

## **HYDROGEN BREAKTHROUGH: PRIORITY INTERNATIONAL ACTIONS FOR 2025**

1. This document outlines the Priority International Actions for 2025 under the Hydrogen Breakthrough, in response to the recommendations in the [Breakthrough Agenda Report 2024](#) from the International Energy Agency (IEA) and the UN High Level Climate Champions (UN HLCs). These Priority Actions have been developed collaboratively by countries participating in the Hydrogen Breakthrough and leading initiatives. They seek to build on the range of important wider work underway and planned across the international landscape, including outcomes of the 28<sup>th</sup> and 29<sup>th</sup> UN Climate Change Conferences (COP28 and COP29), to build on the processes to develop, communicate and implement new nationally determined contributions, and to take forward the outcomes of the first Global Stocktake under the Paris Agreement. These aims will be pursued by strengthening international collaboration in specific areas where in doing so we can accelerate progress towards our shared Hydrogen Breakthrough Goal to make:

***‘Affordable renewable and low-carbon hydrogen’ globally available by 2030.’***

2. Noting that each country will have its own national pathway to decarbonise key sectors and approach to competing for future clean technology market opportunities, and with full recognition of the many excellent wider international activities and partnerships already underway, we intend to prioritise our international efforts to advance specific Priority International Actions and projects as listed below.
3. Progress on these actions in 2025 will be tracked through the next Breakthrough Agenda Report from the IEA and UN HLCs, discussed through the Hydrogen Breakthrough dialogues co-led by the United Kingdom, the United States of America and India, and supported by the Hydrogen Breakthrough Facilitator hosted by the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), in collaboration with the Clean Energy Ministerial, Mission Innovation and World Business Council for Sustainable Development, and reported on at COP30, alongside an updated set of Priority International Actions for Hydrogen for 2026.
4. In order to implement the Breakthrough Agenda launched by 45 World Leaders at COP26, and now backed by 61 governments, set out below are the Priority International Actions being taken forward by individual countries and governments as appropriate to their national priorities, noting the ambition to strengthen the international offer of assistance to Emerging Markets and Developing Economies (EMDEs) in all Priority Actions.

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<sup>1</sup> The term *clean hydrogen* is used throughout the rest of this document, replacing the previously used *renewable and low-carbon hydrogen*. This reflects new terminology to be adopted in future Breakthrough Agenda annual reports, and it is based on the same understanding and definition as *renewable and low-carbon hydrogen* (as used in the 2024 Breakthrough Agenda Report), which encompasses *renewable and low-carbon hydrogen* and other similar terms, such as *clean and low-emissions hydrogen*, *low-emissions hydrogen*, and *zero-emissions hydrogen*, based on clean technologies countries choose to deploy.

## H1. Standards and Certification

### Breakthrough Agenda Report Recommendation:

Governments working together through the international initiatives involved in the Hydrogen Breakthrough need to urgently present a well-articulated plan that defines resource needs for the development and implementation of a comprehensive portfolio of national and international standards for hydrogen and hydrogen-based fuels. Governments and businesses should provide financial and human resources in line with that plan to ensure the development of that portfolio. Governments should facilitate regulatory interoperability by committing to adopt, or ensuring consistency with, globally recognised international standards, such as the ones developed by the ISO methodology, in their regulations, which is an important step to support the process of mutual recognition of certification schemes. Governments should anticipate building technical capacity of their national systems to verify compliance with international hydrogen standards.

#### Priority International Action on Standards and Certification:

*Accelerate delivery of a coordinated portfolio of international standards and certification solutions.*

Accelerate and resource the implementation of a coordinated and time-bound programme of work to support the development of a comprehensive portfolio of international standards for clean hydrogen and its derivatives, reflecting the best available science and the enabling framework for mutual recognition of certification schemes. The multi-year programme will submit an annual progress report at subsequent UN Climate Change Conferences (COP summits).

#### How this will be taken forward:

By identifying resources for coordinating and partnering initiatives to implement an inclusive, multi-stakeholder, multi-year, global programme to support the development of international standards, certification solutions, and related initiatives, including:

##### *Mobilising & Coordinating Resources:*

- Developing a time-bounded plan, with clear milestones, to support the development and implementation of a comprehensive portfolio of international standards for hydrogen and hydrogen-based fuels and mutual recognition of certification schemes.
- Clearly define resource needs
- Identify resources to support coordination and partnership efforts, ensuring initiatives have the necessary financial and logistical support.

##### *Progressing International Standards:*

- Coordinate the work of multiple international stakeholders to support the timely development of global standards for life cycle

#### Collaborating initiative(s):

##### *Coordinated by:*

International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE)

##### *Partners:*

- Hydrogen Council
- International Energy Agency (IEA)'s Hydrogen TCP
- International Renewable Energy Agency (IRENA)'s Collaborative Framework on Green Hydrogen
- International Hydrogen Trade Forum (IHTF)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Industrial Development Organization (UNIDO)

#### Collaborating governments

Australia  
Cambodia  
Canada  
Chile  
European Commission  
Finland  
France  
Germany  
Guinea Bissau  
Ireland  
Italy  
Japan  
Netherlands  
Norway  
Panama  
Spain  
Sweden  
United Arab Emirates  
United Kingdom

	<p>GHG emissions assessment to promote consistency and transparency, reflecting the best available science.</p> <ul style="list-style-type: none"> <li>● Support the development of and advocate for rigorous safety protocols and guidelines.</li> <li>● Promote standardised operational procedures to enhance efficiency and reliability across various sectors</li> <li>● Support technical capacities needed in EMDEs to verify compliance with international standards.</li> </ul> <p><i>Developing Mutual Recognition Framework:</i></p> <ul style="list-style-type: none"> <li>● Coordinate and expand activities that support progress towards mutual recognition of certification schemes by engaging in political and technical collaboration and the implementation of work plan for the COP28 Declaration of Intent, including through pilot projects.</li> </ul> <p><i>Coordinating Pre-Normative Research:</i></p> <ul style="list-style-type: none"> <li>● Collaborate with initiatives involved in Priority Action H3 to identify and address pre-normative research needs. This will ensure that foundational research supports the development and harmonisation of international standards and certification processes.</li> </ul>		United States
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## H2. Demand Creation & Management

### Breakthrough Agenda 2024 Report Recommendation:

Governments and companies should co-ordinate internationally to increase commitments for the use of low-carbon and renewable hydrogen and hydrogen-based fuels, particularly in sectors where hydrogen is already used, supported by the implementation of specific policies and the signing of solid purchase agreements, to collectively send a strong demand signal and mobilise investment in production. In new priority application sectors, countries should share learnings to accelerate early deployment. This should be done in a manner that ensures a level playing-field in international trade.

<b>Priority International Action on Demand Creation &amp; Management:</b>	<b>How this will be taken forward:</b>	<b>Collaborating initiative(s):</b>	<b>Collaborating governments</b>
<p><i>Strengthen demand for clean hydrogen through coordinated commitments and policies that accelerate deployment in existing and new priority application sectors.</i></p> <p>Strengthen demand by facilitating the delivery of existing and new firm and sustained demand-side measures and public and private commitments to offtake clean hydrogen and its derivatives at scale. Focus on displacing unabated fossil fuel-derived hydrogen deployment in existing and new priority application sectors through supportive policies, global targets and purchase agreements, considering the need for just transitions. Leverage existing platforms to continually share learnings and best practices to accelerate early deployment. Sectoral targets and aggregated commitments to be announced by COP30 and updated at</p>	<p>By countries and other stakeholders joining and/or increasing engagement in existing initiatives in this field to collaborate and build coalitions of leading countries and companies, with the aim of:</p> <p><i>Driving commitments to Clean Hydrogen by COP30, with a focus on stimulating demand in both existing and new priority application sectors, such as shipping, steel, fertilizer, and aviation, including by:</i></p> <ul style="list-style-type: none"> <li>• Supporting the development of aspirational sector-specific demand targets</li> <li>• Encouraging increased and firm commitments, from public and private sector actors to clean hydrogen use in end-use applications.</li> <li>• Aggregating and communicating these commitments within global fora.</li> </ul> <p><i>Addressing enabling conditions, through shared learning and exemplar projects that:</i></p> <ul style="list-style-type: none"> <li>• Support the development of effective policies and sectoral roadmaps to accelerate demand creation:</li> </ul>	<p><i>Coordinated by:</i> Clean Energy Ministerial Hydrogen Initiative</p> <p>Rocky Mountain Institute (RMI)</p> <p><i>Partners:</i></p> <ul style="list-style-type: none"> <li>- Green Hydrogen Organisation</li> <li>- H2 Global</li> <li>- Hydrogen Council</li> <li>- IEA's Hydrogen Technology Collaboration Programme</li> <li>- International Partnership for Hydrogen and Fuel Cells in the Economy</li> <li>- Mission Innovation Clean Hydrogen Mission</li> <li>- United Nations Climate Change High-Level Champions</li> <li>- United Nations Industrial Development Organization</li> <li>- World Bank – Hydrogen for Development Partnership</li> </ul>	<p>Australia Cambodia Canada Chile European Commission Finland Germany Guinea Bissau Ireland Italy Japan Kenya Netherlands Norway Panama Spain Sweden United Arab Emirates United Kingdom United States</p>

subsequent UN Climate Change Conferences.	<ul style="list-style-type: none"> <li>• Mitigate financial and non-financial risks and utilize relevant instruments and initiatives, developed under priority actions: H1 on Standards &amp; Certification; H3 on Research &amp; Innovation; H4 on Finance &amp; Investment</li> </ul>	<ul style="list-style-type: none"> <li>- World Business Council for Sustainable Development</li> <li>- World Economic Forum's Accelerating Clean Hydrogen Initiative &amp; First Movers Coalition</li> </ul>	
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### H3. Research & Innovation

**Breakthrough Agenda Report Recommendation:**  
 Governments and companies should work together to dramatically increase the number and geographical distribution of demonstration projects for hydrogen use and to ensure that these appropriately cover each of hydrogen's high-value end-use sectors, including maritime shipping, heavy industry and long-duration energy storage. Governments and the private sector should agree on minimum reporting principles to guide a deeper and more rapid sharing of knowledge among these demonstration projects and with the broader stakeholder community, including a commitment to share the lessons learnt from all publicly funded demonstration projects.

<p><b>Priority International Action on Research &amp; Innovation:</b></p> <p><i>Increase global clean hydrogen research and demonstration projects across diverse sectors and regions, with mechanisms to share learnings rapidly.</i></p> <p>Support the drive for a significant increase in the number and geographical distribution of new, innovative clean hydrogen research and demonstration projects spanning a wide variety of technologies for clean hydrogen production and infrastructure and end-use across a diverse array of hydrogen's high-value sectors, backed by mechanisms to broaden and more rapidly share learnings from projects. Increase pre-normative research</p>	<p><b>How this will be taken forward</b></p> <p>By joining and/or increasing support for and engagement with international R&amp;I programmes, including:</p> <p><i>Delivering a wider portfolio of new, innovative clean hydrogen research and demonstration projects</i></p> <ul style="list-style-type: none"> <li>• Support advancing the 100 Hydrogen Valleys under Mission Innovation Clean Hydrogen Mission</li> <li>• Support IEA's Hydrogen and Fuel Cells TCPs</li> <li>• Strengthened or develop platforms for information sharing.</li> </ul> <p><i>Driving forward research priorities</i></p>	<p><b>Collaborating initiative(s):</b></p> <p><i>Coordinated by:</i></p> <p>Mission Innovation Clean Hydrogen Mission</p> <p><i>Partners:</i></p> <ul style="list-style-type: none"> <li>- IEA's Hydrogen and Fuel Cells TCPs</li> <li>- International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE)</li> <li>- International Renewable Energy Agency (IRENA)</li> </ul>	<p><b>Collaborating governments</b></p> <p>Australia          Cambodia          Canada          Chile          Chile          European Commission          Finland          Germany          Guinea Bissau          Ireland          Italy          Japan          Kenya          Netherlands          Norway          Panama</p>
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<p>activities to support accelerated delivery of international standards. Progress to be reported on by COP30.</p>	<ul style="list-style-type: none"> <li>Collaborate with initiatives involved in Priority Action H1 to take forward identified pre-normative research needs.</li> </ul>		<p>Spain Sweden United Arab Emirates United Kingdom United States</p>
<p><b>H4. Finance &amp; Investment</b></p>			
<p><b>Breakthrough Agenda 2024 Report Recommendation:</b> Governments, MDBs, DFIs and relevant technical partners should work to deliver and scale up support by financing instruments and de-risking mechanisms, particularly for viable projects that are being delayed by high costs of capital and other obstacles to investment. This should include appropriate and coordinated technical and financial assistance, particularly in developing countries, to assist governments with policy design.</p>			
<p><b>Priority International Action on Finance &amp; Investment:</b> <i>Strengthen international assistance for clean hydrogen projects by identifying financing opportunities and de-risking mechanisms; and supporting programs to mobilize catalytic funding in emerging markets and developing economies.</i></p> <p>Enhance the overall public offer of international assistance for clean hydrogen projects, by coordinating and facilitating better access to financing instruments and expanded de-risking mechanisms and support programmes that address obstacles to investment, with the goal of mobilising catalytic funding at scale in emerging markets and developing economies. Targeted support in emerging markets and developing economies (EMDEs) through the 10 GW lighthouse initiative and a coordinated</p>	<p><b>How this will be taken forward:</b></p> <p>By countries and other stakeholders collaborating with relevant institutions and drawing on the insights gained in 2023 from World Bank, OECD, and UNIDO’s reviews of barriers to investment (in particular, risks that increase the cost of capital of projects) and UNIDO’s mapping of current international assistance, to strengthen support for clean hydrogen projects, in EMDEs with the aims of:</p> <p><i>Supporting the development of a consolidated and enhanced package of international assistance for clean hydrogen production &amp; use by COP30</i></p> <ul style="list-style-type: none"> <li>This could include: analysing the volume of finance required to be mobilised this decade and underpinning metrics for regional distribution to emerging markets and developing economies; and seeking to secure a broad commitment to</li> </ul>	<p><b>Collaborating initiative(s):</b></p> <p><i>Coordinated by:</i></p> <ul style="list-style-type: none"> <li>the United Nations Industrial Development Organisation (UNIDO)</li> <li>World Bank</li> </ul> <p><i>Partners:</i></p> <ul style="list-style-type: none"> <li>Donor countries</li> <li>Hydrogen for Development (H4D)</li> <li>Organisation for Economic Co-operation and Development (OECD)</li> </ul>	<p><b>Collaborating governments</b></p> <p>Australia Azerbaijan Cambodia Canada Chile European Commission Finland Germany Guinea Bissau Ireland Netherlands Panama Spain Sweden United Arab Emirates United Kingdom United States</p>

<p>matchmaking platform that facilitates access to support mechanisms is to be delivered on a pilot basis by COP30.</p>	<p>strengthening a coordinated package of international assistance through to 2030.</p> <p><i>Supporting the development of a matchmaking platform</i></p> <ul style="list-style-type: none"> <li>• This would seek to coordinate, mobilize, and facilitate access to finance and related support, helping to connect EMDEs with bespoke support mechanisms.</li> </ul> <p><i>Identifying and supporting viable projects through the 10 GW lighthouse initiative.</i></p> <ul style="list-style-type: none"> <li>• This would seek to: identify a priority portfolio of the most viable ‘lighthouse’ projects that have a prospect to reach final investment decision in coming years; identify the country and project specific barriers for deployment; develop methods of best practices to strengthen project governance, improve business models and deploy effective economic, de-risking and financing instruments; and support targeted and tailored assistance to overcome those obstacles.</li> </ul>		
<p><b>H5. Landscape Coordination</b></p>			
<p><b>Priority International Action on Landscape Coordination:</b></p> <p><i>Improve coordination among international initiatives to enhance global efforts and foster alignment.</i></p> <p>Support and facilitate the global landscape of initiatives and countries under the Hydrogen Breakthrough,</p>	<p><b>How this will be taken forward:</b></p> <p>Countries and initiatives will seek to further strengthen forums and institutions that support international co-operation in clean hydrogen, with sufficient participation, deeper analysis and communication of the potential gains from co-ordinated international action, supported by a dedicated Hydrogen Breakthrough Facilitator role, hosted by IPHE to jointly support the</p>	<p><b>Collaborating initiative(s):</b></p> <p><i>Coordinated by:</i></p> <p>Breakthrough Agenda Secretariat</p> <p>Hydrogen Breakthrough co-leads</p> <p>IPHE as hosts of the Hydrogen Breakthrough Facilitator</p>	<p><b>Collaborating governments</b></p> <p>Australia Azerbaijan Cambodia Canada Chile European Commission</p>

<p>facilitating information sharing and coordinating activities.</p> <p>Utilize the Breakthrough Agenda annual cycle to embed a process for regularly reviewing and updating a detailed map of international hydrogen initiatives and their workstreams, fostering a shared understanding of roles and plans, identifying gaps and overlaps, and brokering support for delivery.</p>	<p>Breakthrough Agenda Annual Cycle, which includes:</p> <p><i>Coordinating the Breakthrough Agenda Annual Cycle, including by:</i></p> <ul style="list-style-type: none"> <li>• Embed in the international landscape a light-touch process for regularly reviewing and updating a detailed map of the landscape of international initiatives and their hydrogen workstreams.</li> <li>• Facilitate a shared understanding of respective roles and plans, identify gaps and overlaps, develop options, and support delivery.</li> </ul> <p><i>Guiding Priority Actions, including by:</i></p> <ul style="list-style-type: none"> <li>• Use the Breakthrough Agenda report to capture priority actions and facilitate alignment with international goals and strategies for hydrogen development.</li> <li>• Prepare and develop supporting plans, resources and deliverables (where requested and relevant by initiatives and countries) to support the delivery of priority actions.</li> </ul> <p><i>Facilitating Information Sharing, including by:</i></p> <ul style="list-style-type: none"> <li>• Work with initiatives and countries under the Hydrogen Breakthrough to facilitate the sharing of information, delivery of key priority actions and light-touch coordination of activities where useful.</li> <li>• Coordinate an international annual calendar of events</li> <li>• Develop a single web-based portal as a transparent and accessible entry point for all global initiatives working in hydrogen</li> </ul>	<p><i>Partners:</i></p> <p>All leading international hydrogen initiatives</p>	<p>Finland Germany Guinea Bissau Ireland Japan Netherlands Norway Panama Spain Sweden United Arab Emirates United Kingdom United States</p>
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## **Growing priorities for collaborative action**

Over the past 12 months, several emerging areas of interest have been identified by interested countries and organizations for potential further collaboration and coordinated action. Through collective feedback, the following key areas have been identified for potential future focus in the Breakthrough Agenda framework, subject to prioritization and resource availability. These include:

1. **Skills and Capacity Building:** Enhancing the skills and capacities of stakeholders across the ecosystem is essential to drive innovation and effective implementation of clean hydrogen, including through identifying and addressing skill gaps, fostering knowledge exchange, and building the capacity of individuals and organizations.
2. **International Trade:** Accelerating international trade is crucial for setting up cross-border hydrogen and derivatives corridors and establishing a global market for clean hydrogen. Efforts could reflect the ongoing work of the International Hydrogen Trade Forum, that is bringing exporting and importing countries together and is facilitating the private-public dialogue.
3. **Social Acceptance and Community Engagement:** Achieving widespread adoption of hydrogen technologies requires the support and active participation of communities, including through ensuring that the benefits of hydrogen innovations are widely understood and shared.