

## "Looking back to look forward to Net Zero"

### Looking back at changes in energy consumption and the effect likely to continue

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### Introduction:

The UK witnessed some interesting energy numbers for the extreme year that in 2020 due to the impact of COVID-19 restrictions. Some of the values are taken from UK Energy Trends UK, October to December 2020 and 2020<sup>1</sup> published on the 25<sup>th</sup> of March 2021.

In a year when the UK is hosting COP26, I would like to highlight the expertise and work that the statisticians in BEIS undertake. There is a great deal of expertise that the UK could potentially share in terms of best practice, if tasked and resourced to do so. There is also a growing interest in the curation and publishing of more detailed data for the UK too, which would be of interest to Local Authorities and be helpful in the creation and validation of Local Area Energy Plans. Again, this might be an area that BEIS could consider if tasked and resourced to do so.

### Headline annual values:

Great Britain's primary energy dropped by 14%, or about 200 TWh in 2020 compared to 2019.

### Liquid Fuels:

Not surprisingly with restrictions on travel for much of 2020, the biggest reductions in primary energy came from liquid transport fuels. Aviation fuel, petrol and diesel saw a combined 29% drop overall, and aviation fuel in particular saw a 60% drop over its 2019 values. This led to a reduction on 'Taxes on Production and Fuel Duties' of just over 5 billion pounds<sup>2</sup>. This took fuel demand for aviation and road transport back to the 1980's.

### Natural Gas

Total natural gas demand (less exports) was down 6%, with a reduction of 16% in the power sector and 3% in local gas demand (the majority of which is space heating and hot water). There was a drop in the service and industrial sectors, but a slight increase of 0.8% despite warmer weather due to the stay-at-home orders for households. Interestingly, gas demand as a fraction of overall primary energy demand was its highest ever (depending on the method used to calculate primary energy demand it will be between 50-55%).

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/976000/Energy\\_Trends\\_March\\_2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/976000/Energy_Trends_March_2021.pdf)

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<https://www.ons.gov.uk/economy/governmentpublicsectorandtaxes/publicsectorfinance/timeseries/cudg/pu/sf>

## Electricity:

Looking at electrical demand for England and Wales only (to compare to a historical dataset) 2020 had a similar reported overall demand to 1978, just before the All-Party Parliamentary Group on Energy Studies was created. However, there were 10 million fewer people living in England and Wales at the time, meaning the per capita electrical demand in 2020 is likely to be further back in time to the early 1970s. Great Britain's electrical system was coal free for nearly 60% of 2020; coal supplied under 1.5% of Britain's electricity. Renewables (wind, solar, hydro and biomass) generated more electricity than fossil fuels for the first ever time, a watershed moment for Britain. However, the lack of wind in Q1-2021 means wind output in 2021 may be similar to or even less than in 2020, a multi-year contingency that future energy systems will have to prepare for.

Notwithstanding the impact of COVID-19 restrictions in 2020, data over the medium-term to 2019 shows that electricity continues its decline (a drop of 15% since the peak year in 2005), gas demand also continues to reduce (a drop of 22% since the peak year in 2004). The increase in customer bills has undoubtedly been a factor in reducing overall gas and electrical demand, but so too has a change in the economy, greater levels of imports, building fabric improvements and efficiency of devices. However, liquid fuel demand has been on a relatively stubborn path for some time (a drop of 8% since the peak year in 2007), as the benefits of more efficient vehicles have been countered by the growth in transport from SUVs and air travel.

In terms of the progress towards net-zero UK 2020, emissions dropped by an estimated 10.7% from 2019<sup>3</sup> as nearly 200 TWh of fossil liquid fuels were simply not combusted to provide transport. There is a strong policy direction to shift away from liquid fuels to electric vehicles powered by low-carbon electrical generation, so the drop in liquid fuel demand will be seen again in the future (they have to be to less than this to meet net-zero), but the drop in actual transport demand is something that the wider British public(s) are unlikely to wish to repeat.

Since 2016 natural gas has consistently provided about 80% of the non-liquid fuels (non-transport) primary energy for Great Britain. This points to the current importance of natural gas to Great Britain's energy systems. In terms of emissions, gas has remained the highest fraction of annual carbon emissions since 1995 and is estimated to be nearly 52% of UK's territorial CO<sub>2</sub> emissions in 2020. The combustion of natural gas is incompatible with net-zero targets – and the shift away from natural gas is arguably the most challenging for the UK's energy system to address to reach net-zero. Natural gas not only provides the 80% of energy to meet non-transport primary energy, but it also crucially underpins the flexibility to balance the supply of energy over sub-daily to seasonal timeframes *i.e.*, where and when the energy is delivered. The replacement of this balancing is an area that needs to be addressed without fossil fuels if the UK is to meet its net-zero target.

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/972583/2020\\_Provisional\\_emissions\\_statistics\\_report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/972583/2020_Provisional_emissions_statistics_report.pdf)