nexus energía

Spanish Energy Market: opportunities with BESS

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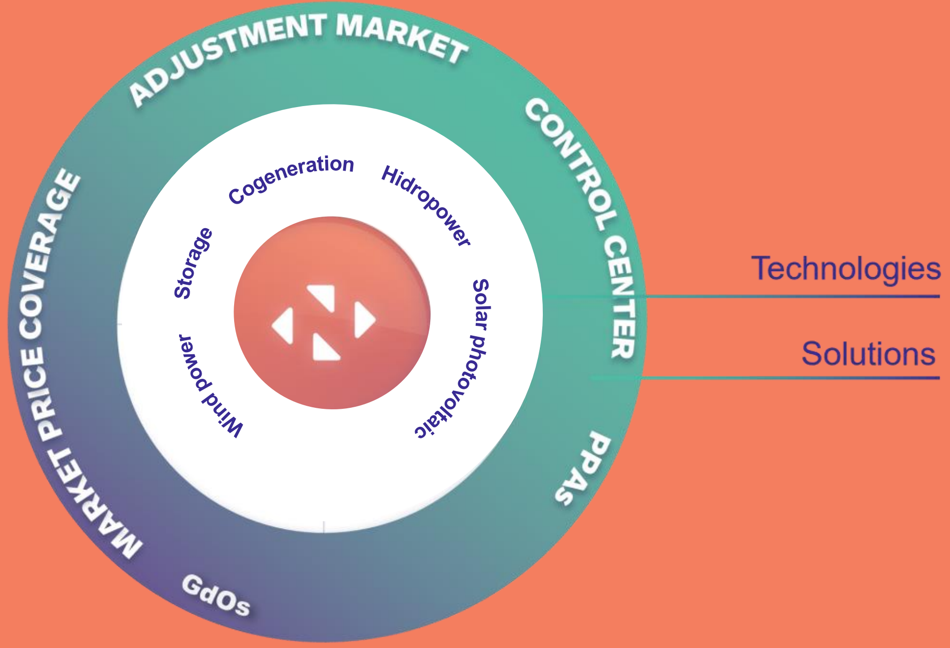
The experience of a group leading the way in renewable energies

We optimise the sale of energy from renewable power plants in the market. We offer participation in the balancing markets, market price hedging and our own control centre.



25 years
Experience in the sector

1st
Market agent for photovoltaic solar power

2nd
Market agent for renewable energies

+ 16,500
Plants receiving our market agent services

18 TWh
Energy managed by the consolidated group

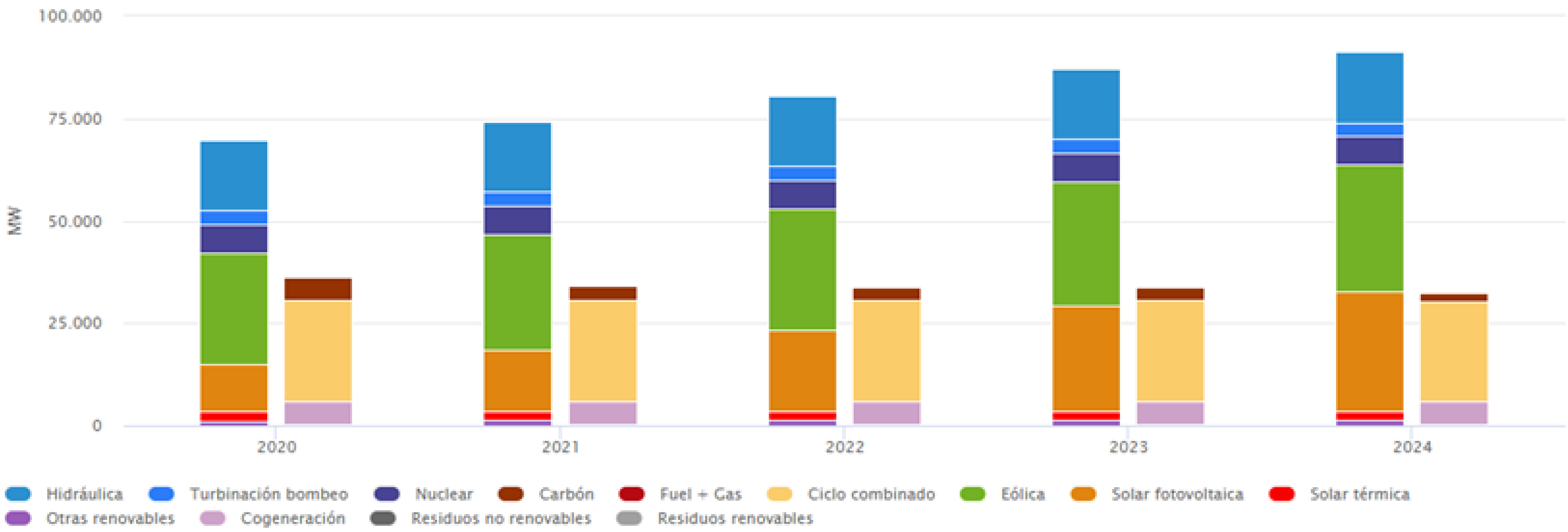
The Energy Market in Spain Today

Renewable energy trends &
Balancing Markets

Exceptional growth in installed renewable capacity

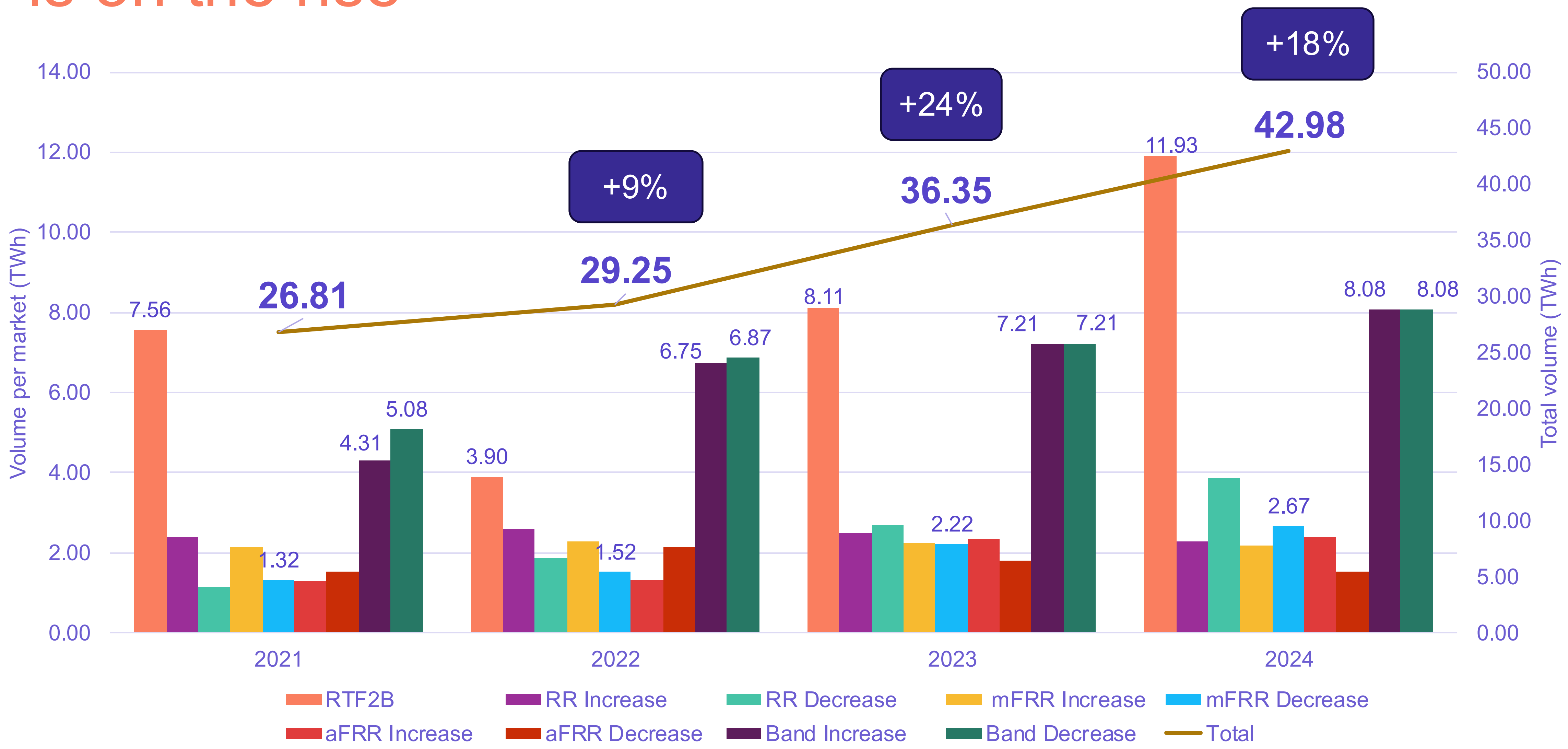
Especially, wind and solar

Installed power structure with/out CO2 eq. emissions (MW)| Electricity system: Mainland 2020 to 2024



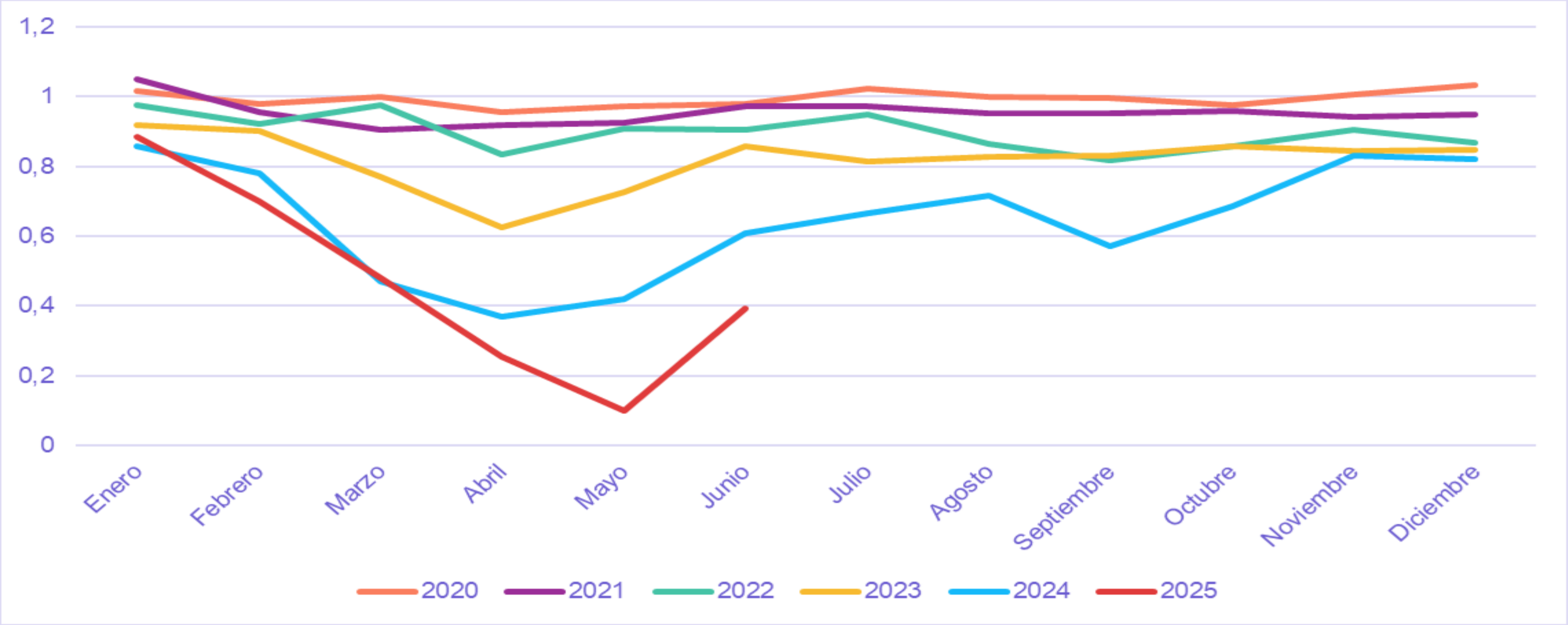
	2024
Hydropower	17.100
Pumped-storage hydro	3.331
Nuclear energy	7.117
Wind energy	30.929
Solar photovoltaic energy	29.132
Solar thermal energy	2.304
Other renewables	1.095
Renewable waste	132
Without CO2 eq. emissions	**91.140**
Coal	1.820
Fuel + Gas	8
Combined cycle	24.562
Cogeneration	5.529
Non-renewable waste	387
With CO2 eq. emissions	**32.306**

The volume of balancing services is on the rise



Solar Capture Price is collapsing

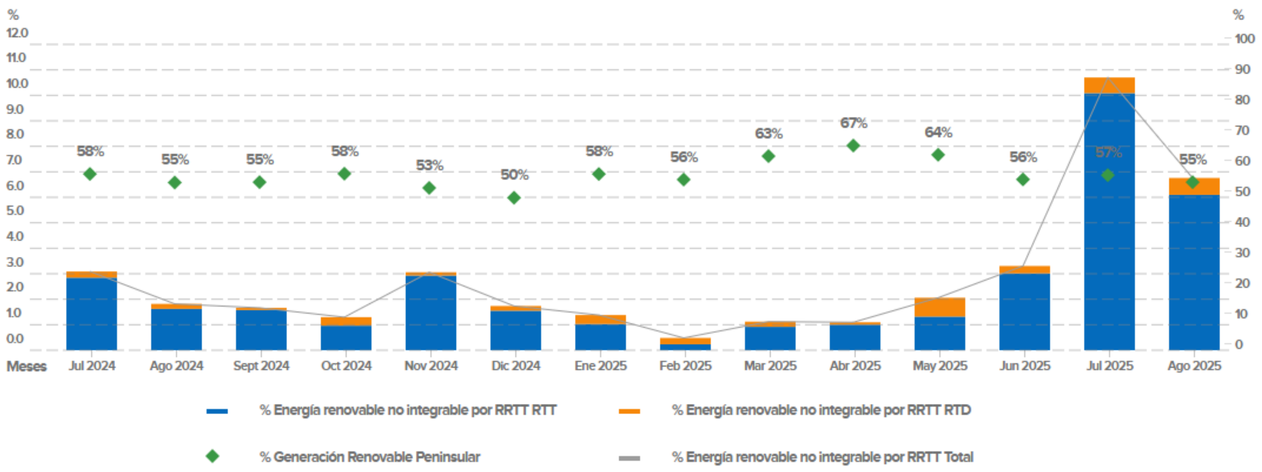
Historical monthly PV solar capture rate



2020	2021	2022	2023	2024	2025 (Jan-June)
0.97	0.92	0.9	0.82	0.66	0.50

Increasing Curtailment for solar and wind

RENEWABLE ENERGY PERCENTAGE THAT CANNOT BE INTEGRATED INTO THE SYSTEM DUE TO TECHNICAL CONSTRAINTS IN THE GRID

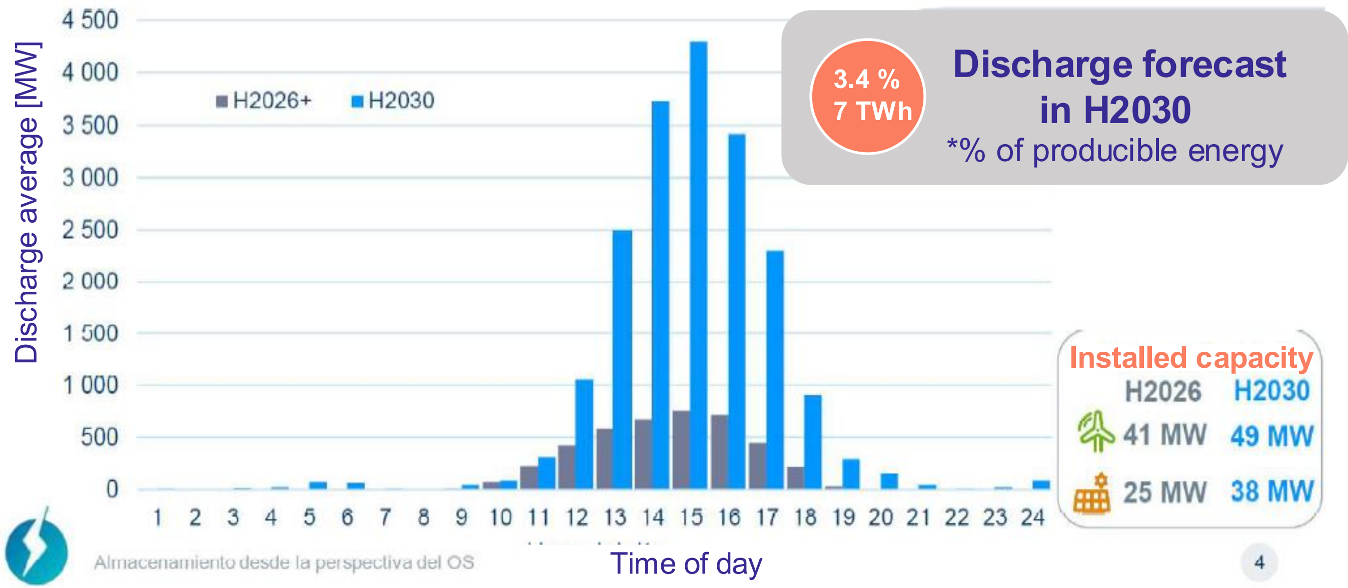


Nodal impact

It depends on the location of the facility, it is a nodal problem, with localised impact.

Although, since April 28th, it has been occurring more frequently and widespread.

Renewable energy curtailment average daily profile



Increased Curtailment
Loss of production due to technical constraints in the grid.

Solutions
Battery Energy Storage to prevent losses and shifting the time of discharge

Battery Storage Opportunities in the Spanish Market

Renewable asset optimisation with batteries

Forecast for the BESS market in Spain

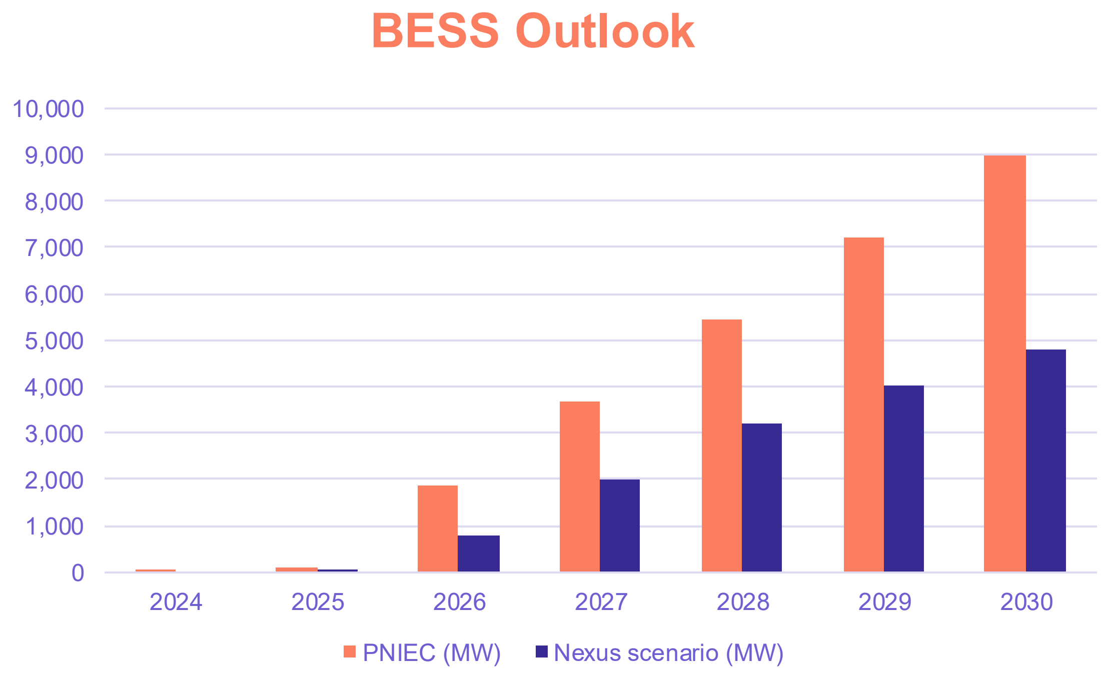
Forecast in the Integrated National Energy and Climate Plan (PNIEC) 2023-2030 (updated)

Total storage capacity forecast for 2030: 22 GW promoting such technologies as pumping, batteries and hybrid solutions.

2030 target for batteries: 9GW

Storage is recognised as a key factor for:

- Integrating intermittent renewable generation (solar and wind)
- Preventing spillages and minimising losses
- Guaranteeing electricity supply stability, security and quality
- Promoting demand management and flexible market models



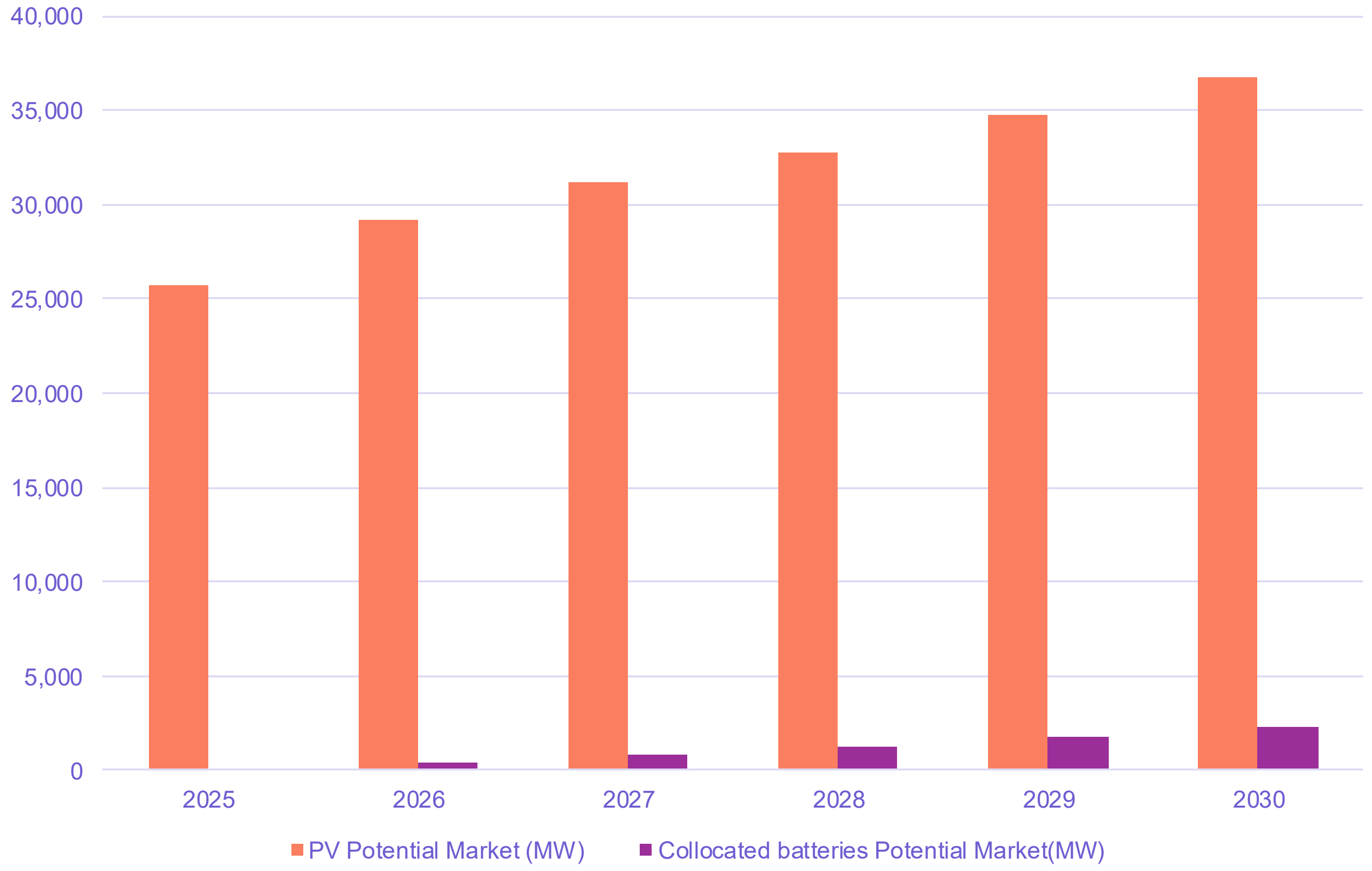
	2024	2025	2026	2027	2028	2029	2030
PNIEC (MW)	25	100	1.880	3.660	5.440	7.220	9.000
Nexus scenario (MW)		25	800	2.000	3.200	4.000	4.800

Power (MW) goals: Collocated PV

	2025	2026	2027	2028	2029	2030
PV Potential Market (MW)	25.708	29.208	31.208	32.708	34.708	36.708
Collocated batteries Potential Market(MW)	10	365	780	1.227	1.735	2.294

Main Stoppers Spanish Market:

- **Underdeveloped market ->** Doubts about the yields of the projects
- **Problems to get financing -->** In a yet uncertain market, Spanish Banks hesitate to finance this kind of projects.
- **Capacity Market -->** Because it is not defined yet, many producers have not considered developing these projects due to the uncertainty of income.
- **Loss of Dispatch Priority -->** A year and a half ago, through a RD, the hybridisations lost it and that stopped all developments. However, it has been solved recently.
- **Development Problems -->** In hybridisation, it is not possible to start a BESS development until the solar/wind development has been put into COD.



Suitable Markets for BESS optimisation

Markets managed by the Market Operator (OMIE)

Markets managed by the TSO (REE) Ancillary Services

Pool			Technical constraints		Balancing markets		
Day-ahead market	Intraday markets	Continuous Intraday market	Technical constraints PBF	Real-time technical constraints	Replacement reserves (RR) DECREASE INCREASE	Tertiary regulation (mFRR) DECREASE INCREASE	Secondary regulation (aFRR) DECREASE INCREASE

Nexus Energía & enspired:
A winning partnership for BESS optimisation

Strategic partnership: first movers for leading the Spanish market in the optimisation of Battery Energy Storage Systems (BESS) in hybridised and stand-alone projects.

Unique innovative offer in the Spanish market: integrated solution for the multi-market optimisation of storage assets, initially aimed at new stand-alone projects and a renewable portfolio of 6 GW in Spain.

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Nexus Energía

- Leading position in the Spanish market
- Over 25 years of operating experience in markets and ancillary services
- In-depth knowledge of the Spanish market and ties to market entities (OMIE, REE, etc.)

enspired

enspired

- Leadership in the European BESS optimisation market
- Innovative optimisation software that uses AI to maximise profitability from batteries
- International ecosystem of companies and investors with a stake in the Spanish market

Simulation of results

Renewable asset optimisation with batteries

Collocated simulation results 2024

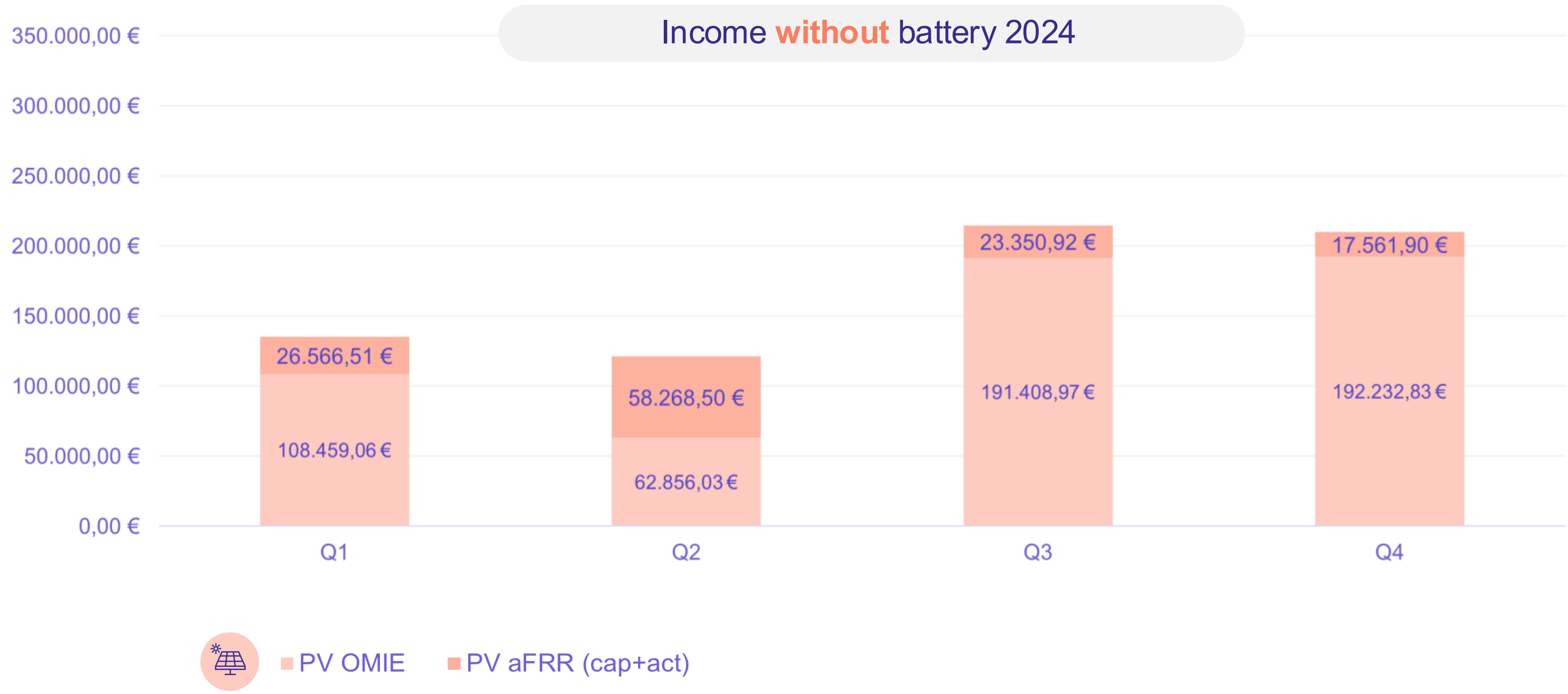
PV: 5MW

BESS power: 1.25 MW

Energy capacity (BoL): 5MWh

Efficiency charge/discharge: 92%

Max. cycles per day: 2



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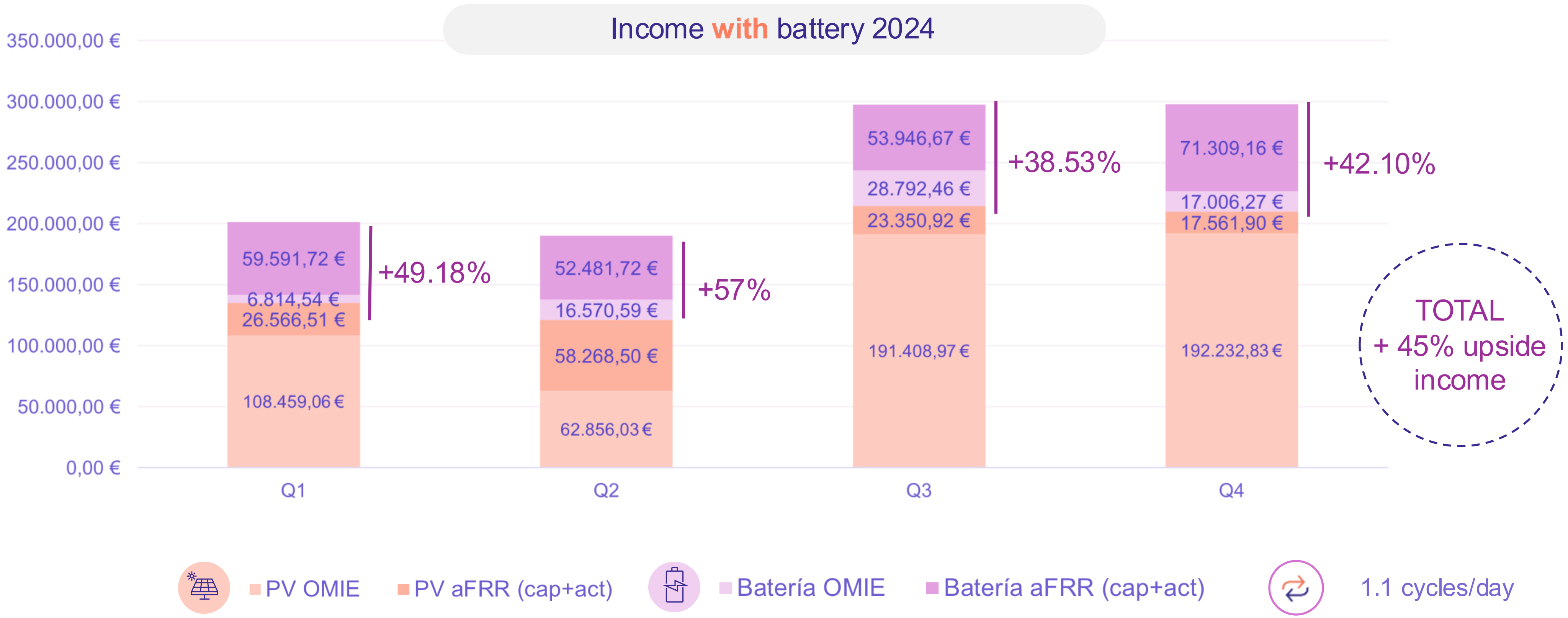
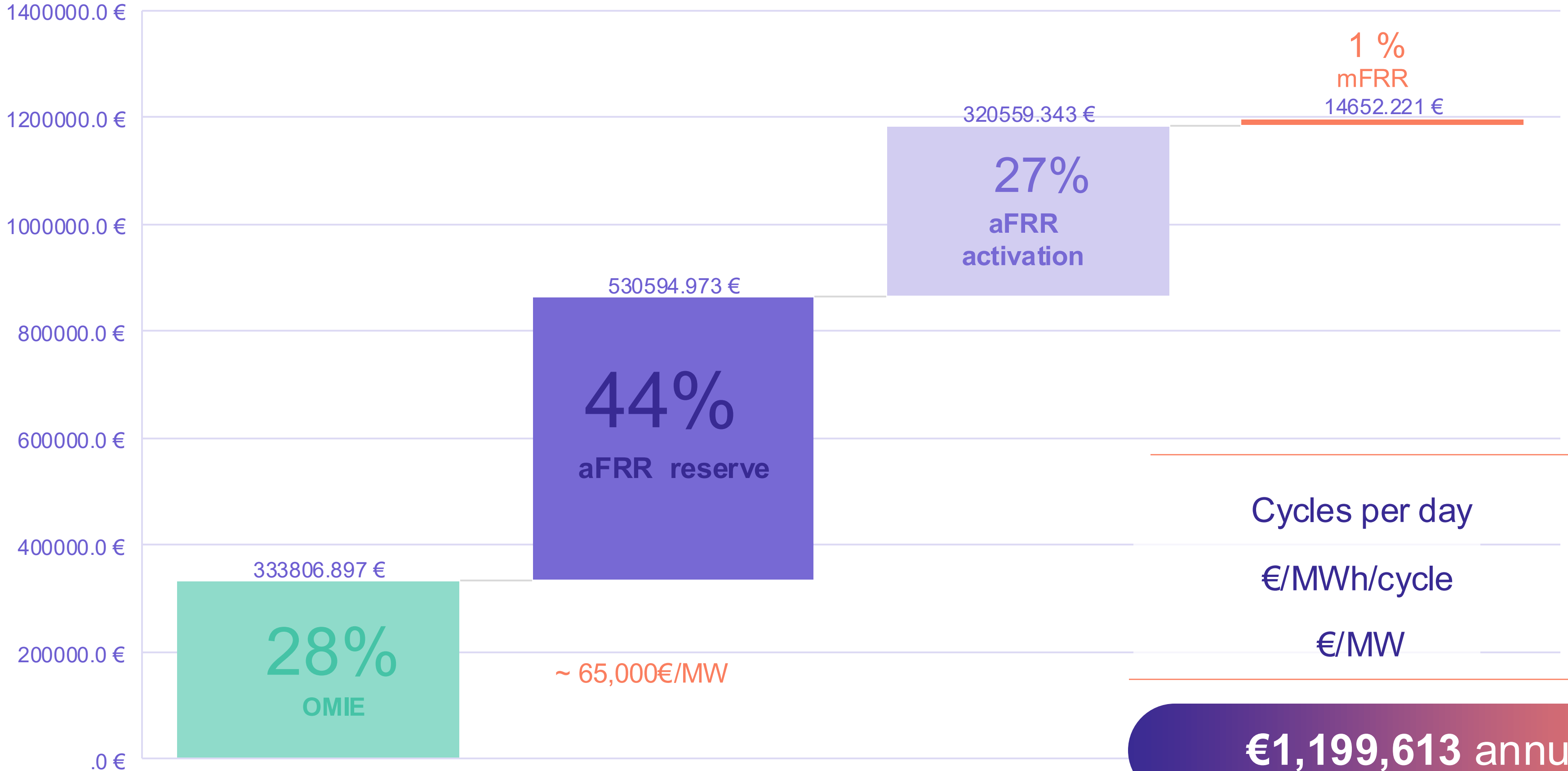


Stand-alone simulation results 2024

Participation in OMIE and balancing markets: secondary regulation (aFRR) and tertiary (mFRR)

Energy capacity (BoL): 20 MWh DoD: 80%

Power charge/discharge: 5 MW Efficiency: 95%



Cycles per day	1.2
€/MWh/cycle	€133.56
€/MW	€239,922

€1,199,613 annual income

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