Power grids: from bottleneck to accelerator of the energy transition

1) **Anticipatory investments:** It's great the Market Design reform embeds anticipatory investments. National authorities must now enable TSOs and DSOs to actually make them. And that they invest not just in grid expansion but also reinforcement, modernisation, efficiency and flexibility - with the overriding aim of supporting the goals in the revised National Energy and Climate Plans (NECPs). Guarantees will be crucial for investor confidence, both technical and against inflation - financial institutions will play a key role here.

2) **Expand the supply chain:** Europe's grid equipment supply chain - substations, cables, transformers, switchgear - is not big enough. It can produce up to 1,900 km of offshore cables a year today - we need up to 3,200 km; and we need to expand transformer and substation manufacturing. Governments should support supply chain growth with dedicated funding and financing - and expedite the permitting of new factories. Long-term framework agreements between TSOs and suppliers will be key. There should be incentives to standardise equipment design and reduce its environmental and material footprint. National variations in the application of network codes should be avoided.

3) **Optimise existing grids:** Europe's existing grid capacity is not used optimally. You can move far more electricity in existing cables if you use e.g. flexible AC transmission systems (FACTS), dynamic line rating and modular power flow control. National authorities should incentivise TSOs and DSOs to make the relevant investments. They should quantify and publish the societal cost of not doing so.

4) **Improve transparency:** Information about the grid is central to the operation of the electricity system, to new investments in generation capacity and flexibility, and to electricity consumers especially in industry. The lack of comprehensive and reliable information on congestion and available grid capacity is slowing down renewables' deployment. Authorities should ensure regular publication of data on grid congestion, curtailment and available capacity for new connections.

5) **Clarify the rules on grid connection and curtailment:** Many grid connection applications get put on hold because system operators are worried about the volume of curtailment and resulting compensation. The EU and national authorities in collaboration with TSOs and DSOs need to clarify the rules on compensation for renewables' curtailment and flexible grid connection agreements.

6) **Simplify grid connection processes:** TSOs and DSOs are overwhelmed right now with grid connection requests, e.g. > 100 GW in Spain, > 50 GW in Romania. National authorities, TSO and DSOs must jointly design transparent processes which allow for the prioritisation and filtering of grid connection requests. To accelerate the delivery of grid reinforcements, all options should be explored including enabling third parties to carry out the necessary work where feasible.

7) **Boost grid security:** Electricity grids are critical infrastructure for society. Their physical and cybersecurity is an existential priority, not least in a time of rising geopolitical tensions. National grid development plans and NECPs must assess the security risks for grid infrastructure and equipment supply chains and outline measures to mitigate them.

8) **The governance of the grid:** The existing TEN-E and the Ten-Year Network Development Plan processes are inadequate for the planning of the grids - and the relevant supply chains - needed for net zero. Long-term grid planning needs more coordination between TSOs/DSOs, governments/regulators and the EU and key neighbours. It also needs more joined-up thinking and political leadership, including to ensure accelerated permitting, the necessary focus on sustainability and biodiversity and the right cost-effective mix of direct electrification with hydrogen and gas grid investments.

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