Bacton Energy Hub Hydrogen Demand

Progressive Energy

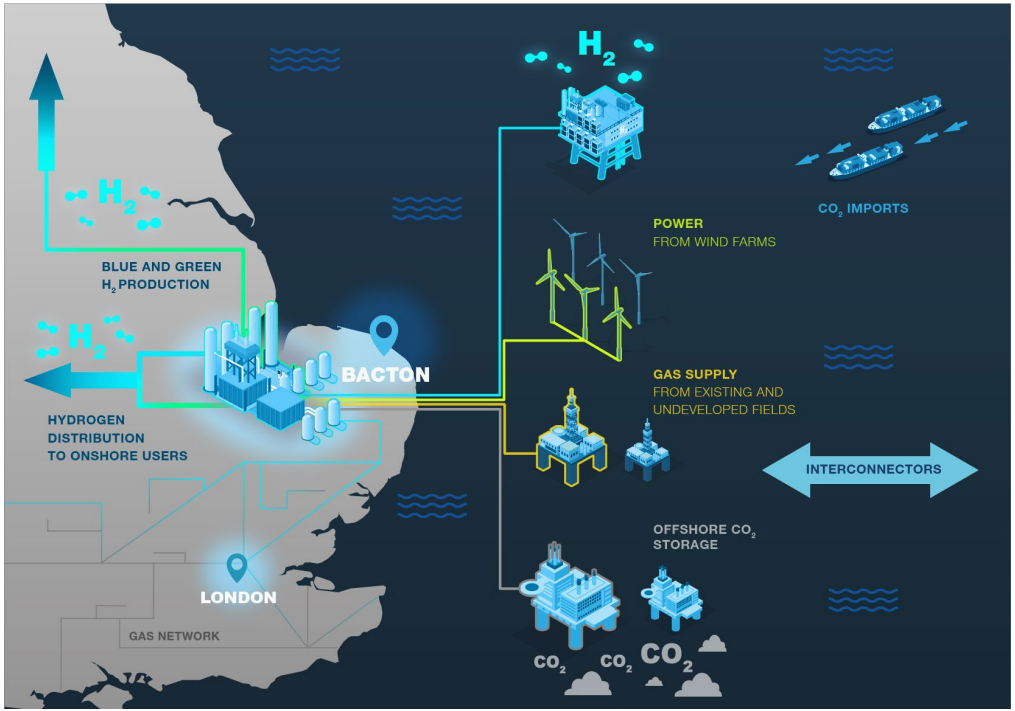
December 2022

Progressive Energy

- Low carbon power project developer
- Active in CCS, and low carbon power for 20+ years
- Originator and lead partner on Track 1 HyNet cluster
- Commissioned to deliver phase 1 Bacton Net Zero report (late 2020)

SIG key objectives

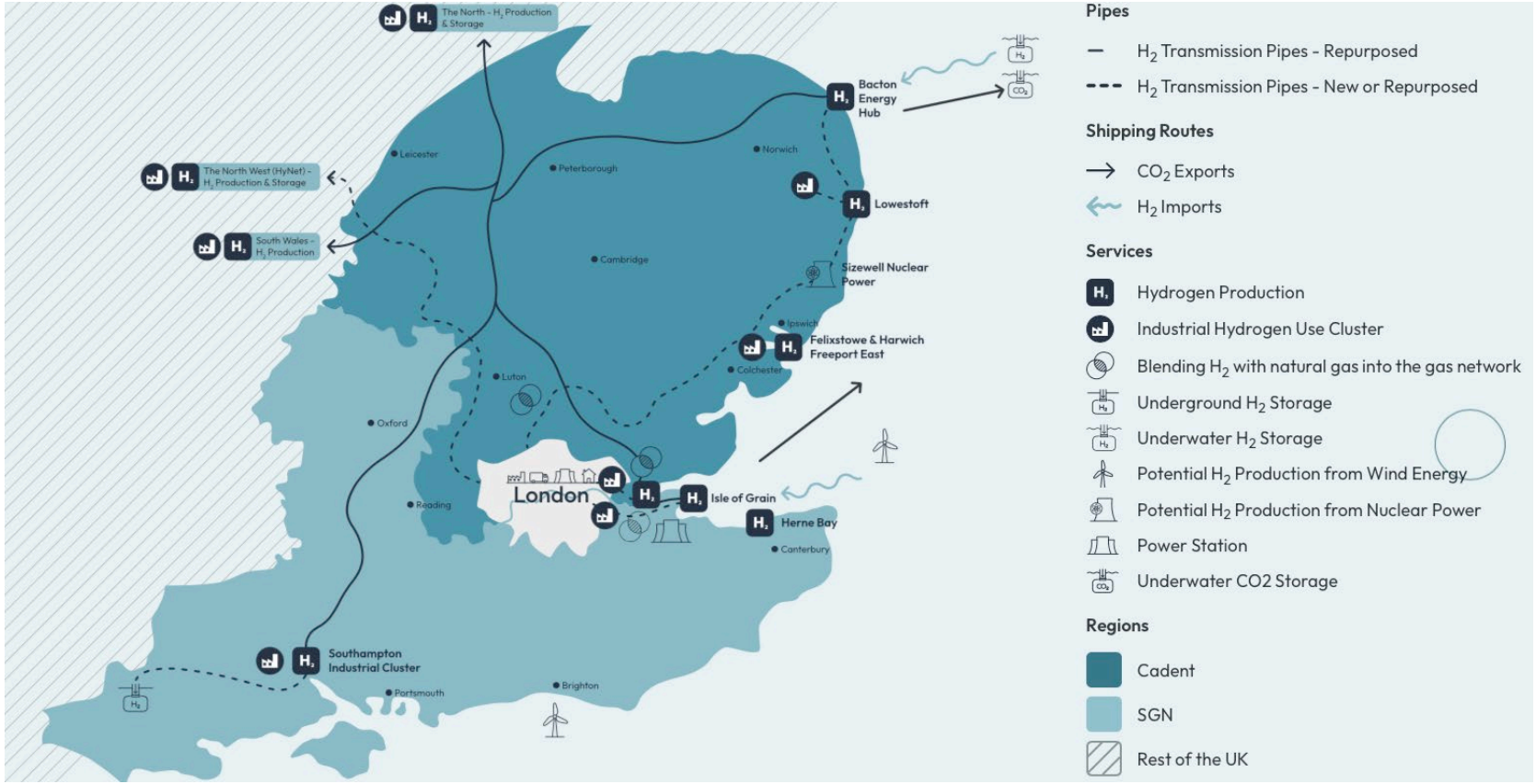
- Quantify potential hydrogen demand in Bacton catchment area by sector from 2030-2050
- Understand seasonal and diurnal variability in demand across sectors
- Understand key sensitivities, drivers and blockers to demand cases
- Assess hydrogen storage requirements and identify storage scenarios
- Inform supply and infrastructure SIGs



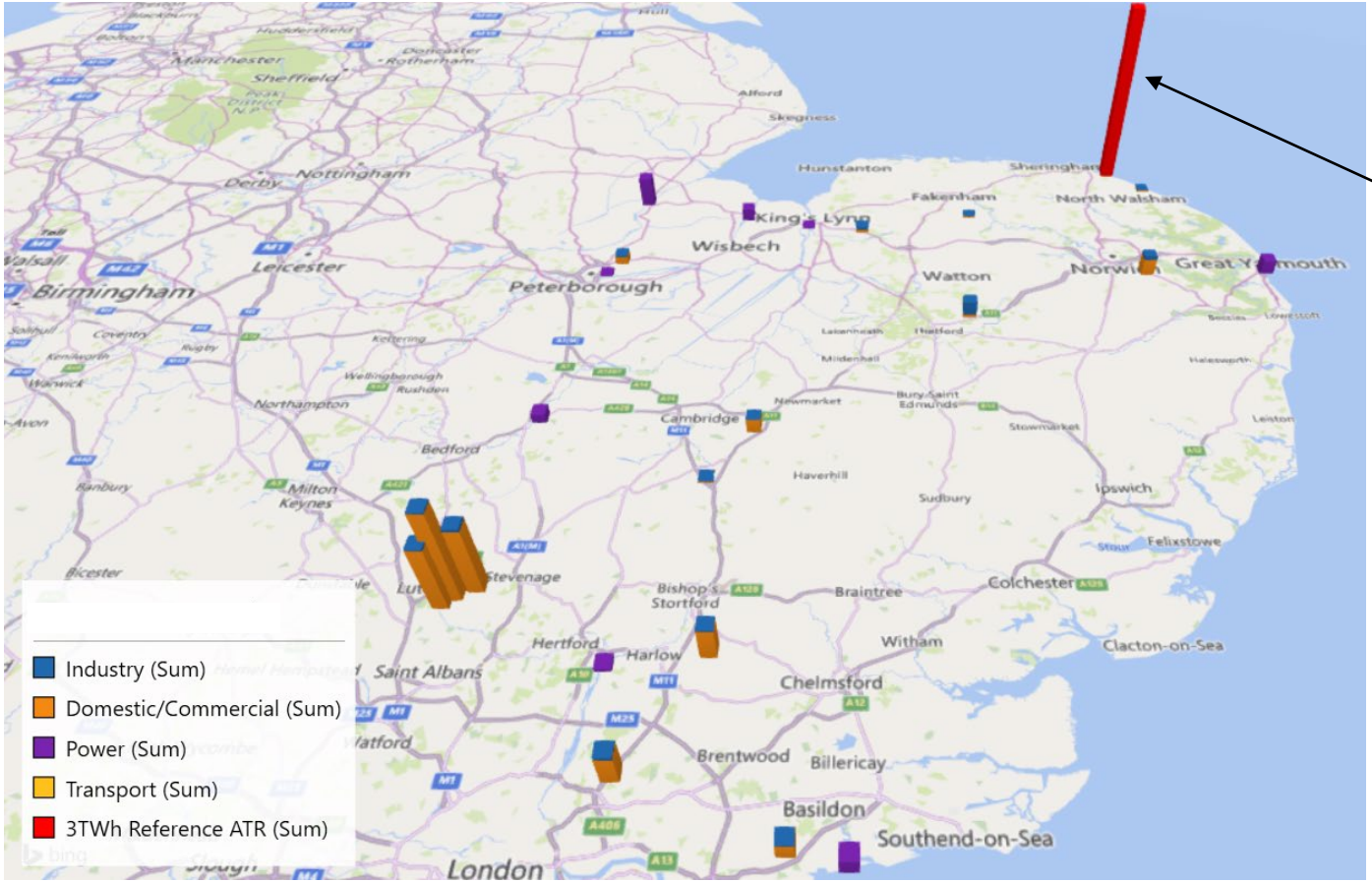
Demand forecasting

- Develop demand forecasts for BEH
  - Context of the core project and buildout scenario (for 2030, 2040, 2050)
- Approach based on current natural gas use
  - Modified to reflect electrification, energy efficiency and technology developments
- Local industrial and power demand
- Blending into NTS to serve London
- Full conversion of NTS to hydrogen
- But first: Bacton's connections…

Bacton connections



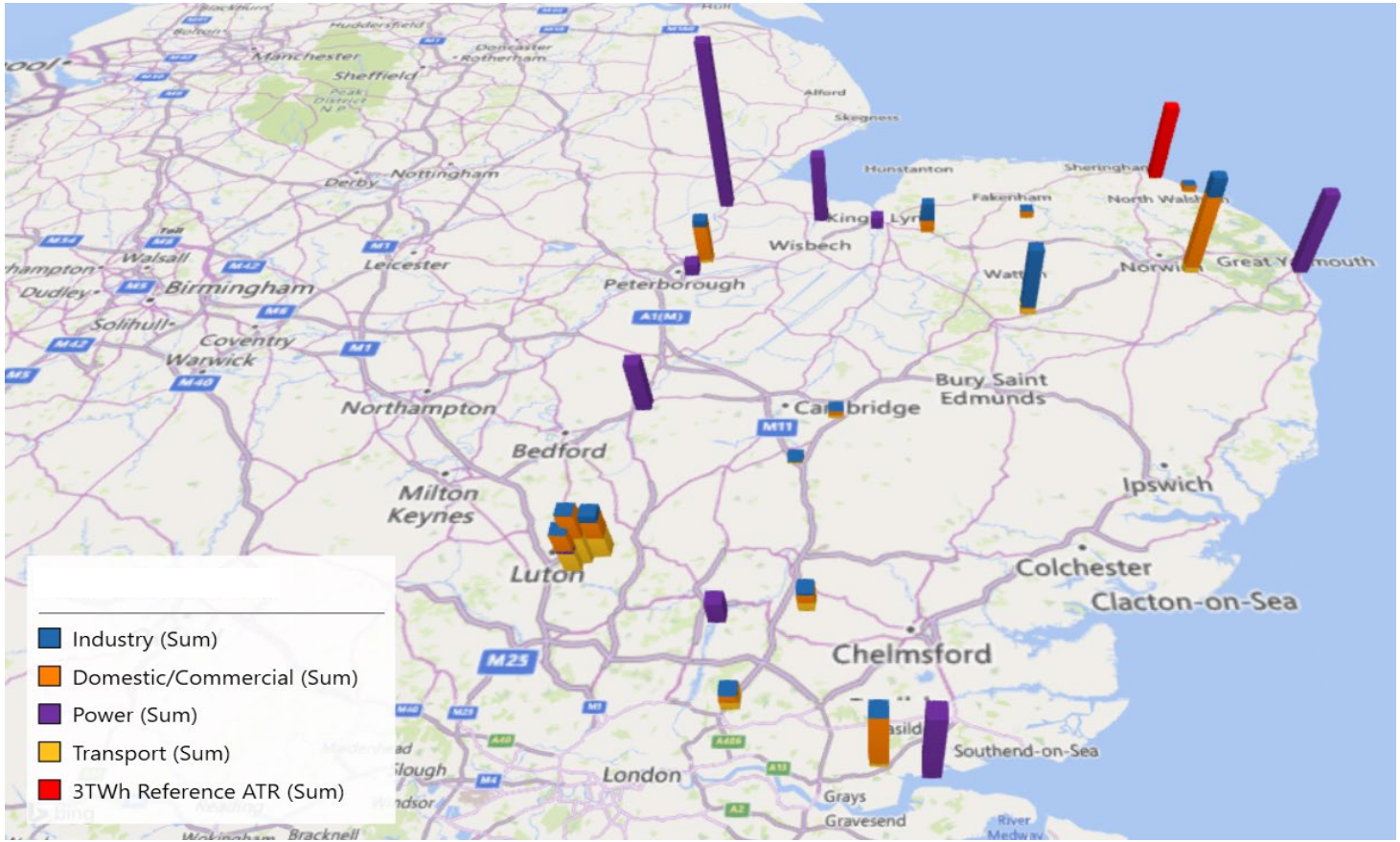
2030 demand



This column shows production from 350 MW core project

Demand dominated by blending to London

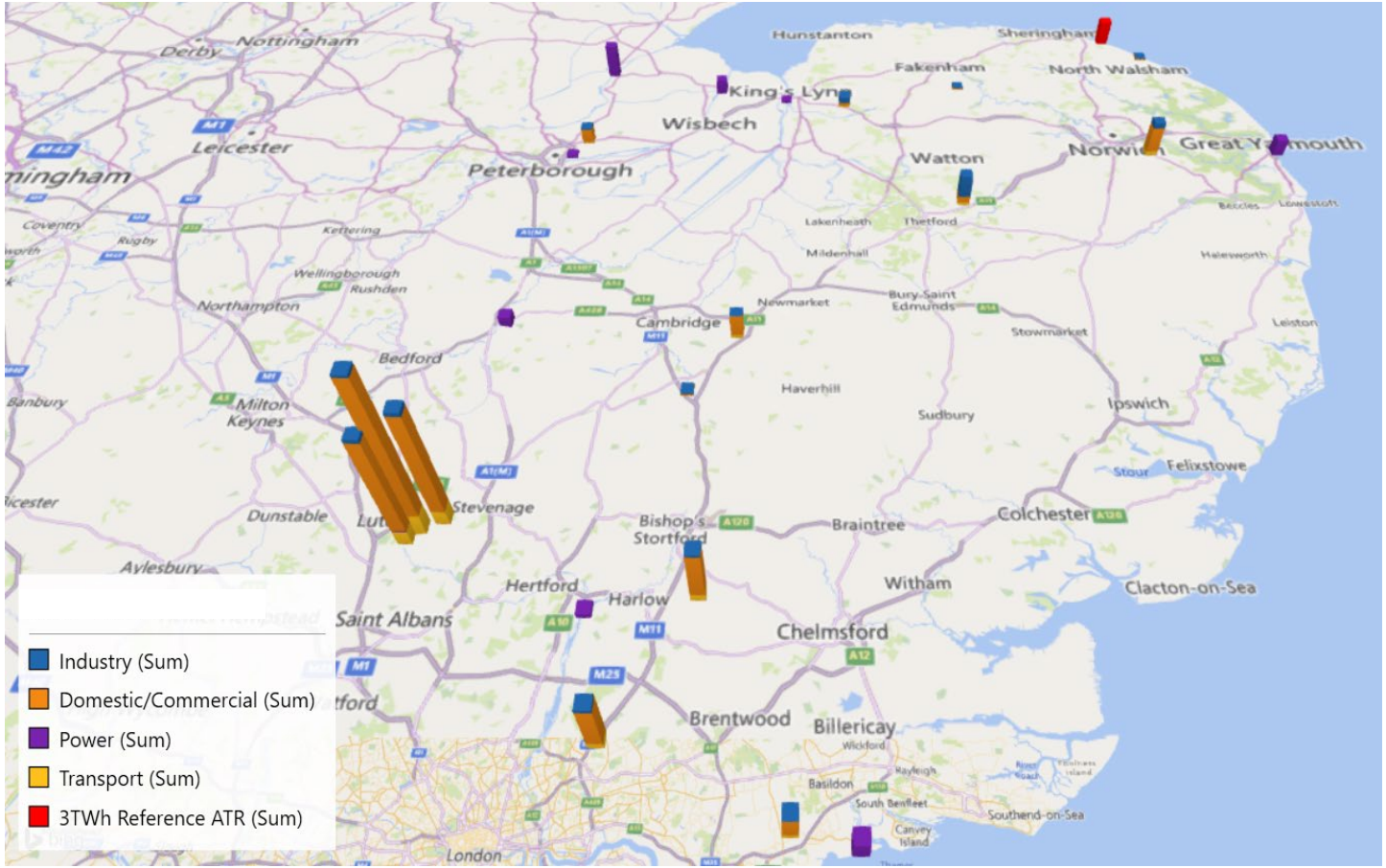
2040 demand



London shifting to 100% hydrogen

Other domestic, power and industry demand emerging

2050 demand



London shifting to 100% hydrogen

Other domestic, power and industry demand emerging

Demand forecasts (TWh/yr)

Sector	2030	2040	2050
Domestic / commercial	5.7 (blending)	28.4	61.8
Industry	0.6	4.8	6.5
Power	1.6	20.0	12.0
Transport (excl marine/aviation)	0.2	1.9	5.6
Total	**8.1**	**55.1**	**85.9**

Note:

(depending on load factors, especially for electrolysis)

Core scenario	350 MWth ‘blue’	Produces: c. 3 TWh/yr
Buildout scenario	3.6 GW ‘blue’ 6.3 GW ‘green’	Produces: c. 40-50 TWh/yr

Storage assessment

- Mismatch between supply and demand: drives need for storage
  - Domestic demand is much higher in winter
  - Electrolytic hydrogen production relies on available renewable electricity
- Storage options in a hierarchy
  - Linepack
  - Local tank storage
  - Salt caverns
  - Depleted gas fields/aquifers
- Findings:
  - Core scenario – linepack is adequate
  - Buildout case - depleted gas fields/aquifers – dependent on wind climate