

# India's debut: Train-of-Trainers on green hydrogen and Power-to-X



To bolster India's journey towards a sustainable future, the International Power-to-X Hub and the Indo-German Energy Forum (IGEF-SO) co-hosted the first-ever comprehensive eight-day Train-of-Trainers on green hydrogen and Power-to-X (PtX) from 27 February to 7 March 2024 in New Delhi and Gujarat, India.

The training embarked on a transformative journey, guiding participants from curious learners to adept trainers. With a curriculum tailored to the evolving needs of the green hydrogen sector, the programme drew 14 professionals from the renewable energy sector.

Prof. Dr. Christoph Menke as the main lecturer brought depth and insight, and Mr. Michael Zillich, the didactics trainer, innovative teaching methods.



*Prof. Dr. Menke, main lecturer, during the Train-of-Trainers programme. Copyright by Indo-German Energy Forum (IGEF-SO)*

National trainers and multipliers in India, Ms. Bidisha Banerjee, Dr. Deepak Yadav, and Mr. Vivek Jha played pivotal roles as mentors, enriching the training experience and fostering a collaborative learning environment for the participants.

The first chapter of the training programme commenced in Delhi with an introduction to the programme and participants. Mr. Philipp Wittrock, International PtX Hub and Mr. Clemens Antretter, IGEF-SO provided an overview of the PtX Hub's philosophy and concept. Prof. Dr. Menke delivered an impulse lecture on the role of renewable PtX in energy policies, energy economy, and developmental policies. This was followed by an insightful presentation on the facts and figures regarding Indian electricity supply and hydrogen by Mr. Karan Arora, IGEF-SO. Mr. Elmar Schuppe, International PtX Hub continued by providing an introduction to the [Renewable PtX trainings](#) and the atingi platform, a digital learning platform designed and implemented by GIZ GmbH.

The training then delved into an in-depth exploration of the principles and practical aspects of PtX, encompassing a deep dive into seven comprehensive modules led by the main trainer and mentors.

As part of the training programme's industrial visit, participants had the exciting opportunity to explore the facilities of FC TecNrgy (FCT) and SFC Energy. FCT is an India-based, leading private-sector enterprise in fuel cell based sustainable stationary and mobile Power and energy management solutions. SFC Energy launched the manufacturing of hydrogen and methanol fuel cells at its New Delhi/Gurgaon site in July 2023. The visit included an insightful presentation from representatives of the companies showcasing their cutting-edge hydrogen and methanol fuel-based sustainable energy solutions, covering net-zero projects, micro-grids, data centers and rural electrification across various sectors.



*At the site visit to FCT and SFC Energy. Copyright by FC TecNrgy and SFC Energy*

Participants also toured FC TecNrgy's Production, Experience Centre, and Research & Development (R&D) facilities, gaining valuable insights into their state-of-the-art technologies. To top it off, a live demonstration of their Hydrogen and RMFC Fuel Cell-based Energy Solutions offered a captivating glimpse into the future of renewable energy.

After a successful first chapter in New Delhi, participants moved to Gujarat for the second phase of the training. The implementation phase unfolded at the Gujarat Energy Research and Management Institute (GERMI), a distinguished centre of excellence in the energy sector. Dr. Akash Davda, Head of New Renewable Energies, gave an introduction to GERMI and its work, while Dr. Biswajit

Roy, Director General, interacted with the participants and offered insights into India's renewable energy landscape, which was further discussed by the participants.



*Michael Zillich, didactics expert, giving an input during the training. Copyright by Indo-German Energy Forum (IGEF-SO)*

Divided into working groups, participants worked in groups to practice the implementation of the seven modules. Participants took the opportunity to apply the concepts from the basic renewable PtX training course in smaller working groups, benefiting from feedback from both peers and trainers. This collaborative approach facilitated a deeper understanding and effective implementation of the course material.

Participants embarked on an enlightening journey as they visited the Green Hydrogen Training Centre and a 1 MW multi-technology solar PV plant at the Gujarat Energy Research and Management Institute.

The Green Hydrogen plant installation at GERMI stood out as the highlight of the second chapter. This facility, which seamlessly integrates electrolysers, lithium-ion batteries, fuel cell stacks, and a solar PV system, represents a landmark achievement in Gujarat and India's capacity building efforts in green hydrogen technology.



*During the site visit at the GERMI GH2 plant facility. Copyright by Gujarat Energy Research and Management Institute*

Some key technical specifications of the GH2 facility include

- an electrolyser capacity of 2.4 kW each (a total of 4 electrolysers installed);
- a fuel cell capacity of 2.5 kW and 48 V output;
- a hydrogen production rate for each electrolyser of 0.5 Nm<sup>3</sup> per hour;
- cumulative green hydrogen production rate per hour of 2 Nm<sup>3</sup>
- and a solar installed capacity of 7 kWp.

Another highlight of the training were two impulse lectures which were delivered during the workshop – one on coal gasification by Mr. Vivek Jha, and another on biomass-based hydrogen production by Dr. Piyali Das from The Energy and Resources Institute (TERI), explaining why hydrogen produced through the biomass pathway could serve as a viable and efficient alternative for India. Two additional presentations were delivered during the programme. Mr. YVK Rahul, IGEF-SO presented on the Agri PV site project located in Manwath, Parbhani. The primary objective of the project is to demonstrate the economic and ecological advantages of Agri PV in India. Mr. Kartikeya Anand, Officer on Special Duty to the Minister for Finance, Skill Development and Training, Commercial Taxes, and Planning, Government of Andhra Pradesh (AP), provided insights into renewable energy initiatives in the state and policy measures implemented by the Government of AP.



*During the site visit at the GERMI GH2 plant facility. Copyright by Gujarat Energy Research and Management Institute*

As we reflect on this exhilarating journey, we eagerly anticipate the next phase of our mission – mobilising our trained trainers and implementing renewable PtX trainings in the days to come.