Nordic Testing Ground for Co-operation Mechanisms of the RES Directive

The Nordic Working Group for Renewable Energy

Final Report

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Content

Foreword

This is a final report of the Nordic Coop-Mex Testing Ground project that was done in 2011-2012 by the Nordic Working Group for Renewable Energy. The Testing Ground project included workshops were implementation frameworks and case studies for the Coop-Mex were developed. In general the project has been a long iterative process where the workshops and views of the various stakeholders have contributed significantly to the outcome of the project.

This final report of the Testing Ground project has been prepared experts of GreenStream Network Plc (Juha Ruokonen, Karl Upston-Hooper, Suvi Viljaranta and Pirita Mikkanen). The authors wish the present they gratitude for the comments and support from the members of the Nordic Working Group for Renewable Energy and views and comments from participants in the workshops. All the conclusions and presented in the report are those of the authors.

Summary

The new Renewable Energy Directive (2009/28/EC) sets binding targets for a share of renewable energy sources in energy consumption in the EU Member States. The overall EU target of the EU is a 20% share of renewable energy sources that is further allocated to the countries with national targets varying from 10% to 49%. The Directive includes mechanisms that enable co-operation (Coop-Mex) between Member States in order to reach their targets cost efficiently. There are four co-operation mechanisms in the Directive and they are briefly presented in the Table 1.

Table 1. Co-operation mechanism of the RES Directive. (Renewable Energy Sources, RES)

	”Product”	Projects
Statistical Transfer	RES production in national statistics for one or several years	No underlying projects
Joint Projects	RES production of a specific project	RES projects: electricity, heating or cooling
Joint Projects with third countries	RES-E, transmitted to the EU	RES based electricity
Joint Support schemes	Common or linked support schemes. National RES balances are adjusted with Statistical Transfer	No underlying projects

The Nordic countries have a long history in co-operating in energy issues. Under the Nordic Coop-Mex Testing Ground project, Nordic countries aimed to build capacity and understanding and contribute to a common understanding of the Coop-Mex in the Nordic countries with an active dialogue with other EU countries and stakeholders. The project concentrated in Statistical Transfer and Joint Projects.

Participation to the Coop-Mex market and utilization of the mechanisms are voluntary. One of the key findings of the Testing Ground project is that Coop-Mex can be implemented in many ways and different type of objectives of the co-operation can be taken into account. Such objectives include but are not limited to:

- Using mechanisms only to fine-tune statistics in order to reach set targets.
- Build a long-term co-operation on RES issues even beyond 2020.
- Cost saving i.e. buyer seeks to meet targets with minimum costs (€/MWh) and get an access through Coop-Mex to a relatively cheaper or technically (for example due to easier licensing) more feasible RES potential in other countries.

- Selling country hosting the projects could consider co-operation as a technology specific mechanism for RES potential that is not captured by the domestic support schemes.
- Buying country could also have technology specific objectives. For example if a country has a certain strong RES technology sector and size of a domestic market for that technology is limited, the country could provide support for projects also abroad via Coop-Mex.
- Coop-Mex can be used for timing the exploitation of the RES potential. Seller could use mechanisms to develop domestic RES potential that will be used to fulfil targets beyond 2020 and buyer could use mechanism to buy time for domestic RES potential to reach techno-economical stage.

Choice of which mechanism to use depends on the objectives. If the objective of the buyer is to achieve only cost savings and buy time for technologies to improve before utilizing (currently expensive) domestic resources, then Statistical Transfer that does not have underlying project would be a obvious choice. However, if the motivation to use mechanisms is to enter into close co-operation with the selling country or to provide support only to certain technologies the implementation of the Joint Projects can be designed to support these objectives. From the sellers perspective the difference between the benefits and challenges of the mechanisms are seen somewhat smaller - both mechanisms work well for increasing RES investments in the seller country and receiving revenues for the RES production.

Recommendations

The RES Directive requires Member States to prepare bi-annual reports on progress in the promotion and use of energy from renewable sources. Next progress reports are due by the end of 2013. The authors recommend that countries will carefully evaluate the possibilities and benefits of using co-operation mechanisms latest before submission of the next progress report. The outcome of the evaluation should be clearly communicated to other countries. Currently there is limited interest for buying RES production through Coop-Mex and changes in the potential demand should be communicated in order to provide potential sellers time to adapt. Selling countries should also indicate how much RES production they could sell and which mechanisms and type of co-operation they would prefer.

The objective of the use of Coop-Mex should be well communicated both for other countries and for the private sector.

A clear trading strategy is also needed i.e. when to enter the market and which type of contracts and delivery periods to apply. In particular Statistical Transfer provides opportunity to react fast for changing production or market conditions and predefined strategy will form a basis for decision making.

In the design of the implementation frameworks focus should be on predictable, transparent and efficient administration of the scheme. This applies especially for Joint Projects were project developers are involved with the mechanism. Private sector should be consulted when designing the implementation framework.

Sammandrag

Det nya direktivet om främjande av användningen av förnybar energi (2009/28/EG) fastställer bindande mål för andelen energi från förnybara källor i EU. Det övergripande målet för EU är 20 % medan de nationella målen varierar mellan 10 % och 49 %. Direktivet innehåller ett antal samarbetsmekanismer som möjliggör samarbete mellan medlemsstaterna. Syftet med samarbetsmekanismerna är att förbättra kostnadseffektiviteten av de nationella åtgärderna. Tabell 1 presenterar samarbetsmekanismerna.

Tabell 1. Samarbetsmekanismer enligt förnybartdirektivet

	"Produkt"	Projekt
Statistik överföring	Försäljning av statistik för ett eller flera år	Inga underliggande projekt
Gemensamma projekt	Energi från förnybara energikällor, från ett specifikt projekt	Produktion av elektricitet, värme eller kyla från förnybara energikällor
Gemensamma projekt med tredje länder	Elproduktion, elektriciteten bör transporteras till EU	Produktion av elektricitet från förnybara energikällor
Gemensamma stödsystem	Gemensamma eller länkade stödsystem. Mängden energi fördelas mellan de deltagande länderna med hjälp av statistisk överföring	Inga underliggande projekt

De nordiska länderna har en lång tradition av samarbete i energifrågor. Målet i projektet *Nordic Coop-Mex Testing Ground* var att bygga nordisk kapacitet och förståelse för användningen av samarbetsmekanismerna i förnybardirektivet. I projektet togs även i beaktandet möjligheten till en aktiv dialog med andra EU-länder och intressenter. Projektet koncentrerade sig på statistik överföring och gemensamma projekt.

Deltagandet i marknaden och utnyttjandet av samarbetsmekanismerna är frivilligt. En av nyckelobservationerna i Testing Ground –projektet är att mekanismerna kan implementeras på flera olika sätt och att olika mål kan nås samtidigt. Till målen hör bl.a. följande:

- Användning av mekanismerna för att finjustera statistik för att uppnå utsatta mål.
- Bygga ett långvarigt samarbete i energifrågor som sträcker sig över 2020.
- Kostnadsbesparningar, dvs. köparna försöker uppnå utsatta mål men lägsta möjliga kostnad (EUR per MWh). Detta är möjligt om samarbetsmekanismen ger köparna tillgång till produktionspotential i utlandet som är antingen förmånligare eller mera tillänlig än potential i hemlandet. Potentialen kan vara mera tillänglig i utlandet t.ex. på grund av enklare tillståndsprocesser.

- Värdlandet, som säljer energiproduktionen, kan se samarbetet som en teknologspecifik mekanism för att förverkliga sådan potential som inte omfattas av dess inhemska stödmekanismer.
- Landet som köper energiproduktionen kan även ha teknologirelaterade mål. Antag att antalet inhemska företag inom en viss bransch är stort medan den inhemska marknaden är liten. Då kan köparlandet skapa efterfrågan för de inhemska företagen genom samarbetsmekanismerna.
- Samarbetsmekanismerna kan även användas för att tidsplanerna utnyttjandet av potential inom förnybar energi. Säljaren kan använda samarbetsmekanismerna för att utveckla sådan inhemsk potential som kommer att användas för att uppnå mål efter 2020. Köparen kan även använda samarbetsmekanismerna för att köpa tid i väntan på att outnyttjad inhemsk potential når en viss tekno-ekonomisk nivå.

Val av mekanism beror på vad man vill åstadkomma. Statistik överföring är det naturliga valet om köparens mål är att skära kostnader eller att köpa tid. Statistik överföring har inga underliggande projekt. Att köpa tid kan vara motiverat om köparen förväntar sig att utnyttjandet av inhemska resurser är fördelaktigare i framtiden pga. av till exempel teknisk utveckling. Gemensamma projekt är däremot ett bättre val om målet är ett nära samarbete med säljarlandet eller om målet är att stöda endast vissa teknologier. Skillnaden mellan statistik överföring och gemensamma projekt är mindre ur säljarlandets perspektiv – båda ökar investeringarna i ny produktionskapacitet och skapar intäkter från försäljningen av energin från förnybara källor.

Rekommendationer

Förnybardirektivet kräver att medlemsstaterna lämnar in en rapport vartannat år till kommissionen om hur främjandet och användningen av energi från förnybara energikällor utvecklas. Nästa omgång av rapporter skall lämnas in före årsslutet 2013. Skribenterna föreslår att medlemsstaterna utvärderar möjligheterna och fördelarna med samarbetsmekanismerna i god tid före nästa omgång av rapporterar skall lämnas in. Slutresultaten av utvärderingen bör delges med andra medlemsstater. Efterfrågan på produktion av förnybar energi från samarbetsmekanismerna är för tillfället begränsat. För att ge försäljarna tid att anpassa sig är det viktigt att förväntade förändringar i efterfrågan delges så snart som möjligt. Dessutom bör varje säljarland uppskatta hur mycket produktion från förnybara energikällor de skulle kunna sälja och vilka samarbetsmekanismer och samarbetsformer de skulle föredra.

Målet med samarbetsmekanismerna bör kommuniceras väl till andra länder och till den privata sektorn.

Dessutom behövs en tydlig handelsstrategi, som berättar bl.a. att när man skall gå in på marknaden, med vilka typ av kontrakt och med hur långa leveransperioderna man skall handla. Speciellt i statistik överföring är det möjligt att reagera snabbt på förändringar i produktion eller marknadsläge. En förutbestämd strategi utgör basen för beslutsfattandet.

I planeringen av implementeringsramverket borde man betona förutsägbarhet, transparens och administrativ effektivitet. Detta gäller speciellt gemensamma projekt eftersom projektutvecklare har en central roll i dem. Den privata sektorn bör konsulternas i planeringen av implementeringsramverket.

1. Introduction

The new RES Directive (2009/28/EC) sets binding targets for a share of renewable energy sources in energy consumption in the EU Member States. The overall EU target of the EU is a 20% share of renewable energy sources that is further allocated to the countries with national targets varying from 10% to 49%. The Directive includes mechanisms that enable co-operation between Member States in order to reach their targets cost efficiently. The Nordic Working Group for Renewable Energy has been actively exploring possibilities, challenges and benefits of applying the co-operation mechanisms of the Directive (Statistical Transfer, ST; Joint Project, JP; Joint Projects with third countries and Joint Support Schemes, together “Coop-Mex”). The Working group has continued its work and further explored various aspects of the mechanisms under project “Nordic Coop-Mex Testing Ground”.

The objectives of the Nordic Coop-Mex Testing Ground project are capacity building, increasing the knowledge and understanding of Coop-Mex and to contribute to a common understanding of the Coop-Mex in the Nordic countries. In addition, there is a dialogue with other countries and stakeholders. In particular, during the project framework, methods, guidelines has been developed for utilization and management of the Coop-Mex.

Section 2 of the report briefly introduces the co-operation mechanism and discusses their advantages and disadvantages. Section 3 concentrates issues related to Statistical Transfer in particular Statistical Transfer transactions. In the section 4, Joint Projects are examined with various case studies and overall conclusions are presented in the section 5. The Nordic Testing Ground project has been an iterative process and various topics has been discusses during the projects. In the Annexes there several topics and viewpoints to the Coop-Mex are covered. Moreover, during the projects two workshops were organized and reports from these events can be found from the Annexes as well.

2. Benefits and challenges of using Statistical Transfer compared to the Joint Projects

2.1 Co-operation mechanisms

The RES Directive included four co-operation mechanisms that are briefly introduced in the Table 2 below. For more detailed introduction see Analysis of the flexible support mechanisms in the Directive on the promotion of the use of energy from renewable sources report (GreenStream, 2010).

Table 2. Co-operation mechanism of the RES Directive

	”Product”	Projects
Statistical Transfer	RES production in national statistics for one or several years	No underlying projects
Joint Projects	RES production of a specific project	RES projects: electricity, heating or cooling
Joint Projects with third countries	RES-E, transmitted to the EU	RES based electricity
Joint Support schemes	Common or linked support schemes. National RES balances are adjusted with Statistical Transfer	No underlying projects

2.1.1 Statistical Transfer (ST) – Strengths and Weaknesses

The Statistical Transfer (ST) is, perhaps, the simplest of the co-operation mechanisms. The challenges and weakness of the mechanism is presented below.

Strengths:

- Simple and straightforward. Can be implemented with very light framework.
- Is not based on commissioning date of the installation (for example old vs. new hydro power) or type of RES production (for example bio vs. wind) – it is rather based on the whole RES production mix of the exporter i.e. the seller country
- Does not necessarily directly interfere with the exporter country RES support mechanisms.
- In some cases, can potentially have a positive impact on the exporter’s RES support scheme. For example higher RES production can reduce administrative costs of the RES support scheme per MWh.

Weaknesses:

- Use of ST requires one Member State to exceed its RES targets and another Member State to be willing to purchase statistical RES production. So far EU countries have expressed limited interest for using the Coop-Mex. As there is a limited willingness to buy, the interest of individual countries proactively exceed the national RES targets in order to sell RES production via ST is also limited.
- In ST, the production is transferred ex-post which brings additional challenges: countries keen on using ST for year 2020 targets might end up being unable to purchase RES production if there isn't sufficient supply. Countries planning to use ST have to the take long-term perspective for the transactions.
- Market dynamics. There is only limited number of actors (Member States) in the ST markets which means that market liquidity is very low and price discovery is challenging. Moreover, governments have limited experience on trading with similar mechanisms.
- ST is not a technology type or project specific mechanisms. Some buyers might have preferences in which RES projects the ST revenues are allocated.
- The ST does not necessarily capture the cheapest undeveloped RES potential. The transferred product is purely based on the "over delivery" of the domestic support scheme and not for the untapped RES potential. See Figure 1 for example. Country A might have high feed-in tariff leading a RES surplus that could be sold to the other countries, while country B would have low level tariff that has been sufficient for meeting RES target of the country B. However, with small increase in the tariff of the country B could exceed its target and sell excess production and still providing less support than the country A.

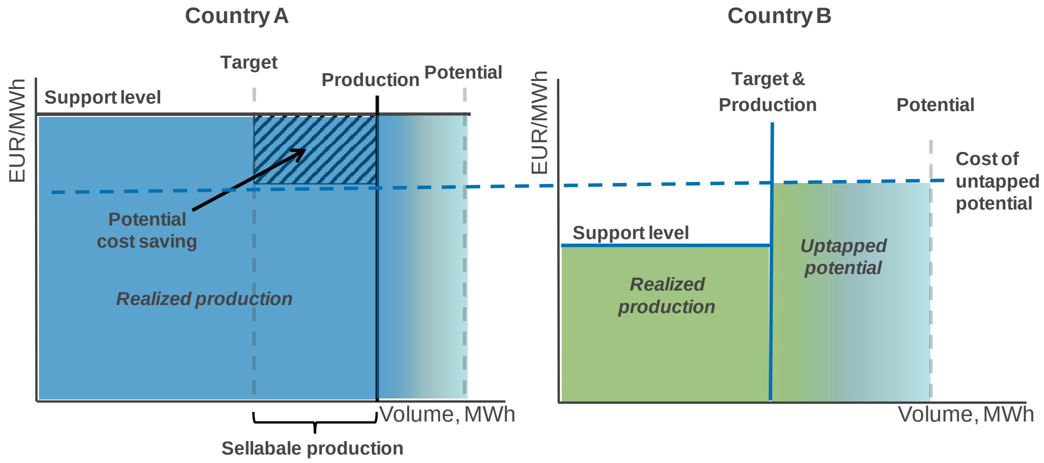

Figure 1. Illustration of the challenge of the ST to capture cheapest untapped RES potential.

2.1.2 Joint Projects (JP) – Strengths and Weaknesses

The Joint Projects (JR) provides many ways for co-operation. The challenges and weakness of the mechanism are presented below.

Strengths:

- JP enables access to RES potential that is not necessarily included in the host country RES support scheme or the scheme does not provide sufficient support
- JP is based on relatively long term co-operation with the participating countries.
- Buying countries can take an active role in initiating projects and they do not have to rely on the effectiveness of RES support scheme of the exporting country.
- Accounting for the production from the JP is not undermined in the case where the host country fails to meet its RES targets
- Private sector participation in the JP is essential, which can improve the activity level and bring more projects to the JP markets. However, governments are still required to create a framework where the JP mechanism operates.

Weaknesses:

- Creating a framework for JP takes time and there is a chance that several different types of frameworks are created in the EU. This jeopardizes the overall EU level efficiency of the JP by increasing transaction costs. For example project developer could offer his project to tenders of the buying countries with different tendering procedures, preferences, documentation etc. EU wide streamlined tendering procedures would make it easy for project developer to offer his production to the interested buyers. Streamlined procedures would have similar definitions, terms, obligations etc.
- JP might interfere with the host country RES support scheme and consequently reduce effectiveness and efficiency of the domestic support scheme.
- There is risk for the host country to lose some RES potential abroad that it might need for achieving its own RES targets. This can be managed with carefully evaluating what projects are allowed to participate JP.

2.1.3 Advanced schemes

As the RES Directive provides great flexibility in the implementation of the Coop-Mex it is possible to implement the mechanisms in the way that they capture some elements in the other cooperation mechanism. In particular, Statistical Transfer could be implemented with project specific elements and Joint Projects framework could take a holistic view for certain sectors. Below some potential frameworks are presented.

Statistical Transfer Plus (ST+)

ST+ tries to bring some projects specific elements to the Statistical Transfer scheme by earmarking revenues from the ST transaction to certain technology or project types. One implementation option for allocation ST funds for certain technologies are to create a scheme were the funds are distributed to predefined project types that fulfil the investment criteria of the exporting and importing countries. The scheme could be motivated by the willingness of the country to establish a selling program or two countries entering to close co-operation. The key features of the ST+ scheme are illustrated in the Figure 2.

The central role of the scheme would be a RES selling programme that would operate under the mandate of the exporting country. The investment criteria and eligibility of the projects could be redefined or they could be established case by case basis. In the case were countries would enter long-term co-operation, predefining projects and technology types would support the long-term nature of co-operation. In particular, in case where buyer of the ST has a technological interest such as promoting offshore wind investments due to its domestic wind industry or technological development, earmarking ST revenues for certain project types could be justified. The daily operations of the RES selling programme would be guided by the Investment Committee that would define guidelines for a project selection and would supervise the day to day operations. The buyer country could have representative in the Investment Committee and hence be able to follow the programme closely.

An important aspect that has to be taken into account in the ST+ scheme is that country can sell statistical RES value only if it is above its national RES targets. Consequently there has to be reporting procedures that allow RES selling programme to evaluate and estimate what kind of volumes could be sold for other countries. As the ST+ scheme would enable a long-term relationship the reporting should include ex-post RES production data, prediction of the future RES production and operating limits for the RES selling programme. The operating limits could be used to create a buffer for the Selling country that would take into account development of the RES production towards domestic targets.

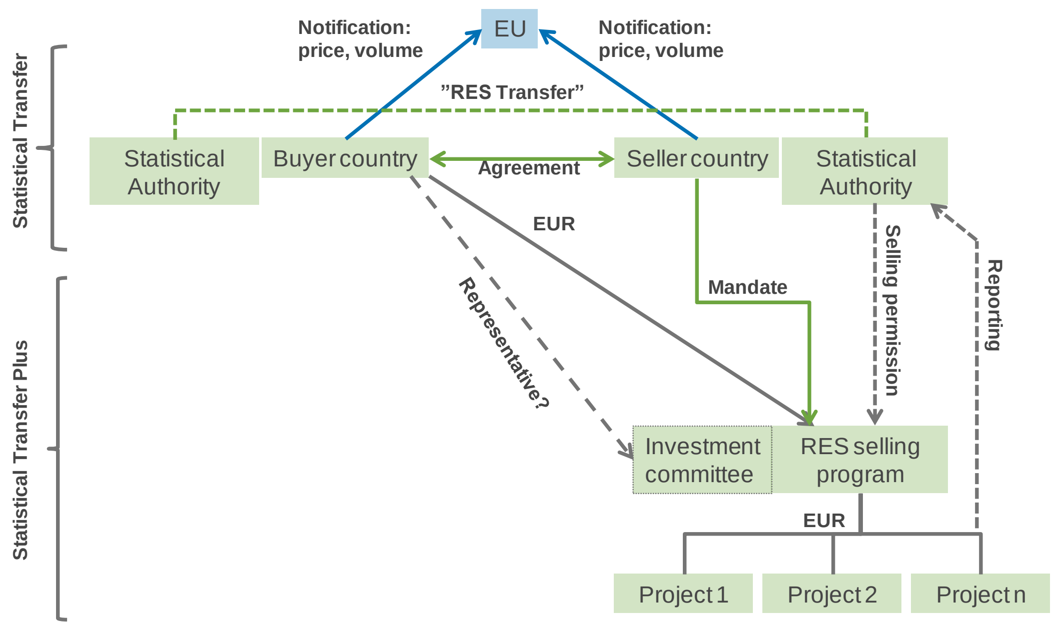

Figure 2. Illustration of the ST+ scheme.

Programmatic Joint Projects (PJP)

Programmatic Joint Projects (PJP) scheme would create a framework where certain project types would be approved to participate in Joint Project transactions. Instead of detailed case by case project assessment, PJP scheme would list project types and preconditions that are required to be included in the Joint Projects transactions. In particular, the scheme would target medium or small size projects. The main difference to the ST+ scheme is that JP does not depend on the host country exceeding its RES target. This would reduce the risk of the buying country. Moreover, scheme could be seen as a pooling tool – the organisation co-ordinating the scheme could divide the investments across several projects that would further reduce the risks of the buyers.

Figure 3 illustrates a PJP scheme. The upper part of the Figure sketches a standard Joint Project transaction that included only one project. The lower part of the Figure illustrates a framework where a special Program for Joint Projects is created. Similar to ST+ scheme, there would be a central entity that would be in charge of the daily operations of the program (PJP Program) and that would operate under the mandate and instructions provided by the host country of the projects. PJP scheme would be most apporiate in particularly for situations where the host country would not have any support mechanisms for the certain type of technology or installations and the buyer would be keen on providing support for the required investments. While ST+ scheme could be seen as earmarking revenues for certain project types, PJP could be seen as extension of the buying countries RES support scheme abroad. The scheme would require several projects in order to benefit from economies of scale and reduce transaction costs per project.

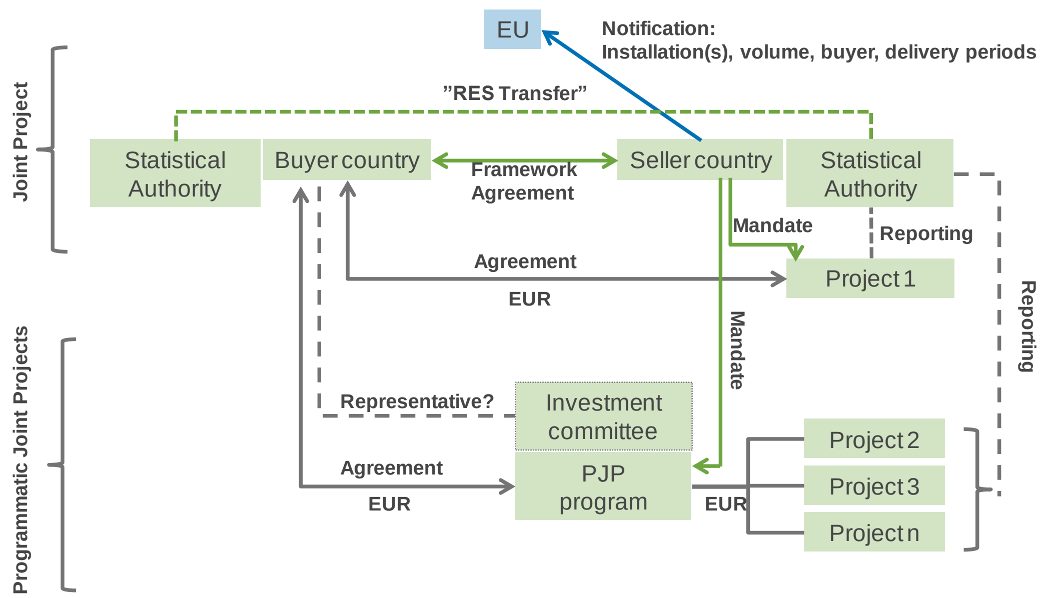

Figure 3. Programmatic Joint Projects scheme.

2.2 Co-operation mechanisms from the buyers perspective

There are three main reasons for the buyer to use co-operation mechanisms for helping it to meet its RES targets. First and the most important motivation is the potential cost saving of meeting national targets with cheaper RES potential abroad. Secondly, the reason for timing domestic RES potential could be proactively managed. For example, country with offshore wind potential in challenging conditions could first help developing offshore wind projects in easier conditions abroad and allow technology to improve and costs to reduce before initiating domestic projects. By and large, one can use Coop-Mex to buy time for technologies to develop, market conditions to improve and/or domestic infrastructure, such as electricity grid, to be built. Third reason for using Coop-Mex is to enhance deeper co-operation with other countries in the renewable energy and energy issues. In particular, countries establishing joints support schemes are likely to see co-operation in the field of RES and part of integration and harmonization of the energy markets.

2.3 Co-operation mechanisms from the sellers perspective

From the sellers perspective the Coop-Mex provides many opportunities. Allowing other countries to provide support for the overall RES development through ST or participating in the projects promotes the host country's RES market and can bring revenues for the seller. The main opportunities that the Coop-Mex provides for the exporting countries are the possibilities to target foreign support for certain technologies and build RES capacity earlier than in the case where the capacity would be build only for meeting domestic targets. In addition exceeding of domestic targets of certain technologies might provide economies of scale i.e. lower administration cost of the support scheme per MWh, larger market for technology providers and higher number of project developers and projects. Benefits from early development of this additional RES potential very case by case but they might be for example:

- Development of the home market for certain technologies in order to provide competitive edge in the internal market. For example Denmark has been one of the frontrunner in wind power and it is home of several wind technology companies.
- For early stage technologies provide larger market to boost technological development and increase attractiveness of the market.
- Selling country could use see co-operation mechanisms as an opportunity to see whether this additional potential can be realised and what is the required support level. This information can be used in developing RES policies for post-2020 period.
- Image i.e. frontrunner in the RES development

In general, Coop-Mex can boost RES investments that are needed to reach long-term RES targets post 2020. In addition, RES investments have many secondary benefits such as employment, energy security and environmental benefits. Moreover, participating in the co-operation mechanisms can be seen as part of wider energy co-operation between countries or country groups.

2.4 Summary

Participation to the Coop-Mex market and utilization of the mechanisms are voluntary. There are both advantages and disadvantages. Table below summarises the analysis above by giving ranking for suitability of the JP and ST for various preferences of the buyer and seller. If the objective of the buyer is to achieve only cost savings and buy time for technologies to improve before utilizing (currently expensive) domestic resources then the ST would be obvious choice. However, if the motivation to use mechanisms is to enter into close co-operation with the selling country or to provide support only to certain technologies the implementation of the JP can be designed to support these objectives. From the sellers perspective the difference between the benefits and challenges of the mechanisms are seen somewhat smaller. Both mechanisms work well for increasing RES investments in the seller country and receiving revenues for the RES production. Joint Projects can more appropriately take into account special objectives such as targeting employment, security of supply and targeting to certain technologies than Statistical Transfer. In addition, due to state budgetary restrictions, in some countries earmarking revenues from ST sales might be difficult and hence JP would be more preferable for targeting benefits from international co-operation to RES sector.

Table 3. Preferences of the Buyers and Sellers vrs. JP and ST. The ranking is based on the Group work in the Workshop organized during the Testing Ground –project. Scale: -3 to +3.

	Motivation	JP	ST
Buyer	Cost savings	+1	+2
	Timing i.e. developing domestic RES potential once is commercially viable after 2020 or technology will be available.	-2	-1
	Co-operation in energy issues with the seller country	+2	-1
	Support of certain technologies	+2	
	Other		
Seller	Financial	+2	+2
	Other benefits (security of supply, employment and environmental quality but NIMBY issues)	+2	+1
	Co-operation in energy issues	+2	+1
	Support of certain technologies i.e. boosting the volume	+2	+1
	Sharing risks with other countries	0	0
	Incentive to meet long term goal at an earlier stage (more linear RES-expansion)		
	Other		

In brief, if the buyer's objective is purely cost savings and buying time for domestic RES market to develop, Statistical Transfer would be the preferred mechanism. If other objectives are involved Joint Projects seem to have more benefits than the Statistical Transfer mechanism. From the sellers perspective Statistical Transfer brings revenues and is relatively easy to implement. However, Joint Projects ranked better in taking into account security of supply, employment and environmental issues, co-operation in the energy field and opportunity to target certain technologies.

There is flexibility in the implementation options of the Coop-Mex and all the mechanisms can be implemented to serve certain objectives. ST+ and PJP schemes presented above provide some alternative implementation options that could be used capture specific objectives (technology, project type etc.) of the buyer and seller. In the Annex 3 the authors have explored possibility to use ST to reduce challenges of international trade of biomass in case where the exporting country provides support for increasing amount of biomass collected for energy use.

3. Framework, implementation models and legal aspects of the Statistical Transfer

3.1 Implementation models/options for the ST

There are several factors affecting how the Statistical Transfer could be implemented. Below the legal framework and potential implementation processes are described.

3.1.1 Framework

Prior to investigating the framework for implementing Article 6 this Report briefly considers a) the formal legal framework of the directive and b) the context provided by the legislative history of Directive 2009/28/EC.

The Directive is promulgated pursuant to Article 175(1) of the Treaty establishing the European Community and accordingly, as a shared competency, it is subject to the principle of subsidiarity, and therefore Member States have wide discretion in implementing the flexible mechanisms established by Articles 6 to 11. This discretion is further emphasised by the wording of Article 6 which foresees Member States “may make arrangements for statistical transfer”. This flexibility is in contrast to proscriptive nature of Directive 2009/28/EC implementing the EU ETS.

The flexible mechanisms contained in the Directive are the result of a compromise solution between the European Council (based on the non-paper submission of Germany, the United Kingdom and Poland), the European Parliament (based on the persuasive report of rapporteur Claude Turmes), and the early drafts and legislative proposal of the European Commission. The issues debated within this legislative process are very relevant to the implementation of the flexible mechanisms as finally drafted and many of the issues removed from the proposed directive or unsuccessfully suggested by the Report of the Committee on Industry, Research and Energy will nevertheless need to be addressed by Member States who decide to utilize the mechanisms. Any agreement between Member States in relation to Statistical Transfer will need to address the following:

- **Who are the Parties**: Obviously only Member States can utilise the mechanism of Article 6, but do they do so bi-laterally or within geographic or interest groupings (i.e. sellers vs buyers). Will negotiations and/or implementation be handled at a political level or through a delegated accredited agent?
- **What is being transferred**: Again, the Directive outlines the object of any agreement as “the statistical transfer of a specified amount of energy”. In light of the legislative history (and the Energy Statistics Regulation EC/1099/2008) the energy should be denominated in MWh or ktoe (depending on whether electricity or heating, cooling and transport) , but unlike the early legislative proposal the Directive does not formally create a named accounting unit. The requirement for the relevant Member States to notify the quantity and price of the energy transferred implies a financial transaction (assumed to be a contribution towards RES-E support schemes in the seller Member State(s)) but

other "value", such as technology transfer, could also form part of the consideration.

- **When is it being transferred**: The Directive sets mandatory targets for 2020, and indicative targets at two yearly intervals until 2020. However, failing the indicative targets only subjects Member States to the requirement of submitting a revised national renewable energy action plan (outlining adequate and proportionate measures to rejoin the trajectory) and power of the Commission to make a recommendation to the European Parliament in relation to such. Accordingly, Member States have flexibility on the temporal structuring of any statistical transfers and the advantages of early action will be discussed below.
- **What if it is not transferred**: The Turmes Report suggested the introduction direct penalties on Member States if the renewables target of the Directive is not reached (it also suggested indicative targets were mandatory). Although the Turmes Report left the setting of the penalty level to the Commission it did suggest a penalty of 90 per MWh of under-achievement. This suggestion was not adopted in the final Directive and accordingly the consequences of non-compliance are opaque. The risks and consequences of non-compliance will accordingly be a matter of negotiation between the respective Member States.

The remainder of this section will examine implementation process, design issues, risk management tools and legal practicalities raised by the above conceptual framework.

3.1.2 Implementation process

Before entering into a ST or JP transaction, Member States have to resolve various practical issues. In this section, brief outline of potential implementation process is listed. The Commission's template for the National Renewable Energy Action Plan includes procedural aspects related to the use of the Coop-Mex and provides support for the implementation process. The list below is based on a top-down implementation approach and is mainly from the ST point of view.

- Starting point for the implementation is a political decision to utilise the Coop-Mex. The decision could include:
    - What is the objectives and targets of using the Coop-Mex
    - Which mechanisms to use (ST/JP or Joint Projects with third countries)
- Decision on more detailed objectives, in particular for JP or in case ST revenues are earmarked for certain RES sectors (see section 2.1.3):
    - Targets or limits for each mechanism
    - Targeted technologies, project types
    - Other criteria for the eligible projects
    - Partner countries

- Create a national framework and legislation for hosting JP projects or selling ST or purchasing RES production.
    - Appointing the responsible ministry.
    - Creating a national Coop-Mex contact point with a operating mandate i.e. organisation carrying out daily operations (Energy Agency etc.). There could be a committee supervising, proving guidance and supporting the national contact point.
    - Supervising authority if applicable.
    - Reporting procedures and review of the scheme. Reporting of RES production (collaboration with the national RES Statistical Authority) and operations of the Coop-Mex scheme. The scheme should include predetermined schedule for the review, which improves predictability of the scheme.
- Create detailed procedures for operations of the scheme. In particular:
    - ST sell/buy process and procedure (how, when, approval of the transactions etc.)
    - Risk management practices
- Communication and marketing. Host country should promote and communicate other countries the possibility to implement JP within its territory or possibility to sell surplus RES production through ST.
    - In case of JP, communication towards project developers is essential.

3.2 Details of the ST transaction

3.2.1 Price formation

The price or the value of the transaction depends on the costs, benefits and distribution of the risks. In theory the correct market price would the cross-section of the Demand and Supply curves. The supply curve is based on the costs of increasing the RES production and it increases as less and less favourable resources are utilized. The Demand curve of the buyer is in fact the mirror image of the buyers supply curve i.e. the buyer is willing to buy only if the price offered by the seller is lower than costs of the domestic production. Figure 4 illustrates this principle. The maximum price the buyer is willing to pay is the penalty price. However, there is no pre-defined penalty defined in EUR/MWh for failing to meet RES targets under the Directive. Consequently in the Coop-Mex market, the penalty could be currently seen as potential costs of failing to meet the target but it does not provide clear maximum price level for the transactions.

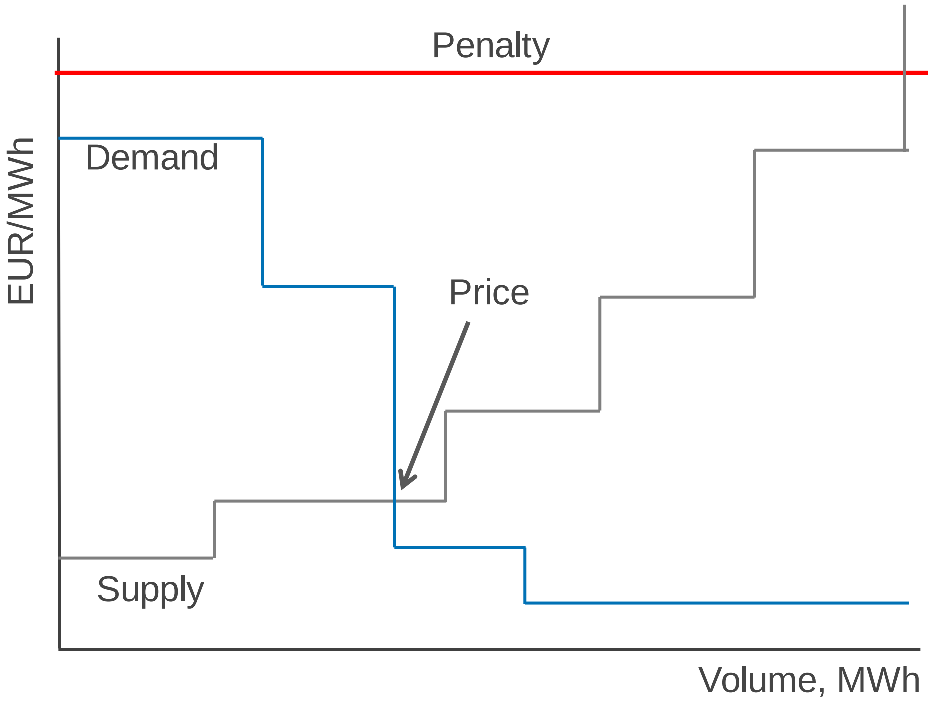

Figure 4. The demand and supply.

Table 3 lists costs and benefits from the ST transaction. From the seller point of view the value of the RES production could be calculated with following formula:

> *National RES support price + transaction costs + costs due to increased RES production (including potential grid enhancement costs etc.) – the benefits from the increased RES production >0*

The formula includes several parameters than can be defined relatively accurately such as national RES support level and time and resources used for negotiating the transactions and related reporting. Grid enhancement costs and benefits from the transaction are harder to estimate accurately. Annex 2 of the report discusses the grid enhancement issues related to the increased wind production. Moreover, seller might receive local environmental benefits mainly trough reduced consumption of fossil fuels. These include reduced air pollution[1] and waste (wind, hydro, solar) and less greenhouse gas emissions (wind, hydro, solar, bio). However, renewable energy generation also has environmental impacts that have to be taken into account in estimating total environmental benefit.

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[1] For example EU Commission (2008) has estimated in the impact assessment of the the Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020 that EU's emissions reduction and renewble energy targets would reduce SO2, NOx and small particles (PM 2.5) by 10-15 % due to reduced consumption of fossil fuels.

The main driver for the Buyer in the ST transaction is assumed to be cost-savings. The value of the transaction could be calculated with following formula:

> *Savings from not using domestic production (cost of domestic production) + other benefits (e.g. technology promotion, co-operation) - transaction costs – other potential costs (e.g. reputational risk for not promoting domestic production) > potential penalty*

Similarly to the seller, also buyer has parameters in its formula that are easy to calculate but some parameters, such as co-operation in the energy issues, are very hard to calculate in monetary terms.

The parties in the ST transactions are countries and consequently the ST transactions could, or even should, take into account not only direct easily definable costs but other soft benefits and costs as well. For example, co-operation in the energy issues have a great value and it should be considered as integral part of the assessment whether or not to utilize ST. Reputational risk is relevant for both parties, as relying RES development in other countries could be seen as a buy out from the RES obligations or developing RES potential above national targets could be seen too expensive.

Table 4. Costs and benefits from ST transaction.

	Costs	Benefits
Seller	National support price	Employment
	Grid enhancement costs	Environmental benefits
	Transaction costs	Security of supply
	Other costs	Energy co-operation
	Reputational risk	Contribution to finance fulfilment of long term goal beyond 2020
Buyer	Benefits	Direct cost saving – direct costs of the domestic supply
	Transaction cost	Energy co-operation
	Reputational risk	Technology promotion

3.2.2 Price estimates

Ideally, there should not be difference between theory and practise but in reality there is. Due to lack of transparent information, unclear objectives and potential hidden agendas the price of the transactions does not always present "real" market value. However, when two parties agree on the price and other details of the transaction, they are using their best knowledge at the time and consequently the price should reflects the value of the transaction for the parties. The Directive requires parties to notify the price and volume of the transaction to the EU Commission which will provide ST market information in the future. The ST market is likely to be illiquid and at least for the first ST transactions there is not going to be any clear reference prices available. Moreover, notification to the Commission is done ex-post which means that values of the transactions are likely to be published too late for seller and buyers that are aiming to balance their targets for the year 2020.

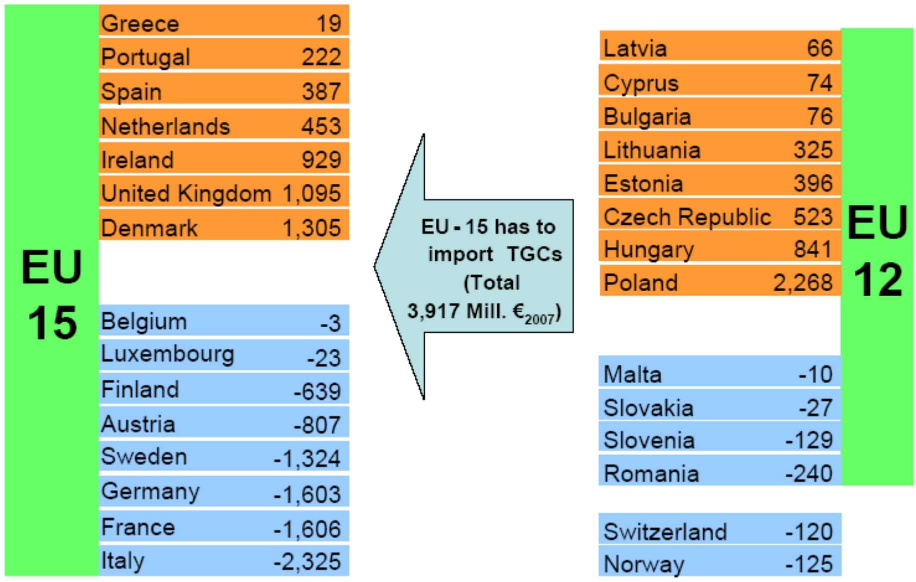
The authors foresee that there will be two different types of ST markets. In the long-term co-operation countries are entering into long term collaboration and the price will reflect RES potential and costs of the countries in addition to other benefits and costs related to the ST transactions. The framework and agreements for these transactions are likely to take place prior to production occuring. In the RES balancing market, countries are adjusting their RES deficits and surpluses in order to meet their targets. This market is based on the known production figures or relatively accurate estimates after the production has taken place. Price formation in these transactions is based on the demand and supply of the RES statistics available at the time and number of market participants. Below some estimates for potential value of the ST transactions are made indirectly for both market situations.

Results of the EU-wide green certificate market modelling

In past, there have been several studies on the overall cost of RES development in Europe and price level of potential EU-wide green certificate market. Results of these studies can be used as a proxy for assessing potential ST transaction prices.

Energy Economics group at the University of Vienna has created a Green-X database that allows dynamic changes and calculating potential and costs of RES-E supply, CHP production, efficiency improvement and fuel switching in the electricity sector as well as the corresponding GHG reductions. The final report of the project was published in 2004 and the project received financing from the European Commission. According the Green-X data the EU15-wide green certificate market price would be about 35 €/MWh in 2013-2020. Similarly Green-X estimates EU15-wide harmonised feed-in tariff (premium tariff) would be slightly below 30 €/MWh.

Institute of Energy Economics at the University of Cologne (EWI) published in April 2010 a report called European RES-E Policy Analysis – A model based analysis of RES-E deployment and its impact on the conventional power market. The study concentrated on RES-E and assessed among other things price based vs quantity based support mechanisms. According to EWI, in the EU27, Norway and Switzerland wide harmonised technology neutral green certificate prices would be slightly above 50 €/MWh in 2020. In the “Cluster” scenario countries with operational green certificate market (Belgium, Poland, Romania, Sweden, United Kingdom) would create a common green certificate scheme. In this cluster the certificate price would be in 2020 slightly below 40 €/MWh. EWI has also analysed streams of green certificates, which are present in the Figure 5.



Source: EWI.

Figure 5. Green Certificate importers and exporters in the EU27, Norway, Switzerland wide harmonized green certificate market and GDP weighted target setting. (Orange = Net exporter, Blue = Net importer, Number indicating value of the transaction Million EUR).

In the Futures-e Project several scenarios were developed in relation to European RES policies (futures-e, 2009). In scenario where there would be technology neutral EU-wide green certificate scheme the certificate price would be in the range of 0-20 €/MWh in 2011-2015 after which it would rise to close to 60€ by 2017. In 2018-2020 certificate price would jump to 160-180 €/MWh. In a technology specific green certificate scheme the green certificate price would start from 60 €/MWh in 2011 drop to 20 € in 2013 and rise to around 30 euro in 2020 with a peak of 80 €/MWh in 2018. The harmonized feed in tariff (premium) would be between 30-40 €/MWh in 2011-2020. If the green certificate market would be technology specific, the green certificate price would range from 20-75 €/MWh depending on the weighting of technologies. With a moderate technology weight the price would be on average 28 €/MWh in 2011-2020.

Aune et. al. (Statistics Norway discussion papers no 630) have made scenarios on using EU wide green certificate market to reach EU's 2020 RES target. In their scenarios green certificate price varies 26-47 €/MWh in 2020.

The estimates of the green certificate price in the EU-wide market in 2020 vary between 26-180 €/MWh with most of the estimates falling between 30-50 €/MWh. This price is a premium paid for the producer in addition to power price. Assuming that EU Member States would prefer purchase ST if the cost of the domestic RES development would be higher than in other countries and that all EU countries would be willing exploit their RES potential fully, the situation would resemble the situation with EU-wide technology neutral green certificate market. Moreover, if the countries would be actively seeking for counterparties i.e. the there would be liquidity in the market, the value of the ST could be in the same range as in the case of Green Certificate markets. Green Certificate models do not include heating or cooling which might bring additional low cost potential into market. However, at this stage it seems that as handful of countries have indicated their interest in participating Coop-Mex the market is small and does not capture the full EU-wide RES potential.

Price based on the national of the RES support

Another approach for determining countries price preferences is to use their national RES support price levels as indication of the willingness to pay and as a cost of the RES deployment. This approach is already applied by Italy that is planning to use Joint Projects with third countries. The incentive that Italy is willing to pay for producer in other countries is lower than the support for the similar installation in Italy. By and large, Italy is willing to pay for RES production abroad but the domestic RES support levels set a maximum price. The auhtors find this a very rational approach. Buyer might be willing to pay higher price in case the domestic RES potential would be already fully exploited and new production would require increasing the support level. Also factors such as delays in licensing and construction of the new installations, i.e. factors independent form the support level that might delay project implementation, might force countries to pay higher price for the ST than the domestic support level. Nevertheless, domestic RES support price seems to be clear maximum price for the ST transaction from the buyers perspective.

Seller could adopt several selling strategies. In the long-term cooperation, it is likely that the seller would like to receive full compensation for the renewable value. This would be domestic support price plus a premium that would cover the transaction costs. Figure 7 illustrates this approach. Figure 6 illustrates the financial support level of onshore wind power in the EU countries. One can see that there is many countries with support level in the range of 50-100 €/MWh and some countries with significantly higher support level – in some countries even higher than estimated average generation costs.

In case the transaction would purely be ad hoc balancing of the statistics, the buyer would be strong in the negotiations as the alternative use for the seller would be limited mainly for image benefits. In the latter case, seller could be forced to accept significantly lower prices than the domestic support prices. It is worth noting that this approach does not necessarily lead to the least cost solution (see Figure 1).

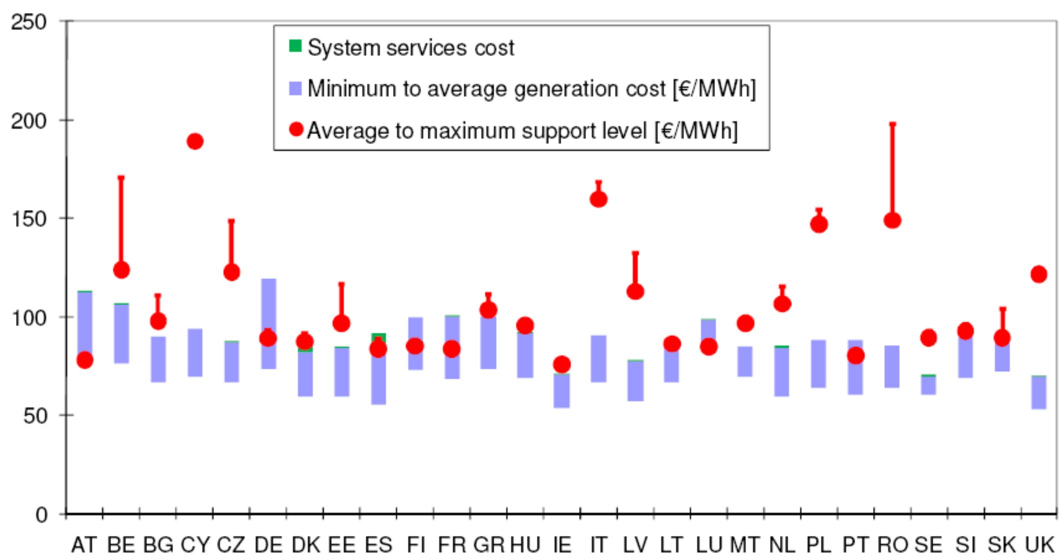


Figure 6. Support level ranges (average to maximum support) for Wind Onshore in the EU-27 MS in 2009 (average tariffs are indicative) compared to the long-term marginal generation costs (minimum to average costs). (Source Ecofys, 2011)

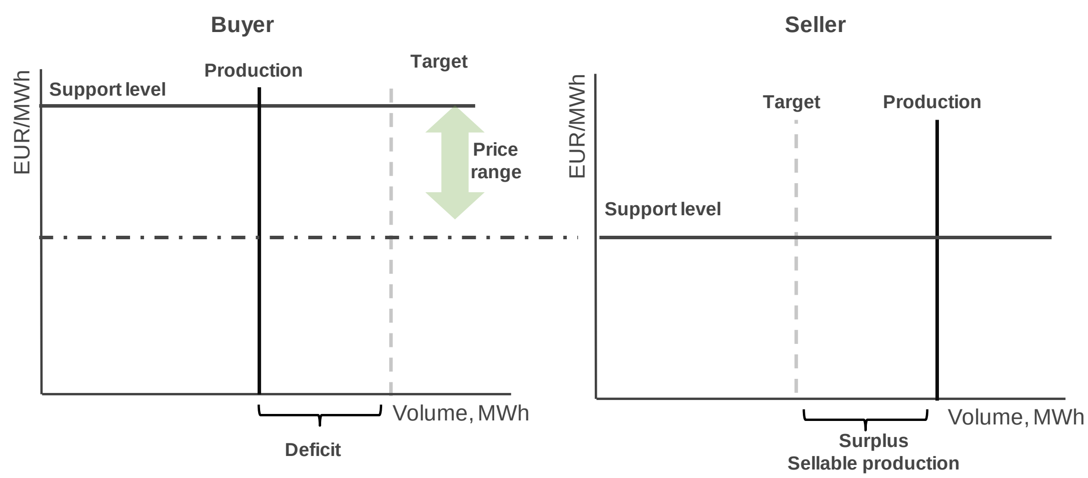


Figure 7. Price range of the ST transaction when buyer and seller base their pricing strategies for domestic support price levels.

3.2.3 Delivery periods

As discussed in relation to pricing above, it is likely that there will be two types of ST markets: long-term collaboration and balancing market. Delivery periods in the balancing market are expected be short, 1-2 years reflecting the fact that the main RES target is set for the year 2020 and that the Member States are reporting their development to the

Commission in two year intervals. The main weakness of this strategy, for both buyers and sellers, is that it is difficult to estimate the demand and supply of ST in 2020. If there is significant need for additional RES production in 2020 but countries are not willing to show demand for ST or other co-operation mechanisms there isn't simply enough time to exploit unused RES potential. In that sense it would advisable for countries not only to report their RES production and use of co-operation mechanisms but also indicate when they might make a decision to use these mechanisms and what kind of transactions they would be willing to enter.

In the long-term collaboration market there are several delivery period alternatives that could be used. Choosing a suitable delivery period is essential in managing liquidity risk that is discussed in the next section. Below some delivery period strategies for long-term collaboration are presented.

Figure 8 illustrates a simple scenario where the buyer and seller enter in a long-term collaboration and the seller is able to sell steady stream of RES production from 2011 until 2020. In this scenario buyer has created a compliance strategy where it has given a significant role for the ST transaction. Joint Projects would also be suitable for this approach.

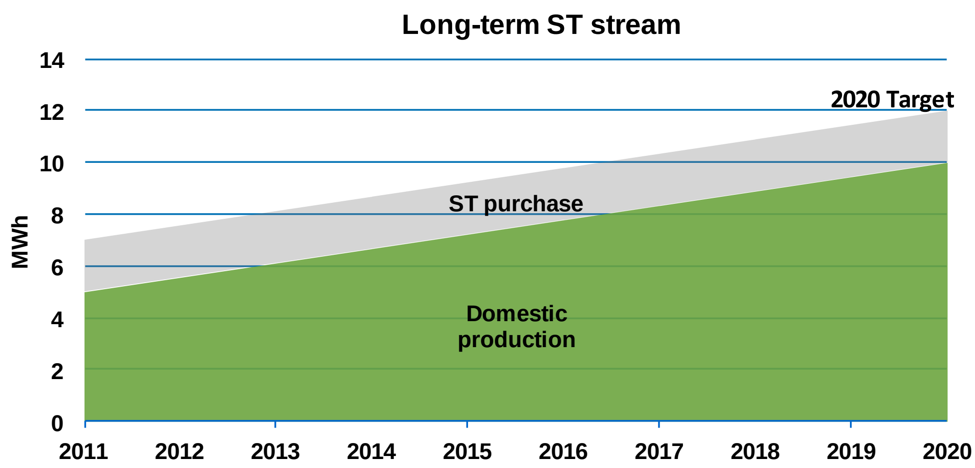


Figure 8. Long-term ST collaboration.

Figure 9 presents a scenario where buyer is relying domestic production in the beginning of period but in the end of period purchases some RES production via ST mechanisms. This scenario could happen in cases where for example, the domestic RES support mechanism no longer creates new production i.e. no potential or the support is not high enough. This "wait and see" approach is a appealing strategy for the buyer but when the buying interest is indicated relatively late there might be only few sellers available. This is due to fact that if the sellers does not have surplus to sell without adjusting its RES support scheme there is only limited time for seller country to invest for more (surplus) RES production.

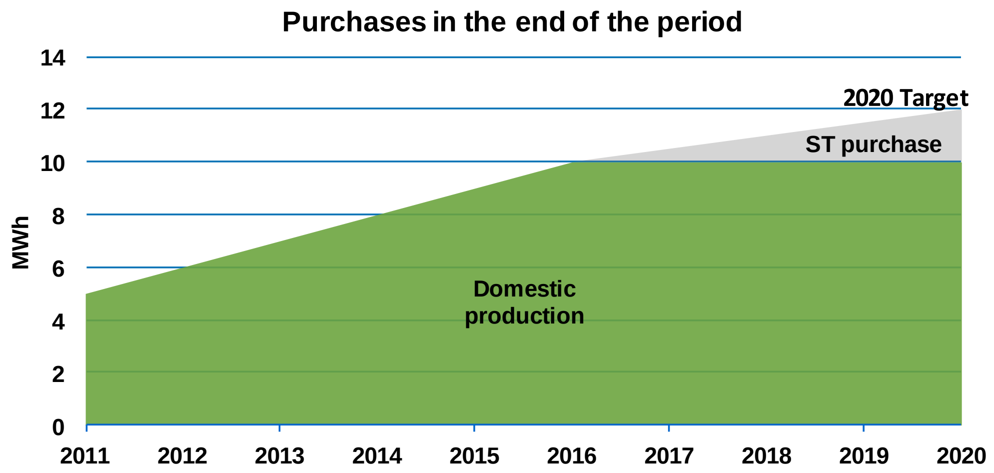


Figure 9. Strategy where ST is used to adjust balance towards 2020.

In the Figure 10 a scenario where exporting country buys time for domestic RES production to start is illustrated. The Directive sets targets for 2020 but there is regular reporting required. If the country is lacking behind its indicative trajectory it has to report how it plans to rejoin, within reasonable timetable, to the path leading compliance with 2020 target. Some countries might use ST purchases in the beginning of period and wait and see how the domestic RES support mechanisms start to promote new investments. By entering ST transaction early, the buyer would indicate for the exporting countries that it is willing to purchase RES production abroad and in case the buyers own RES scheme would not delivery sufficient amount it would already have established ST relationship with other country/countries.

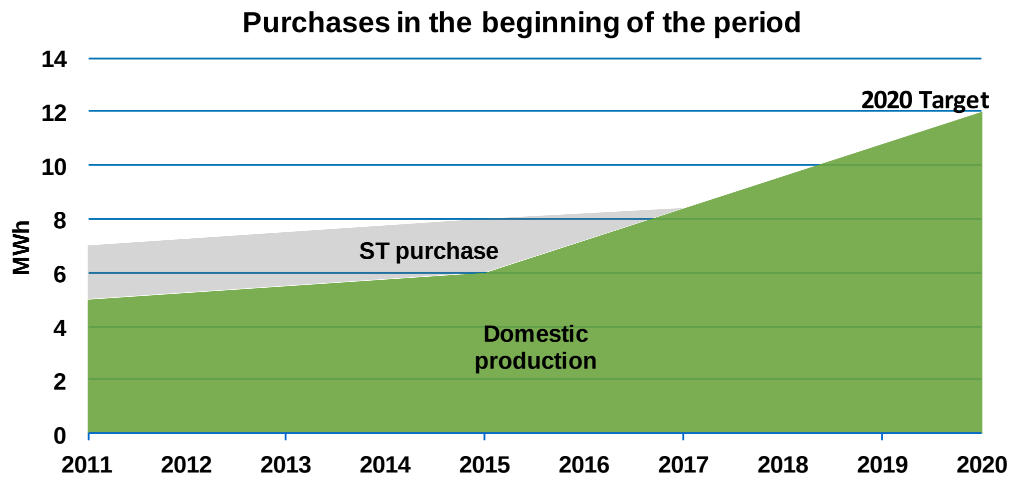


Figure 10. ST strategy where importing country buys time for domestic RES support mechanisms to effect.

3.2.4 Risks and contract types

As in all transactions, any Statistical Transfer transaction includes risks. Table 4 summarised the main risks in the ST transactions. The market and liquidity risks of the ST are high. The market is in a very early stage and consequently there is a risk that a willing buyer is not able to find a suitable seller. Both of these risks can be managed by starting to operate in the market early enough. Operational and counterparty risks are low or moderate. Typically countries are reliable counterparties for the contracts and RES Directive requires regular reporting of the RES production and related policies. As a result it is easy to track whether the buyer is able to sell or deliver RES production through ST or not.

Table 5 Typical risks in the ST transactions.

Risk	Description	In ST transaction	Risk Management Tools
Market risk	The price of the commodity changes	**High** If the focus on purely on 2020 target there is possibility for short/long/even markets. (Example Phase 1 of the EU ETS)	• Contracting early/timing, • Use of option contracts
Liquidity risk	The risk the commodity cannot be traded quickly enough in the market to prevent a loss (or gain profit)	**High** Currently the market is illiquid and Member States have indicated only limited interest for ST. Especially challenge for the Buyer.	• Contracting early/timing • Entering long-term and strong co-operation.
Operational risk	The risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events	**Moderate** Sellers RES support scheme or other programe does not deliver,	• Contracting early/timing to ensure that proper functioning of the support scheme • Use of option contracts
Counterparty risk (Default risk)	The counterparty does not pay or deliver as agreed	**Low** In general States are good counterparties in the commercial contracts	• Distributing the risk i.e. several buyers/sellers • Due diligence, in this case analysis of the RES support scheme and scenarios
Other:			
Image risk	Bad publicity due to use of the mechanism	**Moderate-High** Depends on several factors	• Well planned communication • Earmarking revenues for certain purposes

There are several of contract types that can be used for the ST. Table 5 lists the basic alternatives. The simplest transaction would be a spot agreement where the seller is selling RES production ex-post the production. The risks are low since there is a certainty that the seller has excess production. However if the buyer relies only on possibility to do spot transaction in the future there is a high market and liquidity risks i.e. there is not sufficiently production available. In order to manage this risk, the buyer could enter a forward transaction for the future deliveries. Option contracts might provide interesting opportunities for the ST transactions but there are challenges for defining the price for the option at this stage.

Table 6. Contract types.

Contract	Description	Strengths in the ST transaction	Weaknesses in the ST transaction
Spot	Payment and delivery immediately after the transaction.	• Simple and straightforward • Small counterparty risk • Small operational risk • Good for balancing small volume	• High market risk due to unknown liquidity • No long-term perspective • Market risk (price), in particular for 2020
Forward	Payment and delivery in future	• Relatively simple • One transaction can cover several vintages (for example 2015-2020) • Time to look for counterparties • Allows long-term perspective • Locks the price	• Operational risk - seller defaults • Bankability i.e. possibility to sell a specific contract to another party (can this be allowed?)
Option	Buyer of the option gains the right, *but not the obligation,* to buy the commodity in agreed date.	• Buyer secures his opportunity to buy (in particular for 2020) • Risk mngt tool if domestic RES support scheme does not deliver • Better than spot for a seller?	• Relatively complex agreement • Bankability is low – this would not be similar option as traded in the exchanges • How to determine the price • Uncertainty of revenues for the Seller

3.3 Legal Aspects of a Statistical Transfer Transaction

Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.

- John Maynard Keynes, 1936

It is appropriate to start this section with Keynes' famous admonishment of academic theory, as given the skeletal nature of the legal framework for Statistical Transfer in Article 6 of the Directive, there is a risk that the authors of this Report are later castigated as "academic scribblers". In order to hopefully deflect this criticism the Report now turns to a practical assessment of the legal aspects of a Statistical Transfer transaction.

The initial starting point for any analysis of how to draft an agreement for Statistical Transfer must begin with the requirements of the Directive itself:

- Member States are the entities involved
- They may "make arrangements for the statistical transfer of a specified amount of energy from renewable sources"
- "Energy from renewable sources" is defined in Article 2(a)
- The transferred amount must be taken into account (deducted from the seller and added to the buyer) when determining compliance under the 2020 binding target of Article 3(1) and trajectory targets of Article 3(2)
- The transfer cannot detrimentally affect the achievement of the national target of the selling Member State
- The "arrangements" may have a duration of one year or longer

- The "arrangements" should be notified to the Commission no later than 31 March of the following applicable year
- The notification to the Commission shall include price and quantity information
- The transfer is only effective after all concerned Member States have notified the Commission

With these mandatory requirements in mind, and in light of the flexibility granted to Member States through the subsidiarity principle, the second question is what form should the arrangement take? Intergovernmental agreements over policy delivery are common in federal jurisdictions such as Australia, Canada, Belgium, Switzerland and Spain (often in a European context referred to as "Co-operation") and have become increasingly common even in non-federal systems, i.e. the devolution concordats of the United Kingdom. The form of such agreements varies tremendously and includes: formal treaties and their protocols, co-operation agreements of an administrative nature, memorandum of understanding, political framework agreements, contracts for services and summit declarations to name but a few. A key point of categorisation is whether the intergovernmental agreement is intended to be legally binding and subject to dispute resolution (whether by domestic or international courts or international arbitration). The authors suggest, that in light of the mandatory target set out in Article 3(1) of the Directive, any "arrangement" for statistical transfer needs to be in the form of a functional legally binding agreement rather than a non-binding aspirational political statement. If the agreement is to be binding, the subsequent question is whether it should be made as an international treaty or a commercial contract? Due to the administrative transaction costs of treaty formation, and in light of the example of Green Investment Scheme agreements, the authors suggest that a commercial contract would be preferable. This issue will be subject to further analysis and the substantive content below would be relevant regardless of the form selected.

The third question, and most practically relevant, is what would such a functional legally binding agreement for the statistical transfer of a specified amount of energy from renewable sources contain?

The following sections could form the structure of a Statistical Transfer agreement:

1. **Parties**: The legal parties involved should be clearly stated, whether Member States or authorised agents of Member States;
2. **Recitals**: The recitals should outline the background to the agreement, including reference to the Directive and an express exclusion of the application of the Vienna Convention on the Law of Treaties;
3. **Definitions**: For the purpose of drafting simplicity and to ensure mutual agreement on key points, a full set of relevant definitions should be included;
4. **Conditions Precedent**: A key aspect of any agreement for Statistical Transfer is the date of entry into force of the agreement and any conditions that need to be satisfied prior to such date. The Directive requires that the transfers themselves do not become effective until after the Commission has been notified, but this is a separate issue from the agreement *per se* becoming effective. Given the recommendation of this Report that the arrangement should be on a forward basis, conditions precedent should be minimised and limited to those legal approvals necessary from the Member States (if any) to enter the agreement and those states of fact necessary for a statistical transfer, i.e. compliance with the Energy Statistics Regulation EC/1099/2008;
5. **Sale and Purchase**: The heart of any arrangement will be the obligation to sell and purchase the "specified amount of energy from renewable sources"

pursuant to Article 6 of the Directive. This section should clearly set out the quantity, type, measurement unit and vintage of the renewable energy subject to the arrangement. The nature of the transfer will also be encapsulated in this section: is the agreement a spot transaction for balancing 2020 RES production or a forward contract with advance payment (in whole or part) designed to grow cost-effective RES production in the seller Member State or does it contain an call option for future vintages, if required by the Buyer;

6. **Transfer**: The Directive does not contain a formal registry to effect transfer (unlike the EU ETS) and the Commission serves the keeper of record for the purpose of compliance with the mandatory and indicative targets. Article 3(3) states that the transfer "shall become effective only after all Member States involved in the transfer have notified the transfer to the Commission".
7. **Price and Payment**: The key rationale for the incorporation of flexible mechanisms in the Directive is the ability for Member States to achieve cost-effective compliance. The buyer and seller may agree that any payment should be tagged for specific purposes (a general budgetary contribution to the seller may be politically difficult for the buyer). Such allocation of funds closely represents the "greening" of AAU trading in Green Investment Schemes, and similar may be subject to further agreement with targets for the expenditure. In the language of GIS, the "greening" can be of an aspirational ("soft greening") or a mandatory ("hard greening") nature. The monies received may be conditional on the achievement of certain targets in relation to RES energy or simply dedicated to the encouragement (whether through an intermediating agency or otherwise) of RES energy. If the money is dedicated to specific purposes the issue of state aid will need to be considered in accordance with Article 109 of the Treaty for the Functioning of the European Union (the "TFEU"). It is likely that, given the publication by the Commission of the Guidelines for State Aid for the Environment, properly designed incentives for RES energy will not breach Article 109 of the TFEU. This section may also include interest penalties on late payment of any funds due and payable under the agreement.
8. **Other Obligations**: The arrangement will also need to contain a variety of other obligations of the parties including a covenant of compliance with the 2020 national target by the seller and mutual obligations to report the arrangements to the Commission (with the requested information on quantity and price).
9. **Non-Compliance**: Unlike policy areas such as the common agricultural policy and common fisheries policy direct penalties are not prevalent in the area of EU environmental legislation. The Directive, contrary to the recommendation of the Turmes Report, does not contain a compliance penalty for Member States that fail the mandatory 2020 national target. The risk of both breach by the seller of the terms of the agreement (delivery default) and the risk the seller is unable to transfer due to missing its own target (and thus being unable to transfer in accordance with Article 6) will need to be address in the agreed arrangements. The parties may wish to impose an agreed default penalty or the seller could have a replacement obligation (but this would be difficult in an extremely illiquid market) or the seller may be required to indemnify the buyer for any loss (including penalties imposed by the European Court of Justice following a Commission (or other Member State) action under Art 260 of the TFEU).[2] In

[2] Under the Treaty on the Function of the European Union ("TFEU") if the Commission believes a breach of EU law (the failure to meet the compliance 2020 target) has occurred it can give a reasoned opinion on the matter, which if not resolved can be referred to the ECJ under Article 258 of the TFEU. If the Member State does not comply with the decision of the ECJ the Commission can seek financial penalties (as a daily penalty or lump sum) under Art 260. The ECJ has historically been guided by the formula established by the Commission in setting the level of Art 260 penalties: Commission Communication SEC (2005) 1658 and . Only 9 fines have

addition, if the agreement has hard or soft obligations in relation to any payment received for the Statistical Transfer the consequences of the seller Member State failing to meet this additional obligations will need to be addressed.

10. **Representations and Warranties**: Standard warranties and representations should be included on capacity to enter the agreement, information provided under the agreement, consents (including budgetary and institutional arrangements) necessary to execute the agreement, use of funds under the agreement
11. **Vienna Convention on the Law of Treaties**: If the agreement is to be executed as a treaty then the exclusion of the Vienna Convention should not be included and various formal changes would need to be incorporated. The process for approval of the agreement as a Treaty would also need to be considered, including any ratification requirements of domestic legislatures;
12. **Force majeure**: A force majeure clause should be included that provides for termination in the event that the force majeure continues beyond an agreed timeframe. Under Article 5(2) force majeure may also lead to an adjustment of the compliance target of the Member State affected;
13. **Term and Termination**: The term of the agreement will follow its function (spot, forward, option, etc) but careful consideration should be given by the parties to termination events.
14. **Confidentiality**: Although certain disclosure is required to the Commission, and will subsequently be made available to the public under Article 24 (Transparency Platform) of the Directive, the parties may wish to ensure certain provisions of the agreement remain confidential.
15. **Applicable law**: If the agreement is structured as a commercial contract it will be necessary for the parties to agree an applicable law. If the arrangement is structured as a treaty its interpretation will be governed by the Vienna Convention on the Law of Treaties as interpreted by the International Court of Justice.
16. **Notices**: Parties should provide details for communication and any contractual notices under the agreement.
17. **Assignment**: The more personalised the arrangement is (targeting of funding and/or other contractual obligations) the less likely the parties are to agree to assignment of the agreement. Given the unique nature of Statistic Transfer agreements in the near future and the political dimension involved it is recommended that the agreement is not assignable.
18. **Language**: The working language of the arrangement will need to be agreed;
19. **Miscellaneous**: Various “boilerplate” clauses will need to be incorporated such as provisions for entire agreement, severability, change in law, and further assurance;
20. **Dispute resolution**: Unlike domestic commercial contracts, disputes between Member States are rarely subject to domestic judicial proceedings. The authors recommend a full arbitration clause, but note that the Commission has opposed the use of arbitration in recent bi-lateral investment agreement disputes arguing that these agreements have been superseded by EU law.[3]

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been imposed on Member States, with the largest being a 20m euro fine imposed on France in 2005 in case C-304/02. However, in recent years the Commission is undoubtedly making greater use of this enforcement power.

[3] AES v Hungary, Electrabel v Hungary and Eastern Sugar v Czech republic

4. Joint Project Case Studies

4.1 Introduction for the case studies

Joint Project mechanism covers electricity, heating and cooling projects and it has many implementation options. The Directive set only few requirements for the JP frameworks. The main requirements by the Directive are:

- Only installations commissioned after 25 June 2009 are eligible
- Host country has to notify the Commission (volume, delivery years, buyer)

In the section 4, common parameters for implementation options for Joint Projects are presented and further explored with case studies.

4.2 Joint Project implementation options

In the Table 7 main implementation options for various JP related parameters have been listed.

Table 7. Parameters for Joint Projects.

Element	Alternatives	Comment
Overall Objective of the co-operation	**Ad hoc co-operation with one (large) project** It is expected that at least in the beginning most of the JPs are based on ad hoc co-operation with relatively large projects. There are two main reasons for countries to co-operate: (1) Countries could divide risks and costs of the project and mutually benefit from the production (2) or the buyer would like to get an access to seller's low cost RES potential.	Objectives should be clear and in line with the national RES policies.
	Close long-term JP co-operation If the objective is to exploit significant number of small size projects with a view of achieving a meaningful impact, countries should enter in a close co-operation and create a framework that takes into account long-term nature of the co-operation and number of projects expected to be included in the scheme. Programmatic Joint Project scheme is one alternative for this type of co-operation (See section 2.1.3).	
Project type	**All RES** If the objective is purely cost saving, then choosing suitable projects should be done from the whole RES project potential/pipeline. However, it is likely that the host country will set some limits for eligible project types in order to secure achievement of domestic targets.	Eligible projects depend on the objectives of the co-operation
	Technology and size specific Both buyer and sellers might have a strong interest to limit co-operation for certain technologies that they consider interesting and suitable for co-operation. In particular, in the case of risk sharing, technologies are likely to be relatively new and projects big.	
Project selection in the ad hoc co-operation	**Hand pick suitable project(s)** Countries could just choose one project for JP scheme if it fits to their preferences. The advantage of this approach is that it does not necessarily require large project selection process. In particular, if the project is very big, there are probably only few candidates available. This alternative can also be implemented in a way that interested project developers are asked to submit their projects for screening and selection of the project is based on several parameters (not necessarily the price). However there is challenge of transparence and equal treatment of the project developers.	
	Tendering In the tendering system, eligible projects developers are asked to submit offers for the price/financial support they would need for implementing the project. There would be clear requirements for the project types, project stage and potentially some sanction procedures. The main selection criteria would be the required financial support.	
Project selection in the close long-term co-operation	**Positive list of eligible projects types and/or size** In this type of co-operation the seller could consider JP as an extension for the domestic RES policies and choose certain project category for the scheme. The administration of the scheme could be integrated to the domestic RES support administration which could lower the transaction costs compared to administration created only for the JP scheme. The buyer and seller can also agree other criteria such as size or specific technology. Approval of the projects to the scheme would be based on "positive list" i.e. if the set criteria would be fulfilled the project would be registered to the scheme.	Effective administration of the large number of projects is important
	Applications Project could be selected based on their voluntary applications. The difference of this approach to the positive list would be that that each projects would be individually evaluated based according to set criteria. Approval would not be automatic. This approach would leave more flexibility for participating countries. On the other hand, evaluation requires resources and could increase the transaction costs.	

Product	**RES production (MWh)** This is the most obvious alternative for the subject of transaction. The targets for countries are measured in RES production and installations are selling production to the end customers of energy as well.	If the buyer is a country production is natural choice. If buying gives purchase mandate to a company other options are worth considering.
	RES production capacity (MW) In the energy industry companies sometimes buy right to use certain production capacity. This approach could be considered for JP transaction as well for certain technologies. In particular, time of using biomass as fuel (co-firing with coal) can be determined with market conditions (fuel prices etc.). Buyer could own right to use biomass in the production facility if the conditions are suitable. This approach might not be appealing for countries as they are not in the energy production business but countries could outsource JP project origination for energy companies that could find this kind of arrangement feasible.	
	Equity (ownership in the installation) In this alternative, buyer would invest directly to the equity of the installation. Similarly to investing to RES production capacity above this approach is not appealing for countries but might be considered if energy companies would have a role in JP sourcing on behalf of the buying country.	
Allocation of production (Delivery)	**Full production for the buyer** Production could be assigned fully for the importing country.	
	Shared production Participating countries could divide the production. In particular, this approach is used when countries are sharing the risks and costs of the projects.	
	Yearly cap Countries could agree on yearly cap for the production. Depending on the arrangement importing country could have all the production before the cap is reached and production over the cap would be accounted for the host country or vice versa.	
Support mecha-nism	**Host country support mechanism** In the case, where host country RES policy is creating a surplus of production, countries could use host country support mechanisms for the JP as well. The financing provided by the buyer would be distributed to JP installations in the same manner to installations serving host country targets. This approach could be used in cases were JP financing would be used to cover additional sectors or technology types. The authors believe it would be suitable for close long term JP cooperation.	Type support mechanism affects to the project implementati on and financing which should take into account when choosing the mechanisms or set of mechanisms.
	Importing country support mechanism Importing country (buyer) RES support scheme could be extended to cover installations in other countries as well. In this arrangement project would be included in the buyers support scheme. From the project owner point of view there is a risk that administration increases i.e. reporting to two countries, applying permission to participate from the host country and applying permission to join the scheme from the importing country.	
	Tailored support Tailored support could be considered in the cases where there would be only few Joint Projects selected or where the host country support mechanisms could not be extended to cover these new installations. The tailored support could be investment aid or some type of feed-in tariff. Green certificate or tax based supports might turn out be too complex to implement.	
	Mixture If both countries will receive part of the production a mixture of support systems could be used. The installation could receive for part of the production domestic support and another part could receive some form of support from the buying country. This approach might be challenging for the project owner if the mechanisms would be different types, for example green certificates and feed-in tariffs.	

Delivery period	**Support lifetime** Depending what type of support is used, one can consider this approach as one of the main alternatives for delivery period. In vast majority of the feed-in tariff and green certificate schemes there is limited time what the installation is eligible to the scheme. From the importing country perspective if the support lifetime is short this might not be an attractive option.	
	Installation lifetime Installation lifetime is long – typically 20-30 years. This might not be an attractive alternative for the host country as there would not be clear milestone when the arrangement would end. Moreover the administrative burden (although small in the end) would continue for a very long time period.	
	Until 2020 or other predefined period The RES Directive sets targets until 2020 which creates one natural end year of the arrangements. However, if the investments are large, buying countries might not be interested in big investments that last only few years. For the host country this would be attractive approach as the targets after 2020 are not yet known and JP installation might play important role in reaching post-2020 targets. Another option is to determine a limited time period (for example 2015-2020) that would support participating countries strategies and preferences.	
	Cap In this approach, countries would set a maximum amount of production that would be subject to JP arrangement. For example first 1 GWh of the production would subject to agreement. This might not be suitable for example biomass projects if the buyer is targeting certain production volume in 2020. However if the cap is very likely to achieved after the 2020 then it would not be a problem.	
	Other Other options include adjusting deliveries/allocation of production over the years. For example production of the JP installation could be allocated 100% for the buyer until 2020 and after that 50% until the end of the support period or life time of the installation.	

4.3 Case studies

4.3.1 Background

4.3.1.1 Wind power in the Nordic countries

According to Chris Kjaer, Chief Executive of European Wind Energy Association, around 194 billion euros will be invested in onshore and offshore wind power between 2010 and 2020, driven by EU targets. The share of wind power from total electricity demand by 2020 is estimated to be 5% for Finland, 15% for Sweden and 38% for Denmark. Between years 2010 and 2020 the current national wind power capacity is expected to increase by factor 9.6 in Finland, by factor 1.6 in Denmark and by factor 4 in Sweden. (European Wind Energy Association. 2011.)

Among the Nordic countries Denmark has the greatest share of wind power in total electricity consumption and the country has announced that the targeted increase is from 20 % share to 50 % by the year 2030. In other Nordic countries the share of wind power stays under 2% but many plans of increasing the share by 2020 have been presented. The planned wind power production among the countries is presented in Table 8. (Sköldberg et al. 2010.)

Table 8. Wind power targets in the Nordic countries. (Sköldberg, H. et al. 2010.)

Country	Planned wind power
Denmark	Increase the share of wind energy from 20 % to 50 % by 2020
Finland	2000 MW (~5 TW) increase by 2020
Iceland	n/a
Sweden	Annual wind power production 30 TWh, of which 10 TWh offshore, by 2020. Notice that Sweden does not have target for wind by 2020. These targets are only a physical planning targets.
Norway	Approximately 20 TW of wind power production in 2020

4.3.1.2 Offshore wind power project pipeline

In 2010 the installed offshore wind power capacity among Nordic countries was the highest in Denmark, being 871 MW. In Europe only the United Kingdom had greater installed offshore wind power capacity than Denmark. When considering Nordic countries only, Sweden has the second largest installed offshore capacity, 163 MW. Capacities in Finland and in Norway were modest. In Finland there was only one near shore project with capacity of 24 MW and in Norway one experimental floating turbine with capacity of 2,3 MW. (Pimenta de Miranda et al. 2010.) As all the Nordic countries have set ambitious targets for increasing the level of wind energy production in the future, there will be many potential offshore wind farm projects to become joint projects as well. The following Figure 11 presents the total volume of offshore wind power project pipelines in Nordic countries. The pipeline illustrates all the wind power projects that are not yet generating power but are under planning. The complete data about the offshore projects in pipeline is presented in the Annex. The average project size is 400 MW.

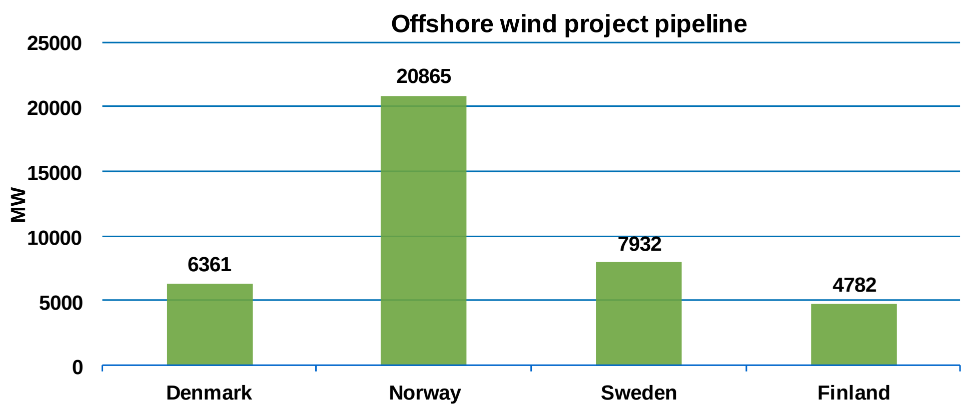

Figure 11. Offshore wind power pipeline in Denmark, Norway, Sweden and Finland. The figures present the planned capacity of which not all will be realized (4C Offshore. 2011.)

4.3.1.3 Biomass in the Nordic countries

The consumption of biomass in energy use (power and heat) in Sweden, Finland, Denmark and Norway totaled some 2240 TWh in 2009 (See Figure 12). In their NREAPs Sweden Finland and Denmark forecast that RES-E capacity would increase within these three countries by 3128 MW by 2020. In 2005 installed capacity totaled 5485 MW. All three countries project a significant increase in the biomass based energy production as well. Compared to 2005 Finland, Sweden and Denmark project an increase of 88 % in electricity and 31% in biomass based heating and cooling by 2020. In total this is some 69 TWh of new production by 2020 (Figure 13). In general biomass will play an essential role in the Nordic countries in reaching 2020 targets.

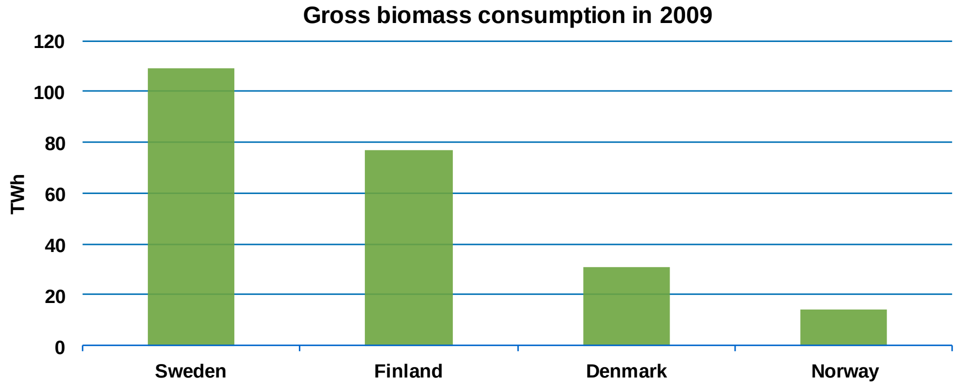

Figure 12. Biomass based energy consumption in 2009. Source: Eurostat.

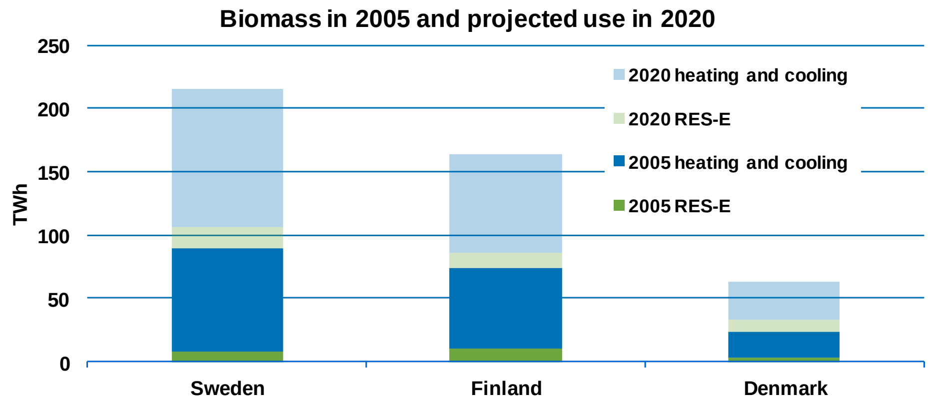

Figure 13. Projected increase in the use of biomass in energy consumption. Source: National Renewable Energy Action Plans.

4.3.2 Case 1: Nordic offshore Joint Project with a tailored support

Objective

The objective of the project is to contract at least 500 MW offshore wind capacity. This will require selection of one or two projects.

Implementation framework

In this hypothetical offshore wind case study, two or more Nordic countries or other EU country agree to enter to ad hoc co-operation and implement a Joint Project(s) which production will be accounted towards participating countries targets in order to reach their 2020 targets. Offshore wind power is suitable for this kind collaboration as the technology is relatively new and investments costs and risks are high. Common offshore project can partly be seen as R&D and demonstration project.

The project is selected in a tender and projects located within the Nordic countries are eligible for participation. After the project or projects are elected, country that hosts the country will administer the project.

Project selection and participants

In order to provide level playing field for the project developers and owners, projects are selected through a tendering procedure. Primary bidders are project developers that have a quite advance stage project and that have received a permission from their host country to participate in the tender. Offshore wind development in Denmark is somewhat different than in the rest of the Nordic countries. In Denmark, the state develops the offshore site to the stage where it has the main licences, geographical surveys and wind measurements in place. After that a tender is organised and a company to construct and operate the site is selected. In other Nordic countries, project developers will carry out preliminary site investigations and licensing. Consequently, the Danish state could participate in the JP tender together with a company constructing the site. In order make this possible, the JP tender schedule should be known early enough for Danish sites to participate as well.

Support type

In the tender, participants would offer a fixed premium based tariff for a limited time period that they would require to build and operate the site. Other similar type of alternative would be to use investment aid. In general this approach would require that financing of the projects would be more or less outside the participating countries national RES support schemes i.e. using budget money.

Delivery period

As the Coop-Mex are new mechanisms, it can be assumed that countries are willing to participate the scheme only for a limited period. From the delivery period alternatives, period ending 2020 is probably practically the shortest period available taking into account long lead and construction time of the offshore projects. Another option for the consideration is tariff period of some 10-15 years.

Division of costs and production

There are several options for sharing the support costs between the participating countries. One option is to divide the costs according to share of production that each country is willing to buy. Assuming that the arrangement will last until 2020, the host country has a benefit of hosting the project after 2020 and consequently project would help it to reach its post 2020 targets. This could be considered to compensate additional costs such as grid enhancement costs for the host country.

Countries might prefer domestic projects which could be taken into account in the process. This would have to be agreed with all participating countries. For example some country might be interested only 20% of the expected production (in this case 100 MW) from the project abroad but willing to contract higher volume from a domestic project. This preference could be taken into account only if other countries would be willing to accept that their share of the production is also determined by the location of the project.

Implementation of the scheme

Implementation of the scheme would require participation of various authorities and allocating or assigning various tasks. Table below lists main tasks and potential authorities involved in their implementation.

Table 9. JP Implementation tasks.

Task	Alternatives
Setting national objectives and preferences	Energy ministries, government (and parliament)
Modifying national legislation to allow projects to participate and apply to become JP.	Energy ministries, government (and parliament), permit authorities
Creating rules and co-operation agreement for the scheme	Energy ministries
Financing the scheme	Energy and Finance ministries, national RES support authorities
Tender	The tender can be conducted by a designated working group with representatives from different countries or it can be outsourced for a designated organization (for example NEFCO or private consultant)
Payment of the support to the project	Designated organization or host country RES authority
Reporting	National statistics authorities, RES authority
Reporting to the Commission	Host country Energy ministry, RES authority

Other issues

Sanctions. The winners of the tenders have incentive to implement the project as the payment of the support (feed-in tariff) is paid against delivered production (MWh). However, if there were no sanctions for failing to implement projects there would be higher uncertainty of the outcome of the scheme and it could open a door for a speculative behaviour in tenders. At least a bid bond should be used as proof of the truly process. If the winner fails to sign agreement with the tender organizer, it will lose the bid bond. A performance bond could be considered in order promote prompt implementation of the project. If the project is not implemented in schedule, developer will lose the performance bond. A performance bond can also be claimed in parts i.e. gradually in several instalments until the whole performance bond is paid to the government after missing a predefined ultimate deadline.

Pricing. There are two options for pricing of the tender. In the discriminatory pricing winners of the tender would receive same price as they have put in their bids. Effectively each project would have a unique tariff level. In the uniform pricing all winning projects would receive same clearing price (highest winning bid).

Discussion

The strength of a tailored support approach is that it is relatively simple and can be adjusted to take into account various preferences of the participating countries. There is experience of using tendering mechanism for RES support where countries could draw lessons for the JP tender. In particular, in this approach even different type of delivery periods and shares of production can be easily taken into account.

The main challenge in this type co-operation is to negotiate a scheme that fits to objectives of the all participating countries. One aspect of this challenge is determining which projects country would allow to participate in the scheme and for what period. In this case the stage of the project can be used to limit number of eligible projects but nevertheless each country has to decide which projects are allowed to participate in the tender. Countries might be inclined to forbid the cheapest potential to participate in the JP and reserve it fully for the domestic targets. Hence, countries need to agree on certain conditions for exclusion of projects.

In this case study, two Nordic countries enter in co-operation, however similar framework can be applied with other countries as well. Moreover, the potential sites can be limited to other participating country only.

From the project developer point of view tailored support mechanism might be preferable to a mix of various domestic schemes (see Case 2). In case the domestic support would not be sufficient for project to realise, JP scheme would bring additional opportunity for the support. Premium based feed in tariff and investment aid are both proven to be efficient in the supporting renewables. In this case the project developer can apply support level that is based on its costs and hence uncertainty whether the support is sufficient to cover the costs is purely based on the estimate of the best expert of the project i.e. the project developer.

4.3.3 Case 2: Nordic offshore wind Joint Project with a mixture of national support schemes

This case is similar to case above but the support is provided by a mixture of various national support mechanisms: green certificates and feed-in tariffs. Here the authors highlight the main difference to case above.

Preconditions

In practise, most of the RES support schemes would have to be modified in order to allow JP with mixture of support schemes. The national support schemes of the host country would have to allow partial participation in the scheme i.e. domestic support would be provided only for part of the production. Moreover, the national scheme of the importing country would have to be modified to allow partial participation of the projects abroad in the scheme.

Implementation framework

Similar to Case 1.

Project selection and participants

In this case, the countries would organise a tender where interested and eligible projects would submit their interest to participate the scheme. The subject of tender would not be required support for the project but simply interest to build the windpark with a financial support based on mixture of national support mechanisms. If several projects are needed for reaching the targeted capacity, then the process could be ongoing until the targeted amount is reached or there could be several tendering rounds. The project selection criteria would be more qualitative than in Case 1 (price) as the project would be able to compete with the price i.e. low costs projects would have an advantage.

Support type

The main support types in the Nordic countries are electricity certificates and feed-in tariffs. As the price of electricity certificates varies over time the total amount of support to be paid for the project would vary as well. Table bellow illustrates this principle. Here it is assumed that two countries will contribute with guaranteed feed in tariffs and one country with electricity certificates for a period of ten years.

Table 10. Mixture of support mechanisms and support price levels.

	Year									
€/MWh	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Power price	40	40	40	45	45	45	45	50	50	50
Guranteed price 1	*140*	*140*	*140*	*140*	*140*	*140*	*140*	*140*	*140*	*140*
Support 1	100	100	100	95	95	95	95	90	90	90
Guranteed price 2	*84*	*84*	*84*	*84*	*84*	*84*	*84*	*84*	*84*	*84*
Support 2	44	44	44	39	39	39	39	34	34	34
Electricity Certificate	22	26	25	22	23	31	35	33	27	23
Total support	**166**	**170**	**169**	**155**	**157**	**164**	**168**	**156**	**150**	**147**
Total (supports + power)	**206**	**210**	**209**	**200**	**202**	**209**	**213**	**206**	**200**	**197**

Over the time, both guaranteed prices vary only if there is a change in the power price. The price of electricity certificates varies, in this example in a range of 22-35 €/MWh reflecting the realised price range in the Swedish certificate system in 2003-2012. During the 10 year support period the higher Guaranteed price 1 accounts 59% of the provided support while Guaranteed price 2 and Electricity Certificates account 24% and 17% respectively. This approach requires adjusting the amount of electricity certificates to be issued on regular basis based on the electricity certificate price levels.

Division of costs and production

Similarly to Case 1 the production of the project would be divided between the participating countries according their contribution to the total support and host country will benefit from the production towards post 2020 targets.

From the point of view of countries with guaranteed price this arrangement might not be attractive as their share of the RES production is difficult to estimate. Production of the project is relatively straight forward estimate but in order to estimate available production towards their targets they have to estimate the future price of electricity certificates as well. High certificate prices would reduce the share of production for the guaranteed price countries. One way to remove this risk would be by fixing the shares of the production to the price level at the signing of the contract with the project owner. From the participating countries perspective the system would resemble Case 1 – they would receive certain fixed percentage of the production of the installation.

Another option to reduce challenges of the variable certificate price would be dividing the production capacity (MW) between the countries instead of the production (MWh). In this approach the capacity allocation could be determined on the support price levels at the signing of the contract.

Delivery period

Typically feed-in tariff system and electricity certificate scheme set a limit where the project is entitled to the support. This would lead to different time periods for the support which would have to be taken into account when the production is allocated between the countries. In the base case, countries would receive production for all the production they provide support for. After the support from one country ends the remaining production would be divided between the remaining countries. Figure below illustrates this principle. Support from the Host Country 1 ends in 2022 and production is then divided between Countries 2 and 3. The host country will receive full production from 2026 onwards after support from other countries have ended.

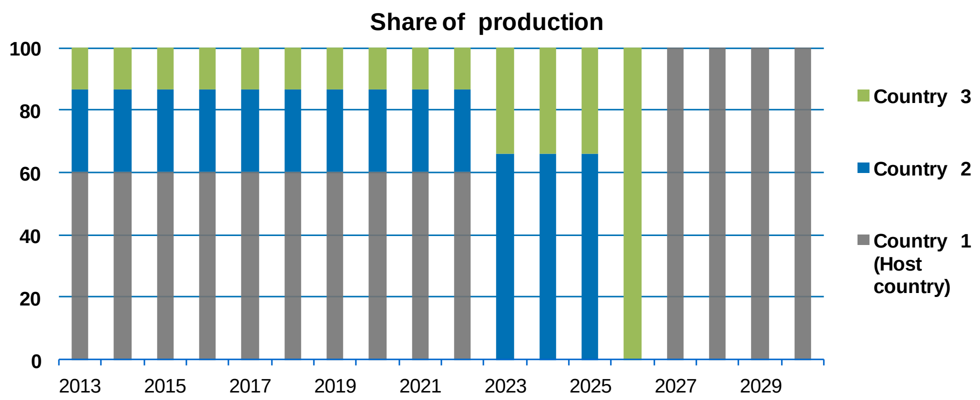

Figure 14. Development of the RES share of countries.

Countries may agree a delivery period that is shorter than any of the periods in the national support schemes but that would have to be taken into account when modifying the national legislations for the JP scheme.

Discussion

From the project owner point of view this kind of arrangement might turn out to be cumbersome. Particularly, if the project has to be registered and report in several RES support schemes. For the project owner the guaranteed support levels would be low risk but electricity certificate price would entail relatively high risk financing. Depending on the preferences of the project owner, the price risk of the electricity certificates could be hedged with a forward contracts. Arrangement where share of production that is entitled to electricity certificates would be fixed to a certain level would be very attractive for hedging as the volume risk would be low. However, this would require guaranteed price countries to bear the volume risk as they would receive production that is left after fixed part of production would have been allocated for the electricity certificates.

Including JP in the electricity certificate system should be done carefully and rules and anticipated share of production should be communicated carefully in order to provide transparency for the electricity certificate markets.

4.3.4 Case 3: Joint Project biomass portfolio

Biomass has some significant differences compared to wind power. In particular, biomass can be transferred, stored and used when needed. Support mechanisms for biomass can be aimed for the use of biomass or for the production of the biomass. Most of the biomass projects are relatively small and are based on a local fuel supply. These unique characteristics make it interesting to compare biomass JP to offshore wind projects. As the biomass projects are small, the objectives of the biomass JP are set accordingly.

Objective

The objective of the project is to contract biomass based energy production of 500 GWh annually in the period of 2015-2020 from new biomass installations.

Implementation framework

In this biomass case study, two or more Nordic countries agree to enter to an ad hoc co-operation and implement a portfolio of biomass Joint Projects which production will be accounted towards participating countries RES targets. The objective is to contract new projects that are not included in the domestic support schemes or projects that would not be realised with a domestic support alone.

Projects are selected in a several tendering rounds before the delivery period starts. After the projects are elected, country that hosts the country will administrate the project.

Project selection and participants

Projects are selected through a several tenders. Primary bidders are project developers that have an advance stage project and that have received a permission from their host country to participate in the tender. The main criteria for the permission is that project is not directly eligible in the domestic support scheme or the project can demonstrate that domestic support is not sufficient to make project economically viable and hence should receive a permission from host country to participate in the JP tender. Moreover, the project has to be new i.e. to be commissioned in future and prior 2015.

Support type

In the tender, participants would offer a fixed premium based tariff for a limited time period that they would require to build and operate the site. The tariff would be set for the produced heating, cooling or electricity. Investment aid would not be suitable in this case as the biomass can be stored. The project would not be included in the national support schemes – instead the JP support would be tailored support mechanisms similar to offshore wind Case 1. In order to avoid speculative behaviour each winning project would receive same clearing support price (uniform pricing). In practise each tender round would set unique support price level.

Delivery period

Taking into account that biomass project are typically relatively small and timing of the use of biomass can be adjusted, the JP scheme can be used for relatively short time period. In this case it is assumed that countries will contract five year period ending in 2020.

Division of costs and production

In this case there are also several options for sharing the support costs between the participating countries. Primary option is to divide the costs according to share of production that each country is willing to buy. Assuming that the arrangement will last until 2020, the host country has a benefit of hosting the project after 2020 and consequently project might help it to reach its post 2020 targets if the use of biomass continues. This could be considered to compensate additional costs such as grid enhancement and administration costs for the host country.

In comparison to offshore wind case, biomass JP scheme would consist of portfolio of several projects with different support price levels (different tender rounds). Assigning different shares of production for the participating countries from different tender rounds could be considered but there should be process to do that before the tender takes place.

Countries might be willing to contract more production from domestic projects which could be taken into account in the process. Conditions for this should be agreed between the all participating countries when the JP scheme is set up.

Implementation of the scheme

See Case 1.

The portfolio of the projects can locate in several countries which sets additional requirements for reporting. A designated organisation would take care of the tenders and would manage the portfolio. The organisation would also pay the support based on the reports of the project owners. In this case it might not be feasible to assign administration to the host country RES authorities as the projects could be located in several countries.

Other issues

Similarly to offshore wind cases, a sanction should be put failing to meet contractual obligations after winning in the tender or in implementation of the project. In particular project owner could be obliged to compensate participating countries if they fail to produce certain minimum amount or RES production. The purpose of this sanction would guarantee that if there is another use of biomass that is able to pay higher prices for the raw material, JP projects do not reduce their biomass use without penalty. Naturally, this minimum level should be set to the level that takes into account availability of fuel and demand for the produced energy as well as possibility of project owner to hedge its fuel supply. It is assumed that project owners can guarantee part of their fuel supply with forward contracts for a few years in advance. Giving up this requirement could potentially reduce the cost of the JP projects but it would increase the volume risk for the countries participating in the project.

Discussion

By and large, there are no big differences between the implementation of the biomass and offshore wind projects but they do can serve different type of objectives. Due to nature of biomass (transferrable, storable) and typical size of the projects, authors see that biomass JP time scale could be short and the scheme could be used for fine-tuning the renewable energy portfolio used for meeting the national targets rather than forming basis for long term targets.

Benefit of multiple tendering rounds is that tenders can also be targeted for certain purposes and they can be developed further if there have been problems in the earlier tender rounds.

Sweden and Norway have a common electricity certificate market that is the primary support mechanisms for the renewable energy. JP in these countries could have an indirect effect on the certificate market as the Joint Project power plant would compete on same fuel as power plants included in the certificate scheme. This could reduced interest of Sweden and Norway to host biomass Joint Projects.

From the project owner or project developer point of view this JP scheme would provide support that it could not receive from the domestic RES scheme. Participation in the tender requires time and increases transaction costs and consequently the tender process has to be efficient and easy to understand. In addition, there has to be procedure to receive a permission from the host country to participate in the JP scheme.

4.4 Case studies conclusions

Establishing a common Nordic off shore wind or biomass project is very much possible. The greatest challenges are political. Countries have created domestic RES policies and measures and proving financing for projects in other countries have not yet been taken into account. An exception is the common electricity certificate market established in Sweden and Norway that aims in helping both countries to reach their 2020 targets. However, changing the focus from domestic measures only to opportunities in other countries as well would require high level political decisions that would modify national RES strategies. Another political aspect is the role of JP in the long-term RES policy which will affect to preferred delivery period and project types.

From the project developer point of view it is important that level playing field is created. In particular the method of choosing the project should be transparent and schedule for the tendering (or other mechanism) well communicated in order provide sufficient time for developers to fulfil the set criteria. Various JP schemes envisioned above can provide support mechanism for project that would not realise otherwise. Most straightforward cases are scheme were RES projects that are not included in the domestic support schemes could potentially participate JP schemes and receive support outside domestic schemes. In Sweden and Norway that have a market based support scheme also potential indirect impact of the JP has to be taken into account. For example, biomass can be used both in power plants included in the certificate scheme and in plants implemented as Joint Projects. Both countries benefit from the co-operation: the host country benefits from the investment while the RES benefit would go for country or countries providing the support.

In above case studies it was assumed that contracted projects would be located within Nordic region. This is not essential requirement and countries can open tender for all projects in the EU area (or with electricity also outside EU). As the host country has to report exported RES production to European Commission it is always essential that buyer will require that projects have received permission to sell their production abroad or that host country legislation allows RES exports via JP.

Based on case studies it seems that technology sets only minor differences for the JP implementation. In offshore wind and biomass cases the main differences were number of projects that have an impact on the administration of the projects and scheme and different objectives of the co-operation in particular length of the delivery periods.

5. Overall conclusions and recommendations

Statistical Transfer and Joint Implementation do provide interesting possibilities for both buyer and seller countries. The RES Directive provides little guidance how these mechanisms could be implemented. As in all policy making, the devil is in details and thorough analysis from various aspects before implementation of the mechanisms is needed. By and large, the mechanisms provide several implementation options but before they can be implemented there has to be clear objectives set by the participating countries in order utilize the wide flexibility in the implementation options. Such objectives include but are not limited to:

- Nature of co-operation: using mechanisms only to fine-tune statistics or enter in a long-term co-operation even beyond 2020.
- Cost saving i.e. buyer meeting the targets with minimum costs (€/MWh) and accessing relatively cheaper or technically (for example due to easier licensing) more feasible RES potential.
- Selling country hosting the projects could consider co-operation as a technology specific mechanism for RES potential that is not captured by the domestic scheme. Buying country could also have technology specific objectives.
- Timing the exploitation of the potential. Seller could use mechanisms to develop domestic RES potential that will be used to fulfil targets beyond 2020 and buyer could use mechanism to buy time for domestic RES potential to reach techno-economical stage.

Both ST and JT can be implemented to serve certain specific objectives or set of objectives. In general, if the buyer's objective is purely cost savings and buying time for domestic RES market to develop, Statistical Transfer is recommendable mechanisms. If other objectives are involved Joint Projects seem to have more benefits than Statistical Transfer mechanism. From the sellers perspective Statistical Transfer brings revenues and is relatively easy to implement. However, Joint Projects ranked better in taking into account security of supply, employment and environmental issues, co-operation in the energy field and opportunity to target certain technologies.

Collaboration in the Joint Projects can take several forms. In this report potential ways to implement JP were examined with case studies. It is likely that JP will be used in a long-term strategic co-operation targeting certain technologies or individual projects. The auhtors foresee that Joint Projects will, at least in the beginning, focus on large projects and collaboration between the countries is evaluated case by case. In the implementation special focus should be given to transparency of the scheme and equal treatment of project developers and project owners.

Recommendations

The RES Directive requires Member States to prepare bi-annual reports on progress in the promotion and use of energy from renewable sources. Next progress reports are due by the end of 2013. The authors recommend that countries will carefully evaluate the possibilities and benefits of using co-operation mechanisms latest before submission of the next progress report. The outcome of the evaluation should be clearly communicated to other countries. Currently there is limited interest for buying RES production through

Coop-Mex and changes in the potential demand should be communicated in order to provide potential sellers time to adapt. Selling countries should also indicate how much RES production they could sell and which mechanisms and type of co-operation they would prefer.

The objective of the use of Coop-Mex should be well communicated both for other countries and for the private sector.

A clear trading strategy is also needed i.e. when to enter the market and which type of contracts and delivery periods to apply. In particular Statistical Transfer provides opportunity to react fast for changing production or market conditions and predefined strategy will form a basis for decision making.

In the design of the implementation frameworks focus should be on predictable, transparent and efficient administration of the scheme. This applies especially for Joint Projects were project developers are involved with the mechanism. Private sector should be consulted when designing the implementation framework.

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Annex 1: Grid investments for the wind

Introduction

In 2009 there was about 5300 MW (13 TWh) of wind power installed in the NordicGrid, according to the report of ENTSO-E. During the next years this capacity is likely to increase due to the policies of European Union and strong supporting of the renewables, an estimation of 17700 MW wind power installed by the year 2020 is presented. Finnish government set a goal for 6 TWh of wind power generation by the year 2020 and also other Nordic countries have set their own wind power targets. (ENTSO-E). This illustrates a favorable atmosphere for wind power production and also presents that many similar investments are already done. When planning to launch a new wind power park the existing experiences of grid connection and transmission capacity improvements can be exploited.

Investment costs

Launching a new wind power park will incur costs in different levels of its implementation and in different geographical areas. Occurring costs can be separated to investment costs and operational costs. (Barth et al. 2008). Investment costs are normally those incurred only once and most likely in the beginning of the projects life-cycle. They can be divided into grid connection costs, grid reinforcement costs and power plant investment costs. (Barth et al. 2008).

Grid connection costs occur when integrating the new power plant to the existing grid. It can be the installations of new underground (or undersea) cables and the necessary convertions in the busbar. Both the national and EU wide regulations and limitations should be taken into account. The amount of the costs strongly depends on the distance of the wind park from the grid coupling point, the sort of equipment used and the voltage level. (Barth & co). According to Krohn et al. (2009, p. 30) the grid connection costs in Europe are estimated to be about 9 % of the total investment costs of a wind turbine.

Grid reinforcement costs incur when the integration of the wind power park requires improvements in distribution and transmission grids or the existing network capacity is not sufficient. (Barth et al. 2008.) When installing a large capacity of wind power the fluctuations in power generation give also a need for capacity backup (GreenNet). According to experiences from Denmark the variation of wind power generation level during operating hour is normally not more than 50 % offshore of installed wind capacity (Entso-e). For example other steadier power plant is needed to balance the feed-in. The most cost-effecting factors, when considering the reinforcement of the grid, are the capacity of the connected power plant, the present character of the grid, the change in the load flow pattern and the integrations impact on power quality and system stability (Barth et al. 2008.)

According to one study, where especially offshore wind power is considered in the Netherlands, the additional grid upgrade costs are estimated to be 60-110 €/KW - total capacity of wind power installed being 5,1 GW. (Holttinen et al. 2006.) Fingrid has announced that it will invest 1,6 billion euros among others to prepare for 2000 MW geographically decentralized wind power integrations by the year 2020. (Fingrid. 2008.) In the end of 2010 the total wind power capacity in Finland was only about 197 MW but by the end of January 2011 the capacity of published wind power projects was worth of 6000 MW (Suomen Tuulivoimayhdistys ry). Considering this it seems that even wider grid reinforcements might be needed, than the already outlined ones.

In Norway there was around 420 MW of installed wind power in 2008 and according to some estimations this capacity will increase to about 10 000 MW (Statnett. 2008). Statnett has also presented some different scenarios of future energy production in its grid development plan. In the base scenario the electricity production will increase by 5 TWh from hydropower and 5 TWh from wind power by the year 2020. The wind power and integration scenarios consists 12 TWh of new wind power and 8 TWh new hydropower by the year 2020, the estimated additional grid investment costs being NOK 7,5 billion compared to the base scenario. (Statnett. 2005.)

A report from Statnett and Svenska Kraftnät presents three different scenarios of necessary grid reinforcements in Swedish-Norwegian power system, total costs of the reinforcements vary between 2 and 5,5 billion euros, depending on which scenarios are included. (Svenska Kraftnät et al. 2010. p.55.) In Sweden there are notifications of wind power projects worth of about 36 000 MW - the existing capacity in 2010 being 1400 MW (Svenska Kraftnät et al. 2010). Denmark had in 2009 a wind power capacity of approximately 2800 MW from land turbines and 400 MW offshore (Krohn et al. 2009).

10 leading European companies have also developed a plan of an electricity grid that would connect the UK, Germany and Norway. This so-called super-grid is estimated to cost around 34 billion euros. (World Energy Council. 2010. p.14.)

Power plant investment costs include primarily the necessary equipment directly related to the wind farm. These costs are normally carried out by the investors and distributed between them as agreed in the contract. Also the infrastructural conditions play a significant role when planning a wind power park investment. Major infrastructural improvements may be needed to make the park operative and these costs can form a huge part of the total investment. Therefore a wide analysis of the surrounding circumstances must be carried out to evaluate not only the wind conditions but also considering other significant factors when designing the wind power park.

Methods for cost distribution

Swider et al. (2007) present that the investment costs can be divided into shallow costs and deep costs. If the RES-E developer pays only for the plant´s grid connection but not for grid reinforcement, it is said that he carries the shallow costs. In this case the network operator pays for the grid reinforcement and bypasses the costs for the electricity consumers. If the RES-E developer pays the connection costs and also all the grid reinforcement costs he carries the deep costs. In this case the investment costs for the RES-E generator are higher because he is supposed to cover all the costs related to the integration and this might encourage more optimization regarding the investment. This method for cost allocation faces some problems because the improved grid conditions benefit the future users as well this kind of allocation may not be fair for the RES-E generator. (Swider et al. 2007.)

Besides these methods also other two ways to allocate the costs are presented. A super-shallow solution, when the RES-E generator does not have to pay any connection costs, would be really favorable for the producer because the end users cover all the expenses.

The hybrid approach for one is a compromise where the RES-E generator pays an agreed fraction of the total grid extension and reinforcement costs. (Swider et al. 2007.)

Swider et al (2007) also present a problem regarding the connection of an off-shore wind farm. If the RES-E generator pays all the grid connection costs the new built connection will likely be the generator´s property. In the case of a new generator it becomes more difficult to say if the newcomer should pay for the grid owner for connecting to the existing grid or to build its own connection. Because of that it might ease the system operation if the network operator pays the whole grid connection and thereby owns the grid. (Swider et al. 2007)

Annex 2. Offshore wind power pipeline

Country	Windfarm	Capacity/MW	Status	Construction starts	Operation - Generating power
Denmark	Anholt	400	Consent Authorized		by the end of 2012
Denmark	DanTysk DK	1200	Concept/Early Planning		-
Denmark	Horns Rev A HR3	200	Development zone	2019	
Denmark	Horns Rev A HR4	200	Development zone	2020	
Denmark	Horns Rev A HR5	200	Development zone	2021	
Denmark	Horns Rev B HR6	200	Development zone	2027	
Denmark	Horns Rev B HR7	200	Development zone	2027	
Denmark	Jammerbugt A J3	200	Development zone	2024	
Denmark	Jammerbugt A J4	200	Development zone	2025	
Denmark	Jammerbugt B J1	200	Development zone	2030	
Denmark	Jammerbugt B J2	200	Development zone	2030	
Denmark	Kriegers Flak A K2	200	Development zone	2017	
Denmark	Kriegers Flak A K3	200	Development zone	2017	
Denmark	Kriegers Flak A K4	200	Development zone	2016	
Denmark	Kriegers Flak B K1	200	Development zone	2029	
Denmark	Kriegers Flak III	455	Concept/Early Planning	October 2012	July 2016
Denmark	NearshoreLAB	36	Consent Authorized	2011-2012	
Denmark	Ringkoebing Fjord A RK1	200	Development zone	2026	
Denmark	Ringkoebing Fjord A RK2	200	Development zone	2026	
Denmark	Ringkoebing Fjord B RK3	200	Development zone	2028	
Denmark	Ringkoebing Fjord B RK4	200	Development zone	2028	
Denmark	Ringkoebing Fjord C RK5	200	Development zone	2029	
Denmark	Roenland II		Concept/Early Planning		-
Denmark	Roenland III		Concept/Early Planning		-
Denmark	Roenne Bakke	70	Concept/Early Planning		-
Denmark	Roenne Banke RB1	200	Development zone	2023	
Denmark	Roenne Banke RB2	200	Development zone	2022	
Denmark	Store Middlegrund MG1	200	Development zone	2031	
Danish pipeline total volume /MW		**6361**			
Norway	Aegir Havvindspark	1000	Concept/Early Planning		2015
Norway	Auvaer	300	Development zone		-
Norway	Fosen Offshore Vindpark-Fase2	300	Concept/Early Planning		-
Norway	Fosen Offshore Vindpark-Fase3	300	Concept/Early Planning		-

Norway	Froeyabanken	1500	Development zone		-
Norway	Froeyagrunnene	200	Development zone		-
Norway	Gimsoey nord	300	Development zone		-
Norway	Gimsoey offshorepark	250	Concept/Early Planning		-
Norway	Havsul I Phase 1	50	Consent Authorized	2014	
Norway	Havsul I Phase 2	300	Consent Authorized	2016	
Norway	Idunn energipark	1200	Concept/Early Planning		-
Norway	Lofoten Havkraftverk	750	Concept/Early Planning		-
Norway	Moerevind offshore vindkraftverk	1200	Concept/Early Planning		-
Norway	Nordmela	300	Development zone		-
Norway	Nordoeyan - Ytre Vikna	300	Development zone		-
Norway	Olderveggen	300	Development zone		-
Norway	Sanskallen - Soeroeya nord	300	Development zone		-
Norway	Selvaer offshore vindkraftverk	450	Concept/Early Planning		-
Norway	Siragrunnen	200	Consent Application Submitted		-
Norway	Sorlig Nordsjoen	1000	Concept/Early Planning	2014	
Norway	Stadthavet	1500	Development zone		-
Norway	Stadtvind	1080	Concept/Early Planning		-
Norway	Steinshamn Offshore Vindpark	105	Concept/Early Planning		-
Norway	Soerlige Nordsjoe I	1500	Development zone		-
Norway	Soerlige Nordsjoe II	1500	Development zone		-
Norway	Traena vest	1500	Development zone		-
Norway	Traenafjorden - Selvaer	300	Development zone		-
Norway	Utsira nord	1500	Development zone		-
Norway	Utsira Phase 1	25	Concept/Early Planning		2012
Norway	Utsira Phase 2	280	Concept/Early Planning		2016
Norway	Vannoeya Havkraftverk I	75	Concept/Early Planning		-
Norway	Vannoeya Havkraftverk II	100	Concept/Early Planning		-
Norway	Vannoeya Havkraftverk III	600	Concept/Early Planning		-
Norway	Vannoeya noerdoest	300	Development zone		-
Norwegian pipeline total volume / MW		**20865**			
Sweden	Blekinge Offshore AB	2500	Concept/Early Planning	2014	2018
Sweden	Finngrunden	1500	Consent Application Submitted	2014	
Sweden	Klasarden	48	Dormant		-
Sweden	Klocktärnan	660	Concept/Early Planning		-
Sweden	Kiregers Flak II	640	Consent Authorized		2015
Sweden	Kårehamn	50	Consent Application Submitted		2016

Sweden	Petlandsskär		Concept/Early Planning		-
Sweden	Seawind Lake Vänern	90	Concept/Early Planning	2013	
Sweden	Skottarevsprojektet	150	Concept/Early Planning		2012
Sweden	Stora Middelgrund	540	Consent Authorized		-
Sweden	Storgrundet	265	Consent Authorized	2013	
Sweden	Södra Midsjöbanken	900	Concept/Early Planning		-
Sweden	Taggen Vindpark	300	Consent Application Submitted	2012	
Sweden	Trolleboda	180	Consent Application Submitted		-
Sweden	Utgrunden II	86	Consent Authorized		2013
Sweden	Vindpark Vänern - extension	23	Concept/Early Planning	2012	
Swedish pipeline total volume / MW		**7932**			
	Data taken on 19 Juoly 2011				
Finland	Inkoo-Raasepori	300	Concept/Early Planning	2012	2015
Finland	Kemi Ajos III	200	Concept/Early Planning	2012	
Finland	Korsnäs	800	Concept/Early Planning	2016	
Finland	Kristinestad	365	Consent Authorized	2013	
Finland	Östra Skärgården	120	Concept/Early Planning	2014	
Finland	Oulun-Haukiputaan alue 1	150	Consent Application Submitted	2016	2016
Finland	Oulun-Haukiputaan alue 2	650	Consent Application Submitted	2016	2016
Finland	Oulunsalo-Hailuoto	225	Concept/Early Planning	2012	2015
Finland	Pori 2	90	Consent Application Submitted	2011	
Finland	Raahe-Maanahkiainen	500	Concept/Early Planning	2012	2015
Finland	Raahe-Pertunmatala	72	Concept/Early Planning	-	
Finland	Raahe-Ulkonahkiainen	210	Concept/Early Planning	-	
Finland	Siipyy	400	Concept/Early Planning	2012	2015
Finland	Suurhiekka	400	Consent Authorized	2014	2015
Finland	Tornio	300	Concept/Early Planning	2012	2015
Finnish pipeline total volume / MW		**4782**			

Source: 4C Offshore, 2011

Annex 3. Case: ST and trade of solid biomass

Solid biomass is transferrable and storable fuel. Some countries such as Finland are promoting collection of wood fuel in order to increase its use in energy production. In this case study, potential problems arising from high international demand for wood fuel is discussed and possibility of using of ST to manage this challenge is discussed.

Introduction

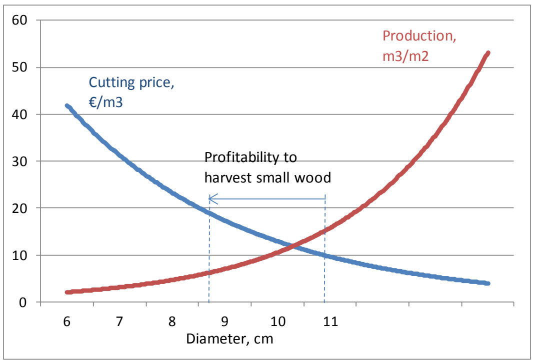
Finland has identified solid biomass e.g. woodchips as one of the main fuels for reaching its RES targets by 2020. Year 2009, the usage of woodchips was ca 10 TWh, which compares to approximately 5 million cubic metres of woodchips. The government of Finland has decided to increase the amount to 25 TWh and 13,5 milj. m^3, respectively. This amount corresponds to almost 40% of the required increase of the renewable energy production in Finland and almost 20 % of the solid biomass increase in Europe. The amount of biomass based energy production was 102,1 TWh year 2008, which makes biomass the second largest renewable electricity source in the EU.

National scheme

In order to increase the use of forest energy, a three-part support scheme has been devised which will increase the competitiveness of forest energy to a level at which the required growth can be achieved. The scheme comprises energy support for small-sized wood, a feed-in tariff to compensate for the difference in costs between wood chips and alternative fuels, and a feed-in tariff for small CHP plants. The costs of the national scheme is estimated to be 83 milj.€ per year.

The Finnish law for support of small-wood energy usage (101/2011) is proposed to be extended to cover all early thinning of the harvesting process, if the wood is used for energy purposes. This extension is necessary to support the usage of the small-wood of which the harvesting is the most expensive compared to forest residue and stump collection. The regulation is still subject to EU Commission acceptance.

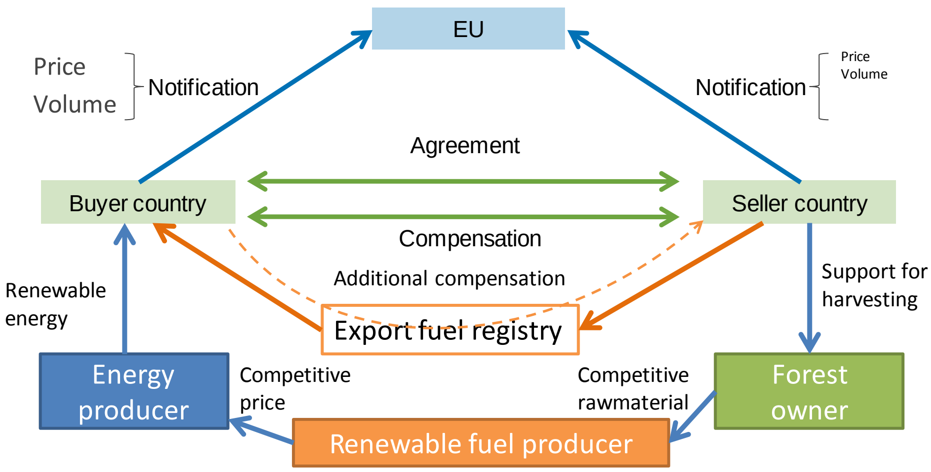
Harvesting of small-sized wood is supported, since thinning and collection of biomass in a production forest is costly. In a figure below, an illustration of the price of the harvesting (blue line) and the growth of the forest, i.e., production (red line) is shown. The substitute to the small-sized wood enables collection of smaller wood to be used for energy production. The substitute is 10 €/m3 for maximum of $45m^3/m^2$.



Relation to ST

Since production of forest biomass based fuel obviously benefits from the support for harvesting the small-sized wood via competitive raw material prices, there is a possibility to a RES leakage. This can happen, if the produced fuel is exported to an EU country for production of renewable energy, which is subsequently subject to ST. In this case, the support of Finland may result lower fuel prices and thus benefit the energy production abroad.

In order to compensate Finland for the support leakage to another EU country, a register for renewable fuel origin could be initiated. In this registry, the origin of the fuel could be tracked and appropriate origin certificates granted. The objective of the arrangement would use ST as vehicle to transfer part of the RES value back to country where the wood originated. This is illustrated in figure below.



Benefits

Possibility for extended support for harvesting and export potential may induce more business opportunities. The income of the substitute is directly to the forest owner after the harvesting has been carried out and usage for energy purposes is shown. Moreover, the income is tax free. There is a limit for harvested amount per square meter, but not a limit for area of managed forest. Therefore, the export opportunity may introduce economics of scale to the fuel raw material production.

The price of the woodchips is a fraction of total cost of the fuel product, for example, the cost of the woodchips contributes less than half of the total cost of a wood pellet. Therefore, the value added for a fuel product creates jobs and investments in equipment. It has been estimated, that in order to increase the woodchip production three-fold an investment of 700 milj. € is necessary for the harvesting and transportation equipment alone and the increased employment results about 635 jobs annually.

Weaknesses

The support for harvesting the small-sized wood is estimated to cost ca 20 milj. € a year with the current situation and 36 milj. € year 2020. Thus, a compensation of exported fuel products would be necessary if the value added of the production is mainly benefiting the import country.

The cutting cost of the trees is inversely proportional to the tree diameter. And since the large trees are of interest to the fibre and wood product industries, the competition of the forest biomass becomes evident. The climate policy instruments for renewable energy and changes in fuel mixes have a contribution to upward pressure on wood prices.

Price for road transportation is ca 10-15 % for a 100 km radius from an energy production plant. Thus, profitable production of woodchips has to happen within 200 km of road transport. However, transportation by other means is cheaper and thus for example transportation by ships can be profitable for much longer distances. If the compensation of the fuel products further lures the export of the biomass material, Finland may results in using even more expensive renewable fuels.

Annex 4. Workshop report 1

Workshop 1 (7 April 2011): Co-operation Mechanisms of the RES Directive – implementation possibilities

Background

The Nordic Working Group for Renewable Energy has been actively exploring possibilities, challenges and benefits of applying the co-operation mechanisms of the Directive (Statistical Transfer, Joint Project, Joint Projects with third countries and Joint Support Schemes, together called “Coop-Mex”). The Working Group is now continuing its work and further explores various aspects of the mechanisms under the project “Nordic Coop-Mex Testing Ground”, with the main aim to develop a practical framework to facilitate the test and use of Coop-Mex in the Nordic region. The work is done in an active dialogue with other countries and stakeholders.

Workshop presentations

The event was opened by Hanne Windemuller from the Danish Energy Agency followed by presentation by chairman of the Nordic Working Group for Renewable Energy Bjarne Juul-Kristensen from Danish Energy Agency to the objectives of the working group, the Coop-Mex testing Ground Project and objectives of the workshop.

The first presentation was given by Bjarne Juul-Kristensen and it covered Renewable Energy Action Plans of the Nordic Countries and their planned use of Coop-Mex. In brief, Denmark and Finland are planning to meet their national targets with domestic RES production, Sweden has indicated that it could have surplus RES production that could be sold to other countries, Norway and Iceland do not yet have decision on the use of Coop-Mex. However, Norway and Sweden are currently negotiating to create a common electricity certificate market. Juul-Kristensen highlighted that from the RES support perspective Nordic countries provide interesting ground for analysis as there is wide variety support schemes (feed-in tariff, tendering, investment aid, green certificates) used in these countries.

Unfortunately Andre Poschman from the Ministry of Environment of Germany and Chairman of the Coop-Mex working group of the EU’s Concerted Action had to cancel his participation to the workshop in a last minute. Juul-Kristensen presented the work on the Coop-Mex in the Concerted Action. The aims of the Working Group 1 under the Concerted Action are to foster joint implementation of the Coop-Mex, evaluate difficulties/ challenges of their implementation, joint learning and continuous exchange best practice exchange on best national support policies.

In the third presentation Agime Gerbeti from Gestore dei Servizi Energetici (GSE) told implementation status of the Coop-Mex in Italy. Italy has decided to use Coop-Mex and there are already some projects identified that could be contracted as Joint Projects with third countries and account RES production against Italian targets. In her presentation she covered planned projects, Italian support scheme and implementation of the Coop-Mex in the Italian legislation. Some interesting points to notice include that Italy requires that power produced by the projects is injected to the Italian grid and that it is not willing to pay more for the Joint Projects than similar type project receives support in Italy.

Consultant of the Coop-Mex Testing Ground project Juha Ruokonen from GreenStream Network Plc analysed the strengths and weaknesses of Statistical Transfer (ST) and price determinants for ST transactions. In the agreements buyer and seller agree on how to divide various risks and Ruokonen highlighted the main risks of the ST. He concluded his presentation with discussion about potential transaction types (spot/forward/option).

Group work 1

The morning ended with a group work where three teams (1 seller and 2 buyer teams) created Statistical Transfer trading strategies for various scenarios. The task provided a ground for intensive discussions on what kind of contracts to use, what are the delivery periods, when to enter into agreement and what kind of risks to accept or not to accept.

Table 11. Scenarios for the sellers

Case	Seller	Comment
1	Proactively planning to exceed its trajectory, 2020 and future RES targets	CO2 neutral by 2050
2	Proactively planning to meet its trajectory and 2020 target, but not willing to contract production post 2020	Developing post-2020 potential early
3	Reactive strategy, the country sells if it exceeds its targets	Balancing the statistics if possible

Seller team discussed the main drivers of the trading strategy and risks. Issues such as penalty from default and how to secure surplus of RES production. In Scenarios 1&2, seller team preferred forward contracts and dividing the portfolio to different volumes and risk levels. Team noted that Scenario 1 has more political interference as it has very long perspective. In the Scenario 3 team considered spot contracts likely but noted that there is low risk in the transaction but there is a risk that there might not be supply in 2020.

Table 12. Scenarios for the buyers

Case	Seller	Comment
1	High domestic RES costs and no reasonable priced RES potential even in very long-term	No potential
2	High domestic RES costs but potential that might become commercially viable in mid-term	Potential maybe in future
3	Reactive strategy, the country buys if it has a deficit	Balancing the statistics if needed

There were two teams analysing ST transaction scenarios from the buyer perspective. First teams considered forward and option contracts suitable for the Scenario 1 and pricing of contract below the buyer country's RES support level or marginal costs. In the second scenario both teams found forward contracts suitable and noted that in this case buyer might be willing to take more risk if the mid-term targets are not binding. Similarly to the seller team, buyers chose spot contract for balancing the accounts for 2020. Both teams considered the timing of the transaction i.e. when do countries know RES production accurately enough that they can enter into agreements.

Group work 2

The work continued in the afternoon. Karl Upston-Hooper of GreenStream Network Plc provided a presentation of the legal aspects and challenges of using Statistical Transfer and Joint Projects (JP). The discussion of the legal aspects continued in the group work where one of the groups discussed various legal challenges of the Coop-Mex. The main message from the work was that from legal perspective there isn't anything extremely difficult as long as in policy level it is clear what are the objectives of the transaction. The team also discussed using ST transaction in a way that money from the transaction is earmarked for specific RES projects in a similar way as in the Green Investment Schemes in the carbon markets. The team named this as ST+ mechanism. In similar way they identified several levels of implementation of Joint Projects, where JP light would look more like ST than pure JP transaction.

Team 2 analysed the preferences of the Buyers and Sellers and the suitability of the mechanism for various purposes. The team ranked the suitability from -3 to +3 and the results are summarised in the Table 3.

Table 13. Preferences of the Buyers and Sellers vrs. JP and ST.

	Motivation	JP	ST
Buyer	Cost savings	+1	+2
	Timing i.e. developing domestic RES potential once is commercially viable after 2020 or technology will be available.	-2	-1
	Co-operation in energy issues with the seller country	+2	-1
	Support of certain technologies	+2	
	Other		
Seller	Financial	+2	+2
	Other benefits (security of supply, employment and environmental quality but NIMBY issues)	+2	+1
	Co-operation in energy issues	+2	+1
	Support of certain technologies i.e. boosting the volume	+2	+1
	Sharing risks with other countries	0	0
	Incentive to meet long term goal at an earlier stage (more linear RES-expansion)		
	Other		

Third team analysed potential case studies to be further analysed in the Coop-Mex Testing Ground project. The team chose large offshore wind farm and solid biomass projects for case studies. These case projects will be analyzed within different scenarios and implementation options.

Wrap up

Both Juha Ruokonen and Bjarne Juul-Kristensen made a short summary of the day. The discussions were fruitful and participation to the discussion and group work very active. As general conclusion, there is still work to be done in order to reach common understanding on various issues at EU level. The Nordic Testing Ground project will provide one platform for these discussions.

Workshop 1, Agenda

8:30	*Registration*	
8:45	**Welcome**	***Hanne Windemüller***, Head of Department, Danish Energy Agency
8:55	**Introduction to the workshop**	***Bjarne Juul-Kristensen***, Danish Energy Agency, Denmark
9:05	**Renewable energy action plans of the Nordic countries and use of co-operation mechanisms**	***Bjarne Juul-Kristensen***, Danish Energy Agency, Denmark
9:25	**Ongoing and future work on Coop-Mex in the EU's Concerted Action**	***André Poschmann***, Ministry of Environment Germany, Chairman of the Coop-Mex working group of the Concerted Action
9:45	**Use of the co-operation mechanisms, seen from a buyer's perspective – criteria and methodologies for calculating benefits**	***Agime Gerbeti***, Gestore dei Servizi Energetici (GSE), Italy
10:00	**Statistical Transfer – parameters for transactions**	***Juha Ruokonen***, GreenStream Network Plc, Finland
10:30	*Coffee*	
10:45	**Introduction for the Group Work 1 – Development of framework for Statistical Transfer**	***Juha Ruokonen***, GreenStream Network Plc, Finland
11:00	**Group Work 1**	
12:15	*Lunch*	
13:00	**Presentations of the Group Work 1**	
13:30	**Legal challenges of Statistical Transfer and Joint Projects**	***Karl Upston-Hooper***, GreenStream Network Plc, Finland
14:00	**Introduction for the Group Work 2 – Development of framework for Joint Projects**	***Juha Ruokonen***, GreenStream Network Plc, Finland
14:15	*Coffee*	
14:30	**Group Work 2**	
15:45	**Presentations of the Group Work 2**	
16:15	**Wrap-up and closing remarks**	***Bjarne Juul-Kristensen***, Danish Energy Agency, Denmark
18:00	*Dinner*	

Annex 5. Workshop report 2

Workshop report 2 (6 October 2011): Co-operation Mechanisms of the RES Directive in the Nordic region – Joint Projects in practice

Background

The Nordic Working Group for Renewable Energy has been actively exploring possibilities, challenges and benefits of applying the co-operation mechanisms of the Directive (Statistical Transfer, Joint Project, Joint Projects with third countries and Joint Support Schemes, together called "Coop-Mex"). The Working Group has continued its work and is exploring various aspects of the mechanisms under the project "Nordic Coop-Mex Testing Ground", with the main aim to develop a practical framework to facilitate the test and use of Coop-Mex in the Nordic region. The work is done in an active dialogue with other countries and stakeholders.

Objectives of the workshop

The objective of the workshop was to discuss and develop common methods for the Joint Projects and to identify and explore challenges and possibilities in the implementation of the Joint Projects. The workshop included presentations and a breakout session.

Work shop presentations

The event was opened by Pernilla Winnhed, Director General for Energy at the Swedish Ministry of Enterprise, Energy and Communications. She welcomed everybody to the workshop and expressed that Sweden has a positive view on the use of the Coop-Mex. This was followed by a presentation by the chairman of the Nordic Working Group for Renewable Energy Bjarne Juul-Kristensen from the Danish Energy Agency of the objectives of the working group, the Coop-Mex testing Ground Project and objectives of the workshop. The chairman pointed out the interest the topic has had in Europe resulting in participants from 11 Member States. Besides, he welcomed the interest from as well the private sector as the national authorities in the workshop.

The first presentation was given by André Poschmann from the Ministry of Environment of Germany. He chairs the Coop-Mex working group of the EU's Concerted Action (http://www.ca-res.eu/index.php?id=32). His presentation covered the potential of the market Coop-Mex mechanisms may induce and the savings that could be achieved. He stated that the potential savings of up to 10 bln euros do not require harmonization of schemes within EU, but rather further improvement of national schemes and use of the cooperation mechanisms in order to achieve cost efficient RES deployment. In addition, he stated that commissioning of Joint Projects would be facilitated through strengthening of electricity transmission between countries agreeing upon such a scheme.

Katarina Jacobson from the Swedish Energy Agency showed a detailed analysis of the consequences of employment of the cooperation mechanisms of the RES-directive in Sweden, an assignment from the Swedish government. She also distributed an executive summary of the project report. They had studied four different scenarios and compared the consequences for the electricity market and the electricity certificate market. The scenarios included two cases where electricity certificates would realize for 7,5 or 15 TWh and Joint Projects realized for 7,5 and 15 TWh. The results showed that in all cases the electricity price would be lower to the consumer in long term (2012-2030). The Swedish Energy Agency's opinion is that Sweden should make use of the Coop Mex through the electricity certificate scheme where an additional MS could be added as a buyer. If Joint Projects is used it should only target off-shore wind power in order not to disturb the certificate market. Also, the Agency sees no problem with a statistical transfer if Sweden has a surplus.

The third presentation was given by Gary Shanahan (gary.shanahan@decc.gsi.gov.uk), Deputy Head – Renewable Strategy & Delivery, Department of Energy and Climate Change, UK. He showed views of UK on Joint Projects and ongoing Irish/British co-operation. The UK roadmap had been created bottom-up estimating deployment potentials for electricity, heat and transportation. Based on these scenarios, an overall approach had been generated for different renewable energy potentials. On the Coop-Mex, British Irish Council has initiated a project to produce case studies of how Joint Projects between BIC States might work. The studies shall cover both support mechanisms and regulatory issues. UK and Ireland have an offshore wind pilot project at Irish Sea that would be applicable for JP. In addition, he mentioned an example of JP for some tidal projects on Channel Islands (not part of EU nor UK). Gary also discussed contingency of the trading. The amount of renewable that UK has to target is 235 TWh by 2020. He mentioned that UK has a legally binding target of reduction of 80% of CO2 emission and the RE is part of this goal, as well.

The first industry view was titled E.ON's view on the Coop-Mex and the presentation was given by Mark Porter, Nordic Regional Director. He argued that offshore projects could be profitable in Sweden with help of the Joint Project mechanism. His view was very positive and they even had an example project (the Södra Midjöbanken project) that could be commissioned as a pilot first Joint Project in the EU.

The second presentation from industry was given by Sune Strøm from the Danish Wind Industry Association. His message was clear; the target for the industry is to be independent of subsidies. However, before this is possible mechanisms like Joint Projects are needed to speed up development of offshore sites. He showed an example of the economics of a joint site of Kriegers Flak and the possible implications to the price of wind electricity. This induced a lively conversation on interconnectors and possibilities to reinterpretate borders at sea to enable the best positioning of the offshore wind power parks.

Unfortunately Juha Poikola from PVO (Pohjolan Voima) and head of Finnbio had to cancel his participation to the workshop in a last minute. We hope to share the view of the Finnish industry at another occasion.

The last presentation of the morning was given by Øistein Schmidt Galaaen, Norwea – Wind Wave Tidal. He stated, that overall there is less interest in Coop-Mex in Norway, because of the planned joint support scheme (certificates) with Sweden and he did not see many other opportunities for RE for Norway. His presentation covered the general requirements for mechanisms; they would need to be cost efficient, yet grid needs subsidies. In addition he had doubts if there is enough momentum for Coop-Mex to be viable before 2020.

Consultant of the Coop-Mex Testing Ground project Juha Ruokonen from GreenStream Network Plc presented the results of the midterm report and the previous groupwork. He analysed the strengths and weaknesses of Joint Projects (JP) and price determinants for the ST transactions and provides some estimates of potential price ranges for ST. Ruokonen presents a case study of a potential offshore wind power Joint Projects within Nordic region as a background for the Group work.

Group work

In the break out session, participants were divided into three groups. Two groups took a offshore wind energy point of view and one group biomass project point of view. The groups were given two issues to be considered:

- Consider strengths and weaknesses of the project selection alternatives for JP
- How to take into account project developer/owners needs? What are the main issues and how those could be tackled?

Groups discussed the issues and reported the conclusions in the plenary session. Overall conclusion from the work was that there is still need for clarification for the JP framework. In particular, which projects are eligible to participate in the scheme and they are related to the domestic RES support scheme. Interestingly the biomass group did not find any major challenges in the JP compared to other project types such as wind energy. There is strong need to create a efficient functional scheme for JP implementation.

Different objectives of the buyer and seller raised active discussion: buyer is looking for cheap RES potential while typically the seller's objective is to receive support for the expensive RES potential that is not used for the national targets. Groups discussed, among other things, challenges to contract projects taking into account various competition laws. Tendering was seen as one option that takes into consideration competition and could provide level playing ground for project developers. Biomass group discussed about price discovery and considered trading platform as one option to provide market transparency.

Conclusions

Chairman of the Nordic Working Group for Renewable Energy Bjarne Juul-Kristensen closed the workshop by highlighting the dialogue between the EU Member States stakeholders in the private and public sector and the ongoing work within the EU's Concerted Action. He promised that power point presentations and working papers from the workshop will be distributed to the participants.

The project is planned to be completed in 2011 and Final report of the project will hereafter be published at the website of Nordic Energy Research (www.nordicenergy.net).

Workshop 2, agenda

	8:30	*Registration*	
Welcome	9:00	Opening of the workshop	Pernilla Winnhed, Director General for Energy, Ministry of Enterprise, Energy and Communications, Sweden
		Introduction to the day's program	Bjarne Juul-Kristensen, Chairman for the Nordic Working Group for Renewable Energy
EU perspective	9:15	Ongoing and future work on Coop-Mex in the EU's Concerted Action Program for Renewable Energy	André Poschmann, Ministry of Environment Germany, Chairman of the Coop-Mex working group of the Concerted
National perspectives	9:35	Swedish perspectives to the Coop-Mex. Main findings from recent study for the Swedish government	Roger Östberg and Katarina Jacobson, Swedish Energy Agency
		Views of UK on Joint Projects and Ongoing Irish/British co-operation	Gary Shanahan, Deputy Head – Renewable Strategy & Delivery, Department of Energy and Climate Change, UK
		Discussion	
	10:55	*Coffee*	
Private sector's perspectives	11:15	E.ON's view on the Coop-Mex	Mark Porter, CEO, E.ON Vind Sverige
		Danish Wind Industry's thoughts and interests in the mechanisms with a particular focus on joint projects	Sune Strøm, Danish Wind Industry Association
		Finnish industry perspective	Juha Poikola, PVO (Pohjolan Voima), and head of Finnbio
		Norwegian industry perspective	Øistein Schmidt Galaaen, Norwea – Wind Wave Tidal
		Discussion	
	12:30	*Lunch*	
Nordic Coop-Mex Testing Ground and Joint Projects	14:00	Summary of the Phase 1 results of the Testing Groud Project? Implementation options for Joint Projects	Juha Ruokonen, GreenStream Network, Finland
		Introduction to the break out session: *How to select projects for the Joint Projects?* *How to take into account project owners needs?* *Case studies: wind and biomas projects* *Implementation alternatives and preferences*	Juha Ruokonen
		Break out session	
	16:00	*Coffee*	
Round up	16:10	Presentations of the break out session	
		Closing remarks	Bjarne Juul-Kristensen
	17:00	End of workshop	
	18:00	*Dinner (optional)*	