EUROPEAN
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Brussels, 2.7.2025
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COMMISSION RECOMMENDATION

of 2.7.2025

on innovative technologies and forms of renewable energy deployment, on the establishment of areas for grid and storage infrastructure necessary to integrate renewable energy into the electricity system in accordance with Article15(e) of revised Directive (EU) 2018/2001 of the European Parliament and of the Council, and on future proof network charges to reduce energy system costs

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THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 thereof,

Whereas:

(1) The clean industrial deal sets out specific actions to ensure that the goal of decarbonising the economy by 2050 fosters the growth of European industries, including by tackling the high energy prices. The affordable energy action plan[1] looks at factors driving up energy prices and identifies eight actions aiming at lowering energy costs for all. This may be achieved, in part by speeding up the roll-out of clean energy and creating a fully integrated energy market, supported by an interconnected and digitalised network and a cohesive regulatory and governance regime. The plan proposes to address all the elements that together constitute electricity bills, namely the cost of the commodity, the cost of the network and levies and taxation.

(2) Three key actions to achieve these objectives are (i) the acceleration of renewable energy and energy storage deployment, (ii) the acceleration of the expansion and reinforcement of electricity grids, and (iii) the introduction of efficient signals for the optimal use of the grid and for the containment of grid costs, in particular through network tariffs.

(3) Europe's reliance on imported fossil fuels is identified as a major factor contributing to volatile and high supply costs. Expanding the range of renewable energy sources would help to reducing the costs of energy supply and prices to customers, both industry and private individuals. To make this a reality, it is also necessary to significantly accelerate the procedures for granting permits for renewable energy projects, not only for conventional renewable technologies and deployment modes, but also for innovative forms of deployment and innovative renewable technologies.

(4) Directive (EU) 2018/2001 of the European Parliament and of the Council[2] ('the Directive') sets a renewable energy target for the EU of 42.5% by 2030, with an aspiration to reach 45%. Achieving this target requires both faster deployment of renewable energy installations and better integration of the renewable energy generated into the grid and the energy system. In addition, it includes a target for

[1] COM(2025)79 final

[2] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82, ELI: http://data.europa.eu/eli/dir/2018/2001/oj

Member States to dedicate at least 5% of new installed renewable energy capacity to innovative renewable energy technologies by 2030.

(5) The Directive and the accompanying Union initiatives, such as the recommendation[3] and guidance[4] on speeding up permit-granting for renewable energy and related infrastructure projects, provide the Member States with additional instruments to secure that deployment. On the one hand, the Directive lays the groundwork for speeding up the use of innovative renewable energy technologies through the indicative target. On the other, the 2022 EU solar energy strategy[5] highlighted innovative forms of solar energy deployment and commits to issue guidance to the Member States in this regard. These innovative technologies and forms of deployment complement conventional renewable technologies deployment for the achievement of the revised RED target. Finally, under Article 15e of the Directive, Member States are able to designate areas for grid and storage infrastructure, which are necessary for integrating renewable energy into the electricity system.

(6) Innovative renewable energy technologies, such as ocean energy or floating offshore wind energy technologies, unlock the exploitation of renewable energy sources that remain untapped and can complement standard offshore and onshore wind, as well as utility-scale solar technologies, which will remain the backbone of the Union's renewable energy deployment. In addition, investment in these innovative technologies unlocks economies of scale and generates new knowledge and a competitive advantage for the Union.

(7) The key benefit of deploying innovative forms of renewable energy is the expansion of opportunities for renewable energy deployment through multiple use of space and the efficient exploitation of underutilised structures (i.e. motorway barriers, vehicles). New forms of deployment can sometimes require innovations in renewable energy technology. In other cases, they represent a novel use of the same generation technology. Innovative forms of solar energy deployment are varied, including agrisolar (agrivoltaics or solar heat combined with agriculture), building-integrated solar, infrastructure-integrated solar, floating solar, vehicle-integrated PV and plug-in mini-solar (for instance 'balcony PV'). Floating offshore wind energy can also be considered an innovative form of deploying wind energy. However, these innovative technologies and forms of renewable energy deployment face specific regulatory and non-regulatory barriers to their deployment such as the inadequacy of the legislation to their specificities.

(8) Accelerating the expansion and reinforcement of electricity grids and of energy storage deployment could be facilitated by means of designating areas for grid and storage infrastructure. Grids and storage projects located in these areas which are necessary to integrate renewable energy into the electricity system can benefit from derogations from certain types of environmental assessments, provided that the conditions established by the Directive are met, with the aim of significantly shortening the timelines for issuing permits. The swift implementation of these provisions is absolutely instrumental to unleash the potential of a rapid roll-out of grid and storage projects to ensure the EU's climate and energy targets and the climate neutrality objective.

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3 C(2024)2660 final
4 SWD(2024)333 final
5 COM(2022) 221 final

(9) Moreover, to lower overall network costs and ensure affordability for all consumers, these necessary investments have to go hand in hand with a better use of the existing and new infrastructures. Enabling the cost-effective integration of increasing shares of renewable generation requires more flexibility and efficiency in the way the grid is used and managed. An efficient methodology for designing electricity tariffs can provide the necessary incentives for system users to adjust their behaviour in a way that helps to reduce the overall system cost. This, in turn, bears significant potential for greater cost-efficiency of the energy transition.

(10) A significant shift in the design of network tariff methodologies, which is the responsibility of National Regulatory Authorities (NRAs), is necessary to align them with the needs of a decarbonised energy system.

HAS ADOPTED THIS RECOMMENDATION:

DEFINITIONS

(1) For the purposes of this Recommendation, 'innovative forms of renewable energy deployment' should be understood as those ways of deploying solar energy – either photovoltaics, thermal or a combination of both – listed in the EU solar energy strategy: agrisolar, building-integrated solar, floating solar, infrastructure-integrated solar, vehicle-integrated photovoltaics, plug-in mini solar systems and floating offshore wind energy systems.

(2) For the purposes of this Recommendation, 'innovative renewable energy technologies' should be understood as floating offshore wind energy, ocean energy, without excluding other potential innovative renewable energy technologies that may benefit from these Recommendations as well.

(3) For the purposes of this Recommendation, 'grid infrastructure' should be understood as any project to deploy electricity transmission and distribution assets essential for the efficient operation of the electricity system.

(4) For the purposes of this Recommendation, 'storage infrastructure' should be understood as all energy storage assets at transmission and distribution levels.

CLEARER REGULATORY FRAMEWORK FOR INNOVATIVE RENEWABLE TECHNOLOGIES

(5) As regards innovative technologies and forms of renewable energy deployment, Member States should define these innovative forms of deployment and innovative renewable energy technologies in relevant national regulations, to provide clarity on which regulations apply and how they apply to each specific innovative form of deployment.

(6) For those innovative forms of deployment and innovative renewable energy technologies to be able to access the market, Member States should specify the technical standards that must be complied with, including as regards safety regulations. These technical standards should take into account the specificities of the innovative form of deployment or innovative renewable energy technology.

(7) Without prejudice to the permitting deadlines of the Directive, Member States should establish sufficiently short and clear permit-granting procedures for these innovative forms of deployment and innovative renewable energy technologies, including by specifying the required permits and technical standards.

(8) Member States should exploit the synergies between innovative forms of deployment, innovative renewable energy technologies and renewables self-consumption, including by clarifying the regulatory framework for renewables self-consumption when needed.

(9) Member States should facilitate the multiple use of land and sea, including for renewable energy production, in particular where this can bring local benefits, such as reducing the amount of land required for renewable energy, mitigating competition for land and sea use, synergies with other land and sea uses and positive impacts on the public acceptance of renewable energy.

(10) Where necessary, Member States should consider to amend national or regional legislation that governs the locations where these innovative forms of deployment and innovative renewable energy technologies could be deployed to make that deployment possible, taking into account local specificities and system needs, respecting EU environmental acquis and the principles of Do No Significant Harm in a cost-effective manner.

(11) Member States adopting maritime spatial plans should consider designating maritime areas for specific renewable energy technologies or innovative renewable energy technologies or both, including floating offshore wind, ocean energy and floating offshore solar, while considering the potential for synergies between technologies.

(12) When implementing the recommendations under points (5) to (11), Member States are encouraged to take into account the practices on innovative renewable energy technologies and forms of deployment described in Section 2 of the Commission Notice on innovative technologies and forms of renewable energy deployment adopted by the Commission on the same day as the Recommendation[6].

FASTER PROCEDURES FOR GRIDS AND STORAGE ROLL-OUT

(13) As regards grid and storage infrastructure necessary for integrating renewable energy into the electricity system, Member States should set up dedicated infrastructure areas in line with Article 15e of the Directive to make best use of the permitting opportunities for boosting electricity grid and storage infrastructure.

(14) Member States should swiftly adopt specific plans to designate dedicated infrastructure areas for the development of grid and storage projects in line with Article15e of the Directive.

(15) When designating such areas, Member States should cooperate with system operators to consider the needs of the electricity system and ensure synergies with existing plans, assessments and areas already identified under other processes. These may include network development plans, national energy and climate plans, national air pollution control programmes, maritime spatial plans, flexibility needs assessments and the mapping performed in line with the designation of renewables acceleration areas and Article 15b of the Directive.

(16) To accelerate the roll-out of cross-border infrastructure in particular in view of completing the Energy Union, Member States should closely work together in the definition of grids and storage areas nearing their borders that may fall under Article 15e, and coordinate the relevant stakeholder consultation, the mitigation rulebook

[6] The draft notice has been adopted on the same day as this recommendation: C(2025)4011

and possible compensation measures applicable in case of significant environmental impacts in these areas that cannot be avoided.

(17) Where significant environmental impacts expected from the construction and operation of the projects in these areas cannot be avoided, such impact should be duly mitigated or, where not possible, compensated for. Member States shall comply with the respective provisions of Article 15e of the Directive with view to avoid or reduce the impacts and adopt a dedicated mitigation rulebook that sets rules for appropriate and proportionate mitigation measures.

(18) Member States should make as much use of existing digital tools as possible when implementing the recommendations under points (13) to (17).

(19) Once areas for grid and storage infrastructure have been set up, Member States may make use of the exemptions from certain environmental assessments under Article 15e(2) of the Directive if justified to speed up the deployment of renewable energy and the connection of end-users to the electricity grid, including industrial consumers, in order to achieve the climate and renewable energy targets.

(20) When projects are deployed in the dedicated grid and storage areas, Member States shall establish an appropriate expedited screening process based on available environmental data to verify that there are no highly likely significant unforeseen adverse effects on the environment that result from the construction or operation of the projects.

(21) When implementing the recommendations under points (13) to (20), Member States are encouraged to consider the practices described in the guidance on the establishment of areas for grid and storage infrastructure necessary to integrate renewable energy into the electricity system adopted by the Commission on the same day as the Recommendation[7].

FAVOURABLE FINANCIAL FRAMEWORKS FOR INNOVATIVE TECHNOLOGIES AND FORMS OF RENEWABLE ENERGY DEPLOYMENT

(22) Member States are encouraged to consider combining different renewable technologies, including innovative forms of deployment and innovative renewable energy technologies, on the same site, including offshore. This is known as hybridisation. Hybridisation utilises the complementary nature of different renewable energy sources, resulting in a more efficient, reliable and stable power system. Sharing the grid connection could help to reduce the cost of these innovative projects, help stabilise the grid and limit the need for grid expansion and storage and provide a more programmable supply and support services to the grid. In doing so, Member States should consult the Recommendation[8] and Guidance[9] on permit-granting procedures for renewable energy projects.

(23) Member States may design support schemes in a way that encourages the participation of innovative forms of deployment and innovative renewable energy technologies, ensuring that the pre-qualification and award criteria enable their eligibility and successful participation while maintaining the competitiveness of the

[7] The draft notice on the guidance has been adopted on the same day as this recommendation: C(2025)4012

[8] C(2024) 2660 final

[9] SWD(2024)333 final

schemes. Where appropriate, Member States should consider promoting further the participation of innovative forms of deployment and innovative renewable energy technologies, including by introducing non-price criteria rewarding innovation by introducing a requirement to meet a minimum level of improvement in key performance indicators which goes beyond the state of the art of technologies and solutions that are already on the market, by means of setting out separate baskets for them or designing specific tendering procedures for them[10]. When designing support schemes for renewables, Member States should consult Recommendation[11] and Guidance[12] on design elements of renewable energy auctions and the Implementing Act[13] on non-price criteria in renewable energy auctions under the Net-Zero Industry Act.

(24) Member States should consider designing support schemes for offshore renewable energy deployment in a way that encourages the participation of all relevant innovative forms of deployment and innovative renewable energy technologies, including offshore floating wind, ocean energy and offshore floating solar, while considering the potential for synergies between technologies.

(25) Member States should consider promoting the development of agrisolar with specific policies through their common agricultural policy strategic plans. They should also establish eligibility conditions for the granting of income support that allows farmers to benefit from it when having agrisolar installations.

(26) For the purposes of installing solar energy in buildings under Article 10 of Directive (EU) 2024/1275 of the European Parliament and of the Council[14], Member States should promote the deployment of building-integrated solar in the framework of public procurement of solar energy products through the application of non-price criteria.

(27) When implementing the recommendations under points (22) to (26), Member States are encouraged to take into account the practices described in Section 3 of the guidance on innovative technologies and forms of renewable energy deployment[15], adopted by the Commission on the same day as the Recommendation.

INCREASING KNOWLEDGE AND EXPERIENCE ON INNOVATIVE TECHNOLOGIES AND FORMS OF RENEWABLE ENERGY DEPLOYMENT

(28) Member States are encouraged to promote continued research into innovative forms of deployment and innovative renewable energy technologies, including via pilot projects, demonstration, testing and studies, that is to say on their potential to contribute to the Union's renewable energy target, and their likely environmental impacts.

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10 In line with point 96 of the Climate, Energy and Environmental Aid Guidelines if State aid is at stake.

11 C(2024)2650 final

12 SWD(2024)300 final

13 Commission implementing regulation specifying the pre-qualification and award criteria for auctions for the deployment of energy from renewable sources - COM(2025)2900

14 Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (OJ L, 2024/1275, 8.5.2024, ELI: http://data.europa.eu/eli/dir/2024/1275/oj)

15 The draft notice has been adopted on the same day as this recommendation: C(2025)4011

(29) Member States are encouraged to monitor their innovative projects regularly and disseminate widely the knowledge acquired, including among Member States.

(30) Member States should foster cooperation among the different public authorities involved in creating and maintaining the regulatory framework of innovative forms of deployment and innovative renewable energy technologies and among themselves, including by creating specific meetings or fora to promote exchange. National-level coordination should be combined with efforts to ensure standardisation and interoperability across Member States.

(31) Member States should address the lack of experience and skills in the public administration with the professionals working with these innovative forms of deployment and innovative renewable energy technologies. In this regard, Member States are encouraged to promote adapted training and capacity-building activities. In doing so, Member States could also make use of the opportunities provided at EU level, such as the European Commission's financial and technical assistance delivered through programmes like Cohesion 4 Transition, the Life programme or the Pact for Skills.

(32) When implementing the recommendations under points (28) to (31), Member States are encouraged to consider the practices described in Section 4 of the guidance on innovative technologies and forms of renewable energy deployment, adopted by the Commission on the same day as the Recommendation.

FUTURE-PROOF ELECTRICITY NETWORK CHARGES TO REDUCE ENERGY SYSTEM COSTS

(33) A well-planned and careful approach to household and industrial consumers is required to enable users to adapt to the design of more cost-reflective tariffs. Thorough stakeholder involvement and a gradual phase-in of the relevant changes should be envisaged to manage short-term effects on particular user categories.

(34) To ensure cost-effective grid operation and the delivery of important projects contributing to the integrated market, NRAs should assess the potential for incentive-based regulation and adapt the related set of performance indicators and benchmarks for network operators.

(35) NRAs should use tariff design to incentivise the reduction of peak load consumption, including through adding a capacity element in to the tariff structure that reflects peak load, combined with a time-of-use energy element to the tariff, especially at times when the grid risks being saturated, to reduce the cost of network expansion to the level needed.

(36) NRAs should include time-of-use elements in tariff structures, to correlate cost allocation with peak network usage, in order to incentivise efficient use of the network. Different approaches can be used for time differentiation, from the simpler (e.g. peak/off-peak, seasons, weekdays/weekends) to the more complex (i.e. where smart meters can allow for a very dynamic time-of-use element).

(37) NRAs should promote the use of locational signals in network tariffs as they provide signals for more useful siting of necessary generation and consumption on the grid. Attractive or reduced tariffs can stimulate consumption in places and at times where grid is available and demand is lower than available generation at that network location. Also, injection charges can be a useful way to incentivise behaviour and investment decisions of generators. Where transmission and distribution-connected

generators pay injection charges, these should be designed so as to include time-of-use and locational elements to alleviate congestion and incentivise the most efficient use of networks. They may be particularly relevant where grid upgrades are not a viable or cost-effective solution.

(38) Special tariff regimes can be offered to specific classes of grid users such as energy intensive-users, prosumers, energy communities and bi-directional charging in justified cases. The NRA should provide objective grounds that these grid users, based on their consumption profile and the flexibility they offer to the overall system, have a lower impact on the overall cost of the electricity network.

(39) Network tariffs for electricity storage can be used to incentivise grid-friendly behaviour by storage operators, to direct storage investments to the most appropriate areas and to incentivise charging/discharging at times of most utility to the electricity system. Tariff regimes should account for the particularities of storage and avoid 'double charging' of storage facilities, as this could discourage deployment of storage assets, but should reflect the overall cost-impact of the storage on network costs.

(40) Members States are allowed to inject general government funds into the overall network charges budget within the applicable legal framework, provided this is done in a non-discriminatory manner, does not favour particular categories of network users, does not undermine incentives to adjust behaviour so as to lower overall system costs, and only covers the additional costs resulting from measures to accelerate decarbonisation and market integration.

(41) While cost cascading may still be justified, a more sophisticated approach could better ensure cost-reflectivity as generation becomes prevalent in distribution networks, even at low voltage levels. NRAs should therefore take account of the changing generation/consumption profiles at the distribution level when applying cost cascading.

(42) When implementing the recommendations under points (33) to (41), Member States are encouraged to consider the practices described in the Guidelines on future proof network charges to reduce energy system costs, adopted by the Commission on the same day as the Recommendation[16].

MONITORING, REPORTING AND REVIEW

(43) Member States should carry out an audit of the regulatory and non-regulatory barriers to innovative technologies and forms of innovative renewable energy deployment that exist in their territory, which should be reviewed regularly, in order to determine and implement measures to encourage their development and deployment.

(44) Member States are encouraged to communicate to the Commission, in particular as part of the integrated national energy and climate progress reports to be submitted under Article17 of Regulation (EU) 2018/1999[17], detailed information on the national measures taken in the context of this Recommendation.

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16 Draft notice on Guidelines on future proof network charges for reduced system costs C(2025)4010

17 Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and

(45) The Commission will assess the information submitted by the Member States and consider whether further measures are needed to support them (i) in promoting the development and uptake of innovative renewable energy technologies and forms of deployment or (ii) in adopting plans to designate dedicated infrastructure areas for the development of grid and storage projects.

Done at Brussels, 2.7.2025

For the Commission
Dan JØRGENSEN
Member of the Commission

CERTIFIED COPY
For the Secretary-General

Martine DEPREZ
Director
Decision-making & Collegiality
EUROPEAN COMMISSION

(EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council (OJ L 328, 21.12.2018, p. 1, ELI: http://data.europa.eu/eli/reg/2018/1999/oj).