DATA EXCHANGE IMPLEMENTATION IN ITALY

CEER Webinar Series on Data Accessibility
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Arianna Rossi
Wholesale Energy Markets and Environmental Sustainability Directorate

The SOGL Regulation – Art. 40 - 53

It defines provisions about **data exchange between TSO, DSOs and SGUs**. Regarding the data exchange requirements on national level:

❖ in coordination with the DSOs and SGUs, each TSO shall determine the applicability and scope of the data exchange on:

> ➢ Structural data

> ➢ Scheduling and forecast data

> ➢ Real-time data

❖ each TSO shall agree with the relevant DSOs on effective, efficient and proportional processes for providing and managing data exchanges between them, including, where required for efficient network operation, the provision of data related to distribution systems and SGUs.

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The Italian electricity system 2000 vs. 2019 data
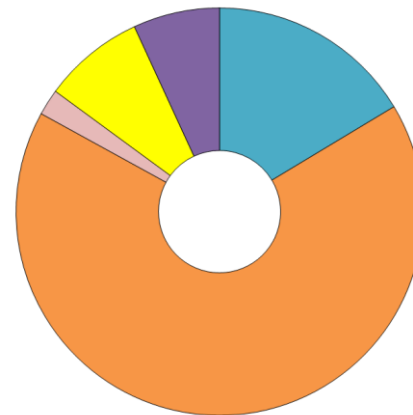
Gross prod.

Legend:
- Hydro
- Thermo
- Geothermal
- PV
- Wind

year: 2000
276,63 TWh
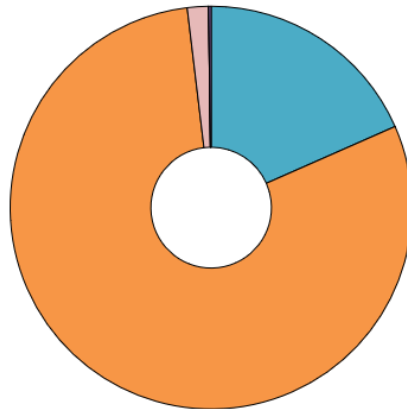
Legend:
- Hydro
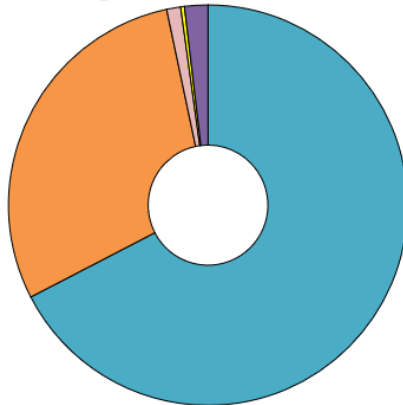- Thermo
- Geothermal
- PV
- Wind

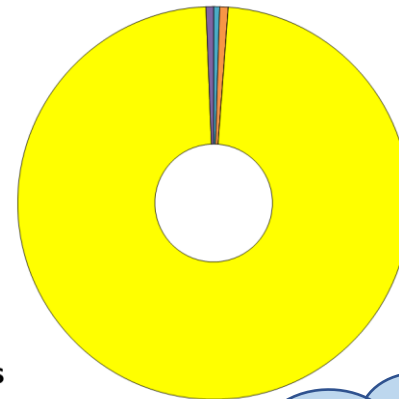**year: 2019**
293,89 TWh

Number of plants

Legend:
- Hydro
- Thermo
- Geothermal
- PV
- Wind

year: 2000
2915 plants

Legend:
- Hydro
- Thermo
- Geothermal
- PV
- Wind

year: 2019
896417 plants

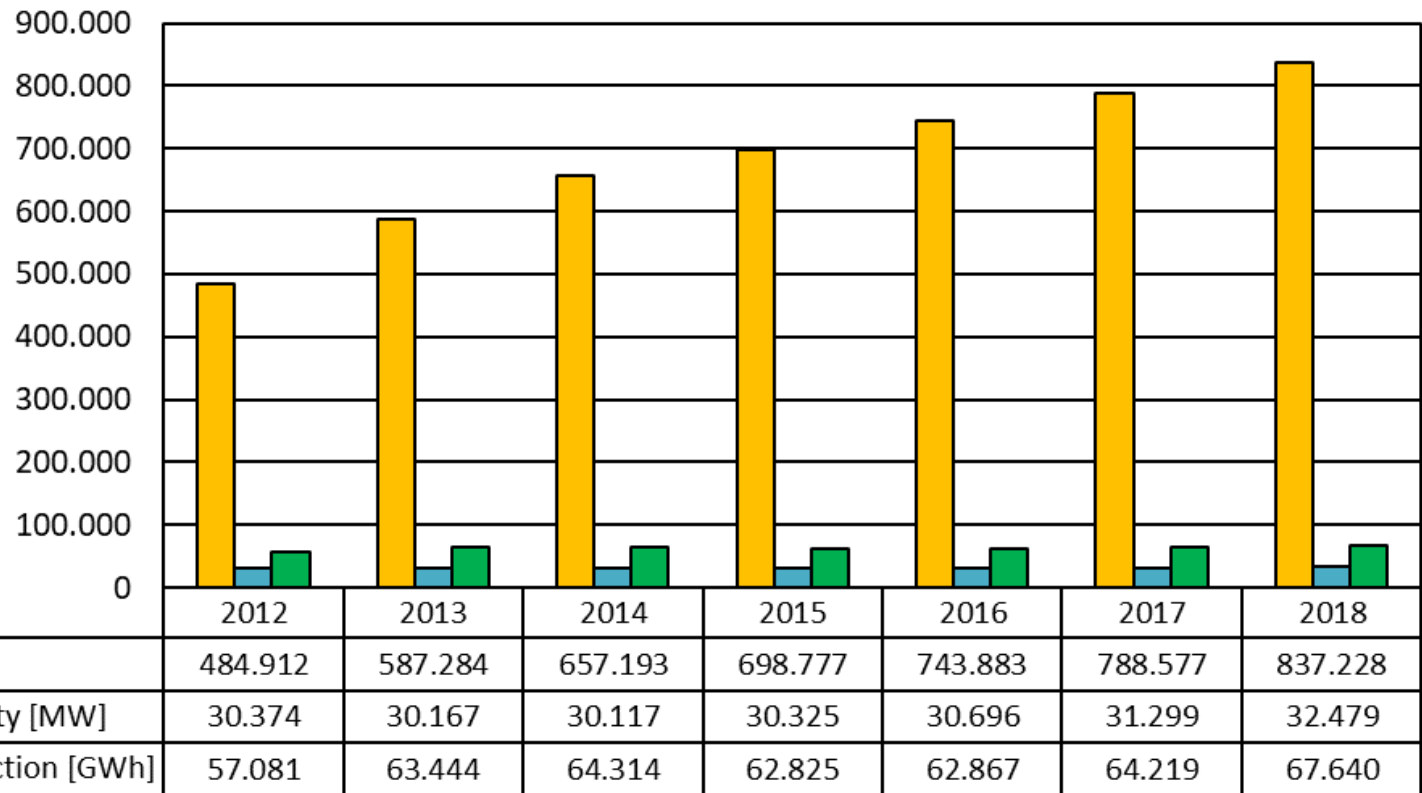**About 895.200 plants (96%) connected to LV or MV grid**

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The Italian electricity system
DG data 2012-2018

Source: ARERA
Report
320/2020/I/eel

	2012	2013	2014	2015	2016	2017	2018
☐ N° of plants	484.912	587.284	657.193	698.777	743.883	788.577	837.228
☐ Gross capacity [MW]	30.374	30.167	30.117	30.325	30.696	31.299	32.479
☐ Gross production [GWh]	57.081	63.444	64.314	62.825	62.867	64.219	67.640

DG definition introduced by EU Directive 2009/72/CE (adopted in Italy since 2012):
Distributed Generation = generation plants connected to the distribution system

Data exchange implementation in Italy (1/8)

ARERA resolution 646/2015/R/eel

In 2015, ARERA launched a first data sharing about DG plants between DSOs and TSO

SOGL Regulation

EU defined provisions about data exchange between TSO, DSOs and SGUs

ARERA resolution 628/2018/R/eel

ARERA initiated a process to implement SOGL requirements on data exchange in Italy

TERNA – Grid Code consultation

Italian TSO's consultation about the implementation of data exchange, in coordination with DSOs (applicability and scope)

ARERA resolution 36/2020/R/eel

ARERA approved the proposal made by the TSO in coordination with DSOs

ARERA consultation 361/2020/Reel

ARERA consultation on timelines, equipment and retrofit

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Data exchange implementation in Italy (2/8)

Proposal made by TSO in coordination with DSOs approved with resolution 36/2020/R/eel:

❖ **Structural data**: <u>in part already defined in the Italian Grid Code</u>. Povided by SGU:

- ➢ **All power plants**
- ➢ **HVDC**
- ➢ **Consumption plants** (connected to transmission or distribution network) that supply **load interruptibility service**

The most significative innovations introduced by the implementation of the SOGL Regulation (art. 45) are:

- ➢ Power plants connected to transmission network (or type D) must provide data on: voltage and reactive power control, data for short-circuit current calculation, data on turbines and converters, permits, dynamic simulation and coordinates
- ➢ By DSOs: coordinates and primary substation of power plants connected to its own network, structural data on reactors and capacitors for DSOs of networks with V ≥ 50 kV
- ➢ HVDC: active power control capability, frequency response capability, dynamic simulation

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Data exchange implementation in Italy (2/8)

Proposal made by TSO in coordination with DSOs approved with resolution 36/2020/R/eel:

- ❖ <u>**Scheduling and forecast data**</u>: <u>already defined in the Italian Grid Code</u>. Provided by SGU which are:
    - ❖ **Power plants** with capacity of at least **10 MVA/100 MW** or significant for the electric system security.
    - ❖ **Consumption units** with capacity of at least **10 MVA/100 MW** or significant for the electric system security.

They must provide the TSO (art. 46): active and reactive power output and availability, scheduled unavailability, active and reactive power restriction

Data exchange implementation in Italy (3/8)

Proposal made by TSO in coordination with DSOs approved with resolution 36/2020/R/eel:

❖ **<u>Real-time data</u>** provided by SGU:

➢ «**standard perimeter**»: **all power plants with capacity of at least 1 MW connected to MV grid**. Italian TSO (TERNA) requires following real-time data:

> ➢ Active and reactive energy produced by the entire power plant;
> ➢ Active energy produced by single generators in case of storage systems > 50 kW, inverter-based plants > 170 kW, synchronous generators > 250 kW

Data sampling interval: **4 sec**

➢ «**extended perimeter**»: a **significative group of power plants with capacity less than 1 MW connected to MV or LV grid**. TERNA requires following real-time data:

> ➢ Active and reactive energy produced by the entire power plant in case of plants connected to MV grid;
> ➢ Active energy produced by the entire power plant in case of plants connected to LV grid.

Data sampling interval: **4 sec for MV plants, 20 sec for LV plants**

Data exchange implementation in Italy (4/8)
Real time data

❖ **standard perimeter**: power plants connected to MV with capacity larger than 1 MW

Quantities to be measured	P, Q produced by the plant per source
Maximum error (accuracy)	< 2,2 % (> 97,8 %)
Sampling rate	4 sec
Ageing	< 4 sec
Presence of the quality code	YES
Signals to be provided	Device status (sent on variation)

❖ **extended perimeter**: power plants connected to MV or LV with capacity lower than 1 MW

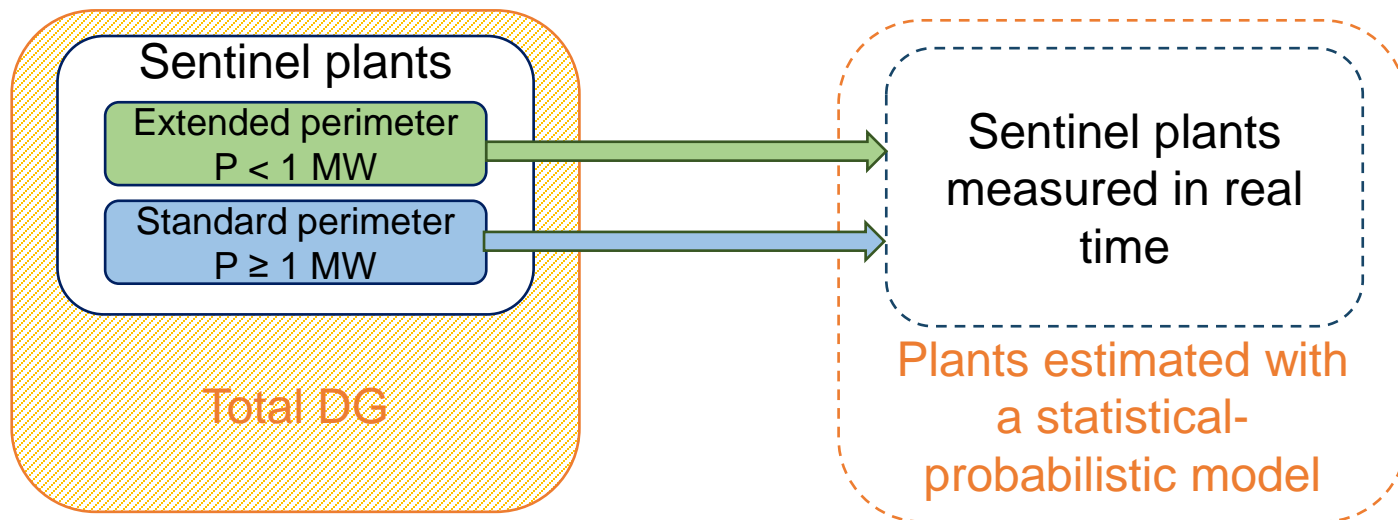|	**MV plants**	**LV plants**
Quantities to be measured	P, Q produced by the plant per source	P produced by the plant per source
Maximum error (accuracy)	< 2,2 % (> 97,8 %)	< 2,2 % (> 97,8 %)
Sampling rate	4 sec	20 sec
Ageing	< 4 sec	< 20 sec
Presence of the quality code	YES	YES

❖ **Real-time data** provided by SGUs. **DSOs are responsible for the communication channel** SGU-DSO-TSO. SGUs send data to DSOs with protocol IEC 61850. DSOs send data to the TSO with the standard protocol IEC 60870-5-104.

❖ **Real-time data** will be used by the Italian TSO as an input, together with other data (such as weather forecasts and DG plant master data) for an **estimation algorithm,** managed by the TSO. Such an estimation algorithm is based on a statistical-probabilistic approach.

Sentinel plants

Extended perimeter
P < 1 MW

Standard perimeter
P ≥ 1 MW

Total DG

Sentinel plants measured in real time

Plants estimated with a statistical-probabilistic model

Goal of the model: to estimate DG plants production

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Data exchange implementation in Italy (7/8)
Real time data

ARERA consultation 361/2020/R/eel:

❖ **standard perimeter**:

➢ the **producer shall install** and mantain the necessary data collection equipment («Monitoratore Centrale di Impianto – **MCI**»). The Italian Electrotechnical Committee («CEI») is currently defining the MCI standard requirements.

➢ **Retrofit for plants in operation** according to time frames that will be defined by the NRA (ARERA). A premium will be defined for those producers that install quickly MCI (see example in figure). Such a premium will be paid by DSOs to the producers (DSO's expenditure is then compensated through electrical bills).

➢ **DSOs are responsible for the communication channel** SGU-DSO-TSO. DSOs send data to the TSO with the standard protocol IEC 104.

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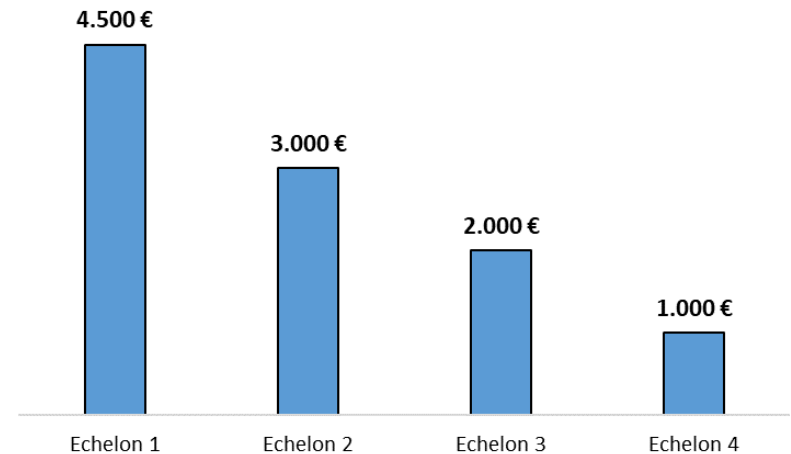
Data exchange implementation in Italy (8/8)
Real time data

ARERA consultation 361/2020/R/eel:

❖ **extended perimeter**:

- ➤ «Sentinel» power plants will be identified by the TSO according to non-discriminatory criteria.

- ➤ Data exchange in the extended perimeter will be implemented in a second phase and **only if necessary for the system security**. Moreover, there will be a further distinction, with possible different timeframes, between **«extended perimeter MV»** and **«extended perimeter LV»** since also the necessary equipments are different.

- ➤ Regarding the **«extended perimeter MV»**, the **producer shall install** and mantain the necessary data collection equipment as for the «standard perimeter».

- ➤ Regarding the **«extended perimeter LV»**, the **DSOs shall install** and mantain the necessary data collection equipment. CEI is analyzing the possibility to use **smart meter 2G** also for data exchange.

Thanks for your attention!

Arianna Rossi

arossi@arera.it