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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

Delivering on the EU offshore renewable energy ambitions

1. INTRODUCTION

Offshore renewables will make a key contribution to reach the EU's ambitious energy and climate targets for 2030 and 2050 and reduce dependency on imported fossil fuels. Offshore renewables are set to become an indispensable part of the energy mix that will be necessary to decarbonise and reach climate neutrality. This is reflected in Member States' ambition to achieve 111 GW of offshore renewables by 2030 which is nearly twice as high as the ambition set out by the European Commission in the Offshore Renewable Energy Strategy published in November 2020[1].

The Commission welcomes this higher ambition, also in the context of REPowerEU, which requires a faster shift towards renewable energy. These higher ambitions in the offshore renewable sector will have to be turned into real projects at an accelerated pace, also for the EU to maintain global leadership and competitiveness at manufacturing and deployment stage, an endeavour that has become more challenging. Costs have increased, profit margins are squeezed, and global supply chains are more and more fragmented, including through constrained access to materials and skilled labour. This is why an Action Plan for wind manufacturers[2] makes up an integral part of the wind package.

Building on the important progress made on the actions in the strategy, these new challenges must be tackled. Achievements in the implementation of the strategy cover a variety of topics and sectors covering maritime spatial planning, interaction with the marine environment, offshore infrastructure, an EU regulatory framework, mobilising investment, research & innovation and a stronger supply and value chain across Europe.

To complement the Action Plan, this Communication underlines the Commission's continued commitment to offshore renewable energies and reaching the new offshore ambitions. The wind industry plays a significant role in realising these ambitions, but also ocean energy technologies will have to make an important contribution. Besides, offshore renewables require specific components in their supply chain. Therefore, the Communication takes stock of the progress achieved so far and addresses the main challenges ahead and proposes a way forward to:

- Develop cross-border offshore grids based on reliable methods for cost-benefit analysis and cost allocation.

- Fast-track permitting.

- Strengthen maritime spatial planning (MSP) as a tool to enhance regional co-operation and sustainable co-existence between offshore renewables and other industries at sea.

- Strengthen the resilience of offshore renewable infrastructure and maritime security.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:741:FIN&qid=1605792629666

[2] COM(2023)669

- Sustain R&I efforts to ensure EU's technological leadership and sustainable solutions reconciling offshore renewable activities with the environment.

- Support the EU supply chains to develop their capabilities to remain competitive and able to help realize the higher ambitions levels for installed offshore capacities in the EU as well as in third countries through dedicated trade dialogues also with the involvement of industry.

2. NEW AMBITIONS FOR OFFSHORE RENEWABLE ENERGIES

To ensure that offshore renewable energy gets to realise its full potential, the Commission published a dedicated EU strategy on offshore renewable energy in November 2020 called An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future[3] (referred to as 'the strategy' thereafter).

The strategy was a step change by proposing several specific actions and milestones to support the long-term sustainable development of the offshore energy sector and to increase the installed capacity of offshore wind by 2030. And it set clear ambitions: to have an installed capacity of at least 60 GW of offshore wind by 2030 and 300 GW by 2050. In addition, an objective for ocean energy was set: to have at least 1 GW by 2030 and 40 GW by 2050.

Significant progress has been made since then. The actions proposed in the strategy have to a large extent been implemented or are well under way. At the same time, there have been significant developments in the field of offshore renewable energy. Moreover, the climate and energy targets as reflected in the Climate Law[4] and the Fit-for-55 package as well as REPowerEU[5] have further underlined that offshore renewables will have to play a key role in ensuring further decarbonisation, security of supply and replacing fossil fuel imports from Russia.

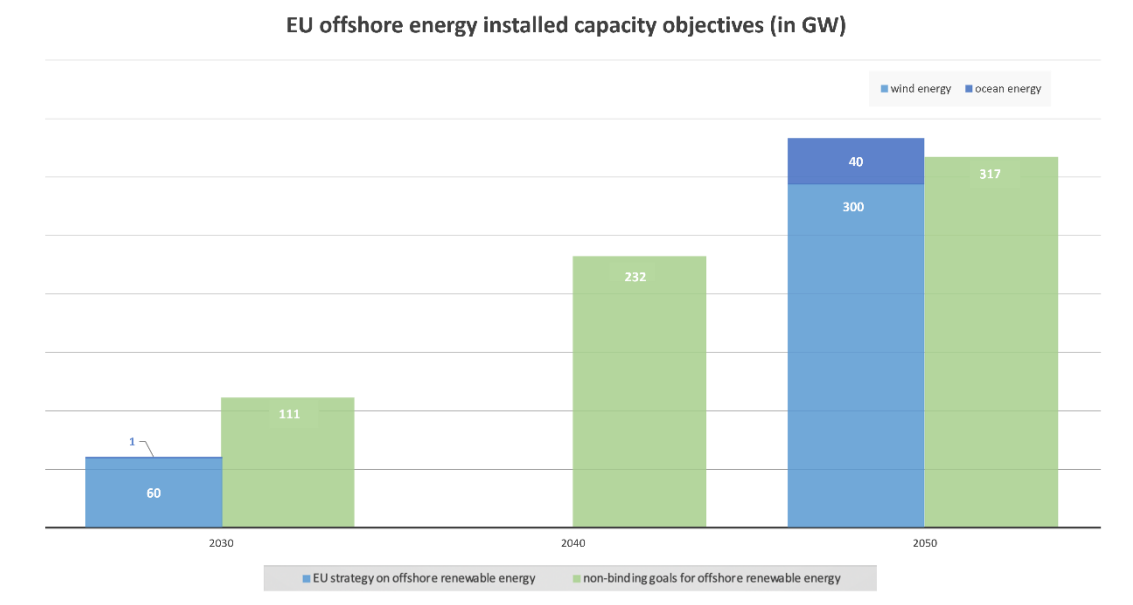
In January 2023, building on the strategy and the TEN-E Regulation, Member States agreed on non-binding goals for offshore renewable energy (ORE) generation by 2050, with intermediate goals for 2030 and 2040, in each of the EU's five sea basins. The new goals set a higher ambition level for installed capacity compared to the strategy. The 2030 goals are nearly twice as high as the 61 GW ambition set out in the strategy. This

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:741:FIN

[4] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')

[5] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS REPowerEU Plan (COM/2022/230 final)

gives an overall ambition of installing approximately 111 GW of ORE generation capacity by the end of this decade and it rises to around 317 GW by mid-century. For the North Sea basin, the Ostend Summit in April 2023 resulted in a further strengthening of the ambition level to at least 300 GW by 2050 in the North Seas.



In 2022, the cumulative EU-27 offshore installed capacity amounted to 16.3 GW. To bridge the gap between the 111 GW committed by Member States and the installations in 2022, we must install almost 12 GW/year on average. This is 10 times more than the 1.2 GW that were installed in 2022.

The EU has made good progress in ocean energy development since the launch of the Offshore Strategy. Several pilot projects of tidal and wave energy are well advanced, including with support of Horizon Europe and the Innovation Fund. 100 MW of ocean energy capacity is achievable by 2027 and 1 GW by the end of the decade or early 2030's.

Regional cooperation is key to deliver on the offshore goals. Leaders and Ministers met on 17 December 2022 in Romania and 24 April 2023[6] in Belgium at offshore summits to agree on further strengthening cooperation at the political level and advancing cross-border offshore renewable energy projects. These summits have built on the 2022 Esbjerg and Marienborg summits in Denmark, in the presence of President von der Leyen and Commissioner Simson, for enhanced cooperation on the accelerated rollout of offshore renewable energy.

Furthermore, there is a growing interest in setting, at the upcoming COP28 in November 2023, a global renewable target which would set a global ambition in line with the goals of the Paris Agreement[7]. Thus, there is momentum for rapidly accelerating the

[6] https://energy.ec.europa.eu/news/president-von-der-leyen-participates-high-level-summit-focused-energy-security-energy-partnerships-2022-12-16_en; https://northseasummit23.be/

[7] https://unfccc.int/documents/9097

deployment of all forms of renewable energy, including offshore renewables. In this context, the G7 ministers have already agreed to increase offshore wind capacity by 150 GW by 2030.

Going forward, the Commission will continue to implement the actions introduced in the strategy, but also build upon these to enhance efforts to meet the new offshore ambitions.

3. HOW TO REALISE THE NEW OFFSHORE TARGETS – ACTIONS TAKEN AND FURTHER MEASURES

3.1. Strengthening grid infrastructure and regional cooperation

For offshore wind, large scale projects may be developed far from shore. Thus, timely access to a well-functioning grid is crucial, both offshore to transport the electricity to the shore, and onshore to ensure the necessary grid reinforcements so that demand centres, also in non-coastal regions, can fully benefit from the deployment of offshore renewables.

Building on the previous successful experience with the political High-Level Groups (HLGs) as regional cooperation structures in the field of energy, with the revised TEN-E Regulation, a conducive framework has been put in place for cross-border co-operation. It enables the EU to go towards an integrated and efficient offshore and onshore grid, including hybrid projects interconnecting Member States and offshore wind projects – sometimes of very large scale, like the planned energy islands in the North and Baltic seas. By connecting several Member States, hybrid projects and interconnected offshore grids at large will improve security of supply, reduce costs for consumers and diminish environmental impacts.[8]

For the accelerated deployment of offshore renewables, regional cooperation is essential. Through regional fora including the TEN-E regional groups and the political HLGs[9], the Commission has been promoting the development of offshore wind and ocean energy technologies at sea basin level. These efforts have recently built on the reinforced provision on offshore grids in the revised TEN-E Regulation, which includes the requirement on Member States to conclude and regularly update non-binding goals for offshore renewables by 2050 with intermediate steps for 2030 and 2040. The non-binding agreements of January 2023 will be updated by December 2024.

[8] The hybrid grid project "Kriegers Flak - Combined Grid Solution" is an example on how to close gaps in the European interconnected grid and contribute to the development of a single European energy market while facilitating the incorporation of renewables. The project was a European Project of Common Interest (PCI) and benefitted from the TEN-E Regulation.

[9] The North Seas Energy Cooperation (NSEC), the High-Level Group for Interconnections for South-West Europe, the Baltic energy market interconnection plan (BEMIP), the Central and South Eastern Europe energy connectivity (CESEC), for further information: https://energy.ec.europa.eu/topics/infrastructure/high-level-groups_en

The Commission has facilitated cross-border cooperation and encouraged Member States to integrate objectives of offshore renewable energy development in their national maritime spatial plans, in line with national energy and climate plans. As a result, Member States have identified and allocated substantial areas for offshore wind. Currently the most advanced regions regarding offshore are the North Sea Region and the Baltic Region, where the North Sea Energy Co-operation (NSEC) and Baltic energy market interconnection plan (BEMIP) serve as proactive regional cooperation platforms for expanding offshore renewable energy production. Member States from the Atlantic Arc, the Mediterranean and the Black Sea have also announced high political ambitions and engage with EU neighbours in these regions. In addition, macro-regional and sea basin strategies and interregional cooperation were supported by cohesion policy through pilot projects such as the Baltic Intergrid[10].

To complement regional cooperation under the TEN-E framework, the revised Renewable Energy Directive includes provisions to support cooperation and the deployment of offshore renewable energy. It requires the Member States to agree to establish a framework for cooperation on joint projects with one or more other Member States to produce renewable energy. It also requires the Member States to publish information on the offshore volumes they plan to achieve through tenders, based on indicative goals for offshore renewable generation to be deployed within each sea basin identified in accordance with the TEN-E Regulation. Coordination of such tender planning for offshore renewables on regional level has already started to be discussed in some regional formations, notably the NSEC High-level group. The Directive also encourages Member States to allocate space for offshore renewable energy projects in their maritime spatial plans, considering the activities that already take place and that are planned in the affected areas.

Furthermore, the European association for the cooperation of transmission system operators (ENTSO-E) with Member States, the Commission and transmission system operators (TSOs) collaborate on the development of **Offshore Network Development Plans (ONDP)**, which will provide further strategic guidance for Member States and potential investors by mapping infrastructure needs. Based on Member States' non-binding agreements, ONDPs will be developed for each sea basin providing a high-level outlook on offshore generation capacities potential and resulting offshore grid needs, including for the long-term until 2050. The potential needs for interconnectors, hybrid projects, radial connections, reinforcements and hydrogen infrastructure will be included. The ONDPs will also take into account environmental protection and other uses of the sea.

A substantial part of the electricity generated by these wind farms may in fact flow into other countries, including landlocked. Benefits being more scattered across the regions means that hosting countries may have more limited incentives to deploy all of their offshore renewable potential if appropriate cooperation mechanisms are not utilised, both in the infrastructure and the renewable energy generation parts. Thus, it may be difficult to justify that tariff-payers and taxpayers of hosting countries cover all the burden, when in fact some of the benefits go elsewhere. The Commission is currently carrying out an

[10] Integrated Baltic offshore wind electricity grid development - Interreg Baltic Sea Region (interreg-baltic.eu)

assessment that will identify the needs and complexities of an **effective and pragmatic cost and benefit sharing** that enables all the offshore ambitions to be reached. The study aims to inform future guidance documents as regards cost-sharing for infrastructure projects both at a sea-basin level and at project level.

With the on-going implementation of the TEN-E Regulation, the Commission has been addressing grid related challenges. Nevertheless, there are several remaining challenges, such as the need to promote **anticipatory investment** in grids and solving **cost-sharing** issues in relation to offshore grids, energy islands and offshore hubs, as well as grids necessary to integrate offshore renewables.

As for the **regulatory framework**, all the actions presented in the strategy would be completed once the **Electricity Market Design (EMD)** proposals are adopted. The EMD proposal includes provisions to promote the use of Power Purchasing Agreements (PPAs) as well as Contracts for Difference (CfD). Both instruments intend to encourage to reducing price risk and stimulating investments, giving predictability on prices. Beyond price, the EMD gives an answer to another challenge of particular relevance for some offshore renewable projects in an offshore bidding zone – the risk of potentially not having market access to the hybrid interconnector to which they are connected because of constraints in the onshore grid. EMD proposes such volume risk via an appropriate financial compensation for a "transmission access guarantee".

Furthermore, the EMD recognises the importance of anticipatory investments and require tariff methodologies to provide appropriate incentives for anticipatory investments and TOTEX[11] solutions, as well as best practice sharing among Regulatory Authorities. Thus, for investor certainty, there is complementarity between the EMD and the continuing work on anticipatory investment and cost-sharing mentioned above.

A further commitment in the strategy was to begin work on amendments to the Commission Regulation (EU) 2016/1447 on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules (HVDC Network Code) to ensure that it is fit for purpose for future developments in offshore networks. This work is well underway through the Electricity Stakeholder Committee[12].

Building on the above the Commission will focus on the following:

- The Commission will, in close consultation with the Member States and relevant Transmission System Operators (TSO), the European Union Agency for the Cooperation of Energy Regulator (ACER) and National Regulatory Authorities (NRA), publish **guidance for a specific cost-benefit analysis and cost sharing** with two angles: first, at the level of offshore network development plans per sea basin, with the aim to provide the principles that can help ENTSO-E improving future editions of the plans; and, second, at project level, considering both renewable and

[11] Total expenditure (TOTEX) comprising capital expenditure (CAPEX) and operational expenditure (OPEX)

[12] CROS Phase 1 report available here: https://www.entsoe.eu/network_codes/cnc/expert-groups

infrastructure for cross-border offshore grid projects. This will be based on extensive exchanges with Member States, including at political level, and support authorities and promoters in their discussions on new potential cross-border projects and hence promote the development of offshore renewables.

- In implementing the revised TEN–E Regulation and the Renewable Energy Directive, the Commission will seek to increase the attractiveness of offshore hybrids and joint projects over national projects. Besides the ONDPs and cost-benefit sharing guidance, the Commission is working with co-legislators to speed-up the adoption of the EMD for an improved regulatory framework. Following the conclusions from Copenhagen Energy Infrastructure Forum of 2023[13], the Commission will also address anticipatory investments, by organising a workshop with relevant stakeholders and, if appropriate, develop guidance.

- Building on the strengths and achievements, the Commission will continue to use the High-level groups for the **better cooperation and coordination for accelerated deployment**, considering the business cases of the different offshore assets and actors (TSOs, NRAs RES developers, Member States), facilitating the establishment of offshore bidding zones and mitigating the additional risks that hybrid offshore projects may entail.

- The Commission will also promote further coordination of Member States' **forward planning for the publication of auctions for offshore renewable energies** through the High-level groups which should include the regular publication of auction schedules. In this context, the Commission will also promote further exchanges on the convergence of auction criteria. This should in particular facilitate the realisation of joint and hybrid projects. Improved auction design is also a key element in the Wind Power Action Plan.

3.2. Accelerating permitting

With the ambition levels described in chapter 2, the current pace of project deployment will need to speed up significantly.

Offshore grid infrastructure projects are often subject to lengthy permitting procedures in view of the distance that they cover and their cross-border nature. This in turn affects the expedited deployment of the necessary grids to ensure the electrification of the EU. The revised TEN-E Regulation contains additional provisions aiming at accelerating the permitting process, such as the creation of a **unique point of contact** for offshore projects of common interest. It also establishes a framework that fosters enhanced public acceptance through timely and inclusive public participation. For this purpose, the Commission also supports the co-operation among national competent authorities (NCPs) for permitting to facilitate sharing of best practises to achieve efficient

[13] https://energy.ec.europa.eu/document/download/b74bef91-5434-4928-ae6e-36c9ae0b77c5_en?filename=Conclusions%209th%20EIF_13%20June%20FINAL.pdf

permitting procedures across the Member States. Such discussions and co-operation are taking place in a dedicated platform as well as in the TEN-E Regulation regional groups.

The revised Renewable Energy Directive includes provisions to **simplify and accelerate permit-granting** for renewable energy projects, as well as for the necessary infrastructure projects to integrate the additional renewables into the electricity system. It calls for the creation of specific "renewables acceleration areas" (RAA) where permit-granting for renewable energy projects can go ahead quickly, in balance with considerations related to the environment and biodiversity protection. Member States may also designate similar dedicated infrastructure areas for grids and storage necessary to integrate renewables into the system. Environmental impact assessments, where required, have been included in the deadlines for the permit-granting process for renewable energy projects, and, recognising the complexity of offshore renewable energy projects, the deadlines for these projects are one year longer than for onshore projects. The Energy and Geography Industry Lab (EIGL) developed by the European Commission provides a wide range of relevant data sets and can support Member States in streamlining their RAA identification.[14]

In addition to the legislative measures, the guidance accompanying the Recommendation on speeding up permit-granting procedure, adopted as part of the REPowerEU Plan on 18 May 2022, includes good practice examples that can support the deployment of offshore renewable energy, such as multiple use of space and environmental pre-assessments of offshore wind sites. As a follow-up to the Recommendation[15] and guidance[16], an informal Commission expert group has been set up, consisting of Member State experts. The expert group will discuss the implementation of the recommendations and exchange good practices on several topics, including offshore renewable energy.

Furthermore, the Concerted Action on the Renewable Energy Directive (CA RES) is a joint initiative between the EU Member States and the European Commission. Its objective is to facilitate the sharing of information and national experiences to support the effective transposition and implementation of the RED, including as regards the provisions on permitting. In addition, the adopted Recovery and Resilience Plans also include reforms aiming at improving the regulatory regime for offshore wind deployment. The European Commission also supports EU Member States via the Technical Support Instrument with tailor-made expertise for the design and implementation of reforms.[17]

Building on the above the Commission will focus on the following:

- The Commission will strengthen support to national authorities in the implementation of the provisions to accelerate permitting procedures through CA RES under the

[14] https://energy-industry-geolab.jrc.ec.europa.eu/

[15] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=PI_COM%3AC%282022%293219&qid=1653033569832

[16] https://energy.ec.europa.eu/publications/speeding-permit-granting-and-ppas-swd2022149151_en

[17] https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/technical-support-instrument/technical-support-instrument-tsi_en

Renewable Energy Directive and support the work and exchanges of the national competent authorities[18] in charge of permitting under the TEN-E Regulation, including through providing technical assistance to a group of Member States. The Commission will also support Member States in implementing the provisions on accelerating permitting for all grids necessary to integrate renewable energy mobilising the Single Market Enforcement Task Force (SMET) as necessary.

3.3. Ensuring integrated Maritime Spatial Planning

Maritime spatial planning (MSP) is a necessary tool to allocate sea space for different uses of the sea using an ecosystem-based approach and to ensure long-term co-existence and preservation of the ecosystems The Commission has established an EU MSP Platform for sharing knowledge and experiences, prepared guidance on managing tensions with sectors in competition with ORE and issued best practice for multi-uses of space and cross-border cooperation. The Commission will continue to facilitate national maritime spatial planning by identifying potential tensions, providing guidance, supporting cross-border co-operation and supporting projects in these areas. These efforts include support to national authorities with the implementation of the MSP Directive[19]**,** including for ORE developments.

Planning offshore renewables operations will need to ensure co-existence with other human activities and uses at sea while safeguarding the achievement of environmental and nature protection and restoration objectives, as well as safety of navigation at sea. In May 2023, the Commission launched the **European Blue Forum** for users of the sea to facilitate a dialogue in an open and prospective approach between science and stakeholders involved in marine protection, energy, maritime industry and transport, fisheries and aquaculture, tourism and health. Additionally on fisheries, the Commission is strongly engaged with the sector and regional advisory councils to facilitate exchanges of knowledge and dialogue.

Most Member States have adopted their maritime spatial plans and have identified and allocated space for offshore renewable projects. 17 out of 22 coastal Member States have a plan as required by the **MSP Directive**. Several plans are being revised to accommodate higher ambition for offshore renewables as well as nature protection and restoration targets under the EU 2030 Biodiversity Strategy. The Commission calls on those Member States that have not yet adopted their MSPs as strategic and integrated planning to deliver on their legal obligation and to set aside space for energy in co-ordination with other economic activities, including fisheries, along a synergies by design approach, in line with their national energy and climate plans NECPs.

[18] In 2021 the National Competent Authorities (NCAs) agreed to establish a dedicated forum for their cooperation. The Commission has supported the NCAs' initiative supporting the coordination of their regular meetings and their efforts to identify best practices and opportunities for the acceleration of permitting procedures.

[19] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0089

The EU Marine Strategy Framework Directive (MSFD)[20] has been put in place to protect the marine ecosystem and biodiversity upon which our health and marine-related economic and social activities depend. This Directive requires the achievement of good environmental status of EU seas, thus ensuring that the marine environment is clean, healthy and productive, while enabling the sustainable use of marine goods and services by present and future generations. In particular, the Directive calls for addressing the cumulative impacts of human activities on the state of the marine environment, as part of its ecosystem-based approach, by taking the necessary measures to achieve the threshold values for good environmental status.

Under the **OSPAR Convention** for the protection of the Northeast Atlantic coastal and marine environment[21], a technical group dedicated to the offshore renewable energy development is exploring through studies the impacts of offshore renewable energies on the marine environment and biodiversity. Similar co-operation is taking place under **HELCOM Convention**, a joint working group co-chaired by HELCOM and the Vision and Strategies for the Baltic Sea group (VASAB) aims to ensure cooperation among the Baltic Sea Region countries for coherent regional Maritime Spatial Planning (MSP) processes in the Baltic Sea. While research efforts concentrate on specific areas and species, which corresponds to the current level of deployment of offshore wind farms, continuous research and innovation funding is needed to address cumulative impacts. This was also highlighted in a recent Special Report by the European Court of Auditors[22].

Building on the above the Commission will focus on the following:

- When aligning MSPs with increasing overall ORE targets and sea-basin ambitions, the Commission will explore with Member States and regional organisations ways to move from purely national MSPs with cross-border consultations to regional MSP planning within the respective sea basins, ensuring that sufficient sea space is allocated to enable such offshore renewable ambitions. This is to be compatible with other marine economic activities as well as with environmental objectives and nature protection and restoration targets at sea. As highlighted in the strategy, the Commission will also support coastal regions, the EU outermost regions, and islands to tap into their vast offshore renewable energy potential.

- Building on existing legal framework and funding instruments such as Horizon Europe, the Commission will complement its support to Member States in terms of identifying, estimating and addressing the effects that offshore renewable energy installations have on ecosystems and biodiversity, including the cumulative effects at sea basin level[23].

[20] https://environment.ec.europa.eu/topics/marine-and-coastal-environment_en

[21] https://www.ospar.org/site/assets/files/1169/ospar_convention.pdf

[22] European Court of Auditors: Special report 22/2023: "Offshore renewable energy in the EU – ambitious plans for growth but sustainability remains a challenge"

[23] This is in line with the Special Report of the European Court of Auditors: Offshore Renewable Energy in the EU.

- The Commission will support Member States in establishing the necessary links between ORE developments, MSP and the marine strategies developed under the MSFD for achieving the offshore renewable ambitions and good environmental status through appropriate fora such as the Greater North Sea Basin Initiative (GNSBI),

- By means of expert group meetings, regional cooperation and support for dedicated projects, the Commission will work with Member States to include areas for multi-use when revising national MSPs. This would facilitate permitting processes and co-existence of offshore developments including grids.

3.4. Strengthening the resilience of infrastructure

The Russian war of aggression in Ukraine and the sabotage on the North Stream gas pipeline illustrate the importance of having a resilient infrastructure in place for both the defence and energy sector. The Commission and the EEAS adopted in March 2023 an updated **EU Maritime Security Strategy** (EUMSS ([24]) and Action Plan. In October 2023, the Council is expected to endorse a revised EU maritime security strategy. The strategy and its action plan have been updated to address, among other issues, threats against critical maritime infrastructure. The revised strategy includes a variety of actions that will improve surveillance, protection and resilience of infrastructure such as energy pipelines, data and electricity cables, wind farms, ports etc. from conventional, hybrid and cyber-attacks. The strategy also addresses the implementation of solutions for co-existence between ORE projects and defence activities. The Symbiosis project will contribute to the development of such solutions.

In January 2023, the **Directive on the Resilience of Critical Entities**[25] (CER Directive) and the **Directive on measures for a high common level of cybersecurity across the Union** (NIS2 Directive) entered into force, putting forward new rules to strengthen the resilience of critical entities. Also in January, President von der Leyen announced together with NATO Secretary General Stoltenberg a task force on resilient infrastructure, enhancing cooperation with our key partners. The Final Assessment Report of the Task Force was published in June 2023[26]. In December 2022, the Council adopted the Recommendation on a Union-wide coordinated approach to strengthen the resilience of critical infrastructure. One key priority here is the conduct of stress tests, starting with the energy sector. The role of Member States is key, and cooperation on this important matter is essential. The Commission adopted in September 2023 a proposal for a Council Recommendation on a Blueprint to coordinate a Union-level response to disruptions of critical infrastructure with significant cross-border relevance[27]. In order to successfully strengthen our preparedness, it is vital that Member States share information, even on a confidential basis, as appropriate.

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[24] https://oceans-and-fisheries.ec.europa.eu/ocean/blue-economy/other-sectors/maritime-security-strategy_en

[25] Directive (EU) 2022/2557 of the European Parliament and of the Council on the resilience of critical entities and repealing Council Directive 2008/114/EC (OJ L 333, 27.12.2022, p. 164)

[26] EU-NATO_Final Assessment Report Digital.pdf (europa.eu)

[27] COM(2023) 526 final

In line with the strategy, the Commission and the European Defence Agency have set up a joint project called **Symbiosis**[28] supported by Horizon Europe with EUR 2 million. The project will identify and address barriers for offshore renewable energy developments in areas used or reserved for present and future military activities and purposes. The project started in October 2022 and will run until 31 March 2025.

Taking into account the Russian war of aggression in Ukraine, the presence of Russian vessels around maritime infrastructure in the Baltic and North Seas, as well as the attacks on the Nord Stream 2 pipelines, the EU is putting more emphasis on maritime security and the resilience of critical infrastructure at sea. Ensuring effective co-existence between energy and defence infrastructure at sea will be a priority. The Commission will:

- Seek to strengthen the resilience and protection of offshore renewable infrastructure, mindful of regional specificities and threats levels.

- Step up cooperation between Member States, with the support of relevant agencies, to develop regional surveillance plans for offshore infrastructure.

- Develop cooperation on cybersecurity in the offshore domain with like-minded non-EU countries at bilateral and multilateral level in the context of e.g. cyber dialogues.

3.5. Research and innovation supporting offshore energy

Research and innovation have been essential in making the EU a leader in certain offshore technologies, such as offshore wind[29]. A sustained R&I effort is fundamental to keep this leadership. EU research and innovation activities are ongoing on several other emerging technologies which are relevant for the offshore sector, like floating photovoltaic, algae as source of sustainable bio-fuels and offshore hydrogen systems. .As some technologies such as bottom fixed wind turbines have reached a high technology readiness level, there is a need to innovate production processes with a view to upscaling, while continuing to explore novel concepts that will take longer time to industrialise and standardise.

Floating offshore is a priority as this technology is necessary to unlock the potential in deeper waters, such as the Atlantic and Mediterranean sea. Prototypes and demonstrators are developed to test and improve the performance and reduce costs. Even if many different floating wind technologies are progressing, no concept has so far prevailed over others. However, the different solutions are at different technology readiness levels, with some of them closer to market deployment. Ireland, Portugal, Spain, Italy, Malta and Greece have identified potential sites for floating wind developments, and France is organizing its first tender for a commercial floating wind park.

[28] https://eda.europa.eu/docs/default-source/brochures/eda-symbiosis_factsheet---v4.pdf

[29] JRC, Clean Energy Technology Observatory: Wind energy in the European Union - 2023 Status Report on Technology Development Trends, Value Chains and Markets

The EU has made good progress in ocean energy development since the launch of the Offshore Strategy[30]. This has been achieved notably with EU funding for R&I. However, progress is needed in many areas such as design and validation of ocean energy devices, logistics and marine operations. The revised Renewable Energy Directive has an indicative target of at least 5% of all new installations by 2030 to come from innovative renewables, such as ocean energy technologies. The Commission will therefore encourage Member States to include targeted policies to support the deployment of ocean energy technologies in the revised National Energy and Climate Plans (NECPs).

The Commission has set up a website dedicated providing an overview over EU funding programmes relevant to finance offshore renewable energy projects [31], including but not limited to research and innovation. As this overview shows, over the period 2009-2022, offshore technologies have received the largest share of EU funding across all wind research and innovation priorities.

Various projects under **Horizon Europe** (HE), especially under Pillar 2 Cluster 5 Climate, Energy & Mobility, have supported offshore renewables. For instance, the InterOPERA project is the EU's flagship project to support the cooperation between TSOs, manufacturers and offshore wind developers to start a large-scale High Voltage Direct Current (HVDC) grid demonstration project. Other projects have supported the development of new wind, ocean energy and solar floating technology designs as well as systematically integrating the principle of 'circularity by design' into renewables research & innovation. The Horizon Europe Mission "Restore our Ocean and Waters" has launched several research projects to advance knowledge for the integration of aquaculture production within offshore wind farms.

The **European Regional Development Fund** has also supported a number of projects to support offshore renewables, including, for example, the development of innovative, better performing high-voltage cables and the creation of an Offshore Wind Innovation Centre in Eemshaven (NL).[32] **The Recovery and Resilience Facility** is financing the deployment of offshore wind (1500 MW), floating wind and solar capacities (100 MW) and the deployment of pilot projects in marine energy. It also finances the construction of an offshore energy island, offshore energy platforms and port infrastructures which serve the maintenance of offshore wind farms.

The Innovation Fund has taken steps to accommodate breakthrough projects, like ocean energy technologies, and recently selected two ocean projects for grant under the topic *mid-sized pilots*. One project integrates several energy sources, including wave and wind energy, as well as a full hydrogen system (electrolyser, storage and fuel cells). The Innovation Fund also has a manufacturing topic covering innovative technologies for clean-tech manufacturing. This includes components for renewable energy generation. The next call will have a size of EUR 4 billion and cater for projects of all sizes.

[30] JRC, Clean Energy Technology Development and Outlook - 2023 Report

[31] Overview of EU funding for offshore renewables: https://energy.ec.europa.eu/topics/renewable-energy/financing/eu-funding-offshore-renewables_en

[32] More information on these and other projects on wind energy supported by Cohesion Policy can be found on https://kohesio.ec.europa.eu/en/projects

Under the **InvestEU Programme**, which is also supporting private investments in offshore renewables, more than EUR 1 billion of loans to offshore projects has so far been approved. For example, the EIB has recently signed an agreement to co-finance the construction of the first offshore wind farm in Poland — one of the largest in the world — with a loan of up to EUR 610 million, EUR 350 million of which backed by the InvestEU programme.[33]

The Commission has closely co-operated with the **Strategic Energy Technology Plan (SET Plan)** countries to **review the SET Plan targets** on ocean energy and offshore wind, their implementation agendas and to launch an additional SET Plan working group on HVDC. The Commission will:

- Support the European Technology and Innovation Platform (ETIP) on wind energy to revise their Strategic Research and Innovation Agenda and publish it by end of 2023 and support the ETIP on ocean energy to revise their Strategic Research and Innovation Agenda and publish it in spring 2024.

- In 2024, as part of the implementation of the revamped SET Plan, and considering the latest political priorities, reassess and possibly revise the R&I targets of the SET Plan Implementation Working Group on wind energy, and promote a stronger representation of countries in this group.

- In 2024, as part of the implementation of the revamped SET Plan, pay special attention to manufacturing, circularity, materials, skills and societal needs with the aim of advancing the competitiveness of the clean energy sector, including offshore renewables.

Over the coming years, research and innovation actions identified in the strategy will be continued and enhanced, mainly through **Horizon Europe and its work programs** and, where relevant, dedicated, calls for proposals. The Commission will in particular:

- Continue its focus on *circularity* as a priority given circular solutions can boost the competitiveness of the sector, reduce the risk of disruptions in the supply of raw materials and improve the environmental and sustainability performance of offshore renewable energy.

- In 2024, launch a series of projects focused on advanced materials for magnets, with special attention to permanent magnets for wind turbines. These projects will contribute to substitute critical materials in wind turbines to decrease material dependency.

[33] https://www.eib.org/en/press/all/2023-341-poland-investeu-eib-supports-one-of-the-world-s-largest-wind-farms-with-eur610-million-in-financing#:~:text=The%20European%20Investment%20Bank%20(EIB,by%20the%20LLC%20Baltic%20Power

- In 2024, launch a research and innovation action to *reduce the environmental impact and optimise the socio-economic impacts* of offshore wind farms. Addressing cumulative effects that different human activities and multiple offshore renewable energy farms have on ecosystems at sea basin level requires particular attention.

- Continue its efforts to improve *industrial productivity and efficiency* across the value chain of offshore wind energy. This involves improved manufacturing technologies, including *digital technologies*, such as Internet of Things devices. An important objective is to build scale and reduce cost. The Commission will launch in 2024 an innovation action to demonstrate offshore floating wind.

- Work with Member States and regions, including islands, to make use of available funds in a coordinated manner for *ocean energy technologies* to achieve a total capacity of 100 MW across the EU by 2027 and around 1 GW by 2030.[34] Topics have been launched comprising tidal and wave farms asking for synergies with national regional funding programmes.

- Explore *innovative procurement* as a mechanism to de-risk technology development and maintain European offshore renewables technological leadership, building on existing European Commission initiatives[35].

3.6. Developing supply chains and skills

The strategy addressed the supply chain and skills dimension in considerable detail and various actions have been implemented since. However, high inflation rates stemming from the effects of Russia's war of aggression on Ukraine, including on energy and food prices, global supply chains adjusting to the reopening after the pandemic lockdowns, a recovery in demand with a switch from services towards goods, and tight labour markets have put pressure on the overall economy, including the offshore renewable industry's capacity to deliver. Furthermore, increased competition from China and the potential effects of the US Inflation Reduction Act make it necessary to pay particular attention to the framework conditions for the EU supply chains[36].

Despite important differences, the EU supply chains for offshore renewables are intrinsically linked to those of the wind sector. To address the current challenges for wind manufacturers, the Commission has presented an Action Plan for the European wind manufacturing industry[37]. Policy measures and actions that are of particular relevance to the *offshore* supply chains are elaborated below.

[34] Recently, longer project lead times have made 2027 a more realistic timeframe than 2025 that was set out in the strategy.

[35] For example, the Horizon 2020 'Europewave' project – https://www.europewave.eu/

[36] 2023 Progress Report on the Competitiveness of Clean Energy Technologies COM(2023)652

[37] COM(2023)669

The EU supply chain for offshore wind farms is a complex network of segments and components interlinked to each other. Growing demand for offshore wind farms across Europe and globally is reflected in the corresponding increasing demand for EU offshore wind turbines, foundations, HVDC substations and other electrical equipment, cables, port readiness and vessels. For EU manufacturers to be able to continue serving increasing demand within and outside the EU, the EU's manufacturing capabilities need to grow substantially and at an accelerated pace to meet the block's fast-growing demand. At the same time, outside the EU, manufacturing capacities for offshore wind components are quickly growing and further substantial expansion is being projected. In parallel to expanding manufacturing capacity to meet the increasing demand to deploy offshore wind, EU manufacturers need to remain competitive in fierce international competition. Additional challenges pertain to the operation and maintenance stage based on cybersecurity concerns, and the availability of installation vessels for offshore wind[38]. Bottlenecks are expected to arise in virtually all parts of the offshore supply chain in the EU in the next few years.

A particular segment of the supply chain is that of **ports**, unique gateways to offshore energy installations. They provide terminals for the vessels needed for offshore installation and maintenance, and they can allocate the space and conditions needed for the fabrication and assembly of certain components. The increasing size of wind turbine blades pose logistical challenges. This requires major investments, for example in dredging, space for storing and assembly of turbines, or in crane capabilities. Moreover, the offshore renewable energy sector currently mostly relies on vessels built outside the EU which may create risks to future supply chains. Therefore, the development of offshore renewable energy constitutes an opportunity for the EU maritime equipment and shipbuilding industries. In order to address these challenges, the following actions have been initiated:

- The Commission will address the role of ports and their challenges related to both their own environmental footprint and their ability to help decarbonise industrial activities and maritime transport. These challenges are addressed by a pilot project called Port Electricity Commercial Model to be finalised in the first half of 2024.

- A study is carried out within the NSEC framework to address the capacity of ports to support the fast roll-out of offshore wind by mapping, categorising and prioritising port infrastructure needs relating to offshore wind developments[39].

- The trans-European transport network regulation (TEN-T) that is currently being revised and the TEN-E regulation are both relevant for port infrastructure. The Commission will promote synergies and complementarities between the two regulations with a view to improving the overall framework conditions for ports wishing to step up their activities in the offshore renewables sector.

[38] See footnote 1

[39] Study will be published on the NSEC webpage: https://energy.ec.europa.eu/topics/infrastructure/high-level-groups/north-seas-energy-cooperation_en

The European Commission presented in 2023 the **Green Deal Industrial Plan** (GDIP) to enhance the competitiveness of Europe's net-zero industry and support the fast transition to climate neutrality. The Plan aims to provide a more supportive environment for the scaling up of the EU's manufacturing capacity for the net-zero technologies and products required to meet Europe's ambitious climate targets. The Plan is structured around four main pillars: a predictable and simplified regulatory environment, faster access to public and private funding for clean tech production in Europe, initiatives to enhancing skills for the green transition and, finally, the encouraging open trade and resilient supply chains. **The Net-Zero Industry Act**[40] and the **Critical Raw Materials Act**[41] proposed 16 March 2023 are the main acts to develop the GDIP. Both acts will contribute to increasing the EU's resilience by boosting manufacturing capacity and reinforcing bilateral partnerships and multilateral co-operation.

In particular, access to **raw materials** is a critical topic. Many wind turbines' electric generators rely on rare-earth permanent magnets to deliver their high efficiency and performance levels[42]. While the EU has a leading role in the global wind turbines market, China dominates the rare earth elements market, from raw materials to magnet production[43]. Consequently, the EU is exposed to potential disruptions related to the supply of rare earth element (REE) materials and components. To increase the EU's strategic autonomy, reduce over-dependencies, strengthen supply chains and reduce the environmental footprint a combination of strategies and actions is being explored both in the NZIA and Critical Raw Materials Act (CRM), including:

- boosting extraction of REE resources in Europe;
- increasing component manufacturing capacity in the EU, with special emphasis on REE refining and the production of permanent magnets;
- enhancing recycling of permanent magnets and substitution of REE with innovative materials and designs.
- promoting partnerships with partner countries to ensure undisrupted supply of critical raw materials;

The proposed **Critical Raw Materials Act** also contains provisions requesting the Member States to design measures aiming at improving the circularity of the critical and strategic raw materials and by this fostering the creation of a secondary raw materials market in the EU. Horizon Europe will also contribute to the achievement of such goals through ongoing research and innovation projects on circularity, where the Commission will monitor their uptake by the industry[44].

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[40] EUR-Lex - 52023PC0161 - EN - EUR-Lex (europa.eu)

[41] EUR-Lex - 52023PC0160 - EN - EUR-Lex (europa.eu)

[42] These rare earth elements (REE) are Neodymium (Nd), Praseodymium (Pr), Dysprosium (Dy) and Terbium (Tb).

[43] JRC, 2023: Carrara et.al. "Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU - A foresight study", https://publications.jrc.ec.europa.eu/repository/handle/JRC132889

[44] This is line with the recommendations of the European Court of Auditors' report on Offshore Renewable Report | European Court of Auditors (europa.eu)

The Net-Zero Industry Act (NZIA) proposes a simplified regulatory framework for production of clean tech and the components of the supply chains needed and proposes accelerated permitting procedures for clean tech manufacturing projects. Offshore renewable technologies and grid technologies are listed in the proposed NZIA as strategic net-zero technologies, critical for EU's path towards its 2030 climate and energy objectives[45]. This will allow offshore renewable manufacturing projects to be recognised as net-zero strategic projects, benefitting from a priority status, shortened permitting procedures and administrative support for a rapid and effective implementation. Additionally, to support the deployment of high-standard products, the NZIA proposal requires renewable energy auctions to award the contract also based on resilience and environmental sustainability criteria[46].

In view of the urgency to support the resilience of European manufacturing for offshore renewables, the Commission will take a number of actions in relation to the coordination of auctions and the convergence of criteria as explained in more detail in the wind action plan.

The Commission will also further optimise the use of existing financing instruments and work with the European Investment Bank on possible dedicated financing streams.

As for **skills**, the offshore renewable energies (ORE) sector is growing. Today it accounts for around 80,000 jobs and is expected to create between 20,000 and 54,000[47] new ones in the next five years across Europe. However, with such a rapid development access to *skilled* labour may become a challenge for the many specialised parts of the supply chains and offshore specific training will become more important as the activities at sea will grow. In this context, the industry will have to address risks of skills shortages. Today, managers, engineers and technicians are already in high demand and vacant job positions are already difficult to fill. This will require a combined approach, accelerating efforts both to:

- Support the development of new skills both for people working in or entering the industry, especially in digitalisation, ICT, robotics, health and safety.
- Improve the diversity and inclusiveness of the sector. This means supporting gender balance and attracting youth as well as those workers in transition from other sectors with the view to ensuring that the green transition is a just transition.

As stressed in the 2020 Skills Agenda and reflected by the European Year of Skills, addressing skills challenges is a priority for the Commission. In addition to broader initiatives to support skills development for instance through the Council recommendations on vocational education and training, individual learning accounts[48]

[45] EUR-Lex - 52023PC0161 - EN - EUR-Lex (europa.eu)

[46] There are promising developments with the increasing practices by Member States of setting non-price criteria in offshore wind auctions, including on co-location of nature enhancement projects, multi-technologies (e.g. floating wind, wave energy or floating solar), fisheries and aquaculture.

[47] Observatory – Flores (oreskills.eu)

[48] Council Recommendation 2022/C 243/03

and micro-credentials[49], the Commission has developed specific initiatives to address sectoral needs. For instance, the successful Erasmus+ Blueprint Alliance for sectoral cooperation on skills in maritime technologies (MATES) contributed to the setting up of a large-scale partnership for offshore renewable energy under the Pact for Skills. The partnership aims to attract new workers to the sector, in particular young people and women, and support training and reskilling of maritime technologies professionals. In the next two years (2023-2024), it will be supported by the Erasmus+ funded project FLORES (Forward Looking at the Offshore Renewable Energies). It will involve major players in the ORE industrial ecosystem, as well as public authorities at all governance levels, to foster dedicated training offers and promote careers in the sector. It will also develop an observatory of training needs and offers for the ORE sector. Moreover, the Erasmus+ funded Centre of Vocational Excellence "Technical Skills for Harmonised Offshore Renewable Energy" (T-shore) aims to develop training programmes and resources to provide workers with the skills and competencies they need to succeed in the offshore wind industry.

To further underpin skilling for the clean-tech transition, the Net-Zero Industry Act proposal tasks the Commission to support the establishment of European Net-Zero Industry Academies. The Academies would aim to enable the training and education of 100.000 learners each, within three years of their establishment, to contribute to the availability of skills required for the net-zero technologies, including in small and medium-sized enterprises. To ensure skills transparency and portability and the mobility of workers, the Academies will develop and deploy credentials, including micro-credentials, covering learning achievements.

4. CONCLUSIONS

Since the Offshore Renewable Energy Strategy was adopted in November 2020, the war in Ukraine and the ensuing REPowerEU plan has underscored the importance of accelerating the roll-out of offshore renewable energies. The strategy has been instrumental in driving forward changes in many areas, including changes in the legal framework, such as the revised TEN-E Regulation and the revised RED. **New offshore objectives, as put forward by Member States, are more ambitious and require swift action** at national and regional level building on the progress made so far. The wind power action plan, adopted together with this communication, sets out a number of actions that can help accelerate the deployment of wind energy in particular and strengthen the European wind industry.

The achievements so far and the challenges ahead underline the need to further **strengthen regional co-operation** to accelerate the development of cross-border energy infrastructure, in particular the development of offshore grids and cross-border renewable energy projects as well as regional MSPs. The Commission will work closely with Member States and all relevant stakeholders to implement the identified actions to advance concrete offshore renewable energy projects to deliver on the bold ambitions.

[49] Council Recommendation 2022/C 243/02

On the **international scale**, the Commission will continue to engage with international organisations, such as the IEA and IRENA, and partner with countries that are key players in the energy field to realise world-wide offshore renewable energy aspirations including through the Global Gateway initiative.

The Commission considers that reinforced cooperation with Member States on the implementation of the existing legal framework as well as fostering agreement on proposed new legislation as described in this Communication will enable a timely delivery on the offshore renewable energy ambition in a sustainable manner. This will require a persistent and unrelenting effort by all stakeholders.