CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY
An Initiative of the Clean Energy Ministerial

International Hydrogen Landscapes

Hydrogen and Analytical Tools Webinar Series

April 17, 2024

Housekeeping - Zoom

- This webinar is **being recorded** and will be shared with attendees.
- You will be **automatically muted** upon joining and throughout the webinar.
- Please use the **chat feature** to add comments and share input.
- Please use the **Q&A function** in your toolbar to ask questions.

- If you have **technical issues**, please use the chat feature to message Sophie Schrader.
- You can adjust your audio through the **audio settings.** If you are having issues, you can also dial-in and listen by phone. Dial-in information can be found in your registration email.
- We will be launching a **survey** when the event ends. Your feedback is highly valuable to us!

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Webinar & Speaker Introductions

Presented by Daniella Rough

Webinar Speakers

Daniella Rough

International Program Manager

National Renewable Energy Laboratory

Laurent Antoni

Executive Director

International Partnership for Hydrogen and fuels cells in the Economy (IPHE)

Catherine Casomar

Community Benefits Negotiations Lead

U.S. Department of Energy Office of Clean Energy Demonstrations (OCED)

Agenda

Speaker	Topic	Duration
Daniella Rough	International Hydrogen Landscapes	10 mins
Laurent Antoni	Overview of International Hydrogen Markets and Standards, and the International Partnership for Hydrogen and fuels cells in the Economy – IPHE	30 mins
Daniella, Laurent, Catherine	Q&A	25 mins
Catherine Casomar	Hydrogen Workforce Development, Energy and Environmental Justice	30 mins
Daniella, Laurent, Catherine	Q&A	25 mins

CLEAN ENERGY SOLUTIONS CENTER
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Overview of the Clean Energy Solutions Center

Presented by Holly Darrow, National Renewable Energy Laboratory

April 17, 2024

The Clean Energy Solutions Center

CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

OBJECTIVE

To accelerate the transition of clean energy markets and technologies.

RATIONALE

Many developing governments lack capacity to design and adopt policies and programs that support the deployment of clean energy technologies.

AMBITION/TARGET

Support governments in developing nations of the world in strengthening clean energy policies and finance measures

ACTORS

Leads:

Operating Agent:

NREL
Transforming ENERGY

Partners:

More than 40 partners, including UN-Energy, IRENA, IEA, IPEEC, REEEP, REN21, SE4All, IADB, ADB, AfDB, and other workstreams etc.

ACTIONS

- **Deliver** dynamic services that enable *expert assistance*, *learning, and peer-to-peer sharing of experiences. Services are offered at no-cost to users.*
- **Foster** dialogue on emerging policy issues and innovation across the globe.
- **Serve** as a first-stop clearinghouse of clean energy policy resources, including policy best practices, data, and analysis tools.

UPDATES

Website:
www.cleanenergyministerial.org/initiatives-campaigns/clean-energy-solutions-center

Factsheet:
www.nrel.gov/docs/fy22osti/83658.pdf

Requests: Now accepting Ask an Expert requests!

The Clean Energy Solutions Center

CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

Ask an Expert Service

- Ask an Expert is designed to help policymakers in developing countries and emerging economies identify and implement ***clean energy policy*** and finance solutions.
- The Ask an Expert service features a network of more than **50** experts from over **15** countries.
- Responded to **300+** requests submitted by **90+** governments and regional organizations from developing nations since inception

Training and Capacity Building

- Delivered over **300** webinars training more than **20,000** public & private sector stakeholders.

Resource Library

- Over **1,500** curated reports, policy briefs, journal articles, etc.

For additional information and questions, reach out to Jal Desai, NREL, jal.desai@nrel.gov

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IPHE

Hydrogen: a new player at the service of the environment and the economy

Presented by Laurent Antoni, IPHE

April 17, 2024

Agenda

- A fast evolving global context
- The creation of a global market and
- The role of international multilateral collaborations
- Conclusions

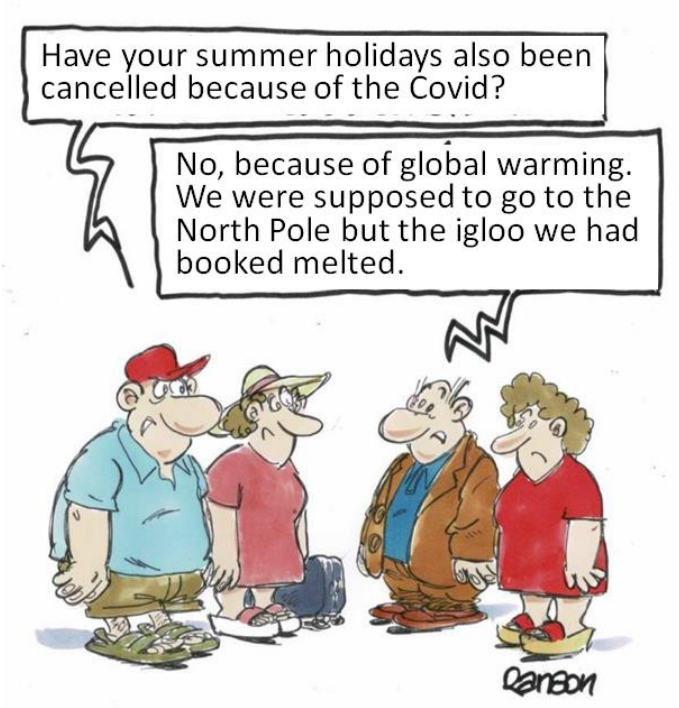
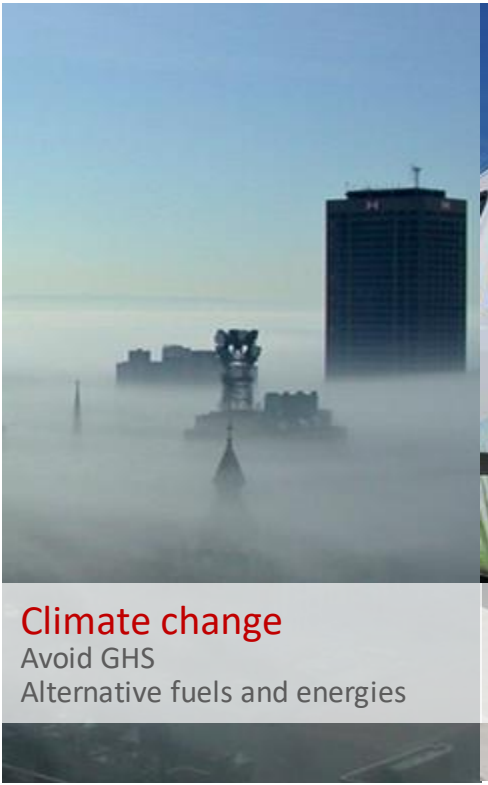


Image Source: Sam Booth, NREL

A FAST EVOLVING GLOBAL CONTEXT

Multiple challenges we face to live in a better world



Climate change
Avoid GHS
Alternative fuels and energies

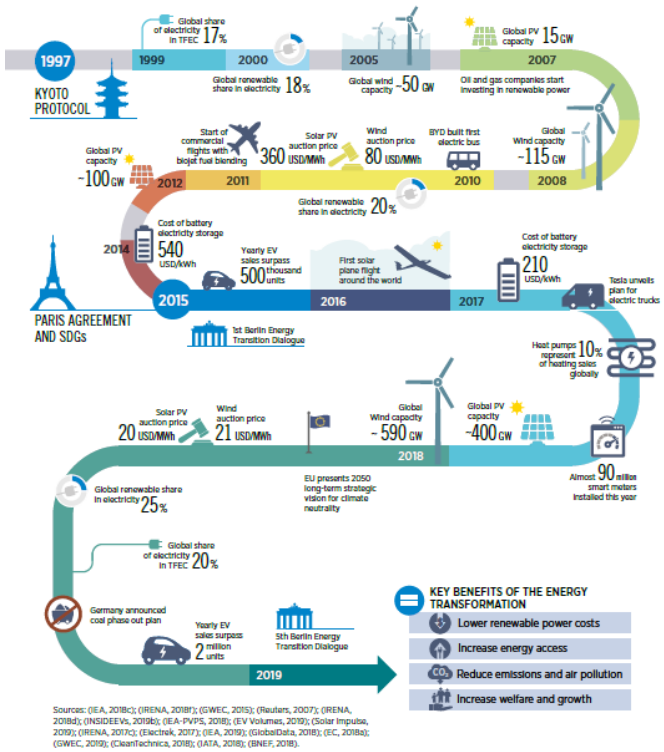
Health
Zero-emission mobility
Zero-emission energy

Energy availability
Massive energy production
Energy sovereignty

Jobs
Technology leadership

Image Source: Sam Booth, NREL

Significant progress since the Kyoto agreements...
but not enough



Sources: (IEA, 2018c); (IRENA, 2018f); (GWEC, 2015); (Reuters, 2007); (IRENA, 2018d); (INSIDEEVs, 2019b); (IEA-PVPS, 2018); (EV Volumes, 2019); (Solar Impulse, 2019); (IRENA, 2017c); (Electrek, 2017); (IEA, 2019); (GlobalData, 2018); (EC, 2018a); (GWEC, 2019); (CleanTechnica, 2018); (IATA, 2018); (BNEF, 2018).

Global CO_2 emissions

Global atmospheric carbon dioxide compared to annual emissions (1751-2022)

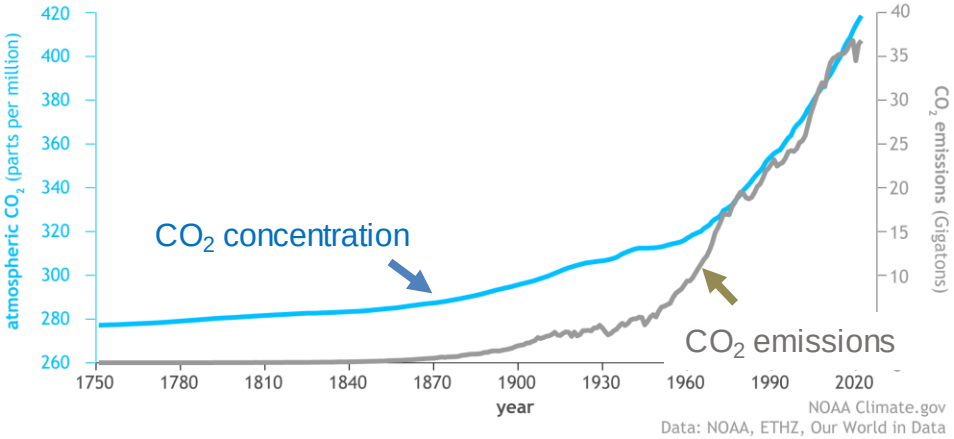


Image Source: Sam Booth, NREL

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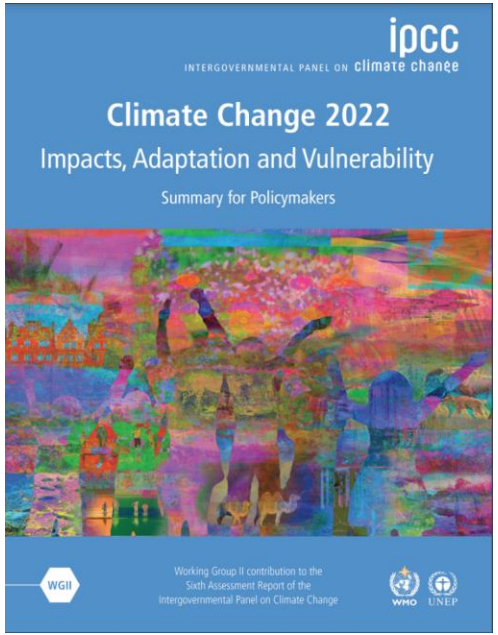


- Scenario at +1.5°C: 400 Gt CO_2e

  → in 6 years at the current rate

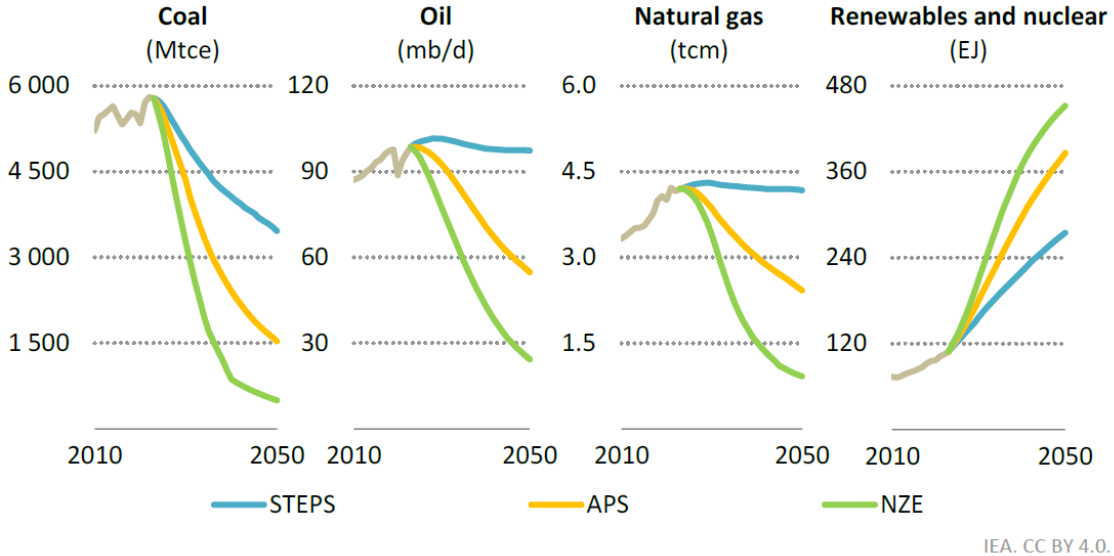
- Scenario at +2°C: 1 150 Gt CO_2e

  → in 25 years at the current rate

- Carbon neutrality in 2050: in less than 10 000 days!

Image Source: Sam Booth, NREL

Different scenarii to achieve the climate targets



Low-emissions sources expand significantly and – for the first time – all fossil fuels peak and start to decline before 2030 in each scenario

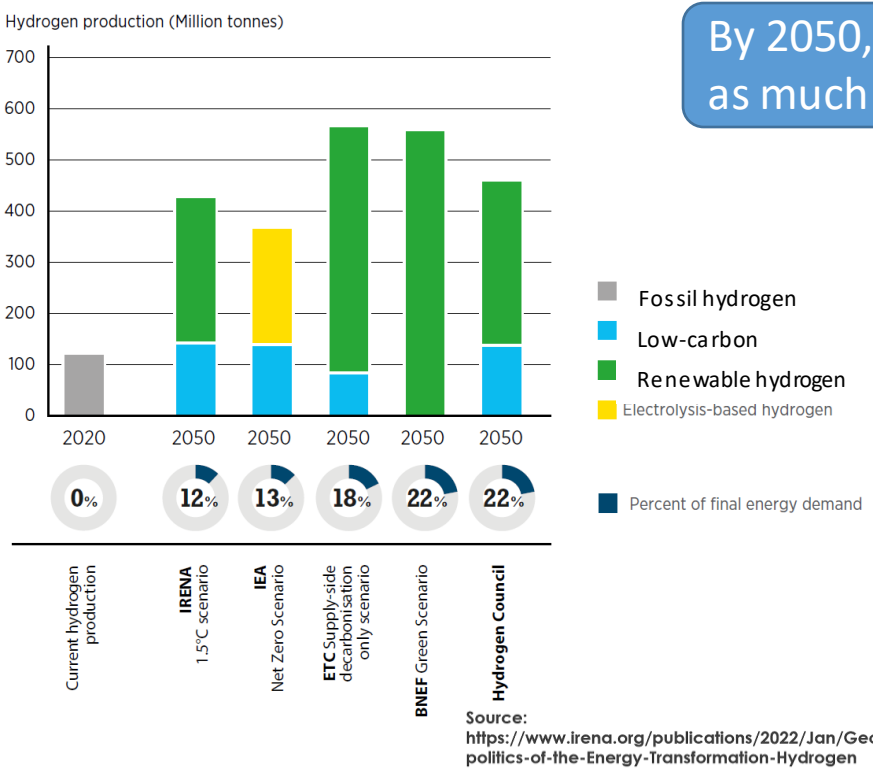
Source: IEA 2023

Note: Mtce = million tonnes of coal equivalent; mb/d = million barrels per day; tcm = trillion cubic metres; EJ = exajoules.

Note: APS = Announced Pledges Scenario; SDS = Sustainable Development Scenario; NZE = Net Zero Emissions by 2050 Scenario.

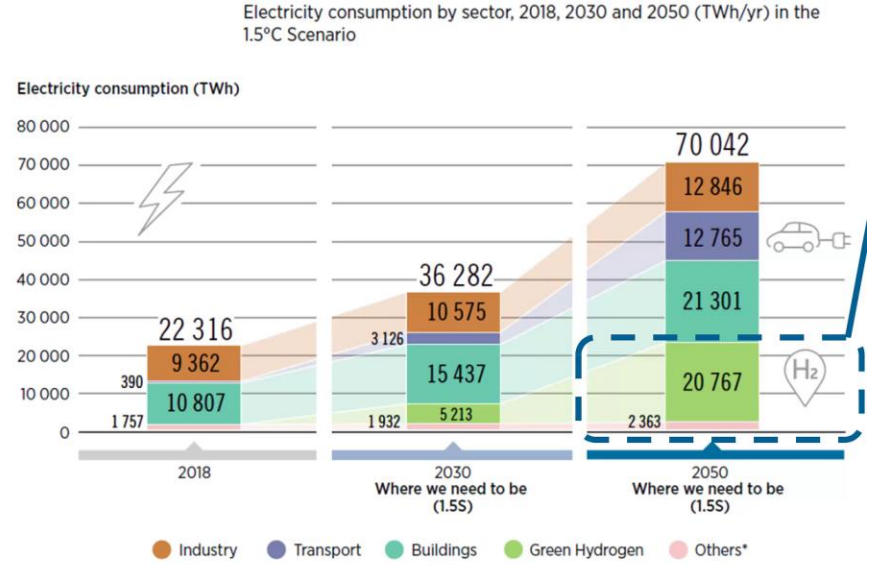
X2 / X3
of
the electricity demand

Unanimous consensus at the international level …



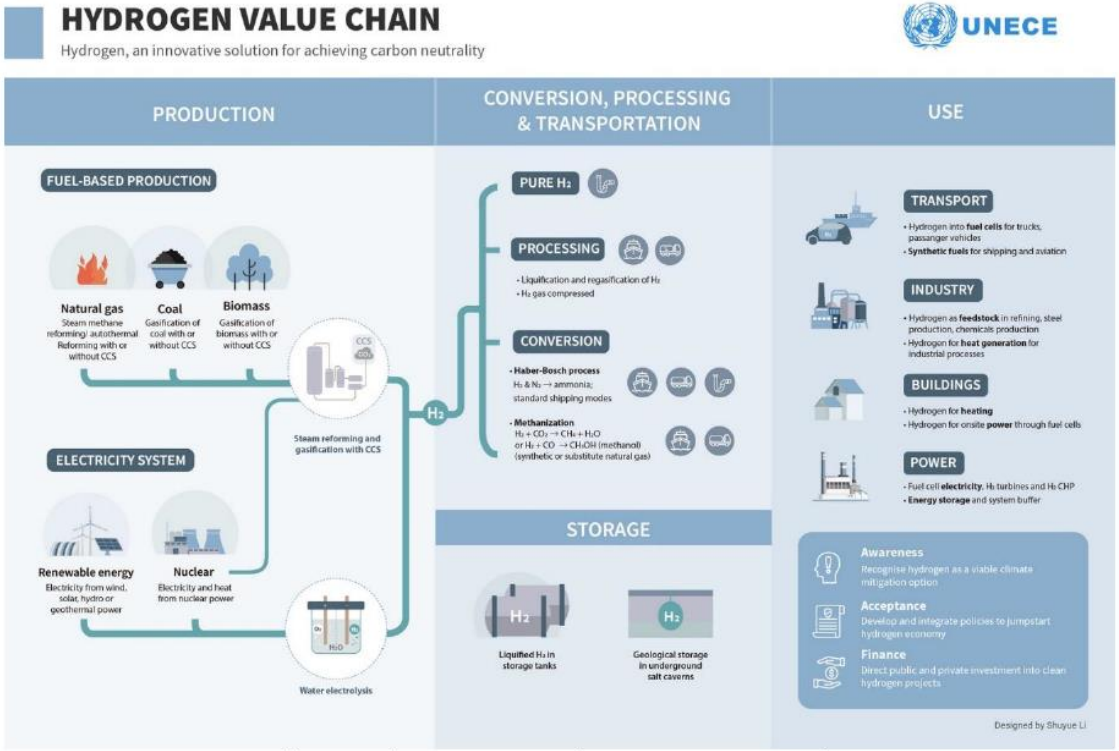
Source: https://www.irena.org/publications/2022/Jan/Geopolitics-of-the-Energy-Transformation-Hydrogen

By 2050, the electricity demand for Hydrogen is almost as much electricity as we consume globally today!



Source: https://irena.org/publications/2022/Mar/World-Energy-Transitions-Outlook-2022

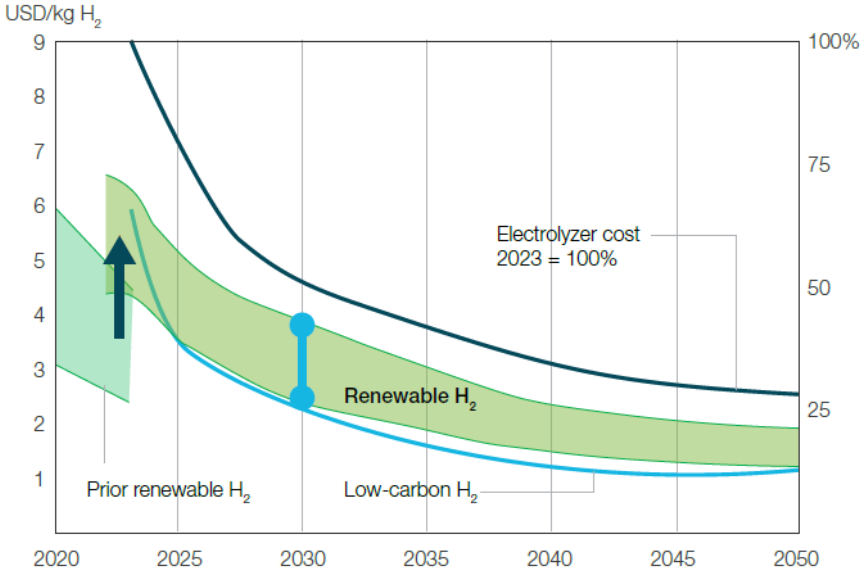
… owing to the versatility of hydrogen in its production and usage …



Source: UNECE, 2021 https://unece.org/sustainable-energy/cleaner-electricity-systems/hydrogen

Image Source: Sam Booth, NREL

... and cost competitiveness by 2030



Source: Hydrogen Insights 2023, Hydrogen Council

+30–65%
increase[1] in LCOH driven by capex, financing and renewables costs

$2.5–4.0
cost target by 2030

"The LCOH of low-carbon hydrogen produced via SMR or ATR technology coupled with CCS could be lower than renewable hydrogen near-term, and could be **competitive with grey hydrogen** in jurisdictions **with adequate carbon prices**.
Low-carbon hydrogen costs will likely lie below renewable hydrogen costs through 2030, except in a few select regions with very attractive renewable power resources."

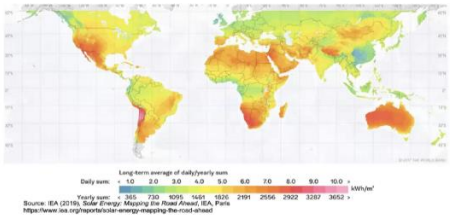
THE CREATION OF A GLOBAL MARKET

Key Drivers: based on unique National Circumstances

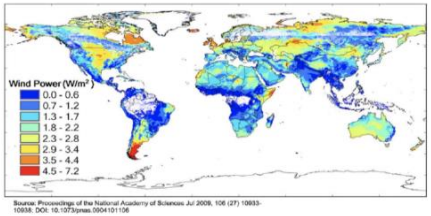
- **Environmental Benefits – Climate Change**
  - Climate Change, Clean Air/Local Air Quality, Noise Pollution

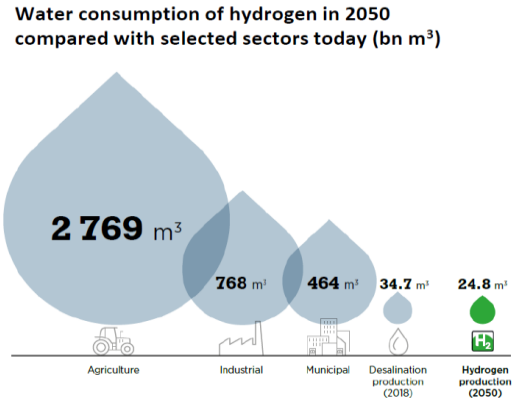
- **Energy Security**
  - Security of Supply and Resource Diversity

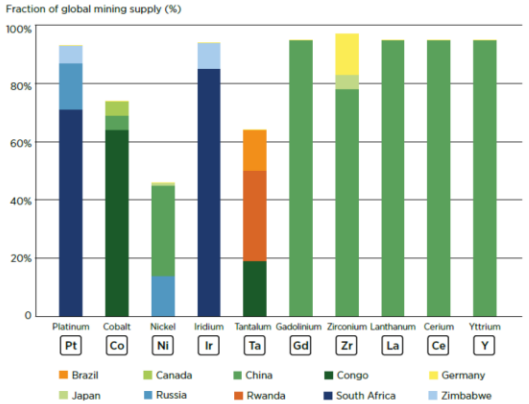
Geographical aspects



Geographical aspects







Source : IRENA (2022) Geopolitics of the Energy transformation: The Hydrogen Factor

Image Source: Sam Booth, NREL

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**
  - Strength of the industry
  - Capacity of innovation
  - Skilled Jobs and Manufacturing Opportunities

Image Source: Sam Booth, NREL

Key Challenges: Need to Get to a Global Scale

1. Innovation

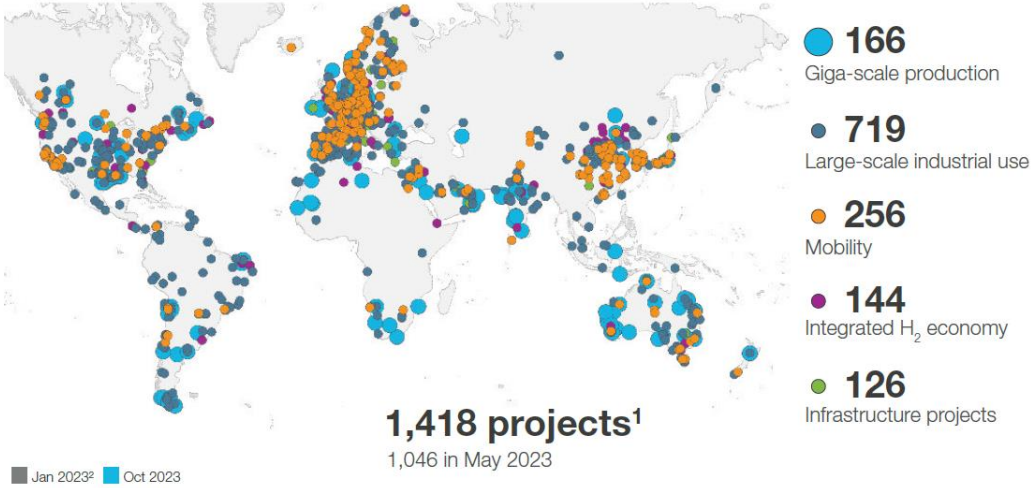
- *Must get **low-carbon hydrogen cost competitive***
  → ***Requires Innovation and Scaling-up Production***
- ***Skilled workforces** from engineers to operators: initial cursus and lifelong trainings*
  → ***Great opportunities for young talents***

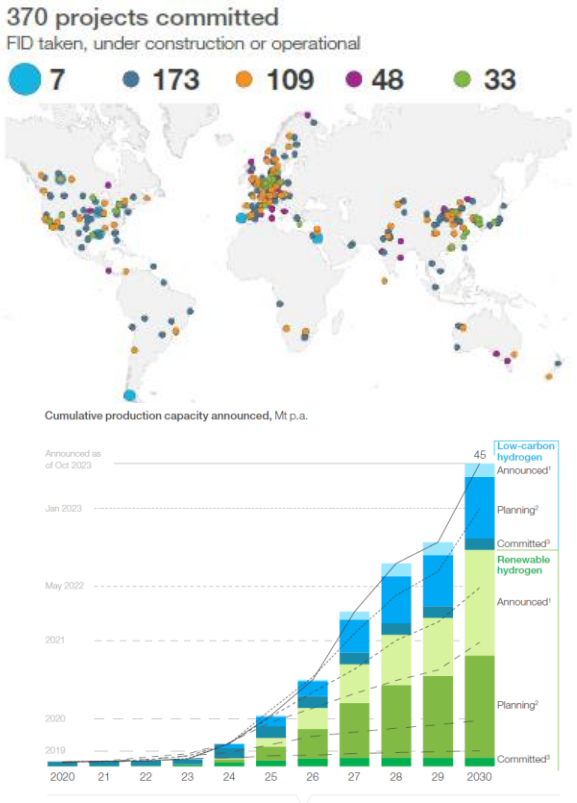
2. Infrastructure Investment

- *Installation of the massive production capacities*
- *Efficient Transmission/Transportation*

Image Source: Sam Booth, NREL

Key Drivers: Infrastructure Investment



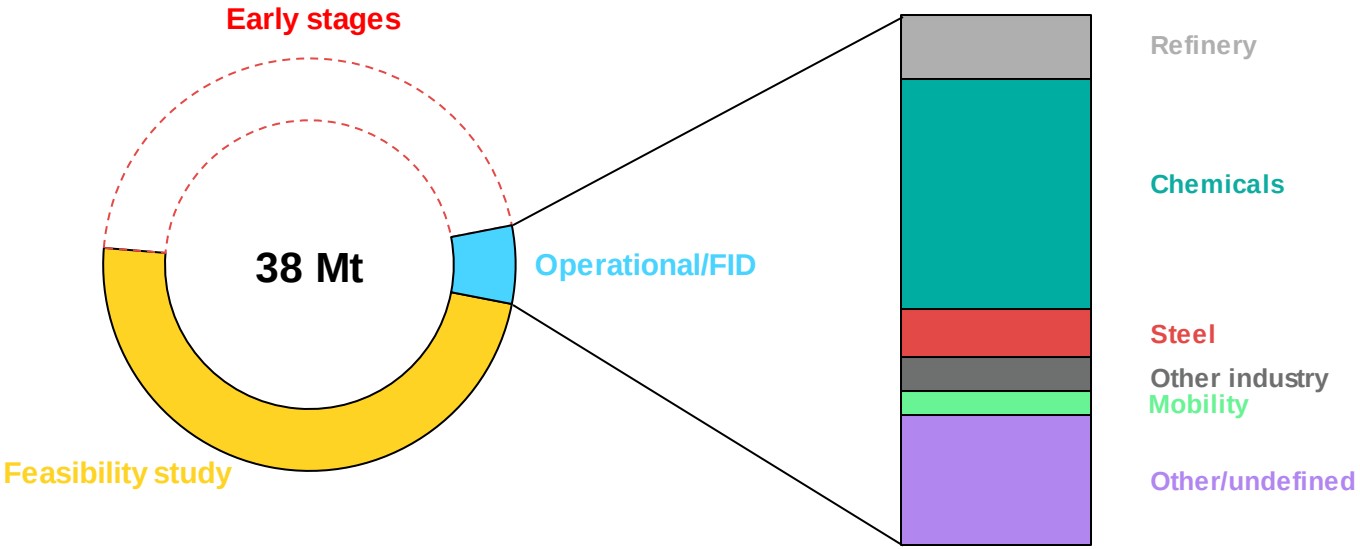


Source Hydrogen Council Dec 2023

Project budget: $570B (FID $39B) but $1000B needed to be in line with the Net Zero Scenario

Key Drivers: Increase the level of FIDs

Low-emission hydrogen production from announced projects by demand sector, 2030



Source IEA GHR 2023

The majority of the low-emission hydrogen production projects having reached FID are linked to existing applications of hydrogen

Key Challenges: Need to Get to a Global Scale

1. Innovation

- *Must get **low-carbon hydrogen cost competitive***
  → Requires Innovation and Scaling-up Production
- ***Skilled workforces** from engineers to operators: initial cursus and lifelong trainings*
  → Great opportunities for young talents

2. Infrastructure Investment

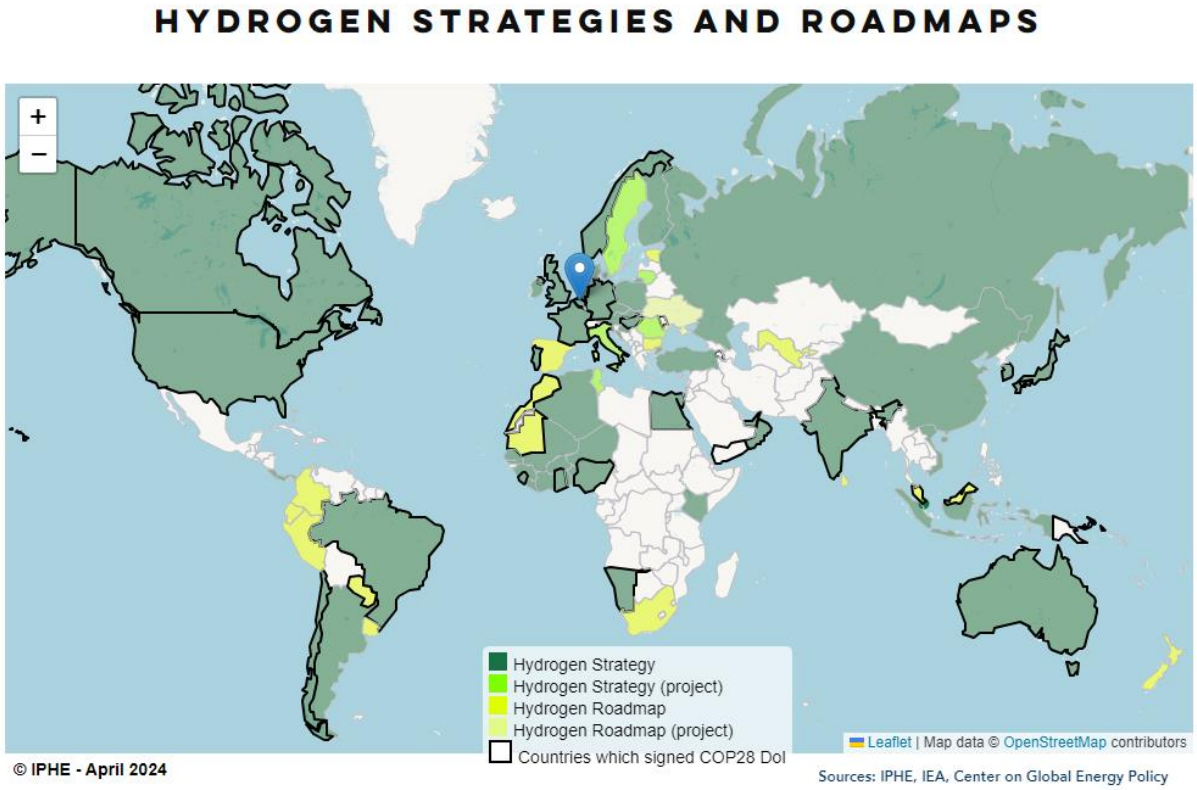
- *Installation of the massive production capacities*
- *Efficient Transmission/Transportation*

3. Policy and Regulatory Framework

- *Stable and strong Policy Signals*
- *Regulatory Certainty*
- *Market Transparency*

Image Source: Sam Booth, NREL

More and more countries have or prepare their hydrogen strategy

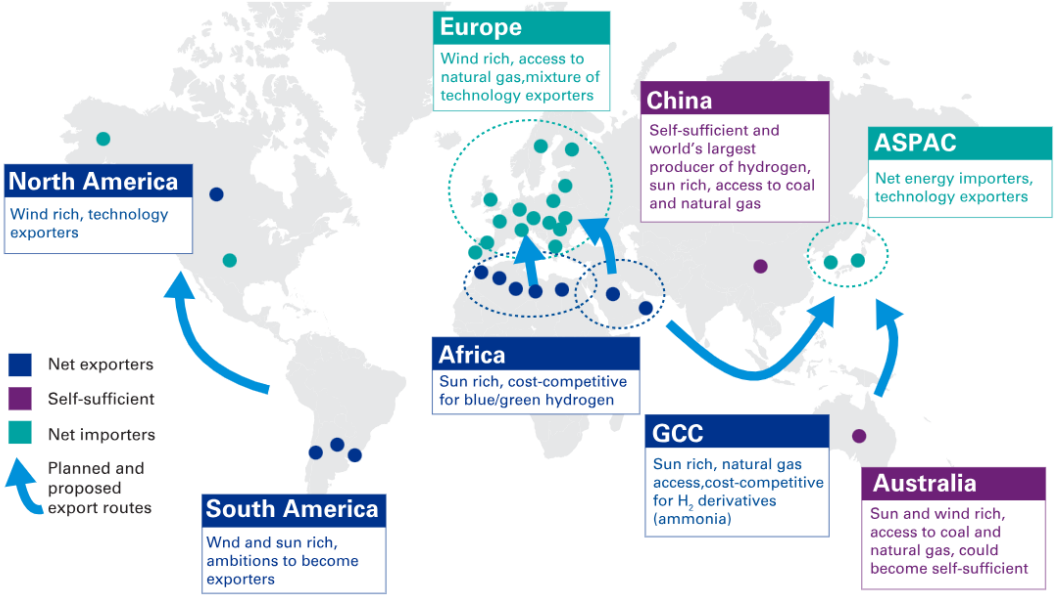


with multiple approaches:

Low carbon (SMR/CCS or nuclear) / renewable hydrogen are **not competing but complementing** at least for the next decade(s)

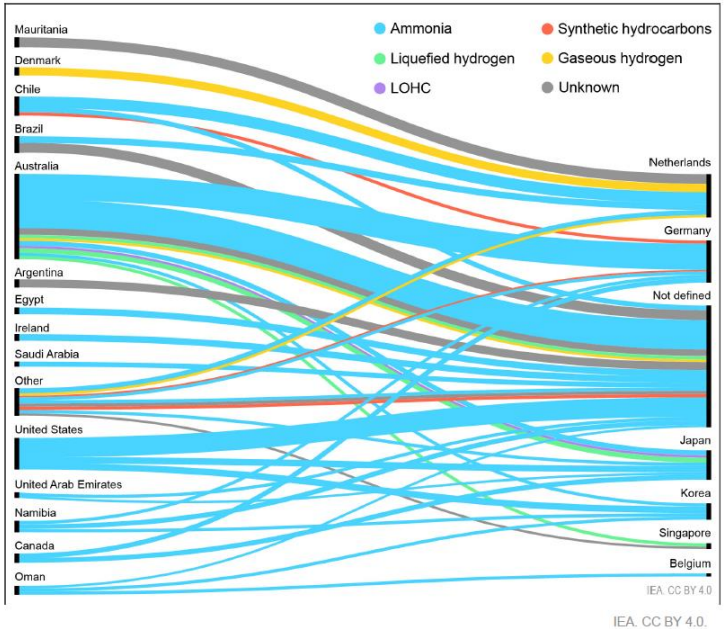
https://www.iphe.net/hydrogen-strategies

The creation of an international trade



Source: KPMG (2023)

Figure 4.3 Potential low-emission hydrogen trade flows based on announcements, 2030



IEA. CC BY 4.0.

Source: IEA (2023)

International collaboration and coordination is key

THE ROLE OF INTERNATIONAL MULTILATERAL COLLABORATIONS

More and more stakeholders consider hydrogen

Hydrogen Energy Ministerial Meeting
H2EM 2023

COP28 UAE

MI CLEAN HYDROGEN MISSION

HYDROGEN INITIATIVE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

IRENA
International Renewable Energy Agency

BREAKTHROUGH AGENDA

IPHE

THE WORLD BANK

iea
International Energy Agency

Hydrogen Council

IEA Technology Collaboration Programme
Advanced Fuel Cells

Hydrogen TCP

UNECE

UNIDO

ISO

WORLD ECONOMIC FORUM

WORLD TRADE ORGANIZATION

Image Source: Sam Booth, NREL

IPHE: a Global Government-to-Government Partnership to Accelerate Hydrogen and Fuel Cell Deployments

Formed in 2003

Chair

Vice-Chairs

Our Priorities

Share

Monitor

Provide

Enable

23 Countries & European Commission

International collaborations and coordination are key

Priority International Action	Coordinating Initiative(s)
H.1: Accelerate the development of Standards and certification for clean hydrogen	IPHE & IEA's Hydrogen TCP
H.2: Coordinate internationally to drive demand for clean hydrogen	CEM H2I secretariat & RMI
H.3: Expand the number and scope of innovative clean hydrogen projects	Clean H2 Mission
H.4: Scale and facilitate access to finance, particularly for developing countries	World Bank & UNIDO
H.5: Enhance the coordination and transparency of international collaboration on clean hydrogen	Facilitator hosted by IPHE

Outcomes shared during CEM, HEM, COP and international events

Key Drivers: Policy and Regulatory Framework

What does **“clean” hydrogen or “low-emission” hydrogen** mean?

How to create trust, it is “clean” hydrogen I am producing/buying/using?

→ Hydrogen needs rules, not colors!

Hydrogen doesn’t care about color labels:

- Its molecule has the same properties regardless of the method of production
- Safety standards and regulations are color blind and technology agnostic
- Division and thus discrimination of production pathways by color coding is the wrong approach
- **Decarbonisation is the key word!**

Image Source: Sam Booth, NREL

Certification - a crucial instrument for the H_2 economy

Building consumer trust, facilitating demand creation, enabling trade

How to create trust?

"It is "clean" hydrogen, I am producing / buying / financing / using"

Incompatibility of certification design/ requirements → **Lack of fungibility of certificates** → **Barriers to cross-border trade**

Image Source: Sam Booth, NREL

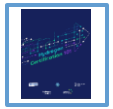
Unlocking a global hydrogen trade

Use of a common language & Develop technical recommendations

Overarching approach

- Use of a **common language**
- Develop **technical recommendations**
- Agree on **harmonized underlying methodologies**
- Establish a **common understanding** between governments on certification mechanisms

Ongoing technical actions and main implementing bodies



- Development of **Hydrogen Certification 101 paper**
- Production of **technical recommendations including environmental and social criteria**

Hydrogen TCP

BREAKTHROUGH AGENDA

IRENA

Unlocking a global hydrogen trade

Agree on harmonized underlying methodologies

Overarching approach

- Use of a **common language**
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Ongoing technical actions and main implementing bodies

- Development of Hydrogen Certification 101 paper
- Production of technical recommendations including environmental and social criteria

IPHE, Hydrogen TCP, BREAKTHROUGH AGENDA, IRENA

- Methodology for **GHG emissions assessment of hydrogen** (ISO Technical Specification followed by International Standards)

ISO

Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

Agree on harmonized underlying methodologies

Standards in general and ISO/TS 19870:2023 **are NOT:**

Defining what is acceptable in a given jurisdiction or for the purpose of a specific public policy

Thresholds, Labels (Colors) are defined by public policies or by the market

Regulation
Define compliance criteria

Standards
How to measure

Enforce - check compliance

Harmonizing labels and thresholds only through negotiations between governments

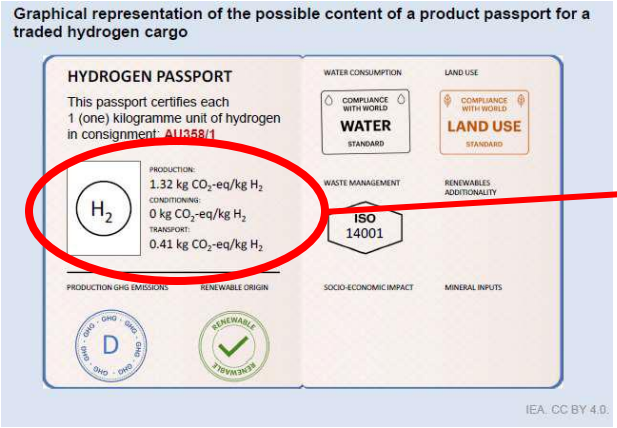
Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

Agree on harmonized underlying methodologies – sustainable attributes

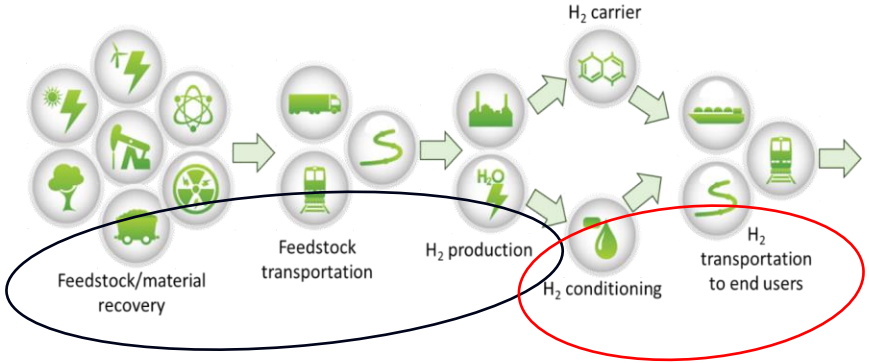
Hydrogen characteristics – Greenhouse Gas Emissions

Graphical representation of the possible content of a product passport for a traded hydrogen cargo



Source: IEA Tow ards H2 definitions based on their emissions intensity (2023)

Schematic of "Cradle-to-Consumption Gate" system boundary adopted



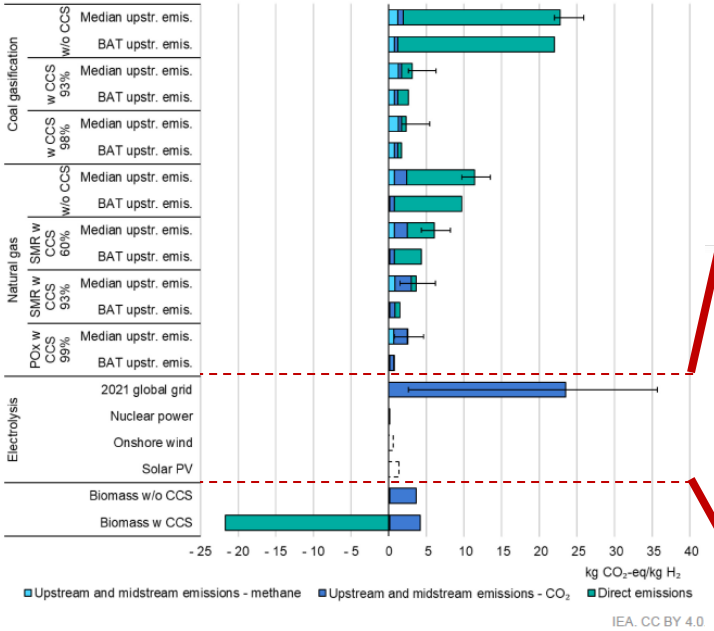
Source: https://www.iphe.net/_files/ugd/45185a_8f9608847cbe46c88c319a75bb85f436.pdf

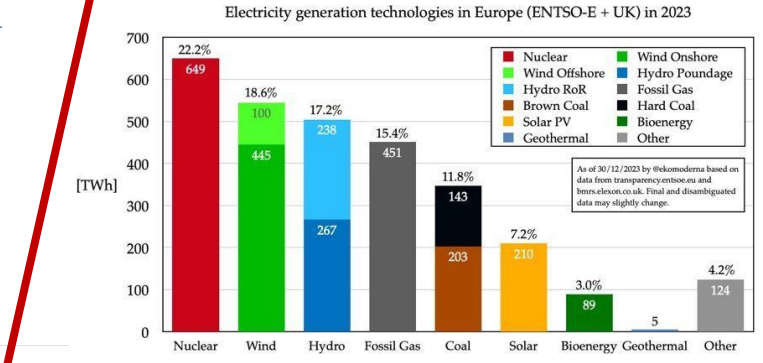
Unlocking a global hydrogen trade

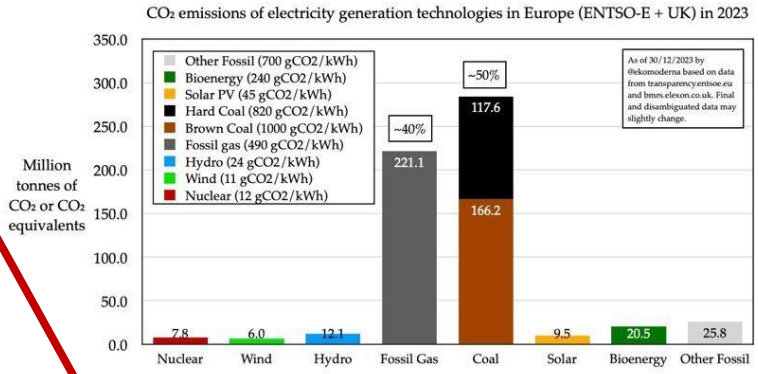
Agree on harmonized underlying methodologies – GHG Emissions

Technology neutrality

Figure 2.2 Comparison of the emissions intensity of different hydrogen production routes, 2021







The GHG Emissions associated with the Production of H_2 depend on:

- the primary energy

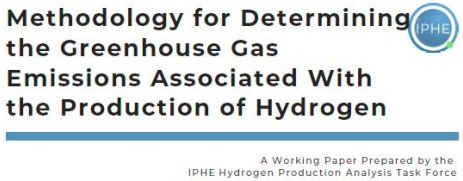
AND

- the production pathway

Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

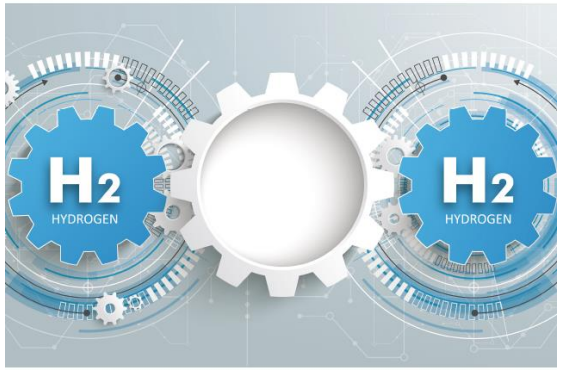
Agree on harmonized underlying methodologies – GHG Emissions



International Partnership for Hydrogen and Fuel Cells in the Economy

Start Jan 2020

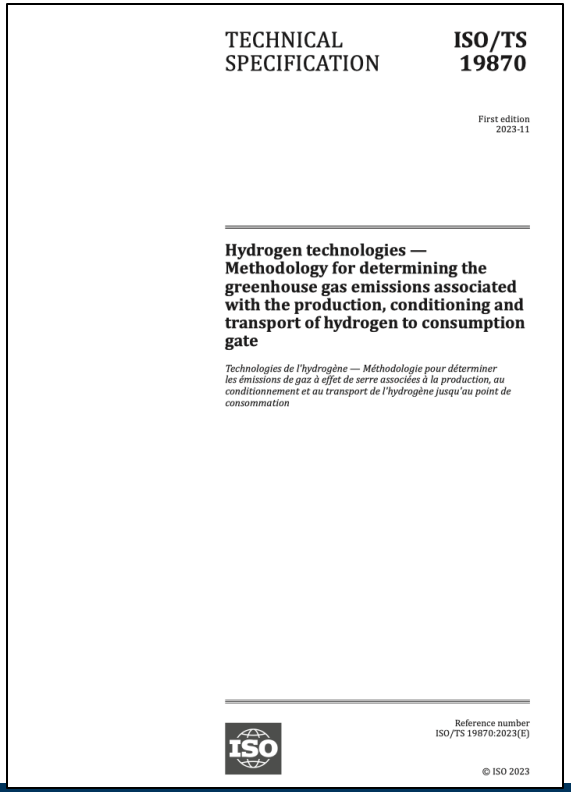
Nov 2023



VERSION 3 - JULY 2023

COP 28 - H2 Ministerial

5 December 2023


TECHNICAL SPECIFICATION

ISO/TS 19870

First edition
2023-11

Hydrogen technologies — Methodology for determining the greenhouse gas emissions associated with the production, conditioning and transport of hydrogen to consumption gate

Technologies de l'hydrogène — Méthodologie pour déterminer les émissions de gaz à effet de serre associées à la production, au conditionnement et au transport de l'hydrogène jusqu'au point de consommation

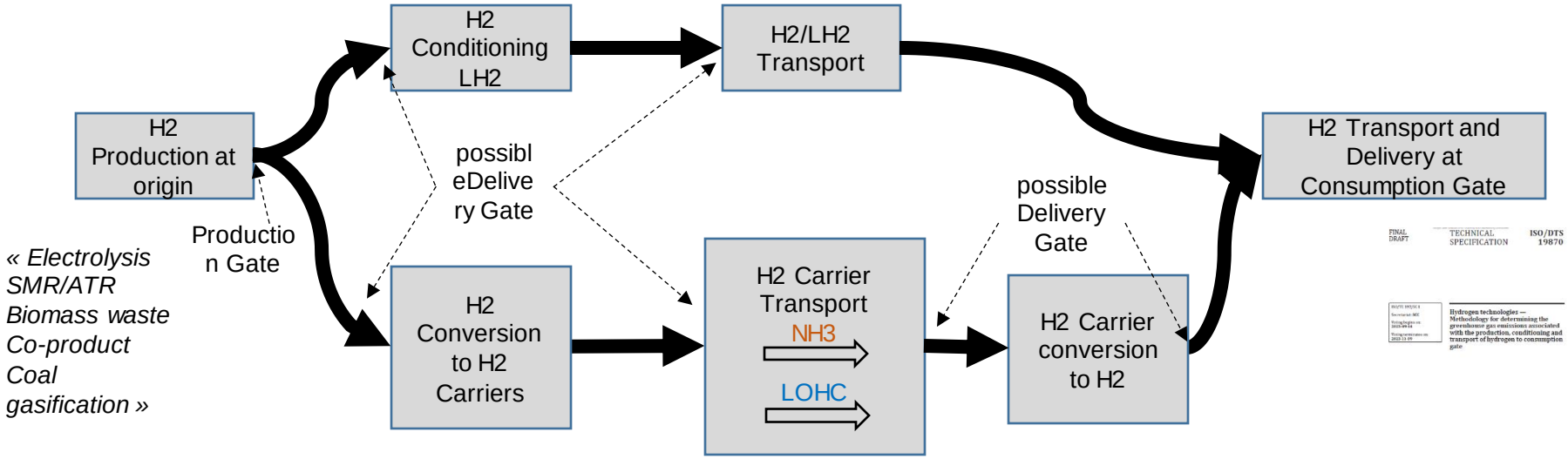
Reference number
ISO/TS 19870:2023(E)

Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

Agree on harmonized underlying methodologies – GHG Emissions

ISO Methodology for determining the greenhouse gas emissions associated with the production, conditioning, and transport of hydrogen to consumption gate (ISO/TS 19870:2023)



Schematic of "Cradle-to-Consumption Gate" system boundary adopted

Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

Establish a common understanding between governments on certification mechanisms

Overarching approach

- Use of a **common language**
- Develop **technical recommendations**
- Agree on **harmonized underlying methodologies**
- Establish a **common understanding** between governments on certification mechanisms

Ongoing technical actions and main implementing bodies

- Development of Hydrogen Certification 101 paper
- Production of technical recommendations including environmental and social criteria

IPHE, Hydrogen TCP, BREAKTHROUGH AGENDA, IRENA

- Methodology for **GHG emissions assessment of hydrogen** (ISO Technical Specification followed by International Standards)

ISO

- **Coordination** of actions
- **Annual stock take & monitoring** of progress

IPHE, Hydrogen TCP

Image Source: Sam Booth, NREL

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Image Source: Sam Booth, NREL

Unlocking a global hydrogen trade

Agree on harmonized underlying methodologies

COP 28

H2 Ministerial

5 December 2023

COP28 Flagship Declaration of Intent on Mutual Recognition of Certification Schemes for Renewable and Low-Carbon Hydrogen and Hydrogen Derivatives

Covers 80% of future global market	Promotes reliability and trust	Advances interoperability	Lays out implementation pathway
• Declaration endorsed by nearly **40 countries** representing prospective importers and exporters	• Certification schemes key to evidence the **sustainability attributes** of hydrogen and its derivatives	• Mutual recognition of certification schemes is instrumental **to avoid market fragmentation**	• IPHE & IEA H2 TCP to lead **technical implementation and report progress** at G20/CEM and COP29

Image Source: Sam Booth, NREL

CONCLUSIONS

Title

Without considering the Hydrogen vector, the objectives of COP 21 and carbon neutrality by 2050 will not be achievable

Hydrogen is applicable in any country owing to its versatility in its production and usage

Tens of countries have published their ambitious hydrogen strategy and have started deployments but FIDs need to increase

Business-as-Usual is not sufficient given energy, climate and societal drivers. Crucial for governments to facilitate efficient and effective international hydrogen markets

International collaboration and Innovation are key.

CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY
An Initiative of the Clean Energy Ministerial

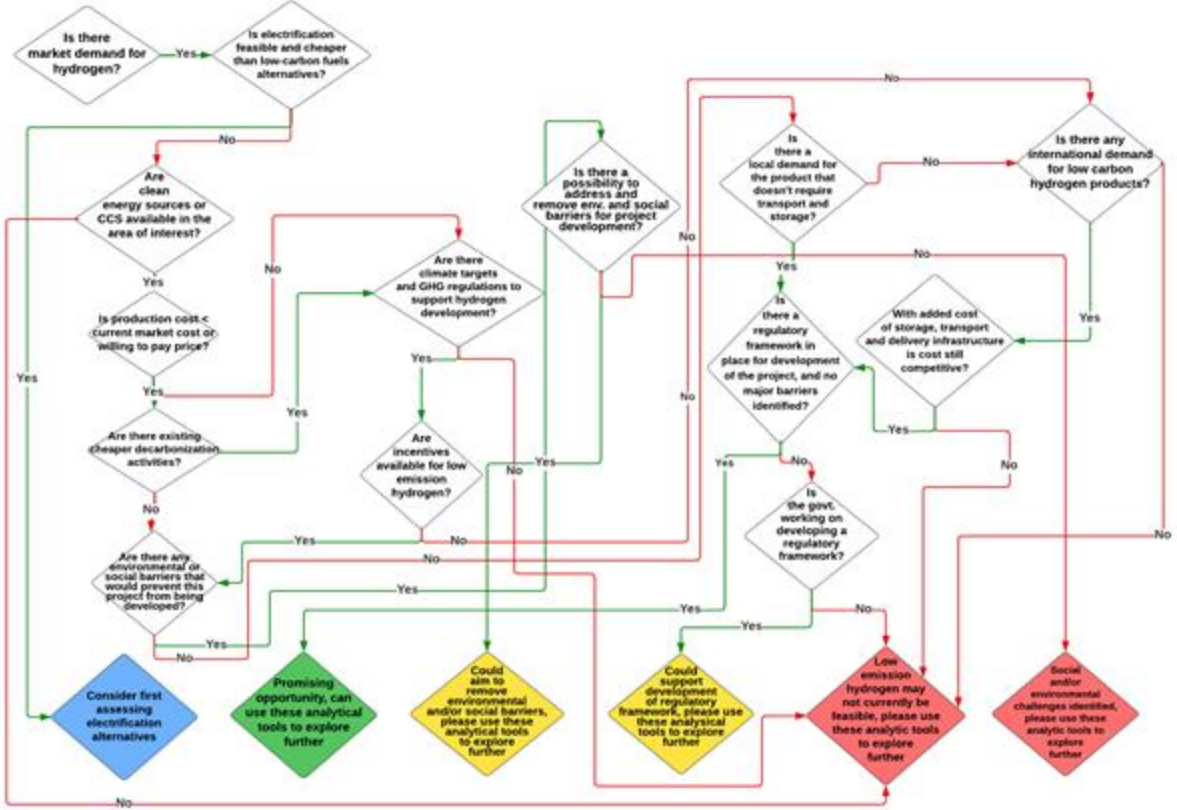
IPHE

Thank you!

laurent.antoni@iphe.net

Navigating Hydrogen Considerations Tree Flow Chart

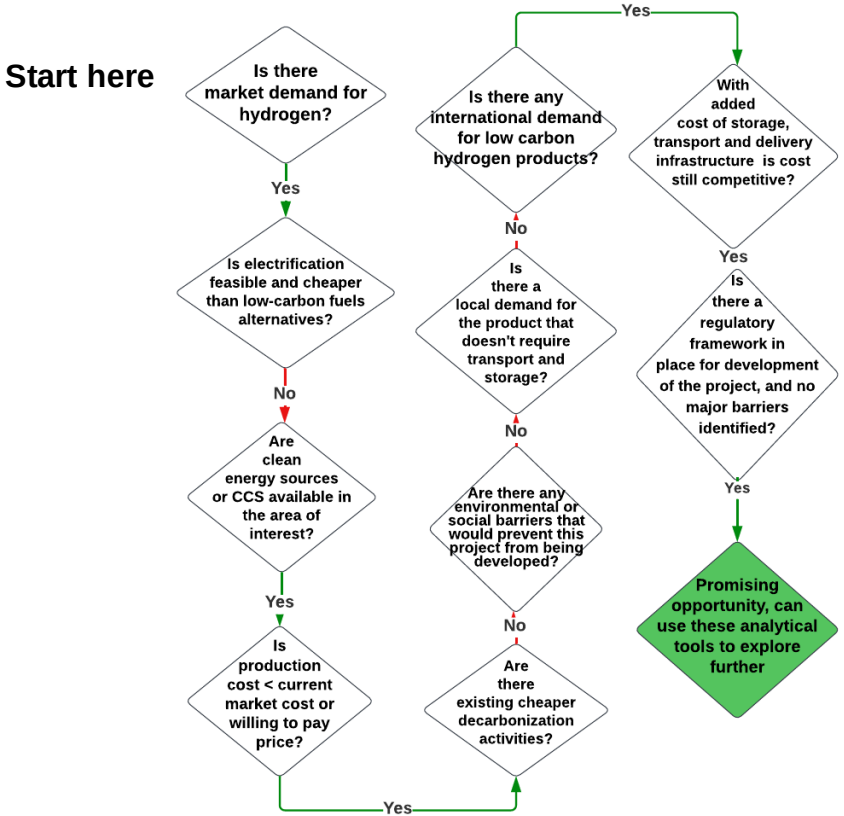
Start Here:



Note: This flow chart is intended to provide a very high-level overview of considerations and questions, to be used for qualitative discussion purposes.

It should not be used to make investment decisions.

No Barriers - Promising Opportunity to Explore Further



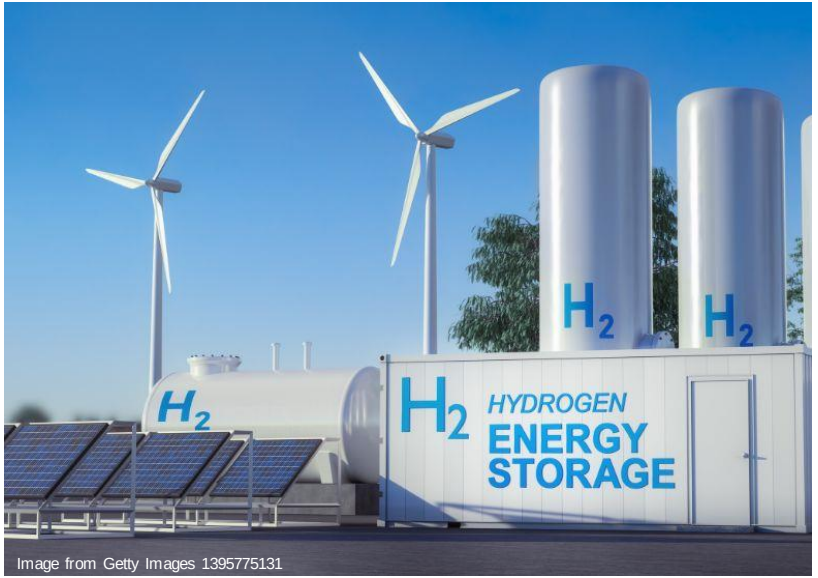
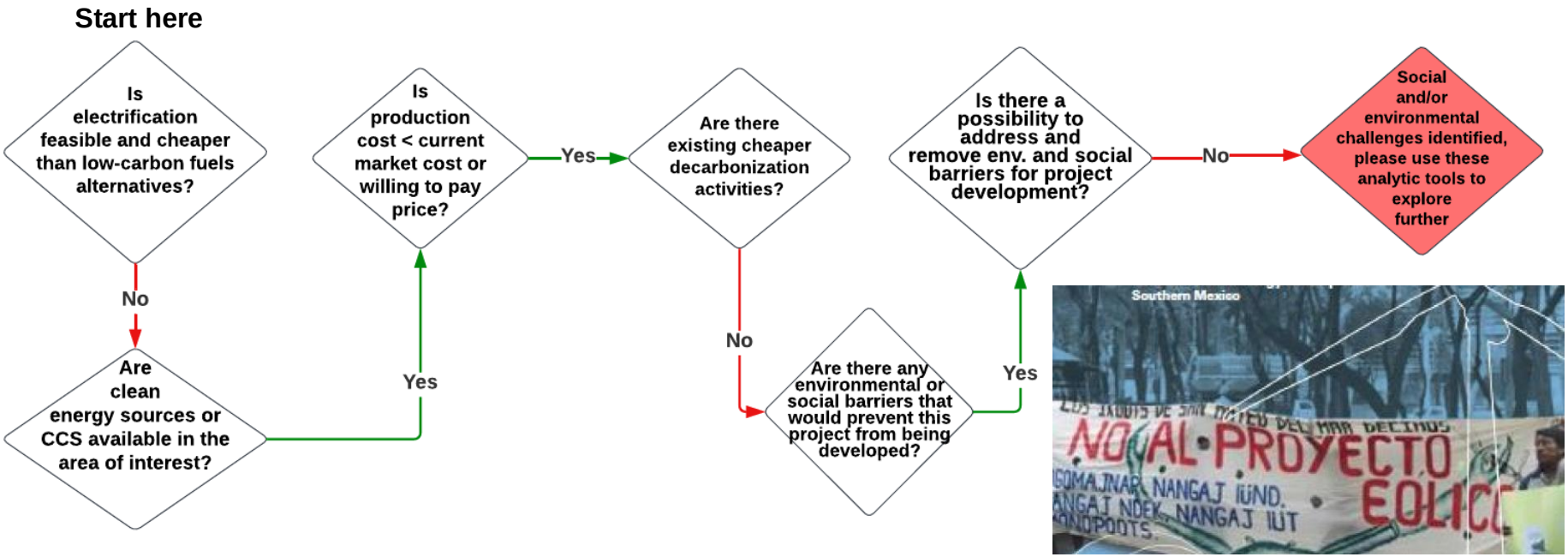


Image from Getty Images 1395775131

Significant Social or Environmental Barrier(s) Identified



Hydrogen decision-making requires review of environmental considerations that also have social impacts

- **Carbon Emissions and LCA:**
  - Calculated reductions in carbon emissions and air pollutants?
  - 3rd party verification (e.g. LCA and CCUS)?
  - Potential for leakage?
- **Land Use and Access:**
  - Land availability for infrastructure?
  - Resource extraction and land disruption?
- **Water Usage:**
  - Water requirements for hydrogen production considered?
  - Potential impacts on ecosystems and local communities?
- **Waste:**
  - Is there a waste disposal plan in place?
  - How is brine and other discharge being managed?
- **Sustainability:**
  - Are renewable energy resources being utilized where possible?

Photo from Getty Images 508752705

Hydrogen decision-making requires review of social considerations

- **Land use and access:**
  - Land ownership or use models (leasing versus purchasing)?
- **Stakeholder engagement**
  - What is the local perception of the project?
  - Have local workforce opportunities been identified and supported?
  - Value chain & supply chain risks?
- **Water usage:**
  - Is there water competition with agriculture, human consumption, or productive uses?
  - Does the project contribute to fresh water supply with a desalinization plant?
- **Human health and safety:**
  - Have human safety risks been mitigated?
- **Regulatory framework for successful stakeholder engagement:**
  - Existing regulations for stakeholder engagement?

Source: United Nations Sustainable Development Goals. https://sdgs.un.org/goals

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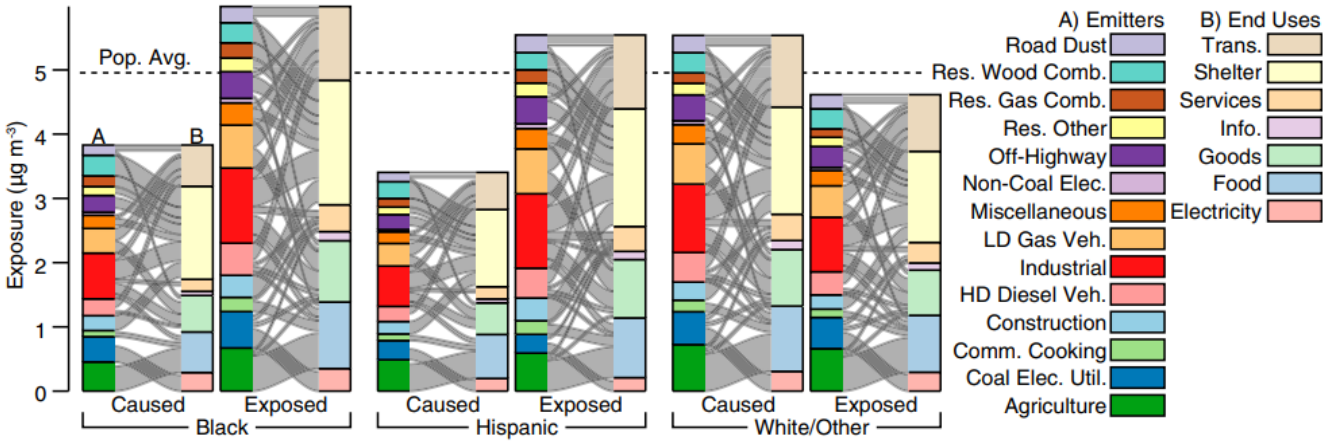
THE OFFICE OF
CLEAN ENERGY DEMONSTRATIONS

International Hydrogen Landscapes Webinar

Dr. Catherine Casomar
Community Benefits Negotiations Lead
Office of Clean Energy Demonstrations
U.S. Department of Energy

Environmental Injustice Today – PM2.5

"Fine particulate matter (PM2.5) air pollution exposure is the largest environmental health risk factor in the United States…**PM2.5 exposure is disproportionately caused by consumption of goods and services mainly by the non-Hispanic white majority, but disproportionately inhaled by black and Hispanic minorities**."



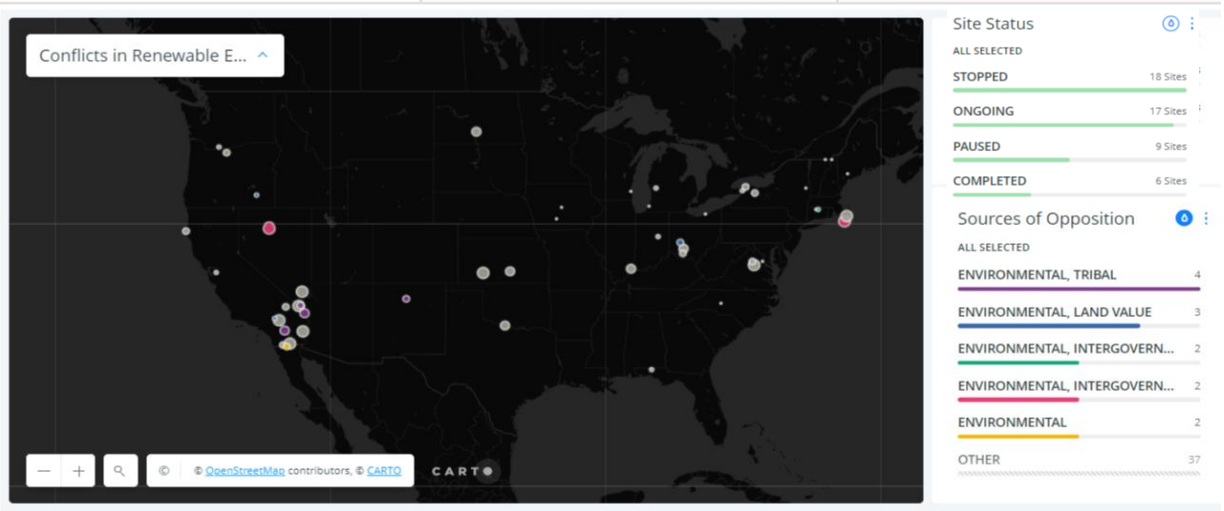
- Latinx Americans exposed to **63% more** PM2.5 than they produce
- Black Americans exposed to **56% more** PM2.5 than they produce
- White Americans (non-Hispanic) exposed to **17% less** PM2.5 than they produce

Source: *Christopher W. Tessum, et al. "Inequity in consumption of goods and services adds to racial–ethnic disparities in air pollution exposure." Proceedings of the National Academy of Sciences (March 2019).*

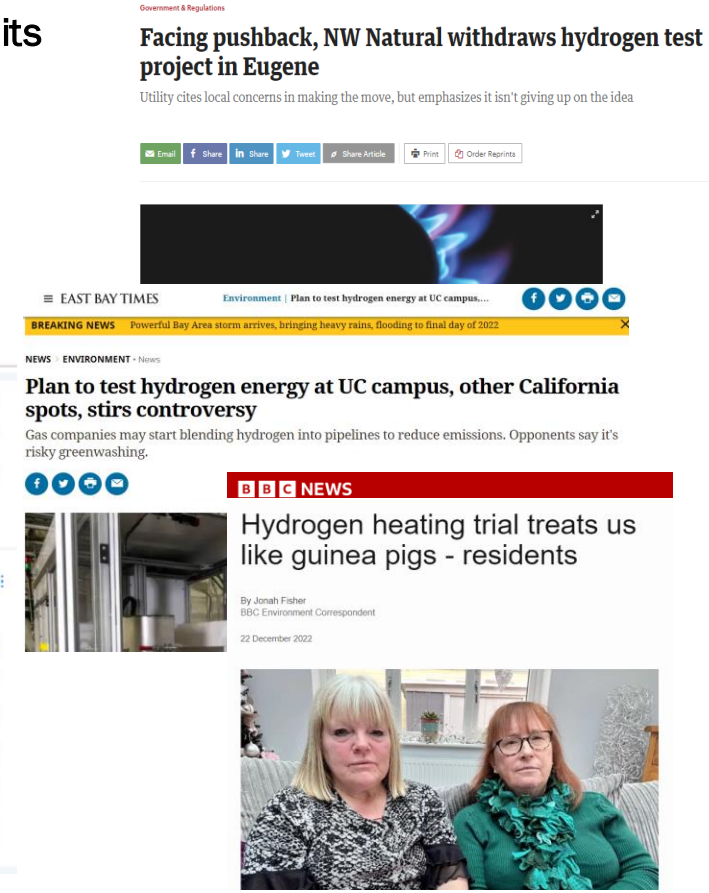
Engagement & Project Risk

When engagement is not meaningful, communities may bring **lawsuits and protest, leading to project delays or cancelation**

Addressing concerns can **minimize community acceptance risk and legal risk**, while **maximizing opportunities** for quality jobs, community benefits, and positive community relationships



Renewable Energy Clinic: Research (mit.edu)



Government & Regulations

Facing pushback, NW Natural withdraws hydrogen test project in Eugene

Utility cites local concerns in making the move, but emphasizes it isn't giving up on the idea

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EAST BAY TIMES Environment | Plan to test hydrogen energy at UC campus,...

BREAKING NEWS Powerful Bay Area storm arrives, bringing heavy rains, flooding to final day of 2022

NEWS > ENVIRONMENT - News

Plan to test hydrogen energy at UC campus, other California spots, stirs controversy

Gas companies may start blending hydrogen into pipelines to reduce emissions. Opponents say it's risky greenwashing.

BBC NEWS

Hydrogen heating trial treats us like guinea pigs - residents

By Jonah Fisher
BBC Environment Correspondent

22 December 2022

Clean Energy Workforce

- Energy sectors are **adding jobs faster** than employers anticipate; job growth rate expected to increase
- >80% of employers reported at least **"some difficulty" finding qualified workers**
- Energy sector lacks gender diversity, has lower than average Black workers and workers with disabilities

Figure 3. Hiring Difficulty by Technology

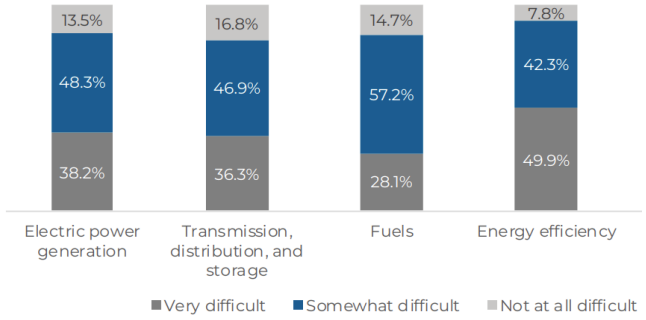
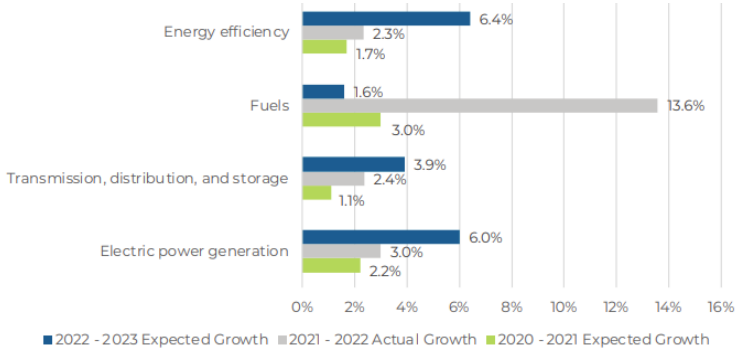


Figure 4. Anticipated and Actual Change in Employment by Technology




REUTERS

World Business Markets Sustainability More

Insight: Biden's climate agenda has a problem: Not enough workers

By Nichola Groom and Valerie Volcovici

January 11, 2023 1:55 PM EST · Updated 8 months ago

[1/4] Student inmates at Madera County Jail train to install solar panels in Madera, California, U.S., June 2022. Carmela Arzola-Prudente/Madera County Jail/Handout via REUTERS NO RESALES. NO ARCHIVES. THIS IMAGE

2023 USEER_REPORT-v2.pdf (energy.gov)

Clean Energy Workforce - Hydrogen

Based on industry estimates, the hydrogen economy can create ~100,000 net new direct and indirect jobs related to the build-out of new capital projects and new clean hydrogen infrastructure in 2030 in the US alone.

Energy & Environmental Justice - Hydrogen

Because of the multiple pathways to produce, distribute, and use hydrogen, the type and magnitude of benefits and harms – and who experiences them – varies significantly by project.

- Safety of H2 infrastructure and CO2 infrastructure (for H2 produced with CCS)
- Health impacts
- Quality jobs
- Etc.

Prioritizing Community Benefits in OCED Projects

OCED **requires** applicants to include a Community Benefits Plan to help ensure broadly shared prosperity in the clean energy transition.

By **prioritizing community benefits**, we can ensure the next chapter in America's energy story is marked by greater justice, equity, security, and resilience.

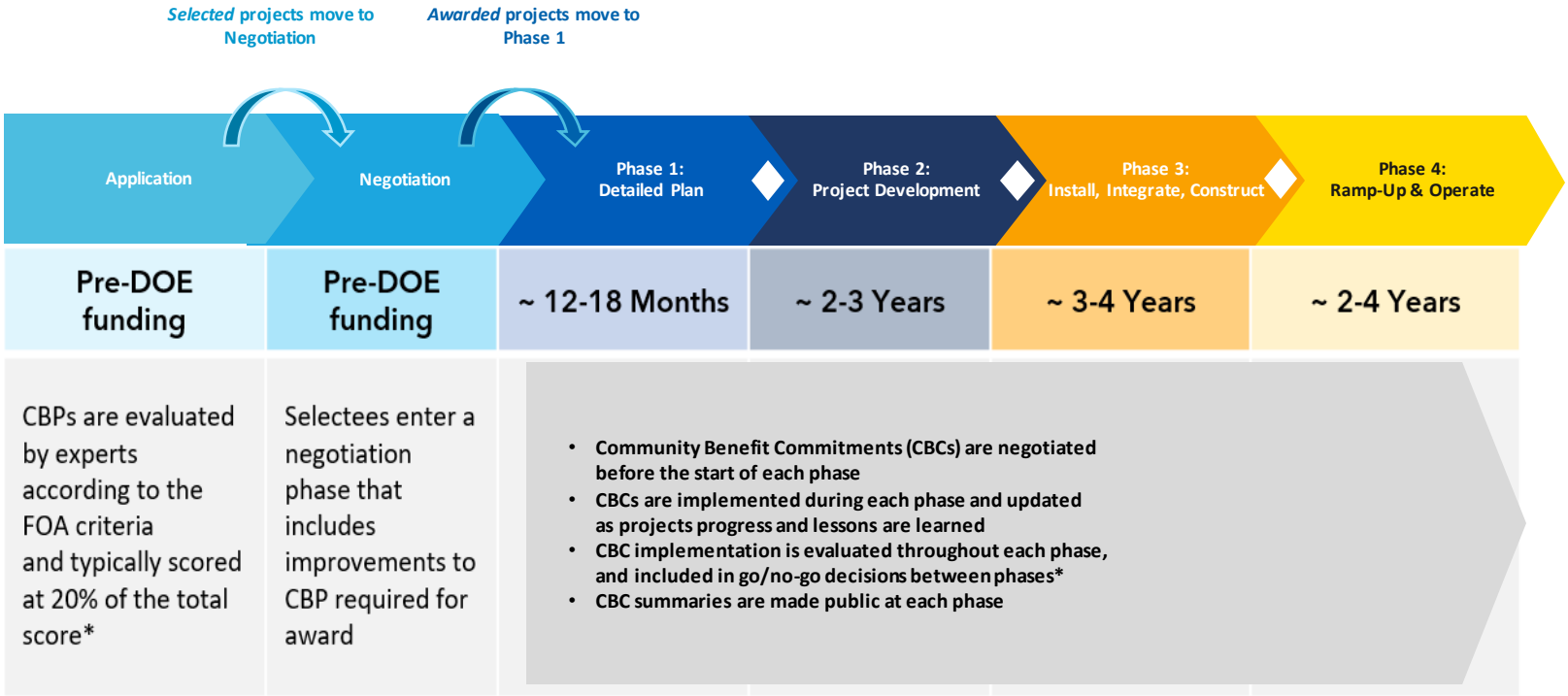
Community & Labor Engagement

Diversity, Equity, Inclusion, & Accessibility

Investing in the American Workforce

Justice40 Initiative

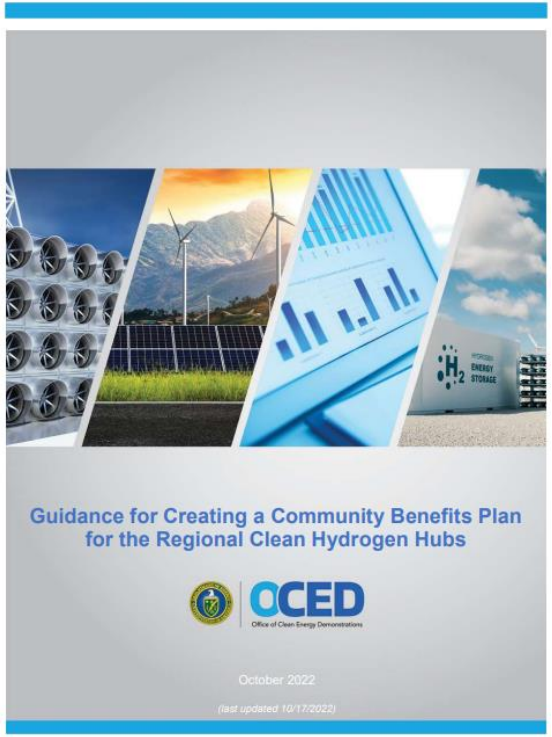
CBPs in the OCED Project Lifecycle



**CBPs are considered alongside assessments of engineering, procurement, and construction; business development and management; permitting and safety; and technical data and analysis.*

Strong CBPs

- Demonstrate moving beyond a vision or assessment into **actionable goals, outcomes, and implementation steps** supported by adequate money, people, and time resources
- Include mechanisms for **accountability to and transparency with** impacted communities
- Propose clear **metrics** to measure success
- Match proposed actions to the **needs and priorities** of impacted communities
- **Robustly address** all four topic areas
- **Minimize and mitigate negative impacts** and harm, especially to already overburdened communities
- **Create quality jobs**, equitable access, and invest in workforce development
- **Evolve** to incorporate community and worker feedback
- **Build** toward lasting and enforceable Community and Labor Agreements



OCED FOA CBP Guidance docs available with each FOA at:
https://oced-exchange.energy.gov/Default.aspx#Foald4dbbd966-7524-4830-b883-450933661811

Thank you!

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For more information, please visit: energy.gov/OCED

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Thank you!

Questions? Contact Expert@CleanEnergySolutions.org.

The next installment in this series will focus on Hydrogen in the Transport Sector and Infrastructure Planning.

Register today!