Overview of the Italian Energy Market
(Updated to 2013)

Milan, December 2014
Agenda

1. Main features of the Italian energy market
   - Market size
   - Offer and demand; market players
   - Market infrastructure

2. The wholesale market

3. The retail market

4. Market prices and margins
The Italian market is no.4 in the European electricity market ranking, and no.3 in gas market ranking.

- The Italian electricity demand in 2012 stands at the same level of 2004.
- The Italian gas demand in 2012 is below the level of 2003.

Source: Eurelectric early statistics 2012; Eurogas statistical report 2013. EU27, including Norway and Turkey
The historical trend of Italian electricity demand

- Electricity demand in 2013 amounts to 318 TWh.
- Electricity demand is still downward in 2013, mainly due to the economic crisis.
- In 2014 is decreasing further.

Source: AU website; Terna website, REF
Final consumption by sector and GDP

- Services consumption grew between 2008 and 2012 (+6 TWh).
- Drop in industrial sector: -26 TWh in 6 years (-17.5%).
- From 2008 to 2013 industrial consumption decreased much more than electricity demand (-1.27%) and GDP (-1.9%).

Source: GME’s 2013 annual report.
**The electricity demand**

**Demand breakdown by Market**

- **Liberalized**: 75%
- **Regulated**: 25%

**REGULATED MARKET**

- **AU (Acquirente Unico – Single Buyer)**: state owned body responsible for the electricity supply to the regulated market.
- **AU** sources electricity from the wholesale forward market (mainly by auctions) and from the spot power exchange.
- **Volumes managed by AU in 2013**: approx. 70 TWh.

*Sales to wholesalers and resellers not included.

Source: GSE website; AU website
Gas consumption in 2013 (67 bmc) is below the level of 2003, due to the drop of thermoelectric demand and, secondarily, to the decrease in industrial consumption.

Source: Snam rete gas.
The mix of electricity production

- The relative importance of thermoelectric generation (gas, oil and coal) decreased from overall 83% in 2007 to 62% in 2013.
- Huge decrease of CCGT production volumes: in 2013 the national load factor has been about 1,800 hours.

Source: AEEG annual report 2012; Terna preliminary data.
Major companies’ contribution to the electricity gross production

Year 2013

- The national incumbent is still the main player. Many medium-sized players have emerged after liberalization.

- Consolidation process is now expected due to economic crisis.

(*) TirrenoPower: Sorgenia (39%), GdFSuez (50%), Hera (5.5%), Iren (5.5%)

Source: AEEG annual report 2012; Preliminary data from Terna
The generation capacity increases while the electricity consumption is slowing

- Starting from 2005 huge investments in the thermoelectric sector have been on stream to increase the capacity after a critical period.
- Additional renewable capacity, subsidized by the tariffs, has been developed from 2009.
- The electricity consumption dropped in late 2008 and the recover is lingering.
- The balance between generation capacity and consumption load is normally cyclical and should reverse in the next few years.
- The peak reserve margin in 2013 ranged from 33.5% (winter period) to 45.9% (summer period).

Source: Terna
Hydroelectric production accounts for nearly half of total renewable sources.

Huge increase in solar and wind production, due to the EU 20-20-20 Targets and thanks to a generous incentive scheme.

Source: GSE; AEEGSI. 2013 interim data.
Distributed generation in 2012

- Distributed Generation (DG) is the total amount of power plants connected to the distribution system.
- In 2012 the energy gross production of DG amounted to 57 TWh, about 19% of national production, through more than 480,000 plants.
- 69% of the energy comes from renewable sources, especially from solar power plants.

Source: AEEGSI

<table>
<thead>
<tr>
<th>Technology</th>
<th>n° plants</th>
<th>Gross Capacity</th>
<th>Volumes</th>
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<tbody>
<tr>
<td></td>
<td>#</td>
<td>MW</td>
<td>TWh</td>
</tr>
<tr>
<td>Hydro</td>
<td>2,628</td>
<td>3,754</td>
<td>11</td>
</tr>
<tr>
<td>Wind</td>
<td>841</td>
<td>2,283</td>
<td>4</td>
</tr>
<tr>
<td>Solar</td>
<td>478,277</td>
<td>15,682</td>
<td>18</td>
</tr>
<tr>
<td>Thermo</td>
<td>3,166</td>
<td>8,655</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>484,912</td>
<td>30,374</td>
<td>57</td>
</tr>
</tbody>
</table>

Volumes breakdown by source:
- Non Renewable 31%
- Solar 31%
- Hydro 19%
- Biomass, biogas 12%
- Wind 7%
- Other 19%
Renewable power installations

- Huge increase in new renewable installations from 2009 due to high public incentives.
- About 10 b€ of incentives in 2012 (collected through the tariffs) were allocated to renewables, whereof more than 6 b€ for solar energy.
- New installed “green” capacity has more than doubled between 2000 and 2011. A slower growth rate is expected over the next years due to the reduction of incentives.

(*) Provisional data
Source: GSE website; Terna
Electricity interconnection capacities

- Main imports come from Switzerland and France.
- Import reductions by Terna to maintain the system security.
- Flows from Slovenia and Greece hard to optimize due to the local illiquid markets.
- New Montenegro-Italy and France-Italy interconnections are expected to be commissioned in 2017 and 2019 respectively.

Source: AEEG annual report 2012
Gas interconnection capacities

- Interconnection capacities are allocated to the market participants through explicit auctions and through long-term contracts.
- The gas in the pipelines is normally inflowed (except Gorizia).
- New LNG Terminal in Livorno started to operate in September 2013.

Source: AEEG annual report 2012; SNAM website
Italian electricity chain

Players along the value chain:

- **Regulated business**
  - **TRANSMISSION**
    - 1 main TSO (Terna) + 11 minors
    - 65,000 km tr. lines
  - **DISTRIBUTION**
    - 138 local distributors

- **Liberalized business**
  - **GENERATION**
    - ~12 main producers
  - **WHOLESALE/TRADING**
    - ~40 active traders
  - **SALES**
    - ~20 main sales companies
  - **RETAIL MARKET**
    - ~37 Mil. customers

Institutional bodies:

- **Ministry of Economic Development**: defines the political and strategic guidelines for the management and security of the national electric system.
- **Regulatory Authority for Electricity Gas and Water**: sets the regulated tariffs; promotes and controls the competitiveness and efficiency of the energy sector. Independent of the government.
- **Transmission System Operator**: owner of the national transmission grid through a concession and responsible for the security and for the optimal dispatching. Listed company.
- **Market operator**: organizes the day ahead market and MTE.
- **Single Buyer**: responsible for the electricity supply to the regulated market.
Terna’s energy demand forecast 2013-2023

- In the “Baseline Scenario”, a decrease of the electric intensity of 0.5%/year is assumed, due to the compliance with the energy efficiency goals. Demand foreseen in 2023: 338.5 TWh (+0.3% average YoY).

- In the “Development Scenario”, an increase of the electric intensity of 0.3%/year is assumed. Demand foreseen in 2023: 370 TWh (+1.1% average YoY).

- In the Baseline Scenario, the industry’s contribution to consumption growth is negative. Positive the growth of services (+1.5% year).

- In the Development Scenario, an increase of the share of consumption in the service is foreseen at the expense of the industrial sector.

1. Main features of the Italian energy market

2. The wholesale market
   - Spot market (IPEX, MSD)
   - Forward/futures market

3. The retail market

4. Market prices and margins
IPEX: Italian Power Exchange

**MGP**
*Day ahead*

**DAY AHEAD MARKET**
- Purchasing and sale of electricity on an hourly basis
- Players: producers, traders, consumers
- System Marginal Price (zonal market for the producers)
- Bilateral contracts are allowed
- Counterparty: GME

**MI**
*Intraday (4 sessions)*

**INTRADAY MARKET**
- Purchasing and sale of electricity in order to adjust the MGP’s program
- Players: producers, traders, consumers
- Discretionary
- System Marginal Price
- Counterparty: GME

**MSD**
*dispatching service (3 sessions)*

**DISPATCHING SERVICES MARKETS (ancillary services)**

**DISPATCHING**
- Purchasing and sale of power by TSO for congestion resolution and reserve
- Players: relevant producers
- Pay as Bid
- Counterparty: TERNA

**BALANCING**
- Purchasing and sale of power by TSO for real-time balance
- Players: relevant producers
- Pay as Bid
- Counterparty: TERNA

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**MB**
*balancing*
The day ahead market

- 6 geographical zones
  - North
  - Center-North
  - Center-South
  - South
  - Sicily
  - Sardinia

- 6 virtual zones
  - France
  - Switzerland
  - Austria
  - Slovenia
  - Corsica
  - Greece

- Limited production poles

- Hourly clearing price for each market zone
- Reference price for producers and importers

- Unique National Price: average of the zonal prices weighted on the zones’ volumes
- Reference price for consumers

Transport capacity limits exist among the market zones and are cleared through the market algorithm (see next slide)
The day ahead market algorithm

The electricity price is calculated through a demand-offer equilibrium algorithm:

The algorithm runs the first time at national level. If the capacity limits among the zones are not breached, the outcome is an equal price for all the zones. If any capacity limit breach occurs, the market is split into one or more zones. The algorithm is repeated at zone level and the resulting prices are different among the zones.

The electricity imported and the electricity produced from renewable sources are bid at zero (price takers).

Renewable capacity installed shaves peak prices
The Ancillary Services Market (MSD)

- Terna (TSO) procures through the Ancillary Service Market (MSD) the resources necessary to guarantee the balance of the power system and to release the **intra-zonal congestions**, that characterize Italian electricity market, which is a very complex physical market.

- The MSD is cleared through a *pay as bid* algorithm. Terna is the **central counterparty** which accepts bids/offers from market participants related to different reserve and balancing services.

- The market is divided into:
  - **«ex-ante MSD»**: consists of 3 sub-sessions, where Terna trades energy and balancing services in order to release congestions and to create reserve margins (secondary and tertiary reserve);
  - **«Balancing Market»** (MB): consists of 5 sub-sessions, where Terna trades real-time balancing services to restore secondary/tertiary reserve and to maintain the balance of the grid.

- Each player admitted to the market must provide bids and offers for each of the following services:
  - Secondary Reserve;
  - Terziary Reserve;
  - Start-up;
  - Shut-down;
  - Change of plant configuration.

- After the last update of the dispatching rules in 2011 volumes in MSD drastically dropped, due to the introduction of new market sessions and the creation of a more cost reflective offer structure. Thereafter the balancing needs increased because of the diffusion of intermittent renewable sources.

Source: GME
The wholesale futures and forward markets

**Bilateral and brokered market**
- Bilateral forward market currently supported by 8 brokers
- Trading of standard products: baseload, peakload, off-peak
- Physical and financial transactions under bilateral master agreements (i.e. EFET, ISDA)
- Credit risk managed by margin calls system (clearing house)
- High liquidity available, from day-ahead until 2 years-ahead

**IDEX, EEX**
- Centralized power exchange
- Trading of standard futures products (baseload, peakload)
- Financial transactions with unique counterparty
- Credit risk managed by margin calls system (clearing house)
- Medium liquidity

**MTE**
- Centralized power exchange managed by the GME
- Trading of futures products with physical delivery (standard: baseload and peakload)
- Unique counterparty. Automatic scheduling
- Credit risk managed by bank guarantee and/or cash deposit
- Low liquidity
The futures/forward market segmentation

- Wholesale futures/forward market size is steadily around 500 TWh since 2011.
- One of the most liquid power market in Europe
- OTC physical forward market is the main wholesale channel.

Source: A2A internal analysis
Expected evolution of the market regulation

Capacity payment

Until 2017, the temporary regime provides for an equal remuneration (CAP) for all and a supplementary one (S) linked to actual revenues. In 2013 the total remuneration for the mechanism was equal to 155 M €. With the resolution 320/2014, AEEG introduced an auction mechanism to remunerate the flexible capacity for the period 2015-2017.

Capacity market

Terna will secure through central auctions the system adequacy and flexibility. The organization of the capacity market is expected at the end of 2015. The auctions will be open to participants with new or existing programmable and not subsided capacity; in exchange of a fixed amount of money (which will be the auctioned item), market participants shall ensure capacity plant availability and shall return the difference, if positive, between a reference price (MGP or MSD) and the strike price linked to an open cycle gas turbine overall cost.

Imbalances of intermitting renewables

The imbalances regime has been reviewed in November 2014. The Authority defined the new mechanism of imbalance settlement, with different thresholds for different kind of renewables, and a fee within the threshold in order to avoid cost socialization. If producers do not accept this mechanism they will pay the same cost of the non relevant but programmable units.

Market coupling

Starting from 2015 Italy should gradually join the European Price Coupling, which simultaneously determines volumes and prices in all relevant zone, using a single algorithm based on the marginal pricing that meets the requirement of efficient allocations of the cross border capacity. Some important differences in the market structure have to be removed: gate closure at 9.15 instead of 12.00, two months settlement instead of two weeks, negative prices.
Agenda

1. Main features of the Italian energy market

2. The wholesale market

3. The retail market
   - Distribution service
   - Switches to liberalized market
   - Electricity prices for retail customers

4. Market prices and margins
The incumbent is still predominant.
Besides A2A and Acea, competition is spread across many small players.

Most of the distributors are pretty small, with only local distribution network and small size customers.

Source: AEEG annual report 2013
The captive customers progressively switch to unregulated tariffs

Market liberalization started in 1999 involving only big industrial customers, then progressively extended to the smaller industrials.

From 2007 the market liberalization process has been completed involving the residential customers.

In the last years households and SMEs have been the main switchers.

Source: AU website
Who’s switching to the liberalized market

Most of the customers switching to the liberalized market are non-household. Most of the customers reluctant to switch to the liberalized market are households.

Few suppliers are prepared to serve households due to high acquisition and commercial costs.

Source: AEIG annual report 2013; A2A internal analysis
The cost of renewables financed by the domestic bill

Over the past two years, the weight of the energy component within the regulated tariff has dropped from 60% to 53% and, conversely, the system charges significantly increased (moving from 9% to 19%), mainly due to the increase of the incentives to renewable sources.
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Italian prices are the highest in Europe

- Italian prices higher than European prices.
- Heavy decrease of prices from 2008 due to the financial world crisis and to local generation overcapacity.
- Increase of price from 2011 due to higher oil costs, despite the enduring overcapacity conditions and the significant increase of renewables.

CCGT is still the main marginal technology.
New renewable sources (besides hydro) are emerging.

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**Baseload prices**

€/MWh

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<tr>
<th>Year</th>
<th>Germany</th>
<th>France</th>
<th>Italy</th>
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<tr>
<td>2008</td>
<td>66</td>
<td>39</td>
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</tr>
<tr>
<td>2009</td>
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<tr>
<td>2013</td>
<td>75</td>
<td>38</td>
<td>43</td>
</tr>
</tbody>
</table>

**Marginal Technology**

- CCGT variable costs are the main reference price especially during the peak hours

Source: AEEG; A2A internal analysis

* Technology which set the price for a single hour

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This information was prepared by A2A and it is not to be relied on by any 3rd party without A2A’s prior written consent.
Spot price hourly shape

- Typical peak hours shifted from morning hours to h.19-21, because of the strong impact of PV production occurring in the central hours, along with steep reduction during the evening hours not matched by load decrease. Therefore CCGTS are able to set System Marginal Price in evening hours with high margins to recover their fixed costs.

- Ratio between peak and baseload hours has decreased over the last 4 years.
- This is due to overcapacity and low demand scenario, together with remarkable solar generation increase.

Source: A2A internal analysis
The Italian Gas Balancing Market (PB-GAS) is a daily spot gas market where the market participants can offer their storage resources to the balancing operator (Snam Rete Gas) in order to solve the contingent imbalances of the system.

In 2013, 41 TWh were traded at an average price of 27.86 €/MWh, aligned with PSV (Italian virtual exchange point), with a correlation of 89%.

In 2013, the spread between PBGAs and TTF drop from 3.65 to 0.83 €/MWh gas.

Fonte: dati GME e analisi interna.
The Italian forward electricity market

- On the forward electricity market, the Calendar 2014 quotation drops from 75 €/MWh level of beginning of 2012 to 69 €/MWh at the end of the year, and then to 62 €/MWh at the end of 2013. This was due to a progressively huge decrease in the electricity spot prices. The 2014 price is now equal to 52.5 €/MWh.

- The decrease in energy consumption, the increase in the renewable installed capacity, the high hydraulicity levels are the main causes of this slump in the electricity prices.

Source: internal analysis
The Italian forward gas market

- On the forward market, in 2013 PSV and TTF remained highly correlated.
- In the first months of 2013 the spread between PSV and TTF fell below 0.5 €/MWh due to a particular gas shortage in Northern Europe. It then recovered to a stable level of 1.5 €/MWh, that represents the transport cost from TTF hub to PSV hub.

Source: internal analysis; GME Annual Report
ETS at The beginning of the Phase III

- The huge excess of credits at European level and the lack of regulation caused an important collapse in the EUA price from 2008 to 2013. In April 2013 EUA dropped to the minimum level of 2.73 €/ton.
- The approval of Backloading and the Market Stability Reserve gave some support to the price that reached a relative maximum level 7.2 €/t in March 2013.
The Clean Spark Spread (CSS) measured using baseload and peakload electricity prices is an indicator of CCGT profitability. The CSS are calculated as the difference between i) the power spot price and ii) the PB-Gas price and the environmental costs related to CCGT production (i.e. CO2 and Green Certificates).

The profit has hugely decreased in the last 2-3 years, becoming negative on baseload in Q2 2013 (- 7.6 €/MWh), due to the important presence of renewable sources coupled with low demand level.

(*) In the 2012 due to free allocations, the CO2 cost is set as revenues.
Source: A2A internal analysis