RES integration – Regulation & Technological Innovation
Terna Experience

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10th April 2019

NECP targets and 2030 energy scenarios

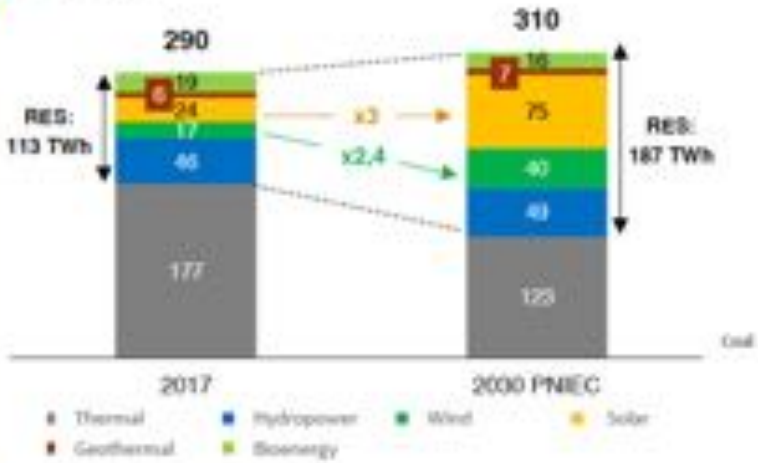
Main NECP Targets

➢ **Res share**

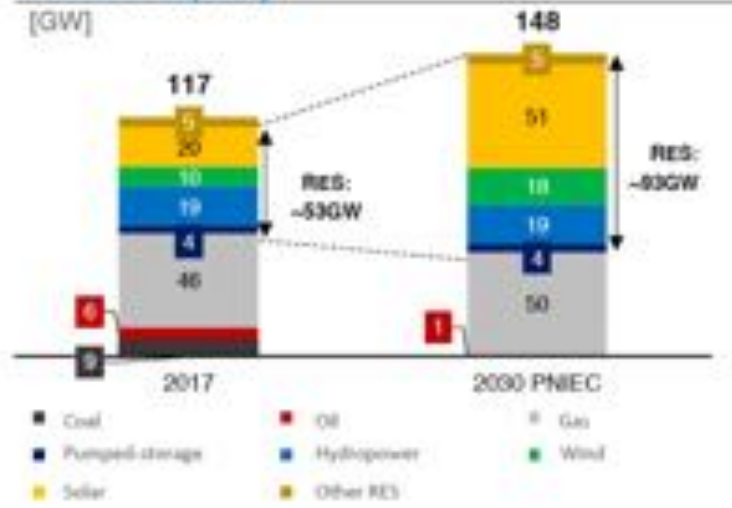
➢ **Coal phase-out by 2025**

2030 Scenarios

Italy electricity production
[TWh]



Installed Capacity
[GW]



The Italian National Energy and Climate Plan foresees coal phase-out by 2025 and an increasing RES share in energy consumption

Impacts on the electric system

1 Greater complexity of the system

2000

~3.000

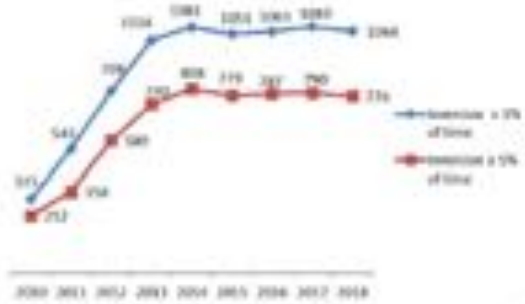
Number of plants connected to the grid

2018

~838.000

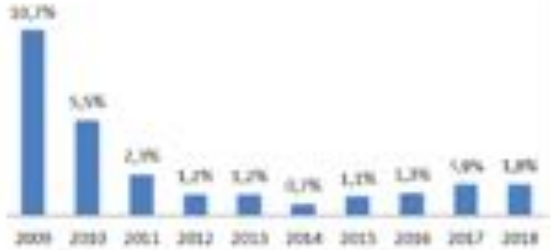
Number of plants connected to the grid

2 HV/MV Power flow inversions

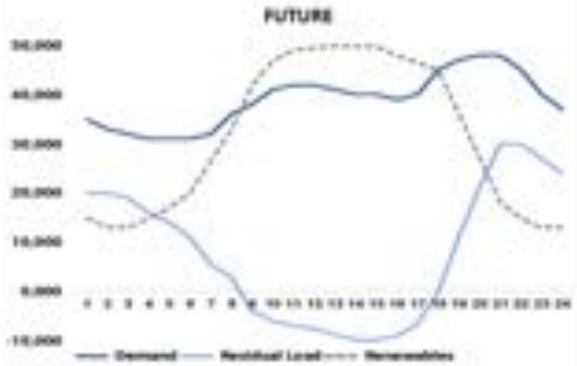


3 Inter/intrazonal congestions

4 Wind production curtailment (MPE)



5 Changes in residual load curve



6 System security

Challenges of the energy transition

Enabling factors

POWER GRID INVESTMENTS

- Transmission grid development projects in order to remove power grid congestions and constraints, improving system adequacy and security, to manage coal-fired generation phase-out, to increase RES integration and to reduce overgeneration:
  - Strengthening and development of the power grid, inter and intra zonal development projects (i.e. from North to South) and interconnection with foreign countries and the main islands
  - Power grid projects to improve voltage control and system inertia

LONG TERM PRICE SIGNALS

- Renewal of auctions to boost again investments in RES generation and **Capacity Market** to provide long term price signals in order to promote investments in new efficient generation capacity, to improve RES growth and enable the phase-out of coal-fired and most polluting power plants

ENERGY STORAGE SYSTEMS

- New **energy storage systems** are required, both pumped-storage plants and batteries, to ensure system adequacy, security and inertia, absorbing energy from the grid when RES production is higher

NECP targets cannot be achieved without new transmission infrastructures, new storage systems and price signals to promote the renewal of power plants. Furthermore, specific actions are required to promote market developments and the digitisation of both system and power grid

Key submarine cable projects

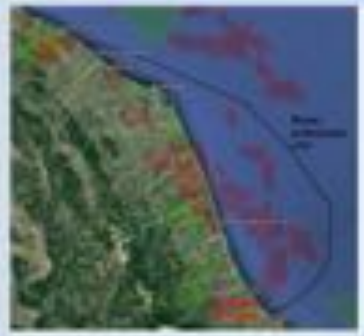
Legenda

Name of the project
Driver
Relevant status update

● Decarbonisation ● Market Efficiency
● Security of Supply

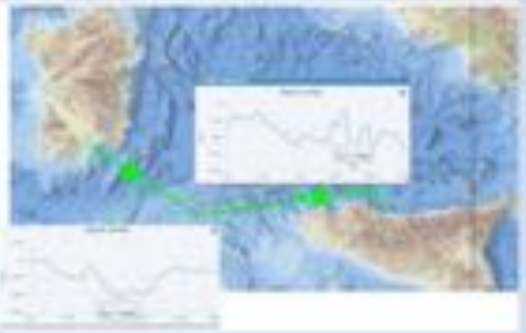
1 SACOI 3 interconnection development

In December **1966, the electricity line that connects Sardinia to Tuscany passing through Corsica was turned on for the first time.** It was 413 km long (121 km undersea cable and 292 km overhead line), and after half a century it continues to represent an electrical bridge from the island to the continent.



2 HVDC Center South / Center North

The new link will remove the congestions between South and North due to the high generation of wind power plant connected in the South of Italy. It will be a HVDC submarine cable, 2 X 600 MW, 288 km long (**Max depth 200 m**).



3 HVDC Continente - Sicilia - Sardegna

The new link connects Central South – Sicily and Sardinia; the HVDC submarine cable will be about **1000 km** (**Max depth 2000 m**).
The project is essential for the **Coal Phase Out** in Sardinia Island.