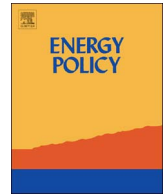




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A techno-economic analysis of EU renewable electricity policy pathways in 2030

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ABSTRACT

The aim of this paper is to assess several pathways of a harmonised European policy framework for supporting renewable electricity (RES-E) in a 2030 horizon according to different criteria. The pathways combine two main dimensions: degrees of harmonisation and instruments and design elements. A quantitative model-based analysis with the Green-X model is provided. The results of the simulations show that there are small differences between the evaluated cases regarding effectiveness. All the policy pathways score similarly with respect to RES-E deployment, i.e., with different degrees of harmonisation and whether using a feed-in tariff, a feed-in premium, a quota system with banding or a quota without banding scheme. In contrast, the policy costs clearly differ across the pathways, but the differences can mostly be attributed to the instruments rather than to the degrees of harmonisation. This is also the case with other criteria (static and dynamic efficiency and the socioeconomic and environmental benefits in terms of CO₂ emissions and fossil fuels avoided). Both the degree of harmonisation and the choice of instrument influence the distribution of support costs across countries. Finally, our findings suggest that keeping strengthened national support leads to similar results to other policy pathways.

1. Introduction

EU policy for renewable energy sources (RES) beyond 2020 has been laid in several documents. Most importantly, a climate and energy framework, and particularly targets for 2030 were agreed in the EU Council of October 24th, 2014 (European Council, 2014). These targets include a 40% cut in greenhouse gas emissions compared to 1990 levels, a 27% share of renewable energy consumption and 27% energy savings compared with the business-as-usual scenario. The RES target will be binding at EU level and “will be fulfilled through Member States (MS) contributions guided by the need to deliver collectively the EU target without preventing MS from setting their own more ambitious national targets and supporting them (...). Targets will not be translated into nationally binding targets. Individual MSs are free to set their own higher national targets” (European Council, 2014, number

3). That is, there aren't any binding targets for MSs, as in the current legislative 2020 framework (European Parliament and Council, 2009). In addition, the European Commission stresses the need to limit the detrimental effects of badly-designed, fragmented and uncoordinated public interventions in the Energy Union Package in February 2015. It claims that divergent national market arrangements, such as uncoordinated renewables support schemes have to be made more compatible with the internal market since “some forms of public intervention have had a serious negative impact on the effective functioning of the internal energy market” (European Commission, 2015, p. 10) and that “the Commission will facilitate cooperation and convergence of RES national support schemes leading to more cross border opening” (op.cit., p. 15).¹

These EU legislation and policy documents on RES need to be contextualized within the broader discussion on the degrees of

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¹ Three relatively recent communications from the European Commission provide recommendations to MS on the use of renewable electricity support instruments: the European Commission Guidance for the Design of Renewables Support Schemes published on November 5th, 2013 (EC, 2013), the Communication from the Commission on January 22nd, 2014 on a policy framework for climate and energy in the period from 2020 to 2030 (EC, 2014a) and the Guidelines on State aid for environmental protection and energy 2014–2020 (EC, 2014b). These documents argue in favour of instruments which are more coherent with the internal market and more cost-effective.

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harmonisation and choice of instruments for the support of electricity from RES (RES-E). Harmonisation can be defined as the top-down implementation of common, binding provisions concerning the support of RES-E throughout the EU (Bergmann et al. (2008)). In practice, it refers to a single RES-E support scheme being applied EU-wide. In contrast, Member States may remain in charge of their national RES-E support schemes, in line with the subsidiarity principle.²

Despite the fact that the basis for the policy framework for renewable energies until 2030 has been laid, the debate on harmonisation of renewable energy support, which is certainly not new, has not ended.³ While the European Commission has traditionally been an advocate for harmonisation and it has repeatedly mentioned that harmonisation remains a long-term goal (European Commission, 2005, 2008; European Parliament and Council, 2001), support schemes have not been harmonised and it remains to be seen whether and how they can be harmonised in the future. Indeed, in its June 2012 Communication (EC, 2012), the European Commission stressed the need for improved support schemes and called for guidance on best practices, convergence and cooperation rather than harmonisation. This softening of its position on harmonisation is probably due to opposition from the majority of MSs and the European Parliament (Resch et al., 2013). A new Renewable Energy Package, including a new Renewable Energy Directive, is envisaged for 2016–2017, and further decisions on harmonisation may be made. The aforementioned Energy Union Communication states that “the Commission will propose a new Renewable Energy Package in 2016–2017. This will include (...) legislation to ensure that the 2030 EU target is met cost-effectively.” (p. 21).

The policy dimensions on the debate on a future renewable energy strategy for Europe beyond 2020 have included: 1) RES-E support instruments and financing aspects related to that, 2) electricity market design and impacts on market functioning arising from an enhanced use of (variable) renewable energy sources, 3) sustainability concerns, in particular related to the use of biomass, 4) cooperation with third countries, in particular imports (to the EU) of biofuels and solid biomass as well as RES-E. Generally, future policy choices related to the above dimensions might show a more national orientation or could reflect further consolidation and cooperation among Member States, whereby the ultimate extent would be a harmonised approach across the EU. This paper focuses on the instruments and degrees of harmonisation.

The harmonisation of RES-E support has received some attention in the literature. Taking into account the aforementioned aspiration of the European Commission, the initial analyses in the late 90s and early 2000s focused on the pros and cons of a very few alternatives, most often circumscribed to the analysis of an EU-wide quota with TGC system either with theoretical (e.g. del Río, 2005; Voogt and Uyterlinde, 2006) or simulation models (e.g. Uyterlinde et al., 2003; Huber et al., 2004).⁴ Some of those studies argued that a harmonised framework (combined with the possibility of trade in renewable electricity) would facilitate effectiveness and cost efficiency in reaching targets at the EU level. The academic literature on this topic has gone in parallel to the policy documents from the European Commission. Facing opposition from the majority of MSs and the European Parliament, the political debate has moved from harmonisation

towards coordination and cooperation between MSs in relation to several identified best practices (Resch et al., 2013). While the first communication from the Commission on the topic argued in favour of harmonisation (EC, 1999), only two years later (in 2001), the renewable electricity directive (Directive 77/2001/EC) envisaged the possibility that a harmonised framework for support schemes would be implemented in Europe. It was expected at the time that this could come in 2005, following a report from the Commission on the experience gained with the coexistence of different support schemes.

In parallel to the political debate (and possibly both influencing it and being influenced by it), the academic literature evolved to consider different degrees of harmonisation (Guillou, 2010; Bergmann et al., 2008), including coordination and convergence between RES support schemes (Resch et al., 2013; Gephart et al., 2012; Kitzing et al., 2012). However, this more recent literature is mostly qualitative. In addition, the influence of different instruments (beyond quotas with TGCs) and design elements within specific instruments were not considered. This paper tries to cover this gap using the GREEN-X model to simulate and quantitatively assess the pros and cons of different alternatives (degrees of harmonisation, instruments and design elements). Thus, a broad set of policy pathways for the deployment of RES-E in a post-2020 framework in the EU is analysed. Therefore, the aim of this paper is to evaluate pathways of a harmonised European policy framework for supporting an enhanced exploitation of RES-E beyond 2020. The preliminary results of Resch et al. (2013), which also used the Green-X model, suggested that cooperation and coordination among MSs was beneficial and, indeed, was required to tackle current problems in RES markets. Thus, both policy options could also be fruitful for the period beyond 2020. By contrast, “simplistic approaches” to RES policy harmonisation (e.g. via a uniform RES certificate trading) cannot be recommended – neither in the short- nor in the long-term. However, these authors did not consider all the degrees of harmonisation in their analysis. In addition, they did not take the implementation of different instruments and design elements into account. This is a major shortcoming since, as it will be shown in this paper, differences between the scenarios in terms of criteria are more related to the instruments and design elements implemented than to different degrees of harmonisation.

Accordingly, the paper is structured as follows. The next section provides the background for this study. It describes the elements of the policy pathways and the criteria to assess those pathways. The methodology and the data are described in Section 3. The results are provided and discussed in Section 4. The paper closes with some conclusions and policy implications.⁵

2. Background: pathways and assessment criteria

2.1. The pathways

In order to define the policy pathways, an extensive literature review, as well as a stakeholder consultation, were conducted. Pathways are defined at two levels. A first level involves degrees of harmonisation: i.e. the administrative level at which the decisions on instruments and design elements are taken, and whether there are national RES-E targets in addition to a European target. On a second level, there are some components of the pathways that need to be harmonised: instruments, design elements, framework conditions and other elements, including the use of cooperation mechanisms and cost-

² Member States have developed their own tailor-made energy policies, which include different goals, ambitions and preferences. Not all Member States share a comparable ambition towards renewable energy and they are not willing to transfer the required competences to a European level (Resch et al., 2013, p.15).

³ Indeed, there is an old discussion on the advantages and disadvantages of harmonising support schemes in the EU (see del Río (2015) and Resch et al. (2013) for a review).

⁴ To our best knowledge the only theoretical contribution which considered non-TGC instrument at the time was Muñoz et al. (2007), who analysed the possible design of an EU-wide FIT. On the other hand, Huber et al. (2004) was the first and only contribution at the time which simulated the comparative impact of FITs and TGCs

⁵ Please note that this paper builds on and partly summarizes work conducted under the “Intelligent Energy Europe (IEE)” project beyond2020. This project was a collaborative initiative of several research institutions, consultants and industry partners supported by the IEE programme of the European Commission. Its core objective was to conduct detailed analyses on the design and impact of a harmonised policy for renewable electricity in Europe in the period post 2020. For details on the project and its outcomes please visit www.res-policy-beyond2020.eu.

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