

Welcome!

We will start
promptly at 14:02

HyNTS
FutureGrid

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

slido

Event Code:

#NGG12

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.

HyNTS

Welcome and Opening



Antony Green
Project Director – Hydrogen

Thank you for joining us today

Please feedback via:

Event Code:
slido #NGG12

HyNTS

Introductions



Antony Green
Project Director – Hydrogen



Jenny Pemberton
Stakeholder Manager



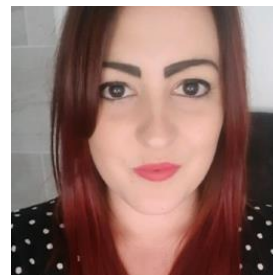
Corinna Jones
Innovation
Manager



Tom Neal
Innovation Delivery
Manager



Steve Johnstone
Senior Innovation
Specialist



Holly Kinch
Innovation Stakeholder
Lead



Sarah Kimpton
Energy Transition
at DNV GL

HyNTS

Logistics

Should last for approximately **60 minutes**

Questions and polling via [slido.com](#) **#NCG12**

All callers will be placed on **mute**

We will circulate the **slides and a recording** of this webinar

HyNTS

Agenda

nationalgrid

- ◆ Introduction
- ◆ Introducing the FutureGrid Programme
- ◆ FutureGrid Phase 1 – NIC
- ◆ Engaging our Stakeholders
- ◆ Phase 2 & 3 Opportunities
- ◆ Q&A

Event Code:
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Poll question

The Prime Minister's 10 point plan has outlined some key steps for hydrogen & carbon capture for the journey to Net Zero.

What else do we need to deliver a Net Zero energy future?

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HyNTS FutureGrid

Building A Collaborative Pathway to a Greener Future

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Gas National
Transmission
Network (NTS):

£6.3bn

value of the
existing assets

7660km

high pressure
pipelines

NTS carries

3/4

of GB energy
today

Collaboration has been key to developing our hydrogen capabilities:



GDN projects have
positive results and
have not found any
show stoppers



Department for
Business, Energy
& Industrial Strategy

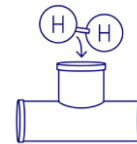


Hydrogen Programme
Development Group
(HPDG) and Gas
Goes Green (GGG)



gasunie

International hydrogen
demonstration with
significant learning
and knowledge shared

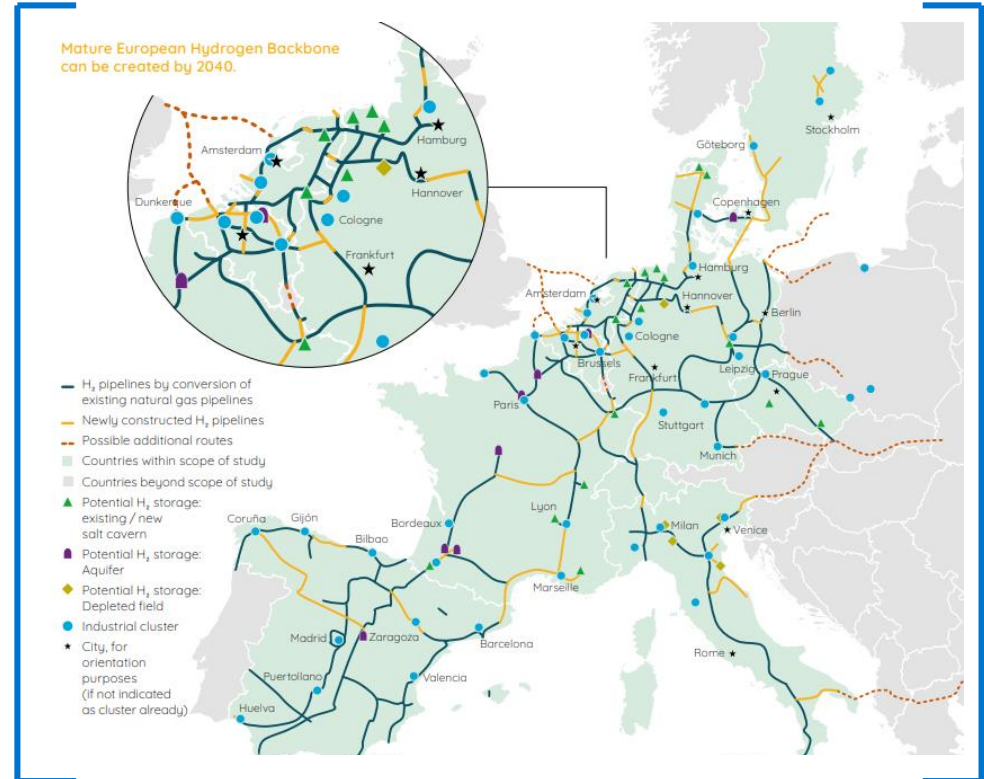
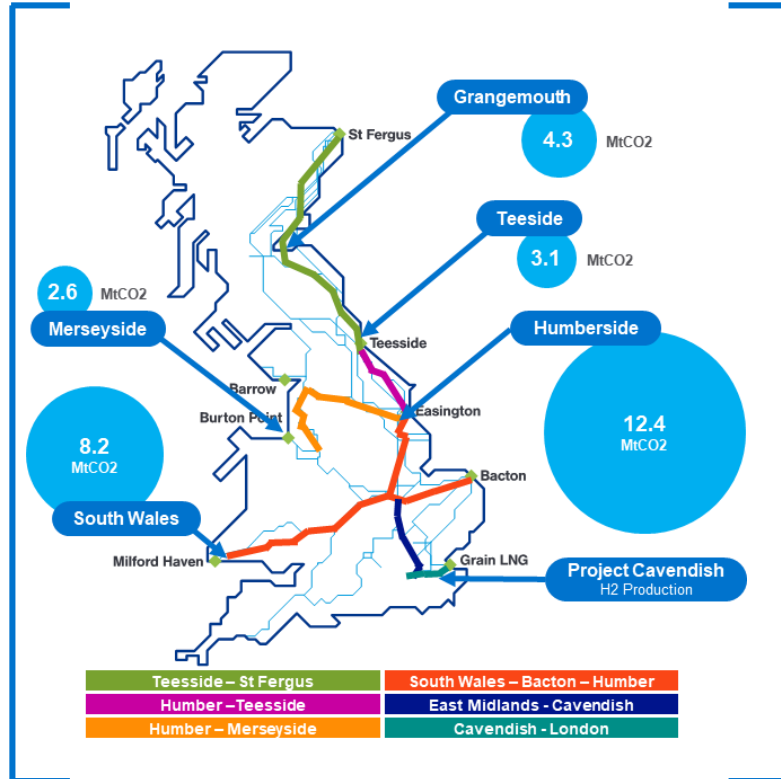


HyNTS programme
has provided desktop
evidence of the NTS
capability & capacity

NTS Pathway to a Net Zero Future

HyNTS FutureGrid

Developing a hydrogen backbone



Poll result

The Prime Minister's 10 point plan has outlined some key steps for hydrogen & carbon capture for the journey to Net Zero.

What else do we need to deliver a Net Zero energy future?

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Poll question

Will you be directly impacted by the hydrogen transition?

Yes

Somewhat

No

Please explain...

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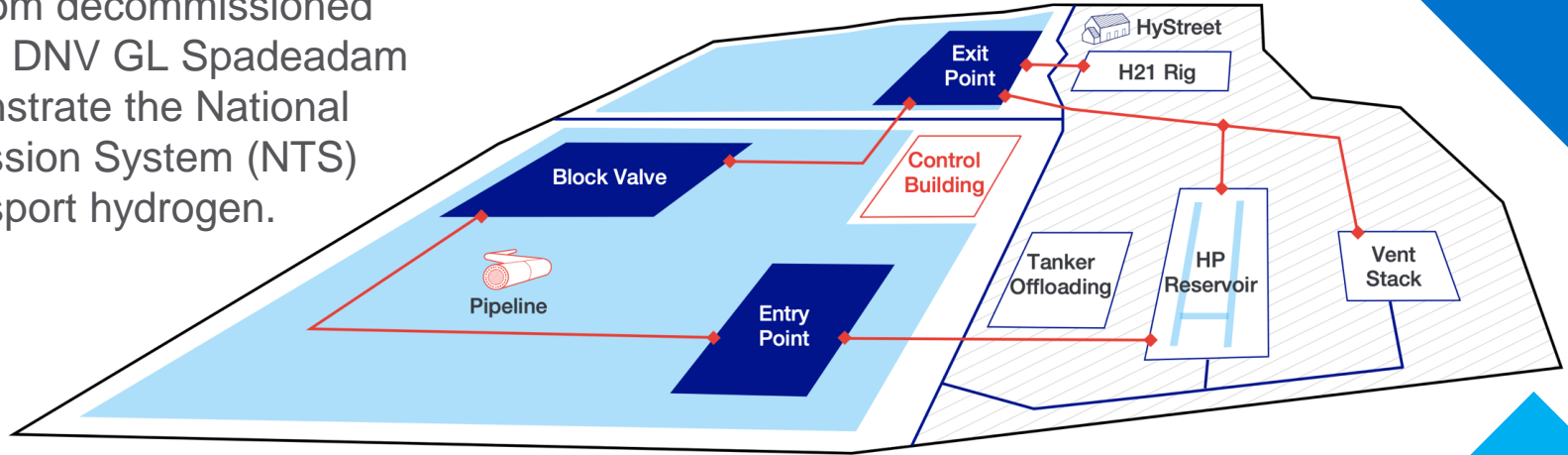
Introducing the FutureGrid Programme

Tom Neal



HyNTS FutureGrid

This ambitious programme seeks to build a hydrogen test facility from decommissioned assets at DNV GL Spadeadam to demonstrate the National Transmission System (NTS) can transport hydrogen.



HyNTS FutureGrid

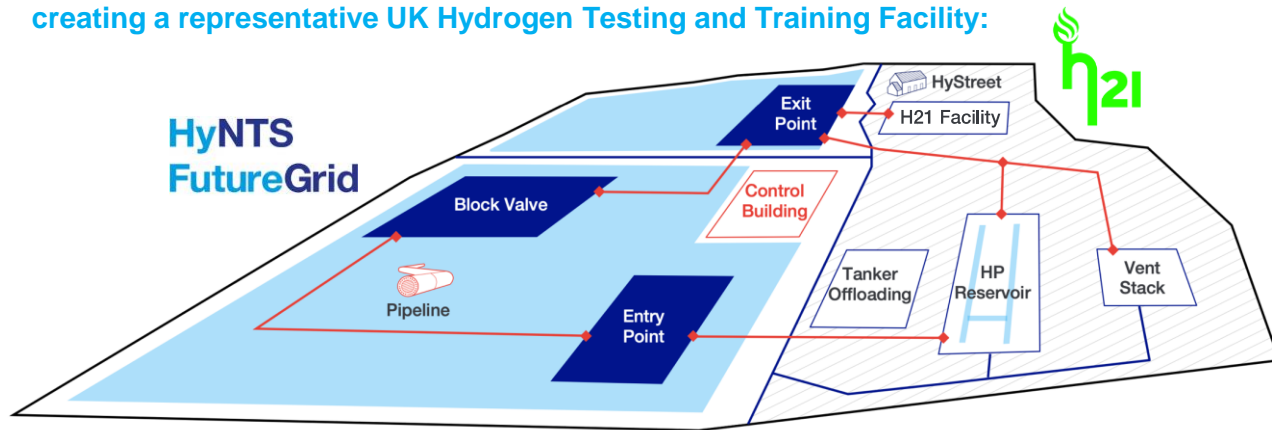
Building a Testing & Training Facility for the UK

nationalgrid

The FutureGrid test facility will be built at DNV GL's Spadeadam Site:



The FutureGrid test facility will connect to the H21 distribution facility creating a representative UK Hydrogen Testing and Training Facility:



'Beach to Burner' UK Test Network



Digital first approach to engagement



Maximise collaboration and reach



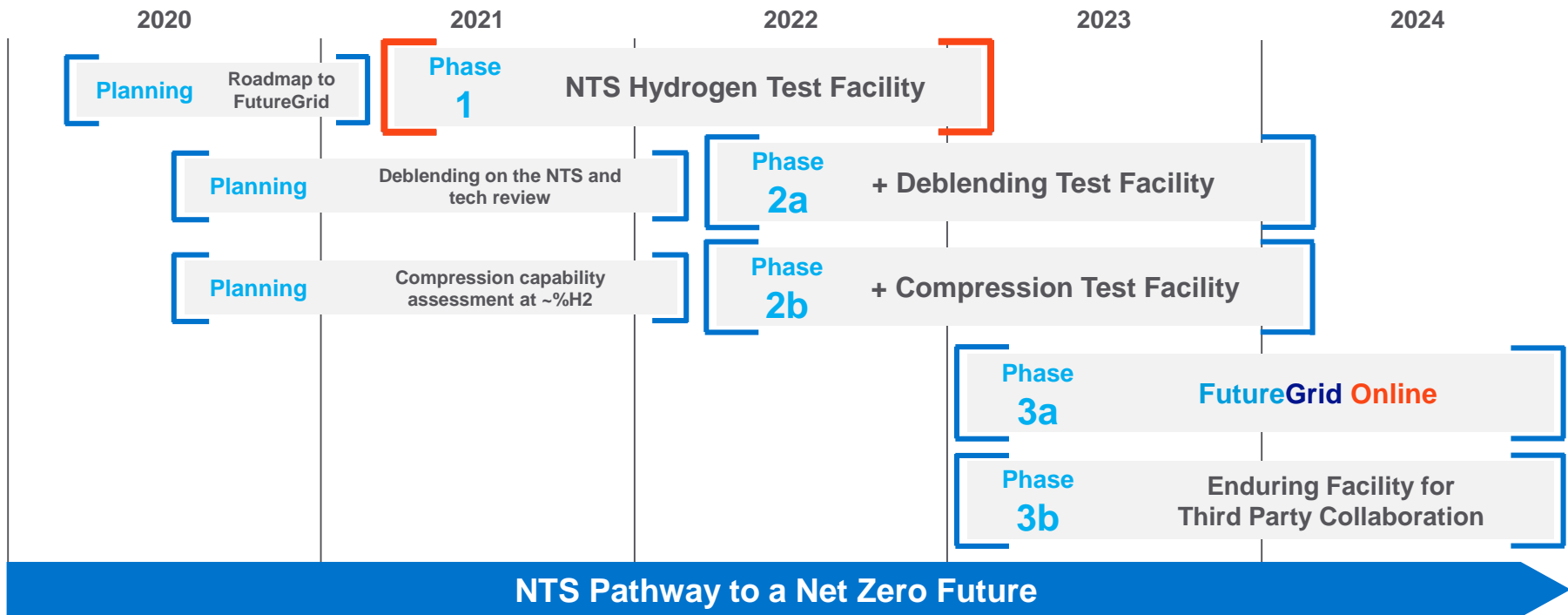
Testing & Training Facility

Train Future Hydrogen Engineers

HyNTS FutureGrid

Building the FutureGrid Programme

nationalgrid



HyNTS FutureGrid

Roadmap to FutureGrid Project

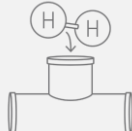
The **Roadmap to FutureGrid** project is key to developing the principles and specification of the proposed offline test facility including the development of a robust testing plan to provide an updated safety case for the NTS.

Building on Learning:

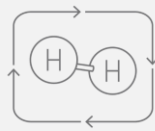
This NIA and wider programme of work builds on learning across our portfolio of projects and from across industry projects:



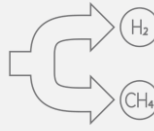
Feasibility of
H₂ in the NTS



Hydrogen Injection
in the NTS



Hydrogen Flow
Loop



Hydrogen
Deblending



The NIA Project will deliver 3 key outputs:

1

Design of the Test Facility

Full design of the hydrogen test facility which will include the pipeline configuration, the assets to be tested, injection and mixing points, storage capabilities and flows.

2

Development of Master Testing Plan

Develop the testing plan to validate NTS assets and flow parameters such as gas velocities, pressures, energy delivery and other operating parameters for hydrogen blends up to 100%.

3

Asset Integrity Testing & Interpretation

Design and develop a number of desktop and small scale asset integrity tests with analysis and interpretation of the results to feed into the full design and testing programme.

Poll result

Will you be directly impacted by the hydrogen transition?

Yes

Somewhat

No

Please explain...

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FutureGrid Phase 1 – NIC

**Steve Johnstone
& Sarah Kimpton**

HyNTS FutureGrid

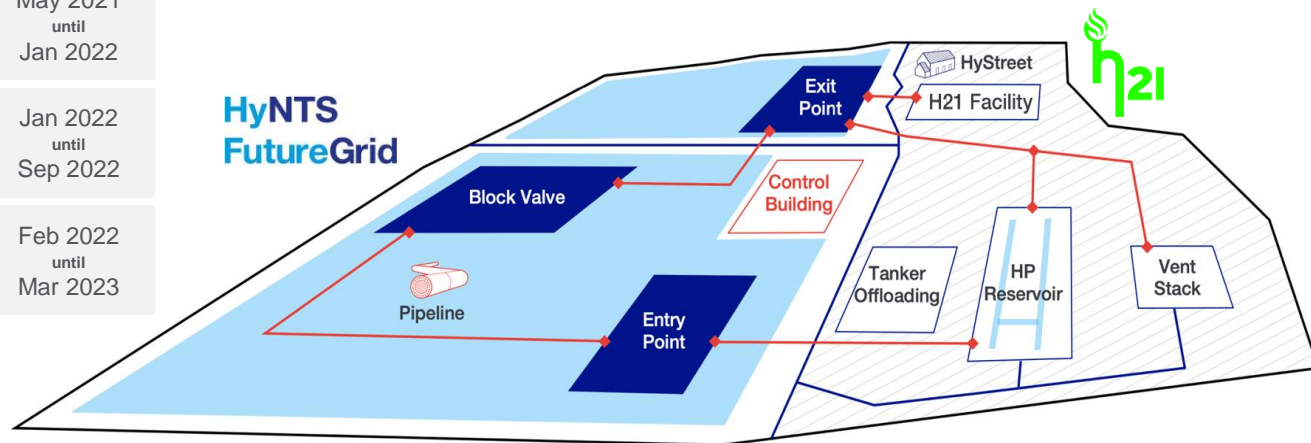
Phase 1 Overview

This ambitious programme seeks to build a hydrogen test facility from decommissioned assets at DNV GL Spadeadam to demonstrate the National Transmission System (NTS) can transport hydrogen.

The project will be delivered in three phases:

Phase 1a	Offline Facility Build	May 2021 until Jan 2022
Phase 1b	NTS Asset Testing	Jan 2022 until Sep 2022
Phase 1c	Safety & Risk Impact	Feb 2022 until Mar 2023

The FutureGrid test facility will connect to the existing H21 distribution facility creating a representative UK Hydrogen Testing and Training Facility:



FutureGrid
Project Partners:



HyNTS FutureGrid

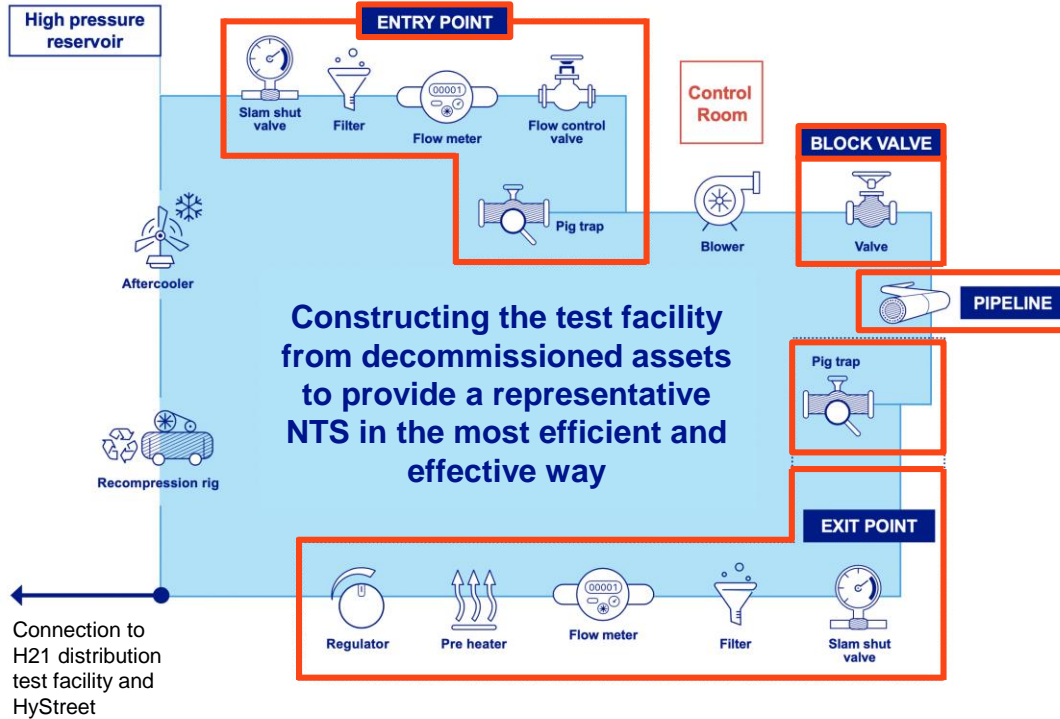
1a: Offline Facility Build

Phase 1a
Offline Test
Facility Build

Phase 1b
NTS Asset
Testing

Phase 1c
Safety & Risk
Assessment

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HyNTS FutureGrid

1b: NTS Asset Testing

Phase 1a
Offline Test
Facility Build

Phase 1b
NTS Asset
Testing

Phase 1c
Safety & Risk
Assessment

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Three concentrations of hydrogen will be tested:



2%

hydrogen in natural gas



20%

hydrogen in natural gas



100%

hydrogen

The main steps for Phase 1b are:



Operate the FutureGrid test facility for 6-12 months across 2% 20% and 100% hydrogen, following the detailed Master Test Plan developed under the FutureGrid NIA project.



Review and evaluate the test results utilising the research from Fluxys with the Fast Screening Methodology allowing for the extrapolation of results across the NTS.



Validate flow parameters such as gas velocities, pressures, energy delivery and other operating parameters for the 3 concentrations of hydrogen.

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1c: Safety & Risk

Phase 1a
Offline Test
Facility Build

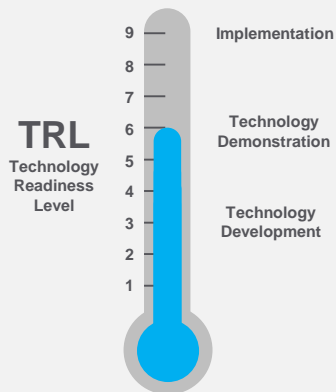
Phase 1b
NTS Asset
Testing

Phase 1c
Safety & Risk
Assessment

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There is a fundamental difference between how natural gas and hydrogen behaves. We must be able to understand the impacts of different concentrations of hydrogen and develop our safety standards:

FutureGrid will develop the maturity of our knowledge and understanding to ensure a safe and resilient hydrogen network



Hazard Assessment of the Transmission System (HATS)



Provide an updated HATS for the NTS pipelines, based on the network transporting hydrogen instead of Natural Gas

Quantitative Risk Assessment (QRA)



Record and update the Hazard Assessment Methodology Manual (HAMM) where deviations are required for assets transporting Hydrogen.

Overpressure Risk (OR)



Identify whether the existing methodology can be adapted for 100% hydrogen. If needed, develop an appropriate methodology for risk analysis and emergency planning purposes.

NGGT Safety Case



Assess and update the NGGT safety case (policies, procedures and work instructions) depending on the impact of hydrogen.

Poll question

What one thing do you think helps make engagement more beneficial to you?

What engagement methods have you seen that have impressed you?

Please explain...

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Engaging Our Stakeholders

Holly Kinch



HyNTS FutureGrid

Our Engagement Plans

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Digital first approach – Livestreaming all events with a physical presence where possible.



Stakeholder led engagement plan – building our plans to suit how you want to engage with **FutureGrid**.



Mixed media approach – using a range of channels to ensure there's something for everyone.



We want your input – gives us your ideas on how we can help you to get the most out of the project.

Poll result

What one thing do you think helps make engagement more beneficial to you?

What engagement methods have you seen that have impressed you?

Please explain...

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Poll question

What other considerations do you think are needed to transition to hydrogen?

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Phase 2 & 3 Opportunities

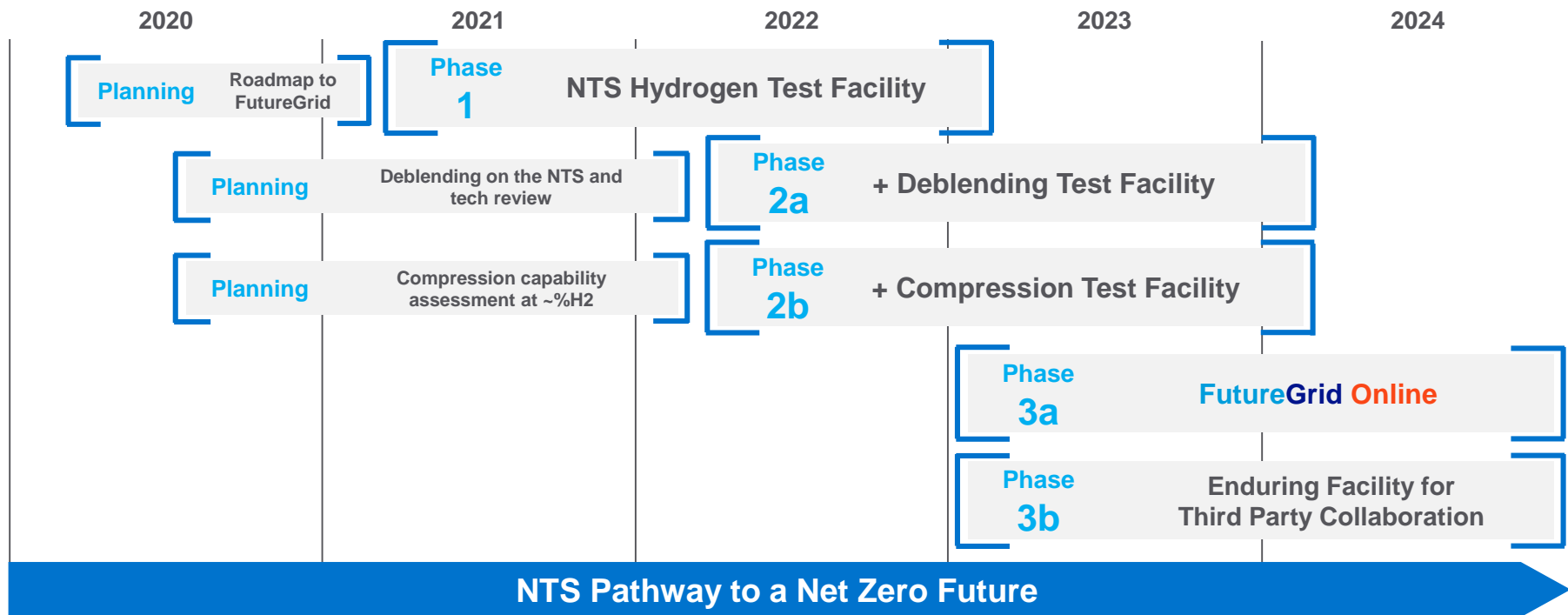
Corinna Jones



HyNTS FutureGrid

Building the FutureGrid Programme

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Phase 2: Deblending & Compression

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FutureGrid Phase 2a Hydrogen Deblending



Cryogenic Separation

Review and develop cost effective technologies for deblending using capabilities seen today in industry at a smaller scale. Mobile systems would be preferable to enable deblending facilitation as we transition to 100% Hydrogen.



Pressure Swing Absorption

FutureGrid Phase 2b Compressors



Driving Turbines with Hydrogen

Use of hydrogen to drive the turbines and the ability of compressors to compress hydrogen / natural gas mixes

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Phase 3: Online Testing & Third Party Access

FutureGrid Phase 3a Online Testing

This phase will identify an online pilot location on the NTS, taking into account key factors to choosing a suitable location:



Isolatable
section of
the NTS



Hydrogen
Source



Willing
Customers



Other
Users

FutureGrid Phase 3b Testing & Training Facility



Testing &
Training
Facility

With the addition of the FutureGrid Transmission Test Facility to the H21 Distribution Facility, DNVGL Spadeadam will become a unique training facility.



A Global Test
Centre in the UK



Open for Third
Party Testing



Training & Skills
Development

A facility for the UK Gas Industry supported by:



nationalgrid



Poll result

What other considerations do you think are needed to transition to hydrogen?

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Poll question

Are you interested in getting involved in future phases of FutureGrid including testing?

Please explain (and leave your details)

Did you find today's session useful?

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Questions?

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thank you!

You can find out more across our website and social media or email us at: FutureGrid@nationalgrid.com



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FutureGrid](http://www.nationalgrid.com/FutureGrid)