



Contract N°: IEE/11/845/SI2.616378

***Bringing Europe and Third countries closer together
through renewable Energies***

BETTER

***D2.2: Pre-assessment of
the potentials and the benefits
of intensified RES cooperation***



*Project Coordinator: **CIEMAT***

*Work Package 2 Leader Organization: **TU Wien***

February 2013

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D2.2: Pre-assessment of the potentials and the benefits of intensified RES cooperation

February 2013

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PREFACE

BETTER intends to address RES cooperation between the EU and third countries. The RES Directive allows Member States to cooperate with third countries to achieve their 2020 RES targets in a more cost efficient way. The core objective of BETTER is to assess, through case studies, stakeholders involvement and integrated analysis, to what extent this cooperation *can help Europe achieve its RES targets in 2020 and beyond, trigger the deployment of RES electricity projects in third countries and create win-win circumstances for all involved parties.*

The case studies focusing on **North Africa, the Western Balkans and Turkey** will investigate the technical, socio-economic and environmental aspects of RES cooperation. Additionally, an integrated assessment will be undertaken from the “EU plus third countries” perspective, including a quantitative cost-benefit evaluation of feasible policy approaches as well as strategic power system analyses. Impacts on the achievement of EU climate targets, energy security, and macro-economic aspects will be also analysed.

The strong involvement of all relevant stakeholders will enable a more thorough understanding of the variables at play, an identification and prioritisation of necessary policy prerequisites. The dissemination strategy lays a special emphasis on reaching European-wide actors and stakeholders, well, beyond the target area region.

PROJECT PARTNERS

N°	Participant name	Short Name	Country code
CO1	Centro de Investigaciones Energéticas, Tecnológicas y Medioambientales	CIEMAT	ES
CB2	German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt e.V.)	DLR	DE
CB3	Energy Research Centre of the Netherlands	ECN	NL
CB4	JOANNEUM RESEARCH Forschungsgesellschaft mbH	JR	AT
CB5	National Technical University of Athens	NTUA	GR
CB6	Observatoire Méditerranéen de l'Energie	OME	FR
CB7	Potsdam Institute for Climate Impact Research	PIK	DE
CB8	Vienna University of Technology	TUWIEN	AT
CB9	United Nations Development Program	UNDP	HR



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1 Introduction

Directive 2009/28/EC, subsequently named as RES Directive, sets binding national targets for all EU Member States to reach an overall RES contribution of 20% in EU's gross final energy consumption by 2020. These national 2020 RES targets are defined in a way that does not explicitly reflect the national resource availability. In order to allow for cross-border support of renewable energy in a more cost-efficient manner, articles 6 to 11 of that Directive introduce cooperation mechanisms, providing Member States as well as third countries with an option to agree on cross-border support of RES. Thereby, one country can partly make use of the more cost-efficient RES potentials of another country. By joining forces, Member States may exploit potentials which otherwise would have remained untapped.

Various studies have discussed the potentials and costs for different Member States in meeting their 2020 RES commitment. Aim of this report is to compare some key sources in this respect, specifically those which explicitly took into account the impact of (intensified) RES cooperation. This shall then be compared with the Member States' intentions for making use of the cooperation mechanisms.

1.1 Objective of this report

The core objective of this report is to conduct a pre-assessment of the potentials and the benefits of intensified RES cooperation. For that purpose the Members States' progress reports according to Article 22 of Directive 2009/28/EC have been analyzed and the relevant data and sections are compiled in this report for each of the Member States. This bottom-up view gives a good indication of the intended use of the cooperation mechanisms. To put this into a perspective the modelling work that has been conducted in two other IEE projects, Re-Shaping and RES4LESS is analyzed with regards to the potential use of the cooperation mechanisms and presented here. This finally allows evaluating to which extent the Member States plan to make use of the potential for cooperation.

Finally, this pre-assessment aims to provide already during the inception phase of the BETTER project an indication of the potential and benefits of intensified RES cooperation between Member States. This shall consequently serve as starting point for the comprehensive set of follow-up assessments of RES cooperation with third countries as scheduled within BETTER in a bottom-up style by case study (WP 3 to 5) and later on complemented by the integrated perspective (WP 6).

1.1.1 Organisation of this report

This report is organized as follows. Section 2 gives an overview of the plans to use the cooperation mechanisms as stated in the progress reports. Section 3 provides the complementary view from the modelling perspective. Section 4 concludes this report, discussing key findings and recommendations.

2 Planned use of cooperation mechanisms per Member State

The EU Member States are required to submit to the Commission a progress report biennial documenting the progress achieved towards their 2020 RES targets. As part of those reports the Member States have to indicate planned surpluses or deficits compared to their trajectory. This information can be used to estimate the potential for cooperation from a bottom-up perspective.

This section is dedicated to present this information in a consolidated format, thus new information / analysis is added to the information already provided in the progress reports. Thereby, in the following for each country a brief summary on the planned use of the cooperation mechanisms is given directly at the beginning of each country-section.

According to Article 22, Section 1 the Member States were asked to provide the following information.

- Each Member State shall submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 31 December 2011, and every two years thereafter. The sixth report, to be submitted by 31 December 2021, shall be the last report required.
- The estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to other Member States, as well as the estimated potential for joint projects, until 2020;
- The estimated demand for energy from renewable sources to be satisfied by means other than domestic production until 2020;

Our reporting follows this general structure and documents and summarises relevant information on the latter two points (i.e. on estimated excess production and on possible deficits) where applicable.

2.1 Austria

2.1.1 Summary: the intended use of cooperation mechanisms

Currently, Austria has no plans for statistical transfers, joint projects or joint support schemes with other countries and, hence, aims to reach the renewable energy target domestically

2.1.2 Information provided by the Progress Report

Page 28, Item 11, Table 7 Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries in Austria (ktoe)^{1, 2, 3}

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	0	0	0	0	0	0	0	0	0	0	0
Member States											

Page 28, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

To reach the target of a 34 % share of renewables in gross final energy consumption, no statistical transfers between Member States and participants in joint projects with other Member States and Third countries are planned at present.

¹ For excess production, state actual values for the two years prior to the submission of the report and estimated values for the years until 2020. Member States have the possibility of correcting in each report data stated in previous reports.

² When completing the table, indicate production deficits with negative numbers (e. g. -x ktoe).

³ These references apply for all subsequent tables, which specify each Member States estimated excess production/deficit (-) of energy from renewable energy sources compared to the indicative trajectory.

2.2 Belgium

2.2.1 Summary: the intended use of cooperation mechanisms

Belgium has expressed no concrete plans to use cooperation mechanisms according to its progress report.

2.2.2 Information provided by the Progress Report

Page 56, Item 15, Table 7: Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries in Belgium (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	-	-	-	-	-	-	-	-	-	-

Page 57, Item 16: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

At present, Belgium still has not performed any exchange of statistics.

2.3 Bulgaria

2.3.1 Summary: the intended use of cooperation mechanisms

Bulgaria plans to over-achieve the trajectory and thus could act as exporter. However for a concrete application the benefits will have to outbalance the costs and associated risks. From the NREAP it is known that this could most likely be projects in the heating sector.

2.3.2 Information provided by the Progress Report

Page 56, Item 11, Table 7: Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries in Bulgaria (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	120	80	168	202	353	386	481	420	471	411	341

Page 57, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Bulgaria did not make use of any statistical transfers, joint projects and joint support schemes during the period 2009-2011. As is evident from the projections in the National Renewable Energy Action Plan, Bulgaria has the potential to achieve its renewable energy targets by implementing national support schemes to promote the production and use of renewable energy. Nevertheless, the national legislation, and in particular the Renewable Energy Act, allows for the implementation of the cooperation mechanisms provided for in Directive 2009/28/EC. The decisions whether or not to apply these mechanisms will be based on a comprehensive analysis of the financial and non-financial benefits, as well as of the costs and risks associated with their implementation. The choice of a scheme will depend on the specific advantages and disadvantages of each mechanism.

2.4 Cyprus

2.4.1 Summary: the intended use of cooperation mechanisms

The Republic of Cyprus is not planning to make use of the cooperation mechanisms for own target compliance. The participation in joint projects with Member States / third countries is generally seen as a possibility.

2.4.2 Information provided by the Progress Report

Page 28, Item 11, Comment regarding Table 7

The Republic of Cyprus aims to achieve its binding targets on renewable energy sources using only domestic production and is not expected to use the cooperation mechanisms. However, it does not exclude mainly the possibility to participate in joint projects with other Member States and third countries.

Page 28, Item 11, Table 7: Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/ imported from other Member States and/or third countries in Cyprus (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-11.43	33	39	34	46	30	42	57	34	21	0

Page 29, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Currently, no national procedures have been established for arrangements relating to statistical transfer or joint projects and/or joint support schemes, but legislation is being elaborated (that is expected to be adopted at the end of 2012 - beginning of 2013) which describes the procedures governing decision-making on joint projects, statistical transfers and joint support schemes.

2.5 Czech Republic

2.5.1 Summary: the intended use of cooperation mechanisms

At present, the Czech Republic does not plan to develop any cooperative RES projects jointly with another Member State. The Czech Republic aims to achieve the national RES goal solely with domestic resources.

2.5.2 Information provided by the Progress Report

Page 8, Item (l): The estimated excess production of energy from renewable sources compared to the indicative trajectory which could be transferred to other Member States, as well as the estimated potential for joint projects, until 2020

The appropriate indicative interim targets for the period 2011-20 and the binding target for energy from renewable sources for 2020 are expected to be achieved by means of domestic renewable energy sources alone. It is not anticipated, therefore, that there will be any transfer to another Member State of surplus energy produced from domestic renewable sources.

Not available in the Progress Report of the Czech Republic, Table 7: Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries in the Czech Republic (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	-	-	-	-	-	-	-	-	-	-

Page 8, Item (m): Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The appropriate indicative interim targets for the period 2011-20 and the binding target for energy from renewable sources for 2020 are expected to be achieved by means of domestic renewable energy sources alone. It is not anticipated, therefore, that any demand for energy from renewable sources will be satisfied by means other than national production.

2.6 Denmark

2.6.1 Summary: the intended use of cooperation mechanisms

The Danish government expects to be able to fulfil its obligations for the expansion of renewable energy up to 2020 with domestic initiatives. Furthermore, as the expected total share of Danish renewable energy is expected to exceed the indicative trajectory, the Danish government is also prepared to make any excess renewable energy available to other countries in the years up to 2020. Regarding the participation in joint projects, Denmark has begun a clarification of technical aspects and agreements within the framework of the Nordic Testing Ground and the Concerted Action including how the various types of national support schemes can be included in joint projects.

2.6.2 Information provided by the Progress Report

Page 20, Item 11, Table 7: Actual and estimated excess and/or deficit (-) production of renewable energy in Denmark compared to the indicative trajectory which could be transferred to/from other Member States and/or third countries in Denmark (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimated excess as stated in the prognosis document	-	613	809	769	784	473	657	333	366	-	0
Estimated excess as stated in the National Renewable Energy Action Plan	-	694	834	1123	1106	833	928	552	619	-	63

Page 20, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

As also stated in the RE Action Plan of June 2010, the Danish Government expects to be able to fulfil its commitments for expansion with renewable energy up to 2020 via national action. On this basis, it will probably not be necessary to use the RE Directive's cooperation mechanisms for statistical transfers between countries in order to ensure Danish compliance with the objectives.

The Danish Government is also prepared to make the expected excess of renewable energy available to other countries for the period up to 2020, during which the share of renewable energy is expected to be above the recommended level.

With regard to the provisions in the cooperation mechanisms on statistical transfers and common projects, within the framework of the Nordic energy cooperation, Denmark has initiated a clarification of the procedure and agreement processes, including how different types of national support schemes can be included in common projects. This includes a Nordic action entitled "Nordic Testing Ground" and a three year EU initiative "Concerted Action – Renewable Energy", in which Denmark is an active participant and which is focused on the further development of the concept. It is expected that the above trans-national projects will contribute to establishing how Denmark, at least, will be able to determine rules and procedures for the use of the cooperation mechanisms.

2.7 Estonia

2.7.1 Summary: the intended use of cooperation mechanisms

Estonia envisages fulfilling the targets without making use of statistical transfer mechanisms. Due to the perceived level of uncertainty regarding specific procedures Estonia plans to decide at a later point whether to become active in statistical transfers or joint projects.

2.7.2 Information provided by the Progress Report

Page 22, Item 11, Comment regarding Table 7

The amount of biomass-heat consumption was 70 ktoe bigger than planned for 2010 in the National Renewable Energy Action Plan up to 2020, but the amount of renewable electricity was bigger by 34 ktoe.

Page 22, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Estonia (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	104	-	-	-	-	-	-	-	-	-	-

Page 22-23, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

So far, there are no detailed data on statistical transfers, joint projects and joint support scheme decision rules. However, Estonia has long-term established practices and experience in carrying out joint implementation projects under the Kyoto Protocol. According to the UNFCCC Secretariat, Estonia has implemented 12 joint implementation projects, most of which pertain to renewable energy⁴.

As there is no specific legislation stipulating procedural acts for organising a statistical transfer or joint project, these arrangements with Member States or third states are governed by the Foreign Relations Act.

According to Section 63(1) of the Government of the Republic Act, energy-related issues are included in the area of government of the Ministry of Economic Affairs and Communications, which organises the respective activities in Estonia.

Any further procedural aspects will be revised when further improving the legislative acts of Estonia in compliance with Directive 2009/28/EC.

The above procedures and criteria used as a basis for the use of statistical transfers or joint projects will be established after the analysis of additional information or receipt of instructions from the Commission.

⁴ Information on the projects: http://ji.unfccc.int/JI_Projects/ProjectInfo.html.

2.8 Finland

2.8.1 Summary: the intended use of cooperation mechanisms

Finland is currently not planning to make use of the mechanisms, but this might be adapted to changes in future energy strategies / scenarios.

2.8.2 Information provided by the Progress Report

Page 17, Item 11, Comment regarding Table 7

The Government is preparing an update of the energy and climate strategy to be adopted by the end of 2012. The strategy updates the scenario reviews and proposes means to promote renewable energy sources. According to the scenario review conducted in the summer of 2010, Finland will not obtain renewable energy from other countries or supply it to other countries through cooperation mechanisms.

Page 17, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Finland (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	0	0	0	0	0	0	0	0	0	0	0

Page 17, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Finland has not implemented statistical transfers, joint projects or joint support schemes with other countries in 2009 and 2010, and neither has it concluded such agreements concerning future years.

2.9 France

2.9.1 Summary: the intended use of cooperation mechanisms

France is not planning the use of the mechanisms for the moment. However the option is kept open for the future, this regards also the French activities in the Mediterranean Solar Plan.

2.9.2 Information provided by the Progress Report

Page 39, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in France (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	784,2	0	0	0	0	0	0	0	0	0	0

Page 40, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

No statistical transfers or joint projects are planned for the moment, although France does not exclude the use of such measures in the future.

2.10 Germany

2.10.1 Summary: the intended use of cooperation mechanisms

Germany plans to reach its 18% RES target domestically. Germany also sees the cooperation mechanisms as a promising opportunity for targeted cooperation in the future and is thus interested in its further development. Germany would in that respect consider transferring parts of the currently estimated excess amount of 1.6% RES production to other Member States, making thereby use of the cooperation mechanisms. Germany is particularly interested in carrying out projects with third countries in accordance with Article 9 of the RES Directive.

2.10.2 Information provided by the Progress Report

Page 58, Item 11, Comment regarding Table 7

Directive 2009/28/EC does not provide any figures yet for the indicative trajectory for the current 2009/2010 reporting period. Therefore no deficit or surplus can be ascertained for this period. However, at 11.3%, the RES share in Germany is already significantly above the trajectory figures until 2014 inclusive. Hence, it can be assumed that for the next 2 reporting periods (2011/2012 und 2013/2014) at the very least, Germany will achieve surpluses as regards the indicative trajectory which can be made available, where necessary, for statistical transfers and joint projects.

The numerical values indicated in Table 7 are identical to the figures in Table 9 of the NREAP as Germany's estimates regarding gross final energy consumption and RES energy supply have not changed from what is contained in the NREAP.

Insofar as the possibility of potential surpluses actually being used for statistical transfers or joint projects by Germany is something that would have to be clarified on a case-by-case basis.

Page 58, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Germany (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	5703	7065	5507	7105	4761	6453	4130	5976	-	3065

Page 58-59, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

As indicated in the National Action Plan for Renewable Energies, Germany will hit its national target of 18% energy from renewable sources in gross final energy consumption in 2020 by means of national measures. According to current estimates, the share of renewable energy in gross final energy consumption is anticipated to reach 19.6%, yielding a 1.6% surplus. Consequently, Germany is not reliant on use of the flexible cooperation mechanisms and has thus far not made use of articles 6 to 12 of the Directive. Nevertheless, Germany is very interested in successful implementation of the cooperation mechanisms and sees the growth of renewable energy in Europe as offering promising possibilities for effective cooperation between Member States.

Given this context, Germany actively supports exchanges between the Member States on ways how to put into practice the flexible cooperation mechanisms under the Intelligent Energy Europe (IEE) project “Concerted Action” implementing Directive 2009/28/EC, for which Germany has taken on the co-chair’s role in the working party on flexible cooperation mechanisms.

In principle, Germany is interested in transferring surplus quantities of renewable energy over the indicative national trajectory – whilst taking into account achievement of its own targets – by way of statistical transfers to other Member States under Article 6 of the Directive to achieve their objectives. The anticipated annual surplus up to 2020 ranges from approx. 3000 to 7000 kilotons crude oil equivalent (kt COE). Due to its comparatively clear surplus amounts, Germany offers corresponding securities when executing a statistical transfer. Germany supports cooperation of this kind and is engaged in negotiations with other Member States in this regard. Specific commitments via statistical transfer will be decided on and checked on a case-by-case basis.

Germany views the execution of joint projects on energy production from renewable sources with other Member States as offering great potential and major opportunities. Germany is particularly interested in carrying out projects with third countries in accordance with Article 9 of the Directive. In energy scenarios commissioned by the Federal Government in Germany it becomes apparent that in the long term, Germany will have to cover part of its renewable electricity renewable needs through imports. Put in perspective, importing solar power from North African countries can make an important contribution towards future energy supply in Europe. Due to better storage capability, solar thermal power stations (Concentrated Solar Power) can also be a means to ensure needs-based energy production through renewables in Germany itself. In order to make headway on implementation of Article 9 of the Directive, Germany supports the execution of the first reference projects importing power from renewables from North Africa under the Union for the Mediterranean’s solar plan.

2.11 Greece

2.11.1 Summary: the intended use of cooperation mechanisms

Greece plans to over-achieve its target by 529 ktoe and is particularly interested in the use of statistical transfers and joint projects with regards to PV.

2.11.2 Information provided by the Progress Report

Page 29, Item 11, Comment regarding Table 7

The Table 14 presents this projected RES excess for the period 2011-2020 and the actual RES excess for 2010, compared to the table of the RES indicative trajectory prepared in 2009.

Page 29, Item 11, Table 14: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Greece (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	404 ⁵	408	513	686	812	856	842	737	743	683	529

Page 29, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The recently enacted L.4062/3012 transposes the provisions of Directive 2009/28/EC on statistical transfers, joint projects and joint support scheme decision rules to the national legislative framework. Moreover, MEECC has recently announced an initiative under the name “HELIOS”, which aims to utilise the higher solar yields for PVs in Greece and foresees possibilities both for statistical and physical transfer of RES energy produced in Greece to other Member States.

⁵ The 2010 NREAP estimate was 257 ktoe

2.12 Hungary

2.12.1 Summary: the intended use of cooperation mechanisms

Hungary is planning to meet its target domestically, but is in general open in the use of statistical transfer, for the export of excess RES production or even for the implementation of a joint support scheme.

2.12.2 Information provided by the Progress Report

Page 39, Item 11, Comment regarding Table 7

No excess was transferred to or imported from other Member States in the years 2009 and 2010. The energy policy instruments of Hungary ensure that the target shares are met, and therefore it will likely not be needed to import excess from other Member States in the future either.

Hungary is open to cooperating with other Member States to transfer excess renewables production statistically and to establish common support schemes. Currently no quantified information can be provided on such projects or cooperation, because no such cooperation has been established yet.

Page 39, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Hungary (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	0	547	283	323	267	280	274	516	464	679	325

Page 40, Item 11: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Pursuant to Articles 6, 7, 9 and 11 of the RED, Member States may agree on statistical transfers, joint projects and joint support schemes (hereinafter jointly referred to as cooperation mechanisms). Pursuant to the RED, the substantial elements of these agreements are stipulated in the agreements concluded by the Member States – in this particular case by Hungary – and the EEA States (or third countries, where applicable).

Hungary did not conclude a cooperation agreement with any country until 31 December 2011. In accordance with the relevant articles of the RED, Hungary transposed the concepts of joint investment, joint support scheme and statistical transfer with points 6, 7 and 13 of Article 1(1) of NFM Decree No 1/2012 (I.20.) on the calculation methodology of the share of energy from renewable sources (hereinafter referred to as calculation decree). The calculation decree stipulates the national calculation methodologies and procedures on the share of energy from renewable sources for cooperation mechanisms. Thus, the legal conditions necessary for the conclusion of intergovernmental agreements are available. The calculation decree therefore stipulates – in line with the RED – that if Hungary concludes cooperation agreements with other countries, the provisions of the cooperation agreements must be taken into account when determining the share of energy from renewable sources in Hungary. The calculation decree stipulates, inter alia, that the energy from renewable sources transferred by Hungary to another country under, for instance, a statistical transfer

may not be taken in account when determining the share of energy from domestic renewable sources, or, on the contrary, the quantity imported from other Member States must be added to the domestic share.

The establishment of the regulation ensures the possibility for Hungary to transfer its statistical excess – in accordance with the provisions of the RED – to other Member States under the provisions of the cooperation agreement if such demand arises.

2.13 Ireland

2.13.1 Summary: the intended use of cooperation mechanisms

Ireland is open to participation in joint projects with other Member States (MS). However, the reaching of the national Irish target is not predicated on the use of the cooperation mechanisms under the Directive. At present, there is no plan to support a specific capacity via joint projects. Ireland has significant offshore resources which hold electricity export potential and could potentially be available for joint projects with other MS.

2.13.2 Information provided by the Progress Report

Page 25, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Ireland (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	105	270	271	390	314	418	212	313	141	0

Page 25-26, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Ireland is actively involved in exploring the possibilities provided for in the co-operation mechanisms under the Renewable Energy Directive. As stated in the NREAP, we have considerable potential, particularly in the offshore renewable energy area for the export of renewable generation. We are participating actively in this working group which has been set up under the concerted action under the Directive and we have also attended a meeting of the Nordic working group that is looking at use of the co-operation mechanisms.

One of the areas of collaboration of the British Irish Council is energy and following an energy summit in June 2011, a joint communiqué was issued. The Council agreed to an 'All Islands Approach' vision to energy resources across the British Islands and Ireland which enables opportunities for commercial generation and transmission, facilitating the cost-effective exploitation of the renewable energy resources available, increasing integration of their markets and improving security of supply. The Council agreed a set of principles to underpin the vision, and launched a programme of joint work spanning the potential for renewable energy trading, as well as work streams on interconnection and market integration. The opportunities for renewable energy trading will be explored in the British Irish Council in the context of the co-operation mechanisms under the Directive.

It is envisaged that if any agreements on renewable trade are reached under the co-operation mechanisms of the Directive, there will be detailed negotiations on the terms and rules that are to apply. The agreements are likely to be legally binding inter-governmental treaties backed up by legislation in both jurisdictions, as appropriate.

2.14 Italy

2.14.1 Summary: the intended use of cooperation mechanisms

Due to the domestic uptake in RES production, especially due to PV, the Italian situation has changed with regards to the use of the cooperation mechanisms. The projected deficit in the forecasts of the NREAP's has been turned into a surplus. As such the instrument could be used differently by Italy as initially projected, but existing agreements shall remain untapped.

2.14.2 Information provided by the Progress Report

Page 50, Item 11, Comment regarding Table 7

Directive 2009/28/EC provides an approximate trajectory identified as average quota of cover of consumption of energy from renewable sources for the two-year periods 2011-2012, 2013-2014, 2015-2016 and 2017-2018 and, finally for 2020.

On the basis of that provision, of the data relative to total final customers of energy and the estimate of their performance for the years to come, a minimum reference trajectory for the quantities of energy from renewable sources has been identified for interpolation starting from 2005. An estimate of the excess or deficit of renewable energy produced has been extracted from the data relative to final consumption of energy from renewable sources for 2009 and 2010 and from estimates of these for future years, calculating the difference from the actual data (2009 and 2010) and the estimate (for the following years until 2020). As a consequence of the reduction of total final energy consumption and simultaneous increased growth in production from renewable sources in the two years considered, Italy has recorded a surplus of 2.8 Mtoe and 4.3 Mtoe respectively for 2009 and 2010, compared to the minimum reference trajectory referred to above.

On the basis of the data recorded in the last two years and the new growth targets in the photovoltaic sector, differently from that provided in the National Action Plan of 2010, it is estimated that the Italian surplus in production of energy from renewable sources, albeit reducing from 2014 onwards, shall remain positive until 2020.

With respect to the forecasts indicated, it is considered that a possibility remains for recourse to international cooperation mechanisms, without prejudice to the agreements already concluded, as an instrument to contain the charges for reaching targets, or as a replacement strategy in the event of failure, even partially, to reach the specific development targets for renewable energy or containment of consumption. On the base of the data recorded in the last two years and the new, more ambitious, targets for the photovoltaic sector, new scenarios are outlined, compared to the scenarios set out in the National Action Plan.

Page 50, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Italy (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	4234	5320	5797	6128	5853	5654	4733	4236	2837	1582	513
Member States											

Page 52, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Recourse to the cooperation mechanisms defined in the Directive is an opportunity for Member States and therefore transposition of the articles of the Directive concerning those mechanisms is at the discretion of the States. Italy, by Legislative Decree No 28/2011, transposed into its national legal system the provisions on the subject of statistical transfers, joint projects between Member States and joint projects with third countries. The joint support systems have not been explicitly mentioned in Legislative Decree No 28/2011 but that does not preclude in any way the possibility for their subsequent application.

Described hereunder are the specific provisions of the Italian legal system.

Statistical transfers and Joint Projects with other Member States (Article 35 of Legislative Decree No 28/2011)

Article 35 of Legislative Decree No 28/2011 provides that promotion of agreements pertaining to these two mechanisms is dependent on failure to reach the intermediate targets until 2016.

The energy subject of statistical transfers, i.e. the shares originating from joint projects, will be supported by way of an incentive, the extent of which shall have a lower value than the average weighted value of the incentives accorded for electricity production from plants supplied by renewable sources situated in Italy, net of production and net of the value of incentives for electricity from solar sources. For the definition of the amount of that incentive the year of reference will be that prior to the stipulation of the agreement itself. Furthermore, it is provided that cover of the costs for implementing these projects is ensured by the electricity and natural gas tariffs according to methods which will be established by the Italian Electricity and Gas Authority following conclusion of the agreements.

The agreements are stipulated and managed using methods which ensure that the energy subject of statistical transfers, i.e. the share of energy coming from the Joint Project, contributes to the reaching of the Italian objectives fixed by the Directive.

Joint projects with third countries (Article 36 of Legislative Decree No 28/2011)

As regards the international agreements on electricity from renewable sources produced in countries not belonging to the European Union and supplied to the Italian electricity system, the Decree provides that their stipulation is effected on the initiative of parties operating in the energy sector on the basis of international agreements concluded for that purpose.

The support to be given to the energy supplied to the Italian electricity grid will be defined in the individual agreements, respecting the criteria of greater production capacity and efficiency of plants situated in third countries and average value of the incentives paid for production by plants from renewable sources situated in Italy. On the basis of those criteria, the incentive for electricity production performed in a third country will be paid for a period equivalent to that provided for the same source and type of plant design situated in Italy, but usually of a lower amount.

Production and importation will take place by methods that ensure that the imported electricity contributes to the attainment of the Italian targets. To that end, the necessary measures will be established to ensure the monitoring of electricity imported for the purpose of attainment of the national target.

2.15 Latvia

2.15.1 Summary: the intended use of cooperation mechanisms

Latvia envisages fulfilling the overall targets for the share of energy from renewable sources. So far no agreements on the use of cooperation mechanisms have been concluded.

2.15.2 Information provided by the Progress Report

Page 48, Item 11, Comment regarding Table 7

Total final consumption of RE exceeds the amount expected in the Action Plan, whereas the share of RE in the transport sector is under the expected value. Compared to 2009, in 2010 this gap decreased. It is envisaged that also in the future the use of RE will be approximately the same as expected in the Action Plan.

Special attention shall be paid to measures of energy efficiency in order to ensure that the share of RE in the total gross final energy consumption does not decrease.

Page 48, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Latvia (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	136	-	-	-	-	-	-	-	-	-	-
Member States											

Page 48, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

In 2009 and 2010, Latvia did not cooperate or plan to cooperate with EU Member States and third countries in joint projects related to generation of electricity, heating and cooling energy from renewable energy sources. During this period, Latvia did not make any decisions on consolidation or partial coordination of state support schemes. Latvia has not agreed with other EU Member States on delivery or receipt of a particular amount of energy generated from RES.

2.16 Lithuania

2.16.1 Summary: the intended use of cooperation mechanisms

Lithuania envisages fulfilling the renewables targets without making use of statistical transfer mechanisms. It possesses the resource potential, especially in the heating sector, to surpass the national target. Lithuania signed a memorandum of understanding with Luxembourg concerning cooperation in the sphere of energy from renewable sources, including the opportunities for statistical transfers and joint projects.

2.16.2 Information provided by the Progress Report

Page 36, Item 11, Comment regarding Table 7

In 2009-2011, the Republic of Lithuania did not perform the statistical transfer to or import from the Member States and/or third countries of energy from renewable sources (see Table 1).

By 2020, a statistical excess of the amount of renewable energy sources is expected in Lithuania. The excess forecasts remain unchanged from those presented in the National Renewable Energy Action Plan.

In 2011, the survey 'Evaluation of international cooperation in promoting the use of energy from renewable sources', ordered by the Ministry of Energy of the Republic of Lithuania, was carried out to analyse the potential and costs of the joint projects of Lithuania and other Member States of the European Union. The survey found that the largest potential for the implementation of joint projects in Lithuania is in the systems of district heating, where the annual heat demand does not exceed 50 GWh.

On 28 February 2011 Lithuania signed a memorandum of understanding with Luxembourg concerning cooperation in the sphere of energy from renewable sources, including the opportunities for statistical transfers and joint projects.

Page 36, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Lithuania (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	-	-	-	-	-	-	-	-	-	-	-
Member States											

Page 36, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Article 66(3) of Law No XI-1375 of the Republic of Lithuania on Energy from Renewable Sources stipulates that the rules on statistical transfers of renewable energy sources and on the implementation of joint projects shall be drafted by 31 December 2012.

2.17 Luxembourg

2.17.1 Summary: the intended use of cooperation mechanisms

Due to its small land area, the comparatively high population density, Luxembourg will have to make use of RES-potentials in other countries, at a scale of up to 92.9 ktoe in 2020. The country will therefore depend on statistical transfers and is already in discussions with potential partner countries.

2.17.2 Information provided by the Progress Report

Page 18, Item 11, Comment regarding Table 7

The figures provided in Table 7 are identical to those of Table 9 of the NREAP.

Page 18, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Luxembourg (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	0	-44.8	-22.8	-37.8	-9.8	-45	-21.6	-74.5	-39.2	-66.1	-92.9

Page 18, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

As indicated in the NREAP, Luxembourg had to resort to the cooperation mechanisms contained in Directive 2009/28/EC in order to meet its targets. The estimates and explanations provided in the NREAP still apply. Luxembourg has made various efforts to engage in talks with countries willing to cooperate, as well as to explore and advance potential cooperation options.

2.18 Malta

2.18.1 Summary: the intended use of cooperation mechanisms

Currently, Malta has no plans for statistical transfers, joint projects or joint support schemes with other countries as neither a high deficit nor excess compared to the trajectory is projected.

2.18.2 Information provided by the Progress Report

Page 16, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Malta (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	-	2.05	-	7.60	-	8.34	-	16.08	-	1.07

Page 16, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Malta currently estimates that gross final consumption share by renewable energy sources targets in 2020 will be achieved through domestic means. Though the first interim target calculated on the average energy consumption and renewable energy generation during 2011 and 2012 indicates a slight margin of excess, the action plan still indicate a recovery once the planned major projects will become on line providing a maximum excess by 2018 declining towards 2020.

The indicated trend suggests that Malta, though initially tight to the first interim target due to delayed measures implementation will still recover by 2020 and does not have any substantial sustainable excess which can be marketed in the long term.

The rules for co-operative mechanisms have not yet been defined, and Malta would like to follow exemplary cases of other MS in these regards if the need arises in order to ensure that the legal procedures, for example concerning state aid issues, are addressed properly.

2.19 The Netherlands

2.19.1 Summary: the intended use of cooperation mechanisms

The Netherlands are currently not planning to make use of cooperation mechanisms, but may reconsider their use depending on the outcomes of the evaluation of the Directive in 2014.

2.19.2 Information provided by the Progress Report

Page 52, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in the Netherlands (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	0	0	0	0	0	0	0	0	0	0	0
Member States											

Page 52, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

There are not yet any statistical transfers, joint projects or joint support scheme decision rules. The use of collaborative mechanisms may be considered during the evaluation of policy in 2014. In that event, future monitoring reporting will examine this policy option.

2.20 Poland

2.20.1 Summary: the intended use of cooperation mechanisms

Poland does not specify the use of the cooperation mechanisms. However RES production in excess of the trajectory is foreseen and provisions for the potential use of statistical transfers are taken.

2.20.2 Information provided by the Progress Report

Page 27, Item 11, Comment regarding Table 7

Table 7 contains figures in ktoe corresponding to the excess or deficit production of energy from renewable sources compared to the indicative trajectory for Poland specified in Directive 2009/28/EC and the estimates included in the NREAP. Figures in column “2010” constitute a difference between Table 1a (column “2010”) of this Report and figures in Table 4a (column “2010”) of the NREAP. There was no reference for the year 2009 in Directive 2009/28/EC or the NREAP.

It is not possible to estimate the excess or deficit per specific sector. The excess for 2011-2012 was estimated based on the data included in the NREAP. The indicated excess constitutes a difference between estimated forecast consumption of energy from renewable sources (Table 4a of the NREAP, row G) as an average for the two-year period and minimum RES trajectory [ktoe] (Table 3 of the NREAP) calculated based on Annex I letter B to Directive 2009/28/EC. Since Directive 2009/28/EC does not specify the indicative trajectory for 2019, the excess for that year has not been estimated.

Page 27, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Poland (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019 ⁶	2020
Expected transfer of RES to other Member States	543	1050	1050	1182	1182	1074	1074	968	968	-	587

Page 28, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The details of statistical transfers have been specified in the draft Act on renewable energy sources. It is assumed that respective provisions enabling such transfers will enter into force on 1 July 2012.

⁶ No reference period available

2.21 Portugal

2.21.1 Summary: the intended use of cooperation mechanisms

If Portugal would make use of the mechanisms in their view this should be combined with the physical transfer. Currently insufficient cross border capacity thus make near term use of the mechanisms unlikely.

2.21.2 Information provided by the Progress Report

Page 25, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Portugal (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	-	-	-	-	-	-	-	-	-	-

Page 25, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The existence of a reliable and entirely unobstructed interconnection in the Pyrenees could help square Portugal's objectives of promoting electrical energy production from RES, with the pressing need of countries in central and northern Europe to guarantee their energy security – an energy security that is increasingly founded (and this trend can only become more pronounced in the future) on the supply of electricity from non-fossil fuels.

Portugal thus argues that flexibility mechanisms should be backed up by the physical transfer of the energy involved in these mechanisms. The necessary investments are therefore required to remove the bottleneck in the Pyrenees and so create an effective and workable connection between the Iberian Peninsula and the French electricity grid. In the absence of these investments it is unlikely that Portugal will make use of these mechanisms in the near future.

2.22 Romania

2.22.1 Summary: the intended use of cooperation mechanisms

At present Romania thinks that it can fulfil its targets domestically. However the need for joint projects will be evaluated continuously depending on the actual progress achieved and the experiences of other Member States with the use of the mechanisms.

2.22.2 Information provided by the Progress Report

Page 34, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Romania (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual/estimated excess or deficit production of electricity from RES	52	0	0	0	0	0	0	0	0	0	0
Actual/estimated excess or deficit production of energy from RES in transport	-223	-253	0	0	0	0	0	0	0	0	0
Actual/estimated excess or deficit production of RES in heating and cooling	1156	1066	700	731	775	700	642	480	310	0	0
Total	982	812	700	731	775	700	642	480	310	0	0

Page 35-36, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Romania considers it will be able to achieve the limit of the overall target established without resorting to transfers from other Member States, and no national procedures have been laid down for the performance of a statistical transfer.

At present, Structural Funds, as well as national programmes, offer important financial support opportunity for the carrying out of investments in the use of RES. It is estimated that the investments to be carried out as a result will be sufficient for complying with the indicative trajectory of production of energy from RES.

The economic development of our country, together with the support mechanism for the production of energy from RES will enable the increase of the volume of private investments in installations for the production of energy from RES. Consequently, no national procedures for the performance of joint projects have yet been laid down.

The need for joint projects on the national territory will be examined subsequently, depending on the development of the actual valorisation of the national potential. When drafting the procedures for the

carrying out thereof, the specific experience existent at that time in the EU will be used to the maximum extent possible. Romania will be able to also use its own joint implementation experience in accordance with the Kyoto Protocol.

2.23 Slovakia

2.23.1 Summary: the intended use of cooperation mechanisms

Slovak Republic plans to have an excess of 143 ktoe of renewable energies production until 2020, which could be exported through statistical transfers. Slovak Republic is not anticipating the use of joint projects at the moment and is generally not in favour of the use of joint support schemes.

2.23.2 Information provided by the Progress Report

Page 14, Item 11, Comment regarding Table 7

It is expected that the excess in the 2011 to 2020 period will predominantly come from the production of heating and cooling from renewable sources of energy. The production for electricity or for transport purposes is not expected to form a significant share. Currently no countries have been earmarked for exports of excess energy from renewable energy sources.

Page 14, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Slovakia (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	80 ⁷	181	240	228	313	305	364	269	349	190	143

Page 14, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The Ministry of the Economy is holding talks with other Member States on statistical transfers of energy from renewable sources. The rules, conditions and instructions relating to statistical transfers and planned participation in joint projects will be published on the Ministry's website. Slovakia is not currently anticipating any joint projects within its territory. Slovakia does not favour joint support schemes.

⁷ excess compared with the figure given in the NREAP

2.24 Slovenia

2.24.1 Summary: the intended use of cooperation mechanisms

In the progress report Slovenia does not specify the use of the cooperation mechanisms.

2.24.2 Information provided by the Progress Report

Page 18, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Slovenia (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	149	0	0	0	0	0	0	0	0	0	0

Page 19, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

Statistical transfers were not performed.

2.25 Spain

2.25.1 Summary: the intended use of cooperation mechanisms

Spain does not make any specific announcements on the use of the cooperation mechanisms in its progress report.

2.25.2 Information provided by the Progress Report

Page 56, Item 11, Comment regarding Table 7

As seen in table 7, actual and estimated excess and/or deficit production of energy from renewable sources for the year 2010 has been null, since there is no indicative trajectory target for these two years.

Page 56, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Spain (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of											
RES to other	-	3337	3956	3388	3878	2804	3469	2049	2793	-	839
Member States											

Page 56, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

No procedure has been established as of yet.

2.26 Sweden

2.26.1 Summary: the intended use of cooperation mechanisms

Sweden is the first EU Member State to have implemented one of the cooperation mechanisms by establishing a joint support scheme with Norway. Though no specific plans exist yet, Sweden is generally positive to extend the use of the mechanisms, whereas the focus should be on offshore wind.

2.26.2 Information provided by the Progress Report

Page 52, Item 11, Comment regarding Table 7

According to the forecast that is the basis for estimating the potential excess production and/or deficit production all energy from renewable sources compared with the indicative trajectory in this progress report (Table 7), Sweden lies over the indicative trajectory throughout the entire forecast period (see Figure 1 below). Note that the value reported for 2020 lies within the forecast's uncertainty range. For a description of the underlying forecast, see Annex 2.

Table 7 shows the actual (for 2009 and 2010) and the estimated (for the other years) excess production of energy from renewable sources compared with the indicative trajectory. The reason that these data differ significantly from those reported in the Action Plan is that those in the Action Plan are based in part on an older forecast and were estimated using a more simplified method of calculation. The data in this progress report are calculated by comparing the actual values and the forecast values for each year, respectively, with the indicative trajectory for that year.

In an investigation (ER 2001:16 - see more under Section 11.1), the Swedish Energy Agency has proposed that if joint projects are to be realised, then they should be for offshore wind energy. Here there is currently a potential among operations that have been granted authorisations of around 7 TWh per year if all projects were to be expanded. Obviously this potential could change leading up to 2020.

Page 53, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in Sweden (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	2450	2430	2530	2280	2380	1940	2040	1430	1530	1000	470

Page 53-54, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

The work involved in establishing a joint market for electricity certificates for renewable electricity production with Norway is complete and the joint market for electricity certificates will begin from 1 January 2012. Such a joint market for electricity certificates constitutes a joint support scheme for the promotion of renewable electricity production under Article 11 of the Renewables Directive. Sweden and Norway have come to an agreement regarding a joint support scheme for renewable electricity

production by means of a joint market for electricity certificates⁸. The Riksdag approved the agreement on 30 November 2011. The Stortinget approved the agreement on 12 December 2011. On 20 December 2011, the EU's Renewables Directive was given force in law in the EEA Agreement, which means that Norway has adopted the Renewables Directive. A joint market for electricity certificates means that renewable electricity production can be located in both Norway and Sweden. The market determines where it is most cost-effective to build for a certain type of electricity production. The producers of renewable electricity can then sell their electricity certificates in this joint market. A larger electricity certificate market with more actors is likely to mean better competition and more stable prices for electricity certificates while at the same time achieving the target more cost effectively.

The Swedish Government is fundamentally positively disposed to the use of cooperation mechanisms in accordance with the Renewables Directive.

In 2011, the Swedish Energy Agency was tasked with analysing the various alternative cooperation mechanisms⁹. The analysis includes an impact assessment for Sweden of using the mechanisms to various extents. This report may comprise the foundation for the Swedish Government's decision on its line of action for working with cooperation mechanisms.

The Swedish Energy Agency's analysis shows that Sweden ought to be able to compete as a seller. The Swedish Energy Agency is of the opinion that, in the first instance, the Swedish Government should work to implement the cooperation mechanisms via the electricity certificate system. This could be done by broadening the electricity certificate system to include additional Member States. It could also be done through a partial coordination of the support scheme. The Agency has analysed a model where a Member State purchases and cancels electricity certificates in the market in order to generate further expansion within the electricity certificate system. The purchase of electricity certificates corresponds to the amount of electricity that the Member States have contracted to purchase. Subsequently statistics on the equivalent amount of electricity is transferred to the purchasing Member State. Furthermore, the Swedish Energy Agency is of the opinion that joint projects should be limited to offshore wind energy, in order to minimise the impact on the electricity certificate system. Currently there are six offshore wind power projects that had been granted authorisation but have not yet been built. The Swedish Energy Agency does not either see any obstacle to transferring the statistics for the years when Sweden has excess production. Note that the Swedish Government has not yet taken a position on whether and to what extent Sweden will utilise cooperation mechanisms or how this might occur.

Through the Swedish Energy Agency, Sweden is participating in the concerted action under the RES Directive. Work to do with the cooperation mechanisms is being carried on within this framework.

⁸ Press release from the Ministry of Enterprise, Energy and Communications, 29 June 2011 www.regeringen.se/sb/d/14953/a/171933

⁹ Swedish Energy Agency (2011), Cooperation mechanisms under the Renewables Directive – an in-depth analysis [Samarbetsmekanismer enligt förnybartdirektivet – en fördjupad analys], ER2011:16.

2.27 United Kingdom

2.27.1 Summary: the intended use of cooperation mechanisms

The UK is confident that its target can be achieved domestically. However the potential use of the cooperation mechanisms will be further observed as a safeguard against unexpected cost increases.

2.27.2 Information provided by the Progress Report

Page 30, Item 11, Comment regarding Table 7

We indicated our likely approach to making use of the Flexibility Mechanisms within the Directive to trade renewables when we submitted the UK's Forecast Document to the Commission in December 2009. Our approach is to:

- Aim to meet our 15% target domestically;
- Be open to potentially using the flexibility mechanisms as a contingency measure - particularly where this provides benefit to the UK ;
- Give consideration to what further legislative or other measures are needed to enable such trading.

In our Renewable Energy Roadmap¹⁰, we recognised that trading renewables with our European partners and others could provide an important mechanism to safeguard UK consumers in the event that the costs of domestic deployment do not come down, and alternative, cheaper opportunities arise in other countries.

As shown in Table 7 we consider, at this stage, we can deploy sufficient renewables domestically to meet the first (2011/12) and subsequent targets – with the key technologies for cost-effective delivery set out in the Renewable Energy Roadmap . However, there is considerable uncertainty in the contribution of biofuels to renewable targets post-2014, given the delay in the Commission establishing its policy on Indirect Land Use Change (ILUC).

Page 30, Item 11, Table 7: Actual and estimated excess and/or deficit (–) production of renewable energy compared to the indicative trajectory that could be transferred to/from other Member States and/or third countries in the United Kingdom (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Expected transfer of RES to other Member States	-	0	0	946	946	1290	1290	1118	1118	-	946

Page 30, Item 11.1: Detailed statistical transfers, joint projects and decision-making arrangements for joint support schemes

No procedures have yet been established.

¹⁰ DECC – Renewable Energy Roadmap - published in July 2011

3 Complementary top-down assessment – RES cooperation from a modelling perspective

To put the Member State's intentions on the use of RES cooperation into a perspective this section is dedicated to recapitulate and contrast key outcomes of two related model-based assessments of the potential, expected and / or feasible use of cooperation mechanisms. These results stem from two other IEE projects, namely the Re-Shaping study and the RES4LESS project, and both are first discussed separately and, subsequently, compared with each other. Both finally allow evaluating to which extent the Member States plan to make use of the potential for cooperation.

3.1 Summary of RES4LESS scenarios on the use of cooperation mechanisms

The RES4LESS project developed a Roadmap for the cost-efficient deployment of RES in the EU up to 2020 and beyond, based on the use of cooperation mechanisms among EU Member States. In the Roadmap different cooperation scenarios are analysed, highlighting the potential impact cooperation mechanisms can have in terms of savings in support costs. The scenarios have been constructed by synthesizing and integrating all the data, findings, information and inputs gathered in the course of the project.

The quantitative basis for the analyses carried out in RES4LESS was provided by a modelling exercise aimed at identifying *Valleys of Opportunity* (VoO) for the realization of cost-savings via cross-border cooperation. The outcomes of the model have then been confronted with the practical aspects of actually implementing the VoOs in reality. This has been achieved through further elaboration of the data, a study of the barriers associated with the implementation of cooperation mechanisms, the in-depth analysis of three case studies, the analysis of grid-related issues, and the integration of stakeholders' feedback.

In this section a brief description of the RES4LESS modelling methodology is presented, followed by a summary of the scenarios presented in the RES4LESS Roadmap, and an overview of the RES4LESS case studies and analysis of barriers and opportunities.

3.1.1 RES4LESS modelling methodology

The overall aim of the model analysis was to identify *Valleys of Opportunity* (VoO) to use cooperation mechanisms for the realization of savings in support costs. ECN model of the renewable electricity sector, RESolve-E, has been used to construct cost supply curves for all EU Member States in 2015 and 2020. The cost supply curves have then been compared pair by pair, as illustrated in Figure 3-1. A satellite model, Res4Less, has been developed for this purpose. The shaded areas beyond the targets (bullet points in the graph) represent the surpluses of the two MSs. Figure 3-1 highlights that achieving the RES target will be more expensive for MS-2 than for MS-1. At the same time, MS-1 has a surplus potential, which is cheaper compared to part of the potential MS-2 will need to develop to achieve its target domestically. Therefore, the model identifies a *candidate VoO* between the two MSs, as MS-2 could realize some savings by exploiting the cheaper surplus potential of MS-1 through cooperation mechanisms. The model then narrows down the candidate VoO by applying an economic constraint,

and calculates a series of parameters that characterize the VoO. The most important parameter is the *VoO size*, expressed in TWh. The details of these procedures are explained in Dalla Longa and Bole-Rentel (2011). According to the convention adopted in the RES4LESS project, the MS selling surplus is called the *host country*, while the MS buying surplus is called the *user country* in advance.

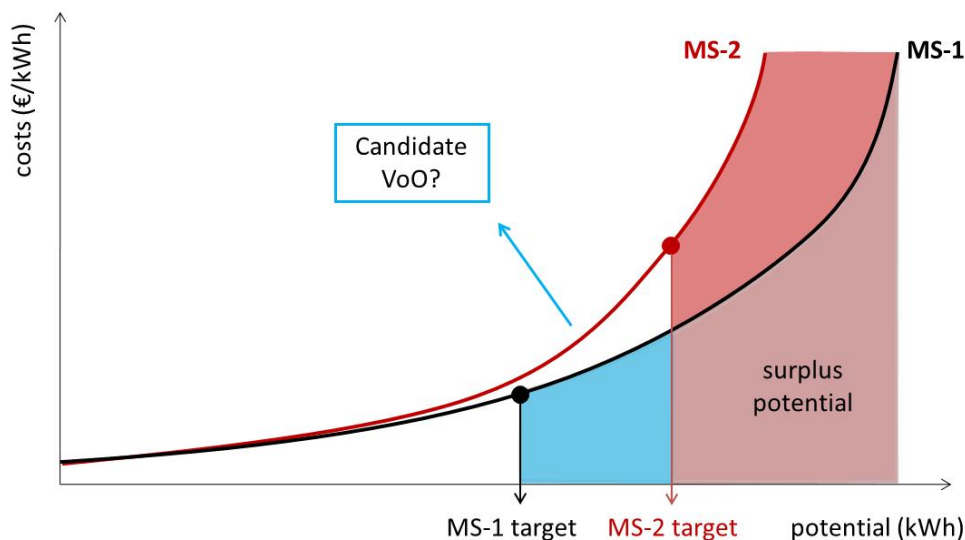


Figure 3-1: Pair-wise comparison of RES-E cost supply curves.

3.1.2 RES4LESS scenarios

The methodology to identify VoOs can be generalized to an arbitrary number of countries. Therefore two types of analysis have been carried out:

- a *pair-wise analysis*, where the VoO methodology has been applied to every possible pair of MSs in the EU;
- a *global analysis*¹¹, where the VoO methodology has been applied to the EU as a whole.

Based on the results of the global analysis the *Full cooperation* scenario has been built. In this scenario EU Member States agree on moving away from local planning and domestic support, and choose instead for deploying RES by making maximum use of cooperation. The most expensive RES technologies in Europe are replaced with the cheapest surplus potentials available. Figure 3-2 summarizes the results of the *global VoO analysis* for the year 2020, indicating which surpluses from the group of *Host Countries* can be allocated to replace the most expensive RES technologies in the group of *User Countries*. In order to implement in practice this scenario needs two key conditions to be met: RES deployment must be planned in a centralized top-down manner at EU-level and support instruments must be designed in a harmonized fashion. These conditions are clearly in contrast with the actual situation of RES deployment and support in EU, which is characterized by a fragmented national approach towards the fulfilment of the 2020 targets.

¹¹ The term *global analysis* in this case does not refer to world-level, but to EU-level analysis, since only EU Member States and Norway were included in the modelling exercise.

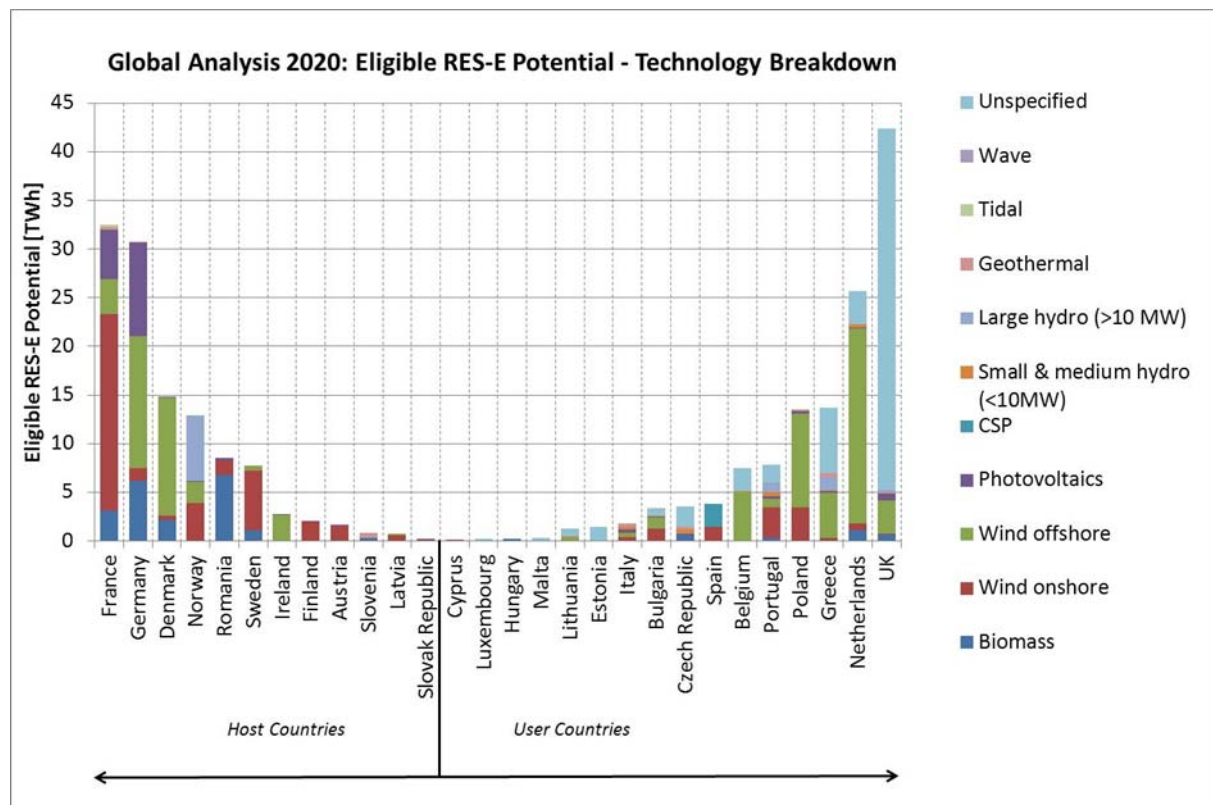


Figure 3-2: Results of the global VoO analysis.

In order to provide a more realistic picture of what can be achieved by 2020 in terms of cooperation mechanisms, two additional scenarios have been developed in the RES4LESS Roadmap: the *Twin stars pilots* and the *Twin stars scale-up* scenarios. Building on the results of the pair-wise analysis, the outcomes of the RES4LESS case studies and the feedback received from stakeholders, these scenarios envisage the possibility of a number of pairs of countries (called *twin stars*) establishing a series of joint projects. The host countries have been selected among the Member States that presented the largest and cheapest surplus potentials in 2020 according to the modelling projections. Similarly, user countries have been chosen among the MSs, where RES deployment in 2020 was most expensive. When possible, in the selection actual RES-deployment plans and ambitions in relation to cooperation mechanisms of single MS have been taken into account. However it is important to highlight that:

- the choice of pairs of MSs is still partly arbitrary;
- many interesting combinations have inevitably been left out;
- the aim of this selection is not to pin-point Member States that definitely should (or should not) engage in cooperation mechanisms, but rather to provide a “reasonable” set of pairs to enable the analysis of the scenarios and the quantification of the corresponding savings;
- given a pair of countries that together have enough potential to achieve both their 2020 targets, it is almost always possible to devise a cooperation agreement that can bring some direct and/or indirect benefits to both countries.

In the *Twin stars pilots* scenario the twin stars start up small- and low risk joint projects, typically with a capacity of approximately 200 MW. In the *Twin stars scale-up* scenario the joint projects of the *Twin stars pilots* scenario are expanded to their maximum achievable size, according to the results of the pair-wise analysis.

The outcomes of the three scenarios for the year 2020 are summarized in Figure 3-3. The graph shows the potentials available for cooperation. A positive bar indicates a relatively cheap surplus that could be sold, while a negative bar indicates an expensive potential that could be replaced. The results are very different in the three scenarios, indicating that interesting chances for establishing joint projects can be found outside the optimal allocation of surpluses calculated in the *Full cooperation* scenarios. In particular it is interesting to notice that Spain, a *user country* in the *Full cooperation* scenario, could in fact profitably act as *host country* in a well-designed joint project with a suitable partner.

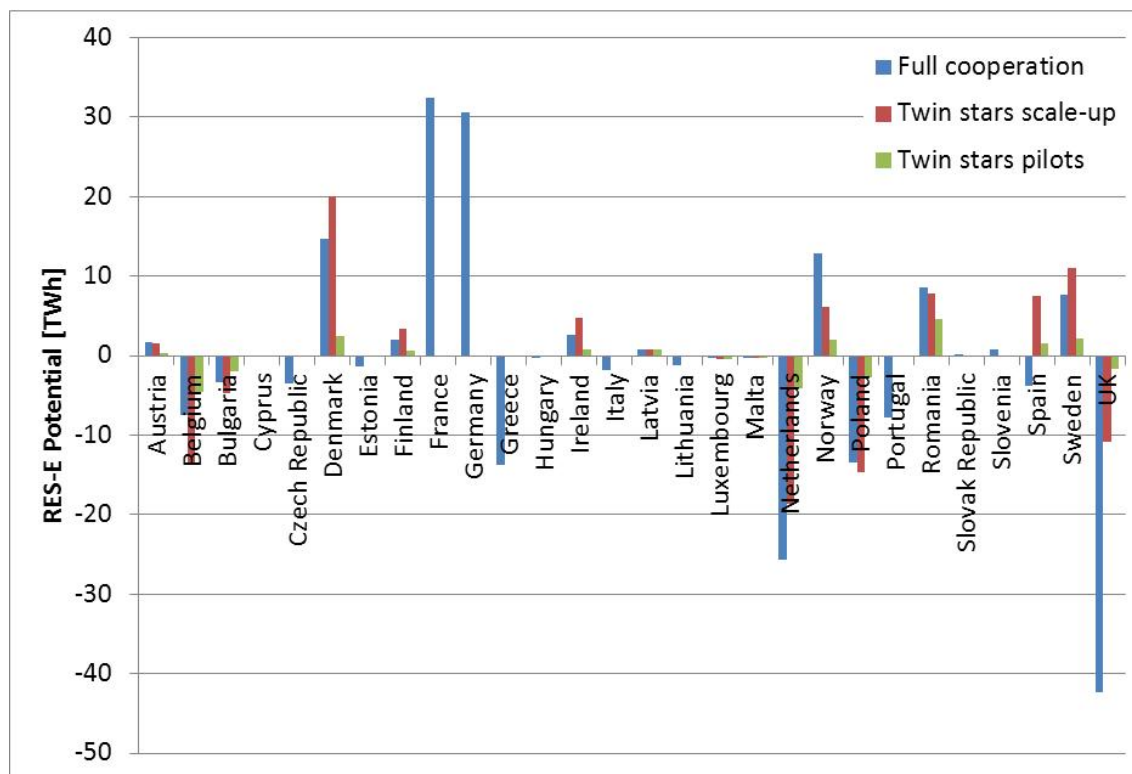


Figure 3-3: Trading of RES potentials in the RES4LESS scenarios, in 2020.

Finally, it is important to remark that the results presented in this section are not projections about how much surplus or deficit the different MSs will generate in 2020, but just possible scenarios that would enable a cheaper deployment of RES in the EU through cooperation mechanisms.

3.1.3 Lessons learnt from the RES4LESS case studies and analysis of barriers

Among the MSs identified as possible *host countries* in the VoO pair-wise analysis, Denmark, Romania and Spain were chosen as *host countries* for the RES4LESS case studies. The technologies considered in the case studies were offshore wind, Biomass, and CSP, respectively. This choice was made taking into consideration not only the size and costs of surpluses in these countries, but also the fact that these are realistic opportunities, which represent a diverse set of technologies and geographical areas, and raised interest among stakeholders. The Netherlands appeared to be a suitable *user country* in all three case studies, mainly because it could realize significant savings from cooperation mechanisms, as well as due to domestic interest in making use of cooperation opportunities (Dalla Longa and Bole-Rentel, 2011, 52).

- The **Offshore wind case study in Denmark** consists of several offshore wind parks in Danish waters totalling a maximum capacity of 2 GW. A 200 MW pilot project could already be

realized in 2017 corresponding to a saving of about 10 M€ for the Netherlands. Among the identified barriers to materialize this case study is the need to engage in early negotiations and discuss the policy options and transfer prices at an early stage. Furthermore, in case physical transfer is considered, the need to put in place the required grid infrastructure (Cobra connection cable) also constitutes a barrier.

- The **biomass case study in Romania** consists of several small biomass projects across the country totalling a max capacity of 280 MW. First plants could be operational in 2017 and would represent savings of about 15 M€ for the Netherlands. In this case, the main barrier for Romania is to get back on track to achieve its own RES targets.
- With respect to the **Concentrated Solar Power (CSP) case in Spain**, a maximum of 1,25 GW total installed capacity could be deployed in the south of Spain. A 200 MW pilot plan could already be realized in 2017 corresponding to savings of about 12 M€ for the Netherlands. Given the current situation in Spain, this is seen as a unique opportunity for the CSP sector to keep growing, without compromising Spanish public funds in the form of required RES support policies (Feed-in-tariffs). One key factor for a success in this case is the realization of the expected decline of CSP production costs from now to 2020. Despite the great interest generated by this case study among private stakeholders, the main barrier for the materialization of this opportunity is the engagement of the high level decision makers at the Spanish Government. It is important to say that besides the pilot project, for larger joint projects, the existing grid interconnection capacity between Spain and France could become a bottle neck. However, when the new grid infrastructure becomes operational in 2014, this aspect should subsequently not be a barrier.

Besides the specific opportunities and barriers identified in each case study, some more general barriers and opportunities – some of which are also applicable to the cooperation with third countries – have been identified:

Barriers

- Not knowing what the EU post-2020 energy policy will look like, makes it difficult to assign a value to the RES produced after 2020;
- Not knowing what the implications (penalties) for non-compliance with the RES targets are, makes it difficult to assess the net benefits of cooperation;
- Lack of knowledge and assistance in making use of the cooperation mechanisms;
- The current economic crisis is shaping policies and priorities. Therefore, due to the above mentioned uncertainties, many governments are less interested in taking a “first mover” role in that respect;
- To realize some of the identified cooperation opportunities, there might be a need to increase or reinforce the existing grid capacity in an instant.

Opportunities

- The use of the cooperation mechanisms could lead to the realization of substantial monetary savings throughout Europe;

- The current economic crisis might affect many countries' RES target achievement trajectory. Therefore, there might be a greater interest and demand in making use of the cooperation mechanisms;
- For the potential host countries that are currently facing financial RES support "shortages", the use of the cooperation mechanisms could become an even more attractive option as an opportunity to further develop the domestic RES industry without compromising public funds.

3.2 Re-Shaping scenarios on meeting 20% RES by 2020 with limited or strong RES cooperation (*Green-X* modelling)

This section discusses results from the Re-Shaping project with the aim to shed light on **the need for and impact of cooperation between Member States**, highlighting selected outcomes of the model-based prospective RES policy assessment. Background on the approach taken and scenarios conducted is given in a comprehensive manner in the corresponding scenario report of the RE-Shaping project (see Resch et al. 2012).

3.2.1 Background information (methodology and key assumptions)

As in previous European projects such as FORRES 2020, OPTRES or PROGRESS the *Green-X* model was applied to perform a detailed quantitative assessment of the future deployment of renewable energies on country-, sector- as well as technology level. The core strength of this tool lies on the detailed RES resource and technology representation accompanied by a thorough energy policy description, which allows assessing various policy options with respect to resulting costs and benefits. A short characterization of the model is given below, whilst for a detailed description we refer to www.green-x.at.

Short characterisation of the Green-X model

The model Green-X has been developed by the Energy Economics Group (EEG) at the Vienna University of Technology under the EU research project "Green-X—Deriving optimal promotion strategies for increasing the share of RES-E in a dynamic European electricity market" (Contract No. ENG2-CT-2002-00607). Initially focussed on the electricity sector, this modelling tool, and its database on renewable energy (RES) potentials and costs, has been extended to incorporate renewable energy technologies within all energy sectors.

Green-X covers the EU-27, and can be extended to other countries, such as Turkey, Croatia and Norway. It allows the investigation of the future deployment of RES as well as the accompanying cost (including capital expenditures, additional generation cost of RES compared to conventional options, consumer expenditures due to applied supporting policies) and benefits (for instance, avoidance of fossil fuels and corresponding carbon emission savings). Results are calculated at both a country- and technology-level on a yearly basis. The time-horizon allows for in-depth assessments up to 2020, accompanied by concise outlooks for the period beyond 2020 (up to 2030).

The Green-X model develops nationally specific dynamic cost-resource curves for all key RES technologies, including for renewable electricity, biogas, biomass, biowaste, wind on- and offshore, hydropower large- and small-scale, solar thermal electricity, photovoltaic, tidal stream and wave power, geothermal electricity; for renewable heat, biomass, sub-divided into log wood, wood chips, pellets, grid-connected heat, geothermal grid-connected heat, heat pumps and solar thermal heat; and, for renewable transport fuels, first generation biofuels (biodiesel and bioethanol), second generation biofuels (lignocellulosic bioethanol, biomass to liquid), as well as the impact of biofuel imports. Besides the formal description of RES potentials and costs, Green-X provides a detailed representation of dynamic aspects such as technological learning and technology diffusion.

Through its in-depth energy policy representation, the Green-X model allows an assessment of the impact of applying (combinations of) different energy policy instruments (for instance, quota obligations based on tradable green certificates / guarantees of origin, (premium) feed-in tariffs, tax incentives, investment incentives, impact of emission trading on reference energy prices) at both country or European level in a dynamic framework. Sensitivity investigations on key input parameters such as non-economic barriers (influencing the technology diffusion), conventional energy prices, energy demand developments or technological progress (technological learning) typically complement a policy assessment.

Within the Green-X model, the allocation of biomass feedstock to feasible technologies and sectors is fully internalised into the overall calculation procedure. For each feedstock category, technology options (and their corresponding demands) are ranked based on the feasible revenue streams as available to a possible investor under the conditioned, scenario-specific

energy policy framework that may change on a yearly basis. Recently, a module for intra-European trade of biomass feedstock has been added to Green-X that operates on the same principle as outlined above but at a European rather than at a purely national level. Thus, associated transport costs and GHG emissions reflect the outcomes of a detailed logistic model. Consequently, competition on biomass supply and demand arising within a country from the conditioned support incentives for heat and electricity as well as between countries can be reflected. In other words, the supporting framework at MS level may have a significant impact on the resulting biomass allocation and use as well as associated trade.

Moreover, Green-X was recently extended to allow an endogenous modelling of sustainability regulations for the energetic use of biomass. This comprises specifically the application of GHG constraints that exclude technology/feedstock combinations not complying with conditioned thresholds. The model allows flexibility in applying such limitations, that is to say, the user can select which technology clusters and feedstock categories are affected by the regulation both at national and EU level, and, additionally, applied parameters may change over time.

Constraints of the model-based policy analysis

- ▶ Time horizon: 2006 to 2020 (2030) – Results are derived on a yearly base
- ▶ Geographical coverage: all Member States of the European Union (EU-27)
- ▶ Technology coverage: limited to RES technologies for power and heat generation as well biofuel production. The (conventional) reference energy system is based on PRIMES modelling – in particular the PRIMES scenario on meeting both EU targets by 2020 (20% GHG reduction, 20% RES by 2020) as of 2008 (“PRIMES target case”) and the PRIMES baseline and efficiency case (as of 2007) was taken as reference.
- ▶ RES imports to the EU: limited to biofuels and forestry biomass – besides no alternative possibilities such as physical imports of RES-Electricity are considered for national RES target fulfilment.
- ▶ Flexibility options for national RES target fulfilment as defined in the RES directive: limited to “statistical transfer between Member States” and the option of (EU-wide) “joint support schemes” (by means of harmonised RES support). Although from a practical viewpoint important, the third principle intra-European flexibility option of “joint projects” as defined in the RES directive was neglected. The incorporation into the modelling approach was not feasible within the scope of this project due to time and budgetary constraints.

Overview on key parameters

Table 3-1: Main input sources for scenario parameters

Based on PRIMES	Defined for this study
Energy demand by sector	RES policy framework
Primary energy prices	Reference electricity prices
Conventional supply portfolio and conversion efficiencies	RES cost (Green-X database, incl. biomass)
CO ₂ intensity of sectors	RES potential (Green-X database)
	Biomass trade specification
	Technology diffusion
	Learning rates

In order to ensure maximum consistency with existing EU scenarios and projections the key input parameters of the scenarios presented in this report are derived from PRIMES modelling and from the Green-X database with respect to the potentials and cost of RES technologies. Table 3-1 shows which parameters are based on PRIMES and which have been defined for this study. The PRIMES scenario

used for the subsequent assessment related to RES cooperation is the *PRIMES reference scenario* (with updated energy prices) as of 2011 (NTUA, 2011).

Assessed cases

Current RES deployment, as well as the potentials and the corresponding cost of future RES options, differ among Member States. In the previously discussed default scenario of “strengthened national policies” efficient and effective resource exploitation is assessed assuming moderate level of cooperation between Member States. Thus, the **reference case of “moderate (RES) cooperation”** can be classified as a compromise between:

- a “national perspective” where Member States primarily aim for a pure domestic RES target fulfilment and, consequently, only “limited cooperation”¹² arising from that,
- and a “European perspective” that can be classified as “strong cooperation”, where an efficient and effective RES target achievement is envisaged at EU level rather than the fulfilment of each national RES target using domestic resources.

3.2.2 Results on the need for and impact of RES cooperation

Next the outcomes of a sensitivity analysis performed on the use of cooperation mechanisms are discussed briefly. Following the classification of boundaries related to their use two sensitivity variants of “strengthened national RES policies” have been researched, assuming either a “limited” or a “strong cooperation”.¹³

As a starting point, Figure 3-4 (below) provides a graphical illustration of (virtual) exchange of RES volumes needed in 2020 for RES target fulfilment according to distinct scenarios on the extent of use of RES cooperation (i.e. from limited to strong), showing the remaining resulting import and export volumes in relative terms (i.e. as share of gross final energy demand (top)) and in absolute terms (i.e. TWh (bottom)). Notably, also with tailored national support schemes in place, not all countries have sufficient realisable¹⁴ potentials to fulfil their 2020 RES obligation purely with domestic action. As shown in the graph, Belgium, France, Italy, Luxembourg, the Netherlands and Slovenia have to rely, in all cases, on RES imports by 2020. Summing up the required imports of all related countries, a gap of 76 TWh occurs in the case of “limited cooperation” which needs to be covered via imports from other

¹² Within the corresponding model-based assessment it is assumed that in the case of “limited cooperation / National perspective” the use of cooperation mechanisms as agreed in the RES Directive is reduced to the necessary minimum. In the exceptional case of a Member State not possessing sufficient RES potentials, cooperation mechanisms would serve as a complementary option. Additionally, if a Member State possesses barely sufficient RES potentials, but their exploitation would cause significantly higher support expenditures compared to the EU average, cooperation would serve as a complementary tool to ensure target achievement.

¹³ In the “strong cooperation / European perspective” case economic restrictions are applied to limit differences in applied financial RES support among Member States to an adequately low level – i.e. differences in country-specific support per MWh RES are limited to a maximum of 8 €/MWh_{RES} while in the “limited cooperation / National perspective” variant this feasible bandwidth is set to 20 €/MWh_{RES}. Consequently, if support in a country with low RES potentials and / or an ambitious RES target exceeds the upper boundary, the remaining gap to its RES target would be covered in line with the flexibility regime as defined in the RES Directive through (virtual) imports from other countries.

¹⁴ In the case of “limited cooperation”, weak economic restrictions are specified for the exploitation of RES potentials, meaning that support levels for certain RES technologies may differ significantly between Member States (i.e. by up to 20 € per MWh RES).

Member States which exceed their national obligations. This accounts for 2.6% of the total of required RES deployment by 2020 (2911 TWh) and emphasises the need for intensifying cooperation between Member States, particularly if “national thinking” (of using domestic resources to gain related benefits etc.) maintains its dominance. According to the default variant of “moderate cooperation” the exchange of RES volumes is expected to increase to 108 TWh (or 3.7% of total RES volumes) by 2020. The best use of cooperation mechanisms is achieved under the variant named “strong cooperation” which would increase the (net) exchange of RES between countries to 138 TWh (or 4.7% of total RES). Moreover, “strong cooperation” should allow for more efficient and effective target achievement than domestic action alone.

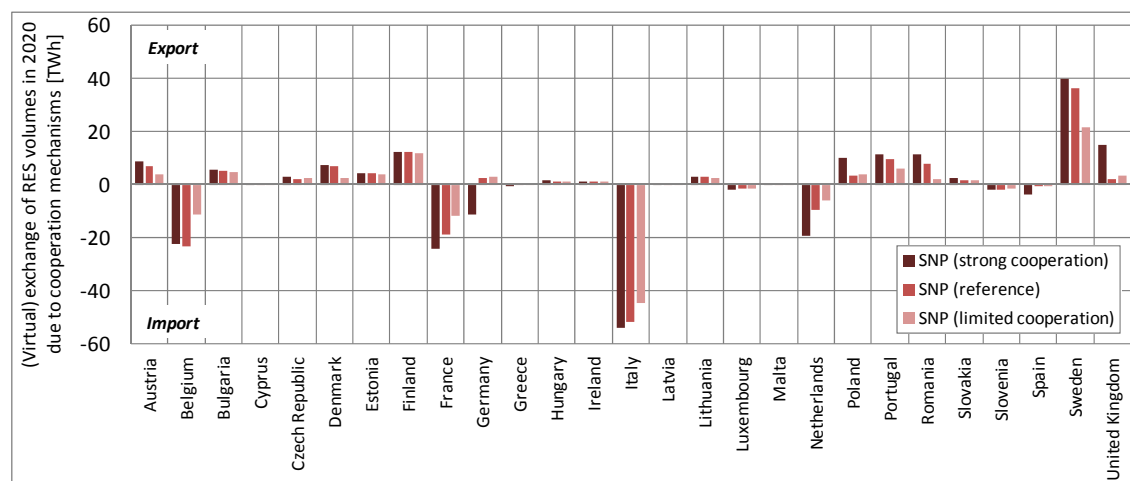


Figure 3-4: (Virtual) exchange of RES volumes between Member States in 2020 according to selected variants of “strengthened national RES policies”, assuming limited, moderate (default) or strong cooperation between Member States, expressed in relative terms (i.e. share in gross final energy demand) (top) and absolute terms (TWh) (bottom)

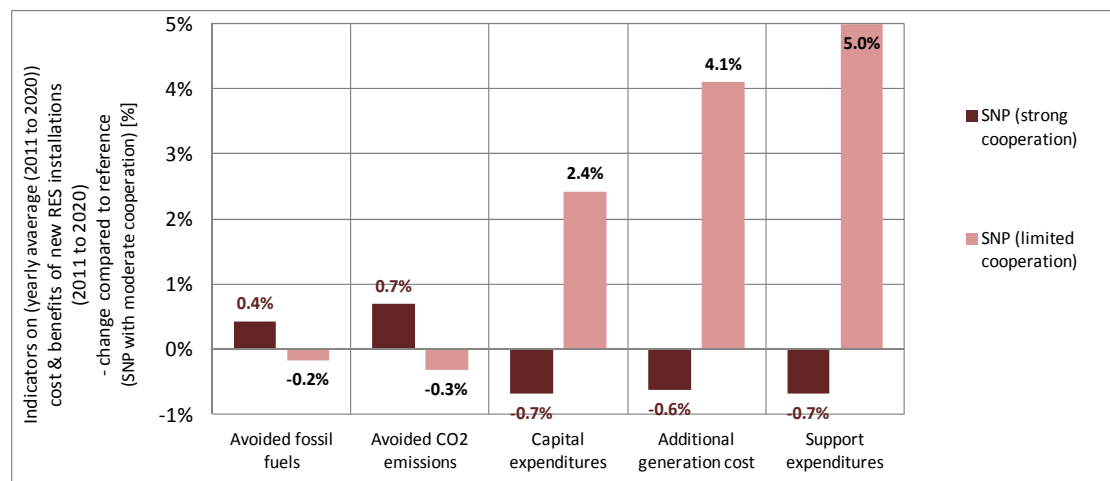


Figure 3-5: Indicators on yearly average (2011 to 2020) cost and benefits of new RES installations (2011 to 2020) for selected variants of “strengthened national RES policies”, assuming limited or strong cooperation between Member States, expressed as deviation from the (default) case of moderate RES cooperation

A closer look on Figure 3-5 indicates that cooperation appears to be beneficial at the aggregated (EU) level. Strong (rather than moderate) cooperation would increase benefits slightly, for example through fossil fuel avoidance by 0.4%, and lead to a more pronounced decrease of related cost and expenditures. Thus, additional generation cost for new RES installations would decrease by 0.6% and

capital and support expenditures by 0.7%. In contrast to this, pure “national thinking” as specified in the case of “limited cooperation” would decrease benefits insignificantly (-0.2 to -0.3%), but cause a strong increase of additional generation cost (4.1% compared to reference) as well as capital (2.4%) and support expenditures (5%).

3.3 Comparison of the results of the model-based assessments

The results from the Re-Shaping and the RES4LESS projects presented in this chapter are based on differing modelling approaches. In the Re-Shaping scenarios projections on of the available surplus and deficit in the EU in 2020, are based on a “strengthened” version of the current policies in the various MSs. On the other hand, in the RES4LESS scenarios no explicit projections are made on possible surpluses or deficits. The technology costs are assessed, independently of the current policies, and possible re-allocations of RES resources are analyzed within three different scenarios. In particular in the *Full cooperation* scenario an optimal allocation of surpluses has been carried out, that maximizes the savings that can be achieved through cooperation. Furthermore, in Re-Shaping all sectors have been taken into account, while in RES4LESS the analyses is restricted to the electricity sector.

In this context it is obvious that the Re-Shaping and the RES4LESS results are not directly comparable. Nevertheless, it is interesting to plot some of the results from the two projects in the same graph and draw a few qualitative conclusions.

The results of the Re-Shaping *Strong cooperation* scenario and the RES4LESS *Full cooperation* scenario are compared in Figure 3-6. For the Re-Shaping data, surpluses and deficits are shown in absolute terms in TWh as positive or negative bars, respectively. For the RES4LESS data, the positive bars still represent surpluses, while the negative bars represent potentials that should be given up in the *user countries*. For many EU Member States (e.g. Germany, France, Italy, Poland, United Kingdom) the two models deliver opposite results. Only Spain, Ireland, Latvia, Malta the Netherlands, Romania and to a lesser extend Belgium, Denmark, Slovenia or Slovakia show a more or less homogeneous trend.

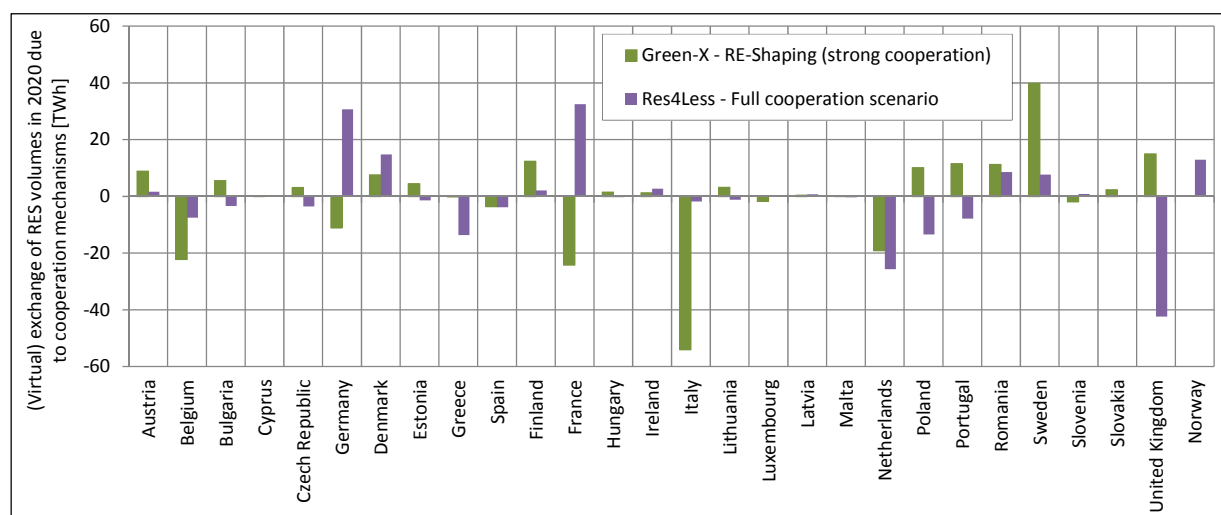


Figure 3-6: (Virtual) exchange of RES volumes between Member States in 2020 according to a Green-X assessment compared to a Res4Less assessment in absolute terms.

Taking into account the modelling approaches underlying the two set of results, the differences highlight that the current policies will not deliver a set of surplus potentials that is optimal in terms of cost-efficiency. Many MSs that could potentially produce cheap RES surpluses will result as net importers if they continue with their current domestic policies.

4 Conclusions

Finally, this pre -assessment aims to provide already during the inception phase of this BETTER project an indication of the potential and benefits of intensified RES cooperation between Member States, focussing on the short-term perspective (2020). This shall consequently serve as starting point for the comprehensive set of follow-up assessments of RES cooperation with third countries as scheduled within BETTER in a bottom-up style by case study (WP 3 to 5) and later on complemented by the integrated perspective (WP 6).

Figure 4-1, an extension of Figure 3-6 as shown above, also adds a bar of a Green-X scenario with limited cooperation and a bar for the planned surpluses / deficits as indicated by the Member States in their progress reports. From section 2 it is known that – with exception of Luxembourg – Member States generally either plan to overachieve or at least achieve their own target through domestic RES production. The comparison of those numbers below reveals that under those conditions no market will emerge due to the missing demand. If the data from the progress reports would have created a market setting the follow up question would have been to identify the “efficient set” in an economic sense of suppliers and importing states. However as highlighted above it is not directly possible to identify such a pattern from the scenario comparison, but cases where Re-Shaping and RES4LESS results agree with regards to im-/exports seem to be more robust.

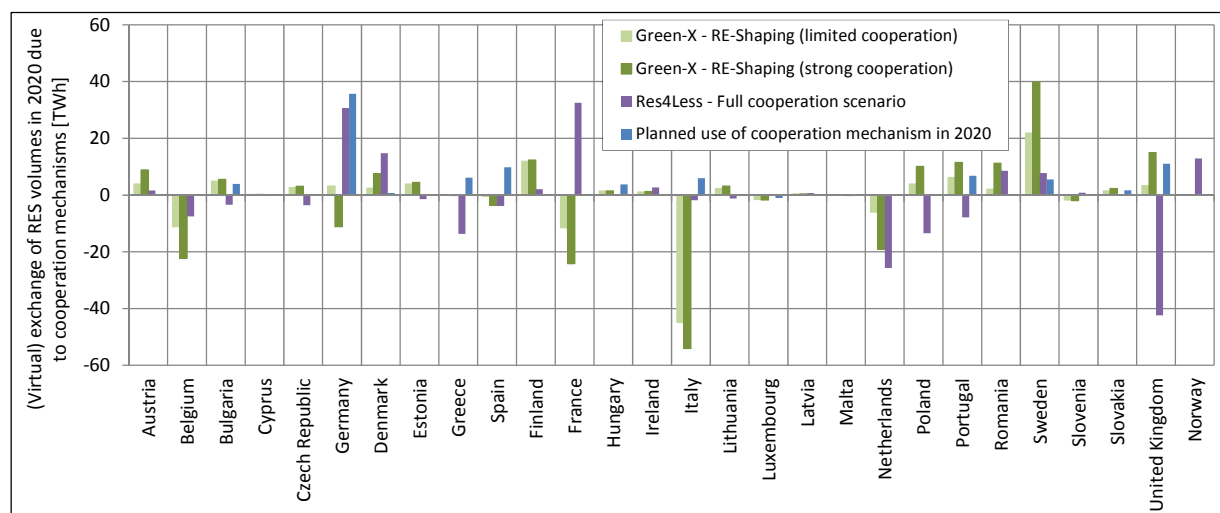


Figure 4-1: (Virtual) exchange of RES volumes between Member States in 2020 according to two Green-X assessment, a Res4Less assessment in absolute terms.

In addition to the more detailed view above Figure 4-2 compares what the different sources project in terms of aggregate surpluses available at EU level, which could be used by Member States that will not be able to fulfil their targets purely domestically. The different sources project (virtual) total RES export volumes at EU level between 76 and 138 TWh, which is compared to the results from above an overall higher level of accordance.

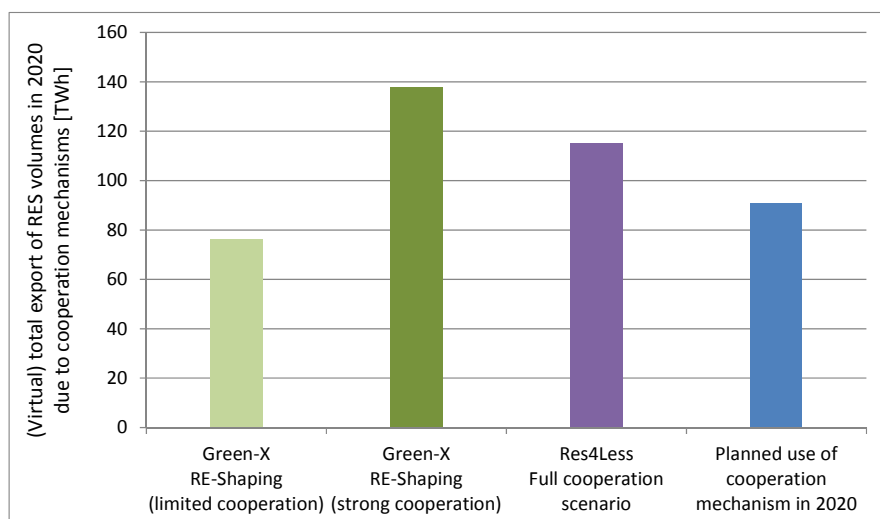


Figure 4-2: (Virtual) total export of RES volumes in 2020 due to cooperation mechanisms.

To sum up, some overall conclusions can be drawn. It is clear that increased cooperation can lead to overall lower costs of reaching European RES policy objectives. Thus in the mid- to long term some pattern of “importing” and “exporting” states should emerge. For the moment and in view of the target year of the current RES directive (2009/28/EC), i.e. 2020, such a pattern is not yet clearly identifiable. The reasons are twofold: Firstly, even though Europe is making progress deploying new renewable energies there is still sufficient potential for new RES projects across Member States at acceptable costs, plus recent drops in costs of various RES technologies further counteract the trend of “declining” potentials. Secondly, differences across Member States with regards to the functioning of support schemes and on financing conditions both have an impact on costs again and on the short term realizable potential. This may, among other motives, explain the “reluctance” of Member States to proactively express their will to act as importers and thus to create a demand section in the framework of the cooperation mechanisms. Finally, both the Member States’ own evaluations, but also modeling exercises rely on good input data for cost-resource curves of the individual RES technologies. Thus a high level of transparency in this respect could both facilitate the convergence in different modeling approaches and reduce the uncertainty of Member States when evaluating their own situation.

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