



**ABU DHABI**  
SUSTAINABILITY WEEK

DEVELOPING THE  
**UAE HYDROGEN  
ECONOMY**

# Introduction

The UAE has great ambitions for clean hydrogen, seeking to capture 25 percent of this significant new market globally, and helping to reach the targets of the nation's Net Zero by 2050 Strategic Initiative. As part of the planning and development for a hydrogen economy, the Hydrogen Roadmap and National Hydrogen Strategy have already been set in motion. And although electrification is vital today, it is not the only way to achieve the energy transition. Hydrogen is set to become a key enabler to address Net Zero across the hard-to-abate sectors, and the UAE stands at the forefront of many developments with an opportunity to drive such a transition forward.



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In October 2022, Abu Dhabi Sustainability Week (ADSW) gathered experts from business and

industry to explore the importance of hydrogen and hopes for its future usage.

# ADSW Web Series

The fourth episode of the #ADSW Web Series, **“Developing the UAE Hydrogen Economy”**, featured Mohammad Abdelqader El Ramahi, Director, Asset Management, Technology and Green Hydrogen in the Clean Energy Division, Masdar, Felipe Arbelaez, SVP Hydrogen and Carbon Capture & Storage, BP, and Florian Merz, Director – UAE Industries, Mubadala.

El Ramahi spoke of green hydrogen as a vital tool in shaping the future of the energy transition, referring to it as “the fuel of the future”.

As the world focuses on addressing sustainability issues, climate change mitigation and decarbonization, such efforts will not be sufficient on their own. Today, the world economy still requires a significant amount of fuel to drive its various industries and help economic growth. “We need this to be reliable and cost effective while still looking at all the environmental conservation issues,” he explained. “Hydrogen will be at the centre stage of all of this, with the technology that promises to produce it in an environmentally-friendly way.”



## Mohammad Abdelqader El Ramahi

Director, Asset Management, Technology and Green Hydrogen in the Clean Energy Division, Masdar



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Green hydrogen and its derivatives can positively impact multiple sectors: they will be the future fuel for transportation, feedstock to many industries across the world, and a major fuel for coal firing and electricity generation. It can also be a growth catalyst for the fertilizer and steel industries.

Such sources will cut across many sectors that help the international community.

This includes helping industries to meet business expectations while aligning with strategic

decarbonization initiatives. Furthermore, green hydrogen will be a cost effective, reliable solution that empowers all sectors collectively.

Arbelaez mentioned BP’s strategy to become a net-zero company by 2050, or earlier, with hydrogen playing a key role in that regard. It is one of BP’s five key growth engines, occupying up to eight percent of the energy matrix by 2050, and with the potential to almost double that figure when used as a feedstock for fuels and ammonia.



BP is progressing its hydrogen agenda across four key themes, starting with decarbonizing the hydrogen used in its refineries – the equivalent of over half a million tonnes per annum. The company is also looking to scale hydrogen for its industrial customers in the vicinity of its refineries, while pursuing other large industrial hubs around the world where it believes there will be hydrogen demand. Some of these industries will be enabled by blue hydrogen and BP will offer a carbon capture and storage solution. This is likely to be the case

in the United States Gulf Coast. Other locations, such as the Great Plains in the US Midwest, will be focusing on green hydrogen. “We believe the hydrogen market will not be balanced globally in the future,” Felipe Arbelaez, SVP Hydrogen and Carbon Capture & Storage, BP, explained. “There will be regions that will be high production and potential export regions and within these BP wants to position the development of large-scale hydrogen projects.”



### Felipe Arbelaez

SVP Hydrogen and Carbon Capture & Storage, BP

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For Merz, building the hydrogen economy in the UAE is crucial, especially with Mubadala as an investor. However, the global hydrogen economy is also of vital importance as the industry is a significant market in the world today with long-term potential growth. By 2050, clean hydrogen could meet up to 13 percent of the world's final energy demand and as a result, will become a US\$2.5 trillion economy, provided that the significant

investments can be made. It will also deliver over five million jobs, critical at a time of recovery from the global COVID-19 crisis. Thus, the hydrogen economy provides a substantial investment opportunity of roughly US\$15 trillion by 2050.

In addition, the hydrogen economy presents socio-economic benefits. Access to the right technology, equipment and services are key to ensuring the delivery of projects.



### Florian Merz

Director – UAE Industries, Mubadala



“Avoiding carbon emissions in hard-to-abate sectors is a global activity. This supports Mubadala’s position as a responsible investor. Our dual aims are to achieve financial returns and to create socio-economic benefits for the UAE.”

Another essential aspect is decarbonization, and the UAE has committed to becoming the first country in the Middle East to reach net-zero emissions by 2050. “Avoiding carbon emissions in hard-to-abate sectors is a global activity. This supports Mubadala’s position as a responsible investor. Our dual aims are to achieve financial returns and to create socio-economic benefits for the UAE.”

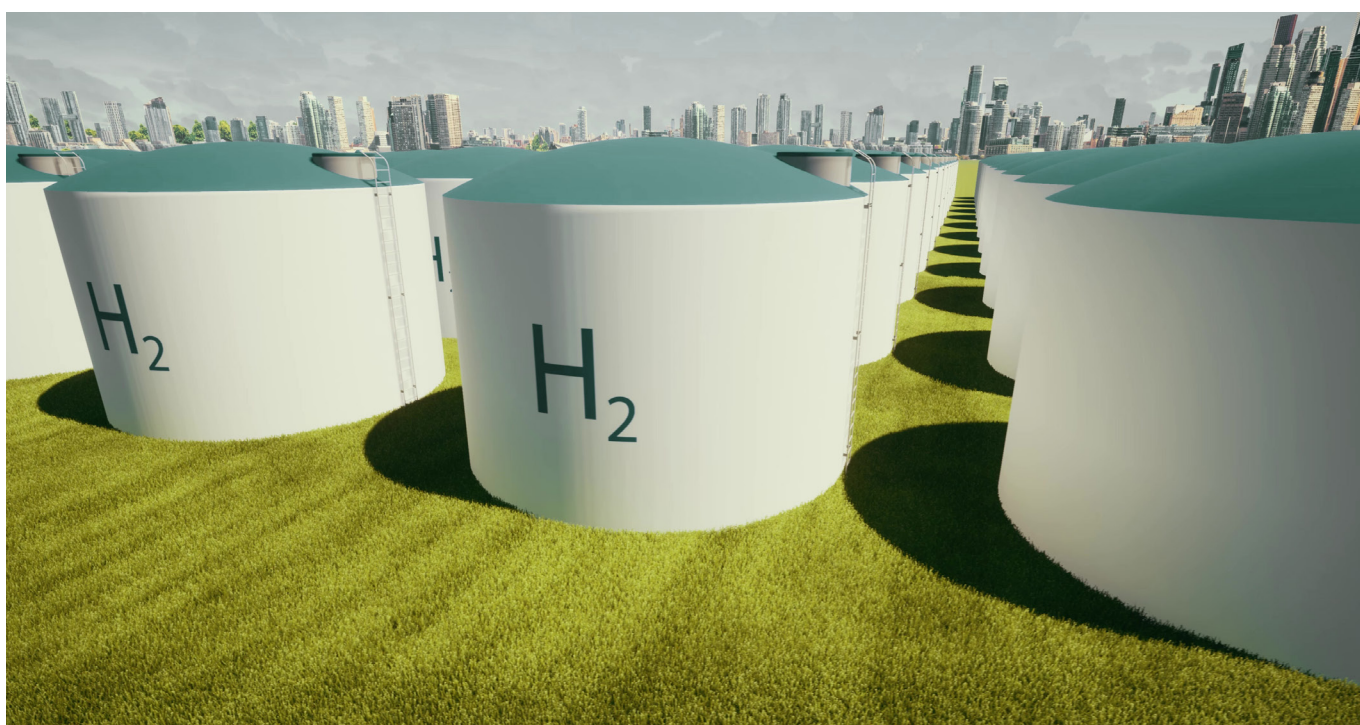
Key markets include places that are experiencing energy and clean hydrogen supply deficits, he said. This predominantly applies to Europe and Northeast Asia. The UAE, located halfway between the two regions, is in a perfect position

to serve both. The UAE is also developing these markets, their direct relationship, and their supply chains. With such a base, Merz believes that the development of the full value chain at the start of projects is key to making them economically feasible. Partnerships will play an instrumental role in that phase. Once supply and demand have achieved significant volumes, he expects a liquid global market.

Moving towards 2030, El Ramahi, of Masdar, spoke of the strategic aim to position Abu Dhabi and the UAE as a global hub for the production of green hydrogen, with the vast majority to be funnelled into exports.

With the currently in the process of maturing and building its regulations around the use of green hydrogen, he believes a clear regulatory framework will be established by the end of the year. This will enable, incubate and accelerate demand for green hydrogen. He expects demand to reach around 200,000 to 300,000 tonnes per annum by 2030, mainly serving large industrial sectors, such as steel, aviation and maritime.

However, further economic support will still be needed from governments, both in the UAE and globally. According to Arbelaez, of BP, such stimulus would support customers, including refineries, steel players or other chemical companies. It will provide them with incentives and mechanisms to access funding to reconvert their installations or mitigate the cost differential between low carbon hydrogen and green hydrogen.



In other countries, mechanisms have incentivized hydrogen producers. This has been done via tax breaks, government grants and contributions toward building capacity to supply low-carbon hydrogen. "A fundamental need will be to ensure incentives are in place for hydrogen to be a part of the decarbonization agenda domestically," he noted. "That will be the fundamental factor in ensuring that countries around the world build local hydrogen ecosystems."

The UAE has the right components to build such an ecosystem, however incentives will be required to ensure that customers in the country are motivated to transition away from lower cost hydrocarbon-based solutions. Over time, global hydrogen standards will need to be developed, to ensure the seamless export of the resource. It will also enable trade across jurisdictions.

# RECOMMENDATIONS



**Merz:** Further requirements are needed to establish a strong hydrogen ecosystem in the UAE and the region. Our investments in the UAE need to create socio-economic benefits. We see four drivers for that. The first is to create geographic clusters for the production of hydrogen and its derivatives. The second one is to use our established capabilities in engineering and manufacturing, our existing infrastructure and strategic geographic location. The third point is that we need partnership because we can't do it by ourselves. Fourthly, we need regulatory support on all sides.



**El Ramahi:** We need four pillars to create a green hydrogen ecosystem. Firstly, to develop the regulatory frameworks and the incentives to support the green hydrogen economy on the supply and demand side. Secondly, to enable competitive financing conditions, which come with tax import duty schemes for green hydrogen production. Thirdly, to continue enabling access to optimal low-cost clean electricity from oil, newly built renewables, and grid because this is very important in enabling the production of the green molecule. And finally, we need to support the development of the infrastructure required to enable the green hydrogen economy to move on a consistent path toward steady growth.



**Arbelaez:** Rebuilding the workforce has been a challenge since COVID-19. Partnerships in hydrogen are going to be crucial because there will be an overlap in terms of infrastructure, skills, and the production and consumption of low-carbon hydrogen. Companies that have been in the oil and gas sector have intrinsic capabilities that are highly transferable to hydrogen. For example, we understand materials and the transportation of gases very well. So, there is a lot of expertise we can bring to the table. We have a firm belief that the oil and gas workforce can be mobilized into this new sector, and there is a lot of talent to pull into this new economy.



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