Session 3: British Chamber of Commerce, Singapore

Successful decarbonisation projects

Moderator
Thomas Briault
Energy Advisory Leader, South East Asia
Arup Singapore Pte Ltd

Panellists	
Andy Koss Head of Sembcorp Energy UK Sembcorp	**Colin McGill** Project Director Teesside Net Zero BP
Herman van der Meyden Government Relations Advisor Shell	**Henry Tse** Director of New Mobility Technologies Connected Places Catapult
Jan Huinink Business Opportunity Manager for Energy Transition projects Shell	**Willie Reid** Director University of Strathclyde Oil and Gas Institute

Sembcorp Biomass Power Station – the start of the journey…

- 300,000 tonnes/pa sustainably sourced fuel
- Saving of 200,000 tonnes carbon dioxide/pa (67,000 vehicle exhausts emissions)

- £65m investment/operational 2007
- UK’s first large scale biomass power plant
- 35MW (c50,000 households)

PORTHOS CC(U)S
From a customer perspective

Singapore International Energy Week, British Chamber of Commerce session

29 October 2020

Herman van der Meyden & Jan Huinink

Project Managers for Shell Pernis refinery

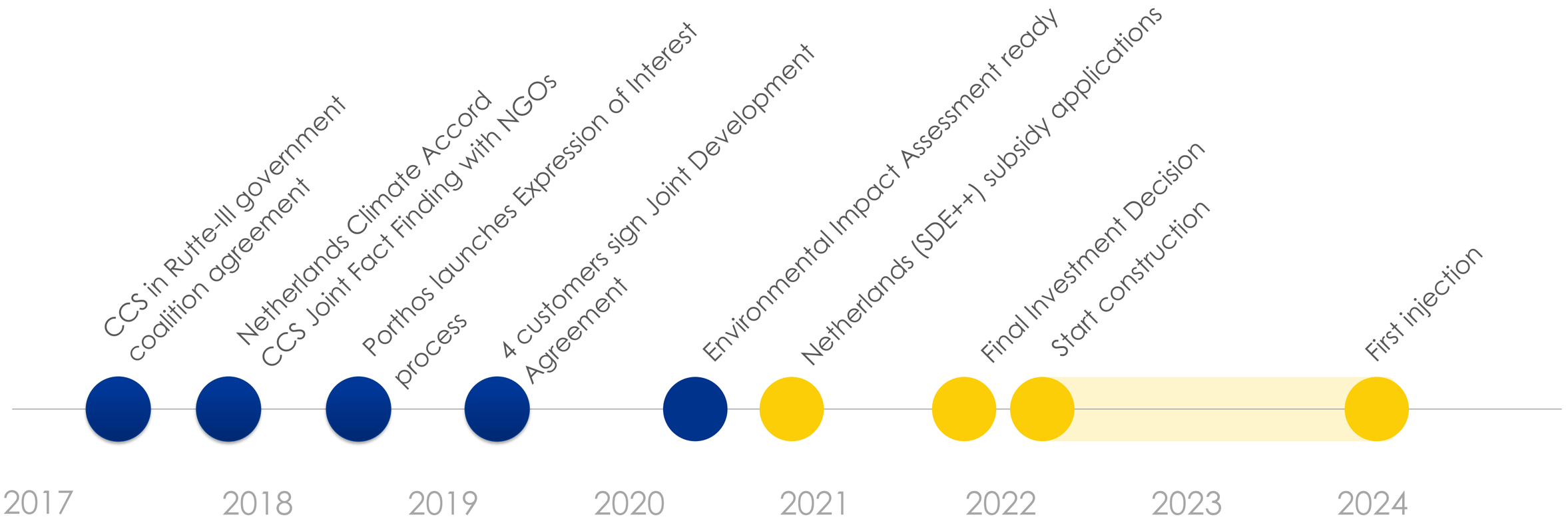
PORTHOS: CCS for the Port of Rotterdam

3 public companies investing in the transport and storage system

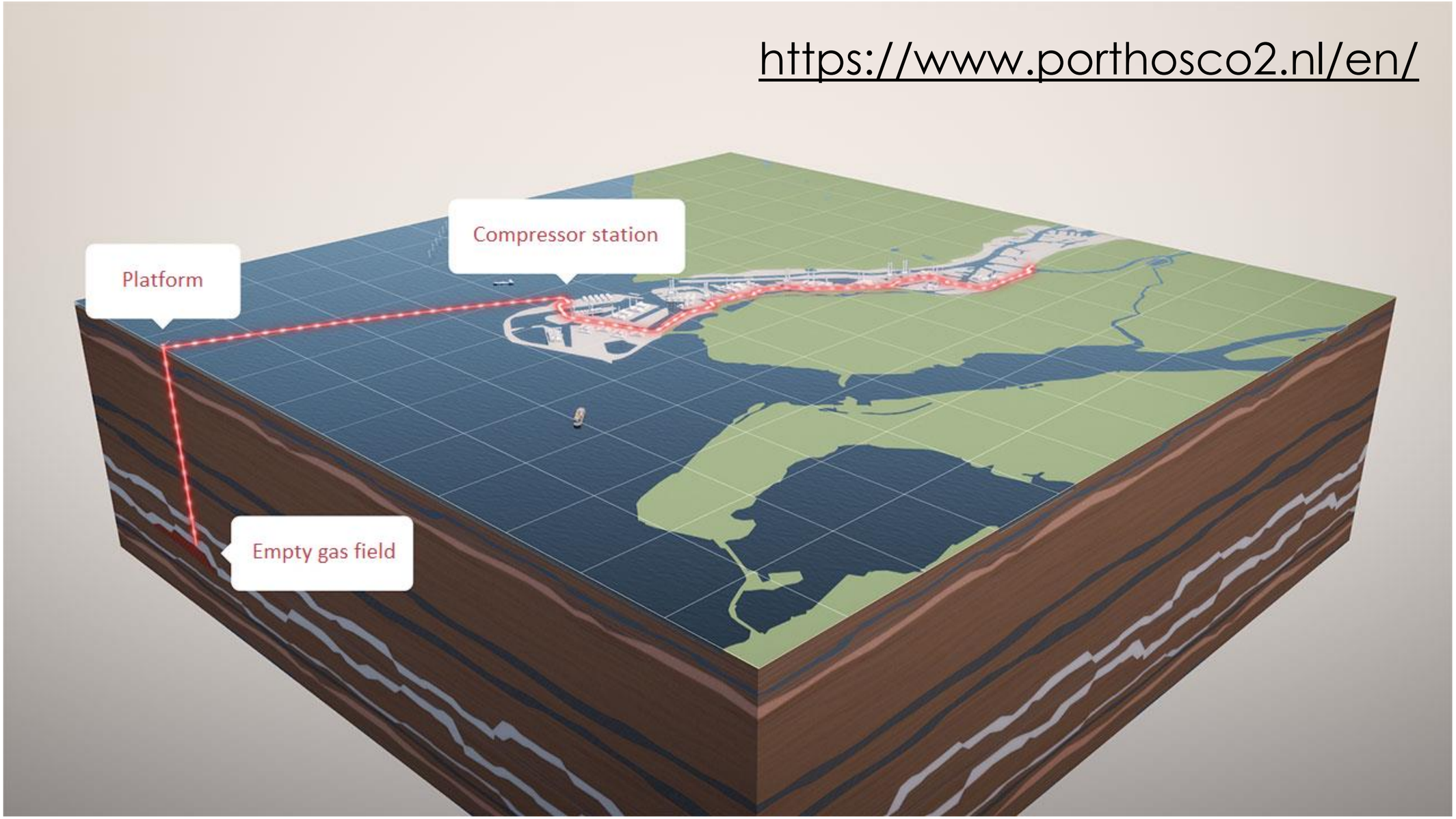
4 launching customers jointly developing the project

- 2.5 MT CO_2/yr capacity
- Netherlands government SDE++ scheme enables CCS
- EU subsidy from Connecting Europe Facility (CEF)

PORTHOS project timeline



https://www.porthosco2.nl/en/



Welcome to Net Zero Teesside

29th October 2020

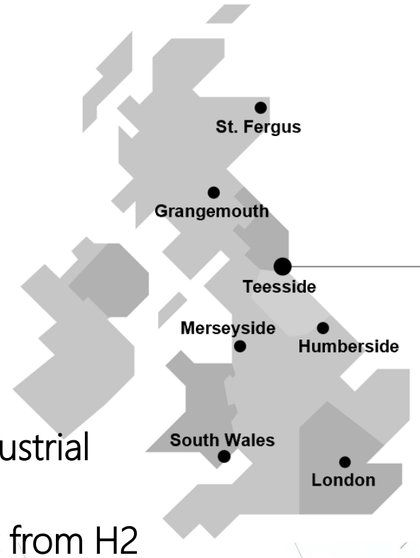
Dr Colin McGill – Net Zero Teesside Project Director

Net Zero Teesside

NZT: critical to climate change

Net Zero Teesside

- CCUS is required to meet climate targets (IPCC estimate 5-10 bn tonnes per year by 2050 to reach Paris Agreement goal of < 2°C)
- Developing new business models will be the most important NZT product
  - Previous attempts at CCUS have failed because of lack of Govt. support
  - Business models will allow CCUS to be applied at scale
  - UK has led the way with Contract for Difference (CfD) power pricing for offshore wind and could lead the way in CCUS
- 50% of world's GDP has plans to be net zero by 2050
  - CCUS will be required to decarbonise any hydrocarbons produced by 2050



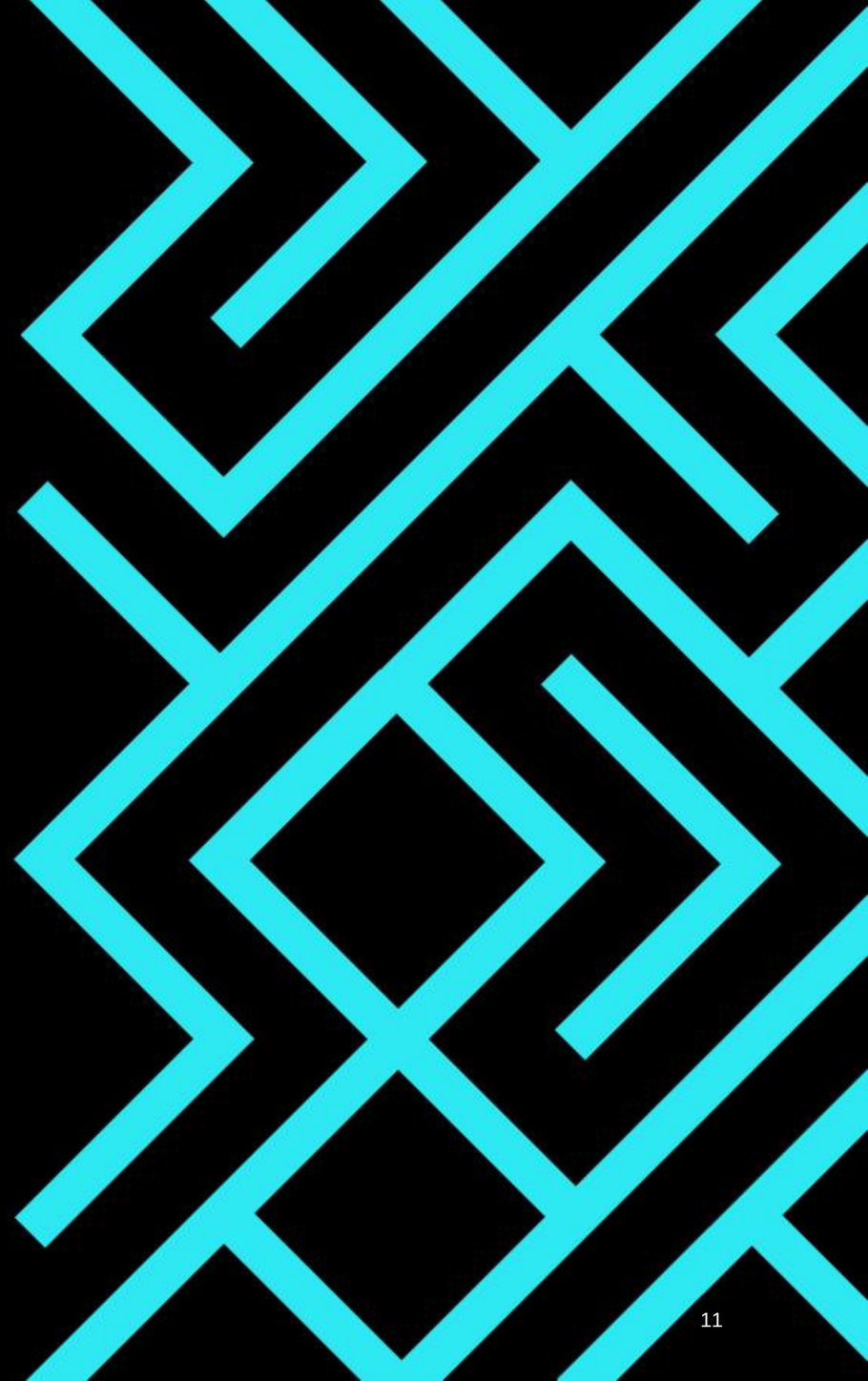
Why Teesside?

- Compact site
- Strong local political and industrial support
- CO2 available as by-product from H2 and fertiliser plants (0.7mtpa)
- 3mtpa CO2 from bioenergy and power from waste plants – negative carbon electricity
- Spare capacity in hydrogen plant (0.2mtpa) and Billingham
- Dispatchable power (CCGT + CCS) 2mtpa CO2

First:…

- ✓ Decarbonised industrial hub as soon as 2030
- ✓ Dispatchable low carbon power from gas
- ✓ Negative carbon electricity

Thank you



Tuesday, November 3, 2020

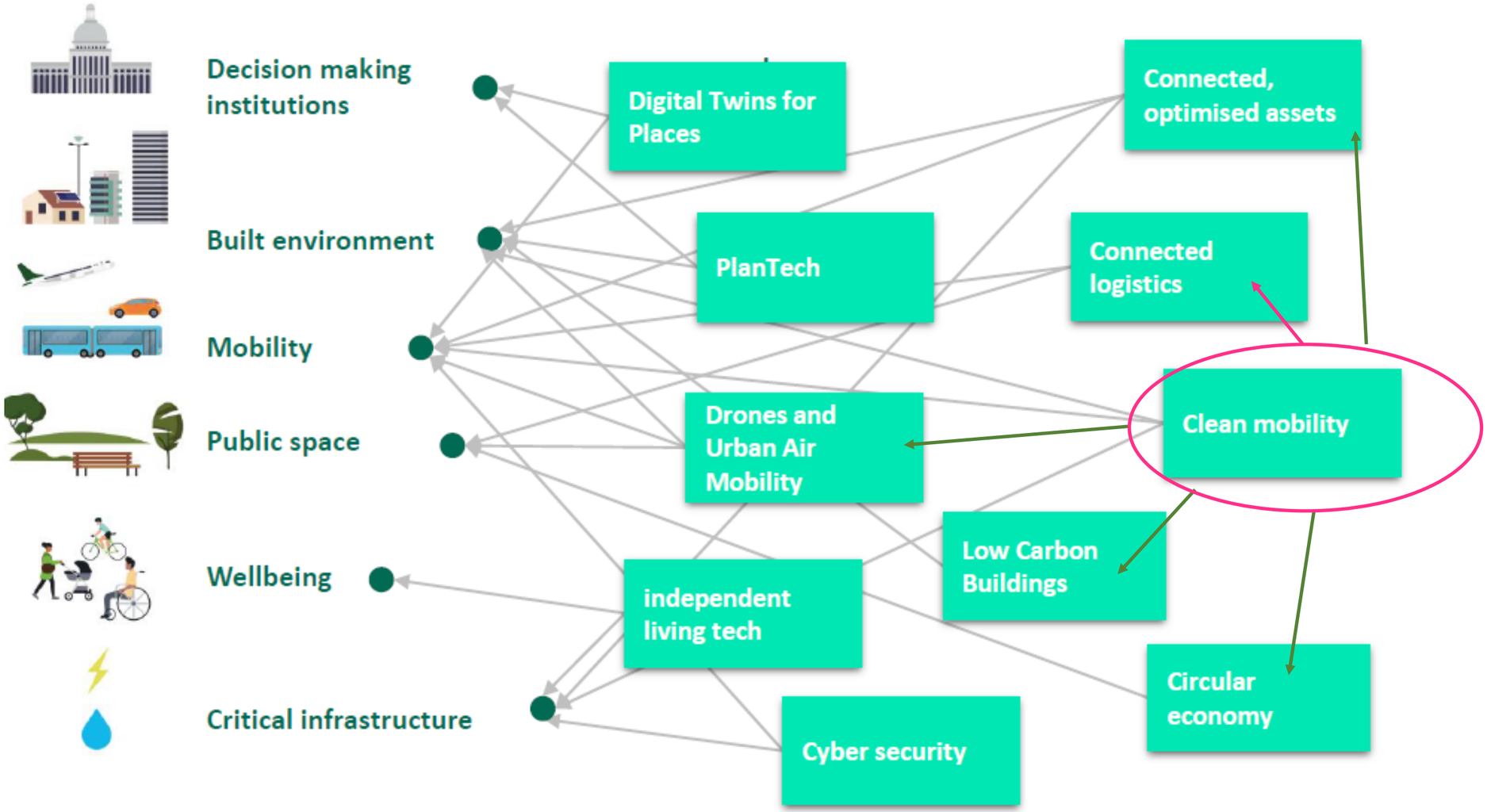
Transport Decarbonisation

Henry Tse
Director of New Mobility Technologies

CATAPULT
Connected Places

The Challenge

This is at the heart of CPC's Strategy



Reduce Travel Demand

Make Shorter Journeys

Transport Decarbonisation

Mode Shift

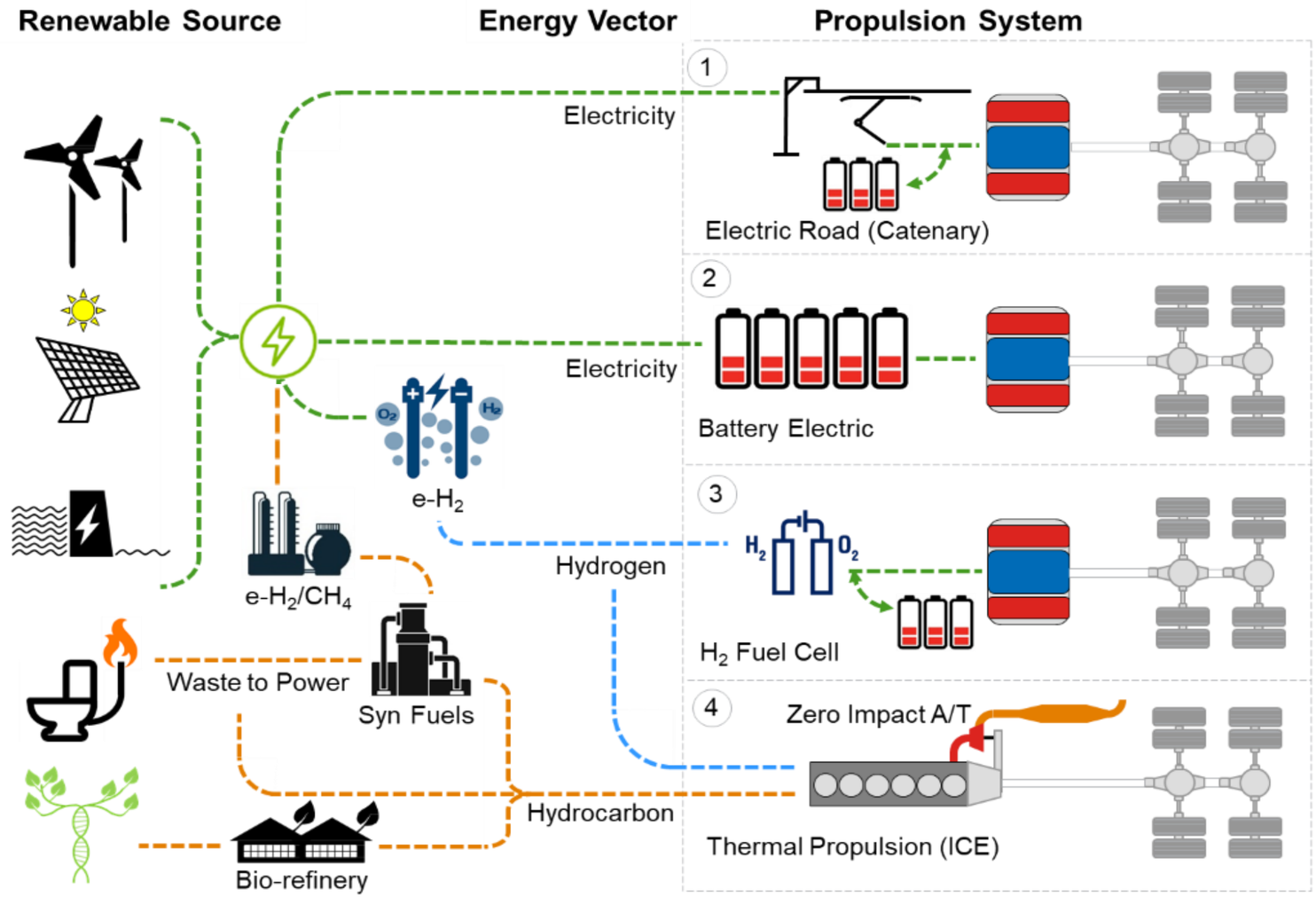
Decarbonise Mode

The Challenge

There are different routes towards transport decarbonisation, which we term ‘System Efficiency’ and ‘Vehicle Technology’

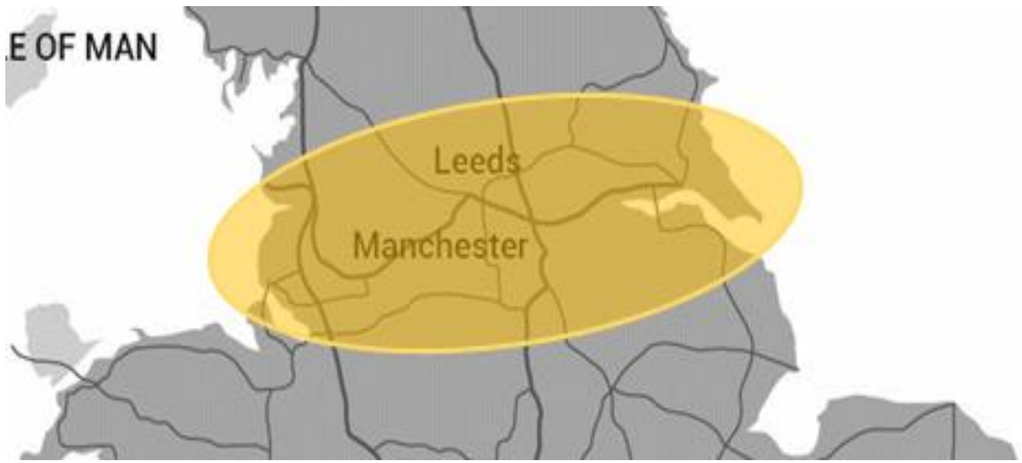
	Reduce Transport Need	Encourage Shorter Journeys	Mode Shift	Decarbonise Mode
Traveller Trips	Alternative ways to live and work	Live closer to work. Shop locally	Switch to shared transport, bicycle, scooter or foot	Switch to zero-emission, low carbon vehicles / vessels
Freight Movements	Reusing, sharing, renting and repair rather than buying new	Produce more locally	Switch to rail, water or cargo bike	
The above examples cam be grouped into:	System Efficiency Methods of reducing vehicle miles travelled. This could be through technology solutions that make travelling less necessary			Vehicle Technology Improving the technology that is used to move both people/freight

Transition to Zero-Emission Long-Haul HGV

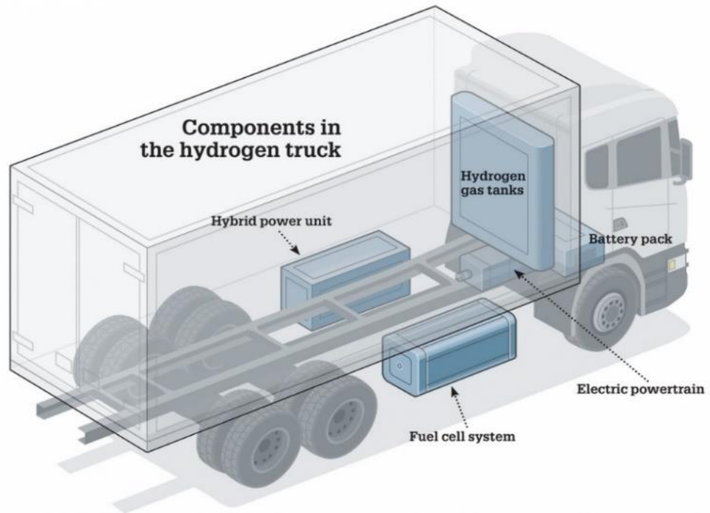


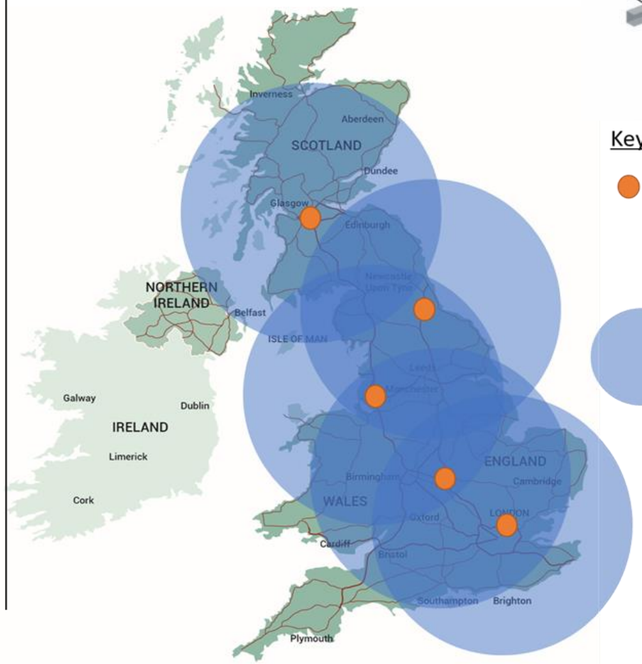
Demonstration locations

Potential Electric Roads Demonstrator Location



Potential HGV Hydrogen Refuelling Locations





Key

- Focus of new HGV hydrogen refuelling stations (mix of depot based and motorway services)
- Areas easily accessible for hydrogen vehicles (150 mile radius)

Thank you

Henry.tse@cp.catapult.org.uk

CATAPULT
Connected Places

UNIVERSITY of STRATHCLYDE
OIL & GAS INSTITUTE

Decarbonisation Projects

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29th October 2020

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UNIVERSITY of STRATHCLYDE
OIL & GAS INSTITUTE

acorn

Acorn CCS, Scotland

World class CO_2 stores
Two large, well understood CO_2 stores with plenty room for growth.

Pipeline reuse
More than £750 million cost savings from reuse of high capacity on and offshore pipelines.

Low cost CO_2
200,000 tonnes of existing CO_2 from the St Fergus Gas Terminals.

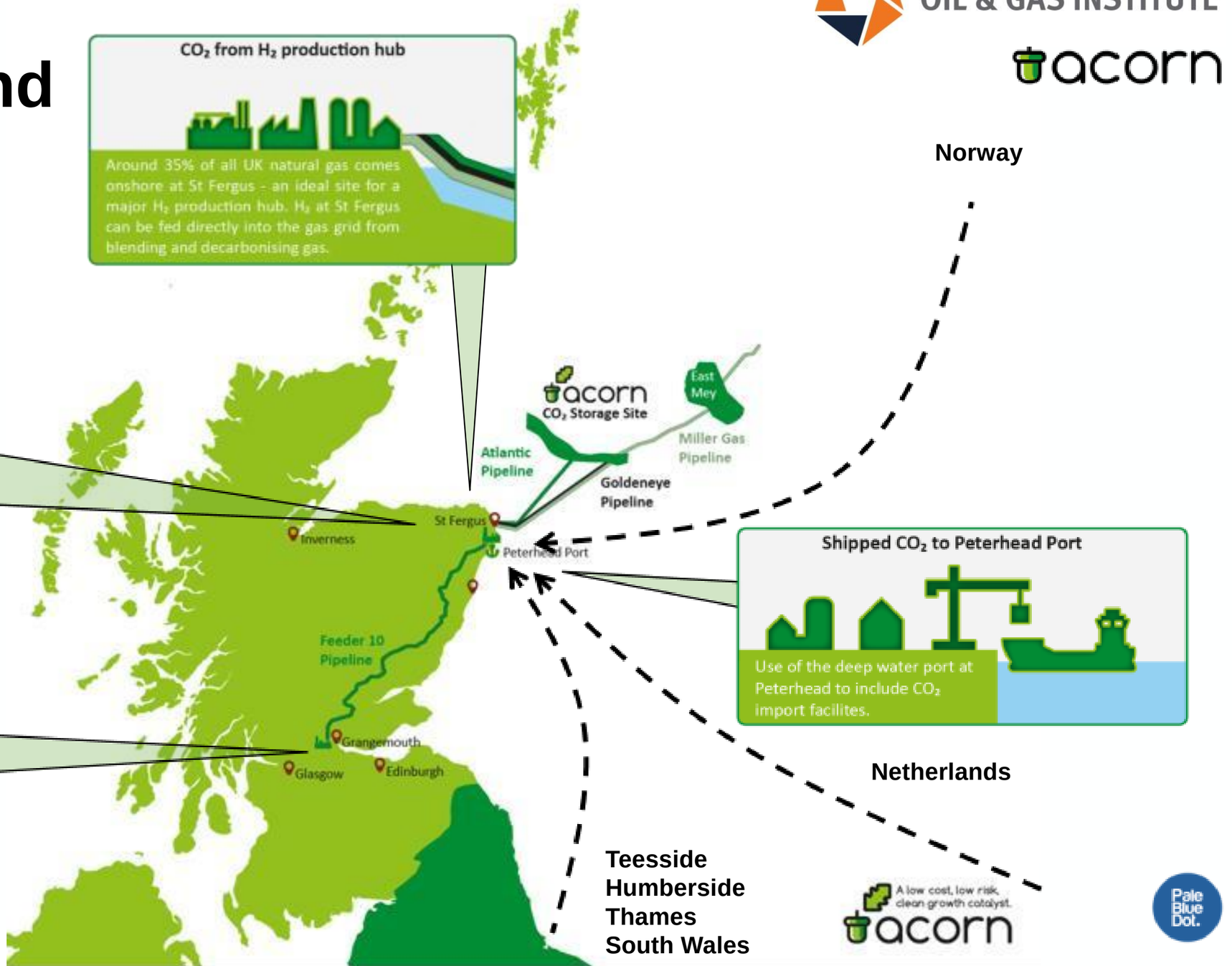
CO_2 from H_2 production hub

Around 35% of all UK natural gas comes onshore at St Fergus - an ideal site for a major H_2 production hub. H_2 at St Fergus can be fed directly into the gas grid from blending and decarbonising gas.

CO_2 from Grangemouth cluster and beyond

Feeder 10 Gas Pipeline

CO_2 from Grangemouth cluster piped to St Fergus through Feeder 10 - a natural gas pipeline ready for reuse.



Courtesy of Pale Blue Dot, Aberdeen

Pale Blue Dot.

Thank you

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