

### Key Findings

Replacing the UK gas supply with hydrogen will require ~150 TWh of seasonal storage capacity

We calculate a P50 value of 6900 TWh of hydrogen working gas capacity in natural gas fields and 2200 TWh in porous saline formations on the UK continental shelf

Most of this capacity is located in natural gas fields in the Southern North Sea where existing infrastructure and several GW of existing and planned offshore wind developments could be utilised to develop large-scale offshore hydrogen production.

### Method

Database previously used to calculate carbon dioxide storage capacities<sup>4</sup>

Filtered for suitability

Converted pore volumes to hydrogen storage capacity

TWh  
1000  
100  
10

Southern North sea gas field hydrogen storage capacities

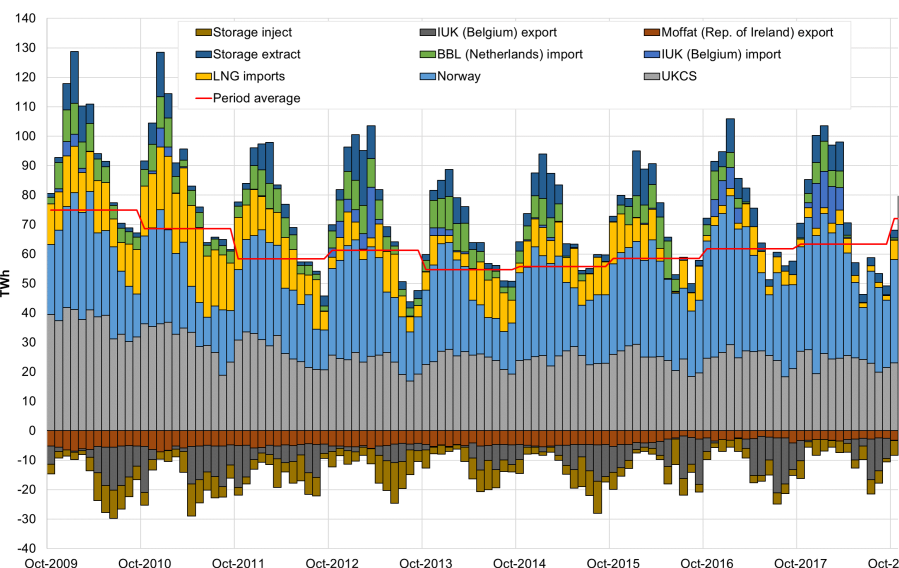
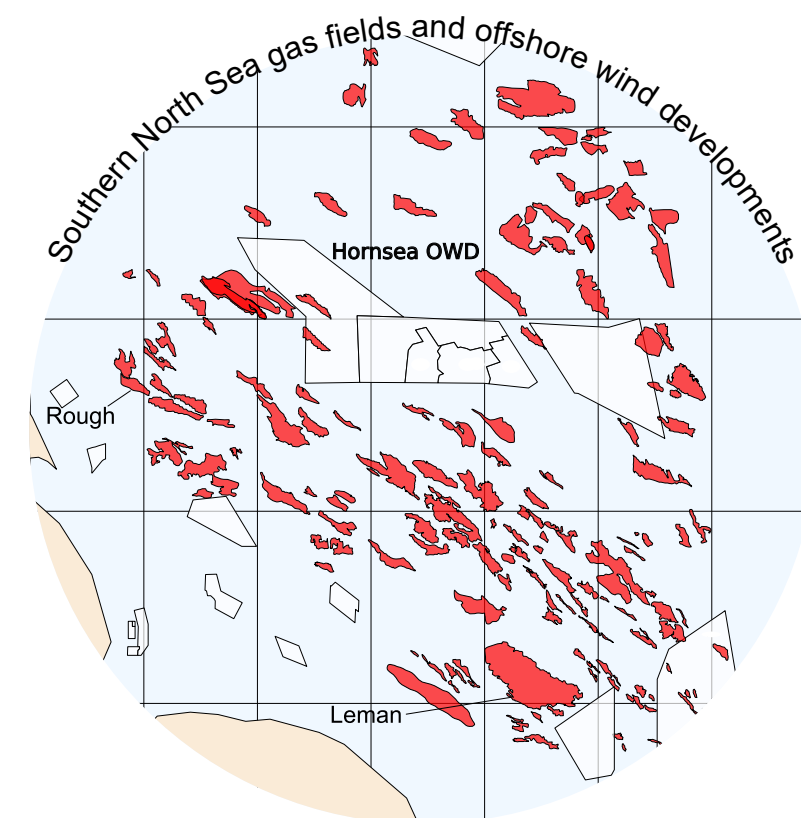
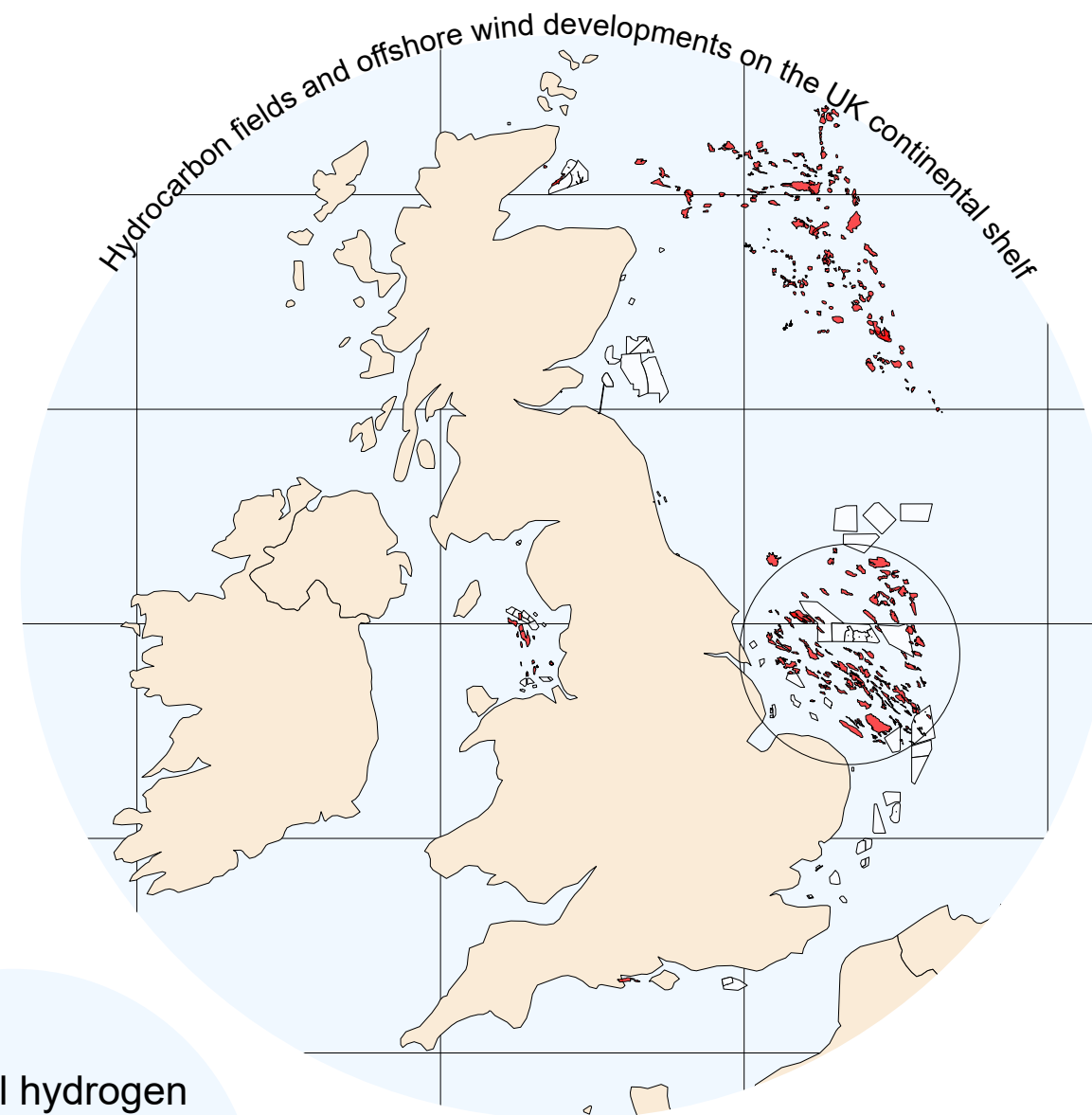


Figure 1: UK gas demand and supply source. Data from Ofgem<sup>1</sup>.

### UK gas supply

Highly seasonal with over 70% from UK and Norway gas fields<sup>1</sup>

Total above average demand in winter of 2017/18 was 133.5 TWh

2018 UK gas demand was 881 TWh<sup>2</sup>

### Seasonal hydrogen storage requirement:

This study calculates at least 133.5 TWh

Energy Research Partnership (ERP) study<sup>3</sup> implies ~150 TWh

### References

- Ofgem. Gas demand and supply source by month (GB). Ofgem data portal <https://www.ofgem.gov.uk/data-portal/gas-demand-and-supply-source-month-gb> (2019).
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- Energy Research Partnership. Potential Role of Hydrogen in the UK Energy System. ERP Reports <http://erpuk.org/wp-content/uploads/2016/10/ERP-Hydrogen-report-Oct-2016.pdf> (2016).
- Bentham, M., Mallows, T., Lowndes, J. & Green, A. CO2STORage evaluation database (CO2Stored). The UK's online storage atlas. Energy Procedia 63, 5103–5113 (2014).