

**International Hydrogen  
Fuel Cell Association (IHFGA)  
2024-2025 Annual Report**

# Global Hydrogen Energy Development 2024

## Hydrogen Supply: Electrolyzer Capacity and Production

Global hydrogen supply capacity has expanded rapidly. Installed electrolyzer capacity worldwide went from 0.69 GW in 2022 to about 1.4 GW at the end of 2023, and as of 2024, the global installed electrolyzer capacity is estimated to be around 5.2 GW as new projects come online. Growth is driven by large-scale green hydrogen projects and supportive policies across major regions. China, as the dominant player, accounted for roughly 80% of new electrolyzer capacity added in 2023 and is projected to hold almost 70% of global capacity by the end of 2024. Europe and the United States are also scaling up capacity, propelled by national strategies and incentives.

## Hydrogen Demand: Applications and Emerging Trends

Global hydrogen demand reached ~97 million tonnes (Mt) in 2023 and is on track to approach 100 Mt in 2024. However, the vast majority of this demand remains in traditional uses, areas like refining and industrial chemistry (ammonia and methanol production) continue to dominate, accounting for virtually all hydrogen consumption. New applications crucial to the energy transition are still nascent: in 2024, less than 2% of global hydrogen demand came from emerging sectors like clean steel, trucking, power generation, or shipping, although this segment did grow ~40% year-on-year from a small base.

Global demand for low-emission hydrogen (green or blue) did rise ~10% in 2023 to nearly 1 Mt, and still remained a continued upward trend in 2024, and governments have set targets and subsidies that could grow clean hydrogen use to 6 Mt per year by 2030. However, this would still be only a fraction of total demand, which means this is still huge need for sustained support to scale up hydrogen adoption across sectors.

In all, 2024 has seen solid progress in scaling hydrogen supply and early steps toward broadening hydrogen demand. Major markets and economies are investing heavily in both production capacity (with green hydrogen projects proliferating worldwide) and in end-use applications (from fuel cell mobility to industrial use), even as fossil-based hydrogen remains prevalent. The global hydrogen ecosystem is thus at an inflection point: poised for accelerated growth, but reliant on continued policy support, cost reductions, and infrastructure build-out to realize hydrogen's potential in the clean energy transition. All quantitative indicators: from electrolyzer deployment to FCEV adoption are all point upward, illustrating momentum as well as the considerable journey remaining to fully integrate hydrogen into the global energy system.

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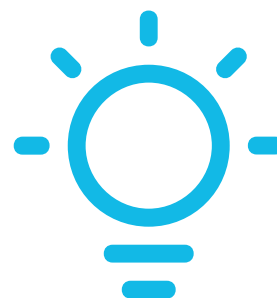
## MAJOR ACHIEVEMENTS

In 2024–2025, the International Hydrogen Fuel Cell Association (IHFCA) achieved significant milestones in advancing global hydrogen industry collaboration, standardization, and governance. The Association deepened its role as a thought leader and platform for innovation by successfully establishing the Hydrogen Safety and Equipment Working Committee, securing ISO 37301:2021 compliance certification, and being designated as a Category A Liaison Organization to the IEC Technical Committee 105. These developments strengthened IHFCA's institutional foundation and enhanced its global influence in shaping hydrogen and fuel cell standards.



IHFCA also played a vital role in convening international dialogue and forging strategic partnerships. From leading sessions at COP29 in Baku and hosting high-level forums in Beijing and Chongqing, to advancing the hydrogen industry at the International Hydrogen and Fuel Cell Vehicle Congress & Exhibition (FCVC) in Shanghai, and global industry webinars, IHFCA showcased a steadfast commitment to international collaboration. It expanded its membership to 102 from 21 countries. The formal approval of the China Green Hydrogen: From Production to Hard-to-Abate End Uses project, publication of the IHFCA Green Hydrogen Economy Insight report, and submission of multiple strategy & policy studies and recommendations collectively demonstrate IHFCA's proactive leadership in advancing hydrogen technology adoption, shaping policy frameworks, and fostering industrial integration within the global hydrogen sector.

# HIGHLIGHTS



## + 2 QUALIFICATIONS

Category A Liaison: IEC/TC 105  
Category A Liaison: ISO/TC 197/SC 1



## + 1 BRANCH

Hydrogen Safety and Equipment Working Committee



## + 13 MEMBERS

Saudi Aramco, China Automotive Engineering Research Institute Co. Ltd. (CAERI), DNV, Global Decarbonisation Advisory Pty Ltd., CNEX-Global B.V., Shanghai Taiqingchen Energy Technology Co., LTD., Australian Hydrogen Council, the Hydrogen Association of Egypt, FDG, Hilite International, China Optimization Society of Capital Construction, Monaco Hydrogen Alliance.



## + 2 IHFCA STANDARDS

- Evaluation Method for Activation Effectiveness of Proton Exchange Membrane Fuel Cell
- Economic Evaluation Method for Proton Exchange Membrane Fuel Cell Cogeneration System



## + 1 EXPERT NOMINATION TO ISO/TC 197

WG 39 Hydrogen technologies-Interoperability - Interface between gaseous hydrogen trailer and hydrogen fueling station



## + 1 STANDARD PORTAL

Launching the IHFCA Standard Portal



## + 10 INFLUENTIAL CONFERENCE/SUMMITS

FCVC 2025, the International Hydrogen Fuel Cell Passenger Vehicle Technology Forum, COP 29 CHINA PAVILION & UNIDO PAVILION, the International Hydrogen Energy Industry Forum, the International Forum on Key Technologies for Hydrogen Energy Storage, Transportation and Utilization ...



## + 1 IN-DEPTH INDUSTRY RESEARCH REPORT

IHFCA Green Hydrogen Economy Insight



## 3 DEMONSTRATION CITIES

China Green Hydrogen: From Production to Hard-to-Abate End Uses project: Ningdong, Shenyang, Dalian



# International Hydrogen Fuel Cell Association (IHFCFA) 2024–2025 Work Report

The International Hydrogen Fuel Cell Association (IHFCFA) has played a pivotal role in advancing the global hydrogen energy industry through a series of impactful initiatives and collaborations during 2024–2025. As an international organization committed to accelerating the development of hydrogen energy, IHFCFA has actively engaged in fostering innovation, promoting international cooperation, and advocating for sustainable energy solutions.

Key achievements include hosting the International Hydrogen Fuel Cell Passenger Vehicle Technology Forum in Chongqing, which brought together over 10,000 participants and launched the "IHFCFA Hydrogen Safety and Equipment Working Committee" to address safety and innovation challenges. At COP29 in Baku, Azerbaijan, IHFCFA co-hosted two side events to champion hydrogen as a climate strategy solution and released the "IHFCFA Green Hydrogen Economy Insight," co-authored with leading global institutions. Furthermore, November 2024 marked the official approval of the GEF-8 project, launching a five-year green hydrogen demonstration initiative across three Chinese pilot cities.

IHFCFA's active participation in global events such as Hyvolution in Paris, the African Green & Natural Hydrogen Conference in Addis Ababa, and the H4D Annual Meeting in Tokyo further underscores its commitment to driving the sustainable growth of the hydrogen economy. The association has expanded its network to include 102 members across 21 countries and regions, engaging with key stakeholders in Africa, Asia, Europe, and beyond to promote hydrogen production, storage, transportation, and application.

IHFCFA has also emerged as a pivotal force in advancing the global hydrogen economy through its comprehensive member services. By fostering international collaboration, developing industry standards, and facilitating high-level exchanges, the association has strengthened the hydrogen ecosystem's governance and accelerated technology deployment. Its thought leadership publications and tailored consulting services empower members to navigate the energy transition effectively. Through strategic partnerships with key industry players and participation in major global events, IHFCFA bridges policy, research and commercial implementation, driving meaningful progress toward carbon neutrality while enhancing member competitiveness in this critical sector.

Policy studies and suggestions are central to IHFCFA's mission, serving as catalysts for the global hydrogen economy's sustainable growth. By conducting rigorous research and providing actionable recommendations, IHFCFA bridges the gap between innovation and implementation, helping shape regulatory frameworks that accelerate hydrogen adoption.

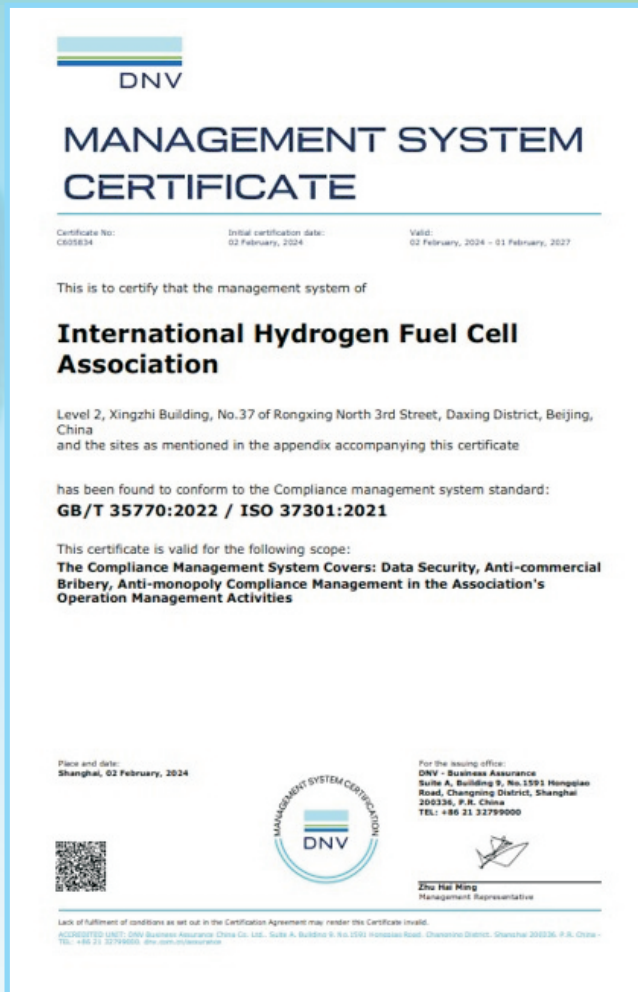
Through these efforts, IHFCFA has established itself as a leading force in shaping the future of the hydrogen industry, playing critical roles in innovation, collaboration, and policy advocacy. Its initiatives align with global decarbonization goals and contribute to the transition to clean energy, particularly in heavy-duty transportation and long-haul sectors.



# I. Strengthening Industry Foundations: Safety Governance & Compliance Excellence

## 1. From Certification to Continuous Improvement:

Following the successful certification in February 2024, where IHFCA obtained the ISO 37301:2021 Compliance Management System Certification through a rigorous audit by the globally recognized body DNV, IHFCA successfully passed its first annual compliance audit in January 2025. As part of this process, IHFCA enhanced its compliance risk register, optimized internal compliance workflows, and further strengthened its governance structure through the refinement of relevant policies and procedures.



- ISO 37301:2021 Compliance Management System Certification

## **2. Launch of the Hydrogen Safety and Equipment Working Committee:**

To promote the safe, efficient, and widespread deployment of hydrogen energy through in-depth research to establish strategic frameworks, technology roadmaps, and standardization initiatives for hydrogen-related equipment. On October 31, 2024, the Hydrogen Safety and Equipment Working Committee of the International Hydrogen Fuel Cell Association (IHFCA) was officially established during the International Hydrogen Fuel Cell Passenger Vehicle Technology Forum. The Secretariat of the Committee is hosted by China Automotive Engineering Research Institute Co., Ltd.



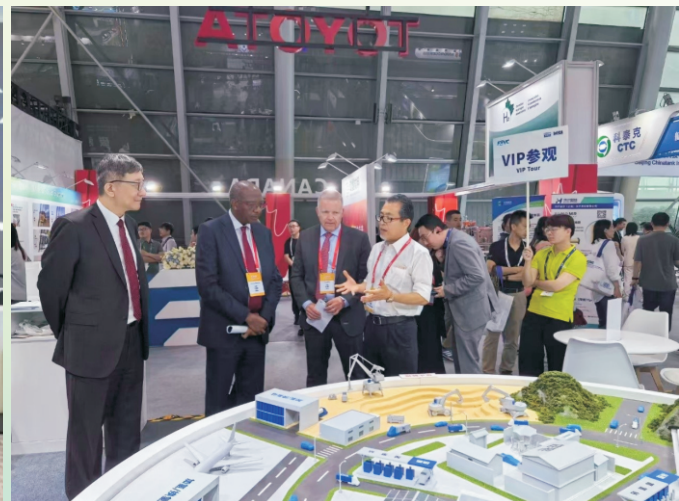
## II. Advancing High-Quality Global Exchange and Cooperation in Hydrogen and Fuel Cell Sectors

### 1. From Innovation to Industrialization: FCVC 2025 Catalyzes Global Hydrogen Ecosystem Development

Hosted by IHFCA, the 2024 International Hydrogen and Fuel Cell Vehicle Congress & Exhibition (FCVC 2024) was successfully held in Shanghai from June 4 to 6, 2024. The event received an enthusiastic response and yielded fruitful outcomes. Centered around key topics such as core components of fuel cells, hydrogen production and storage, hydrogen transport and infrastructure, commercialization of fuel cell vehicles, hydrogen safety and regulatory standards, and investment in the hydrogen industry, the conference featured one plenary session, seven themed forums, and five concurrent sessions. A series of engaging activities were also conducted, including technical presentations, product launches, technical site visits, public outreach events, and cooperation agreement signings.



- Vice Chair representatives of IHFCA including China SAE, Anglo American (now Valterra Platinum), SAIC, etc.



- Representative from Toyota Motor — IHFCA Vice Chair Organization

Scheduled for June 18–20, 2025, the 2025 International Hydrogen and Fuel Cell Vehicle Congress & Exhibition (FCVC 2025) will be held at Shanghai International Auto City under the theme: *“Forging Consensus, Overcoming Challenges: Embarking on a New Journey Toward Industry Scale-Up.”*

The event will feature:

● **2 Plenaries:**

- ▶ ADVANCING THE INDUSTRY INTO A NEW STAGE OF SCALED DEVELOPMENT
- ▶ DIVERSIFIED APPLICATIONS OF HYDROGEN ENERGY AND FUEL CELLS ACROSS MULTIPLE SCENARIOS

● **6 Technical Deep-Dive Themed Forums:**

- ▶ Fuel Cell Endurance Technology Development and Application Breakthrough in the Whole Chain
- ▶ The Path to Hydrogen Parity - Industry Trend, Technology Realization Paths and Investment Opportunities
- ▶ Cost Reduction of Green Hydrogen Production: Breakthrough and Application of Electrolysis Technology
- ▶ Storage and Transport Safety & Commercialization: From Technology Validation to Large-Scale Deployment
- ▶ Global Hydrogen Strategies: Unlocking Opportunities Through International Collaboration
- ▶ Hydrogen Ignites New Quality Productive Forces: Accelerating Commercial Applications through Cross-Industry Collaboration and Innovation

- **40+ technical presentations, Tech Tours, FCVC Walk, and engaging activities such as hydrogen-powered bike-sharing experiences.**

- **A 3-day technical and equipment exhibition, showcasing product launches, technical demonstrations, and site visits**

FCVC 2025 will feature four key highlights:



**Global Participation:**

Nearly **300** domestic and international enterprises/brands confirmed



**Fresh Perspectives:**

Over **40%** first-time exhibitors



**Scale & Focus:**

**25,000m<sup>2</sup>** dedicated to cutting-edge technical and equipment displays



**Audience Reach:**

**7,000+** professional attendees projected

## 2. Hydrogen-Powered Baja Racing Debuts in China Automotive Engineering Competition

From October 13–19, 2024, the China-SAE Baja Competition – Nanxun Station, co-hosted by China-SAE and IHFCA, was held in Nanxun District, Huzhou, Zhejiang Province. For the first time, a hydrogen-powered Baja racing category was introduced, with four university teams participating.

This innovative event reflects the integration of hydrogen and fuel cell technologies into automotive engineering education and promotes green, sustainable values. It also provides a valuable platform for showcasing R&D and deepening collaboration between academia and industry in advancing hydrogen technology.



● Baja Competition – Nanxun Station

### 3. Pioneering Sustainable Transport: IHFCA Forum Unites Experts to Accelerate Hydrogen Fuel Cell Passenger Vehicle Adoption

On October 31, 2024, IHFCA hosted the International Hydrogen Fuel Cell Passenger Vehicle Technology Forum in Chongqing. The event gathered leading global experts and corporate executives to explore technical challenges, market prospects, user experience, and development trends across different technology pathways. More than 10 distinguished speakers from institutions such as CAERI, BMW, DEEPAL, and key stakeholders in fuel cell stacks, vehicle integration, and certification presented at the forum. The event attracted over 10,000 participants in both online and onsite formats.

During the forum, IHFCA officially launched the “IHFCA Hydrogen Safety and Equipment Working Committee”. This initiative marks a pivotal step in fostering collaboration and innovation to accelerate the global transition to sustainable hydrogen-powered transportation.



● International Hydrogen Fuel Cell Passenger Vehicle Technology Forum in Chongqing



## 4. Bridging Innovation and Equity: IHFCA's Multifaceted Impact at COP29

From November 11–22, 2024, IHFCA actively participated in the 29th Conference of the Parties (COP29) to the UNFCCC in Baku, Azerbaijan.

On November 13, IHFCA co-hosted a side event titled “Hydrogen Powering Climate Action: Towards a Clean Energy Future with Net-Zero Emissions” at the China Pavilion (Blue Zone), in partnership with Sinopec Group and the Foreign Environmental Cooperation Center, Ministry of Ecology and Environment. The event aimed to promote international cooperation on hydrogen energy, highlight China's innovation achievements, and advocate for the safe, efficient, and sustainable development of hydrogen technologies.



- IHFCA and representatives from its members (including Sinopec Group, Anglo American (now Valterra Platinum), REFIRE Group, and HydoTech) at COP 29 – China Pavilion

- On November 13, 2024, during the COP29, the thematic side event "Hydrogen Powering Climate Action: Towards a Clean Energy Future with Net-Zero Emissions," jointly organized by the International Hydrogen Fuel Cell Association, Sinopec Group, and the Foreign Environmental Cooperation Center (FECO), Ministry of Ecology and Environment of China, was successfully held at the "China Pavilion" in the Blue Zone

During the event, IHFCA released the IHFCA Green Hydrogen Economy Insight, co-authored with the GH2, Tsinghua University, UNSW Sydney, North China Electric Power University, Dalian Institute of Chemical Physics (CAS), Hyundai Motor Group, and Sungrow Hydrogen.

On November 14, IHFCA, in collaboration with the United Nations Industrial Development Organization (UNIDO) and the International Hydrogen Energy Center (IHEC), hosted another COP29 side event titled “Investing in the Future of Hard-to-abate Sectors with Low-Emission Hydrogen” to showcase the role of low-emission hydrogen in decarbonizing industries such as road transportation. Additionally, UNIDO released the Comprehensive Catalogue for Decarbonizing Transport, with IHFCA serving as lead contributor for the road transport section.



● COP 29 – UNIDO Pavilion

IHFCA partnered with Climate Action as a Partner Institute for the Hydrogen Transition Summit, marking its second consecutive year of supporting this global industry event. Ms. Wang Ju was invited to attend and participated actively in the panel discussion titled Revolutionizing Transport: Unleashing Hydrogen's Potential, where she emphasized hydrogen's critical role in decarbonization—particularly for heavy-duty commercial vehicles and long-haul transportation—and its capacity to accelerate the clean energy transition.

IHFCA also participated in the thematic event Women in Energy Transition: Baku Dialogue, hosted by the Women in Renewables Alliance (WiRA). The session focused on “Impact Investing, Gender Equality, and Sustainable Energy”, exploring women's pivotal role in driving energy innovation.

COP29 served as a pivotal platform for IHFCA to:

- Champion hydrogen as a key solution of climate strategy, backed by research and real-world applications.
- Catalyze collaboration between governments, industries, and institutions to overcome decarbonization barriers.
- Amplify IHFCA's voice in global clean energy dialogues while supporting equitable, technology-driven climate solutions.

## 5. Forging a Global Hydrogen Future: Beijing Forum Unites Industry Leaders to Accelerate Cross-Border Decarbonization

The International Hydrogen Energy Industry Forum convened in Beijing on November 24, 2024. The forum featured a keynote address by Academician Gan Yong of the Chinese Academy of Engineering, alongside presentations from distinguished experts and industry leaders spanning hydrogen production, storage and transportation, industrial applications, and global trade sectors. Speakers shared insights on scenario-based hydrogen applications and best practices for regional/international trade of hydrogen-derived products.

This gathering not only advanced cross-sectoral collaboration but also positioned China's hydrogen ecosystem as a critical enabler of global decarbonization efforts, aligning with IHFCA's mission to accelerate the energy transition.



● International Hydrogen Energy Industry Forum, Beijing, China



## 6. From National Progress to Global Leadership: IHFCA Spotlights China's Hydrogen Advancements and Calls for Unified Global Action on the international stage

From January 31 to February 2, 2025, IHFCA actively participated in Hyvolution 2025 in Paris, France. At the International Organization Pavilion, staff of the secretariat delivered two keynote presentations covering global low-emission hydrogen production progress and current status, as well as fuel cell vehicle and infrastructure development landscape. Furthermore, the presentations elaborated on China's technological roadmap for hydrogen energy development and its related incentive policies, while emphasizing the critical importance of international cooperation in this field.

On May 14, IHFCA was invited to attend the exclusive Hydrogen Council Business Forum convened in Shanghai, China. Ms. Wang Ju delivered a keynote speech titled "Insights from China's Hydrogen Energy Development Journey," offering a systematic overview of China's achievements in the hydrogen energy and fuel cell vehicle sectors.



● Hydrogen Council Business Forum, Shanghai, China



From May 26–28, IHFCA, as a new partner of the Hydrogen for Development (H4D) initiative launched by the World Bank, took part in its annual meeting in Tokyo. As of 2025, IHFCA will actively contribute to H4D's global research projects and events, helping drive the sustainable growth of the global hydrogen economy.



● Hydrogen for Development (H4D) Annual Meeting in Tokyo, Japan

These events symbolize IHFCA's proactive engagement in shaping the future of the hydrogen industry. It reflects the association's dedication to driving innovation, fostering collaboration, and advocating for sustainable energy solutions.

## 7. From National Innovation to African Implementation: IHFCA Catalyzes Hydrogen Cooperation at Addis Ababa Summit

From April 8–9, 2025, IHFCA representatives actively participated in the African Green & Natural Hydrogen Conference in Addis Ababa, hosted by the African Hydrogen Partnership (an IHFCA Executive Member). At the conference, IHFCA shared global hydrogen development trends, China's fast-growing hydrogen market and its application in road transport sector, highlighting the policy incentives, technological innovations, and large-scale demonstration applications underway in China.

IHFCA's participation in the African Green & Natural Hydrogen Conference marked a strategic expansion into emerging hydrogen economies. This engagement established IHFCA as a bridge between China's mature hydrogen ecosystem and Africa's emerging clean energy markets, creating a framework for knowledge-sharing and joint development of renewable energy infrastructure across the African continent.



- IHFCA's participation in the African Green & Natural Hydrogen Conference

## 8. Advancing Hydrogen's Future: Beijing Forum Charts Path for Storage, Transport & Utilization Breakthroughs

The International Forum on Key Technologies for Hydrogen Energy Storage, Transportation and Utilization convened in the Beijing Daxing International Hydrogen Energy Demonstration Zone on June 4, 2025. The event brought together over 30 experts, scholars, and industry leaders from academia, enterprises, and government institutions to engage in in-depth discussions on key challenges such as high costs, safety risks, and limited infrastructure. The forum explored solutions including technology localization, policy support, and cross-sector collaboration, offering insights for industry development and policymaking.



- The International Forum on Key Technologies for Hydrogen Energy Storage, Transportation and Utilization



● Kick-off Meeting for the IHFCA Standard on Evaluating the Activation Effectiveness of PEM Fuel Cells

In the afternoon, IHFCA hosted the kick-off meeting for a new standard on evaluating the activation effectiveness of PEM fuel cells. Led by Tongji University, this standard aims to improve fuel cell performance and manufacturing efficiency, supporting industry scale-up.

This event marked a significant step forward in IHFCA's efforts to drive technical standardization, support industrial innovation, and promote the safe, efficient, and scalable development of the hydrogen energy sector. The forum outcomes will provide valuable input for policymaking, industrial layout, and future R&D directions, reinforcing IHFCA's leadership role in shaping global hydrogen industry standards.

### III. Empowering the Hydrogen Ecosystem: IHFCA's Comprehensive Member Services Drive Global Collaboration

Since its establishment, the International Hydrogen Fuel Cell Association (IHFCA) has remained committed to its mission of "advancing the high-quality development of the global hydrogen energy industry and supporting the achievement of carbon neutrality goals." With a strong focus on member engagement, the association has prioritized member services as a core part of its daily operations. Through close collaboration with its members, IHFCA has actively participated in shaping the international hydrogen governance framework, integrating global resources, and fostering extensive international exchanges and cooperation.

Over the past year, IHFCA has made notable progress in several key areas, including:

- Building international exchange and cooperation platforms
- Hosting conferences and events
- Promoting international standards development
- Implementing global demonstration projects
- Strengthening multilateral institutional partnerships





## Member Services & Industry Engagement

IHFCA has continued to deepen its roots in the hydrogen sector, delivering high-value services to its members, such as:



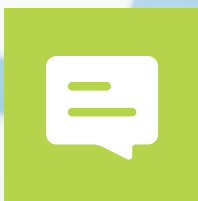
**14** Global Hydrogen and Fuel Cell Monthly Journals



**2** International Hydrogen and Fuel Cell Strategy & Policy Reports



**1** research report: IHFCA Green Hydrogen Economy Insight



Customized Consulting Services



● IHFCA's major publications

### Strengthening Global Collaboration Platforms

The association has played an active role in organizing high-level international events, such as:

- Multiple **technical forums** on hydrogen and fuel cell advancements
- Representatives from Sinopec Group, Anglo America (now Valterra Platinum), Tsinghua University, REFIRE, and HydoTech attended two thematic side events during **COP29**
- **Two international webinars** on hydrogen industry trends (in collaboration with AHP)

Additionally, IHFCA has established regular communication and collaboration with leading global enterprises, including Saudi Aramco, Hyundai Motor Group, and W. L. Gore & Associates, to enhance resource-sharing and strategic alignment. Over the past year, the association has facilitated **more than 20 member visits and high-level exchanges**. For instances, in February and May 2025, hosting senior executives from Saudi Aramco for a tour of Beijing's Daxing Hydrogen Demonstration Zone, followed by discussions on global hydrogen strategy. In March, IHFCA Chairman, Academician Ouyang Minggao, met with the delegation of W. L. Gore & Associates to explore opportunities for collaboration in the global hydrogen fuel cell vehicle supply chain.



## Standardization Initiatives & Member Collaboration

IHFCA works closely with its members to facilitate engagement in high-level international hydrogen standardization efforts. Key activities include:

- **Timely updates** on critical ISO/TC 197 and IEC/TC 105 standard revisions, as well as expert nomination opportunities.
- **Active encouragement** for members to propose new standards through the IHFCA Standardization Working Committee

To date, **two IHFCA-led standards** are currently under development, reflecting the association's commitment to advancing global hydrogen industry benchmarks.

Over the past year, IHFCA's member organizations have actively participated in and supported the Association's various initiatives, diligently fulfilling their responsibilities. They have provided strong support in areas such as organizational development, capacity building, business expansion, and industry empowerment. In particular, Vice Chair institution Anglo American (now Valterra Platinum) has made significant contributions to the Association's international engagement and hydrogen mobility promotion research efforts.

## IV. Actively Expanding Partnerships and Broadening Global Membership

In 2024, the International Hydrogen Fuel Cell Association (IHFCFA) proactively built strategic relationships with international organizations and institutions, including the United Nations Industrial Development Organization (UNIDO), the World Bank, the Asian Infrastructure Investment Bank (AIIB), the Global Hydrogen Industrial Association Alliance (GHIAA), Hydrogen for Development (H4D), the Canadian Hydrogen Association (CHA), the Hydrogen Association of Egypt (H2EH), the Global Hydrogen Organization (GH2), Climate Action, the Sustainable Energy Council (SEC), and various embassies around the world.

In the same year, IHFCFA significantly expanded its global membership network, achieving a nearly 20% year-on-year increase with 13 new members. Notable additions include Saudi Aramco, Hydrogen Association of Egypt (H2EH), Australian Hydrogen Council (AHC), DNV (Norway), Global Decarbonization Advisory Pty Ltd (Australia), and Monaco Hydrogen Alliance (MHA). As of now, IHFCFA has a total of 102 members, spanning 21 countries and regions.

IHFCFA further expanded its network across the African continent. The association established connections with the African Union Commission (AUC), engaging in discussions on hydrogen production, storage, transportation, and application, as well as the development of fuel cell technology in Africa. Additionally, IHFCFA initiated dialogues with relevant government agencies in Ethiopia, South Africa, Namibia, and Egypt—countries with established foundations in the hydrogen energy sector—and expressed mutual interest in future collaboration on low-emission hydrogen and fuel cell technologies.



Throughout 2024–2025, IHFCA continued to engage actively with its members, facilitating close communication and resource sharing. On July 24, 2024, a delegation of over 30 representatives from Hyundai Motor Group, an IHFCA Vice Chair member, visited IHFCA headquarters for in-depth discussions on the current state and future outlook of hydrogen development in China and South Korea.



● Hyundai Motor Group Representatives Visit IHFCA and China SAE

On July 30, 2024, the International Hydrogen and Fuel Cell Association (IHFCA) received a high-level delegation from the United Kingdom, including Ms. Nicole Gregory, Deputy Director of International Technology at the UK Foreign Office; Mr. Perry Smith, Policy Officer in the International Technology Directorate of the UK Foreign Office; Mr. Alex Way, Counsellor for Climate Change, Energy, Environment and International Development at the British Embassy in Beijing; and Mr. David Giles, Head of Energy Transition at the Department for Business and Trade of the British Embassy in Beijing. This visit highlighted the growing strategic partnership between Chinese and British stakeholders in advancing hydrogen fuel cell technologies.



● The United Kingdom Government Delegation Visit IHFCA

On February 20, 2025, Dr. Ali Al-Meshari, Senior Vice President of Saudi Aramco (an Executive Member of IHFCA), led a delegation to the IHFCA Secretariat in Beijing to exchange views on global hydrogen strategies and IHFCA's mission. The parties also engaged in in-depth discussions regarding investment opportunities across the hydrogen energy industry chain.



● Saudi Aramco Representatives Visit IHFCA

On March 13, 2025, Academician Minggao Ouyang, Chairman of IHFCA, held a strategic dialogue with Mr. Bret Snyder, Global CEO of IHFCA member company W. L. Gore & Associates, accompanied by Mr. Steve Moule, Chief Operating Officer, and Mr. Ben Zhang, Managing Director & Regional Enterprise Leader for Greater China at Gore Industrial Products Trade.

The discussions focused on current developments and future trajectories of both China's domestic hydrogen and fuel cell industry and the global market landscape, reinforcing the shared commitment to technological advancement and international collaboration in the sector.



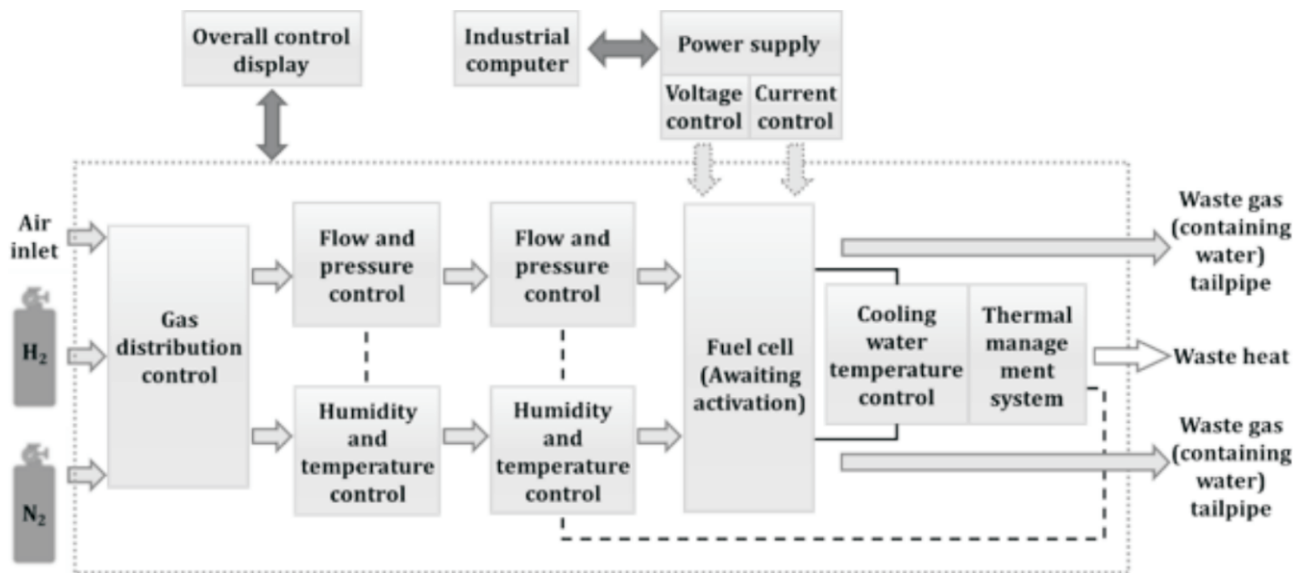
- Mr. Bret Snyder, Global CEO of W. L. Gore & Associates, and his executive delegation visit Academician Minggao Ouyang, Chairman of IHFCA



## V. Advancing Standardization and Expanding International Collaboration

### Standardization Initiatives

In 2024, two standard proposals—Evaluation method for activation effectiveness of proton exchange membrane fuel cell and Economic evaluation method for proton exchange membrane fuel cell cogeneration system—submitted by Tongji University successfully passed the preliminary review in accordance with the IHFCA Standardization Working Directives. These proposals have been formally incorporated into IHFCA's standardization development agenda.



● Evaluation Method for Activation Effectiveness of Proton Exchange Membrane Fuel Cell

Further strengthening its global engagement, IHFCA was approved as a Category A Liaison Organization to the IEC Technical Committee 105 (Fuel Cell Technologies) in January 2025, following deliberation by the International Electrotechnical Commission (IEC). This milestone enhances IHFCA's role in shaping international fuel cell standards and fosters deeper alignment between regional and global standardization efforts.

### Fulfilling ISO/TC 197 Liaison Responsibilities & Expanding Member Engagement

As a Category A Liaison Organization to ISO/TC 197, IHFCA actively facilitates member participation in international standard development. In December 2024, we convened a virtual meeting to update stakeholders on key ISO/TC 197 standard initiatives. Additionally, we periodically circulate expert nomination opportunities to members. That same year, IHFCA nominated one expert (Mr. Kang Zetian, SINOPEC Safety Engineering Institute) to ISO/TC 197 Working Group 39 (Hydrogen technologies - Interoperability - Interface between gaseous hydrogen trailer and hydrogen fueling station).

## Developing IHFCA's Standardization Framework & Roadmap

Leveraging the expertise of our Standardization Working Committee, we established a three-tier IHFCA Standard System addressing:

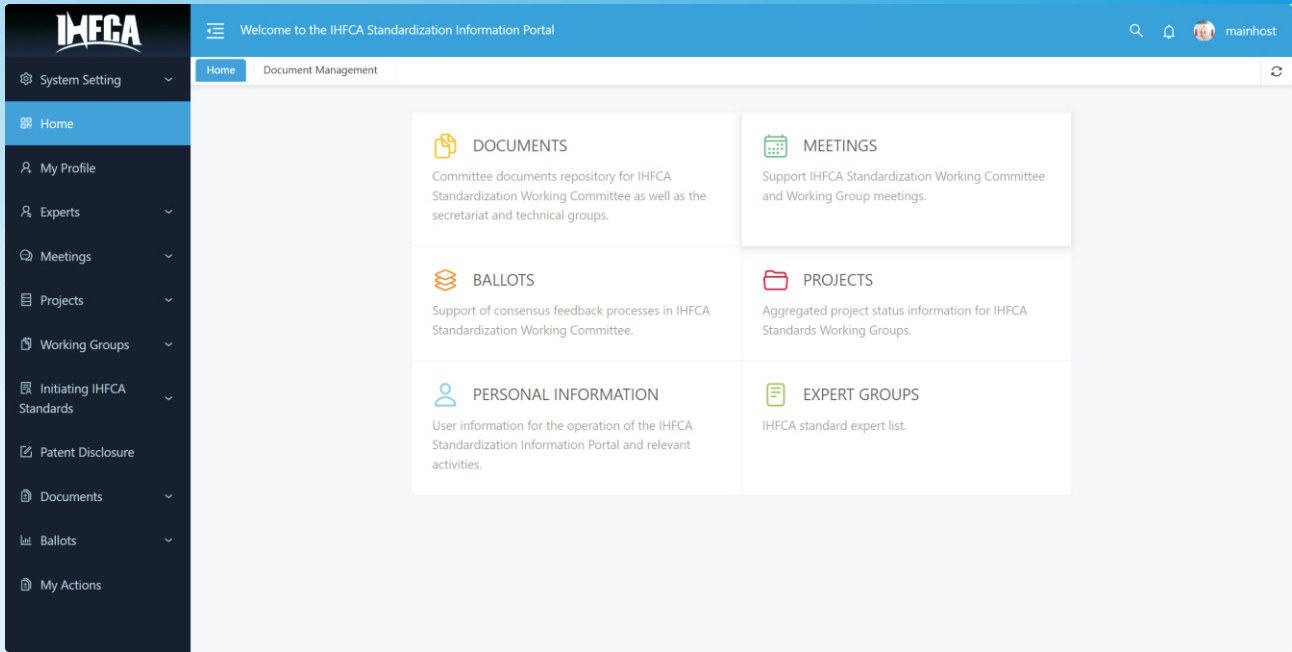
- Hydrogen production, storage, and transportation
- Refueling infrastructure and safety protocols
- Fuel cell technologies, vehicles, and end-use applications.
- This framework is now being operationalized with clear timelines for standard development and revision across all domains.

## Launching the IHFCA Standard Portal

To digitalize standardization processes and enhance global collaboration, we deployed the IHFCA Standard Portal, which streamlines:

- 📌 Consensus-building through virtual meetings
- 📌 Document sharing and project applications
- 📌 Committee voting and expert group formation
- 📌 Collaborative draft editing and progress tracking

This end-to-end platform embodies our co-creation, co-development, and co-sharing philosophy for hydrogen standards.



● IHFCA Standard Portal



# VI. Leveraging High-Level Think Tank Capabilities to Advance Hydrogen-Based Productive Forces

With support from China's Ministry of Industry and Information Technology (MIIT) and Ministry of Finance, IHFCA partnered with the United Nations Industrial Development Organization (UNIDO) to implement **China Green Hydrogen: From Production to Hard-to-Abate End Uses** project in Ningdong, Dalian, and Shenyang—regions abundant in renewable resources. These initiatives focus on scaling up green hydrogen production, storage, transportation, and end-use applications, particularly in road transportation and industrial sectors. The projects encompass policy formulation, standardization development, full-chain demonstration, capacity building, and international collaboration, aiming to accelerate sustainable green development while elevating hydrogen's role in China's and global energy markets. The project has also attracted active participation from numerous IHFCA member organizations, including China SAE, CHN ENERGY, BMW, Sinopec, Tsinghua University, FORVIA, REFIRE, and FTXT Energy Technology.



● China GreenHydrogen: From Production to Hard-to-Abate End Uses Project



● **Hydrogen Production Equipment in Ningdong**

The Project Identification Form (PIF) received conceptual approval in June 2023. Between June and October 2024, the detailed implementation plan was submitted to the Global Environment Facility (GEF) Council and refined based on feedback. The project secured formal GEF approval in November 2024.



● **Hydrogen Refueling Station and Fuel Cell Bus in Dalian**



● **GEF-8 Project Coordination Meeting in Beijing**

As a premier knowledge partner, IHFCA contributed to UNIDO's Committee of Energy Engineering Transition (CEET) report Comprehensive Catalogue for Transport Decarbonization, launched at COP29. Aligned with UN Sustainable Development Goals (SDGs) 7 (Affordable and Clean Energy), 11 (Sustainable Cities), and 13 (Climate Action), the report provides policymakers with scientifically validated transition pathways across road, maritime, aviation, and rail sectors through CEET's authoritative platform.

## Comprehensive Catalog on Transportation Decarbonization

### Key Messages

#### Minimize Energy Losses and Promote Electricity as Primary Energy Vector

Current business practices sometimes dictate the use of longer routes than necessary or to carry excessive amounts of fuels. Such practices unnecessarily increase the fuel consumption for propulsion and should be avoided. Most alternative fuels require the use of massive amounts of electricity, part of which is lost during conversion to alternative fuels. Direct electrification is the most efficient way of using electricity and it should be promoted whenever the electric grid is powered by a majority of green energy. [e.g. in Poland the power is 100% old coal power stations, and until that has been changed biofuels will be a better option than EV's and electrifying railways]

#### Aviation

Aviation plays a crucial role in economic and social development by connecting societies and generating employment opportunities. While electrification is the most efficient solution, it would not be feasible for long-haul flights for decades. Indeed, aviation faces an additional complexity, as flying requires high energy density, especially for long-haul flights. For long-haul flights, it is necessary to rapidly upscale the production of advanced biofuels and synthetic fuels until alternative technologies become available at the 2050 horizon. Electric and hydrogen-powered aircraft hold great promise for short and medium-haul flights in the next decade. Overall, all these solutions will require a huge amount of low-carbon, clean and affordable electricity.

#### Rail

Rail has the potential to play a major role in the future of transportation and its decarbonization considering the advantages that it offers in terms of energy and space efficiency,<sup>2</sup> time-saving, comfort, and load volumes. Today rail networks carry approximately 8% of global motorized passenger movements and 7% of freight transport. Rail infrastructure is a capital-intensive business depending on diverse factors including costs of land, labor and materials, tracks per line, track electrification, topography, and intended operation speed. Therefore high throughputs are required to minimize unit costs. Modal shift, especially from short-haul air travel to high-speed rail, is determined by the routes that lower construction costs. To be a competitive alternative, rail journeys must be time saving compared to available flight options. Finally, the demand has to be large enough to achieve the economic viability of the investments required for rail connections.

#### Road

With increasing CO<sub>2</sub> emissions, the road transport sector urgently needs to embrace clean energy solutions. Further accelerating the sector's electrification stands as a critical pathway. Electric vehicles (EVs) and fuel cell vehicles (FCVs) represent the primary pathway to zero emissions. Both leverage on clean energy like renewables energies, but EVs perform better on shorter distances, while FCVs do well on longer and heavy-duty journeys. By investing in infrastructures, renewables, storage and other leading low-carbon technologies and implementing targeted policies and regulations, the road sector can unlock sustainable mobility and economic growth. Now is the time for collaborative efforts from governments, consumers, and the private sector to overcome existing challenges and accelerate the transition to renewables in the road transport sector.



OCT 2024

### ● Comprehensive Catalogue for Transport Decarbonization

Building upon existing industrial policy achievements, IHFCA reinforced industry confidence through policy continuity in June 2025. Serving as both a catalyst for sector development and a cross-industry collaboration platform, IHFCA partnered with leading think tanks to formulate policy recommendations. These research-backed proposals for advancing fuel cell vehicle commercialization were formally submitted to relevant authorities to support high-quality industry growth.

# International Hydrogen Fuel Cell Association (IHFCFA) Annual Financial Report

Dear Board Members,

Greetings!

Entrusted by the Fifth Session of the First Executive Board Meeting of the International Hydrogen Fuel Cell Association (IHFCFA), I am honored to present to the Assembly a report on the Association's primary financial activities for the period from January 1, 2024, to December 31, 2024, for your review and consideration.

A financial audit of the Association's accounts for the year 2024 was conducted by Beijing Shenzhou Certified Public Accountants in February 2025. The core findings are summarized as follows:

## I. General Financial Overview

The International Hydrogen Fuel Cell Association (IHFCFA) was officially established on July 22, 2022. It is registered with the Ministry of Civil Affairs of the People's Republic of China under the Social Organization Registration Certificate No. 51100000MJ0000798U. The registered capital is RMB 2 million. The Association's legal representative is Ms. Wang Ju. The primary sources of funding include membership dues, service revenue, and government grants.

### (1) Revenue and Expenditure

1. **Total revenue for the year 2024** amounted to **RMB 14.49 million**, comprising:

- Membership dues: RMB 6.09 million
- Service revenue: RMB 6.57 million
- Government grants: RMB 1.80 million
- Other income: RMB 0.03 million

2. Total expenditures for the year 2024 amounted to RMB 9.99 million, including:

- Business activity costs: RMB 7.61 million
- Administrative expenses: RMB 2.47 million
- Financing expenses: RMB -0.09 million

3. **Net asset change for the year stood at RMB 4.50 million.**

### (2) Assets and Liabilities

1. As of December 31, 2024, the total assets of the Association stood at RMB 13.16 million, including:

- Cash and cash equivalents: RMB 12.25 million
- Accounts receivable: RMB 0.84 million
- Net fixed assets: RMB 0.05 million

2. As of **December 31, 2024**, the **total liabilities** amounted to **RMB 0.17 million**, all of which are current liabilities.

3. As of **December 31, 2024**, the **total net assets** amounted to **RMB 12.99 million.**

## II. Audit Opinion


Based on the audit, the financial statements of the International Hydrogen Fuel Cell Association have been prepared in all material respects in accordance with the Regulations on the Registration and Administration of Social Organizations and the Accounting Standards for Non-Governmental Non-Profit Organizations. The statements fairly reflect the Association's financial position and operating results.

# IHFCA 2025 - 2026 Work Plan

## I. Advancing High-Quality International Cooperation and Exchange in the Hydrogen and Fuel Cell Sector

### HydrogenSphere – Connecting the Global Hydrogen Ecosystem

 Paris, France

 Sept. 25

HydrogenSphere – Connecting the Global Hydrogen Ecosystem is designed to advance this vision. Organized by the International Hydrogen Fuel Cell Association (IHFCFA) and the China Society of Automotive Engineers (China SAE), the event will bring together policymakers, industry pioneers, financial institutions, and researchers to collaborate on key strategies for scaling hydrogen deployment worldwide.

Held in Paris, HydrogenSphere will serve as a high-level platform for public and private stakeholders to collaborate on advancing the global hydrogen economy. Bringing together government representatives, industry leaders, financial institutions, and research experts, the conference will focus on key themes such as policy frameworks, standardization, technology innovations, and successful business models driving green hydrogen adoption. Discussions will highlight real-world demonstration projects, regulatory best practices, and financing mechanisms that can accelerate large-scale deployment. With a global perspective, the event aims to strengthen cross-border cooperation, align industry standards, and explore scalable solutions for integrating green hydrogen across energy, mobility, and industrial sectors.

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### COP30: 30th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC)

 Brazil

 November 10 - 22

Building on the established partnerships with UN agencies through past COP events, IHFCFA will continue to organize hydrogen-related sessions during COP to strengthen its presence on high-level global platforms. These activities will not only raise IHFCFA's international visibility and influence but also serve as a bridge for member institutions to connect with global resources and integrate into international value chains.

During COP30, scheduled for November 10–22, 2025, IHFCFA plans to host two hydrogen- and low-carbon-related side events in collaboration with member organizations and international partners. These events will take place in the China Pavilion and the UNIDO Pavilion in the Blue Zone. In addition, IHFCFA will maintain its cooperation with other global organizations by participating in Climate Action's COP30 activities, and will leverage the event to release major research reports or standardization achievements, further amplifying their global impact.

## II. Embracing Global Engagement: Enhancing Influence and Discourse Power

### Hosting Hydrogen Energy Technology Development Forums

As the world accelerates the deployment of hydrogen technologies across the value chain—from production and storage to refueling and end-use—there remains a need for more robust R&D, demonstration projects, and large-scale application. Fuel cell vehicles remain a crucial entry point for hydrogen in the transport sector, but the industry continues to face challenges such as delayed policy incentives, weak demand signals, financing hurdles, regulatory complexity, and operational barriers.

In response, IHFCA will host **Advancing Green Hydrogen Applications as a Key Pathway to Deep Decarbonization of Modern Industry and Daily Life** forum as part of **2025 World Science, Technology and Development Forum** on October 28 in Beijing, inviting global experts, researchers, and corporate leaders to share the latest innovations and best practices from across the hydrogen energy and fuel cell sectors. These events aim to promote technological advancement, accelerate ecosystem development, and support a win-win collaboration across the hydrogen value chain.

### Organizing International Technical and Academic Forums

In 2025, IHFCA will further leverage its role as a high-quality platform for professional and technical exchange by hosting three international forums focused on cutting-edge hydrogen technologies. These forums will explore critical topics across the hydrogen production, storage, transport, and utilization segments, fostering technical collaboration and global industry integration.

Planned focus areas include, but not limited to:

- High-efficiency alkaline electrolyzers
- Solid-state hydrogen storage technologies

IHFCA will mobilize its international membership base to invite global companies, institutions, and technical experts to participate in these events. By facilitating in-depth discussions between Chinese and international stakeholders, the forums will promote knowledge exchange, spur innovation, and drive the coordinated global development of the hydrogen and fuel cell sector.

## Technical Symposium Series at China Science & Technology Hall

The IHFCA will convene two flagship technical symposiums in August, 2025 at China Science & Technology Hall (Beijing), addressing critical pathways for hydrogen energy advancement:

### Symposium on Hydrogen Refueling Solutions for Fuel Cell Vehicles

This forum will assemble global experts through keynote presentations, open debates, and roundtable dialogues to address systemic challenges—including high refueling costs, infrastructure gaps, and unproven business models—that hinder fuel cell vehicle (FCV) adoption. Discussions will:

- Benchmark global and Chinese FCV industry development (covering upstream/midstream/driver segments, policy frameworks, and standardization gaps)
- Analyze international hydrogen refueling models (technology integration, case studies, and commercial viability)
- Develop replicable, cost-optimized, and safety-certified hydrogen supply frameworks to accelerate scalable FCV deployment

### Symposium on Clean Hydrogen Production & Large-Scale Storage

Aligned with national energy transition goals, this session will tackle scientific and technological bottlenecks through:

- Low-cost renewable hydrogen pathways: Grid-cost reduction, electrolyzer efficiency gains, system optimization, and policy incentives
- Storage innovations: Comparative analysis of high-pressure, solid/liquid organic, and hydrogen-derived carrier storage for efficiency/safety breakthroughs
- Policy-strategy integration: Hydrogen's role in carbon neutrality roadmaps and industrial policy formulation

### Strategic Value Proposition

Leveraging IHFCA's global hydrogen expertise, these symposia will:

- ✓ Forge interdisciplinary collaboration among leading scientists and engineers
- ✓ Translate foundational research into scalable commercial solutions
- ✓ Provide actionable policy-industry guidance to overcome technical and operational barriers

## Standardization Initiatives

In 2025, the IHFCA plans to develop no fewer than two association-led standards, while further expanding the technical expert resources of the IHFCA Standardization Working Committee to provide robust support for standard development.

The association will actively engage in the work of ISO TC 197 and IEC TC 105, including:

- Collaborating with member organizations to contribute to ongoing international standard development;
- Ensuring timely dissemination of critical updates on international standards to the IHFCA Standardization Working Committee and member representatives.

Additionally, the IHFCA will nominate qualified experts from its membership—specializing in hydrogen energy, fuel cell systems, and fuel cell vehicles—to serve as registered contributors to ISO TC 197 and IEC TC 105. This initiative aims to strengthen global standardization efforts, foster high-quality international standards, and promote the industry's efficient and standardized growth.

Furthermore, against the backdrop of a rapidly expanding hydrogen energy storage market, continuous breakthroughs in domestic technologies, and the successful commissioning of multiple demonstration projects, China has established a solid foundation for R&D and application. However, the international hydrogen storage sector still lacks unified technical standards. As a strategic emerging industry, China is well-positioned—thanks to its strong industrial base and reserves of key technologies—to swiftly consolidate practical experience, take the lead in formulating technical specifications, and seize the initiative in setting international standards. This will lay a solid groundwork for the large-scale deployment and industrialization of hydrogen energy storage.

Under the guidance of the relevant government authorities, the International Hydrogen Fuel Cell Association (IHFCA), in collaboration with the United Nations Industrial Development Organization (UNIDO), is advancing the project titled “Technical Guidelines for the Development of Hydrogen Energy Storage.” This initiative aims to establish a comprehensive set of technical guidelines covering three critical segments: hydrogen production systems, hydrogen storage systems, and power generation systems utilizing stored hydrogen. The guidelines will address the technical complexity and interdisciplinary nature of hydrogen storage, ensuring its safe, high-quality, and economically viable deployment across different regions.

## Strengthening a World-Class Think Tank

In 2025, amid the diversifying global hydrogen energy landscape and its growing uncertainties, the IHFCA remains committed to establishing itself as a premier international think tank.

Key initiatives include:

- Flagship Report: **Global Fuel Cell Vehicle Outlook** (hereafter **Outlook**), which is planned to be released during COP 30 in 2025. The **Outlook** will feature:
  - Comparative analyses of fuel cell vehicle (both commercial and passenger vehicles), fuel cell stack, on-board hydrogen storage systems, and hydrogen infrastructure technologies across major markets (China, U.S., Japan, South Korea, Europe);
  - Insights into regional technological divergences;
  - Policy and collaboration recommendations for synergistic development.
- To further advance the development of the hydrogen fuel cell industry, IHFCA will take the lead in systematically evaluating the outcomes and lessons learned from the Fuel Cell Vehicle Demonstration City Clusters initiative. IHFCA will further identify key challenges in industrial application, prioritize critical use-case scenarios, and formulate actionable policy recommendations for the next phase. These findings will be compiled into a dedicated policy report to be submitted to relevant government ministries.
- Pursuing consultative status with key international organizations to enhance the IHFCA's role in global scientific governance.





# IHFCA Member Services

## Membership Expansion & Global Collaboration

IHFCA will continue to expand its membership base and establish partnerships with leading international organizations. Our focus will be on engaging globally influential enterprises and institutions in the hydrogen energy and fuel cell sectors, broadening our international membership network, and establishing a more robust platform for global exchange. Additionally, we will develop a country-based expert and corporate resource database to facilitate cross-border collaboration, providing our members with unparalleled opportunities for industry integration and global growth.



## Core Service Offerings

IHFCA remains committed to delivering value through four key service pillars:

- High-Level International Exchange Platforms
- Global Hydrogen Energy Demonstration Projects
- Standardization Initiatives
- Tailored Consulting Services



## Key Initiatives

- Quarterly Industry Forums & Webinars  
In collaboration with members and partners, IHFCA will organize quarterly industry forums and thematic webinars, addressing critical industry trends and emerging opportunities.
- IHFCA Annual Member Gathering  
Coordinate and deliver the IHFCA Annual Member Gathering to be held in two sessions: November 29 in Beijing and December 6 in Shanghai. These events will provide a valuable platform for in-person networking, member engagement, and strategic dialogue, fostering stronger collaboration within the hydrogen and fuel cell community.
- Access to International Demonstration Projects  
We will connect members with global project opportunities, enabling them to participate in and benefit from cutting-edge initiatives.
- Standardization & Global Alignment  
Leveraging our members' expertise, we will advance the development of international standards, ensuring IHFCA's frameworks align with global benchmarks.
- Customized Consulting Solutions  
Members will receive tailored advisory services designed to meet their specific business and strategic needs.

By driving these efforts, IHFCA aims to foster worldwide industry advancement and strengthen the global hydrogen and fuel cell ecosystem.

# Secretariat Development Plan

In 2025, IHFCA will enhance its Secretariat across multiple dimensions, including institutional development, compliance, operational capabilities, global influence, and deeper engagement in global technology governance. Key initiatives include:

- **Strengthening Compliance Systems:**

The Association will refine its compliance management framework, complete annual certification audits, and elevate staff awareness through targeted training programs.

- **Optimizing Digital Infrastructure:**

The Association will upgrade the network environment and website functionality, expanding modules and interactive features to better support business growth and user engagement.

- **Fostering Talent & Collaboration:**

Leveraging existing international programs, the Association will deliver specialized training in operations and technical fields to facilitate knowledge exchange and innovation.





**PLAN**

