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COMMUNICATION FROM THE COMMISSION

Guidance on collaborative investment frameworks for offshore energy projects

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I. INTRODUCTION

I.a. EU policy and the TEN-E Regulation

Accelerating the energy transition and joining forces to achieve a more resilient energy system are the basis of the Commission's REPowerEU Plan to rapidly reduce the EU's dependence on Russian fossil fuels[1]. In full consistence, the EU revised the Renewable Energy Directive[2] increasing the overall Union renewable energy target to at least 42.5% by 2030. Offshore renewables will play a key role in supporting such objectives. They will greatly contribute to achieving the EU's renewable energy targets, are poised to become a main pillar of its future electricity mix and are needed to move towards a fully decarbonised power system by 2040[3]. Offshore renewables will also increase the EU's domestic energy generation, reducing its dependence on fossil fuels. They will deliver competitive electricity prices, as already demonstrated by recent auction results, supporting Europe's industrial competitiveness and contributing to affordable prices for consumers. With a supply chain largely domestic today and growing demand, they will create new opportunities to create high-quality jobs and address local unemployment challenges in the EU.

A first deliverable of the TEN-E Regulation (EU) 2022/869 was completed in 2023, when Member States agreed regionally on cumulative offshore goals of around 111 GW by 2030 and 317 GW by 2050[4], a significant increase from the 19.38 GW installed capacity in the EU by the same year – 2023. The benefits of the enormous generation capacities to be installed are likely to extend beyond the borders of the Member States physically hosting the projects. New cross-border projects, particularly hybrid interconnectors – transmission lines that connect offshore renewables and interconnect Member States – will therefore be needed. This was one of the conclusions of the first edition of the offshore network development plans (ONDPs) developed and published by ENTSO-E for each of the EU's five sea basins in January 2024, a second TEN-E deliverable that builds on the Member States' regional agreements. Specific infrastructure projects consistent with the needs identified in the ONDPs may then be considered within Ten-Year Network Development Plans (TYNDP) and reflected in national energy and climate plans (NECPs). A third consecutive TEN-E requirement is for the Commission to develop guidance on cost-benefit analyses and cross-border cost sharing for the development of the ONDPs for each sea basin, addressed by the present document. Lastly, the TEN-E prescribes ENTSO-E to present the results of the application of this guidance for the first time by 24 June 2025. The regional agreements, ONDPs and results of the application of the cost sharing guidance are to be updated subsequently every two years. In certain areas addressed in this cost sharing guidance, the full application of its principles may require an evolution of the ONDPs. The first version of the cost sharing application exercise to be conducted by ENTSO-E may therefore require certain simplifications.

[1] https://energy.ec.europa.eu/topics/markets-and-consumers/actions-and-measures-energy-prices/repowereu-2-years_en

[2] Directive (EU) 2023/2413

[3] COM(2024) 63 final

[4] https://energy.ec.europa.eu/news/member-states-agree-new-ambition-expanding-offshore-renewable-energy-2023-01-19_en

I.b. Why collaborative investment frameworks are needed

The necessity for cross-border cost sharing for the development of the ONDPs stems from several **particularities specific to offshore projects**, which require particular attention.

First, they **require a significant level of involvement from Member States** to deploy a project within their sea space due to their size, the presence of other activities at sea and possible cross-border impacts. Member States get involved in the development of offshore renewables by developing preliminary studies of the seabed surface and marine environment, strategic environmental assessments, maritime spatial plans selecting suitable areas, renewable auctions, seabed leases and setting political targets for offshore renewables. Since actions by one Member State can impact its neighbours, intergovernmental cooperation is essential. This calls for strong regional collaboration between Member States in the different steps of deploying offshore renewables, including on cost and benefit sharing.

Second, the Member States' regional agreements towards around 317 GW by 2050 are ambitious, realistic and necessary for decarbonising the European power sector by 2040. They contain breakdowns per Member State depicting how to reach the combined goals. Yet, **part of such national breakdowns of the regional goals may be unrealisable if the enabling conditions are not provided**. These are established by ensuring that the offshore renewable potential supported by political goals can effectively reach demand within the region, domestically (provision of electricity to traditional, electrified and new demand), cross-border (trade of electricity via hybrids and through onshore interconnectors) and in conversion to other energy carriers (power-to-X, such as hydrogen and ammonia, for domestic usage or for export).

Adequate EU and regional planning coordination should address some of these areas, particularly through future evolutions of the ONDPs. Nonetheless, some of the enabling conditions are highly dependent on national and local strategies and policies, such as industrial (e.g. decarbonisation of energy intensive industries), digital (e.g. data centres) and for energy (e.g. interconnectors and hydrogen). Without these demand-driven considerations, deploying the regional offshore goals may indeed prove unrealisable: where generation cannot effectively reach demand, the benefits for a Member State willing to host further offshore renewable projects may eventually drop below deployment costs. At the same time, fully exploiting Europe's indigenous offshore renewable resources is key to the decarbonisation of Europe and its regions. This calls for reaching a common understanding between the Member States of each region regarding the implications of developing their regional offshore ambitions, as well as the risks and implications of not achieving part of these, and any associated costs and missed benefits.

A **third** relevant particularity is the **accessibility to the electricity network**. The connection of offshore wind farms will generally require substantial greenfield investment into electricity grids as, contrary to the situation onshore, meshed offshore grids do not yet exist. Here, hybrid projects will play a fundamental role as they enable more renewable capacities to be deployed, increase regional security of supply and keep prices in check. Moreover, a hybrid interconnector may increase the transmission asset utilisation – and thus, its value – compared to a radially connected wind farm (i.e. connected via a direct line to shore) since the wind farm gets access to an additional market and the hybrid can continue to 'serve' as interconnector at times of low wind.

A well-planned energy network for offshore renewables that makes optimal use of the sea and land space and promotes interconnection will also reduce environmental impact and

lower grid investment costs for connecting the same amount of renewable capacities. Cost sharing discussions should therefore be based on planning and cost-benefit analyses that appropriately quantify the value of hybrids and their dual role as a connection line that enables the integration of new offshore renewables, as well as an interconnector.

Given the complexity of offshore energy projects, addressing these three particularities in a timely manner requires **stronger cooperation** at regional level, the establishment of **new cross-border projects** and a **fair system of distributing investment costs reflecting the distribution of benefits**. There is therefore a need for collaborative investment frameworks that enable Member States to achieve their combined goals, ensuring the establishment of the necessary enabling conditions.

I.c. Scope of this guidance

Realising the enormous benefits that offshore renewables will bring requires addressing the **challenge** of reaching consensus on the **equitable distribution of costs**. For a cross-border project, this is typically agreed through bilateral negotiations. The eventual agreement to allocate costs for offshore projects should indeed remain project specific, where detailed information is available. Nonetheless, deploying more than 300 GW in the next two and a half decades, as Member States strive for, requires complementing the bottom-up project-specific approach with high-level assessments per sea basin to support the timely kick-off of discussions, identifying and engaging the relevant parties and understanding cost implications of realising the regional plans.

Collaborative investment frameworks for offshore projects of cross-border relevance **are needed to ensure that regional ambitions are not compromised**. The present guidance seeks to assist Member States and regulatory authorities in engaging in dialogues on collaboration principles from the outset of identifying network needs, accelerating the emergence of new cross-border projects and fostering the implementation of political agreements. Early regional information based on common principles will support Member States in agreeing to explore and invest in cross-border offshore energy projects, namely hybrid interconnectors and joint offshore renewable projects.

The present guidance sets a framework for the new **sea basin cost-benefit analysis** (SB-CBA) and **cross-border cost sharing** (SB-CBCS) exercises that assess the implications of developing an ONDP. They build upon the ONDPs and will complement them in the future, evolving over time to reflect future planning evolutions, including cross-vector integration with hydrogen systems, improving the recognition of the benefits of hybrids, onshore grid reinforcement needs and any other future relevant changes. While this guidance contains the principles that could be largely applicable to ONDP developments, it may be updated if deemed necessary in accordance with Article 15(1) of the TEN-E Regulation. In addition to supporting cost sharing discussions, the SB-CBA and SB-CBCS will, as of 2026, support Member States in future revisions of their regional offshore renewable goals. It is important to also stress that the SB-CBCS does not have binding implications on project-specific cross-border cost allocation (PS-CBCA) decisions, which remain the primary tool for conducting actual investment sharing negotiations for Projects of Common Interest (PCIs) and Projects of Mutual Interest (PMIs) as well as renewable generation joint projects.

The guidance also looks at the particularities of project-specific cost-benefit analyses and cost sharing approaches. It provides recommendations, supplementing the Commission

Guidance on cost-benefit sharing in cross-border renewable projects [5] and ACER Recommendations on good practices for the treatment of the investment requests (including CBCAs) for PCIs[6]. In line with Article 16(11) of the TEN-E, ACER should ensure the principles indicated in the present Commission guidance are consistently considered in any future update of their Recommendations. Lastly, the guidance explores potential new collaborative investment tools for offshore energy projects of cross-border relevance, both for transmission and generation assets.

II. SEA BASIN COST-BENEFIT EXERCISES

ENTSO-E is required to perform cost-benefit and cost sharing assessments for each of the five TEN-E **priority offshore grid corridors** on the basis of already developed ONDPs, i.e. for those Member States that subscribe to offshore renewable ambitions. The SB-CBA and SB-CBCS therefore need to include those Member States concerned by each priority offshore grid corridor in question, namely:

- North Seas offshore grids (NSOG) corridor: BE, DE, DK, FR, IE, LU, NL, SE
- Baltic Energy Market Interconnection Plan (BEMIP) offshore grids: DE, DK, EE, FI, LV, LT, PL, SE
- South and West (SW) offshore grids: EL, ES, FR, IT, MT, PT
- South and East (SE) offshore grids: BG, CY, EL, HR, IT, RO, SI
- Atlantic offshore grids: ES, FR, IE, PT

The geographical scope of the exercises therefore covers the relevant Member States of the respective sea basins. Provided interest exists, in exceptional circumstances and if duly justified, additional Member States, including landlocked ones, or third countries could be included in the exercises, which would need to be assessed on a case-by-case basis.

II.a. Sea basin cost-benefit analysis as the basis for cost-sharing

A cost-benefit analysis supports decision-makers in understanding the expected outcomes of the realisation of a plan or project, serving to substantiate discussions between the involved parties. The SB-CBA refers to the determination of costs and benefits related to the realisation of an ONDP, informing Member States of the impact of their offshore renewable ambitions.

i. Scenarios and sensitivity analyses

Each SB-CBA is to be performed using the most recent joint scenarios established in the framework of the Ten-Year Network Development Plan (TYNDP) in compliance with Article 12 of the TEN-E. The use of several scenarios helps to account for different possible futures, such as a possible higher demand driven by different expectations in, for example, e-mobility or data centres, or in flexibility availability. All TYNDP scenarios need to account

[5] Commission Notice: Guidance on cost-benefit sharing in cross-border renewable energy cooperation projects - European Commission (europa.eu)

[6] https://acer.europa.eu/sites/default/files/documents/Recommendations/ACER_Recommendation_02-2023_CBCA.pdf

for the Member States' regional goals for offshore renewables, while the different scenarios could consider different values within the ranges indicated in the agreements.

Uncertainties should primarily be addressed through using the different TYNDP joint scenarios and not through sensitivity analyses. The increased robustness at plan level, of large geographical and time scopes, will come primarily by introducing several scenarios. Sensitivities to individual variables may be relevant at project level.

ii. Counterfactual

The counterfactual is the alternative to which the benefits and costs of realising the ONDP are compared, i.e. what other realistic development could occur instead of the one presented in the ONDP. This serves determining the added value brought by the realisation of the ONDP and the possibilities for cooperation it identifies. For each SB-CBA, counterfactuals should consider to what extent the totality of the regional offshore renewable goals can be realistically deployed without cooperation. For example, some radially connected wind farms will likely become too expensive for sites beyond certain distance, requiring hybrids to make them commercially interesting. In such cases, the realistic alternative to a certain hybrid project may not be a radial, but no project at all. Likewise, the interest of a hosting Member State for auctioning additional offshore generation may drop if new onshore interconnectors that ensure that the added electricity can reach large demand centres are not established. The counterfactual should then assume a partial decrease of the offshore generation capacities to be deployed.

The determination of such realistic alternative development, the counterfactual, is nevertheless not straightforward. When establishing their regional offshore goals, Member States pay careful attention to constraints such as available offshore wind potential, available sea space, the presence of environmentally protected areas, public support, etc. The ONDPs then outline the needed cross-border (and radial) transmission infrastructure necessary to allow their ambitions to materialise. The counterfactual needs to consider that, in the absence of cooperation as assumed in the ONDP, these constraints will further restrict the offshore capacity that can be deployed. Notably, demand constraints, both domestic and cross-border, are critical to quantifying how much of the factual is not realistic without new cross-border projects. Beyond certain level of offshore generation deployment, without cooperation, the marginal value of new offshore wind farms may be limited in view of domestic demand expectations in the Member State of deployment as well as available trading opportunities using already existing cross-border energy infrastructure.

As Member States are responsible for determining the ambition, siting and auctioning of offshore renewables, they will also have a key role in assessing the consequences in terms of achieving regional offshore ambitions in the absence of new cross-border infrastructure as identified in the optimised ONDP. Therefore, for the counterfactual, Member States should also provide input on their expectation of realisable offshore goals under constrained export conditions, while remaining ambitious and striving for a coherent approach in each region. The counterfactual should assume radially connected projects up to the generation level considered as realistic and take a no-project assumption beyond such threshold.

Doing such exercise should be of high value to Member States as it enables not only to ensure that the SB-CBA is assessed with an appropriate counterfactual, but in understanding the dependency of their offshore renewable ambitions on fruitful regional political cooperation. Moreover, as it is the case with the regional offshore goals, the determination of the unrealisable part of such goals can have cross-border implications and thus should ideally

be conducted regionally based on national assessments and commonly agreed principles. The High-Level Groups[7] or the TEN-E Regional Groups could serve as fora to support such process. Given time constraints, simplifications on the counterfactual will be needed for the first edition of the SB-CBA.

iii. Reference grid

The reference grid is the baseline network expected to be in place by the particular time horizon under analysis in the SB-CBA. Cost and benefits are modelled for the factual (ONDP) and counterfactual, considering such reference grid as the network to which the factual or counterfactual are added or subtracted. The reference grid used for all SB-CBAs should correspond, for each respective time horizon, to the EU-wide model used for the TYNDP project-specific CBAs, ensuring consistency with the TYNDP's system-wide assessments as well as consideration of other sea basin projects and needs.

iv. Bidding zone configuration

The bidding zone configuration may impact the distribution of benefits between Member States. For hybrid interconnector needs identified in ONDPs, an offshore bidding zone configuration should be used in the SB-CBA for the linked generation, as it better reflects the network conditions within the capacity calculation and allocation processes[8].

v. Onshore reinforcements

The realisation of ONDPs will require substantial onshore grid reinforcements, with corresponding costs as well as benefits such as reduced curtailment. The SB-CBA should include onshore reinforcement assessments for those Member States in scope per sea basin. Identifying the reinforcements necessary for the realisation of the ONDPs poses a modelling challenge, since an onshore reinforcement identified in the ONDP might also be required for another onshore system need. Nonetheless, excluding the cost and benefits from onshore reinforcement needs would give a limited view to Member States on the consequences of developing ONDPs and can be a determining factor in confirming the interest in their deployment, since it relates to the certainty that electricity from offshore renewables will actually reach demand. In case of overlapping needs for an onshore grid reinforcement between needs stemming from the integration of offshore renewables and those from other onshore-related needs, only the part of the onshore reinforcement needs that can be clearly identified as needed solely because of offshore needs should be considered. It should also be considered that lower deployment of offshore renewables due to lesser cooperation would lead to an even higher need for onshore renewables, which could likewise increase onshore grid reinforcement needs.

ENTSO-E should provide transparent information on the assumptions made to distinguish the reinforcement needs relating to offshore generation capacities. Where needed, ENTSO-E should seek guidance from the High-Level Groups or TEN-E Regional Groups.

[7] https://energy.ec.europa.eu/topics/infrastructure/high-level-groups_en
[8] SWD(2020) 273 final

vi. Cost and benefit modelling

Impacts assessed under SB-CBA should include at least the following TYNDP benefits: socio-economic welfare, CO_2 variation, non-CO2 emissions (including air pollutants), system adequacy and renewable integration. To the extent possible, impacts on biodiversity and other relevant environmental externalities (e.g. other pollution) should also be assessed. Within the latter, the deployment of offshore renewables is an obvious benefit of developing offshore hybrid and radial transmission infrastructure. Hybrid transmission lines will additionally present benefits in integrating onshore renewables, given their role as interconnectors. Moreover, by assessing the counterfactual as previously described, offshore generation benefits that would otherwise not be realised are quantified.

Costs should be based, when possible, on CAPEX primarily. Only transmission costs should be included, i.e. not generation, for which its costs are commercially-driven and only discovered through project-specific tenders, while the relevant benefits are considered as described above. ENTSO-E should not estimate current and future evolutions of offshore wind farm investment costs. All transmission assets identified in the ONDP should be assessed in the SB-CBA. OPEX costs can represent a significant part of the total costs of realising ONDPs, but are frequently related to project-specific designs, such as network losses or maintenance and may be difficult to adequately assess at sea basin level. Balancing reserve needs may also be affected by the deployment of offshore renewables, but SB-CBAs may not be suited for such assessments. In that regard, TSOs could consider requesting Regional Coordination Centres to conduct dedicated assessments considering offshore generation in their tasks on regional sizing and procurement. ENTSO-E should assess which OPEX could be robustly integrated in SB-CBAs. In cooperating on a concrete cross-border project, Member States may want to include in the respective project-specific CBA any relevant OPEX costs beyond those addressed by ENTSO-E at sea basin level.

vii. Time and geographical granularities

The risk levels associated with the realisation of the ONDPs increase over time, e.g. planning results may change as other developments in the country occur, or alternative projects may be identified. Such time-risk complexities therefore call for a temporal distinction. The SB-CBA should be performed for 2040 and 2050. Given the time necessary for developing an offshore energy project, and the time by which the first SB-CBAs will be published, 2030 assessments should not be conducted as they would not provide any useful information to Member States.

SB-CBA results should be determined individually per Member State as well as in an aggregated manner per sea basin. This provides the tools for Member States in a region to identify net-beneficiaries from the implementation of ONDPs and, in turn, for initiating projects conceptualisations that engage Member States beyond those physically hosting the projects. It also enables them to jointly discuss the complete high-level implications of realising an ONDP. Later in project-specific discussions, it may be assessed that some of the Member States initially considered from the SB-CBA results do not actually benefit from a project in question (and likely benefit from other ONDP projects). At the same time, those Member States that do benefit can be identified and included in the process early on, minimising the risks of failure of a late engagement in a project-specific cost allocation process.

viii. Results of the SB-CBA

The relevant TSOs and NRAs, ACER and the Commission should be appropriately involved in ENTSO-E's SB-CBA exercises. ENTSO-E should present its results to the TEN-E offshore priority grid corridors, in the respective regional groups or, where relevant, High-Level Groups. The results should be provided in euro for a best-estimate TYNDP scenario, showing uncertainty ranges that reflect the other TYNDP joint scenarios. The SB-CBA should identify net-positive and net-negative impacted Member States. It should also include a summary of all the infrastructure needs to develop an ONDP and, to the extent possible, their impact on the SB-CBA results.

To further facilitate regional discussions, NRAs of a region should assess the SB-CBA exercise performed by ENTSO-E and, where relevant, provide support to its results. This can help building upfront regulatory support and commitment, reducing friction and time in project-specific steps. In addition, ACER should consider providing an opinion to all SB-CBAs.

When a SB-CBA shows positive results for certain cross-border infrastructure needs, these should be studied further. As such, the inclusion of project-specific assessments under regional investment plans (i.e. project studies) or in the TYNDP should be expected.

II.b. Sea basin non-binding cross-border cost sharing

The SB-CBCS should provide information on cost sharing considerations, at regional level, on the basis of the costs and benefits of realising ONDPs. The result of this exercise is informative and indicative, without resulting in an actual allocation of costs.

i. Costs to be included in the SB-CBCS

Including all network needs necessary to realise the regional offshore ambitions in the SB-CBA enables Member States (and TSOs and the supply chain) to extract the necessary information regarding cooperation needs, equipment amounts, indications on the benefits from developing cross-border transmission projects to enable otherwise unrealisable offshore potentials and other information relevant for possible revisions to the regional offshore goals.

When it comes to cost sharing, only a subset of the infrastructure needs included in an ONDP and SB-CBA should be subject to the SB-CBCS exercise: those with clear cross-border relevance. For hybrid infrastructure needs, this includes the offshore grid transmission system from the offshore renewable generation sites to two or more Member States. Some radial connection infrastructure needs may also be relevant for cost sharing. This would be the case, particularly, if they are part of an infrastructure need identified by an ONDP as set to become a hybrid at a later stage. Some onshore grid reinforcements will also be relevant to developing ONDPs and have clear cross-border relevance. To ensure fairness in cost sharing discussions related to offshore renewable integration, these should in principle also be included in the SB-CBCS exercise, to the extent that an appropriate methodology can be established as described above.

By keeping in the SB-CBCS scope only those infrastructure needs that are clearly relevant for offshore renewable integration and have cross-border significance, Member States within a region can identify which of these are more likely to be relevant for the design and following cost allocation negotiations of concrete cross-border projects in a particular time

horizon (2040 or 2050). This will help to define early in advance the scope of potential groups of projects to be bundled and timely engagement of NRAs and TSOs.

ii. Significance threshold for net-positive beneficiaries

Negotiations on concrete projects have direct cost allocation implications and therefore the designation of net-positive beneficiaries for a project-specific cross-border cost allocation requires the usage of significance thresholds to remain pragmatic. This ensures that modelled contributions by non-hosting Member States that have a small magnitude do not significantly increase the negotiation and administrative costs for an individual project, i.e. do not excessively increase the number of involved parties.

At plan level, which is conceptual with no binding cost implications, these arguments do not apply whereas there may be opportunity costs from not identifying and engaging sufficiently in advance beneficiary parties with relatively smaller net-positive impacts. Moreover, at plan level any small threshold could lead to substantive gaps in terms of the total amount of costs covered, with the infrastructure needs for a single Member State over a whole decade potentially covering a large number of projects and investment costs. Therefore, for SB-CBCS, no minimum significance threshold of net-positive impacts should be used.

iii. Results of the SB-CBCS

The relevant TSOs and NRAs, ACER and the Commission should be appropriately involved in ENTSO-E's SB-CBCS exercises, of which ENTSO-E should present its results to the TEN-E offshore priority grid corridors. ENTSO-E should report the cost sharing application for each Member State per sea basin, split per decade (2040 and 2050), in euro, on the basis of a distribution proportional to the share of benefits. The SB-CBCS should also include a summary of all the infrastructure needs relevant to regional cost sharing and, to the extent possible, their impact on the SB-CBCS results.

III. RECOMMENDATIONS FOR PROJECT-SPECIFIC ASSESSMENTS

III.a. Project-specific cost-benefit analysis

i. The process of establishing a PS-CBA

When initiating discussions and cost allocation negotiations on concrete cross-border offshore transmission projects, national regulatory authorities (NRAs) rely on project-specific cost-benefit analyses (PS-CBA). This may also be the case when Member States discuss cross-border offshore renewable joint projects, potentially to negotiate statistical transfers or the establishment of a joint support scheme to cover an investment gap. In either case, NRAs and/or Member States may decide to delegate modelling calculations to TSOs.

Risks of failure in negotiations for cross-border projects can be limited when the process is agreed in advance by the relevant parties. For example, a **coordinated approach for cross-border transmission assets** may be to:

1. Establish a memorandum of understanding (MoU), or similar, between relevant Member States
2. Establish an MoU, or similar, between relevant TSOs

3. Relevant NRAs to jointly agree on assumptions to be considered by TSOs
4. TSOs to jointly develop a PS-CBA
5. NRAs to joint validate the results or jointly request changes to TSOs

The joint agreement of assumptions to be used in a PS-CBA (e.g. how many and which scenarios to consider) and conducting joint modelling can largely lower subsequent disagreements stemming from the usage of divergent modelling approaches and results. It should be noted that Member States may also be involved in the process for transmission assets, according to national practices, e.g. in validating the assumptions or results (for example, when some Member States approve national investment plans for the TSOs in their territories). The proposed coordinated PS-CBA procedure should serve as a guiding framework, whereas flexibility should be provided as needed. For example, a group of Member States may deem that conducting MoUs could prolong instead of shortening the necessary negotiating time and thus consider them unnecessary or may decide that some steps should be pursued in parallel.

For **cross-border offshore generation projects**, the relevant Member States may jointly perform the PS-CBA. They should decide, first, the approach to developing the joint modelling calculations (e.g. directly by themselves, delegating to their respective energy agencies, delegating to relevant TSOs or by tendering consulting services). Then, they should jointly decide on the assumptions to be used (e.g. scenarios and the possible inclusion of onshore grid reinforcements in the assessment) and jointly develop the PS-CBA as previously agreed.

Where complex cross-border offshore projects may integrate **both a hybrid interconnector project and an offshore renewable joint project**, the relevant Member States and NRAs should ensure consistency in the respective PS-CBAs for the two projects. They should ensure, on the one hand, that the assumptions of both projects are consistent and avoid double-counting of costs and benefits. At the same time, they should minimise risks in delays, particularly where the respective projects have different investment decision times. For instance, the final cost allocation for the transmission asset may need to be decided earlier where its commissioning would take substantially longer than for the offshore wind farm. They may also decide to integrate the two project assessments into a single holistic assessment. However, such an approach should always enable the distinction between, on the one hand, infrastructure-specific results for the NRAs' consideration in their cross-border cost allocation decisions and, on the other hand, of generation-specific information relevant for Member States' cost-benefit sharing arrangements for a distribution of renewable statistics and support costs.

Energy islands are another type of complex project requiring substantial investment that may have very divergent project designs, ownership structures and financing mechanisms. Therefore, the process and analyses for an energy island should be studied on a case-by-case basis, accounting for its characteristics.

ii. Scenarios and sensitivity analyses for PS-CBAs

In accordance with Article 16(4) of the TEN-E Regulation, the **scenarios** to be used in project analyses should at least consider the TYNDP joint scenarios. Introducing further scenarios might increase robustness by accounting for different possible futures, but also risks overlapping with TYNDP scenarios, extending modelling times and potentially negotiation costs. TEN-E provides for a framework for developing TYNDP joint scenarios

that ensures a high level of stakeholder engagement and scrutiny. National parties should therefore actively participate so that the quality and trust in the scenarios is high, minimising the need for time-consuming (and at times counterproductive) additional scenarios.

Instead of additional scenarios, **sensitivity analyses** on TYNDP scenarios can be effective tools to further increase the robustness of project assessments. This is by assessing how the project value changes when altering a key assumption to identify which assumptions have the most significant impact on the results of the PS-CBA. In case additional scenarios beyond the TYNDP ones are deemed necessary, for example to integrate new local information made available after the development of TYNDP scenarios, TEN-E requires these to be consistent with the Union 2050 climate neutrality objective and intermediate energy and climate targets, be subject to the same level of consultation and scrutiny as for the TYNDP scenarios and be assessed by ACER.

iii. Counterfactuals for PS-CBAs

In developing the counterfactual of an offshore project, Member States and/or NRAs, as relevant, should assess and agree what would be the most likely consequences of a failure of the cost allocation negotiation for the project. The agreed **counterfactual should always represent the most realistic project alternative**. For example, when assessing a **hybrid** transmission project, two NRAs may typically consider that the most likely alternative to developing the hybrid may be a radial line connecting to the closest shore. Where relatively frequent and large electricity price differentials are seen between the countries' bidding zones, considering a traditional point-to-point interconnector may remain a likely alternative.

Likewise, for an offshore renewable **generation joint project** connected via a hybrid, different counterfactuals may be appropriate. For very large generation projects (e.g. those associated to an energy island) or for projects that are realisable only if new interconnector capacity is established (see also 'counterfactual' for SB-CBAs), reasonable alternatives may be the consideration of a smaller offshore wind farm connected radially, or even no offshore wind farm at all if too expensive to connect it radially.

iv. Bidding zone configuration

The bidding zone configuration of a specific project can impact the distribution of benefits between Member States, as well as between transmission and wind farm developers. Therefore, Member States should strive to determine the bidding zone configuration of a project as early as possible, to adequately consider it in the PS-CBAs of the transmission and generation projects and to give visibility ahead of auctions. For projects consisting of offshore wind farms connected through a hybrid interconnector, Member States should investigate offshore bidding zones as a more robust arrangement to fully integrate the generation into the European electricity market.

III.b. Project-specific cross-border cost allocation

Complementing the ACER Recommendation on the treatment of PCI investment requests, certain particularities of offshore transmission projects should be considered. Hybrids in particular present a number of intricacies that can affect negotiations on allocation of investment costs. Traditional point-to-point interconnectors serve to arbitrate prices across borders, optimising the overall energy system. Hybrids, additionally, can potentially integrate very substantial offshore renewable capacities and fundamentally change the energy mixes of

a region. Benefits are more likely than in past electricity interconnector projects to be perceived not only by the hosting Member States, but to spread beyond to neighbouring areas.

For projects to remain interesting, they should have an overall net-positive socio-economic welfare impact, and no individual Member State should experience a net-negative impact. A PS-CBA showing a net-negative impact to a country hosting an offshore project constitutes a potential barrier to its development. A project-specific cross-border cost allocation (PS-CBCA) is an instrument with a structured process set by TEN-E that helps NRAs and Member States reaching agreements on the distribution of investment costs. The usage of PS-CBCAs is mandatory for PCIs and PMIs where grants for works under the Connecting Europe Facility (CEF) are sought, while other similar approaches (not strictly following the TEN-E requirements) may be used in other cases. Even when not mandatory, given the important investment amounts and relative complexity of a hybrid project, the use of simple sharing keys not proportional to benefits and avoiding PS-CBCAs are practises likely to become ineffective. PS-CBCAs are not (solely) a requirement for a possible application by a PCI/PMI for CEF funding for works, but an important negotiating tool with a clear procedure and concrete timelines that can facilitate and accelerate the negotiations. It should thus be viewed as one of the advantages of counting with PCI/PMI status that helps the timely delivery of cross-border infrastructure.

i. Significance threshold for net-positive beneficiaries

As a PS-CBCA leads to a binding decision on how to share costs, the determination of the Member States that receive a significant net-positive impact from the implementation of a project needs to remain pragmatic, while not leaving fundamental investments uncovered. With benefits more likely to spread regionally, a lower significance threshold for identifying net-positive beneficiaries of hybrids may be required than for traditional interconnectors. Against this background, a threshold lower than 10% should be considered.

ii. Contributions by non-hosting Member States

The contribution by a non-hosting Member State that is a net-positive beneficiary may be necessary for the bankability of a project where a hosting Member State is deemed to have a net-negative impact. In principle, such beneficiary Member State should contribute financially to ensure the success of a project and that it effectively realises the benefits in their territory. In practice, this may be challenging. For example, the non-hosting country may be involved too late in the process, raising new questions on the performed models and their results, may consider the estimated benefits to be too uncertain or may consider it practically challenging to conduct a cross-border financial contribution. In either case, where a non-hosting country is engaged in a project only at the time of being requested a contribution, its perception of being part of the project and its willingness to contribute may both be limited. The SB-CBCS should help on mitigating the risk of timely engagement.

Moreover, in investment allocation negotiations for cross-border projects, the relevant NRAs should reach agreements on a PS-CBCA and investment request. When these fail, or under their request, ACER should take a decision, ensuring a timely resolution of the process.

While cases exist of PS-CBCAs allocating contributions to a third-party, these are few and typically for gas infrastructure[9].

Contributions by non-hosting Member States are possible and, in cases where net-positive beneficiaries exist while one or more hosting Member States are deemed as having net-negative impacts, these can be expected to be needed for future offshore projects. At the same time, it should remain clear that a PS-CBCA is just a tool. To ensure rendering a successful outcome in the negotiations and minimise frictions, especially when the benefits go beyond the national borders of hosting Member States, PS-CBCAs would benefit from establishing coordinated approaches where principles are pre-agreed before entering into concrete negotiations. The SB-CBCS and previous PS-CBCA experience could serve to derive such principles regionally. In addition, supplementary collaborative incentives should be considered to increase the readiness of non-hosting Member States for participating in the investment of a project.

III.c. Other instruments beyond PS-CBCAs

The consideration of supplementary arrangements and instruments to PS-CBCAs should carefully account for the practical difficulty of shifting infrastructure costs to regulated entities in non-hosting countries. At the same time, different cooperation practices and offshore ambitions exist in the different European regions. Regional differences may therefore lead to different agreements on any supplementary cost sharing arrangements to be used. The High-Level Groups could be useful platforms to discuss if and what sort of tools could be considered for projects in their respective regions.

Two types of supplementary tools could be further explored: tools to facilitate the full use of the PS-CBCA and tools to cover a persisting financing gap.

i. Tools to facilitate the full use of the PS-CBCA tool for transmission projects

Congestion income distribution sharing keys

A PS-CBCA is made at the timing of agreeing on the final investment decision of a cross-border project. During the operation of the respective asset, congestion income is generated and distributed according to agreed methodologies and sharing keys. Congestion income distribution will typically reflect a standard 50-50 sharing key or other specific sharing keys that reflect ownership or investment levels. Using such specific sharing keys as a negotiation tool beyond ownership/investment levels may, in general, not be a very effective tool for future offshore hybrid projects, as uncertainty on congestion income generation may grow, such as because of cannibalisation effects between parallel transmission projects. Nonetheless, the relevant NRAs may want to agree on different specific sharing keys that reflect the project's needs (e.g. expected OPEX costs), where in line with EU regulation and methodologies.

[9] E.g. for the electricity LT-PL interconnector LitPol Link, ACER concluded that no compensations from non-hosting countries was required. For the gas PL-LT interconnector GIPL, ACER concluded that the net-positive beneficiaries (LT, LV, EE) should compensate PL, hosting Member State deemed to have a net-negative effect.

Bundling of projects

The bundling of a group of projects that are complementary to one another and contain similar levels of risk (e.g. when they are to be commissioned in parallel or close in time) may substantially reduce the transaction costs of a negotiation. Such bundling may ensure that projects that are interlinked are assessed together, for example for several hybrids in the same region, or for a hybrid and onshore interconnector reinforcements needed for the offshore-generated electricity to reach a certain demand centre. This can help reducing uncertainties by modelling together projects that impact each other and by establishing agreements that look at a wider picture, potentially reducing the need for any cross-border financial transactions (e.g. from a PS-CBCA) by netting costs and benefits across projects and enabling "in-kind" contributions through performing parallel investments that benefit all the involved parties. Given the need to develop substantial infrastructure projects in parallel for the timely delivery of Member States' offshore ambitions, the bundling of projects could become a facilitating tool. SB-CBCS can support in identifying sensible bundling options.

Ex-post conditionalities

A PS-CBCA could contain pre-agreed conditions under which a certain correction (e.g. a change in congestion income distribution sharing key) or financial transaction could be performed, i.e. if the conditions substantially change with regard to those assessed at the cost allocation stage. Nonetheless, it may be challenging in practice to implement such conditions without creating new risks for the project, so clear principles should be set in advance if this option is used.

Innovative planning and ownership arrangements

Innovative ownership approaches could be explored by Member States and operators in the different regions, such as *joint ownership* through the establishment of regional offshore transmission entities in charge of sea basin planning activities and the development of the relevant cross-border offshore grid projects. On the one hand, such entities would require an initial effort for their creation and definition of cost sharing arrangements that may lead to substantial investments. On the other hand, they would be beneficial in the medium term, lowering transaction costs as well as the risks of negotiation failure, with the relevant parties being already owners of the entity and thus always engaged in cross-border project design and development. Joint ownership could be supported by the establishment of regional regulatory asset base (RAB) frameworks. Moreover, such entities would not need to have implications on the system operation of the offshore networks, which could remain within the appointed TSOs.

Alternative ownership structures could also be explored to incentivise the development of offshore infrastructure. For example, in a bundle of several projects, the respective parties could agree on *cross-ownership*, creating buy-in from a net-importing country into the offshore transmission asset, and vice versa. This can help incentivising a strong interest to the relevant parties in a particular region to ensure that all relevant projects are delivered as planned and benefits realise as assessed, mitigating risks and creating mutual benefits.

Regional offshore planning (but not development) could also be strengthened, such as by requesting relevant Regional Coordination Centres to perform new regional planning tasks.

Harmonisation of network connection charges for offshore generation

Having different approaches towards grid connection charging regimes (shallow or deep) for offshore renewable generation projects may complicate the bidding process for renewable

developers, as well as the PS-CBCA discussions between Member States and/or NRAs. Regional connection charge alignment could be considered for offshore renewable projects, taking into account the principles of cost reflectiveness of incurred infrastructure costs and non-discrimination in network charges.

Regional templates for negotiation

Regional templates serving to outline the general principles to be followed in moving from a SB-CBCS to project-specific assessments and negotiations could be developed, while these should remain as a facilitative and informative tool to initiate the discussions and flexibility in actual project negotiations should always be maintained.

ii. Tools to cover a persisting financing gap

a) For offshore generation

Multiannual forward statistical transfer products with earmarking for offshore

Agreements on statistical transfers may be for the past or current year, year-ahead or coming years (future products). Future products may be particularly interesting to support offshore projects currently under consideration. The hosting Member State may then secure additional funding to deliver their offshore renewable project, addressing remaining structural support cost gaps, while the buying Member State can secure future statistical transfers and support offshore policy objectives. Statistical agreements may also contain conditions on the usage of the statistical transfer financial exchanges, such as indicating that transferred amounts needs to be used for the offshore networks related to the renewable project. Examples of such conditionality practices already exist in conducted statistical transfers.

EU support

The Renewable Energy Financing Mechanism (REFM) provides an option for Member States to meet their national reference points for renewable shares through cross-border cooperation. It enables tendering support for new renewable projects in the EU to cover a gap in the indicative renewable Union trajectory or simply to accelerate deployment. Contributing countries voluntarily participate financially in the mechanism, where the payment is linked to new renewable projects built on the territory of hosting Member States through a competitive tender organised by the Commission, lowering administrative costs for the involved Member States[10] and increasing deployment efficiency and public acceptance by having cross-border financial contributions linked to concrete renewable projects. Through REFM, it is possible to specify the desire to support a particular type of technology (e.g. offshore renewables) and, while not existing today, aggregation levels could be inserted (e.g. for the different sea basins). Provided that a similar system is renewed for 2040 targets and beyond, REFM could be particularly interesting for offshore renewable projects that require support. The offshore generation capacities found to be unrealisable without collaborative investment frameworks could be ideal candidates.

Moreover, up to 15% of the total Connecting Europe Facility (CEF) budget attributed to energy can be used to support cross-border renewable energy projects, as long as they are underpinned by a cooperation agreement in line with the Renewable Energy Directive.

[10] Although it may face practical challenges in certain national jurisdictions, where it may be currently forbidden to delegate the running of tenders.

Beyond REFM and CEF, other instruments[11] are available including, but not limited to, the European Regional Development Fund (ERDF) and the Modernisation Fund.

b) For offshore transmission

Regional congestion income saving accounts for future investments

Congestion income is to be used for the priority objectives set by the Electricity Regulation (EU) 2019/943, one of which is the coverage of network investments that increase cross-border capacity. Congestion income generated through market exchanges is relatively limited when compared to the total offshore infrastructure investment needs, while as offshore networks are developed, absolute amounts of regional congestion revenue will increase.

Regional approaches to accumulating a share of the generated congestion revenues into dedicated accounts and using it to cover a share in the investment needed for new projects that provide wider benefits for a region should be explored. In accordance with Article 19 of the Electricity Regulation, revenues from congestion income should not be used to lower network tariffs unless the priority objectives have been fulfilled and residual revenues shall be placed on a separate internal account line until they can be used for priority objectives. A regional saving account could therefore support the implementation of such provisions. This could be targeted, for example, to address exclusively the net-negative impacts to hosting Member States for projects with PCI/PMI status. *Regional saving accounts* would address investment gaps persistently difficult to fill while not relying exclusively on the availability of EU or other funds. This would require close coordination in the planning, determination of costs and benefits, and cost sharing arrangements of the NRAs (and TSOs) in the region. Considerations on regional saving accounts could potentially be taken together with assessments on the need for strengthened regional planning and ownership arrangements.

EU support

In the first ONDPs, ENTSO-E estimates[12] the total CAPEX investment needs to connect Europe's offshore renewable capacities of around EUR 400 billion between 2025 and 2050[13], enabling the provision of 1,600 TWh of clean energy every year to European consumers and making offshore wind the third energy source in the European energy system.

Promoters of cross-border offshore infrastructure projects, and particularly those with PCI/PMI status, should explore with the *European Investment Bank* whether competitive financing conditions can be provided to their projects[14].

[11] https://energy.ec.europa.eu/topics/renewable-energy/financing/eu-funding-offshore-renewables_en
[12] https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/ONDP2024/web_entso-e_ONDP_PanEU_240226.pdf
[13] Including Norway and Great Britain, but excluding radials
[14] https://www.eib.org/attachments/lucalli/20230107_cross_border_infrastructure_projects_en.pdf

Lastly, the *Connecting Europe Facility* (CEF) can be a game-changer for a number of ambitious cross-border offshore infrastructure projects with PCI/PMI status. In particular, CEF can be very effective in contributing to covering part of the net-negative impacts perceived by a hosting Member State. The budget allocated in the current Multiannual Financial Framework (MFF) to CEF-E is EUR 5.84 billion for 2021-2027, to which PCI/PMIs of different infrastructure categories may be eligible including electricity grids, offshore grids, smart electricity grids, smart gas grids, CO_2 infrastructure and hydrogen infrastructure, and therefore rather small in comparison with the identified needs.