***Renewable Energies in the EU - historic trends and future expectations from an energy policy perspectives***

Gustav Resch, TU Wien, Energy Economics Group, +43 1 -58801 370354, [resch@eeg.tuwien.ac.at](mailto:resch@eeg.tuwien.ac.at)

Franziska Schöniger, TU Wien, Energy Economics Group, [schoeniger@eeg.tuwien.ac.at](mailto:schoeniger@eeg.tuwien.ac.at)

Jasper Geipel, TU Wien, Energy Economics Group, [geipel@eeg.tuwien.ac.at](mailto:geipel@eeg.tuwien.ac.at)

Lukas Liebmann, TU Wien, Energy Economics Group, [liebmann@eeg.tuwien.ac.at](mailto:liebmann@eeg.tuwien.ac.at)

Reinhard Haas, TU Wien, Energy Economics Group, [haas@eeg.tuwien.ac.at](mailto:haas@eeg.tuwien.ac.at)

## Overview

Renewable energies are well acknowledged as one of the cornerstones for the decarbonisation of our energy supply within Europe and at global scale. Significant progress has been achieved in increasing the deployment of renewable energies and, in this context, energy policy has acted as key driver. This paper aims for taking a closer look at past progress, recent trends and future expectations concerning renewable energies within the European Union, all done from an energy policy perspective.

The paper (and the corresponding presentation) are structured as follows: After a theoretical excurse dedicated to the reasoning for dedicated RES policy interventions, we start with an analysis of historic trends in RES deployment, indicating achieved progress at European level. Next, energy policy trends are researched, with a focus on market incentives for renewables in the electricity sector. Finally, future perspectives for renewables are discussed, indicating what has been agreed upon at European level for 2030, and what one can aim for beyond.

## Methods

This paper builds on research works conducted in a series of EU projects. Of highlight, our qualitative and quantitative results build on research conducted in the Horizon 2020 project AURES II (cf. [1]).[[1]](#footnote-1) Concerning the prospective assessment we made use of TU Wien’s specialised energy system model (Green-X (cf. [www.green-x.at](http://www.green-x.at)) for identifying and assessing possible RES developments up to 2030, indicating RES deployment at sector, at technology and at country level that can be expected under distinct policy concepts. Complementary to results on deployment, related impacts on costs (generation cost), expenditures (capital and support expenditures) and benefits (fossil fuel and related CO2 emission avoidance) were a core element of the RES policy analysis. For specific purposes, e.g. for assessing the interplay between RES and future electricity market design that involves an analysis of the merit order effect and related market values of the produced electricity for variable and dispatchable renewables, Green-X was complemented by its power-system companion – i.e. the open source energy system model Balmorel – to shed further light on the interplay between supply, demand and storage in the electricity sector thanks to a higher intertemporal resolution than in the RES investment model Green-X.

## Results

This section will be further extended (for the extended abstract and the full paper). Below Figure 1 illustrates the changes in energy policy design over time, taking exemplarily a look at 2012 and 2017.



Figure 1. Support schemes for renewable energies in EU member states: comparison of 2012 and 2017.

## Conclusions

EU regulation acted as key top-down driver for renewable energies. In the past, this has been serving as “stick” for Member States to take action whereas the “carrots” have been provided at national level via (national) support schemes and measures. Renewable energies require today and (probably) tomorrow dedicated market incentives, if one aims for achieving the desired transition in our energy system in a timely manner.

The focus in the choice and design of support instruments has changed over the years – in the first decade of the millennium, a focal point has been effectiveness, i.e. rapid market entry, linked to the achievement of high economic efficiency. Today market integration, market opening, competition appears of key relevance.

Legal EU regulations severely restrict the choice of instruments: auctions (for price determination in market premium systems) are accepted by the European Commission, and seen as common practice that would be difficult to circumvent by policy makers. The design of an auction scheme appears (as usual) of key relevance:

* There are many options to achieve different goals (not just cost reduction) through auctioned RES support
* For designing auctions suitable for a particular country or region one needs to first define the respective target criteria and acknowledge national specifics (i.e. available resources, market actors, etc.).

## References

[1] AURES II – Ensuring the effectiveness of auctions for Renewable Energy Sources (RES) in EU Member States. Horizon 2020 project coordinated by Fraunhofer ISI. Key information on the project and its findings are accessible at <http://aures2project.eu>.

1. We gratefully acknowledge the intellectual and financial support provided by the Horizon 2020 programme, operated by the European Commission, Innovation and Networks Executive Agency (INEA). [↑](#footnote-ref-1)