

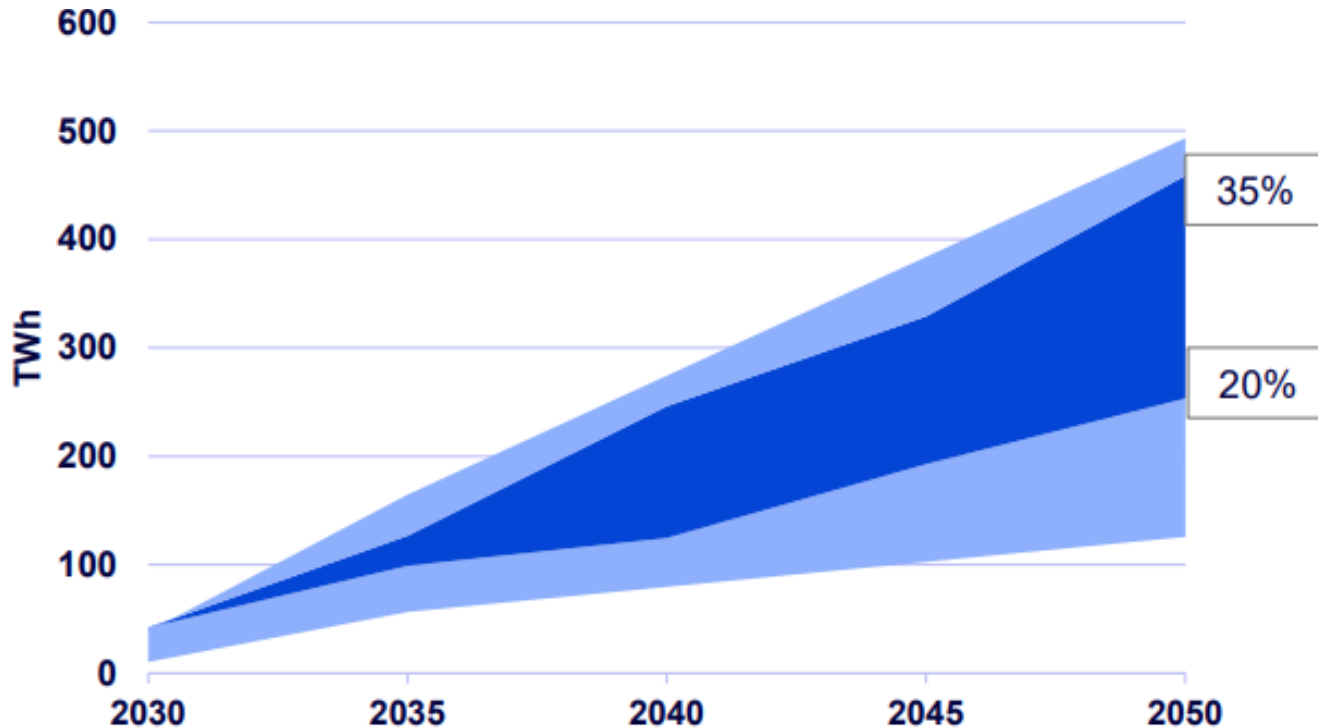
Foresight Live

Nuclear backed hydrogen

Rachael Glaving

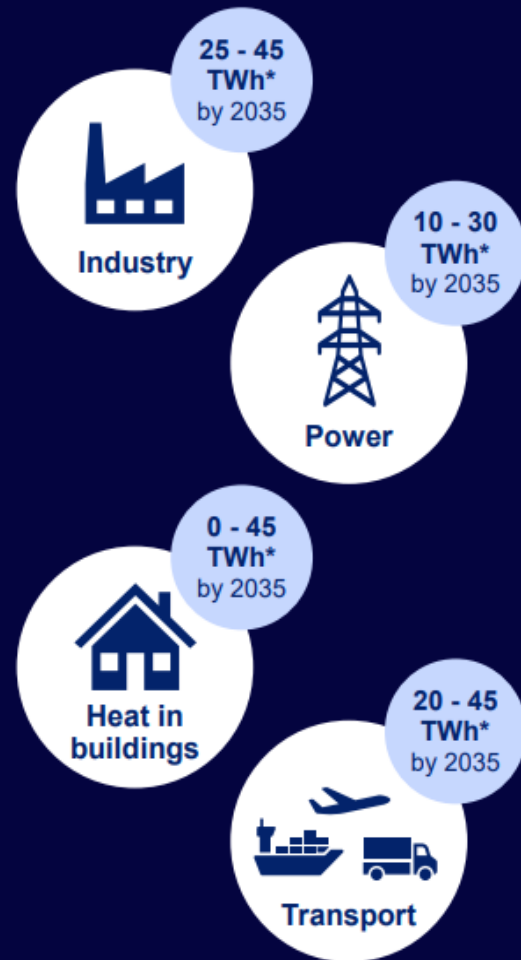


Hydrogen demand could be 20-30% of UK final energy consumption by 2050



% = hydrogen as proportion of total energy consumption in 2050.

Source: Central range – illustrative net zero consistent scenarios in CB6 Impact Assessment. Full range – based on whole range from UK Hydrogen Strategy Analytical Annex. Final energy consumption from ECUK (2019).

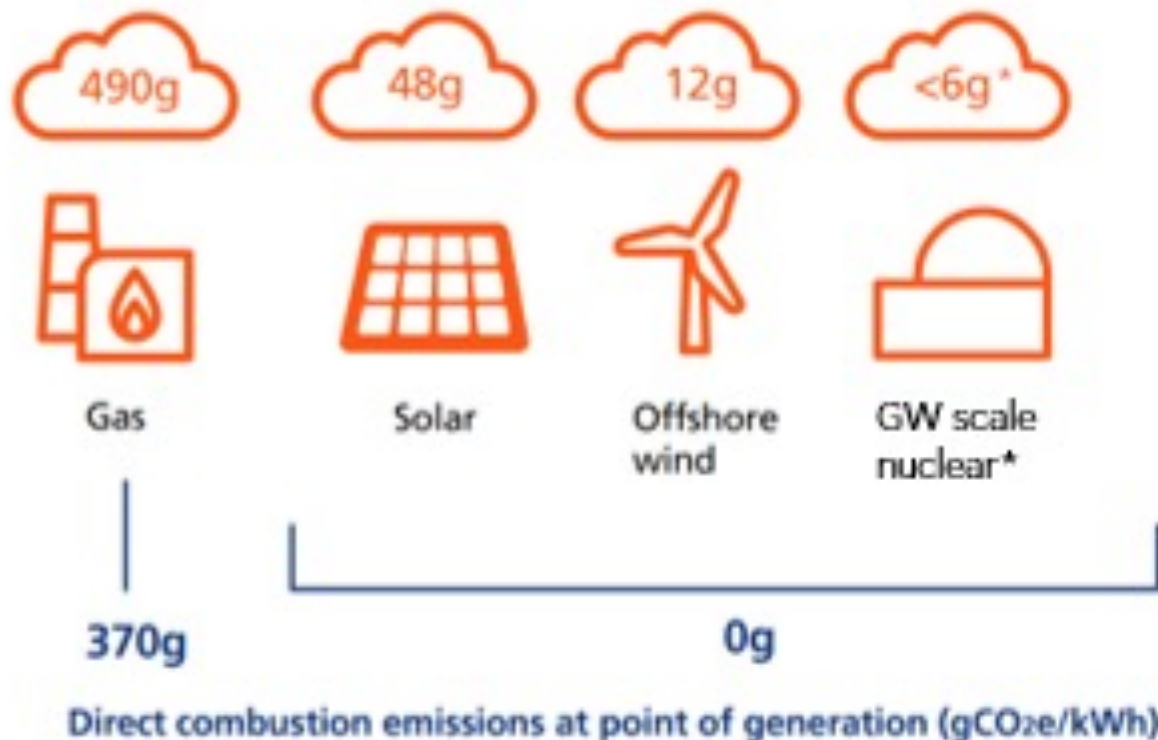


Nuclear is a low carbon energy source

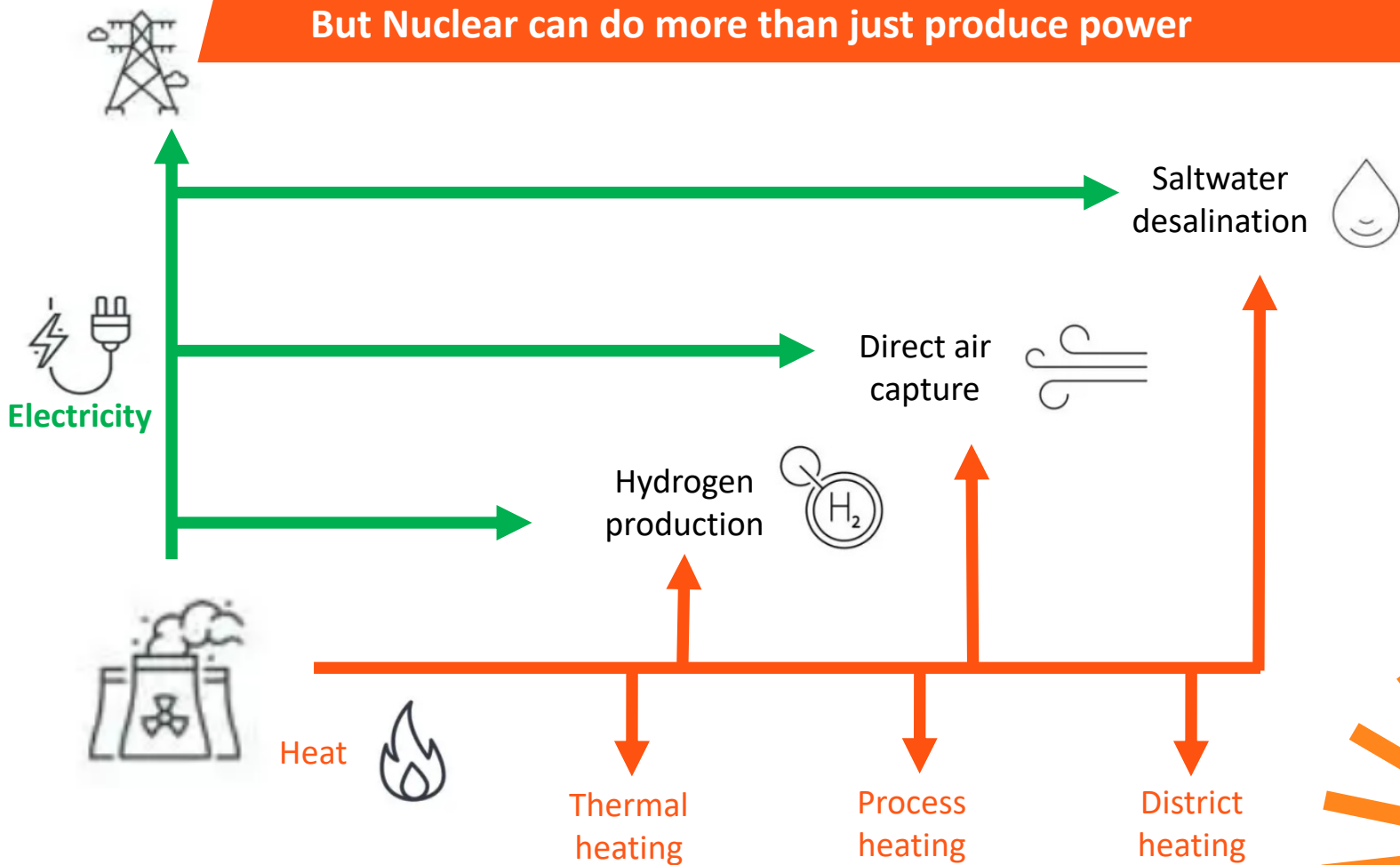
Lifecycle emissions (gCO₂e/kWh) of different electricity generation sources





























*Based on expectations for new GW-scale nuclear in the UK. The global median for all nuclear is 12gCO₂e/kWh

Source: EDF Energy UK sustainable business update; IPCC global median values



But Nuclear can do more than just produce power

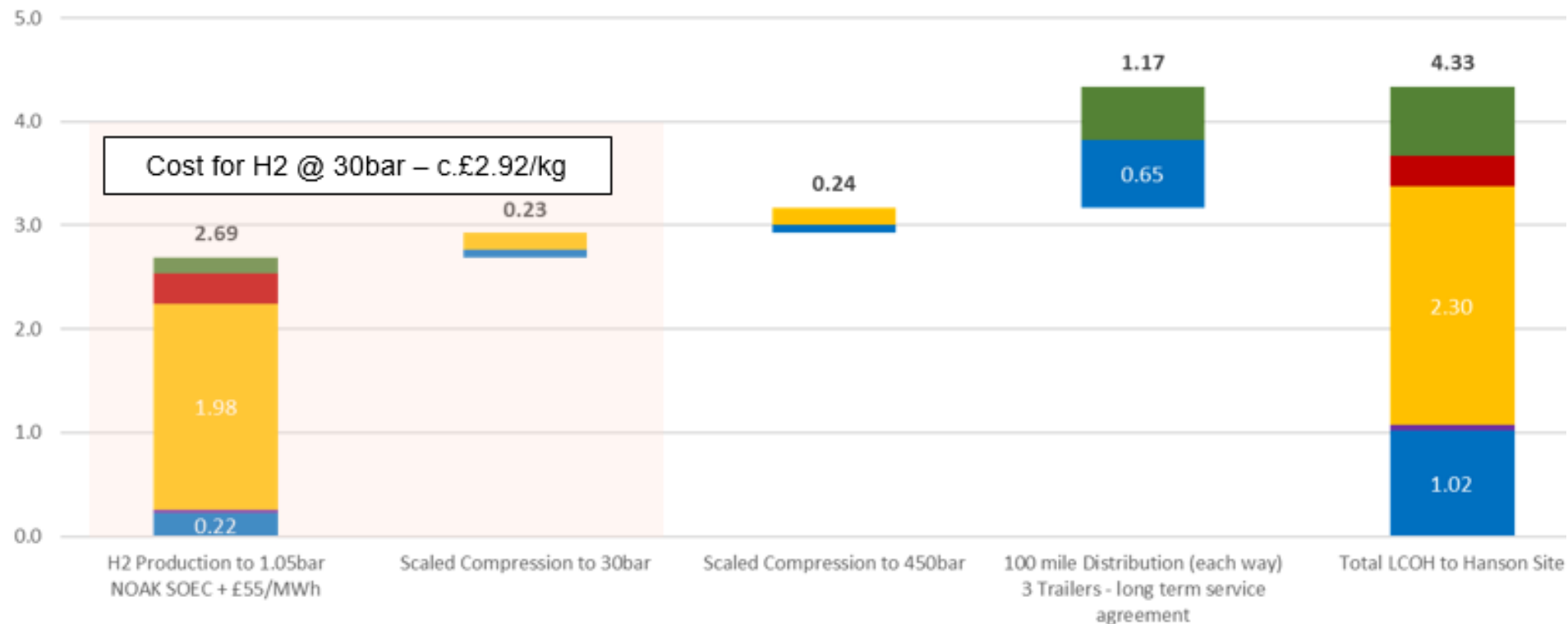


Primary source	H ₂ production	Low Carbon?	Low cost?	Removes dependence on gas?
 Renewable electricity	  PEM or alkali electrolysis	 		
 Nuclear Heat & electricity	  Solid Oxide electrolysis	 		
 Gas (or coal/biomass)*	  Gas reforming + CCS	 		
 Gas (or coal/biomass)*	  Gas reforming	 		

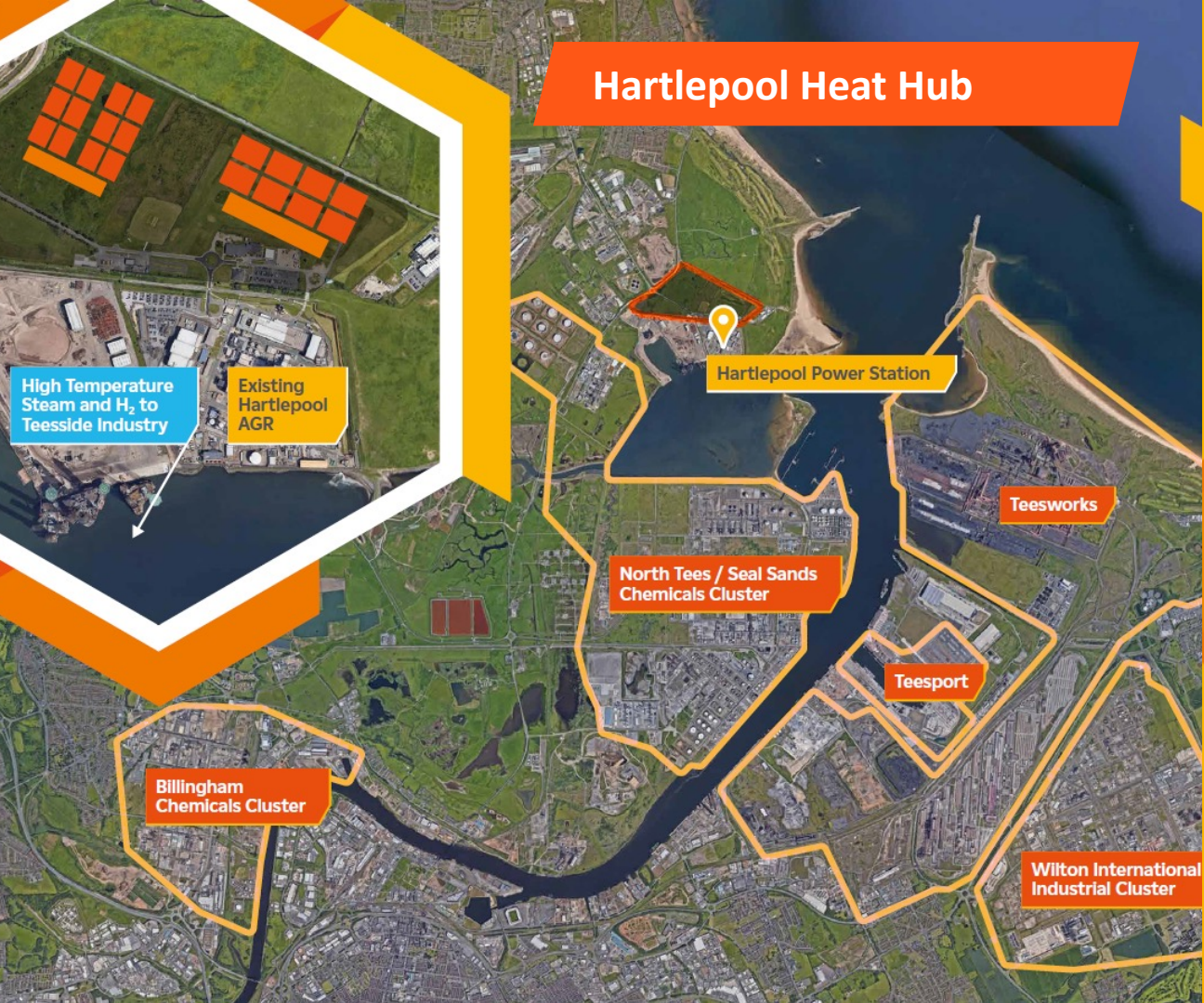
Economics of hydrogen from nuclear

2035 100MW H2 LCOH Waterfall Chart (2022£/kgH2) - 6% discount rate

■ CAPEX (inc. replacement) ■ Fixed OPEX ■ Electricity ■ Heat ■ Other Variable OPEX



Hartlepool Heat Hub



WHY HARTLEPOOL?



Up to 140 hectares of land designated for nuclear new build

Proximity to existing large industrial consumers of high temperature steam and hydrogen on Teesside

Opportunity to help Teesside industry reduce its 3.1 million tonnes of CO₂ emissions per year¹

Provides access to the skills and workforce in one of Britain's largest integrated industrial economies

Teesside's freeport status provides opportunity to unlock global markets, major trade hubs and international projects

¹ Source: World Economic Forum

Bay energy hub and hydrogen production



WHY HEYSHAM?

Up to 115 hectares of land designated for nuclear new build.

Opportunity to help meet the UK's ambition of 24GW of Zero Carbon Nuclear Generation.

2300MW of existing Nuclear Generation due to cease by 2028 which needs replacing.

Proximity to a major port, road and motorway network for transporting zero carbon Hydrogen.

Home to one of Britain's largest pools of nuclear power operational expertise.

BAY ENERGY HUB H_2