

# PV profitability in 2025

BESS hybridization

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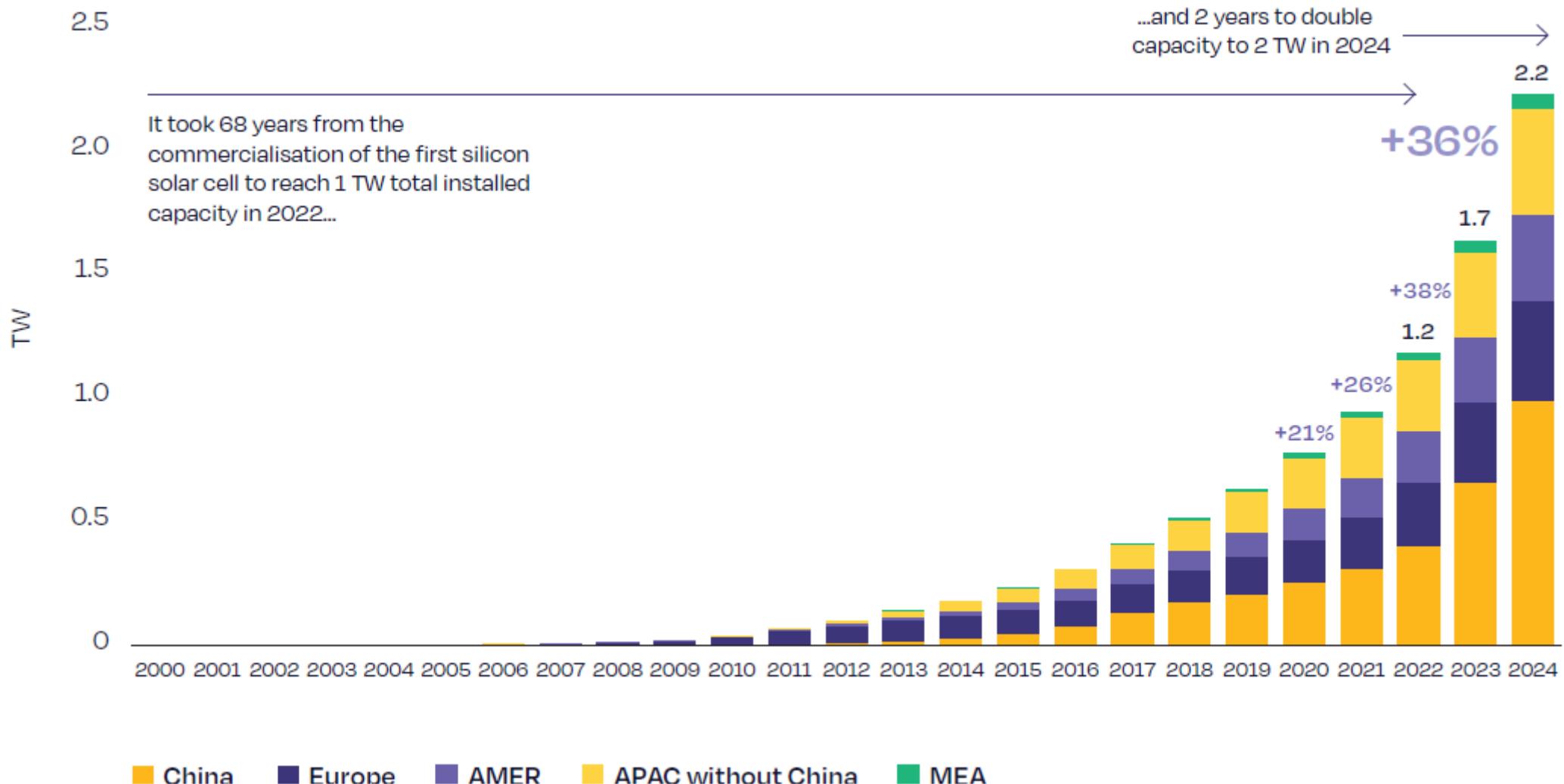
December 2025

# Cubico global footprint

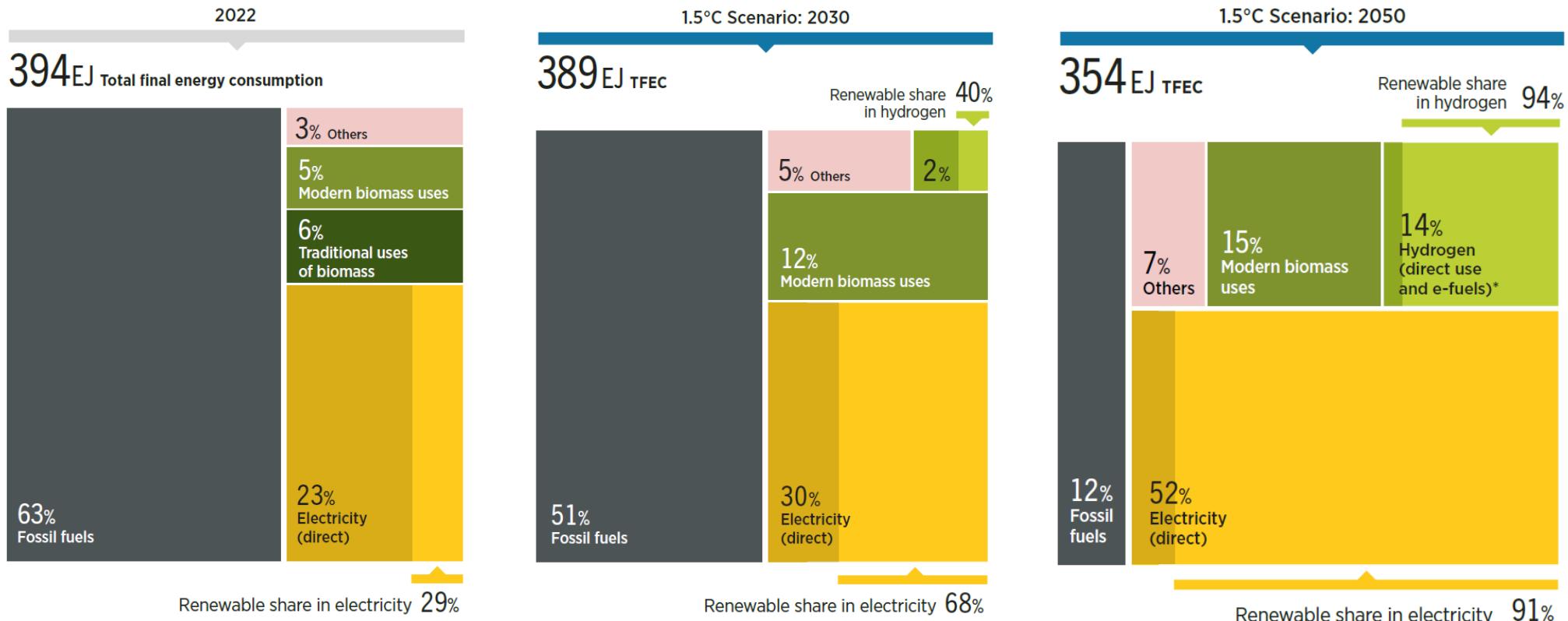
Cubico is an IPP present in 9 countries, with over 3,4 GW installed capacity in 229 assets, and a total development pipeline >20 GW including PV, Wind and BESS.



# Renewable Energy trend



# Renewable Energy targets



IRENA (2024), *World Energy Transitions Outlook 2024: 1.5°C Pathway*, International Renewable Energy Agency, Abu Dhabi.

Strong fundamentals for a sustained PV demand and market growth

# Challenges



## Business case

- Zero prices
- Negative Energy prices
- Lower PPA
- Less profitable investments

## Technical

- Grid congestion
- Grid stability
- Curtailment

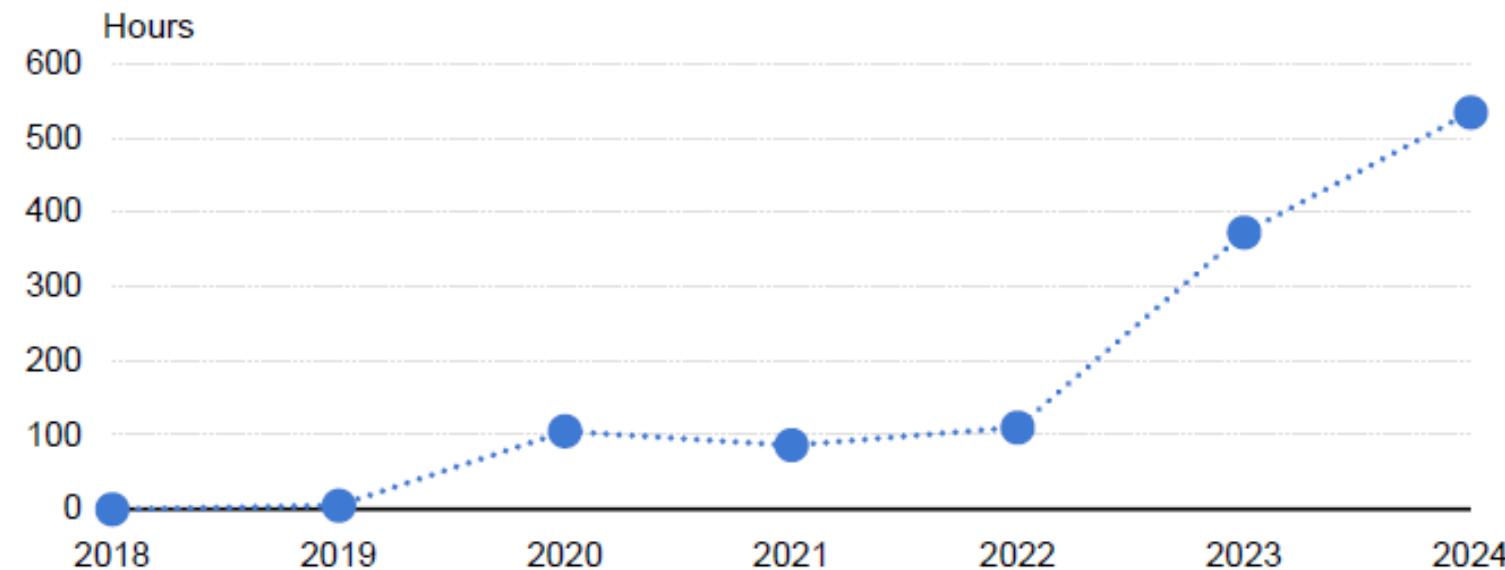
## Market conditions

- Limited space for Capex improvements under current PV module prices

# Energy price evolution

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**Zero or negative wholesale price occurrences in the electricity market in the Netherlands, 2018-2024**



Source: IEA - International Energy Agency, Energy Policy Review The Netherlands 2024

Example Netherlands – hours with negative energy prices tripled between 2022 and 2023 (372h) and increased to over 500 hours in 2024

# Energy price evolution

>500 hours negative energy prices (2025)

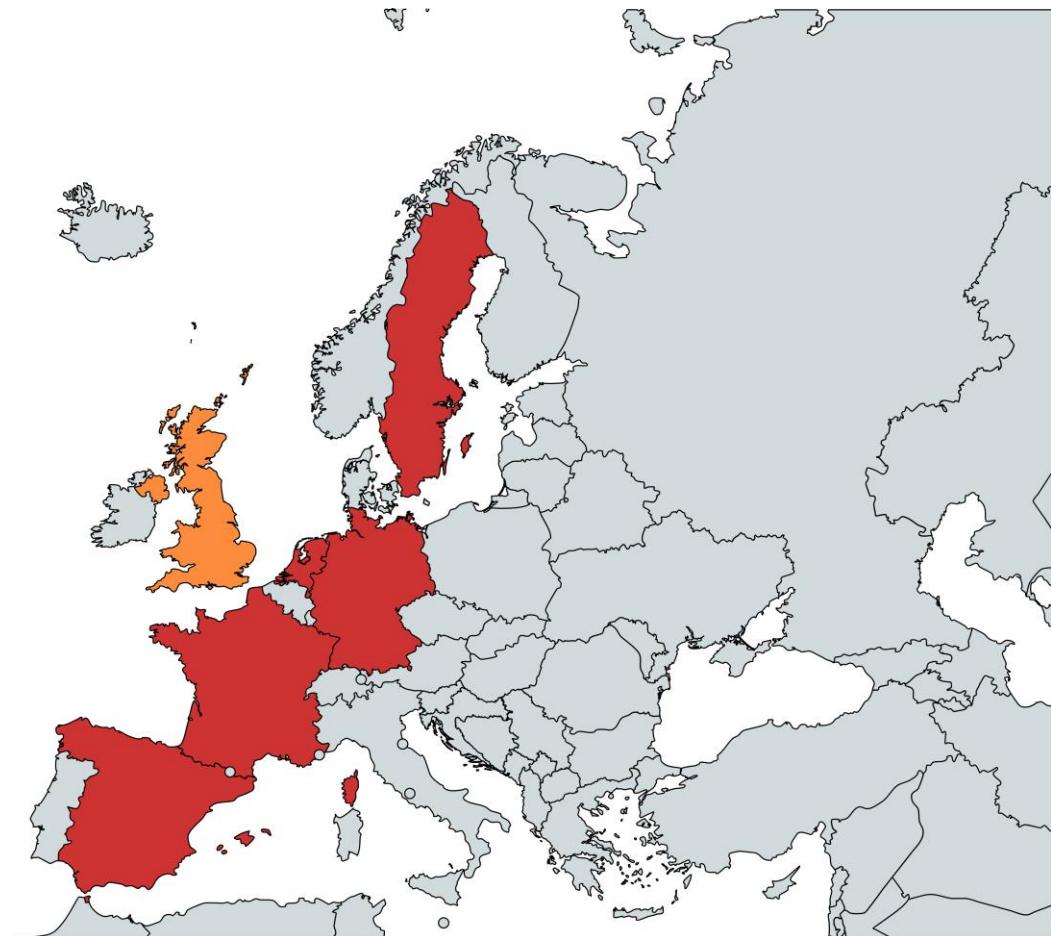


■ >500 h negative energy prices  
■ >150 hours negative energy prices

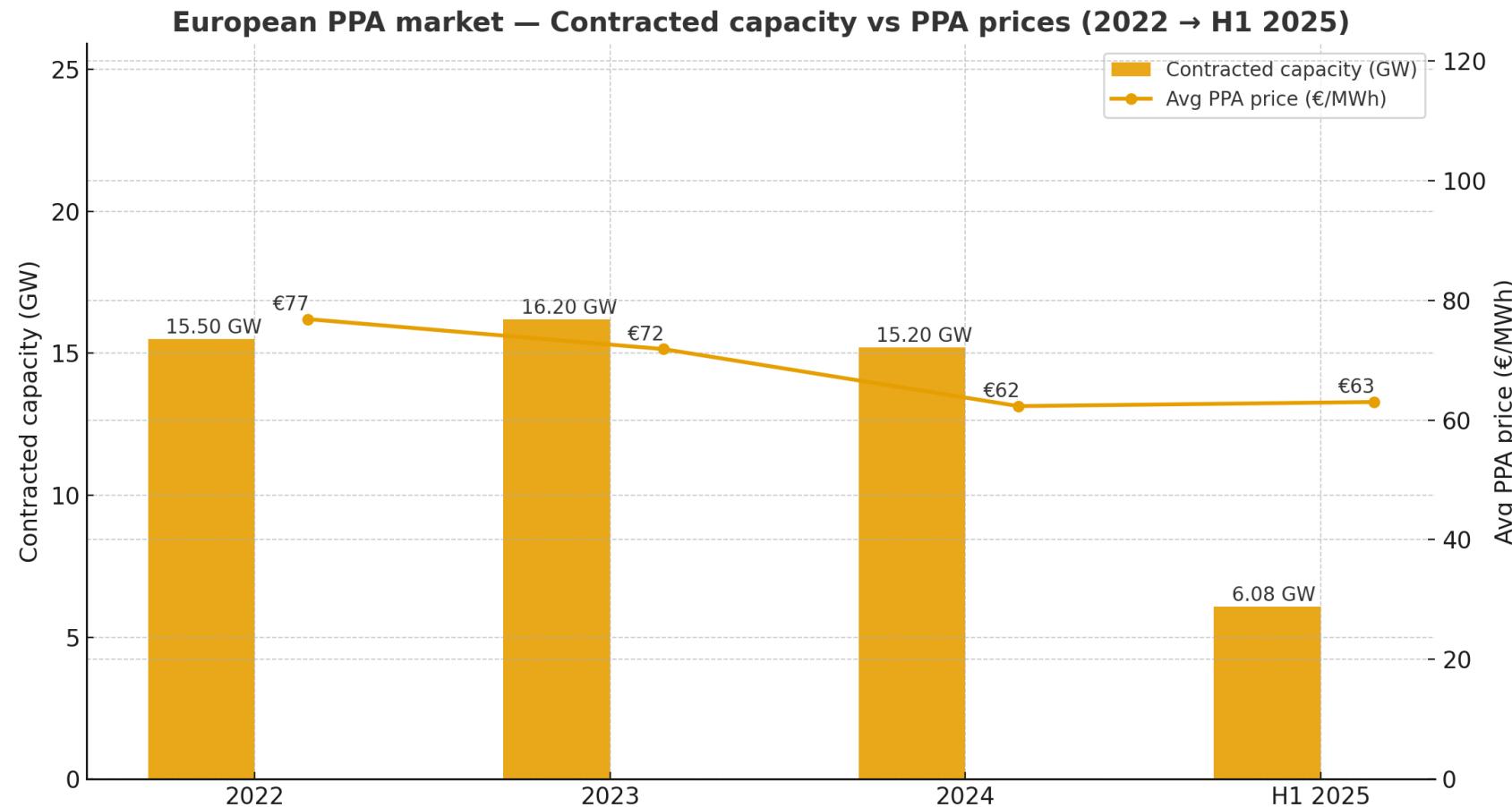
>150 hours negative energy prices (2024)



Created with mapchart.net

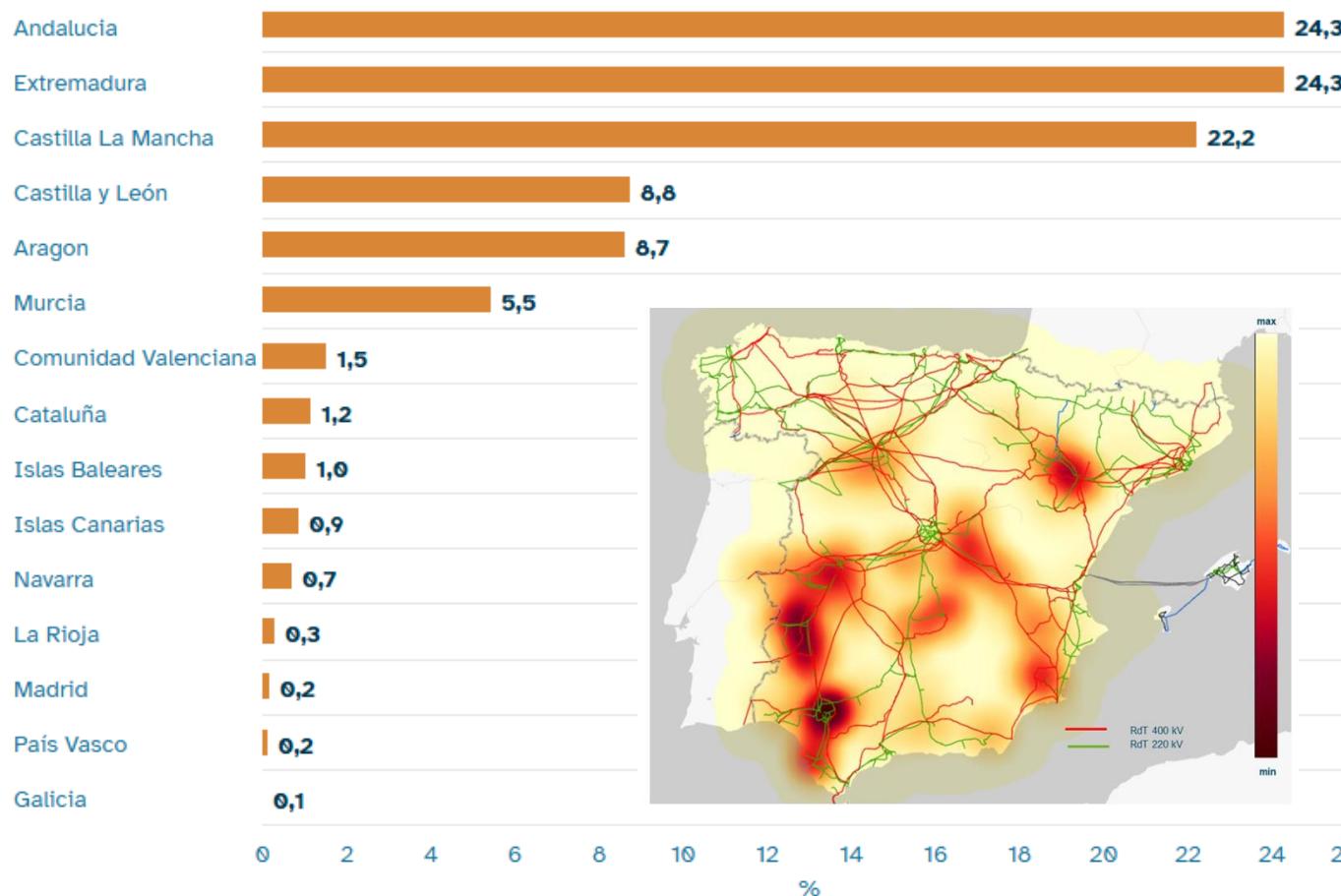


# PPA market & price evolution



The PPA market has been influenced by the normalisation of the wholesale market, increased competition among sellers, and the effects of capture prices, alongside other factors.

# Curtailment

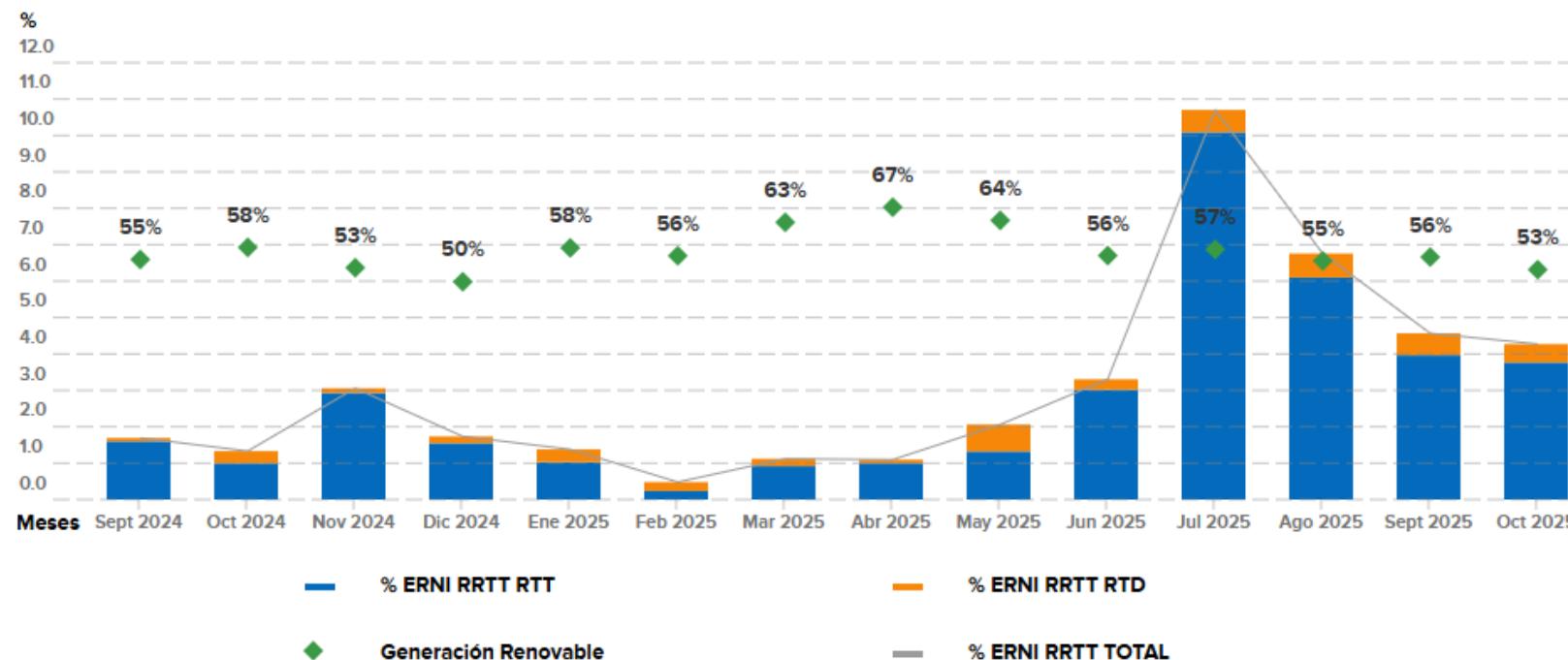


The concentration of installed energy generation capacity in locations that are separate from the primary points of demand places additional pressure on the transmission grid.

# Curtailment

## PORCENTAJE DE ENERGÍA RENOVABLE NO INTEGRABLE EN EL SISTEMA PENINSULAR POR RESTRICCIONES TÉCNICAS EN LA RED

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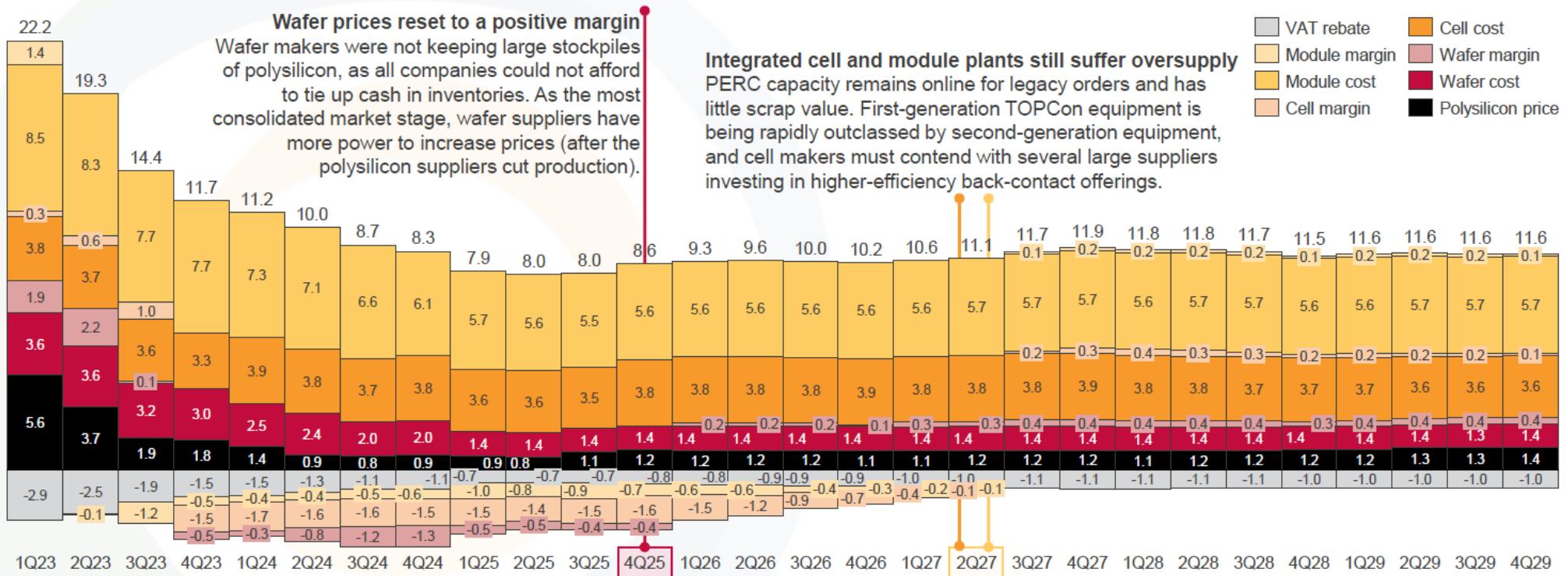


In July 2025, the Spanish grid operator, Red Eléctrica de España (REE), reported that technical grid constraints led to the non-dispatch of up to 11% of renewable energy.

# Limited Capex improvements

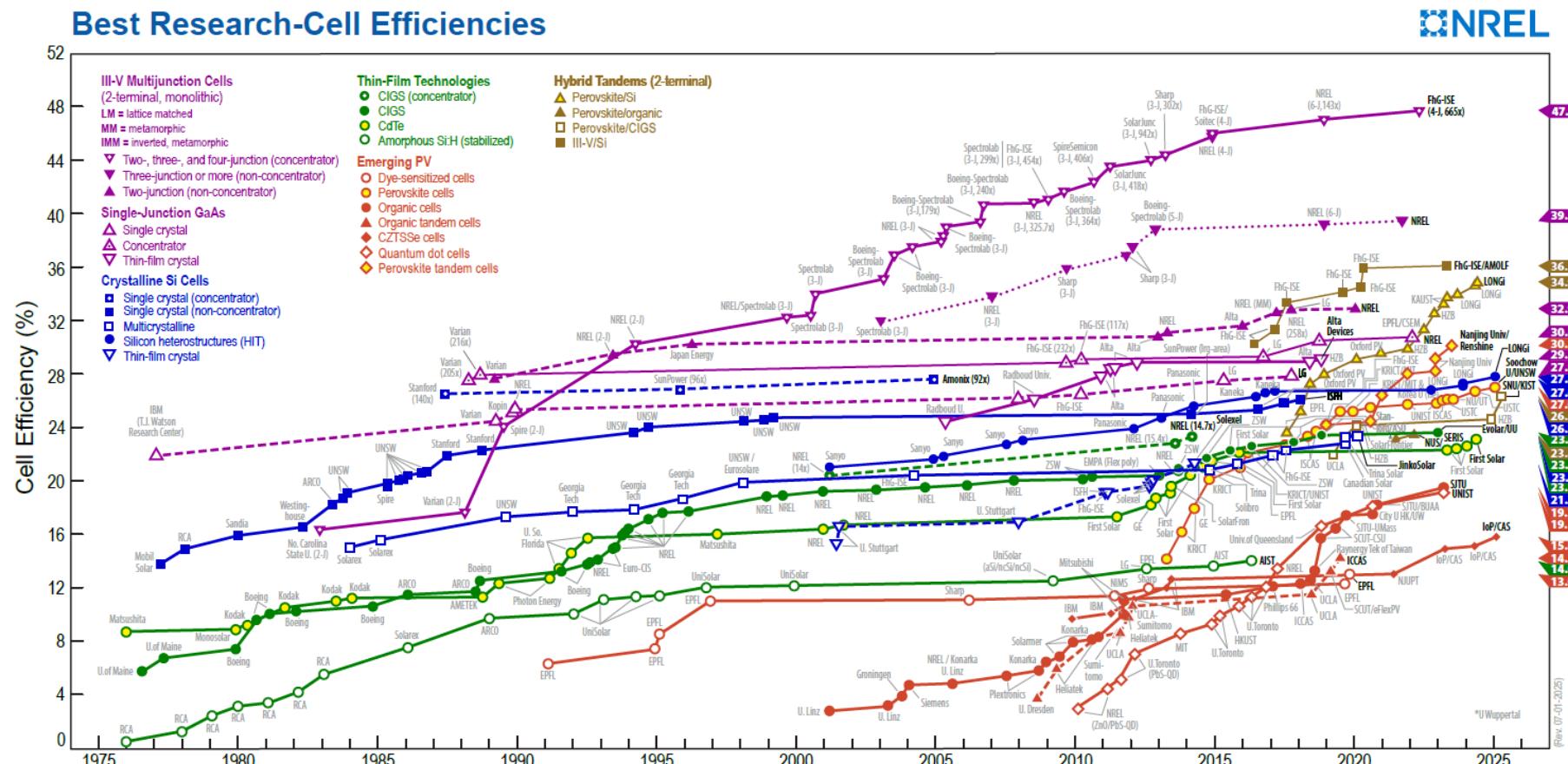


## Base market outlook: Bifacial TOPCon tier 1 PV module price (FOB China, ¢/W)



The potential for further reductions in capital expenditure (Capex) related to photovoltaic (PV) modules is currently limited.

# PV Technology evolution



- 24% efficiency - Current average efficiency in mass production
- 29,4% efficiency – estimated Polysilicon efficiency limit
- 33% efficiency – Perovskite laboratory tests

# BESS hybridization



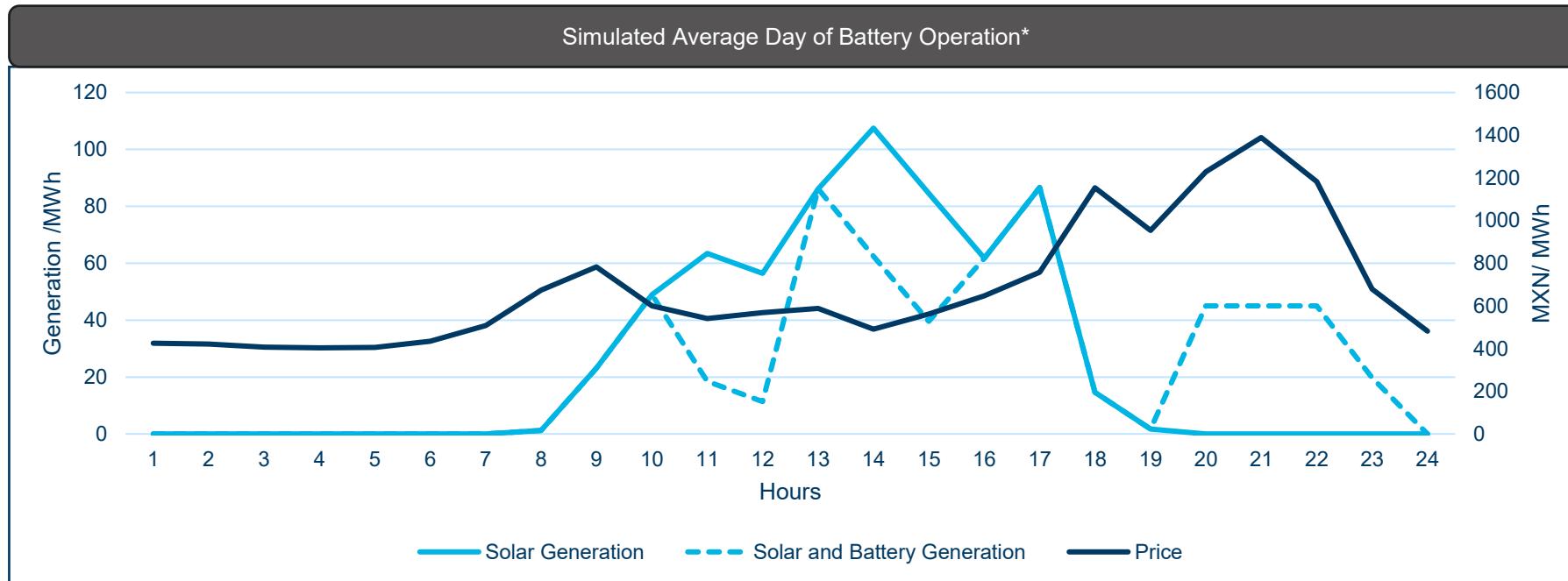
Load shifting & Energy Arbitrage

Grid stability & Ancillary services

Firming intermittent output

Peak shaving / reducing impact of curtailment

# Load shifting business case



- PV site
- BESS system equal to 30% AC capacity of PV site
- 87% RTE

- 4% - 14% merchant price uplift captured

# Grid stability



## Operational Program 7.4 (OP 7.4)

Renewable energy sources for dynamic voltage management

Participating plants must demonstrate an ability to supply or absorb reactive power equal to at least 30% of their maximum output to stabilize voltage in the grid. Facilities can manage voltage either by reactive power setpoints or by real-time voltage setpoints, the latter enabling faster response to fluctuations in a system increasingly dominated by variable renewables.

Approved facilities will receive dispatch priority and may qualify for shorter ramp-up times



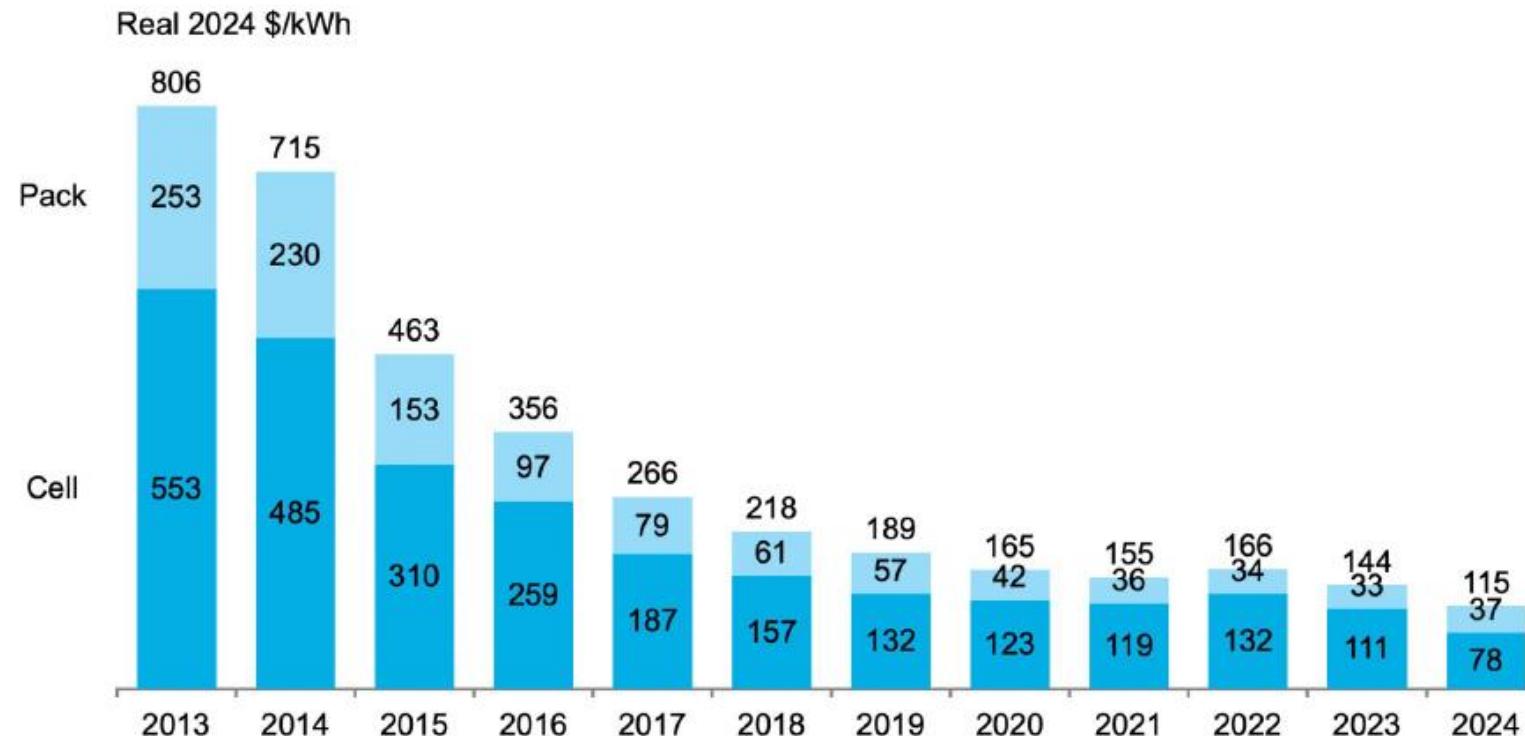
## Stability Phase 2 Pathfinder

The estimated cost-saving benefits over the 10-year contracts awarded as part of the Stability Phase 2 Pathfinder are c.£500 million.

A Grid Forming Battery is an advanced energy storage system that can enable batteries as well as other renewable technologies to act like traditional power stations, unlocking new opportunities to secure the future resilience of the electricity network.

# BESS trend

## VOLUME-WEIGHTED AVERAGE LI-ION BATTERY PACK AND CELL PRICE SPLIT



>85% decrease

# Bankability and trend



**European Bank  
for Reconstruction and Development**

142\$ million financing for two  
solar plus storage projects in  
Uzbekistan (ACWA)



**Ringkjøbing  
Landbobank**

40\$ million financing for solar plus  
storage project in Denmark  
(Greenvolt)



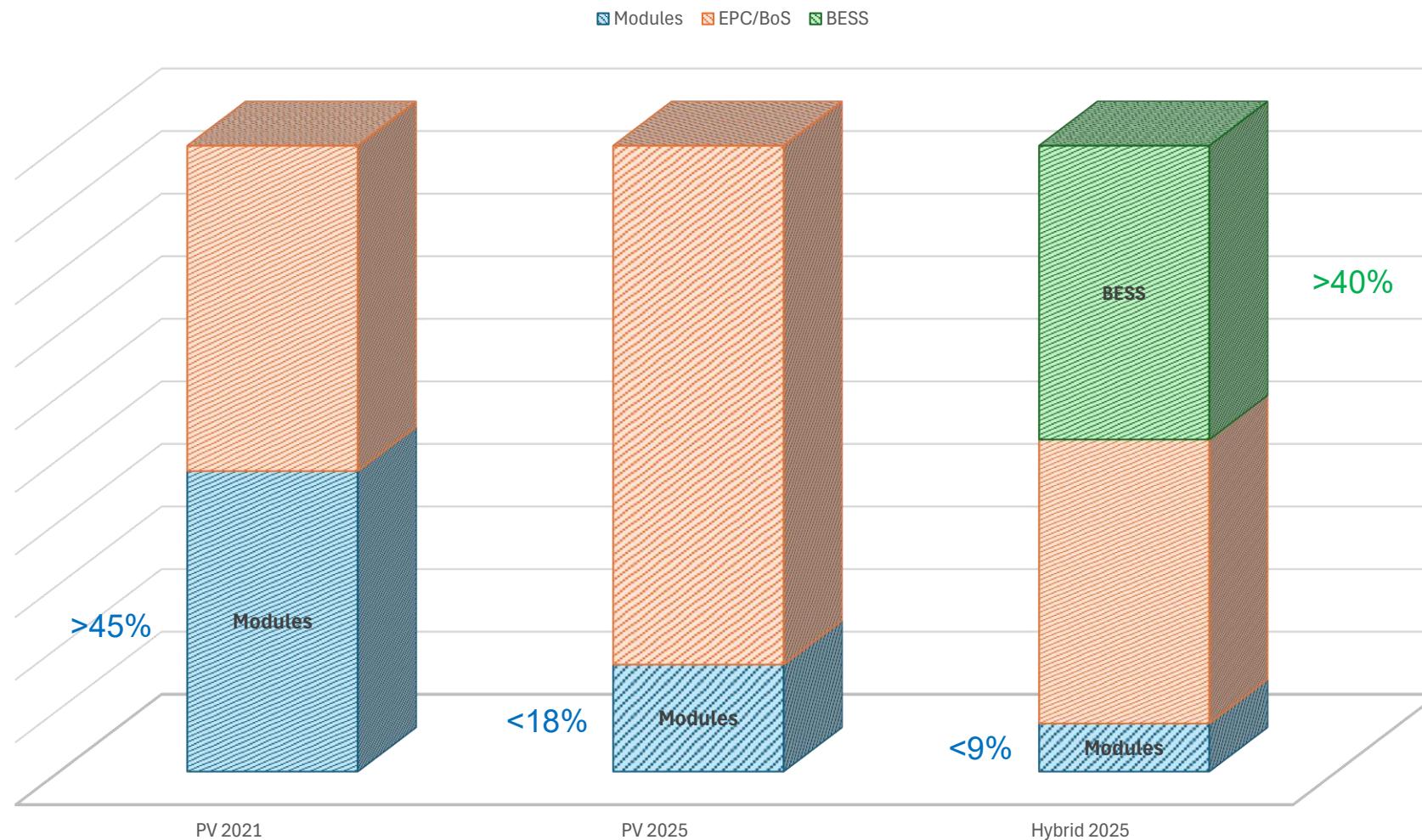
Lightsource BP – 867 MWp solar  
and 300 MWh BESS



Endesa – 360 MW wind, 330  
MWp solar and 337 MWh BESS

# Module weight vs BESS weight

EVOLUTION OF PV MODULE WEIGHT IN EPC COST



# Shifting main drivers

Capex prioritization and focus

Financing and bankability

Value Engineering

ESG & Traceability

QAQC

H&S

LTSA

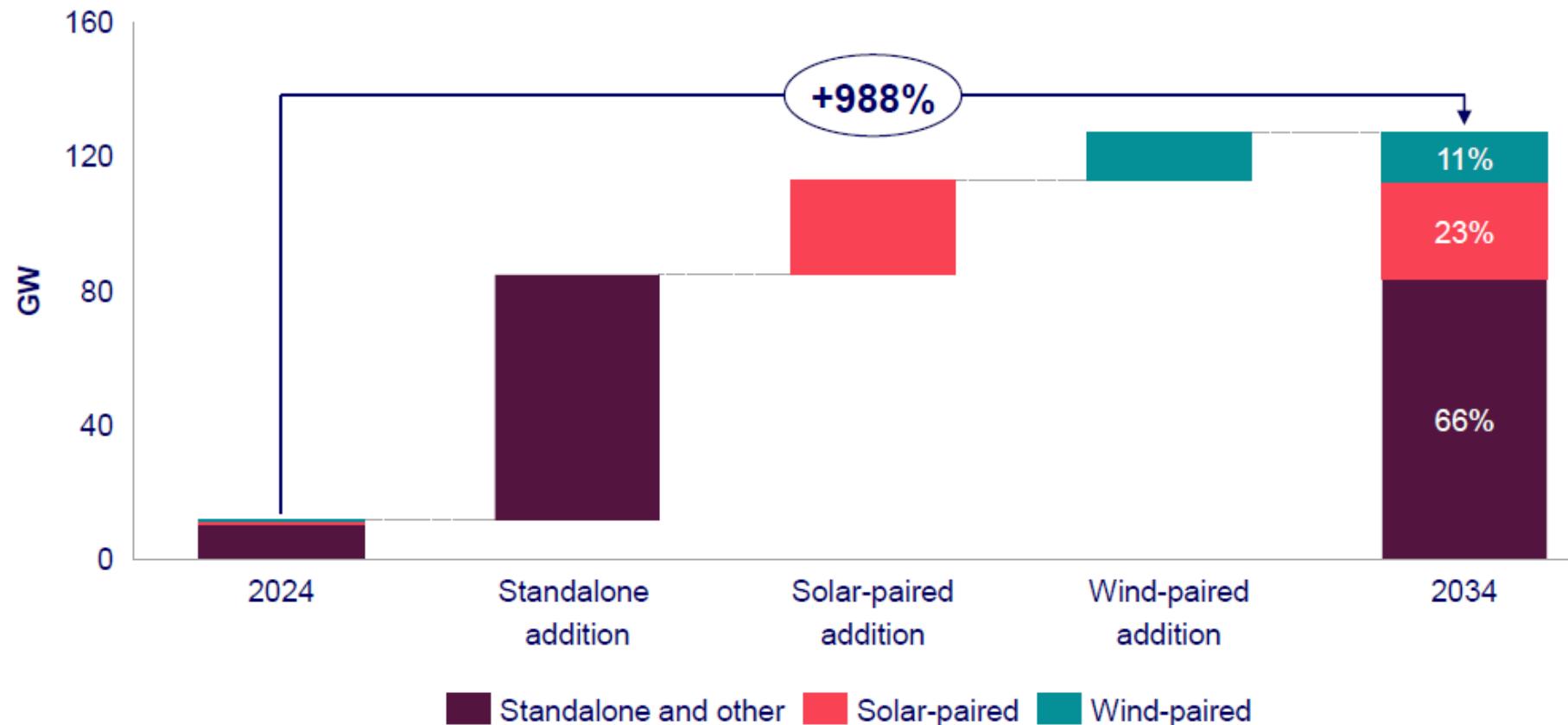
Logistics

Insurance

# Solar plus storage forecast



Total Europe utility energy storage capacity per category



Thank you for your attention