

ESSAR ENERGY TRANSITION



FUELS

# Roadmap to decarbonisation

# EET will host one of the largest energy transition hubs in Europe

- EET Fuels is a leading player in the decarbonisation of the UK economy and is transforming its Stanlow Manufacturing Complex into one of Europe's largest energy transition hubs
- The combination of hydrogen, refinery decarbonisation, e-fuels and biofuels with unrivalled infrastructure, expertise and EET's large land bank (c.900 acres) will facilitate the process
- EET has signed a sale and purchase agreement to acquire Thornton Science Park

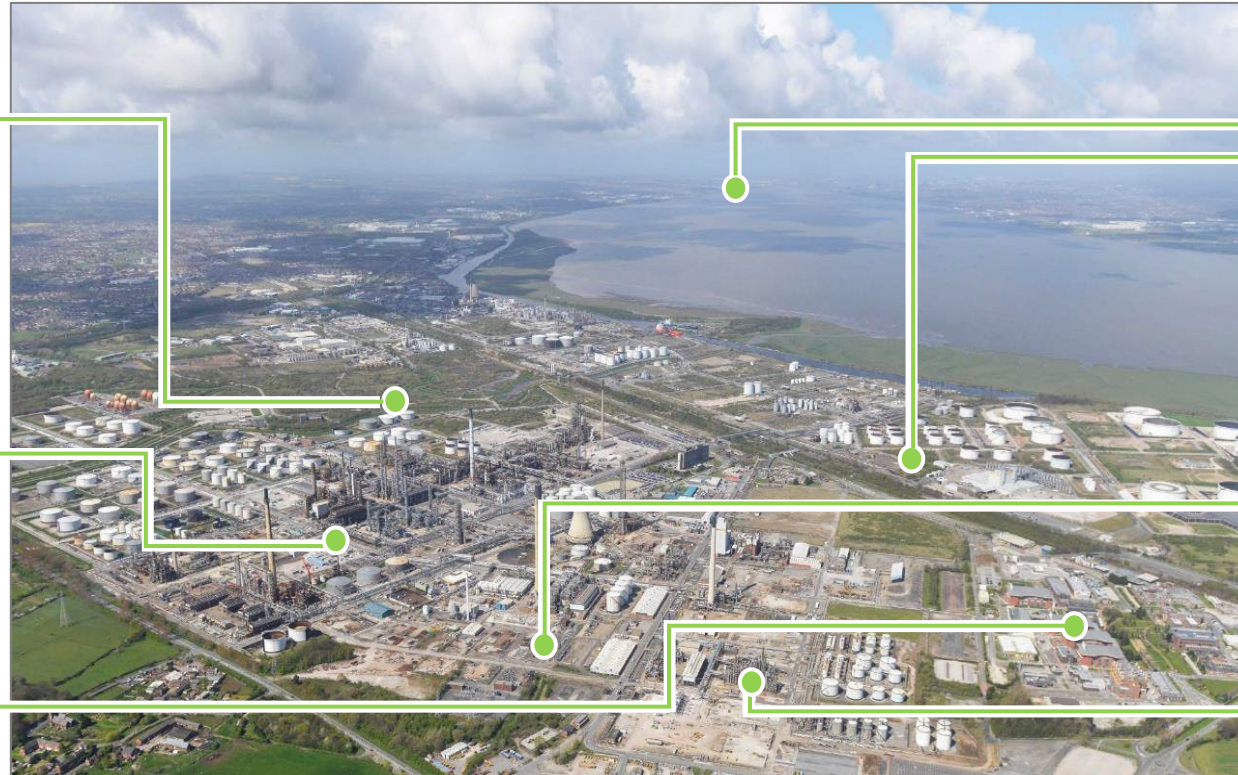
E-fuels & biofuels



EET Fuels Refinery



Thornton Science Park



STL/  
Storage Sites



EET  
Hydrogen/  
Production



EET  
Hydrogen  
Power



# At the heart of HyNet, one of the two Track-1 UK CCUS clusters selected by UK Government to progress to negotiation phase



EET is the only supplier of large-scale low carbon hydrogen within the cluster through its subsidiary EET Hydrogen

EET Fuels is the largest industrial CO<sub>2</sub> emitter in the region and is decarbonising its operations through energy efficiency, fuel switching and carbon capture

HyNet provides a **carbon capture & storage network**, and a **low carbon hydrogen transport & storage eco-system** across the North West of England and North Wales



Delivering 95% decarbonisation this decade



UK's first large-scale low carbon hydrogen production facility



Europe's first hydrogen-ready power plant



# Our unique location

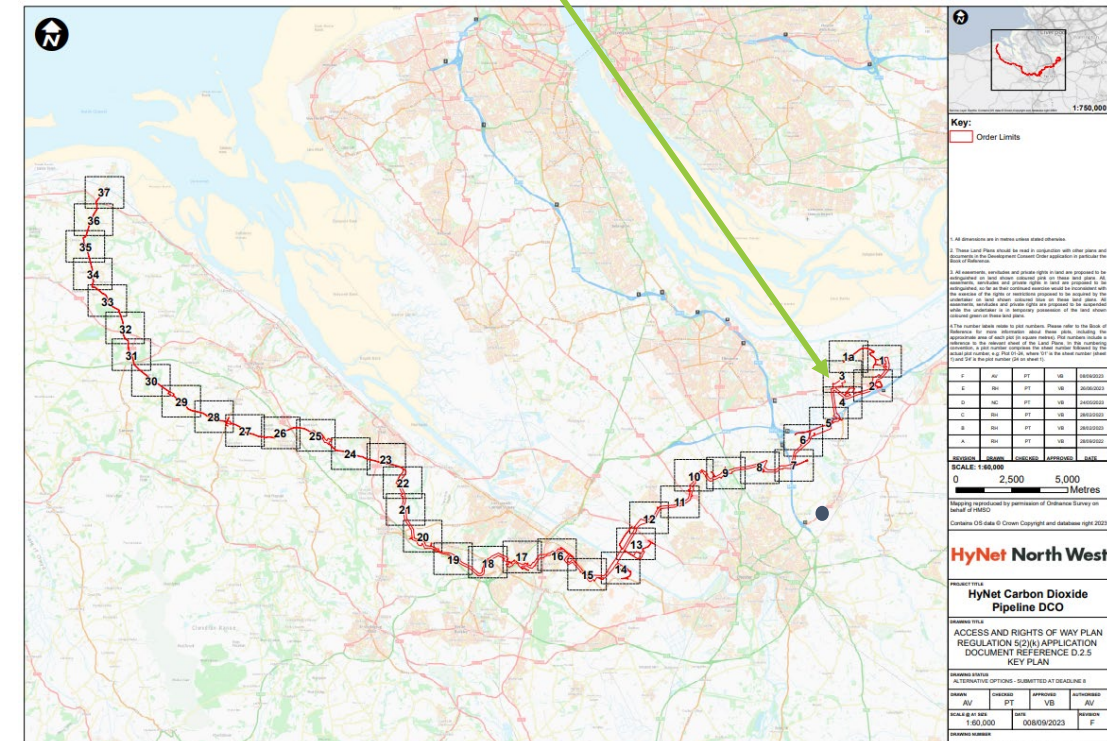


Key **EET companies**, part of the wider Essar Group, sit in Stanlow, Cheshire, at the heart of HyNet



## The HyNet CO2 pipeline:

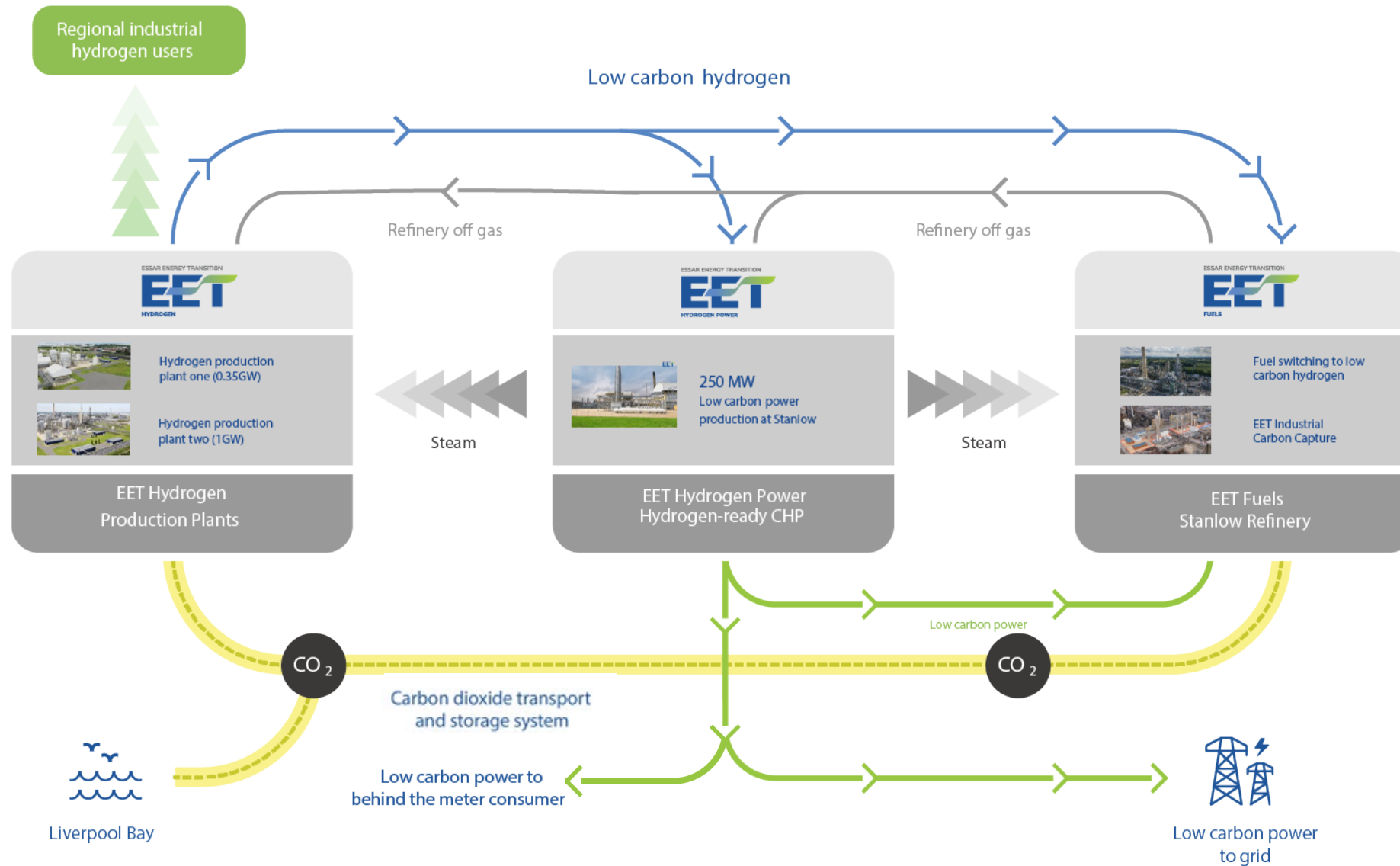
- Connection point at the Above Ground Installation (AGI) located within the physical boundary of the site *(no need for additional spur lines)*
- Utilises repurposed natural gas pipelines and offshore depleted oil & gas fields in Liverpool Bay
- Consented under development consent order (DCO)







# Decarbonisation plans - integrated strategy to reduce emissions

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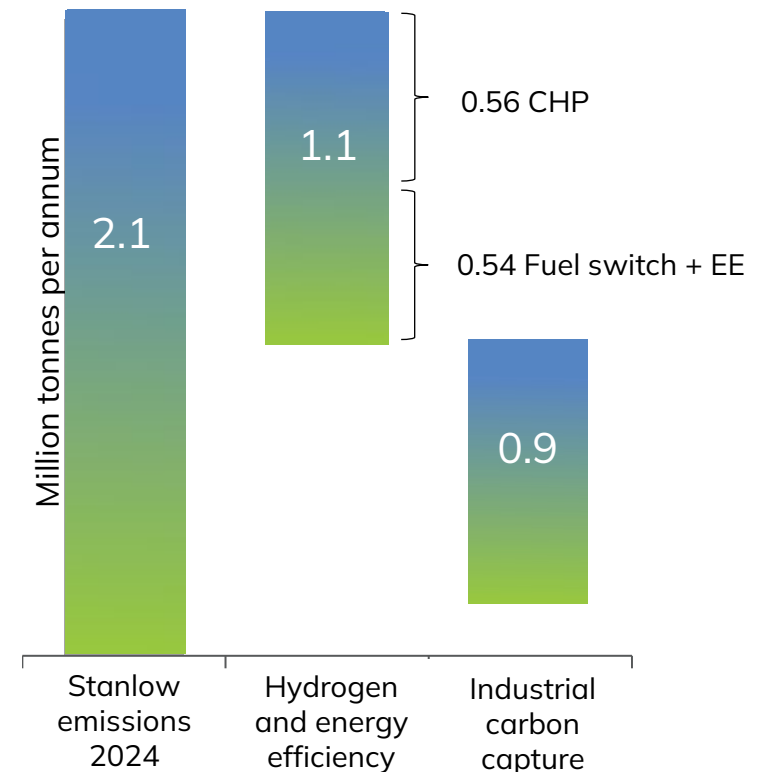


# EET Fuels to deliver the UK's first low carbon process refinery

Leading decarbonisation plans amongst global refiners, will achieve a 95% reduction on emissions before 2030

 <p>Hydrogen &amp; Energy Efficiency <b>1.1 Mtpa of CO<sub>2</sub> savings</b></p>	<ul style="list-style-type: none"><li>• Hydrogen from EET Hydrogen to replace fossil hydrocarbons across EET Fuels' furnaces and combined heat and power (CHP) plant</li><li>• More low carbon power enables "electrification based" energy efficiency (EE) projects</li><li>• Investments are already underway with the hydrogen-ready crude distiller furnace being commissioned in 2025</li></ul>
 <p>Industrial Carbon Capture <b>0.9 Mtpa of CO<sub>2</sub> savings</b></p>	<ul style="list-style-type: none"><li>• 43% contribution to total site's CO<sub>2</sub> reduction</li><li>• ICC project investment to be backed with Government support under the UK's industrial carbon capture business model</li></ul>

Carbon emissions to reduce from 2.1 MTPA to 0.05 MTPA





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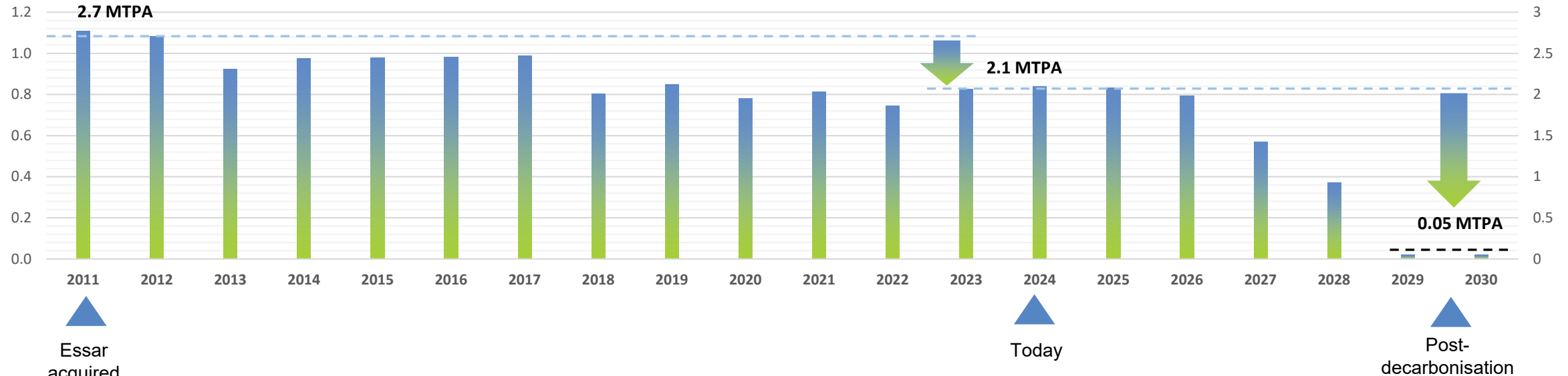
First hydrogen-ready crude distiller furnace being commissioned in 2025, awaiting low carbon hydrogen production from EET Hydrogen





# Decarbonisation progress and plan ahead

CO<sub>2</sub> emissions in MTPA



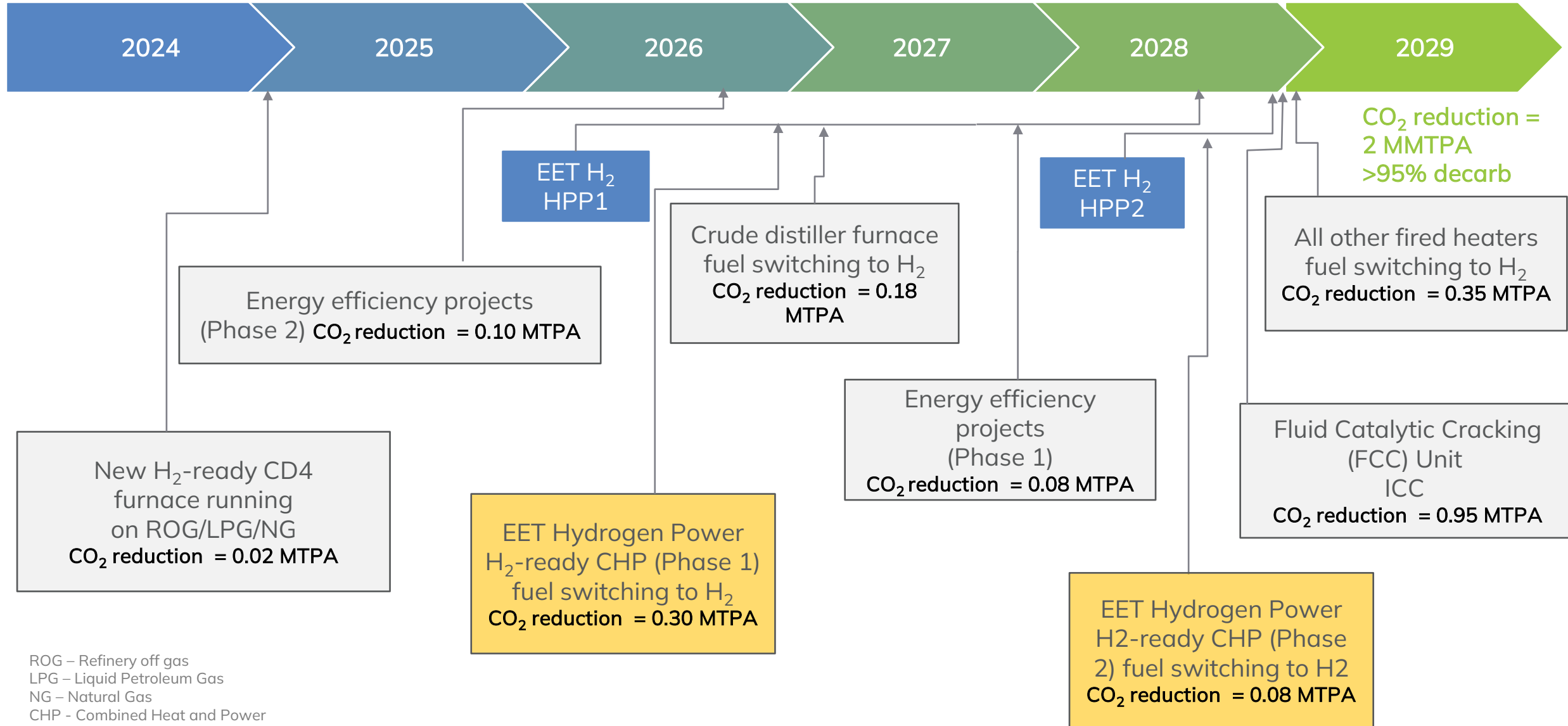
Essar  
acquired  
Stanlow  
refinery

~ \$120m invested in  
refinery decarbonisation  
projects over the last four  
years and estimated £1.2bn  
by 2030

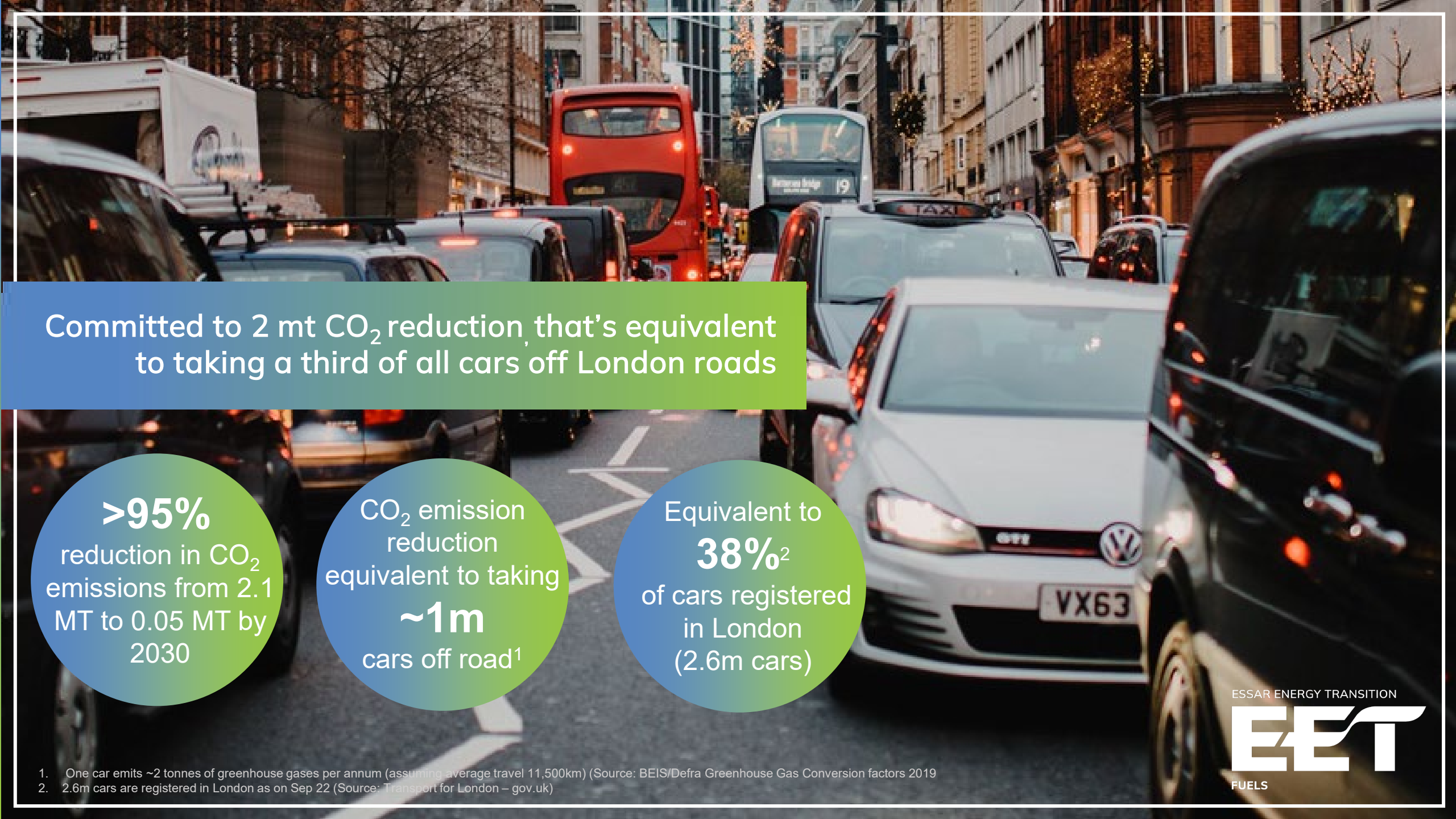
- Hydrogen fuel switching project
- Targeted energy efficiency projects
- EET Hydrogen Power's CHP project
- ICC project



# Delivery of our energy transition projects – next steps



ROG – Refinery off gas  
LPG – Liquid Petroleum Gas  
NG – Natural Gas  
CHP - Combined Heat and Power  
HPP - Hydrogen Production Plant



Committed to 2 mt CO<sub>2</sub> reduction, that's equivalent  
to taking a third of all cars off London roads

**>95%**  
reduction in CO<sub>2</sub>  
emissions from 2.1  
MT to 0.05 MT by  
2030

CO<sub>2</sub> emission  
reduction  
equivalent to taking  
**~1m**  
cars off road<sup>1</sup>

Equivalent to  
**38%<sup>2</sup>**  
of cars registered  
in London  
(2.6m cars)

1. One car emits ~2 tonnes of greenhouse gases per annum (assuming average travel 11,500km) (Source: BEIS/Defra Greenhouse Gas Conversion factors 2019)
2. 2.6m cars are registered in London as on Sep 22 (Source: Transport for London – gov.uk)

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# Project details

# Crude distiller furnace switch to hydrogen fuel

## First hydrogen-ready furnace installed at any UK refinery

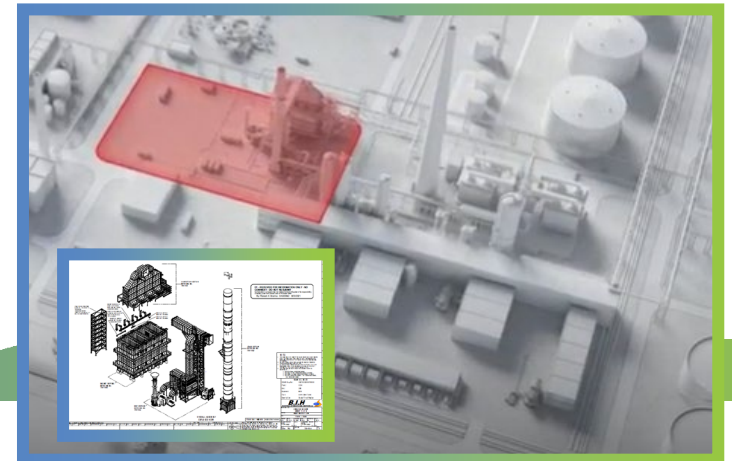
Capable of running on 100% H<sub>2</sub> or a fuel gas mix. Reduced carbon emissions by 0.02 MTPA from start-up with standard refinery fuel

Further reduction of CO<sub>2</sub> emissions by 0.18 MTPA, once running on hydrogen from EET Hydrogen's Production Plant

Hydrogen is then available to **enable the fuel switching** of all fired-heaters on site and the new set of EET Hydrogen Power'S CHP modules

Other process fired-heaters will require retrofit, but not replacement. Project saves an additional 0.4 MTPA of CO<sub>2</sub>

*MTPA = million tons per annum*

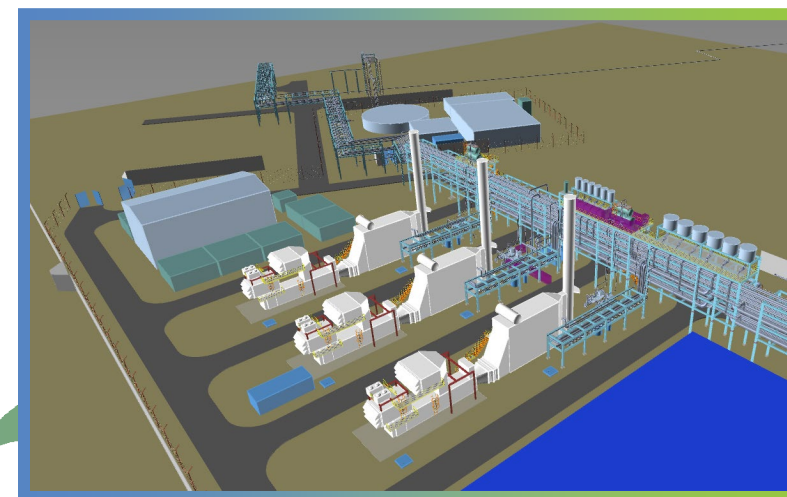




# EET Hydrogen Power Combined Heat and Power plant

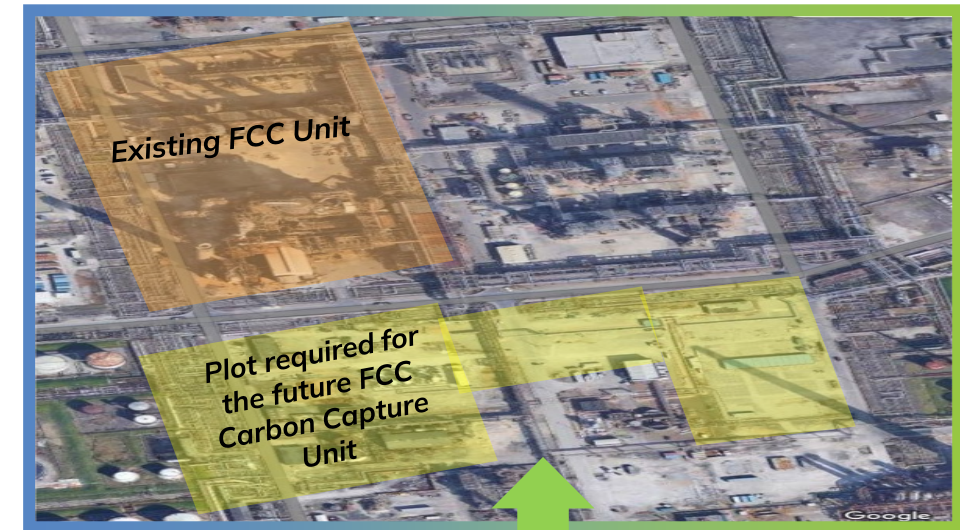
Low carbon CHP will replace existing CHP to rebalance future steam & power needs

- Stanlow refinery generates its own steam & power from its existing CHP, but imports a small amount of grid power
- Existing CHP modules are to be phased out and new EET Hydrogen Power CHP modules brought online
- Generation of power will come from high efficiency 100% H<sub>2</sub> gas turbines, instead of inefficient steam turbines
- CO<sub>2</sub> savings from CHP is 0.4 MTPA
- The first phase of EET Hydrogen Power CHP project with the new hydrogen-ready crude distiller furnace will enable the full offtake of hydrogen from EET Hydrogen's HPP1 plus some energy efficiency projects



## EET ICC & Storage to reduce ~45% of total CO<sub>2</sub> emissions fuel

- Stanlow has one of the largest Full Residue Fluid Catalytic Cracker (FCC) in Europe
- Now investing in a new EET Industrial Carbon Capture plant to capture CO<sub>2</sub> from the FCC unit
- CO<sub>2</sub> captured will be transported and stored through HyNet transport and storage infrastructure being developed by ENI
- Positive environmental impact (significant reduction in particulate matter, SO<sub>x</sub> and NO<sub>x</sub> to single digit ppm levels)
- Project scouting, pre-front end engineering and design and licensor selection has been completed. Now progressing to Licensors Basic Engineering Design Packages and FEED
- FID expected in 2025



Large land parcel required for the FCC carbon capture plant has been identified within Stanlow refinery complex



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EET Fuels is leading the industry with a clear target to decarbonise manufacturing operations before the turn of the decade...







and setting a global benchmark for high emitting industries  
by developing the UK's first low carbon process refinery.

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