Summary of Dataset:

Impact of the COVID-19 Lockdown on the Electricity System of Great Britain: A Study on Energy Demand, Generation, Pricing and Grid Stability

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This dataset is published in relation to the article titled "Impact of the COVID-19 Lockdown on the Electricity System of Great Britain: A Study on Energy Demand, Generation, Pricing and Grid Stability" which is accepted to the Energies journal and also exists as a preprint (doi: 10.20944/preprints202011.0348.v1)

The aim of this study was to assess the effect of the March 2020 lockdown on the electricity system and market. This dataset contains all of the data used for the analyses and plots presented in the paper which uses Britain as a case study. It primarily contains data from March 2020. However, it additionally has March 2019 data in some subfolders as in some cases March 2019 and 2020 were compared.

The dataset is separated into 4 main categories following the structure of the paper (please see the next page for more details):
(1) Demand,
(2) Generation,
(3) Forecast and Grid Stability,
(4) Pricing.

The abbreviations used in the file names are explained below. More information can be found on https://www.bmreports.com/bmrs/?q=help/glossary.

Table 1: Structure of the dataset with the corresponding period and resolution values.

Label	*Period*	*Resolution*
1 DEMAND		
ROLSYSDEM	March 2020	5 min
Rolling System Demand		
TEMP	March 2020	Daily
Average Daily Temperature in Britain		
2 GENERATION		
FUELHH	March 2019	Half-hourly (30 min)
Half-hourly Generation by Fuel Type	March 2020	
3 FORECAST AND GRID STABILITY		
3.1 FREQUENCY		
FREQ	March 2020	15 sec
(System) Frequency		
3.2 LOAD FORECAST ERROR		
INDO	March 2019	Half-hourly (30 min)
Initial Demand Out-turn	March 2020	
ITSDO	March 2019	Half-hourly (30 min)
Initial Transmission System Demand Out-turn	March 2020	
NDF	March 2019	Half-hourly (30 min)
National Demand Forecast	March 2020	
TSDF	March 2019	Half-hourly (30 min)
Transmission System Demand Forecast	March 2020	
3.3 IMBALANCE VOLUME		
Imbalance Volume	March 2020	Half-hourly (30 min)
Actual Load	March 2019	Half-hourly (30 min)
	March 2020	
3.4 LOSS OF LOAD		
LOLPDRM	March 2020	Half-hourly (30 min)
Loss of Load Probability and De-rated Margin		
4 PRICING		
4.2 IMBALANCE PRICE		
Imbalance Price	March 2020	Half-hourly (30 min)
4.3_VARIABLE DOMESTIC TARIFF		
Octopus Agile Tariff Buy Prices	March 2020	Half-hourly (30 min)
Octopus Agile Tariff Sell Prices	March 2020	Half-hourly (30 min)

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https://www.elexon.co.uk/operations-settlement/bsc-central-services/balancing-mechanism-reporting-agent/copyright-licence-bmrs-data/

Energy Stats UK. Octopus Agile Tariff data is provided by the energy-stats.uk website.

Abstract:
The outbreak of SARS-COV-2 disease 2019 (COVID-19) abruptly changed the patterns in electricity consumption, challenging the system operations of forecasting and balancing supply and demand. This is mainly due to the mitigation measures that include lockdown and work from home (WFH), which decreased the aggregated demand and remarkably altered its profile. Here, we characterise these changes with various quantitative markers and compare it with pre-lockdown business-as-usual data using Great Britain (GB) as a case study. The ripple effects on the generation portfolio, system frequency, forecasting accuracy and imbalance pricing are also analysed. An energy data extraction and pre-processing pipeline that can be used in a variety of similar studies is also presented. Analysis of the GB demand data during the March 2020 lockdown indicates that a shift to WFH will result in a net benefit for flexible stakeholders, such as consumers on variable tariffs. Furthermore, the analysis illustrates a need for faster and more frequent balancing actions, as a result of the increased share of renewable energy in the generation mix. This new equilibrium of energy demand and supply will require a redesign of the existing balancing mechanisms as well as the longer-term power system planning strategies.

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