Welcome to DNV

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DNV TECHNOLOGY CENTRE GRONINGEN

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DNV TECHNOLOGY CENTRE GRONINGEN (NL)

TRUST

By combining deep industrial expertise with test capabilities, our Technology Centres help our customers to understand and navigate the complexity of decarbonizing with trust.

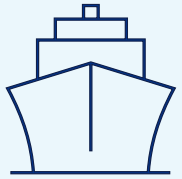
ASSURANCE

We provide assurance by qualifying and applying innovative technologies and new ways of working in a safe, cost-effective and sustainable way.

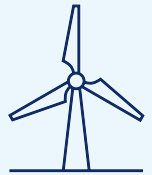
DNV: A global assurance and risk management company

~15,000	100,000+	100+	5%+
employees	customers	countries	of revenue to R&D

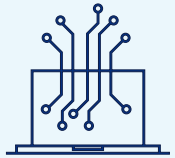
Ship and offshore classification and advisory



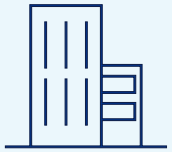
Energy advisory, certification, verification, inspection and monitoring



Software, cyber security, platforms and digital solutions



Management system certification, supply chain and product assurance



DNV

Our purpose

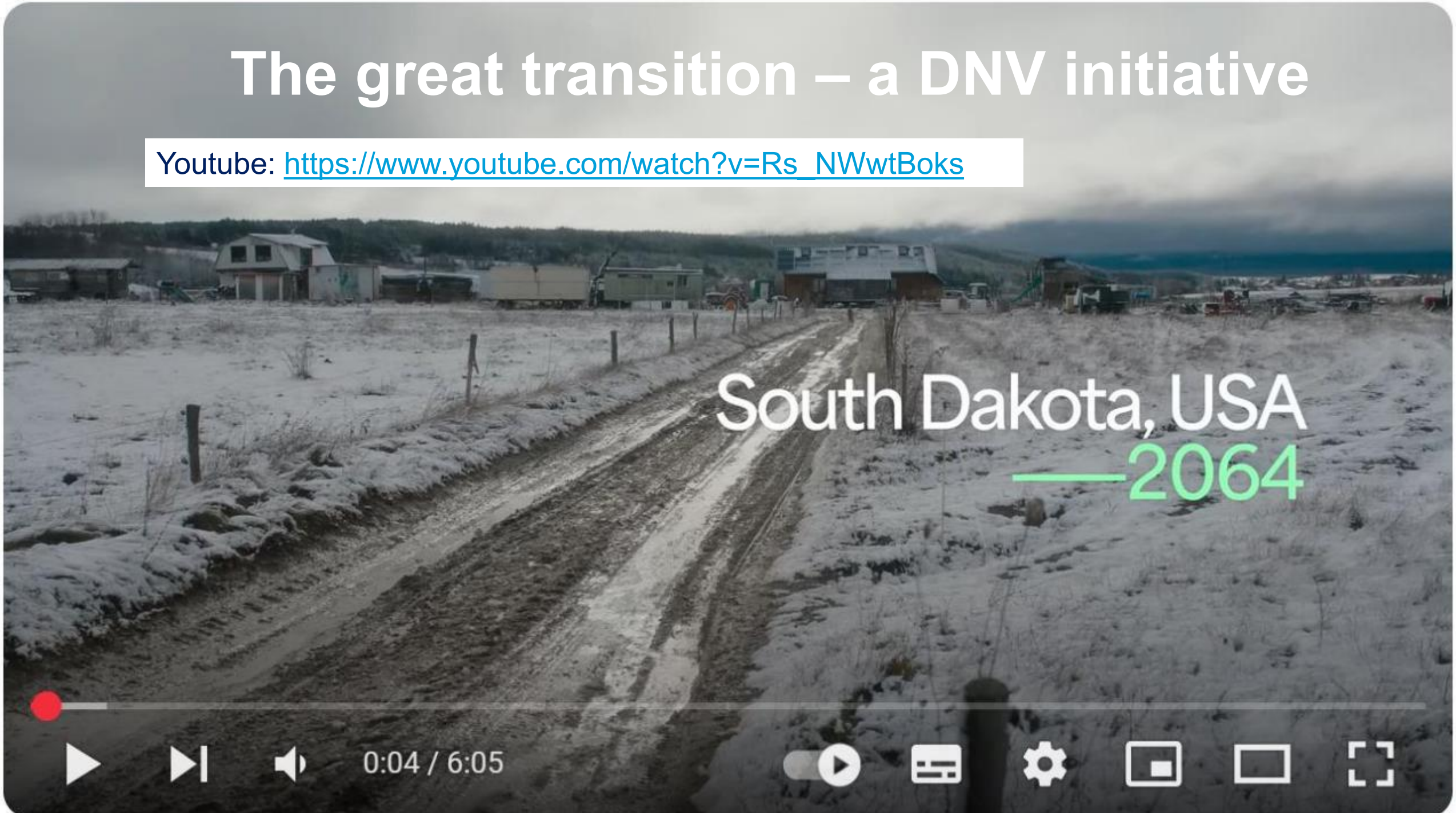
To safeguard life, property, and the environment

Our vision

A trusted voice to tackle global transformations

The great transition – a DNV initiative

Youtube: https://www.youtube.com/watch?v=Rs_NWwtBoks



https://www.thegreattransition.org/

THE GREAT TRANSITION

2025 - 2050

A successful energy transition will be one of
the greatest achievements in the history of humankind

We enable our customers and their stakeholders to manage risk and complexity with confidence

Certify, verify and test

against standards, specifications and regulatory requirements

Qualify and assure

new technologies, systems, data, platforms, supply- and value chains

Give expert advice

on safety, technology and commercial risk, and operational performance

Co-create and share

new rules, standards, software and recommended practices

Inspire and help the energy industry to move forward together

We drive innovation and standardization by bringing industry players together in joint industry programmes to develop new technologies, recommended practices and standards.

The power of joint innovation

DNV's Joint Industry Project (JIP) approach

- DNV set up tens of Joint Industry Project per year aimed at solving industry expressed challenges or needs for smarter and more cost-effective solutions.
- Joint Industry Projects offer a way of bringing together unique knowledge within a partnership. Project partners cooperate, share costs and benefits!
- Joint Industry Projects are managed by DNV and co-funded by two or more industry partners.
- They help to tackle a variety of technical issues across the sector, and aim to develop new technologies, **industry standards and recommended practices.**

Setting the standard in the energy industry

- As the **independent energy expert and assurance provider**, DNV provides a neutral ground for collaboration; creating competence, sharing knowledge and setting industry best practice via **Joint Industry projects**
- Produced in partnership with stakeholders from across the sector, our standards and recommended practices provide the latest technical standards **for safer, smarter and greener** projects and operations.
- Our **standards and recommended practices** cover a broad range of technical challenges across the energy value chain.

  DNV rules and standards

example

VERIFICATION OF POWER-TO-X FACILITIES

This specification presents a structured framework and methodology for the planning, preparation and execution of independent risk-based verification or certification for PtX facilities.

Use of this document is intended to minimize risks for all stakeholders by defining assurance activities for the safe design and operation of PtX facilities and thereby support the upscaling of decarbonized energy solutions. Value chains will benefit greatly from independent due diligence on PtX facilities documented through a DNV statement of conformity.

Scan QR code to learn more

DNV

INDUSTRY STANDARD FOR ELECTROLYSER SYSTEMS

This standard (ST) provides technical requirements and guidance for the design and certification of electrolyser systems. Developed with manufacturers and developers, it helps to assess electrolyser systems and the risks associated with hydrogen production through a systematic approach.

This standard supports verification, certification or type approval covering all phases of the electrolyser equipment-based system, including design, manufacturing, installation, in line with DNV-SE-0674 to support scaling up the industry in a safe and compliant manner.

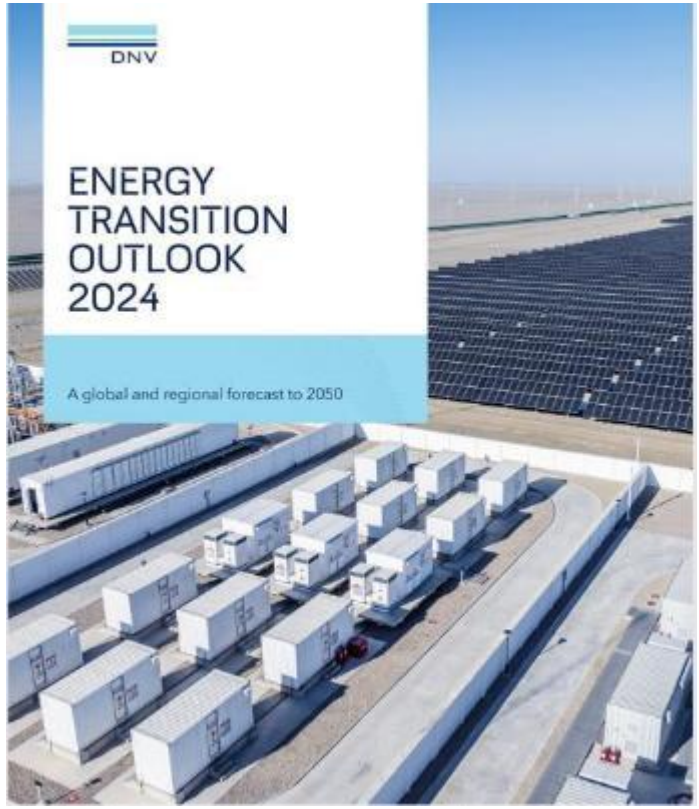
Get in touch to hear how we can support your product assurance and credibility.

Access to standards require subscription

DNV

Presenting insights to guide strategic decisions

DNV Main publication



Our forecast to 2050 is based on our independent model of the world's energy system.

Regional reports

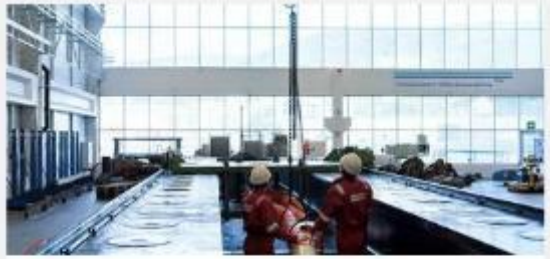
Sector reports

Suite of publications available on eto.dnv.com

DNV Technology Centres

DNV operates some of the most important and progressive laboratories and test facilities in the industry Link

Technology Centre Groningen, the Netherlands



Technology Centre Bergen, Norway

Technology Centre Oslo, Norway

Technology Centre Tuas, Singapore

Spadeadam Research and Testing, UK

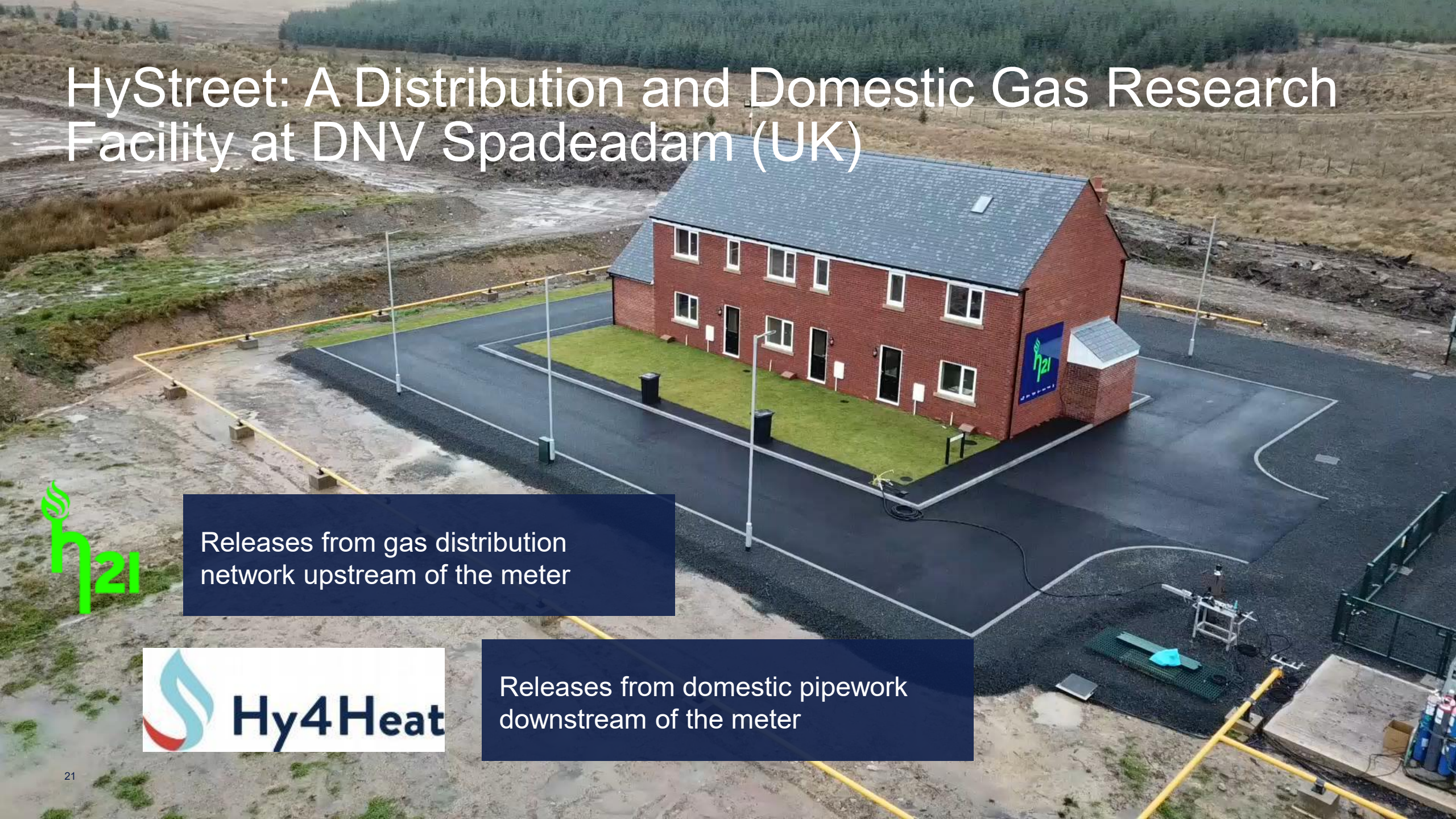
Bishop Auckland, UK

Loughborough, UK

Columbus, Ohio, US

By combining deep industrial expertise with test capabilities, our Technology Centres help our customers to understand and navigate the complexity of decarbonizing with trust.

HyStreet: A Distribution and Domestic Gas Research Facility at DNV Spadeadam (UK)



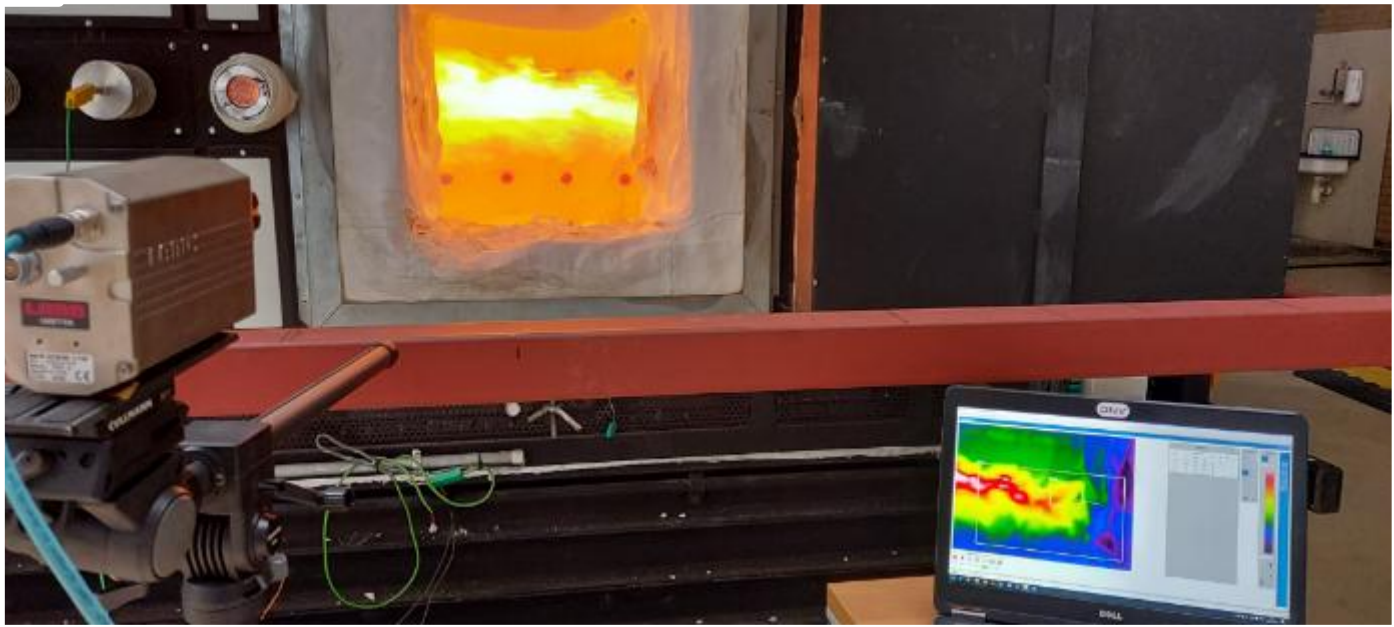
Releases from gas distribution network upstream of the meter

Releases from domestic pipework downstream of the meter

DNV Technology Centre Groningen (NL)

Fuel Transition | Hydrogen Innovation | Combustion technology | Metrology & Flow technology | Gas Technology | New Energies | Clean Technology

DNV TECHNOLOGY CENTRE GRONINGEN (NL) IN OPERATION



DNV Technology Centre Groningen

Hydrogen project portfolio

Understand fundamentals

Proofing the safety case for Hydrogen
Dispersion experiments for small leaks

Pilot Rozenburg (NL) - Heating homes with locally produced hydrogen

Qualify & Demonstrate

Parameter	Eenheid	
Wobbe-index	MJ/m³(n)	[illegible] [A]
Waterstof	mol%	≤ 9
Inerten	mol%	≤ 2 inert N_2, Ar, He
Koolwaterstoffen	mol%	<1,5 incl. CH_4
Koolwaterstofdauwpunt	°C	≤ -2 bij heersende druk
Waterdauwpunt	°C	-8 bij 70 bar(o)
Zuurstof	molppm	≤ 10
Koolstofdioxide	molppm	≤ 20
Totaal S gehalte (incl. H_2S)	molppm	≤ 3
Halogenen	molppb	≤ 50
Koolmonoxide	molppm	≤ 20
Mierenzuur	molppm	≤ 10
Ammoniak	molppm	≤ 10
Formaldehyde	molppm	≤ 10
Stofdeeltjes (> 5 µm)		Disclaimer [B]
Temperatuur (entry)	°C	5 - 30 [C]
Temperatuur (exit)	°C	5 - 30 [C]

H_2 specification

Hydrogen specification for governments and authorities

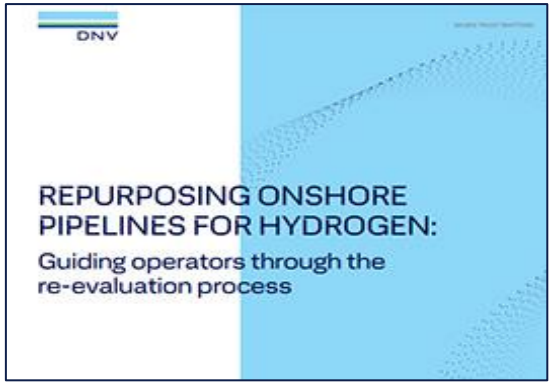
Mature & Implement

Hydrogen tube trailer – ready for operation test

Operational support

Industrial Decarbonisation
Hydrogen for high temperature processes

Hydrogen readiness assessment of flow meters in Joint Industry project



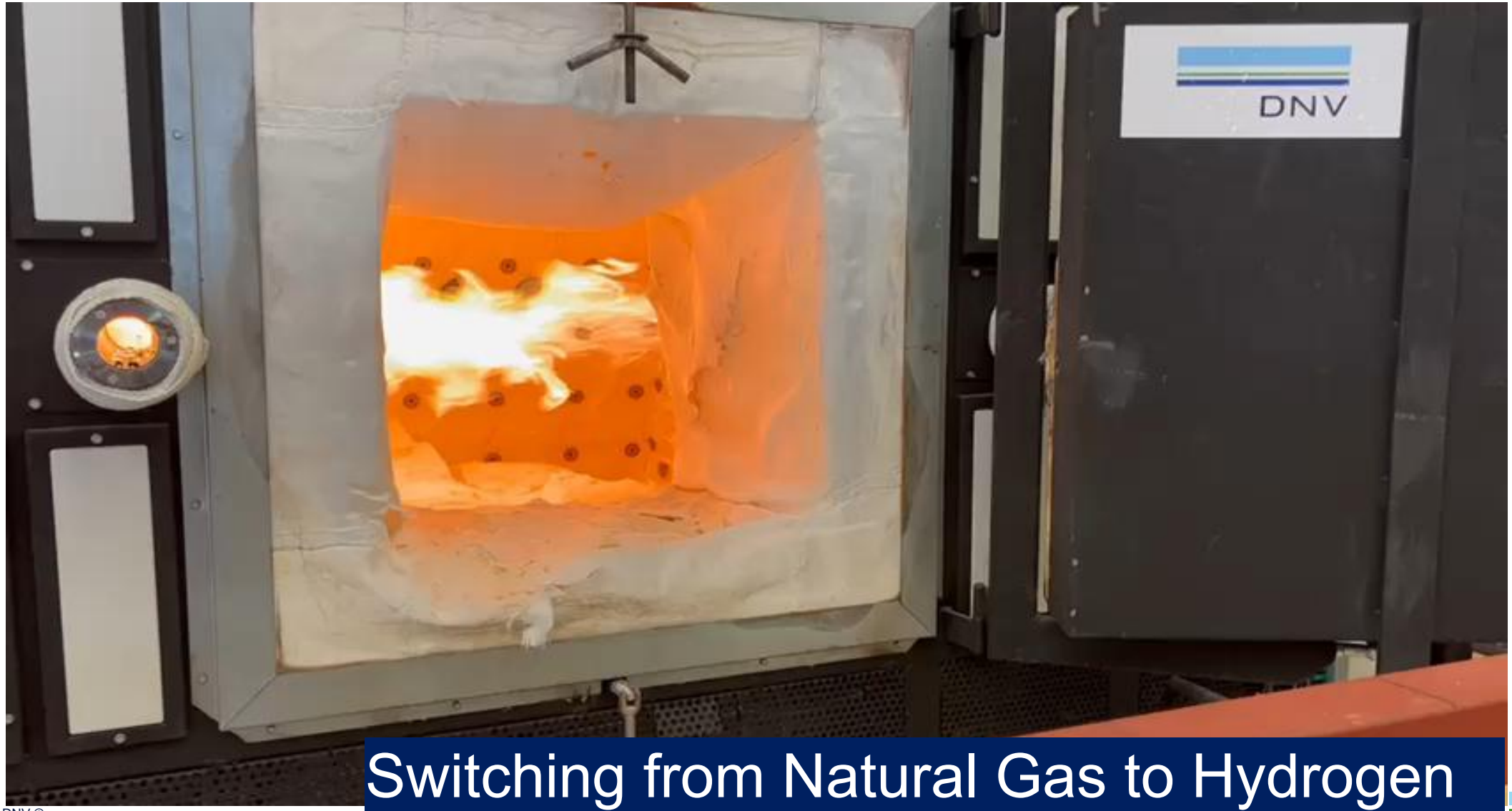
Guidelines and recommended practices

Commissioning hydrogen fuelling stations

DNV Technology Centre Groningen

Facilitating the introduction of hydrogen for the industry

Decarbonize industrial production processes (steel, ceramics, glass, food)



Dutch national research programme

HyDelta

The HyDelta consortium

TKI NIEUW GAS Topsector Energie

gasunie

Netbeheer Nederland

New Energy Coalition

DNV

Hanzehogeschool Groningen University of Applied Sciences

TNO

kiwa

https://hydelta.nl/

- HyDelta is a public-private partnership, a Dutch national research programme and collaboration facilitating the large-scale implementation of hydrogen.
- The aim of the programme is to empower the hydrogen economy by resolving technical, scientific and social barriers.

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Supporting field demonstrations and pilot projects

Example: Hydrogen pilot “Wagenborgen” (NL)

Thanks for your attention

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