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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

Grids, the missing link - An EU Action Plan for Grids

1. INTRODUCTION

Interconnected and stable electricity grids are the backbone of a well-functioning energy market. The European Union has one of the most extensive and resilient electricity networks in the world¹, spanning over 11 million kilometres across its internal market and ensuring that high-quality electricity is delivered to its consumers every day.

Thanks to the EU Regulation on trans-European energy infrastructure ('TEN-E'), the EU has selected more than 100 electricity **Projects of Common Interest** ('PCIs') and facilitated their permitting and construction, including by funding – notably through Connecting Europe Facility (CEF) funds. This helped develop a physical power infrastructure fit for a genuine Single Market and to make progress towards the 15% electricity interconnection target by 2030². During the energy crisis, well interconnected electricity markets brought valuable benefits in terms of increased security of supply, access to competitively priced electricity from neighbouring countries and faster integration of renewable energies. With EU markets now fully coupled, completing the infrastructure network is the next step in maximising the benefits of affordable and clean power for consumers.

Despite these advances, Europe's power networks are confronted with new and significant challenges. They will need to serve growing demand linked to clean mobility, heating and cooling, electrification of industry and the kickstart of low-carbon hydrogen production. Electricity consumption is expected to increase by around 60% between now and 2030. Networks will also need to integrate a large share of variable renewable power. Wind and solar generation capacity must increase from 400 GW in 2022 to at least 1,000 GW by 2030, including a large build-up of offshore renewables up to 317 GW³, to be connected to shore. Therefore, grids need to adapt to a more decentralised, digitalised and flexible electricity system with millions of rooftop solar panels and local energy communities sharing resources.

Planning and operation of Europe's electricity transmission and distribution networks must also correlate with the planning and operation of the new hydrogen infrastructure, energy storage, charging infrastructure for e-mobility and CO₂ infrastructure.

As a result of these trends, Europe's network must rapidly upgrade and expand. ENTSO-E's Ten-Year Network Development Plan (TYNDP) shows that in the next seven years the cross-border transmission infrastructure should double, with an additional 23 GW capacity being incorporated by 2025 and further 64 GW by 2030⁴.

Beyond cross-border needs, the bulk of the investment will be within borders, both at transmission and distribution levels. In particular, distribution grids are bound to grow and change to connect large amounts of decentralised renewable generation, and new flexible demand ("loads") such as heat pumps and charging stations for electric vehicles⁵. They gain

¹ https://ec.europa.eu/commission/presscorner/detail/en/speech_23_4377

² Governance Regulation (EU) 2018/1999 Article 2(11)

³ In January 2023, [Member States agreed regionally](#) on combined ambitions leading to cumulative offshore goals of around 111 GW by 2030 and 317 GW by 2050. This compares to around 971 MW of total onshore and offshore installed capacity in 2023 (Commission's estimations of 971,452 MW based on [ENTSO-E's Transparency Platform](#) country data)

⁴ [System needs study – Opportunities for a more efficient European power system in 2030 and 2040](#), TYNDP 2022, ENTSO-E, May 2023

⁵ Commission Report on [Promotion of e-mobility through buildings policy](#), February 2023

new roles, becoming facilitators of a range of new solutions that the system requires. They will need to turn into smart grids, becoming digital, monitored in real-time, remotely controllable and cybersecure, with research and innovation playing an important role. Moreover, around 40% of Europe's distribution grids are over 40 years old and need to be modernised. Industry estimates around EUR 375-425 billion of investment in distribution grids is necessary by 2030⁶. Overall, the Commission estimates that **EUR 584 billion in investments**⁷ are necessary for the electricity grids this decade. This represents a significant part of the overall investment needed for the clean transition in the electricity sector.

Already now, the need for tackling these challenges is clear. In many countries, renewable generation projects face long waiting times to get connection rights. Waiting time for permits for grid reinforcements are between 4-10 years, and 8-10 years for high voltages. Connection backlogs in the distribution grid are escalating rapidly, with several thousand new requests per month for a single medium-size distribution system operator (DSO). When there is no clarity or certainty about connection timelines and costs, new planned generation projects are stalled or abandoned. While EU legislation already covers regulation relevant for DSOs, with this Action Plan the Commission promotes, for the first time, action targeted to distribution networks. Here, significant supply bottlenecks may arise when businesses and households seek access to affordable clean energy with solutions ranging from integrating flexible energy assets such as zero-emission vehicles to demand response to investments in substations and others. Furthermore, everywhere in Europe, interconnection projects suffer from cost overruns due to inflation and rising interest rates, while also facing difficulties in getting equipment like cables or substations on time. The lack of skilled workforce adds to these problems. Waiting times for new products can reach 2032.

This is not just a European issue. **The need for grids to expand is recognised globally.** The US estimates the need to expand their electricity transmission systems by 60% by 2030. China's State Grid Corporation has announced investment of CNY 1,020 bn (EUR 132 bn) in power grids in 2022-23. The International Energy Agency assesses the need for over 80 million km of grids around the world by 2040 – the equivalent of today's entire existing global grid – and estimates around 1,500 GW of advanced renewable projects waiting in grid connection queues⁸.

The EU is bringing grids to the centre of its agenda. The revised Renewable Energy Directive⁹ streamlines the permitting of networks necessary to integrate renewables. The Regulation and Directive¹⁰ for an internal market for electricity contain rules relevant for developing grids with regard to planning, network tariffs and the roles of ENTSO-E and the EU DSO Entity. The Net-Zero Industry Act proposal includes grid technologies in its scope. But the scale of the challenge is such that dedicated policy attention is required to ensure that grids become an enabler, not a bottleneck for the EU's fast clean transition¹¹. Moreover, the need to improve electricity grid modernisation and interconnectivity, ensure their

⁶ See [Connecting the dots](#), conducted by Eurelectric in cooperation with E.DSO. Grids' share of total energy supply costs has evolved from 27% on average in the previous decade, to 37% this decade – see Commission's [Investment needs assessment](#) SWD(2023) 68 final

⁷ [Implementing the REPower EU Action Plan](#), SWD(2022) 230 final

⁸ [Electricity Grids and Secure Energy Transitions](#), IEA, October 2023

⁹ <https://www.consilium.europa.eu/en/press/press-releases/2023/10/09/renewable-energy-council-adopts-new-rules/>

¹⁰ [Regulation \(EU\) 2019/943](#) and [Directive \(EU\) 2019/944](#)

¹¹ <https://www.ft.com/content/4c843612-1890-49bb-83eb-ddbe4495d6c9>

maintenance and transform them to enable the transition to renewable energy sources is a request of EU citizens¹². For these reasons, the Commission has engaged with stakeholders to discuss the problems and possible actions.

Building on this work, the Commission presents this Communication with a 14-point action plan to make Europe's electricity grids stronger, more interconnected, more digitalised and cyber-resilient. The measures listed focus on implementation of the agreed legal framework and should be delivered swiftly to make a difference in time for the 2030 objectives.

2. A EUROPEAN GRID ACTION PLAN

The Commission has brought into focus the issues of grids in several fora and consultation processes with stakeholders, including the Energy Infrastructure Forum¹³ in Copenhagen and the PCI Days¹⁴ in Brussels and, more recently, the Smart Grid PCI Summits¹⁵ organised by PCI promoters with the Commission's support in Ljubljana and Bratislava. Furthermore, a High-Level Forum on the 'Future of our Grids' was organised on 9 September 2023 by ENTSO-E¹⁶, with the patronage of the Commission, to discuss with the stakeholders representing the whole supply chain the outlook and challenges for grids development.

Based on the outcome of this work, the Commission has identified **seven horizontal challenges** for accelerating the pace of grid development in Europe. These are 1) accelerating implementation of existing PCIs and developing new projects; 2) enhancing long-term network planning; 3) introducing a supportive, future-proof regulatory framework; 4) making better use of existing grids and smartening them; 5) improving access to financing; 6) ensuring faster and leaner permitting processes; and 7) strengthening supply chains.

For each of these seven areas, the following sections of the Action Plan summarise the main drivers of the problem and identifies key tailor-made actions and recommendations on how to address them in the short to medium term.

I. ACCELERATING THE IMPLEMENTATION OF PROJECTS OF COMMON INTEREST (PCIs) AND DEVELOPING NEW PROJECTS

Since 2013, the TEN-E framework has been the main vehicle to reinforce electricity interconnections within the Single Market. It helped identify cross-border infrastructure needs, select **Projects of Common Interest** ('PCI'), secure political support and accelerate their implementation with streamlined permitting. The PCI status has also been instrumental in securing supportive financing conditions, as a widely recognised label that gives additional comfort to financing institutions of the high value of a project, including the **European Investment Bank**¹⁷.

Going forward, the TEN-E framework will gain further importance, in line with the expected growth in cross-border grid needs, to integrate and transport large amounts of new renewable

¹² [Conclusions of the Conference on the Future of Europe](#), proposal 3 on climate change, energy and transport, measure 4 (p. 45)

¹³ https://energy.ec.europa.eu/topics/infrastructure/energy-infrastructure-forum_en

¹⁴ https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest/pci-energy-days_en

¹⁵ 2023: <https://www.pcisummit.eu/live-stream/>; 2022: <https://www.sincrogrid.eu/en/News/ArticleID/442/Recordings-of-the-Smart-Grid-PCIs-Summit>

¹⁶ <https://www.entsoe.eu/eugridforum/>

¹⁷ [The European Investment Bank's role in cross-border infrastructure projects](#), EIB, May 2023

electricity across Europe where it is most needed. PCIs will also support Member States in reaching the 15% electricity interconnection target. Better cross-border interconnections hold a significant potential for saving costs at system level: cross-border projects can decrease generation costs by EUR 9 billion annually to 2040, while investments needed in cross-border capacity and storage amount to EUR 6 billion annually.

The first Union list under the revised TEN-E adopted on 28 November 2023 helps create an infrastructure network fit for a decarbonised future by identifying 166 PCIs and Projects of Mutual Interest (PMIs)¹⁸. It includes a renewed focus on electricity with 68 projects (12 of which storage), 5 smart grids projects and, for the first time, a new category on offshore infrastructure with 12 projects.

These 85 projects address the most pressing bottlenecks in the EU's TEN-E networks. Around half of them are planned to be commissioned between 2027-2030. Their timely completion is key to ensure that they can have an impact within this decade. Avoiding the slippages and delays that hampered PCI completion in the past requires an extra effort of monitoring progress and swiftly removing bottlenecks and obstacles to implementation.

Furthermore, the TEN-E's comprehensive Union-wide TYNDP identifies **significant additional system needs for 2040 and beyond**. These should be matched by new PCIs in the subsequent Union lists in the coming years. For this to happen, effort is needed to accelerate the conception and development of a robust pipeline of new projects to be included in the updated PCI lists, every two years.

While the majority of funding needs for future projects will have to be covered by market finance, there is growing pressure to provide additional **public support** for cross-border projects, to limit impact on tariffs and in consequence energy costs for final consumers. However, there is a mismatch between the growing, identified needs and the EU resources available. The budget available under CEF-Energy 2021-27 was reduced in the final Regulation compared to the initial Commission proposal and was meant to serve a limited number of project categories as set out in the former TEN-E Regulation. The TEN-E revision in 2022 expanded its scope to new categories for offshore, electrolysers, hydrogen infrastructure, energy storage, CO₂ storage and smart gas grids, while the budgetary allocation did not change.

Growing network needs and a limited budget spread among more categories reduces the impact of the instrument and creates a potential funding gap for cross-border energy networks. Moreover, CEF-Energy is limited to PCIs and does not cover local DSO needs. Other EU funding possibilities such as the Cohesion Fund, ERDF, RRF or the Modernisation Fund are available for electricity grids but some are under-utilised. The Recovery and Resilience Plans¹⁹ allocate around EUR 13 billion to grids, covering reforms and investments in grid infrastructure, smart energy systems, energy storage facilities and digitalisation of distribution and transmission networks.

¹⁸ PMIs will link EU Member States with neighbouring countries, contributing to the Union's 2030 targets for energy and climate, and that may for example support the decarbonisation commitments of the Energy Community Contracting Parties

¹⁹ Based on the Recovery Resilience Plans including the RePowerEU chapters of 21 Member States (HR, EE, EL, HU, IT, PL, RO, MT, AT, ES, SI, SK, CZ, PT, LT, LV, CY, DE, BE, BG, FI)

As insufficient investment in distribution grids and storage is already hampering citizens' and businesses' efforts, a **new approach to identify and support local grid projects** appears necessary to prevent gaps in the future.

Action 1: Commission, Member States and Transmission System Operators (TSOs) to strengthen support to PCI and PMI preparation, faster implementation and funding

To accelerate the completion of PCIs on the Union list, the Commission, Member States and project promoters will **prioritise the implementation of PCIs and PMIs already identified**. Moreover, the development of **new priority projects** need to be promoted.

- Based on reinforced monitoring of project implementation, project promoters should update Member States and the Commission on progress and identify issues to be solved, including on permitting. For that purpose, each of the existing High-Level Groups should closely follow priority projects, including through annual ministerial meetings to ensure political steer and close follow-up of implementation progress with the involvement of partner countries, when relevant. The High-Level Groups will also support the **identification of possible future priority projects**.
- Looking forward, the Commission will also assess investment needs for future public funding for infrastructure projects both at transmission and distribution, covering also storage, hydrogen and CO₂ infrastructure.

II. IMPROVING LONG-TERM GRID PLANNING FOR A HIGHER SHARE OF RENEWABLES AND INCREASED ELECTRIFICATION

A rapidly changing energy landscape requires dynamic and comprehensive long-term planning of the electricity transmission system to ensure the integration of offshore and onshore assessments as well as across sectors including hydrogen, recharging infrastructure for the transport sector, heating and cooling, carbon dioxide, electrified industrial processes, and gas.

There is also insufficient long-term visibility of network needs, in particular at DSO level, where needs are growing. In addition, a future-proof power grid requires increased focus on coordination in network planning and data exchange between TSOs, DSOs, generators, aggregators, recharging point operators, hydrogen infrastructure operators and administrations driving heat pump rollout, for a common understanding of future network needs.

Beyond the **new loads** needed for **electromobility**, the integration of **smart and bidirectional recharging** has a substantial impact on the electricity grids. This requires the timely transposition of the **revised RED**, the implementation of the recently adopted regulation on the deployment of alternative fuels infrastructure ('**AFIR**') and the adoption of a new **network code on demand-side flexibility**²⁰. The Commission, following consultation

²⁰ The revised RED includes requirements on Member States to ensure that power recharging points can support smart recharging functionalities and, where appropriate, bi-directional recharging, and should put in place measures to ensure that EVs and batteries can participate in non-discriminatory manner in flexibility services. AFIR sets mandatory deployment targets for publicly accessible recharging infrastructure and requires that, from early 2024, all new or renovated publicly accessible recharging points must be capable of smart recharging. Member States should assess by end-2024 the potential contribution of bidirectional charging to reducing user and system costs and increasing the renewable electricity share in the electricity system and, if necessary, take appropriate measures. The upcoming network code for demand-side flexibility, currently under drafting, will set the regulatory framework for participation of bidirectional charging in grid services together with other technologies to provide flexibility with the aim to address any remaining regulatory barriers. The Commission aims at an adoption of the network code in the course of 2025.

with all relevant stakeholders²¹, will enhance work with view to propose the necessary policy, regulatory and standardisation solutions for smart and bi-directional charging in Europe.

Action 2: ENTSO-E to enhance top-down planning towards 2050 by integrating the identification of offshore and onshore system needs and further considering hydrogen

Cross-border transmission infrastructure development builds on a decade of experience in pan-European network planning through the ten-year network development plans (TYNDP). The revised TEN-E Regulation adopted in 2022 went a step further by making the long-term direction set by Member States on regional offshore ambitions to 2050 the starting point for the offshore network planning exercise, closing the gap between policy expectations and grid development. This strategic long-term logic currently implemented in the first offshore network development plans (ONDPs) due on January 2024 should be expanded to the rest of the European network with the objective of **bringing together offshore and onshore network planning** under a common framework through the next TYNDP process.

In that regard, the **Commission will**, from Q1 2024 after publication of the first ONDPs, **work closely with ENTSO-E** in the further development of the TYNDP. In addition, to ensure integrated energy system planning, hydrogen transport should be better reflected to provide sound expectations of **hydrogen infrastructure needs**, for which Member States' hydrogen strategies where these exist, including for the production of hydrogen offshore and its further transport to demand, should be considered. For that purpose, relevant stakeholders from the hydrogen sector should be more closely involved in the preparation of future ONDPs. ENTSO-E should further strengthen the synergies between different energy carriers in the TYNDP, ensuring engagement of the relevant stakeholders for distribution, storage, hydrogen, CO₂, and gas sectors in view of progressively integrated energy system planning once these sectors reach adequate maturity.

Lastly, at national level, National Regulatory Authorities (NRAs) should ensure that **system operators further assess the flexibility needs** of their energy systems when planning transmission networks, including the potential of **energy storage**²². This should be made in accordance with the upcoming revised Electricity Market Design legislative framework.

TSOs and Member States should ensure that sufficient electricity transmission projects are designed, planned for and developed to fulfil the identified 2030, 2040 and 2050 infrastructure needs of the EU, taking into account the National Energy and Climate Plans (NECPs). Where network development needs are identified but there is a lack of concrete projects to deliver on those needs, Member States and their regulatory authorities should encourage TSOs to develop new project concepts.

Action 3: EU DSO Entity to support DSO grid planning by mapping the existence and characteristics of distribution development plans

Reliable, comprehensive, forward-looking and transparent distribution network development plans (NDPs) will be essential to incorporate renewables and flexible demand and reduce future connection request delays. DSOs²³ are already legally mandated by the Internal

²¹ Such as the [Sustainable Transport Forum](#) and the [Smart Energy Expert Group](#)

²² C/2023/1729 [Commission Recommendation of 14 March 2023 on Energy Storage](#)

²³ Small DSOs serving less than 100,000 customers or small isolated systems may be exempted

Electricity Market Directive to develop biennial 5-to-10-year NDPs and submit them to their NRAs after consultation with all relevant system users. Moreover, the EU DSO Entity has legal tasks enshrined in the Internal Electricity Market Regulation to promote the planning of distribution networks in coordination with the planning of transmission networks and to cooperate with ENTSO-E and adopt best practices on the coordinated planning of transmission and distribution systems, including data exchange between operators for network planning. Around 2,560 DSOs in the EU cover 10 million kilometres of distribution grids²⁴, containing a wide spectrum of company sizes and disparities in national concentrations. Small DSOs can face additional challenges due to limited resources. Over 900 DSOs – small, medium and large – are members of the EU DSO Entity.

This action complements and supports initial work on legal requirements. The EU DSO Entity should, by mid-2024, explore **case studies and best practices and publish recommendations to improve distribution network planning**²⁵ in close coordination with ENTSO-E and TSOs, as well as relevant representatives of the network users, such as renewables, electromobility or heating and cooling, taking into account the uncertainties that most affect the activities of the DSOs, and the heterogenous size of the DSOs²⁶. **Transparent and regular exchanges with stakeholders** from renewable, electromobility, heating and cooling, consumer and civil society regional representatives in the preparation of distribution NDPs will be essential. For example, national, municipal and private firm plans on EV recharging infrastructure, shore-side electricity supply in maritime ports, heat pump rollout or alternatively district heating deployment will have a substantial impact on the need to reinforce electricity distribution grids, which in turn enables opportunities for new flexibility markets, and need to be integrated in network planning, to ensure that the necessary network buildout is rapidly conducted.

Adequate data sharing will also support DSOs in the **planning of network needs** to shorten grid connection times. For that purpose, network users should provide data on their respective power capacities and project locations to support DSOs in understanding new power flow patterns within their grids. Moreover, NRAs, in cooperation with ACER and CEER, should, by Q4 2024, provide guidance to DSOs on planning and promote consistency among plans²⁷. The Commission, with the EU DSO Entity, will also reinforce from 2024 their support to the design and submission of PCI applications for smart grid projects.

The main driver for making investment plan decisions is therefore having comprehensive network development plans in place. Complementing these, National Energy and Climate Plans can be effective tools in supporting the development of distribution networks, in particular through reforms to be conducted by Member States. The **Commission will include grid-related actions** in the iterative process with Member States on their **National Energy and Climate Plans**.

²⁴ Commission estimation of 2,558 DSOs based on Eurelectric's data: [Distribution grids in Europe, Facts and Figures 2020](#), December 2020

²⁵ For example, measurement data from transformers, inverters and consumers at low voltage level can be used as input in load-flow calculations by which it is possible to calculate the influence of new PV connections on voltage and loads based on the individual reserves of the corresponding grid section, limiting grid development planning to what is actually needed ([Distribution grids: The energy transition's backbone](#), Geode, May 2023)

²⁶ See for example those investigated by the JRC's [Distribution System Operator Observatory 2022](#) (chapter 4.7), JRC, April 2023

²⁷ [CEER Views on Electricity Distribution Network Development Plans](#), CEER, November 2021

III. INTRODUCING REGULATORY INCENTIVES FOR FORWARD-LOOKING GRID BUILD-OUT

Among the main drivers impacting the level and effectiveness of investments in network development is the **regulatory framework**. Grids are typically regulated assets and investments are paid for by all consumers through network tariffs. Higher energy system development costs will therefore normally lead to an increase of network tariffs, and hence consumer prices, even though final consumer prices need to remain affordable. In addition, limiting project development to those based on current system needs may increase the future system costs and hence costs for consumers. An agreement of concerned parties on the need for anticipatory investments is therefore important.

Offshore renewables in particular will bring enormous benefits to society, likely to extend beyond the borders of the hosting Member States. This brings about complexities in agreeing on the appropriate sharing of costs, including for hybrid interconnectors.

Providing appropriate regulatory incentives starts by establishing a supportive regulatory framework that brings investment certainty. This calls for a rapid agreement on the Electricity Market Design reform with its provisions recognising the importance of anticipatory investments, a transmission access guarantee for offshore renewables and accounting for both CAPEX and OPEX in network tariffs.

However, such a major overhaul of tariff methodologies requires the right balance between, on the one hand, anticipating future infrastructure needs, accepting a higher degree of uncertainty that an infrastructure asset might not be fully utilised from its commissioning and allowing for the early recovery of the related costs on the one side, and, on the other, affordability for consumers who bear the costs through network tariffs. The **socio-economic welfare losses of delaying the network upgrades** necessary to connect renewables and flexible demand will **frequently outweigh the additional initial cost** of anticipatory investments. Moreover, given the long lifespan of network assets, significant cost reductions can occur in the future when today's investments are done already considering upcoming needs.

Action 4: Commission to propose guiding principles identifying conditions under which anticipatory investments in grid projects should be granted

The electricity market design reform proposal made by the Commission clearly indicates that anticipatory investments should be used for the relevant network projects. At the same time, its usage should remain proportional to the needs.

Anticipatory investments can be relevant for example for investing in future-proof offshore networks that allow for future expansions of meshed offshore grids; for areas with high untapped onshore PV potential such as renewable acceleration areas set in accordance with RED; for grid connections to ports for the provision on shore-side electricity supply, or for building smart grids that support EV infrastructure charging national plans or municipal plans for heat pump rollout.

Complementing the work on anticipatory investments being conducted by the Copenhagen Forum²⁸, the Commission, with support from ACER, ENTSO-E and EU DSO Entity and in

²⁸ https://energy.ec.europa.eu/system/files/2023-06/Conclusions%209th%20EIF_13%20June%20FINAL.pdf

consultation with relevant stakeholders on both electricity supply and demand side, will by Q1-2025 propose **guidance identifying conditions under which the approval of anticipatory investments should normally be expected**, taking into consideration different levels of development certainty of projects and ways to address the different levels, such as via the conditional provision of the anticipatory investments.

Action 5: Commission to issue guidance on cross-border cost sharing for offshore projects

Offshore networks will be composed of radial and hybrid transmission projects evolving towards a future meshed grid. The connection of energy islands and other large offshore projects will bring large benefits to society, likely to extend beyond the borders of the hosting countries. This poses challenges in agreeing on the **appropriate sharing of costs**, taking into account consumer and producer benefits but also the inherent uncertainty of future investments and their timing. Hybrid projects that interconnect countries while connecting offshore renewables will face additional particularities. This will also require increasing transport infrastructure from coastal regions towards landlocked regions in Europe to unblock a larger number of onshore and offshore wind projects.

Taking into consideration the offshore network development needs, Member States and regulatory authorities should engage in discussions on principles for collaboration – including on costs – already at the stage of identifying the network needs to accelerate the emergence of new cross-border projects. ENTSO-E should further develop effective modelling tools to better account for Member States’ needs for information relevant to kickstart such exchanges. Moreover, current approaches on cost allocation should consider new complexities, such as offshore hybrid projects. The Commission will address these challenges in a **guidance aiming to support Member States and NRAs** in such activities by **June 2024**. Dedicated meetings with Member States at political and technical levels will steer the work on cost sharing. In addition, the Commission will organise a series of meetings with Member States to exchange ideas and support them in finding agreements on particular projects.

IV. INCENTIVISING A BETTER USAGE OF THE GRIDS

Queues on grid connections cause long delays in bringing renewables on stream. These are often the result of insufficient information for project promoters but also of the modalities of the permitting process. Thus, bringing visibility on available grid capacities helps directing connection requests to where they can be dealt with most readily. Many system operators have made grid hosting capacity maps available, but with divergent clarity and quality²⁹. On the other hand, some administrations have pioneered practical ways to prioritise applications or disincentivise abusive demands, thus helping to reduce the backlog and cut waiting times.

To improve the usage of existing grids, project promoters’ lack of awareness of the rapid evolution of technologies for smart and efficient grids needs to be addressed, including technologies promoted by Horizon Europe, their degree of utilisation across Europe and the benefits already provided to other projects.

Finally, there are insufficient incentives for the uptake of smart grid, network efficiency and innovative technologies due to prevailing tariff structures with a focus on CAPEX.

²⁹ [Power System of the Future: Keys to delivering capacity on the distribution grid](#), Eurelectric, September 2023

Insufficient compensation of OPEX as so far largely linked to human resource costs does not adequately reflect the rising costs of digitalisation, data processing or flexibility procurement.

Action 6: ENTSO-E and EU DSO Entity to agree on harmonised definitions for available grid hosting capacity for system operators and to establish a pan-EU overview

System operators should provide transparent, understandable, granular and regularly updated information on grid hosting capacities and connection request volumes, in line with the Commission proposal for a revision of the Electricity Market Design. Regulatory authorities should establish frameworks for non-firm connection agreements, where relevant.

From the publication of this Action Plan, ENTSO-E and the EU DSO Entity, in cooperation with the Commission and regulatory authorities, should work towards harmonised definitions for available grid hosting capacity. This should lead to **a pan-EU overview** of available grid hosting capacities³⁰ for new network users to connect, together with information on the volumes of connection requests being processed. Such overview should consider the capacity mappings already done by TSOs and DSOs, when applicable. By mid-2025, ENTSO-E and the EU DSO Entity should establish a pan-EU overview that should **give visibility to project developers** when conceptualising their projects, such as new renewable or EV recharging infrastructure projects and help developers estimate the risk of connection request approval delays and, thus, have a clearer forecast about when projects can start receiving revenues. This will benefit new projects for renewables and flexible demand such as storage or EVs. Some system operators already provide this visibility today locally. Furthermore, ENTSO-E and the EU DSO Entity should support system operators in **digitalising and streamlining procedures for grid connection requests**, for example by issuing guidance and recommendations, at the latest by mid-2025.

Such an overview can **further support NRAs** in understanding **where in the network flexible** (non-firm) **connections could be beneficial** to the system until the necessary grid buildout takes place. Where network development is the structural solution of the capacity problem, non-firm connection frameworks should be designed so that system operators do not delay grid buildout. In other cases, where grid development may not be an economic solution, non-firm connections could be considered as a long-term solution³¹.

NRAs should also provide a clear framework to disincentivise the application for connection request where the request is not substantiated by a solid project and not sufficiently committed by a developer, or the requests of over-capacities beyond what needed for the project, to avoid that the reservation of connection capacities is given to projects less likely to materialise or whose main business plan is to sell the right for connection, where this is allowed. For instance, generation projects that are financially bound or pay for the grid connection costs when requesting connection are less likely not to proceed with their projects.

³⁰ See examples at distribution level in [Spain](#) and in [Czech Republic](#)

³¹ [CEER Paper on Alternative Connection Agreements](#), CEER, May 2023

Action 7: ENTSO-E and EU DSO Entity to promote uptake of smart grid, network efficiency and innovative technologies

Commercial technologies that can greatly improve the functioning of the electricity grids are readily available but not sufficiently used³². Yet, such technologies can lead to lower costs to consumers by reducing network losses³³. Being aware of the existing pipeline of projects where such technologies have already been demonstrated, and the quantified benefits they have brought, can provide clear arguments to project promoters still considering their use. Therefore, there should be an increase of visibility for technological assets available for rapid deployment as well as innovative solutions for smart grids and better network efficiency, such as dynamic line rating (DLR), high-temperature superconductor (HTS) cables, static synchronous compensators (STATCOM), voltage source converters (VSC) in HVDC systems, HVDC breakers or phase shifting transformers (PST)³⁴.

ENTSO-E and EU DSO Entity should jointly **update the Technopedia**³⁵, giving clarity on such elements and ensuring that the technologies being utilised in pilots across Europe relevant for **smart electricity grid** projects and for increasing **network efficiency** are covered, including those technologies developed under **Horizon Europe** or Horizon2020 programmes. Technopedia should **inform of use cases and benefits** and be updated by end-2024 and at least annually, so that promoters can appropriately consider them in their respective projects' conceptualisation, and regulatory authorities can encourage their usage to promoters. Updates should be disseminated in future Smart Electricity Grid Summits organised with support from the Commission and the EU DSO Entity.

To further promote smart grids, network efficiency and innovative technologies, the Commission will further facilitate with the upcoming network codes regarding the participation of decentralised energy resources to the markets.

Action 8: ACER, in its next tariff report, to recommend best practices in relation to the promotion of smart grids and network efficiency technologies through tariff design, focusing on the consideration of OPEX in addition to CAPEX and benefit sharing

Grids are typically financed via network tariffs, complemented with congestion income for cross-border transmission projects. Transmission and distribution **network tariffs** should be regularly updated, with an efficient consideration of both OPEX and CAPEX, to **account for the changing energy system towards decarbonisation** and an increasingly active role of DSOs. There is a **need to acknowledge an increase of operational costs** in the deployment and operation of our networks, including for physical and cybersecurity. Efficiency requirements stimulate the network operators to reduce costs and to work more efficiently³⁶. **NRAs should regularly review their network tariff setting or methodologies**, including how they set long-term incentives, support peak demand shifting and incentivise the deployment of technologies that increase the efficiency and operability of the grids (see previous action), such as through output- or performance-based remuneration schemes. **Network tariffs therefore need to evolve with the energy system.** Innovative approaches

³² [The benefits of innovative grid technologies](#), CurrENT, December 2021

³³ For example, given the higher voltage levels (and lower current), network losses are lower in relative terms in transmission grids than in distribution: around 0.5%-3% in transmission vs 2-14% in distribution. [Report on Power Losses](#), CEER, March 2020

³⁴ Clean Energy Technology Observatory: [Smart grids in the European Union](#), Joint Research Centre, October 2023

³⁵ <https://entsoe.eu/Technopedia/>

³⁶ [Report on regulatory frameworks for European energy networks 2022](#), CEER, January 2023

such as benefit sharing³⁷ can contribute to energy system resilience at affordable prices. Some Member States are introducing new practices, for example the Italian NRA³⁸ is moving from input-based regulation to premiums to increase transfer capacity and CAPEX-efficiency incentives and considering both OPEX and CAPEX in 2024. ACER should further support NRAs through **recommending best practices in the next tariff report**³⁹ due January 2025, based on thorough consultations with all relevant stakeholders, and subsequently **support NRAs in their implementation**.

As established by the Electricity Regulation, tariff methodologies shall provide appropriate incentives, including in the long run, ensuring cost reflectiveness, which is enhanced by a careful consideration on the distribution of costs between producers and consumers. This is especially relevant considering that network development is increasingly driven by the need to connect areas where renewables can be generated, a trend that should be reflected in the appropriate level of injection and connection charges to cover related costs.

V. IMPROVING ACCESS TO FINANCE

Funding the necessary grid reinforcements and adaptations will require mobilisation of vast resources, close to half a trillion, in a context where public resources are constrained and inflation and rising interest rates are hitting projects. There are also emerging issues with the credit rating and access to capital for project promoters. Grid operators, both at the transmission and distribution levels, are faced with an unprecedented increase in the volume of capital expenditure. For example, the size and rapid extension of a company's investment programme may affect its credit rating, with negative consequences in access to finance. All of these require a new effort to identify tailor-made financing products and instruments to support grid investments.

Action 9: Commission to identify tailored financing models and strengthen dialogue to address obstacles to private financing

Building on the **Investors Dialogue on Energy**, the Commission will launch by the end of 2023 a **reinforced process with investors** (including pension funds), **credit agencies, financial institutions, regulatory authorities and system operators** to identify and address obstacles to financing including through bank loans, market-based instruments (debt and equity), guarantees and blended finance. Considering the specificities of the business models of system operators, the Commission, with the support of relevant stakeholders, should explore **financing instruments** to provide the most appropriate solutions to match the investment needs, including guarantees or similar funding mechanisms that catalyse private financing.

The **Commission and the EIB** will explore further the need for financing tools and instruments to support grid investments at large, in the context of InvestEU.

The Commission will ensure the **coordination and synergies** between this work and relevant work on access to finance as set out in the **Wind Power Action Plan** (action 8) and other renewable technologies to ensure a coherent integration of the future electricity system.

³⁷ [Benefit-based incentive regulation to promote efficiency and innovation in addressing system needs](#), Florence School of Regulation, June 2023

³⁸ https://energy.ec.europa.eu/events/9th-energy-infrastructure-forum-2023-06-12_en

³⁹ https://www.acer.europa.eu/Publications/ACER_electricity_network_tariff_report.pdf

Action 10: Commission to increase visibility on opportunities from EU funding programmes for smart grids and modernisation of distribution grids

Distribution grids are eligible for financing under different EU funding instruments. **Major funding sources** are the regional (ERDF), cohesion funds (CF) and the Recovery and Resilience Facility (RRF) including its REPowerEU component. ERDF and CF may co-finance the development of smart energy systems, grids and storage projects. In their operational programmes for the period 2021-27, Member States have so far in total only allocated EUR 4.7 billion leading to investments of EUR 6 billion. Allocated amounts vary strongly among Member States also since some Member States have used RRF to support such investments. The Modernisation Fund, financed via part of the revenues from the EU ETS⁴⁰, and the RRF can contribute to part of the investment needs.

If modifying their operational programmes for the regional and cohesion funds, **Member States with a high need for distribution grid** modernisation and local smart grid deployment **should consider available options to increase allocations for this sector**. The Commission will kick-start from Q1 2024 a process to work with Member States on funding opportunities for distribution grids, including via a dedicated high-level meeting. The Commission will also put forward dedicated technical assistance within the **Technical Support Instrument** to help enterprises preparing their funding applications and will collaborate with the EU DSO Entity to raise awareness on this action among its DSO members.

VI. ACCELERATING DEPLOYMENT THROUGH FASTER PERMITTING AND PUBLIC ENGAGEMENT

Infrastructure projects encounter complex and lengthy permitting procedures as they cover long distances crossing very often several jurisdictions. This entails the navigation through different permitting procedures in several languages with various set-ups and deadlines. Some of these problems are linked to constraints in staffing and digitalisation of the competent authorities. The process of obtaining the necessary environmental permitting for cross-border projects is sometimes difficult, especially for projects crossing protected natural areas or certain species' habitats, in particular where knowledge about the protected habitats and species present is not complete. Moreover, the implementation of infrastructure projects frequently faces significant public concerns that, in the worst cases, may lead to lengthy court procedures. Minimum legislative requirements are often not sufficient in addressing the concerns of local communities impacted by the construction of a projects in their vicinity, and ambition for public engagement should go beyond what is strictly required.

The TEN-E Regulation and most lately the emergency Council Regulation (EU) 2022/2577 offer solutions to these issues, however they are not yet sufficiently taken up.

⁴⁰ The Modernisation Fund uses a part of the EU ETS revenues to support investments in the modernisation of energy networks in the 13 lower-income EU Member States. Over the period 2021-20230, EUR 57 billion will be available under the MF, assuming an EU ETS price of EUR 75/tCO₂.

Action 11: Commission to support permitting acceleration providing guidance and technical support on how to implement existing legislative tools and Member States to implement acceleration measures

Member States may make use of the voluntary provisions under the **emergency Council Regulation**⁴¹ (Article 6) and are encouraged to rapidly transpose the revised **Renewable Energy Directive** (RED) in view of accelerating the development of transmission and distribution grid networks necessary to integrate renewables into the system. Network development is increasingly driven by the need to integrate large amounts of renewables into the system, and thus there might be important potential for Member States to designate dedicated infrastructure areas in compliance with the Regulation and the Directive respectively.

The **Platform of the National Competent Authorities** in charge of permitting set up in 2022 has proven to be a useful forum to exchange best practices and provide clarifications and guiding support. The work of the Platform will be intensified. In particular, a dedicated **ministerial meeting** will be organised to ensure **political steer** to address identified permitting issues. For further support, the Commission will **conduct a study** in 2024 assessing the implementation of the permitting provisions of TEN-E Regulation. This will especially enable the identification and dissemination of **best practices**. On the basis of the findings of the study, **Member States should identify specific measures** to be taken to accelerate their permitting regimes. The Commission will support this assessment and its implementation through the Platform of National Competent Authorities in charge of permitting.

The Commission will work with relevant ministries and permitting authorities, including in the context of the Covenant of Mayors, to **disseminate and support application** of the provisions of the RED III and **emergency Council Regulation and the revised RED** as regards **distribution grids**. Moreover, the Platform of National Competent Authorities will further exchange on the permitting particularities of smart electricity grids with the aim to streamline the respective procedures.

At the latest by mid-2025, in view of the permitting obstacles encountered by energy infrastructure projects, the Commission will **provide guidance** on the designation of dedicated infrastructure areas for grid projects necessary to integrate renewables as provided by the revised RED. The Commission will **update** by Q4 2024, if necessary, the existing **guidance** on streamlining environmental impact assessments for PCIs⁴² and PMIs and the guidance on energy transmission infrastructure and EU nature legislation⁴³ as necessary to adapt them to the revised legislative frameworks of TEN-E and RED and their streamlining permitting provisions.

Lastly, from 2024 the Commission will support the digitalisation of permitting procedures for grid projects through the **Technical Support Instrument** (TSI). The TSI Regulation⁴⁴ foresees that Member States can receive, through either stand-alone or multi-country projects, technical expertise for accelerating permitting. Member States are encouraged to make use of

⁴¹ [Council Regulation \(EU\) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy](#), OJ L 335, 29.12.2022, p. 36–44

⁴² [Streamlining environmental assessment procedures for energy infrastructure Projects of Common Interest \(PCIs\)](#), European Commission, 2013

⁴³ [Guidance on energy transmission infrastructure and EU nature legislation](#), European Commission, 2018

⁴⁴ [Regulation \(EU\) 2021/240 establishing a Technical Support Instrument](#), OJ L 57, 18.2.2021, p. 1–16

the TSI provided by the Commission to upgrade their systems for dealing with permitting and connection procedure applications, for example through digitalisation. In addition, as announced in the European Wind Power Action Plan⁴⁵, by the end of the year the Commission will launch a **dedicated online tool to support Member States**, among others, by providing for answers to frequently asked practical questions from Member States related to the implementation of the revised permitting provisions.

Action 12: Commission to launch a Pact for Engagement for early, regular and meaningful stakeholder engagement and regulatory support

Quantifying and monetising the successful avoidance of conflicts and delays can be challenging in a complex regulatory framework for building infrastructure that crosses several jurisdictions and competences. Whilst best practices are promoted and shared amongst project promoters, there is a need to reinforce the engagement framework towards stakeholders into a regular and collective effort to mitigate the impact on communities and nature, while redistributing benefits to communities and enhancing nature protection.

To address potential public opposition and ensure the highest standard in stakeholder engagement, the Commission will launch, with the occasion of the 2023 edition of the PCI Energy Days, a Pact for Engagement with Member States, NRAs, system operators and civil society for early, regular and meaningful stakeholder engagement and the need for adequate regulatory support (see Annex II).

VII. STRENGTHENING GRID SUPPLY CHAINS

The EU industry is global leader in the manufacturing of components for power systems, such as on HVDC cables and substations, fundamental elements to deliver on the EU's offshore ambitions.

Nonetheless, grid project promoters flag long and growing lead times for procuring specific grid components, sometimes of several years even for the most urgent Projects of Common Interest, including because of tight supply of some components or increasing raw material prices. At the same time, EU manufacturers are faced with barriers to benefit from economies of scale due to divergencies in product specificities. The strong growth in global demand for electricity grid technologies could stretch lead times even longer. Therefore, the EU manufacturing capacity is set to increase significantly, while EU's partnership will further strengthen the value chains.

Increasing global competition in the market for HVDC and HVAC cables and systems, which are still supplied mainly domestically in Europe, is very positive provided a level playing field is in place. To foster energy system resilience, careful attention is needed to ensure such a level playing field remains in place with no room for unfair trade practices.

Moreover, it must be ensured that security risks do not emerge. Relying on third country suppliers, in particular from countries not aligned with EU values and positions, to meet EU critical energy infrastructure needs can however present security risks⁴⁶ – both directly in

⁴⁵ COM(2023) 669 final [European Wind Power Action Plan](#)

⁴⁶ [Directive \(EU\) 2022/2557 on the resilience of critical entities](#)

terms of cybersecurity⁴⁷ as well as relating to the potential weaponisation of such supply chain dependencies.

Reliance on high-risk third country suppliers for critical components can create cyber-vulnerabilities to the grid, including interconnectors to third countries. The Network and Information Systems (NIS 2) Directive⁴⁸ requires entities in the energy sector to take security measures in relation to their supply chains as part of the cybersecurity risk-management measures. The upcoming Cyber Resilience Act, currently under negotiation by the co-legislators, will considerably enhance supply chain security by requiring cybersecurity-by-design for hardware and software products with digital features accessing the EU market, as well as obligations for manufacturers to ensure compliance with cybersecurity requirements throughout the lifecycle of the product.

Furthermore, EU grid operators face challenges in getting sufficient access to raw materials, such as copper or steel. Given the ambitious deployment objectives, boosting domestic production capacities and diversification of supplies of raw materials and key components will have to be pursued domestically and via EU agreements or partnerships with reliable third countries, respectively. The Critical Raw Materials Act will help to ensure that Europe meets such objectives, including through domestic production and strategic partnerships. The Commission is working on securing access to critical and strategic raw materials. Free trade and other bilateral agreements, covering energy, raw materials and clean technology supply chains, and the Global Gateway strategy, will also contribute to this end.

It should also be highlighted that electricity interconnection projects with third countries, such as PMIs, that aim at exporting significant amounts of renewable electricity to the EU should not create new dependencies in terms of security of energy supply.

Finally, the lack of skilled workers affects the increasing staffing needs of transmission and distribution system operators, HVDC cable manufacturers and other power system suppliers. This includes the need to acquire further advanced digital and technological skills, such as automation, controlling, big data and advanced analytics, to detect and control network challenges as well as develop the necessary technologies⁴⁹.

The above important needs for resilient and effective grid manufacturing supply chains have been addressed in the proposal for a Net-Zero Industry Act (grid technologies are proposed among the strategic net-zero technologies and Net-Zero Academies address skill challenges) and the European Wind Power Action Plan (increasing grid demand certainty by establishing an EU digital platform for wind power auction planning and national pledges). A swift adoption and implementation of the Net-Zero Industry Act will allow supporting a resilient grid supply chain notably through faster permitting for new manufacturing capacity, increased skilled workforce and through appropriately designed public tenders and auctions.

Other Commission enforcement tools are available to EU industry, to promote a level playing field, counter unfair trade practices⁵⁰, or to remedy asymmetries between EU and third countries in market openness in the public procurement sectors (International Procurement Instrument). Furthermore, with regard to risks relating to security and public order, the EU's

⁴⁷ [Commission Recommendation \(EU\) 2019/553 of 3 April 2019 on cybersecurity in the energy sector](#)

⁴⁸ [Directive \(EU\) 2022/2555 on measures for a high common level of cybersecurity across the Union](#)

⁴⁹ [Skills needs developments, vocational education and training systems in the changing electricity sector](#), by industriAll European Trade Union, the European Public Service Union (EPSU) and Eurelectric, with support from the EU

⁵⁰ See the recent opening of a trade investigation on optical fiber cables, in OJ C2023/891 [Optical fibre cables notice of initiation](#)

Foreign Direct Investment (FDI) Screening Regulation⁵¹ allows for the assessment of security risks of FDIs. Moreover, EU trade agreements are geared to promote renewable investments, including through access to energy grids, with a view to diversify sourcing and enable market access in third countries while preserving security of supply.

Additional and complementary targeted action in this present Action Plan will support further improvements in the grids supply chains. Efforts in aligning product designs across the EU would enable suppliers to focus on delivering quantity, instead of utilising time and human resources in tailored design and manufacturing. Such alignments would serve not only to increase access of suppliers to the internal market, but also increase competition, lower costs and increase manufacturing output with the same manufacturing capacities.

Action 13: ENTSO-E and EU DSO Entity to collaborate with technology providers to develop common technology specifications and improve visibility of grid project pipelines, to facilitate investments in manufacturing capacity and secure supply chains

Standards, addressing the whole value chain of electricity grids and equipment, are critical to ensuring safety and security of the electrical installations, facilitating supply chain security, interoperability, enabling investments in the electricity network, saving costs and hence speeding up deployment and modernisation.

As first and imminent need, current tender specifications by TSOs towards grid manufacturers are frequently very tailor-made, meaning that efforts and resources of the supply chain need to be used on special design requests for virtually each TSO in Europe. The collaboration among TSOs towards agreeing on common specification requests would lower costs, accelerate project delivery, increase the amount of output with the already existing manufacturing facilities that suppliers can produce and enable a better access of suppliers across the EU to other markets within Europe. First attempts to agree on common requirements have been conducted, initiated by the EU's Horizon Europe⁵² and in some instances by some TSOs⁵³, while still implemented in divergent ways by different TSOs. The need to further collaborate in this regard and streamline specifications was stressed by ENTSO-E in the discussions under the high-level event on the Future of our Grids⁵⁴.

The Commission will request the **European Standardisation Organisations (ESOs)** to provide a Workshop Agreement deliverable, involving all relevant stakeholders (**ENTSO-E, TSOs and manufacturers**) on common **product specifications** that should be agreed by end-2024. These product specifications **should be deployed by TSOs across the EU in their own procurements** and regulatory authorities should encourage them in tariff designs. The work should be closely coordinated with the **High-Level Forum on European Standardisation's** working group on green electricity system. Going forward, if deemed necessary, this could be a first step towards developing technical specifications and ultimately EU standards for the entire electricity grid value chain.

In cooperation with the above workstrand by the ESOs, the High-Level Forum will identify standardisation gaps and propose a roadmap by Q1 2024. The focus will be on strategic

⁵¹ Regulation (EU) 2019/452 establishing a [framework for the screening of foreign direct investments into the Union](#)

⁵² <https://interopera.eu/>

⁵³ E.g. TenneT's 2 GW programme for offshore grids (<https://www.tennet.eu/about-tennet/innovations/2gw-program>)

⁵⁴ [Conclusions](#) ENTSO-E event 'Future of our Grids' session 3 on 'People and procurement'

issues based on current market and business trends, including geopolitical constraints, impact on European business and facilitating global trade.

ENTSO-E and the EU DSO Entity should, together with grid operators, establish by Q4 2024 mechanisms for **providing increased visibility to manufacturers into their upcoming procurement plans for equipment and systems** on all voltage levels. This action could help the manufacturers of grid technologies to better prepare their production capacities and skilled workforce and/or plan production slots for catering in time for the grid expansion needs. As a result, potential bottlenecks in the technology supply chains could be avoided. This action should take inspiration from the interactive EU digital platform on which the auction planning of the Member States will be published, as announced in the EU Wind Power Action Plan.

Action 14: Commission to promote common technical requirements for generation and demand connection

Specifications set for the connection of new demand and new generation projects have important implications on the product design and requirements. Today, such technical requirements are deeply divergent across Europe, requiring manufacturers to adapt to such requests locally and hampering their access to the single EU market. The Commission will assess and propose measures to promote common technical requirements in revisions of the network codes on requirements for generators and demand connection code, by 2025, to ensure that manufacturers can fully benefit from the single market access.

6. CONCLUSIONS

Electricity grids are a true European success story of integration, cooperation and mutual support. The indispensable role of electricity grids in the energy transition makes it of utmost importance to ensure that the right incentives are put in place, and undue barriers and risks minimised. Grid modernisation, expansion and smartening are highly needed in both transmission and, increasingly, distribution levels to enable the energy transition across all economic sectors. The grids need to be ready for the new system needs, especially integrating renewables and flexible demand. These challenges in network development translate into high investment needs which amount to half a trillion Euro by 2030.

This European Grid Action Plan identifies a number of interlinked measures that can be completed within the next 18 months to provide an adequate investment framework for grids. For example, reliable and high-quality network planning coupled with an enabling framework for anticipatory investments in areas with firm plans for renewable, electromobility or heat pump deployments, together with streamlined permitting procedures for those grid projects, can substantially increase grid hosting capacities for new renewables and flexibility sources for the system.

While the actions identified should be kicked off in the proposed timeline by the respective organisations, they can only produce their full effect through a strong and long-term commitment of all relevant actors, public and private, to collaborate on their implementation. Only by working together will it be possible to keep the momentum make our grids fit for the challenge.

For this reason, the Commission will set up within the Copenhagen Energy Infrastructure Forum a dedicated platform, in collaboration with Member States, ACER, ENTSO-E and the EU DSO Entity, EIB, manufacturers and NGOs, to regularly monitor the progress and report at the annual meeting of the Forum on delivery of this action plan.

ANNEX I – THE EUROPEAN GRID ACTION PLAN IN A NUTSHELL

CATEGORY	ACTIONS	TIMELINE
Accelerating the implementation of PCIs and developing new projects	1. Commission, Member States and TSOs to strengthen support to PCI and PMI preparation, faster implementation and funding	From 2024
Improving long-term grid planning for a higher share of renewables and increased electrification	2. ENTSO-E to enhance top-down planning towards 2050 by integrating the identification of offshore and onshore system needs and further considering hydrogen 3. EU DSO Entity to support DSO grid planning by mapping the existence and characteristics of distribution development plans	From Q1 2024 Mid-2024
Introducing regulatory incentives for forward-looking grid build-out	4. Commission to propose guiding principles identifying conditions under which anticipatory investments in grid projects should be granted 5. Commission to issue guidance on cross-border cost sharing for offshore projects	Q1 2025 Mid-2024
Incentivising a better usage of the grids	6. ENTSO-E and EU DSO Entity to agree on harmonised definitions for available grid hosting capacity for system operators and establish a pan-EU overview 7. ENTSO-E and EU DSO Entity to promote uptake of smart grid, network efficiency and innovative technologies 8. ACER, in its next tariff report, to recommend best practices in relation to the promotion of smart grids and network efficiency technologies through tariff design, focusing on consideration of OPEX in addition to CAPEX and benefit sharing	From adoption Q4 2024 Q1 2025
Improving access to finance	9. Commission to identify tailored financing models and strengthen dialogue to address financing obstacles 10. Commission to increase visibility on opportunities for EU funding programmes for smart grids and modernisation of distribution grids	From adoption From Q1 2024
Accelerating deployment through faster permitting and public engagement	11. Commission to support permitting acceleration providing guidance and technical support on how to implement existing legislative tools and Member States to implement acceleration measures 12. Commission to launch a Pact for Engagement for early, regular and meaningful stakeholder engagement and regulatory support	2024-25 From adoption
Strengthening grid supply chains	13. ENTSO-E and EU DSO Entity to collaborate with technology providers to develop common technology specifications and improve visibility of grid project pipelines, to facilitate investments in manufacturing capacity and secure supply chains 14. Commission to promote common technical requirements for generation and demand connection	Q4 2024 By 2025

ANNEX II – A PACT FOR ENGAGEMENT

Ensuring early, regular and meaningful stakeholder engagement in grid development

The cornerstone of our energy transition and economic recovery will be an electricity system to which renewable energy will contribute to around half of the generation in 2030 and which will be fully decarbonised well before 2050. We will be deploying renewable energy capacity at a pace that is many times faster than today which will require an integrated and interconnected European infrastructure. Accelerating the development of electricity grids in parallel with the massive scale-up of renewable energies is thus key to Europe's spearheading its energy security and climate ambitions.

None of this can be achieved in isolation or at the expense of the environmental protection of our most vulnerable habitats. The revised TEN-E Regulation will continue to serve as a guiding framework for identifying and building Projects of Common Interest (PCIs) if and where needed to connect demand and supply across Europe. Decision-making processes, whether at the selection stage for the PCI label or later on, during the ground routing and construction, have been strengthened to be more inclusive, more transparent and accountable towards the views and needs of those communities affected by the construction. Whilst best practices are promoted and shared amongst project promoters, delays in grid development at both transmission and distribution level still occur due to lack of acceptance by communities affected by energy infrastructure projects. Quantifying and monetising the benefits of successful stakeholder engagement and avoidance of delays can be challenging in a complex regulatory framework for building infrastructure that crosses several jurisdictions and competences. There is a need to reinforce the engagement framework towards the public into a regular and meaningful collective effort that harnesses trust and participation in grid development, softens the impact on communities and nature, redistributes benefits and enhances nature protection.

In its Communication 'Grids, the missing link: An EU Action Plan for Grids', the Commission announces the launch of a *Pact for Engagement to ensure early, regular and meaningful stakeholder engagement in grid development*, together with Member States, ACER and national regulatory authorities, ENTSO-E and transmission system operators, EU DSO Entity and distribution system operators, project promoters and civil society, calling for:

1. Designing and carrying out national and European communication efforts on the key role of transmission and distribution grids as enablers of the energy transition;
2. A joint cooperation effort between national and local authorities in ensuring effective implementation of permitting provisions for grid and renewable energy projects and best practices adopted and/or recommended at local, national and EU level;
3. A commitment from Member States to strengthen their involvement in the regional cooperation fora such as the established High-Level Groups in order to accelerate the implementation of PCIs, prioritising the most mature and concrete ones. This work will involve transmission system operators and project promoters, as well as national regulators and stakeholders;
4. An open dialogue between ministries, regulatory authorities and transmission and distribution system operators on adequate regulatory support for early, regular and

meaningful stakeholder engagement activities on the basis of dedicated chapters on stakeholder engagement accompanying grid investment plans;

5. Providing for the necessary organisational conditions among all parties involved in permitting or stakeholder engagement processes aligned with the significant needs for grid deployment.

The Commission will work closely with all parties adhering to the Pact for Engagement within appropriate grid-related cooperation fora, such as the PCI Energy Days, the Energy Infrastructure Forum (Copenhagen Forum) and the National Competent Authorities' Platform (NCA Platform) in order to support the implementation of the four pillars of the Pact. Within these fora, the Commission will also monitor the progress achieved by these initiatives, as well as promote the exchange of practices inspiring further efforts from all parties in developing and sustaining engagement processes that rise up to the EU's grid challenge.

The Commission invites Member States, national regulatory authorities, transmission and distribution system operators, project promoters and civil society to join the *Pact for Engagement* and contribute through their collective actions to an enabling framework for *early, regular and meaningful stakeholder engagement in grid development*.