Illustrative 2030 OpTIC and Zonal locational signals with delayed network investment

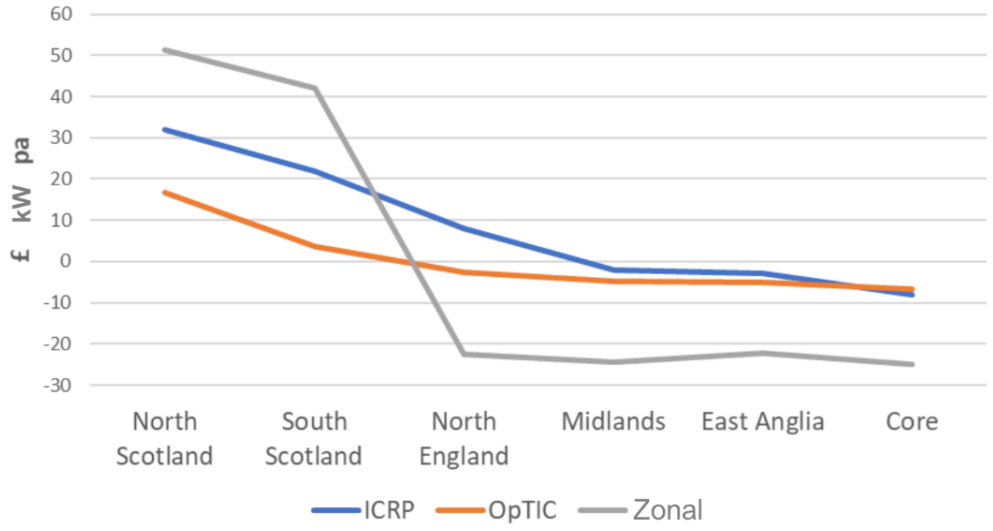
As an illustration, Trident Economics were commissioned by ScottishPower to carry out a simplified OpTIC system optimisation in PLEXOS[1], using 8 zones and modelled against a single scenario. The purpose of the analysis is to illustrate some possible charges given a particular set of inputs and to understand how they relate to the conceptual framework set out in Figure 5 of the OpTIC CUSC Modification Proposal document.

The estimated charges for 2030 are shown below in Figure 6 alongside estimates for ICRP and a zonal market. This analysis indicates a similar pattern of charges to the current ICRP methodology, with charges decreasing from the north to the south of the country. However, the charges for Northern zones are lower compared to ICRP. With ICRP there is a fixed relationship between the share of renewable capacity in an area and the extent to which further injections cause incremental network costs.

Further, at higher levels of national wind penetration, periods of excess generation in the national market may increase the frequency of negative or zero national prices resulting in the "self-curtailment" of wind without the need for greater levels of ESO redispatch. In such circumstances, adding additional wind to the network would have a smaller impact on constraint costs than is currently assumed.

In contrast to ICRP, OpTIC responds automatically to this changing dynamic. If there is a shift to increased self-curtailment as renewable capacity increases, then the estimated revenues in the unconstrained optimisation would reduce, narrowing the gap to the revenues estimated in the constrained optimisation, thereby reducing the calculated OpTIC charge. ICRP charges would continue to rise linearly as renewable capacity increases.

Figure 6: Illustrative 2030 ICRP, OpTIC and Zonal locational signals with delayed network investment[2]



Source: Trident Economics, December 2022

[1] PLEXOS is an energy system optimisation modelling tool which has been used for the purposes of the analysis carried out to date and illustrations presented in this report. There are other optimisation models which could deliver the same results.

[2] Note TNUoS comparison used numbers prior to NG ESO 10-year projection published in September 2023.

The estimated charges for OpTIC also vary much less significantly from north to south than under a zonal market. This is because of an assumed difference in the network assumptions:

- Under OpTIC, the network reflects optimal investments and therefore the charge is not sensitive to delays in investment; whereas
- Under zonal LMP, the delay in network investments affects the locational signal directly and risks overstating the signal.

If the actual transmission system investment follows an optimised path, then in the long run, the expected locational signal from a zonal wholesale market would be the same as the expected locational signal from OpTIC. However, if transmission investment is delayed, relative to an optimal path, the locational signals sent by OpTIC and a zonal market can diverge significantly. The analysis illustrates this effect, showing that if transmission investment is delayed, then zonal wholesale markets could imply much stronger locational signals being sent to Scottish generators than either ICRP or OpTIC charges.