



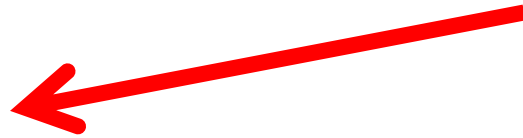
# Multi-vector energy diagram Great Britain - daily resolution

Data from: January 2017 to March 2021 (2021-Q1)

Great Britain was subject to Covid-19 social distancing measures from March 2020

Latest version of this slidepack from:

<https://doi.org/10.5281/zenodo.3930970>





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This slidepack is produced as an aid to teaching and learning, as a reference of Great Britain's recent energy transition, and an indication of the challenges ahead.

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- On limited occasions, there are errors in the data that have been manually corrected. For most erroneous values, a linear interpolation has been used to correct data points between the two nearest valid values.

## Data sources:

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The underlying electrical and natural gas data are available at a geographical level of Great Britain rather than the United Kingdom (Northern Ireland is not included).

Embedded electrical data are from National Grid and transmission connected electrical data are from Elexon. Electrical demand methodology can be found in pre-print paper: <http://arxiv.org/abs/2006.15717>

Gas data are from National Grid's data explorer:

<http://mip-prod-web.azurewebsites.net/DataItemExplorer/Index>

The liquid fuels data are available at a United Kingdom level that includes Northern Ireland from:

'Deliveries of petroleum products for inland consumption (ET 3.13)' from <https://www.gov.uk/government/statistics/oil-and-oil-products-section-3-energy-trends>

# Cleaned electrical dataset half-hourly resolution

The data underpinning the electrical system analysis in this presentation has been released on Zenodo. This is a publicly available dataset of half-hourly data from 2009

<https://doi.org/10.5281/zenodo.3884858>

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The screenshot shows the Zenodo dataset page for 'Electrical half hourly raw and cleaned datasets for Great Britain from 2009-11-05'. The page features a blue header with the Zenodo logo, a search bar, and navigation links for 'Upload' and 'Communities'. The main content area includes the dataset title, project leader (Grant Wilson), and researcher (Shivangi Sharma, Joseph Day, Noah Godfrey). It also displays the version history, including a note about a problem with the local time format in version 3.0.0. The page is indexed in OpenAIRE and has a DOI of 10.5281/zenodo.4302184. The publication date is December 2, 2020. The dataset has 1,317 views and 1,045 downloads. The license is Creative Commons Attribution 4.0 International.

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December 2, 2020

Dataset Open Access

## Electrical half hourly raw and cleaned datasets for Great Britain from 2009-11-05

Grant Wilson; Noah Godfrey

**Project leader(s)**  
Grant Wilson

**Researcher(s)**  
Shivangi Sharma, Joseph Day, Noah Godfrey

2020-12-02: Version 3.0.0 was created. There was a problem with earlier versions local time format - where the +01:00 value was not carried through into the data properly. Now addressed - therefore - local time now has the format e.g. 2020-03-31 20:00:00+01:00 when in British Summer Time.

2020-10-03: Version 2.0.0 was created as it looks like National Grid has had a significant change to the methodology underpinning the embedded wind calculations. The wind profile seems similar to previous values, but with an increasing value in comparison to the value published in earlier the greater the embedded value is. The 'new' values are from <https://data.nationalgrideso.com/demand/daily-demand-update> from 2013.

Previously: raw and cleaned datasets for Great Britain's publicly available electrical data from Elexon ([www.elexonportal.co.uk](http://www.elexonportal.co.uk)) and National Grid ([https://demandforecast.nationalgrid.com/efs\\_demand\\_forecast/faces/DataExplorer](https://demandforecast.nationalgrid.com/efs_demand_forecast/faces/DataExplorer)). Updated versions with more recent data will be uploaded with a differing version number and doi

Pre-print of methodology can be downloaded from: <http://arxiv.org/abs/2006.15717>

All data is released in accordance with Elexon's disclaimer and reservation of rights.  
<https://www.elexon.co.uk/using-this-website/disclaimer-and-reservation-of-rights/>

This disclaimer is also felt to cover the data from National Grid, and the parsed data from the Energy Data Analytics Group at the University of Birmingham too.

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Phase 3 Grant funding as part of Research Councils (UK) EP/V012053/1 - The Active Building Centre Research Programme (1406-000)

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• UK Energy Research Centre Phase 3 (EP/L024756/1)

**Communities:**  
Energy Data

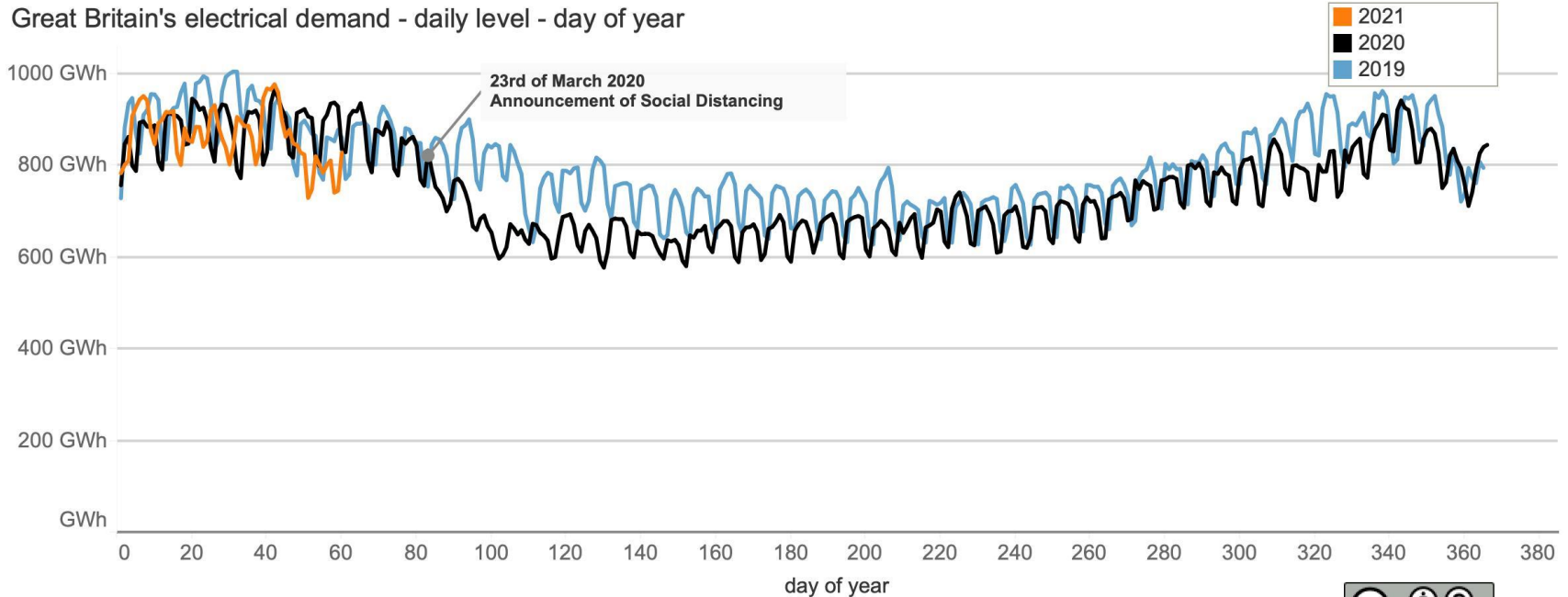
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# Covid-19 impacts on GB's electrical energy system



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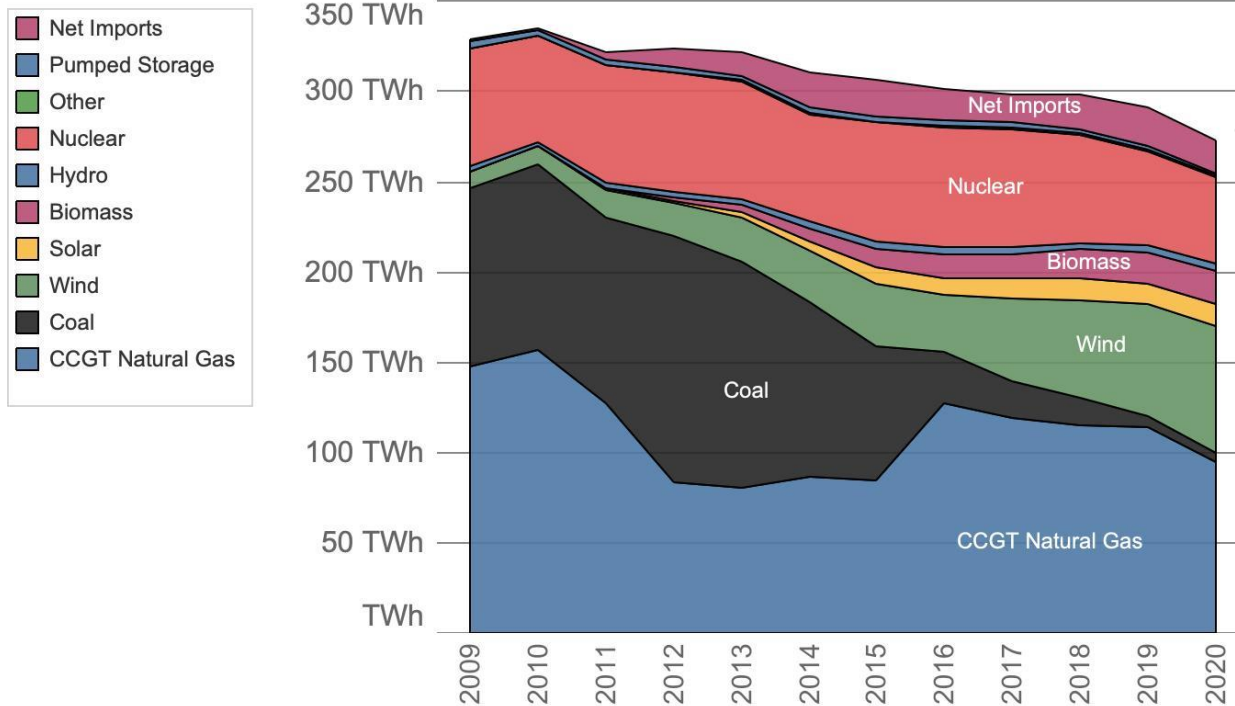


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Underlying data are from National Grid, Elexon and BEIS  
Figure created by Dr Grant Wilson: [i.a.g.wilson@bham.ac.uk](mailto:i.a.g.wilson@bham.ac.uk)  
Energy Informatics Group, University of Birmingham  
data available from <https://doi.org/10.5281/zenodo.3884858>

# GB Electrical demand has dropped and generation has changed

Great Britain's electrical generation, annual level in TWh

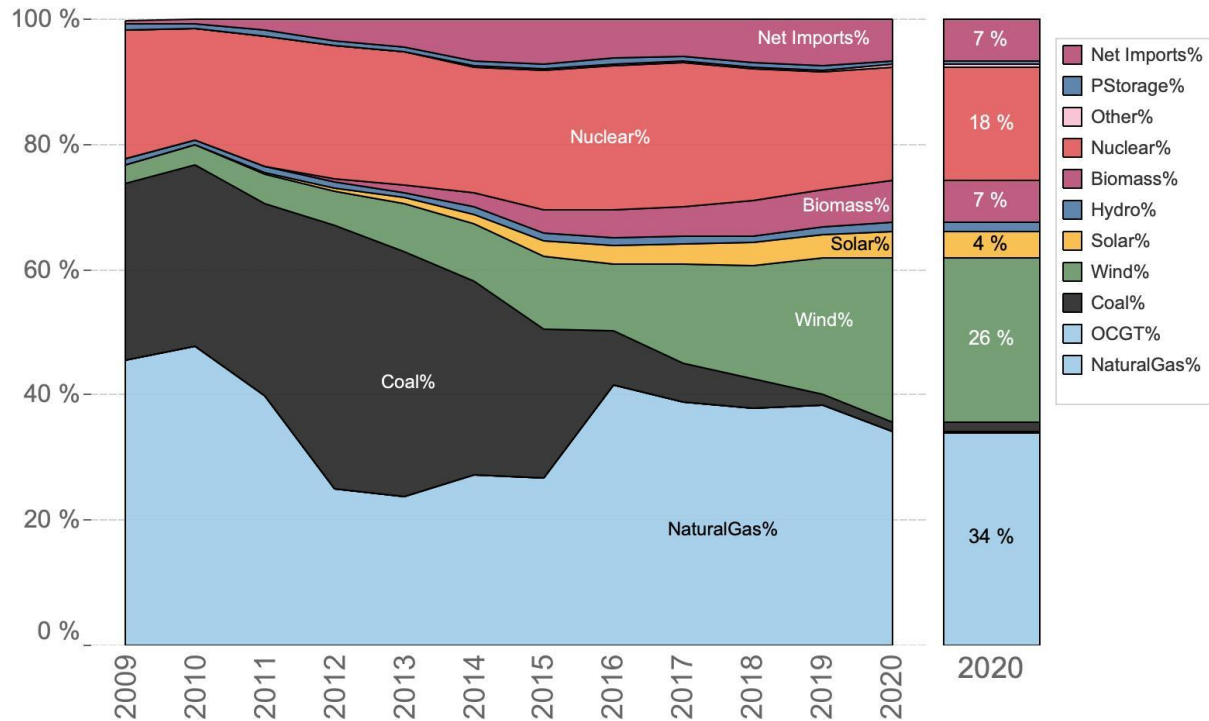


61 TWh (18%)  
reduction from  
2010 to 2020



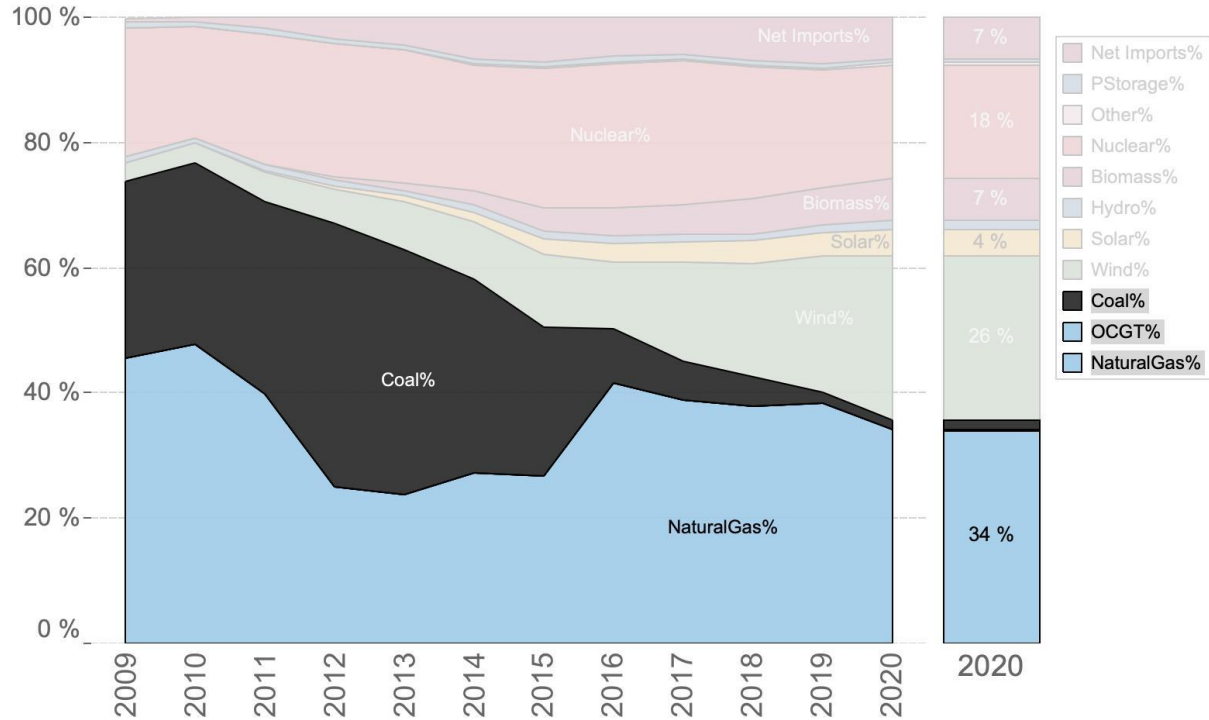
# GB electrical generation, annual % values

Great Britain's generation, % of overall generation and net imports



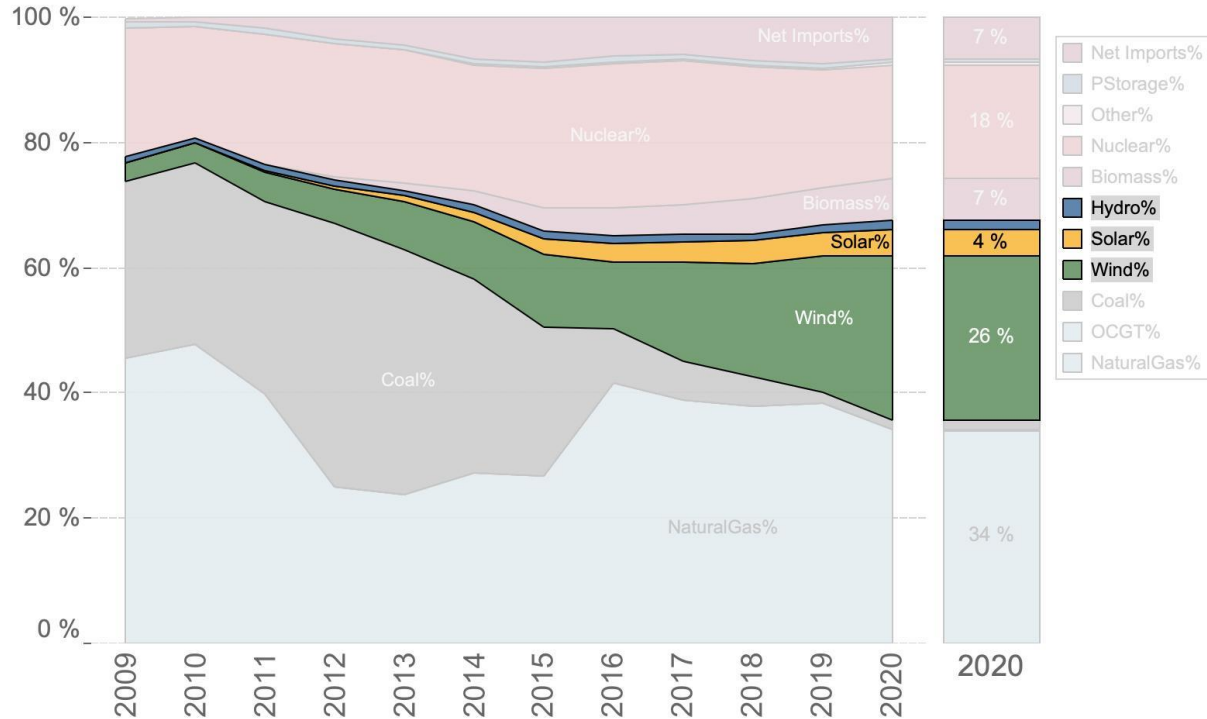
# GB electrical generation, annual % values – fossil fuels

Great Britain's generation, % of overall generation and net imports



# GB electrical generation, annual % values – weather dependent generation

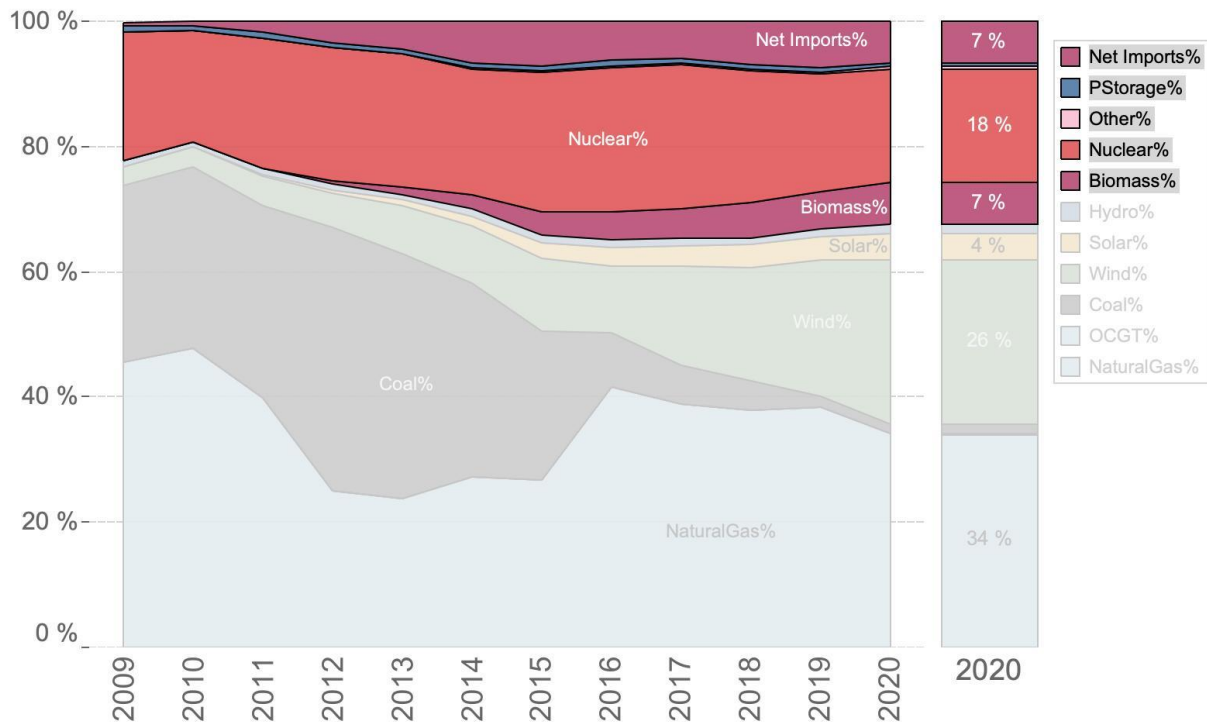
Great Britain's generation, % of overall generation and net imports



In 2020 about a third is from weather dependent renewables  
Wind, Solar, Hydro

# GB electrical generation, annual % values – biomass, nuclear, other, net imports

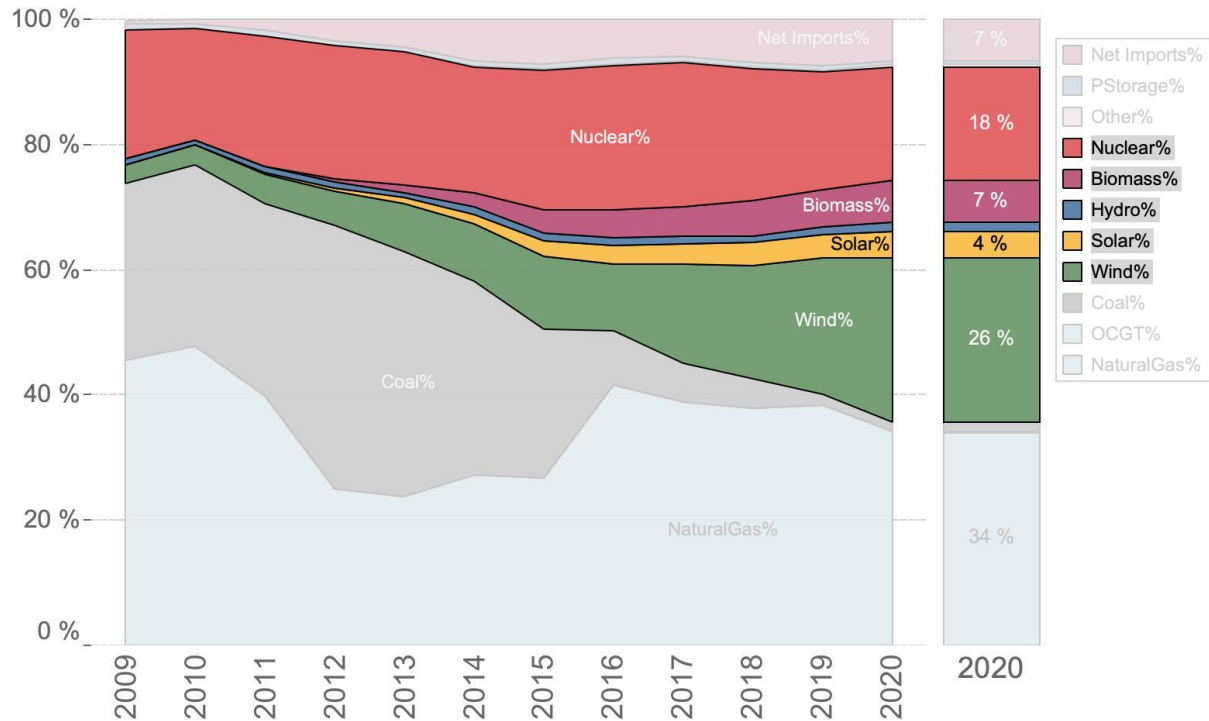
Great Britain's generation, % of overall generation and net imports



In 2020 about a third is from Nuclear, Biomass and Net imports

# GB electrical generation, annual % values – low-carbon

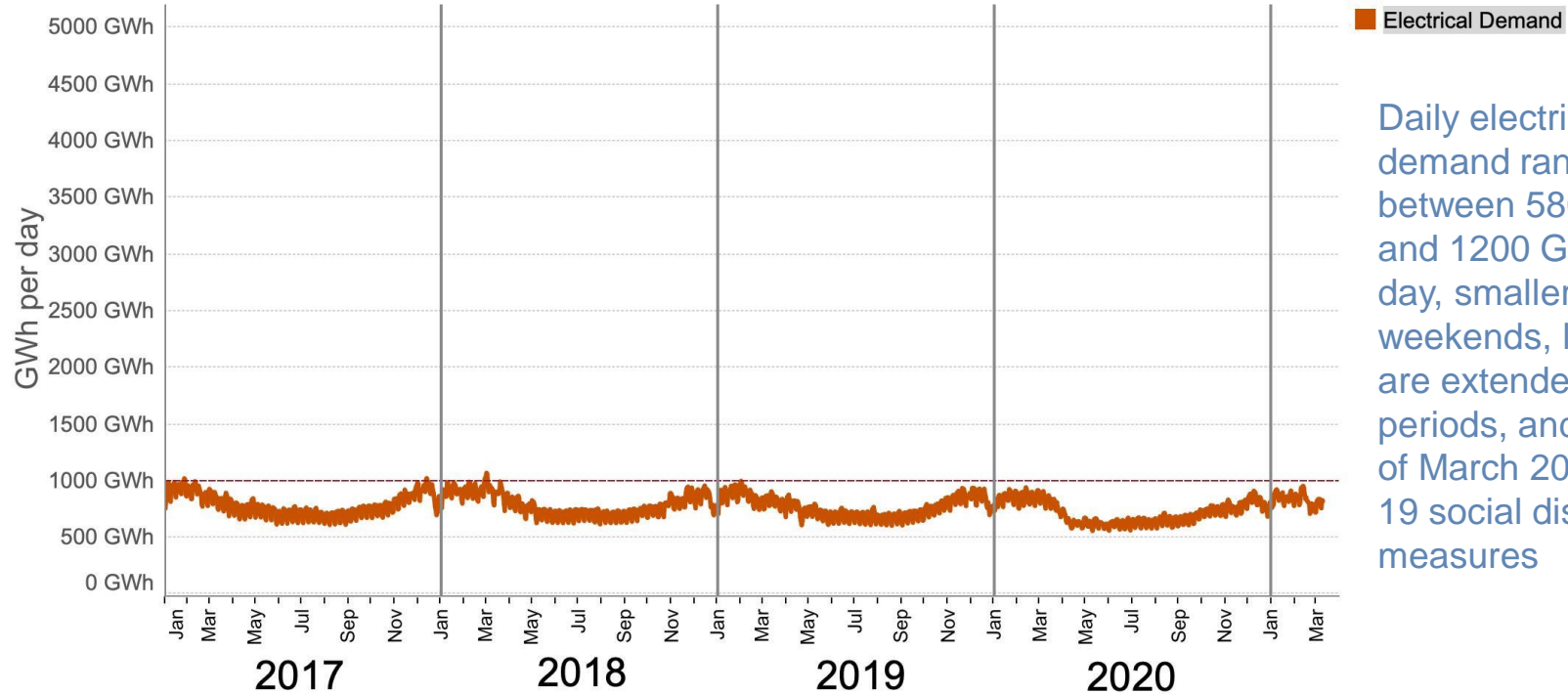
Great Britain's generation, % of overall generation and net imports



In 2020 in Q1 to Q3 about 57% is from:  
 Nuclear  
 Hydro  
 Biomass  
 Solar  
 Wind

# Daily demand

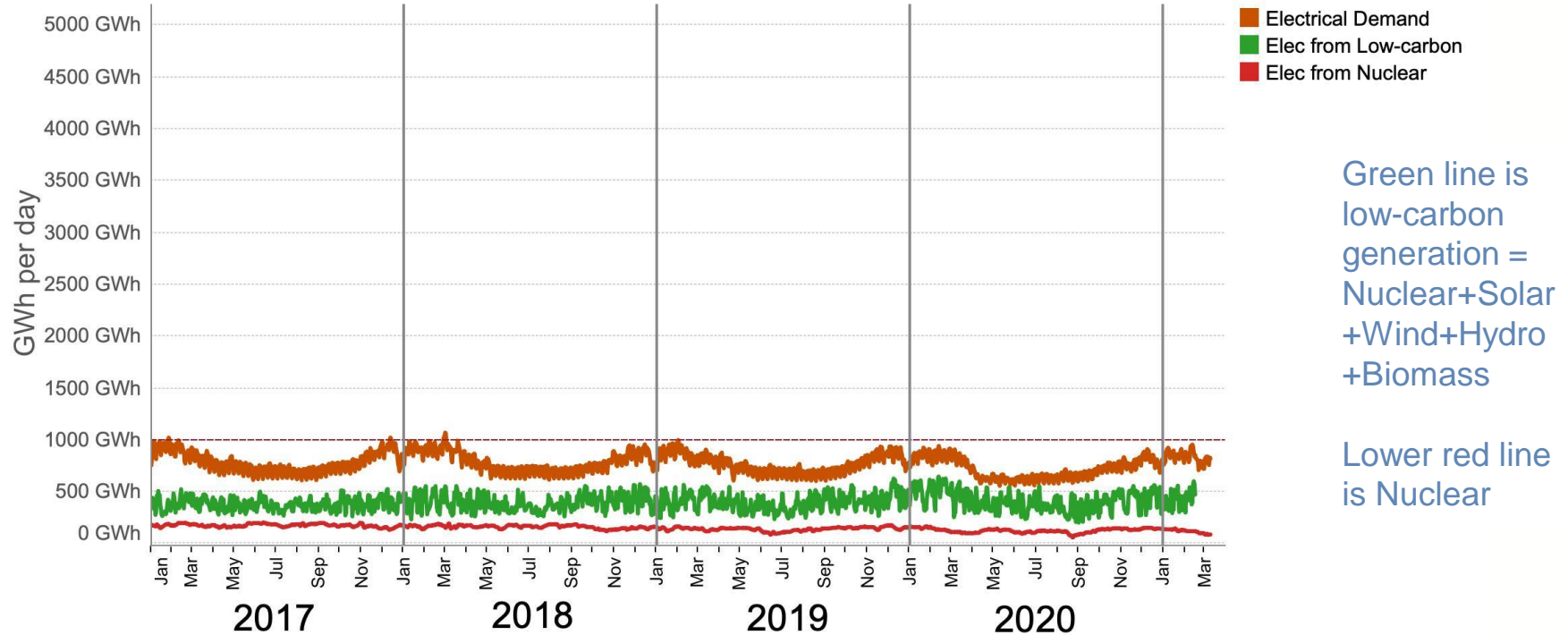
Multi-vector Energy Diagram for Great Britain GWh per day



Daily electrical demand ranges between 580 GWh and 1200 GWh per day, smaller dips are weekends, larger dips are extended holiday periods, and from end of March 2020, covid-19 social distancing measures

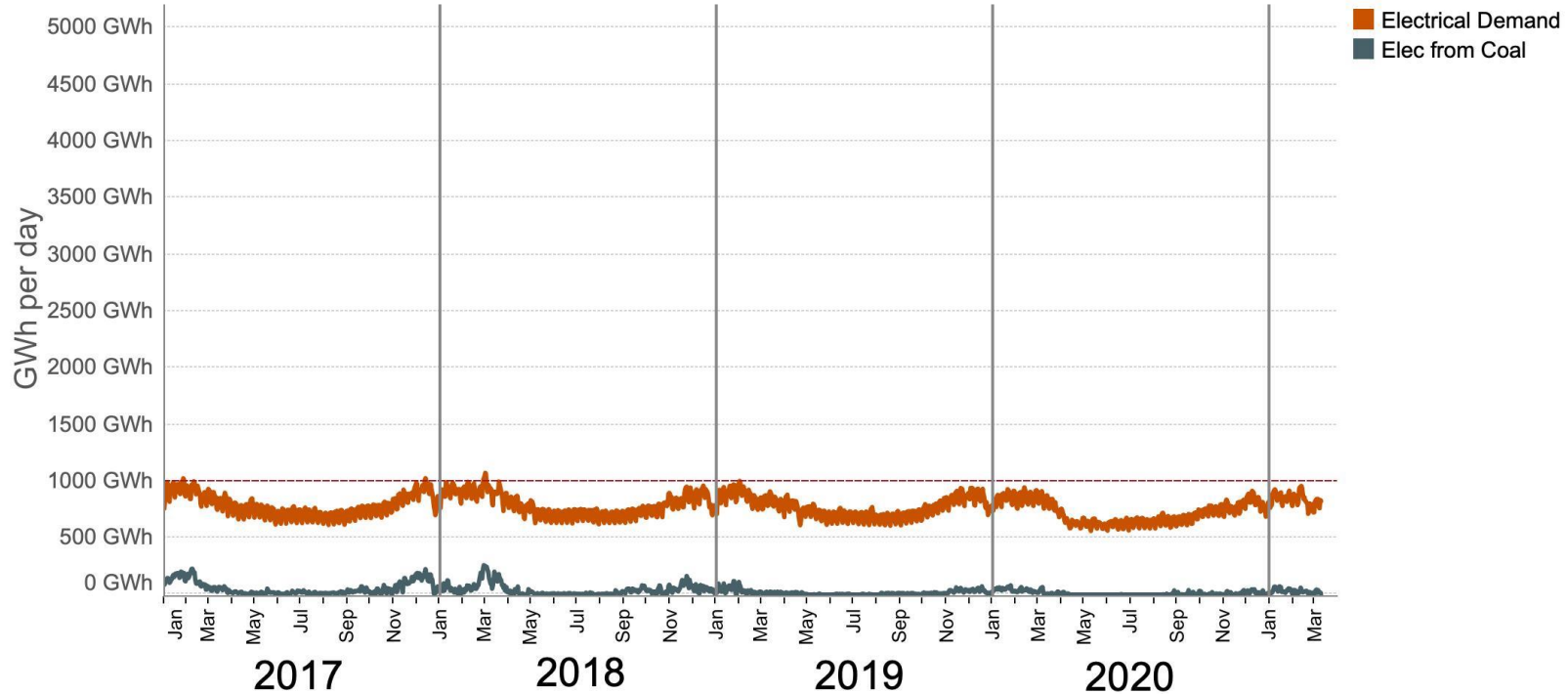
# Daily demand, low carbon generation, nuclear generation

Multi-vector Energy Diagram for Great Britain GWh per day



# Daily demand, coal generation

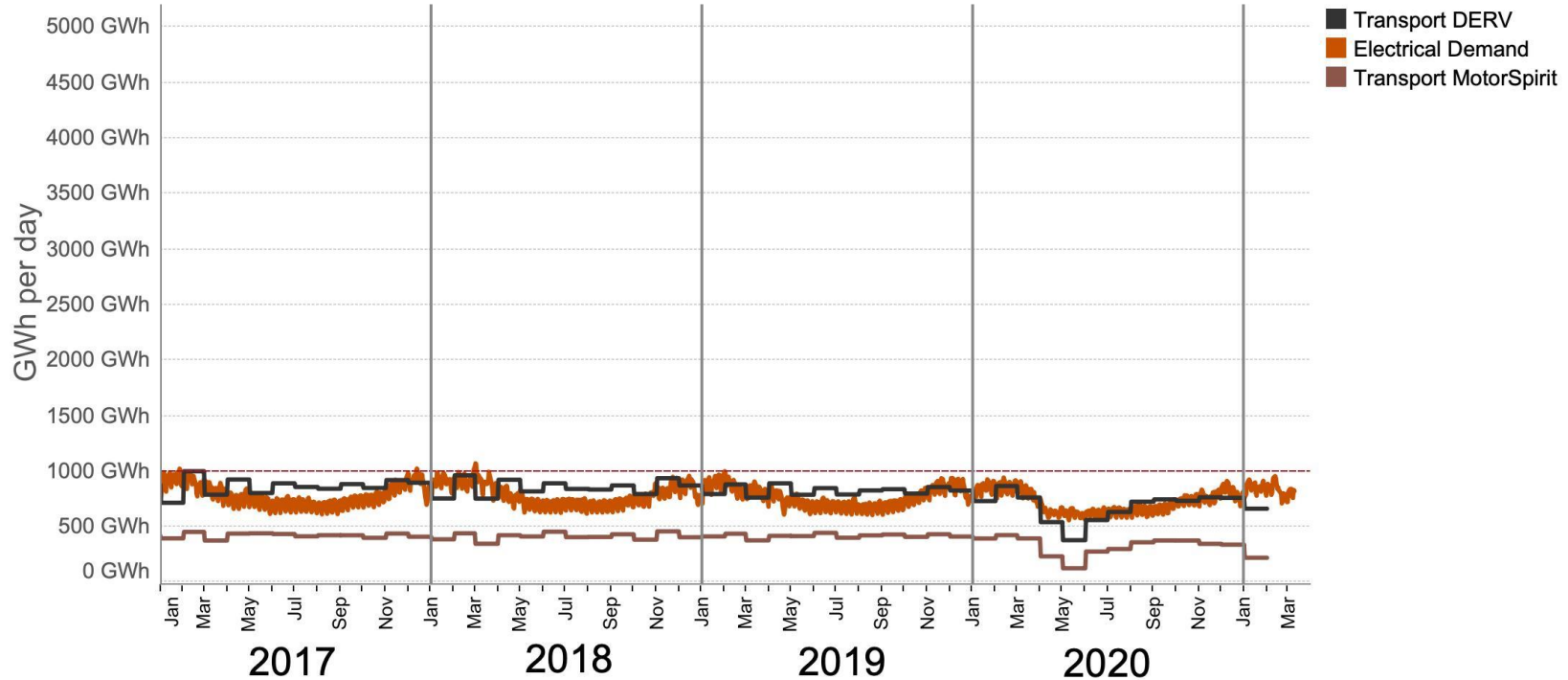
Multi-vector Energy Diagram for Great Britain GWh per day





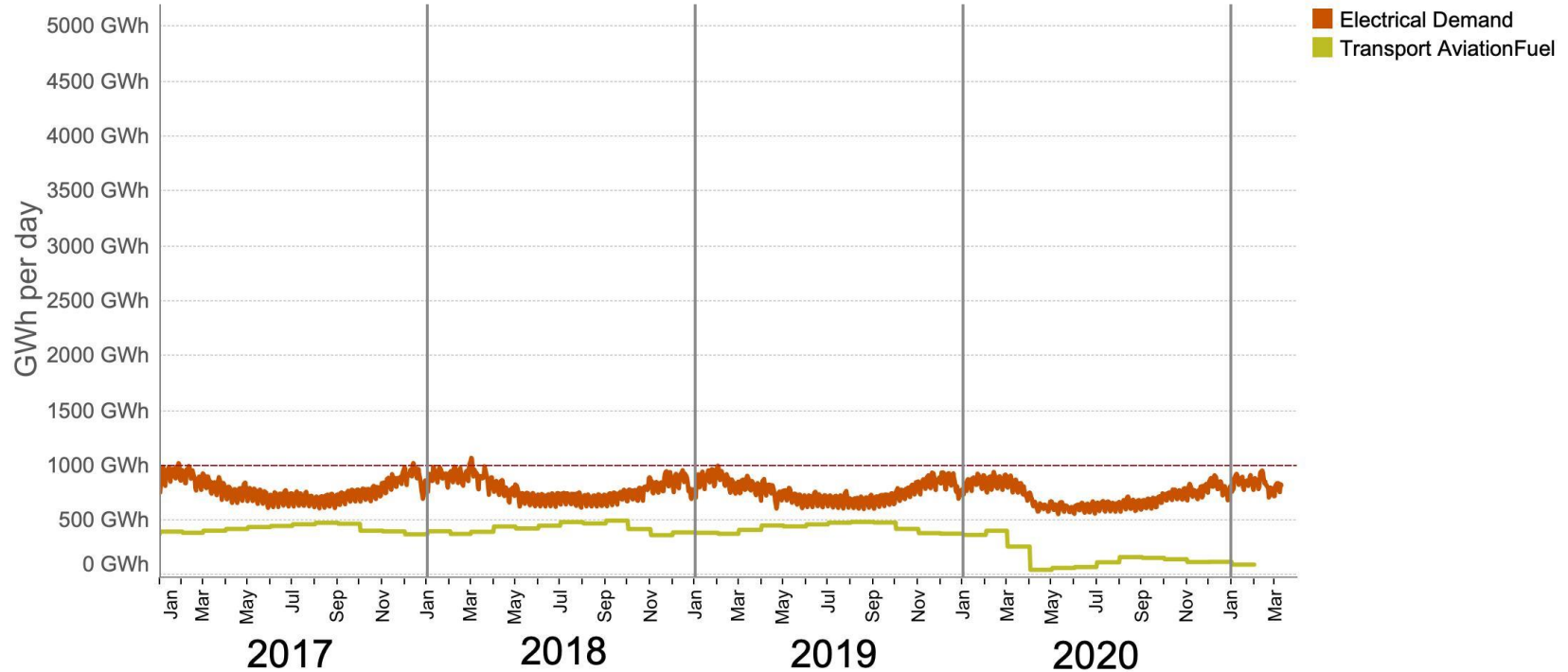
# Daily electrical demand, diesel (DERV), petrol (Motor Spirit)

Multi-vector Energy Diagram for Great Britain GWh per day



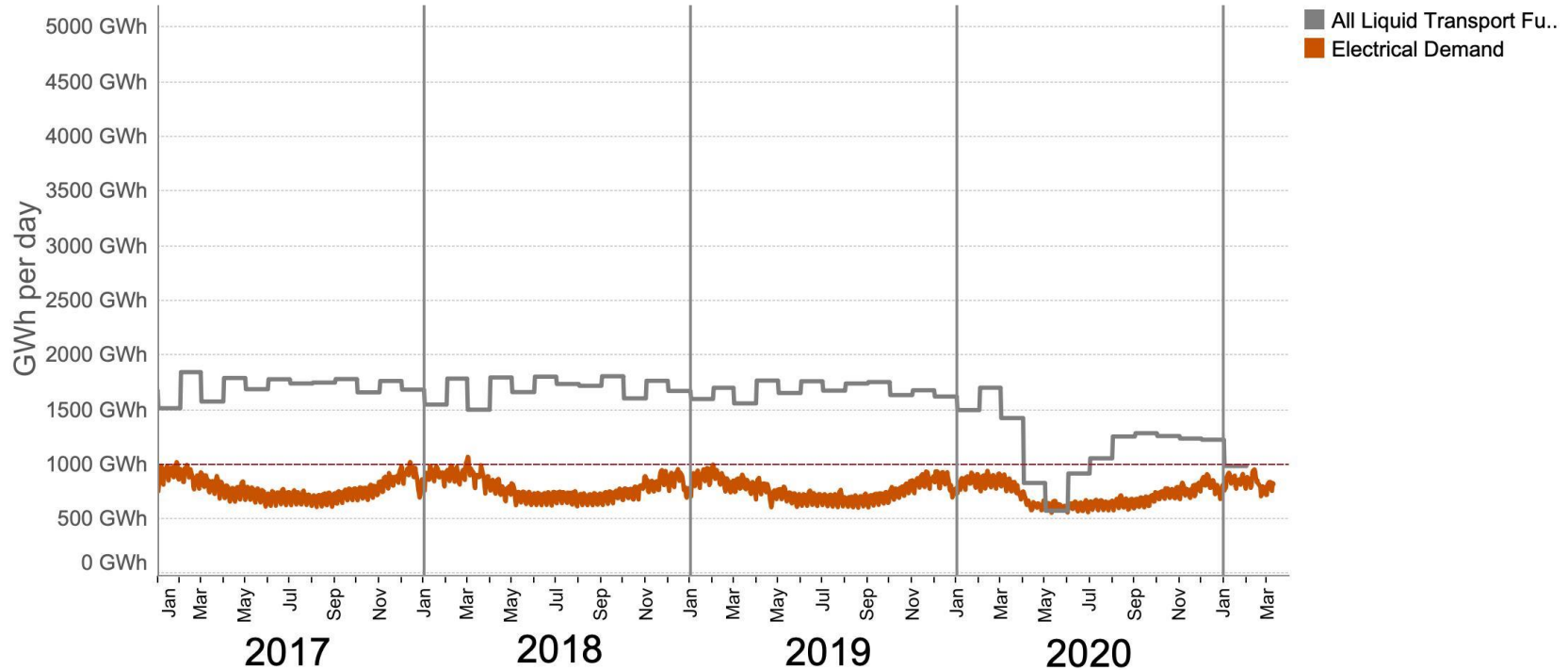
# Daily electrical demand, aviation fuels

Multi-vector Energy Diagram for Great Britain GWh per day



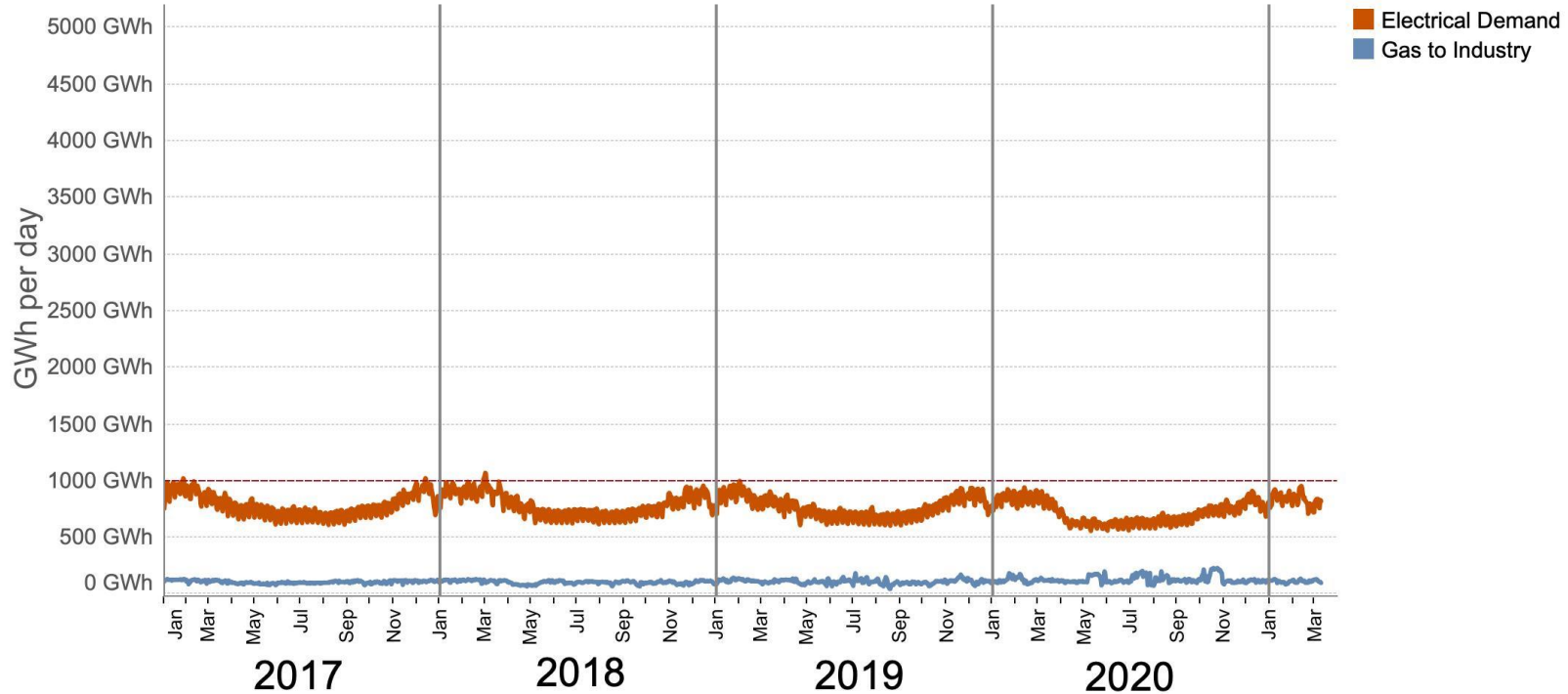
# Daily demand all liquid fuels, electrical demand

Multi-vector Energy Diagram for Great Britain GWh per day



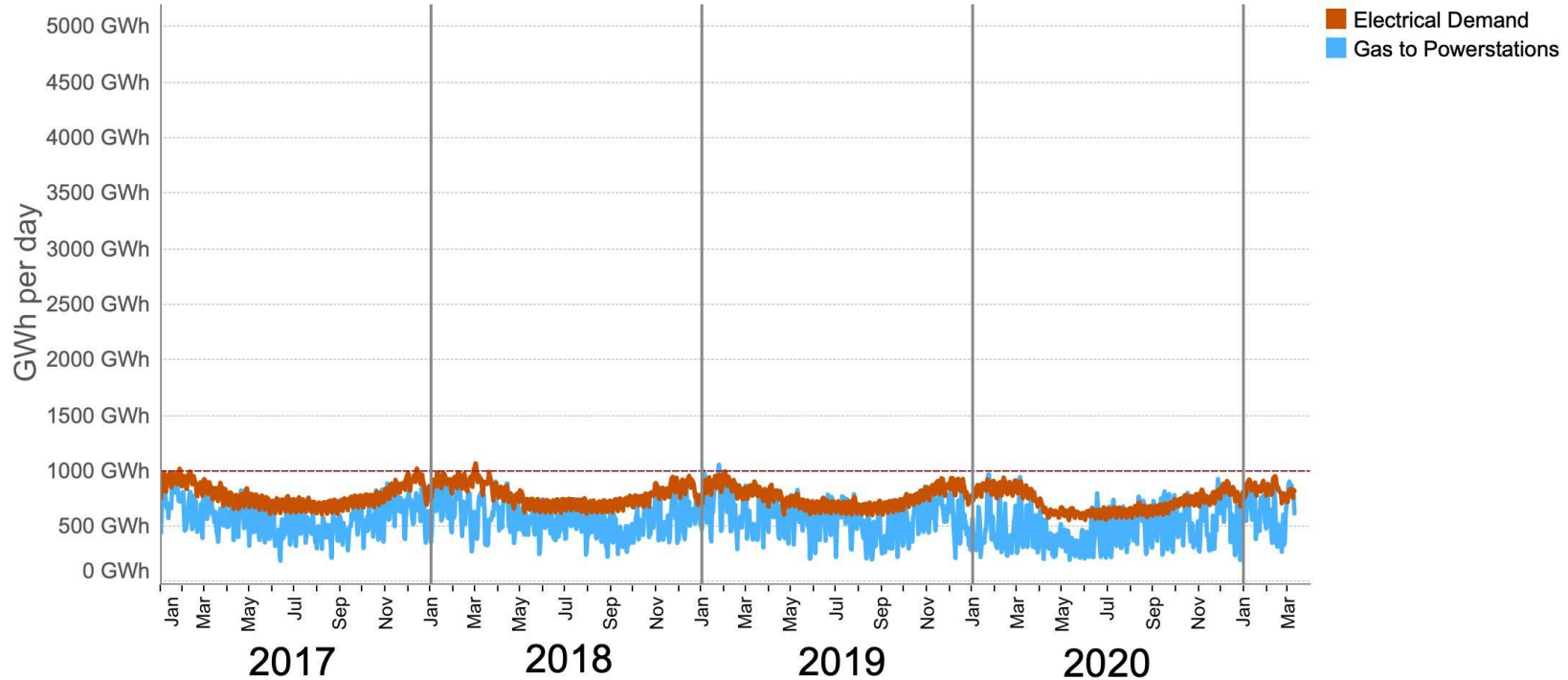
# Daily electrical demand, gas for industry connected to gas transmission system

Multi-vector Energy Diagram for Great Britain GWh per day



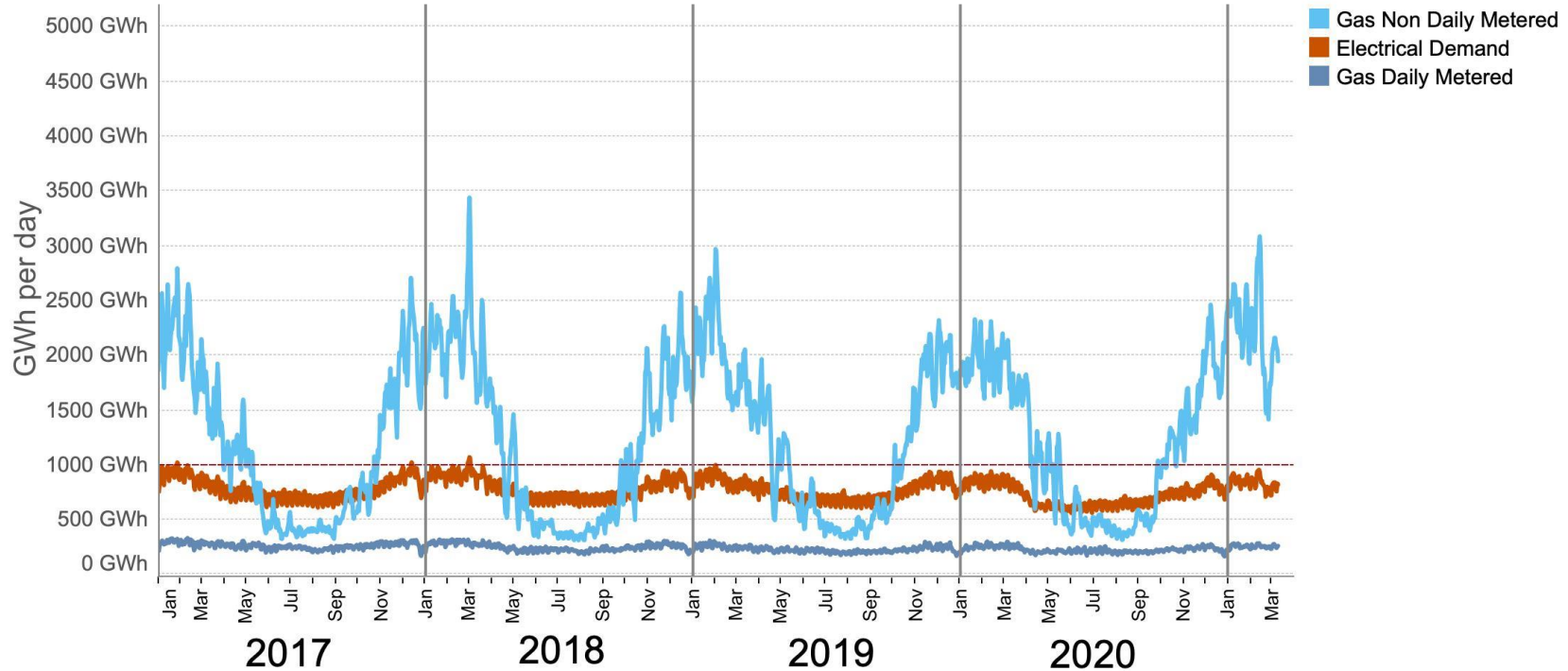
# Daily electrical demand, gas for generation connected to gas transmission system

Multi-vector Energy Diagram for Great Britain GWh per day



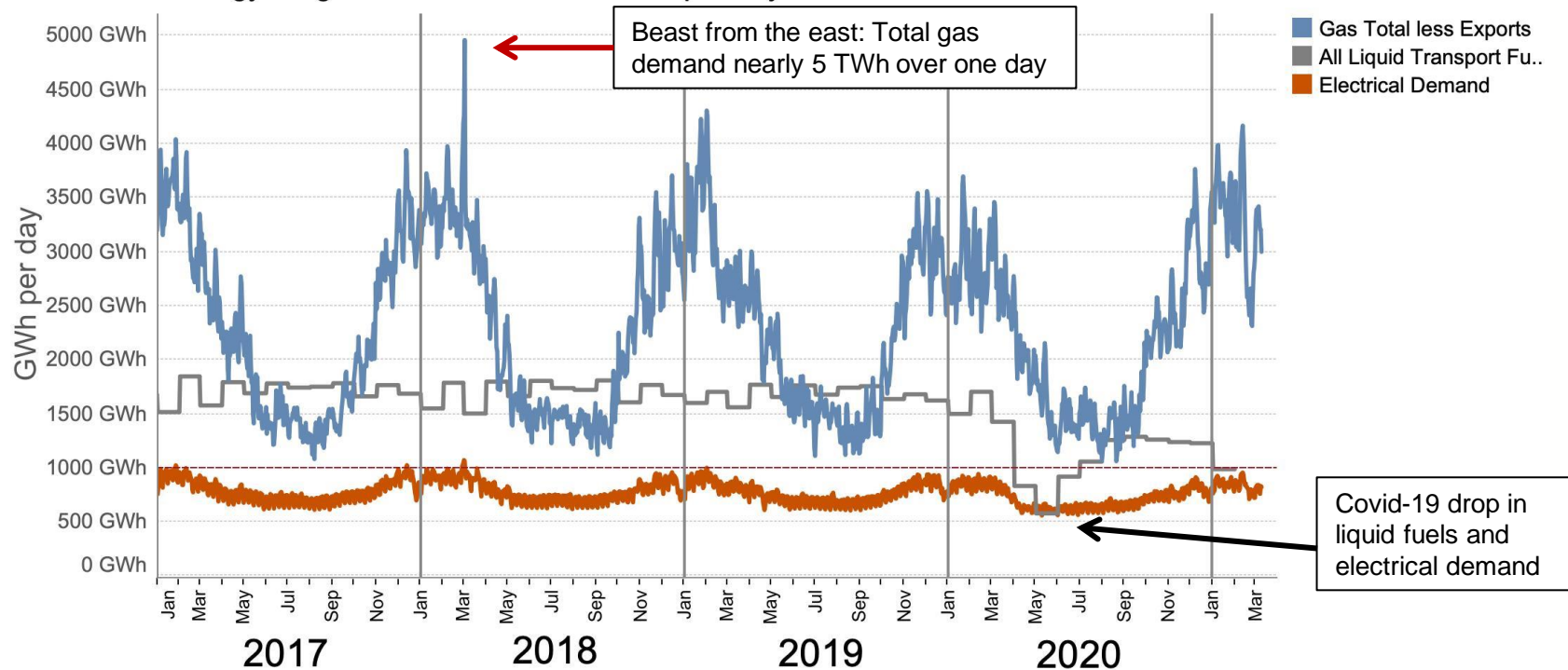
# Daily local gas demand non-daily metered, daily metered, electrical demand

Multi-vector Energy Diagram for Great Britain GWh per day



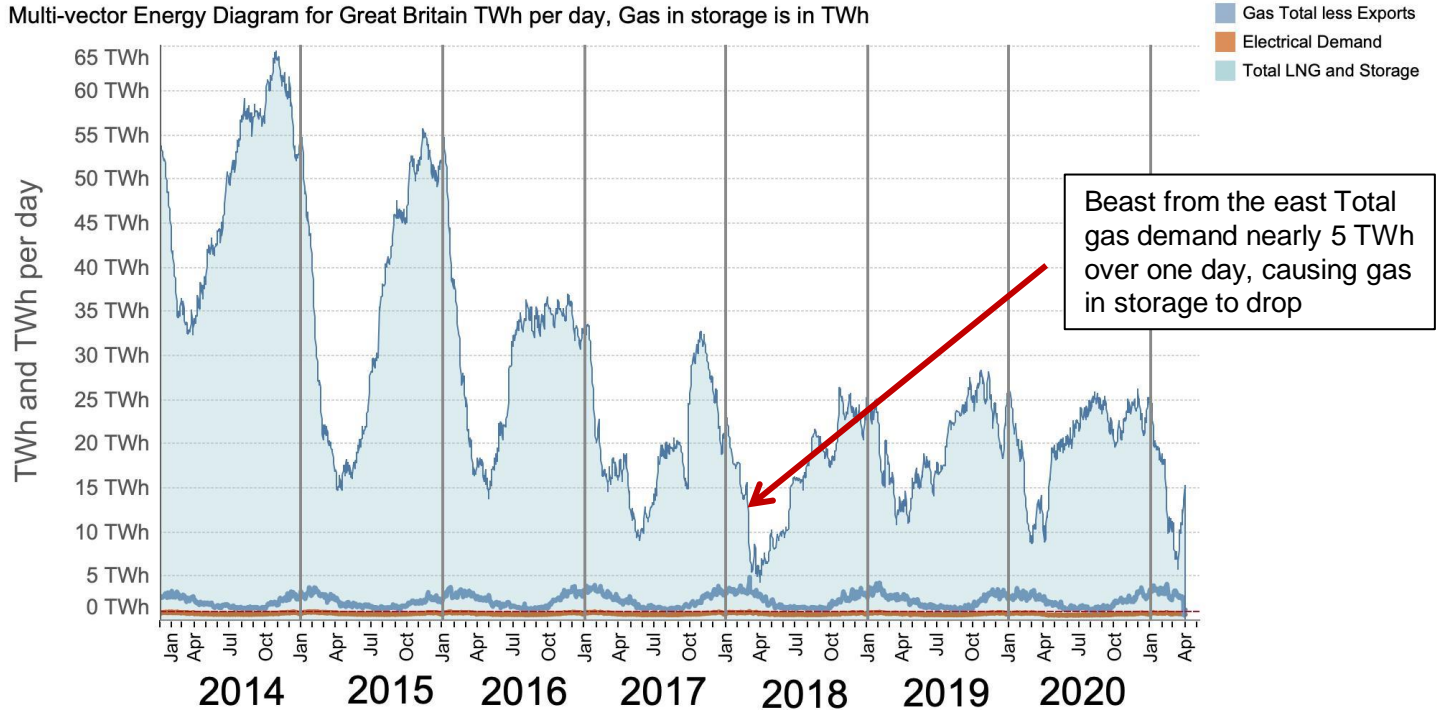
# Daily total gas, all liquid transport fuels, electrical demand

Multi-vector Energy Diagram for Great Britain GWh per day



# Daily total gas, all liquid fuels, electrical demand – and gas in storage

Multi-vector Energy Diagram for Great Britain TWh per day, Gas in storage is in TWh



Underlying data are from National Grid, Elexon and BEIS  
Figure created by Dr Grant Wilson: [i.a.g.wilson@bham.ac.uk](mailto:i.a.g.wilson@bham.ac.uk)  
Energy Informatics Group, University of Birmingham  
slidepack available from <https://doi.org/10.5281/zenodo.3930970>