Terms of Reference: Hydrogen Production Analysis Task Force
March 10, 2020

The Terms of Reference (TOR) set forth below for the Hydrogen Production Analysis (H2PA) Task Force are established in alignment with the TOR of the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), whose purposes are: "To serve as a mechanism to organize and implement effective, efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies. It also provides a forum for advancing policies, and common codes and standards that can accelerate the cost-effective transition to a global hydrogen economy to enhance energy security and environmental protection."

Through Article 3.6 of the IPHE TOR, the IPHE "Steering Committee has the authority to form appropriate Task Forces, Work Groups, and any other subgroups it determines are needed to assist its work. These subgroups are not permanent Partnership structures, existing only as long as is needed to achieve their objectives."

In October, 2019, at the 32nd IPHE Steering Committtee Meeting in Seoul, IPHE Partners agreed to the formation of a Task Force specifically to address challenges brought forth by governments and industry stakeholders on the need for a consistent framework and methodology in assessing hydrogen production technologies from diverse sources. The TOR set forth below provides the framework for the new Task Force.

Background

Recognizing that there is a need for harmonised regulation, codes, and standards (RCS) to facilitate the deployment of new and innovative technologies;

And that hydrogen, as one part of a comprehensive energy portfolio, can be produced from diverse sources including renewables, nuclear and fossil fuels using Carbon Capture, Utilization, and Storage (CCUS), and that numerous sectors including transportation, industrial manufacturing, and power generation can use hydrogen;

And acknowledging that hydrogen demonstrates benefits for its versatility, including capacity for energy storage, and its potential to enable economic growth and energy security while simultaneously protecting the environment through addressing air quality challenges and reducing greenhouse gas emissions (GHGs);

That at the Hydrogen Energy Ministerial in 2018 (HEM2018) in Tokyo, Japan, Ministers released the "Tokyo Statement" asking that leading organizations including the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), the International Energy Agency (IEA) and Clean

Energy Ministerial (CEM) / Mission Innovation (MI) take actions on four main issues individually and collaboratively to facilitate the goal of a "Hydrogen Society[1]", including:

- Collaboration on technologies and coordination on harmonization of regulation, codes and standards, and
- Collect, analyze and share data to evaluate the potential of hydrogen and its effect on CO2 and other emissions reduction, both upstream and downstream across a variety of hydrogen production pathways;

And, at HEM2019 in Tokyo, Japan, Ministers reaffirmed the view that hydrogen can be a key contributor to clean, safe, and affordable energy for the future and recognized that the next ten years will be critical to enable wider deployment of hydrogen by scaling-up production and use of hydrogen as well as by reducing cost;

That there is a need for a Global Action Agenda to mobilize efforts globally. Ministers encouraged actions in line with the four pillars in the Tokyo Statement, while taking into account different national circumstances. In particular, the versatility and storage capacity of hydrogen creates potential, not only for domestic production and consumption of hydrogen, but also for trade between countries;

And to enable a robust and sustainable market for hydrogen technologies, it is necessary to develop clean, affordable, secure, and reliable supply chains and to support the development of effective hydrogen trading markets. To this end, countries will need to put in place standards and protocols that are transparent and that facilitate efficient international trade in hydrogen. This will require international standards developed through the relevant international standards development bodies, facilitating the removal and/or reduction of regulatory barriers, and to help develop a common definition of clean/sustainable hydrogen;

So as to stimulate investment and promote hydrogen as a clean, secure, and affordable energy vector, reliable data and analyses regarding hydrogen is encouraged, including environmental impact assessments and the development of international standards for life cycle assessments (LCA) of hydrogen technologies and the sharing of information and analytical results;

Noting that during the 32nd IPHE Steering Committee in October 2019 in Seoul, South Korea, countries recognised that regulations currently limit the development of a clean hydrogen industry and that government and industry must work together to ensure existing regulations are not an unnecessary barrier to investment;

And noting that a particular challenge is that identical hydrogen molecules can be produced and combined from sources with very different CO_2 intensities, that accounting standards for different

[1] The term "Hydrogen Society," as used in the Tokyo Statement, reflects a society where hydrogen is used in applications and sectors as appropriate, and does not imply that the society is fueled only by hydrogen.

sources of hydrogen along the supply chain will be fundamental to creating a market for low-carbon hydrogen, and that these standards need to be developed on an internationally agreed basis;

At the 32nd IPHE Steering Committee, members agreed to work to enable the development of an international hydrogen market, by creating a Hydrogen Production Analysis Task Force (H2PA TF) to review and come to a consensus[2] view on describing the methodology and analytical framework to determine the emsisons related to a unit of produced hydrogen. The IPHE H2PA TF agreed to exchange information and learnings with other hydrogen initiatives such as the Clean Energy Ministerial Initiative (CEM H2I) on this task with the goal that the work and any results will be of value and use to the IPHE and to the broader international hydrogen community.

Scope of the Hydrogen Production Analysis Task Force (H2PA)

The H2PA TF aims to trigger a process and at taking initial steps to develop a mutually agreed upon methodology for determining the CO_2 equivalent and other pollutants emissions associated with the production of hydrogen.

The H2PA TF will report on progress at the IPHE Steering Committee meetings and at appropriate international events. As a longer-term outcome, the H2PA TF will contribute to the definition of "clean hydrogen." Various factors will also be considered such as hydrogen purity and pressure criteria. A key issue in the longer term is the certification of CO_2 equivalent intensity and provenance of hydrogen supplies, as well as benchmarks for the incumbent processes they replace. A mutually recognised, international framework is needed that is robust, avoids mislabeling or double-counting of environmental impacts (e.g., provides a mutually agreed to "certificates" of origin, also termed "guarantees of orgin" in existing frameworks)), and that covers CO_2 equivalent inputs to hydrogen-based fuels and feedstocks.

Participation in the H2PA TF and its associated outcomes does not lead to any binding commitments or expectations on behalf of any country. The H2PA TF's focus is on development of a technical and analytical methodology and there is no expectation that the TF will develop policies or regulations. Application of the results can help facilitate market valuation and international trade in 'clean' hydrogen by developing a common approach established by several IPHE and CEM member's countries. The methodology may also be used within each country for the purchase of hydrogen across regions and to identify the emissions footprint of the various sources of hydrogen. The adoption of any results is not mandatory and is subject to each member's discretion, depending on each member's circumstance.

Note that IPHE is a government partnership focused on programmatic and technical collaboration across relevant ministries and agencies and as such does not develop regulations, codes or standards. The outcomes of the H2PA TF may be used to inform relevant RCS development entities.

[2] By mutual agreement, but if not possible then within a specific timeframe and based on a simple majority of the representatives of the participating countries listed in Annex A.

Process and Activities of the H2PA Task Force

Process

- Development of the methodology is driven through a consensus[3]-based approach, engaging government, industry, and non-governmental organizations;
- Terms of Reference (ToR) for the H2PA TF describe the scope, the expected outcomes, the member's participation, the process and activities, and the associated agenda;
- Work will be carried out through a series of meetings and information sessions to:
  i. Get background information and an understanding of current methodologies;
  ii. Use a common terminology of the different origins and methods of produced hydrogen;
  iii. Reach out and engage key stakeholders representing other hydrogen initiatives (CEM, MI, etc.) and industry (e.g., Hydrogen Council and other entities) seeking their expertise and requesting them to provide input to the H2PA TF in the technical development and assessment of this methodology;
- Updates on activities and outcomes will be presented, discussed, and validated at the IPHE Steering Committees, with any external communications reviewed either during the Steering Committees or if in between Steering Committees, through teleconferences, or by the Chair and the Vice-Chairs of IPHE and shared at CEM H2I advisory board meetings.

H2PA TF Participation

Countries confirming interest in working on the H2PA TF include France, European Commission, United States, Japan, Korea, Netherlands, United Kingdom, South Africa, Costa Rica, and Norway with a Co-lead being France, European Commission, and United States.

Countries expressing interest in participating are Australia, Germany, and Canada. Other countries are welcome to join the H2PA TF. The requirement of H2PA TF membership is active participation and engagement on work underway, including participation in teleconferences, workshops, meetings, and providing an appropriate technical experts to support the development of the methodology.

Countries are to assign a "lead contact person" to be the on-going contact, being the person consistently participating in meetings and calls. For meetings at international events, electronic conferencing facilities will be put in place to allow those not able to travel to participate in the meeting. The lead contact person is not expected to be technical but technical experts can participate. As work progresses however, the H2PA Task Force can and will draw upon technical experts, including the IEA and other entities as required.

[3] As described above

Annex A lists the participating countries, the lead contact, and the active members. Annex B lists the active member and the technical experts appointed by the participating countries These Annexes will be regularly updated by the Co-leads.

Activities

a) Develop a common understanding of Terminology

It is important to ensure that all H2PA TF participants have a common understanding of the terms used in the TF. This task will start with a review of the different definitions used by various international organisations (e.g., IEC, ISO, UNECE, CEN/CENELEC).

Deliverable: Document with the definition of the terms to be used during the H2PA TF.
Draft due Q2 2020 and final document Q4 2020.

b) Review of Boundary Conditions of the H2 Production Analysis

This action will lead to agreement on the upstream and downstream boundary limits to be considered in the emissions related to the production of a unit of hydrogen. For example, the upstream boundary condition might include the emissions of the primary energy production using renewable, nuclear energies or fossil fuels, and the downstream boundary could consider H_2 stored at 30 bar at the exit of the H_2 production plant.

Deliverable : Document defining the upstream and downstream boundaries chosen for the application of the H2 production analysis
Draft due Q2 2020.

c) Review of the Methodologies Being Used Already or Under Development by Various Jurisdictions

Background information and an understanding of approaches used to determine GHG emissions from processes that produce hydrogen, such as part of UNFCCC obligations/national goals, are to be tabled and considered, starting with the European CertifHy project, followed by any other relevant projects in other countries and including the 2019 refinement to the 2006 IPCC GHG Inventory Guidelines. Ongoing analysis for the implementation of EU legislation on renewable energy should also be reflected.

Deliverable : Compendium of the key existing or under-development approaches to determine GHG emissions
Draft due Q3 2020.

d) Development of the Methodology to evaluate the Emissions Related to the Production of a Unit of Hydrogen

Based on the previous outcomes, this task will consider the following items:

i. Identify and report on the main different possible pathways to produce hydrogen; develop an approach to consider a mix of these origins/production methods that stakeholders need to/should consider in coming to a consensus on the GHG emission methodology in hydrogen production
ii. Apply the chosen approach to several case studies as examples;
iii. Prepare documentation for broad stakeholder (e.g., policy and regulatory officials at various levels of government, industry association, environmental organisations) engagement and information sharing to build broad understanding and potential agreement;
iv. Identify and specify content necessary in any technical report to be written based on the agreed approach; and,
v. Writing of a technical report describing the agreed to approach.

Deliverable : Document describing the methodology to assess the emissions from the production of a unit of hydrogen
Draft due Q4 2020 and final document Q2 2021

– – –