SHIP.NL
SUSTAINABLE HYDROGEN IMPORT PROGRAM

AGENDA
SHIP.NL SESSIE III 20 APRIL 2022

15:00-15:10 WELKOM EN OPENING

15:10-15:30 TOUR DE TABLE - ACTUALITEITEN

15:30-16:10 DEEP DIVE: VOPAK NEW ENERGIES & SUSTAINABLE FEEDSTOCKS AND ITS FOUR PILLARS | VOPAK

RESPONSE: HYDROGEN SUPPLY OPTIONS | SHELL

16:10-16:50 DISCUSSIE: IMPORTREGULERING EN CERTIFICERING | HYXCHANGE

16:50-17.00 AFSLUITING

TNO innovation for life

‘HUISREGELS’

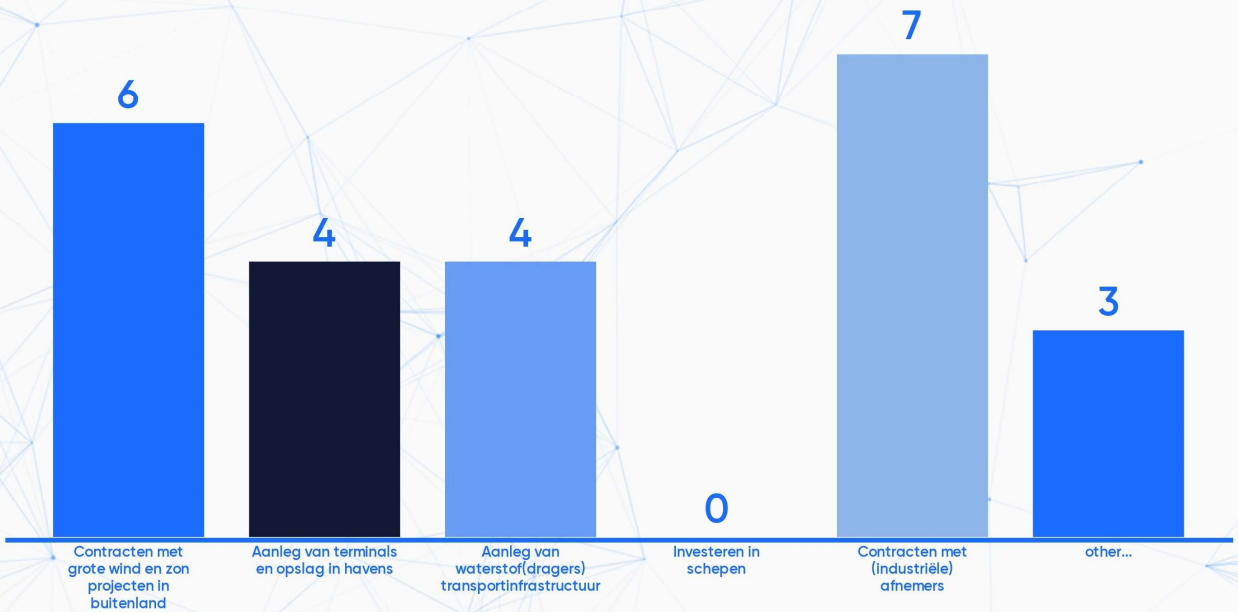
- Camera aan, microfoon op ‘mute’
- Vragen?
  - Plaats *verduidelijkingsvragen* in de meeting chat;
  - Steek je hand op

) De moderator zorgt ervoor dat je vraag beantwoord wordt (eventueel achteraf).
- Slides worden na de sessie gedeeld
- TNO maakt een verslag van geïdentificeerde kennisvragen en inzichten; het zal geen specifieke informatie of uitspraken bevatten.
- We bespreken uiteraard geen marktgevoelige zaken.
- Chatham hous rules: De besproken informatie mag gedeeld worden, maar zonder de spreker te onthullen.

UITKOMST MENTIMETER SHIP SESSIE 16 MAART

Waar begint de opbouw van een waterstofketen mee?

Mentimeter



TNO innovation for life

MEERJARIG KENNISPROGRAMMA MET 5 LIJNEN

In deze sessie:

1 Technisch economisch	2 Beleid	3 Markt	4 Internationaal	5 Omgeving
▪ Inzicht in importketens productie-conversie-transport-opslag-reconversie-gebruik	▪ Impact van 'Fit for 55', REDII, Delegated acts, ETS/CBAM, etc.	▪ Marktmodellen: bilaterale contracten, vrije handel, waterstofbeurs	▪ Samenwerking met omringende EU/niet-EU importlanden om corridors te ontwikkelen	▪ Ruimtegebruik van ketenelementen
▪ Vraagontwikkeling, scenario's	▪ Impact van certificering en CO2 allocatie: emissiefactoren, LCA ketenanalyse, etc.	▪ Internationale handelsstromen: verwachte vraag- en aanbodvolumes en transportstromen	▪ Concurrentie met omringende EU/niet-EU importlanden	▪ Veiligheid: brandbaarheid, zorgwekkende stoffen, risicocontouren, etc
▪ Infrastructuur & systeemintegratie: corridors, benutten bestaande infra.	▪ Financiering en stimulering (EU & NL): IPCEI, PCI, TEN-E, JTF, EIB, Horizon Europe, MOOI, DEI, MIEK, SDE++, etc	▪ Importtarieven, trade agreements en handelsbeperkingen, WTO, etc.	▪ Geopolitieke aspecten: strategische voorraden, afhankelijkheid, politieke stabiliteit van exportlanden	▪ Milieu: stikstof, lekkage
▪ Technology assessments, R&D				▪ Maatschappelijke acceptatie
				▪ MVO / samenhang met SDG's in exportlanden
Synthese				

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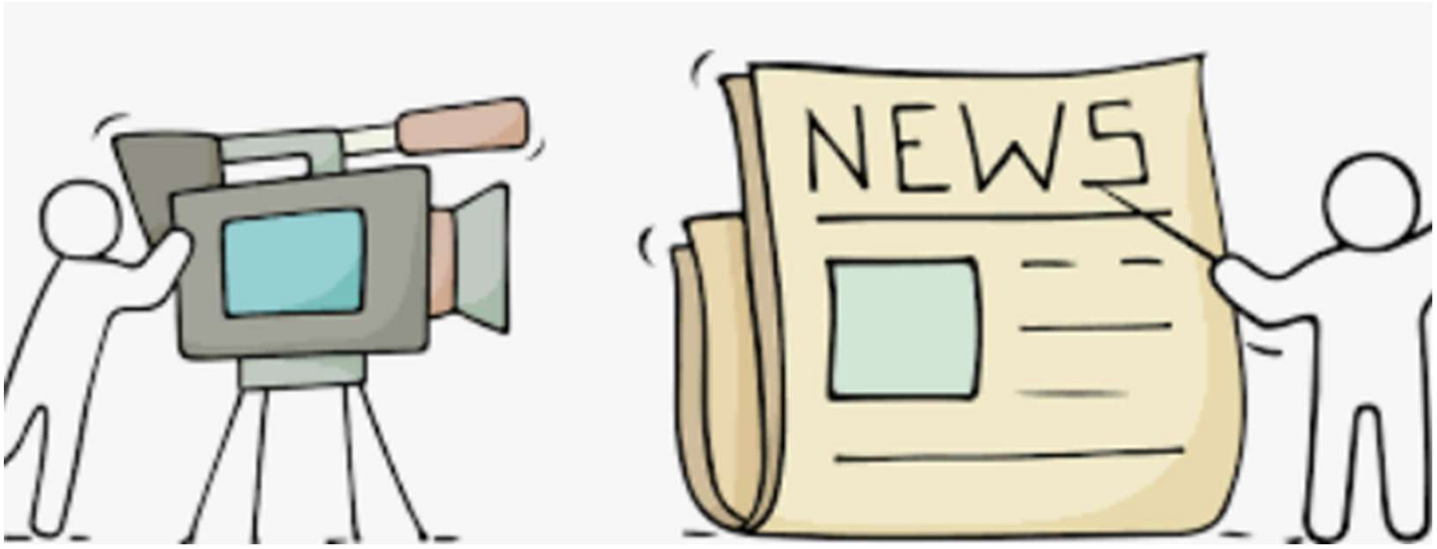
ACTUALITEITEN | TOUR DE TABLE

Zet teams op ‘together mode’



DEEP DIVE I: PRAKTISCHE PROJECTEN (O.A. LOHC & NH3)

Marcel van der Kar | Vopak

Vopak

Long Pack New Energies

by

New Energies team

January 2022

Vopak New Energies & Sustainable feedstocks and its four pillars

Vopak's Relevance for Society

Storing vital products with care today..

- Vopak is the world's **leading independent tank storage company**
- Through our global network of terminals we **connect supply and demand**
- As a service provider we offer and ensure **safe, efficient, and clean storage of society's vital products**

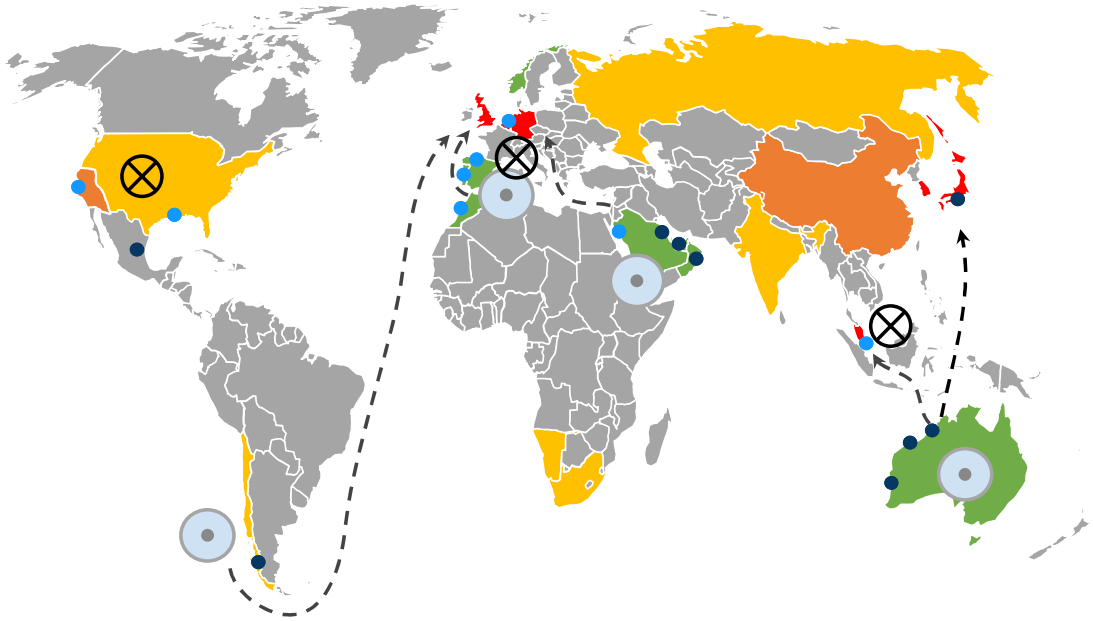
..and *tomorrow*

- Renewable energy & feedstock imbalances will result in **new value chains**
- **National and international cooperation** is essential for the success of these new value chains
- Vopak's constantly adapting to changing markets and aims to **contribute to the upcoming energy and feedstock transition**


Number of countries
23
Market capitalization
in EUR billions
3.9
EPS
in EUR - excluding exceptional items[1]
2.38
Storage capacity
in million cbm
36.2
Number of employees
in FTE
5,669
EBITDA
in EUR million - excluding exceptional items[1]
827
Total injury rate
In 200,000 hours worked by own personnel and contractors
0.25
Number of terminals
73
2021 highlights
at year-end

Vopak's hydrogen projects

Leads in all divisions, ammonia-based projects seem most advanced in terms of scale



Locations with:				
Political ambitions	✓		✓	✓
Low-carbon H_2 resources	✓	✓	✓	
Surplus energy for export	✓	✓		

- **Current leads for potential hydrogen projects**
- **Current H_2 projects in funnel**

Export locations:

- **EU-NA**
- **Middle East**
- **South America**
- **APAC**

Demand locations:

- **North West Europe - Rotterdam as hub**
- **North America**
- **APAC**

Hydrogen carriers

All carriers have potential end markets, project developed around all three technologies

Liquid H_2

Advantages

- ✔ Analogue to **LNG**
- ✔ Can be used in current gas grid
- ✔ High purity

Disadvantages

- ▬ Liquefaction temperatures of -253 C required
- ▬ Low maturity in technologies over supply chain
- ▬ High investment costs

NH_3

Advantages

- ✔ Use existing (**LPG**) infrastructure
- ✔ Besides hydrogen also potential direct new end markets
- ✔ Relatively high hydrogen carrier capacity

Disadvantages

- ▬ Highly toxic
  - Social acceptance
  - Permit requirements
- ▬ Significant energy required for cracking

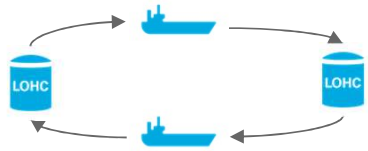
LOHC

Advantages

- ✔ Use existing (**oil/diesel**) infrastructure
- ✔ Safe and easy to handle

Disadvantages

- ▬ Significant energy required for dehydrogenation
- ▬ Recycling of carrier required



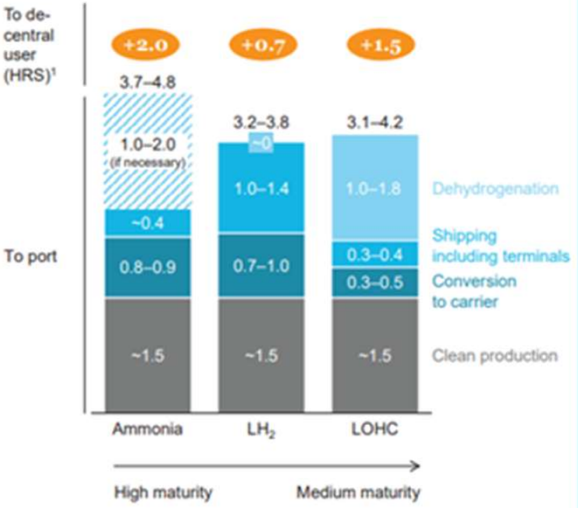
From a TCO perspective LOHC is seen as competitive as the other hydrogen carriers by independent institutions (e.g. Hydrogen Council)

Exhibit 15: Landed costs at port of renewable H2 shipped from Saudi Arabia to Europe

Cost for at scale production and shipping transportation in 2030

Shipping route from Saudia Arabia to Europe through Suez Canal, 8,700km

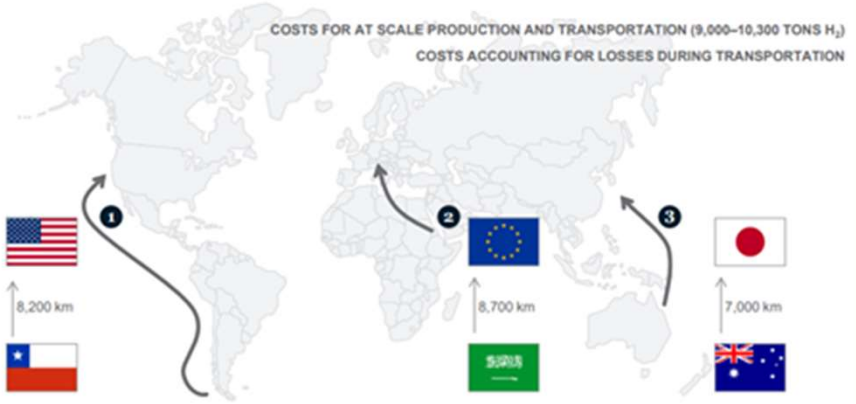
Costs, USD/kg H_2



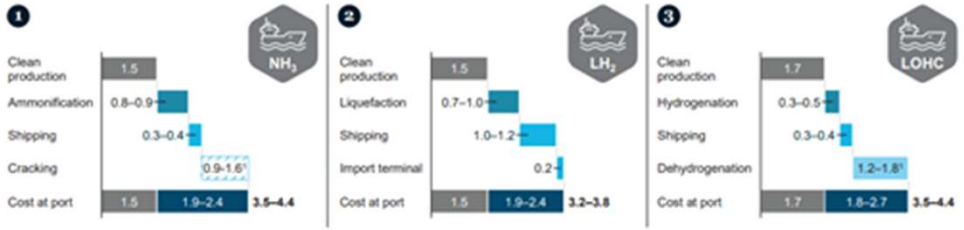
1. Assumes liquid (for LH_2) or gaseous (for ammonia, LOHC) distribution with truck for 300km, also includes: purification to FCEV standard using a PSA for LOHC and NH_3, boil-off losses for LH_2, storage costs at port and HRS operating costs

[9] While BT includes toluene, it is does not fall under toxicity regulations given the limited toluene content per ton of BT.

Exhibit 16: Landed costs of hydrogen at port for selected global transport routes



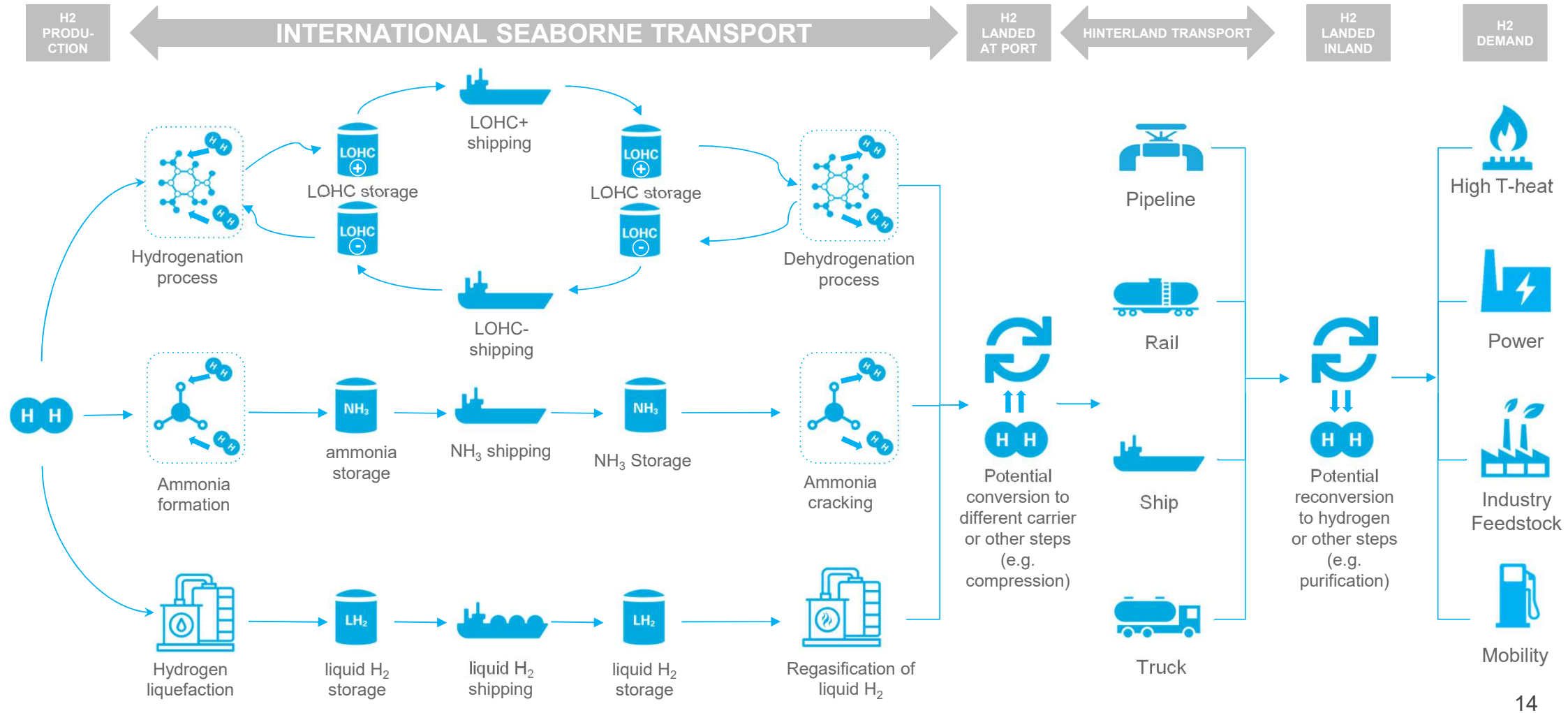
Illustrative routes modeled, USD/kg H_2



1. Dependent on whether hydrogen feedstock or heat from grid is used for dehydrogenation heating requirement

Different supply chains

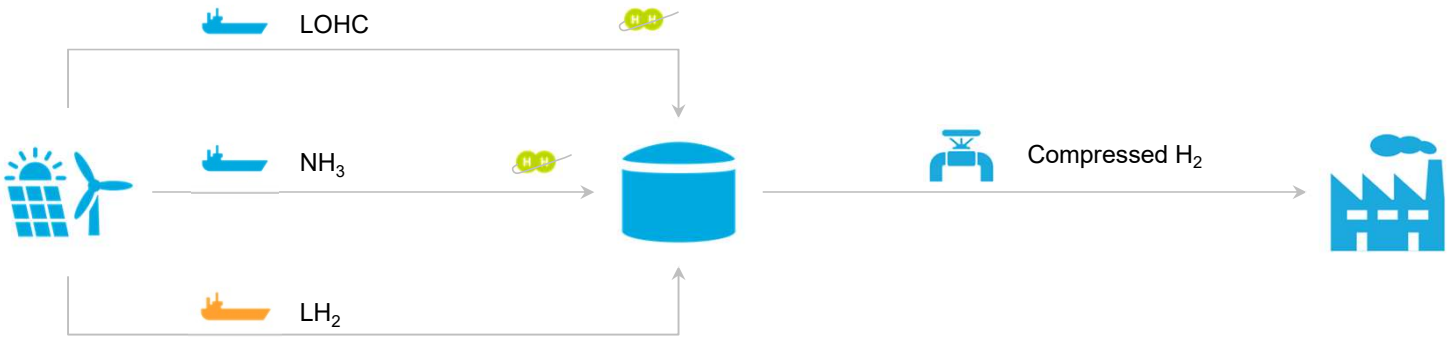
Choice of carrier implies different steps and complexity over supply chain



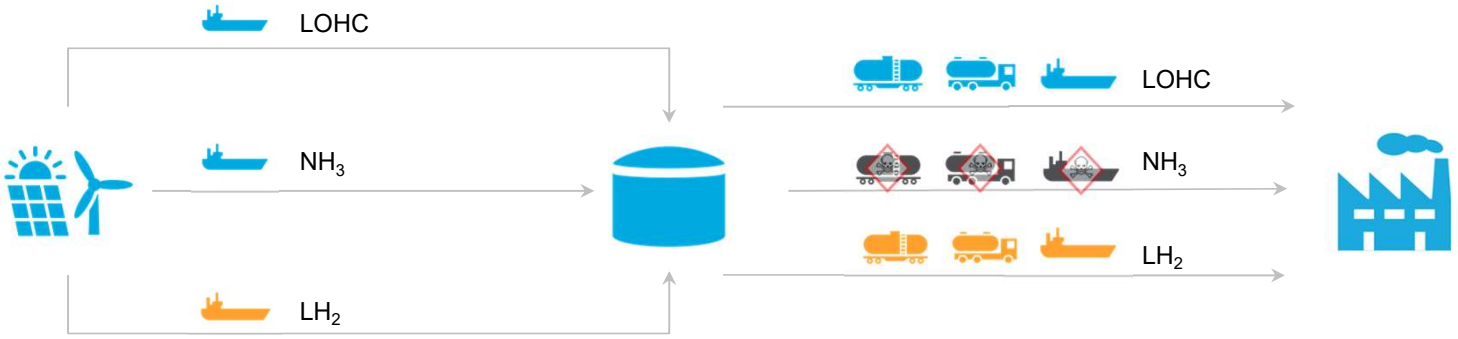
Hydrogen transport systems

Centralised vs decentralised approach

Centralised approach



Decentralised approach



Viable option

Scale-up required, costly

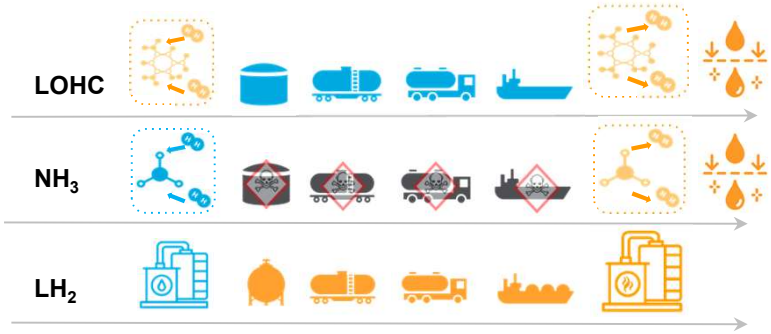
Hydrogen compression required after dehydrogenation

Toxic product

Carriers and hurdles

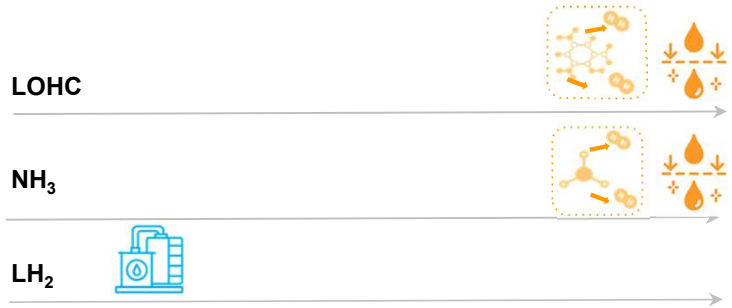
Techno-economic elements of comparison

Viability of Supply chain



- Most steps of supply chain are viable today. Dehydrogenation and **purification** steps still have to mature
- Most steps of supply chain are viable today. Dehydrogenation and **purification** steps still have to mature. Toxicity may become a problem at very large scales
- Supply chain is NOT viable today. Increasing intelligence in disruptive technologies (like cryo-compressed tanks and pumps) may make it a successful option in the future. Its high purity makes it a good fit for all end H_2 end markets

Energy-driven costs



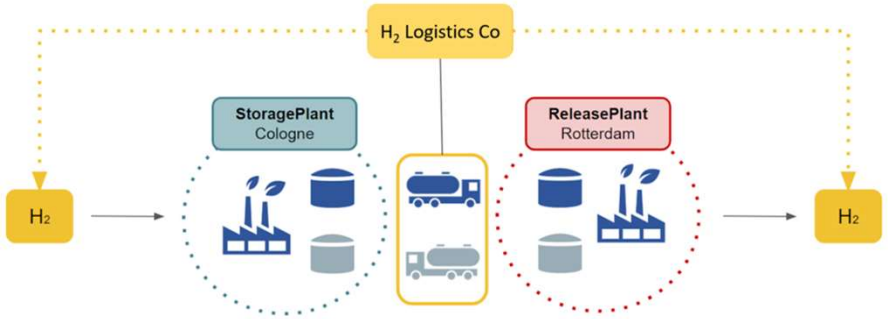
- Dehydrogenation of LOHC requires heat at ~320 ºC, while carbon-neutral heat is expensive in import countries. Waste heat integration options remain unclear **(cost comparison showed this is a point of attention for Hydrogenious testing!)**
- Dehydrogenation of NH3 requires heat at 700-900 ºC, while carbon-neutral heat is expensive in import countries.
- Production of LH2 requires a lot of electricity, however green electricity in export countries is relatively cheap

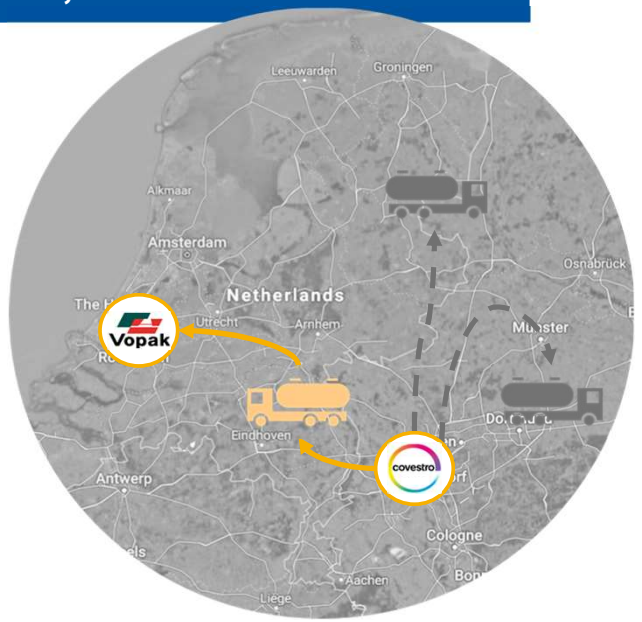
Scale-up required, costly Viable option Toxic product

LOHC: **Puffin** is 1st step to **pave the way for future large scale H_2 import** with RP as PoC and SP as first commercial unit

Pilot project to prove and upscale LOHC technology using existing assets, create the market

- **Demonstrate** an **international supply chain** based on LOHC technology as real option for **H_2 imports**
- Binding 5 tpd green hydrogen at the storage plant in Dormagen to Benzyltoluene (**LOHC**), being the first **commercial** deployment of the Storage Plant
- Bringing **1.5 tpd of H_2** from Dormagen to Rotterdam and release the H_2 in Rotterdam, being the largest H_2 demand pocket/throughput hub in NWE
- First **industrial deployment** of a Release Plant
- **JV** between **Hydrogenious** and **Vopak** for the entire supply chain based on **joint control**
- **Goal** of pilot:
  - **Develop and prove first LOHC supply chain** for future large-scale H_2 import projects using existing assets at Chemiehaven terminal (*exposure, operational synergy*)
  - **Scale-up LOHC technology** for future projects
  - Experience with **customs** procedures, solve potential hurdles





Mile stone	Timeline
Selection	August 2020
FID	Q2 2022
Project completion	Q3 2024

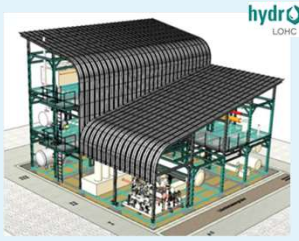
The Puffin set up at Chemiehaven Rotterdam

Release unit of 1.5 tpd H2 planned alongside existing gasoil tanks to store LOHC

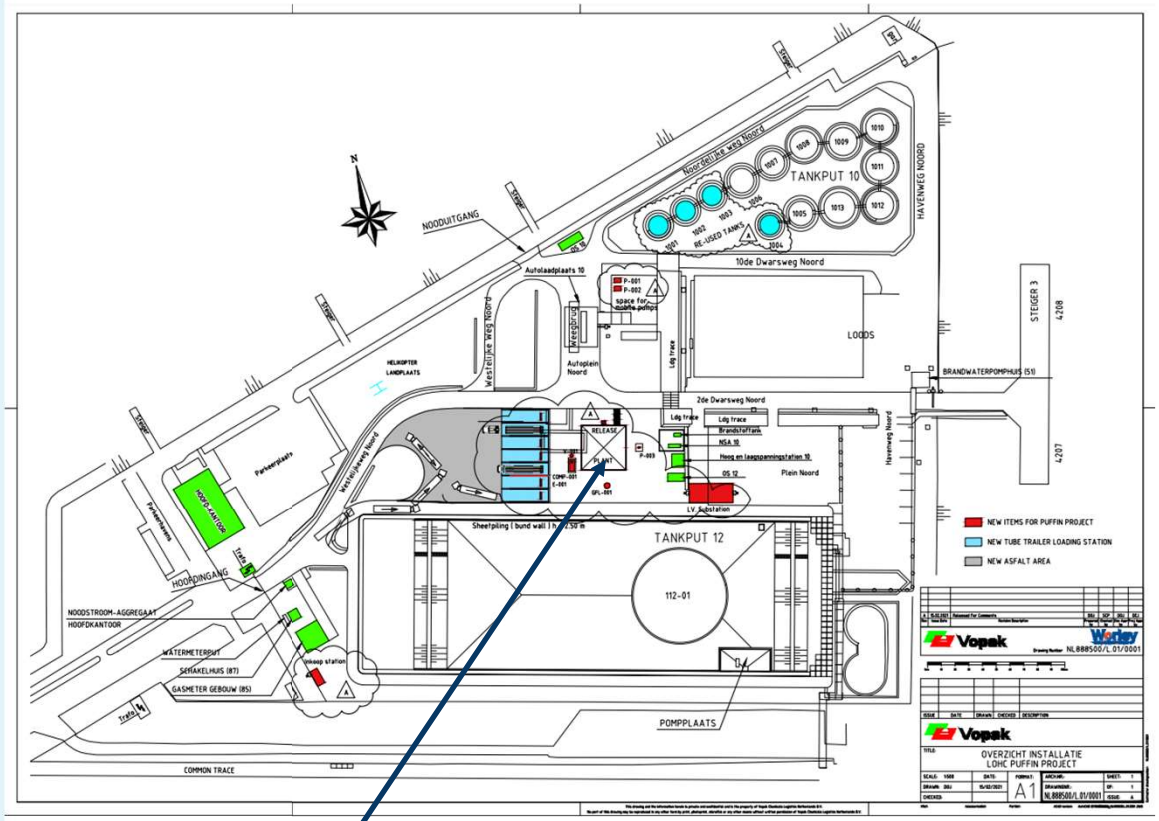
Storage capacity Chemiehaven:
2 x 400 cbm

Vopak

Overall capacity to be stored at terminal in existing tanks



Release unit releasing 1.5 ton H_2 per day from Benzyltoluene



Release unit

Current activities involving LOHC

LOHC strategy primarily based on Hydrogenious's technology

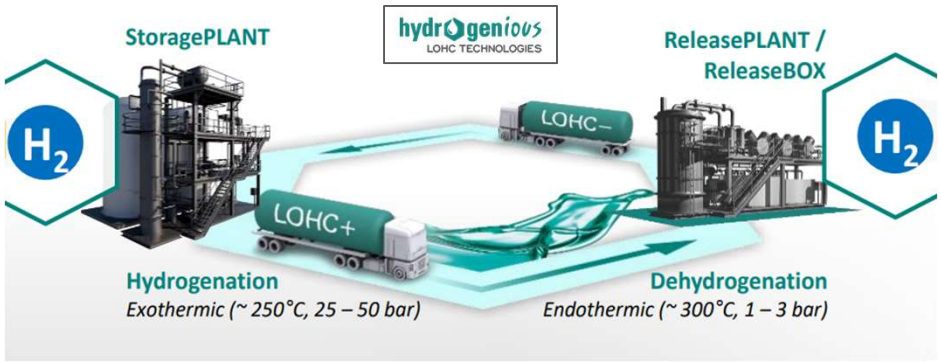
A WINNING TECHNOLOGY AND PARTNER

ELSEVIER

Fuel Cells Bulletin

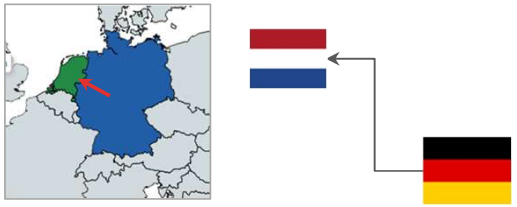
Volume 2019, Issue 8, August 2019, Page 10

Hydrogenious global cooperation deal, wins major new investment



FROM START-UP TO MAJOR MARKET PLAYER

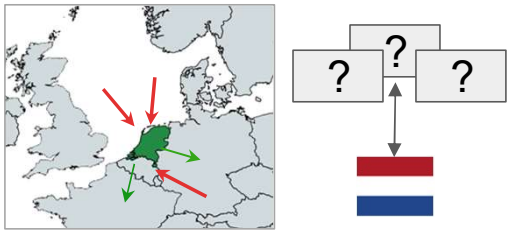
Construction pilot — 2023



First industrial deployment — 2026

Mature supply chain — 2030

180 kton/year



LH2: H2Sines as upscaling from Hystra project

NL50 - H2Sines.RDAM

Project aim: Build an integrated renewable hydrogen shipping corridor between Portugal and the Netherlands, for distribution in NW Europe.

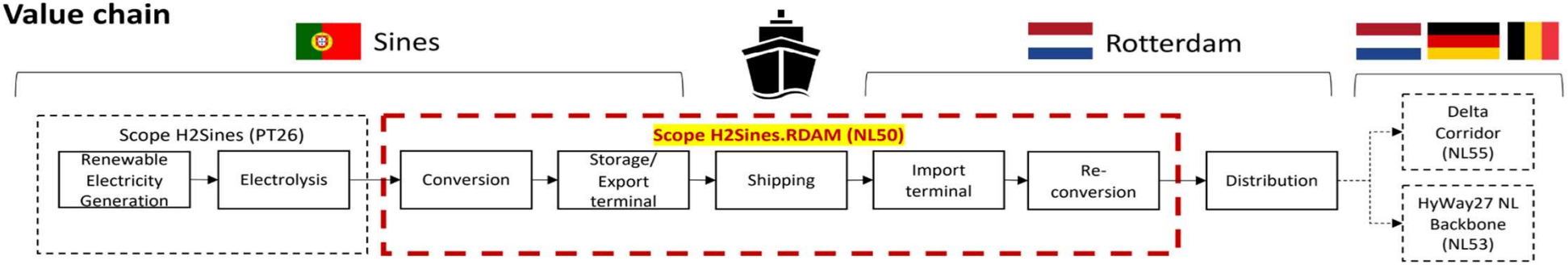
- **H_2 Production:** 630MW electrolysis capacity in Sines (PT) by 2030, powered by low cost renewable electricity
- **H_2 Shipping:** Convert 74 ktpa H_2 to liquid hydrogen and/or ammonia for export to Rotterdam (NL), the energy hub for NW Europe (first shipment 2027)
- **Scope:** Construction of hydrogen (re-)conversion plants and import/export facilities in Sines and Rotterdam, along with required transport and storage infrastructure

Project status
- MoU between H2Sines (PT26) and H2Sines.RDAM (NL50)
- MoU between PT and NL governments
- Pre-feasibility study finalized, preparing for feasibility study
- Part of the CONNECT H2 initiative

NL50 - Key Figures:
- 630MW electrolysis capacity in Sines (PT)
- 74ktpa H2 for export to Rotterdam (NL)
- Transport by ship using liquid hydrogen and/or ammonia as carrier
- First shipment 2027

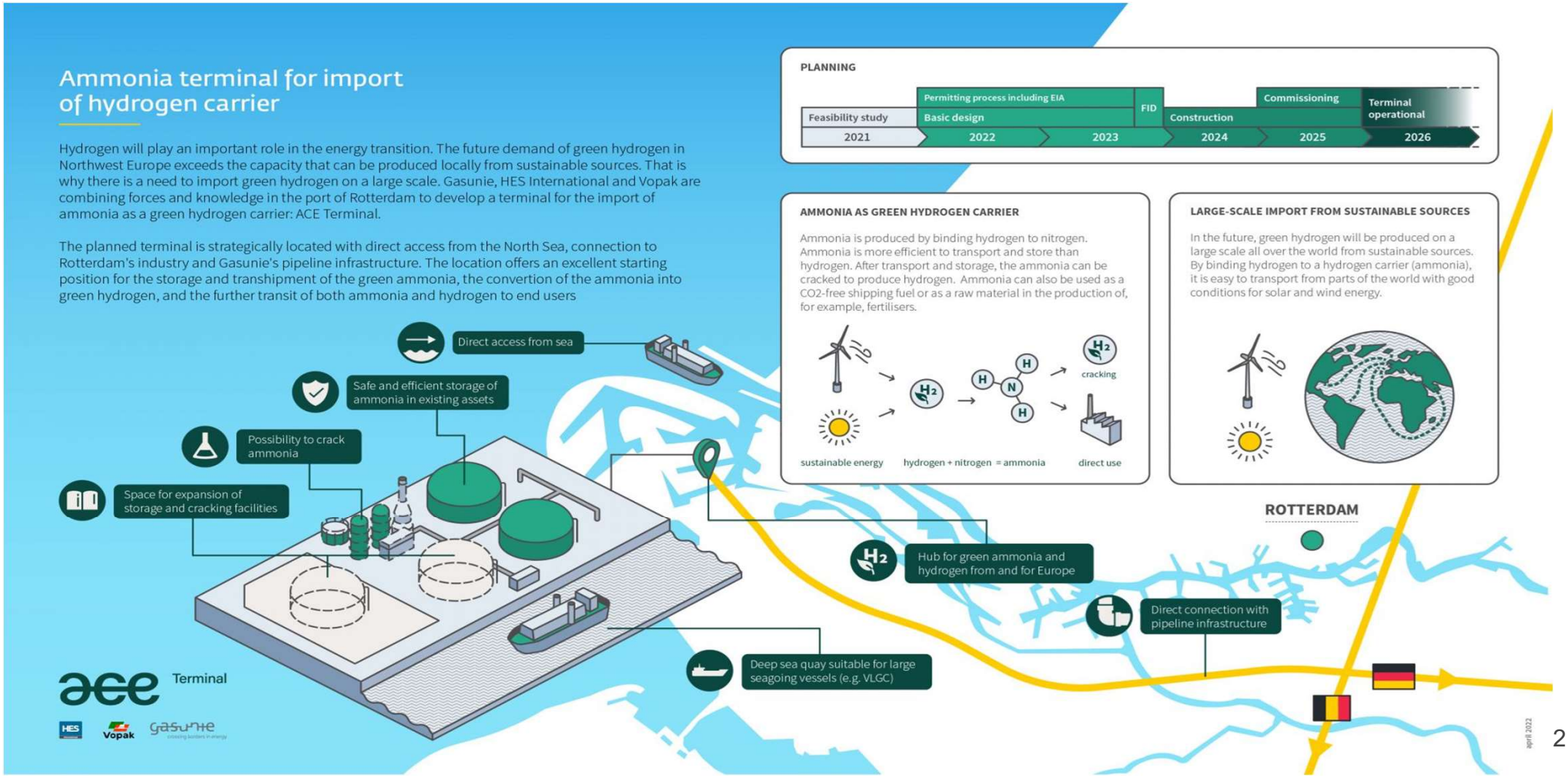
Potential reference with other IPCEI projects:
- H2Sines (PT26, *hydrogen production*)
- Hytransport.RTM (NL55, *distribution*)
- Hyway27 (NL53, *distribution*)
- GETH2 Nukleus (DE24, DE26, DE34, DE49, DE56, *hydrogen offtake*)
- LH2 for the maritime sector (NO09, *L-H2 import*)

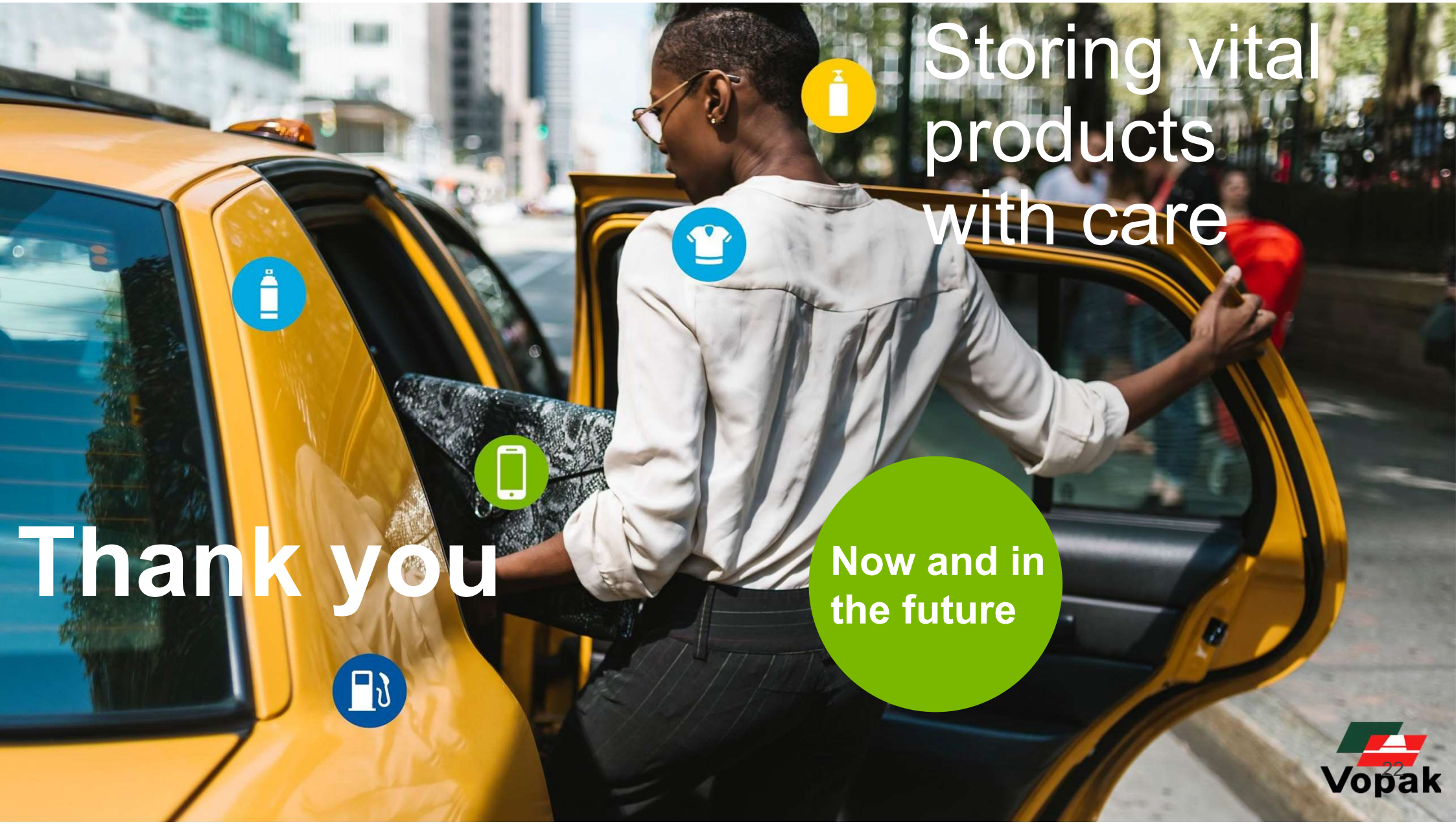
Value chain



Ammonia: ACE Terminal expected COD in 2026

First large-scale independent Ammonia import terminal in Rotterdam




Storing vital products with care
Thank you
Now and in the future

DEEP DIVE I: REACTIE SHELL HYDROGEN SUPPLY OPTIONS

Wouter Koopman | Shell

Hydrogen Supply Options

April 2022

Wouter Koopman – Shell Netherlands

Our strategy

Providing hydrogen for mobility

- Building a hydrogen refuelling for long-haul heavy-duty road transport for trucks and buses.
- Hydrogen refuelling stations for light duty and medium duty vehicles.
- Optimise supply and distribution of decarbonised hydrogen.
- Evaluate hydrogen opportunities for shipping.
- Work with other sectors, including aviation, to identify long term hydrogen solutions.

Providing hydrogen for industry

- Orchestrate large scale hydrogen supply and demand through sector coupling.
- Produce hydrogen in conjunction with CCS to more rapidly scale up decarbonised hydrogen supply.
- Maximise scale up of hydrogen produced from renewables.

How we intend to grow

- Work closely with our customers.
- Collaborate with industry partners to develop end-to-end solutions.
- Liaise with government and regulators to further policy support.
- Leverage own hydrogen demand to initiate market growth.
- Lower costs to reach economic viability.
- Demonstrate safety.

Our key markets

Europe

- A combination of supportive policy, access to renewable energy and increasing demand makes Europe a key market for hydrogen growth.
- Shell was a founding member of the H2Accelerate consortium aiming to roll out a network of heavy duty hydrogen trucks across Europe by 2030.
- Leverage own hydrogen demand to initiate market growth for hydrogen production through development of electrolysers near assets in north-west Europe.

North America

- Increasing infrastructure to enable the advancement of hydrogen fleets and vehicles in California.
- Shell received a Notice of Proposed Award for $40.8 million funding to expand our hydrogen fuelling station network in California.
- The funding will be used to install hydrogen refuelling equipment at 48 existing Shell retail stations, upgrade two Shell H2 stations and add light-duty fuelling dispensers at one existing Shell H2 heavy-duty truck station.

Asia

- In January 2022, Shell started up a 20MW electrolyser in China with JV partners, in time to supply renewable-based hydrogen for the 2022 Winter Olympic games held in Beijing.
- In March 2022, Susio Frontier, the world's first liquified hydrogen carrier, completed its maiden voyage, travelling from Japan to Australia, where it was loaded with liquified hydrogen before returning to Japan.
- Liaise with government and regulators to further policy support and reduce costs
for customers, car manufacturers and fuel providers.

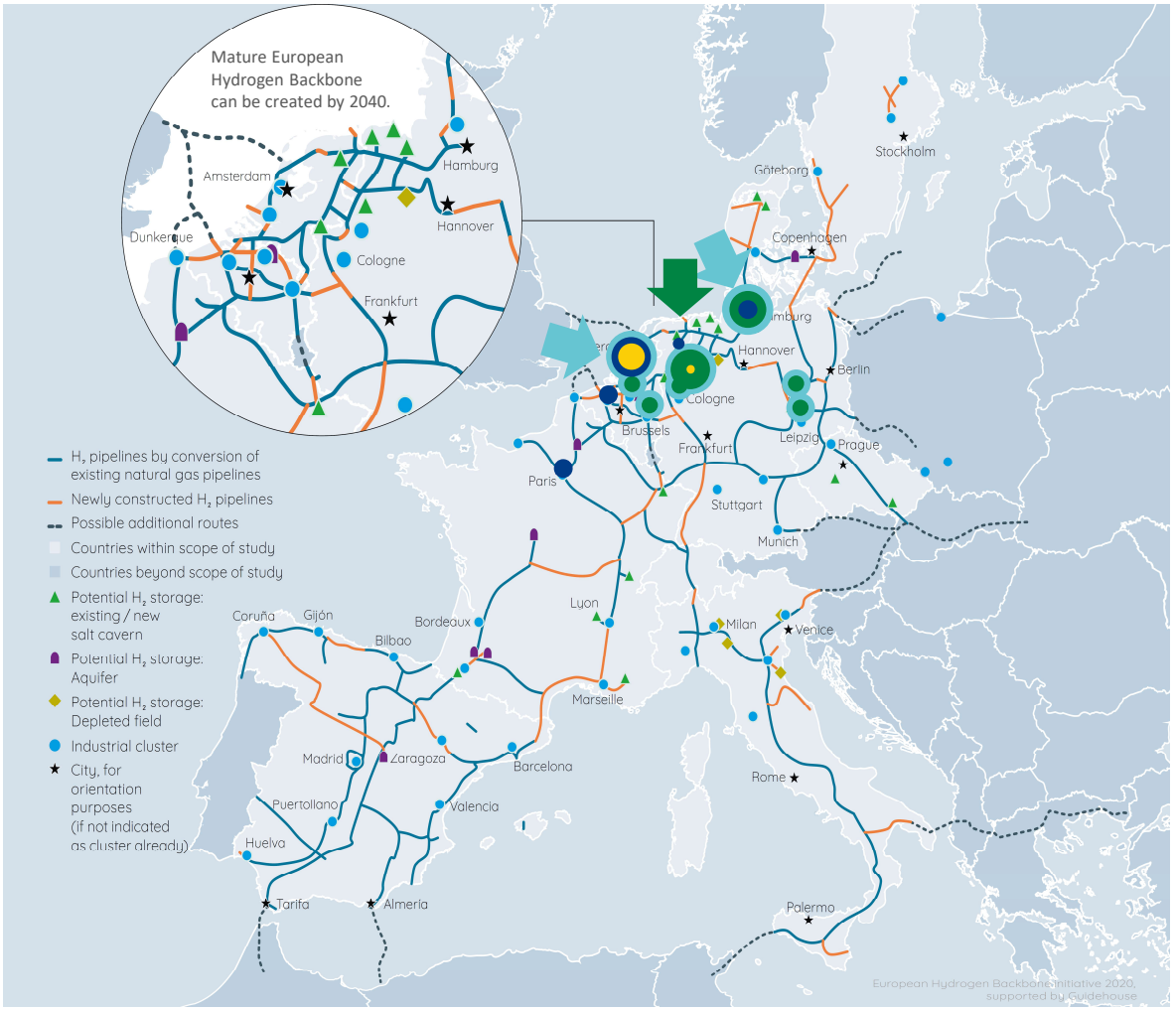
Decarbonising industry starts at hubs, expanding to industry clusters as the infrastructure develops

Shell aims to serve big industrial clusters to help decarbonise their businesses.

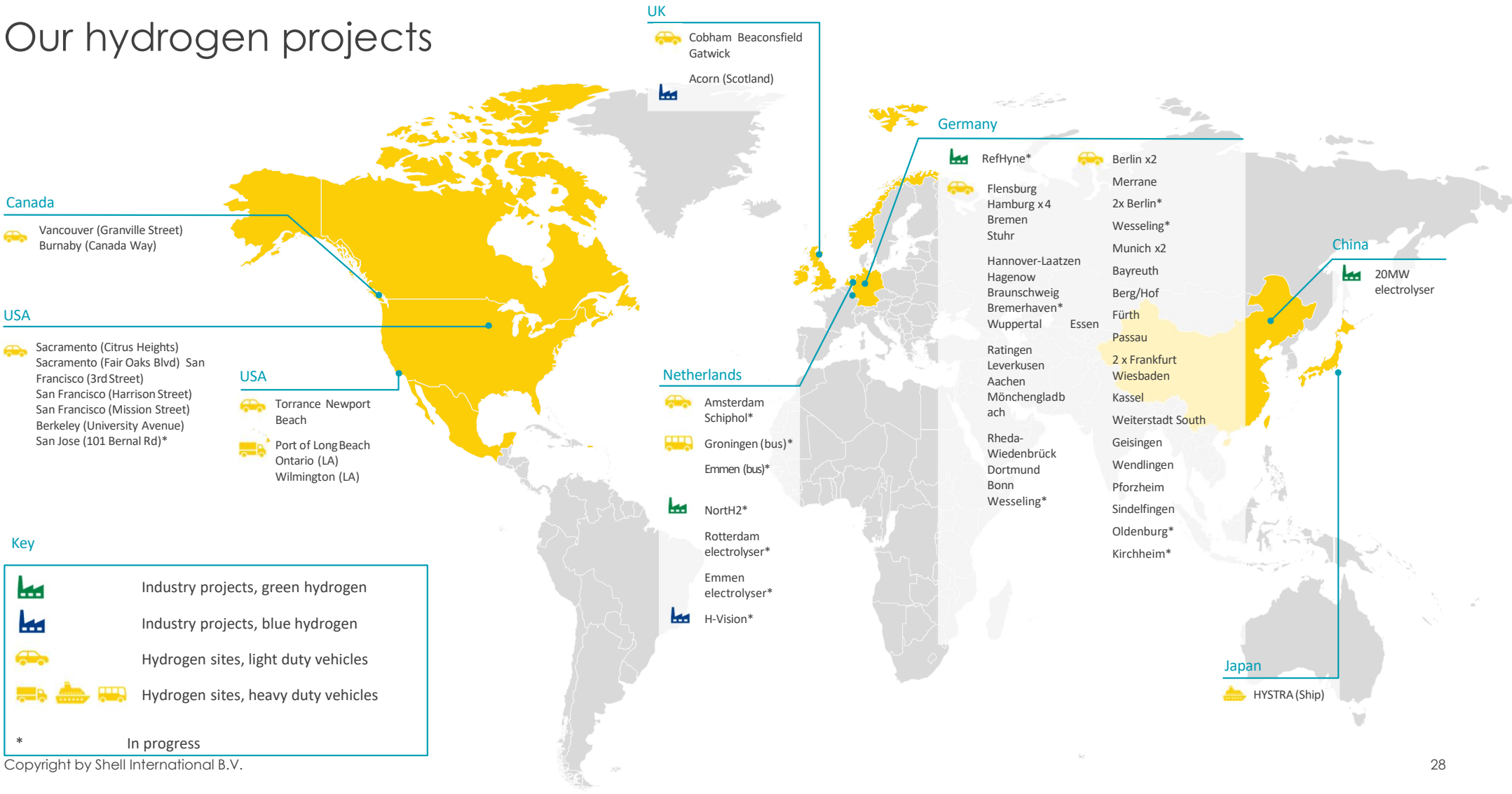
We get started by serving our own anchor demand in e.g. refineries, expanding to local hub demand close to the supply and finally connecting to large industry hubs when the infrastructure becomes available.

Increasing uncertainty & risk

	Proof points	
Step 1 – Own Use Serve own-use as anchor demand in hubs – enables to build supply positions and gain experience and credibility	RefHyne - Rhineland Rotterdam Electrolyser	●
Step 2 – Serving the hubs Serve local third party customers in hubs - create market and solutions, expand supply position	GZI - Emmen Rotterdam Electrolyser Hamburg	●
Step 3 – Starting the clusters Serve inter-regional and international industrial demand through an expanding hydrogen backbone network	NorthH_2 Ingoland	● ↓
Step 4 – Fully developed Traded hydrogen commodity market – facilitated by a wide-spread hydrogen pipeline network, including import	Rotterdam import Hamburg Import	● ↓



Our hydrogen projects



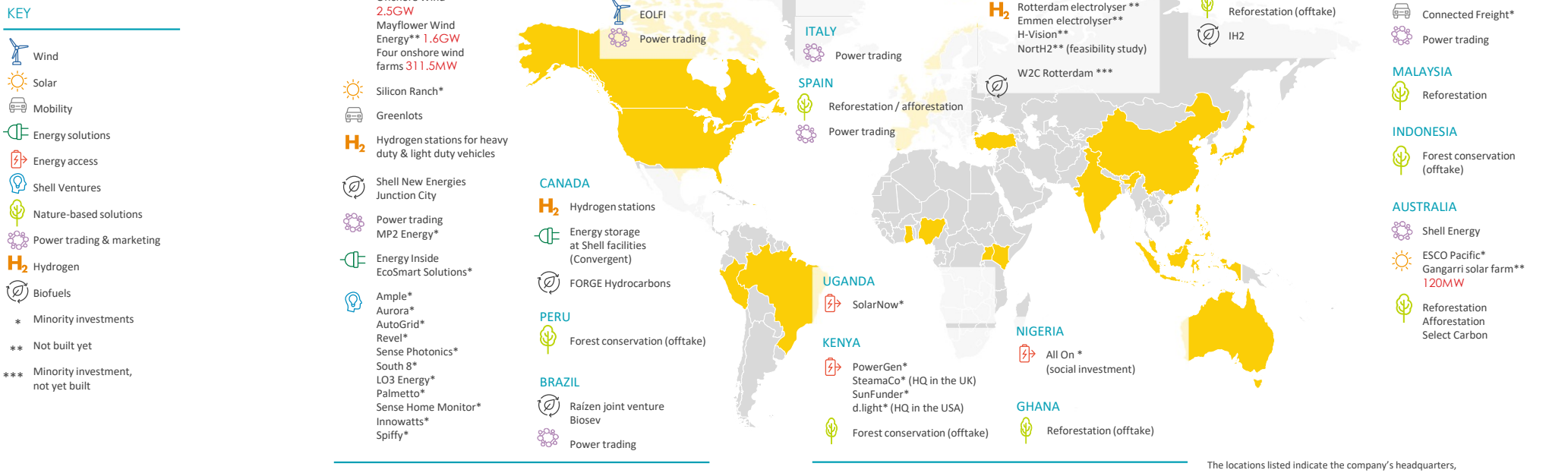
Key

- Industry projects, green hydrogen
- Industry projects, blue hydrogen
- Hydrogen sites, light duty vehicles
- Hydrogen sites, heavy duty vehicles

* In progress

A customer-led integrated energy offering

Shell offers integrated solutions to customers – from biofuels, to hydrogen, solar and wind – while using nature and technology to capture emissions from hard-to-abate sectors. Here is a selection of our activities.



The locations listed indicate the company's headquarters, market or examples of where they operate.

Perspective on technology scale up

Development of technology for production, storage and transport need to go hand in hand

Methane Pioneer 1959, 5500 m3

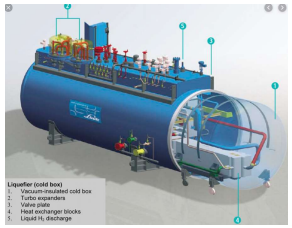
Methane Princess,1964, 28000 m3

Norman Lady, 1973, 78000 m3

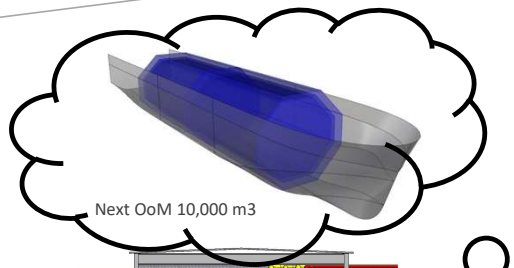
Pacific Breeze, 2017, 180,000m3

- LNG
- LH2

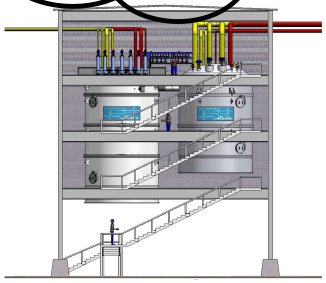
Suiso Frontier, 2020, 1250 m3



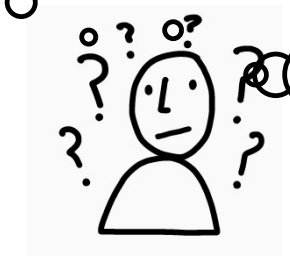
Liquefaction – 5 tpd

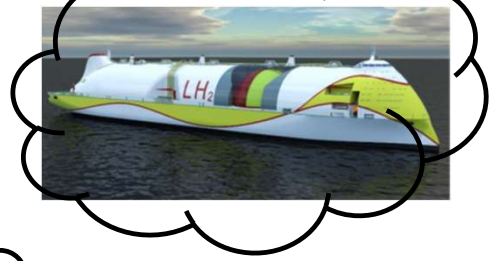


Next OoM 10,000 m3



Liquefaction – 50 tpd





Next OoM 200,000 m3

Next OoM 500 tpd

Why is liquid hydrogen part of the energy mix?

Demand for LH2 will start with shipping sector, followed by road and aviation sectors

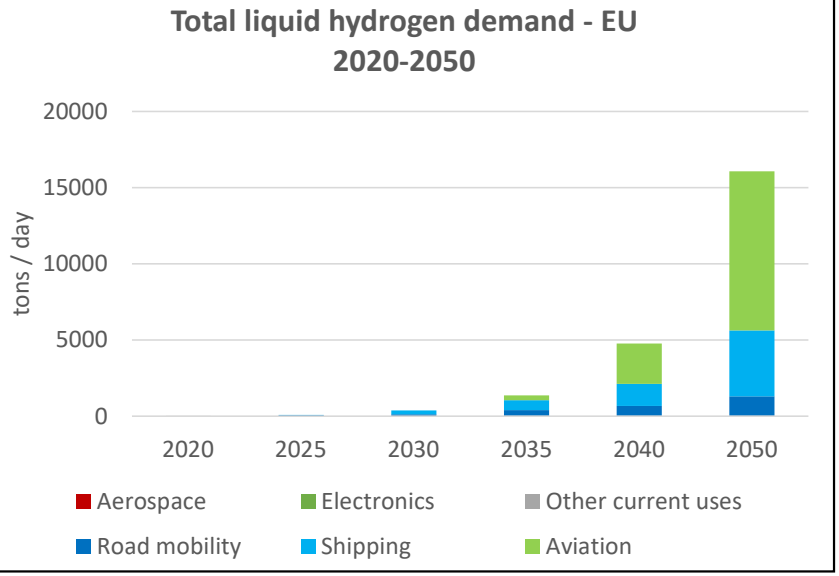
- **High energy density** – in liquid form cooled at -253˚C LH2 has a much higher energy density than gaseous hydrogen and is better suited for transportation by ship.
- **Suitable for mobility applications** - due to its higher energy density and purity, it is a preferred solution for mobility applications
- Imported renewable LH2 requires **no additional energy or conversion** to suit specification of the customers – on arrival in the destination port it can either be kept in a liquid condition or transformed back to gas, without additional energy input.
- LH2 will enable to contribute to balancing and diversifying the green energy supply of the mobility sector in the NL, especially
- To fit the need of mobility sector, alternative H2 carriers will require a costly conversion (which consumes significant amounts of the renewable energy) and contain impurities making the product unsuitable for processes like the fuel cell technology used in mobility & transport.
- Gradual adoption of LH2 for shipping, for short-sea vessels only: on average 10% of new short-sea vessels are LH2 ships in 2030.
- Road mobility: 10% of road mobility H2 market supposed to be liquid.

2030

Market share of LH_2 in shipping : 0,6% of total ships (1% of short-sea ships)

2050

- Market share of LH_2 in shipping : 8% of total ships (30% of short-sea ships)
- Market share of LH2 in total road : ~5%
- Market share of LH2 in aviation : 12% of aircrafts



DISCUSSIE: IMPORTREGULERING EN CERTIFICERING

Bert den Ouden| HyXChange

SHIP sessie 20 April 2022

Importregulering en certificering

Bert den Ouden, projectdirecteur HyXchange

Inhoud

- Stava HyXchange en GvO pilot
- Belang importen
- Ontwikkelingen regulering certificering
- Perspectief

Aanbieding ontwikkelingsplan…..

….. en 1e Groene waterstofcertificaat (GVO)

Jeroen Savelkouls - Energeia 14 uur

NIEUWS

Proef met groenewaterstofcertificaten van start

Handelsplatform HyXchange draait de komende drie maanden een pilot met een certificeringssysteem voor groene en CO_2-arme waterstof. Aan deze proef doen zestien marktpartijen mee. Na afloop van de pilot wordt het systeem, mits tegen die tijd wettelijk toegestaan, echt in gebruik genomen. Later wordt er ook een spotmarktsimulatie opgestart, zo is deze dinsdag bekendgemaakt.

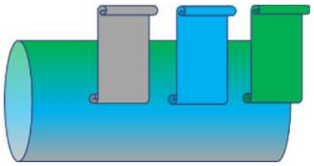
Bewaren

Minister Rob Jetten (links) krijgt het eerste certificaat uit handen van Bert den Ouden. (Foto: HyXchange)

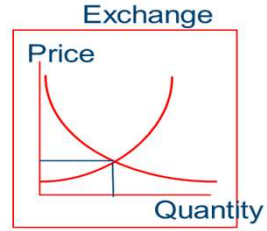
Development plan “HyXchange”

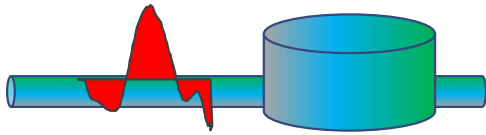
Out of the study and input from market parties the following were selected:

1. Certificate product: a wish of many market parties. Can be developed doing a pilot in advance, awaiting the hydrogen infrastructure. Is a precondition for all other products.



2. Spot market product: needed, due to intermittent output of electrolyzers. Start by doing a market simulation. To be launched at sea port locations readiness of infrastructure, market parties. To be migrated towards the backbone when that is (partly) ready.
   Products for grid balancing and storage: develop the market design together with infrastructure developers. Include in market simulation.

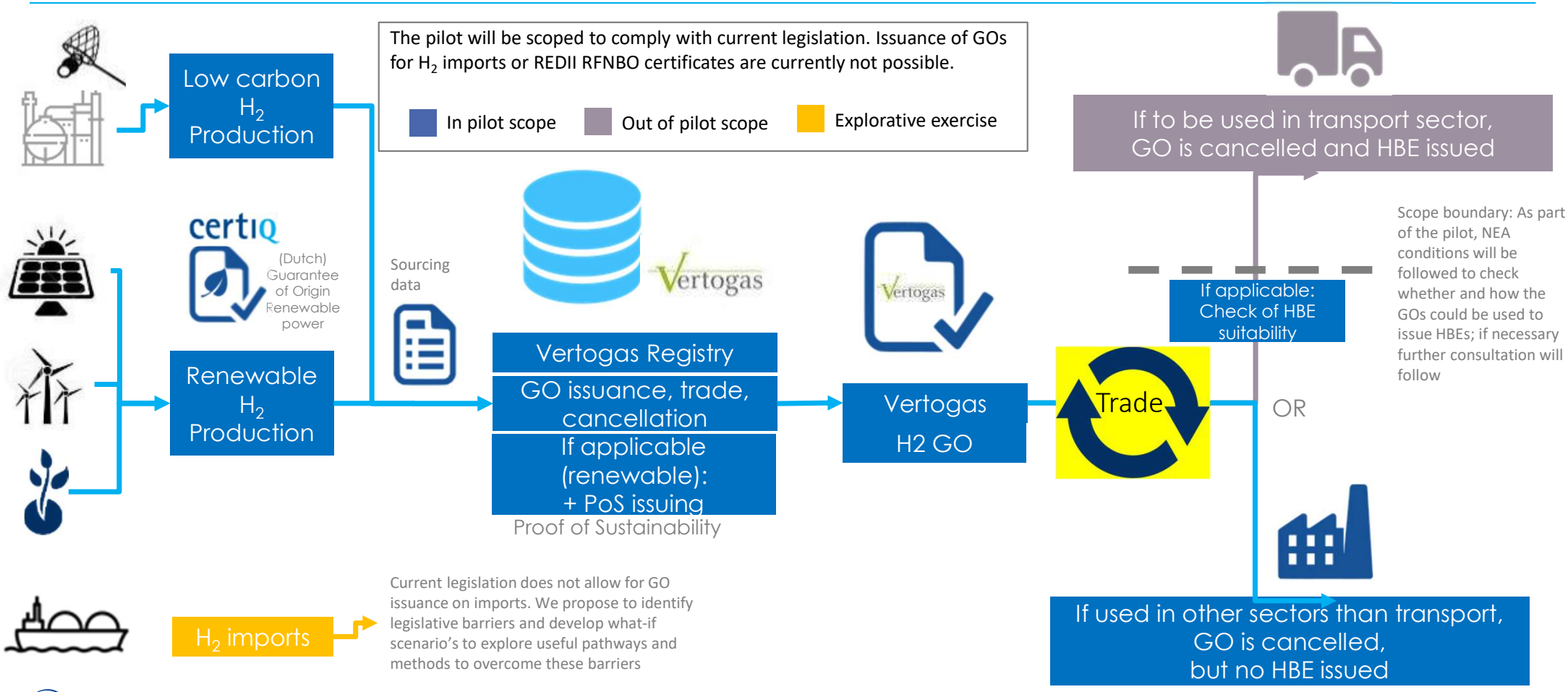




3. Index product: this provides a value to the certificate product. This can be developed in anticipation of a hydrogen infrastructure. The index product is also a precursor for spot and futures and swaps.

Introduction virtual certification pilot, 16 market parties active

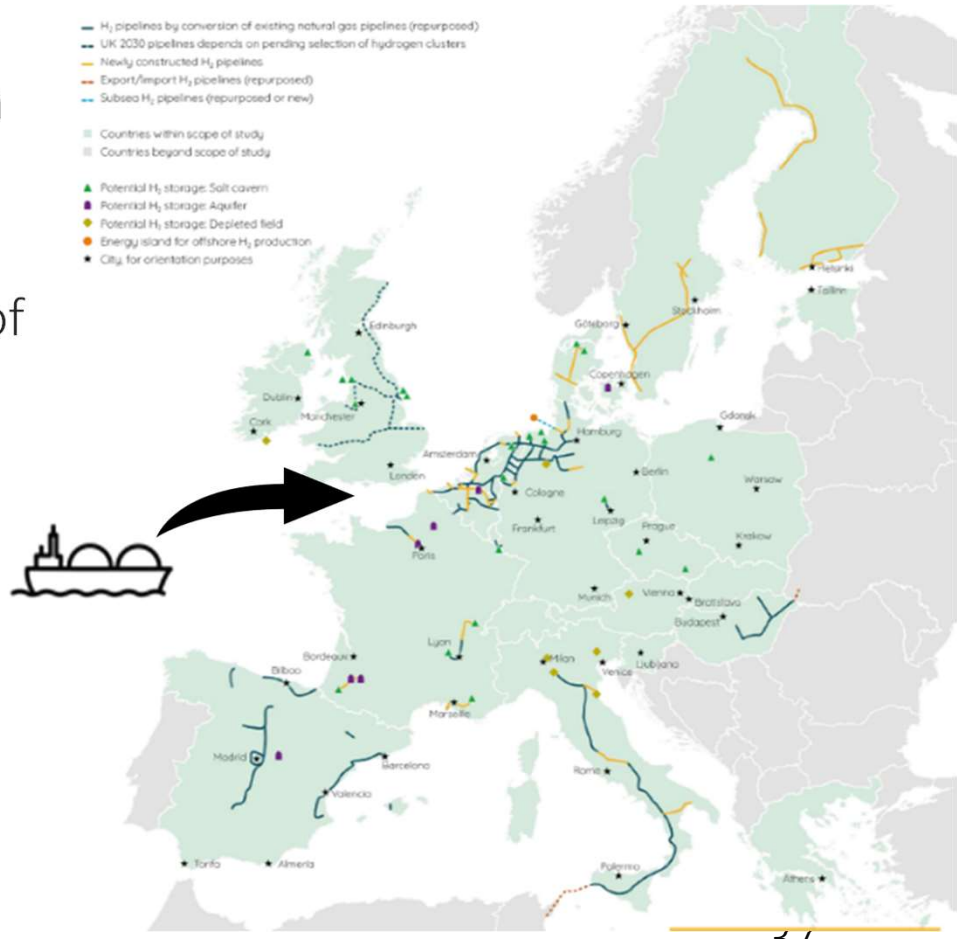
The pilot, as conducted by HyXchange, will result in a fully functional GO scheme based on proposed Dutch law, which is a key element in the Dutch HBE schemes. These are GO's (separately tradable from the commodity)



Source: Hinicio adapted from HBE scheme for biomethane from Vertogas

Future EC certificates: RED 2, based on mass balancing. Still separately tradable on the grid ("Gross mass balancing")

- GO's separately tradable from the commodity
- EC LCA H2 certificates: mass balancing, "go with the flow" of H2: connected to the commodity
- However, *interconnected* H2 grid is one mass balancing point. So within *that* grid, free trade of certificates, seperately from the commodity.
- No tracing of transactions while on the grid
- Monitoring certificates of all injected / withdrawn certified hydrogen
- Preferably, full disclosure within the H2 grid: all grid H2 certified NOTE: is this NL policy?
- Shipping imports: based on mass balancing, go with the ship. Ideally LCA based, "into pipe" EU

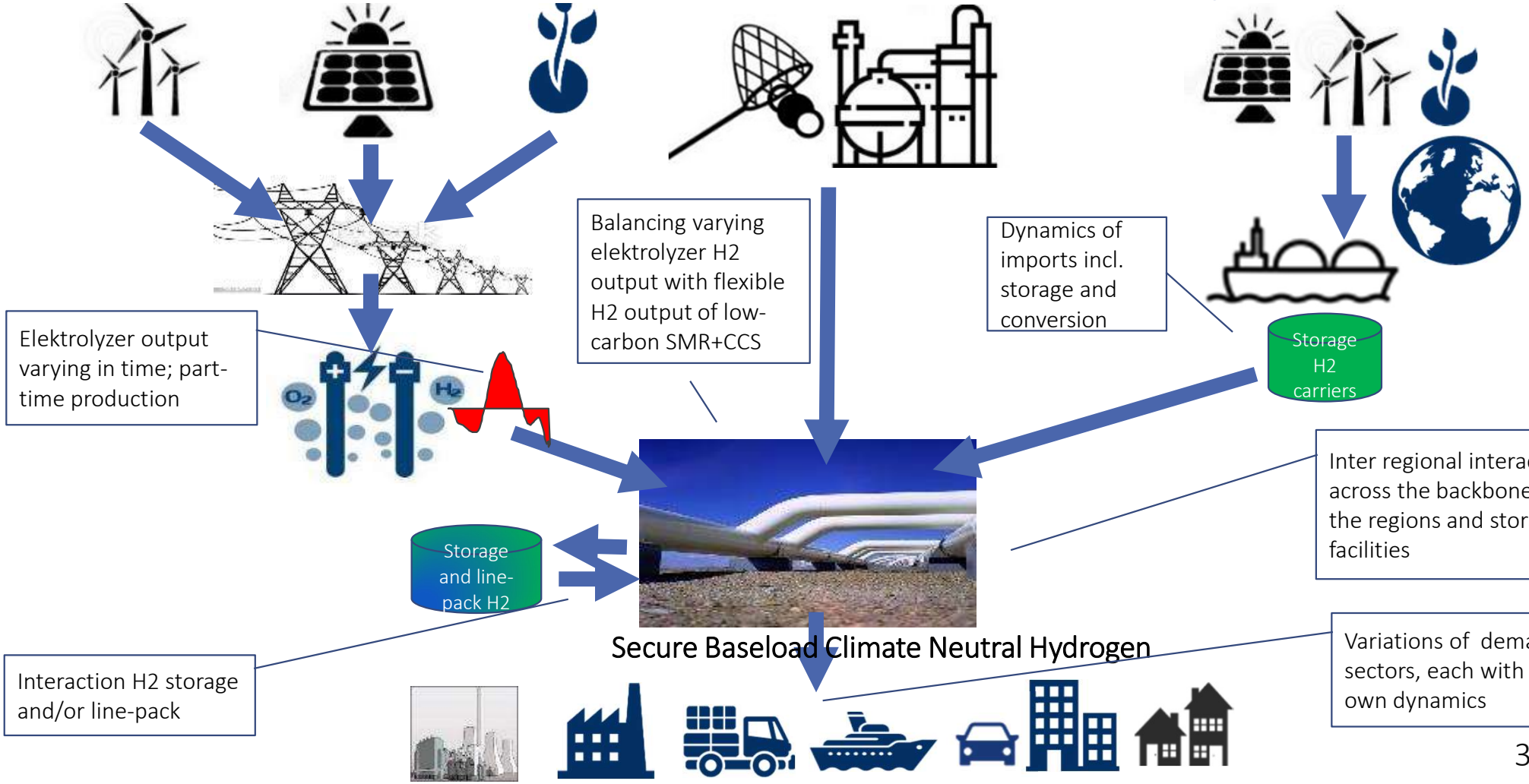


Belang van duurzame waterstof importen

1. Belangrijk voor duurzame balancering waterstofnet
2. Nodig voor volume doelstellingen industrie duurzame H2 2030 (fit for 55)
3. Wezenlijk voor Repower Europe: reductie aardgasimporten

Imports needed for optimization and balancing of Hydrogen

1. EU Renewable 2. EU low carbon 3. Import renewable



H2 imports: more important due to EC proposal target 2030: 50% of all industrial H2 demand (excl. refineries) to be renewable

- Current industrial H2 demand NL: 116 PJ* (excl. H2 for refineries)
- 2030: Gasunie middle scenario : ~200 PJ (excl. H2 for refineries; added: H2 switch of steel industry)

Renewable hydrogen demand NL	**GW**	**hours**	**TWh**	**PJ H2**	**Kton H2**	**Pattern**
50% industrial H2, current		8760		58	479	Continuous
50% industrial H2, 2030		8760		100	**825**	Continuous
Possible sources:						
10 GW offshore wind 50% base electrolysis	5	6000	30	74	**600**	Intermittent
10 GW offshore wind 50% peak electrolysis	5	3000	15	37	**300**	Intermittent
Import liquid green Ammonia (2 ships/week) a 80.000m3; (partly used as ammonia, partly converted in H2)**				108	**900**	Continuous

→ Impossible to cover fully with (additional) renewable domestic power
→ Import needed; but this is not facilitated yet by current EC RED II regulation

*data Gasunie, DNV GL ** Part of industrial H2 demand is for ammonia production. Imported green ammonia can fill that H2 demand directly.

Strategic potential of green H2 imports

- Today, 16.5 billion m3 of hydrogen is produced annually in the Netherlands
- Of this, 10 billion m3 of hydrogen is made from natural gas.
- This requires 4 billion m3 of natural gas annually
- In other words, 10% of our Dutch natural gas consumption (40 billion m3).

- If we replace this by green hydrogen, we can avoid 4 billion m3 of gas imports
- A sizable part of the current import of natural gas from Russia
- How to find this green hydrogen:
- *Hydrogen from offshore wind in 2030: 1.5 billon m3 of natural gas equivalent**
- *Imports from countries such as Australia, Chile, Middle East: bigger potential, and first cargoes within a few years (2025). Even earlier than NL offshore wind*

** Kamerbrief over gasleveringszekerheid komende winter en verder, Letter of Dutch minister of Climate and Energy to parliament, 17 March 2022*

Draft RED 2 “Delegated Act” for green hydrogen

- Additionality requirement: has to be “new” renewable power
- Temporal correlation: matching the time of renewable supply and electrolyzer demand
- Geographic correlation: green power for H2 production has to come from same zone

Still a draft, has been delayed several times……

- Many claim that this would hamper hydrogen generation in Europe
- If imposed on imports from exporting countries: possibly hamper hydrogen imports
- Meanwhile the continuing unclarity is detrimental to hydrogen in EU,……and imports!

Speeding up the Imports of H2, ammonia (now made from natural gas) could:

- Save large volumes of natural gas demand and –imports (over time, billions of m3)
- Ease the discussion of hydrogen generation from renewable electricity in Europe

→ Practical start-up solution needed

Criteria for certification

Renewable Energy Directive 2018/2001

- Voluntary schemes may apply for recognition by the EC
  - Reliability
  - Transparency
  - Independent auditing

- 13 voluntary schemes are expected formal adoption by end of Q1 2022 (for biomass)

- EU Members are free to accept evidence from voluntary or national certification schemes

Probleem: lange (EC) goedkeuringsperiode voor waterstof verwacht

Criteria for renewable hydrogen (RFNBOs)

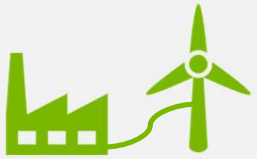
Renewable Energy Directive 2018/2001

Uit: EC Presentatie roundtable on international sustainability standards and certification (14/2/2022)
- D, NL, B (ministeries ec.zaken)
- EEX, H2global, HyXchange,
- Australie, Chili, Ver.Arab.Emiraten

Suggestie (*Hyxchange): Zou deze case relatief snel kunnen?

Case 1
Partial renewable hydrogen
- Renewable share of grid

- < 3,4 kg CO_{2eq}/kg H_2 consumed



Case 2
100% renewable hydrogen
- New renewable installation

- < 3,4 kg CO_{2eq}/kg H_2 consumed

Case 3
100% renewable hydrogen
- Additionality
- Temporal correlation
- Geographical correlation

- < 3,4 kg CO_{2eq}/kg H_2 consumed

Delegated Act (DA)

Regulering en certificering van importen: opties

Volgens te publiceren RED II / delegated act

Groene H2: vrijwillig schema, te voldoen aan Delegated act
- vraag: goedkeuringsperiode Eur.Commissie erg lang?
- kan dit versneld worden (op basis case 2 = semi autonome H2 opwek)?

- De H2 importen uit semi-autonome duurzame opwek (wind- en zonneparken met elektrolyser): addionaliteit en geografische en temporele correllatie geen issue.
- Dat is toch zonneklaar en moet makkelijk te regelen zijn
- Waarom moet dat wachten op de RED II / Delegated act, die grotendeels gaat over Europese netgekoppelde situaties (waarover veel discussie is).

Laatste nieuws (tentatief)

- Delegated act gepland uit te brengen op 18 mei 2022
- Onderdeel van een package
- ….Importen zouden er eventueel niet direct in voorkomen?

(Hetgeen niet meteen betekent dat de delegated act nvt hierop is)

- Repower Europe: rol voor waterstof. Import apart regelen?

→ Wat te doen vanaf hier

Overige onderwerpen

Huidige GvO volgens NL wet (en huidige pilot HyXchange en Vertogas):

- Groene H2 certificaten zouden uitgewisseld kunnen gaan worden met buurlanden (mits die een vergelijkbare GvO certificering hebben)
- Kennelijk onduidelijkheid in toepassing H2 GvOs voor mengsituaties (blending van H2 met aardgas)

Opties import low carbon H2 (of –dragers)

- Low Carbon H2: nog geen wettelijk kader (komt niet snel, zie gas package)
  - Optie: vrijwillig certificaten schema om importen nu al te faciliteren
  - Geen target met geassocieerde waarde, wel wens CO2 reductie tonen
  - Bijv. blauwe NH3 import, mogelijkheden versneld importeren
  - Ammonia certificaat in ontwikkeling door Ammonia Association

Initiatief HyXchange: pre-certification project

- Doing the homework in advance of the detailed regulation. Base:
  - factual compliance with RED II criteria,
  - case 2 situations, would be based on practical import examples
- Verification of electricity consumption & production, GHG emission
- Including Cradle to Gate GHG emission for the foreseen steps in import/export process
  - Conversion, Shipping, Reconversion, Pressurization (“Into pipe” at sea port, H2 infrastructure)
  - Last 2 steps not applicable for direct application ammonia (“Into storage terminal” NH3)

  → Does this obey the RED 2 70% criterion
- Comparison with EU benchmark H2 (and its consequences for ammonia)
- Documentation “certification ready” to GHG emissions reduction

Uitnodiging: meedoen aan en ondersteuning van dit project

Stellingen

1. Nederland moet in alle omstandigheden qua regelgeving en certificering van waterstofimport (inclusief de toepasbaarheid voor overheidsdoelen) de richtlijnen van de Europese Commisie volgen, en daarin niet iets zelf proberen te doen.

2. Gezien het grote belang van Nederland in waterstof en ammonia (industrie en havens) moet Nederland zelf (pre-EC regels) voorop lopen in de regels van certificering voor importen daarin ten behoeve van verduurzamingsdoelen, desnoods samen met buurlanden of zelfstandig.

3. Gezien het belang van meer import van waterstof in de nieuwe energierealiteit moet Nederland meedoen aan het Duitse waterstofimportinitiatief H2 global

4. Hetzelfde als stelling 3, mits Duitsland met ons meedoet aan stelling 2

5. Het naast elkaar bestaan van Garanties van oorsprong en Mass balancing certificaten geeft verwarring voor de markt en de overheidsdoelen en is dus ongewenst.

Stelling 1: Volg Europa, niet solo acteren

Stelling 2: Loop voorop met certificering

Stelling 3: Doe mee met H2Global (De)

Stelling 4: Doe mee met H2Global mits Duitsland meegaat in NL certificeringsinitiatief

VOORLOPIG PROGRAMMA KENNISSESSIE 18 MEI A.S.

18 mei	Onderwerp	Organisatie
Internationaal	Ontwikkelingen first mover landen Japan en Duitsland	TNO
Beleid	Routekaart NWP	TNO/EZK
Beleid	Delegated Act	EZK

HARTELIJK DANK VOOR UW AANDACHT

Vragen? Neem gerust contact met mij op:

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