
Fast Reserve – Information pack

07/2020

- *This document has been prepared by Terna to provide to all market parties a general overview on the new Pilot Project Fast Reserve (the so-called “Progetto Pilota Riserva Ultra-rapida”).*
- *Whilst Terna has taken all reasonable care in preparing this document, no representation or warranty either expressed or implied is made as to the accuracy or completeness of the information that it contains and parties using information within the document should make their own enquiries as to its accuracy and suitability for the purpose for which they use it.*
- *To receive more details about the Pilot Project Fast Reserve, parties are invited to visit Terna’s website where the whole documentation (Regulation and related Annex) has been published:*

<https://www.terna.it/it/sistema-elettrico/progetti-pilota-delibera-arera-300-2017-reel/progetto-pilota-riserva-ultra-rapida>

- **Electricity system context and needs**
- **Fast Reserve – Main features**
- **Fast Reserve – Timeline**

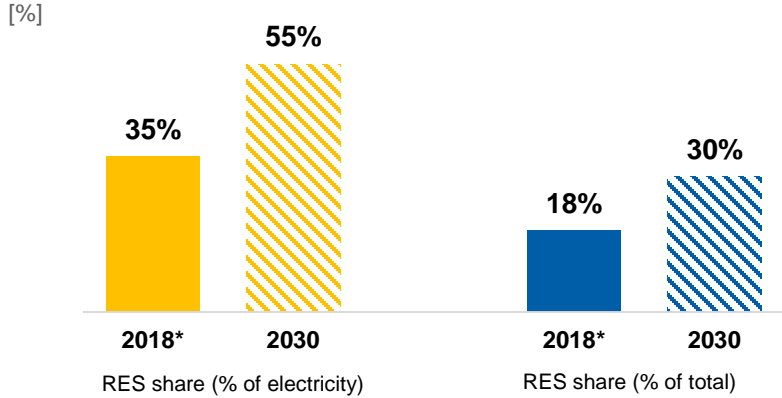
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Electricity system context

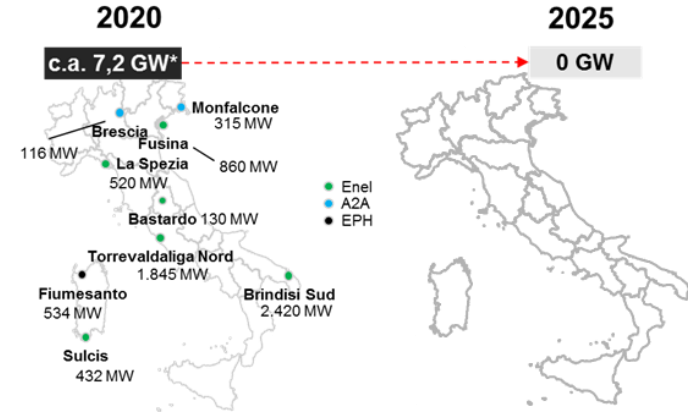
Italian Energy and Climate Plan and future energy scenarios



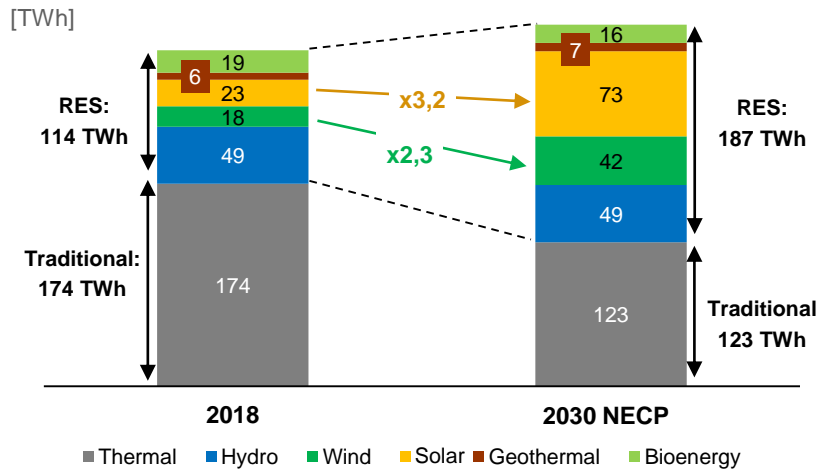
RES share



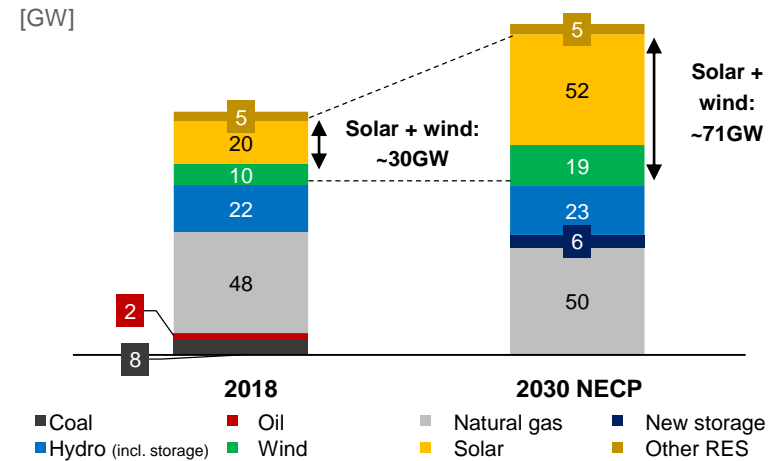
Coal phase-out by 2025



Electricity production



Installed capacity



The NECP targets a complete coal phase-out by 2025 and a significant push towards RES

Impacts of RES on electricity system management

Cluster

Impacts on electricity system management

Technical characteristics of RES



- ▶ Reduction of **system inertia**
- ▶ Reduction of resources for **frequency and voltage control**

focus

Intermittency of RES



- ▶ Reduction of **adequacy margin**
- ▶ Growing periods of **over-generation** during noon hours
- ▶ Increasing steepness of **residual load evening ramp**

Location of RES

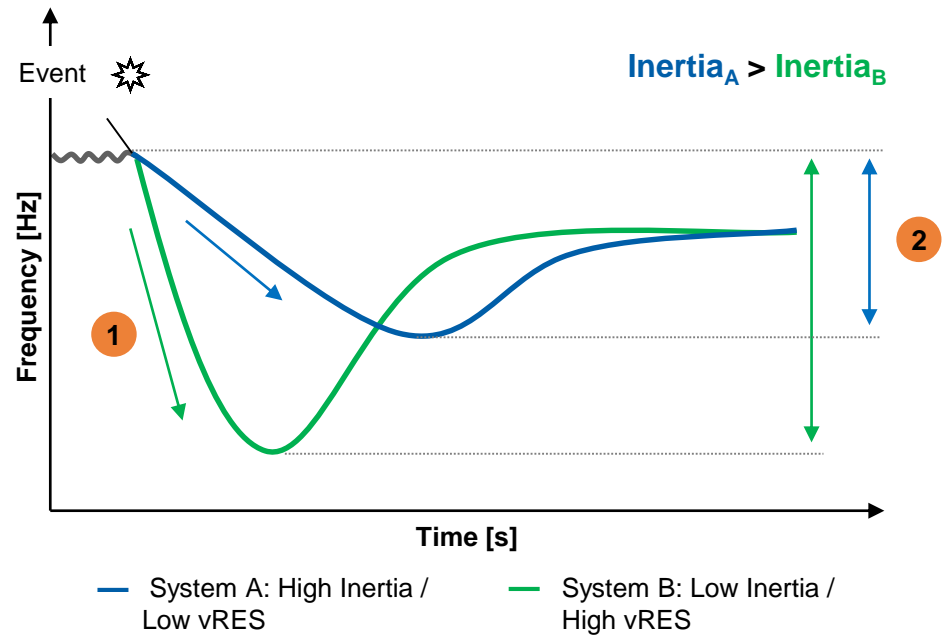
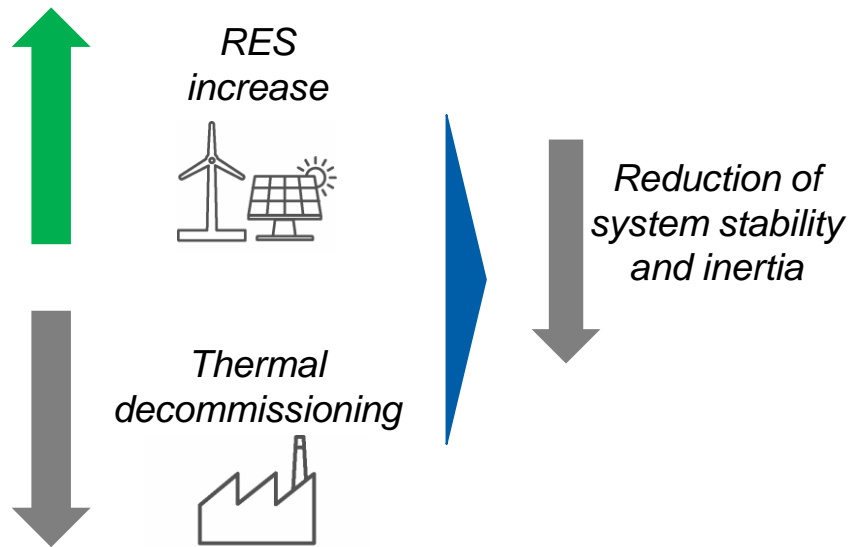


- ▶ Increasing **grid congestion** in case of geographical distance between RES supply and consumption centers
- ▶ Growing **system operation challenges**, due to the increasing role of Distributed Generation

The increasing penetration of RES and the continuous decommissioning of conventional thermal capacity pose new challenges for TSOs.



Reduction of system inertia



In a system characterized by lower inertia, a **frequency event** (for example a power loss) could lead to the following:

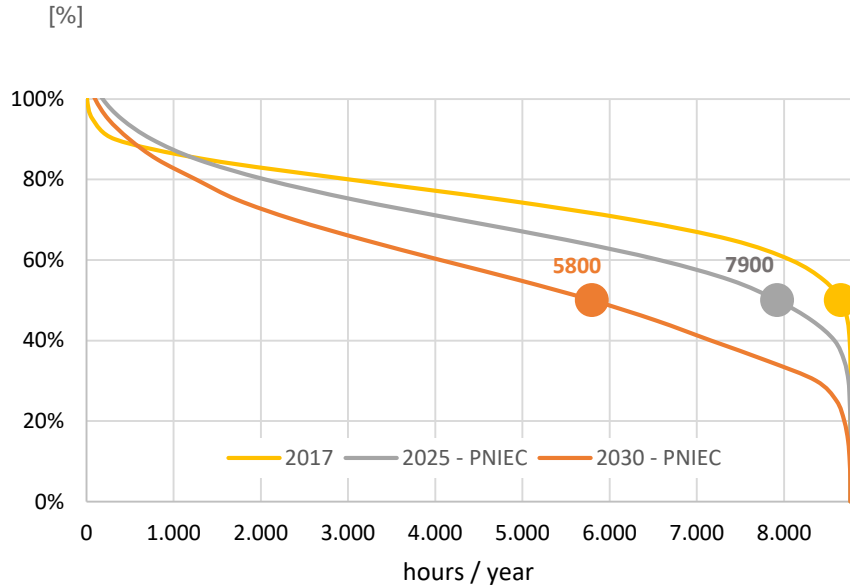
- 1 The frequency drops more quickly (higher RoCoF*)
- 2 The maximum frequency offset is greater. This can cause triggering of emergency countermeasure when admissible limits are exceeded.

The higher the share of inverter-based power plants (e.g. photovoltaic generation) the lower the inertia, thus the stability of the system. This condition also determines the need to increase the flexibility and the speed of response of the system.

Evolution of electricity system

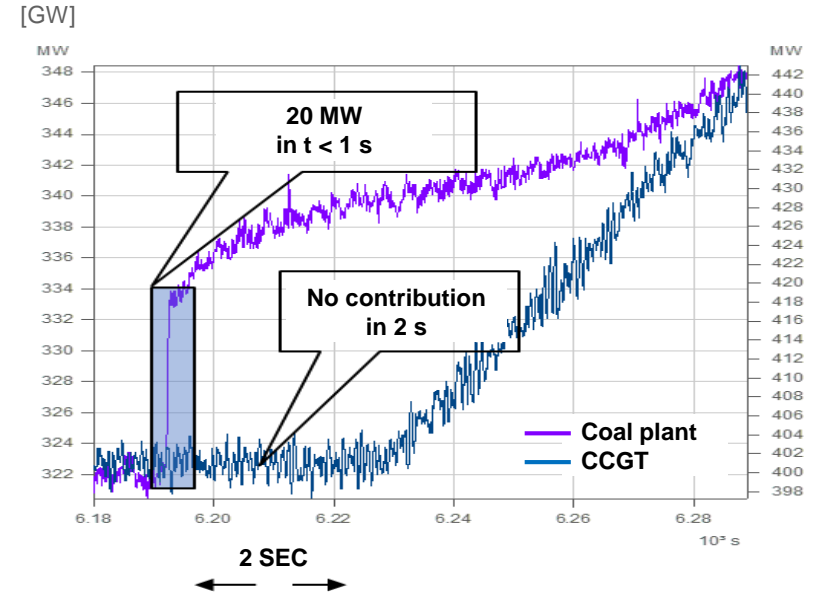
Load covered by synchronous machines and response time

Load covered by synchronous machines



- **Less synchronized thermal power (spinning generation)** causing a decrease in system inertia

Response speed: coal-fired power plant vs CCGT



- Issue is amplified by the **phase-out of the traditional steam generators**, e.g. **coal-fired plants**, considering their high response speed in the first seconds (3% of power provided almost instantly)

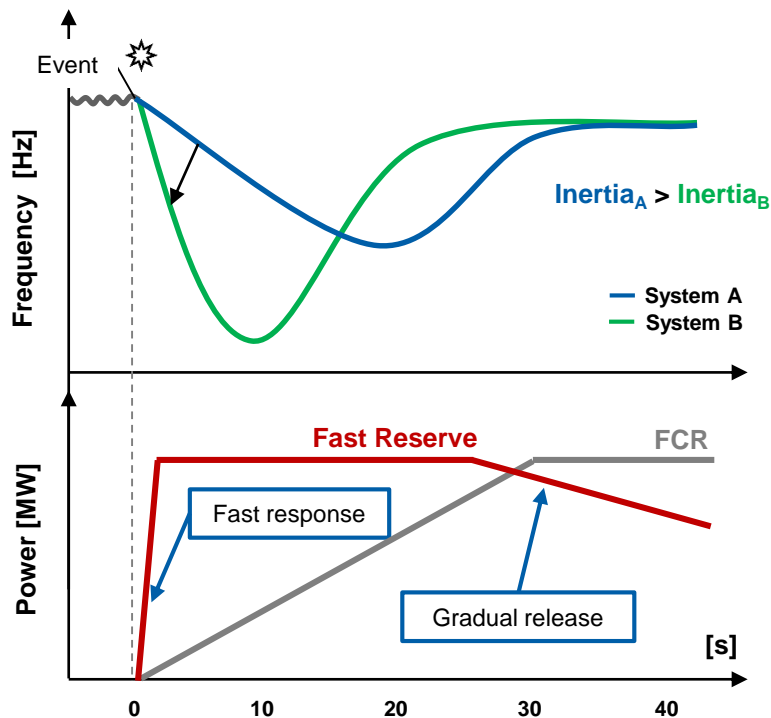
The future energy scenarios foresee a reduction of thermal generation and a phase-out of traditional steam generators, thus reducing the spinning generation and consequently the system inertia.

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Rational and objective of the service

Key Rational



FCR might be insufficient to assist frequency dynamics in the **very first moments** after an event

Objective and main features*

- New service to **support system inertia**
- Fast activation (< 1 second)
- **Proportional response to frequency variations** and/or triggered by a setpoint with continuous operation
- Possibility to be remotely activated for the Defense System
- Gradual release to avoid network disturbances



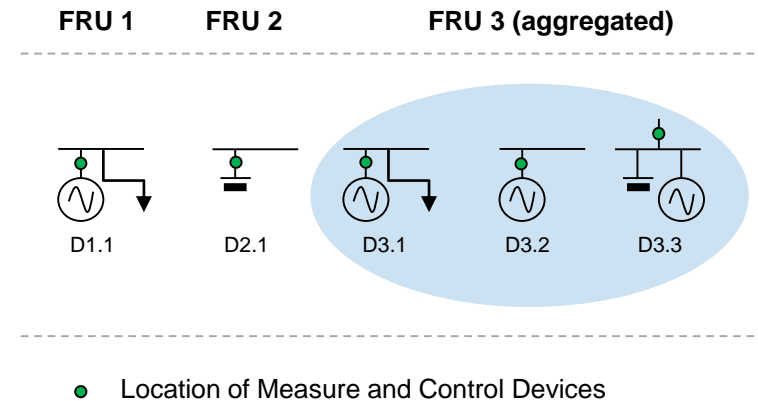
Service **not replacing FCR** but coordinated with it to contribute to the dynamic frequency stability



Definition of Fast Reserve Unit (FRU)

Fast Reserve is a **technology-neutral service** and can be provided by so-called “**Fast Reserve Units**” (FRUs) which can be composed of stand-alone or aggregated devices (aggregation is allowed within the same bidding zone):

- **Stand-alone Production Unit (UP)**
- **Behind the meter UP**, even if they share their connection point to the grid with Demand and Storage devices.
- **Demand Response** (provided that it is not already contracted as interruptible load)
- **Storage Devices** both stand-alone and behind-the-meter



! FRUs are **relevant only for the provision of Fast Reserve**. Devices included in FRUs can participate to Energy and Ancillary services markets as stand-alone units or within other aggregates according to specific participation rules of these markets.

! Assets that qualified for **Capacity Market** cannot offer the same nameplate capacity to the Fast Reserve service.



Eligibility criteria

Size

- **Minimum size of FRU: 5 MW** Min threshold set to guarantee that FRU response is significant*
- **Maximum size of FRU: 25 MW** Max threshold set to ensure a better distribution of FRUs across the whole territory

Performance

Activation time: **within 1 sec** after the event

Minimum up time: power response must be maintained for **at least 30 seconds**

Release time: linear ramp towards zero response **within 5 minutes** (default value)

Energy capacity: sufficient to provide the contracted capacity for at least **15 mins** in both upward and 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**

Measure and Verification devices

Each device in the Fast Reserve Unit must belong to the same bidding zone and **must be equipped with:**

- **Frequency Measure** device, the so-called **PMU** (Phasor Measurement Unit)
- **Fast Reserve Response Verification** device, the so-called **UVRF**
- **Detachment and Monitoring Peripheral** device, the so-called **UPDM**



Procurement

- Service procured via a **competitive bidding process** in a **descending price auction**
- **Price CAP: 80 k€/MW** as approved by Italian NRA (ARERA) – **pay-as-bid** scheme
- **Forward contract duration: 5 years** (starting from 1st of January 2023 or up to 6 months earlier if the FRU is available)
- **Procurement volume per area: 100 MW** (North and Centre North) + **100 MW** (Sicily and residual continent) + **30 MW** (Sardinia)
- The total amount assigned to a single bidder (or bidders belonging to a single corporate group) shall not exceed **40% of the procurement volume** of a procurement area.



Remuneration Scheme

- **Remuneration of availability:** Terna remunerates the contracted capacity through an annual remuneration (**€/MW/year**) with 12 monthly payments.
- **Remuneration of activation:** the energy supplied to provide the service and to restore the SOC is remunerated at the **zonal day-ahead market price**.
- **Revenue stacking:** it is possible to participate in other markets **in the hours when no availability for the Fast Reserve is requested**.



Providers

The following parties may request to participate to the Fast Reserve:

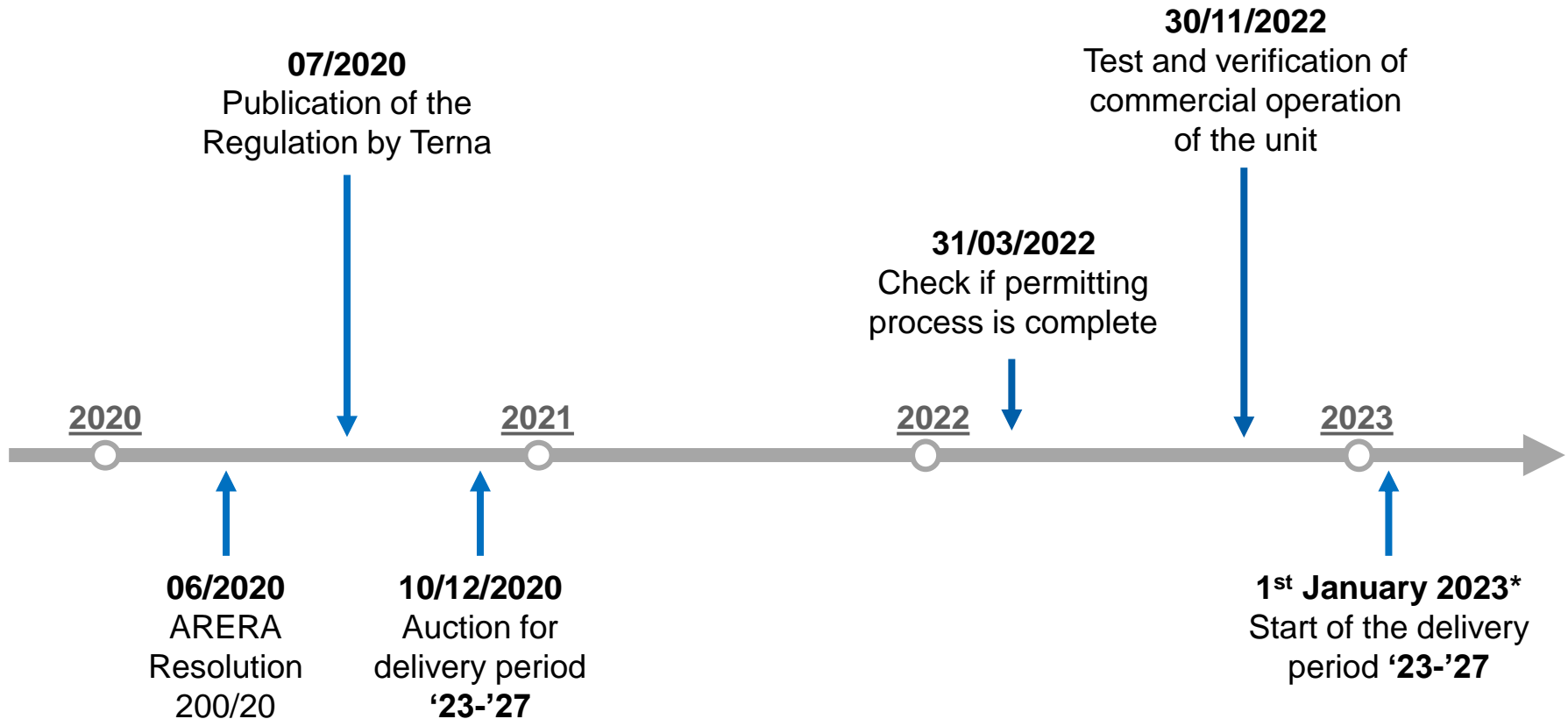
- **A dispatching user** (the so-called UdD)
- **A device owner**
- **An aggregator (the BSP)** provided that a delegation to participate was granted by the dispatching user or the device owner

Guarantees


- **Pre-auction guarantee:** the provider must issue a guarantee equal to **5,000 €/MW** by 10 days before the auction. When a contract with Terna is signed (or the FRU is not successful in the auction) this guarantee is refunded.
- **Post-auction guarantee:** the provider must issue a guarantee which ensures the availability of the FRU. This guarantee per each FRU is equal to:

$$\text{Guarantee [€]} = 0.25 * \text{Contracted Capacity [MW]} * \text{Contracted Price [€/MW]}$$

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Regulation

	Regolamento recante i requisiti e le modalità per la fornitura del servizio di regolazione ultra-rapida di frequenza	Pagina: 1 di 23
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REGOLAMENTO RECANTE I REQUISITI E LE MODALITÀ PER LA FORNITURA DEL SERVIZIO DI REGOLAZIONE ULTRA-RAPIDA DI FREQUENZA

Progetto pilota ai sensi della delibera 300/2017/R/veel dell'Autorità di Regolazione per Energia Reti e Ambiente

«Regolamento recante i requisiti e le modalità per la fornitura del servizio di regolazione ultra-rapida di frequenza»

Annex 1 Request for participation

Allegato 1
[CARTA INTESTATA DEL RICHIEDENTE]

Società TERNIA SpA
Affari Regolatori
Viale Egidio Galvani, 70
00156 ROMA


OGGETTO: Richiesta di partecipazione al progetto pilota relativo alla fornitura del servizio di regolazione ultra-rapida di frequenza (Progetto "Fast Reserve")

Il sottoscritto
nato il a
in qualità di
dell'impresa
con sede in
con codice fiscale n.
con partita I/V.A. n.
(di seguito: il Richiedente)

CHIEDE
di partecipare al progetto pilota per la fornitura del servizio di regolazione ultra-rapida di frequenza (di seguito: Progetto Fast Reserve) di cui al "Regolamento recante i requisiti e le modalità per la fornitura del servizio di regolazione ultra-rapida di frequenza" (di seguito: Regolamento Fast Reserve) pubblicato sul sito internet di TERNA.
A tal fine:

«Richiesta di partecipazione al servizio di regolazione ultra-rapida di frequenza»

Annex 2 Contract


	Contratto standard per l'approvvigionamento del servizio di regolazione ultra-rapida di frequenza	Pagina: 1 di 20
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ALLEGATO 2
CONTRATTO STANDARD PER L'APPROVVIGIONAMENTO DEL SERVIZIO DI REGOLAZIONE ULTRA-RAPIDA DI FREQUENZA

Progetto pilota ai sensi della delibera 300/2017/R/veel dell'Autorità di Regolazione per Energia Reti e Ambiente

«Contratto standard per l'approvvigionamento del servizio di regolazione ultra-rapida di frequenza»

Annex 3 Technical Annex

	Requisiti tecnici dei Dispositivi Inclusi in Fast Reserve Unit	Pagina: 1 di 13
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ALLEGATO 3
REQUISITI TECNICI DEI DISPOSITIVI INCLUSI IN FAST RESERVE UNIT

Progetto pilota ai sensi della delibera 300/2017/R/veel dell'Autorità di Regolazione per Energia Reti e Ambiente

«Requisiti tecnici dei dispositivi inclusi in fast reserve unit»