

ENSURING THE VIABILITY OF EUROPE'S FUTURE ENERGY MIX

Policy Brief February 2015

1 THE CHALLENGE OF OUR CHANGING ENERGY MIX

The European Council recently agreed on ambitious energy and climate policy targets¹⁾ which will require integrating around 45% renewable electricity generation in our power system²⁾.

The challenges associated with moving towards a system with such a high share of renewable energy sources (RES) are well-documented. Primary forms of RES such as wind and solar power are variable and less controllable in their output than conventional forms of generation. The technical and connection characteristics of RES require new approaches for secure system operation.³⁾ Smart homes, and smart grids empower consumers, and together with energy storage multiply the active decisions affecting the system.

The increasing interconnectivity of Europe's electricity systems is key to enable a cost-effective integration of RES and the single, internal market in electricity. It is planned jointly, Europe-wide, in ENTSO-E's Ten-Year Network Development Plans. However, this shows that energy mix decisions at the national level⁴⁾ will have strong cross-border impacts.

1) [European Council Conclusions October 2014](#)

2) [EC Communication 'A policy framework for climate and energy in the period from 2020 to 2030'](#)

3) In many cases RES technologies are not centrally controlled and contribute less to services required for system stability. In particular they either possess no inertia – rotating mass which stabilizes the frequency – or the way they connect to the system does not provide any inertia. This reduces the system's capability to withstand major incidents and recover frequency.

4) Under Article 194 of the Lisbon Treaty, decisions regarding the energy mix are a Member State competence

2 TSOs' ROLE IN RESPONDING TO THE CHALLENGE

As operators of Europe's high-voltage electricity networks, Transmission System Operators (TSOs) have the responsibility of keeping the power system secure. They also facilitate the market, in cooperation with power exchanges and distribution system operators.

Because of their central, neutral role in the system and the market, TSOs will ensure that this shift in the generation portfolio takes place in the most secure and cost-efficient way. TSOs will play a **central, advisory role to policymakers** when significant decisions on the generation mix are being made: **TSOs can provide objective assessments** on the impacts, opportunities and risks of different policy options – both in terms of costs, prerequisites and transition times – and through that help ensure that the transition will be smooth and cost effective.

One of the key tools Europe's TSOs have at their disposal to do this is **ENTSO-E's Scenario Outlook & Adequacy Forecast (SO&AF)** which provides a mid- and long-term assessment of Europe's generation adequacy (i.e. the ability for generation to match consumption on Europe's power system). For shorter timescales, **ENTSO-E's Winter and Summer Outlooks** provide biannual seasonal views on national and regional supply security and highlight possibilities for neighbouring countries to contribute to the generation/demand balance in critical situations. Both these tools are developed by ENTSO-E to address adequacy and flexibility needs of the system; they model the interaction of weather-dependent RES,

demand response, and Europe-wide power flows. ENTSO-E puts all its tools and the TSOs' expertise at the disposal of policymakers for their decisions⁵⁾.

In parallel to the key advisory role of ENTSO-E and its member TSOs, it is essential that continued efforts are made to complete and implement Europe's **electricity market**, to build the necessary **transmission infrastructure** (identified in ENTSO-E's **Ten Year Network Development Plan 2014**⁶⁾), and adopt **Network Codes** to ensure the system's ability to cope with the transition to a low(er) carbon energy mix. Ensuring that electricity markets **reward system flexibility** and provide incentives for market participants to act in line with system needs is a key priority. ENTSO-E and TSOs will continue working closely with decision-makers, market participants and stakeholders in implementing all of the above to enable a smooth transition to a low(er) carbon generation mix.

⁵⁾ ENTSO-E Market Design Policy Paper published in September 2014, for example

⁶⁾ The TYNDP 2014 explains how ENTSO-E proposes to integrate by 2030 up to 60% of RES-E through the planned strengthening of Europe's electricity power grid

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