The Italian Electricity Market

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The GME: Gestore Mercati Energetci

- "Gestore dei Mercati Energetici S.p.A." (GME) is the company in charge of organising and managing
  - the Electricity Market,
  - the natural Gas Market
  - the Environmental Markets in Italy

  under principles of
  - neutrality,
  - transparency,
  - objectivity competition among or between producers.
- GME is wholly owned by the company "Gestore dei Servizi Energetici - GSE S.p.A." (GSE), which is in turn wholly owned by the Ministry of Economy and Finance.
- GSE has also full control of the companies "Acquirente Unico S.p.A." (AU) and "Ricerca sul Sistema Energetico S.p.A. (RSE).

The GME: Gestore Mercati Energetci

- GME manages
  - the "**Mercati dell'energia elettrica**" (Electricity Markets), which consist of:
    - "**Mercato a Pronti dell'Energia**" (Spot Electricity Market - MPE), including "Mercato del Giorno Prima" (Day- Ahead Market - MGP), "Mercato Infragiornaliero" (Intra-Day Market - MI) and "Mercato per il Serviziodi Dispacciamento" (Ancillary Services Market - MSD);
    - "**Mercato a Termine dell'Energia con obbligo di consegna fisica dell'energia"** (Forward Electricity Market with physical delivery obligation - MTE);
- and "**Piattaforma per la consegna fisica dei contratti finanziari conclusi sull'IDEX**" (Platform for physical delivery of financial contracts concluded on IDEX – CDE).
- GME has also run the "**Piattaforma dei Conti Energia a Termine"** (OTC Registration Platform - PCE). On this platform, parties trading electricity bilaterally off the MPE and, in particular, in the MTE or over the counter (OT C) register their commercial obligations and nominate the related injection and withdrawal schedules.

The GME: Gestore Mercati Energetci

- GME also participates in the implementation of environmental policies, by managing
- the "**Mercati per l'ambiente"** (Environmental Markets):
  - "Mercato dei Certificati Verdi" (Green Certificates Market - MCV);
  - "Mercato dei Titoli di Efficienza Energetica" (Energy Efficiency Certificates Market – MTEE
  - "Mercato delle Unità di Emissione" (Emissions Trading Market – MUE);
  - "Mercato delle certificazioni CO-FER" (RECO Market); RECOs (renewable-energy certificates of origin) give proof of the percentage of electricity generated from renewables in the commercial offerings of electricity selling companies
- GME menages the "**Mercato del Gas Naturale**" (Gas Market)

Regulatory framework

- Decree no. 79/99 of 16 March 1999 (Legislative Decree 79/99) as part of the process of transposition of Directive 96/92/EC concerning common rules for the internal market in electricity.
- Trading on Ipex (first stage of the market) began on 1 April 2004.
- On 1 January 2005, the market was opened to full demand-side participation: all interested parties may purchase the electricity that they need directly on Ipex, subject to the obligation of scheduling their withdrawal profile on an hourly basis.
- On 1 November 2009, GME launched its "**Mercato a Termine dell'energia Elettrica"** (Forward Electricity Market - MTE) to allow the trading of electricity over longer timescales than the daily ones offered by the traditional market.
- As part of the Electricity Market, GME has also run the "Piattaforma Consegna Derivati Energia" (Platform for delivery of electricity derivatives - CDE) since 26 November 2009. On this platform, Electricity Market participants may physically deliver contracts concluded on IDEX (the electricity derivatives market organised and managed by "Borsa Italiana S.p.A.") by registering them on the PCE.
- Under art. 17 of Annex A to AEEG's Decision 111/06, GME also manages the "**Piattaforma dei Conti Energia a Termine"** (OT C Registration Platform - PCE) for registering forward electricity sale and purchase contracts that have been concluded off the exchange, as well the related injection and withdrawal schedules implementing such contracts

Regulatory framework

- The Italian Electricity Market is governed by the following Community and national legislation and regulations:
  - **Law no. 481 of 14 November 1995** establishing the "Autorità per l'energia elettrica e il gas" (AEEG, the electricity & gas regulator), which has the mission of regulating and monitoring the electricity and gas sectors.
  - **Directive 96/92/EC of 19 December 1996** concerning common rules for the internal market in electricity (repealed by Directive 2003/54/EC).
  - **Legislative Decree no. 79/99 of 16 March 1999** implementing Directive 96/92/EC concerning common rules for the internal market in electricity: in particular, art. 5 of the decree entrusts "Gestore dei Mercati Energetici" (GME) with the economic management and organisation of the Electricity Market under principles of neutrality, transparency, objectivity and competition among or between producers.
  - **Directive 2003/54/EC of 26 June 2003** concerning common rules for the internal market in electricity and repealing Directive 96/92/EC. This directive establishes common rules for electricity generation, transmission, distribution and supply, as well as rules on organisation and functioning of the electricity sector, access to the market, criteria and procedures applicable to calls for tenders, granting of authorisations and operation of systems. The directive was repealed by Directive 2009/72/EC.
  - **Directive 2009/72/EC of 13 July 2009** concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.
  - **Regulation (EC) No 714/2009** of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation

Regulatory framework

- **Regulation (EC) No 1228/2003**. The regulation is aimed at setting fair rules for cross-border exchanges in electricity, thus enhancing competition within the internal market in electricity.
- **Testo Integrato della Disciplina del Mercato Elettrico"** (Integrated Text of the Electricity Market Rules) laying down rules governing the operation of the Electricity Market (under art. 5 of Legislative Decree no. 79 of 16 March 1999), and of the Green Certificates Market (referred to in art. 6 of the Decreeof the Minister of Industry, Trade and Handicraft of 11 November 1999, repealed and superseded by the Decree of the Minister of Economic Development of 24 October 2005, in turn repealed and superseded by the Decree of the Minister of Economic Development of 18 December 2008, adopted in concert with the Minister of Environment, Land and Sea Protection).
- **Decree of the Minister of Productive Activities of 19 December 2003,** approving the Integrated Text of the Electricity Market Rules (GME's takeover of responsibilities for the Electricity Market), as subsequently amended and supplemented.
- **"Disposizioni Tecniche di Funzionamento"** (DTF – Technical Rules), the implementing and procedural provisions of the Integrated Text of the Electricity Market Rules, posted on GME's website (www.mercatoelettrico.org).
- **Law no. 239/2004 of 23 August 2004** reorganising the energy sector and enabling the Government to revise the applicable legislation on energy matters; this law reorganises the energy sector as a wholeand defines, among others, general energy policy objectives, e.g. guarantee of security, flexibility and continuity of energy supplies and promotion of the unitary operation of energy markets.
- **AEEG's Decision 111/06** (as subsequently amended and supplemented), establishing - with effect from 1 April 2007 - a procedure for registering forward electricity purchase/sale contracts, based on a "sistema per conti di energia" (electricity account system), i.e. the OTC Registration Platform (PCE).

Regulatory framework

- **Law-Decree no. 73 of 18 June 2007** (converted into Law no. 125 of 3 August 2007) concerning urgent measures for implementing Community legislation on liberalisation of energy markets and, in particular, art. 1, paras. 2 and 4 on the "servizio di tutela" (standard-offer service) and the "servizio di salvaguardia" (last-resort service).
- **AEEG's Decision ARG/elt 115/08 of 5 August 2008,** as subsequently amended and supplemented: consolidated text of rules on the monitoring of the wholesale Electricity Market and of the Ancillary Services Market ("TIMM"). With this decision, AEEG introduced a new procedure for the activities to be conducted by Terna, GME and GSE in support of its own monitoring activities.
- **AEEG's Decision ARG/elt 203/08** laying down provisions on GME's markets (with effect from 1 January 2009). These provisions include, among others, the option - also for consuming units – to participate in the Adjustment Market (now Intra-Day Market) and the concurrent abolition of the "Piattaforma di Aggiustamento Bilaterale per la Domanda" (Demand-Side Bilaterals Adjustment Platform - PAB).
- **Law no. 2 of 28 January 2009** amending Law-Decree no. 185 of 29 November 2008 and converting it into law; this law concerns urgent measures for supporting families, work, employment and companies and for redesigning the national strategic framework to combat the crisis. Among the principles stated in this law, those that directly involve the activities of GME, as entity in charge of the economic management of the Electricity Market under art. 5 of Legislative Decree 79/99, are: i) creation of an Intra-Day Market (MI), replacing the Adjustment Market (MA); ii) reduction of the period during which GME must hold the data about supply offers/demand bids confidential from twelve months to a maximum of seven days; iii) reform of the Ancillary Services Market (MSD); iv) functional integration of the Intra-Day Market (MI) with the Ancillary Services Market (MSD), as well as development of physical and financial forward markets.

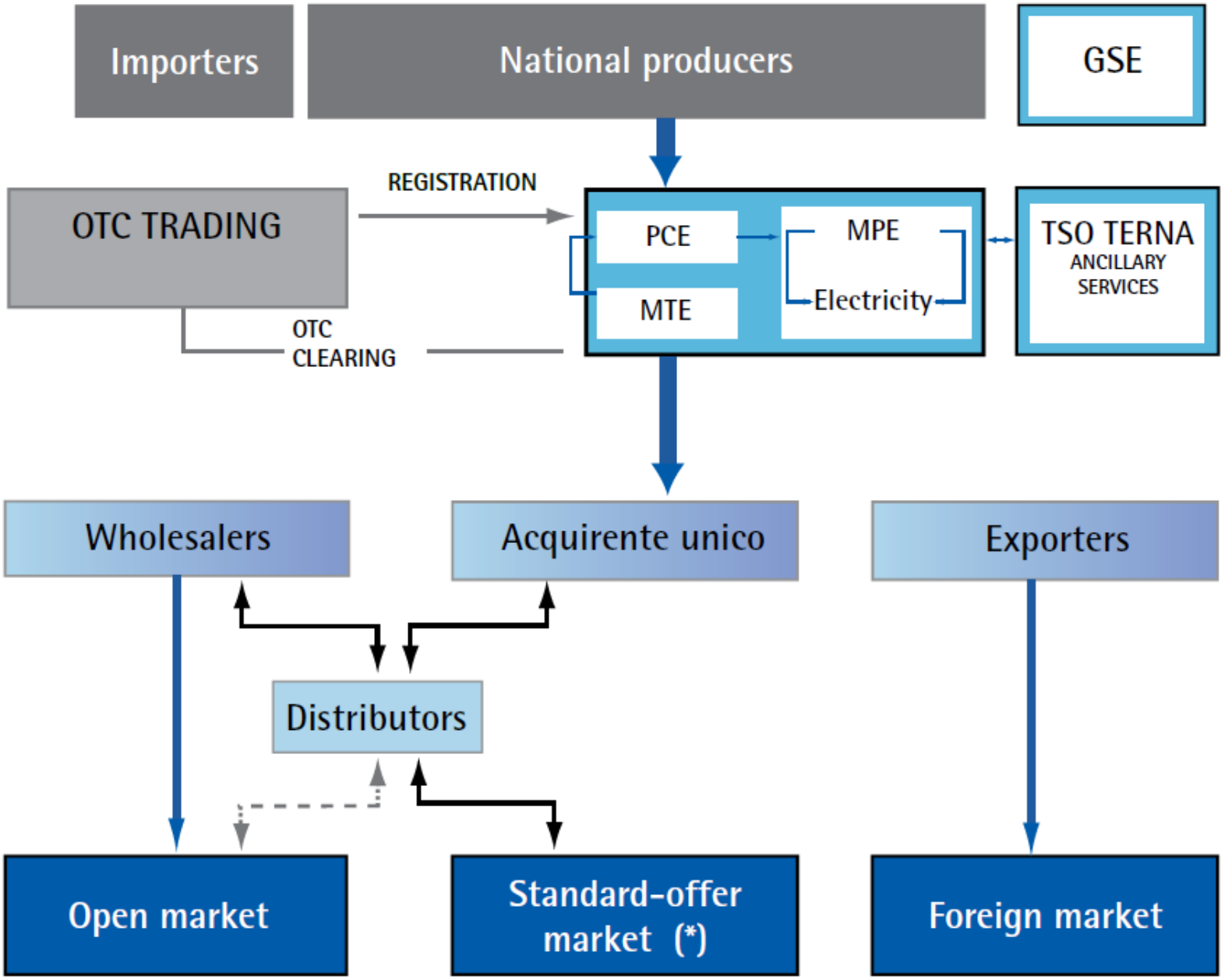
Regulatory framework

- **Decree of the Minister of Economic Development of 29 April 2009** giving guidelines for the reform of the Integrated Text of the Electricity Market Rules, under art. 3, para. 10, Law no. 2 of 28 January 2009 (impetus to the evolution of regulated forward markets and strengthening of Electricity Market monitoring tasks).
- **Law no. 99 of 23 July 2009** concerning provisions on development and internationalisation of companies, as well as on energy matters. Among the principles stated in this law, those that directly involve the activities of GME, as the entity in charge of the economic management of the Electricity Market under art. 5 of Legislative Decree 79/99, provide that: *the guarantees which cover the obligations acquired by participants in the markets organised and managed by GME, in whatever form, shall not be diverted from their intended use or subject to ordinary, interim or precautionary actions by the creditors of the individual participants or of GME, even in case of opening of insolvency procedures. The guaranteed amount shall not be subject to set-off (whether by operation of law, judicial or voluntary). GME shall determine the procedures and time limits for redemption of the posted guarantees, as well as the time upon which the contracts concluded in the markets, the consideration and the consequent payments shall become binding between participants in the markets organised and managed by GME and, in the case of opening of an insolvency procedure against a participant, enforceable vis-à-vis third parties, including the bodies in charge of the same procedure. No actions, including actions for invalidity, shall prejudice the above-mentioned definitivity.*

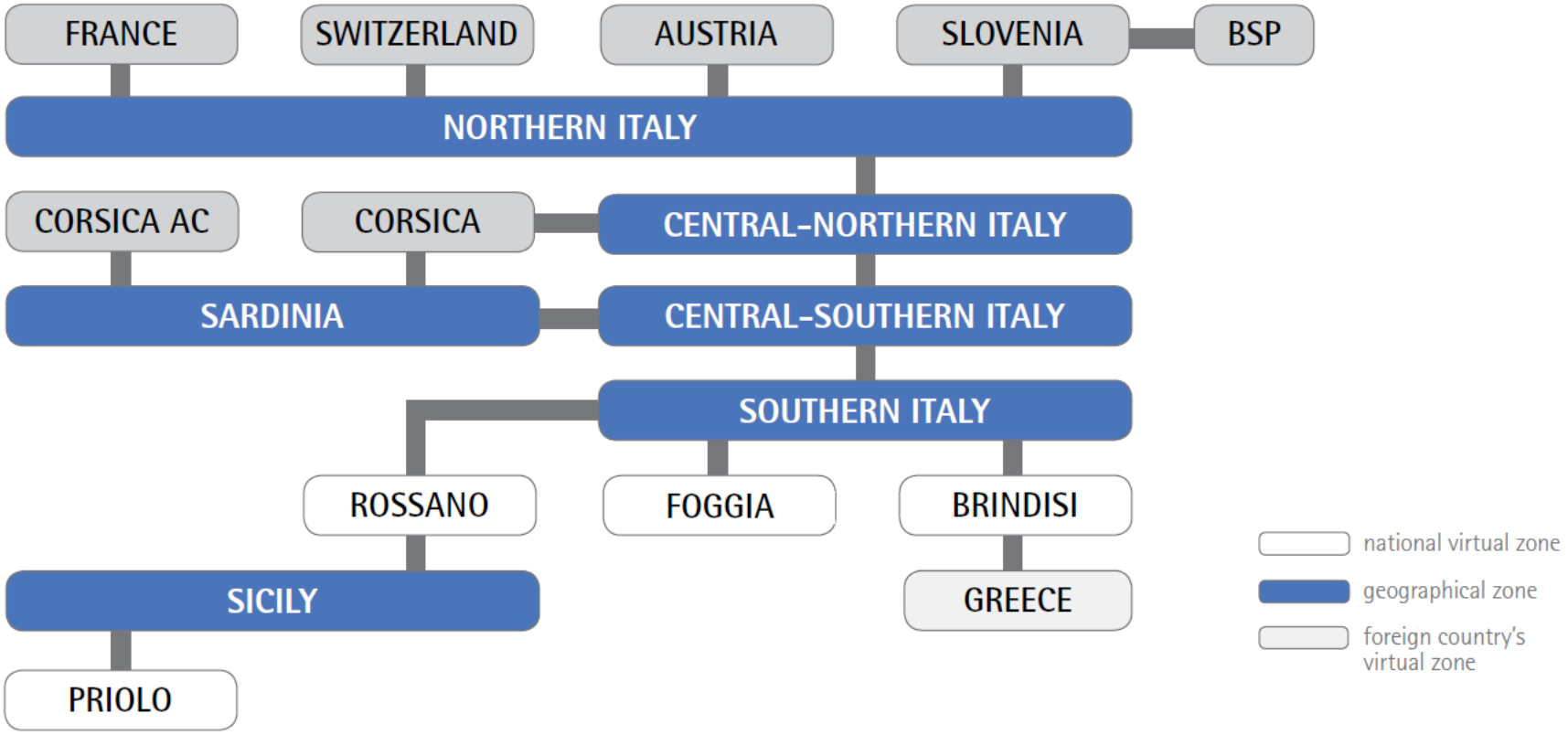
Entities of the power system

- In addition to Parliament and Government, the main entities which contribute to the functioning of the power system - each with a specific role explicitly defined by the applicable legislation - are:
  - the Ministry of Economic Development (MSE), which defines, among others, the strategic and operational guidelines for security and cost-effectiveness of the national power system;
  - the “Autorità per l’energia elettrica ed il gas” (AEEG, the electricity & gas regulator), which guarantees the promotion of competition and efficiency in the sector and has regulating and monitoring tasks;
  - “Terna S.p.A.”, which manages the national transmission grid under security conditions, as well as the power flows thereon through its dispatching activity, i.e. by balancing supply and demand of electricity for 365 days a year and 24 hours a day;
  - “Gestore dei Servizi Energetici” (GSE), the public holding company that promotes the development of renewables by managing support schemes and granting the related incentives;
  - “Acquirente unico” (AU), which guarantees electricity supply within the framework of the “servizio di maggior tutela e di salvaguardia” (standard-offer and last-resort services), as per Law-Decree no. 73 of 18 June 2007, converted into Law no. 125 of 3 August 2007; and
  - “Gestore dei Mercati Energetici” (GME), which organises and manages the Electricity Market under principles of neutrality, transparency, objectivity and competition among or between producers.

Organisation of the Electricity Market in Italy



Market zone structure



Virtual and geographical zones of the national transmission grid

Offer points

- Each geographical or virtual zone is a set of offer points.
- Offer points are the minimum units of electricity in respect of which hourly injection and withdrawal schedules must be defined, whether to execute bilateral contracts or as a result of the acceptance of demand bids or supply offers in the Electricity Market.
- In the case of **injection** schedules, the injection offer points usually match the individual points of injection (points of the power grid, equipped with one or more metering systems, at which electricity is injected into the grid), i.e. the individual generating units (units converting the energy supplied by any primary source into electricity). This depends on the fact that, as generating units can control their injections instant by instant, they are dispatched by Terna directly and individually, in order to guarantee the balancing of the system, because the different units have different physical and dynamic properties. The injection schedules must be defined for the individual units, so as to permit the selection of units from which resources for the dispatching services may be procured.
- In the case of **withdrawal** schedules, the withdrawal offer points may correspond both to individual points of withdrawal, i.e. individual consuming units, and to sets of withdrawal points.

The dispatching user

- For each offer point, a “dispatching user” is identified. This user is answerable to Terna both for the implementation of injection and withdrawal schedules and for the execution of balancing commands.
- These commands may be sent by Terna to offer points in real time in order to maintain the security of the system.
- Non-compliance with the cumulative schedules involves the payment of deviation charges, i.e. the penalties applied to offer points.

Components of the Electricity Market

- GME's Electricity Market consists of
  - the Spot Electricity Market (MPE),
  - the Forward Electricity Market with delivery-taking/-making obligation (MTE)
  - of the Platform for physical delivery of financial contracts concluded on IDEX (CDE).

Spot Electricity Market (MPE)

- The Spot Electricity Market consists of three submarkets:
  - **Day-Ahead Market (MGP)**, where producers, wholesalers and eligible final customers may sell/buy electricity for the next day;
  - **Intra-Day Market (MI)**, which replaced the existing Adjustment Market; in this market, producers, wholesalers and eligible final customers may change the injection/withdrawal schedules determined in the MGP; the market is organised into four sessions: the first two are held on day d-1 after the MGP (MI1 and MI2 - operational since 31 October 2009); and the second two intra-day sessions are held on day d (MI3 and MI4 - introduced on 1 January 2011);
- **Ancillary Services Market (MSD)**, where Terna S.p.A procures the ancillary services needed to manage, operate, monitor and control the power system; this market consists of:
  - an ex-ante session, during which services for congestion relief and reserve capacity are bought;
  - a second intra-day session, during which the same bids/offers are accepted for balancing purposes (MB);

  The ex-ante MSD consists of three scheduling substages (MSD1, MSD2 and MSD3) and the MB of 5 sessions.

The markets

	MGP	MI1	MI2	MSD1	MB1	MB2	MI3	MSD2	MB3	MI4	MSD3	MB4	MB5
Reference day	D-1				D								
Preliminary information	08:45	12:30	14:40	n.d.	n.d.	n.d.	07:30	n.d.	n.d.	11:45	n.d.	n.d.	n.d.
Opening of sitting	08:00**	10:45	10:45	15:10	°	22:30*	16:00*	°	22:30*	16:00*	°	22:30*	22:30*
Closing of sitting	09:15	12:30	14:40	16:40	°	05:00	07:30	°	11:00	11:45	°	15:00	21:00
General results	10:30°°	12:55	15:05	20:30	##	##	07:55	9:50	##	12:10	14:05	##	##
Individual results	10:45	13:00	15:10	20:40	#	#	08:00	10:00	#	12:15	14:15	#	#

** the hour refers to day D-9
* the hour refers to day D-1
° use is made of bids/offers submitted in the first substage of the MSD
°° provisional results
fifteenth day of month M+2
general results are notified on an hourly basis, 1 hour after the end of each hourly period

Bids/offers

- Participants trade in the market by submitting demand bids or supply offers.
- Bids/offers consist of pairs of values, i.e. volume and unit price of electricity (MWh; E/MWh).
- They express the willingness to sell (or buy) a volume of electricity not higher than the one specified in the offer (or bid) at a price not lower (or not higher) than the one specified in the same offer (or bid).
- Prices and volumes must not be negative and demand bids may also not specify any purchasing price (except in the MSD); in this case, they express the market participant's willingness to purchase electricity at any price.
- Bids/offers refer to "offer points" (physical generating and consuming units) and to individual hours: this means that, for each day and each offer point, a maximum of 24 bids/ offers may be entered and that each bid/offer is independent of the other ones.

Bids/offers characteristics

- **simple**, consisting of a pair of values indicating the volume of electricity offered in the market by a market participant and the related price for a given applicable period;
- **multiple**, consisting of the division of an overall volume offered in the market by the same market participant for the same applicable period, the same generating unit and the same withdrawal point;
- **pre-defined**, consisting of simple or multiple bids/offers which are daily submitted to GME.

Bids/offers characteristics

Types of bids/offers		
Day-Ahead Market (MGP)	Intra-Day Market (MI)	Ancillary Services Market (MSD)
Purchase (*) Sale (*)	Purchase Sale	Purchase Sale (*)
"electricity volume – electricity price" pairs	"electricity volume – electricity price" pairs	Price by type of service
Multiple Simple Pre-defined (*)	Multiple Simple Balanced	Pre-defined (*)

(*) Admitted only in respect of offer points pertaining to consuming units and pumped-storage units.
(*) Admitted only in respect of offer points pertaining to generating units and pumped-storage units.
(*) Active only if no bids/offers have been submitted during the market sitting.
(*) Only of simple type: one purchase + one sale.
(*) Bids/offers of secondary reserve and multiple bids/offers of other services are admitted.

Bids/offers in the MPE

- Bids/offers in the MPE should contain at least the following data:
  - the identification code of the market participant submitting the bid/offer;
  - the identification code of the market and of the market sitting where the bid/offer is entered;
  - the identification code of the offer point to which the bid/offer refers;
  - the applicable period to which the bid/offer refers;
  - the type of bid/offer (purchase/sale);
  - where applicable, the specification of pre-defined bid/offer;
  - the offered volume;
  - the unit price for the offered volume.

Units of measurement used in the market

- The units of measurement used in the market are as follows:
  - for electricity, the unit of measurement is the MWh, specified with three decimals;
  - for monetary quantities, the unit of measurement is the Euro, specified with two decimals;
  - for the unit prices of electricity, the unit of measurement is the €/MWh, specified with two decimals.

Organisational diagram of the MPE

Organisational diagram of the MPE				
	MGP	MI	MSD	
Traded Resource	Electricity	Electricity	Electricity for congestion relief	Electricity for real-time balancing
Admitted units	All injection and withdrawal points		All injection and withdrawal points authorised to supply ancillary services	
Admitted parties	Market Participants	Market Participants	Dispatching users	Dispatching users
Price	Clearing Price	Clearing Price	Offered Price	Offered Price

The Italian Day-Ahead Market (MGP)

- The Italian Day-Ahead Market (MGP) is a wholesale electricity market, where hourly blocks of electricity are negotiated for the next day and where not only prices and volumes but also injection and withdrawal schedules are defined for the next day.
- The MGP, which is based on an implicit-auction model, hosts most of the transactions of purchase and sale of electricity.
- The sitting of the MGP opens at 08:00 of the ninth day before the day of delivery and closes at 09:15 of the day before the day of delivery.
- GME publishes preliminary information about the MGP on its website by 8:45 of the day of closing of the sitting and, anyway, at least half an hour before the closing of the same sitting.
- GME publishes the provisional market results, notifies the individual market results to participants and the cumulated schedules to dispatching users and to Terna by 10:45 of the day of closing of the sitting.
- All parties that have acquired the status of “Electricity Market participants” may trade in the MGP.
- GME acts a central counterparty to purchase and sale transactions in the MGP.

Bid/offer types and constraints

- When the sitting of the MGP is open, participants may submit bids/offers where they specify the volume and the maximum/minimum price at which they are willing to purchase/sell.
- Supply offers and demand bids must be consistent with the injection or withdrawal capabilities of the offer points to which they refer and, above all, they must correspond to the real willingness to inject or withdraw the related volumes of electricity.

Bids/offers in the MGP

- Supply offers express the willingness to sell a volume of electricity not higher than the one specified therein and at a unit price not lower than the one specified therein.
  - Participants may refer supply offers only to injection or mixed points.
  - The acceptance of an offer involves the market participant's commitment to inject the volumes of electricity specified in the offer into the grid in a given applicable period or, in case of partial acceptance of the offer, the corresponding share;
- Demand bids express the willingness to purchase a volume of electricity not higher than the one specified therein and at a unit price not higher than the one specified therein.
  - Participants may refer demand bids only to withdrawal or mixed points.
- Multiple bids/offers may include both supply offers and demand bids.

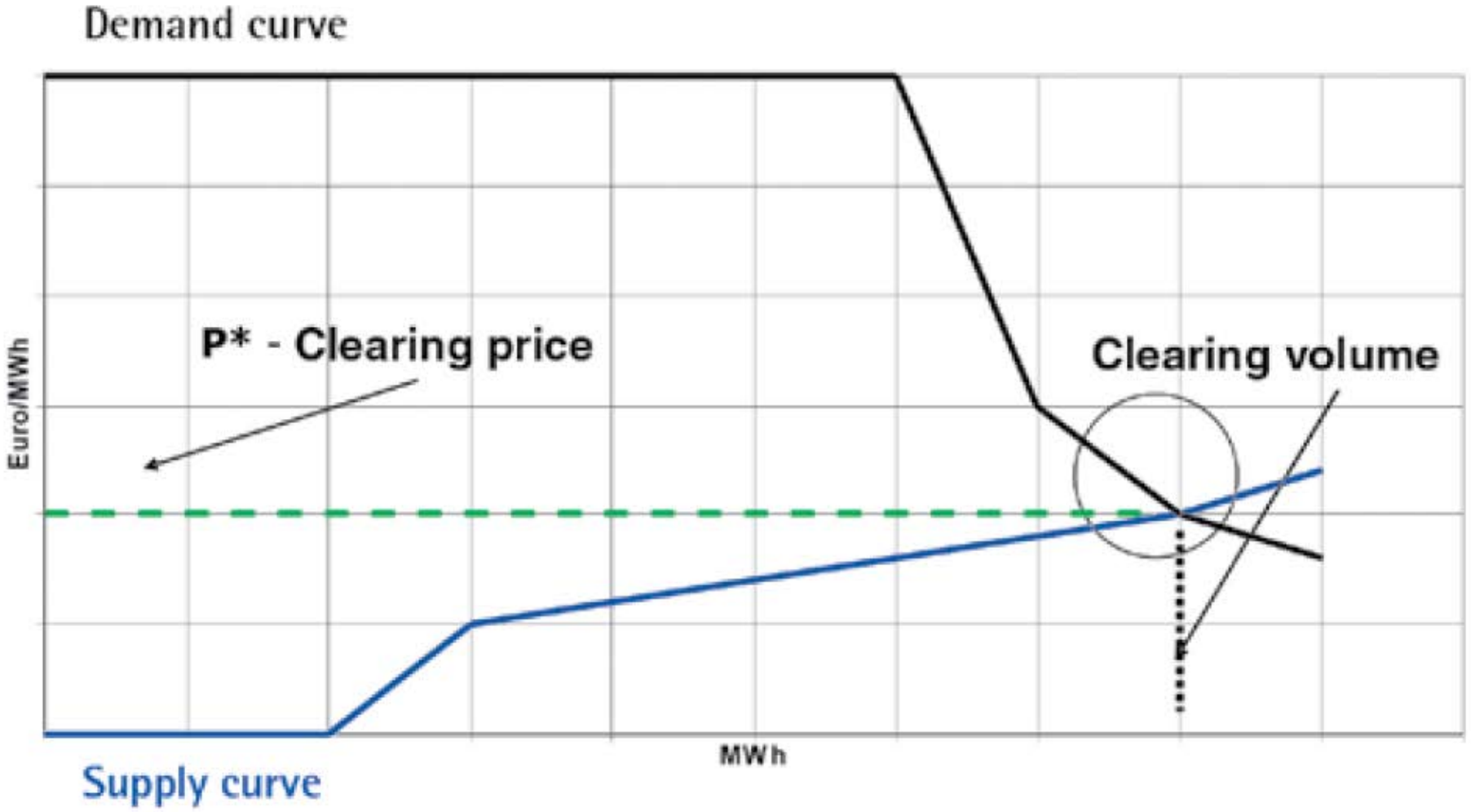
The clearing procedure

- Bids/offers are accepted after the closing of the market sitting under the economic merit-order criterion and subject to transmission limits between zones:
  - all accepted supply offers and all accepted demand bids pertaining to mixed points and to withdrawal points belonging to virtual zones are valued at the clearing price of the zone to which they belong.
  - This price is determined, for each hour, by the intersection between the demand curve and the supply curve and is different from one zone to the other when transmission limits are saturated;
  - accepted demand bids pertaining to withdrawal points belonging to geographical zones are valued at the “Prezzo Unico Nazionale” (PUN – national single price), which is equal to the average of zonal prices weighted for zonal consumption

Bid/offer acceptance

- At the end of the bid/offer submission sitting, GME activates the market resolution process.
- For each hour of the following day, the market algorithm will accept bids/offers in such a way as to maximise the value of transactions, while satisfying maximum transmission limits between zones.
- The acceptance process may be summarised as follows:
  - all valid and adequate supply offers that have been received are ranked in increasing price order on an aggregate supply curve and all valid and adequate demand bids that have been received are ranked in decreasing price order on an aggregate demand curve.
  - The intersection of the two curves gives: the overall traded volume, the clearing price, the accepted bids/offers and the injection and withdrawal schedules obtained as the sum of the accepted bids/offers pertaining to the same hour and to the same offer point.

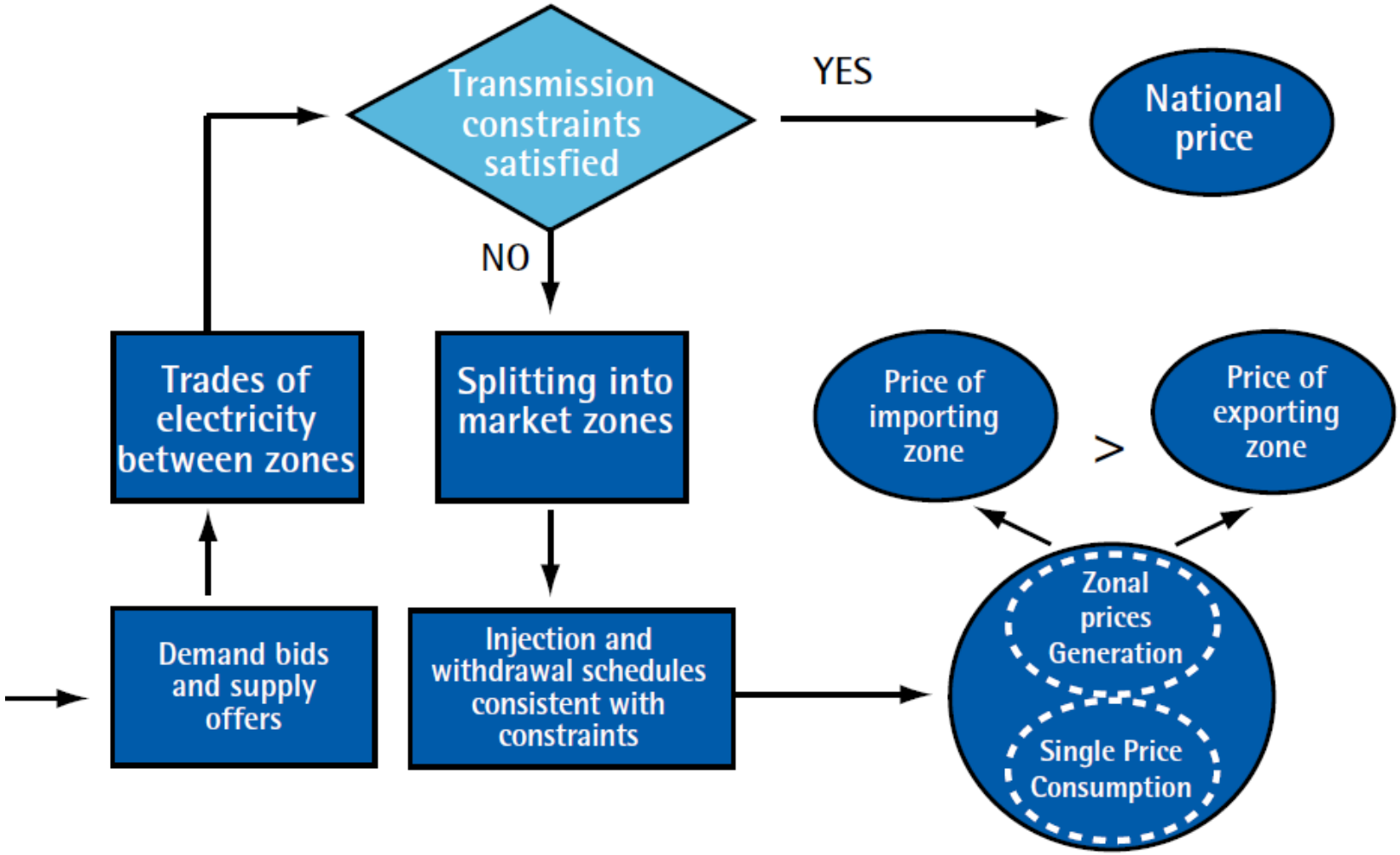
Bid/offer acceptance



Bid/offer acceptance

- If the flows on the grid resulting from the schedules do not violate any transmission limit, the clearing pric e is a single one in all the zones and equal to **P***. Accepted bids/offers are those having a selling price not higher than P* and a purchasing price not lower than P*.
  - If at least one limit is violated, the algorithm “splits” the market in two market zones - one exporting zone, including all the zones upstream of the constraint, and one importing zone, including all the zones downstream of the constraint. In each zone, the algorithm repeats the above-mentioned intersection process and, for each market zone, it builds a supply curve (including all the supply offers submitted in the same zone, as well as the maximum imported volume) and a demand curve (including all the demand bids submitted in the same zone, as well as a volume equal to the maximum exported volume).
  - The result is a zonal clearing price (Pz), which is different in the two market zones.
  - **Pz** is higher in the importing market zone and lower in the exporting one. If, as a result of this solution, additional transmission limits within each market zone are violated, the market splitting process is repeated also within this zone until obtaining a result which is consistent with grid constraints.
- With regard to the price of electricity allocated for consumption in Italy, GME implemented an appropriate algorithm. In case of prices differentiated by zone, the algorithm applies a national single purchasing price (PUN), which is equal to the average of zonal selling prices weighted for zonal consumption.
- The PUN is only applied to withdrawal points belonging to national geographical zones, whereas both the selling and purchasing Pz are applied to all injection points, mixed points and withdrawal points belonging to neighbouring countries’ virtual zones.

Bid/offer acceptance



Modello matematico in presenza di PUN

$$\max \sum_{k,i} QA_i^k \bullet PA_i^k - \sum_{k,j} QV_j^k \bullet PV_j^k$$

$$0 \le QV_j^k \le \overline{QV_j^k} \quad \text{se} \quad PV_j^k = P^{*k}$$

$$QV_j^k = 0 \quad \text{se} \quad PV_j^k > P^{*k} \qquad \forall j,k$$

$$QV_j^k = \overline{QV_j^k} \quad \text{se} \quad PV_j^k < P^{*k}$$

$$0 \le QA_i^k \le \overline{QA_i^k} \quad \text{se} \quad PA_i^k = P^*$$

$$QA_i^k = 0 \quad \text{se} \quad PA_i^k < P^* \qquad \forall i,k$$

$$QA_i^k = \overline{QA_i^k} \quad \text{se} \quad PA_i^k > P^*$$

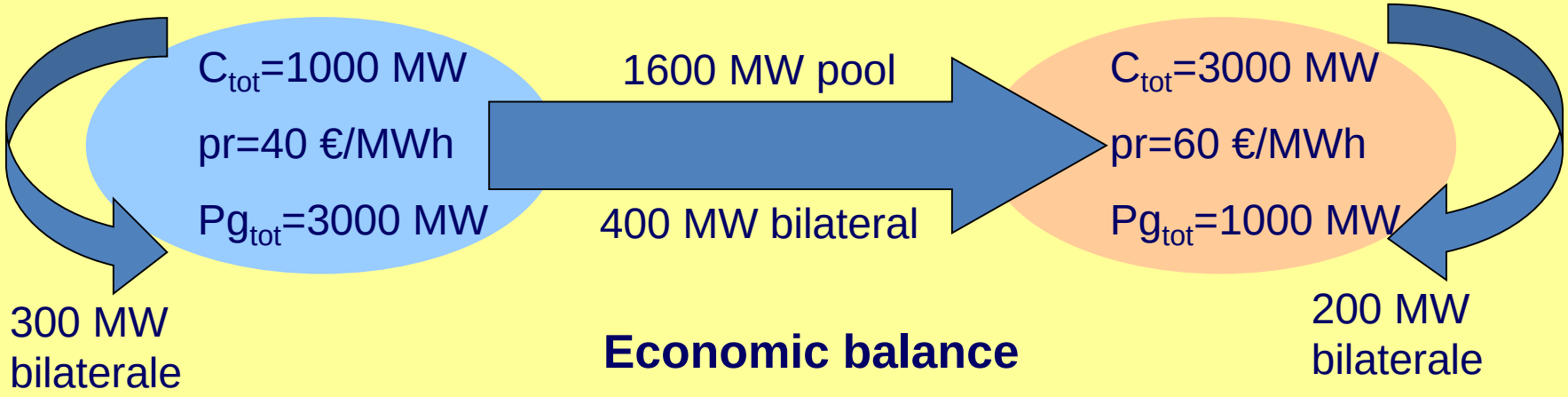
$$\sum_{k,j} QV_i^k - \sum_{k,i} QA_i^k = 0 \qquad \forall i,k$$

$$T_h = \sum_k S_h^k \bullet QVN^k \qquad \forall h$$

$$MINF_h \le T_h \le MAXF_h \qquad \forall h$$

$$P^* \bullet \sum_{k,i} QA_i^k - \sum_k P^{*k} \bullet \left(\sum_j QV_j^k \right) = 0$$

PUN example



Economic balance

$$\text{PUN} = \frac{40 \cdot 1000 + 60 \cdot 3000}{1000 + 3000} = 55 \text{ €/MWh}$$

Gen A

Income 40*(700+1600)= 92000 €
Pay (55-40)*400 = 6000 €
Pay (55-40)*300 = 4500 €

Gen B

Income 60*800=48000 €
"Pat" (55-60)*200=-1000 €

Load A

Pay 55*700=38500 €

Load B

Pay 55*(800+1600)=132000 €

PX

Pay 92000+48000+1000 = 141000 €
Income 38500+132000+6000+4500 = 181000 €
Revenue 193000-153000 = 40000 € =(60-40)*2000 €

The Congestion Charge in presence of PUN

- CCT: corrispettivo per l'uso della capacità di trasporto
- Each bilateral contract has to pay the CCT for each hour given by the following equation:

$$CCT = MW \cdot (PUN - p_{zi})$$

- The CCT can be
  - Positive (the money goes from the owner the contract to GME)
  - Negative (the money goes from GME to the owner the contract)
  - Also a contract totally inside a zone has to pay the CCT

Why a contract totally inside a zone has to pay the CCT?!?

- If the expected zonal price $pz_{expetecd}$ > PUN all players sell/buy energy in the pool
- If the expected zonal prise $pz_{expected}$ < PUN all players sell/buy energy through bilateral contracts

Preliminary information of MGP

- Before the sitting of the MGP, GME provides market participants with information about the expected electricity requirements for each hour and each zone and the maximum admissible transmission limits between neighbouring zones for each hour and each pair of zones.

Over-The-Counter (OTC) contracts (bilateral contracts)

- The electricity traded through bilateral transactions that are registered onto the PCE participates, since it contributes both to:
  - committing a share of the transmission capacity available for flows;
  - determining the volumes to be weighted for the national single price (PUN).
- The schedules registered onto the PCE are submitted into the MGP in the form of bids/ offers and contribute to determining the results of the MGP.

The characteristics of the Italian bilateral contract

- The bilateral contract before 1st April 2007
  - Quantity
  - Injection point
  - Withdraw point
- This implied that in the conctract had to define the generation units adopted to produce the energy

- Strong rigidity
  - Difficult management of unavailability of generating units
  - Difficult management of surplus / deficit of energy
  - No optimal economic dispatch

The PCE

- What is it?
- For the management of forward purchases
- What are the forward purchases?
- For each relevant period, an amount of electricity energy purchased outside the bidding system

- The PCE provides greater flexibility in the management of purchases and sales of energy through bilateral contracts

How does it work?

- It has distinguished the commercial activity and the production activity of the bilateral contract
- On the PCE, operators can record business transactions and, at a later stage, it is possible to define the scheduling of generating units
- Each operator is assigned an injection/withdrawal energy account, depending on the type of unit (production/consumption)
- On each energy account can be recorded either purchase transactions or sales contracts, but the net position of the account (obtained as the algebraic sum of purchases and sales recorded) always remains consistent with the type of account
  - a net sale with reference to injection energy accounts
  - a net purchase with reference to withdrawal electricity accounts

How does it work?

- What is a trade in the PCE:
  - the operator that sells energy has an obligation to inject electricity
  - the operator that buys energy has the right to withdraw energy from the network
  - Every purchase is registered as a commercial transaction and is completely independent from the physical scheduling.
  - After the registration phase of commercial transactions follows the definition of the physical scheduling.
  - Each operator declares, with reference to its production/consumption units, the scheduling of injection/withdrawal consistent with the net position on its electricity accounts

How the bilateral transactions are represented in the pool market?

- After the definition of the commercial transaction the net position for each player is known
  - It is the sum of the transactions recorded to the same energy account
- The account user holder can "run" this position through the recording of programs physical injection / withdrawal
- The registration request of programs must be sent to the PCE by 8.30 the day before the dispatching day.
- In the registration request there must be indicated at least the following information:
  - identification code of the offer points;
  - day;
  - the relevant time (hours);
  - amount of energy of the program;
  - price

How the bilateral transactions are represented in the pool market?

- If the operator is also a market operator of the electricity market, the price may have a value greater than or equal to zero, otherwise it is zero.
- The programs are sent to MGP as follows:
- the injection are represented as buy bids relating to the quantities and prices specified in the program;
- The withdrawal programs are represented as purchase offers concerning the quantities and prices specified in the program.
- The programs accepted at the conclusion of MGP are "registered" for the PCE.
- The programs accepted have to pay the CCT

The unbalance programs

- The algebraic sum of the net position of the account (less than zero for the net sale, greater than zero for the purchase) and recorded programs on the same account (greater than zero for programs in injection, less than zero for programs withdrawal) determines the energy balance of the account.
- If the balance is zero, the operator has "performed" a physical programming consistent with its commercial position
- if the physical balance is different from zero, there is an unbalance position: the difference is sold/purchased by the pool

Example

- Injection energy account
  - Net position of the injection energy account: 100 MWh: the operator has to sell 100 MWh
  - Registered position in the PCE 90 MWh: only 90 MWh are declared in the pool market
  - The operator buys 100-90=10 MWh from the pool market
  - This purchase for unbalancing program is valued at PUN price

Example

- Withdrawal energy account
  - Net position of the withdrawal energy account: 100 MWh: the operator has to buy 100 MWh
  - Registered position in the PCE 90 MWh: only 90 MWh are declared in the pool market
  - The operator sells 100-90=10 MWh to the pool market
  - This sale for unbalancing program is valued at PUN price

The Italian Intra-Day Market (MI: Mercato Infragiornaliero)

MI

- The MI was introduced by Law 2/09 with a view to enabling participants to update their demand bids and supply offers, as well as their commercial positions, with a frequency similar to the one of continuous trading, taking into account variations
  - of information about the status of power plants
  - and consumption requirements.
- Continuous trading is a mechanism of trading based on automatic matching of demand bids and supply offers and continuous entry of new bids/offers during the trading sessions.

Why the MI?

- The **Intra-Day Market (MI)** allows participants to change the schedules defined in the MGP through additional demand bids or supply offers.
- The MI consists of four sessions: MI1, MI2, MI3 and MI4.
- The sessions are organised in the form of implicit auctions of electricity, with different closing time and in sequence.
- Through these auctions, participants may better check the status of power plants and update the withdrawal schedules of consuming units, taking into account more up-to-date information about the status of their own power plants, the electricity requirements for the next day and market conditions.

Price setting rules

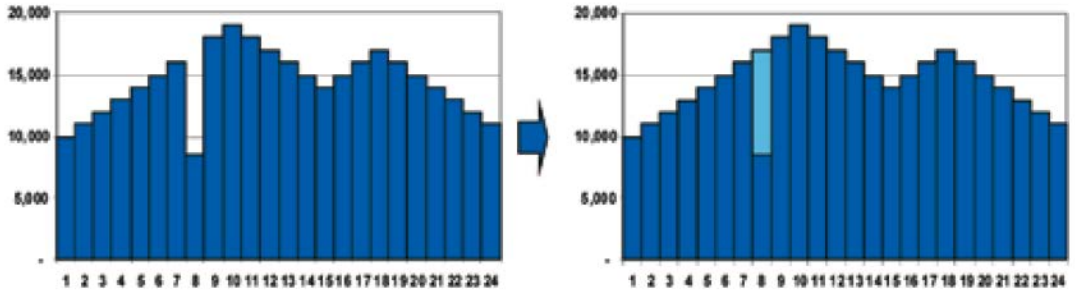
- The sessions of the MI are based on price-setting rules that are consistent with those of the MGP.
- Nevertheless, unlike in the MGP, the PUN is not calculated and all purchases and sales are valued at the zonal price.
- Upon the closing of each session of the MI, GME (as done at the end of the MGP) notifies Terna of the results that are relevant for dispatching: flows and updated injection and withdrawal schedules.
- If there are other market sessions after the one to which GME's results refer, these results are required by Terna to determine preliminary information about residual transmission capacities between zones for subsequent market sessions.

MI organisation

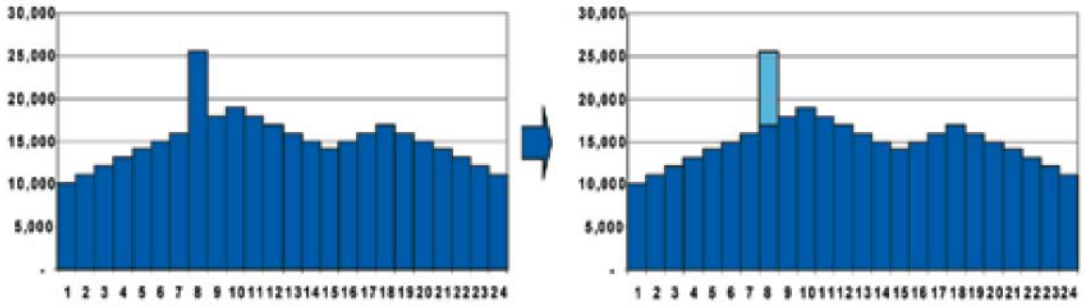
- The sitting of the MI1 takes place after the closing of the MGP; it opens at 10:45 of the day before the day of delivery and closes at 12:30 of the same day. The results of the MI1 are notified to participants and published by 13:00 of the day before the day of delivery.
- The sitting of the MI2 opens at 10:45 of the day before the day of delivery and closes at 14:40 of the same day. The results of the MI2 are notified to participants and published by 15:10 of the day before the day of delivery.
- The sitting of the MI3 opens at 16:00 of the day before the day of delivery and closes at 07:30 of the day of delivery. The results of the MI3 are notified to participants and published by 8:00 of the day of closing of the sitting.
- The sitting of the MI4 opens at 16:00 of the day before the day of delivery and closes at 11:45 of the day of delivery. The results of the MI4 are notified to participants and published by 12:15 of the day of closing of the sitting.

Example

Preliminary Hourly Schedule of Unit X (MWh)



Preliminary Hourly Schedule of Unit Y (MWh)

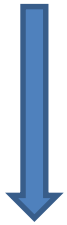


In the MGP each hour is cleared independently from the previous and next hour, therefore the resulting UC for a generating unit could be infeasible from technical point of view

In the MI it is possible to handle this condition

The problem introduced by PUN

- In the MGP
  - the purchased energy is evaluated at PUN
  - the sold energy is priced al zonal price
- In the MI both the purchased and sold energy are priced at zonal price



Arbitrage could arise

Why?

- It is possible to buy energy in the MGP and to sell it in the MI
- The profit derives from the difference between the PUN the energy value represented by the zonal price in the MGP

Example

A buyer buy 50 MWh in the MGP and sell this energy in the MI

	MGP	MI
P_z (€/MWh)	15	15
PUN (€/MWh)	10	
Money paid by the buyer in the MGP	50 MWh * 10 €/MWh = 500 €	
Money received in the MI		50 MWh * 15 €/MWh = 750 €
Revenue due to the arbitrage	750 - 500 € = 250 €	

Non-arbitrage fee

- In the MI, to replicate the effect of the application of the PUN to withdrawal points belonging to geographical zones, GME applies a non-arbitrage fee to all accepted bids/offers pertaining to such points.

- For each **purchase transaction** concluded in the MI and pertaining to a withdrawal point belonging to a geographical zone:
  - if the PUN in the previous MGP has been higher (lower) than the related zonal price, the market participant will pay (receive) a non-arbitrage fee.
  - This fee is equal to the difference between the PUN and the zonal price, applied to each MWh covered by the purchase transaction.
- For each **sale transaction** concluded in the MI and pertaining to a withdrawal point belonging to a geographical zone:
  - if the PUN in the previous MGP has been lower (higher) than the related zonal price, the market participant will pay (receive) a non-arbitrage fee.
  - This fee is equal to the difference between the zonal price and the PUN, applied to each MWh covered by the sale transaction.

Example

A buyer buy 50 MWh in the MGP and sell this energy in the MI

	MGP	MI
P_z (€/MWh)	15	15
PUN (€/MWh)	10	
Money paid by the buyer in the MGP	50 MWh * 10 €/MWh = 500 €	
Money received in the MI		50 MWh * 15 €/MWh = 750 €
Revenue due to the arbitrage	750 - 500 € = 250 €	

The non-arbitrage fee is equal to (15-10)*50= 250 € exactly equal to the Revenue due to the arbitrage

Admission to electricity market

Who can participate to the market?

- GME's Electricity Market is open to all parties that
  - have adequate experience and competence in the use of ICT systems and related security systems;
  - have not been convicted, with a final judgement or with a judgement applying the penalty at the request of the parties, for agiotage, for one of the violations of the privacy of ICT communications, for computer fraud or fraud to the damage of the State or other public entity, as well as for income tax and value added tax crimes;
  - have not been previously excluded from the Electricity Market (except if they have been excluded on request).

Admission to the Electricity Market

- To be admitted to the Electricity Market, the applicant must have successfully completed a specific admission procedure.
- The applicant must submit to GME:
  - a Market Participation Application (using the predefined format annexed to the Integrated Text of the Electricity Market)
  - documents certifying that he/she meets the above-mentioned requirements (no conviction and, if the application is submitted by a legal entity, powers of representation);
  - two signed copies of the Market Participation Agreement (in the format annexed to the Electricity Market Rules), where the contracting party certifies that he/she is aware of and accepts, without any condition or reservation, the Electricity Market Rules and undertakes, among others, to pay an access fee, a yearly fixed fee and a fee for each MWh traded/registered.

Admission to the Electricity Market

- Within fifteen calendar days from receipt of the above documents, after verifying the fulfilment of the requirements and the validity of the submitted documents, GME will notify the applicant of his/her admission or of the rejection of his/her application.
- Before rejecting the application, if the submitted documents are irregular or incomplete, GME will notify the applicant of the steps necessary to complete and/or regularise them, as well as of the date by which he/she must do so.
- This notification will suspend the initial time limit of 15 days, which will run again from the date upon which GME receives the completed and/or regularised documents.
- Upon admission, the applicant will acquire the status of market articipant. Market participants are entered into an appropriate “Register of Market Participants”, which is held and administered by GME in compliance with personal data privacy legislation.

Market Participation on Application

- To participate in the market, the applicant must complete the Market Participation Application and Market Participation Agreement forms
- The forms must be completed and signed by the applicant (if she/he is a natural person) or by the owner, legal representative or duly authorised person (if the applicant is a legal entity).

Market Participation Application form

- The applicant will have to complete the fields reserved for the market participant's data and specify:
  - for which markets (Electricity Market or Green Certificates Market) he/she is applying;
  - name, surname and contact data (both telephone number and e-mail address) of the contact person for possible communications;
  - name, surname, date and place of birth, taxpayers' code, address and contact data (both telephone number and e-mail address) of the party/parties that are authorised to access GME's information system on behalf of the applicant under a strong authentication and smart card/digital signature procedure;
  - the identification code assigned by Terna (for admission to the Electricity Market) and/or by GSE (for admission to the Green Certificates Market).

Market Participation Agreement

- The applicant must:
  - complete and sign two originals of the Agreement;
  - initial each page of the Agreement;
  - specifically approve the contractual clauses as per articles 1341 and 1342 of the Italian Civil Code, by affixing a second signature after their listing.

Exclusion from the Electricity Market

- Market participants may be excluded from the Electricity Market, if they have filed a written request for exclusion with GME.
- However, the exclusion will not exempt the market participant from fulfilling obligations acquired in the Electricity Market prior to the request for exclusion or when, after verifying violations of the Electricity Market Rules or of the Technical Rules, GME has excluded the market participant from the Electricity Market.

ACCOUNTING IN THE ELECTRICITY MARKET, VAT TREATMENT AND SETTLEMENT OF PAYABLES/RECEIVABLES

Billing

- Every day, to facilitate the checking of transactions concluded in the Electricity Market and of payables/receivables resulting therefrom, GME makes available the following data for each market participant:
  - the values of accepted bids/offers in respect of purchases and sales in the MGP and MI;
  - the values of purchases and sales concluded in the MTE and of those in respect of forward contracts concluded off the market and registered in the MTE;
  - the values of fees owed to GME for each MWh covered by demand bids and supply offers accepted in the Electricity Market;
  - the values of accepted bids/offers in respect of purchases and sales in the MSD;
  - the values of purchase and sale transactions registered as a result of the exercise of the option of physical delivery of financial electricity derivatives (CDE).

Invoicing

- For all transactions concluded in the ME, GME issues invoices for sales made in favour of market participants and provides each selling participant with a notification of the sales made by the same, with all the data required for issuing an invoice to GME.
- For transactions in the MSD, as soon as Terna reports the final results of the MSD to GME, GME provides market participants with the data required for issuing their respective invoices.
- GME also issues separate invoices to both purchasing and selling participants for fees owed for the services provided by GME for each MWh traded.
- The invoice and invoice notifications are organised into fields and sets of fields and show the details of all the transactions made in the Electricity Market. The exchange of invoices between GME/Terna S.p.A and market participants takes place through the posting of the same invoices/invoice notifications on the ”MeSettlement” electronic platform.

VAT treatment

- In compliance with the applicable legislation and given the “physical” nature of the market, purchases and sales of electricity are VAT relevant transactions and the chargeability of VAT thereon depends on the place where the purchasing customer (market participant) has established his/her/its business.
- For sales to Italian customers, GME always issues invoices with VAT at the 21% rate, or at the 10% rate if the customer qualifies as “wholesale customer” (“cliente grossista”).
- Conversely, for purchases, GME receives invoices with VAT at the reduced rate of 10%, as GME qualifies as “wholesale customer” (“cliente grossista”).
- Also the other transactions that are carried out between GME and other parties and that qualify as supplies of services are VAT-relevant and obey the territoriality rules established for “general services”.
- For sales/purchases of goods and services to/from foreign customers, GME issues invoices without VAT and receives invoices without VAT, respectively and, in the latter case, it will apply the Italian VAT with the reverse charge procedure in accordance with the applicable legislation.

VAT treatment

- All the fees for the management of the Electricity Market that are invoiced by GME are VAT-relevant and the chargeability of VAT thereon depends on the place where the market participant has established his/her/its business.
- Therefore, GME will issue an invoice with VAT at the standard rate of 21%, if the customer has his/her/its place of business in Italy.
- If the customer has established his/her/its place of business in one of the countries of the European Union (EU) and is a taxable person in his/her/its own country, GME will issue invoices without applying VAT.
  - In this case, the customer will apply VAT with the reverse charge procedure.
  - If the customer has established his/her/its place of business in a non-EU country, GME will issue invoices without VAT.

Settlement of payments

- For each market participant, GME determines the net debit or credit position towards GME itself (net balance to be settled) on the basis of the amounts (including VAT, where applicable) pertaining to the invoices issued and received by GME in respect of the same invoicing period.
- The amounts of the invoices issued by GME and of the invoices received by GME within the 6th working day of the month will be offset in order to determine the net balance to be settled.
- Payments must be made through the “Bonifici di Importo Rilevante” (BIR) bank transfer procedure. The bank transfer is to be made to the bank in charge of GME’s treasury services, which receives and makes payments.

Fees

- The fees represent the consideration owed to GME for the services provided to market participants.
- The fees are as follows:
  - access fee: GME invoices this fee within 5 days from admission of the applicant to the Electricity Market;
  - yearly fixed fee: GME invoices this fee, for the first 12 months, as a single payment within the third working day of the month following admission of the applicant to the Electricity Market and, subsequently, every 12 months;
  - fee per MWh covered by purchase and sale transactions; this fee is applied separately to each bid/offer accepted during the invoicing period.

Extent of the Fees for 2014

- For the Electricity Market (MPE, MTE and CDE) access fee (on a one-time basis): € 7,500.00;
- Yearly fixed fee: € 10,000.00;

- For the MPE
  - Regressive variable fee defined as follows:
    - initial exemption on the first 0.02 TWh of monthly traded electricity;
    - fee of 0.04 €/MWh for monthly traded electricity volumes exceeding the threshold of 0.02 TWh up to a maximum of 1 TWh;
    - fee of 0.03 €/MWh for monthly traded electricity volumes exceeding the 1-TWh threshold up to a maximum of 10 TWh;
    - fee of 0.02 €/MWh for monthly traded electricity volumes exceeding 10 TWh.

- for the MTE
  - variable fee of 0.01 € per MWh traded

- for the CDE
  - variable fee of 0.045 € per MWh registered.

Payment of fees

- After admission to the market, GME will issue an invoice to the market participant for the amounts of the access fee and the yearly fixed fee. The latter fee pertains to the services provided by GME in the Electricity Market for the twelve-month period beginning on the date of admission to the market.
- With regard to the fees owed for each MWh covered by purchase and sale transactions, GME will issue an invoice within the sixth day of the second month following the end of the respective invoicing period.
- Each participant must pay the amounts due for fees within the following time limits:
  - the access fee within thirty calendar days from the date of issuing of the invoice and with value date on the same day;
  - the yearly fixed fee within the last working day of the month in which the invoice has been issued and with value date on the same day;
  - the fee for each MWh covered by purchase and sale transactions within the sixteenth working day of the month in which GME has made available the related invoice and with value date on the same day.
- On a yearly basis, GME determines the extent of the fees - with effect from 1 January of the following year - in such a way as to ensure its own economic and financial equilibrium. The fees are posted on GME’s website together with the parameters for their determination

Guarantee systems

- Market participants must post financial guarantees (which may be cumulated with one another) to cover obligations arising in the energy markets or on the PCE.
- The guarantees may be posted in the form of a first-demand bank guarantee or of a non-interest bearing cash deposit.
- The guarantees must meet the requirements specified in the Electricity Market Rules and, if they are posted in the form of bank guarantees, they must conform to the various formats annexed thereto (art. 79) and may be updated by submitting an updating letter in the various formats annexed to the Electricity Market Rules (art. 80).

Guarantee systems

- Article 79, para. 79.1 of the Electricity Market Rules provides that:
  - market participants wishing to trade in the energy markets (MGP, MI, MTE and CDE) or on the PCE shall post financial guarantees in the form of bank guarantees in the format of Annex 3 to the Electricity Market Rules;
  - for the purpose of submitting adequate bids/offers only into the MPE, market participants shall post financial guarantees in the form of bank guarantees in the format of Annex 5 and/or in the format of Annex 3 to the Electricity Market Rules;
  - for the purpose of submitting adequate bids/offers only into the MPE or requests for registration on the PCE, market participants shall post financial guarantees in the form of bank guarantees in the format of Annex 7 and/or in the format of Annex 3 to the Electricity Market Rules.