

First EU-Canada Dialogue on Hydrogen: Supporting the Development of a Global Regulatory Framework for Hydrogen and Its Derivatives

Slide Deck

Note: Some speakers did not use slides.



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Dr. Laurent Antoni

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Hydrogen and Fuel Cells in the Economy**



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International Partnership
for Hydrogen and Fuel Cells
in the Economy

Scene Setting on a Global Framework for Hydrogen

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International Developments



Global Momentum Growing Significantly:

- **+30 National or Regional Hydrogen Strategies** and Roadmaps published in the past 2 years
 - **Clean H2 a Key Challenge**
- **As of June 2021** in IPHE member countries*
 - **\$30B in announced public funding for H2 specific actions**, 10% increase from December 2020
 - **18% increase in transport vehicle deployments** between December 2020 and June 2021
- **Trade Corridors:** Japan – Australia, MENA – Europe and more exploring opportunities; Ports as key hubs (e.g., Sines, Portugal; Rotterdam, Netherlands; Ministry of Energy, Chile)

* Does not include IPHE Members China and Russia



Key Drivers: Based on Unique National Circumstances



- **Environmental Benefits – Climate Change**
 - Climate Change, Clean Air/Local Air Quality, Noise Pollution
- **Energy Security**
 - Security of Supply and Resource Diversity
- **Energy System Resiliency and Stability**
 - Effective Use of Variable Generation – grid services, storage at scale, and sector coupling
 - Distributed Generation Option
- **Economic Growth: Innovation & Technology Leadership**
 - New Products and Supply Chains across Sectors
 - Skilled Jobs and Manufacturing Opportunities
 - Impact on Transportation (marine, rail, vehicles, trucks, air), Industry (e.g. steel, ammonia), Stationary power, and Energy Storage



Key Challenges: Need to Get to a Global Scale

1. Innovation

- Must get **low-carbon hydrogen cost competitive** – Requires Innovation and Scaling-up Production

2. Policy and Regulatory Framework

- Functioning market requires:
 - **Stable and strong Policy Signals** (e.g., Strategies, Road Maps, Tangible Targets and Goals)
 - **Regulatory Certainty** (e.g., Consistent Regulation, Codes, Standards & Safety requirements)
 - **Market Transparency** (e.g., Carbon Content)

3. Infrastructure Investment

- **New Production Methods** (e.g., Steam Methane/AutoThermal Reforming with Carbon Capture Utilisation and Storage, Electricity, Biomass ...)
- **Efficient Transmission/Transportation** (e.g., Repurpose Pipelines, New Hydrogen Carriers)
- **Effective Use in Processes and Products** (e.g., Business Cases for different ways to make the same Products)



International Hydrogen Initiatives



Technology Focus

Policy & Markets Focus

Hydrogen Energy Ministerial

Global Action Agenda (GAA), framework & requests to 10's; 10, 10, 10 Targets + future targets; Platforms for H2 supply chain, mobility

International Partnership for Hydrogen and Fuel Cells in the Economy

Regulations, Codes, Standards, Safety; Education & Outreach; Facilitate Int'l Trade & Harmonization

Hydrogen Council (Industry)

Works with IPHE, CEM, HEM, MI, others: Deployments, Public Private Partnerships, Finance & Investment

IEA: Technology Collaboration Program - R&DP, techno-economic analysis, crosscutting issues, IEA's analytical support

IEA: Energy Technology Policy - Track tech deployment; policy & market analysis; scenarios; high-level gov't & industry exchange

Mission Innovation 2.0 (Clean Hydrogen)
R&D and Innovation-Push; Technology goals performance; Missions – pilot large scale projects

Clean Energy Ministerial (Hydrogen Initiative)
Policy and Market-Pull; Deployment/cost goals and targets; Policy/project review, analysis, and experiential learning

International Renewable Energy Agency (CF on Green Hydrogen)

Renewable Energy (RE) based hydrogen, awareness & investment opportunities with RE

World Economic Forum (Accelerating Green Hydrogen)

C-Suite Industry and Gov't Engagement; UNFCCC focus

CLEAN HYDROGEN ONLY

Links between Ministerial meetings



IPHE: Global Government-to-Government Partnership

Accelerate Hydrogen and Fuel Cell (FCH) Deployments



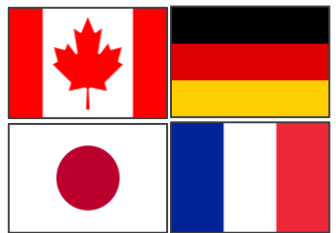
Formed in 2003



Chair



Vice-Chairs



Past Chairs

Priorities:

1. Share Information on Latest Developments
2. Inform Future Government Policy
3. Foster Collaboration

The IPHE addresses these Priorities by,

- Coordinating and Sharing Information
- Developing Country Updates – Country Profiles at www.iphe.net
- Working Groups
- Task Forces

And by, coordinating with International Initiatives and Organizations including the IEA, HEM, CEM/MI, HC, IRENA & Others



21 Countries &
European Commission



Examples of Activities within IPHE



Regulations, Codes, Standards, Safety (RCSS) WG

RCS&S Compendium

Center for Hydrogen Safety
Connecting a Global Community

hySafe
INTERNATIONAL WORK GROUP FOR HYDROGEN SAFETY

HYDROGEN Safety Panel
HYDROGEN Emergency Response Training Resources

- Sharing lessons learned on safety
- Reports, workshops
- Assessing gaps in RCS to enable harmonization and identify key priorities

Task Force on H₂ Production Analysis

- Developing a common analytical framework to determine emissions footprint for hydrogen
- Harmonizing approach across countries and pathways

Methodology for Determining the Greenhouse Gas Emissions Associated With the Production of Hydrogen

A Working Paper Prepared by the IPHE Hydrogen Production Analysis Task Force

VERSION 1 - OCTOBER 2021

Task Force on analysis to facilitate international H₂ trade

- Identifying tariff and non-tariff barriers on imports and exports of hydrogen.
- Understanding the trade rules under the WTO and various FTAs for hydrogen

International Trade Rules for Hydrogen and its Carriers: Information and Issues for Consideration

A Discussion Paper for the IPHE Hydrogen Trade Rules Task Force

FEBRUARY 2022



Summary: Actions Supporting Global Hydrogen Market

IPHE

1. Innovation

- Fundamental Research through Development & Demonstration for at-Scale Applications

2. Market Frameworks: Policies and Regulations

- Strong Policy Signals
- Regulatory Certainty
- Market Transparency

3. Infrastructure Investment

- Large Scale Investments
 - Governments, Industry, International Financial Institutions, and Investment Houses



Thank you

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Hydrogen Production Analysis Taskforce

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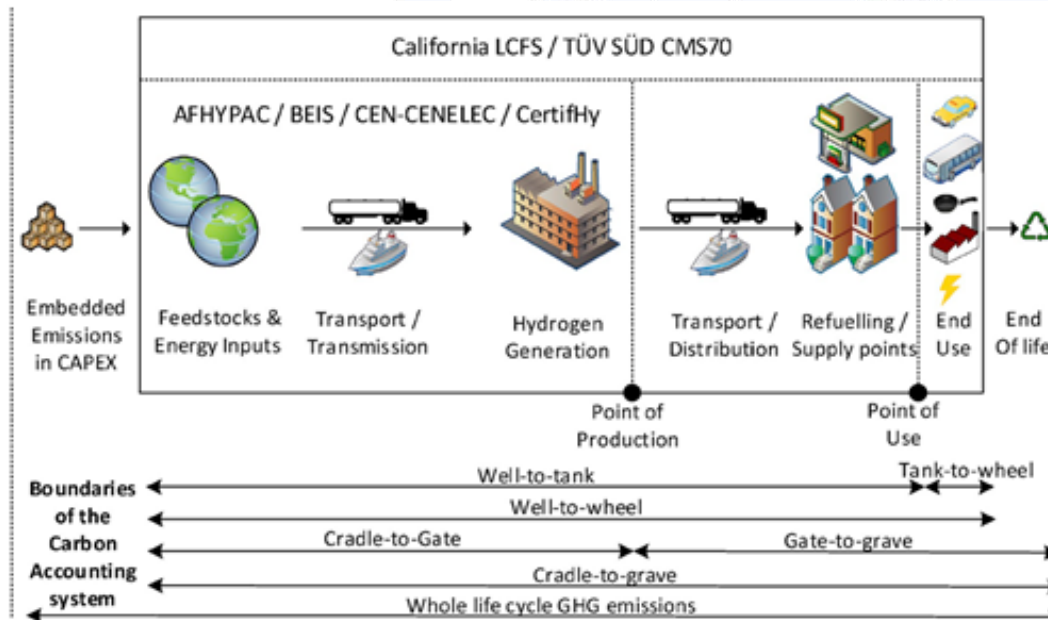
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Global Harmonisation of Hydrogen Certification



- **Market transparency** is expected by society on how hydrogen contributes toward a carbon neutral economy. Carbon content becomes therefore a pivotal parameter.
- As developed for electricity, **certification** allows buyers to be confident about the quality of H₂
- Importance of an **international common methodology** for the GHG emissions determination of a unit of H₂

What product system boundary to select?

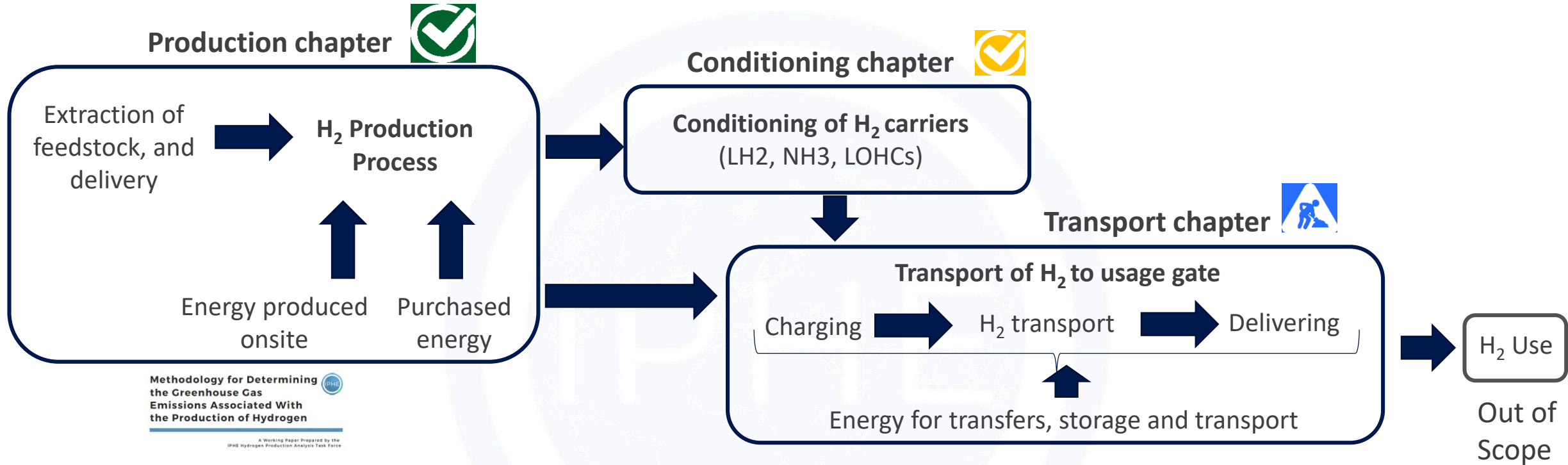


Source: A. Velazquez Abad, P.E. Dodds, Energy Policy 138 (2020) 111300

- What carbon allocation rules?
- What electricity emission factor?
- What Cut-off value?
- What reporting units?
- What CO₂ responsibility?

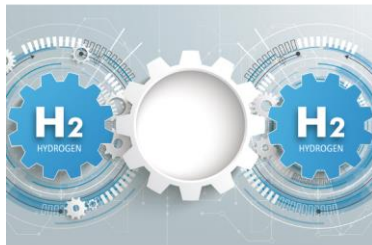


IPHE approach



Methodology for Determining the Greenhouse Gas Emissions Associated With the Production of Hydrogen

A Working Paper Prepared by the IPHE Hydrogen Production Analysis Task Force



VERSION 1 - OCTOBER 2021

Released on October 4th, 2021



Thank you

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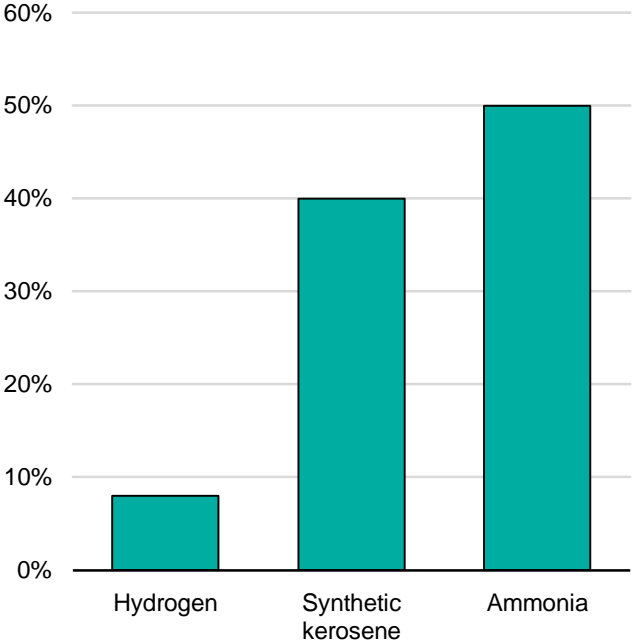
The Road to a Global Framework for Hydrogen

Uwe Remme, Head of Hydrogen and Alternative Fuels Unit

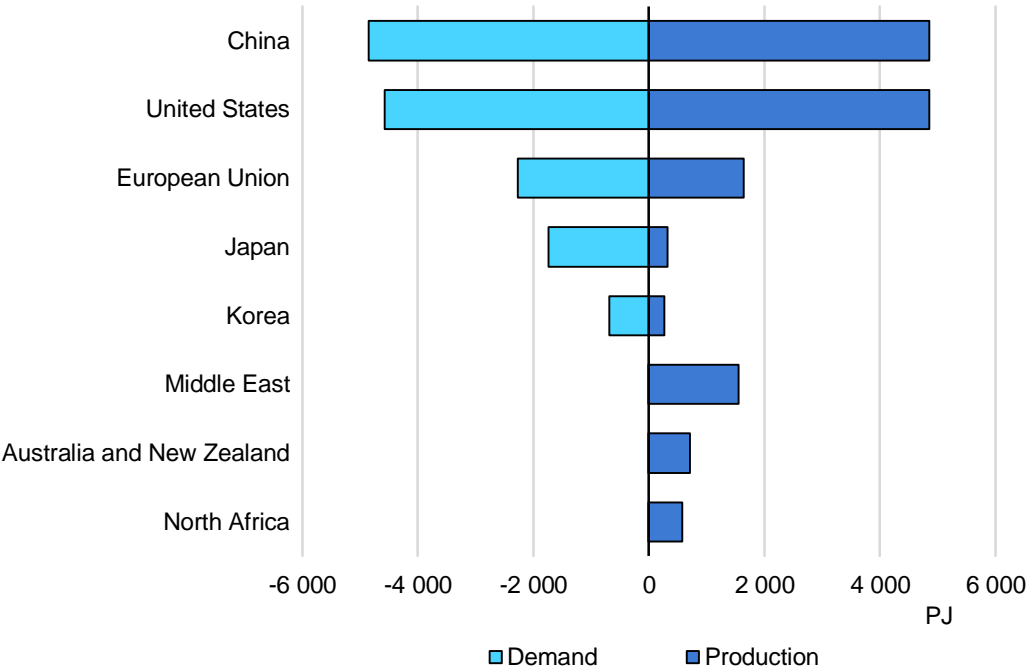
EU Canada Dialogue on Hydrogen, April 28, 2022

Global hydrogen trade will require standards

Share of global hydrogen and hydrogen-based fuel demands covered by trade in Announced Pledges Scenario, 2050



Hydrogen and hydrogen-based fuel demand and production in selected regions in Announced Pledges Scenario, 2050



- First certification schemes and standards for hydrogen have been announced or are under development.
- Critical for a global framework are less the actual thresholds, but a harmonised methodology for calculating the carbon footprint of hydrogen.
- A modular approach, certifying different parts of the supply chain separately (e.g. production and transport), could resolve differences in system boundaries between different certification schemes.
- Still, agreeing on common core characteristics is essential for developing compatible certification schemes (e.g. definition of renewable electricity, fossil fuel upstream emissions, chain of custody).
- International collaboration, such as through IPHE, can help in harmonisation, avoiding duplication of efforts on national levels.





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EU-Canada Dialogue

Supporting the Development of a Global Regulatory Framework for Hydrogen and Its Derivatives

Barbara Jinks – Programme Officer – green gas delivery and use

28 April 2022

IRENA is engaged in 21 global hydrogen initiatives



International Partnership on Hydrogen
in the Economy, IPHE

Hydrogen Energy Ministerial

Clean Energy Ministerial H2 Initiative

Coalition for Disaster Resilient Infra

IRENA Coalition for Action

Climate Breakthrough Agenda
(COP 26, Mission Possible, WEF)

UNFCCC HL Champions
Green H2 Compact Catalogue

Mission Innovation, H2 Mission

IEA Technology Coll Programme on H2

Marrakech P' ship - Global Climate Action

UNIDO Global H2 Partnership Industry

UN FCCC Race to Zero, HL Champions,
Climate Ambition Alliance

Green Hydrogen Organisation (GH2)

IRENA Coll Framework on Green H2

First Movers Coalition (WEF, USA)

Hydrogen Council

Mission Possible Partnership

H2Zero Initiative

WEF Accelerating Clean H2 Initiative

UNFCCC HLC Green H2 Catapult

Breakthrough Energy Catalyst

Glasgow Breakthroughs

IRENA established initiative

IRENA engaged initiative



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Global Harmonisation of Hydrogen Certification: Opportunities and Barriers

Maira Kusch | World Energy Council – Germany | 28 April 2022

Report: „Global Harmonisation of hydrogen certification“

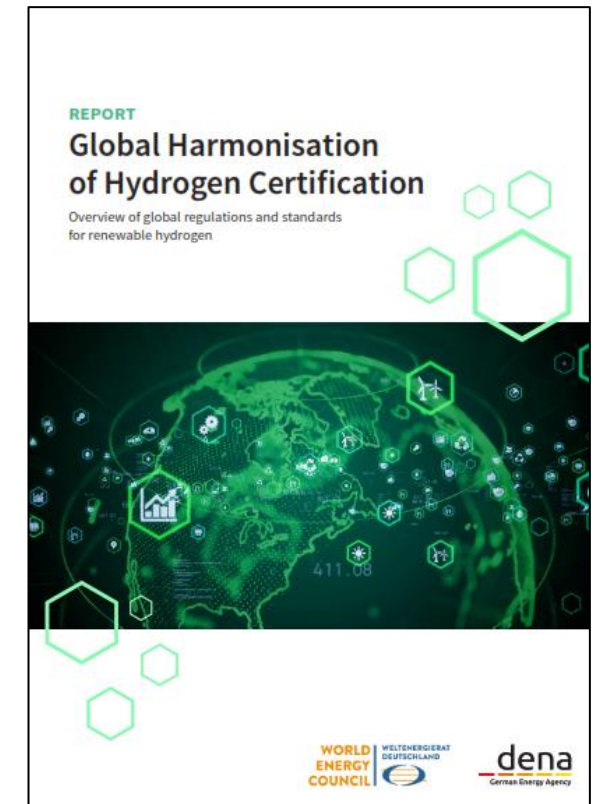


Status Quo: There is already a variety of hydrogen standards globally. This means less flexibility for producers to address different international markets.

Research question(s): What would it take to harmonise requirements? What is a common denominator enabling suppliers to address different markets?

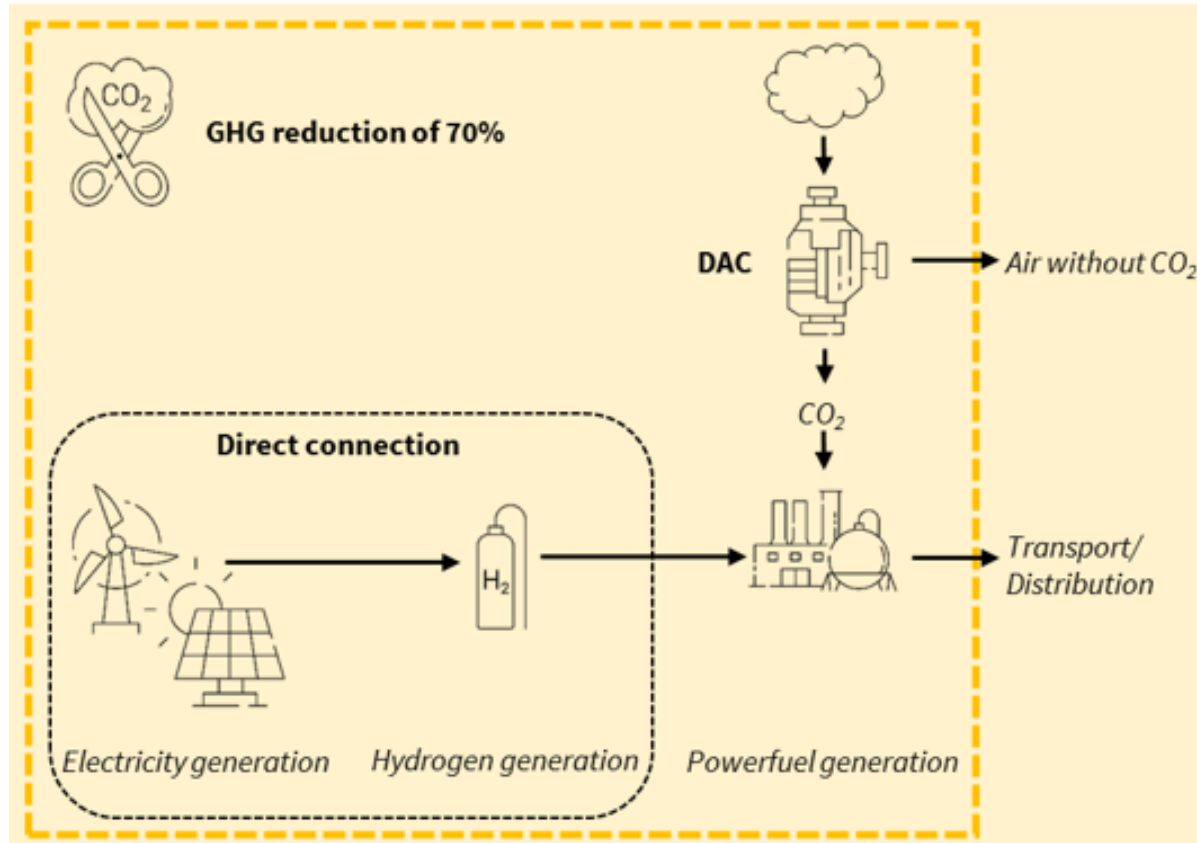
Method: We assessed **eleven** hydrogen regulations / standards in terms of their potential for harmonisation.

Result: Currently, a harmonised global certification scheme seems difficult to implement, because for some regulations / standards that would mean to give up on the most ambitious requirements.



Source: German Energy Agency/World Energy Council – Germany, Global Harmonisation of Hydrogen Certification, 2022

Thought Experiment: A plant concept with the largest global offtake market*



- Direct connection between the renewable power source and the electrolyser
- GHG reduction of 70 % compared to a fossil baseline
- Carbon source: Atmospheric via Direct Air Capture

* Proof for mass balance needs to be provided along the value chain

Thank you!

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