Managing the electricity distribution connection queue in Great Britain: lessons from auction theory and a potential position trading system EPRG Working Paper EPRG2512 Cambridge Working Paper in Economics CWPE2534 *Michael G. Pollitt Rona Mitchell* 

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The UK and other jurisdictions are experiencing queues for power network connection at both transmission and distribution levels, arising from the first come first served (FCFS) rule which has applied to connection applications. Demand from additional generation assets, distributed energy sources (DERs) and from large demand customers (e.g. data centres, housing developments) will have to be managed in a context where aggregate grid capacity cannot always be adjusted in the desired timeframe.

As of March 2025, the size of the distribution connection queue was 173 GW, 68% (119 GW) of which is dependent on or assessed for transmission reinforcements. The other 32% (55GW) of projects with a connection agreement did not need reinforcement work to connect or only needed distribution level reinforcements. Based on an estimate that 8% of the distribution queue does not require reinforcement (ENA, 2023), this would amount to 13.7GW which is more than 23% of the 2023 peak demand of 58GW.

In light of this, this paper aims to explore the issue of managing network connection queues using concepts from mechanism design, auction theory and queuing theory.

We find that the current initial primary allocation of connection rights was found not to be incentive compatible, with the rational strategy of potential customers being to

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overstate their private value and to join the queue even with purely speculative projects. While an auction for connection rights may raise issues of discrimination and be legally difficult to introduce, the allocation may benefit from some changes.

These include reviewing connection fees to discourage speculative applications including holding more money up front or insisting that certain, costly, milestones be met before a place in the queue is fully secured. Also, the potential of a beauty contest with various non-price criteria should be explored. This is somewhat similar to proposals for better evaluating customer readiness. A beauty contest could go beyond readiness and include other priority criteria (such as positive local employment or housing impacts). These must result from consultations with stakeholders (including the government) to avoid the risk of a backlash from consumers and the risk implementing unfair discrimination.

Another improvement we suggest is the trading of queue positions between consenting customers, allowing third parties to maintain their FCFS position. Such a mechanism has been found to have significant potential for efficiency improvements, even if not all welfare improving trades occur. The system may have some vulnerabilities, such as incentives for scalping, would incur some transaction costs, and may require restrictions on who can trade with who. There are important risks that need to be managed including a wider backlash against the perceived profiteering, undermining perceived fairness of the FCFS rule, especially if this is seen to accelerate projects with low actual or perceived public benefit (but low ability to pay) over those with high actual or perceived public benefit.

In addition, important aspects need to be clarified, and trialled, and are best suited for a consultation. These include the ability of multiple swapping, splitting connections into fractions, data privacy and protection of commercially sensitive information, the price setting process, the implications of a trade in terms of energization dates and connection fees, the allocation of oversight responsibilities and trading system fees, and the platform management.

Contact Publication Financial Support daniel.duma@sei.org June 2025 UKPN