

Revision2026 International Conference

Sustainable Energy Transition in Spain

Hugo Lucas Porta

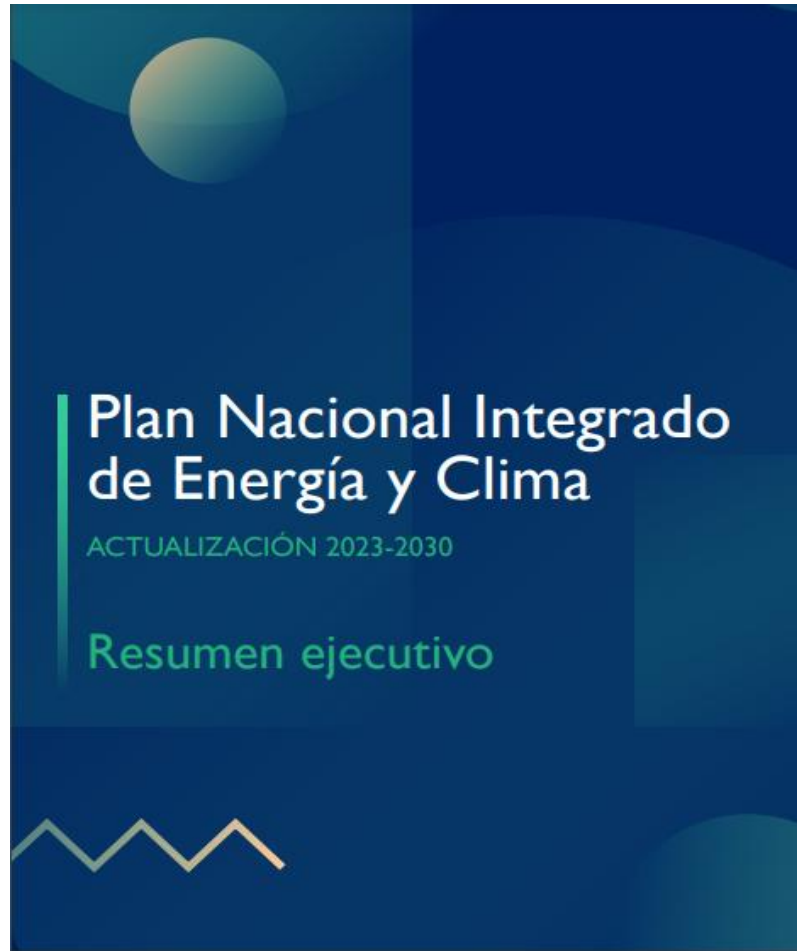
Director of Knowledge, New Business Model Development and Competitiveness



Evolution of Renewable Energy Generation

	2010		2025	
CAPACITY	104 GW		148 GW	
	TWh	%	TWh	%
GENERATION	296,00	100,00%	272,00	100,00%
NUCLEAR	62,00	20,95%	51,80	19,04%
COAL	25,50	8,61%	1,50	0,55%
CCGT	68,60	23,18%	45,70	16,80%
WIND	43,70	14,76%	58,80	21,62%
FV	6,30	2,13%	50,20	18,46%
OTHER RENEWABLE	51,40	17,36%	42,00	15,44%
OTHER FOSSIL	38,50	13,01%	22,00	8,09%

HOW HAVE WE ACHIEVED THIS INCREASE IN RENEWABLES?



32%

GHG emissions



43%

Energy efficiency



48%

Renewable energy



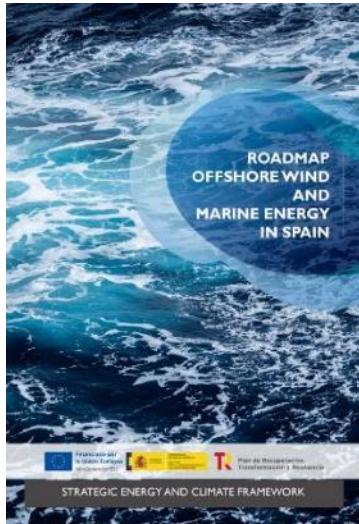
81%

Electricity sector

Sectoral Roadmaps and Strategies



Renewable Hydrogen



Offshore Wind & Marine Energy



Self-Consumption



Biogas

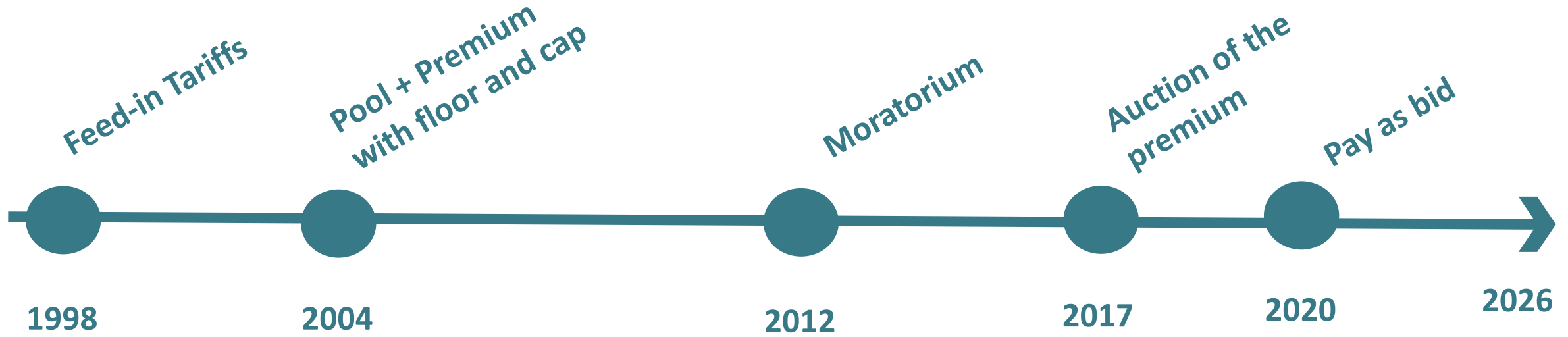


Energy Storage



Raw Materials

Spain' Evolution of Support Schemes



FV 180€/MWh
Wind 73€/MWh

FV 24,4€/MWh
Wind 25,3€/MWh

CITIZEN'S ROLE: SPAIN'S DISTRIBUTED SELF-CONSUMPTION

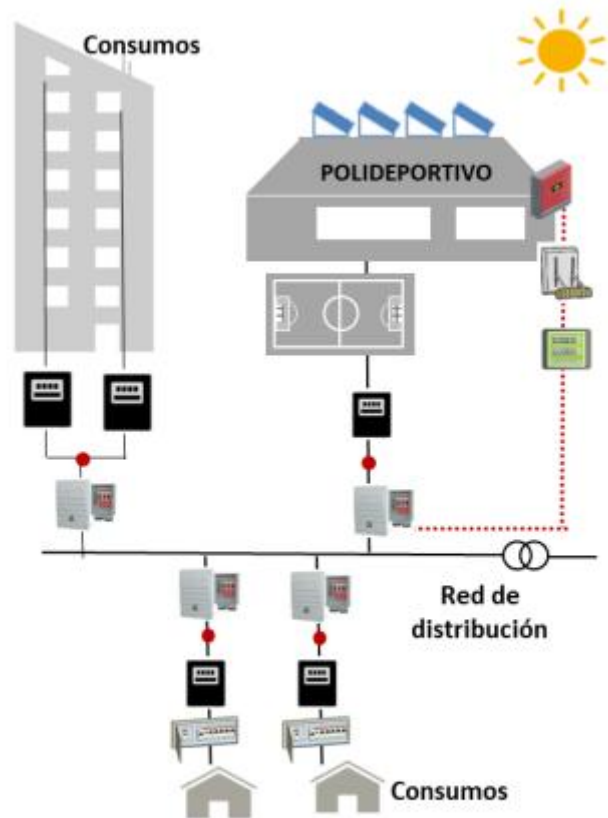


FIGURA D.8. Autoconsumo colectivo a través de red ACOGIDO a compensación

Self-consumption is currently defined by Royal Decree 244/2019:

- **Modalities:** individual or collective self-consumption, , either behind-the-meter (on-site) or through the public grid (shared installations).
- **Simplified compensation:** surplus energy is credited on the bill.
- **No cash payments:** compensation can reduce the energy term down to €0, but does not generate revenue.
- **Simplified procedures:** for installations ≤ 100 kW (administrative, access and connection).
- **Collective radius:** consumers may participate if located within 1 km of the PV installation (planned extension to 2 km).

Photovoltaic self-consumption data in Spain Accumulated power evolution



IDAE has developed various technical guidelines and training programmes on self-consumption:




IDAE has managed approximately €1,659.3 million in self-consumption support programmes.





Solar PV: 5.6 GW

CITIZEN'S ROLE: SPAIN'S ENERGY COMMUNITIES

REGULATION

- 

Directive (EU) 2019/944 → Citizen Energy Communities:
Legal entities with open and voluntary participation, autonomous and effectively controlled by individuals, SMEs or local authorities, whose primary objective is to deliver environmental, economic or social benefits rather than financial profit
- 

Directive (EU) 2018/2001 (RED II) → Renewable Energy Communities:
Same principles, but applied exclusively to projects based on renewable energy sources.
- 

Spain has already defined both energy community frameworks in its national legislation
Although the full regulatory framework is yet to be finalised and currently remains under draft consultation.

SUBSIDIES

CE IMPLEMENTA



IMPLEMENTA

Projects that promote social innovation and citizen participation in renewable energy, energy efficiency, or electric mobility

Budget of around €220 million

CE OFICINAS



Community Transformation Offices for the promotion and revitalisation of energy communities: strengthen the support system for stakeholders interested in the creation and development of energy communities.

Budget of around €20 million

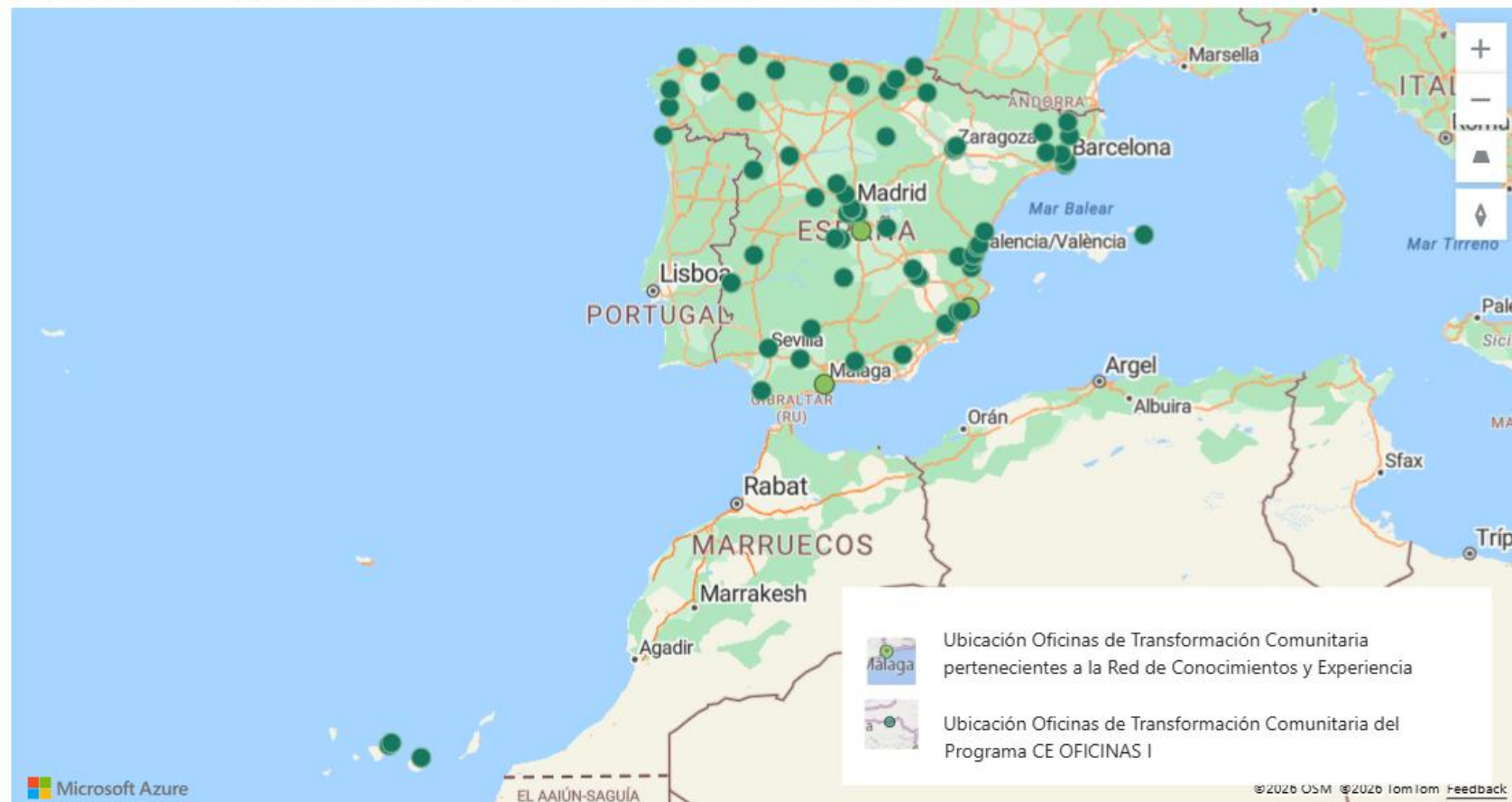


In October 2023, the first call for applications for the incentive program for granting aid to Community Transformation Offices for the promotion and revitalization of energy communities was resolved.

As a result of this call, a network of more than 70 Community Transformation Offices is now operational throughout the country.

Mapa de Oficinas de Transformación Comunitaria

Convocatoria ● OTC's pertenecientes a la Red de Conocimientos y Experiencia ● Programa CE OFICINAS I



Currently 146
energy communities

Mapa de Comunidades Energéticas



INTEGRATION OF ELECTRICITY GENERATION INTO THE GRID

1 The oscillations affected the system

2 The system did not have sufficient dynamic voltage control capacity.

3 There were a series of disconnections, some of which 'were apparently undue'.

This contributed to the escalation of the voltage and ultimately to the blackout.

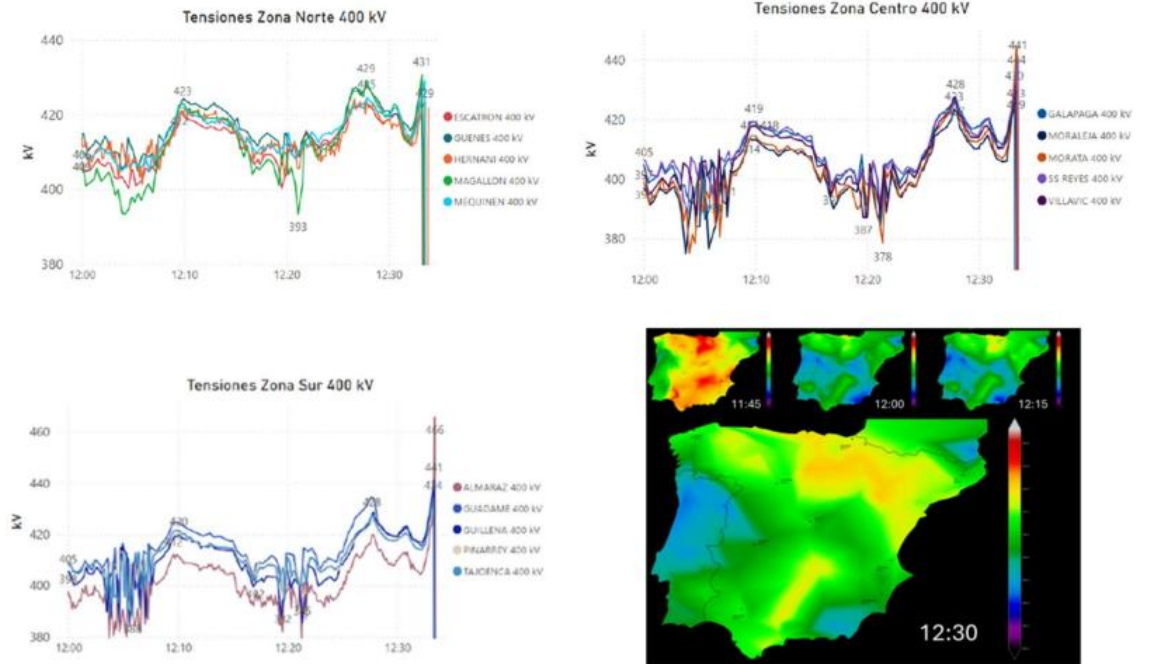


Gráfico 14 Evolución de las tensiones en la red de 400kV entre las 12:00 y las 12:35. Fuente: REE



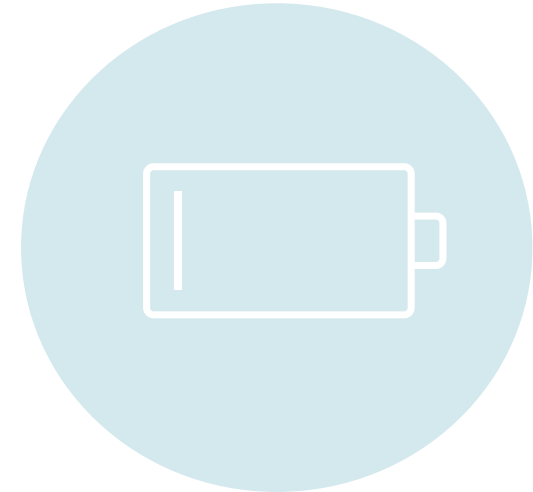
CHALLENGES OF RENEWABLE ENERGY



1. Economic viability



2. Social acceptance

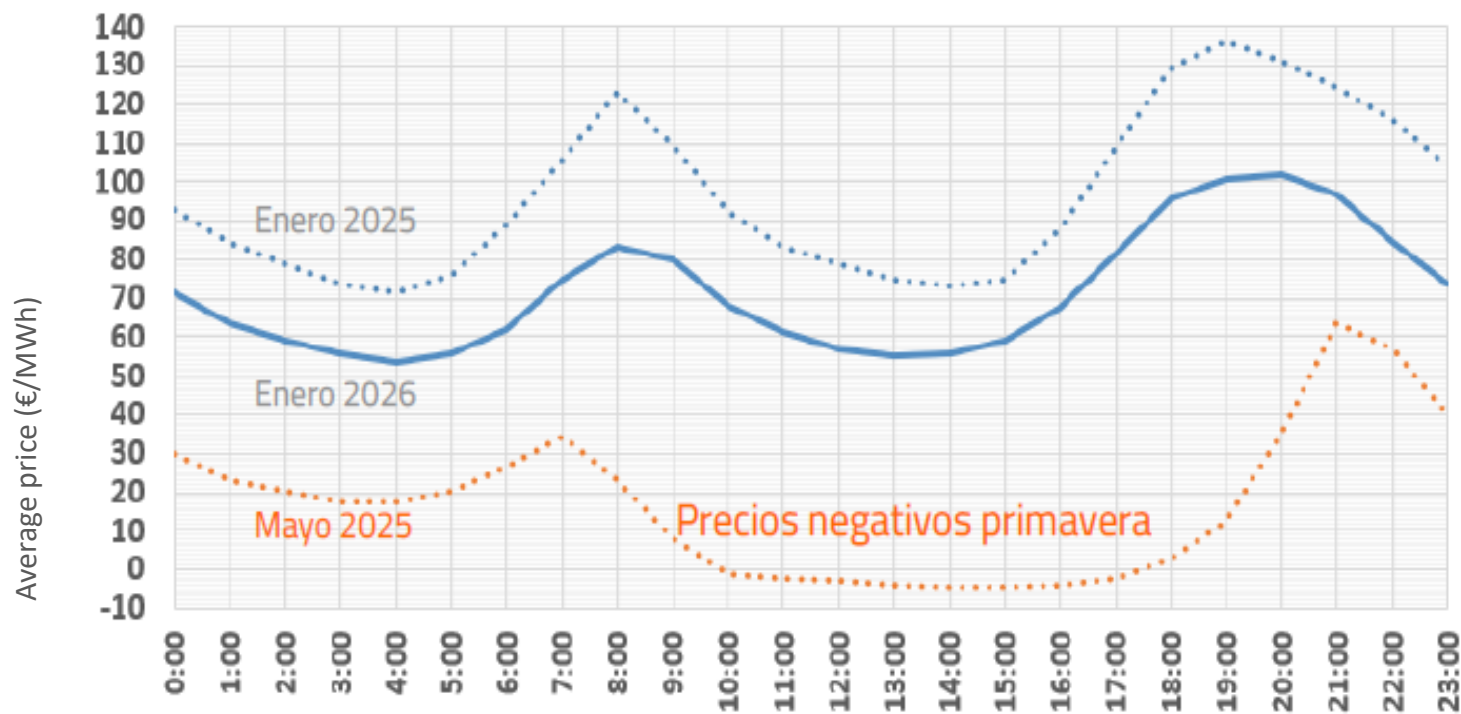


3. Storage and flexibility



1. Economic viability

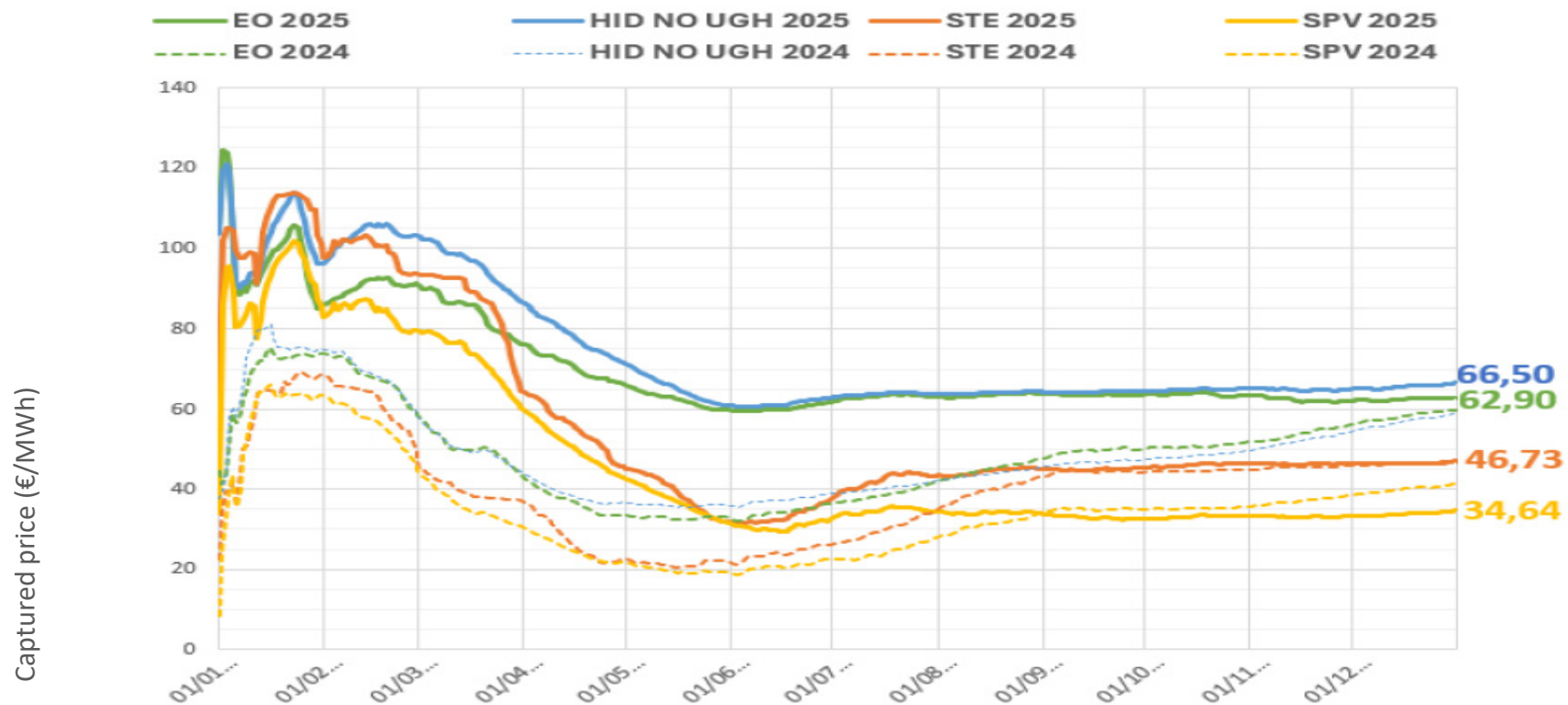
Average price:





1. Economic viability

Captured price renewable energies (2024 and 2025):

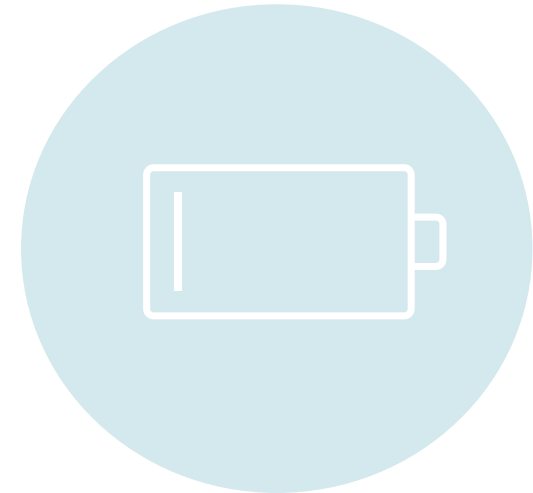




1. Economic viability



2. Social acceptance



3. Storage and flexibility



2. Social acceptance

ENERGÍAS RENOVABLES >

Más de 60 parques eólicos paralizados en Galicia: protestas sociales, sentencias polémicas y leyes controvertidas

Las decisiones judiciales frenan grandes proyectos en medio de la oposición vecinal. La Xunta pone además condiciones difíciles al sector, que advierte de que así no habrá nuevas inversiones

“More than 60 wind farms paralysed in Galicia: social protests, controversial rulings and contentious laws.”

Extremadura prohíbe la instalación de grandes plantas solares en sus dehesas

Viernes, 20 de febrero de 2025



ER

El **gobierno extremeño** ha aprobado una resolución sobre las zonas prioritarias para el desarrollo de proyectos de energía solar fotovoltaica en la comunidad autónoma. Los suelos agrícolas más productivos así como las dehesas, sistema clave en el mundo rural, quedan excluidos de los grandes parques.



El Diario Oficial de Extremadura (DOE) ha publicado en su edición de este jueves (19 de febrero) una resolución de la Consejería de Agricultura, Ganadería y Desarrollo Sostenible en la que se identifican y señalan las áreas con alta y muy alta capacidad de acogida de parques solares.

La resolución se apoya en los mapas de capacidad de acogida previamente elaborados por la Comunidad Autónoma, que clasifican el territorio en cinco niveles en función de distintos factores ambientales, y que han servido de referencia a los promotores para localizar las áreas más adecuadas para nuevas plantas solares.

“Extremadura bans the installation of large solar plants on its pastureland.”

Catalunya tiene ya 72 plantas de biogás con el reto pendiente de la conexión a la red y la aceptación social

Los ingenieros industriales defienden su despliegue por ser una energía que incorpora la circularidad. La Xarxa Catalana per una Transició Energètica Justa crítica que el boom de las renovables abra la puerta a “la impunidad ambiental y las expropiaciones agrícolas”.



“Catalonia already has 72 biogas plants, with the challenge of connecting them to the grid and gaining social acceptance still ahead.”

La Voz de Asturias

La plataforma Stop Baterías alerta de un «vacío normativo» en la instalación de parques de baterías

LA VOZ REDACCIÓN



Stop Baterías Asturias

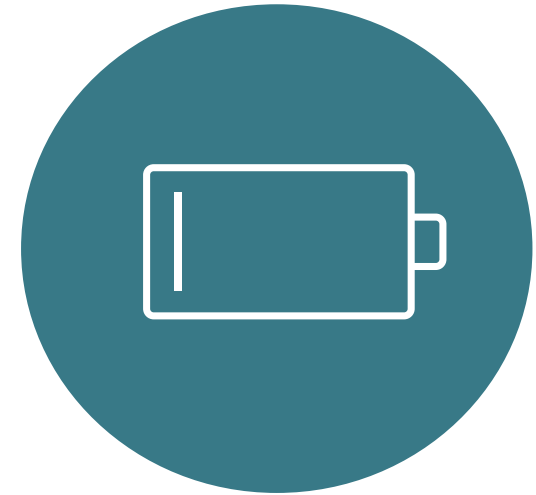
Asturias: “The Stop Batteries platform warns of a ‘regulatory gap’ in the installation of battery parks.”



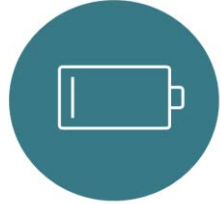
1. Economic viability



2. Social acceptance



3. Storage and flexibility



3. Storage and
flexibility

2025 Curtailment: - FV	9,5%
- Wind	10,4%

Electric system needs:

- More energy storage
- Reinforcement of transmission and distribution grids
- Demand-side response
- Improved operational tools

Spain has recently approved the **Royal Decree regulating the independent aggregator**, a key figure for unlocking flexibility.



3. Storage and flexibility

PRTR

€744 million,

Representing around 4.5 GW and more than 34 GWh.

FEDER

€818 million,

In total, they will enable the installation of 2.2 GW of power and 9.47 GWh of storage.



Technology	PRTR	FEDER
Hybrid storage	900 MW	1.400 MW
Stand-alone storage	700 MW	570 MW
Behind-the-meter storage	620 MW	-
Thermal storage	80 MW	60 MW
Pumped storage	2.200 MW	182 MW
R&D&I storage	22 MW	-
TOTAL	4.522 MW	2.212 MW



Thank you for your attention