



ITALY

Analysis of the Battery Storage Market

Acknowledgements

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Italy's battery storage market has become one of the **largest and most dynamic** in Europe

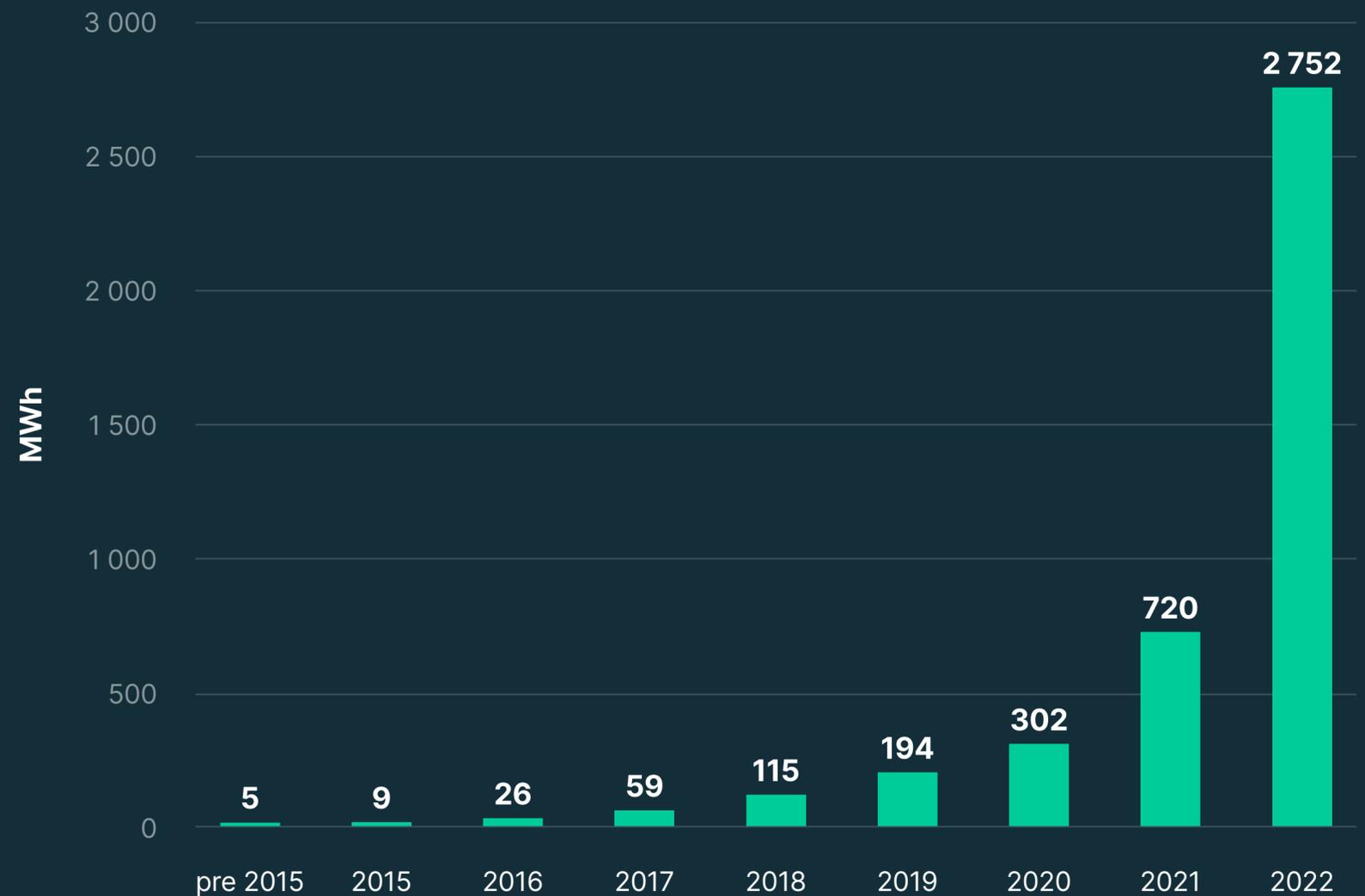
- Italy has both a rapidly growing utility-scale market as well as a flourishing customer-sited battery storage market.
- Customer-sited storage adoption has been mainly driven by a combination of high electricity prices and generous tax incentives.
- For utility-scale systems, Italy has established favourable electricity market rules that enable projects to earn revenues from a range of different sources.
- The ability to generate revenues from the provision of multiple services (so-called “revenue stacking”) significantly improves the bankability of battery storage projects.¹



Italy's total battery storage capacity grew almost 4-fold in 2022

- As of the end of 2022, battery storage capacity in Italy reached 1.530 MW / 2.752 MWh, spread across more than 227.000 battery storage systems.²
- Over 99% (225.000) of these systems employ Li-Ion batteries.³

Cumulative Growth in Battery Storage Capacity (MWh)²



Italy's electricity supply is **dominated by fossil fuels**, but the share of solar and wind is growing

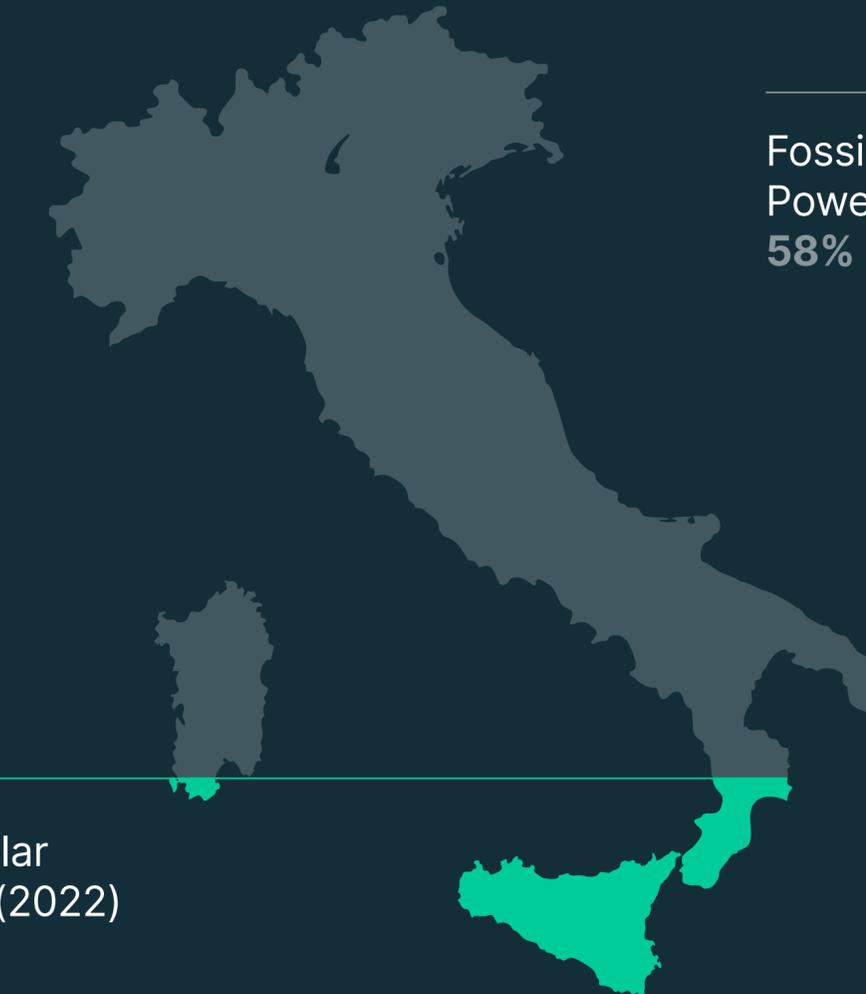
Total installed capacity in 2022 (all sources)⁴

118 GW

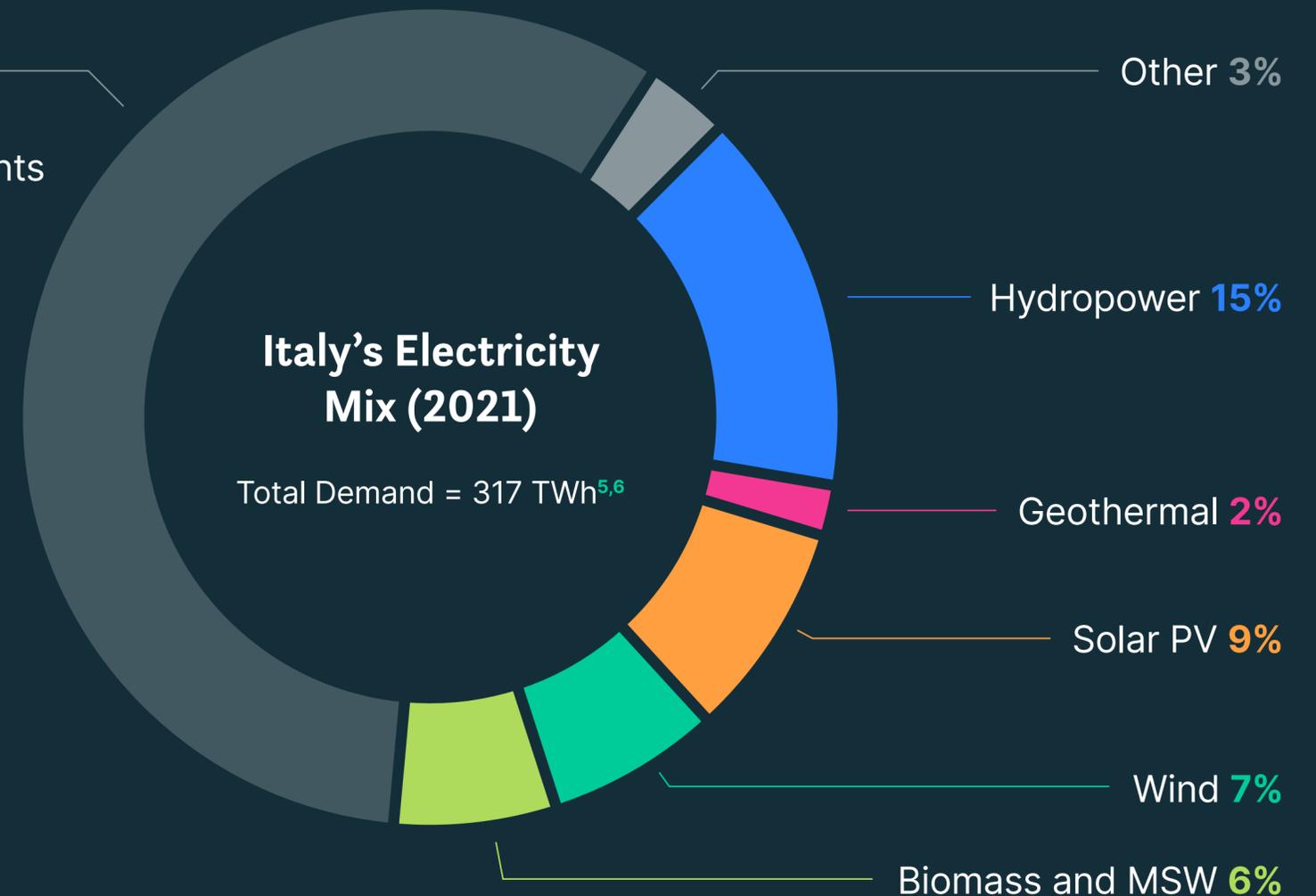


Share of wind and solar in the electricity mix (2022)

16%



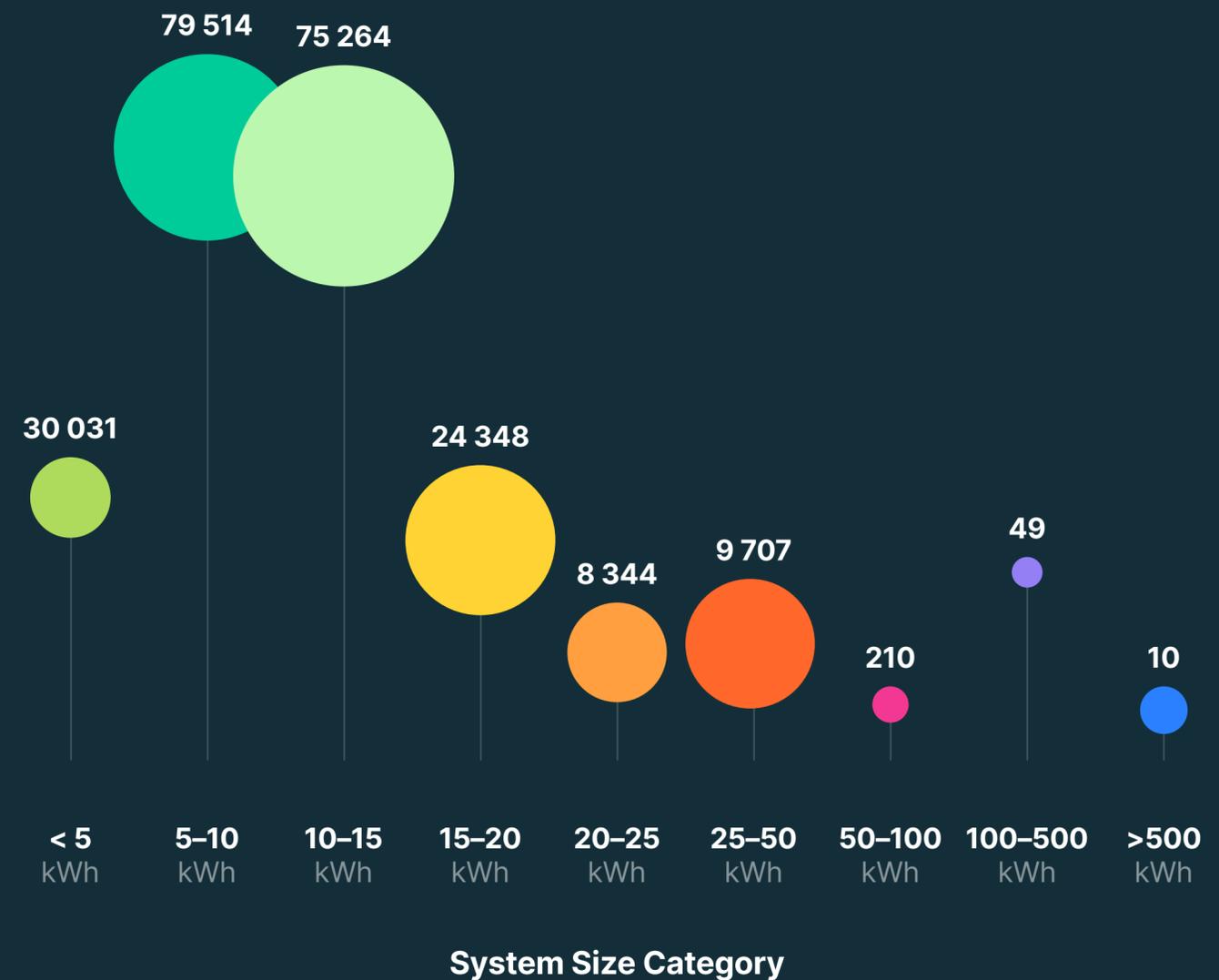
Fossil Fuel Power Plants
58%



Smaller battery systems currently dominate the market

- Battery storage projects between 5–15 kWh make up the bulk of Italy’s battery storage market.
- In most cases, these systems are customer-sited and coupled with solar PV systems.
- By the end of 2022, there were only 10 larger-scale battery storage systems over 500 kWh connected to the grid, though dozens of utility-scale projects are now in the pipeline for 2023 and 2024.⁷

Number of Battery Storage Systems by Size Category (kWh)



Tax incentives have fueled a surge of customer-sited storage adoption in recent years

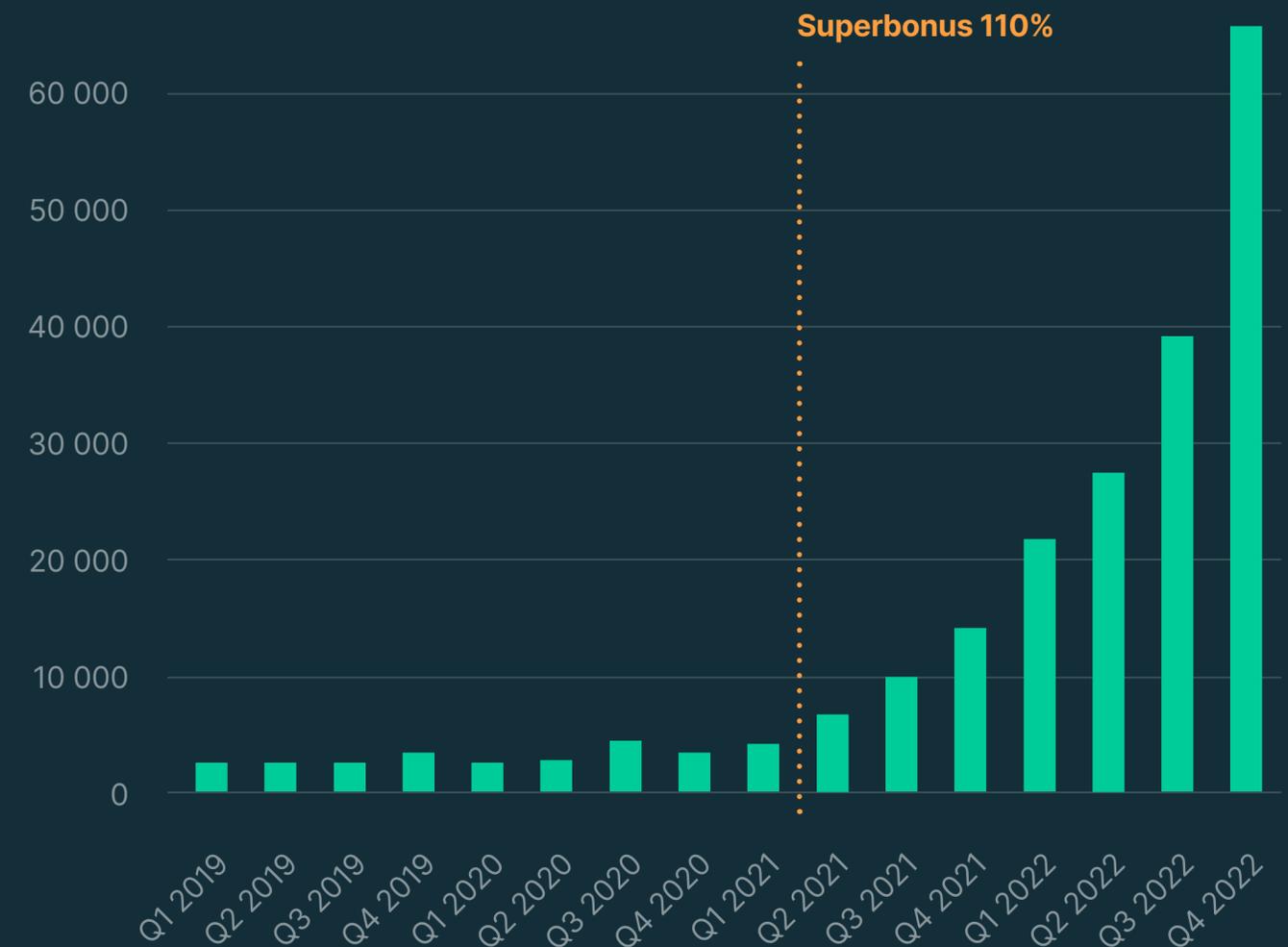
Italy offers two main categories of tax incentives, both of which take the form of income tax deductions:⁸

- Super bonus (110%)
- Renovation bonus (50%)

For example, in the case of the super bonus, if the cost of a residential PV + storage installation is EUR 10.000, the customer will be entitled to a tax deduction equal to EUR 11.000 on their yearly income tax declaration.

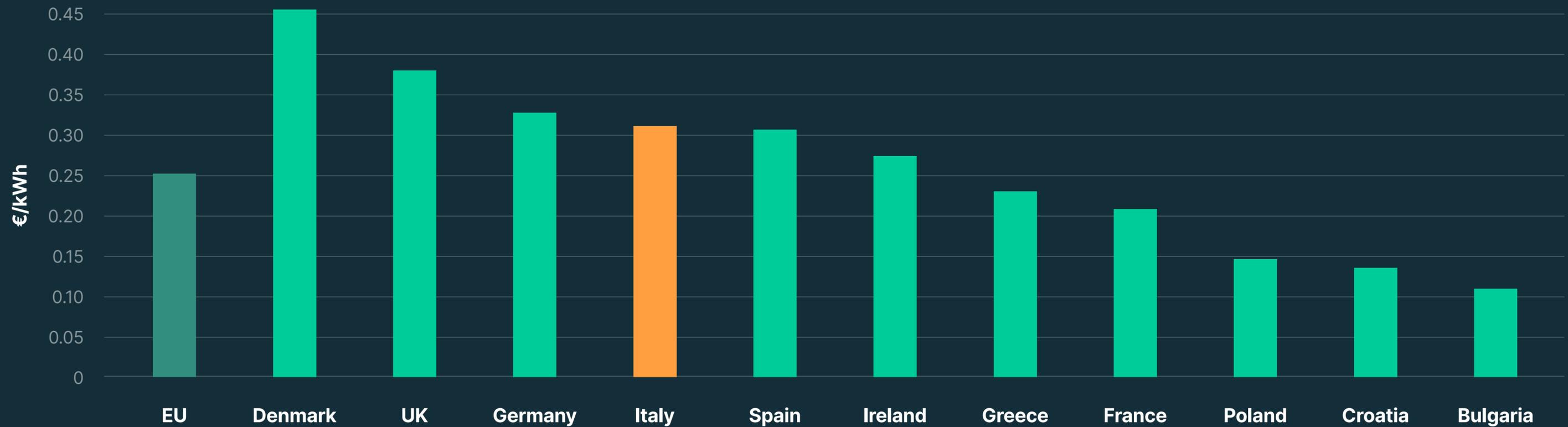
The effect of the introduction of the super bonus in early 2021 is clear

Number of battery storage projects installed by quarter⁹



Storage adoption has been accelerated by Italy's high electricity prices

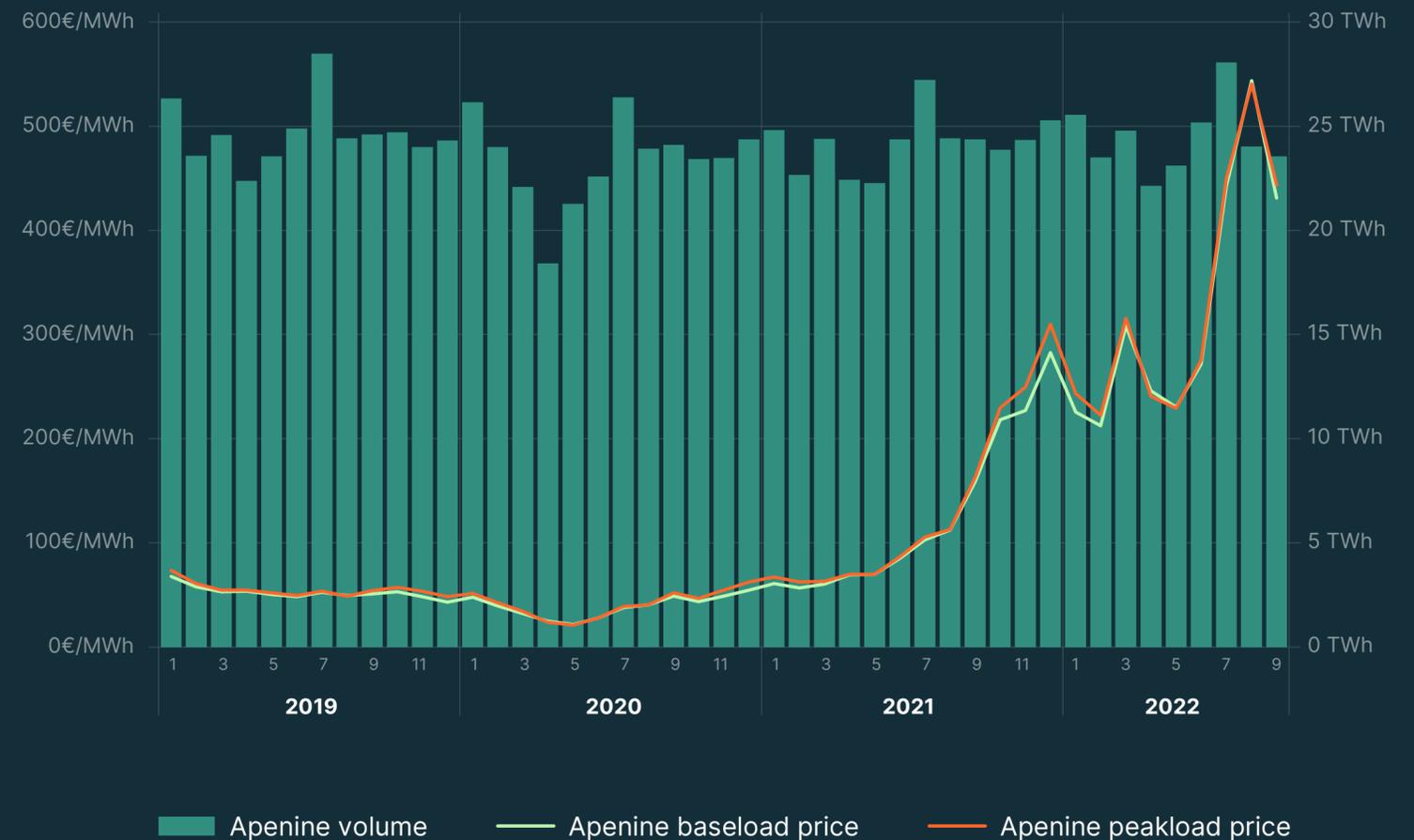
Italy's electricity prices for households currently stand at just over **EUR 0.30/kWh** on average.^{10,11,12}



The **utility-scale market** has benefitted from high electricity wholesale prices and growing concerns over energy security

- Italy had the highest average day-ahead market prices of any country in the EU in 2022.¹³
- Italy's high electricity market prices are largely driven by its heavy reliance on fossil gas for power generation.
- As the price of gas soared in the wake of Russia's invasion of Ukraine, electricity prices in Italy surged, reaching an all-time high of EUR 540/MWh in August 2022.¹⁴

Average Day-Ahead Electricity Prices in Italy
(€ per MWh)¹⁴



Italy's **electricity market rules** enable battery storage projects to compete in different markets

In Italy, the government and the Italian TSO (Terna) have developed several electricity market products where storage projects are able to compete and provide services to the power system.

Utility-scale storage projects can currently earn revenues from three different markets:

- the capacity market¹⁵
- the fast reserve market¹⁶
- the ancillary services market¹⁷



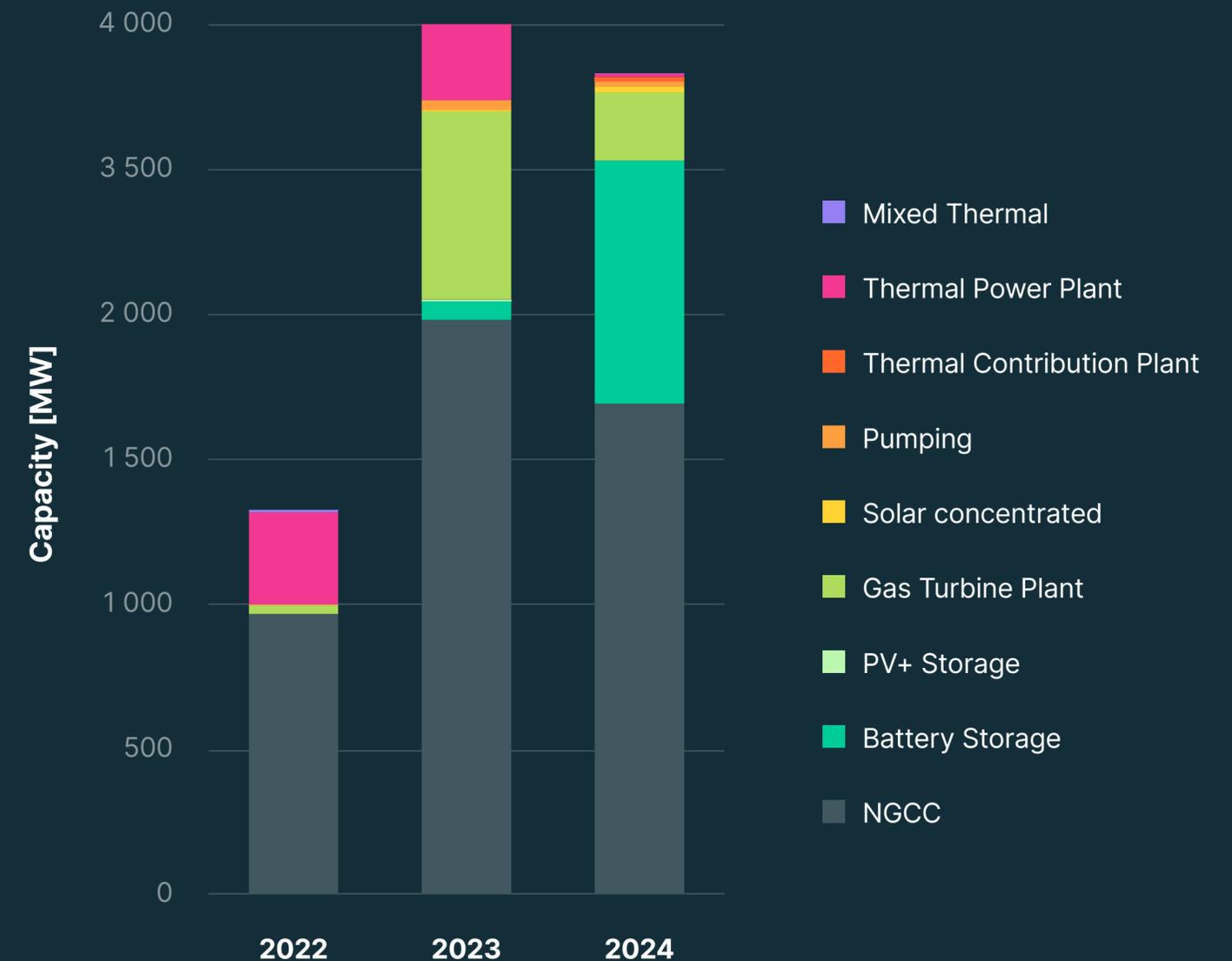
Battery storage projects made a **breakthrough** in Italy's latest capacity auction round

After earning modest shares within previous capacity market auctions, storage projects secured **over 30%** (1.121 MW / 2.032 MWh) of the total capacity allocated in the latest auction held in late 2022.¹⁸

Despite this breakthrough, concerns remain: although capacity market auctions are designed to encourage competition, fully **94% of the new storage capacity contracted in the last auction is owned by energy giant Enel.**¹⁸

Italy's Capacity Market Results

(2022–2024)^{18,19,20}



The **Fast Reserve Market** has provided further revenue opportunities for storage projects

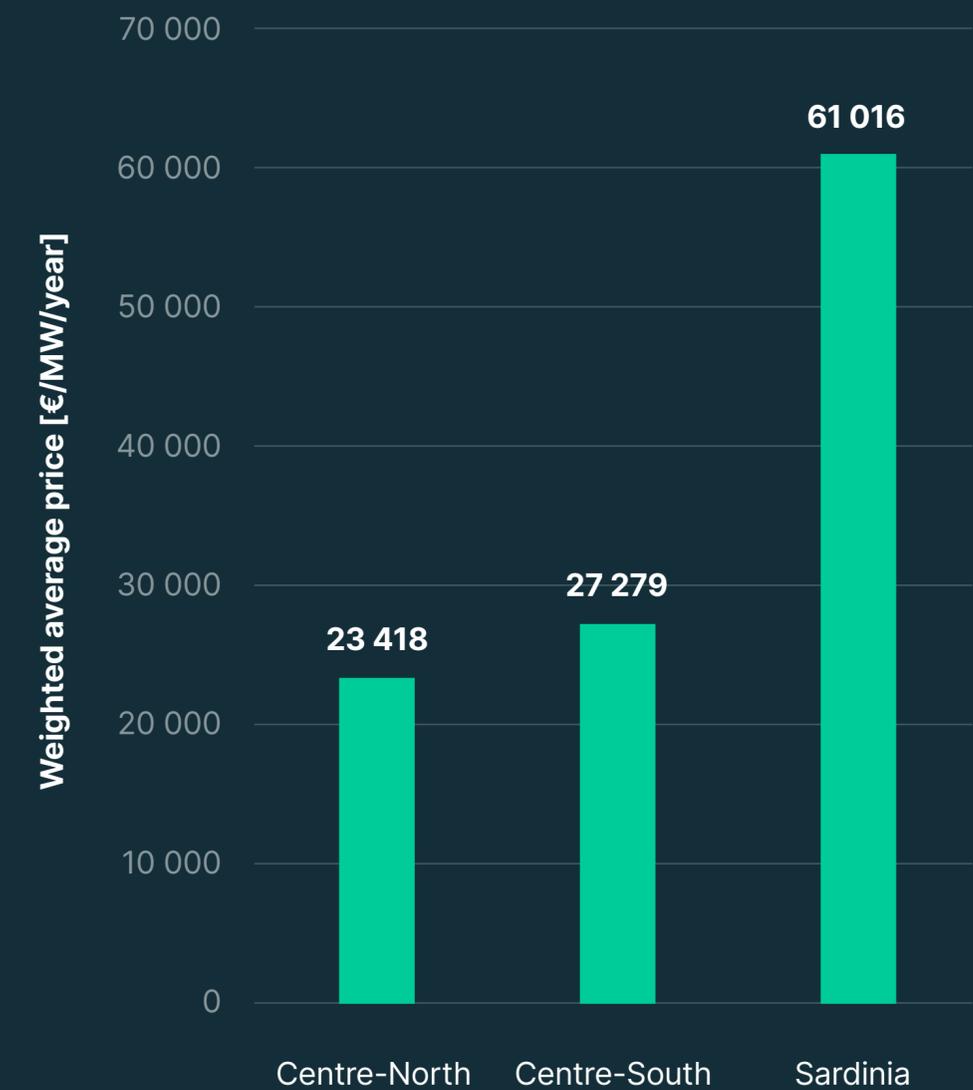
In 2020, Italian TSO Terna created a new capacity market for fast response ancillary services. The framework was developed specifically for battery storage technologies:²¹

- Market size: 250 MW
- The auction granted a five-year contract extending from 2023–2027
- The auction followed a 'pay-as-bid' scheme
- The reserve requires approximately 1.000h of availability.

The auction resulted in prices between 23.000–27.000€/MW/year on the mainland, and over 61.000€/MW/year in Sardinia.²²

Fast reserve auction results

2023–2027²²



The **ancillary services market** offers an additional source of potential revenues for operators

- In addition, storage technologies can participate in providing ancillary services on a day-ahead basis, as well as one hour ahead for the balancing market.²³
- When electricity prices are volatile, as they were throughout much of 2022, participation in the balancing market can provide attractive returns for storage system operators.
- In Terna's ancillary's services market, Terna acts as a central counterparty and winning offers are remunerated on a pay-as-bid basis.



Italy's National Energy and Climate Plan (NECP) includes specific targets for storage technologies

- Italy's NECP targets between 7.5 GW and 8.5 GW of energy storage by 2030, of which 4.5 GW is expected to come from customer-sited storage systems.²⁴
- The remaining 3–4 GW is expected to come from utility-scale systems.
- By 2050, Italy aims to achieve 30-40 GW of storage capacity.

Italy's storage targets



Customer-sited

4.5 GW

Utility-scale

3-4 GW



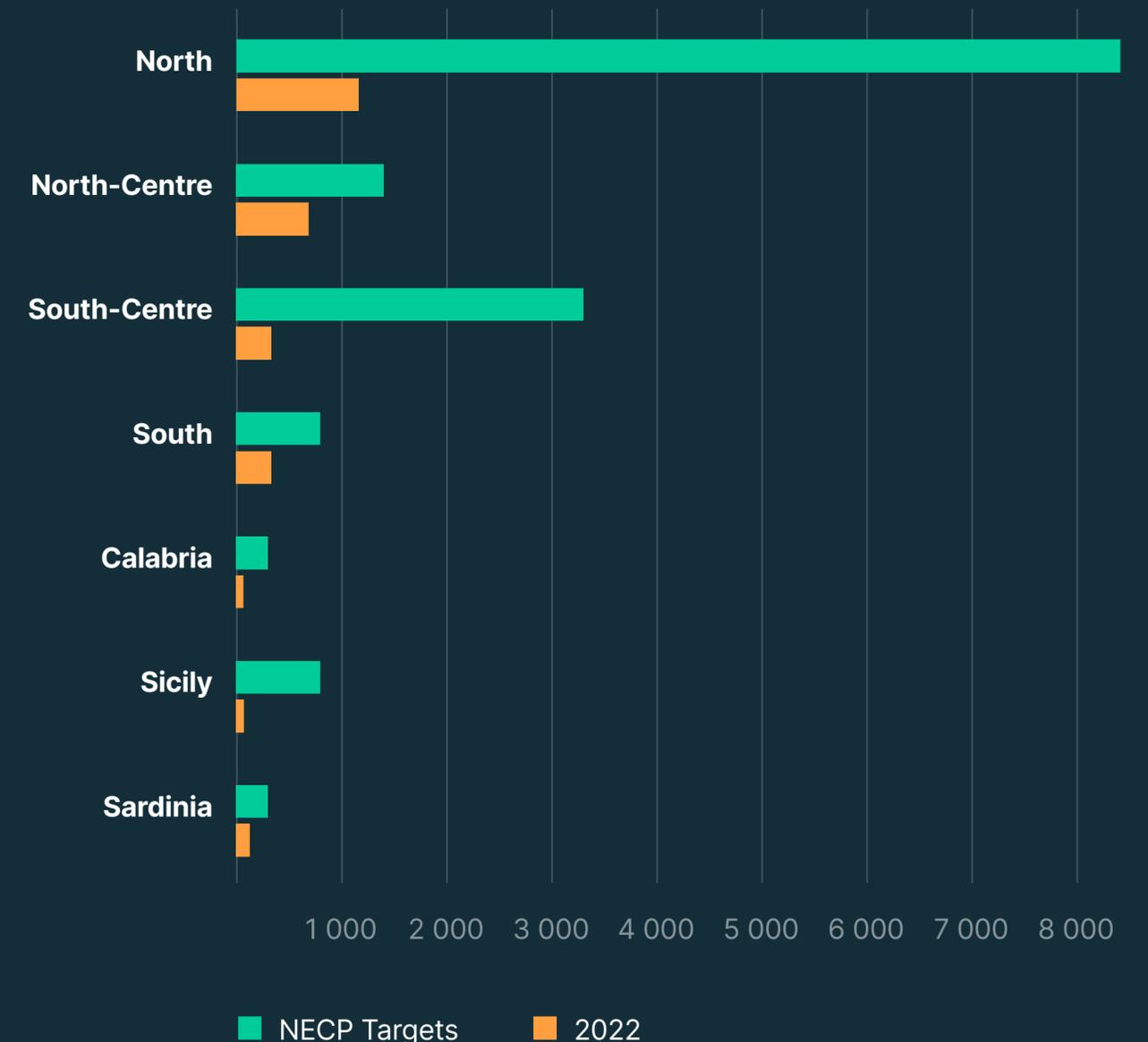
Italy's target for the share of renewable electricity by 2030

55%

Despite the market's significant growth, Italy still has a **long way to go** to reach its national storage targets

- There are significant regional differences in the adoption of battery storage systems across the country.
- Northern Italy (Lombardy, Venetia and Emilia Romagna) currently account for over 50% of the market.²⁵
- While most distributed battery adoption is occurring in the north, most of the larger-scale storage projects are in the south and on Italy's largest island, Sardinia.

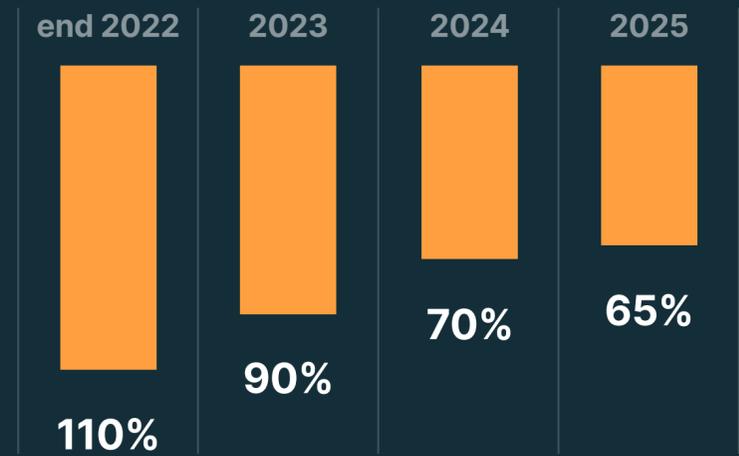
Distributed-scale Battery Capacity
(MWh)²⁵



Recent policy developments remain supportive of continued **customer-sited** battery adoption

- Italy's super bonus tax incentive scheme is planned to continue until 2025, though the percentage share that can be claimed as a tax incentive is scheduled to decline.²⁶
- What impact this decline will have on market adoption remains unclear.
- As a supportive measure, Italy's National Recovery and Resilience Plan plans to channel €2.2 billion for the self-consumption of renewable electricity, including storage systems.²⁷

Super bonus scheme 2022–2025²⁶



NRRP Investments in self-consumption²⁸
Millions €

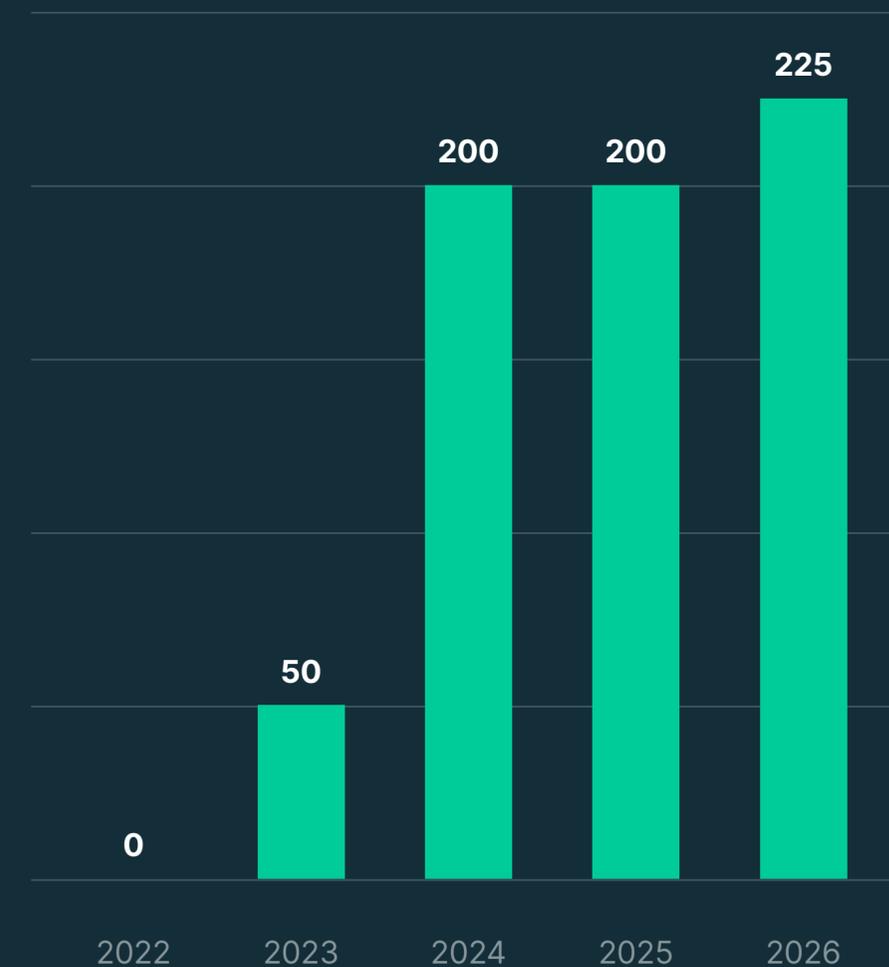


Several factors point to continued growth in utility-scale projects

- In a significant policy change, starting in 2022 Italy has abandoned the practice of double charging, a practice whereby operators are charged fees both for the energy they draw from the grid, and for the energy exported to the grid.²⁹
- As a further sign of support to the storage sector, Italy's National Recovery and Resilience Plan also plans to launch a special incentive program for offshore plants using storage technologies.
- The program envisions offering up to €675 million to support such innovative projects, with wave power being mentioned as one of the targeted technologies.³⁰

NRRP Investments on innovative storage applications

(Millions €)³¹



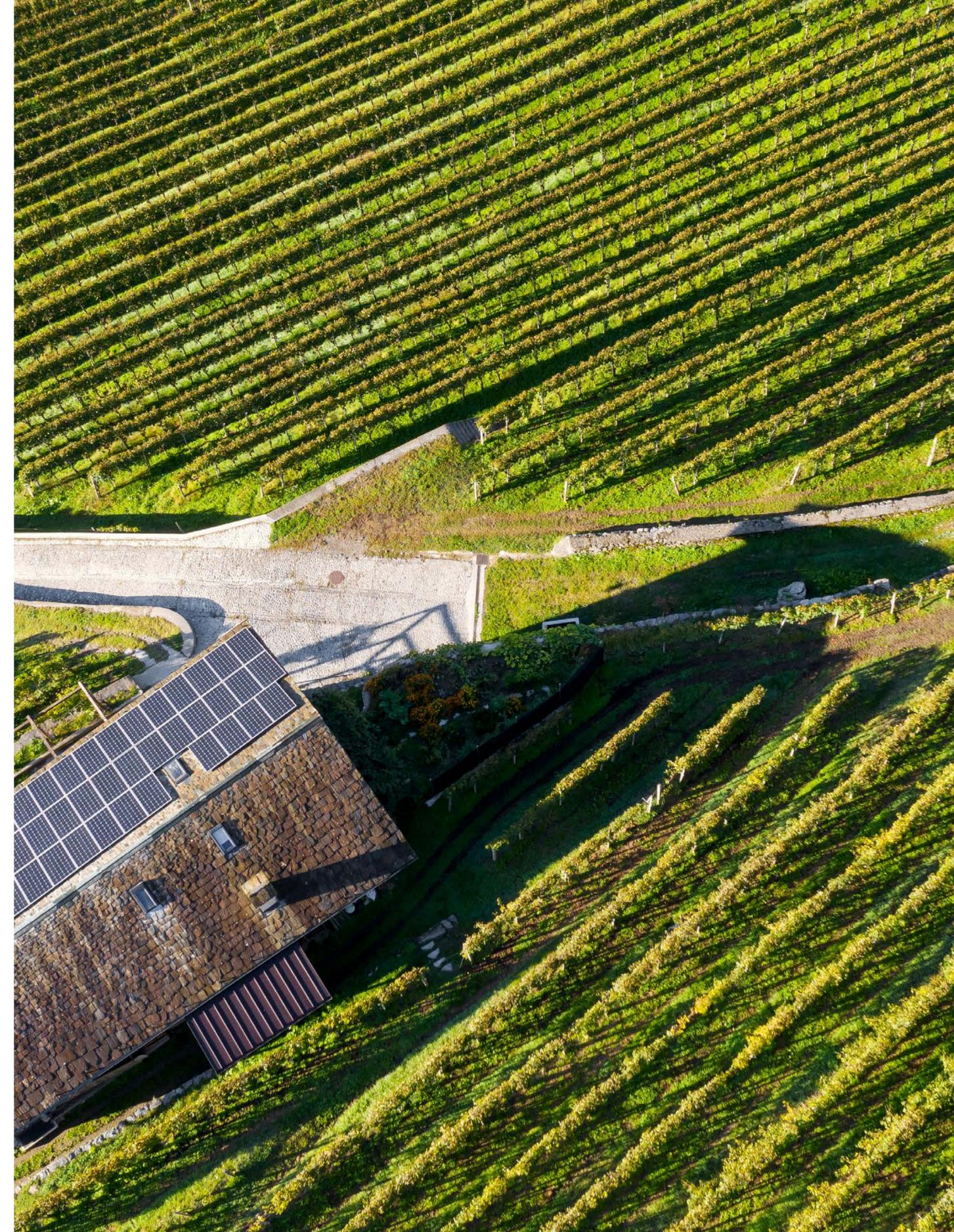
However, **potential challenges** for utility-scale projects remain

- While the economics of utility-scale storage projects in Italy are currently strong, the sector faces a few headwinds.
- The recent debate in Europe about the electricity market reform considers replacing hourly day-ahead markets with CfD schemes.³²
- If European legislation moves towards long-term CfD contracts, the wholesale market will likely become less attractive for storage projects, as such arrangements undermine the incentives to invest in power system flexibility.
- A further headwind for storage technologies is that Italy is in the process of expanding its grid interconnections with neighbouring countries such as Tunisia, Slovenia, France, and Austria.³³
- Such interconnections could reduce both prices and price volatility in the years ahead.



Energy storage poised to play a **critical role** in Italy's energy transition

- As the share of wind and solar in Italy's power system grows to reach Italy's 55% renewable electricity target by 2030, significant investments power system flexibility will be needed.³⁴
- Storage is poised to play an important role in providing the required flexibility.
- In addition, Italy's NECP sets out specific targets for battery storage in the coming years, providing further certainty to the sector.



Endnotes

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