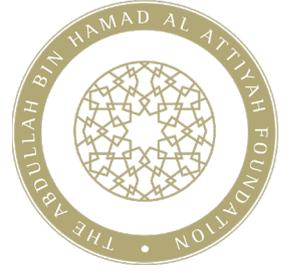


Hydrogen Opportunities for Qatar

CEO ROUND-
TABLE SERIES



The Al-Attiyah Foundation is proudly supported by:



AGENDA

Tuesday 8th March 2022

- 10:00 AM** Coffee and Networking

- 10:30 AM** Special Speakers

- 10:40 AM** Moderated Discussion

- 12:15 PM** Closing Comments

- 12:35 PM** Lunch



CEO Roundtable Series

His Excellency Abdullah Bin Hamad Al-Attiyah, Chairman of the Al-Attiyah Foundation, launched the CEO Roundtable Series and Dialogues to provide a platform for knowledge exchange and support for the global community in the quest towards a sustainable energy future. All guests have the opportunity to share their opinions and insights in what is always a lively and thought-provoking discussion.

** The meeting takes place under the Chatham House Rule whereby participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.*



THEME

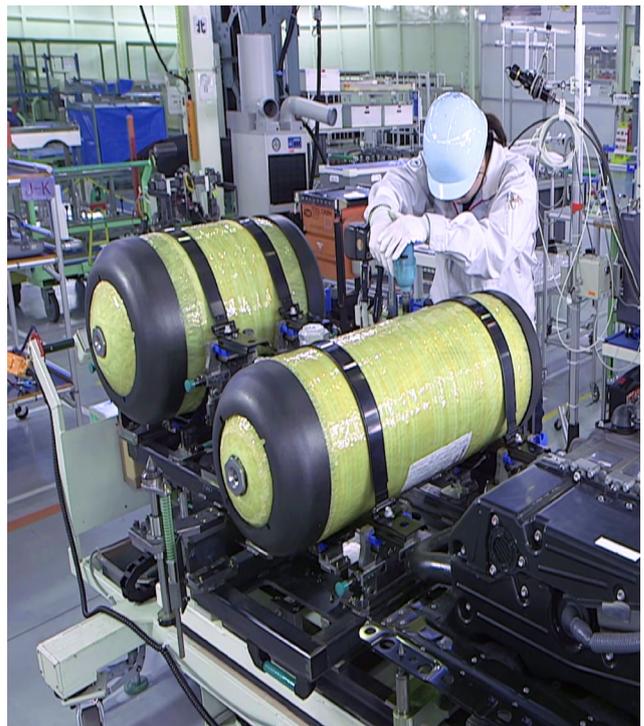
Hydrogen Opportunities for Qatar

The development of hydrogen is a significant feature in the pathway to net-zero emissions in many scenarios developed by a variety of government and state-level research organisations, private enterprises, energy agencies, and international platforms. The IEA net-zero emissions by 2050 scenario, for example, highlights that the needed total transformation of the world's energy infrastructure would require the expansion of the production of low-carbon hydrogen from the current level of 450,000 tonnes to 40 million tonnes by 2030, just 8 years from now. The International Renewable Energy Agency (IRENA) estimates that hydrogen will account for nearly 12 percent of global energy use by 2050. As such, the hydrogen revolution could provide a \$2.5 trillion investment opportunity through 2050 for utilities, equipment makers and others seeking to curb their emission intensity.

It is therefore not surprising to see that the global interest in the role of hydrogen as a clean fuel is growing. The emergence of hydrogen as a potential high value proposition path to carbon-free economy, is evidenced in the number of initiatives and pioneering projects around the world.

- In early 2018, Australia, in partnership with Japan, invested \$50 million in the world-first Hydrogen Energy Supply Chain pilot project.

- In late 2019, the northern Netherlands region won a €20 million EU grant to become Europe's flagship green hydrogen project, with the ultimate aim of this former natural gas region, becoming the leader in Europe and the rest of the world, in the energy revolution.
- The UK Government is committed to give hydrogen a much bigger role in transport decarbonisation by using the UK bus fleet as a testbed for hydrogen technology.
- Canada recently launched a Hydrogen Strategy, seeking to position Canada as a global leader, with an initial US\$1.17bn federal investment.
- Japan, the pioneer of the first commercial hydrogen-powered fuel cell car, has big ambitions to use hydrogen for creating an emissions-free transport sector. The country's aim is to create a hydrogen society, promoting the gas as an emissions-free energy source.



- South Korea is also conceiving the most ambitious plan to create the first hydrogen-powered society. It wants to build three hydrogen-powered cities by 2022 as it positions itself as a leader in the green technology. The plan will see the cities use hydrogen as the fuel for cooling, heating, electricity, and transportation.
- The world's first hydrogen-powered trains are now operating in northern Germany, and more of such trains further delivered to Lower Saxony in 2021.
- The European Marine Energy Centre recently awarded €12 million funding for developing a hydrogen power system for the car and passenger ferries that connect the Orkney archipelago, located off the north coast of Great Britain.
- Hyundai's launched 1,000 hydrogen trucks in Switzerland in 2019, with plans to launch a further 4,000 by 2023.
- On the energy side, several large companies, such as Equinor, Gasunie and ENGIE, have indicated that hydrogen would be at the core of their future gas networks. They have plans to lay pure hydrogen pipelines on the seabed, setting hydrogen as a substitute to LNG, to be transported overseas.

According to the Hydrogen Council, global demand for green hydrogen is expected to grow rapidly in the medium term to 530 Mt, displacing 10.4 billion barrels of oil equivalent by 2050 or 37% of 2020's global oil production. Governments, policymakers, and investors are gearing up to extol the virtues of hydrogen – an abundant resource

that gives off no emissions when it is burnt as fuel. The use of hydrogen as a transportation fuel is receiving particular attention.

It is against the backdrop of the emergence of hydrogen as a potential game changer in the race for green energy sources, especially in the context of the lowering cost of solar and wind power, that the Al-Attiyah Foundation is pleased to convene this virtual CEO Roundtable.



THEME

The Foundation has brought together a team of internationally renowned experts to share their insights and perspectives on the current state of play for hydrogen, its future role in the energy mix and key issues and opportunities for the State of Qatar.

OVERALL OBJECTIVES

- To deliberate on an area that is rapidly becoming the bedrock of green energy revolution. The World Economic Forum (WEF) is of the view that the green hydrogen revolution that has started, won't be stopped.
- To provide up-to-date information on key initiatives and hydrogen projects around the world.
- To explore the potential for large scale production of hydrogen in Qatar, considering that the country is already a significant producer of hydrogen by the steam reforming of natural gas.
- To assess how the existing technical expertise in Qatar, could be leveraged for the production of hydrogen in the country.
- To assess if the addition of carbon capture and storage, to the existing process of steam reforming of natural gas could give Qatar any competitive advantage as a hydrogen producer.

WEBINAR SPEAKERS

Moderator:



Stephen Cole, Host & Executive Producer, The Agenda with Stephen Cole-CGTN.

Speaker



Dr. Kerry-Ann Adamson, Global Strategic Advisor - Hydrogen at the Worley Group.

Speaker



Mr. Jan Frederik Braun, Energy Transition Researcher.

Speaker



Mr. Frank Wouters, Senior Vice President New Energy at Reliance Industries.

Speaker



Dr. Chris Gentle, Senior Advisor, Partnerships and New Ventures at the World Energy Council.

DISCUSSION POINTS

At the CEO Roundtable, international experts will share insights on recent and ongoing developments in the production and utilisation of hydrogen in reducing carbon dioxide emissions. The moderated discussion will cover, but is not limited to, the following aspects:

- 01.** The trends for reducing the cost of electrolyzers, which is a key aspect of the economic feasibility of hydrogen production.
- 02.** The regions/countries that are best positioned to advance the hydrogen economy.
- 03.** Examples of countries and companies that are leading pioneers in the development of hydrogen, either as buyers/consumers or producers or both.
- 04.** The potential for the use of hydrogen in hard to decarbonise sectors such as metal smelting and cement production.
- 05.** Other possible sectors that have great potential for transition to hydrogen.
- 06.** The possible options for the production of green (or carbon free) hydrogen, and how to ensure the carbon free credentials of such options.
- 07.** The role of carbon capture and storage in the process of scaling up the production of hydrogen to meet anticipated growing demand.
- 08.** Options for transporting hydrogen economically, any way that could allow hydrogen to be traded similarly to natural gas.

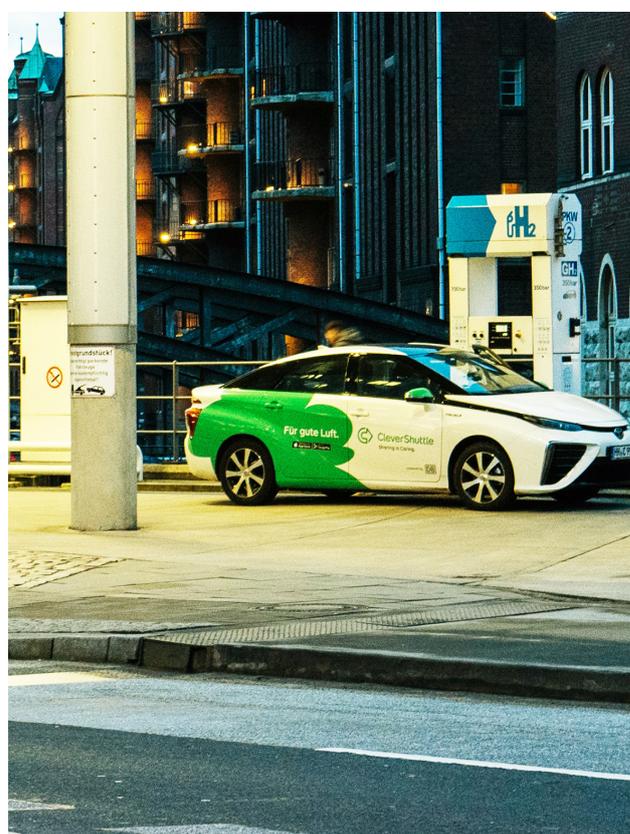
09. The current state of play in the introduction and use of hydrogen fuel cells into heavy vehicles for road transportation.

10. The opportunities and downsides, for countries endowed with natural gas, of perception of hydrogen as a potential competitor to natural gas.

11. Identifying and engaging the entire stock of knowledge available globally to achieve the potential economic benefits from the unstoppable race towards net-zero by mid-century.

12. The policy and regulatory framework necessary for global largescale production of hydrogen.

13. The scope for bilateral, regional and international collaborations in support of growing the global hydrogen market.



KEY QUESTIONS

01. Can hydrogen displace coal for high temperature uses?

02. What will happen to the large asset base in gas producing countries if "blue" hydrogen cannot be produced?

03. Can gas be transported?

04. Can hydrogen be produced from excess solar and wind generation?

05. Can the production of electrolyzers be made much cheaper by achieving economies of scale in producing them?

06. Is the use of "Hydrogen Hubs" the way ahead for hydrogen production and utilisation?

07. At what price for carbon does hydrogen become a viable alternative to natural gas?

08. Can the largest emitters of carbon dioxide, USA and China, be forced to cut emissions by using hydrogen?

FURTHER READING AND VIDEO MATERIALS

(Scan to Download)	LINK
	<p>01 - Pathways to Hydrogen as an Energy Carrier: The Hydrogen Economy. https://www.abhafoundation.org/media-uploads/reports/Energy_Report_Issue_45_05_2020_May-Print.pdf</p>
	<p>02 - Opportunities and Challenges in The Energy Industry: Hydrogen. https://www.abhafoundation.org/media-uploads/reports/Webinar-WhitePaper--09-2020-September-Print.pdf</p>
	<p>03 - Webinar: Harnessing Green Hydrogen for Secure & Affordable Energy. https://www.youtube.com/watch?v=oVgrrHgTtGw&list=PLiQqRVIZjyhPEFIOHbUfIHlbcjom6DG-X&index=5</p>
	<p>04 - Webinar: Achieving Net Zero With Hydrogen. https://www.youtube.com/watch?v=421XvXAEXTI&list=PLiQqRVIZjyhPEFIOHbUfIHlbcjom6DG-X&index=11</p>
	<p>05 - Podcast: Gas, CCUS, Net-zero, & Hydrogen With Dr James Henderson https://www.youtube.com/watch?v=rstJBKj7dIs&list=PLiQqRVIZjyhPaOCR4NXfiZ30JITA0qaVv&index=10</p>
	<p>06 - Podcast: Hydrogen and Carbon Free Energy With Mr Martin O'Neill https://www.youtube.com/watch?v=dJjS7eIhREs&list=PLiQqRVIZjyhPaOCR4NXfiZ30JITA0qaVv&index=20</p>
	<p>07 - Hydrogen, New Industries & Tackling Climate Change With Dr. David Hart https://www.youtube.com/watch?v=pryBJ6iSjb4&list=PLiQqRVIZjyhPaOCR4NXfiZ30JITA0qaVv&index=28</p>

ABOUT THE FOUNDATION

The Abdullah bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development is a non-profit think tank, based in Doha, Qatar, inaugurated in 2015 by His Highness the Father Emir, Sheikh Hamad Bin Khalifa Al Thani. The Foundation works closely with its members, academia, and a wide network of international leading experts, to provide independent insights, in-depth-research and informed debate on critical energy and sustainable development topics.

Mission: To provide robust and practical knowledge and insights on global energy and sustainable development topics and communicate these for the benefit of the Foundation's members and the community.

Vision: To be an internationally respected independent think tank that is a thought leader focused on global energy and sustainable development topics.

Research Reports & Publications

- Daily News Flash
- Weekly Energy Market Review
- Monthly Energy Research Report
- Monthly Sustainability Research Report
- Monthly News Articles
- Special Industry Reports
- Webinar Whitepapers
- CEO Roundtable Whitepapers
- Annual Sustainable Development Book

Podcasts, Webinars & Videos

- Bi-monthly Podcast Interviews
- Monthly Energy Educational Video
- Monthly Sustainability Educational Video
- Monthly Webinars
- Annual High-Profile Webinar

Events & Activities

- The Al-Attiyah International Energy Awards
- Quarterly CEO Roundtable Series
- Qatar Sustainability Week
- The ICP Bosphorous Summit

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OUR PARTNERS

The Al-Attiyah Foundation collaborates with its partners on various projects and research within the themes of energy and sustainable development.





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