Are Carbon Prices Redundant in the 2030 Eu Climate and Energy Policy Package?

Finn Roar Aune and Rolf Golombek

In 2018, an agreement between the key EU institutions—the Commission, the European Parliament, and the European Council—was reached after a long-lasting discourse over the 2030 EU climate and energy policy package. While there had been disagreement over the types of energy targets and how ambitious the targets should be, the parties agreed to an EU-wide renewable share in final energy consumption of 32 percent, to improve EU energy efficiency by 32.5 percent (relative to 2005), and also to reduce greenhouse gas (GHG) emissions by (at least) 40 percent (relative to 1990). The aim of this paper is to offer a comprehensive assessment of the approved EU 2030 climate and energy package. As there have been intense debates on which targets the EU should reach, we also analyze the 2030 outcome if, hypothetically, alternative energy policy targets had been agreed upon (or the EU energy targets are changed in the future).

The motivation of this paper is that the EU 2030 policy package is probably the single most important factor with respect to the development of the European energy markets and it also has powerful implications for policy design. The package is complex as it contains three types of targets: GHG emissions, renewables, and energy efficiency. Each target will contribute to decreased GHG emissions. While standard economic theory predicts the main effects of reaching each of the targets in the EU 2030 package, the net effects of reaching all targets, as well as the magnitude of the effects, cannot be predicted from theory; a numerical model is needed. In this study, we use the numerical model LIBEMOD to find the equilibrium effects of the EU 2030 climate and energy package.

LIBEMOD is a multigood, multiperiod model covering the entire value chain in the energy markets in 30 European countries from investment, extraction, and production via trade to consumption. In LIBEMOD, emissions reductions in the electricity generation sector are accomplished through a different mix and scale of electricity technologies; a higher price of emissions triggers less investment in, and production of, fossil fuel-based electricity. In the end-user sectors, emissions reductions require higher end-user prices. LIBEMOD determines all energy prices and quantities in the European energy markets. Because renewable electricity plays a critical role in reaching the 2030 EU targets, investment in hydro, bio, wind, and solar power is endogenous in LIBEMOD. The model finds the combination of policy instruments that is consistent with reaching all policy goals.

This paper makes three contributions to the literature. Whereas the 2030 EU climate and energy policy package was analyzed in a commissioned work by the EU Commission, see PRIMES (2019), the present paper is the first "external" study of the 2030 package. Our first contribution is to characterize the outcome when all EU climate and energy targets are required to be met. We find that the targets for renewables and improved energy efficiency have been set so high that the implied GHG emissions reduction is 50 percent, which is *higher* than the agreed-upon 40 percent target. This result is in line with the commissioned work by the EU Commission, which found that the 2030 package will lower GHG emissions by 46 percent.

We find that by achieving the renewable and energy efficiency targets, both the ETS and non-ETS emissions targets are met. Hence, there is no need for a climate policy. However, while an efficient emissions reduction is characterized by equal marginal cost of emissions reduction in the ETS and non-ETS sectors, there is no reason to believe that cost efficiency will be reached when the emissions reduction is obtained through achieving the renewable and energy efficiency targets. In

fact, we demonstrate that if a 50 percent GHG emissions reduction is reached cost-efficiently, then annual welfare increases (relative to the Reference scenario above) by an amount corresponding to 0.6 percent of GDP in Europe.

For years there has been a heated debate in the EU on whether there should be policy targets for renewables and improvement in energy efficiency, and if so, how ambitious these should be. Our second contribution is to examine how a renewable share in final energy consumption other than 32 percent, as well as an improvement in energy efficiency other than 32.5 percent, will affect emissions in the ETS and non-ETS sectors. We also show how the policy instruments imposed to reach the two energy policy targets need to be adjusted when the energy targets take alternative values.

Our third contribution is to the energy modeling literature. Here, our main contribution is to offer a framework for endogenizing investment in intermittent power (wind and solar power) and to present a calibration strategy that quantifies structural wind and solar parameters.

REFERENCE

PRIMES (2019). Data retrieved November 10, 2019 from https://ec.europa.eu/energy/sites/ener/files/technical_note_on_the_euco3232_final_14062019.pdf