International Partnership for Hydrogen and Fuel Cells in the Economy

Launch Webinar: IPHE Database of Hydrogen Job Roles and Skills and Skills Needs Assessment Guidance Document

23 September 2025

IPHE H2Skills Task Force

Launch Webinar: IPHE Database of Hydrogen Job Roles and Skills and Skills Needs Assessment Guidance Document

Item	Time
Welcome and Introduction to the IPHE	15:00 - 15:10
Introduction to the IPHE H2 Skills Task Force	15:10 – 15:15
Presentation of outputs (publication 1 and database)	15:15 – 15:50
Panel discussion Sharing of international perspectives and insights on skills needs assessments and workforce estimation by task force members and authors of skills needs assessments.	15:50 – 16:30
Q&A session (via webinar Q&A function)	16:30 - 16:55
Thank you and closing	16:55 - 17:00

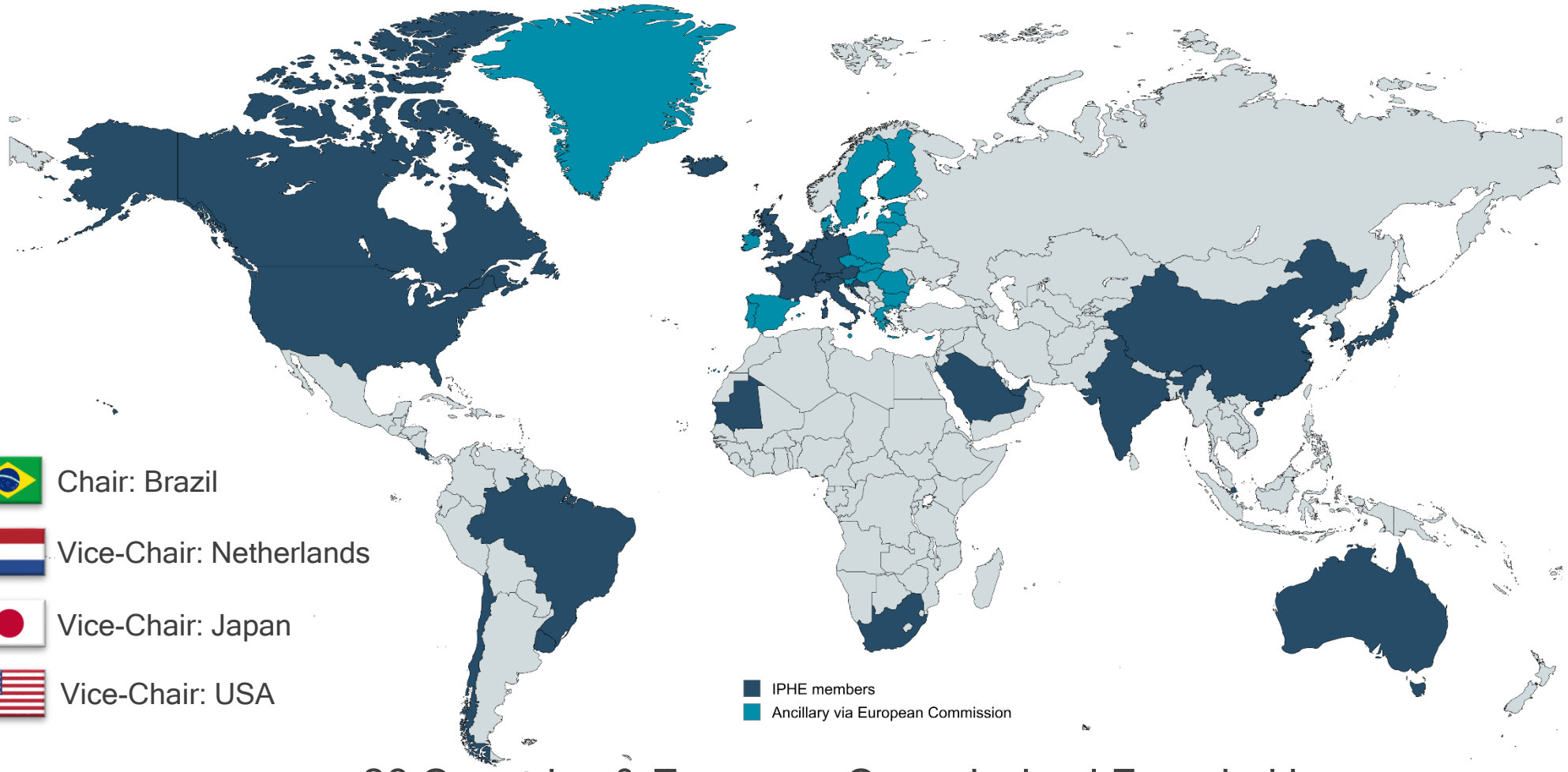
- **Recording:** This webinar is being recorded.
- **Microphones:** Please keep microphones muted unless invited to speak.
- **Questions:** Use the Q&A function for questions at any time. We'll address them during the Q&A segment.
- **Chat:** Please use the chat respectfully for relevant comments and networking.
- **Technical issues:** If you experience connection problems, try rejoining via the Zoom link.

Introduction to the IPHE

Laurent Antoni
Executive Director

International Partnership
for Hydrogen and Fuel Cells
in the Economy

IPHE: A Government-to-Government Partnership



Chair: Brazil

Vice-Chair: Netherlands

Vice-Chair: Japan

Vice-Chair: USA

26 Countries & European Commission | Founded in 2003

IPHE priorities: Share

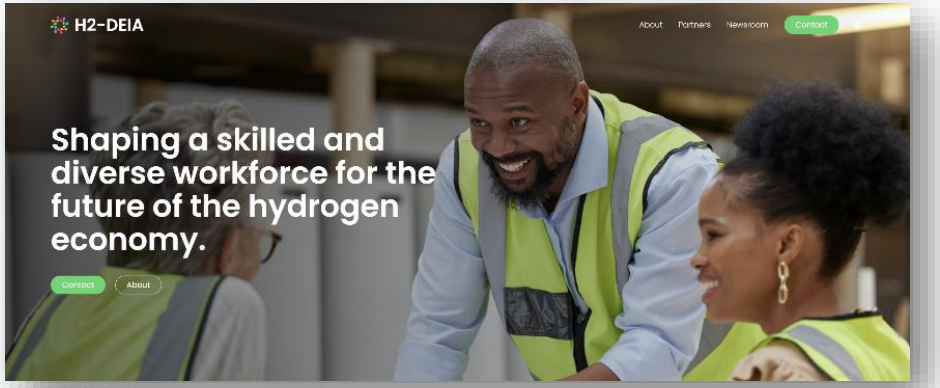
Early Career network & Diversity, Equity, Inclusion, Accessibility platform

Early Career Network

An IPHE initiative counting 500+ members from 40+ countries, aiming at connecting the next generation of scientific researchers, industry experts and government leaders with peers, mentors and potential employers.

Free registration: early.career@iphe.net

Diversity, Equity, Inclusion, Accessibility platform



A platform propelled by IPHE, aiming at creating a hydrogen and fuel cell economy that reflects the diversity of our global society and ensures equal opportunities for all. It includes a dedicated online mentoring platform.

Free registration: https://www.pushfar.com/

IPHE priorities: Provide

It's in IPHE's DNA to monitor information, perform gap analysis and subsequently produce and publish reports, databases, etc.

Most of this work is done within our **Working Groups** and **Task Forces**. They are platforms where IPHE members can meet to discuss and work together. Each group is co-led by at least two members of IPHE.

There are currently 2 Working Groups (WG) and 5 Task Forces (TF), addressing transversal and non-technological issues, with a global perimeter:

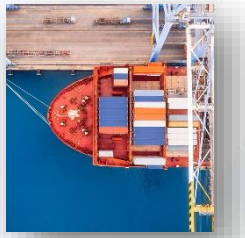
RCS & Safety WG

Education & Outreach WG

H2 Environmental Impact Analysis TF

Certification Mechanisms TF

Trade Rules TF



Maritime TF

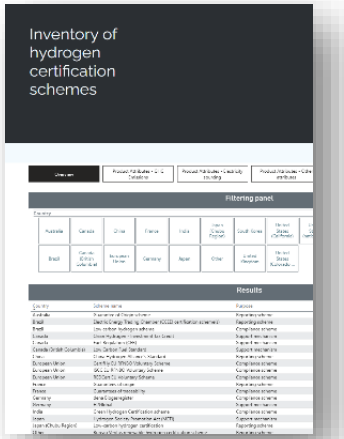
Permitting TF

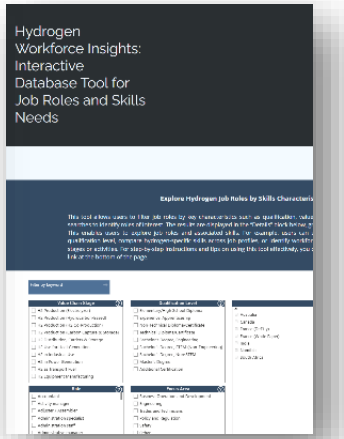
Bulk Storage TF

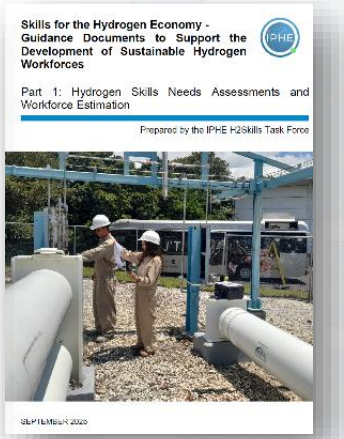
Skills TF

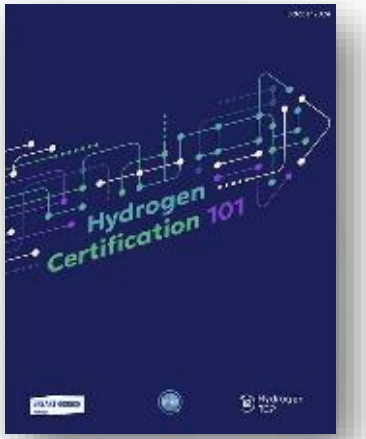
IPHE priorities: Provide

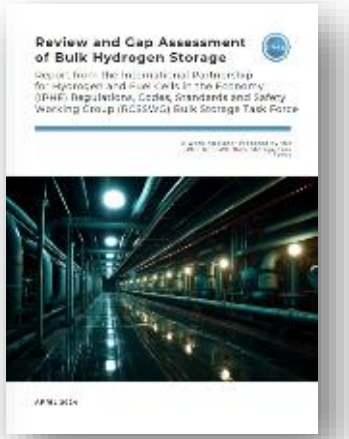
All documents produced by the task forces and working groups of IPHE stem from government-to-government exchanges and work **exclusively**. They are **publicly available**. They are often presented through dedicated webinars.

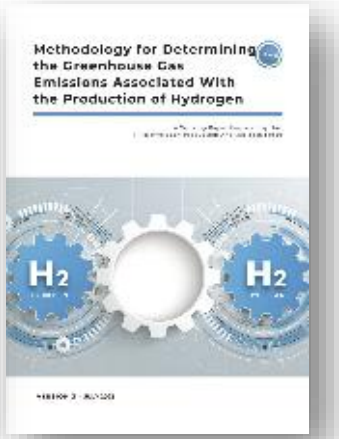












The IPHE Secretariat maintains database listing **national hydrogen strategies** and technology **deployments** as well.

All resources are available here: https://www.iphe.net/intelligence

Introduction to the IPHE Skills Task Force

Lauren Basson
Task Force Co-lead

International Partnership
for Hydrogen and Fuel Cells
in the Economy

Task Force Goals

- **Goal:**
  - To enable countries to **streamline hydrogen skills development efforts**
    - through **knowledge sharing** to develop a **database of hydrogen value chain skills**, and
    - **providing guidance**, in particular for new adopters, for **building the foundation of a sustainable hydrogen workforce**.

- **Longer term goal:**
  - To enable countries to
    - **coordinate** and **integrate hydrogen skills development efforts**
      e.g. standardise training, share training facilities, enable student/workforce mobility, enable international accreditation

Membership

Co-leads

Costa Rica
Franklin Chang-Diaz
Ad Astra Rocket Company

South Africa
Lauren Basson
GreenCape
Sector Development Agency

IPHE Secretariat
Laurent Antoni
Executive Director
Michael Diderich
Project Officer

Members

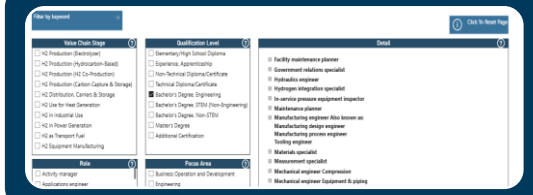
Brazil	*Rosana Domingues*
Canada	*Olumoye Ajao* *Natural Resources Canada* **Experts:** *Trevor Rous* *Jillian Townsend* *Natural Resources Canada*
EU	*Dominik Richter* *Hydrogen Europe Research*
South Africa	*Khavharendwe Rambau* *Department of Science and Innovation* **Experts:** *Mamphokhu Khuluvhe* *Department of Higher Education and Training* *Tshwanelo Rakaibe* *Council for Scientific and Industrial Research (CSIR)* *Aradhna Pandaram* *Impact Catalyst*
USA	*Akeelah Harrell* *Department of Energy*
Uruguay	*Gastón Ellis Boido*

Observers

Germany
NOW GmbH

UK
Department of Energy Security and Net Zero

Task Force Outputs



Online Job Role Database

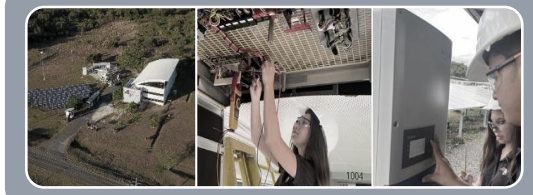
- Centralised resource listing job roles and associated skills-related information from published skills needs assessments globally
- Status: Published
- Launched: September 2025

Publication 1: Skills needs assessments and workforce estimation

- Showcases approaches used internationally to identify hydrogen skills needs and estimate future workforce requirements.
- Status: Published
- Launched: September 2025

Publication 2: Training and dissemination

- Highlights international approaches and initiatives for training and knowledge-sharing in the hydrogen sector.
- Status: In progress
- Launch: October 2025



Publication 3: Workforce development

- Provides guidance on building the hydrogen workforce, with a focus on DEIA, youth, unskilled workers, and transitions.
- Status: In progress
- Launch: January 2025

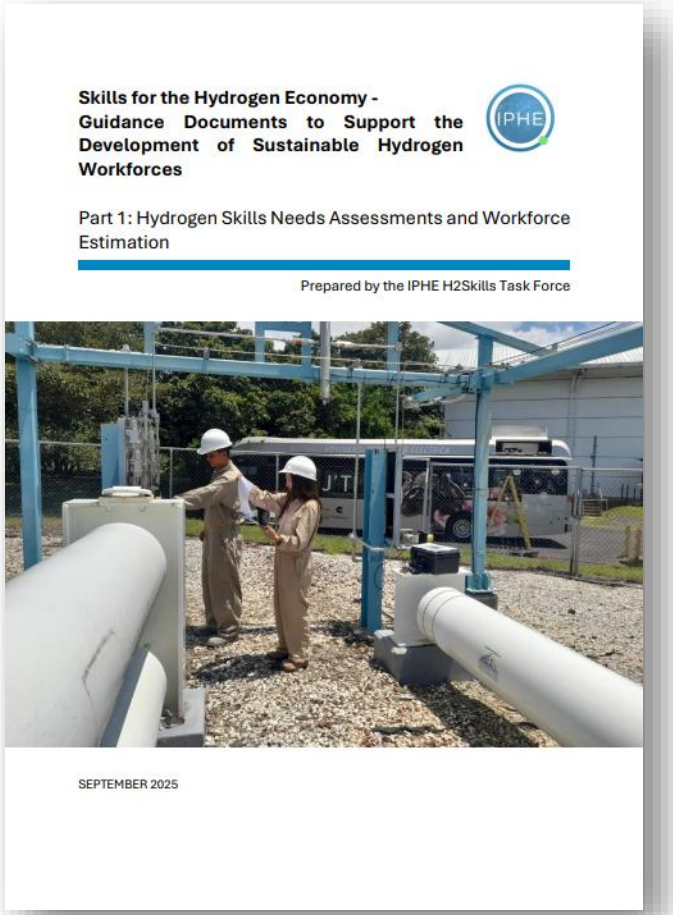
Overview of Publication 1: Hydrogen Skills Needs Assessments and Workforce Estimation

Nyawasedza Magoda

Task Force Team

International Partnership
for Hydrogen and Fuel Cells
in the Economy

Motivation and approach



Goal

- To support stakeholders in commissioning, designing, delivering and interpreting hydrogen skills needs assessment and workforce estimation studies.

Approach

- Share international case studies and methodological insights
- Identify methodological needs and knowledge gaps that could be addressed through international research, development and collaboration

Methodology

- Member survey and desktop research
- Interviews and knowledge sharing sessions

Why do a hydrogen skills needs assessment and workforce estimation?

Hydrogen skills needs assessments and workforce estimations enable countries and regions to:

- identify critical occupations and skills
- forecast future workforce demand
- support education and training alignment
- enable strategic workforce planning
- support policy and funding decisions
- enable safe and efficient deployment of hydrogen

Hydrogen skills needs assessments

- Approaches taken by different countries / regions vary
- Typical steps undertaken

Key Steps	Cross-Cutting Activities	
Scoping and value chain mapping	Literature and data review	Industry and stakeholder engagement
Occupation and job role identification		
Skills mapping		
Education and training system analysis		
Workforce quantification and scenario modelling		
Talent bottlenecks and transition opportunities/needs		
Diversity, equity, inclusion and access considerations		
Conclusions and strategic recommendations		

- Specific steps depend on context and objectives; not all studies will include all of these
- Report provides
  - Description of each step and associated methodological choices
  - Case study examples to illustrate the information and insights that can be generated
  - Summaries of 18 skills needs assessments done across the globe (12 detailed, 6 brief, in appendices)

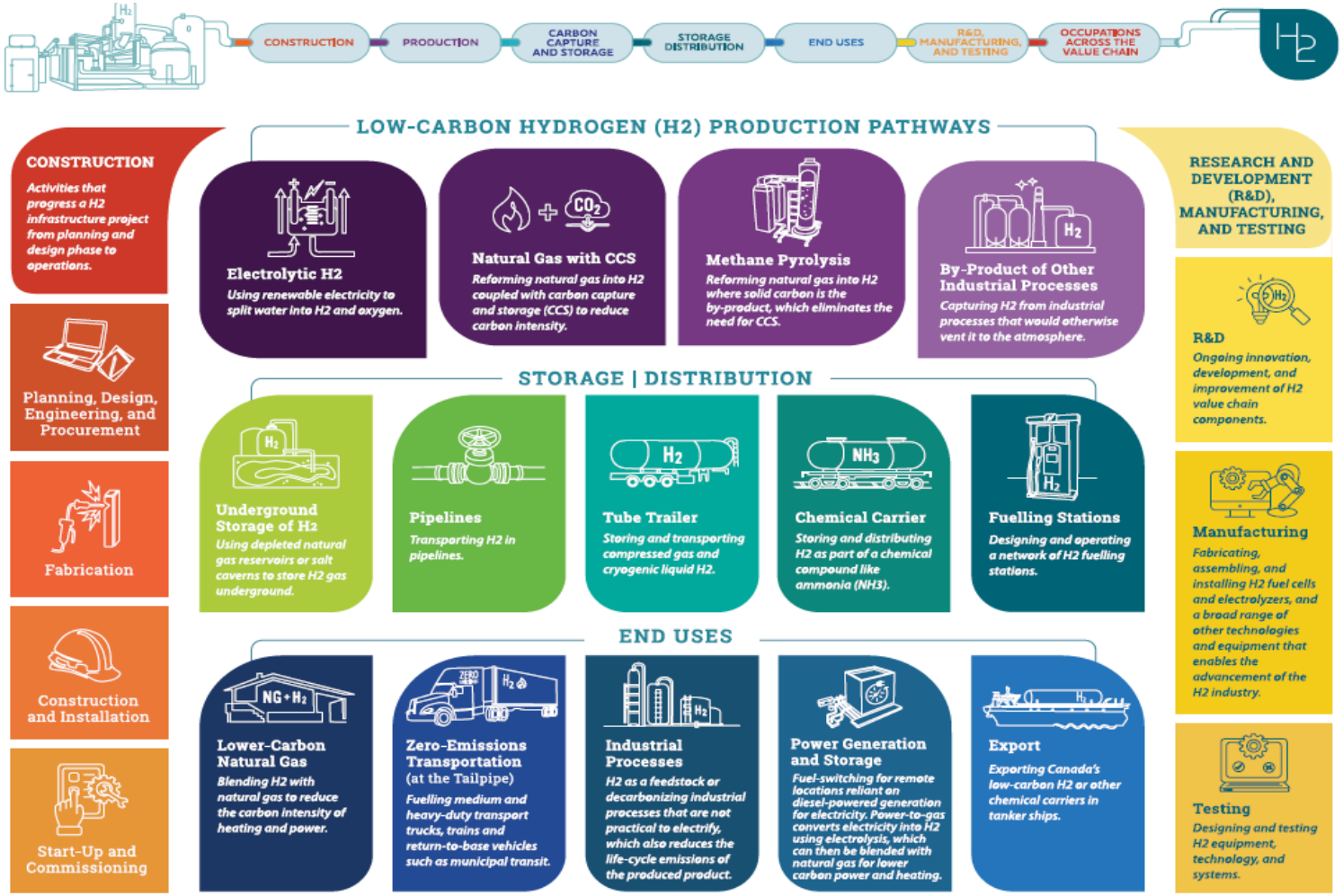
Hydrogen skills needs assessments

Scoping and value chain mapping

Example
that reflects:

- primary and supporting components of the hydrogen value chain
- project phases, and activities

(British Columbia, Canada, 2024)



Workforce Estimation

- Approaches taken by different countries / regions vary

Approach	Methodology	Application (simplified)
Macroeconomic models	Computable general equilibrium	What are the net economy-wide effects of hydrogen and renewables?
	National input-output	In which sectors of the country will there be jobs?
	Regional / multi-regional input-output (MRIO)	Where are the job benefits — locally or in supplier countries?
Employment factor	Input or output-based or capacity-based	How many jobs will X GW hydrogen create?

- Choice of approach: dependent on objectives - economy-wide vs more specific to hydrogen sector
  Choice of methodology: technical complexity, data availability, need for analytical depth etc.
- Country case studies to illustrated main features, advantages and limitations of different methodologies
- A number of methodological challenges highlighted
  - some general to all workforce estimation (e.g. linear, static, data intense etc.)
  - others specific to / compounded by hydrogen:
    fast-evolving, multi-sector industry; relative maturity of sector in different countries

Selected insights: Commissioning and delivering hydrogen skills needs assessments

Planning & Scope

- Set clear goals and scope from the start
- Ensure insights are context-specific and actionable
- Choose workforce estimation methods suited to the information needed
- Allow adequate time and budget to deliver robust assessments

Stakeholders

- Engage stakeholders early and keep them involved throughout
- Validate findings with stakeholders to build understanding of findings and to enable effective implementation

Coverage & Roles

- Reflect the unique situation of each region or country
- Include enabling environment roles (policymakers, regulators, financiers) alongside technical roles
- Assess both accredited and non-accredited training pathways

Execution & Communication

- Communicate assumptions, data limits, and methods clearly
- Interpret and communicate workforce estimates carefully
- Use multidisciplinary expertise to strengthen analysis and recommendations
- Plan for periodic updates of workforce estimates

Selected insights: Hydrogen skills needs assessment methodological challenges and gaps

Occupational classifications

- Frameworks do not capture hydrogen roles fully, especially for renewable and low-carbon hydrogen
- Potential intervention: agreed reference set of occupations

Training and skills data

- Hydrogen content hidden in general qualifications
- Inconsistent terminology
- Potential intervention: standardised skills descriptions

Workforce estimation methodologies

- Limited country-specific data
- Methodologies and data needed to capture industry dynamics
- Capacity building needed for use and interpretation

Selected insights: Hydrogen skills and workforce development emergent from skills needs assessments done internationally

Occupations & Skills

- No entirely new occupation, but some occupations and specific roles may be new in certain countries
- Needs vary depending on existing industries and maturity of the hydrogen economy
- Many existing occupations will need various degrees of hydrogen-specific skilling

Workforce Development

- Clean energy sectors share foundation skills → both competition and flexibility
- Investing in strong foundation skills is a robust strategy for workforce development for hydrogen value chain and other clean energy sectors

Training

- Training currently led mainly by industry (not unexpected for emerging and developing industry)
- Embedding hydrogen skills in formal education for skills development at scale
- Short courses and micro-credentials address immediate needs and enable worker transitions → builds foundation for more formal, accredited training

*These are **general insights** and should **not be assumed to be and acted upon as universal**.*

*A **region/country specific skills needs assessment** is needed to inform **appropriate region/country-specific interventions** for skills and workforce development.*

Further work

Scope: not a detailed comparison of hydrogen occupations, job roles or skills sets

Potential value in developing a reference list (e.g. for updating occupational classification systems or developing universal skills frameworks)

Would require multidisciplinary expertise and collaboration (incl. skills experts, industry, educators)

Job roles and skills database is intended as an input to such an endeavour

Hydrogen Job Roles Database Tool

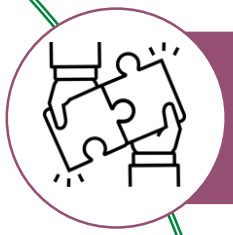
Christina Louw

Task Force Team

International Partnership
for Hydrogen and Fuel Cells
in the Economy

Motivation

- Centralised resource listing job roles and associated skills-related
  information from published skills needs assessments globally
- Key features:
  - Explore job roles by qualification requirements, hydrogen-specific skills, value chain stage, and other characteristics.
  - Map job roles across multiple studies to compare scope, characterisation, and workforce needs.
- Target audience includes:
  - Government officials responsible for workforce planning, policy- and funding decision making, education and training
  - Education and training providers, accreditation and certification bodies
  - Government officials and organisations commissioning and executing hydrogen skills needs assessments



Allow for easy comparison of dispersed data from different sources

Enable new entrants to hydrogen economy to identify skills and workforce requirements

Checking for consistencies and equivalencies between datasets for verification and opportunities for standardisation

Provides foundation for possible exhaustive/definitive dataset of roles, occupations, and hydrogen-related skills and competencies in hydrogen economy

Data Sources

Australia

"Developing Australia's Hydrogen Workforce"

Canada

"Assessing the Workforce Required to Advance Canada's Hydrogen Economy" and the accompanying *"Hydrogen Workforce Assessment Tool"*

France

"Developing employment and training for the hydrogen sector. Anticipating needs and preventing challenges in a rapidly growing sector" (In French. Original title: *"Développer l'emploi et les formations pour la filière hydrogène Anticiper les besoins et prévenir les difficultés d'une filière en fort développement"*)

"Skills and professions of the hydrogen sector: Planning ahead to successfully develop an industry of strategic importance"

India

"Skill Gap Assessment Across Green Hydrogen Sector in India"

Namibia

"Enhancing Employability: Skills Needs and Gap Analysis in Namibia's PtX Sector and Recommendations for a Skills Development Programme"

South Africa

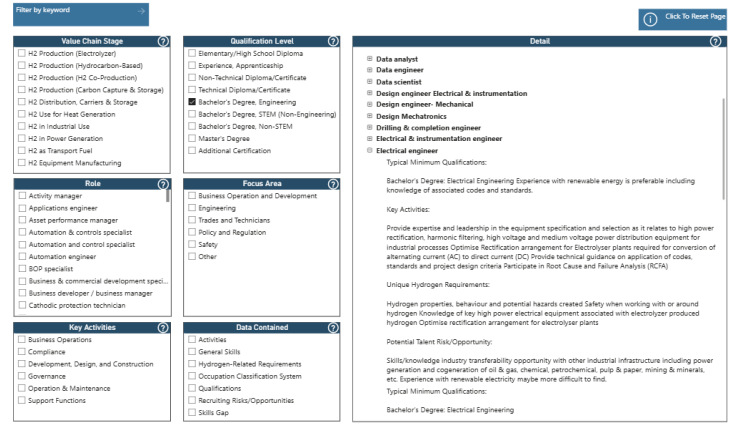
"Identification of Skills Needed for the Hydrogen Economy"

Data Transformation and Handling

Input → **Output**

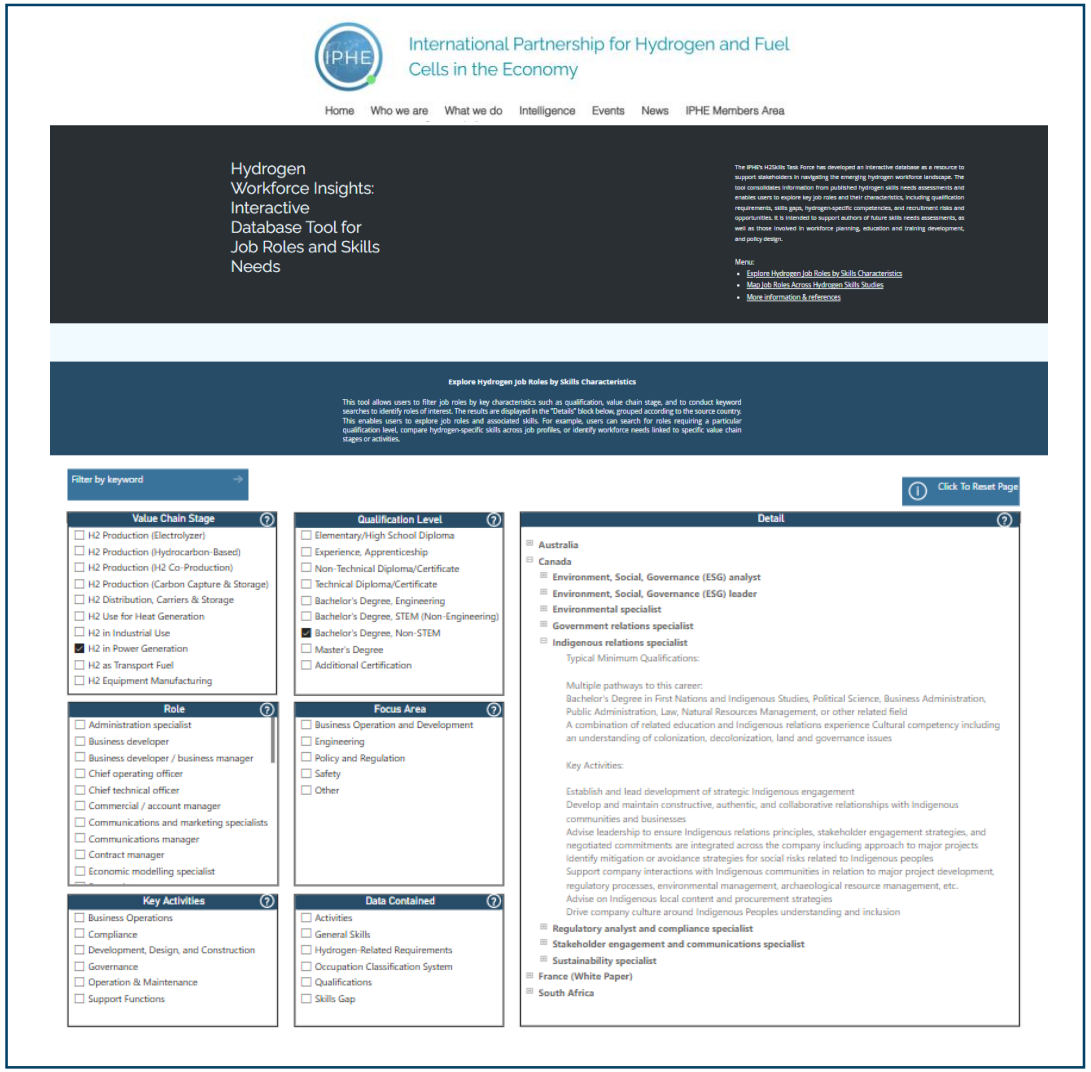
Publically available skills needs assessments → Disparate data / role-specific information → Information organized by job role from each assessment → Tagged/characterized data for each job role → Searchable interactive database

Core Occupation	Typical Qualifications (min)	Key Activities
Electrical engineer	Bachelor's Degree: Electrical Engineering Experience with renewable energy is preferrable including knowledge of associated codes and standards.	• Provide expertise and leadership in the equipment specification and selection as it relates to high power rectification, harmonic filtering, high voltage and medium voltage power distribution equipment for industrial processes • Optimise Rectification arrangement for Electrolyser plants required for conversion of alternating current (AC) to direct current (DC) • Provide technical guidance on application of codes, standards and project design criteria • Participate in Root Cause and Failure Analysis (RCFA)

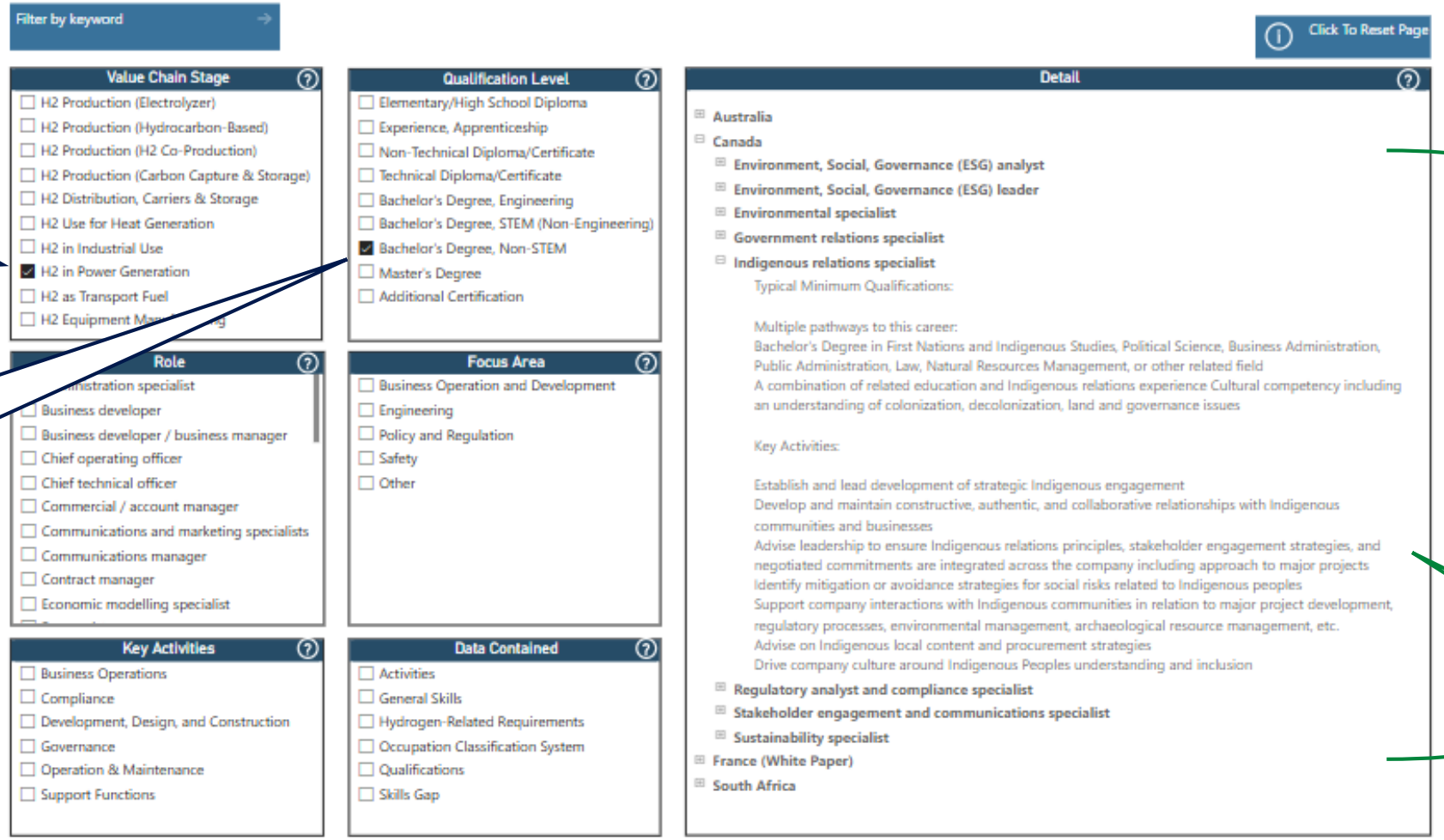


Interactive Database Tool for Job Roles and Skills Needs

- 7 datasets with 693 roles and descriptions
- Users are able to filter roles according to:
  - Value chain stage
  - Qualification type
  - Role title
  - Key activity
  - Focus area
  - Data contained
  - Keyword search
- Designed to be readily updateable as new studies are published
- Available in online interactive - and downloadable Excel format (upon request via email)



Database tool: Explore Hydrogen Job Roles by Skills Characteristics
Example: Value Chain Stage and Type of Qualification



Select value chain stage

Select type of qualification

Relevant job roles in country dataset

Country datasets with the value chain stage and roles requiring the type of qualification

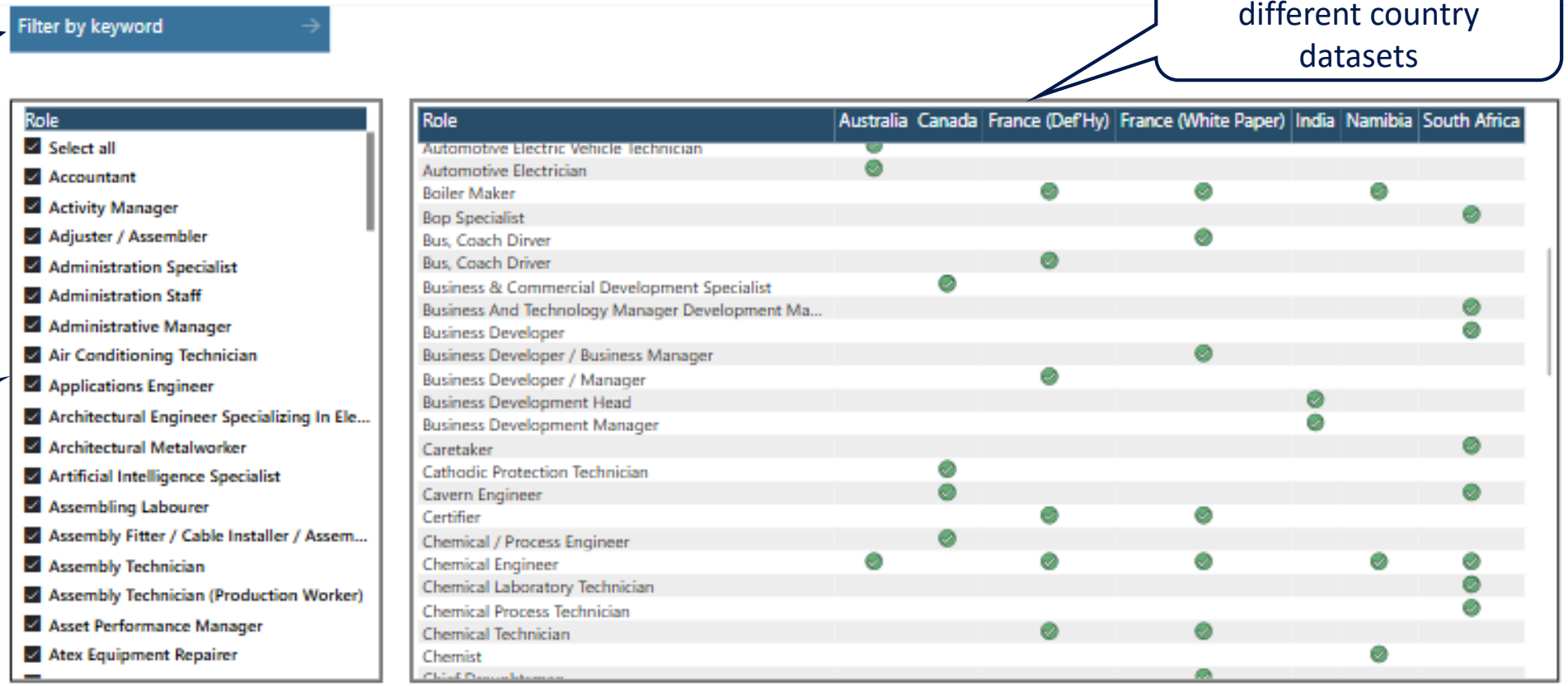
Details on qualifications, specific skills etc.

Database tool:
Map of Job Roles Across Hydrogen Skills Datasets

Search via keyword including wildcard searching (e.g. elec*)

Filter by job role

Overview of roles in different country datasets



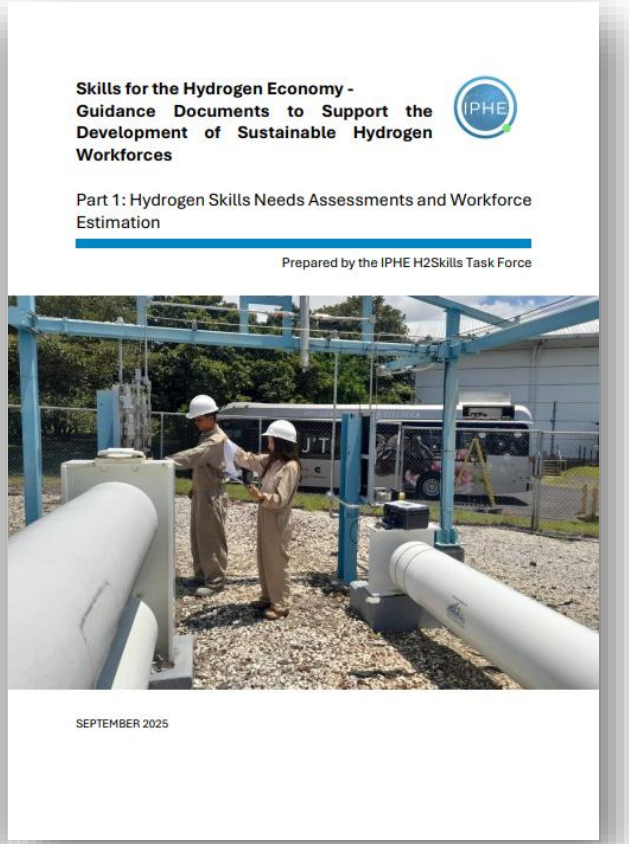
Associated Resources

User guide

- How-to guide for using the tool
- Troubleshooting advice
- FAQs
- Details for feedback, support request for Excel version of data

Additional resources provided:

- Download all datasets in Excel (link to email request to Secretariat)
- Contextual information on datasets
  - References
  - Summaries
- Skills needs assessment publication
- Other taskforce deliverables (as these become available)



Concluding remarks

Looking Ahead: Using Task Force Deliverables

- Updated as new datasets are generated
- Explore and use the Job Role Database
- Catalyse dialogue across industry, education and training, government
- Support improved job role and skills inventories
- Strengthen alignment for current & future hydrogen needs

Panel Discussion

Moderator: Lauren Basson

International Partnership
for Hydrogen and Fuel Cells
in the Economy

Panel discussion

"Sharing of international perspectives and insights on skills needs assessments and workforce estimation by task force members and authors of skills needs assessments."

Pat Hufnagel-Smith	Partner, Creative Links Inc (*Canada)*
Franklin Chang-Díaz	CEO, Ad Astra Rocket Company; President, Strategy for the 21st Century; Co-lead, IPHE Hydrogen Skills Task Force (*Costa Rica)*
Tshwanelo Rakaibe	Senior Researcher, CSIR (*South Africa)*
Gastón Ellis Boido	Ministry of Industry, Energy and Mining (*Uruguay)*
Smeeta Fokeer	Industrial Development Officer, UNIDO

Thank you

International Partnership
for Hydrogen and Fuel Cells
in the Economy