

Design and impact of a harmonised policy for renewable electricity in Europe



Brochure

Summary of key conclusions of the **beyond2020** project - approaches for a harmonisation of RES(-E) support in Europe



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The beyond2020 project *at a glance*

With Directive 2009/28/EC, the European Parliament and Council have laid the ground for the policy framework for renewable energies until 2020. The **aim of this project** is to **look more closely beyond 2020** by designing and evaluating feasible pathways of a harmonised European policy framework for supporting an enhanced exploitation of renewable electricity in particular, and RES in general. Strategic objectives are to contribute to the forming of a European vision of a joint future RES policy framework in the mid- to long term and to provide guidance on improving policy design.

The work comprises a detailed elaboration of feasible policy approaches for possible harmonisation of RES support in Europe, involving five different policy paths: i.e. uniform quota, quota with technology banding, fixed feed-in tariff, feed-in premium, or no further dedicated RES support besides the ETS. A thorough impact assessment is undertaken to assess and contrast different instruments as well as corresponding design elements. This involves: a quantitative model-based analysis of future RES deployment and corresponding cost and expenditures based on the Green-X model; and a detailed qualitative analysis, focussing on strategic impacts, as well as political practicability and guidelines for juridical implementation. Aspects of policy design are assessed in a broader context by deriving prerequisites for and trade-offs with the future European electricity market. The overall assessment focuses on the period beyond 2020; however, a closer look is also taken at the transitional phase prior to 2020.

The final outcome will be a finely-tailored policy package, offering a concise representation of key outcomes, a detailed comparison of the pros and cons of each policy pathway, and roadmaps for practical implementation. The project is embedded in an intense and interactive dissemination framework consisting of regional and topical workshops, stakeholder consultation and a final conference.

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Overview on assessed RES(-E) policy pathways

Possible pathways for a harmonisation of RES(-E) support in Europe were identified and subsequently analysed from different angles within the **beyond2020** project. These pathways were defined at two levels. A first level involves degrees of harmonisation: i.e. at which administrative level 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, etc. The combination of all these components under different degrees of harmonisation resulted in 16 different pathways, see Table 1.

Table 1 Overview on policy pathways

Overview on RES(-E) policy pathways beyond2020 <i>Degree of harmonisation</i> <i>Characterisation</i>			Instrument					
			FIT (feed-in tariff)	FIP (feed-in premium)	QUO (quota system with uniform TGC)	QUO banding (quota system with banded TGC)	ETS (no dedicated RES support)	TEN (Tendering for large scale RES)
Full	<ul style="list-style-type: none"> EU target One instrument 		1a	2a	3a	4a	5	6 Sensitivity to 7 (national support, but harmonisation for selected technologies)
Medium	<ul style="list-style-type: none"> EU target One instrument Additional (limited) support allowed 		1b	2b	3b	4b		
Soft	<ul style="list-style-type: none"> EU & National targets One instrument MS can decide on various design elements incl. support levels 		1c	2c	3c	4c		
Minimum	<ul style="list-style-type: none"> With minimum design standards for support instruments 	<ul style="list-style-type: none"> EU & National targets Cooperation mechanism (with or w/o increased cooperation) 	7d Reference with minimum design criteria (national RES support with increased cooperation and <i>with minimum design standards</i>)					
No	<ul style="list-style-type: none"> No minimum design standards for support instruments 		7 Reference (national RES support w/o increased cooperation and <i>w/o minimum design standards</i>)					

Summary of key conclusions

Below we offer a summary of key conclusions & recommendations of the **beyond2020** project, discussed in topical order.

- Policy pathways for a harmonisation of RES(-E) support and assessment criteria**
 Several alternatives exist for the harmonisation of support schemes for renewable electricity (RES-E) in particular, and renewable energy sources (RES) in

general, which can be assessed on the basis of standard criteria used in energy and environmental economics. The two-dimensional matrix provided during the inception phase of this project allows the structuring of the discussion on feasible alternatives for policy pathways, distinguishing between the policy instruments and relevant design elements, as well as between different degrees of harmonization (i.e. from minimum or soft up to full harmonisation).

These pathways will be assessed according to the policy-relevant evaluation criteria (including effectiveness, cost-effectiveness, dynamic efficiency, environmental and economic effects, socio-political and legal feasibility) developed in the course of this project.

- *Legal aspects - assessment and guidelines for practical implementation*

For a pathway to be legally feasible, two criteria have to be fulfilled: first, the EU must have been granted the competence to adopt the measure, which implies the existence of a legal basis in the Treaties; second, the measure must fit into the existing framework of primary and secondary EU law. Following these assessments, we concluded that the only pathways which are legally feasible are soft and minimum harmonisation. This is subject to: (a) the uncertainties surrounding the interpretation of Article 194 TFEU as a legal basis; (b) the aims and objectives of the measure; and (c) detailed information on the design of either pathway so as to avoid inconsistencies with existing EU law.

It is possible that a more extensive EU measure can be adopted, such as medium harmonisation or ETS-only. This depends upon one's interpretation of the scope of the legal bases which grant the EU the power to adopt measures in the area of energy and the environment (Articles 192, 193 and 194 TFEU). There are many uncertainties surrounding the interpretation of these legal bases, especially with regard to the extent to which the EU can affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply. These uncertainties may be used by Member States to their advantage when negotiating a new EU measure, especially if there is reluctance concerning extensive harmonisation in the renewable energy field.

Given the lack of detailed information on how either policy pathway may be designed, our assessment took into account that, in the event of an EU-level support scheme, either of four possible RES support schemes could be adopted: Feed-in Tariffs, Feed-in Premiums, Quotas with TGCs, or large-scale tendering. In none of these scenarios did existing EU law prohibit the adoption of such a measure. However, our assessment showed that it is unlikely that the EU has the competence to introduce one identical support scheme with the exact same design features in all Member States, or that the conditions governing the exercise of that competence render it so politically difficult as to be infeasible in practice.

Given the outcome of our analysis, we concluded that a Directive would be the most appropriate legal instrument for the EU measure. By virtue of the nature

of Directives under Article 288 TFEU (which are binding as to the result to be achieved, while leaving the Member State to decide on the form and methods of implementation), this would allow Member States to retain a level of discretion concerning how to implement the new provisions into national legislation.

- *Cost-benefit analysis, final results of the quantitative assessment of RES policy pathways beyond 2020*

The current RES Directive (Directive 2009/28/EC) lays the basis for the EU's RES policy framework until 2020, but a strategy and clear commitment to RES beyond 2020 is needed (if RES is to deliver what is expected by 2050). The results of this assessment support the need for dedicated 2030 RES targets and for accompanying policy action rather than simply offering a criticism of harmonisation (as long as adequate instruments that offer some sort of technology-specification are used). Such targets and policy action are essential if renewables are to play the key role as outlined in the Commission's *Energy Roadmap 2050*¹.

The results of the model-based policy assessment also indicate that cooperation and coordination among Member States (e.g. through a prescription of minimum design criteria) appear beneficial and, indeed, are required to tackle current problems in RES markets. Thus, such an approach would also appear to be fruitful for the period beyond 2020. It also appears promising to complement national support activities by an EU-wide harmonised scheme offering support for selected key technologies like wind and centralised solar.

In terms of cost-effectiveness best performer is a harmonised fixed feed-in tariff system, offering safe and secure revenue streams for investors. Other candidates for a soft, medium or full harmonisation are feed-in premiums and quotas with technology banding. By contrast, "simplistic approaches" to RES policy harmonization (e.g. via a uniform RES certificate trading) cannot be recommended - neither in the short nor in the long term (compare also Resch et al (2010)).

Moreover, the model-based assessment clearly points out that the degree of harmonisation has only a small impact on the performance of an instrument - i.e. differences between a soft, medium or full harmonisation appear generally negligible.²

¹ European Commission, 2011. Energy Roadmap 2050, COM(2011) 885/2.

² There is however a significant impact arising from the degree of harmonisation on the cost allocation across the EU - for details on that we refer to the corresponding work package report (Resch et al, 2014b).

- *Interactions between RES Policies and Electricity Markets*

Increasing the penetration of RES in Europe will affect the operation of electricity markets and grids across Europe. It will also require some elements of market design and network operation to be addressed, in order to make this increased penetration easier for the system.

Regarding the impact of increased RES shares on electricity markets and grids, the project has identified the major effects, and has reviewed what the current literature says about them. As a follow-up, a quantification of related impacts was undertaken. To that end, we have run electricity market and network expansion models, also evaluating the differences that different RES policies can make. The policy instruments evaluated were: a harmonized feed-in tariff; a harmonized quota; and a national feed-in tariff. The impact of each of these three instruments has been compared to a 'no-RES policy' scenario.

A first interesting result is that, given a certain amount of RES penetration, impacts do not depend much on the policy instrument chosen (although this will of course have an influence on the amount of RES), but rather on:

- the total outcome of RES deployed; and
- the availability of the grid infrastructure.

Even when there are some differences between instruments, these are not due to the instrument itself, but to its design elements (e.g.: the stability of the regulation; whether the support is technology neutral or technology specific; the harmonized or national character of the policy, etc.).

All of these results show that there will be significant impacts on electricity markets and grids, and that is therefore a need to change the way they are designed if we are to accommodate more RES.

Below, we provide some recommendations based both on the modelling and extensive literature review:

- improved cross-border transmission policies will facilitate the efficient operation of the grid under increased RES penetration. Grid extension will dampen price volatility and numbers of hours with negative market prices. Thus, substantial internal and cross-border grid investments are needed, which requires sufficient investment signals. Current regulations should be adapted if the foreseen extensions (TYNDP) are not able to be realized. Nodal prices might also be an instrument for improving grid investment and operation decisions;
- the costs and need for balancing can be reduced by more frequent and shorter scheduling intervals. Balancing markets should be made more flexible so that renewables and demand-side

sources can participate more easily. The coordination of balancing areas is also important to reduce balancing costs;

- increased RES penetration leads to an augmented need for flexibility in system operation. Therefore, incentives for demand response or other flexibility options could be considered after an in-depth analysis of all of their strengths and weaknesses;
- pricing and bidding rules in electricity markets should be analyzed in detail. Possibly, complex instead of simple bids could be beneficial for systems with high renewables penetration. Also, joint bids for energy production and balancing services could be useful. Non-discriminatory pricing could be used to internalize non-convex-cost related components of the actual value of electricity market prices.

- *Assessment of harmonization concepts and their practicability*

The debate on harmonization is contextualized within the wider integration process of the EU, and the pros and cons of harmonization of RES-E support schemes are discussed. As a conclusion, an interplay between coordination, cooperation (bottom-up, between Member States) and selective harmonization (top-down: e.g. minimum design criteria, EU-opt out or advanced cooperation) is determined to be the most functional and feasible pathway to support policy convergence and subsequent market integration, while at the same time taking into account a wide variety of differences between Member States.

- *Interactions between EU GHG and RES Policies - how can they be coordinated?*

In the current debate about a European climate and energy policy framework for 2030, some critics argue that the coexistence of separate EU targets and policies for renewable energy, energy efficiency and greenhouse gas emissions reduction is undesirable and even counter-productive, and should therefore be discontinued after 2020.

Within beyond2020, the conclusion is drawn that the coexistence of GHG and RES policies and targets is clearly justified. Well-coordinated targets and policies will be capable of reaching both the GHG emissions reduction target and the RES deployment targets in an effective and efficient manner.

The key arguments for the co-existence of separate EU targets and policies for renewable energy and GHG emissions are:

- RES policies address more objectives than GHG mitigation. An incomplete list of these includes: avoidance of local environmental effects, a lower dependence on fossil fuels imports, industrial policy, job creation and regional development.

These other objectives would not be met effectively and efficiently by a policy that focuses on GHG alone; and

- even with respect to their common goal to reduce GHG emissions, the combination of GHG and RES deployment targets can be justified due to three different market failures: the environmental externality, the innovation externality and the deployment externality.

In principle, these arguments justify both the co-existence of policy instruments and targets. Policy instruments are needed to reach policy targets and make them meaningful; and, vice versa, a target defines the ambition and pathways for the use of policy instruments. Due to their different objectives, both GHG and RES targets and policy instruments are needed, but the question arises how to make them coherent. In principle, ETS and RES-E trajectories can be coordinated *ex ante* or *ex post*. From the ETS perspective, *ex ante* coordination is clearly preferable, as *ex post* adjustments will reduce the credibility of the ETS. However, one might consider transparent *dynamic* adjustment mechanisms that would become effective in cases where there are major deviations from the original projections. Adjustments for coordinating RES-E deployment and the ETS cap can be implemented both within the ETS and within the RES-E support instruments through specific design elements. Some flexibility in the RES-E growth trajectory is important, however, as a strict yearly trajectory would be difficult to achieve and could obstruct RES-E market growth patterns.

When discussing the uncertainties affecting ETS, one should acknowledge that there are more severe uncertainties affecting the CO₂ prices in the ETS than those related to RES-E growth. For example, the recent economic crisis has created a large number of surplus allowances (among other factors) and led to a discussion on a structural reform and *ex post* adjustment of the ETS that would stabilise CO₂ prices under the ETS. This discussion is very relevant for RES-E, as stabilising CO₂ emission allowance prices is crucial for the effectiveness and efficiency of RES-E support. Low CO₂ allowances prices will increase the need for RES-E support and either lead to high support payments or to reduced RES growth.

- *Interacting aspects and policy design considerations for burden sharing agreements and future exemptions of EU energy intensive industries*

Across selected EU Member States, different criteria and indicators are used for reduced contributions by, and exemptions for, energy-intensive industries from a wide range of related taxes and payments, such as: electricity taxes; environmental taxes; renewable

energy payments and contributions; co-generation, etc.

It is important to recall the fact that environmental regulations and high energy prices applied to energy-intensive industries do influence their competitiveness in a negative manner, in particular if these industries are strongly exposed to global competition and as long as their main competitors are subject to less stringent regulations. In contrast to above, following the *Porter Hypothesis*³, high prices and strong regulations tend to create the need for the industry to improve the efficiency of their products and to advance technologically. Furthermore, international competitiveness is not affected by increasing costs in one particular country, but rather due to the relative changes in production and energy costs in comparison to changes in other countries' production-costs.

The main conclusion is that several factors (not all of them quantifiable) have an effect upon the international competitiveness of companies and, as a factor of production, electricity costs and demand have an effect depending upon the energy intensity of the industry measured against turnover, production value, or value added vs. international competitiveness.

For policy design with respect to *privileges for EU energy-intensive industries*, exemptions should be set up in combination with: (i) the recognition of the implementation of energy consumption monitoring schemes; (ii) the implementation of profitable energy efficiency measures (i.e. with an internal rate-of-return over 10%); and (iii) the introduction and maintenance of energy management systems.

- *European RES policy beyond 2020 from an energy company/utility perspective*

The mobilization of investors is crucial to achieving European goals in the deployment of renewable energies. Important requirements for attracting investors are legal certainty and sound legal protection. Furthermore, public acceptance and engaging citizens in the decision-making process are crucial, as are transparency and efficiency in the approval process. Incentives for infrastructural measures, such as grid extensions and storage facilities, are required to provide energy security and grid stability. Regional and technological differentiation of support is a measure to mitigate both the regional and technological concentration of RES installations.

³ Porter M. E. and C. van der Linde, 1995. Toward a New Conception of the Environment-Competitiveness Relationship. *Journal of Economic Perspectives*, Vol. 9, No. 4 (Autumn, 1995), pp. 97-118.

- *An integrated RES policy assessment to conclude the evaluation process of policy pathways at the interim and the final stage of this project*

A multi-criteria analysis (MCDA) was carried out, building on the completion of other topical assessments (i.e. cost-benefit analysis, legal evaluation, analysis of market interactions). This serves to provide a ranking of policy pathways depending upon how highly each alternative scores in each criterion, weighted by the decision-makers. The PROMETHEE method is used for this analysis. The weighting vectors of various decision-makers are needed as an input to the model. To obtain an impression of the spread of opinions, a stakeholder consultation was conducted: e.g. at beyond2020 workshops and conferences, participants were asked to fill in a criteria-weighting questionnaire. Based upon the weighting vectors and qualitative information provided by stakeholders, three decision-maker prototypes were initially created (the Environmentalist, the Pragmatic, and the Cost-concerned).

In reality, and considering the current 2030 target discussion, the decision for a RES support policy pathway will not be taken in one step. With the decision for or against a separate RES target, the course will be set for either the ETS (5) pathway or a dedicated RES policy which could look like one of the remaining 15 beyond2020 pathways. The ETS (5) pathway is therefore, not surprisingly, the pathway that causes the most disagreement. While it is the most favoured pathway for some stakeholders, it is completely unacceptable to others. The 2030 target decision will be taken based upon more and different criteria than those used in this analysis, which exceed the scope of this report but are treated in D6.1b. Here, we shall focus on the remaining pathways in case the decision for a RES target is taken.

It follows from the PROMETHEE preference rankings that **minimum harmonisation (7d)** and **FIP soft (2c)** offer the most potential for compromise between the three decision-maker prototypes. **Non-harmonisation (7)** is also among the top-ranking pathways for the Pragmatic and the Environmentalist, and therefore also in the group ranking. However, this pathway is not attractive at all to the Cost-Conscious decision-maker. We have to keep in mind that the group ranking, as mentioned above, assumes equal strength of the three decision-maker prototypes in influencing the preference ranking. It does not mimic the power structures and sideline negotiations which determine real compromise finding between interest groups. It is therefore better to concentrate on the individual preference rankings here instead of the group ranking.

A further argument against non-harmonisation (7) is that, given the evolution of the political debate in

past years, a mere continuation of the status quo seems unlikely. There are many voices, including those strictly in favour of more RES deployment, which call for some alignment of framework conditions and design features (minimum harmonisation).

The main conclusion from the MCDA was therefore to focus on a more detailed elaboration of the pathways **FIP soft (2c)** and **minimum harmonisation (7d)**.

- *A finely-tailored policy package at the end of this project*

The final outcome of beyond2020 is a finely-tailored policy package, offering a concise representation of key outcomes and a detailed comparison of the pros and cons of each policy pathway (including quantitative and qualitative results). Moreover, roadmaps for practical implementation of each of the assessed policy pathways were elaborated and an outline of a legal draft for the implementation of key provisions of two recommended policy pathways was provided.

- ▶ All reports of beyond2020 are available in electronic form at www.res-policy-beyond2020.eu.
- ▶ Hardcopies of selected key publications (final report, summary report) can be ordered via email to beyond2020@eeg.tuwien.ac.at.



This brochure provides a summary of key findings of the beyond2020 project, all related to the discussion of a possible harmonisation of RES(-E) support within the European Union beyond 2020.