

# SSE Thermal

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# Agenda

- Where we stand
- Introduction to SSE | SSE Thermal
- My Background
- SSE Thermal R&D projects
- Recruitment programme for interns and graduates
- Q&A



# Global greenhouse gas emissions and warming scenarios

- Each pathway comes with uncertainty, marked by the shading from low to high emissions under each scenario.
- Warming refers to the expected global temperature rise by 2100, relative to pre-industrial temperatures.

Annual global greenhouse gas emissions  
in gigatonnes of carbon dioxide-equivalents

150 Gt

100 Gt

50 Gt

Greenhouse gas emissions  
up to the present

0

1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

2021

**No climate policies**  
4.1 – 4.8 °C

→ expected emissions in a baseline scenario if countries had not implemented climate reduction policies.

**Current policies**  
2.5 – 2.9 °C

→ emissions with current climate policies in place result in warming of 2.5 to 2.9°C by 2100.

**Pledges & targets (2.1 °C)**  
→ emissions if all countries delivered on reduction pledges result in warming of 2.1°C by 2100.

**2°C pathways**  
**1.5°C pathways**

Data source: Climate Action Tracker (based on national policies and pledges as of November 2021).  
OurWorldinData.org – Research and data to make progress against the world's largest problems.

Last updated: April 2022.  
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# SSE plc

## Purpose

To provide energy needed today, while building a better world of energy for tomorrow.

## Vision

To be a leading company in a net zero world.

## Strategy

To create value for shareholders and society in a sustainable way by **developing, building, operating and investing** in the electricity infrastructure and businesses needed in the transition to net zero.

# SSE Thermal

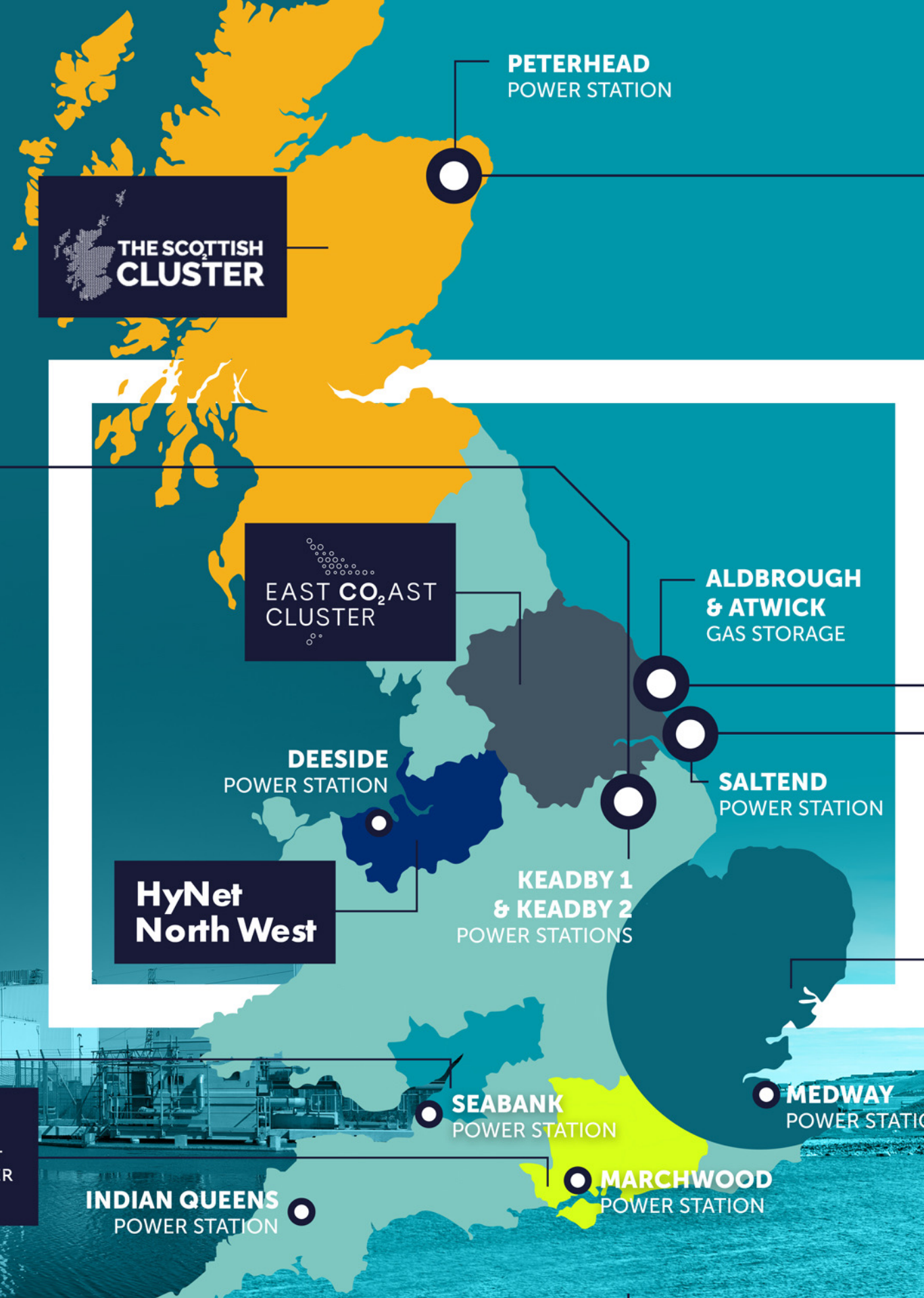


# PRESENCE ACROSS UK INDUSTRIAL CLUSTERS



## KEADBY

- Carbon Capture Power Station
- Hydrogen Power Station



**THE SCOTTISH  
CLUSTER**

**PETERHEAD  
POWER STATION**

**EAST CO<sub>2</sub>AST  
CLUSTER**

**ALDBROUGH  
& ATWICK  
GAS STORAGE**

**DEESIDE  
POWER STATION**

**SALTEND  
POWER STATION**

**HyNet  
North West**

**KEADBY 1  
& KEADBY 2  
POWER STATIONS**

**SALTEND**

- Hydrogen blending at existing power station

**Bacton  
Thames  
NetZero.**



**INDIAN QUEENS  
POWER STATION**

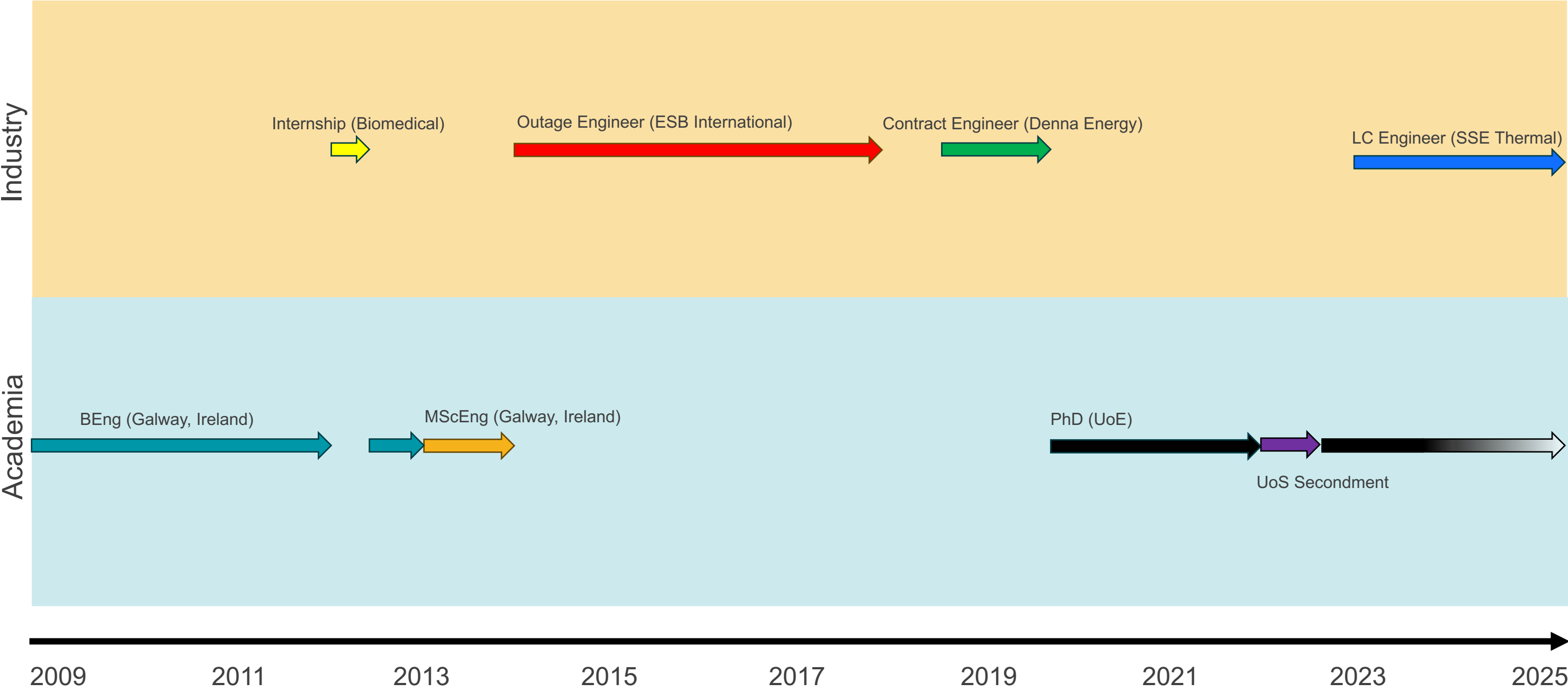
**SEABANK  
POWER STATION**

**MEDWAY  
POWER STATION**

**MARCHWOOD  
POWER STATION**



# My Background



# Academia & Industry Collaboration



| Industry                                        | Academia                                           |
|-------------------------------------------------|----------------------------------------------------|
| Full-time early-stage R&D staff not practical   | Full-time early-stage R&D staff                    |
| Employees need a broad knowledge base/skill set | Employees need a targeted knowledge base/skill set |
| Access to capital, limited resource time        | Access to resource time, limited capital           |
| Realists                                        | Theorists                                          |
| ££££££                                          | $\Delta S \geq \int \frac{\delta Q}{T}$            |

"This really is an innovative approach, but I'm afraid we can't consider it. It's never been done before."

# FOCUSS (FLEXIBLY OPERATED CAPTURE USING SOLVENT STORAGE)



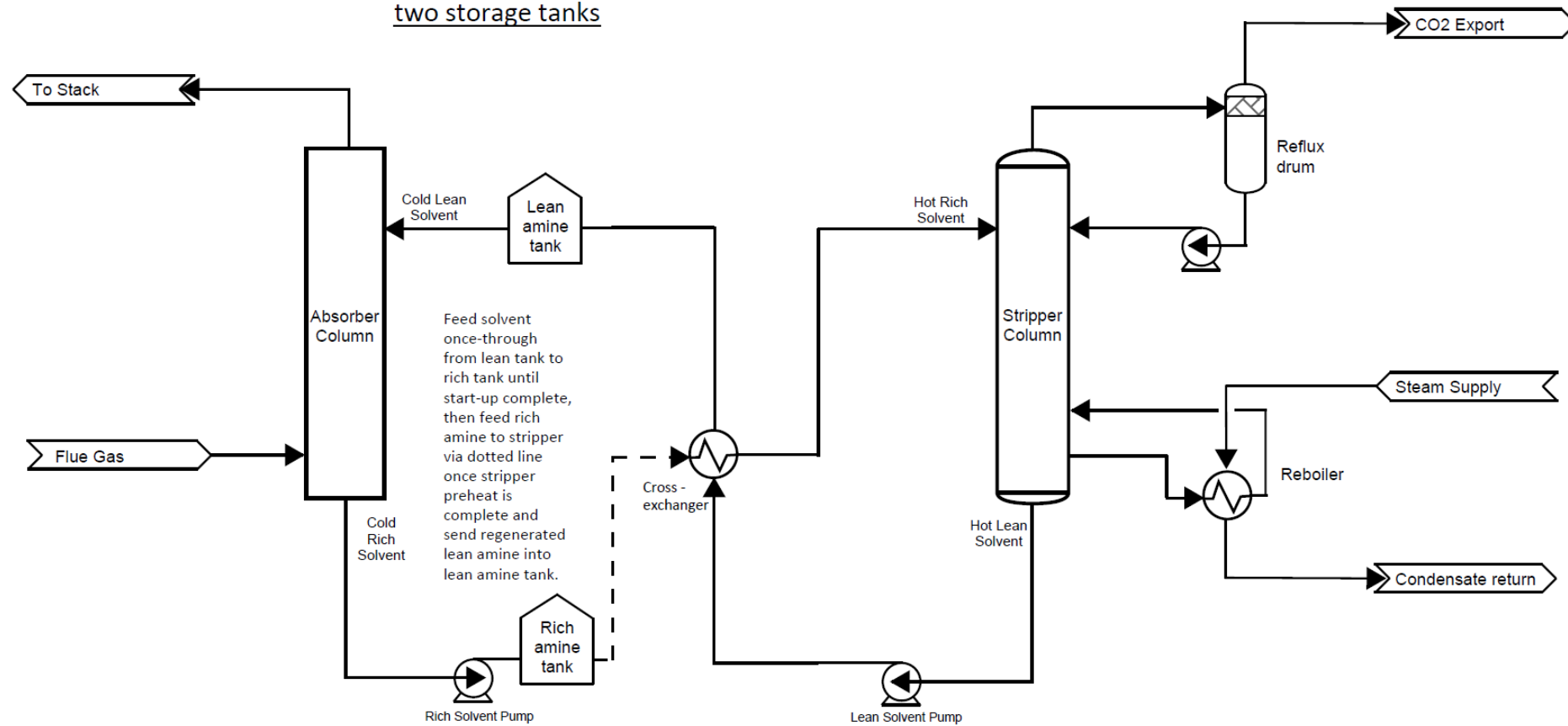
- **Funding:** DESNZ Carbon Capture, Usage and Storage (CCUS) Innovation 2.0 competition (£20million)
- **Budget:** £670K
- **Schedule:** May 2022 to September 2024
- **Aim:** Demonstrate a cost-effective method to achieve high capture levels during plant start-up, shutdown, and other transients using innovative technologies and world-leading pilot facilities.
- **Video:** [FOCUSS Overview](#)





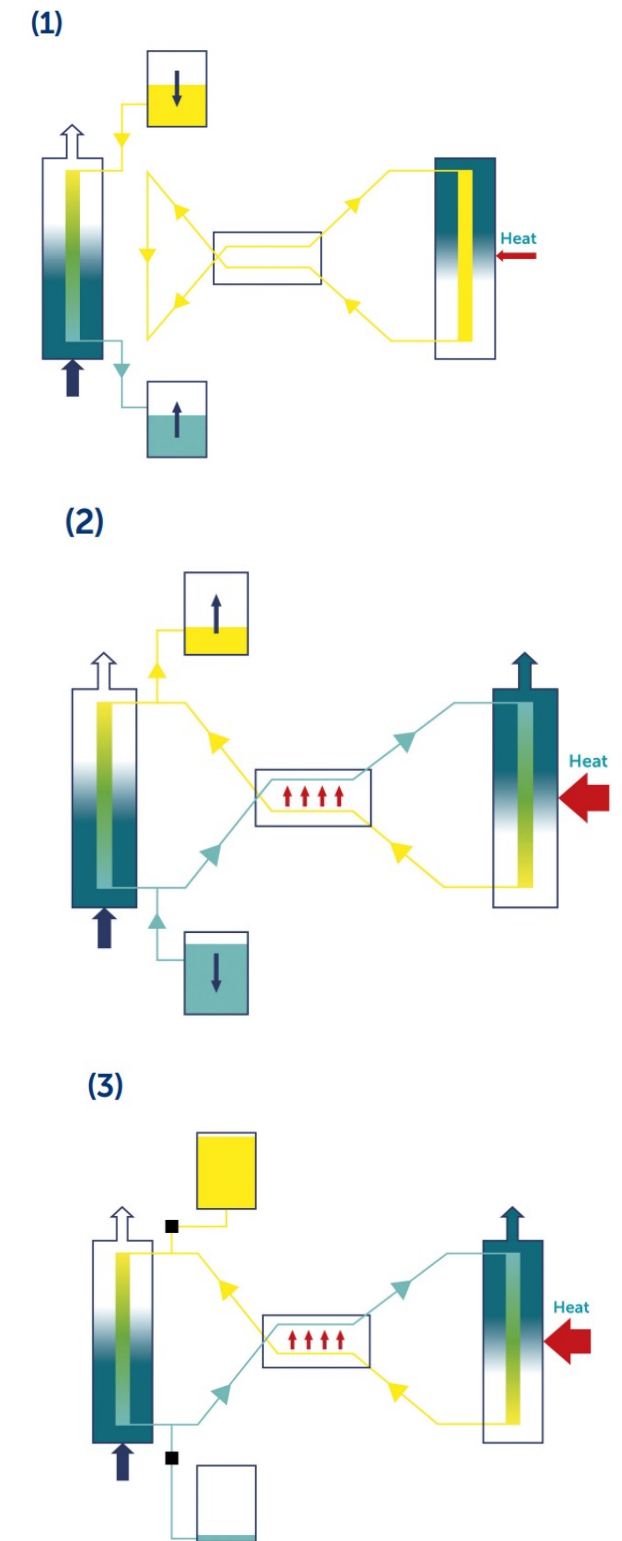
# FOCUSS START UP CONCEPT

Simplified process flow diagram of base case at start-up - two storage tanks



AECOM (2020) for DESNZ, Start-up and Shut-down Times of Power CCUS Facilities.

<https://www.gov.uk/government/publications/start-up-and-shut-down-times-of-power-carbon-capture-usage-and-storage-ccus-facilities>



# FOCUSS TERC PILOT-PLANT PICTURES

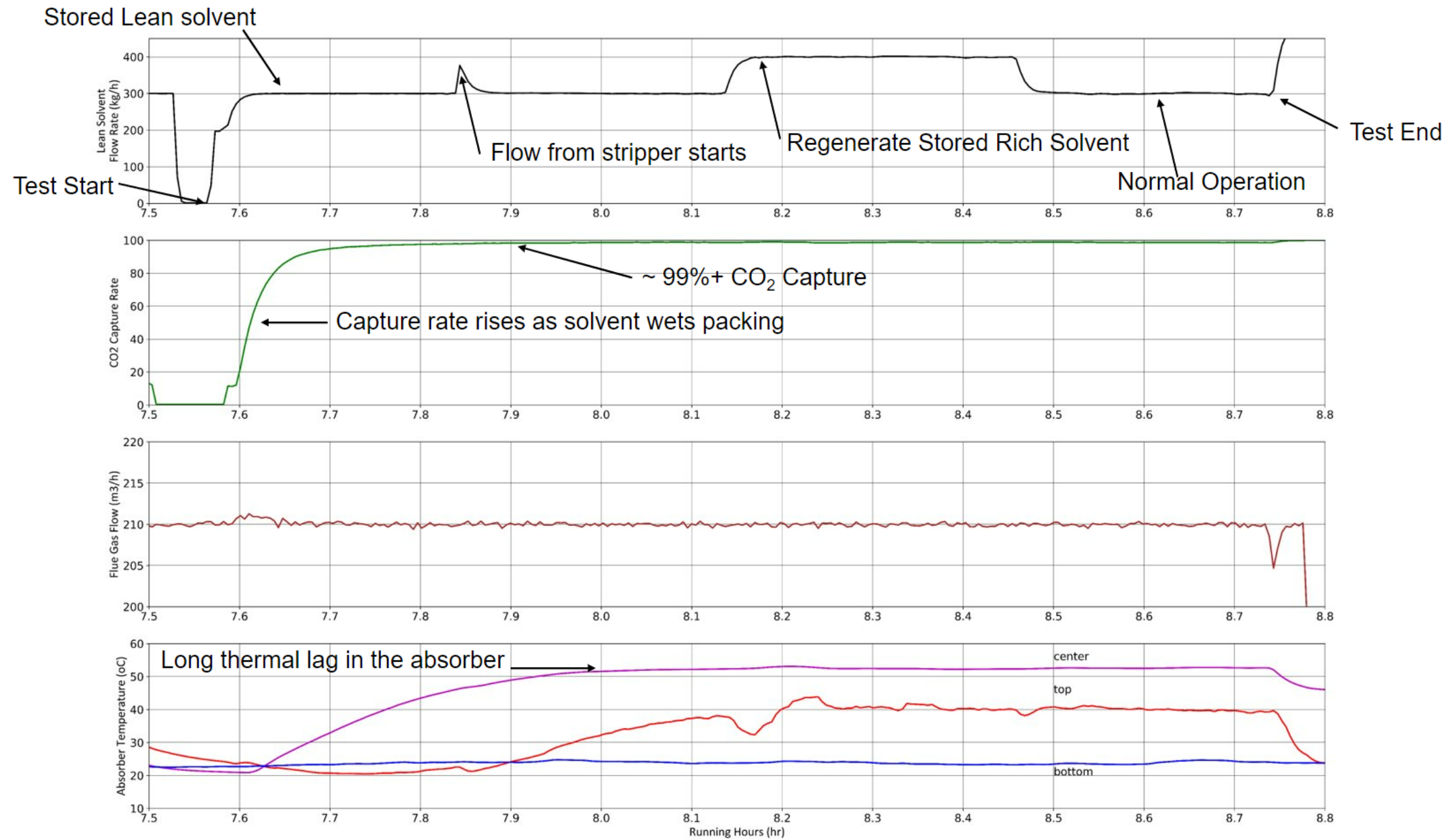


Lean storage tanks adjacent to (L to R) Desorber, Absorber 1 and Absorber 2 columns



# FOCUSS PHASE 1 TESTS AT TERC

- 5 days in August
- ~1 hour of operation for absorber testing
- ~ 20 minutes for start-up test at the minimum solvent flow
- Demonstrated start-up sequence with high CO<sub>2</sub> capture rates
- Experience suggested improved configuration for future tests and commercial operation



# Additional R&D Projects

- Various CEPT applications in progress
- PCC – CARER: Post Combustion Capture - Cost And Residual Emission Reduction
  - UKCCSRC Flexible Funding | Industrial funder
- CAPCCO: Comprehensive Assessment of Post-Combustion Capture Options
  - IDRIC Flexible Funding | Industrial Support
- ETRIC: Effective Thermal Reclaiming Integrated with Capture
  - UKCCSRC Flexible Funding | Industrial Support

**Open to ideas!**

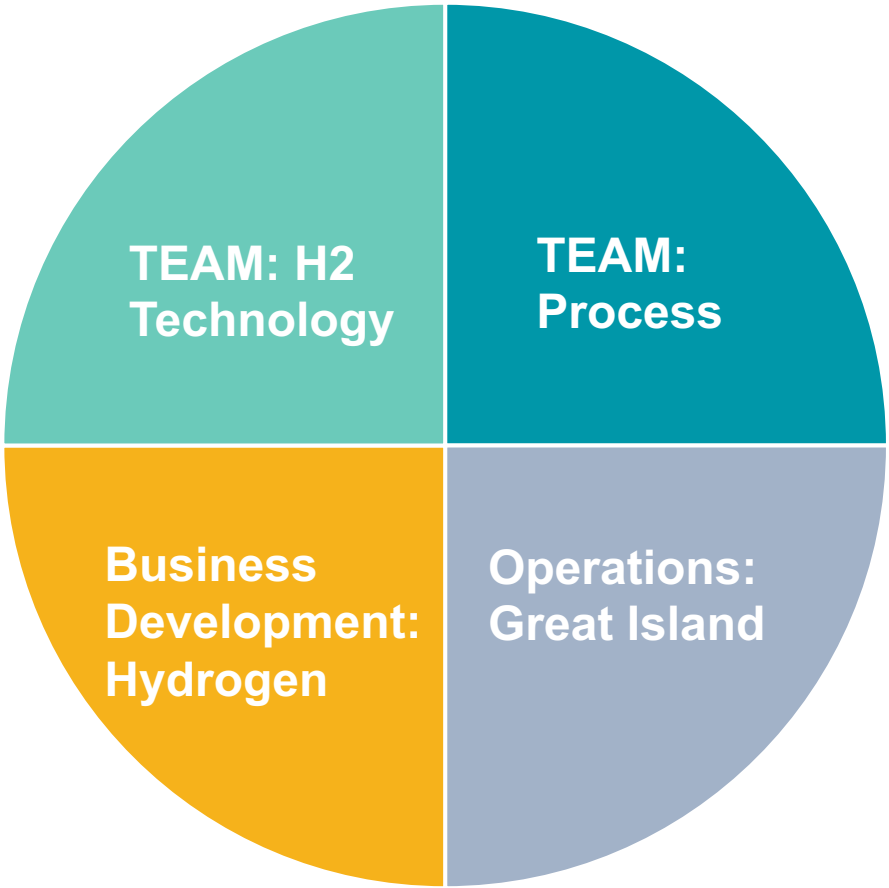
# Graduate Programme

## Structure

### 4 x 6-Month Placements

- With 1 on-site placement
- Compromise of Business needs and personal preferences

### Placement Opportunities



[careers.sse.com/thermal-engineering-graduate](https://careers.sse.com/thermal-engineering-graduate)

# Summer & 12-Month Internships

## Powering your career prospects

If you're studying for your degree in a relevant subject and want a career that makes a difference, a placement gives you the chance to **gain valuable experience** in a thriving industry.

### With an SSE placement, you can expect to:

- ✓ Contribute to important business challenges
- ✓ Learn from industry experts as you develop real-world skills to complement your academic knowledge and experience
- ✓ Develop skills and experience across a wide variety of tasks, working independently and as part of a team
- ✓ Work in a supportive environment where diversity is valued and your ideas count

**Summer applications  
open: Feb '24**

[careers.sse.com/  
early-careers](https://careers.sse.com/early-careers)

**Summer  
Internships**

**Thermal  
Commercial &  
Engineering  
Summer Placement**

# **Get in touch:**

**Daniel Mullen, Low Carbon Technology Engineer**

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