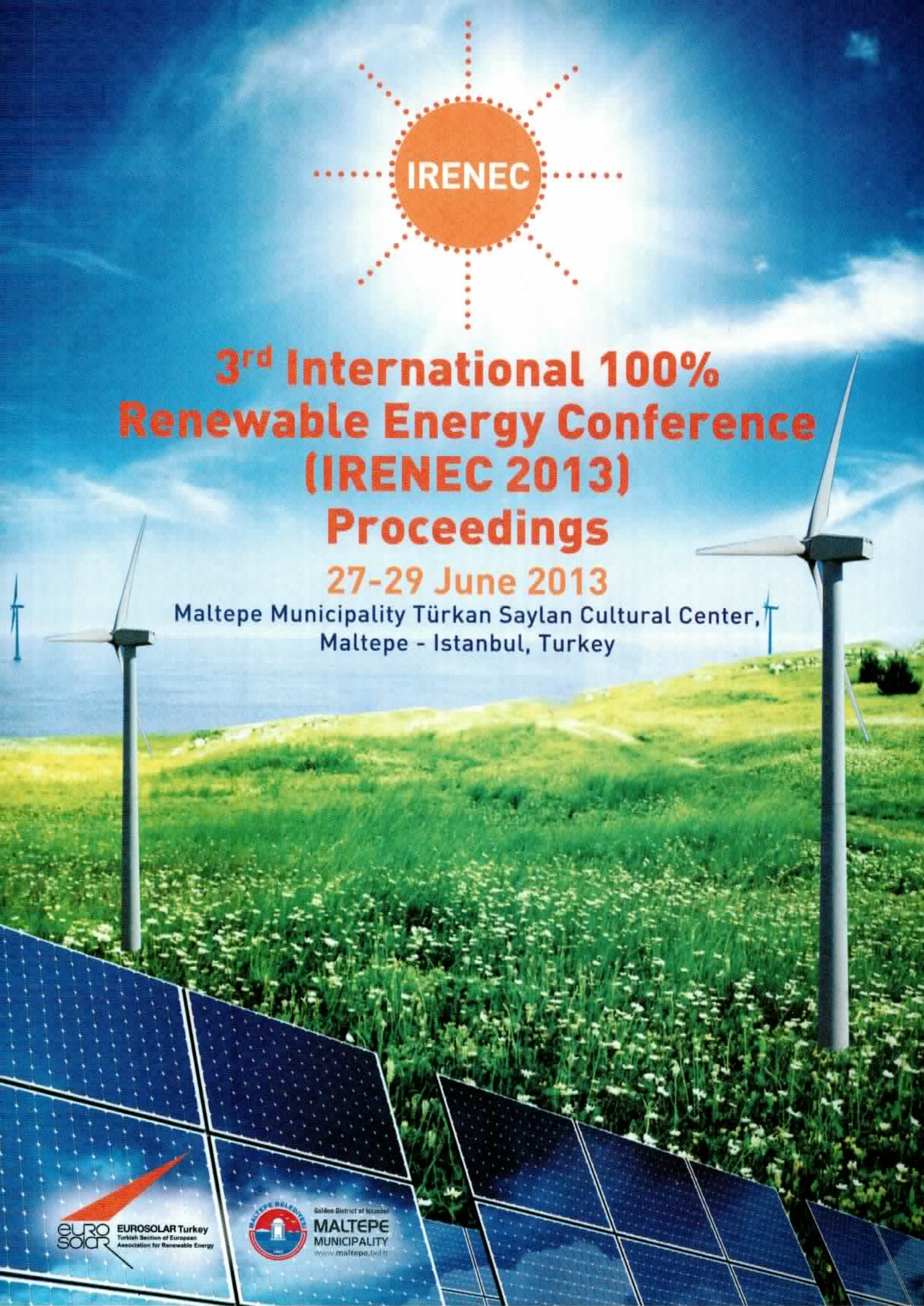

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THE POTENTIALS AND THE BENEFITS OF INTENSIFIED RES COOPERATION IN THE EUROPEAN UNION – A PRE-ASSESSMENT

Related Conference Topic: RES Cooperation between Countries
(and in particular related to the EU and Turkey)

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ABSTRACT

At European level, 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 paper is to discuss 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.

Keywords: *Renewable energy, Cooperation Mechanisms, RES Directive, Cost-Efficiency*

1 INTRODUCTION

At European level, Directive 2009/28/EC [1] 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.

This paper summarises the outcomes of a pre-assessment related to the potentials and the benefits of intensified RES cooperation between (European) countries, see [2] and [3]. As such it presents final outcomes of a model-based analysis conducted within the recently completed "Intelligent Energy – Europe (IEE)" project RE-Shaping, complemented by a qualitative assessment undertaken within the ongoing IEE project BETTER.

Both projects can be characterised as collaborative actions of several European research institutions, policy consultants and stakeholders. While the objective of RE-Shaping was to evaluate the RES policy development in Europe in the 2020 context, the overall aim of the BETTER project is to analyse in detail the role of RES cooperation between the EU and its neighbours (i.e. North Africa, Turkey and Balkan countries). These initiatives could be established thanks to the financial

and intellectual support offered by the Intelligent Energy – Europe (IEE) Programme of the European Commission, operated by the Executive Agency for Competitiveness and Innovation. For more details on the BETTER project, see www.better-project.net. All outcomes of RE-Shaping are applicable at www.reshaping-res-policy.eu.

2 METHOD OF APROACH

This paper generally builds on an intense literature survey and a complementary detailed model-bases assessment. Thus, for the purpose of assessing potentials and benefits of intensified RES cooperation a twofold approach was conducted: On the one hand, the Members States' progress reports according to Article 22 of Directive 2009/28/EC have been analyzed and the relevant data and sections have been compiled. 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 the recently completed IEE project RE-Shaping was 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. Further details on the approach taken within the model-based assessment are provided next.

2.1 Details on the model-based assessment (Green-X scenarios)

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. Details on the model are discussed in [3] or are accessible at www.green-x.at.

Conducted scenarios of future RES deployment cover the time horizon 2006 to 2020 (2030), and the geographical coverage was limited to all Member States of the European Union as of 2011 (EU-27). In order to ensure maximum consistency with existing EU scenarios and projections the key input parameters of the scenario work are derived from PRIMES modelling, in particular the *PRIMES reference scenario* [4] as of 2011 was taken as reference, and from the Green-X database with respect to the potentials and cost of RES technologies.

Overview on assessed cases:

RES cooperation can be seen as complementary tool to national RES support in order to allow for more cost-efficient resource exploitation at the multinational level. Consequently, within the model-based assessment RES cooperation was researched for national policy variants. In particular the case of ***strengthened national (RES) policies*** was taken into consideration, assuming that currently implemented national RES policies will be further optimised in the future with regard to their effectiveness and efficiency. The assumed policy fine-tuning implies that the European target of 20% RES by 2020 will be met, both at EU level and at national level. Further light has been shed on the need for and impact of RES cooperation between Member States. Thus, three different variants of RES cooperation have been assessed that can be distinguished as follows:

- As default scenario, i.e. for the reference case of "strengthened national policies" an efficient and effective resource exploitation is assessed assuming a moderate level of cooperation between Member States. Thus, this case of **"moderate (RES) cooperation"** can be classified as compromise between both "extreme" options sketched below.

- A “national perspective” is researched as sensitivity variant where Member States primarily aim for a pure domestic RES target fulfilment and, consequently, only **“limited cooperation”** is expected to arise from that.
- A “European perspective” is taken in the third variant that can be classified as **“strong cooperation”** where an efficient and effective RES target achievement is envisaged rather at EU level than fulfilling each national RES target purely domestically.

Generally, 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 in the case of “strong cooperation” to a maximum of 8 €/MWh$_{RES}$ while in the “limited cooperation” 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 through (virtual) imports from other countries, making use of RES cooperation mechanisms.

3 KEY RESULTS

3.1 Results of the model-based assessment of the need for and impact of RES cooperation

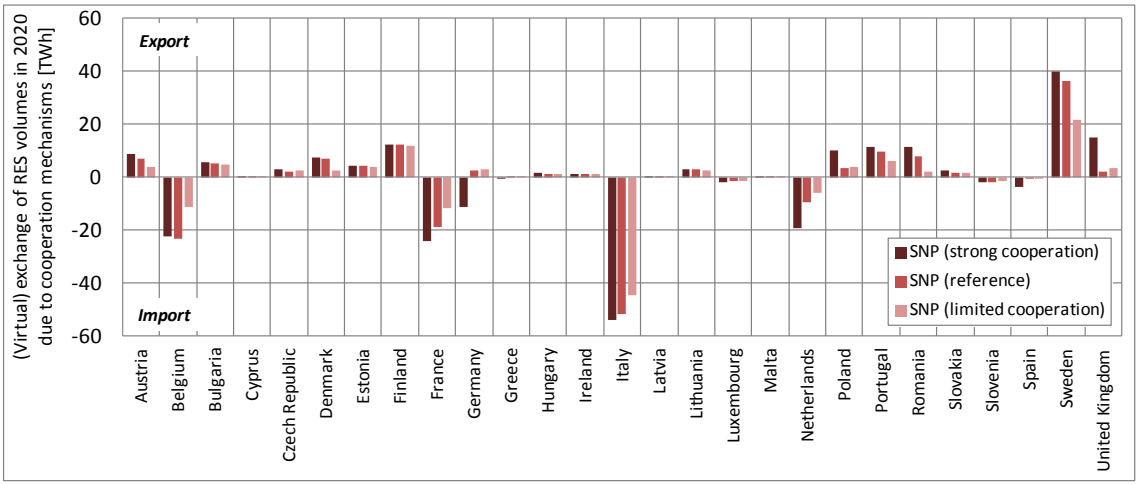

Figure 1: (Virtual) exchange of RES volumes between Member States in 2020 according to selected variants of “strengthened national RES policies”, assuming limited, moderate (default) or strong cooperation between Member States, expressed in absolute terms (TWh)

Next the outcomes of the model-based assessment on the use of cooperation mechanisms are discussed briefly. As a starting point, Figure 1 (above) 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 absolute terms (i.e. TWh). Notably, also with tailored national support schemes in place, not all countries have sufficient realisable 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 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.

A closer look on Figure 2 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%).

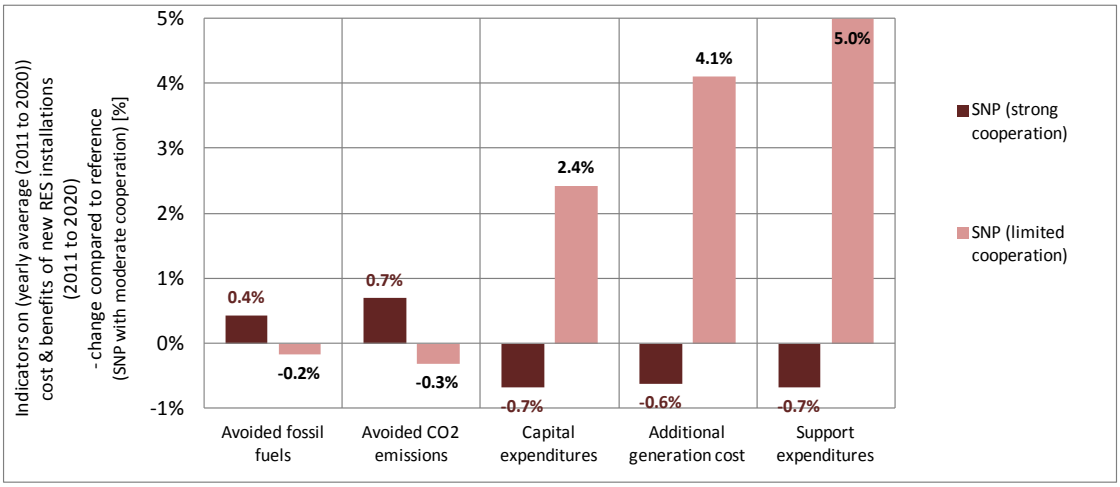

Figure 2: Indicators on yearly average (2011 to 2020) cost and benefits of new RES installations (2011 to 2020) for selected variants of "strengthened national RES policies", assuming limited or strong cooperation between Member States, expressed as deviation from the (default) case of moderate RES cooperation

3.2 Comparison to Member States views on using RES cooperation

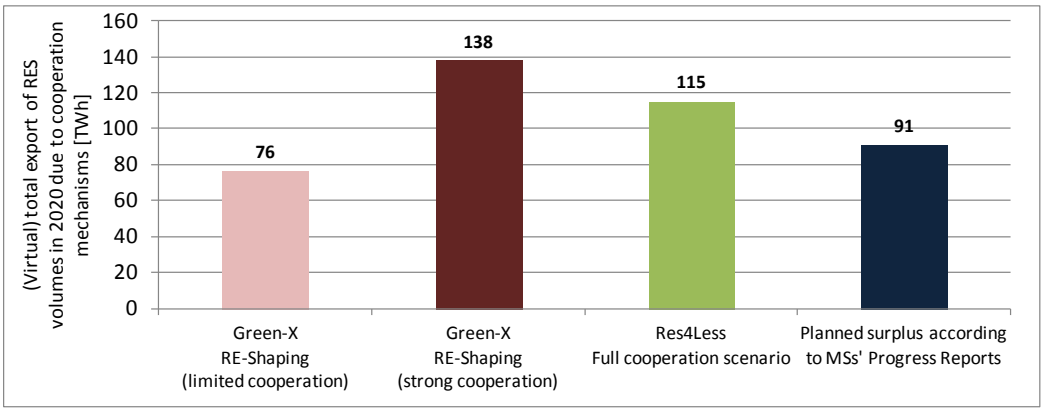

Figure 3: Comparison of different expectations related to (virtual) total export of RES volumes in 2020 due to cooperation mechanisms

Figure 3 (above) compares what 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. This includes the Green-X scenarios developed in the RE-Shaping

study as discussed above and an alternative model-based assessment conducted in the Res4Less project as well as the planned surplus according to Member States RES Progress Reports (as reported throughout 2011 and 2012). The different sources project (virtual) total RES export volumes at EU level between 76 and 138 TWh, indicating in general a high level of accordance.

As expressed in their RES Progress Reports, with execption of Luxemborug, Member States generally either plan to overachieve or at least achieve their own targest through domestic RES production. This 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 "efficent set" in an economic sense of supliers and importing countries.

4 CONCLUSIONS

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 realisable 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.

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BIOGRAPHIES (Lead Author)

Gustav Resch – Gustav Resch is working as senior researcher at Vienna University of Technology, Energy Economics Group. He holds a degree in electrical engineering (Energy Technology) and a PhD in energy economics at Vienna University of Technology. He is responsible for research, project acquisition and scientific coordination in the area of energy policy and energy economics with a focus on renewable energy technologies - with proven expertise on international level. His fields of activity include techno-economic assessments of (renewable) energy technologies, evaluation and design of energy policy instruments and energy modeling (focusing on policy interactions and technology dynamics). He has contributed to several EU studies and policy assessments in the light of "20% Renewable Energy by 2020".