

D6.4, February 2021

Guidance on implementing cross- border renewable energy auctions





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Contents

| | |
|--|----|
| Executive Summary..... | 4 |
| 1 Introduction..... | 6 |
| 2 Rationales for a cross-border approach to renewables | 7 |
| 3 Models of cross-border cooperation on renewables | 9 |
| 3.1 Instruments for cross-border cooperation on renewables | 9 |
| 3.2 Models of cross-border auctions..... | 10 |
| 4 Implementing a cross-border auction..... | 12 |
| 4.1 Four phases to implementing a cross-border auction | 12 |
| 4.2 Checklists for each phase of implementation | 15 |
| 4.2.1 Checklist for phase 1: Setting goals and principles of cooperation | 15 |
| 4.2.3 Checklist for phase 2: Investigating and finding a partner | 18 |
| 4.2.4 Checklist for phase 3: Determining the scope and conditions of the cross-border auction..... | 21 |
| 4.2.5 Checklist for phase 4: Concluding the cooperation agreement | 24 |
| 5 Conclusions | 25 |

Executive Summary

Current EU energy policy developments trigger increasing interest in cross-border cooperation for the deployment of renewable energy. The dominant rationale for a cross-border approach to renewables deployment is the possibility to achieve support cost savings as a result of access to better natural resource potential, higher market value, lower costs of capital and higher competition. Multiple instruments to facilitate cross-border cooperation are available, both at national and at EU-level. Current EU energy policy developments related to the 2030 Renewable Energy Sources (RES) Governance, the voluntary opening of national support schemes under Renewable Energy Directive II (REDII), the new EU Financing Mechanism and the new financing line of the Connecting Europe Facility emphasize the political will to think and act beyond national borders.

This report focuses on cross-border RES auctions. Cross-border auctions are characterized by their openness for participation of projects from more than one country. They will typically result in cross-border flow of support payments in return for renewables target statistics.

There are three models of cross-border auctions:

- **Unilateral cross-border auction:** Only one country opens its support scheme by implementing a cross-border auction that allows for the participation of bidders in a cooperating country.
- **Mutual cross-border auctions:** The cooperation countries both implement separate cross-border auctions.
- **Joint cross-border auction:** The cooperation countries set up a joint auction. Awarded projects are either supported by a jointly established fund or assigned to one country's support scheme.

Despite the potential gains of cooperation, most countries so far have been reluctant to consider or even make use of cross-border auctions. This is in part due to the perceived complexity of the implementation process. This report aims to reduce complexity by providing clarifications on the steps necessary and practical guidance in the form of checklists.

This guidance is structured according to four implementation phases: Implementing a cross-border auction is (for most Member States) a largely unfamiliar process, which includes new challenges and hurdles. Based on our experiences with cross-border auctions, this guidance document speaks to the most important steps and aims to provide practical guidance. To make the implementation process more manageable, we propose an approach which divides the process into four phases.

- In phase 1, each cooperating country should set its own goals and principles for the cooperation.
- In phase 2, based on the goals, countries should investigate potential partners and find a matching partner.
- Once a partner has been found, the cooperating countries should jointly determine the scope and conditions of the cross-border auction in phase 3.
- Lastly, in phase 4, the cooperating countries conclude and sign the cooperation agreement. At the end of the process stands the actual tendering of RES volumes (this however shall not be the focus of this guidance document).

The mentioned checklists include the most important elements that Member States should consider in the implementation process and explain them shortly. For the four phases, these are the main elements that cooperating countries should consider:

- **Phase 1:** Review goals of the national RES policy, set goals (and principles) of cooperation
- **Phase 2:** Determine the basic concept of the cooperation, investigate the natural potential of likely partner countries, review and understand the national regulatory frameworks, investigate the current market situation, discuss potential gains and distributional effects of cooperation
- **Phase 3:** Discuss the administrative processes and responsibilities in national RES schemes, choose the cooperation model, agree on the scope and extent of auctions, analyze and possibly adapt auction/support scheme to differing regulatory and market conditions, determine the allocation of costs and benefits, decide on administrative procedures, define contractual arrangements
- **Phase 4:** Conclude the cooperation agreement



There are various aspects to be considered by all involved parties when designing cross-border auctions. The practical guidance provided in this report shows that establishing cross-border auctions is indeed feasible. Experience with cross-border auctions is still limited and an increased number of such auctions being implemented will generate further knowledge on how to tap into the vast potential for RES deployment while limiting transaction costs.



1 Introduction

In contrast to national auctions, cross-border auctions are characterized by their openness for participation of projects from more than one country. First pilot cross-border auctions for solar PV were successfully implemented between Germany and Denmark in 2016, but other countries have so far been reluctant to make use of cross-border auctions, despite the potential gains of cooperation. However, current developments on EU energy policy trigger increasing interest in cross-border auctions, making the topic more relevant than ever.

This report seeks to provide guidance on the implementation of cross-border auctions. So far, the implementation of a cross-border auction is (for most Member States) a largely unfamiliar process, which includes new challenges and hurdles. Based on our experiences with cross-border auctions, this guidance document addresses the most important steps, provides checklists to consider and aims to generally provide practical guidance. This report builds on previous work within the AURES II project, especially the task 6.1 report 'Design options for cross-border auctions'.¹

The report will begin by laying out how countries can benefit from cross-border cooperation on renewables in chapter 2, before breaking down the different instruments for cross-border cooperation in chapter 3. In chapter 3, the models for cross-border auctions are introduced and explained. In chapter 4, we propose to divide the implementation process into four phases. The checklists (4.1 – 4.4) are structured according to the phases and include important elements to consider. The report completes in chapter 5 with a short conclusion.

¹ It can be found here: http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6_1_final.pdf



2 Rationales for a cross-border approach to renewables

Cross-border cooperation on renewable energy has the potential to significantly contribute to the achievement of the 2030 EU target and may become indispensable to unlock RES potential required to reach more ambitious long-term climate and energy goals. The 2030 RES target for the European Union (EU) of at least 32%² does not translate into binding national targets. Regardless, Member States must contribute towards the target. For defining their national RES contribution to the 2030 EU target and the respective target trajectory, Member States shall take into account the formula defined in annex II of the adopted Governance regulation (EU) 2018/1999.³ In this context, the cost-efficient deployment of renewables is as important as ever and may trigger EU Member States to consider a cross-border approach to renewables.

Taking a cross-border approach to the deployment of renewables can allow Member States to first and foremost reduce the costs of support for renewables by:

- 1) tapping into better natural resource potential of the cooperating country,
- 2) accessing higher market values in cooperation countries,
- 3) providing access to lower costs of capital and better financing conditions that reduce overall investment needs, and
- 4) increasing competition in a domestic auction scheme.⁴

RES cooperation can increase interconnection between cooperating countries and security of supply, e.g. when countries jointly implement offshore wind power in combination with a transmission line connecting both countries. Joint support of innovative technologies and infrastructure solutions by the cooperating countries can also act as a catalyst for innovation. Cooperating countries can also create additional benefits of cooperation by strengthening the political and economic ties.

Member States looking to increase cooperation have several options available, ranging from bilateral statistical transfer to the participation in EU-wide auctions under the EU Financing Mechanism (see chapter 3.1). The focus of this guidance document is on the implementation of cross-border auctions, which are characterized by their openness for participation of projects from more than one country.

Member States that implement cross-border auctions for renewables can decrease support costs for renewables by making use of the above listed four points. Besides the economic benefits, there are a number of political developments potentially triggering an increasing number of cross-border auctions in the near or mid-term future. Beyond the target achievement, according to Art. 5 of the renewable energy directive (RED II), EU Member States have indicative shares for the voluntary opening of their support schemes. The European Commission may even make the opening of national support schemes obligatory as of 2025.

At the same time, new instruments at EU-level facilitate a cross-border approach to renewables deployment. Under the newly established "EU Financing Mechanism" (see chapter 3)⁵, Member States will be able to

² With a view to the proposed target by the European Commission to reduce EU greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, a ratcheting-up of the RES target can be expected.

³ The formula is $RE\%_{2030} = RE\%_{2020} + C_{Flat} + C_{GDP} + C_{Potential} + C_{Interco}$. C_{Flat} is the same for each Member State. The C_{Flat} of all Member States together contribute 30% to the difference between the Union's targets for 2030 and 2020. C_{GDP} is distributed between Member States on the basis of the per capita index of Eurostat for the period 2013 to 2017, expressed in purchasing power standard, to the Union average, the index being limited for each Member State individually to 150% of the Union average. The C_{GDP} of all Member States together contributes 30% to the difference between the Union's targets for 2030 and 2020. $C_{Potential}$ is allocated to Member States on the basis of the difference between a Member State's share of RE in 2030 under the PRIMES scenario and its national mandatory target for 2020. The combined $C_{Potential}$ of all Member States contributes 30% to the difference between the Union's shares in targets for 2030 and 2020. $C_{Interco}$ is allocated between Member States on the basis of an index of electricity interconnection shares in 2017 according to the Union average, measured as the net transfer capacity over total installed generation capacity, with the index of interconnection shares for each Member State limited to 150% of the Union average. The $C_{Interco}$ of all Member States together contribute 10% of the difference between the Union's 2030 and 2020 targets.

⁴ More information on each of the rationales can be found in chapter 2 of the 2019 AURES II report 'Design options for cross-border auctions'. It can be found here: http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6_1_final.pdf

⁵ An AURES II report that explains the functioning of this mechanism and illustrates it using hypothetical case studies



provide funds which are in turn used to implement RES auctions across all Member States (voluntarily) participating as potential hosting countries for RES installations. Member States may also be incentivized to implement cross-border auctions with the introduction of new funding line of the Connecting Europe Facility that will be established by end of 2021 to provide up-front investment support (grants) for “cross-border renewables projects”. Lastly, some countries are required to open their support schemes to comply with the requirements of the State Aid Decisions on their renewable electricity support schemes.

can be found here: <http://aures2project.eu/2020/11/03/the-new-renewable-energy-financing-mechanism-of-the-eu-in-practice/>



3 Models of cross-border cooperation on renewables

3.1 Instruments for cross-border cooperation on renewables

Member States have a variety of instruments to choose from for the cross-border cooperation⁶. As shown in Figure 1, Member States have the option to transfer RES target statistics from already implemented RES projects for a negotiated payment (“statistical transfer”). Statistical transfers are negotiated bilaterally and may be facilitated by the Union Renewable Development Platform (URDP), which is a platform for statistical transfer that will be established by the EU Commission.

Next, cross-border cooperation looking to support new projects that are not yet installed can be implemented through cross-border auctions. Again, EU Member States can choose to implement such auctions bilaterally, or make use of a new instrument to be established at EU-level, the “Union renewable energy financing mechanism” (EU Financing Mechanism) as provided in Article 33 of the Governance Regulation.⁷ Under the EU Financing Mechanism the auction is designed and implemented by a designated authority of the EU Commission. Member States can make voluntary financial contributions to the mechanism.⁸ The mechanism subsequently implements a RES auction which determines support levels and allocates grants to awarded RES projects in hosting Member States, which choose to participate on voluntary basis as well. The hosting Member States transfer RES target statistics from these RES installations back to the mechanism which then redistributes the RES statistics to the contributing Member States according to their share of financial contributions.⁹

⁶ Articles 6 to 11 of the Renewable Energy Directive (2009/28/EC on the promotion of the use of energy from renewable sources) introduced three cooperation mechanisms: 1) The statistical transfers including a reference to the Union renewable development platform (‘URDP’), 2) joint projects in which the involved Member States define which share of the energy production counts towards which Member States’ target, and 3) joint support schemes in which Member States merge or coordinate (parts of) their RES support schemes. Cross-border auctions, the focus of this guidance, stem from the broader concept of RES cooperation as defined in RED I.

⁷ Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action.

⁸ In this report we refer to Member States only, but do not exclude the possibility for Third Countries to participate in the EU Financing Mechanism.

⁹ The AURES II report “The new renewable energy financing mechanism of the EU in practice” explains the functioning of this mechanism in detail. It can be found here: <http://aures2project.eu/2020/11/03/the-new-renewable-energy-financing-mechanism-of-the-eu-in-practice/>



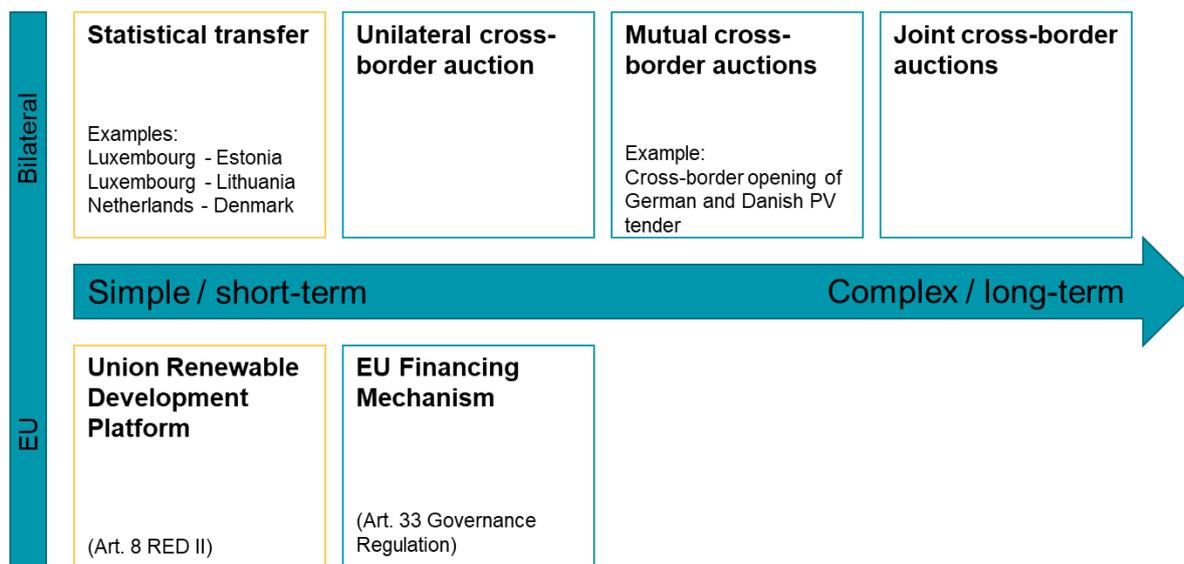


Figure 3-1 - Overview of instruments for renewables cooperation ordered by complexity from the perspective of the Member States, lead time and actors (cross-border auction models in blue, other cooperation mechanisms in yellow)

Statistical transfers¹⁰ (either negotiated bilaterally or facilitated through the to-be-established Union Renewable Development Platform) are short-term transfers of RES statistics with the aim of achieving RES targets. The transfer price is negotiated between the parties in advance. Transaction costs for Member States are low, as the only element to negotiate is the before mentioned transfer price. Depending on the available resources (i.e. the funds and installed RES capacity), the size of the transfer can be adjusted flexibly between the cooperating countries. A statistical transfer is an ex-post form of cooperation, as it does not involve the deployment of new generation resources.

National cross-border auctions are an ex-ante form of cooperation leading to the deployment of new projects. Member States are free to shape the cooperation according to their national preferences. This may include the application of the national support scheme or a technological focus. A cross-border cooperation entails higher transaction costs compared to a statistical transfer as Member States need to negotiate on more elements to tailor the cooperation. One key difference to the statistical transfer is that Member States will not receive the RES statistics immediately, but only after the selected RES project has been built. One source of uncertainty is the cost of RES deployment support, which the Member States does not know in advance to the bid selection and the actual electricity market price developments.

The EU Financing Mechanism works similar to a national cross-border auction, however with less influence over the technological focus or the geographic distribution of projects. The designated authority is responsible for the design, implementation and processing, reducing efforts and transaction costs for the Member States.

3.2 Models of cross-border auctions

There are three basic models for the bilateral implementation of cross-border RES auctions between Member States: 1) unilateral cross-border auctions, 2) mutual cross-border auctions and 3) joint cross-border auctions.¹¹ They are characterized by varying degrees of complexity and different lead times (see Figure 1 above).

¹⁰ Genuine statistical transfers are, in contrast to the statistical transfer occurring as a result of a cross-border auction under the EU Financing Mechanism, unrelated to a specific project.

¹¹ These three models were defined in the 2019 AURES II report 'Design options for cross-border auctions'. It can be found here: http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6_1_final.pdf

Unilateral cross-border auction: In a unilateral cross-border auction, only one country (the contributing/paying country) conducts a cross-border auction by opening its auction scheme to projects in a cooperating country (the host country). The host country does not pay any support costs but provides its RES resource potential and project pipeline for development. Unilateral cross-border auctions require the lowest degree of coordination among the cooperating countries. Yet, they achieve the fundamental benefits of cross-border auctions. Under this model, the cooperating countries agree on the scope of their cooperation, the cost-benefit sharing – most likely based on an allocation of RES target statistics that is perceived as fair by the cooperating countries – and the transfer of payments and information. The country conducting the auction will largely determine the auction design.

Mutual cross-border auctions: The cooperating countries each conduct an auction that is open to installations in the cooperating country. The cooperating countries may implement mutual auctions to fulfil requirements regarding the opening of the national support scheme, and/or to increase the political acceptance of opening through reciprocity. The process of setting up the auction, as well as the number of aspects that cooperating countries need to agree upon, is similar to a unilateral auction. However, under this model, each country conducts its own cross-border auction, for which it solely determines the design. In 2016, the first mutual cross-border auctions were held between Germany and Denmark.¹²

Joint cross-border auction: Implementing a joint cross-border auction is the most complex form of cross-border auctions, as it requires intense exchange and coordination to establish the joint scheme and to prepare the cross-border auction, entailing higher transaction costs. In contrast to the previous models, a joint auction is most likely designed with the intent of implementing multiple tenders covering larger RES volumes or possibly including more cooperating countries. This increases the complexity of the cooperation but also the possibility to tap into further RES potential and markets.

Given the novelty and complexity of some forms of cross-border auctions, it seems reasonable that EU Member States may focus on a simpler model at first. Unilateral auctions include all relevant process steps which are needed for a cross-border auction, making the detailed description of (seemingly) more complex mutual auctions futile. The checklists in chapter 4 are thus written with a unilateral auction in mind but can also be applied to mutual or joint cross-border auctions. For the remainder of this guidance document, whenever the term cross-border auction is used, a unilateral cross-border auction is meant (unless specified otherwise).

¹² The AURES II report 'Design option for cross-border auctions' includes an analysis of the German-Danish cross-border auctions.



4 Implementing a cross-border auction

4.1 Four phases to implementing a cross-border auction

The process of implementing a cross-border auction can be roughly divided into the following four distinct phases: In phase 1, each cooperating country should set its own goals and principles for the cooperation. In phase 2, based on the goals, countries should investigate potential cooperation partners and find a matching partner. Once a cooperation partner has been found, the cooperating countries should jointly determine the scope and conditions of the cross-border auction in phase 3. Lastly, in phase 4, the cooperating countries should conclude and sign the cooperation agreement. At the end of the process is the actual tendering of RES volumes (not focus of this guidance document).

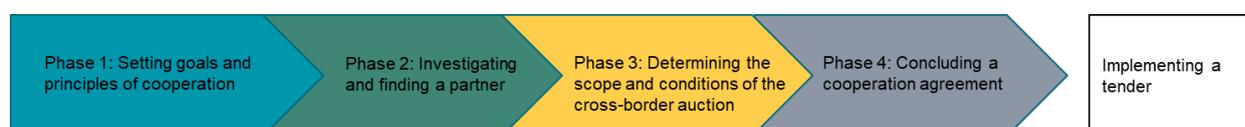


Figure 4-1 - Implementation process of a cross-border auction in four phases

Phase 1: In a first phase towards a cross-border auction, the goals and principles of the cooperation, the legal and regulatory requirements of the cross-border auction, the scope, the potential gains and distributional effects of cooperation should be considered. Setting goals and principles nationally is a prerequisite for finding a matching partner country. Consequently, each cooperating country should review its national policy objectives, priorities and targets to determine goals and conditions for the cooperation. The political priorities and the specific goals depend on the role of the country in the cooperation, thus whether the country is the contributing or the hosting country.

From the perspective of the contributing country important elements to consider are the many benefits (access to cost-effective RES potentials leading to support costs savings, solution for the requirement of opening support schemes) as well as the transaction costs of the cross-border auction and potential effects on political acceptance. Supporting RES deployment outside of the country and missing the positive benefits associated to RES may be perceived as problematic by rate- and taxpayers or the domestic RES industry. Contributing countries may derive concrete requirements in their search of a partner country with regard to the potential support cost savings to be achieved, the technological focus of the cooperation, the geographical proximity or level of interconnectivity of the cooperating country, or the similarity of the regulatory frameworks of both countries.

Possible goals from the perspective of a hosting country, for instance, may be fostering political cooperation with a partner country, creating jobs, modernizing the energy system, increasing security of supply, reducing import dependency, improving air quality or reducing greenhouse gas emissions. On the other hand, host countries need to consider possible costs for system integration, transaction costs, a possible lack of political and public acceptance and that potential sites are no longer available for development under the national support scheme.

Ensuring that cross-border auctions have public acceptance is a key challenge. Defining general conditions or principles of cooperation that ensure that both the contributing and the hosting country maintain control over the scope of cooperation and the cost and benefit distribution between involved actors may be crucial to achieve public acceptance. Principles may for example include requirements of reciprocity or an interconnection of the two cooperating countries to ensure that RES installations in the cooperation country also have an impact on the domestic power system of the contributing country and thus also support its transition towards renewables. Linking cooperation to the availability of interconnection limits the scope of

cooperation both in terms of potential cooperation countries and volumes. Another principle that countries may consider ensuring public acceptance for the cooperation is to determine that RES installations resulting from cooperation do not substitute host countries' domestic efforts to deploy renewables.

Member States are advised to consider early-on in the process necessary changes in existing laws and regulations as well as the legal nature of the cooperation agreement. Depending on national law, the cooperation agreement may have the status of an international treaty or a (simpler) administrative agreement. The legal construct chosen can have implications on the duration of the implementation process (e.g. a treaty needs to pass parliament whereas an administrative agreement does usually not require the involvement of parliament). Member States are also advised to consider the budgetary laws and procedures in place and their implication on the cooperation. One issue to investigate for example is, whether money received by the host state needs to be spent within a specific timeframe.

Phase 2: In a second phase, countries should find a partner that matches the previously determined goals and principles of cooperation. Finding a suitable cooperation partner can be challenging. However, in a unilateral cross-border auction, the paying country's chances of finding a matching partner are relatively high, as little commitment is required from the host country. To determine whether a match is possible, it is important that countries investigate and understand country-specific starting points in terms of renewable energy policies and market conditions and whether the goals and conditions are complementary. For example, in the German-Danish pilot auctions, a matching of the two countries was facilitated by similar goals. Both countries aimed to fulfil their legal obligation to partially open their national support scheme, they had a preference for an interconnected partner to ensure that the electricity produced by the RES installations abroad had an impact on their national power market and both required some form of reciprocity. However, the pilot cross-border auctions also emphasized the importance of accounting for deviating regulatory conditions and market environments for the outcome of an auction.¹³ Once a matching partner is found, phase 2 is complete and the cooperating countries can jointly determine the scope and conditions of the cross-border auction.

From the perspective of the contributing country, it is important to consider the political relations with the host country, the regulatory and market frameworks and, if laid down as a principle, the physical connection to the host.¹⁴ From the perspective of the host country a relevant element to consider may be the improved access to financing, the best practice exchange from a possibly more experienced partner or the general political cooperation with the contributing country.

Phase 3: In the third phase, the cooperating countries jointly determine the scope and conditions of the cross-border auction and the distribution of costs and benefits. In a unilateral (and mutual) cross-border auction, the contributing country can design the auction according to its goals (as defined in phase 1) and will generally make use of the existing national auction and remuneration scheme. It may however be necessary to adapt some elements of the auction and remuneration design to the specific market and regulatory environment of the host country. In case of joint auctions, the cooperating countries need to agree on a common auction design. The good practices of auction design – which have been identified in the first AURES project¹⁵ – apply here as well. Generally, the auction design must be equal for all participants across

¹³ Our analysis of the five successful Danish bids in the German auction showed that Danish bidders had a competitive edge over their German competitors mostly due a higher solar potential, but also due to site restriction rules in Germany. In terms of LCOE, the Danish projects had an advantage of around 0.6 - 0.8 ct/kWh, solely due to a higher solar potential. Site restrictions in Germany are stricter, as plants cannot be built on farmlands. A scenario that allows solar PV on farmland estimate a decrease in LCOE of around 0.3 ct/kWh. Furthermore, at the time of the German-Danish cross-border auctions, Danish project developers had no alternative options to apply for support. Therefore, it can be assumed that Danish developers placed aggressive (low) bids to secure support. More information can be found in in the AURES II report 'Design options for cross-border auctions'.

¹⁴ For more detail on the impact of differing regulatory framework conditions in cross-border auctions see Ecofys and Eclareon (2018): Cross-Border Renewables Cooperation. Study on behalf of Agora Energiewende: https://www.agora-energiewende.de/fileadmin2/Projekte/2017/RES-Policy/144_cross-border_RES_cooperation_WEB.pdf

¹⁵ The final report of the AURES I Project provides an overview of the most important design questions and best practice



the cooperating countries to ensure comparability of bids and effective bid selection. However, if not tailored to the specific cross-border context, some rules (see below) may exacerbate existing differences between bidders from different countries and lead to a distorted competition and inefficient auction results. Thus, the design elements determining the conditions for participation as well as deadlines and penalties, require a closer assessment regarding their applicability, their impact on participants' costs and risks as well as their impact on project realization and thus effectiveness of the cross-border auction.

Some general recommendations for the design of cross-border auctions

In a cross-border auction, the use of material prequalification criteria – which require a certain project development status upon entering an auction – should be limited (e.g. bidders can simply provide a statement declaring they have the permit in question) or avoided completely so as not to discriminate against certain bidders. Financial prequalification criteria are financial guarantees to secure the completion of the project. They are usually connected to the penalties, e.g. bid bonds that need to be placed as financial prequalification at the bidding to guarantee the payments of penalties. In a cross-border auction, the level of financial prequalification should not be too high in order to not disadvantage bidders from markets with less favourable access to financing. Realization deadlines should consider local planning and permitting processes. Our general recommendation is to opt for a combination of a late auctions (shorter realization deadline) and a higher financial prequalification instead of extensive material prequalification requirements.

A topic that also requires consideration are the national regulatory and market conditions. Key aspects impacting the cost of project development include planning and permitting, grid connection, eligible areas and sites, environmental requirements, financing conditions, taxation, project realization periods and risk of non-realization. These aspects cannot easily be aligned in the context of a cross-border auction, as they reflect a broader regulatory and political context. Our recommendation is to refrain from levelling differences artificially in order to tap into the full efficiency potential of the auction¹⁶.

The complexity of the negotiations surrounding the cross-border auctions will increase with each element that needs to be considered in the cost-benefit distribution. As a result of the discussed challenges and based on past experience, we recommend that countries try keeping the cost-benefit analysis and the resulting distribution as simple as possible. Flat-rate approaches to the distribution of RES statistics, i.e. based on the principle of “who pays the support receives the RES statistics” may be a straightforward solution to distribute costs and benefits. The suitability of such an approach depends, however, on whether or not system integration costs are reflected in the support payments which is determined by the regulatory framework of the host country. Cooperating countries can also agree on pro-rata approaches to financing the support of RES installations and/or receiving RES statistics, as shown in **Figure 4-2**. On the other hand, if benefits of support cost savings to the contributing partner are very high, additional redistribution of costs can be considered to increase the hosting country's willingness to become a partner.

options. See Mora et al., 2017: Auctions for renewable energy support – Taming the beast of competitive bidding: <http://auresproject.eu/sites/aures.eu/files/media/documents/aures-finalreport.pdf>

¹⁶ For more detail on this topic, see the report 'Design options for cross-border auctions', which can be found here: http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6.1_final.pdf



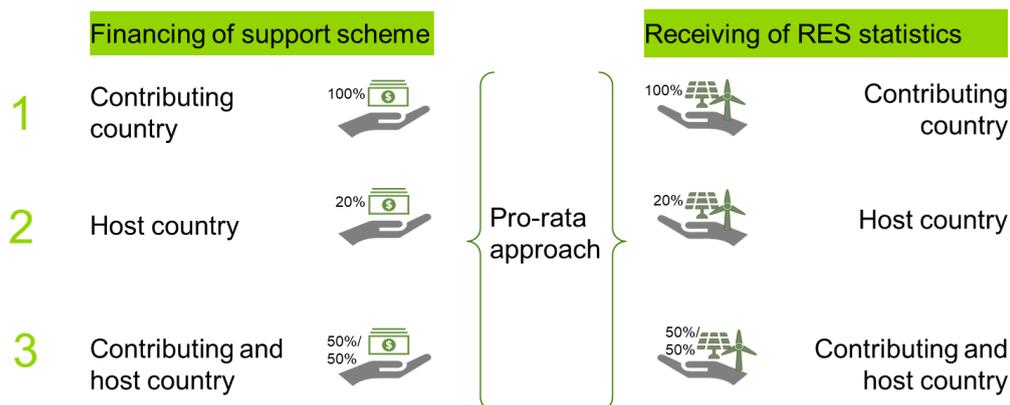


Figure 4-2 - Illustration of pro-rata approaches to the financing of support and the distribution of RES statistics. The suitability of such simple solutions to cost-benefit allocation depends on whether or not system integration costs are reflected in the support payments.

Phase 4: After the negotiations are completed, the cooperating countries can conclude the cooperation agreement in phase 4, thereby laying the foundation for the actual implementation of the cross-border auction. A cooperation agreement provides legal certainty, reduces counterparty risks as much as possible, and thereby reduces the risks for investors. The cooperation agreement needs to define details regarding the exchange of information, responsibilities, and legal liabilities as well as how financial support and the RES statistical benefits are to be allocated amongst the cooperating countries. In the design of the cooperation agreement, the national regulatory authorities and other relevant actors need to be involved.

4.2 Checklists for each phase of implementation

To ensure that cooperating countries address the most important steps in the implementation process, a checklist for each phase is provided in the following sub-chapters. The checklists contain the main issues that may arise, including some of the respective design options¹⁷ for each topic without claiming to be complete. They are aimed to be used as a starting point to the implementation of a cross-border auction reflecting both the perspective of a country implementing the auction (i.e. country contributing the support payments) and the perspective of the country whose bidders can participate in the auction (i.e. the hosting country).

4.2.1 Checklist for phase 1: Setting goals and principles of cooperation

EU Member States have defined national renewable energy targets in their respective National Energy and Climate Plans. National policy frameworks to support the deployment of renewables are set out to ensure the achievement of these renewable energy targets, yet they also reflect a set of underlying political priorities. While cross-border cooperation, such as the implementation of cross-border auctions, has the potential to significantly facilitate the achievement of the renewables targets, Member States will need to reflect upon the underlying political priorities of their national renewables policy framework (e.g. a specific technology focus) when considering the implementation of cross-border auctions.

This checklist lists goals and principles that may be relevant for some or all of the cooperation countries. Countries are encouraged to consider the individual goals and principles listed in the preparation of

¹⁷ A more detailed discussion of the design options can be found here: http://aures2project.eu/wp-content/uploads/2019/06/AURES_II_D6_1_final.pdf

cooperation and ideally prioritize some over others.

| Checklist | |
|---|---|
| Phase 1: Setting goals and principles of cooperation | |
| Potential goals of cooperation | |
| Q | Reduction of support costs: A main benefit of cross-border auctions is the reduction of support costs for contributing Member States. The support costs can be decreased by access to better natural resource potential, higher market values and lower cost of capital in cooperating host countries compared to domestic conditions. |
| Q | Access unexploited RES potential: Cross-border cooperation can be a tool to unlock unexploited RES potential faster and cheaper, for example by jointly developing projects in offshore areas. |
| Q | Ensure competition in the auction: Opening auctions to the participation of bidders located in other host countries can increase competition levels in the contributing Member State and induce additional downward pressure on bid prices. Particularly in smaller countries characterized by a limited amount of domestic market actors, a limited project pipeline and/or low RES potential, opening cross-border auctions to projects in host countries with more favorable conditions may increase competition. |
| Q | Best practice exchange: Participating in a cross-border auction offers the opportunity of best practice exchange between the participating countries. Especially (host) countries with little administrative capacities and/or little experience can benefit from the experience and administrative capacities of a more experienced (contributing) country. This goal may be more pronounced in joint auctions than in unilateral auctions, in which cooperating countries have to agree on a common support scheme design. |
| Q | Technology advancement: The levelized costs of electricity (LCOE) for RES have decreased over the last years, partly due to technology advancement. Cross-border auctions can be a tool to further accelerate the deployment of a certain technology, thereby possibly enabling further efficiency gains and cost reductions in the host country where such installations are built. |
| Q | Reducing the costs of RES integration: The integration of more RES into the electricity system has impacts on (re-)dispatch and grid reinforcement requirements. However, these impacts vary between countries. Reducing costs of system- and grid integration can be the driving motivation for a contributing country intending to shift some of its RES deployment to hosting countries with lower system integration costs. At the same time, potential hosting countries will also consider these costs as well as the extent to which they are reflected in the support payments, i.e. borne by project developers via bid prices, or incurred by domestic stakeholders such as TSOs. A compensation of arising system integration costs for the hosting country may thus be required in addition to support payments. |
| Potential principles of cooperation | |
| Q | Reciprocity of cooperation: Depending on the national political context and acceptance concerns, reciprocity may be considered as a principle of cooperation. This means that all involved countries open part of their support scheme, for example by also conducting a cross-border auction, or that all countries assume part of the support costs. Alternatively, it may be laid down in the cooperation agreement that the cooperation shall be mutually beneficial and have a genuine impact on the energy transition in both countries. |

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|  | <p>Proof of physical import of electricity or impact on domestic power market: Member States may require proof that the electricity produced by an installation in another country is either imported or has an impact on the power market of the contributing country. The existence of an interconnector between the cooperating countries may be considered sufficient as proof. Such a requirement, however, restricts the number of potential cooperation partners significantly.</p> |
|  | <p>Additionality: Countries opening their support scheme by conducting a cross-border auction may require that RES installations resulting from cooperation do not substitute host countries' domestic efforts to deploy renewables, i.e. to ensure that the cooperation leads to the additional deployment of renewables. This principle should be considered to safeguard public acceptance of taxpayers in the contributing country.</p> |
|  | <p>Consideration of balanced geographical distribution of installations: Some EU Member States may experience structural network congestion issues that make it necessary to consider the geographical distribution of projects awarded in the cross-border auction in order to ensure system stability and reduce system integration costs. For example, hosting Member States may decide to limit participation for projects located in certain areas to avoid further network congestion in network-constrained areas.</p> |
|  | <p>Intergovernmental agreement: Cooperating countries generally require the existence of an intergovernmental agreement that defines the terms and conditions of cooperation as a prerequisite for the participation of 'foreign' projects in the cross-border auction. Depending on the involved countries' constitutional laws, such an agreement may either have the status of an international treaty or an administrative agreement, which has implications on the complexity and duration of the national implementation process (e.g. a treaty needs to be ratified by parliament). Member States are advised to consider the required legal nature of the cooperation agreement early-on in the process.</p> |

4.2.3 Checklist for phase 2: Investigating and finding a partner

The aspects listed below have an important role in the search for a suitable cooperation partner. The listed criteria determine the potential of a cooperation to achieve the goals defined in phase 1 and the adherence to the principles of cooperation.

| Checklist | |
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| Phase 2: Investigating and finding a partner | |
| Natural potential | |
| 🔍 | RES resource quality: RES resource quality (e.g. solar radiation, wind speeds) differs heavily within countries and even more so between countries. The uneven distribution of resource qualities across the EU is one of the main reasons for potential benefits from cooperation between Member States that invest in the cross-border deployment of renewables. Tapping into a higher resource quality in hosting countries translates into lower LCOEs potentially resulting in lower bid prices and lower support payments for contributing Member States. |
| 🔍 | Availability of sites and site restrictions: The availability of sites in potential cooperation countries is an important factor when investigating and finding a partner. EU Member States vary significantly in their availability of sites that are suitable for the development of RES projects. In addition, national regulations restrict the availability of sites suitable for RES projects. |
| National regulatory frameworks | |
| 🔍 | Similarities and differences of current support frameworks: The support scheme design mainly consists of two parts: the design of the auction and the design of the remuneration. To account for the national contexts of the involved cooperation countries, the prevailing national auction and remuneration design may not be fully applicable. Instead, some design elements may require adaptation (in case of unilateral or mutual cross-border auctions) to account for the specific market and regulatory environment of the host country or aligning (in case of joint auctions). |
| 🔍 | Availability of sites and site restrictions: The availability of potential RES sites in potential cooperation countries is an important factor when investigating and finding a partner. EU Member States vary significantly in their availability of sites that are suitable for the development of RES projects. In addition, national regulations restrict the availability of sites suitable for RES projects. |
| 🔍 | Potential impact of regulatory/permitting frameworks on cross-border auctions: The conditions under which project developers can realize RES projects differ between countries. For example, planning and permitting procedures are driven by regulatory conditions and vary significantly between countries. These differences have a bearing on costs borne by the project developers and thus have direct effects on the bid and the competitiveness of bids from one country. Attempting to level out differences or align regulatory differences in a cross-border cooperation is not feasible (nor advisable) in most cases. |

Current market situation

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|  | <p>Competitive situation: Competition in an auction is characterized by the participation of different bidders (i.e. a lack of market concentration) as well as sufficient bidders/projects. A high level of competition in an auction is desirable for the auctioneer, since it increases the chances of a cost-effective allocation and decreases bid prices. Countries investigating potential partners are encouraged to assess the competitive situation in potential cooperation countries to ensure that it is high enough to accommodate for a (additional) cross-border auction. Competitions levels in past auctions (e.g. relation of bid volume vs. auction volume), the current project pipeline and the availability of sites are good indicators for a country's competitive situation.</p> |
|  | <p>Current level of support / auction results: Cross-border auctions usually run in addition to national auctions or other national support schemes, which can be considered as outside options or alternative opportunities to receive support for projects. The relative attractiveness of one opportunity to receive support – e.g. in a cross-border auction – and thus also the bidder's behavior in that auction depends on the availability of alternatives and the level of demand and supply for RES installations in the entire RES market. When introducing cross-border auctions in parallel to existing national auctions, it is important to synchronize the auction schedules with a view to providing a continuous pipeline and avoiding boom and bust cycles in the RES industry.</p> |
|  | <p>Electricity market values: The income that renewable energy power plants can generate from the regular electricity market is called the "market value". Market values differ between countries or bidding zones depending among others on the generation mix, the existing capacities of both renewable and conventional electricity generation plants and the level of interconnection. By implementing cross-border auctions, countries can gain access to projects with higher market values compared to the domestic RES power plants, which can lead to a significant decrease in support payments.</p> |
|  | <p>Cost of capital: The costs of financing (usually measured as the weighted average costs of capital "WACC") differ substantially between Member States. They are partially influenced by the type of support system for renewables in place and the political risk associated with the respective country. Cross-border cooperation may provide access to lower cost of capital and overall better financing conditions and thus reduce overall investment needs.</p> |
|  | <p>Structure of market participants: Cross-border cooperation can be used to increase competition in domestic support schemes. Especially smaller countries that face the issues of a limited amount of domestic resource potential, or a limited amount of competition/market actors, can make use of cross-border auctions to reach their RES targets cost-effectively.</p> |

Potential gains and distributional effects of cooperation

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|  | <p>RES production: The hosting Member State benefits from the increased RES production in the form of reduced import dependency, improved air quality, reduced greenhouse gas emissions and additional electricity. For the paying state, the main benefit are the RES statistics, counting towards that country's national RES share.</p> |
|  | <p>Impact on support cost expenditure: Accessing RES potentials in other Member States may lead to support cost savings for the paying country compared to purely national RES deployment. In the host country, auctioned sites are no longer available for national deployment. As a result, the host country's support costs for future domestic RES deployment may increase.</p> |



Geographical distribution of installations: Differences in national regulatory frameworks (e.g. RES site restrictions, taxation) have direct effects on the auction outcome and thus on the distribution of selected projects between cooperation projects.



Distribution of other costs & benefits: There are various challenges related to identifying costs and benefits and to distributing them. The participating countries have to agree on a list of elements to be considered. It is also challenging to quantify and monetize several of these elements. This relates foremost to system and grid integration costs, which can only be quantified in a robust manner when using energy market and grid modelling. We recommend that countries try keeping the cost-benefit analysis and the resulting cost-benefit distribution as simple as possible.

Administrative processes and responsibilities in national RES schemes



Administrative processes of national auction and support payment procedures: Member States need to define rules and responsibilities for the cross-border disbursement of funding. A dedicated body has to be assigned with the disbursement of funding. For unilateral and mutual cross-border auctions this can be the body responsible in the national support scheme. For joint auctions a common body may be established.

Defining the basic concept of specific cooperation case



Model of cross-border auction: There are three basic models for national cross-border RES auctions between Member States: 1) unilateral cross-border auctions, 2) mutual cross-border auctions and 3) joint cross-border auctions. They are characterized by varying degrees of complexity and lead time. Cooperating countries should have clarity on their individual preference for either of these cooperation models before entering into negotiations and ideally be aligned early on in the process with the prospective cooperation partner on their jointly preferred form of cooperation.



Scope of cooperation: Cooperating countries need to agree on the scope of the cooperation as part of their negotiation, including aspects such as a potential technology focus, volume, maximum size of installations and the timing of the auctions (see below). In cross-border auctions, the design elements determining the conditions for participation as well as deadlines and penalties, require a closer assessment regarding their applicability, their impact on participants' costs and risks as well as their impact on project realization and thus effectiveness of the cross-border auction as they may exacerbate existing differences between bidders from different cooperating countries. Countries intending to cooperate should have clarity on these implications before entering into negotiations with a prospective cooperation partner.

4.2.4 Checklist for phase 3: Determining the scope and conditions of the cross-border auction

The elements provided below determine the scope, conditions and procedures of the cross-border auction as well as the distribution of costs and benefits that host and contributing Member State need to agree on. The extent and complexity of aspects to be negotiated and agreed upon between hosting and contributing Member States depend on the chosen cross-border auction model. The following checklist provides a high-level indication of aspects that host and contributing Member States should consider in their negotiations. For more details on the specific design considerations for cross-border auctions, we refer to the AURES report 'Design options for cross-border auctions'.

| Checklist | |
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| Phase 3: Determining the scope and conditions of the cross-border auction | |
| Cooperation model | |
| Q | Model of cross-border auction: Cooperating countries can choose between the three models of cross-border RES auctions. Each model is characterized by varying degrees of complexity and lead time, as well as advantages and disadvantages. For example, in a unilateral (and mutual) cross-border auction, the contributing country can largely design the auction according to its goals while ensuring that the auction and remuneration design are adapted to the specific market and regulatory environment of the host country, whereas cooperating countries need to agree on a common auction design in the case of joint auctions. |
| Scope and extent of the auction | |
| Q | Technology: The cooperating countries may determine the technological focus of the auction to retain control over the further deployment of a specific technology. Alternatively, the cooperating countries can implement a technology-neutral auction, which may increase the efficiency of auction results through increased competition among technologies but provides less control over technology-specific expansion pathways. |
| Q | Volume: The cooperating countries need to determine the overall volume of the cross-border auction and if there should be a specific maximum share of RES installations to be awarded in the host country, which may however limit the efficiency of auction results. |
| Q | Timing: The cooperating countries need to determine the timing, number and frequency of auction rounds. Ideally, the timing of the cross-border auction should be aligned with the schedule of national auctions to provide a continuous auction pipeline and avoid adverse interactions between national and cross-border auctions. |
| Q | Bid size: Cooperating states may decide on a bid size (i.e. the minimum/maximum size for the projects that can participate in the auction). Alternatively, Member States may decide to not limit the bid size. |

Support scheme design



Support scheme design: In a unilateral auction, the auction scheme of the paying country is used. In mutual auctions, the cooperating countries build on their respective national schemes. In a joint auction, cooperating countries need to find common agreement on the auction design. Auction design elements include general design elements (e.g. technology type, auctioned item, size of the installations) the auction procedure (e.g. static vs. dynamic auction, price caps, selection criteria pricing rule), conditions for participation (e.g. timing of the auction, technical requirements, material prequalification and financial prequalification (bid bond) as well as deadlines and penalties. For specific implications of cross-border auctions on the chosen support scheme design, we refer to the AURES report 'Design options for cross-border auctions'. As outlined above, the design elements determining the conditions for participation as well as deadlines and penalties, may require a closer assessment regarding their applicability, their impact on participants' costs and risks as well as their impact on project realization and thus effectiveness of the cross-border auction.

Differing regulatory and market conditions



Whether or not to establish rules for handling/balancing differing conditions: The cooperating countries need to define whether levelling any of the regulatory and market differences in the auction (i.e. adjusting bid levels) is necessary at all. Since relevant aspects such as planning and permitting, grid connection, eligible areas and sites, environmental requirements, financing conditions, taxation, project realization periods and risk of non-realization cannot easily be aligned in the context of a cross-border auction, our recommendation is to not level such differences artificially in order to tap into the full efficiency potential of the auction.

Allocation of costs and benefits



Allocation of RES statistics during and after support period: As a general rule, the Member State paying the support costs should receive the target achievement statistics. Member States are however free to negotiate a different allocation rule to level costs and benefits. After the end of the support period, the transfer of RES shares to the contributing country may be continued for the entire technical lifetime of the installation. Alternatively, the respective installation may start contributing to the hosting country's target achievement after the support period to account for the fact that the host country provides the site and incurs system integration costs.



Whether or not to determine and allocate other costs and benefits: Generally speaking, costs and benefits should be shared in such a way that both cooperating countries benefit from cooperating. However, some costs are difficult to quantify. This relates foremost to system and grid integration costs. We recommend that countries try to keep the cost-benefit analysis and the resulting distribution as simple as possible. In particular, cooperating countries may consider a (flat-rate) splitting of statistical benefits.

Administrative procedures

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| Q | <p>Pre-auction: For inviting, evaluating and awarding bids, a place of jurisdiction needs to be assigned by the cooperation countries. This can either be done by one or several authorities. For unilateral and mutual cross-border auctions, this is typically a national regulatory body or agency. In the case of joint auctions, this can be the respective national agencies, or, alternatively, the cooperating countries establish a new joint body for that purpose. The cooperating countries need to establish a procedure for the publication of call for bids.</p> |
| Q | <p>During auction or prequalification phase: The responsibility for the awarding (or exclusion) of bids should lie with the authority of the paying country. However, the involvement of the national bodies of the cooperating country is recommended. Material prequalification requirements are based on national planning and permitting procedures and therefore vary between the countries. The authority assessing the validity of the material prequalification (if applicable) – usually a national regulator of the paying country – is most likely not familiar with the licensing and permitting procedures in the cooperating country. Familiarization with the context of the cooperating country would induce additional transaction costs. Therefore, the regulator of the hosting country should be involved. It could also assist with assessing the compliance of bids with the national regulations and administering the financial guarantees.</p> |
| Q | <p>Post auction: A dedicated body must be assigned for on-site checks of whether installations are installed according to the technical requirements specified in the auction. For practical reasons, this dedicated body should be the national body responsible in the country in the country where the project is located (usually the regulator). Based on the information provided by the national body, the funding approval should be issued by the tendering authority in the contributing country.</p> |
| Q | <p>Project operation: The cooperation countries need to define rules and responsibilities for the cross-border disbursement of funding. This involves the exchange and monitoring of information to ensure correct support payments to the installations. Processes need to be established for the frequent data exchange of the production volume of each installation, as well as the (technology-specific) market values that are the basis for calculating the support payments (in case of sliding premiums). National bodies may have to set up procedures for the exchange of the required information, specifying the format, frequency and timing of the data transfer. The cooperating countries also need to define a process for the actual payment of the support, possibly through the national authority in the cooperating country.</p> |

Contractual arrangements and legal liabilities

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| Q | <p>Contracts with bid winners: The cooperating countries need to determine the legal relationship that bid winners in the hosting country will have with the authorities in the contributing country. In particular, the institution responsible for disbursing support payments to awarded projects in hosting countries needs to be determined. In a unilateral auction, this will usually be the same counterparty as in the national support scheme.</p> |
| Q | <p>Place of jurisdiction: For inviting, evaluating and awarding of bids, a place of jurisdiction needs to be assigned by the cooperation countries. In a unilateral auction, these responsibilities will typically be taken over by the same institution(s) that are responsible for these tasks in the national support scheme.</p> |

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| Q | Project realization: In cross-border auctions, it is important to set realization rates that consider the local planning and permitting processes. At the same time, late auctions (e.g. relatively short delivery periods in case only financial guarantees apply) are preferable as they potentially increase realization rates. Cooperating states also need to consider a scenario where project realization is delayed, or projects are not realized at all. Such situations can be disincentivized by implementing adequate penalties in case of non-completion and delays. |
| Q | Off taker risk: Projects face an off taker risk of not getting paid for the power output. The cooperation agreement should include elements that reduce the risk as much as possible such as ruling out any retroactive legislative changes that could result in a significant reduction of support payments. |

4.2.5 Checklist for phase 4: Concluding the cooperation agreement

Once Member States have agreed on the scope and conditions of the cross-border auctions and negotiations on these matters are completed, cooperating countries need to conclude and sign the cooperation agreement before the cross-border auction can be implemented. The following checklist lists the two key matters requiring Member States' final attention when concluding the cooperation agreement.

| Checklist | |
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| Phase 4: Concluding the cooperation agreement | |
| Q | Legal nature of cooperation agreement: The cooperation agreement concluded between Member States may have different legal characteristics (treaty vs. administration agreement). The legal nature has implications on the duration of the implementation process (e.g. a treaty needs to be ratified by parliament). The required legal nature of the cooperation agreement should ideally have been considered already early on in the process to ensure a timely conclusion of the agreement once cooperating countries have agreed on all substantial matters of their cooperation. |
| Q | Notification of the EU Commission: According to RED II, Member States are required to inform the European Commission of the cooperation and the resulting RES statistics that are transferred. Notifications have to be done on annual basis for the whole duration for which statistical transfers between Member States take place. |

5 Conclusions

This report builds on previous research within AURES and AURES II and is intended and designed as a guidance document for Member States on cross-border auctions. The report reviewed the economic and policy rationales for cross-border cooperation on RES and briefly discussed different instruments of cooperation. The report then focused on national cross-border auctions as one instrument of cooperation and presented three models, namely unilateral, mutual and joint cross-border auctions. Unilateral cross-border auctions are the simplest form in which only one country opens its support scheme to projects in another country. In mutual auctions, both cooperating countries open their national support schemes. In the most complex form, the joint auction, the cooperating Member States jointly design all elements a cross-border auction.

Triggered by the perceived complexity of a cross-border auction, the report then proposed to structure the implementation process into four successive phases. According to the proposed phases, in phase 1, each cooperating country should set its own goals and principles for the cooperation. In phase 2, based on the goals, countries should investigate potential partners and find a matching partner. Once a partner has been found, the cooperating countries should determine the scope and conditions of the cross-border auction in phase 3. Lastly, in phase 4, the cooperating countries should conclude and sign the cooperation agreement. At the end of the process stands the actual tendering of RES volumes.

The report proposed checklists for each phase which may facilitate the implementation process. These cover important elements that we would recommend Member States to consider in the implementation process. These checklists provide guidance, however, countries should tailor them to the prevailing national circumstances. Given the novelty and complexity of cross-border auctions, it seems reasonable that Member States may focus on the simplest model at first. Unilateral auctions include all relevant process steps which are needed for a cross-border auction, making the detailed description of (seemingly) more complex mutual auctions futile. The checklists were thus written with a unilateral auction in mind. Where needed, reference was made to mutual or joint auctions in the checklists.

Each checklist highlighted the main elements that cooperating countries may want to consider in that phase of the implementation process. Many elements of a country's national support scheme can also be applied in a cross-border auction, however, some elements require specific consideration. Cooperating countries should carefully assess the design elements determining the conditions for participation as well as deadlines and penalties. They require a closer assessment regarding their applicability, their impact on participants' costs and risks as well as their impact on project realization and thus effectiveness of the cross-border auction. Cooperating countries should also discuss elements related to costs and benefits to ensure an overall benefit for all partners involved.



AURES II is a European research project on auction designs for renewable energy support (RES) in the EU Member States.

The general objective of the project is to promote an effective use and efficient implementation of auctions for RES to improve the performance of electricity from renewable energy sources in Europe.

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