BENEFITS AND COSTS SHARING THROUGH RES ELECTRICITY COOPERATION BETWEEN EUROPE AND THIRD COUNTRIES

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European Union (EU) Renewable Energy Directive 2009/28/EC, on the promotion of the use of energy from renewable energy sources (RES), establishes a legal framework for cooperation between EU Member States and third countries in joint projects, regarding electricity generation from RES. A prerequisite to the acceptability of the project is that the electricity produced within the project must be consumed in the EU, enabling in parallel EU Member States to meet their 2020 RES targets in a more cost efficient way. Moreover, this may derive various potential benefits for both sides, including diversification of energy imports, knowledge and technology transfer, reinforcement of existing and new European relationships with third countries, new markets creation and business opportunities for European RES technology companies, as well as employment opportunities for third countries. BETTER – “Bringing Europe and Third countries closer together through renewable Energies” initiative supported by the Intelligent Energy Europe programme tries to address collaboration perspectives between EU and third countries on renewable energy. In this context, the main aim is to assess, through case studies, stakeholders’ involvement and integrated analysis, to what extent cooperation with third countries may help Europe achieve its RES targets in 2020 and beyond, by triggering the deployment of RES electricity projects in third countries, creating synergies and as a result win-win circumstances for all involved parties. The case studies focusing on North Africa, the Western Balkans and Turkey investigate in detail the technical, socio-economic and environmental aspects of RES cooperation. BETTER final outcome is a fine-tailored policy package, offering a concise representation of key outcomes, guidelines for practical implementation of RES cooperation, action plans and policy recommendations reflecting regional specifics.

Keywords: Renewable Energy; Cooperation Mechanisms; Joint Projects; Barriers; Benefits; Policy Recommendations; Europe; Third Countries; North Africa; West Balkans; Turkey

1. INTRODUCTION

The European Union (EU) has defined an overall target for renewable energy of 20% in 2020. Renewable energy sources (RES) Cooperation between Europe and its neighbouring countries plays a crucial role in cost effectively meeting EU 2020 RES targets. The design of Europe’s Energy policy beyond 2020 may be facilitated by the
cooperation within the EU and with the EU’s neighbour regions incentivized by RES cooperation mechanisms, as provided for in the new RES directive that entered into force in June 2009 [1]. RES cooperation may also have a political dimension.

The EU Renewable Energy Directive 2009/28/EC sets the legal framework for the use of cooperation mechanisms with binding national RES targets for EU Member States for 2020. In addition, the RES Directive encourages cooperation between Member States for the 2020 target achievement to increase economic efficiency of their RES target achievement, optimise RES resource utilisation and contribute to the internal energy market. The Directive specifies the general accounting rules of these mechanisms, but their design and implementation is left to the cooperating Member States. Four types of cooperation mechanisms provide different levels of cooperation between countries [2]:

- Statistical transfer (Article 6): Renewable energy (electricity, heat or transport energy) which has been produced in one Member State is virtually transferred to the RES statistics of another Member State, counting towards the national RES target of that Member State.

- Joint projects between Member States (Article 7): Two or more Member States may cooperate on projects relating to the production of renewable electricity, heating and cooling meaning that one country having more favourable conditions to increase renewable energy production will host the project and the other country or countries will also benefit from the resulting power production. This co-operation mechanism may also involve private operators.

- Joint projects with third countries (Article 9): Joint projects can also be implemented between Member States and third countries i.e. countries outside the EU. A precondition is that an amount of electricity that equals the electricity amount generated from RES and subject to this joint project is physically imported into the EU.

- Joint support schemes (Article 11): Member States merge or coordinate (parts of) their RES support schemes and jointly define how the renewable energy produced is allocated to their national targets.

There are many studies in the literature analysing renewable cooperation potential results and benefits for developing countries, especially through the Clean Development Mechanism (CDM) [3 - 7]. Several research studies exist that try to identify the opportunities and risks for a successful RES project, to assess potential pros and cons that emerge for the country and provide recommendations for the effective and efficient project implementation [8 - 12]. However, to the best of our knowledge, there are only very few studies that investigate the RES project within the framework of the cooperation mechanisms under the Renewable Energy Directive [13 - 18].

The aim of this paper is to present an overview of the collaboration perspectives between EU and third countries on Renewable Energy. The core objective is to assess, through case studies, stakeholders involvement and integrated analysis to what extent cooperation with third countries can help Europe achieve its RES targets in 2020 and beyond, trigger the deployment of RES electricity (RES-E) projects in third countries and create synergies and win-win circumstances for all involved parties.
The current paper is primarily based on the research conducted within the framework of the project “BETTER - Bringing Europe and Third countries closer together through renewable Energies. BETTER was initiated in July 2012 under the support of Intelligent Energy Europe programme (http://better-project.net).

The study lays attention to four technologies that are expected to contribute significantly to RES development, namely, wind, biomass, hydro and solar. In addition, the article specifically focuses on exploiting surplus potentials in selected third countries bordering the EU. The three selected regions, namely North Africa, the Western Balkans and Turkey, are characterized by different backgrounds from the point of RES potential and socioeconomic factors and therefore allow the comparison of weaknesses and strengths. While North Africa has a high potential on solar energy with low weather variability [19], Turkey has a significant hydropower and wind potential that requires sufficient storage capacities [20 - 21].

In addition the political backgrounds of the three regional are very different. While North Africa could become an important strategic partner of the EU, the current political situation in some of the countries may threaten investors [22 - 25]. On the other side, while the EU accession of Turkey is being discussed, all of the Balkan countries have EU accession status and their energy systems need to be integrated into the European Energy system fast [26 – 30].

Apart from this introductory section, the paper is organized as follows: the second section introduces the approach that is proposed in order to address the main opportunities and barriers for a successful implementation of cooperation mechanisms and support the development of policy recommendation and action plans to this direction. The third section presents an overview of the main outcomes arisen so far for each case study region. Finally, the forth section summarizes the main key points of the study and presents the future perspectives.

2. PROPOSED APPROACH

Among the four RES cooperation mechanisms, joint projects with third countries are the most complex. Compared to the other mechanisms, some of the existing barriers to the implementation of the cooperation mechanism between EU and third countries include a higher degree of grid infrastructure requirements, some degree of geopolitical unrest, more complex financing schemes, differences in public acceptance, potential socio-economic and environmental impacts, existing laws and regulations [13]. Besides, projects in third countries may need a long lead-time before being fully interconnected to the territory of the Community.

Consequently, there is a need to assess, through case studies analysis, the role and design of this cooperation mechanism with regards to:

(i) helping Europe achieve (or overfull fill) its RES targets in a cost effective way, and

(ii) helping third countries to deploy RES.

By doing so, it will be possible to identify not only the associated barriers, but also the opportunities for both European and third countries (fig. 1).

Generally, the BETTER initiative has a strong empirical component which serves in clarifying to what extent cooperation with third countries – with a special focus on cooperation mechanisms of the RES Directive - can help the EU achieve its RES
targets in 2020 and beyond, as well as trigger the deployment of RES-E projects in third countries and create synergies for all involved parties.

BETTER case studies focusing on North Africa, the Western Balkans and Turkey investigate in detail the technical, socio-economic and environmental aspects of RES cooperation. Complementary to these bottom-up analyses, an integrated assessment is undertaken from the “EU plus third countries” perspective, including a detailed quantitative cost-benefit evaluation of feasible policy approaches, as well as strategic power system analysis (fig. 1).

Moreover, co-effects, such as impacts on the achievement of EU climate targets, energy security, and macro-economic aspects are analysed. The final outcome will be a fine-tailored policy package, offering a concise representation of key outcomes, guidelines for practical implementation of RES cooperation, and actions plans reflecting regional specifics. The strong involvement of all relevant stakeholders enables a more thorough understanding of the variables at play, an identification and prioritisation of necessary policy prerequisites, while the dissemination strategy lays a special emphasis on reaching European-wide actors and stakeholders, well beyond the target area region. The structure of the BETTER work flow (fig. 2) enables the optimal achievement of the envisaged objectives and the timely provision of the proposed outcomes of this action.

Figure 1. BETTER Methodological Framework

Figure 2. BETTER Work Flow
An analysis of the Member States plans and progress towards meeting their RES 2020 targets has been conducted to present the first indication on the Member States willingness and needs to take part in RES cooperation. Existing energy policy cooperation instruments between Europe and third countries has been reviewed to set the current state of the policy scene for the rest of the work. The recent studies focusing on cooperation mechanisms were reviewed and the existing RES cooperation mechanisms with third countries were examined to identify synergies or regulatory overlaps between RES cooperation mechanisms and other finance mechanisms [14, 17]. Aspects that are likely to play a key role in the implementation of the 4th RES cooperation mechanism were also identified.

A bottom-up assessment [14] on increased RES cooperation in the three regions bordering the EU cases studies with strong stakeholder involvement were carried out. The objective of the case studies is to assess the potential and prospects for intensified RES cooperation between the EU and the investigated third countries in the 2020 timeframe and beyond from the regional perspective.

The integrated assessment analysis to what extent the cooperation mechanisms with third countries can help Europe achieve its RES targets in 2020 and beyond, trigger the deployment of RES-E projects in third countries and create synergies for all involved parties. The identification of costs and benefits in the EU and in third countries related to the enhanced RES deployment under varying scenario conditions forms the quantitative model-based part of an integrated assessment, whereby a specific focus is set on strategic power system and grid analysis and on the identification of necessary energy policy prerequisites. Furthermore, the integrated assessment takes also into account co-effects on a European level – e.g. impacts on the achievement of EU climate targets, energy security, air pollution, as well as social and macro-economic aspects.

The case studies gain practical know-how on how the RES cooperation mechanism could work in practice, which opportunities and risks are involved and which framework is needed for project developers to prepare projects. The empirical work does not only focus to identify from a regional viewpoint the role the cooperation mechanisms of the RES directive can play in helping both Europe and the case study regions achieving 2020 RES(-E) targets, but also options for increasing cooperation in the long-term perspective, facilitating market access and investments and creating other environmental and economic co-benefits and synergies.

The action plans and policy conclusions developed will serve to translate the outcomes of the case studies and the integrated assessment into a list of priorities for future action, derive key findings and give target recommendations, assuring that the intensive set of information available is easily communicated.

It is worth mentioning that within the work by case study the involvement of stakeholders is essential. In addition to the regional workshops organized within the duration of BETTER, as well as through the guidance done by the advisory board, in which stakeholders are well involved, there have been bilateral key stakeholder meetings both in Europe, as well as in the studied regions. Moreover, in order to include the most up to date regional information for the project, and to discuss the major findings of the project regarding renewable energy potentials, policy and regulatory frameworks, national energy planning and renewable energy success stories in the region, there has been an intensive dialogue with regional stakeholders just from the beginning and during the total duration of the project via email and other
telecommunication options as well as taking the opportunity for meeting at regional events and conferences. Finally, the dissemination strategy complements the stakeholder consultation and serves to assure a successful promotion of the BETTER project outcomes and results to the targeted audience.

3. INSIGHTS FROM THE CASE STUDIES

In order to assess the potential for the use of cooperation mechanisms in helping Europe to achieve its RES-E targets and to trigger the faster implementation of RES-E projects in the three regions by 2020 and beyond, a detailed inventory of important energy system characteristics was compiled for the North African, Western Balkans countries and Turkey, such as energy grid infrastructure, energy demand, policies, etc., thereby taking into account regional specifications and describing the current situation. In addition to country-by-country data collection and analysis, particular attention was devoted to the analysis of the main documents and results of the most recent or ongoing EU projects and international initiatives in the region.

In a next step the potential for the use of cooperation mechanisms was examined. This is on the one hand done in a bottom-up style and on the other hand through an analysis of strengths, weaknesses, opportunities and threats (SWOT analysis).

As mentioned before, an important number of stakeholders were involved, via email and other telecommunication options, as well as face to face meetings at regional events and conferences. Bilateral meetings with stakeholders were important to make and improve contacts for collaboration during the BETTER initiative, to elaborate with regional stakeholders the present problems in the power sector, power plant structure and the grid expansion plans of each region and to get insight into future plans and to discuss about barriers regarding renewable electricity.

Besides the bilateral meetings, one regional workshop was organized for each case study region. These regional workshops were organized for the discussion of results from each case study and to increase the awareness about investment options and to facilitate cooperation among future stakeholders.

Taking into account the case study regions analysis conducted within the duration of BETTER initiative, the outcomes obtained so far from the SWOT analysis, the bilateral meeting and the regional workshops for each region with regards to their future prospects for successfully developing RES cooperation mechanisms are presented below. The current energy status of the regions, their RES targets, as well as the grid network infrastructure and opportunities for joint projects with EU countries are briefly analysed.

North Africa

Morocco, Algeria, Tunisia and Egypt have implemented renewable energy policies to diversify their energy mix at different levels of ambition and with different levels of success [31 - 36]. Especially in Morocco, significant advancements have been made resulting in 16 projects with an installed capacity of 1,727 MW currently in planning [5, 15, 37-39]. In most countries, some kind of financial or regulatory support schemes are in place either to allow a direct feed-in of RES power into the grid or to directly invest in RES projects mainly by applying tendering schemes [40-41].
In the other North African countries only few large-scale projects have actually been realized. Stakeholders identified a lack of available capital as a major barrier for RES deployment across all countries. This is partly due to the fact that electricity prices in all North African countries are politically defined and in most cases highly subsidized. As these prices are not sufficient to cover the costs for RES electricity generation, RE support policies are needed, but their implementation has not always been effective [41]. Thus, the second, closely related, main barrier identified by most stakeholders is the regulatory and bureaucratic uncertainty and inefficiency deterring investors and project developers from RES deployment [22 - 24]. In some cases, a lack of knowledge concerning renewables and their system integration was reported to be an additional barrier to local investments in RES projects [42 - 43]. Also path-dependencies in oil and gas exporting countries like Libya and Algeria might have a negative impact on the deployment of RES-E [44 - 47].

It can be summarized that Concentrating Solar Thermal Power - High Voltage Direct Current (CSP-HVDC) links from North Africa to Europe have the potential to become an important element of European power supply due to their high quality in terms of flexible and at the same time sustainable solar power [48 - 54]. They are an important means to reduce the effort required to achieve high RES-E shares in Europe, by avoiding surplus generation and the related storage, grid expansion and backup capacity otherwise produced by volatile RES-E. The extremely high investment for such a Euro-North African infrastructure is a significant challenge, as well as the question of acceptance.

**Turkey**

The energy policy and strategy in Turkey seems to have been built on increasing dependence on foreign imports of fossil resources [55 - 56]. This is problematic from an environmental perspective, but also from a point of view of the balance of trade accounts.

Turkish urbanization, given its high migration rates, characteristic urban sprawl and automobile based transportation modalities, is one of the most significant drivers of this high carbon future [20 - 21, 57].

In the light of prevailing barriers for renewable development it is questionable if Turkey will reach its RES targets for 2023. However, currently there are efforts being taken to simplify licensing procedures and bureaucratic processes. The Not-In-My-Backyard (NIMBY) effect plays an important factor for RES development in Turkey, especially with regard to ambitious plans for the development of small hydro power [58 - 64].

Besides the development of RES the government pursuing the plan of building three nuclear plants and therefore fostering the vision for a centralized power system in Turkey. However, one important trend may come in form of the non-licensed solar applications as the economics of self-consumption dictate photovoltaic (PV) installations. As electricity prices rise and solar PV system costs decline, this type of distributed generation is even now attracting a lot of interest. Though financial institutions are only just beginning to understand project economics in solar energy, if not a gold-rush, serious expansion of the market is expected in this sector. As large international third party project developers enter the market, soft know-how regarding project development and financing is expected to penetrate. Turkish industry interest in manufacturing system components is also growing. Presently more than 15
enterprises are either producing or about to commence production in PV modules [56, 65].

Due to its considerable RES potentials Turkey should aim to get in bilateral negotiations with selected EU Member States to analyse RES export possibilities in the mid- to long-term [66 - 69]. This cooperation could lead not only to knowledge transfer and additional revenue streams for Turkey, but can also be an important cornerstone for Turkey’s energy security in the long run.

**West Balkans**

The energy systems in the Western Balkan region face significant challenges in the upcoming years. All of the countries are contracting parties of the Energy Community but are in different stages of the EU accession process. In the post war context with inefficient, fragmented and monopolized energy systems and markets the Energy Community is the main driver of alignment with EU requirements in the energy sector [70 - 71].

All of the Western Balkan countries have accepted binding RES targets under the Energy Community Treaty for 2020 and the Energy Community is promoting market opening, liberalization and regional cooperation. The speed of change however is slow. The markets in the region are far from being open and sufficiently attractive for investors. International financing institutions (IFIs) are needed to raise capital in the risky markets of the region. The regulatory frameworks are subject to continuous changes and the current market models lead to a lock-in of generation capacities by the incumbents that in practice are still government-owned quasi-monopolists [72 - 73].

While the looming EU accession of some of the countries in the region may reduce the political risks, it will be of critical importance to carry out reforms that enable energy sectors to function according to market principles and strengthen the frameworks for regionalization of the energy sectors in order to meet the 2020 targets.

Countries in the region have developed or are developing National Renewable Energy Action Plans (NREAPs), outlining their plans how to meet the 2020 targets set under the Energy Community Treaty. Up to 2020 countries are mainly planning to invest in RES technologies with which they have the most experience, in particular small and large hydro power [74 - 75].

The possible use of the cooperation mechanisms is currently only in an initial stage, and it remains to be seen whether and to what extent they will be used between the Western Balkans and the EU by 2020. In a broader sense of increasing cooperation and integration in the European and Balkan market, even in absence of a 2030 RES target the Western Balkan may be an interesting region for Europe to import flexible power and to assist decarbonising the European energy systems [76 - 80]. Opportunities of cooperation between the West Balkan countries are not sufficiently explored and need additional attention. The cooperation mechanisms could be a starting point to integrate the region’s energy systems and to overcome the fragmentation of the last two decades.
4. CONCLUSIONS

The specific study indicated that when investigating the benefits and costs that could be shared through RES electricity cooperation between Europe and third countries, several factors and aspects should be considered and analysed. The general idea is to evaluate through case studies and integrated analysis the impacts that the implementation of the cooperation mechanism in the studied countries can have in helping Europe achieve its RES targets, as well as the associated co-effects (market opportunities, grid requirements, environmental and socio-economic impacts, etc.) for both Europe and third countries.

All regions investigated have something in common that is the need to promote renewable energies in order to help their national energy strategies, increase energy security and reduce their Greenhouse gas emissions, as well as stimulate their economy, create new job opportunities and reduce their local air pollution. From a European point of view, besides reducing the cost of achieving their RES targets, various potential benefits are assessed through case studies analysis, such as diversification of energy imports, reinforcement of existing and new European relationships with third countries, create new markets and business opportunities for European RES technology companies.

The integrated analysis conducted within the framework of BETTER indicates the complexity of the implementation of a bilateral cooperation between EU and third countries. Therefore, action plans, as well as policy recommendations, in accordance to the specific country characteristics and needs, as well as the particularities of the RES Directive, are considered crucial and more than beneficial for both parties to be developed. These action plans are able to foster renewable energy production, transfer and use in the EU Member States, as well as third countries through cooperation initiatives highlighting their strengths, weaknesses opportunities and threats. In addition, it is of high importance that practical guidelines for project developers be launched to facilitate private sector involvement in the deployment of mutually beneficial RES projects in third countries through the cooperation mechanisms.

To sum up, the design of Europe’s Energy policy beyond 2020 may be facilitated by the cooperation between the EU and the EU’s neighbour regions incentivized by RES cooperation mechanism. It should be mentioned that clarity regarding the 2030 RES targets is consider of vital importance in order for EU countries to engage in pilot cooperation activities by 2020.

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