Italy: the new frontier of energy storage in Europe

Clean Horizon webinar

November 5, 2020

David J.A. Post – Enel X

DISCLAIMER

Please note that:

- *this presentation has been prepared merely for discussion purposes and that it's not intended to provide an exhaustive overview of the matter discussed.*
- *this presentation contains certain statements or projections, which are not exhaustive and might be subject to change, and should be considered for illustrative purposes, and which by no means should be and can be relied upon for making any investment decisions, or any other claims of any nature.*
- *As such, Enel neither the presenter assumes any responsibility for its content.*
- *Chatham rules apply – slides may be shared, but no one may be quoted regarding the exchanges during the discussions*

David J.A. Post

Head of e-Storage Solutions – Enel X

Vice President - EASE
European Association for Storage of Energy

Doctorandus in Economics
Erasmus Universiteit Rotterdam

MBA
Columbia Business School

ENEL X PRESENCE IN THE WORLD

North America

- Canada
- USA

South America

- Argentina
- Brazil
- Chile
- Colombia
- Peru

Europe

- France
- Germany
- Ireland
- Italy
- Norway
- Poland
- Portugal
- Romania
- Russia
- Spain
- United Kingdom

Asia

- China
- India
- Japan
- Singapore
- South Korea
- Taiwan

Australia

- Australia
- New Zeland

Countries

Total: **26**

ENEL X TODAY

e-City	e-Industries	e-Home	e-Mobility	Financial services	Optical fiber
Public lighting	Customer Insights	Green Products	Public infrastructure	Payment Solution	Fiber to the business
E-Bus	Demand Response	Home Services & Products	Private infrastructure	PayTech Factory	Fiber to the home
Digital Platform	Distributed Energy	Digital Services	Energy services	Microloan	Fiber to the tower
	Battery Energy Storage				

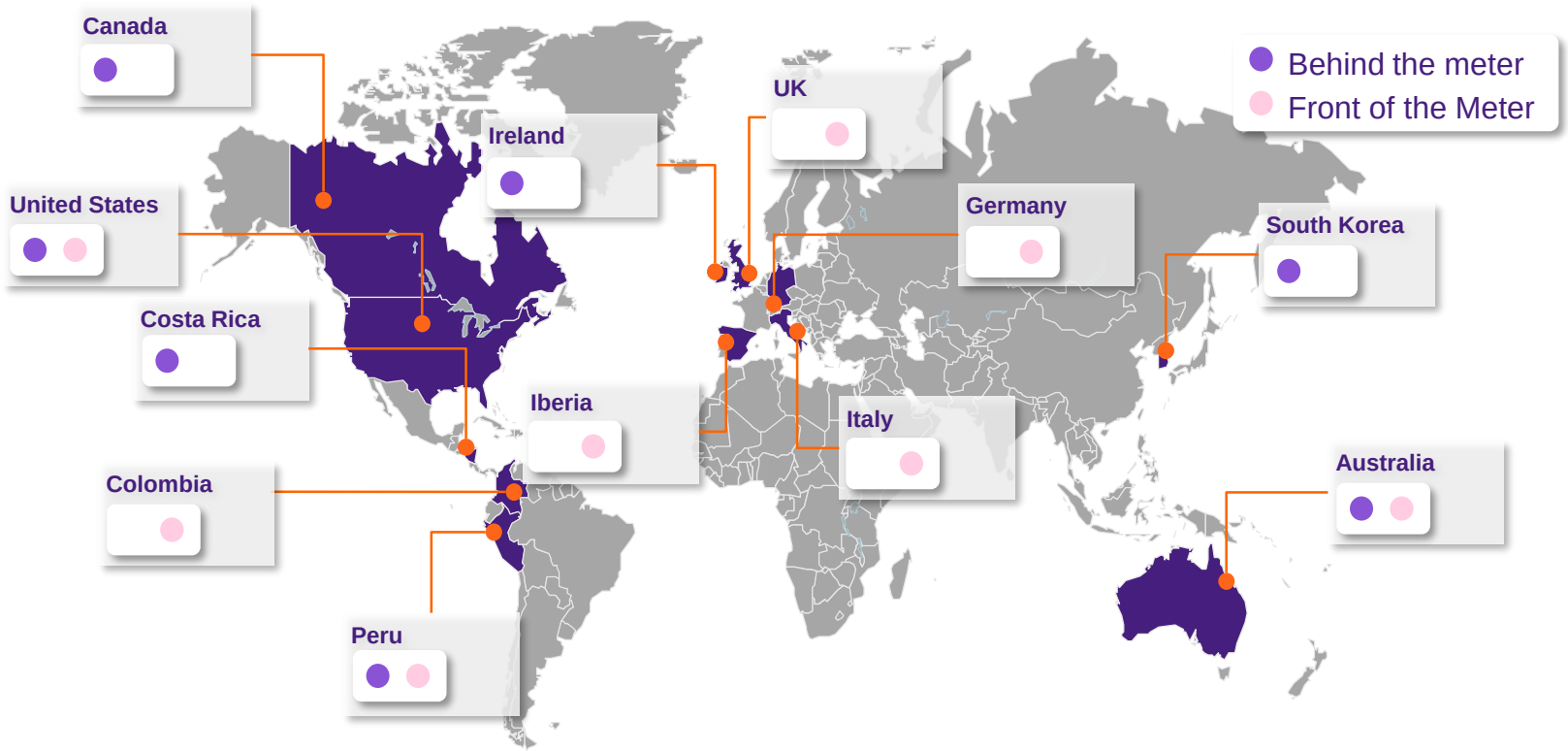
ENEL X BATTERY ENERGY STORAGE

With a global reach and decades of experience in the energy industry, **Enel X** is the leading energy partner with local teams of experts available 24/7/365.

Enel X offers efficient, sustainable and reliable solutions designed around customers' needs and tailored to address their business priorities.

ENEL X BATTERY ENERGY STORAGE SYSTEM (BESS) value proposition is offered in multiple countries with strong growth ambitions.

Enel storage portfolio of approx.. 150 MW including custom-fit systems to align with the business priorities of each client.



MARKET TRENDS SHOW THAT THE NEW CONTEXT REQUIRES A REDISIGN OF ANCILLARY SERVICES

The gradual shutdown of Thermal power plants …

- Average load factor of thermal power plants has come down substantially as EU sustainability targets increase
- Most EU countries announce important decommissioning plans

… and the increasing penetration of Renewables

- Renewable capacity continues to increase even absent Feed-in-Tariffs – capacity built with merchant pricing schemes

… requires new solutions to address system stability and resiliency challenges

1) Increasing need for frequency and voltage regulating power
2) Reduction of system inertial response and improve frequency stability
3) Excess generation from renewable plants during off-peak hours
4) Increased grid congestion due to uneven distribution of renewable plants over the territory
5) Need for increasing ramp-up speed to optimize use of residual SOC

Storage

Distributed Generation

EV charger

Demand Response

GRADUAL ROLL-OUT OF A REGULATORY FRAMEWORK FOR ENERGY STORAGE

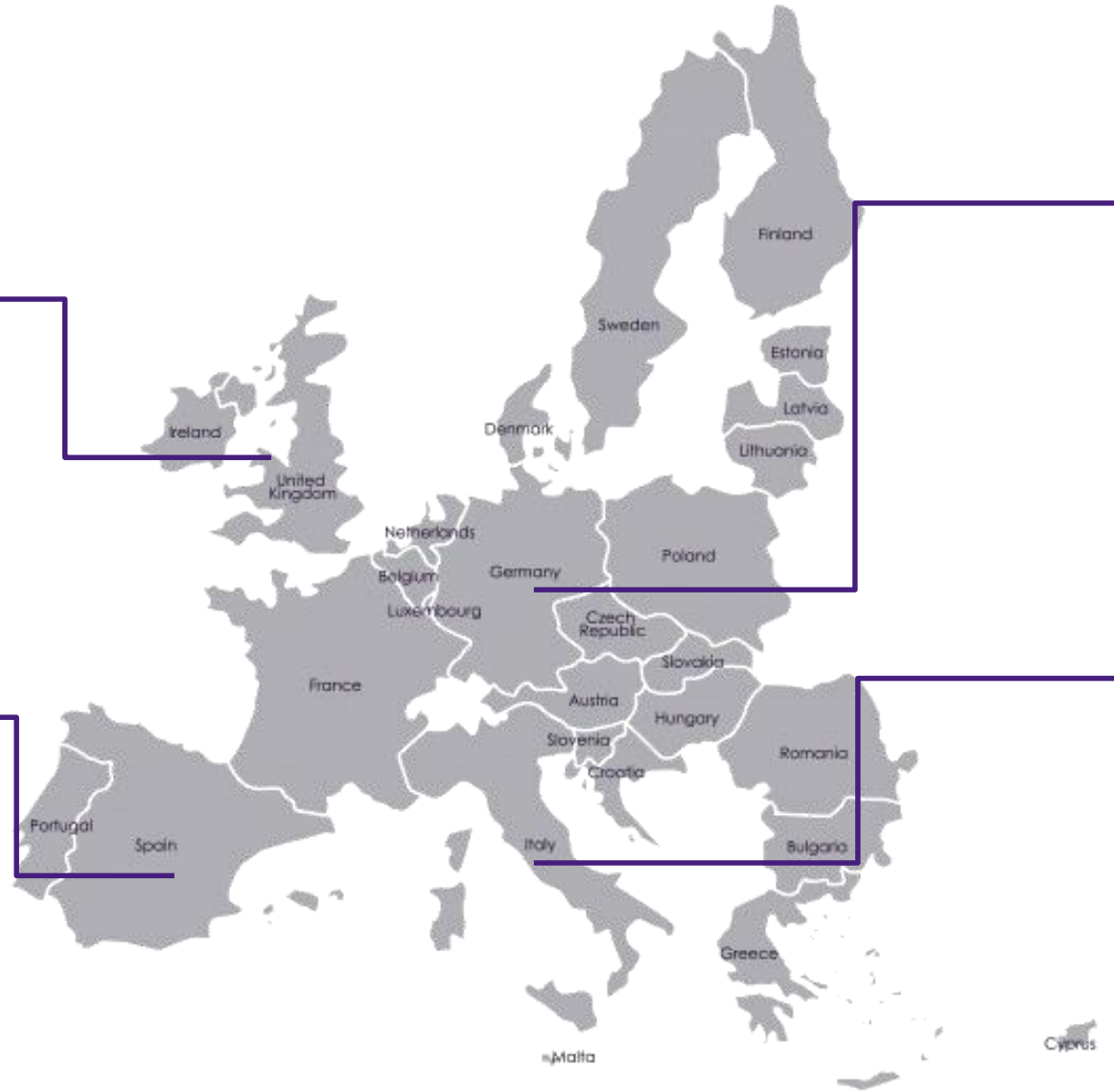
	Main provisions relevant for storage	Status
Renewable Energy Directive	• EU-wide binding target of at least 32% renewable energy in gross final energy consumption by 2030 - **Need to invest in flexibility, especially storage, is explicitly recognized as a means to reach that goal.**	Adopted and published in December 2018
Electricity Regulation	• Recognizes the **right for energy storage to participate in electricity markets** on a level playing field with generation and demand-side response • Requires **TSOs to procure ancillary and balancing services** on a level playing field between generation, demand-side response, and **energy storage** • Ensures **access** of energy storage to eventual **capacity remuneration mechanisms**	Adopted by the Council on 22/5/2019
Electricity Directive	• Contains a **definition of energy storage** that covers all energy storage technologies • Clarifies **ownership of storage** - in general, **storage facilities should be owned and operated by market parties (not by TSOs)** • Ensures **non-discriminatory access** of new storage facilities **to networks**	Adopted by the Council on 22/5/2019 – to be transposed in national laws by 2021

'Clean Energy for all Europeans' Package (CEP) - tabled by the European Commission including 8 legislative acts of which 3 contain the most relevant provisions related to storage

ENEL X KEY EUROPEAN STORAGE INITIATIVES

UK
- EFR tender 2016
- Many utility scale projects under development
- OFGEM regulation – de-rating and elimination double grid charges for projects w/ Gx license
- Nation Grid launches Dynamic Containment product for Storage

Spain
- First utility scale batteries installed in 2018 (Endesa)
- Draft “Estrategia de Almacenamiento Energetico” (2020)

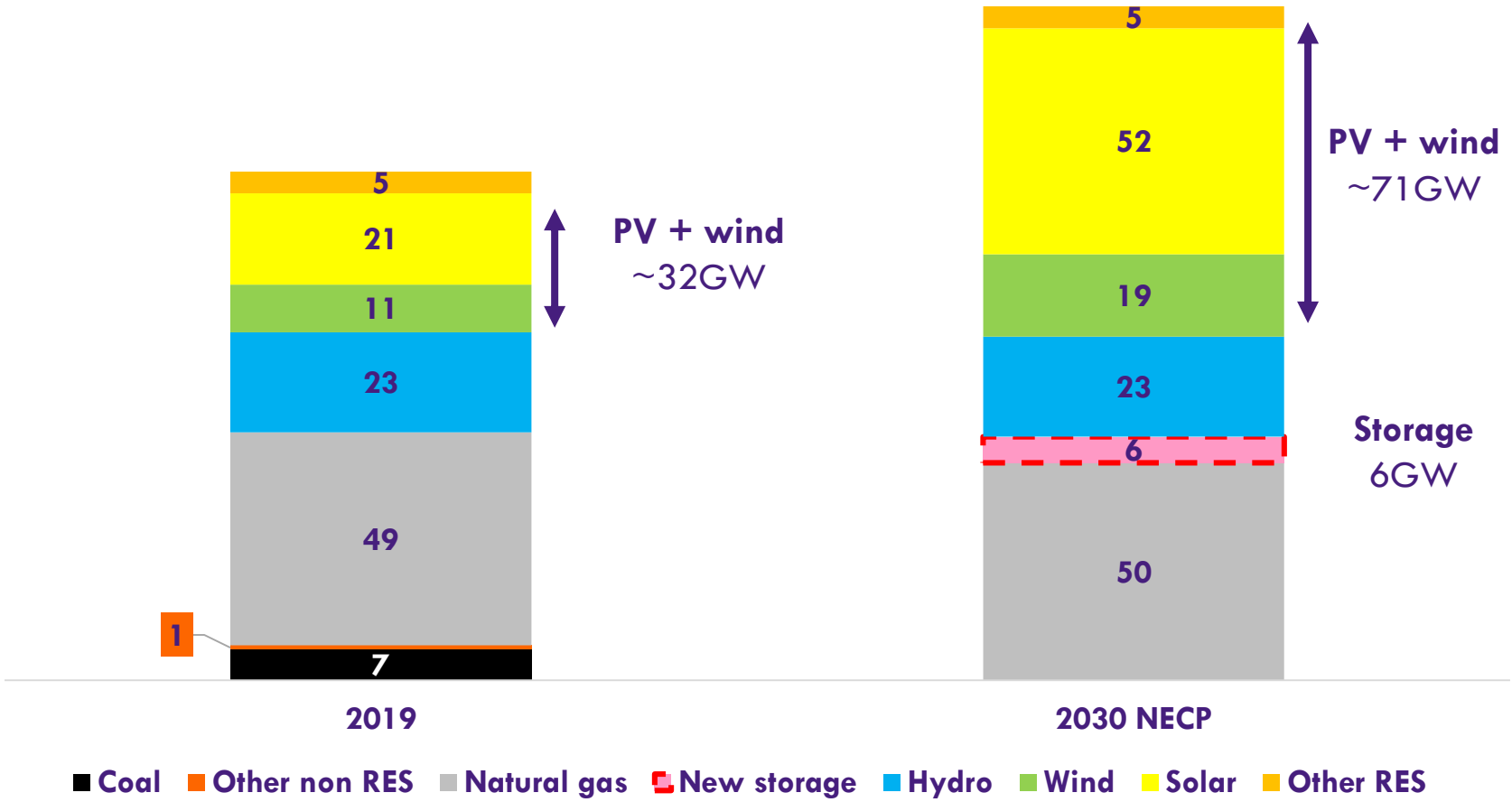


Germany
- Several utility scale BESS in operation and active participation in day-ahead-markets

Italy
- UVAM / UPI pilot (2018)
- Capacity tender – 131 MW awarded to BESS
- Fast Reserve tender (UVAS) targeting flexibility solutions (Dec. 2020)

ITALY - AS RENEWABLE CAPACITY GAINS RELEVANCE, STORAGE IS EXPECTED TO BE DEPLOYED MORE AND MORE

PNIEC* - Projected Installed Capacity



* *Piano Nazionale Integrato per l'Energia*

ITALY - REGULATORY STEPS RECOGNIZING RELEVANCE OF BESS

ARERA Resolution 300/2017/R/EEL

Introduces **pilot program** which fosters **participation of RES, DSR and storage in the ancillary services markets** operated by Terna

2017

ARERA

UVAM

'Unità Virtuali Abilitate Miste'

BESS, RES and DSR can provide **Tertiary Frequency Regulation** ('TFR')

Response time - 15''
Min. duration - 2h

2018

Terna

UPI

'Unità di Produzione Integrate'

BESS **on-plant** can provide **Primary Frequency Regulation** ('PFR')

AWARDED 30MW
Response time - 30''
Min. duration – 10 min

2018

Terna

CAPACITY MARKET

AWARDED 131MW
Response time - 30''
Min. duration – 4h

2019

ARERA

FAST RESERVE

'Unità virtuali Abilitate Stoccaggio

BESS can provide **Enhanced Frequency Regulation** ('EFR')

AWARDED 230MW
Response time - 1''
Min. duration – 1h

2020

Terna

BESS can provide also **Secondary Frequency Regulation** ('SFR')

...

Terna

PNIEC* projects that new storage systems for at least 6 GW will be installed by 2030, mainly aimed at offering network services on the market, targeting 50% pump-hydro plants and the remaining 50% BESS

* *Piano Nazionale Integrato per l'Energia*

ITALY - KEY RULES OF THE FAST RESERVE TENDER

PERFORMANCE

- **Response Time:** within 1 sec
- **Minimum up time:** power response must be maintained for at least 30”
- **Release Time:** linear ramp towards zero response within 5’ (default value)
- **Energy capacity:** sufficient to provide the contracted capacity for at least 15’ in up / downward direction. Energy capacity must be gradually restored after every activation.
- **Requested Availability:** 1,000 hrs/year. Terna will communicate the requested hours in D-7 and confirms in D-2.

PROCUREMENT

- **Price CAP**: 80k€/MW as approved by Italian NRA (ARERA) – pay-as-bid scheme
- **Forward contract duration**: 5 years (starting from January 1st, 2023 or up to 6 month earlier if the FRU is available

REMUNERATION SCHEME

- **Revenue Stacking:** it is possible to participate in other markets in the hours when no availability for the Fast Reserve is requested.

Thank you

Q&A