

# Incentive regulation, productivity growth and environmental effects: the case of electricity networks in Great Britain.

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**Abstract** We analyse the productivity growth of electricity transmission and distribution networks in Great Britain and how changes in incentive mechanism have influenced the measured total factor productivity (TFP). In doing so we are also concerned to examine the effects of quality of service and environmental targets on measured productivity growth. It is increasingly important that productivity measures adjust for the increasing regulatory pressure to reduce the wider societal impacts of the electricity sector and improve quality of service. Failure to do so, may mean that productivity growth may look slower than it actually is. We employ a DEA technique which considers the underlying data without a stochastic element. Our findings show that productivity growth is consistently low for the period we examine, in the region of 1% p.a. over the 29 years from 1990/1991-2018/2019. For both electricity transmission and electricity distribution we try to monetise a wider range of quality and emissions variables in order to show the difference their inclusion makes to measured productivity growth. We show that it can make a difference both positively and negatively, though often this difference is small (e.g. 0.1% p.a.). However, the impact can be much larger (c. 1% p.a.), especially with respect to improvements in quality of service in the distribution network. In the context of generally slow productivity growth, we therefore show the importance of appropriate measurement.

**Keywords:** Total factor productivity, incentive regulation, electricity networks, emissions.

**JEL Classification:** D24, H23, L43, L94

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