

Where next for the electricity distribution system operator? Evidence from a survey of European DSOs and National Regulatory Authorities

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Energy systems are changing to become compliant with the net zero objective pledged by countries and companies around the world. Electricity distribution system operators (DSOs) are likely to play a crucial role in this transition. As part of this process the 'traditional' distribution network would have to change from a passive one-way network to an active two-way network, increasingly involved in active procurement of flexibility resources within its geographical area. In addition, the DSO is likely to be involved in the local and regional integration of energy systems, such as electricity, gas and heat.

The Electricity Directive (EU) 2019/944, which forms part of the Clean Energy Package (CEP), sets out guidelines for the key tasks that DSOs are expected to undertake in support of the common EU goal of decarbonising the energy system. DSOs have a duty to “*ensure the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient system*”. Since the CEP was originally drafted in 2015-16 the level of ambition on environmental and sustainability goals has increased significantly at the EU and national levels. This is reflected in the recent 'Fit for 55' legislative package which proposes revisions and initiatives aimed at achieving the targets of EU Green Deal, in particular a net reduction in emissions by 55% relative to 1990 levels by 2030. Based on a wide public consultation and impact assessment exercise it concludes that the current policy framework is insufficient to achieve the Green Deal targets by 2050 and that an increased level of ambitions must be established. The aim of the paper is to suggest how regulation of the DSO can be amended and improved to support the pursuit of ambitious environmental objectives and to promote efficiency in local energy systems.

In this context, our work aims to address three research questions: 1) How can and should the system operator function of the DSO be defined and regulated? 2) What can regulators

and EU policymakers learn from transmission system operator regulation that can be translated down to the DSO? And 3) How can regulators support the capacity of the DSO to operate and coordinate the system?

We address these questions through two parallel surveys conducted with DSOs and National Regulatory Authorities (NRAs) across Europe, with the aim of looking at the long- to medium-term future of DSOs, going beyond the implementation of current legislation. Our evidence is consistent with the observation that the move towards a more active DSO remains a work in progress for both DSOs and their NRAs. While many DSOs and NRAs are doing things that are in line with the commitment of the EU to an expanded role for DSOs there is little evidence that this has progressed very far in measurable terms, apart from in the UK. Most DSOs have no competitive procurement of congestion management or reactive power. Much research activity is focussed on trials which are themselves often at early stages and/or small.

There is a clearly articulated concern about the prospects for the new EU DSO entity among some DSOs and NRAs. While it can learn from its transmission level equivalent (ENTSO-E) and enhance the role of the DSO across the EU and promote flexibility solutions, there is a worry that it will struggle to reconcile the very different situations of DSOs across Europe. There should be a major role for the EU DSO Entity in evaluating, collating and spreading useful learning from future of the DSO related projects and using these to inform grid code development and its other areas of responsibility.

It is sometimes said, including by several of our respondents, that the Clean Energy Package (CEP) has clarified the role of the DSO. However, we find significant disagreement in the answers to our questions about the future of the DSO between and within our sample of NRAs and DSOs. This suggests that both within and between European countries there is work for NRAs and DSOs to do in clarifying the best way forward for the DSO. If the CEP represents a movement towards optimal regulation its interpretation and implementation need to be clarified further.

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