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APE

APPUNTI DI ENERGIA

THE ITALIAN ANCILLARY SERVICES MARKET

March 2024

APE on MGP

APE on MI

What's that?

The **Italian Ancillary Services Market** (in Italian "Mercato dei Servizi di Dispacciamento": MSD), in contrast with the Day-Ahead Market (MGP[1]) and the Intra-Day Market (MI[2]) which are wholesale markets used to trade electricity, is the mechanism by which **the Transmission System Operator seeks to ensure the security of the power system and the quality of service**.

The **Transmission System Operator (TSO)** manages and controls the power system and is responsible for the activities related to the planning, development and maintenance of the grid. The Italian TSO is **Terna**, a listed company who operates under a monopolistic regime, according to rules set up by the Italian National Regulatory Authority, ARERA.

Its phases

The MSD market consists of **two different phases**:

1. **MSD ex-ante** or scheduling phase: Terna, after the verification of the results of the energy markets (MGP and MI), procures the necessary reserve margins and solves possible intra-zonal congestions.
2. **Mercato del Bilanciamento (MB)** is the last market session before real-time operation: in this phase operators may resubmit offers and bids, which the TSO will activate in real time to guarantee the balance between demand and supply.

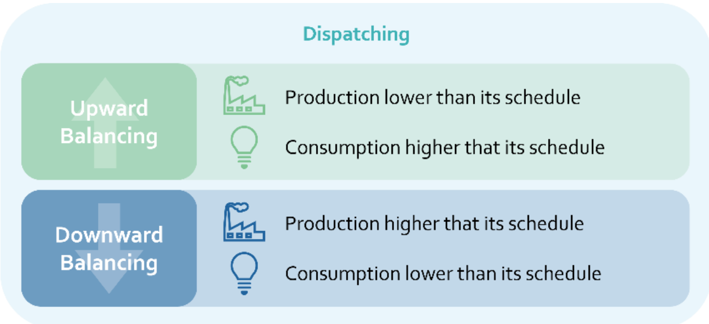
Which is its scope?

To ensure that the system frequency remains around the nominal value (50 Hz), **it is crucial that injections and withdrawals of electricity are constantly balanced**. Imbalances of electricity can happen as a consequence of multiple factors: some examples are the natural fluctuation of the demand, sudden outages or unavailability of power production plants, the uncertainty related to the production from non-programmable renewable sources.

To balance either possible drops of power production or possible rises of consumption, which may lead to a reduction in the system frequency with respect to its nominal value, it is necessary to have access to an adequate "**upward reserve**", which corresponds to an available margin to increase injections or reduce withdrawals of electricity.

On the other hand, to balance either possible rises of power production or possible drops of consumption, which may lead to an increase in the system frequency with respect to its nominal value, it is necessary to have access to an adequate "**downward reserve**", which corresponds to an available margin to reduce injections or increase withdrawals of electricity.

Terna, after having acquired the necessary reserve margins, can activate them to balance injections and withdrawals of electricity in real time, to ensure a safe operation of the system.



[1] *The Italian Day-Ahead Market (Mercato del Giorno Prima: MGP) is a wholesale market in which electricity is bought and sold up until the day before the delivery day.*

[2] *The Italian Intra-Day Market (Mercato Infragiornaliero: MI) is a wholesale market in which electricity is bought and sold up until the hour before the delivery time, allowing buyers and sellers to adjust their commercial position closer to real-time.*

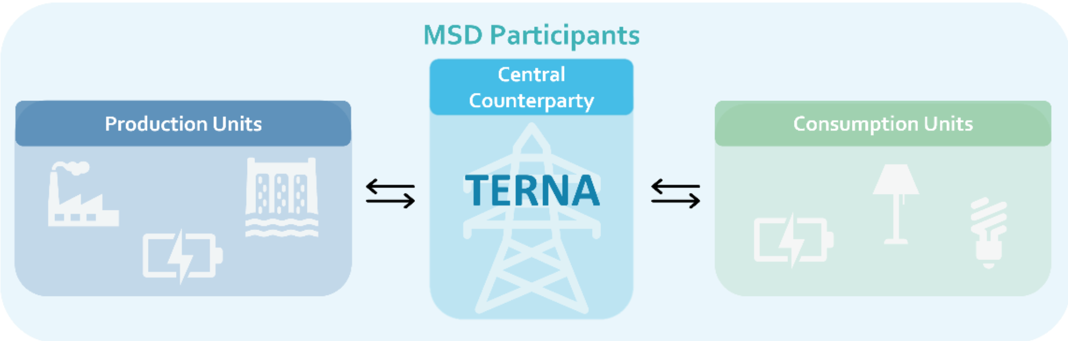
Historically, the units enabled to participate to the MSD were only the "relevant" production plants, namely programmable plants with nominal power not less than 10 MVA. This constraint constitutes a great limit for the current scenario, characterized by a large penetration of decentralized generation, mainly powered by renewables sources, thus generally non-programmable and with aleatory production.

Regulation (EU) n. 2017/2195 (Balancing)

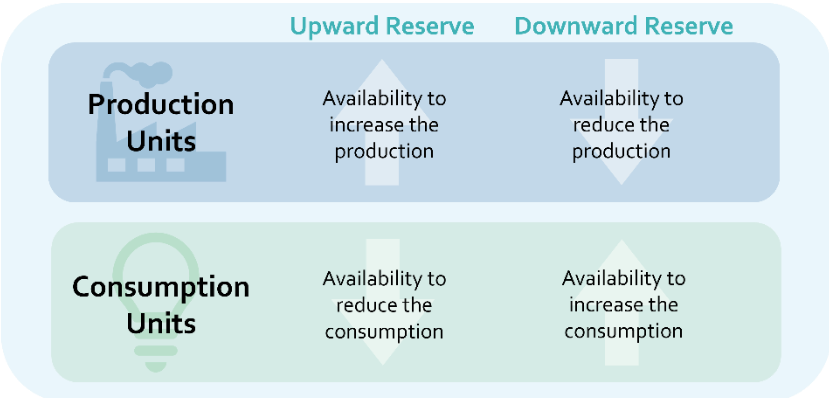
New TIDE

Accordingly, in recent years a revision process has been carried out to update the document that rules the dispatching of the Italian power system (**Testo Integrato del Dispacciamento Elettrico: TIDE**). One of the key purposes of the reform is to overcome the concept of "relevance" for production units, thus enabling a wider set of resources to the provision of ancillary services, under the principle of technological neutrality, as demanded by the **European Balancing Regulation**. The updated TIDE, approved in July 2023 with the Deliberation 345/2023/R/eel by the Italian National Regulatory Authority (ARERA), will enter into force starting from January the 1st 2025.

Who are the players and how do they take part?



The different technologies can deliver reserve margins in the following ways:



The timeline

MSD ex-ante

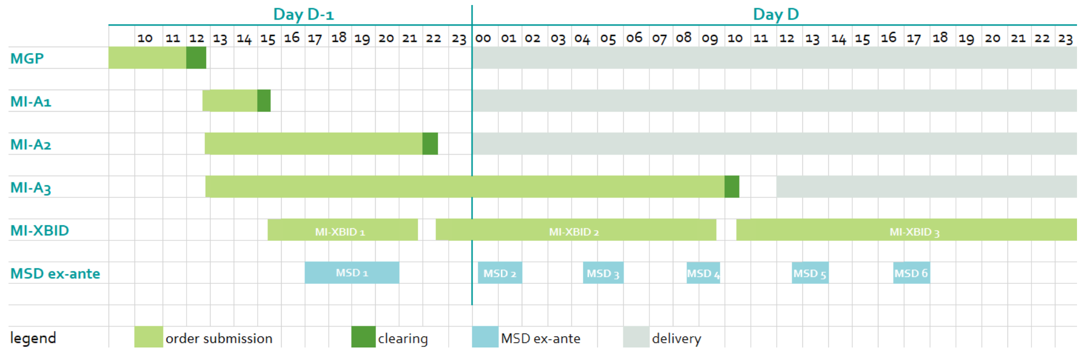
It is composed of **6 sub-phases**. The submission of any order to trade, for each hour of the day D which the order refers to, is only possible in the first sub-phase (MSD1), open from 12:55 and 17:00 of the day D-1. The results of MSD1 are published before 21:45 of the day D-1, whilst the results of the remaining 5 sessions are published on the delivery day D.

MB

Its peculiarity is the **continuous submission of orders** for each hour of the day D, starting from 22:30 of the day D-1, up until one hour before the hour which the order refers to.

MSD-XBID coordination

In september 2021 Italy joined the **Cross-Border Intraday (XBID) project**, whose purpose is to establish a single continuous trading intraday market in Europe. In this market the submission of any order to trade may happen up until one hour before the hour which the order refers to, allowing operators to update their production/consumption forecasts much closer to delivery time. This stands in conflict with the MSD ex-ante timeline, as each sub-phase solution is computed before the closure of the corresponding XBID session, causing possible alterations to the reserve margins procured by the TSO. To overcome this issue, in MSD ex-ante the TSO defines some **feasibility intervals** for each enabled unit, namely active power intervals within which the setpoint of the unit must remain following further renegotiations on the XBID platform.



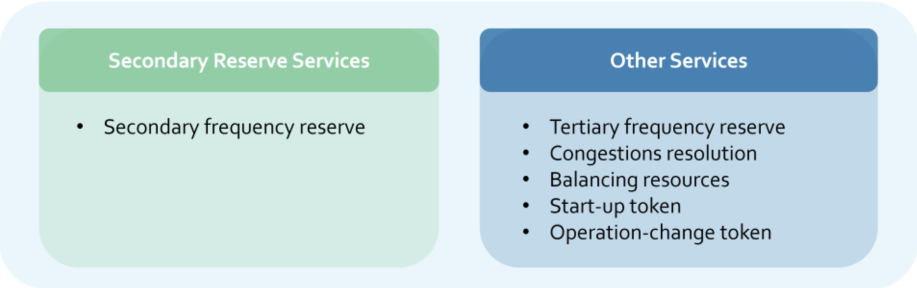
What are ancillary services?

The **ancillary services** are exploited by the TSO to ensure a safe operation of the national power system. The main ancillary services adopted by Terna, including some that are traded on the MSD market, are listed below:

Service	Objective	Remuneration	Traded on MSD?
Primary frequency reserve	To contain frequency deviations from the nominal value	Not provided (eventual)	✗ mandatory service
Secondary frequency reserve	To bring frequency back to its nominal value and restore cross-border flows to the scheduled programs	€/MWh	✓
Tertiary frequency reserve	To restore reserve margins in order to be able to face subsequent perturbations	€/MWh	✓
Congestion resolution during programming phase	To solve intra-zonal congestions resulting from the MGP/MI programs	€/MWh	✓
Balancing	To maintain the balance between injections and withdrawals of electricity, solve congestions, restore sufficient secondary reserve margins	€/MWh	✓
Voltage regulation (primary and secondary)	To keep bus voltages at their nominal values	Not provided	✗ mandatory service

Load rejection	In case of disconnection from the grid of a generating unit, to be able to keep operating in islanding mode, feeding only its own auxiliary services	Not provided	mandatory service
Teletripping	Remote tripping of some generating units	Not provided	mandatory service
Black-start	Capability of some generating units to perform an autonomous start-up in absence of grid supply, providing frequency and voltage regulation	Not provided	mandatory service
Interruptible loads	Interruption of some consumption and/or storage units	€/MW/year	descending-price auctions

The ancillary services traded on the MSD market are generically listed in two sub-groups, which constitute the two products that are currently bought and sold on the market:



What is the orders' structure ?

Consider, for the sake of simplicity, the standpoint of production plants. Each unit enabled to participate to the MSD **must make available all its upward and downward margins** (in other words, its maximum availability to increase or decrease its power production) from its setpoint, that is the program resulting from the outcomes of the energy markets (MGP/MI).

The orders, related to the energy involved, have a step-like structure: from a minimum of 1 step to a maximum of either 3 steps in MSD ex-ante or 4 steps in MB.

The price of each step (€/MWh) must be not less than the price of the previous step.

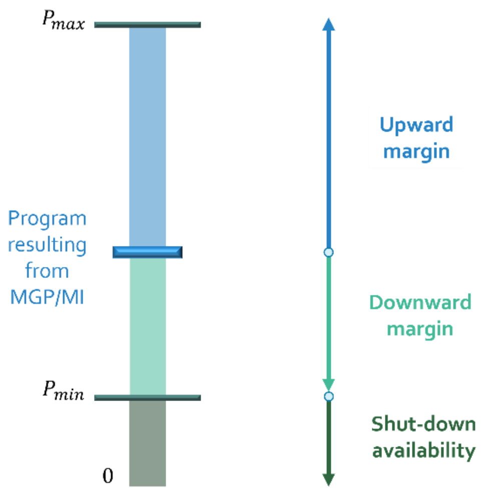


Figure 1 – Commercial position of a generating unit resulting from MGP/MI, with its available reserve margins.

Price mechanism

Differently from MGP and, partially, MI markets that are characterized by the presence of a single price for each market zone, obtained from the pay-as-clear mechanism (namely from the intersection of the aggregated supply and demand curves), the MSD orders are remunerated under a **pay-as-bid** mechanism: the accepted offers and bids are compensated at the requested price. Therefore, the MSD market faces multiple price levels for each service and for each market session.

The acceptance of **selling offers on MSD** (namely for **upward reserves**) corresponds to an **expense for the TSO**. Taking the case of production plants, the enabled units offer their availability to increase the production level from the scheduled setpoint at a price that is usually higher than the average selling price on the MGP/MI markets.

On the other side, the acceptance of **purchase bids on MSD** (namely for **downward reserves**) corresponds to a **revenue for the TSO**. The production plants enabled to the MSD market price their bids at a level that is usually lower than the average selling price on the MGP/MI markets. This is because they offer their availability to reduce their production setpoint from the MGP/MI programs. If their MSD bids are accepted, the operators will buy back the energy that was previously sold on the MGP/MI markets and never produced, thus generating a profit linked to the difference between the selling price on the MGP/MI markets and the purchase price on MSD.

What do prices look like?

Figure 2 shows how MSD average prices follow the trend of MGP prices, particularly in the scheduling phase (MSD ex-ante). As the MSD orders adhere to a pay-as-bid remuneration scheme, there is not a unique price as in the MGP/MI markets, but there are as many prices as accepted orders. Accordingly, as for MSD prices, one can usually refer to the average of all accepted orders, for each zone. It is worth noticing how the MB selling prices are sensibly higher than the selling prices on the scheduling phase of MSD, as they correspond to variations in the scheduled program of production/consumption plants much closer to real-time operation, thus more expensive for the service provider.

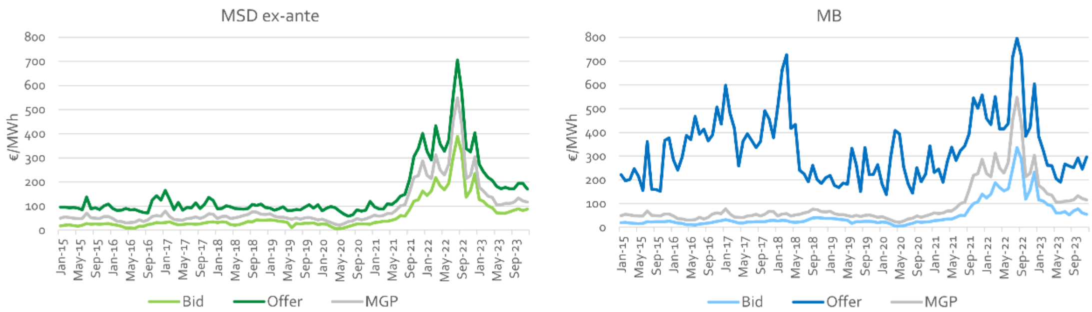


Figure 2 - Monthly average prices on MSD compared to MGP average prices, for "Nord" market zone. ***Source: GME***

Who pays the dispatching services?

APE on the Italian electricity bill

Terna's net expenditure required to ensure the operational safety of the power system is fully charged to the final costumers through a specific cost item present in the Italian electricity bill (the **dispatching services cost**). Among all the cost items composing the latter, there is a specific element called **uplift fee** (in €/kWh), computed by Terna on a quarterly basis and specifically designed to cover its net expenses required to acquire the necessary ancillary services on the MSD market.

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