



## Ancillary services in Great Britain during the COVID-19 lockdown: A glimpse of the carbon-free future

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### Summary

The COVID-19 pandemic led to partial or total lockdowns in several countries during the first half of 2020, which in turn caused a depressed electricity demand. In Great Britain (GB), this low demand combined with large renewable output at times, created conditions that were not expected until renewable capacity increases to meet emissions targets in coming years. The GB system experienced periods of very high instantaneous penetration of non-synchronous renewables, compromising system stability due to the lack of inertia in the grid. In this paper, a detailed analysis of the consequences of the lockdown on the GB electricity system is provided, focusing on the ancillary services procured to guarantee stability. Ancillary-services costs increased by £200m in the months of May to July 2020 compared to the same period in 2019 (a threefold increase), highlighting the importance of ancillary services in low-carbon systems. Furthermore, a frequency-secured scheduling model is used in the present paper to showcase the future trends that GB is expected to experience, as penetration of renewables increases on the road to net-zero emissions by 2050. Several sensitivities are considered, demonstrating that the share of total operating costs represented by ancillary services could reach 35%.

### Highlights

- The GB electricity grid experienced an operational challenge due to low inertia.
- Cost of ancillary services during lockdown was 3 times higher than in 2019.
- This cost could reach up to 35% of total operating costs by 2030.
- Fast frequency response shows to be very beneficial in the future system.



The TradeRES project will develop and test innovative electricity market designs that can meet society's needs of a (near) 100% renewable power system. The market design will be tested in a sophisticated simulation environment in which real-world characteristics such as actors' limited foresight into the future and risk aversion are included.



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