



2021 SPE ADIPEC Virtual University Programme  
Middle East and North Africa Region

## 2021 SPE ADIPEC Virtual University Programme Project & Contest Details

### **‘Hydrogen Energy as an Enabler for a Net Zero Carbon Target’**

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The demand on energy is accelerating with pronounced growth in population as well as the economic growth and development in Asia and Africa. Fossil fuel-in many countries-is still believed to be the main source for satisfying the global energy demand for the next 30 to 40 years. Nevertheless, the growing concerns on limited field discoveries as well as greenhouse gas emissions have shifted the global focus towards increasing process efficiency and decarbonizing the energy industry. Hydrogen energy is one of these low-carbon intensity technologies that is believed to be instrumental to the decarbonization of the energy industry.

“ADNOC is an early pioneer in the emerging market for hydrogen and its carrier fuels, such as blue ammonia, driving the UAE’s leadership in creating international hydrogen value chains and a local hydrogen ecosystem.”

Dr. Sultan Ahmed Al Jaber, Managing Director and Group CEO of ADNOC  
Abu Dhabi’s ADNOC joins global Hydrogen Council, July 2021

Recently, BP has partnered with ADNOC and Masdar companies in Abu Dhabi to decarbonize UK and UAE energy and transportation systems. Among this collaboration, the first project is related to the development of 2 GW of Hydrogen. Recently, UAE is also part of the Hydrogen Council, comprised of 109 members, with the purpose of directing investments toward CAPEX, Merger & Acquisitions, and Research & Development activities. Similarly, Oman and Italy have recently shared prospects and opportunities between the two countries on development of hydrogen energy. Similar collaborations and initiatives have been led by other countries in the Middle East and around the globe. Last year, China announced the investment of \$8 billion in heavy-duty hydrogen fuel cell trucks alone and the US, in particular the state of Texas, announced \$9 billion investment in hydrogen as part of its COVID-19 stimulus.

The demand on hydrogen has grown more than three folds since 1975. Hydrogen is a light, storable, and energy-dense gas with no direct greenhouse gas emissions. Hydrogen is the most promising low carbon energy source. The use of hydrogen is dominated by the oil and gas industry through oil refining, methanol production, ammonia production, and steel production. However, hydrogen needs to be adopted in transport, buildings, and power generation sectors to make a significant contribution to clean energy transition. Hydrogen can be used as an alternative fuel for transportation that reduces global warming concerns and even improves energy storage. Hydrogen energy is a key factor in accelerating energy transition and achieving a net zero carbon target in the future.



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Hydrogen is a crucial element in many country's strategies to achieve net-zero targets. Hydrogen synergies with O&G core business are presented along with IOCs / NOCs' hydrogen strategies & partnerships with small & medium companies (green consortiums). For hydrogen to achieve the ambitious net-zero target, many players across the energy industry must work together (government, policymakers, private sector, and consumer groups). The structures to enable that collaboration will need to be developed as a matter of urgency. The projections from 2020 are driven by an emergent focus on hydrogen stemming from increasing worldwide governmental support.

The scale of transformation of the energy system from one based largely on fossil fuels to one where fossil fuels play a small role is huge and completing such a transformation by 2050 requires unprecedented pace. Hydrogen has the potential to be a powerful enabler of this transition. Hydrogen hub is also a key element in the strategic approach— clusters of large-scale industrial activity. The introduction of hydrogen hubs can reduce the cost of low-carbon hydrogen pathways through several mechanisms, including promotion of synergies through sector coupling, enabling economies of scale to be reached quickly as colocation of hydrogen production facilities allows efficiencies through the utilization of existing infrastructure and skills, fostering of innovation, for example by attracting hydrogen-based industry and academic institutions.

Digital technology will be an essential component in ensuring a sustainable and robust hydrogen economy. It is imperative to think about innovation through digitalization including use of Artificial Intelligence and analytics. This would ensure smooth progress and reduce any concerns pertaining to time and capital costs as well as HSE. Technology will be an enabler and accelerator towards reducing cost of hydrogen. Furthermore, it would allow optimization and reduction in constraints for large scale deployments. In a nutshell, Digital will assist to comprehensively analyze all facets of the hydrogen economy and should be part of the solution to embrace Energy Transition.

### **TEAM TASK**

As a team, you are requested to review the strategies to be followed by oil and gas companies based on hydrogen energy to achieve net zero carbon target in the long term. In addition, the team needs to decide on the best strategy that promises the highest profitability and most sustainable returns yet allowing to excel in meeting technical, economical, and technological demands.

### **Considerations for selecting the best strategy could include the following:**

1. Explore the different types of hydrogen energy
2. Leverage existing oil and gas infrastructure for Hydrogen
3. Accommodate carbon capture utilization and storage (CCUS)
4. Participate and collaborate with hydrogen energy companies
5. Start new business in the field of hydrogen and CCUS energy
6. Review and learn from hydrogen energy success stories
7. Use of Technology & Innovation to lower cost and add growth



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**STAGE ONE: PREVIEW VIDEO JUDGING CRITERIA (ALL)**

- Content and Importance
- Results
- Recorded Preview Video Presentation
- Written Proposal

**STAGE TWO: FINAL PRESENTATION JUDGING CRITERIA (TOP 10)**

- Novelty and originality of the work
- Technical content (activities/projects/tasks/problems)
- Delivery (slide organization/visuals/volume clarity)
- Ending and handling questions

**DELIVERABLES**

The competition includes two evaluation stages:

**Stage One – Proposal and Preview**

**Due: 17 October 2021**

*Participants: all nominated student teams*

For the first stage, each team shall present its proposal and findings through both written paper proposal as well as a pre-recorded video presentation (e.g. MP4 format). The written paper format should not exceed 500 words and the video presentation should be pre-recorded with a duration no longer than **two (2) minutes**. Both the write-up and the video must clearly identify the issue, define the problem, and proposal. For the video recording, there is no standard format or slide template – teams may be creative.

**Stage Two – Final Presentation**

**Due: 13 November 2021**

*Participants: only the top 10 selected teams will present; all other nominated teams are highly encourage to tune in and watch and support their colleagues.*

For the second stage, only the **top ten (10) teams** will be selected based on the first stage submission. These teams will be assigned a Young Professional Mentor (YPM). The team will be expected to build upon their pre-recorded presentation after incorporating their YPM recommendations, and deliver a full length video presentation. The full length presentation should be **no longer than 10 minutes** and will be played live for the YP Judges during the second day of the SPE ADIPEC Virtual University Programme and followed by a live 5-10 minutes Q&A session.

**TEAM FORMATION**

- Up to 4 students per team/university.
- 1 of the 4 students is appointed as the Team Leader.
- The Team will be assigned with a Young Professional Mentor for the second stage presentation development.