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ANNEX

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***to the***

**Communication to the Commission**

**Draft Commission Notice on the Guidance on Cost-Benefit Sharing in Cross-border Renewable Energy Cooperation Projects**

DRAFT COMMISSION NOTICE

CONTENTS

# 1 INTRODUCTION

The present guidance aims to support Member States willing to engage in cross-border cooperation projects in the area of renewable energy generation in finding a mutually beneficial solution for sharing the related costs and benefits. It outlines design options for cost-benefit sharing in cross-border cooperation renewable projects and provides recommendations and best practices, while allowing for Member States' flexibility[1]. The guidance can be applied in the context of the Connecting Europe Facility's (CEF) window for cross-border projects in the field of renewable energy, as well as for renewable (RES) projects using cooperation mechanisms more generally. It is relevant to renewable electricity, as well as renewable heat and renewable gas projects.

## Legal framework

The revised Directive 2018/2001 on the promotion of the use of energy from renewable sources ("the Directive") establishes a legal framework for the development of renewable energy in the European Union. As set in Article 3(1) of the Directive, Member States shall collectively meet the binding overall Union target for the share of energy from renewable sources in the Union's gross final consumption of energy in 2030. This collective target is delivered through the national contributions to be set by all Member States as part of their integrated national energy and climate plans (NECPs). The Directive also recognises the cross-border dimension of the deployment of the renewable energy and encourages the Member States to cooperate in this respect using, inter alia, available cooperation mechanisms such as statistical transfers, joint projects between Member States, joint projects between Member States and third countries or joint support schemes.[2]

As part of the Multiannual Financial Framework 2021-2027, CEF Energy has been complemented with an instrument aimed at supporting the deployment of renewable energy cross-border projects. The concept of renewable energy cross-border projects, as defined in the CEF Regulation[3], is based on the cooperation mechanisms established under the Directive.

## Motives for Cooperation

Cross-border cooperation can facilitate the achievement of the Union target as well as national contributions in a more cost-efficient way by scaling up the project pipeline, whilst providing additional flexibility to Member States in meeting their targets. Furthermore, cross-border regions have an important role of "laboratories of European Integration".[4] As Member States have different geographical and natural resources to exploit renewable energy, production costs differ considerably from country to country. A Member State (the "host country") that produces a surplus of renewable energy, i.e. more than it needs to fulfil its own contribution, can choose to cooperate with another Member State (the "off-taking country") that is willing to co-finance the endeavour. Both will benefit from such cooperation. The host country will

[1] It builds on the earlier "Guidance on the use of renewable energy cooperation mechanism", SWD(2013) 440 final, available at https://ec.europa.eu/energy/sites/ener/files/documents/com_2013_public_intervention_swd05_en.pdf

[2] A more detailed description of the cooperation mechanisms can be found in the Annex. Only the Court of Justice of the European Union is competent to authoritatively interpret Union law.

[3] Regulation (EU) 2021/1153 of the European Parliament and of the Council of 7 July 2021 establishing the Connecting Europe Facility

[4] COM(2021)393: "EU Border Regions: Living labs of European integration"

acquire additional financing and non-monetary benefits linked to the construction and operation of the new installation (e.g. enhanced security of supply, creation of jobs, positive spill-over effects from increased innovation), the off-taking country by reaching its target more cost-efficiently than domestically. Cooperation mechanisms also contribute to sharing of best practices, alignment of the regulatory frameworks and streamlining of the administrative procedure in the Member States.

The motives for choosing to cooperate on renewable energy vary from project to project. The most typical reasons for cooperation include achieving cheaper target compliance, increasing deployment of renewable energy, contributing to infrastructure enhancement, enhancing energy security, improving public acceptance of a certain technology, (joint) testing of innovative technologies or infrastructure solutions as well as fostering market integration of renewables with a view to enhancing the EU internal energy market.

Moreover, market values for renewable energy may substantially differ between Member States, depending, inter alia, on different generation mixes, existing capacities of installations and the amount of interconnection and internal grid transport capacities. By cooperating with one another, Member States with lower market values can access projects with higher market values than their own, which decreases support payments.

Cooperation may be between two or several countries / regions or cross-border territories[5], with complexity and coordination requirements usually increasing with the number of actors involved.

**Example for cross-border cooperation: Mutually open auctions between Germany and Denmark[6]**

In 2016, Germany and Denmark implemented two cross-border PV auctions open for the participation from projects located in the other country. The mutually open auctions were based on a bilaterally negotiated cooperation agreement. The open auctions were each based on the support system in place for PV in the respective country. Furthermore, the cooperation agreement also included arrangements with regards to local site restrictions, data exchange and the contribution to renewable energy targets. With regards to the sharing of costs, the auctioning country pays the support payments to all awarded plants and receives the full RES statistics. No additional costs or benefits are included.

The cross-border auctions led to the location of all successful projects in Denmark. The German open auction reached award prices significantly below the previous German national auctions. In Denmark no national auctions were conducted in the same period. No German projects participated in the Danish auction. This was among others due to the low maximum capacity foreseen for projects located in Germany (2.4 MW only out of a total auction volume of 20 MW), a national auction in Germany taking place only days later, transaction costs related to understanding the Danish auction system as well as the fixed premium used in Denmark which exposed plant operators to long term electricity price risks. For the projects located in Denmark, the participation in the German auction was attractive as no national auctions for PV took place in 2016. Reasons for more competitive bids from Denmark are not clear but are likely to include better PV resources at the sites participating in the auctions, the

[5] Border regions are territories on each side of the same border (definition available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Border_region)

[6] This case descriptions builds on the report "Design options for cross-border auctions", elaborated under the AURES II project on auctions for renewable energy support. The full report can be retrieved at http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6_1_final.pdf

opportunity to build PV plants on farmland (excluded in Germany) as well as the lack of other options for receiving domestic support and thus more aggressive bids.

These mutually open auctions have shown that cooperative approaches between Member States can achieve efficiency gains compared to national auctions. Furthermore, they also make explicit that national support schemes and auction schedules should be taken into account when timing and designing the cooperation agreement. Furthermore, countries also need to take into consideration market arrangements and other factors influencing the costs of projects in order to avoid surprises with respect to the distribution of awards between countries.

**Example for cross-border cooperation: Joint certificate scheme between Sweden and Norway**

In 2012, the cross-border green electricity support scheme between Sweden and Norway became operational with the goal of boosting the growth of renewables in both countries. So far, it is the only joint support scheme realised under the cooperation mechanisms foreseen in the Renewable Energy Directive (RED). The scheme's entry into operation was preceded by a long phase of negotiations between the two countries. It proved particularly difficult to agree on a suitable sharing of costs and benefits. A political agreement on a 50:50 burden-sharing paved the way for the final agreement.

The scheme benefited from Sweden's year-long experience in operating a comparable domestic certificate market. A market-based instrument - the scheme rewards renewable energy producing facilities in both countries by allocating a green certificate for every MWh of renewable electricity produced which can then be traded on a market. Swedish and Norwegian electricity suppliers (and some end users) are obliged to purchase certificates proportionate to a share of their electricity production/consumption.

Given the success of the scheme in (over-)achieving the targeted build-out of renewables, mainly wind and hydropower, the system closed to new participants in January 2022. Even though the scheme's main characteristics were the same in both countries and Sweden and Norway worked towards a joint production goal expressed in TWh, they also retained a certain flexibility as to the scheme's parameters. There is also no joint authority that is in charge of implementation and monitoring, but each country has appointed a domestic entity. This showed that acknowledging the need for flexibility in the design of a joint scheme can be helpful. In addition, the relatively similar potential for renewables as well as comparable cost structures made it easier to agree on the scheme's key features. This also goes for the cost-benefit sharing negotiations which tend to be more challenging if costs and benefits significantly differ between the cooperating countries.

## Barriers to Cooperation

Despite the established and well investigated benefits of cooperation to jointly reach EU renewable energy targets, few cooperation projects using the cooperation mechanisms have actually been implemented since 2009[7] and the use of the cooperation mechanisms is still low.

[7] As of today, twelve cooperation projects have been implemented/agreed (thereof ten statistical transfers, one joint project and one joint support scheme). Whilst this indicates that implementation might be speeding up, the use of the cooperation mechanisms is still below expectations. The following projects have been implemented and/or agreed: statistical transfers between Luxemburg and Lithuania, Luxemburg and Estonia, Malta and Estonia, the Netherlands and Denmark, Ireland and Denmark, Ireland and Estonia, Denmark and Belgium, Finland and Belgium, Czeck Republic and Slovenia and Lithuania and Belgium; a joint project between Germany and Denmark and a joint support scheme between Sweden and Norway. When looking at Member States' National Renewable Energy Action Plans (NREAPs) for 2020, it is obvious that due to the novelty of the mechanisms and lack of implemented projects, plans to make use of the cooperation mechanisms were still vague, cautious or even non-existent. A few years later, in their NECPs, Member States' plans for the use of the cooperation mechanisms were already more concrete, most notably due to consultations held between Member States on a bi- or multilateral basis, individually or via different groups and forums. In this regard, the work in regional energy forums, including the High-Level Groups of North Seas Energy Cooperation (NSEC), the Baltic Energy Market Interconnection Plan (BEMIP), the Central and South Eastern Europe

Evidence[8] suggests that barriers in using cooperation mechanisms persist, which can be of political, technical, legal and regulatory as well as socio-economic and environmental nature. Member States and other stakeholders also report administrative barriers related to the procedural steps needed to plan and implement a cooperation project and barriers with regards to quantifying and sharing costs and benefits. Discussions between Member States on using cooperation mechanisms have intensified in recent years though and several potential projects are being discussed[9]. The increased pressure to rapidly decarbonise in line with the European Green Deal, the "Fit-for-55" package and the RePowerEU Plan calls for more frequent use of cooperation mechanisms.

**Scope**

This Guidance aims to support Member States in planning, designing and implementing cross-border cooperation projects using cooperation mechanisms[10]. By shedding light on the options and design elements available for cost-benefit sharing, it aims to facilitate the overcoming of this barrier to further use of the cooperation mechanisms.

The previous guidance on the allocation of costs and benefits is limited to the cost-benefit analysis (CBA) methodology prepared by ENTSO-E for grid development projects as per Regulation (EU) 2022/869 and no guidance was focused on sharing costs and benefits of generation assets. Therefore, this Guidance aims to provide clarity on the available options and degrees of freedom for analysing and sharing costs and benefits applicable across different renewable energy technologies. Whilst it aims at covering renewables cooperation in general for all renewable energy technologies, it takes into account aspects specific to (radial) offshore wind projects due to such cooperation becoming increasingly significant while facing particular technical and practical implementation challenges. Cost-benefit analysis and sharing aspects of offshore hybrid projects will be dealt with extensively in a 2024 forthcoming Guidance on how to coordinate the sharing of costs and benefits per sea basin for offshore energy transmission projects combined with the development of energy renewable generation projects as well as for sharing of costs and benefits for individual hybrid projects.[11]

Energy Connectivity (CESEC) or the Interconnections for South-West Europe (SWE), or the Pentalateral Forum, should be stressed. The fora have managed to bring together key stakeholders and facilitate dialogue. Nevertheless, there is still a lack of concrete reported plans, reflecting the perceived difficulties in applying the cooperation mechanisms.

[8] Studies and projects include, amongst others, the project on Cooperation Mechanisms between EU Member States and interaction with support schemes under the Renewable Energy Directive (2009/28/EC) (https://res-cooperation.eu/), the CA-RES project (https://www.ca-res.eu/), or the MUSTEC project (https://mustec.eu/). See also the study on "Cooperation between EU countries under the RES directive", 2014, available at https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/cooperation-mechanisms_en#documents

[9] Known examples include a Memorandum of Understanding on one or more offshore energy hubs between Denmark and the Netherlands, a Memorandum of Understanding between Latvia and Estonia on a joint offshore project, a Letter of Intent on analysing joint and hybrid offshore projects between Denmark and Germany and a Memorandum of Understanding on exploring options for energy islands between Denmark and Belgium.

[10] For most cross-border cooperation projects, it can be assumed that Member States or third countries are the ones bearing the highest costs and receiving the majority of the benefits. They are thus the natural negotiating parties and will represent their stakeholders by default.

[11] Acknowledging the growing focus on complex forms of renewable energy cooperation, such as in the context of hybrid offshore wind parks, "guidance on how to coordinate the sharing of costs and benefits across borders for energy transmission projects combined with the development of energy generation projects" shall be provided. This Guidance is related to the TEN-E Regulation Article 15(1) [Regulation (EU) 2022/869] as well as to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'An EU Strategy to harness the potential of offshore renewable energy for a climate neutral future' COM(2020) 741 final, available at: https://ec.europa.eu/energy/sites/ener/files/offshore_renewable_energy_strategy.pdf

This Guidance is structured as follows: first, the most important design elements for support schemes for renewable energy are outlined with a focus on relevant aspects for the sharing of costs and benefits in cross-border cooperation projects. In the following section, general approaches and principles of the CBA as the central tool to assess a renewable projects' overall societal benefits and prerequisite for sharing costs and benefits are described. The Guidance then proceeds to provide information on how to approach the sharing of costs and benefits between cooperating parties, outlining recommendations, examples and best practices. A blueprint for a cooperation agreement can be found in section 6.

# 2 COOPERATION DESIGN ELEMENTS AND OPTIONS FOR FUNDING

When agreeing on a cooperation project, Member States will need to align on an array of aspects, including the main goals and principles of cooperation, the cooperation mechanism(s) that can be used to reach these goals, as well as the scope and conditions of cooperation. With regards to the latter, Member States may need to choose a support scheme and will need to agree on the sharing of the resulting costs and benefits that the project will produce. Different design elements of the cooperation mechanism(s) and support scheme (where applicable) may lead to different outcomes in terms of costs and benefits.

As outlined above, Member States may want to pursue different goals when agreeing on a cooperation project. In any case though, they will want to ensure that the cooperation is mutually beneficial and that costs and benefits are shared in a way that reflects that goal. The overall logic is that the off-taking Member State will contribute to the support costs in return for receiving RES statistics. Sub-goals pursued by Member States may for example include the goal of reducing the costs of RES integration by shifting deployment into countries with lower system integration costs. Host Member States, on the other hand, will also take these costs into account as well as the extent to which they are reflected in the support payments, that means either borne by renewable project developers or incurred by other stakeholders such as TSOs or final consumers. As system integration costs may be substantive, host Member States may include the adequate compensation.

**Choice of cooperation mechanism**

The choice of cooperation mechanism depends on the specific goals that Member States pursue. In general, it can be said that if the sole objective is to seek lower-cost short-term target compliance, or rapidly closing a remaining gap to the target with limited domestic effort, **statistical transfers** are the most appropriate choice as they exhibit the lowest transaction costs and tend to be less complex. On the other hand, statistical transfer do not lead to the deployment of additional renewable capacity, unless the selling country earmarks the revenues for new renewable projects.

**Joint projects** may also be pursued if the objective is to develop or test (new) technologies. **Joint support schemes** are the most complex cooperation mechanism and entail the highest transaction costs. However, joint support schemes may improve cost efficiency and increase long-term market stability as well as liquidity. The higher the volume of cooperation in renewable electricity projects that shall be realised over time, the more the choice of a complex mechanism is justified.

It should also be noted that the cooperation mechanisms are not mutually exclusive and that Member States are free to combine more than one mechanism in one agreement. As for the sharing of costs and benefits, it is recommendable to keep costs and benefits strictly separated per project and not adding them up in combinations of projects.

## Choice of form of support

Even though the market-based deployment of renewable energy is on the rise, it continues to be mostly based on a support scheme – this also applies for cross-border cooperation. In principle, Member States have the choice between using the host Member State's support scheme, opening up the contributing Member State's support scheme or setting up a new tailor-made joint support scheme. A range of design elements for this scheme needs to be defined. It should also be noted that a support scheme does not necessarily entail actual support payments, as these may become obsolete in a situation where there are zero-price bids, i.e. developers willing to go forward with the project without any subsidies.

Using the host country's support scheme has the advantage of ensuring seamless embedding into the national regulatory context. Choosing the contributing Member State's support scheme, on the contrary, will lead to two schemes existing in parallel in the Member State where the installation is located and may be at odds with its regulatory context. Setting up a new joint support scheme on the other hand entails higher transaction costs, but has the advantage of being fit-for-purpose and more efficient for larger cooperation plans. In that case, national or regional institutions that operate the scheme need to be identified. Member States may also choose the host or contributing country's scheme as a starting point, but agree on deviating design elements for individual aspects.

The following elements are to be considered when defining a support scheme, noting that the exact set-up and specificities will differ on a case by case basis.

*Pre-investigation, site selection, permitting and pre-development*

Overall, one can distinguish between centralised (government-led) and decentralised (developer-led) approaches to pre-investigation, site selection, permitting and pre-development. The centralised approach is characterised by a state or state-owned body being in charge of, driving forward and bearing the costs and risks for these processes.[12] In a decentralised model, sites are selected, pre-investigated and pre-developed by project developers in a pre-defined zone. Depending on who initially bears the costs for pre-investigation, site selection and pre-development, compensation might be necessary.

*Grid cost allocation regime*

Cooperating Member States will also need to decide on the interface between renewable developers and TSOs when it comes to the grid regime. In the shallow cost allocation approach, renewable project developers bear the connection costs to the closest suitable connection point in the already existing grid network, generally a sub-station, and TSOs - the costs of any necessary grid reinforcement. Shallow cost approaches are the lowest-cost option for project developers (because grid reinforcements are generally borne by TSOs/DSOs) and enable good cost transparency and consistency. However, projects may be delayed due to necessary reinforcements by TSOs/DSOs before a connection is possible.

[12] Elements of the centralised model are part of the Commission's proposal of 18 May 2022 to revise the provisions related to permitting of RES projects in the Renewable Energy Directive (COM (2022) 222 final).

In the deep cost allocation approach, renewable project developers have to bear all connection costs, as well as any further reinforcement costs, due to the integration of the new installation into the system. A major disadvantage in the deep cost allocation regime is that upfront connection costs can be very high and network reinforcement costs are usually uncertain and difficult to predict for developers[13]. However, project developers are often not required to pay use of system charges for ongoing grid reinforcements under this approach.

Hybrid forms are possible as well. Depending on their exact specification, hybrid models may have disadvantages/advantages of both regimes.

*Forms of financial support*

The main options for forms of financial support are 'operation support' and 'investment aid' (upfront or recurring, e.g. annual). The most relevant forms of operating support are fixed premiums, one-sided sliding premiums and two-sided sliding premiums (contracts for difference) [14].

In the case of fixed premiums, total support does not depend on electricity prices. Also, fixed premiums are easier to administer, but come at the disadvantage of developers bearing potentially high market revenue risks and provide incentives to produce also at times where additional generation is not needed. Long-term market revenue risk may be addressed through sliding premiums which, however, may come at the expense of exposure of total support costs to electricity prices lower than the strike price, paid by consumers. In the case of upfront or annual investment aid, plants are in principle exposed to full electricity market revenue risks.

Investment aid or support differs from operational support by providing a share of the project's investment costs before it actually enters into operation and begins generating. While investment aid is rarely seen at Member State level, it is expected to become more relevant in the context of EU funding mechanisms such as the new funding line for cross-border projects under the Connecting Europe Facility (CEF).

When deciding for a financial support design, it is recommended to start the discussion from the existing support scheme designs in the Member States involved, provided that at least one of the cooperating parties has a domestic scheme in place for the technology in question. In case there is no such scheme in place in the cooperating states, the experience of Member States sharing similar characteristics and objectives might serve as an example. In deciding on the design elements, the cooperating states should strive to ensure the regular operation and maintenance of the new plant, minimise the necessary support costs over its life span, limit the risk of over- or under-compensation, reduce financial risks in general and consider the implications of the support scheme to consumers.

In case of **cross-border cooperation**, Member States may use a sliding premium (one-sided or two-sided), such as contracts for difference. Contracts for difference, in particular, provide

[13] This is mainly due to network effects, but uncertainty can also relate to regulatory changes.

[14] In a one-sided premium system, if market price is below auction strike price, producers receive support that covers the gap, and if market price is higher, they can keep the excess revenue. The two-sided premium operates in a similar fashion, however excess revenue must be paid back by the producer. In the fixed premium scheme, producers receive fixed amount of excess revenue on top of the market price.

price stability while at the same time limiting excessive windfall profits that can be generated in case of very high market prices. It should be noted that where two electricity markets with two different electricity prices are involved, it complicates the calculation of support payments for the regulator(s) and likely increases the risks for renewables investors. This increases administrative and transaction costs and compensation payments might be necessary that cannot be easily estimated ex-ante. To mitigate these risks, the reference market should therefore be agreed on in advance between the Member States. If such barriers are overcome, joint support schemes may provide more efficient and lower support amounts for any necessary investment gaps of renewable projects than national support schemes, thus lowering the total support amounts financed by the taxpayers of each Member State.

While not in the scope of actions that may be conducted by Member States considering implementing cross-border renewable cooperation projects, it is relevant to note that renewable project promoters may have access to other sources of competitive financing, such as via EIB instruments or by agreeing on PPAs with offtakers.

*Tender/auction design*

Generally speaking, when it comes to supporting renewables in the EU, the importance of administratively set tariffs or quota is diminishing, while auctions are on the rise. There are numerous options available when it comes to designing tenders/auctions to allocate support for renewable energy. The most important design elements are the auction technology, volume, timing, bid size, the type of support paid, the pre-qualification and award criteria and if multi- or single-item tenders are used.

In the cooperation case, auctions can take different forms, most notably unilateral, mutual and joint auctions. The type of auction selected will in turn influence the support mechanism, e.g. in **unilateral auctions**, the off-taking or contributing Member State's support scheme will be applied, i.e. corresponding to a unilateral opening of the support scheme to projects from the host Member State. In **mutual auctions**, both countries open up their respective support schemes while in **joint auctions** a bespoke support scheme is designed by the cooperating parties to align with all aspects of the cooperation project. As a general rule, the Member State paying the support costs should receive the corresponding RES statistics. Member States may also make differing agreements with regards to the time span for the transfer of the target achievements and whether the transfer of shares to the contributing Member State shall continue after the end of the support period until the technical end of life of the installation. This will have an impact on the resulting sharing of costs and benefits. Member States may, for example, agree that the installation will start to contribute to the host country's target achievement after the end of the support period to compensate for the provision of the site and the fact that it incurs the system integration costs.

## Funding the cooperation

In addition to selecting the cooperation mechanism and (where relevant) aligning the design elements of the support scheme, Member States will also need to agree on how to fund the cooperation and, potentially, how to recover the costs of support.[15] The principal options for

[15] How to recover the costs of support can also be decided nationally by each cooperating country, except in the case of joint support schemes.

funding are public sources of funding (national budgets, EU financing mechanisms and funds), support levies on consumers or hybrid forms, i.e. combinations thereof. While public sources of funding are essentially a redistribution from all taxpayers to energy consumers, levies redistribute the costs of renewable energy to electricity consumers by topping up the electricity price. Member States can also choose to fund parts of the costs from one source, while using a different source for the rest. The Guidelines on State aid for climate, environmental protection and energy 2022[16] provide the framework for public authorities to support the European Green Deal objectives efficiently and with minimum distortions of competition.

[16] 2022/C 80/01

# 3 COST-BENEFIT ANALYSIS AS THE BASIS FOR COST-BENEFIT SHARING

In the context of cooperation projects, the CBA systemically identifies and compares all the effects, positive or negative, intended or not, direct or indirect, of a given cooperation project. The CBA in principle covers the impact of the project in all of the involved Member States.

To discern whether an envisaged cooperation project generates net societal benefits, costs and benefits need to be determined, quantified and weighed against each other. When benefits outweigh costs over a defined time period, discounted to the present, the cooperation project has a positive net present value (NPV) and is deemed beneficial from a societal, holistic point of view.

Moreover, the project's NPV shall be compared to that of an alternative project deploying renewables without cooperation (a counterfactual). A counterfactual project should first and foremost be a realistic representation of the project promoters' likely alternative project set-up to reach their goals, in line with European and national climate and energy targets, in case the cooperation does not materialise. If the NPV of the cooperation project is larger than that of its counterfactual, the cooperation project is deemed beneficial to pursue from a systemic perspective and further steps can be initiated.

In order to decide whether to go forward with a cooperation project or not, a comprehensive CBA is indispensable.

As a starting point for conducting a CBA, cooperating Member States can refer to existing methodologies and practices. In general terms, this includes the Guide to Cost-Benefit Analysis of Investment Projects for Cohesion Policy 2014-2020[17] and other approaches such as the approach for economic appraisal of investment projects used at the European Investment Bank (EIB)[18]. For RES generation assets, relevant guidance is provided in the CBA principles for cross-border RES projects under the CEF, recommending a comprehensive yet manageable set of indicators.[19] For grid development and investment projects, the most relevant resource is the energy system-wide cost-benefit analysis methodology used for grid investment projects as per Regulation (EU) 2022/869 (TEN-E)[20]. Building on it, ENTSO-E shall perform a CBA as part of the TYNDP process. For cross-border electricity infrastructure, the established CBA methodology developed by ENTSO-E and approved by the European Commission shall be used as starting point.

[17] See https://ec.europa.eu/regional_policy/en/information/publications/guides/2014/guide-to-cost-benefit-analysis-of-investment-projects-for-cohesion-policy-2014-2020.

[18] "The Economic Appraisal of Investment Projects at the EIB. Version March 2013 - Under review", available at https://www.eib.org/attachments/thematic/economic_appraisal_of_investment_projects_en.pdf

[19] "Methodologies for assessing the contribution of cross-border projects to the general criteria and for producing the cost-benefit analysis specified in Part IV of the Annex to the Regulation (EU) 2021/1153 establishing the Connecting Europe Facility", available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021SC0429&qid=1564520971474

[20] See https://tyndp.entsoe.eu/cba

## CBA indicators for generation assets

In the interest of keeping transaction costs as low as possible, cooperating parties shall focus the CBA on the most significant direct and indirect cost and benefit categories stemming from their potential cooperation. While there are certain indicators that are likely to be included in all CBAs, e.g. generation costs of energy, Member States possess some freedom to jointly agree on those cost and benefit categories they want to consider. As a general rule, the more advanced the planning process, the more comprehensive the CBA and list of indicators considered. In principle, it is recommended for cooperating parties to start with a simple and less comprehensive CBA which can then be gradually extended with more indicators as the process progresses.

In general, when moving from "simple cooperation" to more complex forms, e.g. projects combining infrastructure and generation assets, the approach of assessing costs and benefits of cooperation will also become more comprehensive and cover additional and different indicators.

Support costs are not to be included in the CBA as they constitute a net-societal transfer, however, their quantification is strongly recommended already at the stage of the CBA.[21]

## Limitations of CBA

Whilst a CBA is indispensable to decide on whether to proceed with the cooperation project or not, it has to be noted that it has some considerable limits that the cooperating parties have to bear in mind. As outlined above, the CBA needs to strike the balance between limiting complexity and transaction costs to a manageable level while striving for the inclusion of all relevant factors. This can be a challenging endeavour, especially if the project is still at an early stage. The use of assumptions and value judgements thus becomes indispensable.

Finally, the CBA will also not give any insights on the project's effects on different stakeholder groups. Despite a positive NPV it is possible and even likely that not all affected actors will be better off with the project. This is especially important when it comes to the next step, the sharing of costs and benefits.

[21] If State aid is necessary to carry out the renewable project, the funding gap analysis carried out according to the CEEAG should be consistent with the main assumptions of the CBA.

# 4 COST-BENEFIT SHARING APPROACHES

Cross-border cooperation projects will typically produce a unique array of costs and benefits which are asymmetrically distributed. Using the CBA approach, cooperating parties can determine whether a project is beneficial from a societal point of view and thus, in principle, worthwhile to pursue. However, CBAs do not make statements about the distributional effects between the countries involved as well as individual stakeholders.

The use of the cooperation mechanisms generates benefits, such as lowering target compliance costs. Nonetheless, these advantages might be distributed unevenly between the Member States involved. This essentially creates a benefit allocation problem, and the challenge is to find a solution to the problem of allocation in such a way that all the Member States involved can participate in the benefits of cooperation and that the allocation is considered just for the cooperating parties, reflecting each party's contribution. As there is no central market for this allocation, the cooperating parties must negotiate a cost-sharing approach or adopt a benefit-allocation mechanism according to previously agreed criteria, rules or formulas.

Overall, two central questions need to be answered by the cooperating countries. First, by which financial mechanism and at which price will the off-taking country contribute to the project's support costs? Second, if and by which mechanism will the off-taking country compensate the host country for costs incurred domestically? Both of these questions have direct implications on the resulting sharing of costs and benefits, where typically one party will compensate the other.

That said, the underlying logic of compensation is simple, indicating that stakeholders who bear costs but do not (sufficiently) benefit from the cooperation project should be compensated accordingly. To date, most cases of cost sharing or compensation have been limited to grid infrastructure where there are recommendations and guidance available provided by the Agency for the Cooperation of Energy Regulators (ACER)[22], while the sharing of benefits and costs from generation assets has been based on a selective and pragmatic approach to identify the main costs and benefits to be considered. The key elements addressed are usually support costs and RES statistics on a Member State level. The resulting compensation is then agreed during a negotiation process of the main parties involved and/or their representatives.

## Principles of cost-benefit sharing

**The cost-benefit sharing should be based on fairness** i.e. no party receiving an unproportionate benefit / bearing unproportionate costs due to the cooperation which can be achieved by compensating all parties commensurate to their contribution, **practicability** i.e. reducing complexity and thereby transaction costs to a manageable amount through limiting parties as well as cost and benefit categories to the most important ones, and **reflection of**

[22] As for infrastructure, the Fourth Monitoring Report on CBCA decisions published by ACER revealed that the majority of trans-European energy projects involving cross-border infrastructure, choose "traditional" cost allocation approaches. Most onshore projects follow the so-called "territorial principle" where each country bears the costs associated with the implementation of the project on its own territory, notwithstanding any benefits the project may bring across countries, while "50/50 cost allocation" is prevalent for offshore. This approach might not prove effective in cases such as new offshore meshed grids potentially affecting a larger amount of parties.

**actual costs and benefits** (and agree on potential arrangements deviating from these only at a later stage).

In addition to taking into account the three aforementioned principles, stakeholders should ideally assume a long-term perspective and assess not only the short-term, but also the long-term outcomes of cooperation.

**Stakeholders affected**

In general, the overall impetus for cooperation projects would be coming from governments. Therefore, they will ultimately want to achieve an overall net benefit from the cooperation (including all asset components). For most cross-border cooperation projects, it can also be assumed that Member States or third countries are the ones bearing the highest costs and receiving the majority of the benefits. They are thus the natural negotiating parties and will represent their stakeholders by default.

While a larger number of stakeholders might be affected by the cooperation project, it is likely that only a few will bear major impacts. The key stakeholders affected by cooperation projects are Member States/third countries (representing their citizens, i.e. consumers of electricity), generation asset developers, TSOs or other infrastructure project promoters (e.g. in the case of hybrid projects and sometimes for radial offshore projects) and NRAs. It is also recommendable to proactively and early involve civil society in the preparation of the cooperation projects.

In order to simplify the negotiations and keep transaction costs low, the cooperating parties should, however, keep the number of parties involved in the actual negotiations as low as possible, especially for less complex settings. Usually, representatives of the national governments should be involved. Other national stakeholders can be included directly in the negotiations or in parallel processes at national level.

Other stakeholders, may, for example, be included if they reach a certain threshold, e.g. a certain percentage of the total net costs. In some cases, stakeholders in third-party countries may be affected by the cooperation project and might have to be factored into the process.

**Considerations on sharing support costs and RES statistics**

The cooperating parties will ultimately have to agree on a sharing mechanism that allocates the gains from the cooperation. Cost and benefit sharing models will differ mostly depending on how they treat support costs.

In most cooperation cases, the support costs will be split between the off-taking or contributing country and the host country, however, there might also be cases in which support costs are unilaterally borne by the contributing country. If the host state is interested in retaining a part of the RES statistics to meet its own target, the contributing and host states could make an agreement to both contribute to support costs. To compensate the host country for any locally incurred costs, e.g. system integration costs, the RES shares that it receives would have to outweigh the share of support costs that it contributed. On the other hand, also locally incurred benefits such as benefits for security of supply, can be considered.

*Pro-rata approach*

The extent to which the contributing party contributes to the support payments then defines the share of RES statistics being transferred. According to this pro-rata approach, a Member State that pays half of the support costs would also be transferred half of the RES target statistics. This may be adjusted in case there are other cost or benefit indicators deemed significant by the cooperating parties.

*Fixed transfer premium approach*

Alternatively, cooperating countries might find it more convenient to agree on a transfer price. That would mean that the hosting Member State would add a fixed premium per transferred renewable energy statistical unit, e.g. € per kWh, to recover its (indirect) costs. The premium would have to be borne by either the off-taking Member State or directly by the project developer and could also be technology-specific.

**Physical vs. virtual transmission of electricity in cooperation projects**

Cooperation projects can also be distinguished by whether they require the physical transmission of electricity produced or not. Especially countries that would like to increase their long-term energy security might find physical transmission attractive. Also, it might increase the public endorsement of the cooperation project in the off-taking country and make the project more "tangible". However, physical transmission might not always be an option as it poses specific technical challenges, requiring sufficient interconnection and grid infrastructure between the cooperating countries. Requiring the physical transmission of electricity can become complex when the cooperating countries are not neighbours as other countries will have to be included in the design and negotiation of the cooperation. Therefore, many countries find it easier to not require physical transmission of electricity. Another argument in favour of not requiring physical transmission is that the European electricity markets are becoming more and more intertwined through market coupling. In that logic, physical transmission could interfere with the principles of the internal electricity market i.e. the most efficient use of cross-border capacities. As for joint projects with third countries, it should be noted that RED Art. 11 requires sufficient interconnection capacity in order for the produced electricity to count towards the renewable energy share of the Member State.[23]

## Boundary conditions

There are a number of factors that have major impact on the distribution of costs and benefits in RES cooperation projects and need to be taken into account. Any boundary conditions that impact the operation of the project and its embedding into the wider energy system must be specified, as they will influence cost and benefit indicators.

**Cooperation mechanism and support payments**: In addition to the cooperation mechanism selected, one key consideration is the potential cost for support payments. While support costs can be neglected from a societal perspective as they constitute a mere transfer from one party to another (e.g. from government to developer), they do come into play when a transfer of RES shares is planned.

[23] See in particular the conditions set out in Art. 11.2 a) and c) of Directive (EU) 2018/2001.

**Site selection and grid connection regime**: The process for site selection and the grid connection regime also has major impacts on the initial distribution of costs and benefits and the need for compensation, as the related costs will either be borne by TSOs and appear in grid tariffs, or will be included in the bid in an auction and be financed by the support scheme and, as a result, by levy payers. This has implications on which party needs to be compensated.

**Type of support payment:** Depending on the type of support payment, i.e. a fixed premium, a sliding premium, the RES support costs are clear from the start or will depend on the development of electricity market prices in the host country or of the countries agreed by the cooperating parties. Payments might also differ between single plants that form part of the joint project if different support rates are awarded. These differences need to be considered when allocating the values for specific RES statistics.

### Practical implementation of the cost-benefit sharing

Figure 1 gives an overview of the concrete steps for implementing the cost-benefit sharing for cooperation projects focusing on generation assets. These are explained in more detail in the following sections.

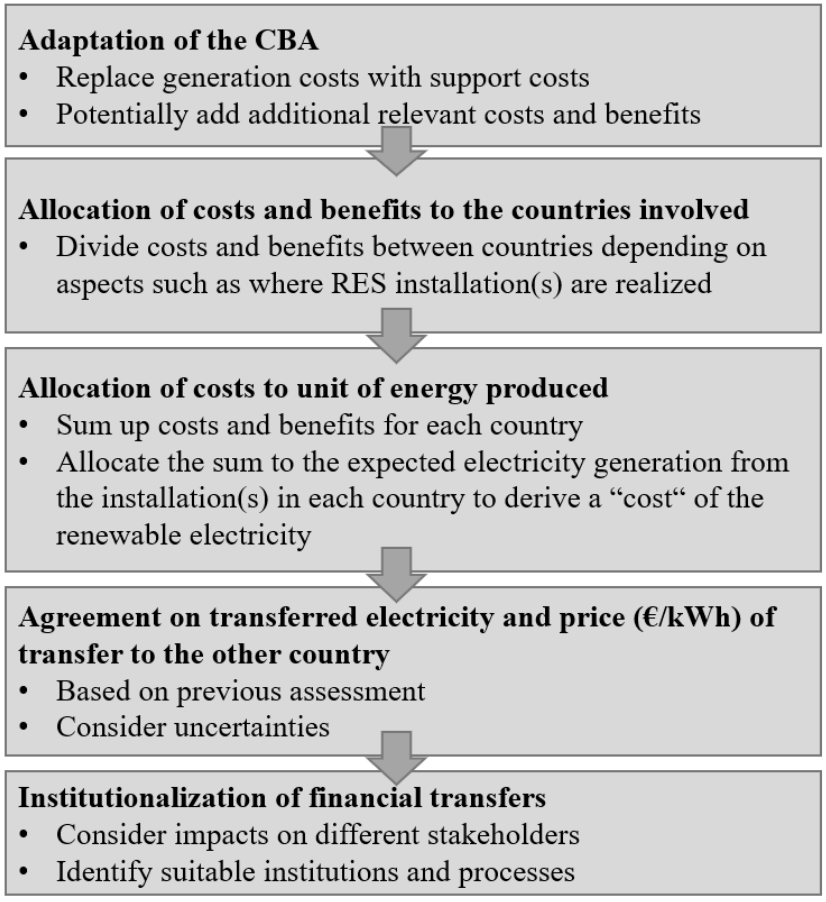


**Figure 1 Steps of cost-benefit sharing for generation assets**

**Step 1: Revisiting the original CBA**

A thorough societal CBA is the prerequisite for the allocation of costs and benefits between Member States and other parties. However, it might not be sufficient as a basis to negotiate their distribution. The conducted CBA will thus need to be revisited and extended. The cooperating countries shall depart from the list of costs and benefits identified in the CBA and add support costs. They will have to consider whether to add further cost and benefit indicators that will impact the initial distribution of costs and benefits per stakeholder re-considered.

In order to maintain coherence with the major effects identified, the sharing of costs and benefits should build on the CBA as much as possible and the main boundary conditions kept. Due to technical or regulatory reasons and the setup details of the project, costs and benefits will be initially allocated to one or another party. These net costs and benefits per stakeholder identified in the CBA will serve as the starting point for any further considerations. After understanding the initial allocation of costs and benefits, a coordinated approach for their reallocation will have to be agreed between all parties concerned, with each cooperating country being free to reallocate national costs according to national specificities.

The following table lists cost and benefit indicators, affected parties and how these might be adjusted or introduced moving from CBA to cost-benefit sharing. The simplest approach is to depart from the original CBA and merely replace generation costs with support costs.

| **Cost and benefit indicator** | **Affected Party** | **Effect** |
|---|---|---|
| Capital expenditures and operating expenses (CAPEX/OPEX) of generation | Generation asset developers | CAPEX/OPEX for generation are initially borne by the generation asset developer and usually refinanced via market revenues and/or support scheme payments. |
| Market revenues | Generation asset developers | Depending on the market arrangement, the developer will earn revenues from the electricity market. |
| Support payments | States / Generation asset developers | Renewable energy facilities usually benefit from support payments. In principle, the funding system of the State in which the plant is located applies. The possible sharing of support payments between States is not a market-based redistribution effect, but a fundamental decision in the framework of the cooperation approach. |
| RES Target Achievement | Member States | At first, RES target achievements are allocated to the Member State in |

| | | |
|---|---|---|
| | | which the plant is located. Similar to support payments, the allocation of RES target achievements in the form of RES statistics will be a negotiation outcome between Member States. |
| Electricity price effects (wholesale market price) | States | Cooperation projects may have an impact on electricity prices in the bidding zones concerned. This in turn has an impact on electricity prices for consumers. Although it is unlikely that these effects will be compensated, it could be part of the political considerations for a cooperation project. |
| CO2 and other emissions | States | Changes in CO2 and non-CO2 emission levels due to the cooperation project. |
| Use of RES potential | States | The State in which the cooperation facility is located, might have less potential available for domestic target achievement. |
| Investment deferral of additional RES production capacity | States | Postponement of other (domestic) projects due to entering into the cooperation project. |
| Additional effects | States | There might be other impacts, such as labour market effects, environmental effects, effects on innovation, etc. Depending on their nature, these additional effects might be hard to quantify, but could play a role in the political negotiations. |
| Capital expenditures and operating expenses (CAPEX/OPEX) of infrastructure | TSOs | In most cases, TSO(s) are in charge of pre-financing the infrastructure asset, including connection to shore and onshore reinforcement. CAPEX/OPEX for infrastructure include interconnector and potentially grid connection costs. Initially allocated to one or several TSOs, they are refinanced via congestion rents and network charges in the respective bidding zones/countries. |

| | | |
|---|---|---|
| Congestion rents | TSO | Depending on the market arrangement, earnings in the form of congestion rents might ensue. |
| Additional redispatch or redispatch reserves | TSO | TSOs may increase or decrease redispatch as a result of the cooperation project. Redispatch costs are recovered by the TSO via grid tariffs. |
| Additional effects, such as effects on system flexibility or investment deferral of infrastructure | TSO | Positive or negative effects on system flexibility or effects such as the postponement of infrastructure reinforcements. |

In order to simplify the negotiations on cost-benefit sharing, the negotiating parties should try to keep the list of indicators to be factored into the sharing of costs and benefits to a manageable amount. The most important indicators for cooperating countries are support costs as well as RES statistics. Cooperating parties are free to include further impacts or make them a topic in the negotiations in case they expect them to be significant in terms of impact or political weight.

**Step 2: Allocation of costs and benefits to the countries involved**

In the next step, cooperating countries shall proceed to allocate all costs and benefits, including support costs, between themselves according to the results of the CBA and depending mainly on where RES installations are realised/located (with the host country bearing the majority of indirect impacts). It should be noted that other countries which are neither host nor off-taking countries, may also be affected, e.g. by grid congestion issues. In such cases, the cost-benefit sharing agreement could be extended to those countries.

The type of allocation rule is strongly influenced by the choice of support scheme. Cooperating countries can agree to create a joint fund/scheme or to extend one of the cooperating states' national support schemes for the administration of support payment flows to the cooperation project and put in place a transfer price as way of compensation. In case of a joint support scheme, cooperating countries will naturally set up a joint fund. Statistical transfers and joint projects, on the contrary, are more prone to compensation via transfer prices. Governments will ultimately have to agree on whether to first allocate all new installations to one country, or whether to "distribute" them according to which country bears the support costs. An additional difficulty arises in case the final location of the installations has not yet been decided, in which case the final allocation can only be performed once the tendering is done. In any case, it is recommendable that governments already agree on the general terms of allocation ex-ante and do an ex-post adjustment.

**Step 3: Allocation of costs to units of energy produced**

Building on the CBA that has established the prospective total output in terms of energy produced (in GWh), the cooperating states shall proceed to allocate costs to units of energy produced. First, they will need to sum up all costs and benefits for each of the cooperating

parties, leading to a total net benefit / net cost per country. The next step is to allocate this sum to the prospective electricity generation from the installation(s) in each country to derive a "cost" per unit of the renewable energy produced. The cooperating states could assume average costs per installation.

**Step 4: Agreement on transferred renewable statistics to the other country and transfer price (€/kWh)**

In the next step, Member States should then set the amount of transferred electricity and price per kWh transferred. The transfer might take place physically or in a virtual manner only, via RES statistics. The transfer price will be calculated based on the total prospective amount of electricity generated. The calculation of the transfer price provides a good indication of the appropriate magnitude, but cooperating states have some room for negotiating which is given by the net cost savings of cooperation.

Member States engaging in a statistical transfer may agree to use different types of contracts, such as ex-post spot agreements, ex-ante spot agreements or option contracts. Combinations of these contract types are also possible and could serve to mitigate risks for both parties. A unit price has to be negotiated, departing from the domestic reference support prices for different renewable energy technologies and account for transaction costs as well as potential grid reinforcement costs. Indirect benefits for the host country shall be subtracted.

It is also important to acknowledge that there will always be a degree of uncertainty in the ex-ante analysis of cross-border cooperation projects that cannot be eliminated. Uncertainty can be dealt with by the parties in various ways and can be attenuated by sensitivity analysis and robustness checks. In less complex cooperation cases, project promoters may decide to simply accept the uncertainty and resulting differences in costs and benefits and politically negotiate an ex-ante contribution. For more complex and comprehensive cases of cooperation it is, however, advisable to include a review clause into the cooperation agreement that can be activated by one or either party to revisit the sharing of costs and benefits in case of significant deviations. It may be triggered for example if deviations reach an agreed threshold. A third option is to define sharing rules for compensation which could for example depend on the actual necessary support costs as determined ex-post.

**Step 5: Institutionalisation of financial transfers**

Finally, the means of financial transfer will have to be agreed upon between the cooperating parties. In terms of "currency", compensation can take the form of either cash payments or transfer of RES statistics. While compensation between TSOs usually happens via cash payments, states may choose to be compensated in cash, statistical transfers or a mix of both.

Whilst setting up a joint fund for support payments is costly, it may benefit the sharing of risks between the participating states and thus lowering the individual risk of each, and may be advantageous to streamline procedures, especially in the case of more than two cooperating parties and follow-up cooperation projects with similar parameters. In case a joint fund is set up, payments to it should be commensurate to the RES target amount sharing and the allocation of costs and benefits. In any case, it could be beneficial to appoint single contact points for such transfers.

## Examples of cooperation

### Example 1: Statistical Transfer

Consider two Member States (Member State A and Member State B) that agree on using the statistical transfer mechanism. Member State A (the selling country) is expected to have a surplus of renewable energy due to its large potential of hydropower and onshore wind and would like to sell the expected excess amount. Its main objectives are to thereby contribute to covering the costs of local RES production and reduce the burden on domestic electricity consumers. A national legal basis to use statistical transfers is in place - this would be the first time of actually using it. Member State B (the off-taker) is not on track to meet its national targets using its own resources only and has enshrined the use of statistical transfers in national legislation and key strategic documents anticipating that it will need to resort to them in order to comply with its national RES targets.

In order to increase planning security, both Member States opt for fixing the transfer price ex-ante and also fixing a minimum volume of renewable energy to be traded. Member State A is willing to enter into this agreement because it is on track to significantly over-fulfil its own domestic RES target and is certain to achieve a RES surplus.

In terms of cost-benefit sharing, the main costs to be considered are support costs. The level of support costs to be considered depends on whether average or marginal costs are used and which are the reference technologies used.

There are also transaction costs arising from the cooperation. As these can be expected to be comparatively small and also equally split between Member State A and B, they could be negleced for the cost-benefit sharing. In terms of indirect effects, the host country might be affected by a number of those, such as GHG emissions savings, system integration costs and security of supply, however, it can be disputed whether these can be credited to the cooperation mechanism as Member State A had already incurred a RES surplus *before* entering into the statistical transfer with Member State B. Hence, Member State A and B agree on discarding these effects for the cost-benefit sharing and only concentrate on support costs.

Member State A and B will first need to agree on the floor and cap of the transfer price. To determine the floor price for the negotiations, Member State A should consider the national support level for different technologies. If there is agreement on underpinning the statistical transfer with a technology, then the support price for this particular technology should be selected. If there is no such agreement, it is an option to calculate an average support price for RES in Member State A. This calculated price would then serve as the floor price. As for the cap price, it is determined by the price for local RES deployment in Member State B. In theory, the maximum price that Member State B is willing to pay is also influenced by the transfer price that other Member States offer for statistical transfers. Once the theoretical price corridor is agreed, the cooperating Member States should proceed to negotiate the actual transfer price which will likely be within the corridor. They will need to find the middle ground with high enough revenues for Member State A and a low enough price for Member State B, thus creating benefits for both sides.

**Example 2: Joint Project and Statistical Transfer considering a radially connected offshore wind farm (without physical cross-border transfer of electricity)**

Consider three Member States (Member State A, Member State B and Member State C) that agree on a large-scale joint project using the respective cooperation mechanism. The joint project consists in an offshore wind park to be built and located in the exclusive economic zone (EEZ) of Member State A (henceforth: the host country) with Member State B (henceforth: the off-taking country) contributing to the support costs. Further, the off-taking country and Member State C agree on an additional statistical transfer, corresponding to 10% of the generated renewable electricity benefits of the joint project at a negotiated price. Member State C is merely interested in purchasing a pre-defined amount of RES statistics to meet its domestic RES targets faster, but has no other particular interest in the joint project.

The off-taking country is the driving force behind the project and coordinates the involvement of the other parties. It does not require physical import of electricity and no interconnector functionality is part of the project and the wind farm will be connected radially to the shore of the host country. By cooperating in this joint project, the host and off-taking country expect to meet their RES trajectory up to 2030 and beyond more cost-effectively, while receiving economic, environmental and social co-benefits in term of job creation and enhancing security of supply.

Since both the host and the off-taking Member States wish to receive RES statistics from the project counting towards their national targets, they agree to both contribute to the support payments. We assume that they do not set up a joint support scheme, but instead agree to use their domestic schemes already in place for offshore wind, meaning that each Member State will treat the offshore wind farm as if it were part of its renewable support scheme. The project is awarded through a joint tender. It is agreed that the reference price of the host Member State will be applied, i.e. the off-taking Member State will accept the reference price of the host Member State in their support system as basis for premium determination. Due to the first-mover character of the project, an exception is granted under the national support scheme of the off-taking country which would normally not allow for this.

The host and the off-taking Member States sign a cooperation agreement for the joint project. The high-level political agreement states that each of them shall be allocated the amount of RES statistics from the project that corresponds to the amount of electricity supported by that country. Since the offshore wind farm is located in the EEZ of the host country, it will by default be allocated the RES statistics which would then need to be redistributed according to the agreement.

The host and the off-taking country conduct a cost-benefit analysis, identifying the most relevant cost and benefit items and their effects. In their cost-benefit analysis, they decide to focus on costs of energy generation, system integration costs, GHG emissions, air and other local pollution, security of supply and innovation effects. To determine their effects for the cost-benefit sharing, they also include and assess support costs as well as effects on RES statistics.

| | Member State A (host) | Member State B (off-taker) | Member State C (statistical transfer) |
|---|---|---|---|
| **Renewable energy generated** | 40% | 60% | N/A |
| **RES statistics** | 40% | 50% | 10% |
| **Support costs** | 40% | 60% | N/A |
| **System integration costs**[24] | 100% | N/A | N/A |
| **GHG Emissions savings** | 40% | 60% | N/A |
| **Air and other local pollution** | 40% | 60% | N/A |
| **Security of supply** | 40% | 60% | N/A |

The two cooperating parties agree to focus on support costs, RES statistics and system integration costs solely for the cost-benefit sharing and discard all other cost and benefit elements.

In the next step, the host and the off-taking country proceed to sum up all costs and benefits for each of them, leading to a total net benefit/cost per Member State. As the host country bears the entirety of system integration costs, it incurs a net cost and demands for system integration costs to be factored into the transfer price.

In general, the negotiation space for the transfer price is determined by the relative contribution of the cooperating Member States to the support costs. Depending on whether support costs are higher in the off-taking or host Member State relative to one another, either one or the other will have a benefit from the cooperation with regards to the support payments. In general, the floor for the transfer price is determined by the additional support costs incurred by either Member State A or B, the cap is the total support cost savings.

Let us assume that technology-specific support costs are higher in the off-taking Member State compared to the host Member State. Cooperation thus leads to cost savings in the off-taking Member State, while the support costs in the host Member State might increase (as compared to the non-cooperation case). However, the cooperation leads to a net cost saving as the total support costs are lower in the cooperation case as compared to the non-cooperation case. In the example, the host Member State incurs higher support costs than it would have in the case of non-cooperation which would result in a financial compensation in the form of a transfer to the host Member State. The level of the transfer price will be determined by negotiation, but it

[24] Borne by TSO.

should be set in such a way that it provides sufficient incentives for both countries to deem the cooperation beneficial, i.e. for the host Member State it needs to be at least as high, ideally higher, as the additional support costs incurred, and for the off-taking Member State it needs to be lower than its total cost savings. Of course, countries might also have non-financial motives to pursue the cooperation which might influence their willingness to accept a lower/higher transfer price.

Departing from the total volume of prospective renewable energy generated and the costs incurred by both countries, they calculate a transfer price (€/kWh) that also takes into account an equal split of system integration costs.

**Example 3: Joint project considering solar PV installations and physical transfer of electricity**

Consider two Member States (Member State A and Member State B) that agree on a large-scale joint project using the respective cooperation mechanism. The joint project consists in a large ground-mounted solar plant located in Member State A (henceforth: the host country) with Member State B (henceforth: the off-taking country) paying for the support costs. The host country has abundant sites available for the deployment of solar PV and high solar potential. It is on track to overfulfil its own national RES targets and is interested in cooperating with other Member States to make use of its overpotential as well as boost its local labour market. Member State B, on the contrary, is not on track to meet its target and interested in making use of the cooperation mechanisms to reach its RES target at a lower cost. On the political level, it has already created the prerequisites to make use of the cooperation mechanisms, by allowing the opening of its domestic, technology-neutral RES support scheme to foreign projects. Member State A is not interested in keeping any of the RES statistics related to the cooperation project for itself which means that the support costs will be entirely borne by Member State B who will integrate the plant into its own domestic scheme.

Member State A requires the physical transfer of electricity in order to ensure that the project does not affect the domestic market balancing. This makes it necessary that there is sufficient cross-border transmission and interconnector capacity between the cooperating Member States. For the analysis of costs and benefits of the cooperation projects, this is of relevance as the necessity of physical export of the generated electricity will likely come at a considerable cost.

The host and the off-taking country sign a cooperation agreement for the joint project and conduct a CBA. In their cost-benefit analysis they decide to focus on costs of energy generation, system integration costs, GHG emissions, air and other local pollution, security of supply and innovation effects. As for the cost-benefit sharing they decide to only focus on the most important ones, i.e. support costs (borne by Member State B exclusively), costs for the physical transfer of energy (to be borne by Member State B), employment effects (for Member State A) and system integration costs (Member State A as well). As for Member State A, the main benefit that it wishes to obtain from the cooperation is to stimulate the local labour market, as for Member State B, the main interest is to lower support payments necessary to reach its domestic RES targets. As both Member States are positive that a win-win situation is

possible with major costs and benefits cancelling each other out, they agree to merely consider the costs of support.

The countries will also need to agree on a reference market price. Since the agreement is that Member State B will incorporate the plant into its domestic support scheme, the reference market price of Member State B could be used. As for the costs of the transfer of electricity, the most straightforward way to deal with this is to have the developers factor this cost into their bids which means that the support costs will increase accordingly.

To determine the likely transfer price to be paid by Member State B to Member State A, the first consideration is to calculate the savings that Member State B is able to make due to the cooperation project, i.e. savings in support costs. This entails calculating the direct support costs to solar PV[25] in Member State A as well as in Member State B. The difference between the two represents the basis for negotiating the transfer price.

[25] An alternative technology can be used for the calculation in case a direct comparison is not possible or not realistic.

# 5 SUMMARY OF RECOMMENDATIONS FOR CBA AND COST BENEFIT SHARING

To summarize, Member States and third countries dispose of a range of options and degrees of freedom for analysing and sharing costs and benefits when engaging in cooperation projects in the field of renewable energy to their mutual benefit.

Overall, two central questions need to be answered by the cooperating countries. First, by which financial mechanism and at which price will the off-taking country contribute to the project's support costs? Second, if and by which mechanism will the off-taking country compensate the host country for costs incurred domestically? As a general rule, the Member State paying the support costs should receive the corresponding RES statistics.

The following sections recap the main steps and recommendations for cost-benefit sharing, building on a cost-benefit analysis. This list and criteria are without prejudice to the criteria for CBA under the CEF Regulation, which are relevant for applications to receive the status of renewable energy cross-border project.

*General approach and required steps for initial CBA*

These non-exhaustive steps are recommended to be followed by project promoters when conducting a CBA:

- Identify relevant stakeholders
- Specify project set-up of cross-border cooperation project
    - Cooperating parties and entities
    - Other relevant authorities and stakeholders that may be affected by costs or benefits such as developers, TSOs, DSOs, etc.
    - Location of the project,
    - Technology used and design,
    - Other relevant technical features or characteristics,
    - Capacity/project size,
    - Time horizon,
    - Type of output and services envisaged, and
    - Relevant additional components
- Define appropriate counterfactual, including its set-up (same aspects as above)
- List all cost and benefits to be included
- Agree on calculation approach and methodologies for CBA indicators
- Gather latest data from verified national, European and international sources
- Quantify and monetise quantifiable indicators if not too costly and verbally describe the effect of non-monetised indicators
- Calculate delta of NPVs of the cross-border cooperation project and its counterfactual
- Write up analysis and accompanying explanations
- Verify results with relevant authorities and other (independent) experts
- Refine analysis as necessary by adjusting data and/or methodology

The order of steps is not necessarily sequential and may be iterative in some cases. Member States may consider to set up single contact points to support project promoters in these steps, in particular the specification of the project set-up of cross-border cooperation projects.

*Building on the CBA as much as possible*

A thorough societal CBA is the prerequisite for the allocation of costs and benefits between Member States and other parties. However, it might not be sufficient as a basis to negotiate their distribution. The conducted CBA will thus need to be revisited and extended.

Cooperating parties should make sure to build on the CBA as much as possible in order to maintain coherence with the main effects identified. The project definition, data used, underlying scenario and boundary conditions may not be changed and the net values calculated in the CBA should be used as the starting point for further discussions. Any boundary conditions that impact the operation of the project and its embedding into the wider energy system must be specified, as they will influence cost and benefit indicators.

The cost-benefit sharing arrangement will ultimately be the outcome of a negotiation process between the cooperating parties. They should have flexibility to agree on which costs and benefits to include. The CBA needs to strike the balance between limiting complexity and transaction costs to a manageable level while striving for the inclusion of all relevant factors.

*Principles of cost-benefit sharing*

The cost-benefit sharing should be based on fairness i.e. no party receiving an unproportionate benefit / bearing unproportionate costs due to the cooperation which can be achieved by compensating all parties commensurate to their contribution, practicability i.e. reducing complexity and thereby transaction costs to a manageable amount through limiting parties as well as cost and benefit categories to the most important ones, and reflection of actual costs and benefits (and agree on potential arrangements deviating from these only at a later stage).

*Reducing complexity*

Past experience on cooperation mechanisms has shown that complexity can be a show-stopper and that highly complex negotiation set-ups with multiple stakeholders have a higher likelihood of failing. This can, however, be mitigated if cooperating countries first agree on the basic principles and terms of cooperation and only then proceed to negotiate the details. Also, high-level political agreements on the sharing of costs and benefits may help as was the case of Sweden and Norway, negotiating their joint support scheme.

*Dealing with uncertainty and factoring it into the decision-making*

As information on costs, benefits and risks cannot be known with certainty, uncertainty is a natural part of the process and needs to be factored in accordingly. It can be attenuated by sensitivity analysis and robustness checks.

*Public acceptance*

As for public acceptance, it is recommendable for any cooperation project to address public engagement early on and proactively to avoid later setbacks. Any direct and indirect costs and benefits related to the cooperation as well as the overall approach to their allocation between the cooperating partners should be clearly described and communicated to the public.

# 6 TEMPLATE INTERGOVERNMENTAL AGREEMENT

## Part I Objective and Definitions

*Article on the objective*

- Member States should note the objective of the Intergovernmental Agreement (IGA). An example in the context of NSEC may be to enable the construction of additional renewable energy generation capacity in the North Sea. The objective is decided between the cooperating Member States.

*Article on definitions*

- Member States should define the most important terms included in the Intergovernmental Agreement. This ensures a common understanding of the involved parties and improves the legal robustness of the agreement.

## Part II Cooperation mechanism

*Article on the cooperation mechanism*

- This element should describe the legal embedding of the cooperation in the RED context, i.e. whether statistical transfer, a joint project (with another EU Member State or a third country) or a joint support scheme is chosen.

## Part III Specifications of the cooperation

*Article on the scope of cooperation*

- Member States should specify the scope of cooperation: 1) RES deployment only, 2) adding infrastructure to the cooperation, 3) adding innovation aspects to the cooperation (such as storage, conversion facilities, etc.)

*Article on the chosen support scheme*

- Member States should specify the support scheme applied (host, contributing MS or a new support scheme). If an existing scheme is used, Member States should include reference to the relevant legal basis.

*Article on new support scheme (applicable only for joint support schemes)*

- Member States should specify technical elements of the support scheme. Elements to consider are:

    a. Single project / multi-project cooperation

b. Maximum capacity/volume (amount of MW installed or MWh to be transferred)

c. Eligible technology (technologies)

d. Location or process for site selection and pre-development

e. Grid connection regime

f. Form of support

g. Tender / Auction design

h. Agreement on state aid notification

*Article on relevant market arrangement*

- Member States should specify the relevant market arrangement (e.g. designated reference market) for the cooperation project and any relevant additional provisions this may include.

*Article on the cost-benefit analysis and cross-border cost allocation*

- Member States should agree on the cost-benefit analysis and cross-border cost allocation.

  - In case of simple cooperation, the RES statistics may be transferred on the agreed transfer price. In this cooperation case, the analysis of costs and benefits should be kept as simple as possible, reducing transaction costs.

  - For more complex cooperation (or when seeking access to cross-border RES funding by the Connecting Europe Facility and / or infrastructure funding) a more comprehensive CBA may be required. In the Intergovernmental Agreement, this section should make reference to available CBA calculations and resulting CBCA approach.

  - Identification of net social benefit

  - Distribution of key costs and benefits among parties

  - Resulting compensation payments between Member States (including share of support costs financed by each cooperation partner, resulting distribution of RES statistics for target contribution purposes)

  - Payment procedure

  - Notification to the European Commission as required by the RED

*Article on the obligations of the parties*

- Here, the cooperating Member States should define the responsibilities according to the form of cooperation chosen as well as procedures and a system allowing monitoring, tracking and issuing of proof and verifications (including data transfer: content, format and timing).

*Article on a responsible body (applicable for joint projects or joint support schemes)*

- This element should describe the responsible body (e.g. an agency, or a single contact point) and its responsibilities. The responsibilities may include the identification of projects, the definition of the tendering procedure, the selection of the bidder, the supervision of the implementation of awarded projects, the payment of support payments and the reporting to the cooperating states.

*Article on the notification to the European Commission*

- According to the RED, the selling/host Member State should notify the European Commission of the agreement and the exact amount of the resulting statistical transfer.

# 7 ANNEX

## Available cooperation mechanisms and basic principles of cooperation

In accordance with Articles 8, 9, 11 or 13 of the Renewable Energy Directive, there are three main cooperation mechanisms that Member States can choose to make use of:

**Statistical transfers (Article 8)**: In the case of statistical transfers no more than two Member States agree to cooperate and virtually attribute a specified amount of renewable energy produced in excess in the one Member State to the other. This is done ex-post via a negotiated transfer price. The energy "bought" by one Member State will count towards its national contribution under the Directive. No transfer or delivery of physical energy is involved. Statistical transfers are usually not related to specific projects, even though Member States may decide to enter into such an agreement if deemed mutually beneficial. Also, statistical transfers are, in principle, technology-neutral. Member States engaging in a statistical transfer have to notify the Commission no later than 12 months after the end of the year in which the transfer has effect. Transaction costs for statistical transfers are relatively low as these are comparatively easy to set up and negotiate and allow Member States to enter into limited cooperation without having to make any changes to their domestic support vehicles. Due to their lower degree of complexity less guidance is needed on statistical transfers, but public acceptance may be an issue due to the fact that no renewable generation is transferred in exchange for the payment. Private actors are excluded from participating in statistical transfers, i.e. they are reserved to public entities.

**Joint Projects between Member States (Article 9)**: Member States may also enter into joint projects with one another to cooperate on renewable energy projects with regards to the production of electricity or heating and cooling from renewable sources. Joint projects go beyond mere statistical transfers and cooperation always takes place in reference to a specific new project. A joint project may or may not provide for the physical transmission of electricity. In addition to single cooperation projects, e.g. large-scale offshore wind projects, multi-project arrangements are also possible when a set-up relating to small- or medium-size installations is repeated. Nevertheless, these multi-project arrangements need to be distinguished from joint support schemes due to their finite nature. Projects may either concern refurbishments of existing installations or relate to new ones. Benefits and costs from these projects are shared between the cooperating parties via agreed rules. Member States may agree to implement the project via an existing support scheme of either cooperating party or create a bespoke scheme.

Joint projects may also be suitable to jointly invest in and gather experience in new technologies. The degree of cooperation and level of transaction costs are higher as compared to statistical transfers, but usually lower than that of joint support schemes, as the cooperation is limited to an agreed number of projects. Unlike statistical transfers, joint projects may also involve private operators.

**Joint projects between Member States and third countries (Article 11)**: Member States may also implement joint projects with third countries which might become particularly relevant in the context of cooperating with Energy Community countries or the United Kingdom. Joint projects with third countries, however, are limited to electricity from

renewable sources (heating and cooling are not covered) and need to establish an actual physical link with the third country. To ensure an in-feed into the EU electricity system, the respective interconnector capacity needs to be booked in time. With the exception of investment aid granted to the installation, the amount of electricity produced and exported may not have received support from a support scheme of a third country.

**Joint support schemes (Article 13)**: Another possible cooperation mechanism at the disposal of Member States are joint support schemes. This means the partial or full coordination and/or merging of national support schemes of two or more Member States. As joint support schemes may entail considerable transaction costs, they typically cover multiple projects. However, they may also be used for large single projects with a very specific set-up. Joint support schemes may also relate only to one segment of the national renewables market, for example a specific technology or geographical area, e.g. a border region. Unless otherwise specified, the agreed joint support scheme does not supersede the existing national support schemes which continue to exist in parallel. Joint support schemes are usually more demanding and complex than joint projects and typically require changes in national legislation and/or regulation.

**Principles of renewable energy cooperation**

In general, renewable energy cooperation of Member States is governed by the following principles:

**Optionality**: Two or more Member States that enter into cooperation with one another or a third country do so on a voluntary basis. Moreover, when Member States choose to join forces on renewable energy, they are free to design the details and conditions of such cooperation.

**Creation of socio-economic benefits**: Cross-border cooperation projects have to create value from a holistic, societal perspective. In general terms, the socioeconomic benefits generated by the project have to outweigh its costs when comparing it to renewables deployment without cooperation.

**Establishing mutually beneficial cooperation**: In addition to creating net societal benefits, cross-border cooperation projects will only materialize if projects ensure mutual benefits for all participating countries and key stakeholders within countries. In general, it is unlikely that all stakeholders will be better off with the project than without it, hence countries need to agree which stakeholders should be compensated and which not.

**Agreement on terms of cooperation**: Member States that intend to implement cooperation must conclude a cooperation agreement setting out the terms and conditions.

**Application of local-specific conditions**: Whilst cooperating countries shall strive to align relevant rules and regulations as much as necessary, there may be natural limits to this. Such limits will particularly apply for location-specific conditions such as licensing and taxes. Therefore, the default is that the rules of the country where the project is physically located shall apply, unless otherwise agreed and specified by the cooperating countries.

**Ensuring tangible impact**: Member States may choose to structure the cooperation such that it has tangible impacts on their power systems and markets. Cooperating Member States may for example require the physical import of electricity (which becomes a must in joint projects with third countries).

**Sharing of Costs and Benefits**: According to the Directive, the renewable energy generated should be counted towards the country that funds the installation. Depending on the technology, other costs and benefits in addition to support costs will be relevant as well. Grid connection and system integration costs are particularly relevant for offshore wind projects, while the relevance of support costs typically decreases with maturing technologies and degree of market integration. Different options for the accounting are possible. Partner countries are free to set out the details in the cooperation agreement.