

Innovation – broadening the horizon

We will start at 12.02 to allow participants to finish previous meetings and join the call

nationalgrid



While you are waiting, please access Sli.do which we will be using for Q&A

Event Code:

#GTX3

Sli.do Instructions:

You can access Sli.do at www.sli.do or by downloading the Sli.do app.

Once you've logged on, enter the code above when prompted.

Welcome and Opening

Thank you for joining us today

**Slido.com
#GTX3**



Who will be speaking today?

Corinna Jones
Head of Hydrogen Innovation



Ian Bennett
Innovation Delivery Manager



Lynsey Stevenson
Technology Lead – Asset Development



Mat Currell
Asset Innovation Specialist



Jennifer Pemberton
Stakeholder Experience Manager



Logistics



Should last for approximately about 60 min



Questions and polling via [slido.com](https://www.slido.com) #GTX3



All callers will be placed on mute



We will circulate the slides and a recording of this webinar

Agenda

Key challenges by theme

Innovation and BAU / Funding

Case studies

How to get involved

RIIO-2 Innovation Themes



Fit for the
Future

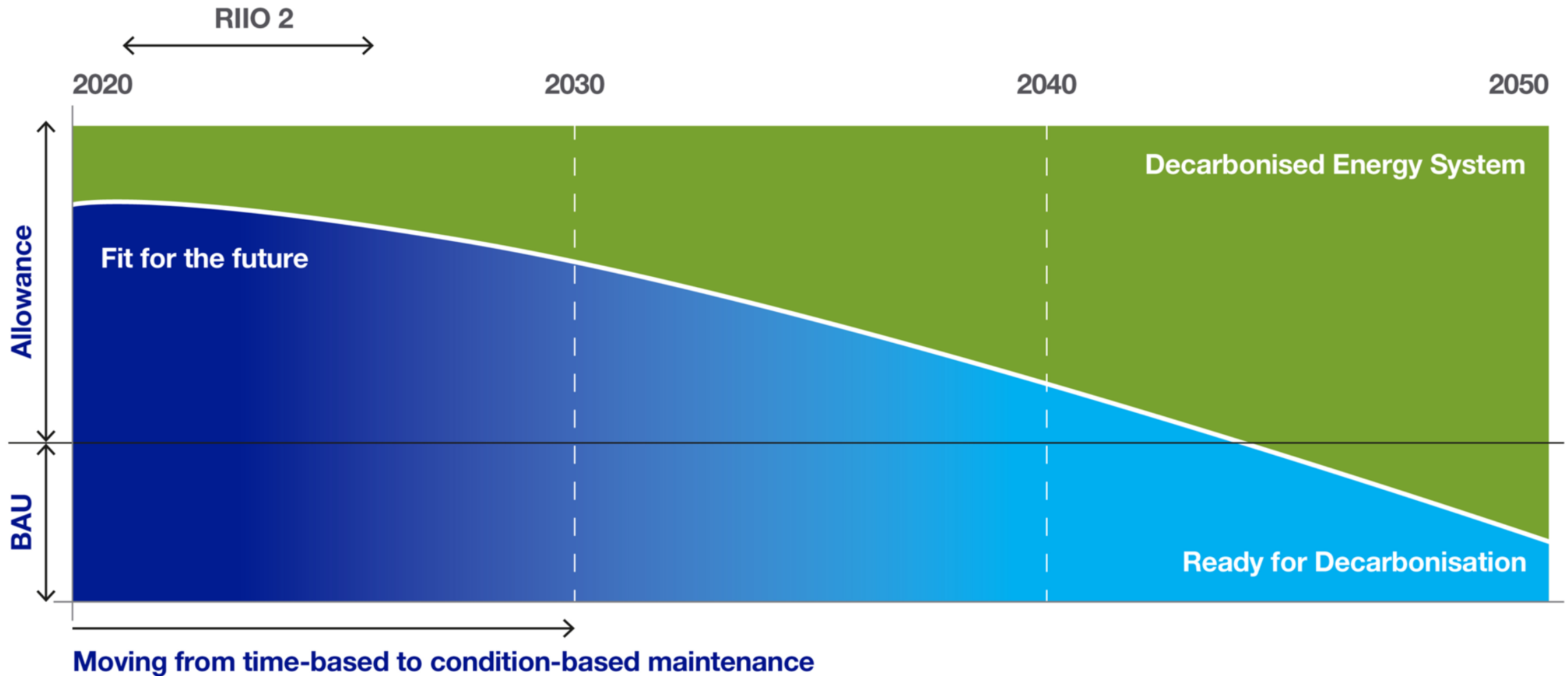


Ready for
Decarbonisation

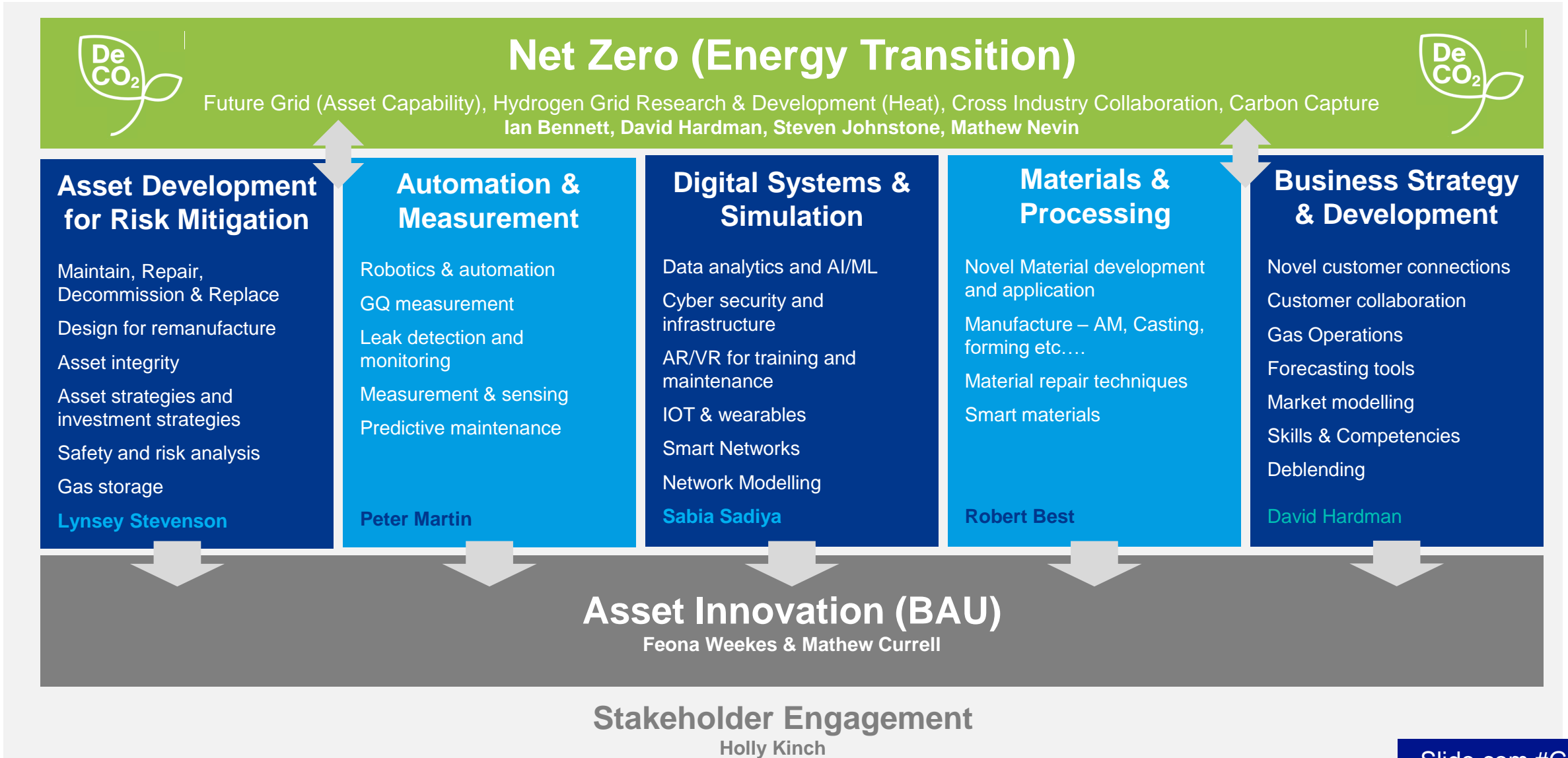


Decarbonised
Energy System

Our Strategy: Transitioning to Decarbonisation



Innovation Technology Portfolios



Key challenges by theme



Fit for the
Future

Extending the life of assets at
the lowest cost but highly
robust and safe



Ready for
Decarbonisation

Development of **new systems**
for assets that can't work in
hydrogen flows or blends
Metering, Gas Analysers



Decarbonised
Energy System

Determination of the **new
markets** and their requirements
Deblending etc...


Asset Innovation Team Key Challenges



Fit for the Future



Ready for Decarbonisation



Decarbonised Energy System

Asset Development for Risk Mitigation

- Focusing on **improving maintenance techniques** to improve safety and operational efficiency, reduce our GHG emissions, keep the gas in the pipe and ensuring our assets are still fit for purpose many years from now
- Identifying **new or improved ways of doing things** to drive value for our customers and stakeholders.

Automation & Measurement

- Continuously develop our **sensor and measurement capability** across the NTS to accurately understand the condition of our assets and how the system is performing. For example, pipe wall thicknesses and fugitive emissions.

Digital Systems & Simulation

- Focussing on **condition monitoring** of our system, advanced simulations of the methane network and exploring dynamic maintenance schedules rather than time based.

Materials & Processing

- Investigating **alternate and technical materials** for use in various applications across the network

Business Strategy & Development

- Challenge the status-quo of **internal business processes** and identify more efficient alternatives

Innovation and BAU / Funding



Net Zero & Vulnerability



BAU & Best Practice



Innovation and BAU / Funding

Ofgem
Innovation
Funding

Ofgem
Reopeners &
Adjustment Mechanisms

Other Funding
Mechanisms

NIA – Network Innovation Allowance

SIF – Strategic Innovation Fund

UIOLI – Net Zero Use It or Lose It

**Vulnerability & Carbon
Monoxide Allowance (GDNs)**

£27.5m over 5 years

£450m to compete for

£8.5m to bridge the gap
between NIA and
future Investments

Innovation and BAU / Funding

Ofgem
Innovation
Funding

Ofgem
Reopeners /
Uncertainty Mechanisms

Other Funding
Mechanisms

Reopeners:
14 accessible for NGGT
18 accessible for GDNs

4 Net Zero Reopeners:
Net Zero, Net Zero Preconstruction &
Small Project, Heat Policy & Large
Load Connections

Coordinated Adjustment Mechanism to
adjust where costs for a project are in
one vector but the benefits fall in the
other.

The innovation projects are
developing a basis of
knowledge to allow us to
scope reopeners for large
hydrogen investments that will
come later in the RIIO-2 period

Innovation and BAU / Funding

Ofgem
Innovation
Funding

Ofgem
Reopeners &
Adjustment Mechanisms

Other Funding
Mechanisms

**UKR&I
ie. InnovateUK, EPSRC**

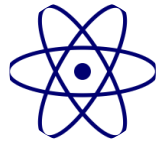
**Regional grants / competitions e.g.
Scottish & Welsh Government**

Industrial Strategic Challenge Fund

Others

There are many other opportunities for research and development funding. Work that falls outside of NIA and SIF can be covered under here and supporting hydrogen work at end users not directly linked to the NTS

Case Study



Robotics



Surveillance



Corrosion Modelling

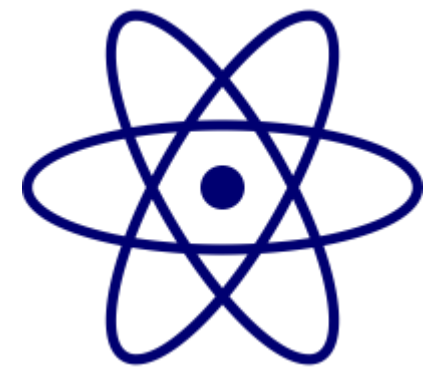


Non-Destructive Testing



Compressor Variability

Case Study: Robotics



RAIN

ABOUT OUR TECHNOLOGIES INDUSTRY ACADEMIA PUBLIC ENGAGEMENT NEWS GET INVOLVED

REBOOTING

ROBOTICS AND AI IN NUCLEAR

The RAIN Hub uses robotic and AI technologies to solve challenges faced by the nuclear industry.

[READ MORE](#)

ORCA HUB
Offshore Robotics for Certification of Assets

About Us Innovation Engagement Latest

REMOTE SAFETY AND INTEGRITY:

Leading the way in offshore robotics

[FIND OUT MORE](#)

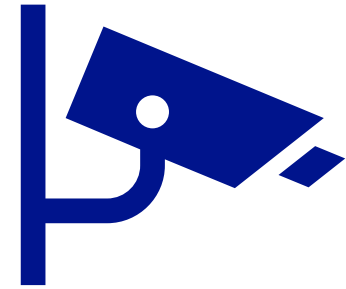
Project GRAID (Gas Robotic Agile Inspection Device)

1st	First of its' kind able to inspect high-pressure buried gas pipes from inside
100 bar	Operates in live gas up to pressures of 100 bar
45°	Able to climb 45 degree angles within buried pipes
360°	Inspection arm has 360 degree view to assess condition of the pipe
100m	100m range of GRAID with a tethered Umbilical Management System (UMS)
ART	Upgrade to incorporate Acoustic Resonance Technology (ART) sensors
1 week	Expected time for 100% coverage of 10m compared to 11 weeks with MFL

Challenge

- Inspection & repair of remote inhabitable environments
- Maintaining safety and robustness
- Nuclear, offshore, construction

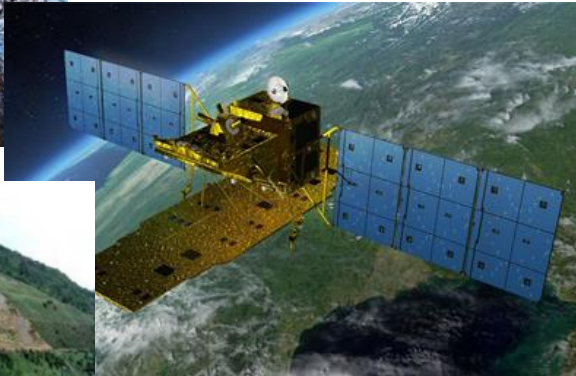
Case Study: Surveillance



Data Driven Asset Management

We will collate more data on our assets than ever before and use this to understand risk and make informed decisions.

Utilising digital technologies such as drones paired with AI to gather useful data quickly and efficiently



Use Cases

- Third party encroachment
- Vegetation management
- Land movement
- Emissions monitoring
- Asset Condition Monitoring



Case Study: Corrosion Modelling

Extensive **data collation** and **augmentation** activities were completed to demonstrate the process by which **corrosion modelling** of both buried and non-buried pipework components could be completed to support tactical and strategic planning activities at an above ground installation.



Figure 3.8 Location of CM/4 Pipe Defects at Year 0

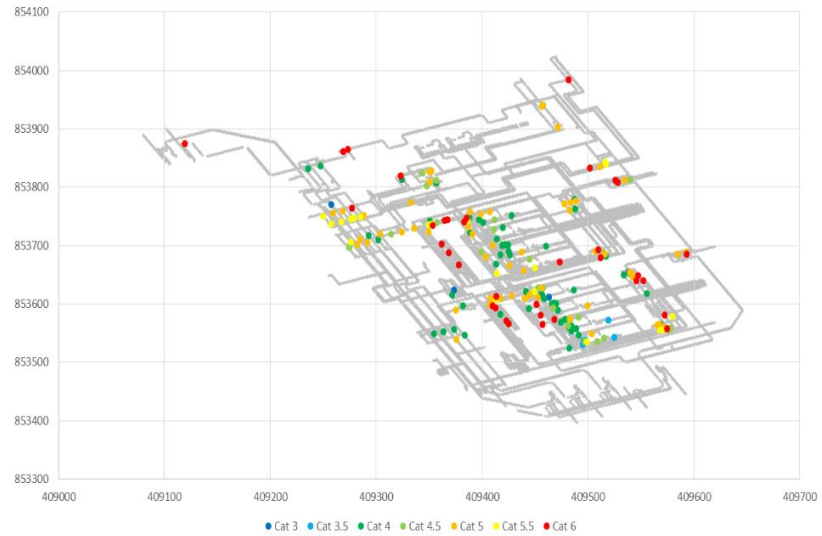
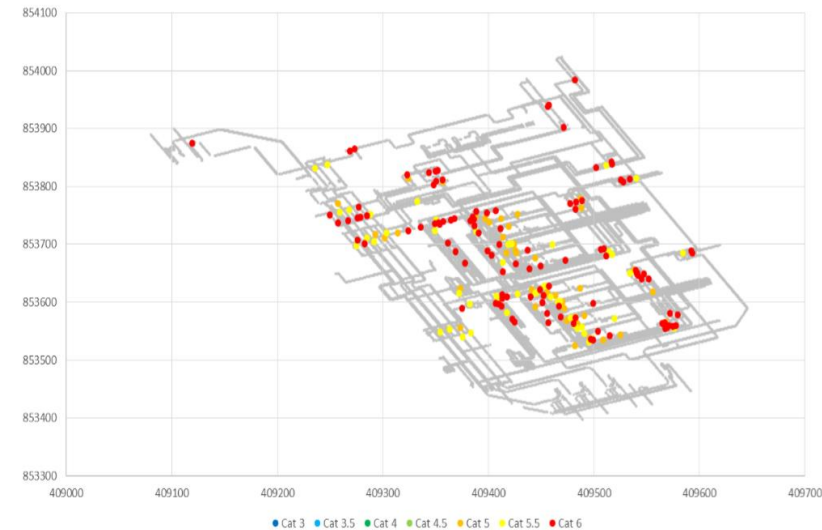


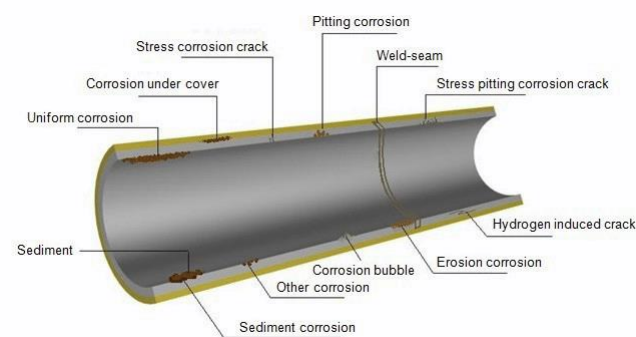
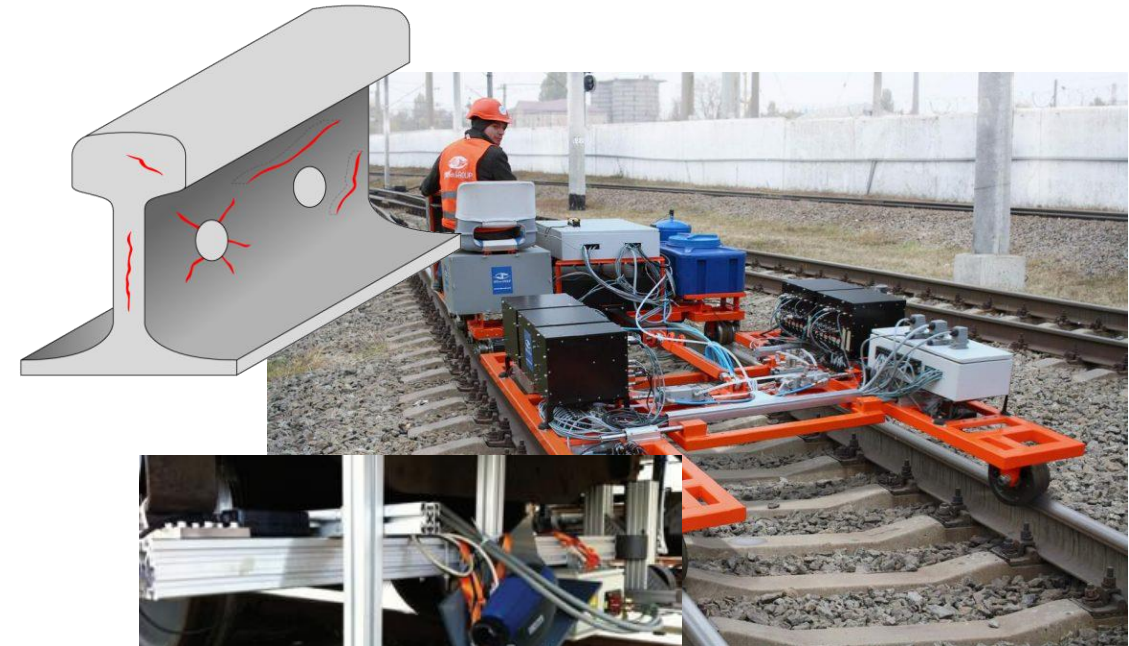
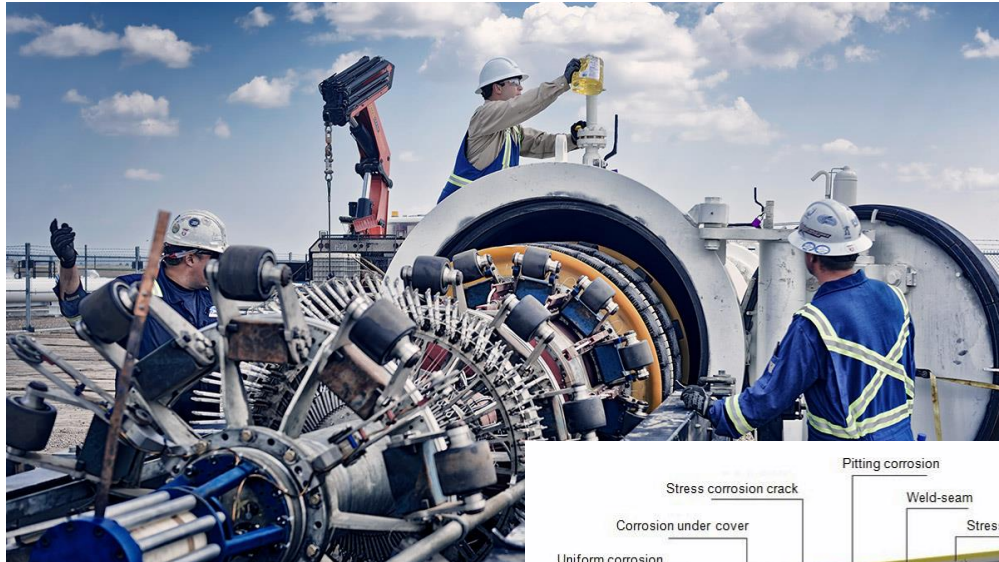
Figure 3.9 Location of CM/4 Pipe Defects at Year 6



Case Study: Non-Destructive Testing



- Pipeline inspection is vital for **pipeline integrity management** to ensure pipelines are safe to operate
- The introduction of **hydrogen** into the NTS **may accelerate** pipeline deterioration



Case Study: Compressor variability

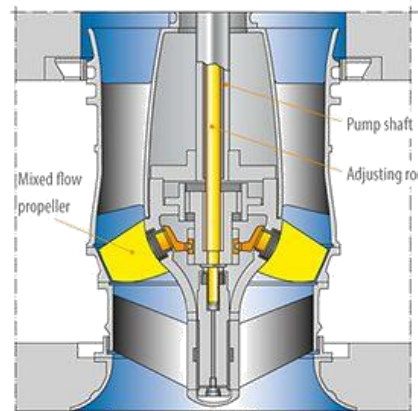


The NTS uses centrifugal compression to transport gas throughout the UK

Considerations:

- Current operational envelopes are limited
- **Transition to hydrogen** presents a challenge
- Pressure ratio achieved dependent on molecular weight of gas
- Consumers may require **different blends**
- Using existing turbine machinery **large variations in speed** are going to be difficult to achieve without gearing systems

Many industries use compressor systems.
Can we collaborate and share lessons/technologies?



Carbon capture and storage using compressed gas solutions



Cement



Chemical and Petrochemical



Compressed air solutions for buses



Compressed air and compressor solutions for industrial applications



Dental Air Compressors



Glass Industry



Heavy duty vehicles application



Industrial Gases



LNG industry



Laboratories



Laser Cutting

Problem statements

How can we better share/collate pipeline assessments?



How can we monitor hydrogen fugitive emissions?



How do we best capture and reutilise vented gas?



How do we convert our existing pipeline to be hydrogen ready?



How could we conduct maintenance more efficiently?



How can we better utilise sensors?



How should we most effectively decommission assets?



How best do we optimise our data?



How to get involved

Get in touch

If you'd like to be added to our mailing list, or have a question or idea you'd like to discuss, just email box.GT.innovation@nationalgrid.com

Or find us on social media:



Is there an innovation that can solve my problem?



Is there a better way to do this job?



Is there a way to make this cheaper for the customer?



Q&A



Upcoming events

Gas Market Plan	Tue 30th Nov 09.30 – 10.30	Register here
Transitioning to a hydrogen backbone	Thu 02 nd Dec 10.00 – 11.00	Register here
Managing methane emissions	Thu 02 nd Dec 13.00 – 14.00	Register here
Supporting regional hydrogen transitions	Fri 03 rd Dec 09.00 – 10.00	Register here
Understanding the skills needed for a net zero world	Mon 06 th Dec 13.00 – 14.00	Register here
Digital Strategy and Information Provision	Tue 07 th Dec 13.30 – 14.30	Register here
Operating the network	Wed 08 th Dec 09.00 – 10.00	Register here
Gas Emergency Frameworks Overview	Thu 09 th Dec 14.00 – 15.30	Register here
FutureGrid 2021 Progress report	Tue 14 th Dec 10.00 – 11.00	Register here
Annual Network Capability Assessment Report	Wed 15 nd Dec 10.00 – 11.00	Register here

What next?



You will receive the recording and material from today's session



If you have any further questions or would like to discuss anything specific please get in touch with Ian.Bennett1@nationalgrid.com



Feedback is important to us, therefore if you have not already taken part, we would like to put you forward for a survey

Thank you!



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