Trading of renewable targets – who wins and who looses

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Overview

Anthropogenic climate change is one of the key challenges of the 21st century. Based on the Paris Agreement and the European Green Deal, the European Union has committed itself to reducing its net-greenhouse gas emissions by 100 percent by 2050 (European Commission 2019). The EU 2030 Climate Target plan (European Commission 2020) increases the EU emission reduction target for 2030 from 40 to 55 percent of greenhouse gas emission reductions compared to 1990 levels. Key instrument in achieving this target will be carbon pricing - both through the expansion of emissions trading as well as energy taxation. In addition, the existing regulatory framework with regards to renewable energy, energy efficiency and transport policies and standards is set to be revised and new policies to be introduced. The most recent national energy and climate plans (NECPs) of EU member states target the following renewable shares by 2030:

Table 1: Electricity sector renewable targets for 2030 based on country NECPs for countries represented in the dispatch and investment model

Austria	100.0%	Hungary	21.0%
Belgium	37.4%	Ireland	70.0%
Bulgaria	30.3%	Italy	55.0%
Czech-Republic	16.9%	Luxemburg	33.6%
Germany	65.0%	Netherlands	73.0%
Denmark	100.0%	Poland	32.0%
Spain	74.0%	Portugal	80.0%
Finland	52.0%	Romania	50.0%
France	40.0%	Sweden	83.0%
Greece	61.0%	Slovenia	75.0%
Croatia	63.8%	Slovakia	27.3%

Such a policy mix combining EU-wide emissions trading and national policies aiming at increasing the share of renewables in electricity generation may introduce inefficiencies compared to a system only based on carbon pricing. Allowing for trading of renewable targets could partially reduce such inefficiencies.The scope of this paper is to assess the potential benefits of a trading mechanism for renewable targets across EU member states in increasing the efficiency of renewable support schemes. Furthermore, we assess the resulting distributive effects between countries within the European Union and decompose the determinants of such gains and losses.

Methods

To this end, building on the model presented in Abrell et al. 2019, we have developed a detailed model of the European electricity system representing hourly dispatch decisions and investments into solar PV as well as on- and offshore wind. The model covers the EU-27 countries less Cyprus, Estonia, Latvia, Lithuania and Malta plus Great Britain, Norway and Switzerland.To reflect interactions between global and sectoral policies such as emissions trading, carbon pricing and expansion targets for renewable electricity generation, the model includes carbon market constraints using marginal abatement cost functions for other sectors in the EU emissions trading scheme (EU-ETS) derived from a computable general equilibrium model. The model uses NTC trading constraints, non-renewable generation capacities and demand time series for the year 2030 from TYNDP 2020 (ENTSO-E 2020).

The model is used to compare three main scenarios:

- A **base** scenario with a reduction target of EU-wide CO2 emissions by 55 percent compared to 1990 and no additional renewable targets.
- A scenario with **separate** renewable targets formulated as percentage share of demand for each member state based on national energy and climate plans on top of the emission reduction target.
- A scenario with a **combined** and tradable target for all EU member states on top of the emission reduction target. This results in a renewable share of 60 percent for the EU electricity sector.

Results & Conclusions

We find that, the introduction of separate renewable targets for each member state reduces welfare compared to the base case by 1.9 billion Euros. Introducing trading of renewable targets reduces this loss to 0.1 billion Euros or by about 95 percent. This reduction in welfare loss is driven by a strong reduction in investment cost of 3.9 billion Euros. At the same time, fuel costs increase by 1.9 billion Euros. While overall emissions are held constant, electricity sector emissions increase by 0.6 percent when allowing for renewable target trading. This means that more abatement activity takes place in other sectors in the European emissions trading scheme.On a country level, gains and losses are distributed as shown in Figure 1**.** The most important components for gains or losses on a country level are reductions in investment costs and gains in electricity trade.

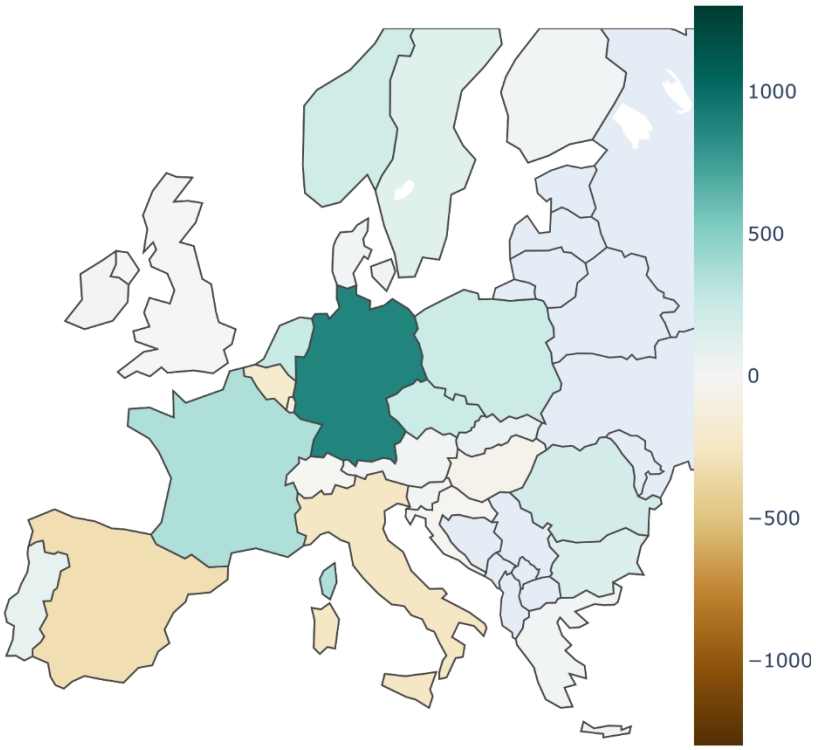

Figure 1: Welfare gains and losses per country from trading renewable targets [Million Euro]

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