

Fostering a low carbon economy with carbon pricing revenues: growth and employment impacts of directed technological change

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Large-scale economic models for analyzing climate change mitigation policies still lack a common concept of adequately addressing technological change, which is one major driver for differences in results. Price instruments fall into the category of policy measures that induce technical change. However, in these models revenues from environmental tax reform (ETR) or energy and emission taxes and auctioning in emission trading systems have mainly been used for reduction in other taxes and labour costs. The paper at hand analysis two sets of scenarios: one in which the revenues are recycled as known from previous studies and one focussing on the inclusion of directed technological change in such a multi-sector, multi-country model. The scenario analysis is conducted using the global energy-environment-economy model GINFORS, which includes input-output tables for the major economies. GINFORS has been applied to analyze impacts of an EU carbon price via ETS and ETR to reach the EU climate target in 2020. In the second set of scenarios, a small part of the additional revenues are earmarked for low carbon technologies. Simulations look into different specifications of such directed technological change: additional investment in renewable energy sources (RES), additional RES exports and the inclusion of different input structures of the RES industries. Compared to the usual recycling of ETR/ETS revenues, the proposed trigger for eco-innovations has not only positive employment, but also positive GDP impacts. The paper includes an outlook on future research needs such as the explicit modelling of learning curves for certain technologies.