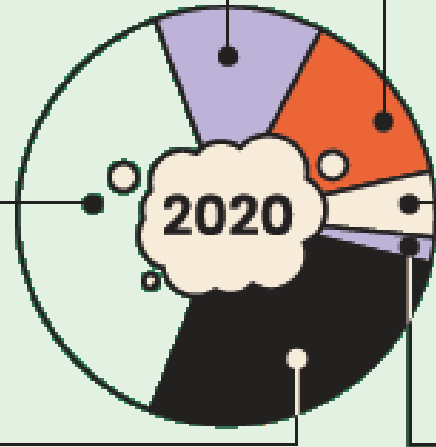
**13%**  
Tertiary, trade, services



**38%**  
Transport



**28%**  
Manufacturing industry



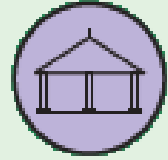
Residential



Waste



Local public services



Què són les emissions de CO<sub>2</sub> equivalents? Són el resultat de les emissions de CO<sub>2</sub> i altres gasos d'efecte hivernacle (metà, gasos fluorats i òxid de nitrogen) que s'emeten a l'atmosfera i que contribueixen al canvi climàtic. Les emissions de CO<sub>2</sub> equivalents són el resultat de les emissions de CO<sub>2</sub> i altres gasos d'efecte hivernacle (metà, gasos fluorats i òxid de nitrogen) que s'emeten a l'atmosfera i que contribueixen al canvi climàtic.

# BIOenergia Granollers



Ajuntament de Granollers



Energy supply: **Local biomass (nearby forests' wood)**

- **2DH 5 + 7 buildings**, schools and other public facilities
- **Total demand:**
  - 611 MWh/year (North branch- Xarxa Nord)
  - 705 MWh/year (South branch- Xarxa Sud)
- **Financing:**
  - 50% European ERDF funds
  - 50% municipality budget
- **Project calendar completed:**
  - North branch – First trimester 2020
  - South branch – Second trimester 2021



# Xarxa Nord-North branch



Ajuntament de Granollers



**The first district heating ever built in the city (2020), with a small energy supply plant (0.5 MW) and a known thermal energy demand of 755.711,03 kWh per year.**

The users are schools and other public facilities

- Two high school centers:
  - Escola Municipal de Treball,
  - Institut Antoni Cumella,
- Two primary school centers:
  - Escola Salvador Llobet
  - Escola Salvador Espriu,
- A cultural center: Sala Edison del Centre Cultural



# Xarxa Nord-North branch



BIOenergy    Local renewables for less fossil fuels and less greenhouse gas emissions

# Xarxa Sud-South branch



Ajuntament de Granollers



**The second district heating built in the city (2021) with an energy supply plant of 1 MW and a known energy demand of 704.788 kWh per year.**

Two schools:

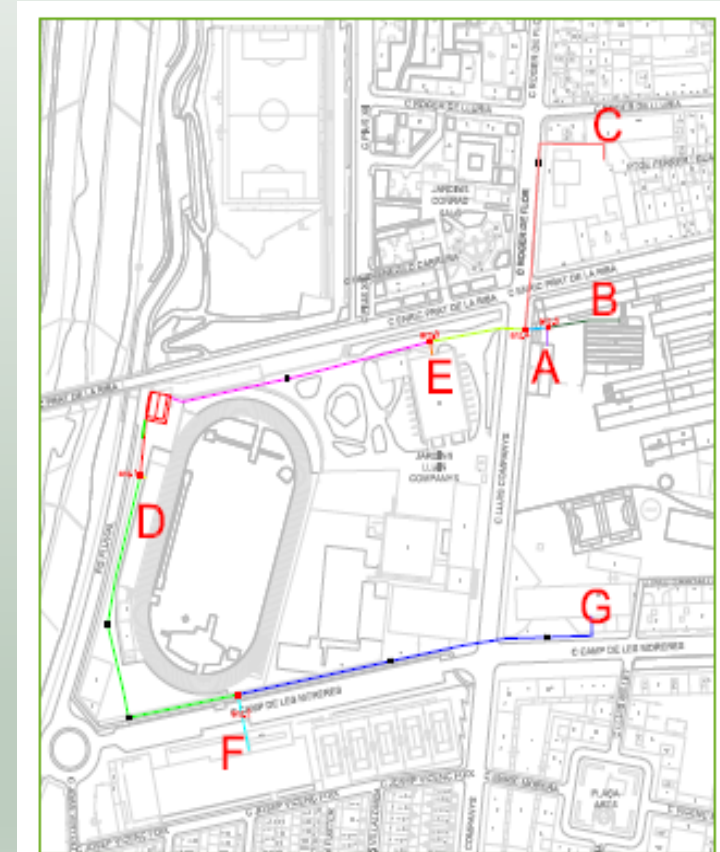
- Ferrer i Guàrdia primary school (C)
- Carles Vallbona secondary school (G)

Three sport facilities:

- Pavelló Municipal d'Esports (E)
- Pavelló poliesportiu municipal El Tub (F)
- Municipal athletics tracks (D)

Other public facilities:

- Municipal printing service / artist's studio
- La Troca center of popular culture

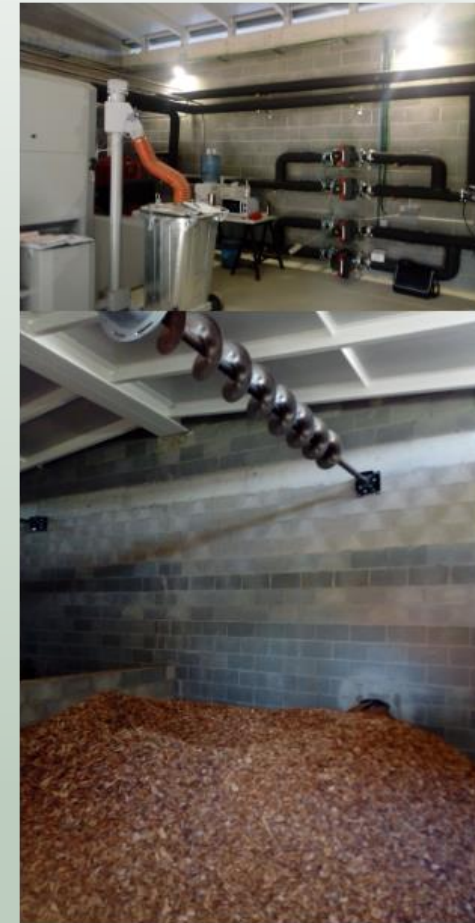


Traçat de la Xarxa Sud de calor

# Xarxa South-South branch



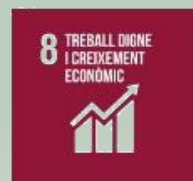
Ajuntament de Granollers



BIOenergy Local renewables for less fossil fuels and less greenhouse gas emissions

# BIOenergia's Outcomes

- Use of local biomass, a source of renewable energy, for thermal uses in municipal facilities
- Improvement of efficiency, safety and energy diversification
- Opportunities for economic growth and the creation of qualified jobs in local economic sectors with a sustainable use of wood from nearby forests.
- The displacement of 12 gas boilers by 3 biomass boilers (500 kW each) what represents savings of 330 tonnes of CO<sub>2</sub>eq/year and almost €40,000/year
- Contribution to A2030 Sustainable Development Objectives and SECAP 2030, reducing GHG emissions, increasing renewables use and other related objectives:



# BIOenergia Vallès Oriental **BioVO**



## **Methane biogas from**

Two public facilities anaerobic fermentation/digestion of organic matter:

- Waste water treatment plant
- Composting plant of municipal biowaste



Ajuntament de Granollers

Pre-feasibility study (2019-2021) THERMOS : Concentration of industrial demand (102 GWh/year). Supply plant 32MWt (forest biomass/biogas)

THERMOS

Funded project 2021 Agreement to upgrade biogas

- Total cost 2.775.000 eur project (1.012.944 eur IDAE/European Regional Development Fund)
- 2022 started to build the upgrading plant
- 2023, agreement with Naturgy to buy up to 22GWh/year

Naturgy



# Thank You!

Marta Chillida Munguet  
Environmental and green areas  
department

[mchillida@granollers.cat](mailto:mchillida@granollers.cat)

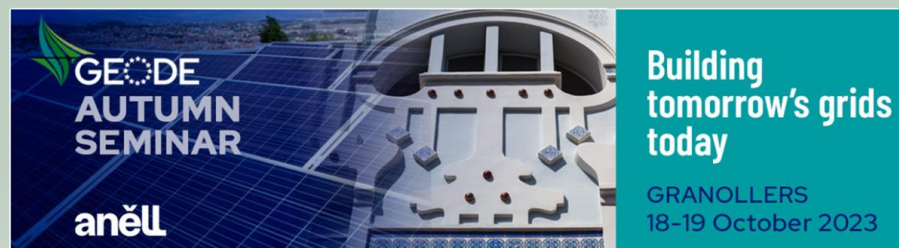
Tel +34 628 541 847



Ajuntament de Granollers

GEODE Autumn Seminar 2023

 **estabanell** *distribució*  
és ara  
**anell**



[www.geode-eu.org](http://www.geode-eu.org)





 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

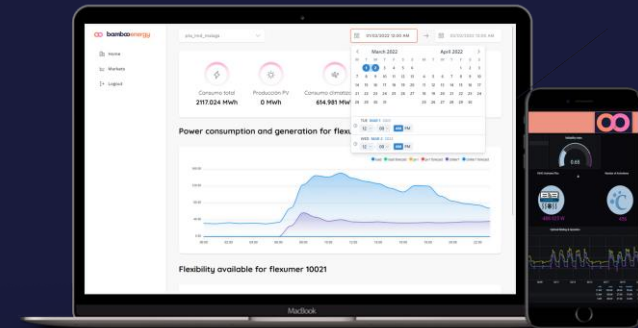
**GRANOLLERS**  
**18-19 October 2023**

**Mattia Barbero**  
**Co-founder, Bamboo Energy**

# Bamboo Energy

## GEODE Autumn Seminar 2023 Flexibility needs in Distribution Networks

Mattia Barbero, PhD  
Founder & Product Owner

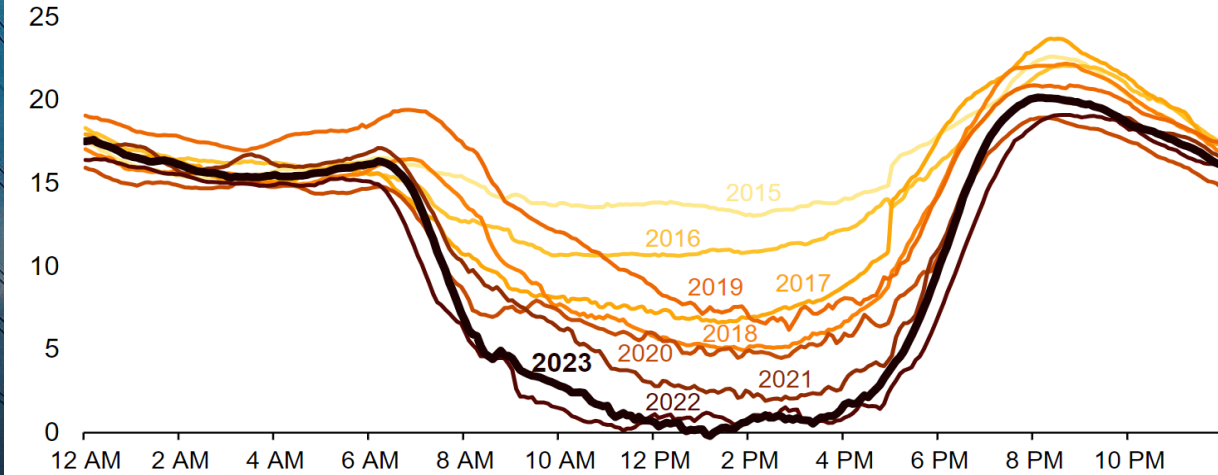


# The need of flexibility

The duck curve is already a reality in Europe

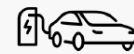
## California's duck curve is getting deeper

CAISO lowest net load day each spring (March–May, 2015–2023), gigawatts



## Flexible capacity of assets by 2030

LCPDelta



Electric Vehicles  
changepoints

315 GW



Stationary storage

19 GW



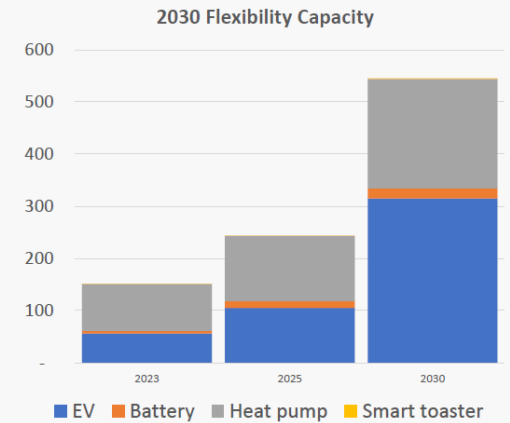
Heat pumps

210 GW



Smart toasters

1 GW



# Benefits from flexibility

Benefits are clear both for consumers and system operators



**€11.1–29.1 billion** would be **saved** in investment needs in distribution grids at EU 27 **annually**.  
**27% to 80%** of today's forecasted **investment needs**.

**Direct benefits for consumers of €71 billion** per year on electric consumption.

Over **€300 billion** in **indirect annual benefits to people**



Grid-friendly use of **DSF** capacity can **reduce by 76.9% the required investments** in distribution grid expansion in Germany by 2035.

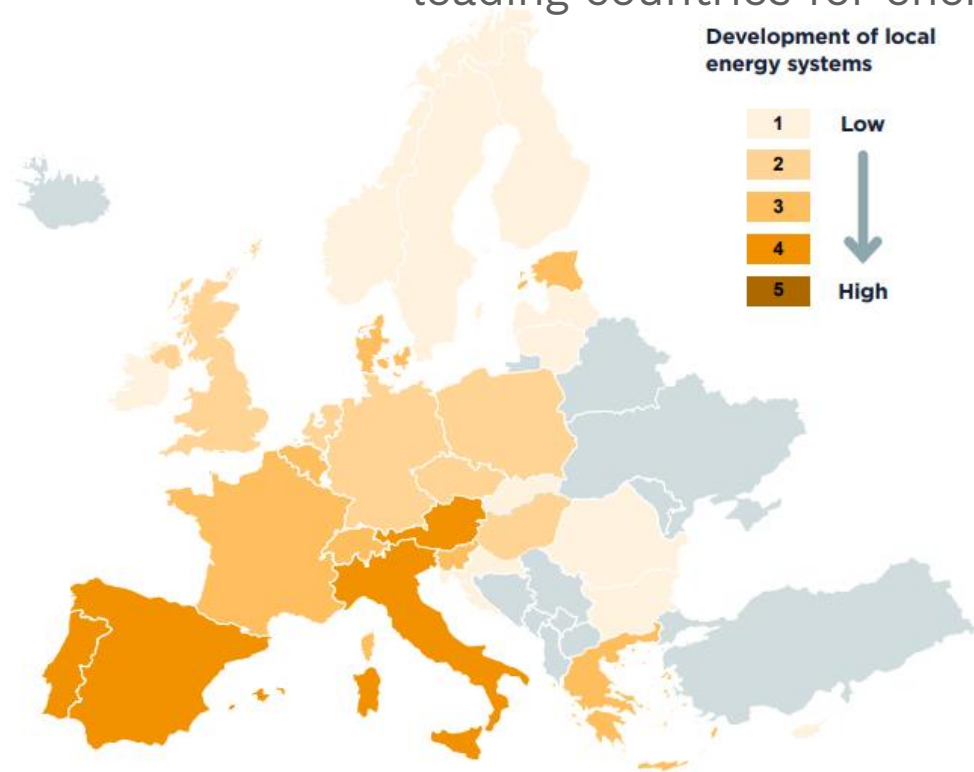


**Business as Usual costs** for DSOs are between **20 and 65 % higher** than using flexibility solutions.



# Development of energy communities and collective self-consumption

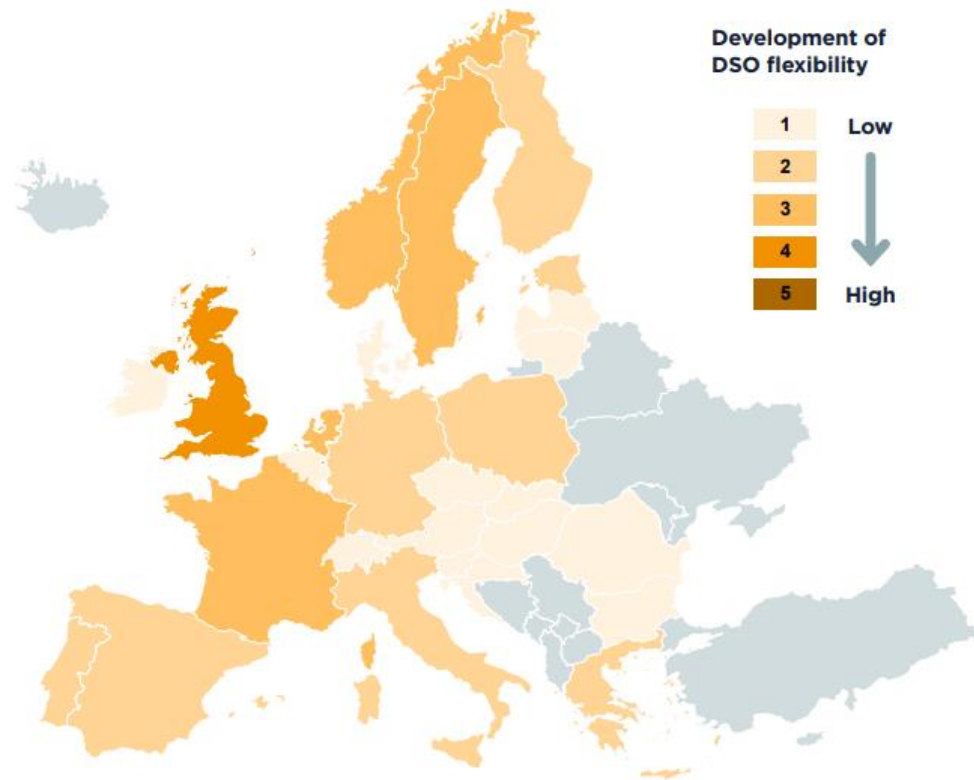
Portugal, Spain, Italy and Austria are currently the leading countries for energy communities



- Is collective selfconsumption allowed?
- Is there a national framework for citizen energy communities?
- Is there a national framework for renewable energy communities?
- Are there subsidies that enable local energy systems?

# Development of DSO flexibility market

The European Electricity Directive, in Article 32, already recognises the importance of giving incentives to DSOs to create such markets



- Whether there are commercial DSO flexibility markets.
- How many DSO flexibility trials are happening in the country?
- What is the volume of flexibility being traded in the commercial market and trials?

# A SaaS to disrupt the energy system

## Demand and generation forecast

Advanced machine learning techniques for energy consumption and local generation.

## Flexibility forecast

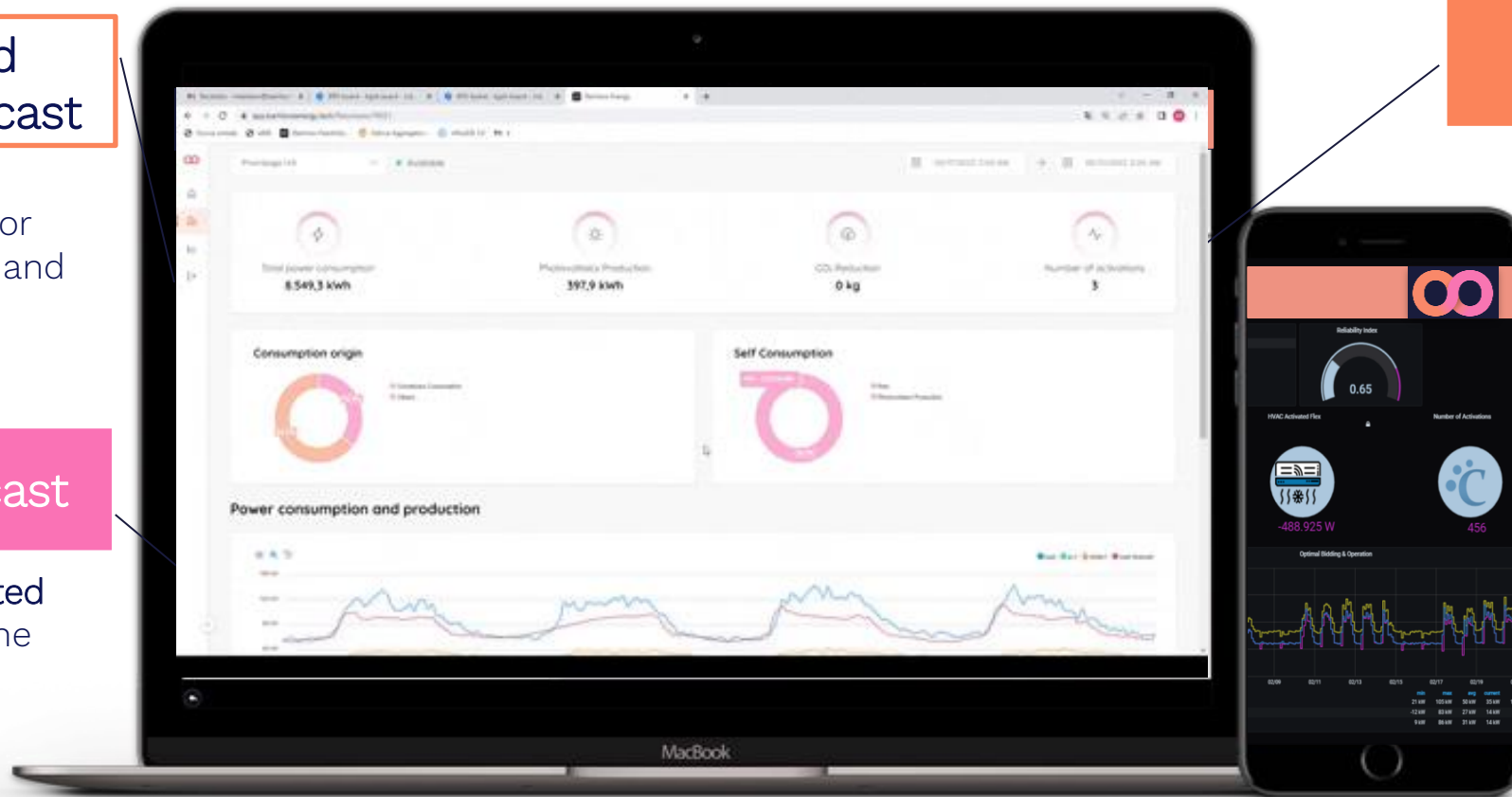
Exclusive and patented solution to predict the flexibility of your customers.

## Intraday operations

Real-time operation on flexible assets and data intelligence

## Optimal bidding strategy

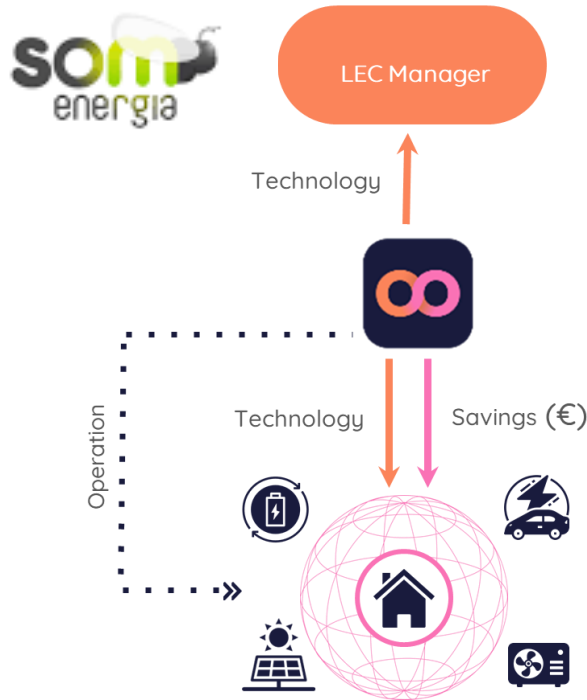
Market value staking with flexibility using optimization models





# Energy communities in Spain

From optimizing shared assets to explicit flexibility



### Analysis & Go Live

- Analysis of CEL resources and processes
- Adaptation of the platform to each use case
- Support in the communication systems

### Monitoring

- Two levels of Interfaces (Aggregator/CEL and User/FLEXUMER)
- Visualization of consumption/local generation/batteries in real time and historical of ALL assets
- Delivery of information on energy exchanges.

### Management

- Management of all assets of the CEL (optimized according to particular case).
- Reduction of consumption peaks to reduce the Contracted Power.
- Optimal management of solar energy at community level (includes dynamic coefficients)
- Market participation and management of surplus flexibility.

# Local energy community to solve grid congestions in Amsterdam

## Problem

1. Congested grid due to electric vehicle charging points.
2. DSOs transformers operates at its limit
3. Limited hours by the DSO to charge the car

## Agents

1. Energy community
2. DSO (Liander)
3. Technology provider (BambooEnergy)



## Solution

Implement flexibility measures to optimize the consumption and production to **avoid peaks** and help DSO in congestion problems

1. Demand and generation forecast
2. Flexibility estimation
3. Asset monitorization
4. Continuous communication with DSO
5. Demand management (heat pumps, small industries, ...)
6. Active management of EV chargers



DSO





# Main challenges

- Coordination DSO/TSO
- Business model for small consumers still under construction
- Data transparency and system interoperability
- Baseline methodology
- To have visibility on the grid to know the needs for DSOs
- Lack of understanding from the demand side

# Let's Bamboo together!

[www.bamboenergy.tech](http://www.bamboenergy.tech)

Mattia Barbero, PhD  
*Founder & Product Owner*  
mbarbero@bamboenergy.tech

With the support of:

**bamboenergy**



# How are we accelerating the market



**Follow up and support**



**Analysis and monitoring**



**Management**



**Additional services**



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

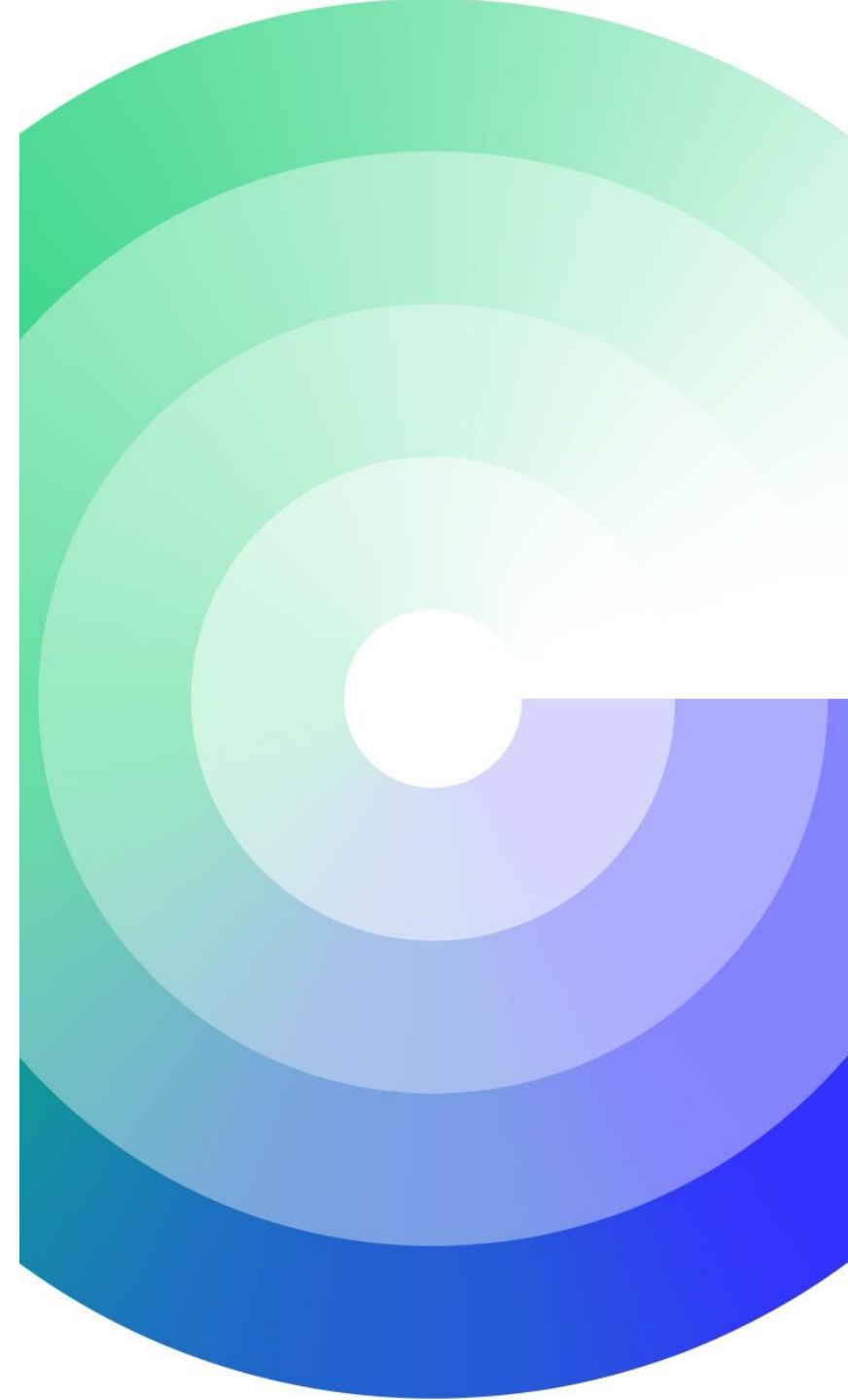
**GRANOLLERS**  
**18-19 October 2023**

**Germán Medina**  
**Head of Advocacy, NEDGIA / SEDIGAS**

# **GEODE Autumn Seminar**

## **NETWORK OPERATORS ENABLING THE ENERGY TRANSITION ACROSS SECTORS AND MARKET ACTORS**

**19/10/2023**



# Spanish adaptation to renewable gases

Spain has significant potential to develop renewable energy technologies. The country's geographical location and climate make it particularly suitable for various renewable energy sources.

## Sedigas support:

- Advocating technology-neutral policies
- Encouraging free and economically efficient competition among energy sources
- Emphasizing balanced approach and recognizing benefits of all available energy solutions

## But finds Spanish NECP to be:

- Biased on policies supporting various energy sources
- Not acknowledging competitiveness among technologies in the market

To fully realize its potential in renewable energy technologies, Spain should continue to **invest in research and development**, promote **policy incentives** for renewable energy projects, and **encourage private sector involvement**. The integration of these renewable energy sources into the energy mix can help Spain **reduce its emissions**, enhance **energy security**, and **increase competitiveness** while contributing to the global transition to a more sustainable energy future.

Advocating for greater incorporation of biogas and hydrogen potential

**We propose a biomethane production target of at least 47 TWh by 2030.**

**Sedigas values positively the target of 11 GW of electrolyzers by 2030**, and Sedigas points out the lack of concreteness in fundamental elements for the development of renewable hydrogen, which could affect its viability and effective deployment



**Context**



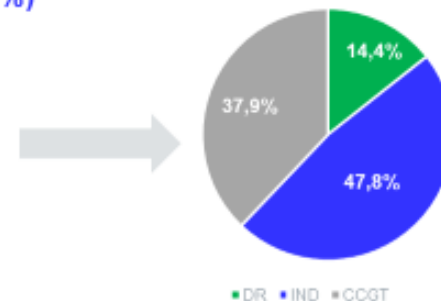
## Spanish gas system

- 19 supplier countries
- 6 +1 regasification plants
- 6 international gas pipelines
- 71% LNG imports



## The gas system in figures

Evolution of demand (Spain): 364 TWh (- 3.7%)



- Conventional demand: -21.4
- Electricity generation (highest value since 2010): +52.6%.
- CAGR (from 2018): 4.3%.

### Some basic magnitudes:

- Installation companies: ~20,000
- Jobs: ~150,000
- GDP: 0.5
- Investment (mn.€): 254
- Number of municipalities: 1,814 (penetration ratio: 31%)
- No. Customers: ~8 million
- Gas pipelines: 95,434 kilometers



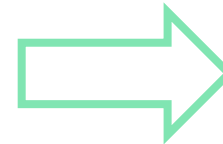
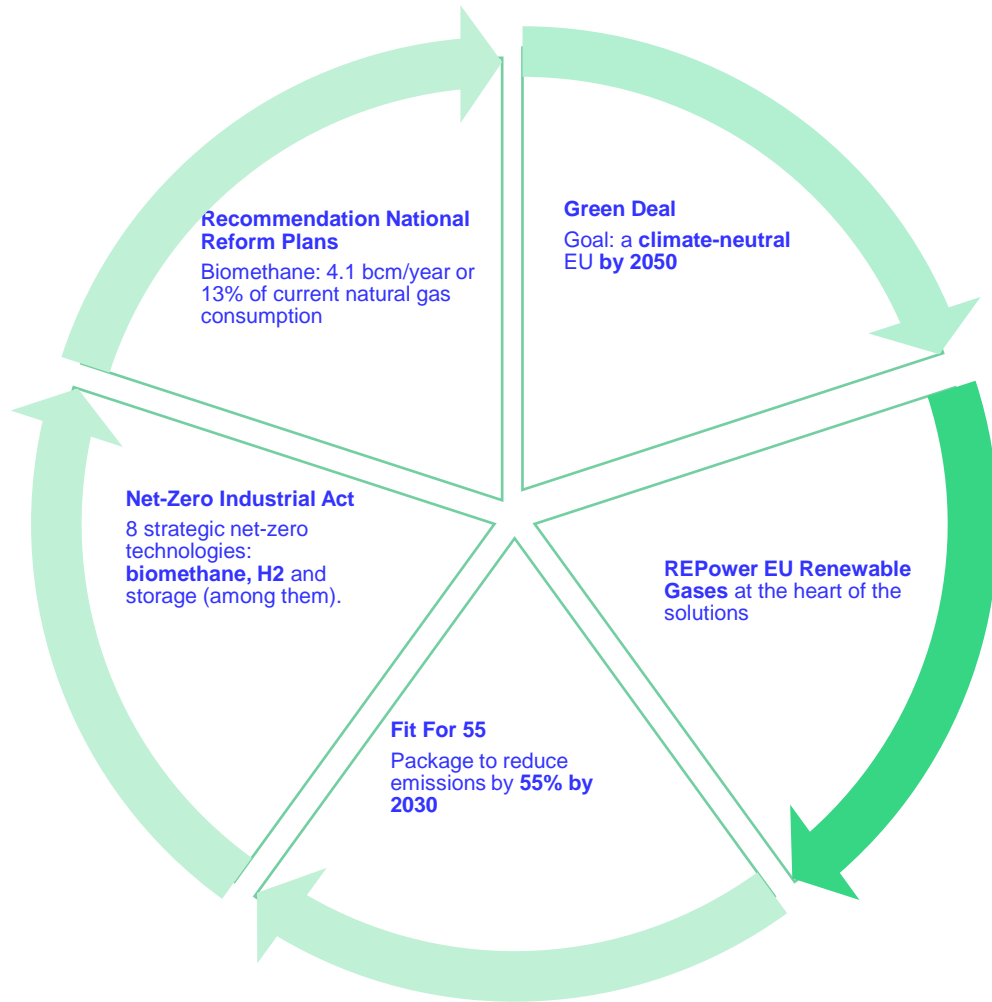
**The rate of filling of storage in Europe slows down:**  
 Once the objectives set by the EU for 1st November (start of the winter campaign) have been met. This makes it possible to face the winter 2023-24 with greater optimism.



## GIE-AGSI (Aggregated Gas Storage Inventory)

	2023	28-ago.	7-sep.
<b>EU</b>		<b>92,5%</b>	<b>93,9%</b>
GER		93,9%	94,0%
ESP		100,0%	100,0%
	<b>2022</b>	28-ago.	7-sep.
<b>EU</b>		<b>79,8%</b>	<b>82,7%</b>
GER		83,3%	87,0%
ESP		84,2%	85,7%

# EU action to address the energy crisis: Europe sets the path for renewable gases expansion



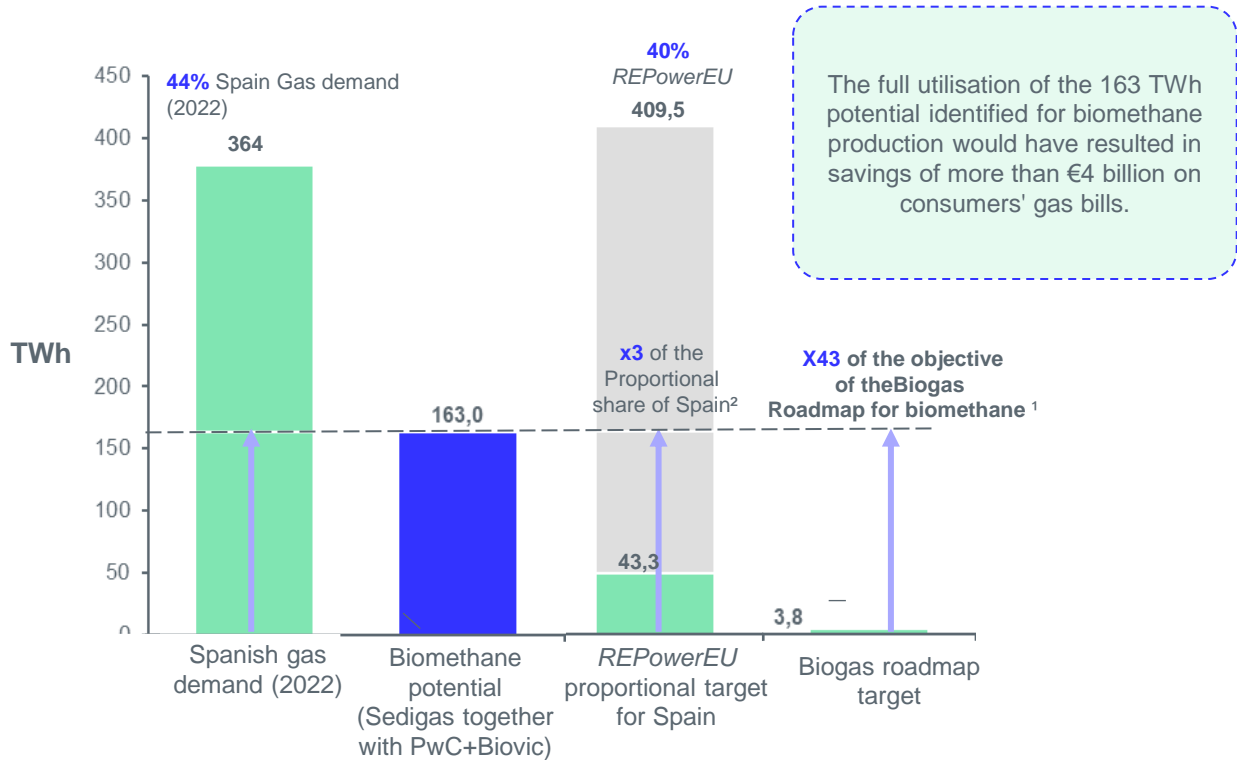
Target: **35 bcm** of biomethane by 2030 (~10% EU demand)

**Renewable gases** as major drivers of decarbonization

Target: **20 Mt (50% domestic)** of H<sub>2</sub> by 2030

# Energy Context. Outlook 2023 Renewable Gases

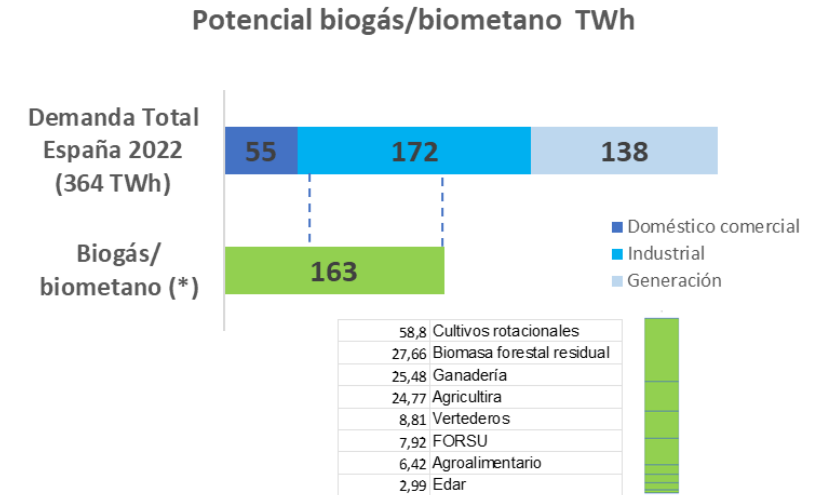
## Comparison of the identified biomethane potential with the main references in the sector:



<sup>1</sup> Se ha calculado en base a la previsión de que el 1% de la demanda de gas sea biometano en 2030 de la HdR del Biogás, con la demanda de gas del año 2021

<sup>2</sup> Objetivo recogido en el documento de recomendaciones de Plan Nacional de Reformas publicado por la CE el 24/05/2023

## Comparison of identified biomethane potential in terms of consumption:



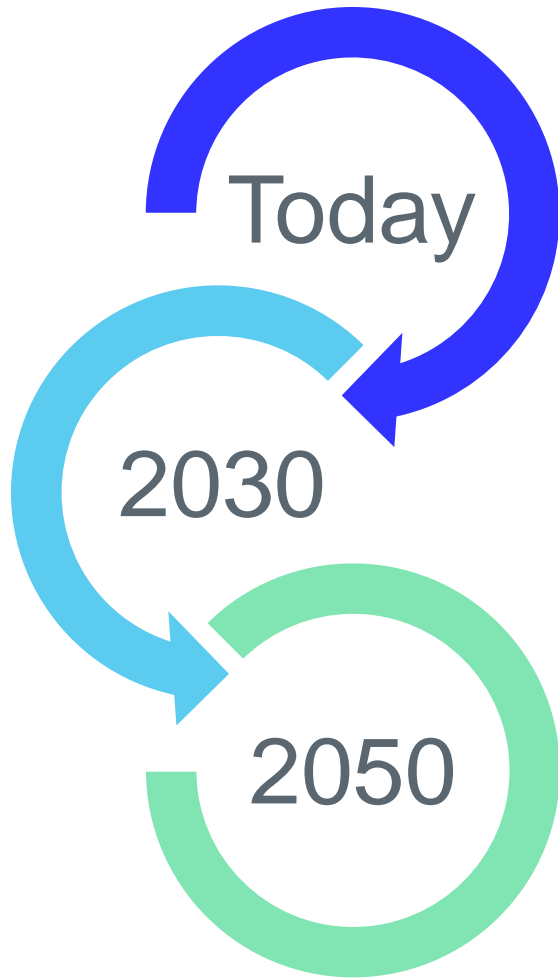
(\*) Potencial calculado en el "Estudio de la capacidad de producción de biometano en España, 2023" de Sedigas

### Potential to replace:

- 72% of conventional demand,
  - ie:100% of domestic and 63% of industrial demand.
- In other words 45% of total gas demand. Renewable gases should be considered as a key element for the heating sector.



# Sedigas' Commitment to Sustainable Energy Transition



- Increase in biomethane and H2 blending in gas infrastructures
- Need for stable regulatory framework for biomethane and H2
- Need for GoO/PoS

- Substituting more polluting fuels
- Supporting electric REE
- Supporting electricity system

- Decarbonized gas system
- Spain as renewable energy exporter
- Security of supply essential element

- Sedigas' firm commitment to sustainable energy transition
- Support for Spain's ambitious goals outlined in PNIEC 2021-2030
- Aim to reduce greenhouse gas emissions and contribute to EU's Paris Agreement commitments



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**

## **Closing Remarks**

# CLOSING REMARKS



**Ms. Alba Barnusell**  
**Mayor of Granollers**



 **GEODE**  
**AUTUMN**  
**SEMINAR**

**anell**

**Building  
tomorrow's grids  
today**

**GRANOLLERS**  
**18-19 October 2023**