A ZERO SUBSIDY WESTERN EUROPEAN ELECTRICITY SYSTEM?

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Overview

Following the 2020 climate and energy package, the European Commission in its communication titled '*A policy framework for climate and energy in the period from 2020 to 2030'* sets a targets of a 40% reduction in GHG emissions by 2030 (relative to 1990) in the EU. In addition to the binding national-level GHG targets, it also seeks to increase the share of renewable energy in the energy mix to 27%. The *Guidelines on Environmental and Energy State aid for 2014–2020* advocates the use of a competitive bidding process in the form of auctions over traditional forms of support, such as feed-in tariffs, for supporting low-carbon technologies. The new guidelines therefore encourage setting targets in the most cost-effective way possible. The concerns of over-subsidizing mature renewable technologies such as onshore wind and PV in many countries and economic austerity in many member states have increased calls for a sound strategy to meet these targets while reducing tax payer burden by phasing out subsidies for renewables.

A series of developments in this decade in Western Europe in light of the 2020 targets have led to restructuring of energy markets and a range of related policy developments. The UK's Electricity Market Reform (EMR) has brought about a series of measures such as introduction of Carbon Price Floor (CPF) and phasing out of Renewable Obligation Certificates (ROCs) in favor of Contracts for Difference (CfDs) among others. After the Fukushima accident, the German government has initiated the closure of its nuclear power plants, envisioning a full phase-out by 2022, as a part of a series of measures under its *Energiewende* (energy transition). Although EU member states will no longer have national-level renewables targets under the proposed 2030 package, Germany is expected to maintain a stronger focus on promoting renewables. The indefinite suspension of all forms of renewable support in Spain, owing to its debt crisis has raised concerns of policy and has, unsurprisingly, created an unfavorable climate for low-carbon investment. Under the planned phase-out of mature renewable subsidies, we investigate the policy outcomes that would enable these countries to successfully meet their climate and energy targets as stipulated by EU's 2030 policy framework under various scenarios.

With the analysis of data on costs and subsidies for low-carbon support from these countries - in terms of number of public interventions, the structure of the renewable support instruments and the levels of support for each technology type, we estimate the cost and evolution of each technology post 2020. This would enable us to project the likely fuel mix in Germany, Spain and the UK in 2020. We characterize the transition to a zero subsidy electricity system beyond 2020 in light of the 2030 framework for climate and energy. We study the implications for national energy markets upon transition to the zero subsidy electricity system in the German, Spanish and the UK context, using 4 scenarios: (i) *High* - strong EU carbon policy with the current subsidies maintained; (ii) *Pessimistic* - weak EU carbon policy with current subsidies maintained; (iii) *Optimistic* - strong EU carbon policy with subsidies removed and (iv) *Low* - weak EU carbon policy with subsidies removed. The implications for the markets are discussed under these three key areas: (i) carbon prices, (ii) wholesale electricity prices and (iii) investment impacts.

Methodology

Case studies, analysis of costs and subsidies data, comparative analysis of theoretical findings.

Results

Data suggests that the total renewable electricity that received support have increased over the years with Germany leading Spain followed by the UK. Despite this observation, on an overall basis 23% of Spain's gross electricity produced was from RES that received support, which makes it the third largest in the EU next only to Denmark (56%) and Portugal (30%). The panel countries (Germany, UK and Spain) spent the highest fraction of their support resources for subsidizing wind energy, with Spain allocating approximately 70% of its total support for onshore wind. Spain supports all of its renewables through feed-in tariffs (FiT) while feed-in premiums (FIP) are increasingly used in Germany in addition to FiT, in contrast to UK's Renewable Obligation Certificates (ROC) in conjunction to the FiTs. The Weighted Average Cost of Capital (WACC) estimates suggest that they are consistently higher for UK across all the power production technologies, although they were, on an average basis, lower than the EU28 levels. Transmission expenditures including capital and operating costs were also one among the highest in the UK than the other EU Member States. The *Optimistic* scenario with a credible carbon price and subsidies removed is expected to result in a higher carbon price provided that the surplus EU allowances is adequately accounted for in a timely manner. The *Pessimistic* scenario might result in an increase in renewables capacity in these countries but at the expense of high costs on subsidies, if the carbon price remains low as the present case. The low carbon price in the absence of renewable subsidies as characterized by the *Low* scenario would prove very difficult for the countries to provide a market climate that is consistent with adequate investments in low-carbon generation capacity. In contrast, the *High* scenario could lead to the desired energy mix however with the risk of doing so at a higher cost and/or with overinvestment in certain generation technologies.

Conclusions

Our earlier findings indicated that the German support structure for onshore wind has been more cost-effective than in the UK and that there is a significant imbalance on deployment subsidies over RDDD&D, which needs to be addressed by EU-wide competitions for RD&D for less mature low-carbon technologies. For example, a EU-wide auction aimed at facilitating the fair allocation of common pool funds to low-carbon projects, could provide a possible pathway to decarbonization in a cost-effective manner. These common pool funds could be financed from cutting back on the least cost-effective national subsidies, which could be identified through country-level case study of the Member States that forms that the topic of our discussion in our subsequent papers. The current findings support the claim that instability in the support for renewables in countries like Spain have resulted in policy credibility concerns that could jeopardize the electricity decarbonization objectives in the EU. Furthermore, increasing expenditure on mature renewables support with little focus on R&D of new technologies have also contributed to less optimal energy policy outcomes at the national level. To this end, addressing the two major failures in the EU is crucial to the success of its climate and energy policy objectives. In addition to the absence of a credible measure for pricing carbon, public goods of research, learning and development are also being under-supplied. To the extent that they are supported, their financing is inefficiently levied as taxes on electricity with the exception of coal and gas, which needs to be rectified. To meet the climate targets in light of the proposed phase out renewable subsidies for mature technologies in the long-run may remain a challenge unless appropriate action is taken through a more efficient support mechanism for immature technologies, with funds generated through general taxation measures as opposed to levies on electricity consumers. In summary, an increase in the interconnector capacity investments along with a single EU-wide carbon price through an efficiently functioning EU ETS (or other mechanisms) with cross border tax adjustments and harmonized capacity payments would support a smooth transition to a zero subsidy electricity system in Western Europe by 2030.

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