

# FutureGrid Project Progress Report Launch

We will start at **14.02** to allow participants to finish previous meetings and join the call

 Gas  
Transmission

**slido**  
Slido.com  
**#GT12**

# Welcome and Opening

## Thank you for joining us today

FutureGrid is at a very exciting stage. Over the past year we've been constructing the facility and this is almost complete.

2023 marks the final year of FutureGrid Phase 1, and its most important. For the first time in the UK, we will operate a gas transmission pipeline with 100% hydrogen.



**Antony Green**  
Hydrogen Director

# Who will be speaking?

**Tom Neal**

FutureGrid  
Manager



**Lloyd Mitchell**

Hydrogen Lead  
Engineer – Mechanical



**Daniel Knowles**

Hydrogen Lead  
Engineer – Electrical



# Logistics



Should last for approximately about 60 min



Questions and polling via slido.com #GT12



All callers will be placed on mute



We will circulate the slides and a recording of this webinar

# Agenda

**1. Overview and progress round up**

**2. 2022: our key achievements**

**3. Future potential of FutureGrid**

**4. Questions – throughout the session**



# FutureGrid

**2022 Progress Report Launch**

**Our key achievements in 2022**





# FutureGrid

Overview and progress round up

Tom Neal



Where it started...





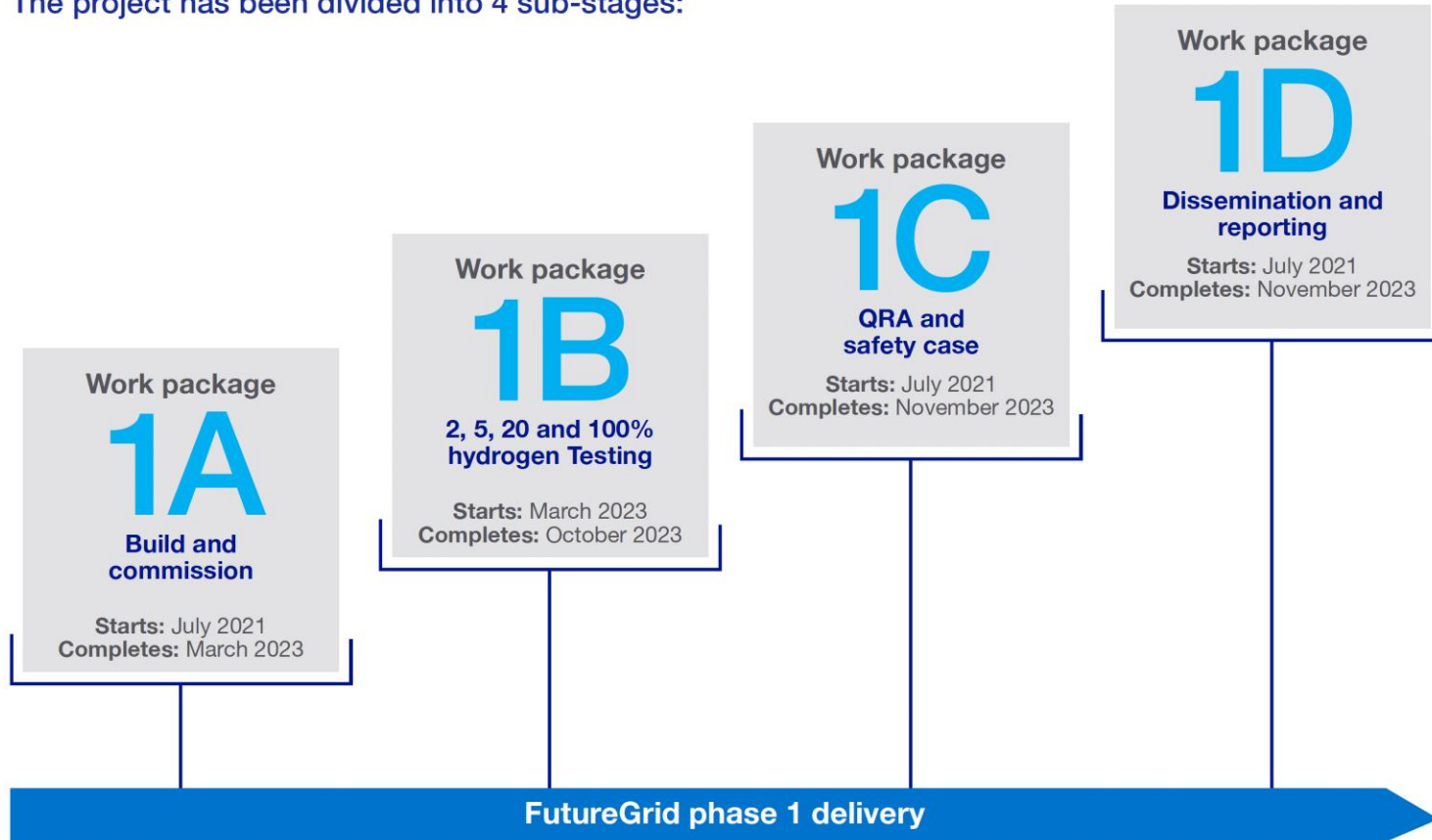
Where we are today...



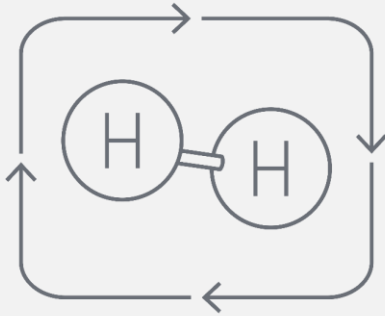


# FutureGrid Phase 1

The project has been divided into 4 sub-stages:

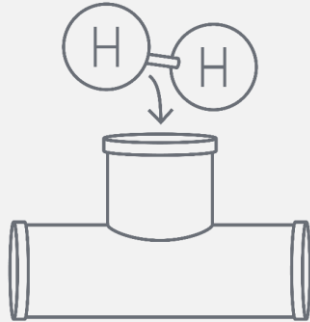


## Our assets being tested



### 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 data to feed into the main facility and address specific knowledge gaps which can't be included in the main test facility.



## Testing: Hydrogen Concentrations

2%

5%

NEW

20%

100%



10% pause for  
meter calibration

## 2022: Our key achievements

**1**

**Asset integrity tests have been completed**

**2**

**Assets have been remediated as required and made fit for service**

**3**

**All assets are now installed and construction is nearing completion**

**4**

**The facility is being prepared for commissioning and testing**

**5**

**A full triage of GT&M procedures has been completed as part of the QRA development**

**6**

**Extensive range of engagement activities delivered, including the return of in person events**





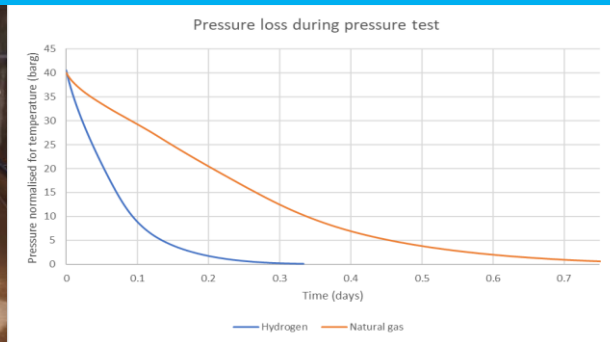
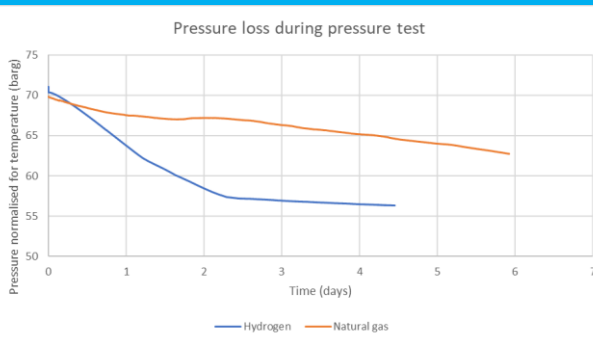
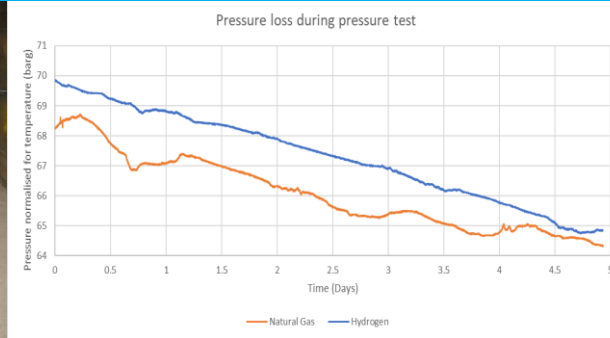
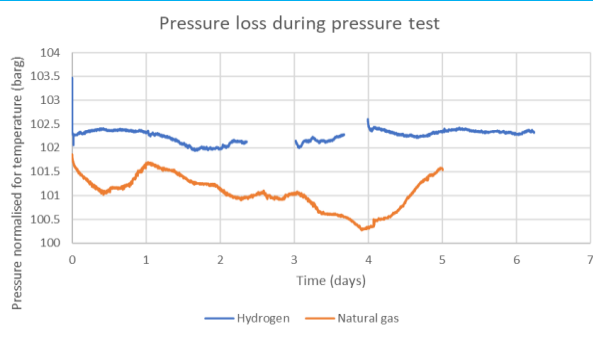
# FutureGrid

1




Asset integrity tests have been completed

Lloyd Mitchell

# Asset Leak Tests

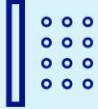




# Standalone hydrogen test progress

Standalone hydrogen test module	End date	Status	Progress to date
<b>Flange testing</b> 	Aug 2022	Complete	Tests complete showing no leakage on either flange type
<b>Asset leak testing</b> 	Oct 2022	Complete	Tests complete including additional tests after asset refurbishment. Data currently being analysed but initial results are in line with expectations
<b>Rupture testing (only the build of the test rig – testing falls under Ofgem deliverable 4.2)</b> 	Feb 2022	Ongoing	Test procedure developed, preparatory works are ongoing



# Standalone hydrogen test progress

Standalone hydrogen test module	End date	Status	Progress to date
<b>Material permeation testing</b> 	Jan 2023	Ongoing	Initial methodology revised and tests completed with no permeation detected. Test methodology revised again with more rigorous test, currently ongoing.
<b>Pipe coating and CP testing</b> 	Jan 2023	Not started	Not started. This will follow the permeation testing
<b>Fatigue testing</b> 	Oct 2024	Ongoing	Weld procedures agreed with SMEs and design finalised. Rig constructed and commissioned. Testing ongoing, 10,000 pressure cycles achieved so far

# Hydrogen asset fatigue testing

36" X60 pipe with 9 different weld types used twice. Targeting **150k cycles** ~ **400 years service**

**15,000** pressure cycles completed  
as of 9 December 2022







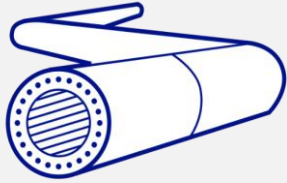
# FutureGrid

2

Assets have been remediated as required and made fit for service

Daniel Knowles

# Offline facility elements



Steel pipeline & bends



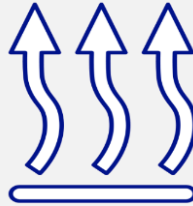
Welds



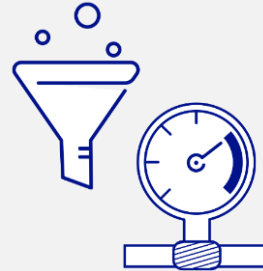
Valves



Flow control valves



Pre-heater and regulators



Filters & meter streams

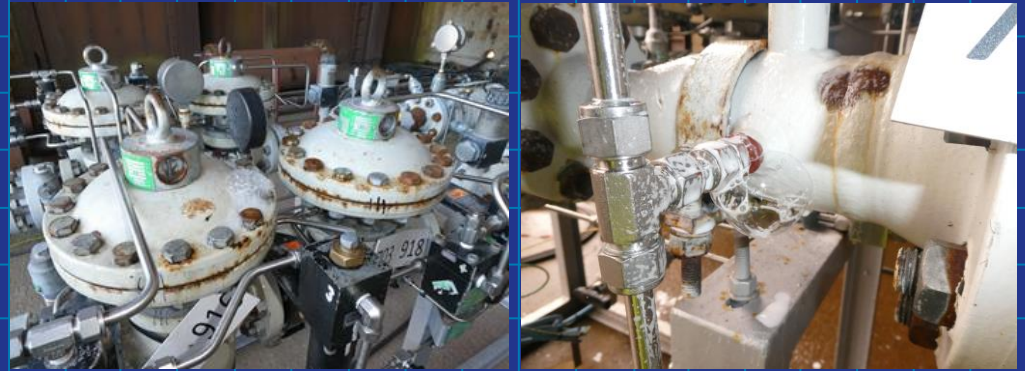


# Assets Remediated

## Orifice Skid



## Regulator Skid



## Valves







# FutureGrid

**3**

**All assets are now installed and construction is nearing completion**

**Dan Knowles**



# Offline hydrogen test facility set up



To see a 3D fly through of the facility, use the QR code below to be taken to the video:







# FutureGrid

4

The facility is being prepared for commissioning and testing

Dan Knowles

## Concentrations being tested

Hydrogen concentration	Natural Gas concentration	Duration
2%	98%	4 weeks
5%	95%	4 weeks
10%	90%	2 weeks (for calibration)
20%	80%	4 weeks
100%	0%	4 weeks



# Offline test facility flow rates

The facility will flow at 7 constant rates up to 1.76mSCm/day with low flow rates representing a smaller offtake and high flows replicating a larger offtake:

## Low flow rate

Flow 1 – 0.12mSCm/day

Flow 2 – 0.24mSCm/day

Flow 3 – 0.36mSCm/day

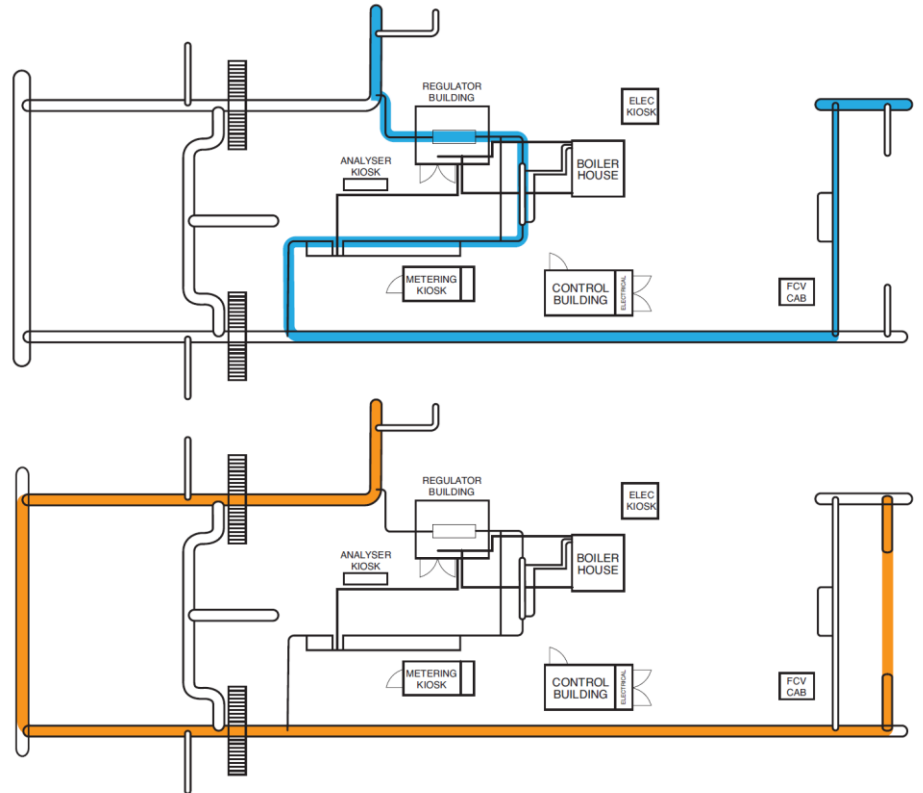
## High flow rate

Flow 4 – 0.36mSCm/day

Flow 5 – 0.82mSCm/day

Flow 6 – 1.28mSCm/day

Flow 7 – 1.74mSCm/day





# FutureGrid

5

A full triage of GT&M procedures has been completed as part of the QRA development

Lloyd Mitchell



# 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.

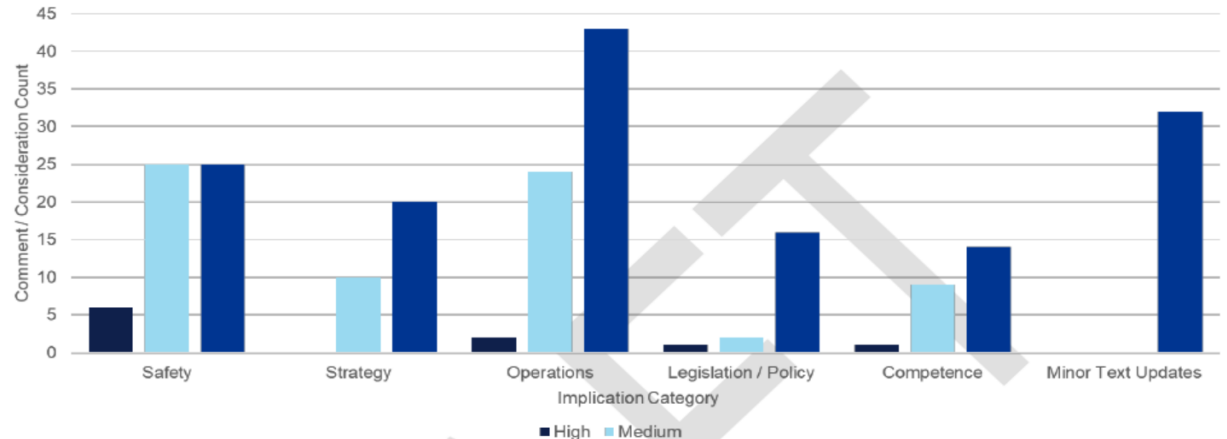
**Table 3 Summary of Breakdown of Assessed Document Update Requirements**

Document Type		Number of documents falling into the following categories			
		Material change		No (material) change	
		High	Medium	Very minor change	No change
Policies	19	1	4	7	7
Management procedures	132	45	26	15	46
Specifications	179	37	42	28	72
Work procedures	224	30	82	58	54
All documents	554	113	154	108	179

## 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.





# FutureGrid

6

Extensive range of engagement activities delivered, including the return of in person events

Tom Neal



# We've welcomed over 350 people to site





# In person events have been key to our engagement





## Engaging across a range of channels

### FutureGrid Explore

FutureGrid Explore comprises 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. These have continued to receive very positive feedback, with several stakeholders joining live and catching up with the recordings after the event.

### FutureGrid 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. With the rise in podcasts in the net zero space, we've continued to develop these, bringing in a wider range of voices to cover the key topics our stakeholders have told us they want to hear more about.

### FutureGrid 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's happening. We've continued to develop this series, providing a more personal perspective on the opportunities of hydrogen and how FutureGrid is unlocking these.

### FutureGrid Feature

FutureGrid Feature articles are focused on the key topics our stakeholders are interested in. They tackle some of the big questions around the hydrogen transition and provide more information on the fundamentals of what this could mean to us all.





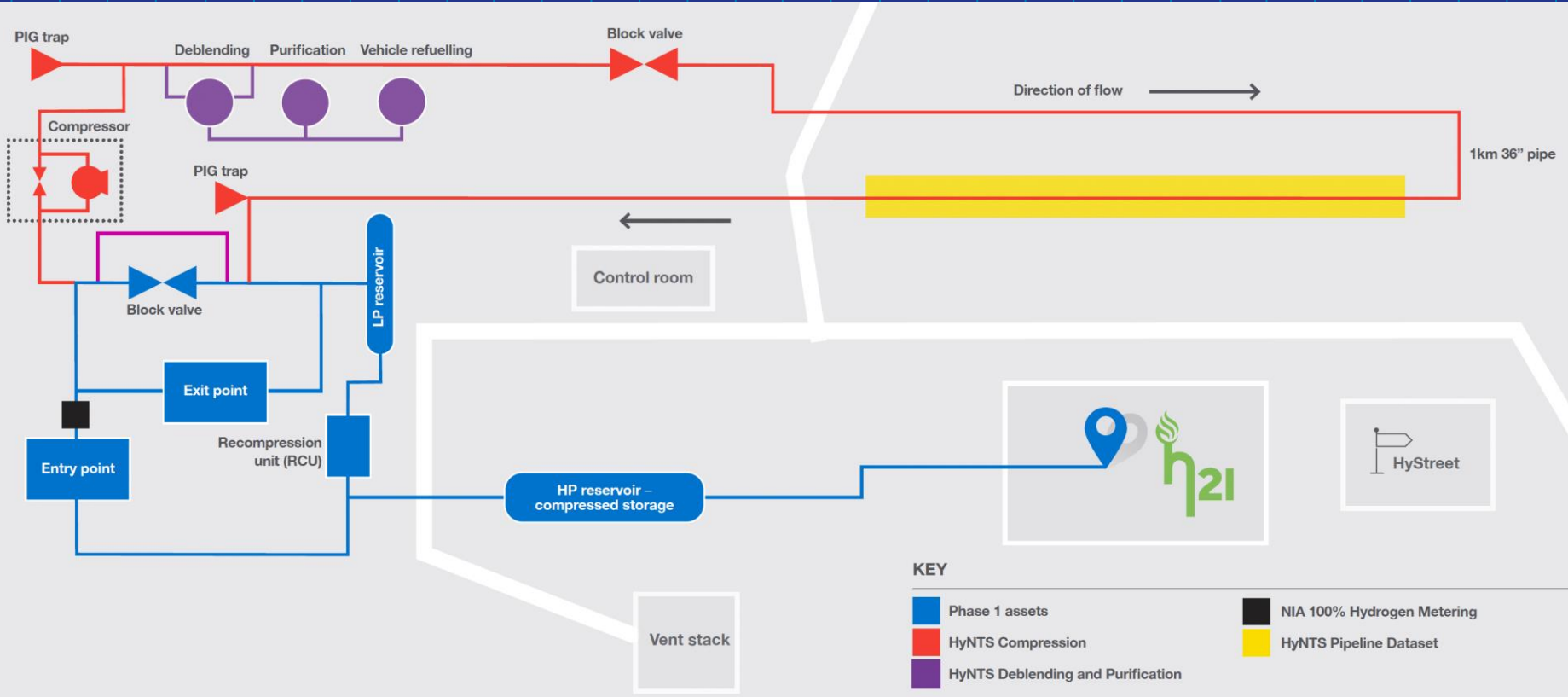
# FutureGrid

An aerial photograph of a coastal landscape. In the foreground, there are green, grassy hills with some dirt paths. In the middle ground, there are several rocky, brownish hills or small mountains. The ocean is a deep blue, and a sandy beach is visible on the right side. The sky is filled with soft, white clouds.

**Future potential of FutureGrid**

**Tom Neal**

# Future development of FutureGrid at DNV's hydrogen test facility









# FutureGrid

## Project progress report

December 2022



Gas Transmission  
and Metering

Download your copy of the  
report today



You can also visit:

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

# Thank you!

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



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



# Webinar Programme

<https://ngrid.com/3ESgN1t>



Event Name	Date / Time	Presenters
Facilitating Commercial & Regulatory Change	Tuesday 29th November @ 09:30	Ian Radley, System Operations Director
Sustainable Construction	Wednesday 30th November @ 09:00	Mark Lissimore, Construction Director
Accessing Energy Data	Thursday 1st December @ 11:00	Mark Lissimore, Construction Director
Operating the Network	Friday 2nd December @ 13:00	Ian Radley, System Operations Director
Blending	Monday 5th December @ 10:00	Tony Green, Hydrogen Director
Transitioning to 100%	Tuesday 6th December @ 11:00	Martin Cook, Commercial Director
Hydrogen Regulatory Framework	Wednesday 7th December @ 12:00	Tony Nixon, Regulation Director
Monitoring and Mitigating Methane Emissions	Thursday 8th December @ 13:00	Steven Vallender, Asset Director
Future of Heat	Friday 9th December @ 13:30	Tony Green, Hydrogen Director
<b>FutureGrid - Progress Report</b>	<b>Monday 12th December @ 14:00</b>	<b>Tony Green, Hydrogen Director</b>
Innovation	Tuesday 13th December @ 13:00	Tony Green, Hydrogen Director
Driving a Positive Environmental & Community Impact	Wednesday 14th December @ 10:00	Jake Tudge, Corporate Affairs Director

# 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 us at [FutureGrid@nationalgrid.com](mailto:FutureGrid@nationalgrid.com)

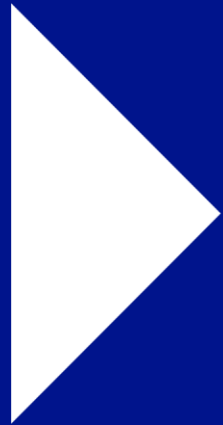


Feedback is important to us, therefore if you have not already taken part, we would like to put you forward for a survey

**Thank you for joining us**







# Gas Transmission