A hydrogen economy in the Humber

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Dr Gesa Reiss

The Humber - The UK's Energy Estuary

- 1/6 of the UK's electricity generation
- 2 major oil refineries - the Humber refines 30% of the UK's fuel.
- Natural gas infrastructure: landing (20% of UK demand), storage and processing.
- High density of energy-intensive industries - Industrial and commercial energy use in the region = 6% of England's energy use (2015)
- Significant number of offshore and onshore wind farms

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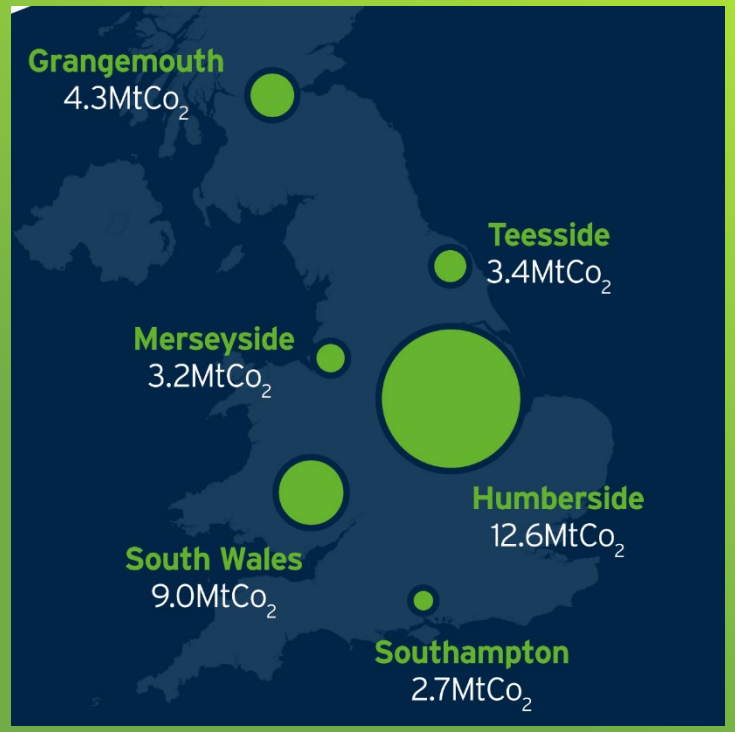
The Humber - Largest carbon emitter in the UK

Industrial carbon:

- Humber - 12.6 $MtCO_2$
- South Wales - 9.0 $MtCO_2$
- Grangemouth - 4.3 $MtCO_2$
- Teesside - 3.4 $MtCO_2$
- Merseyside - 3.2 $MtCO_2$
- Southampton - 2.7 $MtCO_2$



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Drivers for a hydrogen economy

- Energy-related CO_2 emissions to be decreased by 60% until 2050 to limit global warming to 2 ^{0}C
- Clean Air Programme 2030 - 490 deaths in the Humber attributed to anthropogenic PM2.5 pollution
- Curtailment: Hydrogen as a mean to store energy; days, weeks or months
- The need for large-scale, efficient renewable electricity integration
- Energy resilience and security: Energy buffer and strategic reserves of energy; Transportation and distribution of renewable energy across sectors and regions

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The Humber - A green hydrogen economy based on Wind to X

Key assets:

- Significant offshore wind (e.g. Hornsea, Dogger Bank)
- Three offshore landings in the region, two near chemical clusters plus future Dogger Bank landing near City of Hull
- Onshore wind farms (20+); Goole Field 1 & 2, Keadby Wind Farm
- Siemens Gamesa blade factory in Hull; Ørsted operating out of Grimsby
- Green Port Growth - supply chain support

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A green hydrogen economy based on Wind to X

H_2 to decarbonize EIIs:

Saltend Chemicals Park:

UK's second largest chemical cluster hosting world class chemical and energy businesses; Jetty with access to Humber and North Sea;
Westermost Rough OSW landing nearby
Triton Power 1,200MW CCGT

Second cluster along the south bank between Immingham and Grimsby:

2 main oil refineries – the Humber refines 30% of the UK's fuel; Phillips 66 & TOTAL
Vitol Power International Immingham; 1,240 MW - one of the largest CHP plants in Europe

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A green hydrogen economy based on Wind to X

Natural Gas Infrastructure H_2 for heat, energy storage

- Natural gas landing (20% of UK demand); e.g. Easington Terminal – Rough, York
- Storage and processing capabilities
- Salt caverns & onshore / offshore gas storage

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A green hydrogen economy based on Wind to X

Transport Infrastructure H_2 for mobility

- 5 Ports
- High-speed road and modern rail infrastructure links from ports to the UK's industrial heartland and Merseyside Estuary (Liverpool)
- Rail production facility for Siemens AG in Goole
- Established OLEV bidding consortium - private / public sector fleets

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The Humber - uniquely positioned because of ...

- Large-scale green electricity production
- Large-scale chemical / petrochemical clusters (feedstock & energy)
- Significant transport infrastructure
- Existing gas infrastructure to transport & store green hydrogen
- Established knowledge & support infrastructure
- Potential for significant carbon reductions

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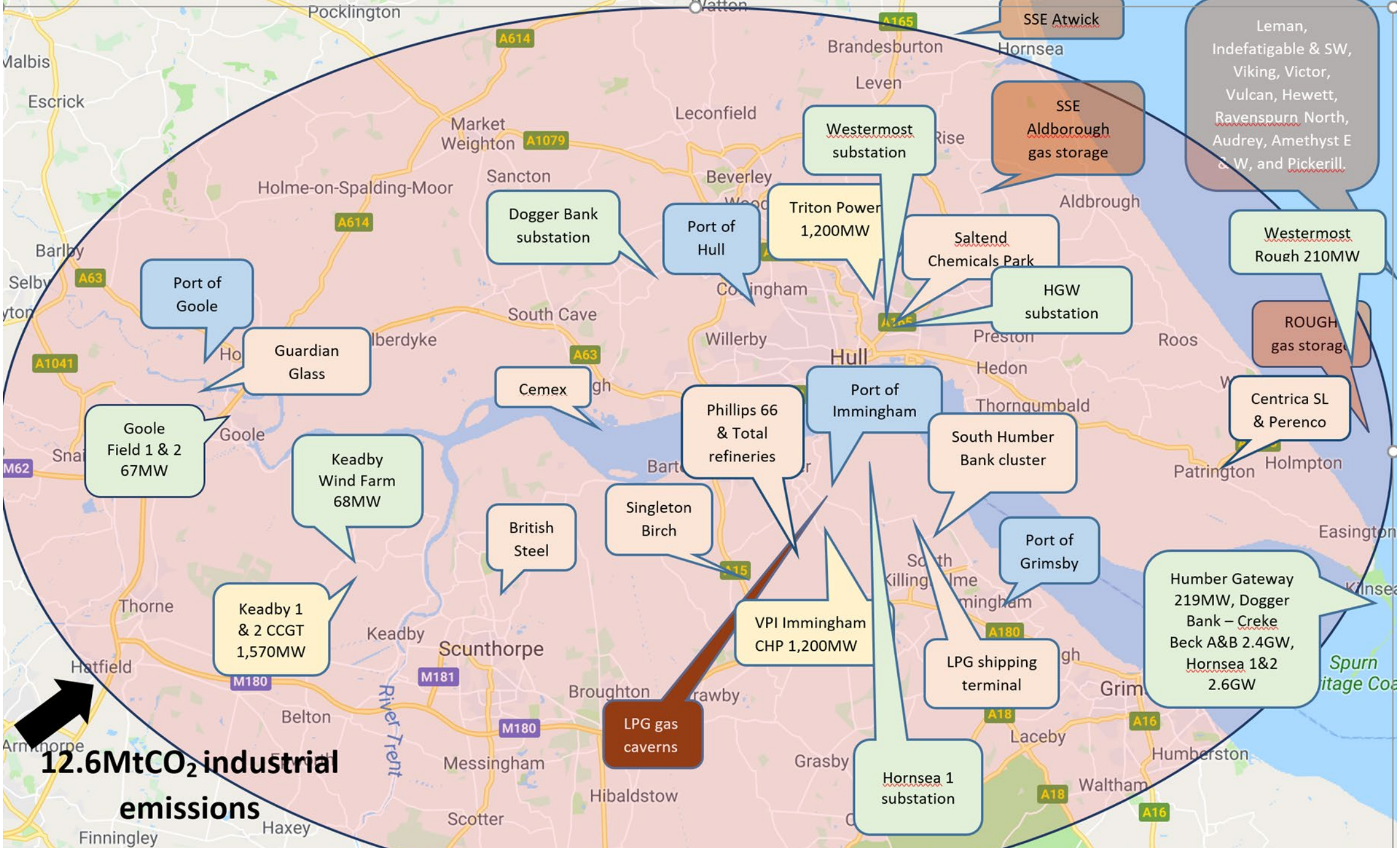
SSE Atwick
Leman, Indefatigable & SW, Viking, Victor, Vulcan, Hewett, Ravenspurn North, Audrey, Amethyst E & W, and Pickerill
SSE Aldborough gas storage
Westermost substation
Triton Power 1,200MW
Saltend Chemicals Park
HGW substation
Westermost Rough 210MW
ROUGH gas storage
Centrica SL & Perenco
Dogger Bank substation
Port of Hull
Port of Goole
Guardian Glass
Cemex
Goole Field 1 & 2 67MW
Keadby Wind Farm 68MW
Phillips 66 & Total refineries
Port of Immingham
South Humber Bank cluster
Port of Grimsby
Singleton Birch
British Steel
Keadby 1 & 2 CCGT 1,570MW
VPI Immingham CHP 1,200MW
LPG shipping terminal
Humber Gateway 219MW, Dogger Bank – Creke Beck A&B 2.4GW, Hornsea 1&2 2.6GW
LPG gas caverns
Hornsea 1 substation
12.6MtCO2 industrial emissions
Pocklington
Brandesburton
Hornsea
Leven
Leconfield
Market Weighton
Beverley
Holme-on-Spalding-Moor
Sancton
Aldbrough
Barlby
Selby
South Cave
Willerby
Hull
Hedon
Preston
Roos
Thorne
Keadby
Scunthorpe
Hatfield
Belton
Messingham
Broughton
Grasby
Hibaldstow
Laceby
Humberston
Waltham
Patrington
Holmpton
Easington
Finningley
Haxey
Scotter
River Trent
A614
A1079
A63
A1041
A165
A180
A18
A16
M62
M180
M181

NEW ! Humber Hydrogen Economy Programme

- Workshop 20th June; attended by 22 key businesses
- First step to building a Humber Hydrogen Economy
- Formalises a governance / delivery structure that enables the Humber's transition from a fossil-fuel based, carbon intensive economy to a low carbon hydrogen economy
- Portfolio of hydrogen projects that combine into a coherent programme – Workshop 17th July

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Thank you !

Dr Gesa Reiss
AURA / University of Hull
g.reiss@hull.ac.uk