Annex

Impact of Carbon Price Support on British energy bills

Here we provide the results of additional calculations to show the final impact of the Carbon Price Support on British annual electricity bills. We refer to the study in Chapter 4 of the main report.

The Carbon Price Support (CPS), introduced by the UK Government in April 2013, has led to a substantial reduction in electricity generated from coal, which fell by 93% from a monthly average of 13.1 TWh in 2013 to only 0.97 TWh in 2019 (Ofgem, 2019a). The lower output from coal was replaced by gas and interconnector imports from France and the Netherlands (Castagneto Gissey *et al.*, 2018).

The main report shows how and by how much the CPS raised the British wholesale electricity price. By making marginal electricity more expensive, the CPS increased the price of wholesale electricity. The report found that the CPS increased the British wholesale electricity price by £7(€8.5)/MWh compared to its largest interconnected European neighbours, France and the Netherlands, accounting for 18% of the average GB wholesale electricity price in 2015–18. Assuming the wholesale cost is fully passed through to electricity bills, and given domestic consumption in 2018 of 106 TWh (BEIS, 2019a), this corresponded to £740(€900) million/year.[1] This is the average amount spent by British consumers through higher electricity bills associated with the CPS in 2018.[2]

Given the number of domestic users, or 27.6 million households (Office for National Statistics, 2019), this is equivalent to a CPS-induced increase in GB average annual electricity bills of £26/year per household in 2018.

Because the CPS does not apply to electricity from abroad, GB imports more from interconnected neighbours. The report shows that GB imports from IFA and BritNed (combined) increased by 13.6 TWh/yr or less than 5% of GB demand. Since imports are not subject to the CPS, the increased imports implied a loss of £93(€113) million of carbon tax revenue in 2018, about 10% of total GB revenue from the CPS[3].

The report also showed that the CPS led to an increase in wholesale prices in interconnected markets, with nearly 20% of the increase in the GB day-ahead electricity price from the CPS passed through to higher French electricity prices and 30% to higher Dutch prices. It also found that the tax has contributed toward an average of £25(€30) million/year welfare losses due to distorted cross-border electricity trading between Great Britain and both France and the Netherlands.

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[1]Assuming a pass-through rate from wholesale to retail tariffs of 100%.

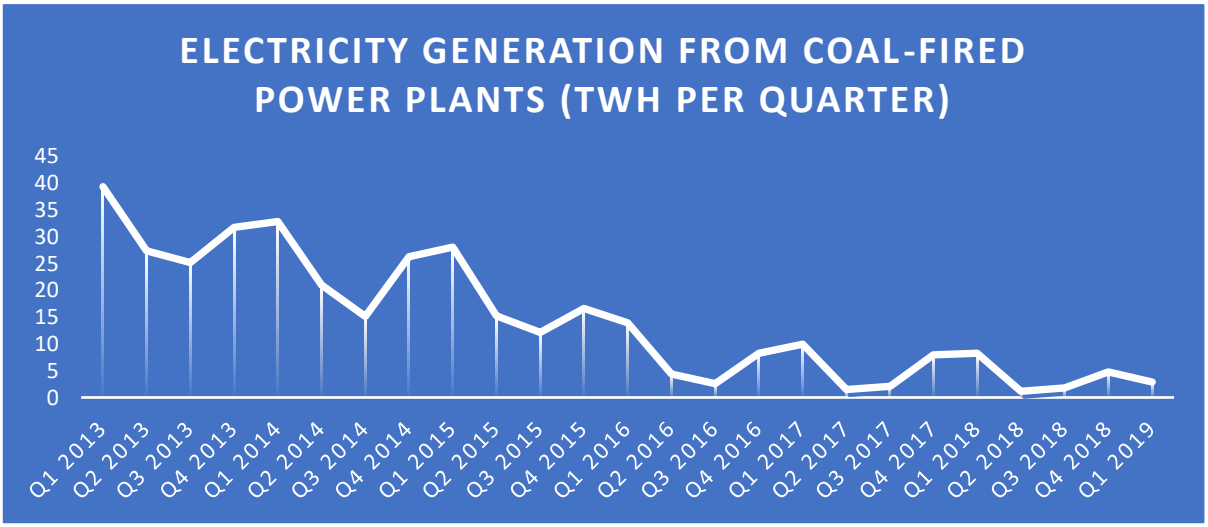
[2] All values in euros presented in this annex have been transformed into pounds using annual average rates from OFX (2019).

[3] The total CO2 emission from power stations in the UK was 65.2 Mt, or £1.17 billion worth of CPS taxes.

The higher British carbon tax increased net electricity imports from France and the Netherlands by 13.6 TWh/yr, an increase of 130% compared to a situation with no CPS. Based on electricity generation values from BEIS (2019b), this amount is equivalent to 4% of the total electricity generated in the country in 2018. The increased imports cost an extra £331(€403) million/year to buy French electricity and £121(€147) million/year to buy electricity from the Netherlands, while saving larger expenditures on domestic generation.[4]

By increasing the GB electricity price, the CPS made it more profitable for the National Grid to earn arbitrage revenues, earning them additional revenues of £55 (€67) million/year, the same amount as the Dutch and French TSOs who own 50% of the interconnectors. These revenues mostly come from GB electricity consumers, as shown in Chapter 4 of the report.

While Chapter 4 studied the distortionary costs of the CPS, we argue that these distortionary costs were modest compared to the benefits of the policy of reducing GB's greenhouse gas emissions, costing the country about £75 (€91) million/year in revenues transferred abroad and inefficient trading. The CPS resulted in coal-fired generation falling from 40% of total GB electricity generation in 2013 to only 3% in 2019. This is equivalent to a reduction in coal generation from a monthly average of 13.1 TWh in 2013 to only 0.97 TWh in 2019[5]. This is shown in the figure below for the period 2013 to 2019:



The report suggests that the trade distortion from the CPS can be eliminated if other EU countries also applied an equivalent carbon tax. The EU electricity sector remains one with high carbon intensity, producing around 21% of its electricity using coal.[6] This would make an EU-wide CPS a highly desirable policy.

[4] This was found by multiplying the average day-ahead price with the quantity of imports.
[5] Expressed as means of quarterly generation values reported in Ofgem (2019a).
[6] Agora Energiewende and Sandbag (2019).

References

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