FutureGrid 2021
Progress Report Launch

We will start at 10:02 to allow participants to finish previous meetings and join the call

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

Event Code:
#GTX12

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.

nationalgrid

Welcome and Opening

Thank you for joining us today

Please feedback via SLIDO

Slido.com
#GTX12

Who will be speaking today?

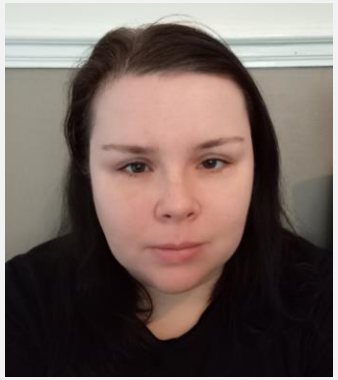
Tom Neal
FutureGrid Manager

Shaun Bosomworth
Senior Delivery Engineer

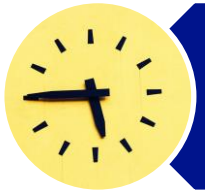
Haroon Khan
Project Manager

Lynsey Stevenson
Technology Lead – Asset Development

Lauren Chater
Stakeholder Experience Team



Logistics



Should last for approximately about 60 min

Questions and polling via slido.com #GTX12

All callers will be placed on mute

We will circulate the slides and a recording of this webinar

Agenda

Progress round-up

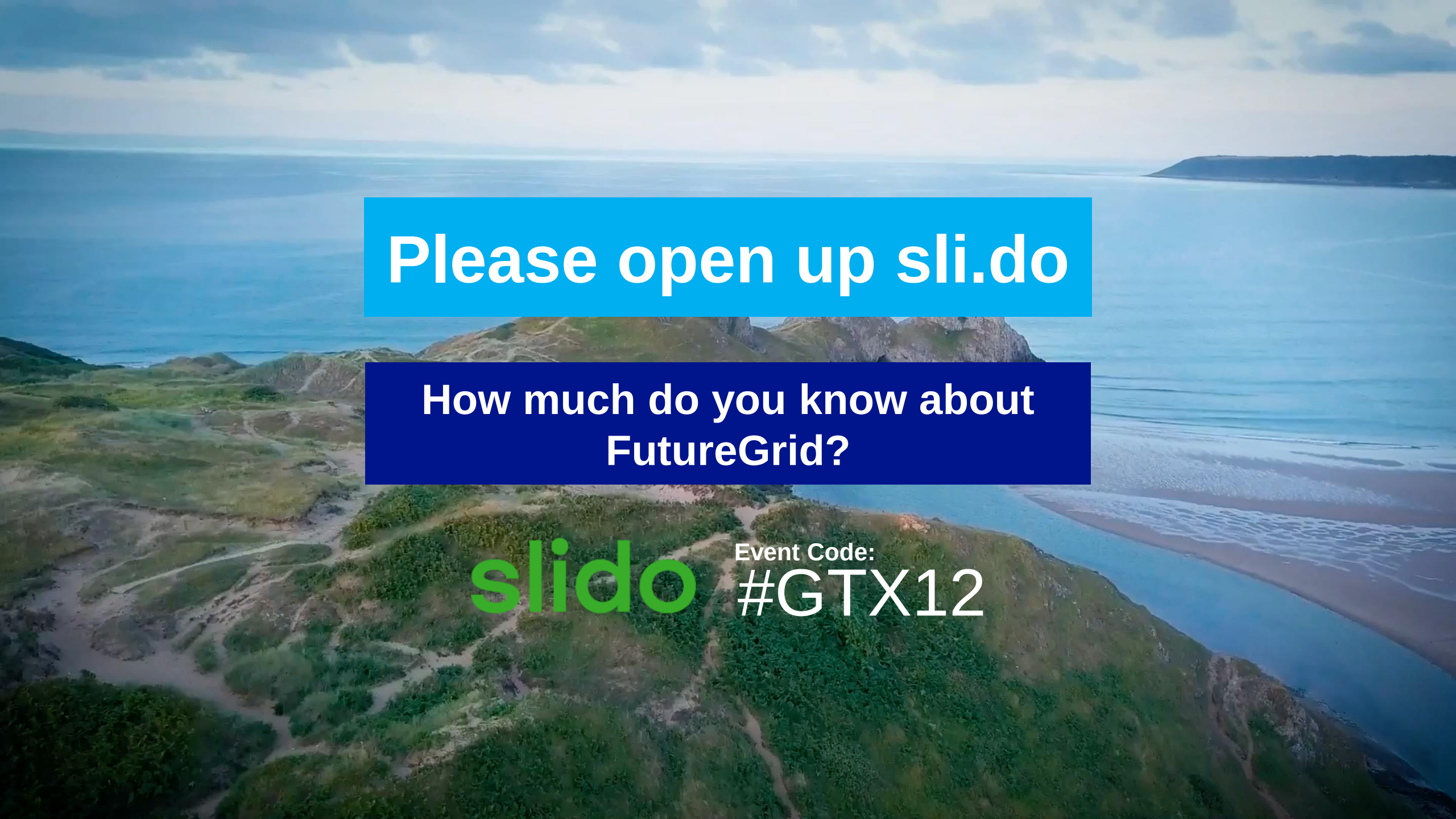
Deep dive into our key achievements in 2021

Preparing for the next phases of FutureGrid

Q&A

Slido.com #GTX12


FutureGrid
2021 Progress Report Launch
Our key achievements in 2021


Please open up sli.do
How much do you know about FutureGrid?
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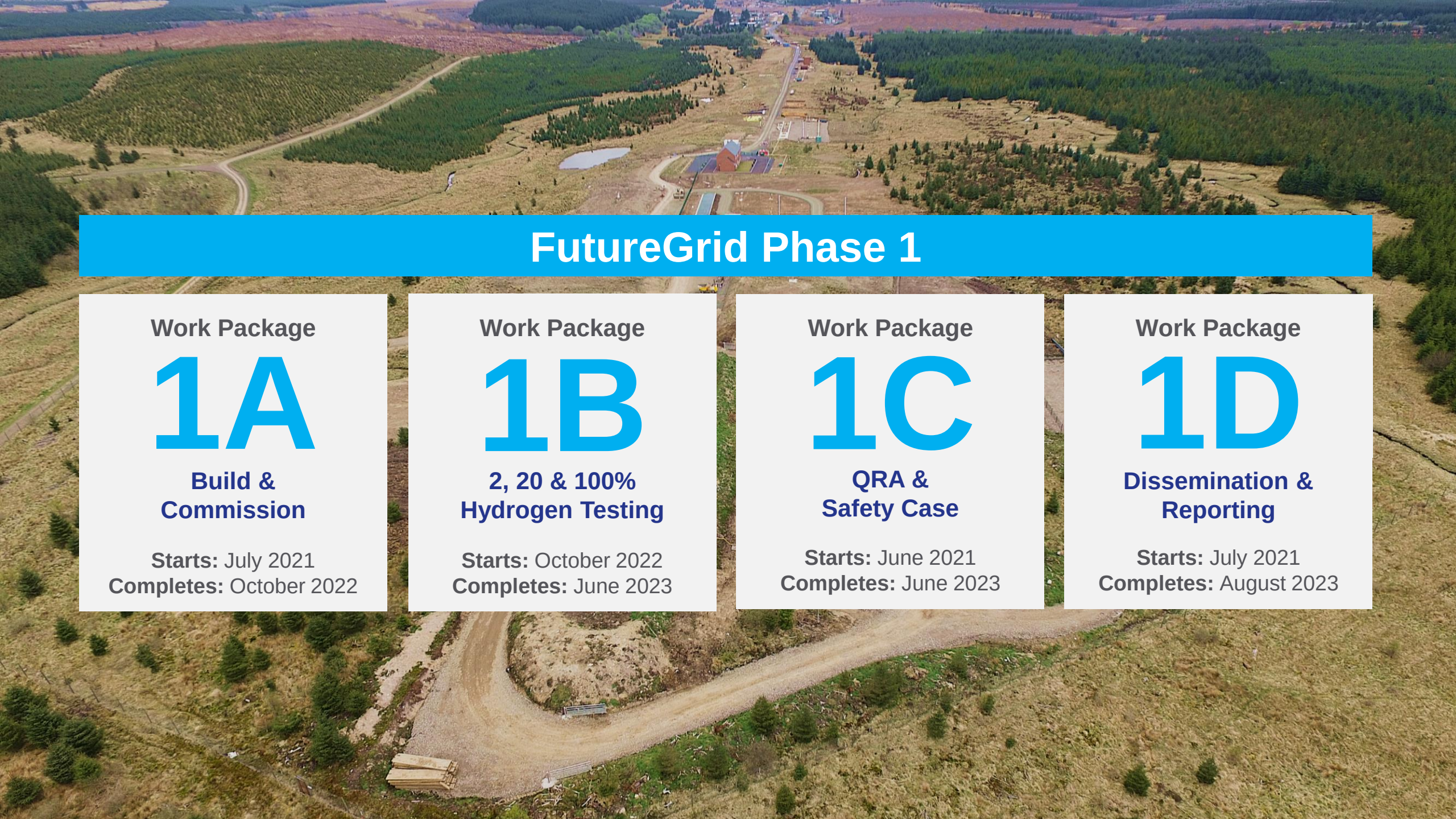
Progress round-up

Tom Neal


DNV
FutureGrid
Phase 1



FutureGrid Phase 1

Work Package 1A

Build & Commission

Starts: July 2021
Completes: October 2022

Work Package 1B

2, 20 & 100% Hydrogen Testing

Starts: October 2022
Completes: June 2023

Work Package 1C

QRA & Safety Case

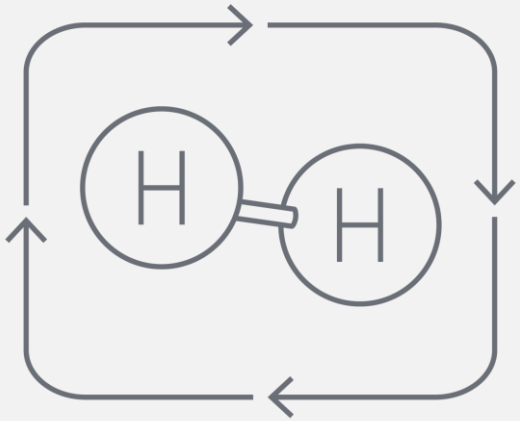
Starts: June 2021
Completes: June 2023

Work Package 1D

Dissemination & Reporting

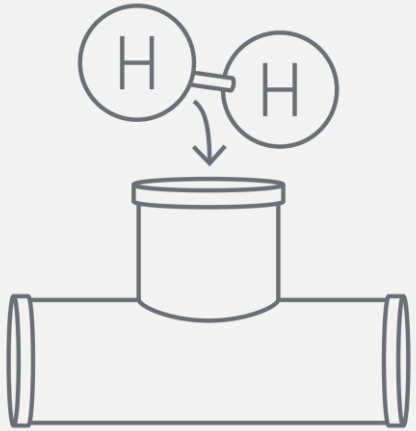
Starts: July 2021
Completes: August 2023

Our assets being tested



Offline Hydrogen Test Facility

A representative range of NTS assets of different types, sizes, and material grades are being supplied from decommissioned assets to build the hydrogen test facility.



Standalone Hydrogen Test Modules

Standalone hydrogen test modules will operate alongside the main test facility, to provide key data required to feed into the main facility

Testing: Hydrogen Concentrations

2% **20%** **100%**

10% pause for meter calibration

2021: Our key achievements

1	Decommissioned assets sourced and being prepared
2	Initial groundworks completed on site
3	Standalone hydrogen testing including lab tests underway
4	Technical Standards review in progress
5	Launch of FutureGrid engagement programme
6	Plans for future phases of work

1 Decommissioned assets sourced and being prepared

Shaun Bosomworth

All assets delivered & inspections underway

Assets from Enron Billingham being delivered to Spadeadam

Valves from Enron delivered to Spadeadam

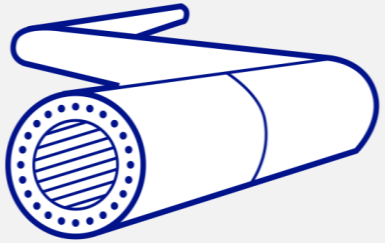
Hays chemical assets delivered to Spadeadam which include pre-heaters and regulators

Potential Leak Path On Regulator Skid

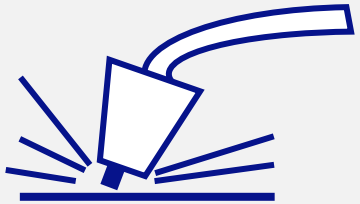
Enron Inspected Assets

Hydrogen Engineers Inspecting Assets

Offline facility elements

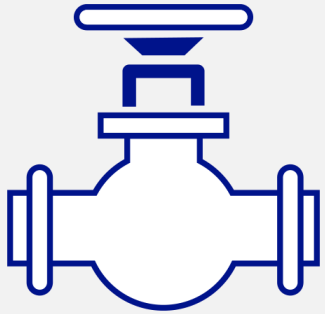


Steel pipeline & bends

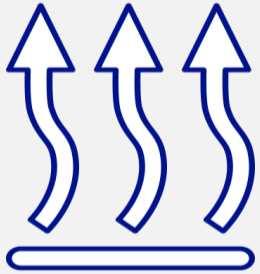


Welds

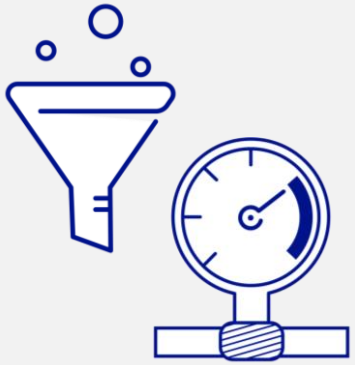
Valves



Flow control valves



Pre-heater and regulators



Filters & meter streams

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2

Initial groundworks completed on site

Shaun Bosomworth

Groundworks

Levelling complete, fencing and infrastructure progressing

Road crossing to the high pressure reservoir

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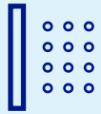
3 Standalone hydrogen testing including lab tests underway

Haroon Khan

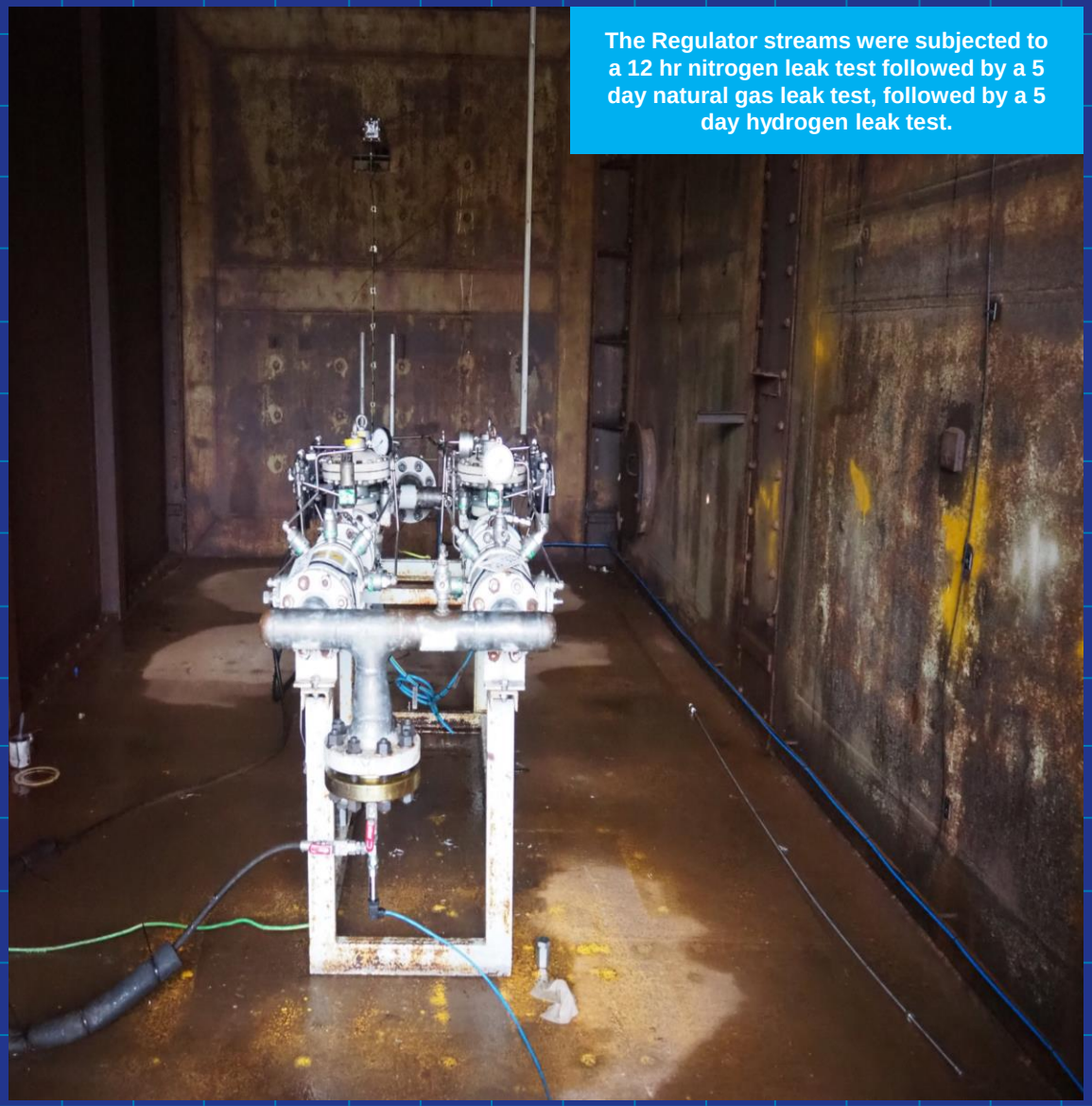
Standalone hydrogen test module progress

Standalone hydrogen test module	Description	Start date	End date	Progress
Material permeation testing 	This test will determine the rate at which hydrogen permeates through the pipe wall in a pressurised hydrogen environment. This will inform the soak time required for full saturation on other tests.	Oct 2021	Mar 2022	• Sample of pipes and valves selected for testing • Sample cut and delivered to the laboratory • Laboratory set-up of testing has commenced
Pipe coating and CP testing 	These tests will assess the impact of hydrogen on external pipe coatings as well as the cathodic protection system to identify any issues.	Mar 2022	Jun 2022	• Planned to be conducted after the permeation testing as the results can be used for planning the test parameters for the coating tests
Fatigue testing 	To demonstrate the NTS can endure tens of thousands of pressure cycles in hydrogen service.	July 2021	Aug 2023	• Asset identified • Material certificate identified • Welding procedures identified • Procurement of long lead items (pumps and dome ends) completed

Standalone hydrogen test module progress

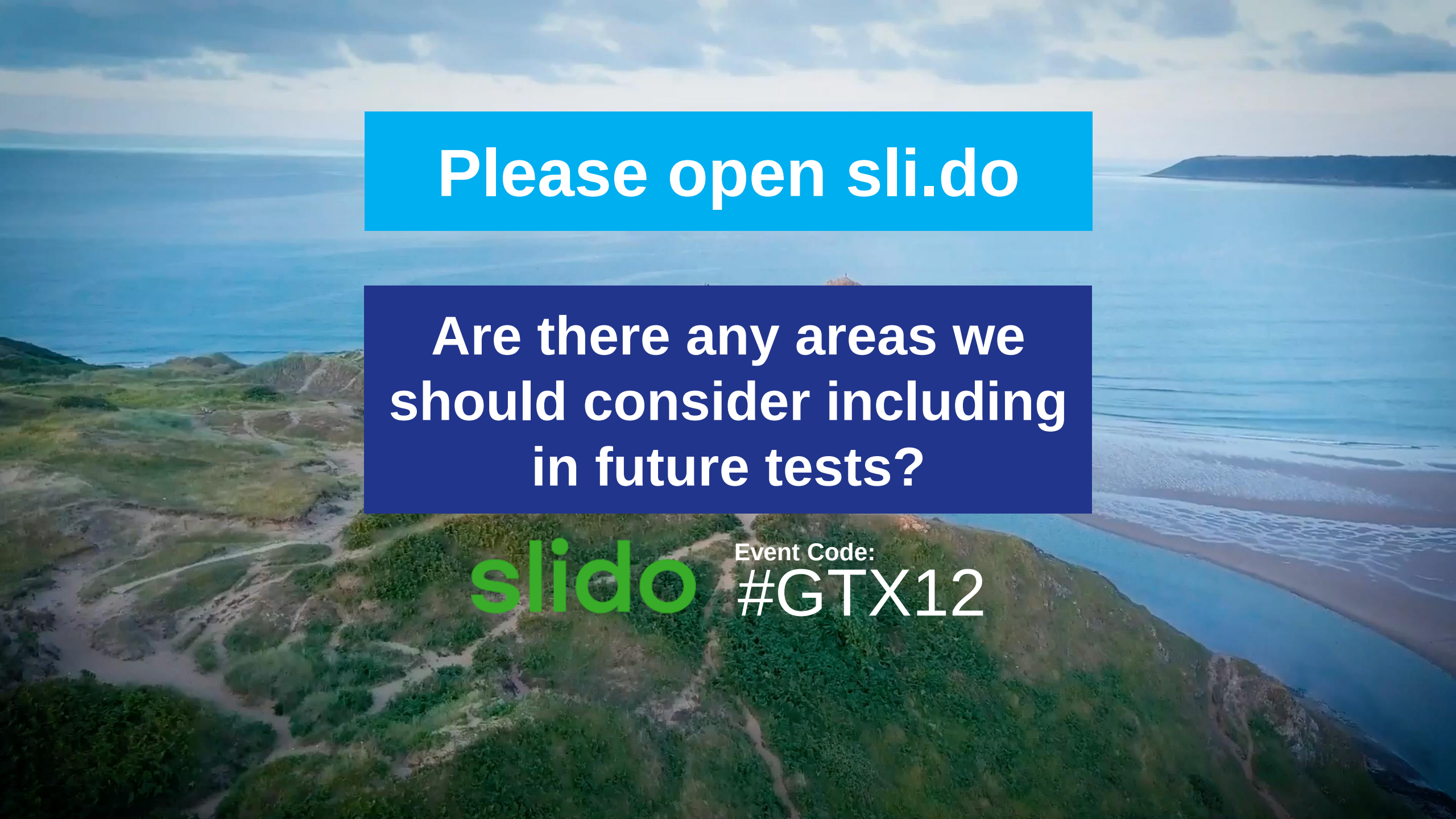
Standalone hydrogen test module	Description	Start date	End date	Progress
Flange testing 	To assess the effect of hydrogen on RF (raised face) and RTJ (ring type joint) flanged joints.	July 2021	Dec 2021	• Asset identified • Material certificate identified • Test completed
Asset leak testing 	To compare the leak rate of hydrogen with natural gas when testing existing assets at their operating pressure. Assets include the orifice plate meter skid, the regulator skid a filter and a 36” ball valve. Hydrogen is more prone to leaking than natural gas. We need to understand the extent of this to determine if additional mitigations are required.	Sep 2021	Jan 2022	• Assets identified • Orifice plate meter skid leak test complete • Regulator skid leak test complete • Filter leak test complete • Valve leak test in preparation • Results and data from tests being compiled and sent to National Grid for review.
Rupture testing (only the build of the test rig – testing falls under Ofgem Deliverable 4.2) 	Investigate overpressures caused by delayed ignition of ruptures on a buried line containing 100% hydrogen. 36” NB gas storage array to provide the necessary gas flow.	Sep 2021	Sep 2022	• Commencement of preliminary investigation to failure mechanism

Example of testing in the test chambers



The Regulator streams were subjected to a 12 hr nitrogen leak test followed by a 5 day natural gas leak test, followed by a 5 day hydrogen leak test.

The orifice plate meter streams were subjected to a 2hr hydrostatic pressure test (water), followed by a 5 day natural gas leak test, followed by a 5 day hydrogen leak test.


Please open sli.do
Are there any areas we should consider including in future tests?
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4 Technical Standards review in progress

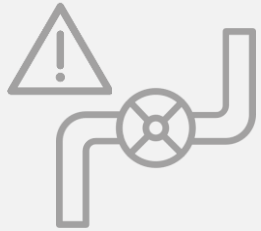
Haroon Khan

Safety & risk Management

Procedure review

Categorisation of NG procedures as high, medium, low impact with a report detailing the methodology findings and next steps for each.

Hazard assessment of the Transmission System (HATS)



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

Quantitative risk assessment (ORA)

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

Hazardous area impact

Hazardous Area Drawings will be produced for each asset type at 20% & 100% hydrogen and compared to existing Natural Gas drawings.

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. Review will involve SMEs.

5 Launch of FutureGrid engagement programme

Tom Neal

How we are engaging with our stakeholders

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Explore

FutureGrid Explore are webinars and in-person events focused on key topics relating to the FutureGrid project. These interactive events allow stakeholders to learn more about the project and participate in relevant discussions. To date, these events have been very successful and we've received a lot of positive feedback.

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InFocus

FutureGrid InFocus gives stakeholders the opportunity to hear from those working on the FutureGrid Project, whether that be the direct team or colleagues supporting the project. FutureGrid InFocus is a blog series providing insight and updates around the progress of the project as it is happening. To date we've released two blogs with more planned in the coming months as construction progresses

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Chat

FutureGrid Chat is a podcast series that brings together key experts across the project and wider industry, to talk about the big questions in hydrogen and how FutureGrid supports this. To date there are two podcasts we've created, with more planned in 2022.

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6 Plans for future phases of work

Lynsey Stevenson

Future development of FutureGrid at DNV's hydrogen test facility

Strategic Innovation Fund (SIF) submissions

HyNTS Compression	This project investigates the key challenges associated with compression of hydrogen using existing national transmission system (NTS) assets. This project will also provide the capability for critical operations such as In-Line Inspection (ILI) to be tested at FutureGrid.
HyNTS Deblending and Purification	This project aims to provide an offline demonstration of gas separation or 'deblending' technology on a gas network scale. The project aims to develop a skid mounted, mobile solution to demonstrate hydrogen fuelling from the NTS for the future transport network.

Fuel cell gas analyser & data analytics	**EcoNET telemetry**	**Hydrogen metering**	**HyNTS pipeline data set**	**Hydrogen barrier coatings for gas network assets**
This project aims to demonstrate a fuel cell gas analyser for blends of hydrogen and natural gas for up to 100% hydrogen in the NTS.	The EcoNet programme sets out to create a pathway to modernise the future telemetry solutions. The project builds on previous work to deploy a robust future proofed telemetry system.	This project will explore options for gas metering equipment for use with hydrogen. There will be scope for demonstration of new technology potentially at FutureGrid.	This project will aim to obtain information on the current condition of pipelines for the transition to hydrogen to determine suitability of pipelines for repurposing.	This project looks into the potential for deployment of hydrogen barrier coatings via electrodeposition onto the internal surface of a pipelines and other assets.

Download your copy of the report today

You can also visit:

www.nationalgrid.com/FutureGrid

thank you!

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

@nationalgriduk

@NationalGridUK

@InnovationAtNationalGrid

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Thank you for joining us today

Keynote speech	Complete	Watch again
Future of Gas	Complete	Watch again
Innovation – broadening the horizon	Complete	Watch again
Gas Market Plan	Complete	Watch again
Transitioning to a hydrogen backbone	Complete	Watch again
Managing methane emissions	Complete	Watch again
Supporting regional hydrogen transitions	Complete	Watch again
Understanding the skills needed for a net zero world	Complete	Watch again
Digital Strategy and Information Provision	Complete	Watch again
Operating the network	Complete	Watch again
Gas Emergency Frameworks Overview	Complete	Watch again
FutureGrid 2021 Progress report	Complete	
Annual Network Capability Assessment Report	Wed 15th 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 FutureGrid@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

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