RE-Source ITALY

European platform for corporate renewable energy sourcing

17 May 2023, Milan

Market scenario and regulatory framework: the possible key to decarbonization through RES

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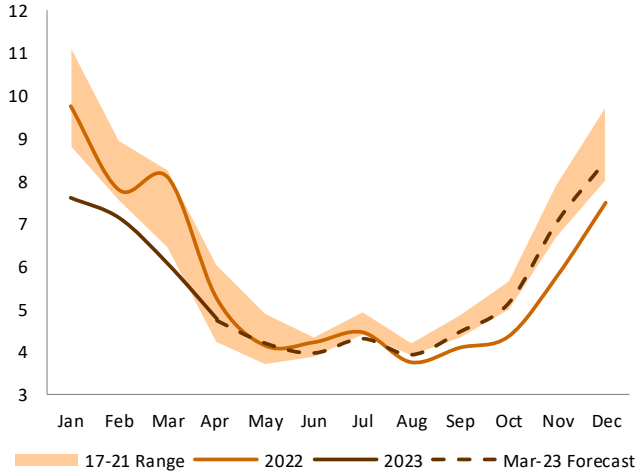
MBSCONSULTING
A Cerved Company

The Transformation Alliance

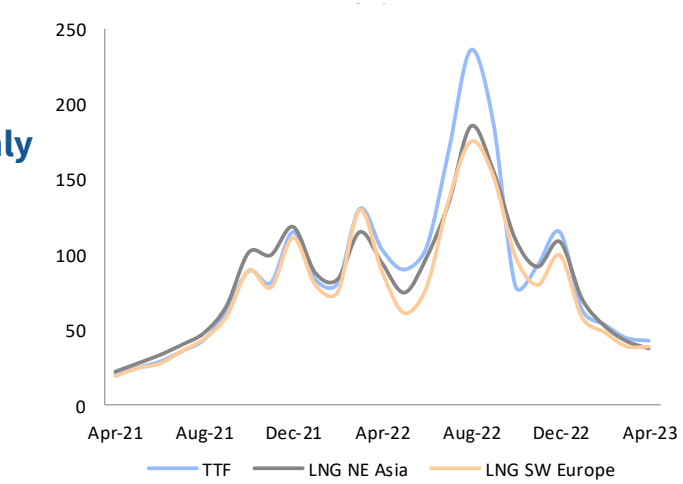
Market trends and policy targets

Low gas demand left storages full for longer: gas prices declined reflecting the market fundamentals relaxation

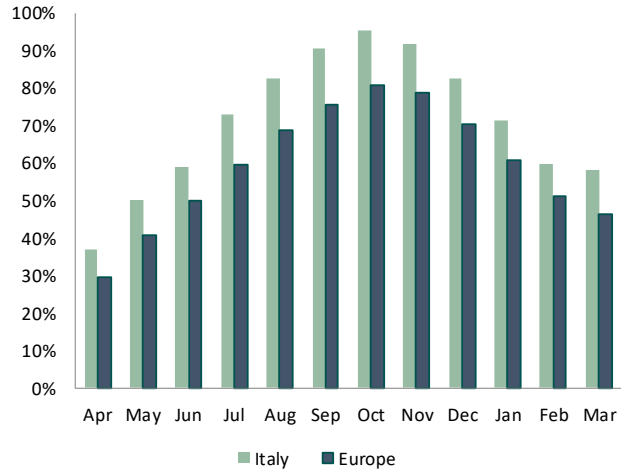
Italian total gas demand (Mcm)



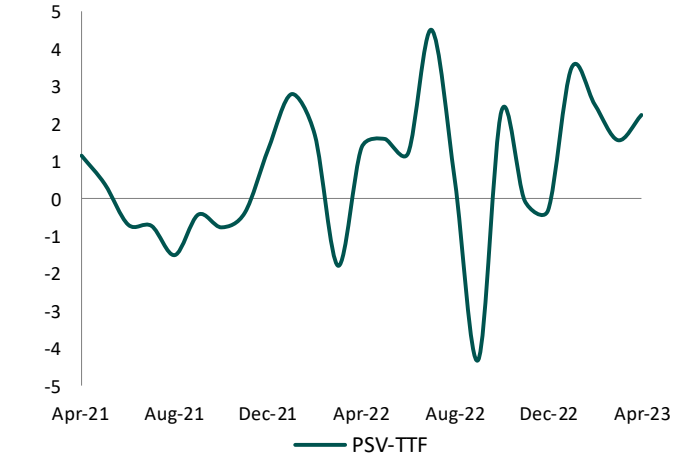
TTF & LNG Monthly Average Prices (€/MWh)



Monthly average storage filling (%)



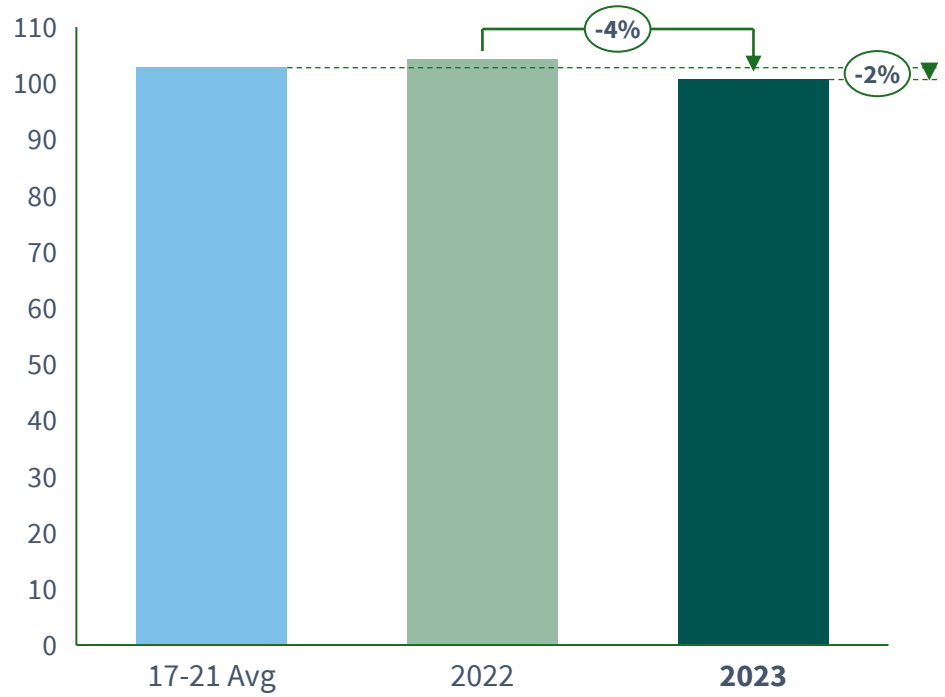
Monthly PSV - TTF Average Spread (€/MWh)



Source: MBS Consulting elaborations

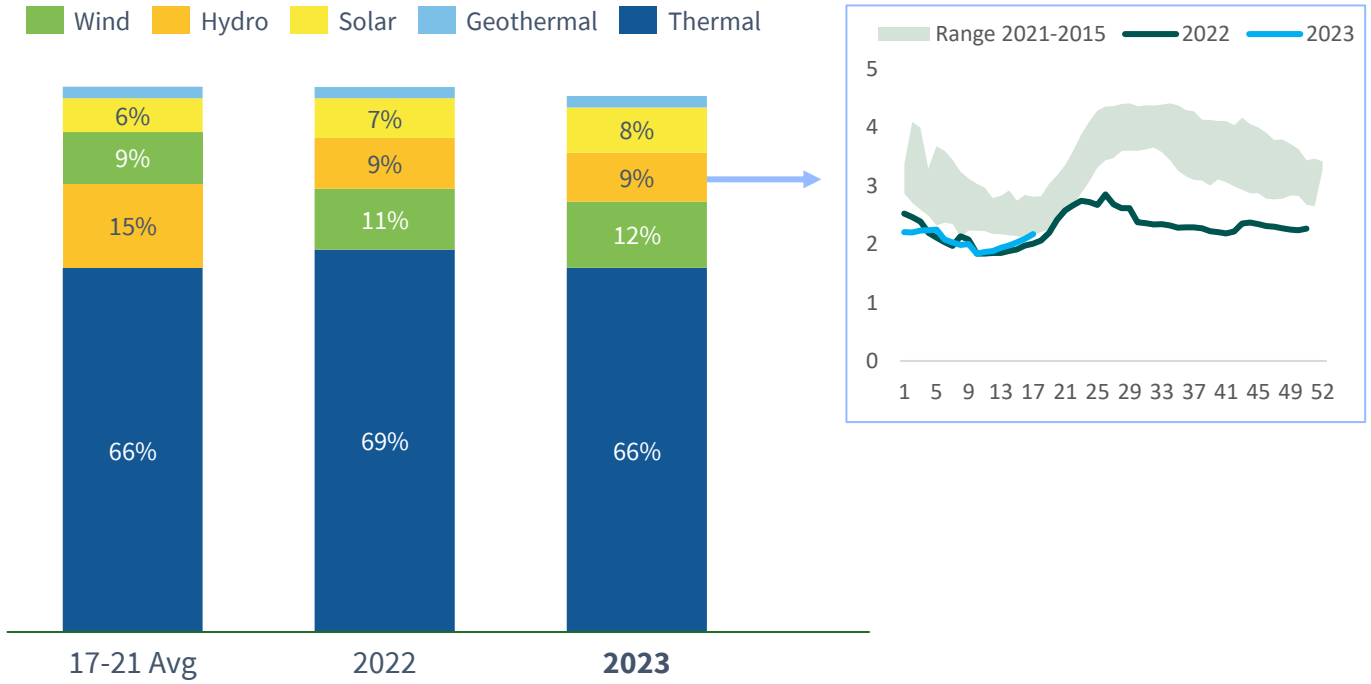
A still subdued consumption mitigates the impact of severe hydro scarcity, despite the expiration of power demand curtailment measures

Cumulative Italian Electricity demand (TWh)
January-April



- Record-high energy prices in the second half of 2022 resulted in a steep reduction in power consumption, reaching -6% y/y between August and December.

Italian Generation Source Mix (%) & Filling rate (TWh)
January-April

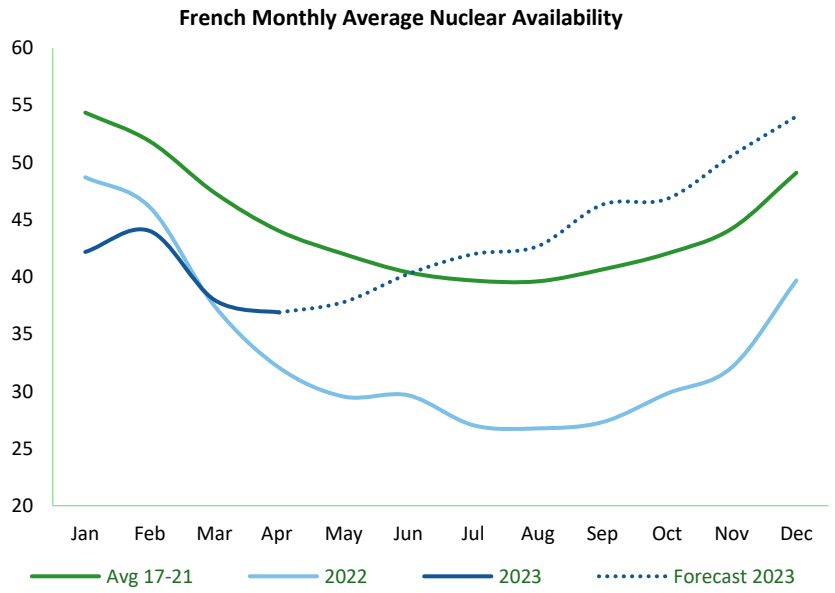


- Significant reduction in water supply, started by the end of 2021, has significantly affected Italian **Hydro generation**, in 2022 its contribution was **down 38% y/y**.
- **Low levels of water reserves have compromised 2023 expected production** and a possible recover is expected not before the 2024.

Source: MBS Consulting elaborations

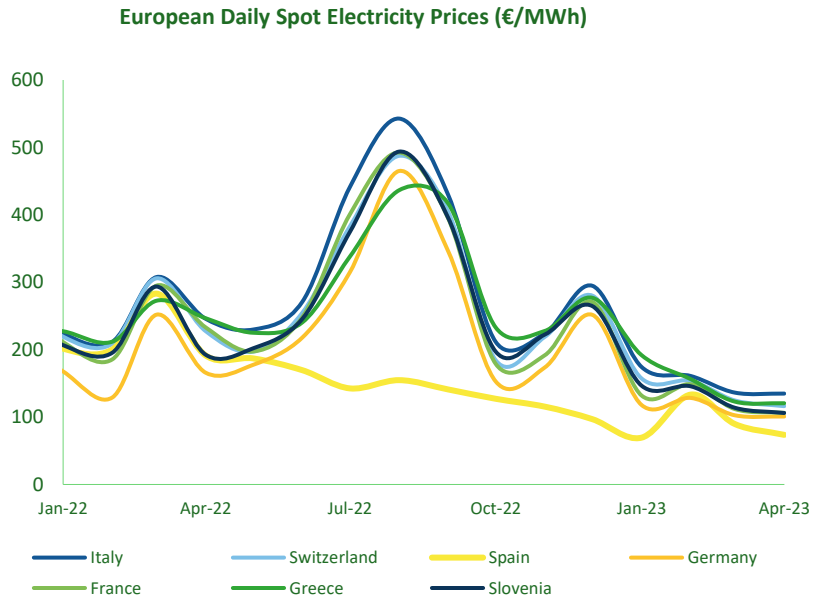
The ongoing ease of market fundamentals results in a decreasing power price trend, although threatened by persisting hydro scarcity and uncertainties on nuclear and thermal fleets

French Monthly Average Available Nuclear Capacity (GW)



- In 2023, pension-related social unrest, along with extraordinary outages and stress corrosion issues, mined French nuclear output and available capacity.
- EDF confirmed the 2023 production target of 300-330 TWh but criticalities may arise from persisting hydro scarcity and widespread strikes

European Monthly Spot Electricity Prices (€/MWh)



- **2023** registered a general decrease in European power prices: by April 2023, the **PUN averaged -45% y/y**

Source: MBS Consulting elaborations and estimates

Renewable development, main driver of decarbonisation, becomes the main option for diversifying European energy supplies

PARIS AGREEMENT
2015
UNFCCC

- *Commitment to limit global average temperature increase below 2°C compared to pre-industrial levels*
- *Actions to limit temperature increase to 1.5°C above pre-industrial levels*

European Clean Energy Package
PNIEC 2030

- ***-40 % GhG emission***
- ***32 % Renewable Energy***
- ***32.5 % Energy Efficiency***

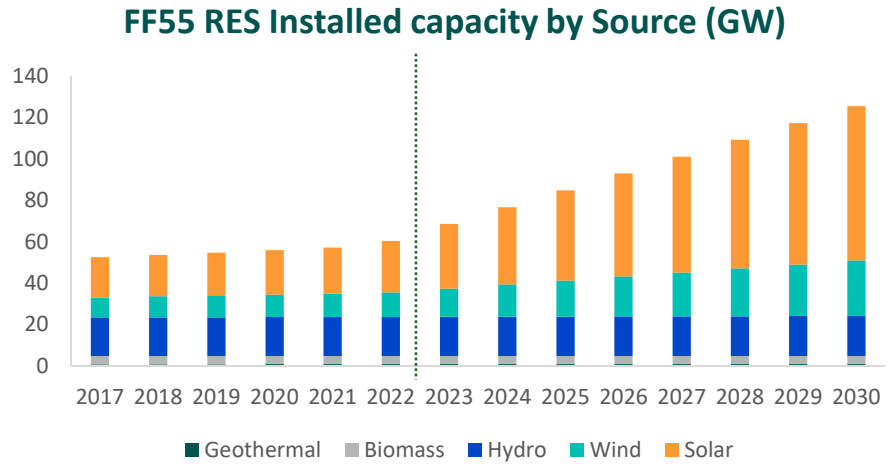
European Green Deal
Fit for 55

- ***-55 % GhG emission***
- ***40 % Renewable Energy***
- ***33-39 % Energy Efficiency***

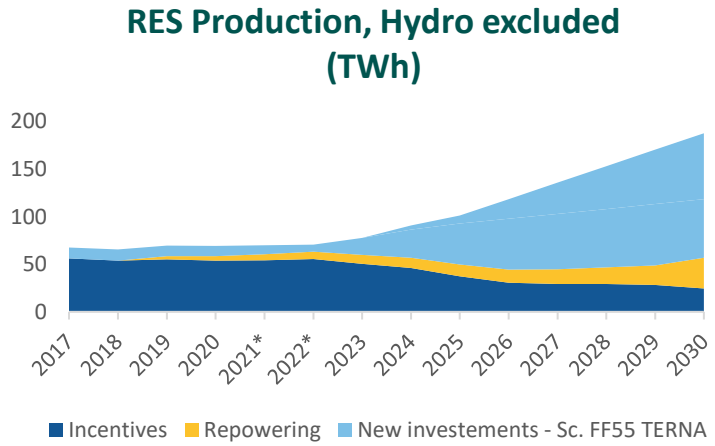
REPowerEU

- ***Anticipate 2030 goals to reduce dependence on Russia***
- ***45 % Renewable Energy***
- ***+9-13 % target 2030 Energy Efficiency***

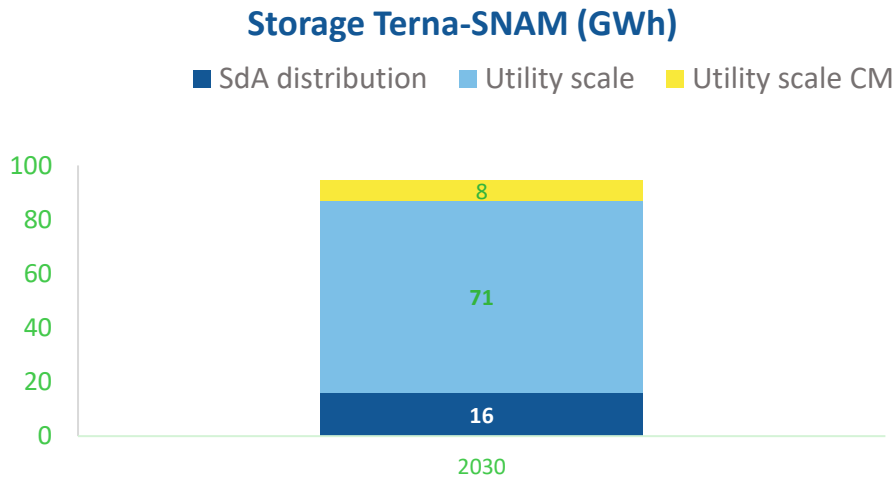
Reaching FF55 2030 objective in Italy requires installing almost 8 GW (6 GW solar and 2 GW wind) of new RES capacity per year



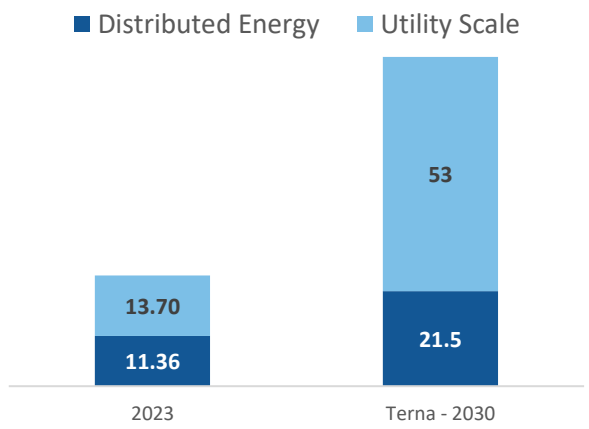
Estimated RES investments: 68 bn€



130-160 TWh merchant renewables at 2030



Estimated storage investments: 34 bn€



DG: from 45% to 30% of solar capacity (2023->2030)

Source: MBS Consulting elaborations and estimates

RES permitting procedures: despite simplifications, institutional skepticism weighs on RES development capacity

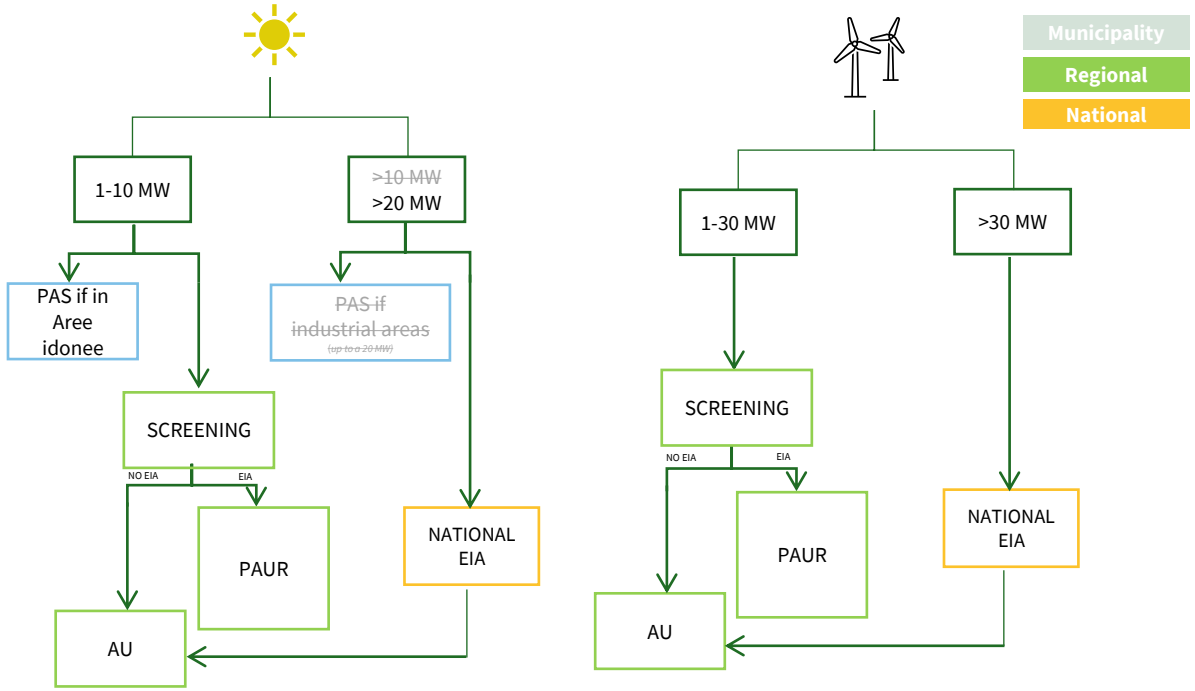
Key Pain Points

- Fragmented jurisdiction
- Screening procedures for small scale
- Prior verification of archaeological interest
- PAS everlasting potential appealability
- Soprintendenze obstructing approach

L.n. 41/2023: PNRR 3

- Temporary VIA exemption in specific areas
- PV as ordinary maintenance
- VIA provisions not subjected to PVAI
- PAS published in Regional Bulletin
- Jurisdiction limited to protected areas

PV and Wind Permitting Processes



Although progresses were made, further measures need to be implemented in order to tackle the following challenges, thus allowing for FF55 targets achievement:

- Ministry of Culture negative EIA provision
- Regions prudence in authorization
- Deregulation paired with appealability uncertainty

The rise in authorization instances is weakened by long lasting procedures and negative statements despite the implemented semplifications

Between 2021 and 2022, the following RES capacity was **authorized**:

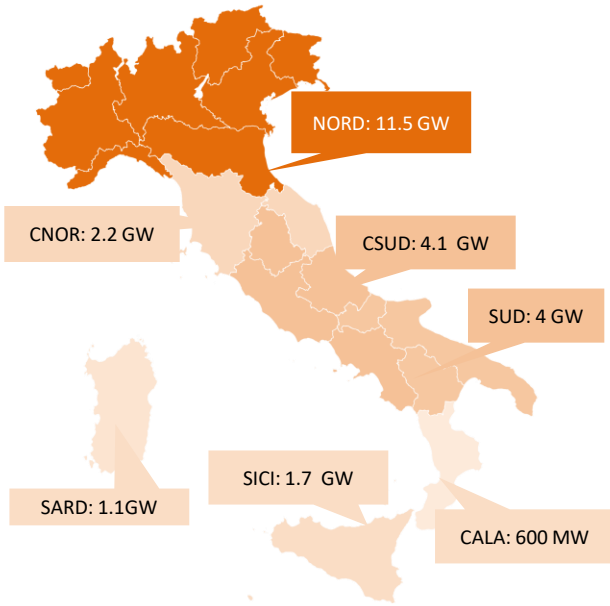
- Solar: **2.4 GW in 2021** and **4.3 GW in 2022**
- Wind: **677 MW in 2021** and **424 MW in 2022**.

Between 2021 and 2022, the following RES capacity was **built**:

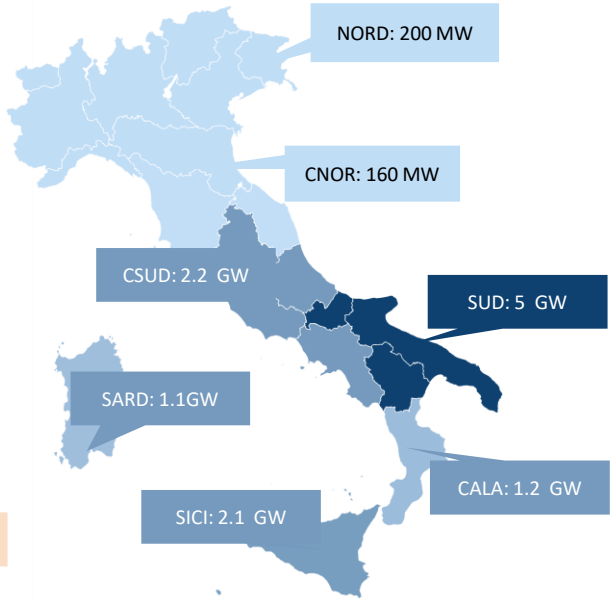
- Solar: **936 MW in 2021** and **2.5 GW in 2022**
- Wind: **404 MW in 2021** and **526 MW in 2022**.

Cumulative RES installed capacity 2022

Solar

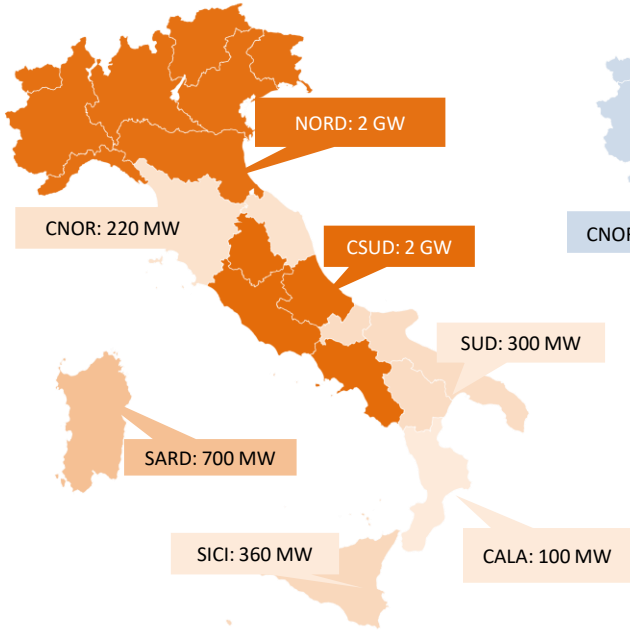


Wind

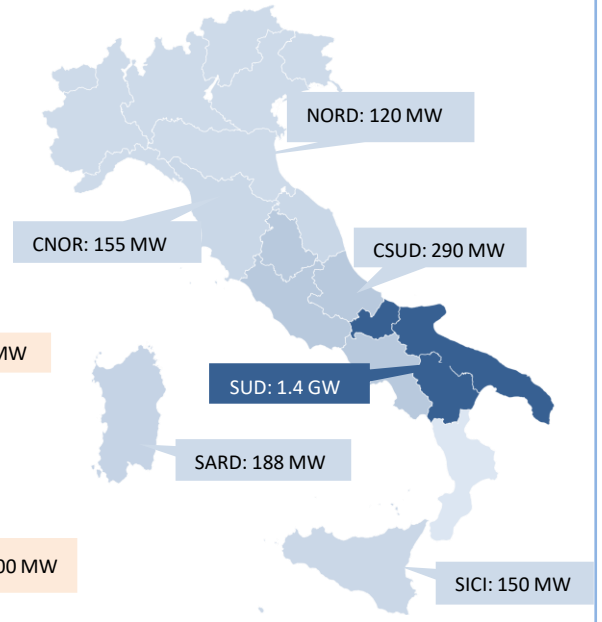


New entrant capacity 2023-24: +8 GW

Solar

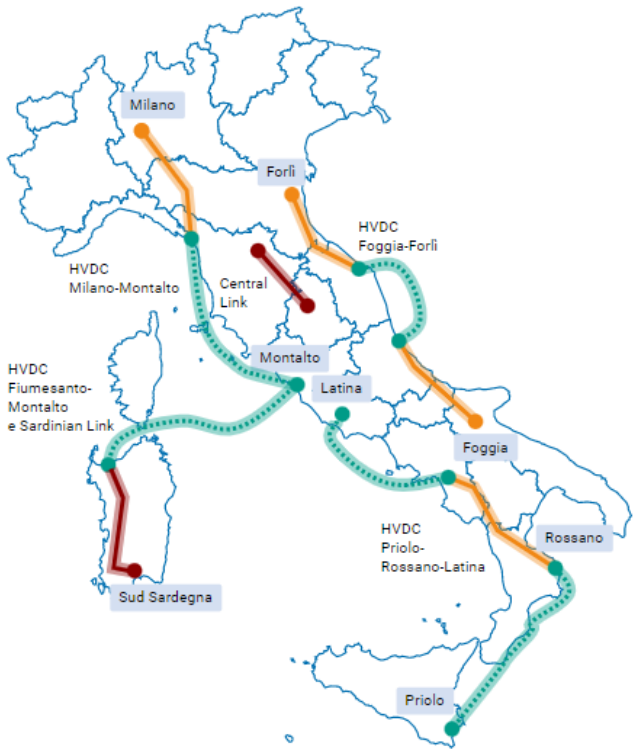


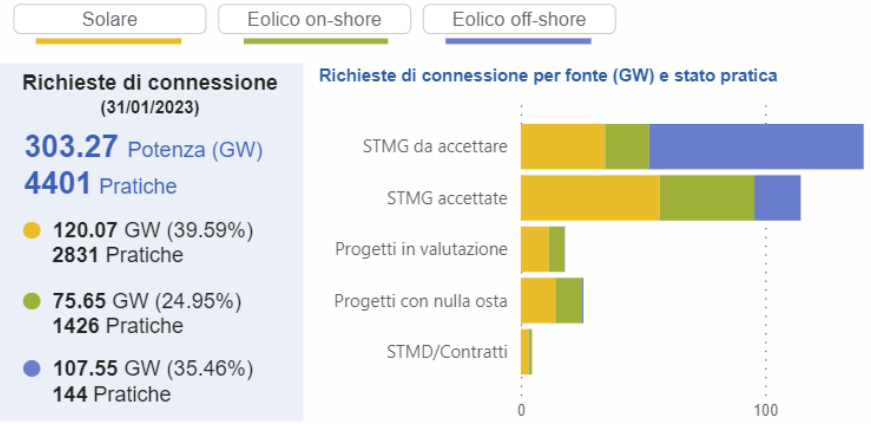
Wind



Source: MBS Consulting elaborations on Terna Consistenze and EIA in progress procedures

The development of the electricity grid (NDP 2023) is fundamental for RES integration





ENTRY INTO SERVICE	
HVDC Milano-Montalto	2030-2032
HVDC Fiumesanto-Montalto	2040
HVDC Priolo-Latina	2035
HVDC Foggia-Forlì	2036

Estimated GRID investments: 21-30 bn€

EXCHANGE CAPACITY BETWEEN MARKET ZONES

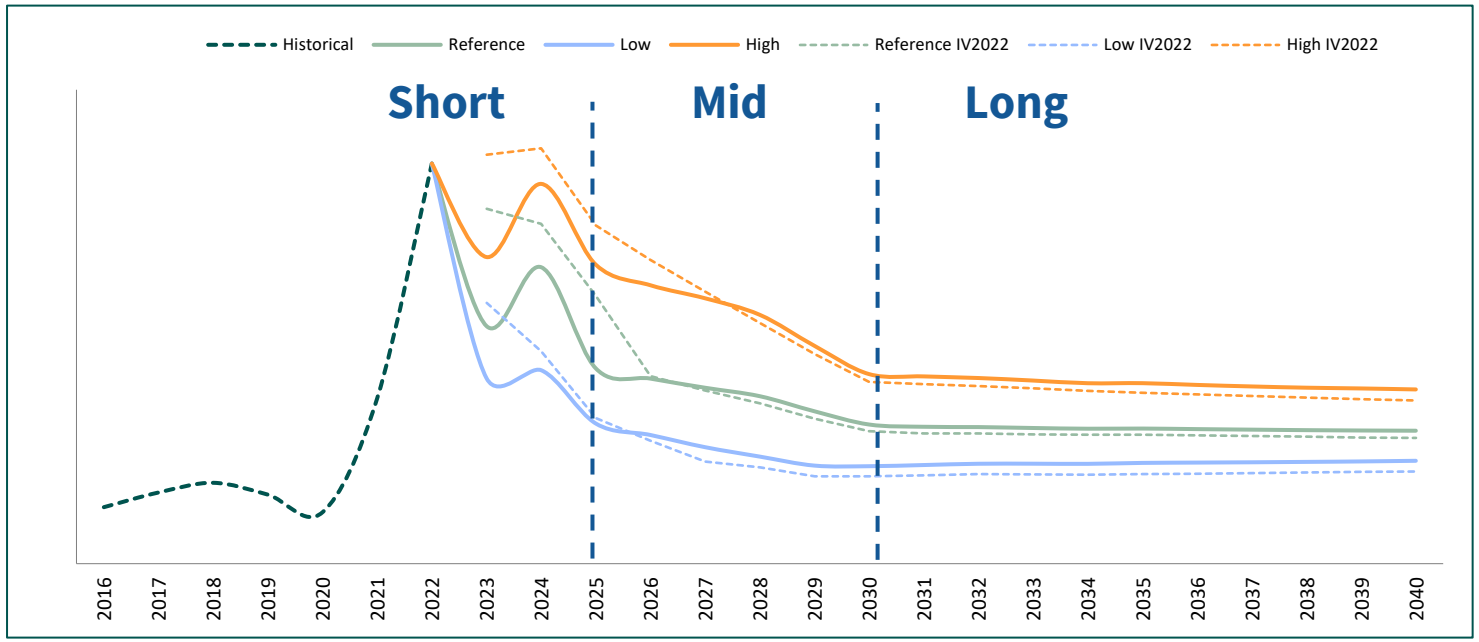
16 GW → 30 GW

Source: "Piano di Sviluppo della Rete", Terna, 2023

Market perspectives

Electric price will be driven by commodity normalization and renewable penetration

Expected electricity price (€/MWh)

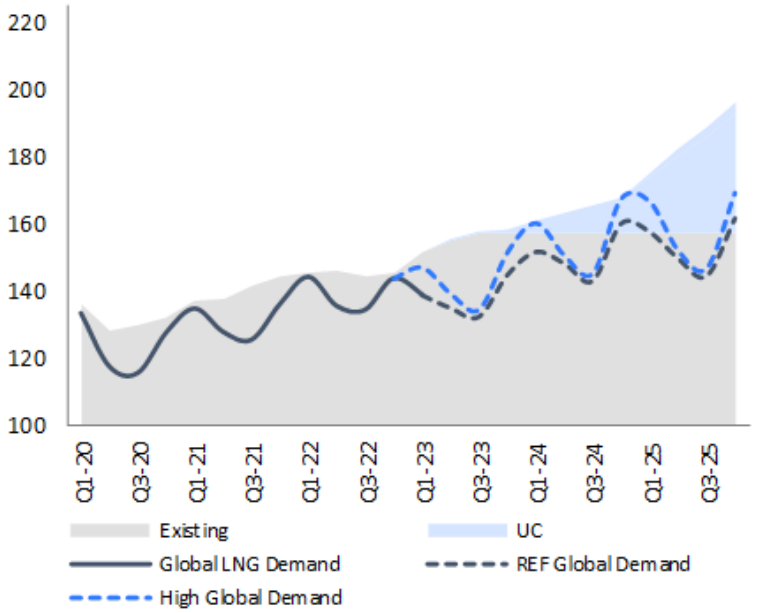


Prices drivers	Short	Mid	Long
	Higher than historical levels ↑	Commodities normalization ↓	RES development ↓
	Drought ↑	RES + BESS development ↓	Energy Intensive storage ↓
	Gas market tension ↑	Tyrrhenian and Adriatic Link ↓	Grid improvement ↓

Source: MBS Consulting elaborations and estimates

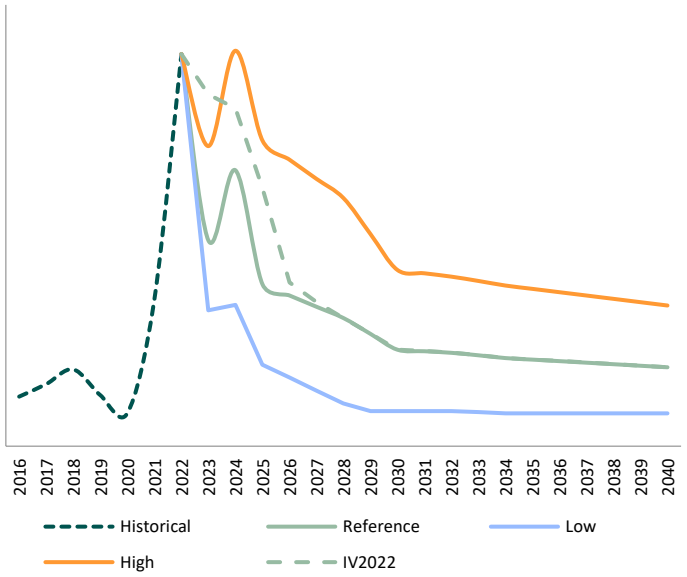
A full normalization of gas prices is not expected before 2025, while the ETS reform supports the upward trend of the CO2 prices

World LNG Demand Supply Balance (Bcm)



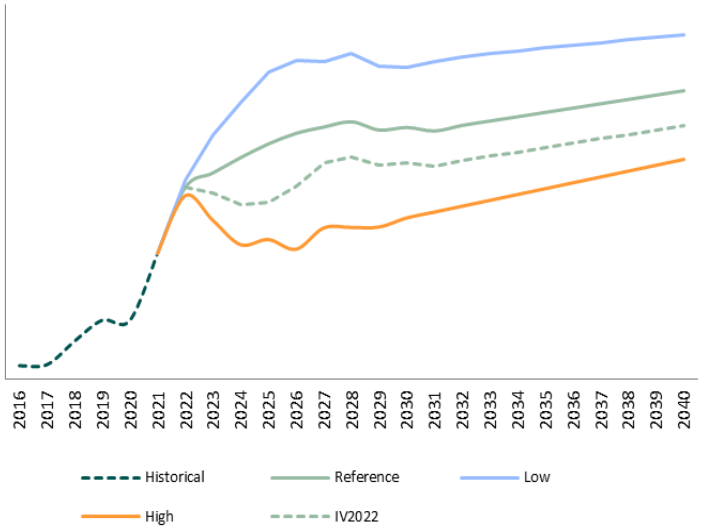
- Europe moved to a premium role in the world LNG market

PSV Price (€/MWh)



- Supply-demand margin on the global LNG market (the main driver of global LNG prices) will stabilize above the historical safety threshold of 10% only in 2025, triggering a full price normalization

ETS (€/ton)

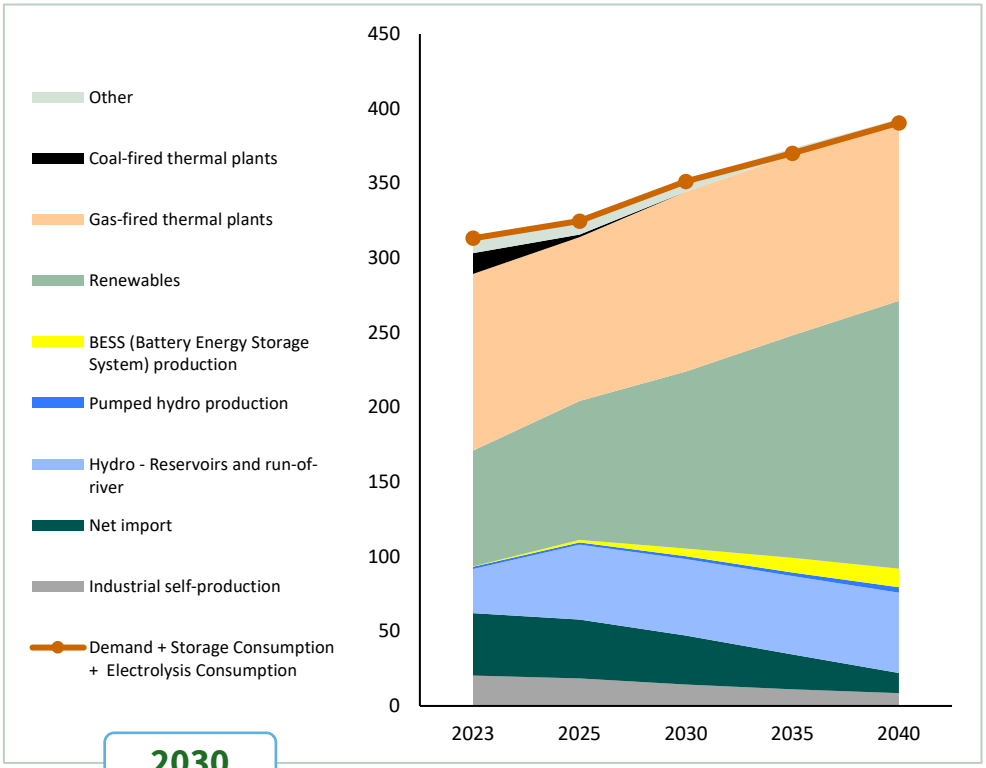


- ETS reform includes measures leading to both a reduction in the supply of certificates and a strengthening of demand
- A significant widening of the gap between supply and demand will be evident from 2025, when the upward trend in the price of CO2 is expected to accelerate

Source: MBS Consulting elaborations and estimates

In the short-term coal remain a central resource to guaranty market equilibrium. RES cover almost 50% of demand in 2030

Energy Balance, Reference Scenario (TWh)

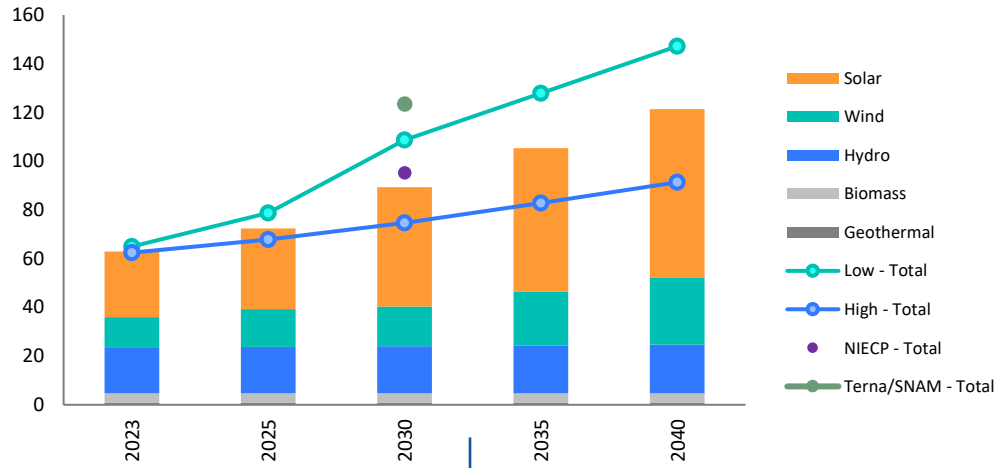


2030

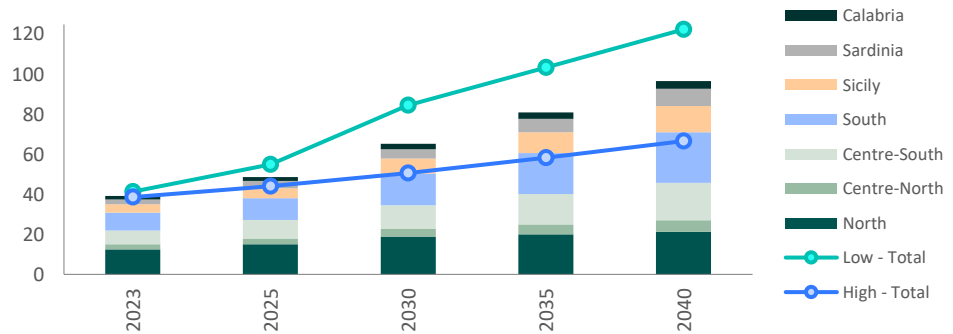
49% RES **37% CCGT**

43% of new Terna-Snam RES capacity

RES Installed Capacity, Reference Scenario (GW)



PV & Wind Capacity Zonal Distribution (GW)



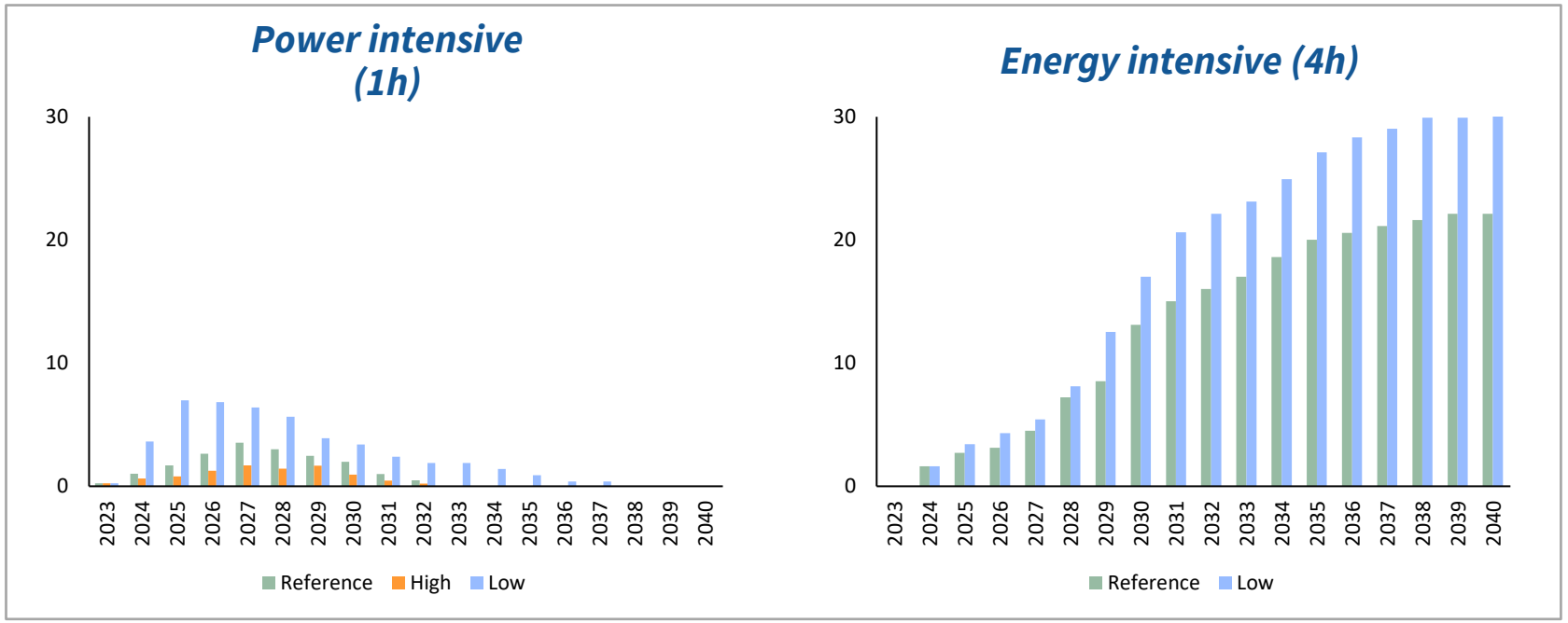
2030

70% RES in the Southern regions

Source: MBS Consulting elaborations and estimates

The increasing volatility can create attractive signals for the penetration of flexible capacity

Expected storage development [GW]



SHORT TERM: signals for power intensive BESS coming from the Ancillary Services Market

MEDIUM TERM: saturation of ASM and volatility of Day-Ahead Market push towards a shift towards energy-intensive configurations

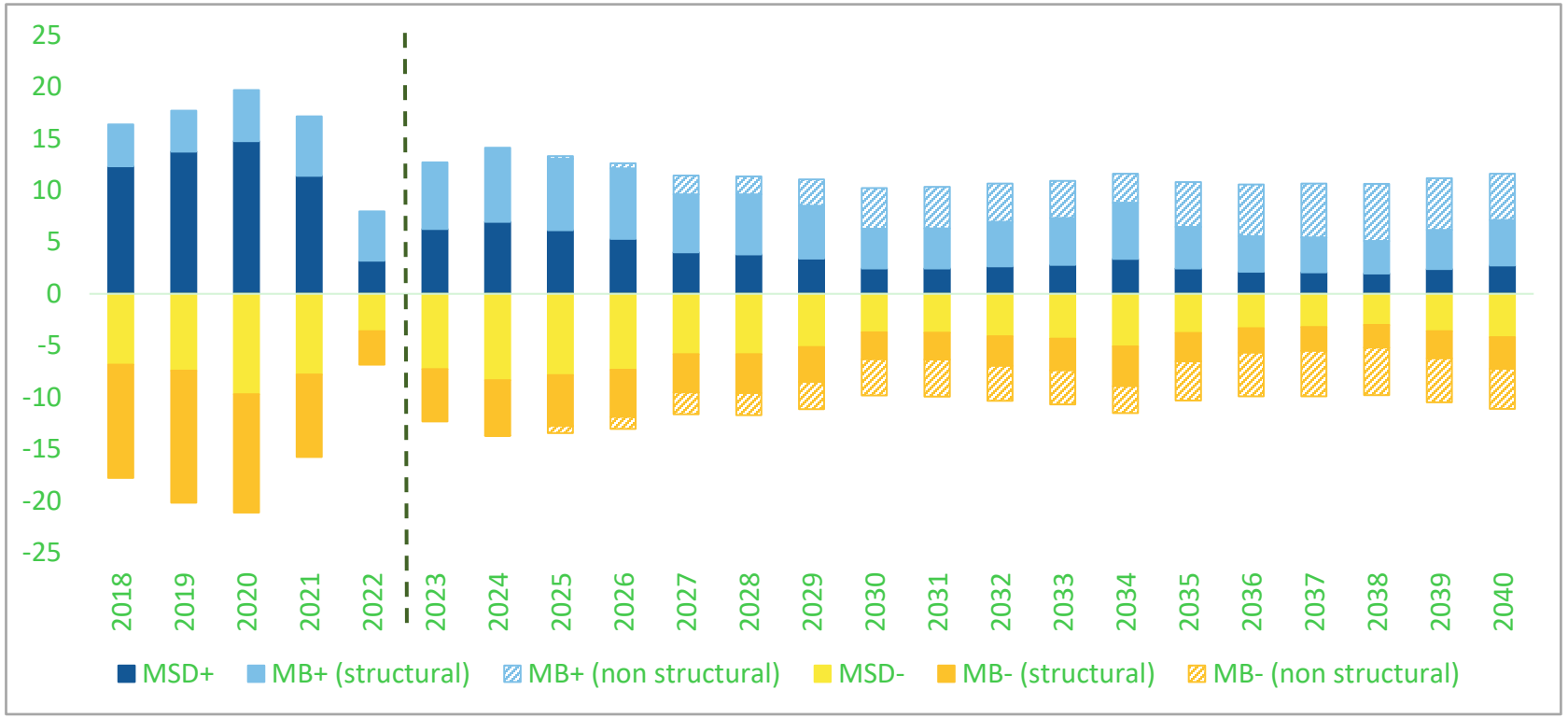
LONG TERM: increasing overgeneration from RES drives a strong penetration of energy-intensive BESS

Example of revenue stacking for BESS [%]

Source: MBS Consulting elaboration and estimates

Ancillary Services Market: lower need of programming, higher need of balancing

Expected volumes on Ancillary Services Market [GW]



2022: strong reduction of ASM volumes, due to rearrangement of Terna's operations, amplified by market dynamics

SHORT-MEDIUM TERM: partial recovery of ASM, due to market normalization and shutdown of coal plants

LONG TERM: ASM ex ante will be progressively reduced by the increasing availability of flexible capacity, while balancing is expected to increase, driven by the RES volatility

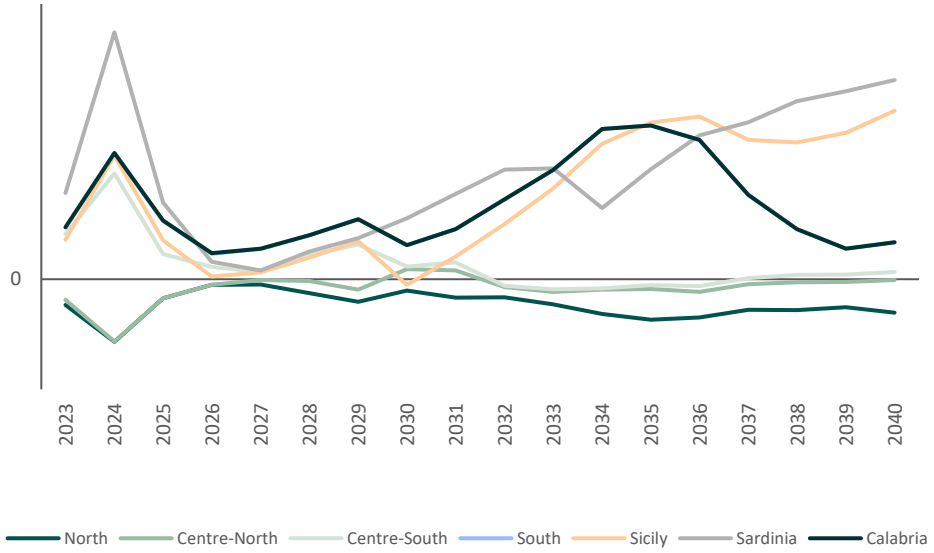
** Structural MB represents the long-term structural portion of the balancing market, needed to compensate the dispatching operated in the MSD ex-ante*

** Non-structural MB represents the short-term portion of the balancing market, needed to compensate the real term imbalances of RES*

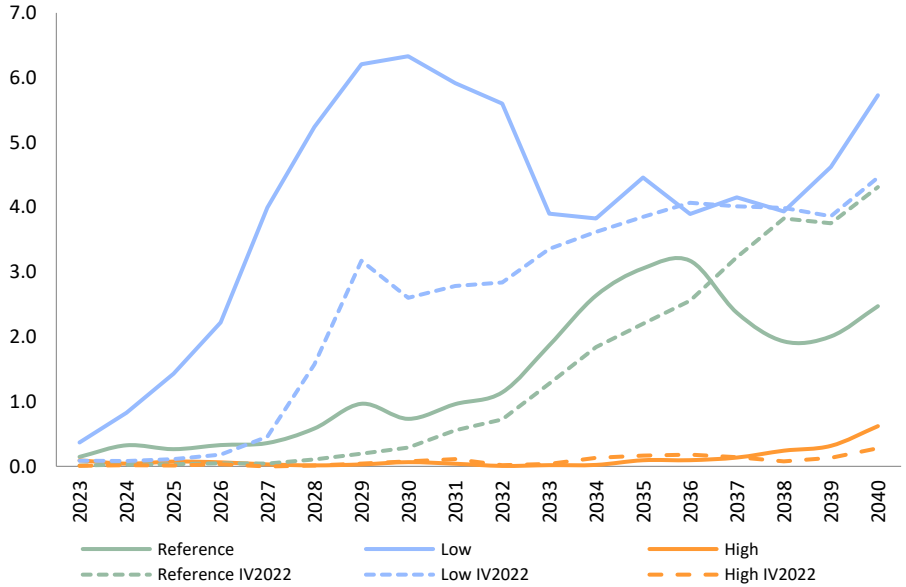
Source: MBS Consulting elaboration and estimates

Overgeneration phenomena on the DAM to become systematic in the future, only partially offset by grid and storage investments

CCT: Baseload PUN – Zonal price (€/MWh)



Day-Ahead Market Overgeneration (TWh)



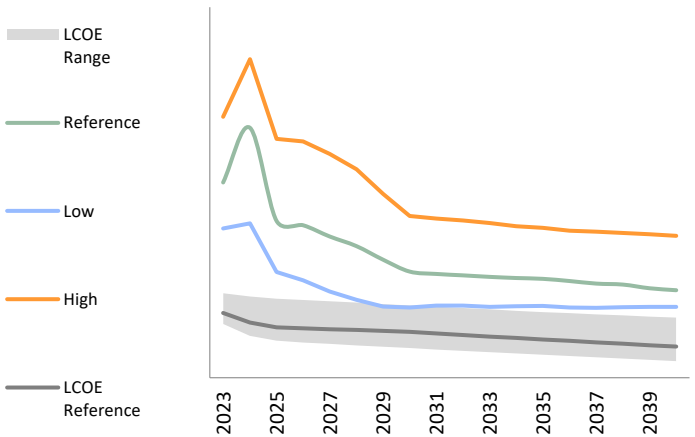
- **Short:** coal and oil production must-run, creating a macro-south and island area, with prices constantly below the PUN
- **Mid:** normalization of commodities prices, but with southern zones still below the PUN
- **Long**: extensive RES development increase overgeneration risk, mailnly in the islands widening prices differentials

- Stronger development of RES in the southern zones is going to generate more congestion favouring overgeneration, despite the development of energy intensive storages and of grid infrastructures (increasing hosting capacity and improving inter-zonal energy exchanges)

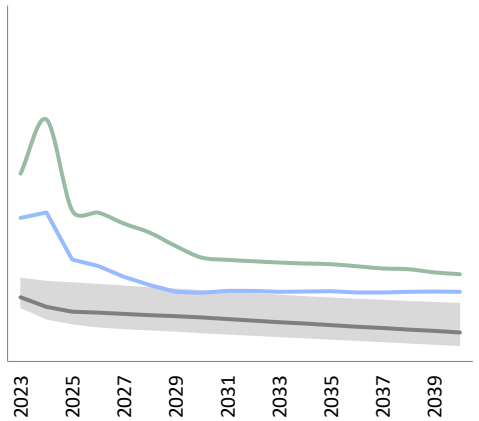
RES market parity is driven by higher than historical commodities despite the increase in technology costs. After 2030 decreasing CAPEX and high CO2 sustain IRR but overgeneration risk increase

RES Market parity

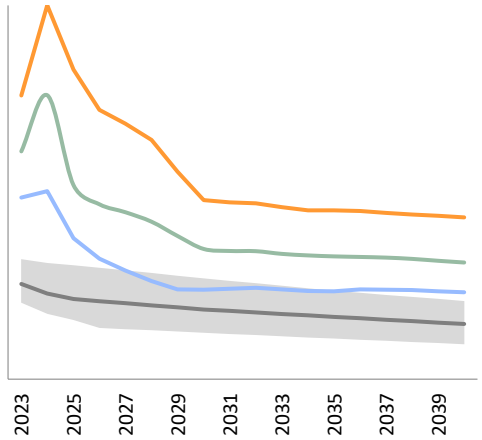
Fixed-tilt (€/MWh)



Single-axis Tracker PV (€/MWh)

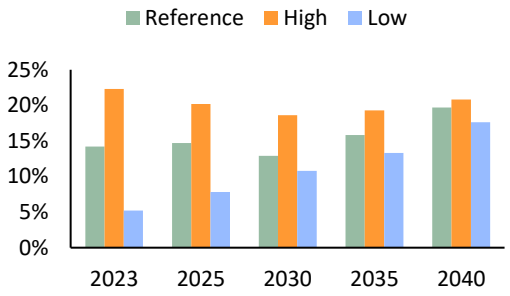


Onshore Wind (€/MWh)

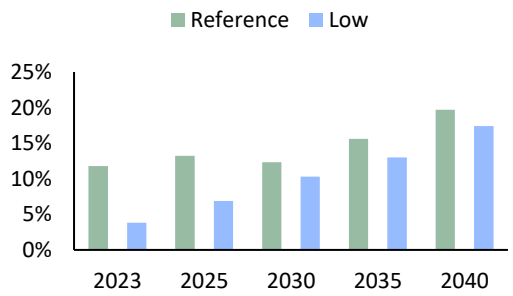


IRR, South Zone (%)*

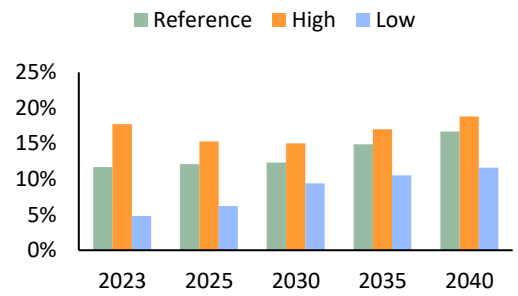
Fixed-tilt Solar



Single-axis Tracker Solar



Onshore Wind

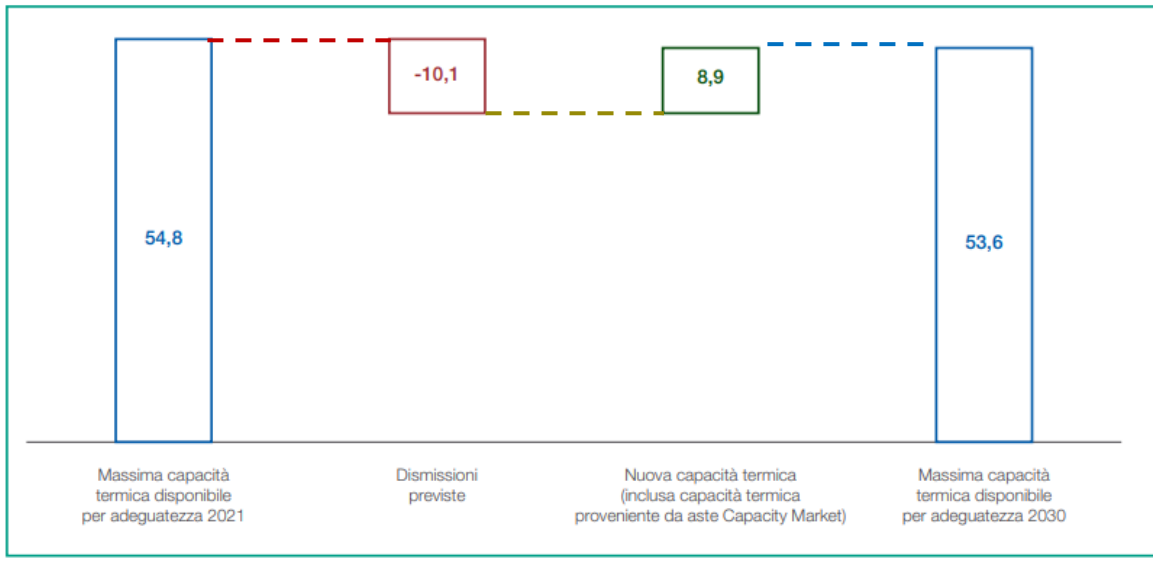


*Post-tax, Full equity Nominal IRR of Merchant Projects in Different Periods, South Market Zone (%)
800k €/MW Average CAPEX with different decreasing trajectory in the three scenario

Despite the increasing role of non-programmable and distributed resources, the role of the conventional generation is confirmed for medium-term adequacy

2021 → 2025 → 2030

FIGURA 10 *Massima capacità termica (potenza nominale) disponibile per adeguatezza (GW)*

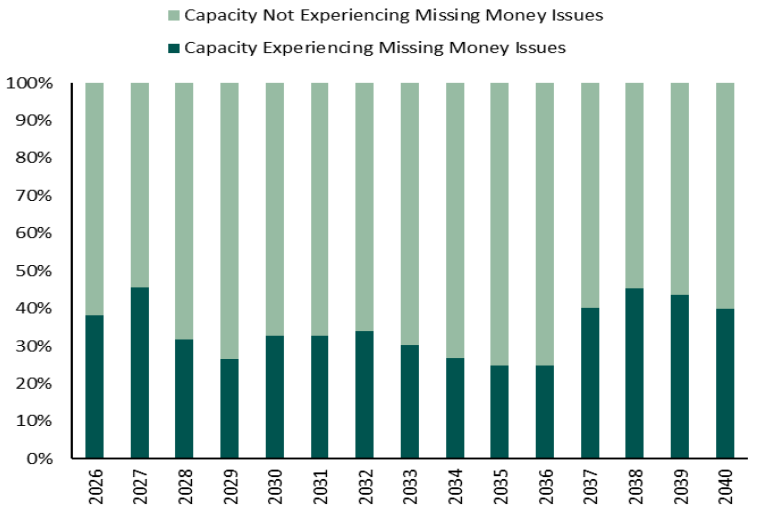


Source: Adequacy Report, Terna 2022

THERMOELECTRIC ASSET:

- ✓ Value put at risk by competition and market restructuring (possible missing money), with the need to rely on long-term remuneration of capacity
- ✓ Possible growth of extrinsic value versus intrinsic value

GAS GENERATION CAPACITY POTENTIALLY SUBJECT TO MISSING MONEY RISK[%]



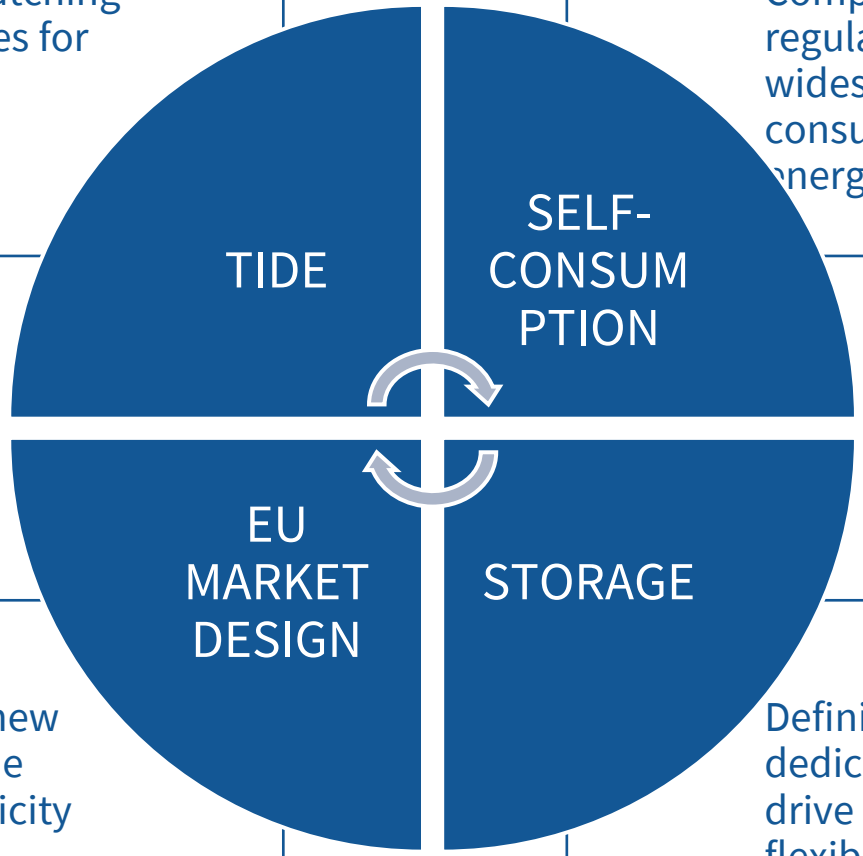
Source: scenario MBS Reference 2023-Q1

The new regulatory framework

The regulatory reform is affecting various areas in an organic way

- Reform of dispatching and market rules for the different resources

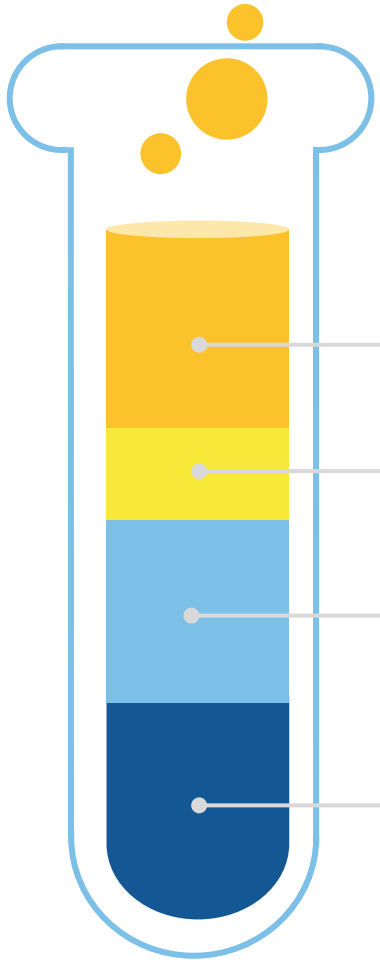
- Completion of the regulatory design on widespread self-consumption and energy communities



- Proposal for a new regulation of the common electricity market

Definition of dedicated markets to drive investments in flexible capacity

European market design foresees a significant role for long-term contracts, with flexibility enhanced in the short term



PROPOSED MEASURES

IMPACT

Electricity price decoupled from gas price
Electricity prices less dependent on gas price fluctuations by protecting end customers with fixed prices

Affordability · Security

Increase the use of long-term contracts
PPA and/or Contracts for Difference (CFD)

Affordability · Sustainability

Promote virtual hubs
Zonal prices with fixed transmission rights to increase liquidity

Sustainability · Security

Increase demand response and storage services
Finding new sources of flexibility to balance the system, incentivizing TSOs with TOTEX

Affordability · Sustainability · Security

TIDE proposes a new paradigm based on a distributed and aggregated market

July 2019
I Consultation TIDE 322/2019/R/eel

December 2022
II Consultation TIDE 686/2022/R/eel

March 2023
Closure II TIDE Consultation

Summer 2023
Definition of regulatory design

Summer 2024
Adaptation of the Network Code (Terna) and Electricity Market Rules (GME)

January 2025
Entry into force TIDE

AGGREGATION

Ability to participate in markets and provide services to the system in aggregate form

NEW SERVICES

Reclassification of ancillary services, with the introduction of new ones and revision of available remuneration

LOCAL MARKETS

Identification of the role of DSOs as local network managers with the possibility of service procurement

NEW ROLES

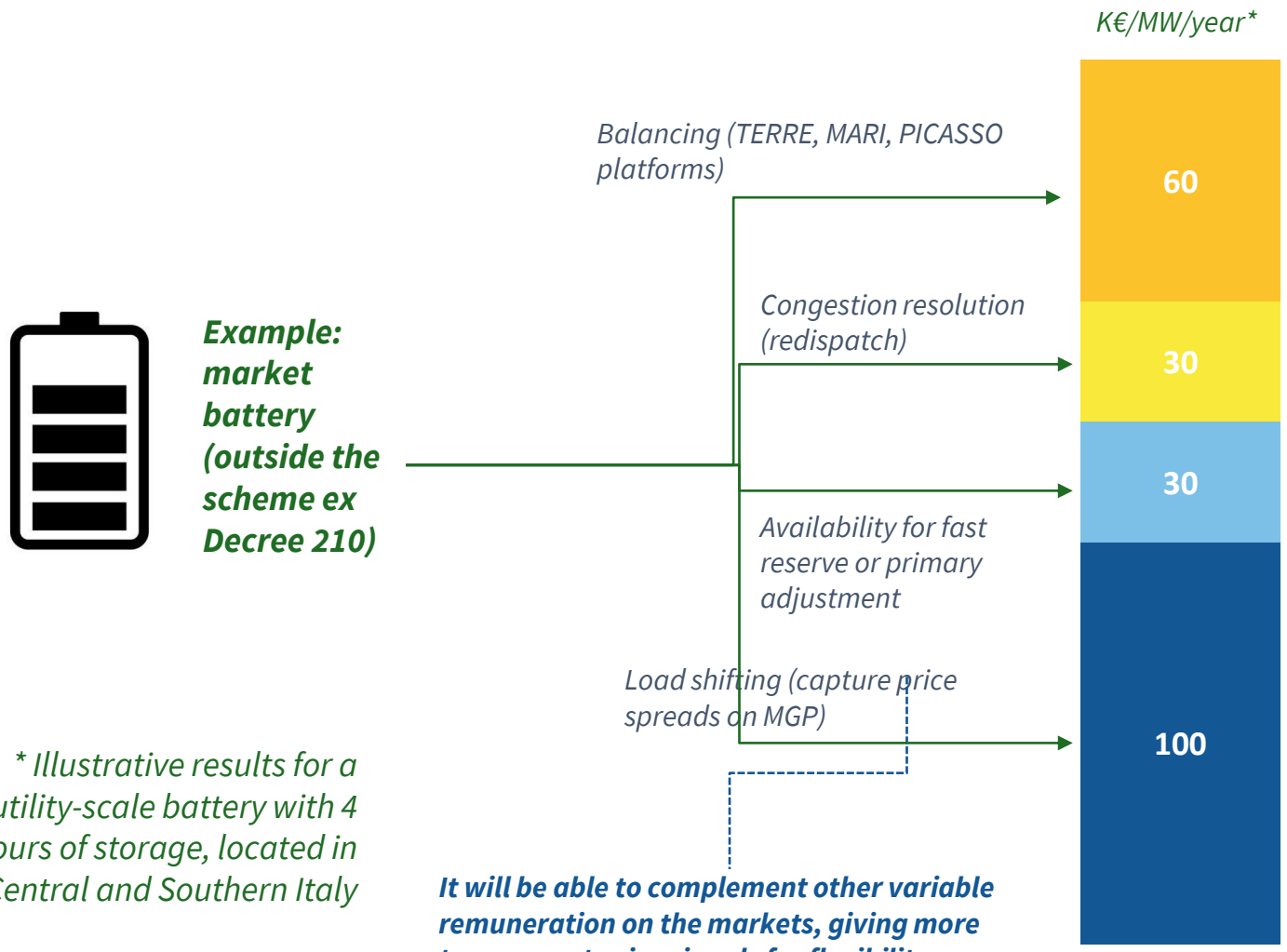
Distinguishing between the role of the Balance Responsible Party (BRP) and the Balancing Services Provider (BSP)

New services will offer market signals for new flexible technologies

NEW SERVICES

- New **ultra-fast frequency** control service, remunerated in €/M
- Procurement at **auction** of the **primary regulation**, remunerated in €/MW
- New **extraordinary modulation service,** which replaces interruptibility, MPE and RIGEDI
- **European platforms for the exchange of balancing resources**

Example: market battery (outside the scheme ex Decree 210)

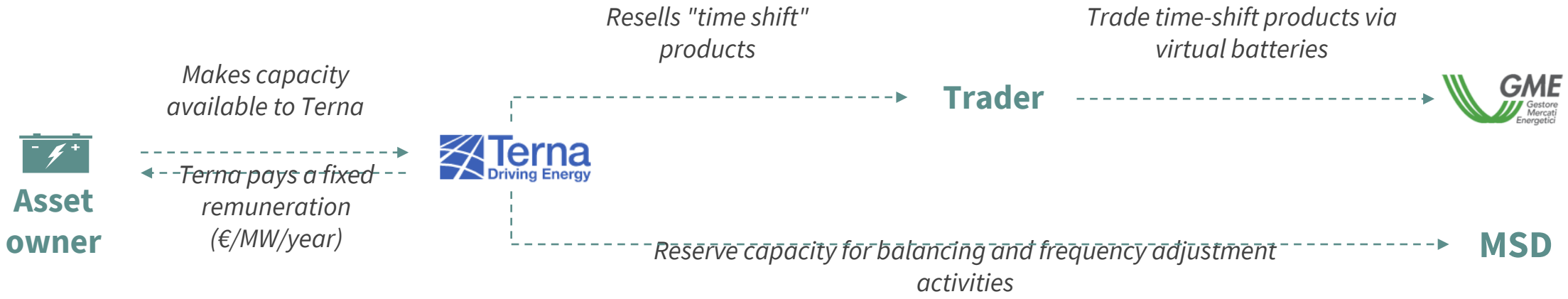


** Illustrative results for a utility-scale battery with 4 hours of storage, located in Central and Southern Italy*

It will be able to complement other variable remuneration on the markets, giving more transparent price signals for flexibility

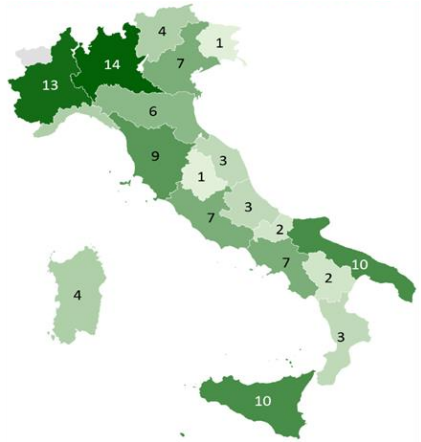
For storage, a market with long-term regulated remuneration is being evaluated

Storage market structure under Consultation 393/22



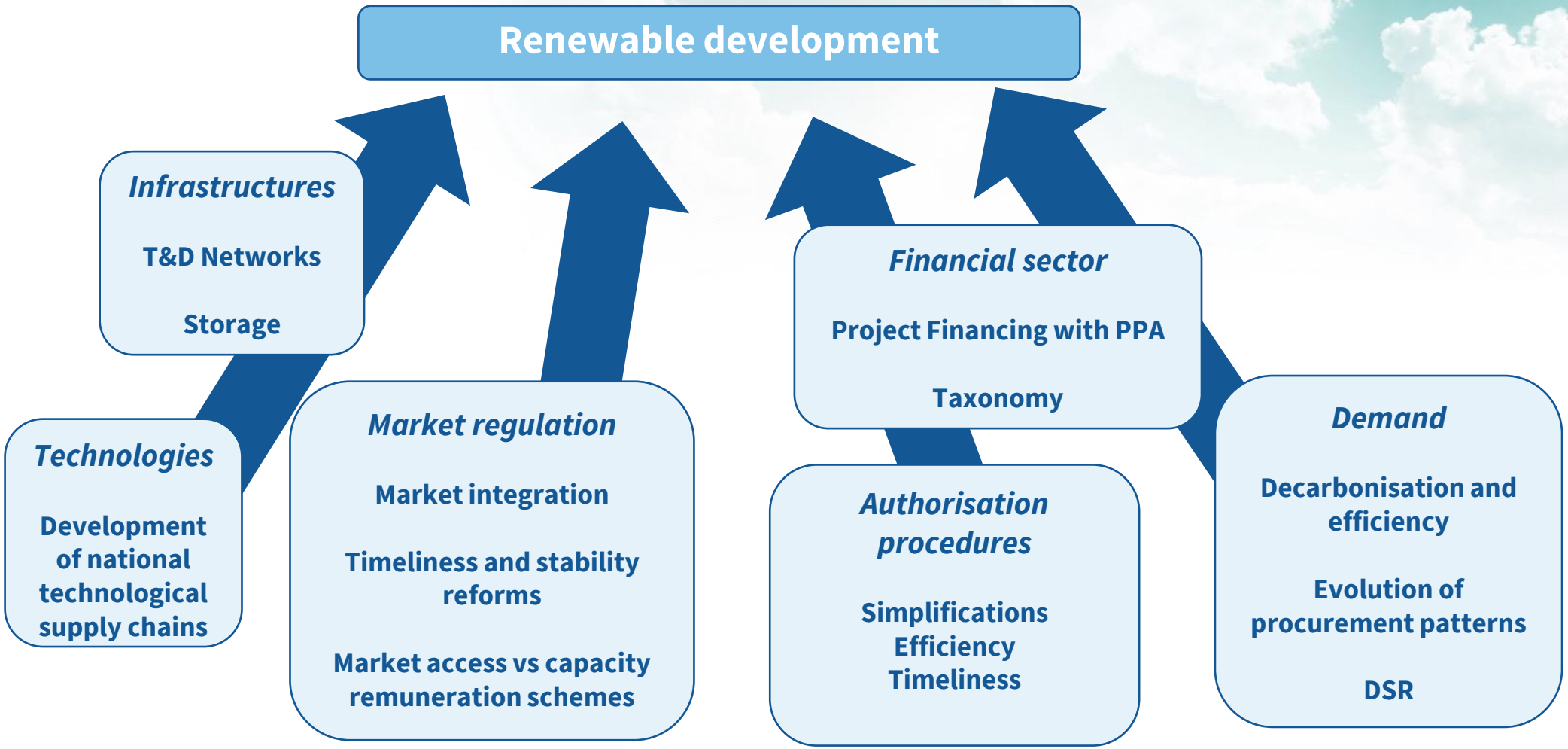
- The market is expected between 2023 and 2024 (mid-2023 for the definition of market design and economic parameters, late 2023-early 2024 for the first auctions)
- The demand will be defined by area and type by Terna and is not yet public information: the market could offer price signals located in the different areas
- The investment provides for a fixed long-term remuneration, without other variable income from market participation

Grid areas of potential interest's



Emerging opportunites

The coordination of all contributions can create a virtuous ecosystem that supports the efficient development of renewables



Business growth opportunities: reducing procurement costs by becoming sustainable

Aree di intervento		
Scope 1 – Direct emissions	Efficiency	Consumption efficiency Electrification
	Decarbonizstion	Adoption of electric, hybrid and biofuel technologies Adoption of high-efficiency technologies and low/zero carbon impact
Scope 2 – Indirect emissions	Renewable sourcing	• PPA, GO • Supply optimization • Distributed Generation • Energy communities and districts •
Scope 3 – Other indirect emissions	Organization Upstream/Downstream	• Procurement optimization • Energy efficiency and supply chain decarbonisation •

Default probability – ESG evaluation cluster
SMEs with ESG score

Cerved ESG Connect, October 2022

Thank you!

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