



**SOUTH ASIA ENERGY MASTERCLASS**

 **ON**

**“GREEN HYDROGEN”**

*FUNDED BY*

**U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT**

*CO-ORGANIZED BY*

**SOUTH ASIA REGIONAL ENERGY HUB (SAREH)**

**and**

**SOUTH ASIA REGIONAL ENERGY PARTNERSHIP (SAREP)**

*TRAINING PARTNER*

**SKILL COUNCIL FOR GREEN JOBS (SCGJ)**

**March 8th – 11th, 2022**

**Registration link\***

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| --- | --- | --- |
| **Date** | **Time (IST)** | **URL** |
| 8th March | 2:00 pm – 5:00 pm  | <https://us02web.zoom.us/meeting/register/tZcof-iorTovHNFwzMnlPGxFQaFEjzaYlhZ1> |
| 9th March | 10:00 am – 12:00 pm | <https://us02web.zoom.us/meeting/register/tZMrd-6grTssGdeRBpNjLiuwOODXQiyS-b37> |
| 10th March | 2:00 pm – 4:30 pm | <https://us02web.zoom.us/meeting/register/tZMrc-6rqjMsGdU7fJJU1NxCEUokfaAJ1Y5H> |
| 11th March | 2:00 pm – 4:00 pm | <https://us02web.zoom.us/meeting/register/tZAlc-GhrToqG9PKBxykl0c4UEM7zrK0iWcF> |

\*All registration links are unique. Please register separately for each day of the masterclass.

**MASTERCLASS OVERVIEW**

Hydrogen has a long history from powering the first combustion engines over 200 years ago to becoming an integral fuel of the modern refining industry. However, due to safety concerns and the advent of alternate energy sources, hydrogen in the past never became mainstreamed as a viable fuel choice.

But in the last few years, hydrogen technologies have seen unprecedented momentum from both policymakers and industry players as part of deeper decarbonization efforts. According to the Hydrogen Council, hydrogen technologies are expected to provide 18% of the world’s total energy needs and will power more than 425 million vehicles worldwide by 2050. Hydrogen, if generated through renewable means, can play a significant role in accelerating the clean energy transition in Asia in majorly all energy end-use sectors – transportation, commercial, industrial, and residential. India, Bangladesh, and Sri Lanka have recently launched specific national missions, programs and demonstration pilots on green hydrogen and hydrogen fuel cell technologies. As several countries strive for net-zero carbon by 2050, new applications of hydrogen technologies stand to revolutionize the approach towards energy supply and use infrastructure.

USAID India, under the Asia EDGE initiative is starting a capacity building workshop series named “South Asia Energy Masterclass” where the focus will be to provide in-depth and hands-on training on topics of emerging interest. With an aim to enhance the awareness on latest technology and policy trends, the first installment of the master class is focused on hydrogen which will have sessions on fundamentals of hydrogen, introduction to technology and applications, coupling with renewables, economics, and global standards and policies. The masterclass is designed to include firsthand case studies that provide evidence and experience sharing on application of hydrogen for power generation.

The masterclass will be conducted online and includes pre-training and post-training assessment for all participants. The target audience will be from policy makers, planners, utilities, and regulators. The expected number of participants will be about 30-35, which will be by-invitation only from the South Asia region. A pre-training assessment to assess participants’ baseline knowledge, identify knowledge gaps and understand expectations, will be conducted prior to the commencement of the masterclass. There will also be an assessment after the masterclass completion to measure participants’ knowledge improvements in the subject area. The masterclass is being conducted through the Skill Council for Green Jobs (SCGJ, India) and SCGJ will provide certificates to participants who fulfill the requirements for minimum attendance and satisfactory completion.

This approximately nine-hours masterclass is designed to help participants to:

1. Learn fundamentals and basics of hydrogen
2. Gain understanding of hydrogen industry technologies and terminologies
3. Understand key applications of hydrogen based on global trends
4. Know about the production, storage, and conversion technologies in the industry value chain
5. Know about the global trends on standards and regulations related to safety, certification of origin, and other enabling regulations
6. Takeaways from project examples and case studies from around the world

 **PROPOSED AGENDA**

Proposed time slots are in **Indian Standard Time (IST)**

**DAY-1, March 08, 2022 (3 hours)**

02:00 pm – 02:25 pm **Opening Session**

* Opening remarks

***Speaker: John Smith-Sreen, Director, Indo Pacific Office, USAID/India (5 min)***

* Opening remarks

***Speaker: Dr. Praveen Saxena, CEO, SCGJ (5 min)***

* Remarks (recorded message)

***Speaker: Sheila Hollis, Acting Executive Director, USEA (5 min)***

* Overview of the training agenda and Introduction of speakers

***Speaker: Deepak Rai, Head-Standards and Research, SCGJ (10 min)***

02:25 pm – 03:05 pm **Technical Session 1: Introduction to Hydrogen**

* What is hydrogen? – basics & fundamentals
* Hydrogen as an energy carrier
* Why green hydrogen? – role in low carbon future
* Q&A

***Speaker: Deepak Rai, Head-Standards and Research, SCGJ (15 min)***

* Recent policy trends and actions in South Asia
* Q&A

***Speaker: Anurag Mishra, Senior Clean Energy Specialist, USAID/India (20 min)***

03:05 pm – 03:10 pm **BREAK**

03:10 pm – 05:00 pm **Technical Session 2: Technologies and supply infrastructure in the Hydrogen value chain**

* Hydrogen production and conversion technologies
* Challenges associated with production and energy conversion

***Speaker: Dr. Pankaj Kalita,*** ***Associate Professor, IIT Guwahati (55 min)***

* Storage, handling, and transportation of hydrogen
* Challenges associated with Hydrogen – Storage and transportation
* Q&A

***Speaker: Dr. Satyajit Phadke, Director, Hydrovert Energy (25 min)***

* Case study and experience sharing by industry
* Q&A

***Speaker: Akshay Bhardwaj, General Manager, ACME (30 min)***

 **DAY-2, March 09, 2022 (2 hours)**

10:00 am – 12:00 pm **Technical Session 3: Economics of Green Hydrogen**

 **Production**

* Understanding the electrolysis cost
* Balance of system, operational and other cost components
* Understanding the distribution and storage costs
* Cost of fuel cell
* Forecasted future cost reductions – and how can they be achieved?
* Case studies
* Cost of green hydrogen production in the regional context
* Q&A

***Speaker: Dr. Ronald Stanis, Process Engineering Manager, GTI***

 **DAY-3, March 10, 2022 (2.5 hours)**

02:00 pm – 03:30 pm **Technical Session 4: Key Applications of Hydrogen (Power)**

* Green hydrogen to power
* Hydrogen application in industrial application and other sectors
* Commercial aspect of green hydrogen to power application
* Hydrogen context: feasibility, enabling factors and challenges
* Case studies
* Q&A

***Speaker: Mathieu Geze, Vice President- Asia, and***

***Dhiah Karsiwulan, Project Finance Manager, HDF Energy***

03:30 pm – 04:30 pm **Technical Session 5: Key Applications of Hydrogen (Mobility)**

* Hydrogen for mobility applications
* Case studies
* Q&A

***Speaker: D M R Panda, NTPC-REL***

 **DAY-4, March 11, 2022 (2 hours)**

02:00 pm – 03:10 pm **Technical Session 6: Standards and Regulatory aspects**

* Codes, standards, and regulations for hydrogen
* Q&A

***Speaker: Chandrashekar Iyer, SAREP***

03:10 pm – 03:40 pm**Technical Session 7: Experience sharing by SA country**

* Country presentation – Nepal

***Speaker: Kiran Gautam, Senior Divisional Engineer, Water and Energy Commission Secretariat, Government of Nepal, and***

***Dr. Biraj Singh Thapa, Team Leader, Green Hydrogen Lab, Kathmandu University (15 min)***

* Country presentation – Sri Lanka
* Q&A

***Speaker: Prof. P.Ravirajan, Dean/Science and Senior Professor in Physics, University of Jaffna, Sri Lanka (15 min)***

03:40 pm – 04:00 pm **Closing Session**

* Post workshop assessment ***(5 min)***
* Feedback from participants ***(5 min)***
* Closing remarks by USEA ***(5 min)***

***Speaker: Sarah Blanford, Deputy Program Director, USEA***

* Closing remarks by USAID/India ***(5 min)***

***Speaker: Anurag Mishra, Senior Clean Energy Specialist, USAID/India***