Indo-German Energy Forum Support Office

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Federal Ministry for Economic Affairs and Climate Action

Federal Ministry for Economic Cooperation and Development

KFW

GOVERNMENT OF INDIA MINISTRY OF POWER

GOVERNMENT OF INDIA MINISTRY OF NEW AND RENEWABLE ENERGY

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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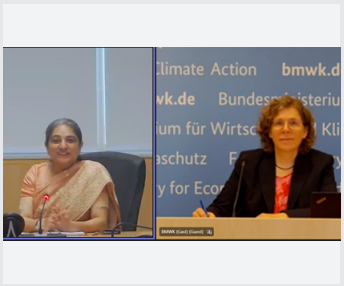

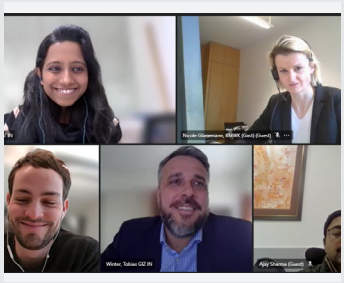

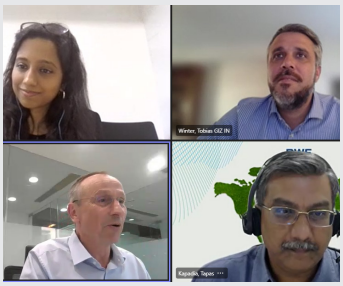

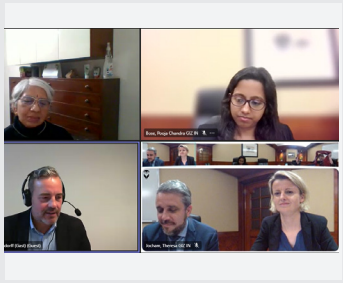

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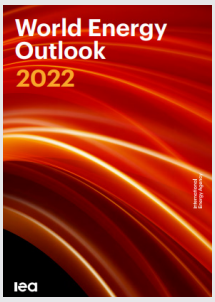

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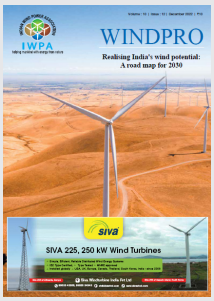

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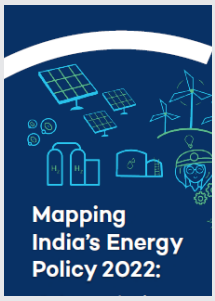

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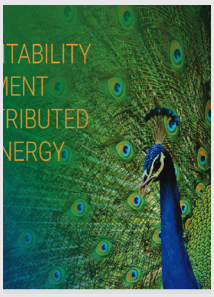

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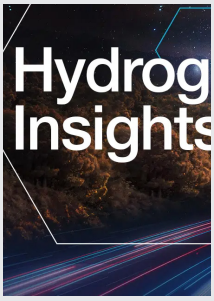

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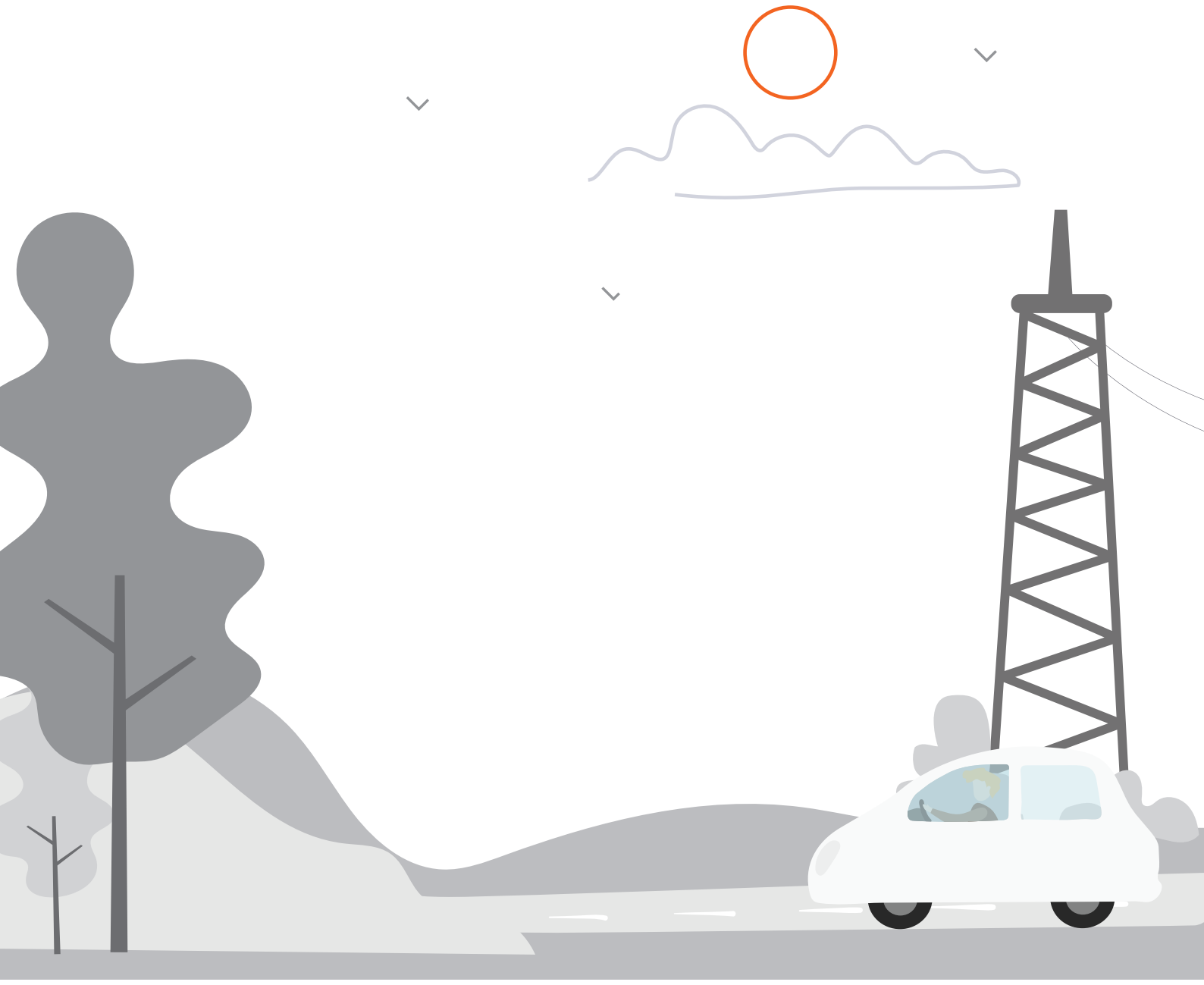


1 Introduction

Mr. Tobias Pierlings
Co-Chair of IGEF Subgroups

> "India and Germany are both committed to decarbonize their economies. I look forward to actively forming part of this exciting joint journey."

In 2022, Mr. Tobias Pierlings was appointed Head of the Division of External Economic Policy with South and Southeast Asia, Australia, New Zealand, and Oceania at the Federal Ministry for Economic Affairs and Climate Action (BMWK). He now has taken over the role of several subgroups under the Indo-German Energy Forum (IGEF).

Mr. Pierlings has been with BMWK since 2008 where he held several positions such as Head of the Minister's Office and Personal Assistant to the Federal Minister of Economic Affairs. He worked in different departments for example at Foreign Trade Law and International Law of the Sea or the UN International Seabed Authority and has been managing diverse portfolios in the Ministry since then. Prior to his journey at BMWK, he received practical legal training in Bonn and Berlin, Germany and in Phnom Penh, Cambodia.

Mr. Pierlings studied law at the Universities of Göttingen (Germany), Geneva (Switzerland) and Bonn (Germany). After obtaining a diploma in international humanitarian law in 2001, he completed his First Judicial State Examinations in Cologne, Germany and Second Judicial State Examinations in Düsseldorf, Germany in 2002 and 2006, respectively.

2

Events and Activities

Indo-German Green Hydrogen Task Force Meeting

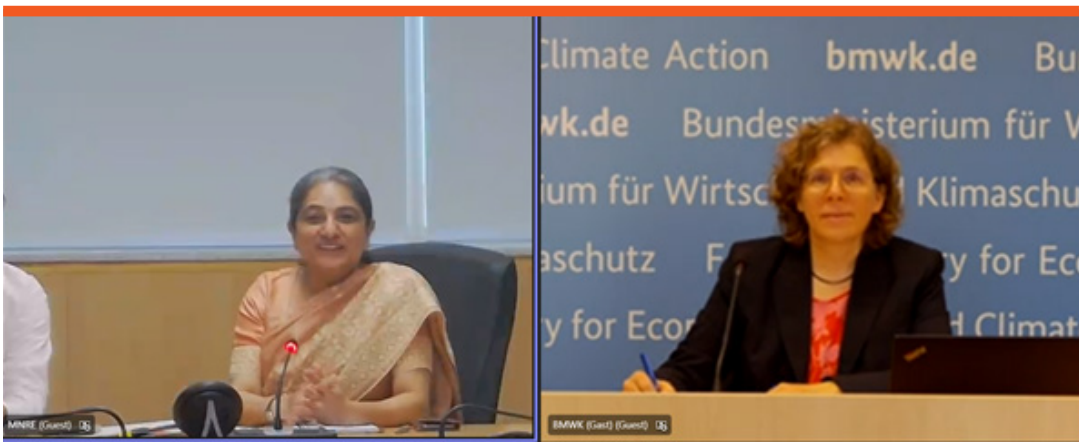
20 September 2022 | Virtual

The kick-off meeting of the Indo-German Green Hydrogen Task Force was held virtually on 20 September 2022. The meeting was chaired by Dr. Vandana Kumar, Additional Secretary, Ministry of New & Renewable Energy (MNRE), Government of India and Dr. Stefanie Schmid-Lübbert, Head Bilateral Energy Cooperation, Ministry for Economic Affairs and Climate Action (BMWK), Government of Germany with the aim to highlight the market developments in both countries and foster Indo-German cooperation in green hydrogen. Participants from the government, industry and research institutes of both countries attended the meeting to give their inputs and learn about the next course of action.

In her welcome remarks, Dr. Kumar offered a brief overview of the developments taking place in the green hydrogen sector in India and stated that the National Green Hydrogen Mission will be launched very soon. Dr. Kumar appreciated the collaborative efforts taken by both countries. Ms. Schmid-Lübbert followed her opening remarks by reinstating Germany's target to be climate neutral by 2045 and to become independent of fossil gas imports as soon as possible. While recognising the short-term measures taken by Germany to reduce dependency on energy imports, Dr. Schmidt-Lübbert said that realistically Germany still showcases a high import demand of green hydrogen of up to 82 terawatt hours in 2030. In order to secure these imports, she said that several international funding programs have now been made available to India.

Further, Mr. Dipesh Pherwani, Scientist, MNRE presented the work that has been done in India. At present, the focus of the Indian government is on the refining and ammonia production sector, he said, since both consume almost 99% of the grey hydrogen today. Shedding light on current research projects, he added that the Department of Science and Technology has been running a focused program on hydrogen fuel cells for the last two years while a pilot project for running buses with a blend of hydrogen and natural gas in the capital city of Delhi has already been demonstrated and will be replicated in other cities soon. He concluded his presentation by inviting Indian leaders from the industry to speak on the major electrolyser manufacturing and green hydrogen production projects they are working on.

Mr. Werner Diwald, Managing Director of the German Hydrogen and Fuel Cell Association (DWV), took over to present the value chain for the



Dr. Vandana Kumar, Additional Secretary, MNRE and Dr. Stefanie Schmid-Lübbert, Head Bilateral Energy Cooperation, BMWK chaired the meeting.

new hydrogen business in Germany. He resonated with Dr. Schmid-Lübbert about Germany's dependence on imported gas and offered the costs of green hydrogen in comparison. The natural gas price in Europe today was found to be over 300 Euro per megawatt hour, whereas green hydrogen approximately costs around 130 Euro per megawatt hour. He said that while Germany has the technology readily available for the global market, what needs to be established are clear regulations for the infrastructure, production, and use of green hydrogen in all sectors. Reiterating the need for partners, he ended his presentation with the thought that if fossil energy is to be replaced with renewable energy without losing economic and energy security then the Indo-German Green Hydrogen Task Force needs to actively discuss the complete green hydrogen system.

Mr. Tobias Winter, Director, IGEF-SO, shared that the purpose of the task force is to strengthen the cooperation on the production, utilisation, storage, and distribution of green hydrogen by building frameworks for projects, stating regulations and standards, and enabling trade and joint research. He also walked the participants through the four subworking groups of the task force that have been created to exchange ideas on sectoral developments, identify opportunities for joint projects and translate practical insights into recommendations for the bilateral political dialogue. It was proposed that the first activities of the task force shall be business delegations of both countries visiting dedicated trade fairs to learn about further opportunities.

Finally, Mr. Stefan Halusa, Director General and Ms. Sonia Prashar, Deputy Director General of the Indo-German Chamber of Commerce shared an overview of upcoming relevant international green hydrogen trade fairs and conferences taking place in Germany and India. Active participation in those events would not only help explore the cooperation but also showcase the Indo-German strength in a renewable energy and green hydrogen based economy.

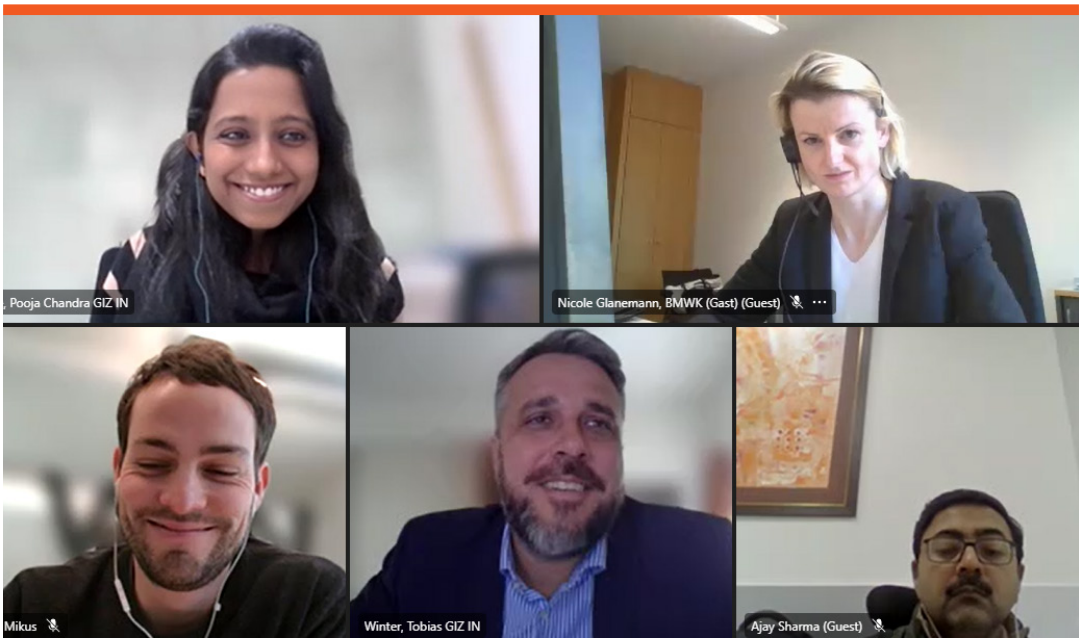
Transport, Storage and Consumption Subworking Group under the Indo-German Green Hydrogen Task Force

19 January 2023 | Virtual

The Indo-German Energy Forum (IGEF) organised a subworking group meeting on Transport, Storage and Consumption under the Indo-German Green Hydrogen Task Force on 19 January 2023. Mr. Tom Mikus, Programme Manager at NOW GmbH, offered to head the group and was confirmed by the members. Mr. Mikus in consultation with IGEF will streamline topics of discussion, convene future meetings, and present the decisions taken to the Co-Chairs of the task force. The discussion kick-started with an interactive poll on transport, storage and offtake of green hydrogen and existing barriers. The poll suggested that there already is around 8 Mio. tonnes of grey hydrogen consumption in India but no long distance hydrogen pipelines have been installed so far. Almost all production and consumption are happening at the same site and are mostly dedicated to fertiliser production and petrochemicals. The floor was open for the participants to discuss and share views on the next steps and industry needs in connection with the transport, storage and consumption of green hydrogen in India. Deliberations and substantial action points were propagated by different participants during the meeting. As part of the discussion, Dr. Praseeth Prabhakaran, DVGW, emphasised on the need for regulations to be standardised. The participants agreed that green hydrogen offtake by shipping and national cluster development were the two main topics to be explored under this subworking group.

Dr. Nicole Glanemann, in-charge of the bilateral energy cooperation with India at the German Federal Ministry for Economic Affairs and Climate Action (BMWK), delivered her welcome remarks by accentuating that the main goal of the task force and its subworking groups is to offer inputs on a joint Indo-German Green Hydrogen Roadmap which shall facilitate investments in joint green hydrogen projects. She welcomed ideas on policy regulations for a market ramp-up in the fields of transport, storage and consumption in India.

For more information, please read here.



Mr. Tom Mikus of NOW GmbH was confirmed as the Head of the subworking group during the meeting.

Finance, Insurance Industry and Trading Subworking Group under the Indo-German Green Hydrogen Task Force

12 December 2022 | Virtual

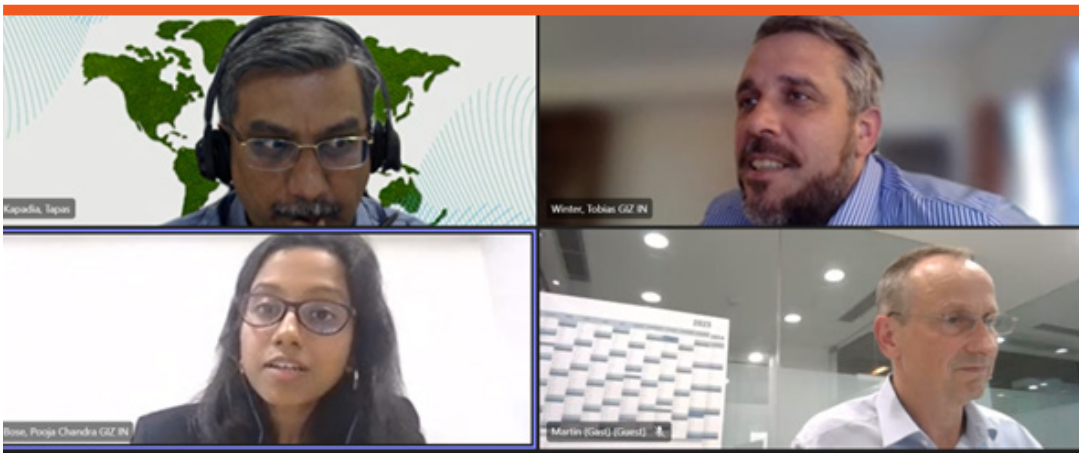
The Indo-German Energy Forum (IGEF) organised a subworking group meeting on Finance, Insurance Industry and Trading of Green Hydrogen Production under the Indo-German Green Hydrogen Task Force on 12 December 2022. Mr. Tapas Kapadia, CEO, RWE Supply & Trading, was confirmed as the Head of this subworking group by the participants. At the request of the German Federal Ministry for Economic Affairs and Climate Action (BMWK) and the Indian Ministry of New and Renewable Energy (MNRE), all participants were briefed on the purpose of the Task Force and its subworking groups. Mr. Kapadia kickstarted the group discussion by giving his remarks on the topic of financing for Indian green hydrogen projects.

Dr. Martin Lux, Head of Energy, KfW Development Bank in India, informed that the organisation has instruments such as concessional loans and grants available for financing green projects. Currently, KfW is developing a promotional platform where over 550 million Euro would be made available under PtX Development Funds and PtX Growth Funds. This information piqued the interest of several industry members and a presentation on available funding instruments was proposed for the next subworking group meeting.

An interactive poll with the participants revealed that there is a keen interest to dig deeper into funding instruments and additional revenue streams. Earlier, the subworking group meeting on Plant Engineering and Production had requested to investigate carbon markets as an additional revenue stream. Based on this, Mr. Philipp Veh, Consultant in Hydrogen Projects, Perspectives Climate Group, briefed the members on the functioning of carbon markets, how they can be applied to low carbon hydrogen projects and their benefits. Mr. Kapadia along with the participants agreed that a dedicated discussion was required on the topic. In addition it was requested to focus on the harmonisation of sustainability criteria for green hydrogen so Indian projects would be compliant with EU requirements and other potential export markets.

Group members specifically expressed an interest to learn about international offtake agreements for green ammonia. It had been informed that the Government of Germany is supporting contracts of difference with international tenders for green ammonia, green methanol, green hydrogen, and e-fuels being published. The call for interest for green ammonia to be exported to Europe had been floated recently by H2Global and Hintco.

"Identifying funding instruments is of utmost importance to the group" said Mr. Tapas Kapadia of RWE Supply & Trading.



Mr. Kapadia concluded the meeting by highlighting that future meetings under this subworking group would also provide an idea on the establishment of a government backed PtX offtake guarantee fund.

For more information, please read **here**.

Quality Infrastructure and Legal Framework Subworking Group under the Indo-German Green Hydrogen Task Force

8 December 2022 | Virtual

The Indo-German Energy Forum (IGEF) organised a Subworking Group meeting on Quality Infrastructure and Legal Framework under the Indo-German Green Hydrogen Task Force on 8 December 2022. Prof. Dr. Chitra Rajagopal, Director, Centre of Excellence, Indian Institute of Technology (IIT) Delhi and Mr. Markus Hoffmann-von Wolffersdorff, Partner-KNPP and Managing Director-KNPP Indigo introduced themselves to the participants and were approved as the Co-Chairs of this group. The Co-Chairs will convene future meetings for this subworking group under the Indo-German Green Hydrogen Task Force and assist in streamlining topics of discussion.

Dr. Nicole Glanemann, German Federal Ministry for Economic Affairs and Climate Action (BMWK) emphasized in her welcome remarks that the goal of the Task Force is to give inputs for the development of an Indo-German Green Hydrogen Roadmap. The focus of this subworking group is to delve deeper into the topics of standards and norms, certification, and legal aspects.

A poll survey gathered understanding of the group members on legal framework conditions for green hydrogen production in India, country specific certification schemes relevant to India, and gaps in standards and norms in the green hydrogen value chain of India. Afterwards participants were able to discuss and share views on the next steps and industry needs in connection with the quality infrastructure required for green hydrogen production in India.

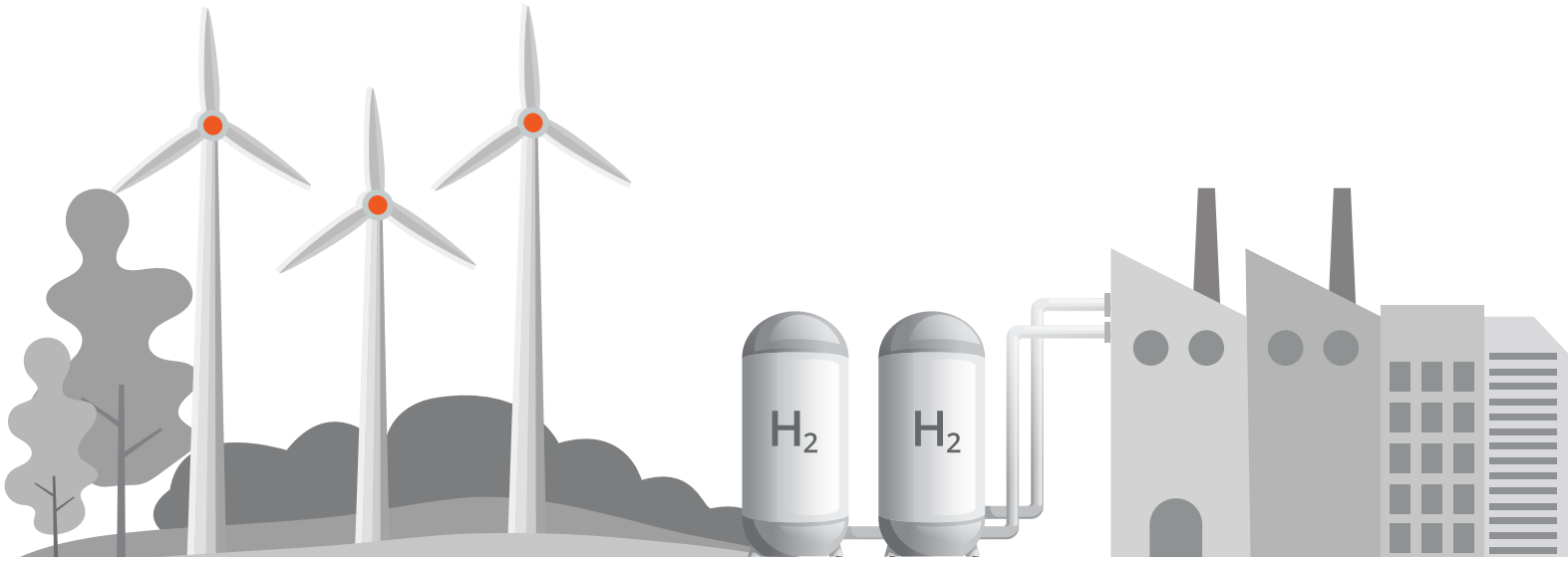
During the discussion, German companies pointed out that there is little knowledge about legal requirements for the implementation and setup of green hydrogen plants in India. Thus, it was decided that a dedicated session on permitting requirements to set up a green hydrogen plant in India will be carried out. It was also found that harmonisation of standards with respect to the compatibility of different green hydrogen certification schemes and sustainability criteria should be further discussed to assure that India is able to fulfil requirements defined by the EU for example.for example.

Prof. Dr. Rajagopal, IIT-Delhi and Mr. Markus Hoffmann von Wolffersdorff, KNPP were confirmed as Co-Chairs of the subworking group during the meeting.

Henceforth, it was agreed that the compatibility of different green hydrogen certification schemes and sustainability criteria are to be further discussed as part of this subworking group. Prof. Dr. Chitra Rajagopal proposed a gap analysis of the existing framework for safety standards in India. She also spoke about the urgent requirement for pilot scale manufacturing infrastructure. India currently lacks the infrastructure for test facilities, e.g. to test electrolysers and other newly used materials of construction, composite storage cylinders and hydrogen blending with natural gas. Hence, it was suggested that this subworking group should consider to support and further discuss the establishement of a national testing facility for new hydrogen related equipment. Another key deliverable from this meeting came from Mr. Markus Hoffmann von Wolffersdorff who highlighted that the social impacts of setting up green hydrogen plants in rural India need to be analysed. Interaction between governmental bodies, entrepreneurs, companies, and the civil sector is a prerequisite so that all stakeholders are involved. Such aspects must be covered by environmental impact assessments and the following approval by the environmental appraisal committee.

The meeting concluded with a presentation by Ms. Johanna Friese, Advisor at the International PtX Hub on the topic of EU sustainability criteria for certification of green hydrogen production. The group requested to have another session with inputs on the topic. This subworking group meeting fostered a need to further convert decided action points into specific activities that will eventually feed into the Indo-German Green Hydrogen Roadmap.

For more information, please read **here**.



Plant Engineering and Production Subworking Group under the Indo-German Green Hydrogen Task Force

23 November 2022 | Virtual

The Indo-German Energy Forum (IGEF) organised a Working Group I meeting on Plant Engineering and Production under the Indo-German Green Hydrogen Task Force on 23 November 2022. Dr. Nicole Glanemann, Deputy Head, German Federal Ministry for Economic Affairs and Climate Action (BMWK) commenced her welcome remarks by reinstating Germany's goal to promote an international hydrogen economy to help reduce the cost of green hydrogen and focusing to remain a net importer of energy even in a climate neutral future. In 2020, the German government dedicated a fund of 2 Billion Euro to its International Green Hydrogen Strategy, which will be increased by another 3.5 Billion Euro.

Dr. Glanemann's speech was followed by a presentation by Mr. Sidharth Jain, Founder & CEO, MEC Intelligence, on the Current Market Developments in Green Hydrogen in India. As per their research, it was found that the annual domestic hydrogen production in India is around 6 million tons mainly for fertiliser production and refining. Mr. Jain said it could be summarised that the Government of India's four focus points to replace the domestic hydrogen consumption under the National Hydrogen Mission are: establishing a global platform for hydrogen manufacturing and related technologies, forming strategies for demand creation, creating demonstration projects for application in the transportation industry sector, and having a single window clearance and across-state harmonisation of policy.

He offered more details on how the Government of India already has a demand creation strategy in progress with several papers published, including one by NITI Aayog on creating demand through mandates and corridors. Speaking about projects, Mr. Jain said that 38 projects had been announced so far with some even looking into exporting green ammonia. Furthermore, he said that state-level hydrogen policies have been implemented in Himachal Pradesh and Madhya Pradesh, with states like Uttar Pradesh and Rajasthan having released draft policies respectively.states like

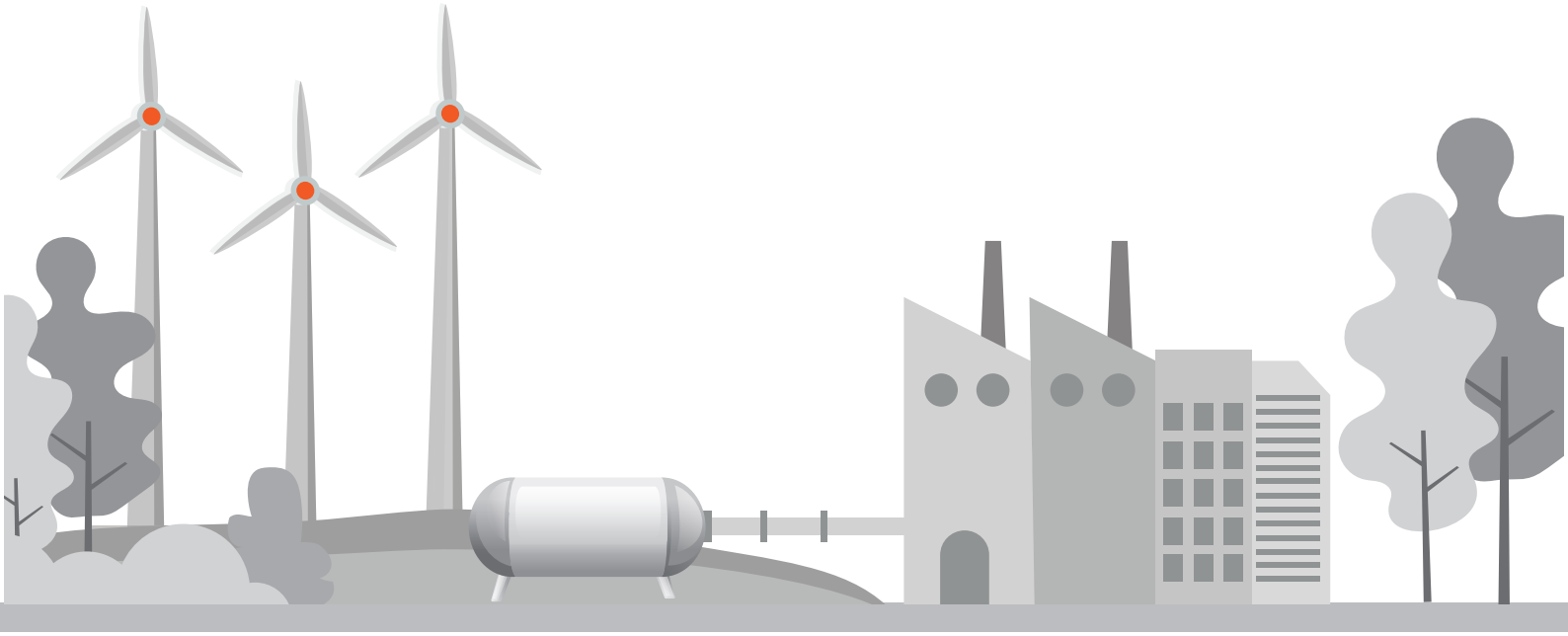
Dr. Nicole Glanemann, Deputy Head, BMWK commenced her welcome remarks

Uttar Pradesh and Rajasthan having released draft policies respectively.

The key obstacle in establishing green hydrogen as identified by Mr. Jain is the green hydrogen price gap. It is said that a cost reduction of 50% - 60% is needed to make green hydrogen competitive in the market. With this, the floor was open to participants to indulge in a discussion about what the next steps should be for industry leaders and researchers. The discussion was kickstarted with a multimedia interactive Q&A on foreseen electrolyser capacity to be installed in India, the highest potential for near term domestic offtake of green hydrogen and the main barriers for the same. This led to several insights being provided by the German and Indian businesses.

Mr. Vineet Goyal, Managing Director, Steinbeis Centre for Technology Transfer, India, introduced himself to the participants and was approved to head the group. Mr. Goyal agreed to convene future meetings for this working group under the Indo-German Green Hydrogen Task Force and will support streamlining the topics of discussion. The meeting concluded with substantial action points narrated by the participants and an urgency to learn more about the upcoming green hydrogen projects in India.

For more information, please read **here**.



Webinar on Safety Standards and Norms of Green Hydrogen, Green Ammonia and Green Methanol

29 November 2022 | Virtual

The Indo-German Energy Forum (IGEF) Support Office together with the Indo-German Chamber of Commerce hosted a virtual knowledge-sharing session on "Safety Standards and Norms of Green Hydrogen, Green Ammonia and Green Methanol" with more than 125 participants on 29 November 2022. Renowned experts from TÜV Nord Group and Dräger provided insights into the safety standards and norms of using green hydrogen-based chemicals. Dr. Nicole Glanemann, Deputy Head, Federal Ministry for Economic Affairs and Climate Action (BMWK), Government of Germany gave the opening remarks.

Mr. Anilkumar, VP Inspection, TÜV Nord India, focused on the regulatory framework of green hydrogen-based chemicals. He presented the Indian requirements for hazardous materials risk assessment and safety studies. This was followed by an introduction to the different standards that are applicable for the handling, storage, and transport of green hydrogen, green ammonia, and green methanol, respectively.

Mr. Marcus Oertel, Product Manager, Dräger Safety AG & Co. KGaA, emphasised that gas detection acts as the primary explosion protection to prevent explosions. Furthermore, he presented the classification of different hazardous areas and how detectors for flammable gases and oxygen can be selected.

The two presentations were followed by a Q&A session which was moderated by Mr. Tobias Winter, Director, IGEF-SO. Questions revolved around internationally applicable standards for green hydrogen considering the decade long implementation of standards for grey hydrogen in refineries. Further questions focused on the green hydrogen production via electroliser and the transport of hydrogen and its derivatives. This included their hazardous potential, and the possible necessary safety measurements.

For more information, please read here.

Train-of-Trainers on Renewable PtX

09 - 18 January 2023 | Berlin, Germany

From 09 - 18 January 2023, the International PtX Hub organised a comprehensive 10-day training on the topic of Renewable PtX in Mainz and Berlin. Technical experts in the field of renewable energy from 10 partner countries attended the training.

Technical, economic, and political aspects of PtX formed part of the training. Based on the inputs given, participants could exchange ideas and develop country-specific additions to the content. Energy professionals from India, Ms. Kajol, Manager at Energy Program, World Resources Institute and Mr. Vivek Jha, Consultant and Independent Researcher, participated in the 3rd Train-of-Trainers workshop. Besides the content-related elaboration on Renewable PtX, the soon-to-be trainers attended knowledge sessions on methodological and didactic aspects and enjoyed inputs from technical experts. To gain first-hand experience, the group went on an excursion to the Energiepark Mainz along with a tour of the RheinMain University of Applied Sciences. The course programme was described as value-packed, well-curated, informative and interactive. Both participants shared their key takeaways which included the need to build additional renewable energy capacities to ramp-up PtX production. After attending the Train-of-Trainers, the participants are now gearing up to implement the PtX training with the International PtX Hub in their respective countries.

Participants from 10 partner countries participated in the 3rd Train-of-Trainers.

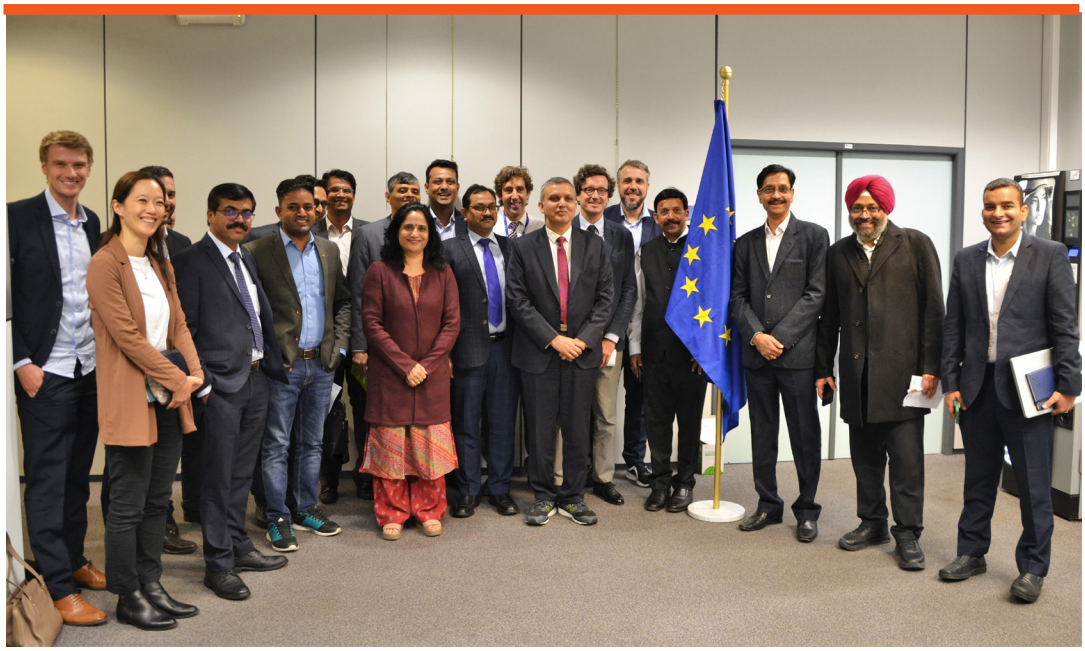
Knowledge Exchange Tour on Green Hydrogen to Brussels, Rotterdam and Hamburg

25 September - 02 October 2022 | Germany

From 25 September - 02 October 2022, the Indo-German Energy Forum (IGEF) Support Office organised a knowledge exchange tour on green hydrogen for high-ranking officials from India to Germany, Belgium, and the Netherlands.

The first day focused on the EU's sustainability criteria for green hydrogen and what implications these have on India's green hydrogen strategy. Mr. Arthur Daemers, Policy Advisor, SolarPower Europe, gave an overview of European developments in green hydrogen from a solar industry perspective. The most promising green hydrogen policy measures were discussed by Mr. Raphael Hanoteaux, Policy Think Tank E3G. The presentations were followed by a visit to the European Commission where participants further discussed the issue of certification criteria of sustainable or green hydrogen with Mr. Ruud Kempener, Team Leader – Hydrogen, Directorate-General for Energy, Mr. Florian Ermacora, Head of Unit for International Relations, Directorate-General for Energy, and Mr. Matthieu Craye, International Relations Officer, especially regarding the export of green hydrogen from India to the EU.

In Rotterdam, the group was welcomed by Mr. Han Feenstra, Senior Policy Officer, Ministry of Economic Affairs and Climate Policy, Government of Netherlands and involved in the Indo-Dutch Green Hydrogen Partnership. He presented various measures undertaken by the central government to boost the Dutch green hydrogen economy. The Port of Rotterdam is working towards the introduction of a large-scale hydrogen network across the port complex, making Rotterdam an international hub for hydrogen production, import, application and transport to other countries in Northwest Europe. The presentation on the Dutch perspective on green hydrogen was followed by a tour through the Port of Rotterdam. The visit included a stop at the ammonia terminals of Koole, OCI and Gunvor, a visit to an offshore-wind



High-ranking officials for the knowledge exchange tour on green hydrogen.

transformer station for green hydrogen production and a stop at the "Conversion Park" development site including electrolyser projects by Shell, BP and Air Liquide. Lastly, the tour ended with an impression of the SIF Offshore wind foundation manufacturing and storage site with an impression of the GE Haliade-X 14 MW wind turbine.

In the Netherlands, the group also visited the GZI Next site where Mr. René Jansen, General Manager Decommissioning and Energy Hubs, Shell Netherlands, Mr. Harry Eshuis, Shell Netherlands and Mr. Rene Schutte, Business Developer, Gasunie Netherlands presented the energy hub concept, which plans to repurpose existing natural gas infrastructure for green hydrogen and green fuels.

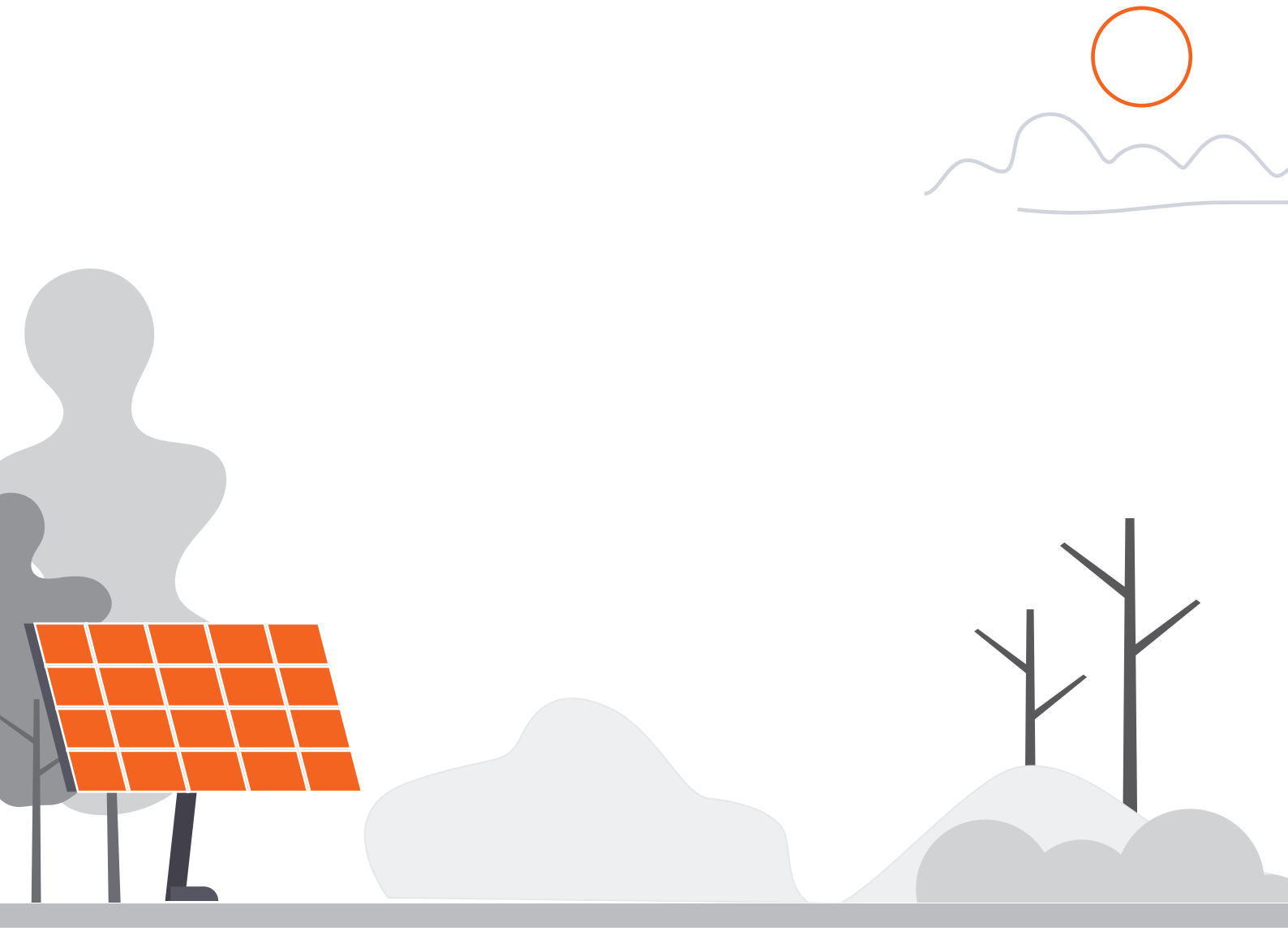
From 27 - 29 September, the delegates attended the WindEnergy Hamburg 2022 and H2 Expo & Conference. During the conference, IGEF organised presentations of the three hydrogen flagship projects by the Federal Ministry of Education and Research (BMBF), H2Mare, TransHyDe and H2Giga, which are important contributions to establishing the German National Hydrogen Strategy. Further, Mr. Emanuel Henrich, Project Manager, H2Global, gave insights into the H2Global mechanism, i.e. on international contracts of difference resulting from an auction-based mechanism to provide fixed green hydrogen volumes from third countries and secure minimum prices. In Hamburg, the delegates visited the Competence Centre for Renewable Energies and Energy Efficiency (CC4E) where Prof. Dr. Hans Schäfers, Professor for Intelligent Energy Systems and Energy Efficiency gave a presentation on the current research projects with regards to green hydrogen.

The Indo-German Energy Forum (IGEF) organised a dialogue event on **"Green Hydrogen and Offshore Wind"** on 29 September 2022 in the framework of the world's biggest event for onshore and offshore wind: WindEnergy Hamburg. Welcome remarks were given by Dr. Nicole Glanemann, Deputy Head, German Federal Ministry for Economic Affairs and Climate Action (BMWK), and Smt. Suman Sharma, Managing Director, Solar Energy Corporation of India (SECI). More than 60 people attended the event.

Visit to Cuxhaven port - a key logistics centre for the offshore wind power industry.

On the last day, the group had the chance to gain a first-hand impression of the immense opportunities offshore wind energy bears through a boat trip to the 111 MW wind farm Nordergründe. The first monopile was set up 15 kilometres north-east of Wangerooge in the Weser estuary. The installation of the wind turbines was completed at the beginning of December 2016. The Nordergründe wind farm is only around 30 kilometres from the coast. TenneT has implemented a three-phase grid connection. The grid connection point for the Nordergründe offshore project is the Inhausen transformer station north of Wilhelmshaven, which was extended for this purpose in 2012. Under the name "Green Wilhelmshaven," the company Uniper plans to establish a German national hub for hydrogen in Wilhelmshaven with both local hydrogen production via electrolysis and import of hydrogen via ammonia and subsequent ammonia cracking.

For more information, please read **here**.



Business Delegation to WindEnergy Hamburg 2022 and H2 Expo & Conference

26 September - 1 October 2022 | Germany

The Indo-German Chamber of Commerce (IGCC) and the Indo-German Energy Forum (IGEF-SO) Support Office organised an Indian business delegation to Germany from 26 September - 1 October 2022 on the topics of green hydrogen and offshore wind. The tour featured a visit to the WindEnergy Hamburg 2022 and H2 Expo & Conference.

A guided tour at the trade fair enabled the delegation to gain insights into the latest developments in the European energy market. Experts from companies with a special interest in India presented their activities and explored possibilities for future collaboration and exchange between the respective businesses. The participants also had the chance to participate in several workshops which were organised and hosted by the International PtX Hub.

On 29 September, the delegates from India were officially welcomed by the Acting Council at the Consulate of India in Hamburg, which emphasised the close diplomatic relations between the two countries.

High-ranking officials' delegation to Germany on Offshore Wind and Green Hydrogen production.

3rd edition of Aatmanirbhar Bharat in RE Manufacturing

17 - 19 October 2022 | New Delhi

The Confederation of Indian Industry (CII) in association with the Ministry of New & Renewable Energy (MNRE), Government of India organised the 3rd edition of Aatmanirbhar Bharat in RE Manufacturing from 17 - 19 October in New Delhi, around the theme - Pathways for Global Partnership in Green Energy –Powering India & the World. The international conference was supported by the Indo-German Energy Forum (IGEF) and witnessed participation from more than 20 countries.

Discussions were held around the issues of leveraging offshore wind, green hydrogen, RE manufacturing, balancing energy transition and energy security, and initiatives of state governments in energy transition and self-reliance.

Dr. Steffen Norbert Koch, Minister, Head of the Department for Economic and Global Affairs, Embassy of the Federal Republic of Germany mentioned that more than half the demand in Germany is in the social and health sectors. However, other fields including energy transition and information technology also have a high demand for skilled labour.

Dr. Prof. Christopher Hebling, Director, Division Hydrogen Technologies, Fraunhofer Institute for Solar Energy Systems, ISE said that promoting RE requires international collaboration in order to set up a huge pipeline system, which is needed, not only for hydrogen but also for green molecules to be carried by ships and other vessels across countries.

Dr. Martin Lux, Head of Energy Team, KfW said that while we support all efforts of decarbonisation and international support is already a part of India's national strategy, we also need to ensure climate efficiency is maintained, and most importantly, there should be no negative environmental or social impact created.

Dr. Prof. Christopher Hebling, Fraunhofer ISE emphasised international collaboration in his talk. ©CII

GH2 Summit India

8 - 9 September 2022 |New Delhi, India

The Indo-German Energy Forum (IGEF) partnered with Infinity Expo to organise the GH2 Summit India from 08 - 09 September 2022 at Radisson Blu Plaza Delhi Airport. The two-day summit attracted 200+ senior leaders from hydrogen developer companies, renewable players, technology providers, investors, policy makers, supply chain experts, energy experts, and consultants with the common purpose of making India a dominant player in the Green Hydrogen sector.

Addressing a panel discussion on Financing Green Hydrogen on day two, Dr. Martin Lux, Head Energy Team, KfW, stated that financing for viable GH2 Projects could be made available, but India needs to have its credible Regulatory Framework in place to attract huge investments.

Mr. Rolf Behrndt, Principal Advisor, GIZ, said that the challenge at the moment is to identify the GH2 demand where producers suffice the supply.

The session was moderated by Mr. Sanmit Ahuja, Founder & CEO, Economic Impact Initiative – Session Chair and other panellists were Ms. Surbhi Goyal, Senior Energy Specialist, World Bank; Mr. Devesh Singh, Operations Officer, The International Finance Corporation; Mr. Rajesh Mediratta, MD & CEO, India Gas Exchange; Mr. Shardul Kulkarni, Adviser, Vibrant Energy; Mr. Palash Srivastava, Deputy CEO, IIFCL Projects; Mr. Arul Shanmugasundaram, Executive Directive Operations, Ayana Renewable Power; Mr. Ajay Garg, Managing Director, Equirus Capital; Mr. Mohan Bhuyan, India Representative, London Stock Exchange.

Speakers from the session on Financing Green Hydrogen.

World Hydrogen Energy Summit 2022

16 - 17 October 2022 | New Delhi, India

The World Hydrogen Energy Summit 2022, a global conference organised by the Energy and Environment Foundation along with the support of the Ministry of New and Renewable Energy, Ministry of Road Transport and Highways and NITI Aayog, was held this year on 16 -17 October to discuss "Green Hydrogen: Cleaner and Zero Emission Fuel for a Sustainable Green Economy." The event was supported by the Indo-German Energy Forum (IGEF) Support Office.

The inaugural ceremony was joined by Shri Anil Razdan, IAS (Retd.), Former Secretary, Ministry of Power, Government of India and Chairman of the Energy and Environment Foundation, Dr. N.B Mazumdar, Chairman of International Academy of Environmental Sanitation and Public Health, Dr. V.K Garg, Former CMD, Power Finance Corporation Ltd. & Chairman of Joint Electricity Regulatory Commission, and Dr. Anil Garg, President of World Hydrogen Energy Summit 2022. HE Bruce Ralston Q.C., Minister of Energy, Mines and Low Carbon Innovation, Government of British Columbia, Canada, and HE Mr. Aranha Corrêa do Lago, Ambassador, Embassy of Brazil, joined in virtually for the opening address.

During the ceremony, Prof. Dr. Christopher Hebling, Director of Division Hydrogen Technologies, Fraunhofer Institute for Solar Energy Systems ISE, Germany, was commended with the "Global Excellence Award" by the Energy and Environment Foundation (EEF) for his research work in the hydrogen energy sector. The ceremony was concluded with the idea that solutions toward sustainability depend on the habitat of each region.

Prof. Dr. Christopher Hebling, Fraunhofer ISE, Germany, was commended with the "Global Excellence Award". ©WHES

The knowledge sessions for the day kickstarted with presentations on 'Hydrogen Towards Net Zero Pathway', from Prof. Dr. Hebling, and Dr. R.K. Malhotra, President of the Hydrogen Association of India. Virtual presentations were made by Dr. Sunita Satyapal, Director, U.S. Department of Energy's Hydrogen and Fuel Cell Technologies Office, Mr. Nobuo Tanaka, Former ED, International Energy Agency, Japan, Dr. Tianyi Sun, Climate Scientist at Environmental Defense Fund, USA and Mr. Laurent Antoni, President of Hydrogen Europe Research & Public Affairs Manager for Hydrogen Technologies, France. A key takeaway from this discussion was that collaboration on energy partnerships is a must. As Prof. Dr. Hebling summarised, "We should go beyond the competitiveness, instead we must link together so that there is faster progress, long term (trading) relationships and a secure environment."

Thereafter, the discussion moved to 'Hydrogen Fuel Cell Solutions and Green Energy Transition' with presentations from Mr. Manoj K. Upadhyay, CMD, ACME Group, Mr. Nishant Arya, Vice Chairman, JBM Group, Dr. Sushil S. Ramdasi, Deputy Director, In Charge-Power Training Design, ARAI, followed by virtual presentations from Dr. Michaela Kendall, CEO, Adelan Ltd., UK, Dr. Xianguo Li, Professor, University of Waterloo, Canada, and Mr. Thomas Engelmann, Head of Energy Transition, KGAL Investment Management, Denmark. The speakers spoke of the benefits and challenges of Polymer Electrolyte Membranes and Alkaline electrolysers while highlighting the potential that India possesses for reducing imports and focusing on local manufacturing of electrolysers.

The final panel discussion was on 'Green Hydrogen & Green Ammonia for Heavy Transportation and Mobility' wherein Mr. Ghanshyam Prasad, Chairperson of Central Electricity Authority, Dr. B.S. Negi, Former Member of Petroleum and Natural Gas Regulatory Board, Prof. T.P Yadav, Hydrogen Energy Centre, Department of Physics, Institute of Science, Banaras Hindu University, Dr. Mukul Das, Director of Shriram Institute for Industrial Research, and Mr. Christian Pho Duc, Chief Technology Officer at Smartenergy Group AG, Switzerland spoke about the potential of Green Hydrogen in heavy motor vehicles (HMV) and the many safety and durability experiments being conducted across the world. Dr. Das also mentioned NTPC's efforts for green hydrogen run HMVs in India. The day concluded with the spirit that to have a green sustainable economy, industries and the government would need to focus on clean and zero emission fuel.

World Energy Storage Day (WESD)

22 September 2022 | Virtual

The Customized Energy Solutions (CES) and India Energy Storage Alliance (IESA) organised the World Energy Storage Day (WESD) virtually on 22 September. As part of the 6th global conference and virtual expo, the Indo-German Energy Forum (IGEF) organised a virtual German pavilion. The Global Virtual Conference & Expo brought together the world's energy storage, e-Mobility and green hydrogen community together.

Apart from the 16 conference sessions which covered stationary, e-mobility, green hydrogen, and manufacturing in each of the regions, there were 10 additional workshops, which covered different topics such as giga factory supply chain, women in energy, skill development, solar-plus-storage, energy storage modelling, and optimisation and urban air mobility. The event witnessed global participation from over 100 countries and 150+ international speakers. Total virtual footfall was 44,022.

Virtual German Pavilion at WESD.

A platform of cooperation and exchange – The German Pavilion at Renewable Energy India Expo

28 - 30 September 2022 | Noida, India

On 29 September, the German Federal Ministry of Economic Affairs and Climate Action together with the German Embassy facilitated the Indo-German Energy Day where representatives of the companies Enapter, Enercast, Dornier Group, ISE, MBJ Solutions, RCT Solutions, RWE, Wavelabs and Vedanjay successfully presented their products and services to participants. In his keynote speech, Dr. Steffen Koch, Head of Economics and Global Affairs from the German Embassy highlighted the strong partnership between India and Germany in working towards a regional and global energy transition.

For more information please contact Mr. Maycaa Hannon, hannon(at)german-energy-solutions.de.

The presentations on the Indo-German Energy Day highlighted climate-friendly energy solutions – made in Germany and paved the way for a productive subsequent networking session. ©BMWK

Business Opportunities for AgriPV in India

29 September 2022 | Noida, India

The Indo-German Energy Forum (IGEF), together with the German Solar Association (BSW-Solar) and National Solar Energy Federation of India (NSEFI) hosted a session on the "Business Opportunities for AgriPV in India" on the 29 September 2022, during the 15th annual Renewable Energy India Expo in Greater Noida.

The session was moderated by Ms. Luz Alicia Aguilar, Senior Project Manager for International Affairs at the German Solar Association (BSW-Solar).

Inaugurating the session with a virtual welcome remark, Dr. Nicole Glanemann, Deputy Head of Division at the Federal Ministry for Economic Affairs and Climate Action (BMWK), Government of Germany highlighted the benefits AgriPV can provide in India. She emphasised that the co-location of solar energy generation and crop cultivation can promote clean and renewable energy without sacrificing scarce land. Moreover, Dr. Glanemann noted that AgriPV can secure agricultural production from emerging climate risks and improve the livelihoods of farmers.

Mr. David Wedepohl, Managing Director International Affairs at the BSW-Solar, in his welcoming remark, reiterated the role of AgriPV in addressing land scarcity and conflicts and further addressed the need for technological exchange in the overall AgriPV scenario.

Dr. Martin Lux, Head Energy Team, KfW India, also gave a welcome remark and outlined some key topics to be addressed, including legal aspects, production to distribution and feeder line construction. In closing, Dr. Lux urged establishing bankable projects that are truly Agri + PV, rather than PV + Agri.

Mr. Pulipaka, CEO, NSEFI, provided an overview of the current developments in AgriPV across India, stating that AgriPV has the potential to be a win-win for agriculture, solar, academia, government and the community. Mr. Pulipaka also highlighted some key points to be addressed, including the need for a greater contribution from stakeholders, and cost-benefit assessments to increase transparency and certainty on the economic viability of AgriPV.

(L to R): Ms. Luz Alicia Aguilar (BSW-Solar), Mr. David Wedepohl (BSW-Solar), Mr. Sascha Krause-Tünker (NEXT2Sun), Dr. Martin Lux (KfW), Mr. Pulipaka (NSEFI), Ms. Suruchi Kotoky (BTG Legal), Mr. Siddharth Goel (IISD), Mr. Vivek Saraf (SunSeed AgriPV).

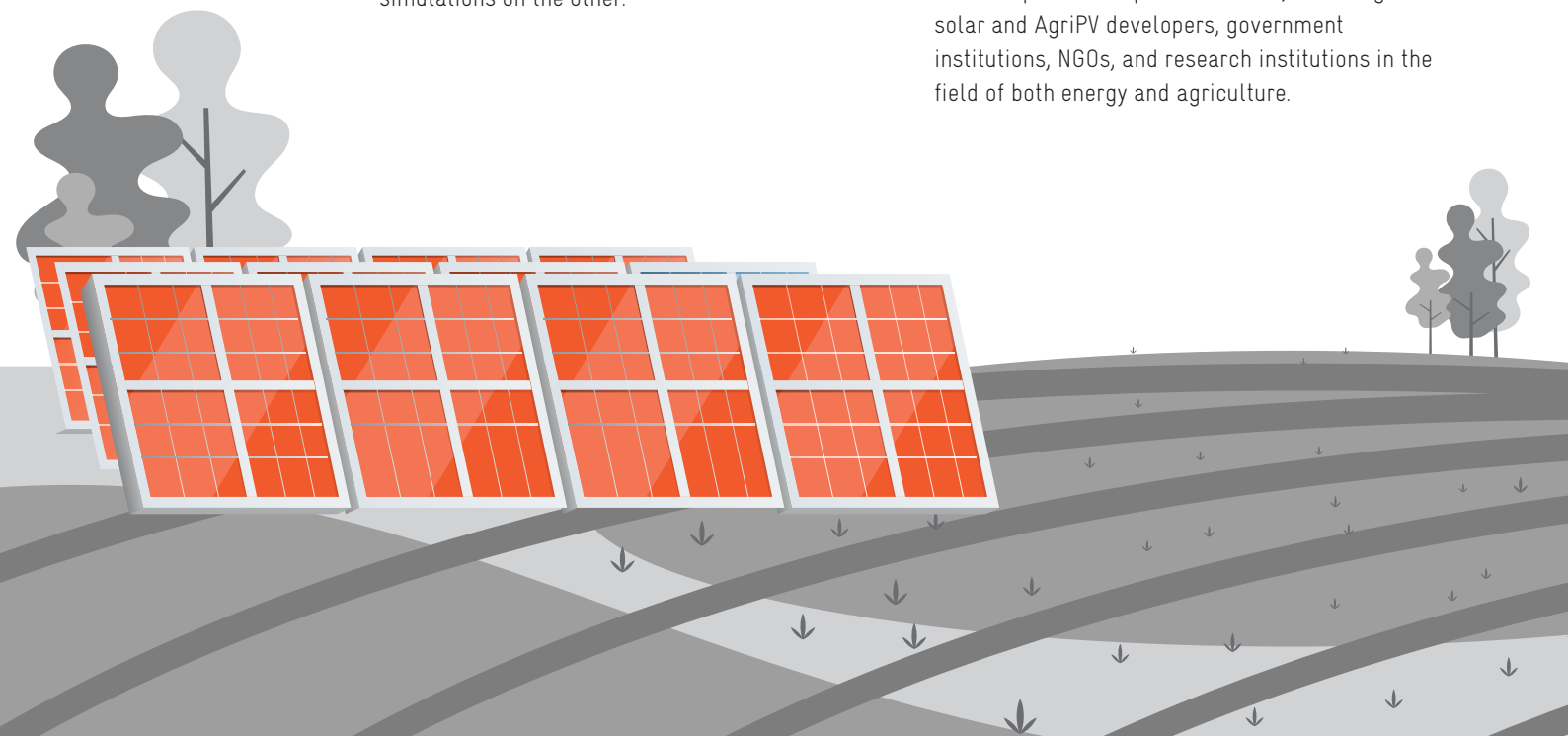
Mr. Siddharth Goel, Senior Policy Advisor, International Institute for Sustainable Development (IISD), introduced three main business models for AgriPV, setting the focus on aligning the incentives of farmers and solar developers. Mr. Goel concluded by outlining three key policy requirements for promoting AgriPV projects; the development of AgriPV definitions and standards, the introduction of financing mechanisms to increase incentives, and the need for capacity building for farmers and developers alike.

CEO and Co-Founder of the AgriPV-Startup, SunSeed APV, Mr. Vivek Saraf, provided some insight on AgriPV Project design, specifically looking towards improving the economics for both developers and farmers. The scientific approach employed by SunSeed APV looks at the costs of various AgriPV designs in connection with the crop yields and energy revenues each design provides. Their efforts thereby include assessment of mounting and material costs on one hand, and light, microclimate, water and crop growth simulations on the other.

Shifting the focus to the legal requirements and barriers for AgriPV, Ms. Suruchi Kotoky, Senior Associate at BTG Legal outlined some key findings from the recently launched study "Legal Aspects of AgriPV in India". Ms. Kotoky addressed the role of land classification and conversion for employment and provided some recommendations, including the introduction of a single-window act for AgriPV, and the formulation of specific regulation policies, such as land legislation which specifically provides for mixed-land use of agriculture and PV.

Closing the session, Mr. Sascha Krause-Tünker, CFO of NEXT2Sun, provided some insights on the integration of bifacial vertical solar panels in agriculture. Based on experiences across Europe, vertical AgriPV maximises the area of land that remains under cultivation and promotes electricity production in morning and evening hours, when demand is generally greatest. Mr. Krause-Tünker emphasised the need to explore and assess the potential of vertical AgriPV in the context of India.

The session brought together an audience from both the public and private sectors, including solar and AgriPV developers, government institutions, NGOs, and research institutions in the field of both energy and agriculture.



Global Green Hydrogen Conference

29 September 2022 | Noida, India

The Global Green Hydrogen Conference was jointly organised by the National Solar Energy Federation of India (NSEFI), the Indo-German Energy Forum (IGEF) Support Office and Informa Markets. The Session was inaugurated by the Hon'ble Member of Parliament, Dr. Mahesh Sharma, from Gautam Buddh Nagar, Uttar Pradesh at Renewable Energy Expo, Greater Noida, on 29 September.

Dr. Mahesh Sharma delivered the keynote address where he mentioned that under the leadership of the Hon'ble Prime Minister of India, Shri Narendra Modi, India has received global recognition for its Energy Transition development. Today, Indians are filled with the excitement of celebrating 75 years of its independence. India is also moving ahead in the Renewable Energy field with many promising results. And at this juncture when India has the 4th largest installed Renewable Energy Capacity, we are now going to make India the Hub of Green Hydrogen in the World.

In his address, he also mentioned that "we have an ambitious target of 500 GW of Non-Fossil Energy Capacity by 2030. We recently achieved the 150 GW of Renewable Energy Capacity (Including Large Hydro) milestone and are the only G20 nation to achieve its Paris Agreement NDC's of 40% installed power capacity from non-fossil sources ahead of its target."

In addition to this, he said that "Noida has a huge potential in terms of Energy Demand and Generation and also the Government of Uttar Pradesh has envisaged development of a green field airport at Jewar, which will be Asia's biggest aviation facility. We would like to invite Industries for the same."

Dr. Mahesh Sharma, Hon'ble Member of Parliament delivered keynote address.

Ms. Sunita Satyapal, Director, Hydrogen and Fuel Cell Technologies, U.S. Department of Energy (DOE), USA, Mr. David Wedepohl, Managing Director International Affairs, BSW (German Solar Association), Mr. Adamo were also present giving an international perspective.

The session witnessed the best brains, policy makers and major stakeholders from the industries and academic Institutions, deliberating and discussing at length the future of Hydrogen in the energy mix.

The representatives from industries shared their respective initiatives undertaken by their companies on the utilisation of hydrogen and their future plans. The speakers also shared the relevance of different technologies developed on hydrogen and its priorities for the country.

The following speakers presented their views on Green Hydrogen Development, Dr. R.K. Malhotra, Hydrogen Association of India, Mr. Srivatsan Iyer, Hero Future Energies, Mr. Alok Sharma, Centre for High Technology, Ministry of Petroleum and Natural Gas, Mr. Arnava Sinha, GreenKo Group, Mr. Kapil Maheshwari, Reliance Industries Limited, Mr. Sandeep Kashyap, ACME Group, Prof. Rajneesh Kumar, BITS Pilani and Mr. Tomasz Slusarz, Cleantech Business Club.

National Roundtable Conference on Agri-Renewables in India

23 August 2022 | New Delhi, India

The Indo-German Energy Forum (IGEF-SO) Support Office together with the National Solar Energy Federation of India (NSEFI) organised the National Roundtable on Agri-Renewables in India: A Double Engine Growth Strategy on 23 August at India Habitat Centre, New Delhi.

Shri Lalit Bohra, Hon'ble Joint Secretary, Ministry of New and Renewable Energy (MNRE), in his keynote address mentioned that by combining agriculture and renewable energy sources and reaping their mutual benefits, farmers may be able to enhance agricultural income in addition to lowering family expenses. He also said in his speech that in addition to immediately enhancing land use, agri-renewables may also help in increasing the amount of energy required for farming, reducing water losses, and properly utilising water while also adding an income source to the farmers.

IGEF-SO and NSEFI launched the report "Legal Aspects of Agri-Photovoltaics in India" together with the chief guest and other guests. In addition, the Agrivoltaics website, a one-stop source for all information about AgriPV in India was also launched.

Agri-Renewables and several organisations' experiences were discussed throughout the workshop, including ICAR-Central Arid Zone Research Institute, Jodhpur, SunSeed APV, SunMaster, Fraunhofer Institute of India, and Shakti Pumps.

Speakers pointed out that the economics of using renewable energy to generate power from the agriculture sector will be a win-win situation. This method will address several problems at once, including climate change, the Food-Energy-Water Nexus, and increasing farmers' income.

Shri Lalit Bohra, Hon'ble Joint Secretary, MNRE together with other guests launched the report on Legal Aspects of Agri-Photovoltaics in India.

Green Hydrogen Training Workshop

29 - 30 September 2022 | New Delhi, India

Steinbeis organised a Training Workshop on Green Hydrogen Economy, Technology and Transition from 29 - 30 September at New Delhi. The training was supported by the Indo-German Energy Forum (IGEF-SO). Speaking on the occasion, Mr. Vineet Kumar Goyal, CEO, Steinbeis Centre for Technology Transfer in India, said "Steinbeis is taking a significant step towards Green Hydrogen Economy in India. It is definitely a catalyst to clean energy in India and in line with the vision of the government.

The Workshop had four technical sessions covering various aspects such as the opportunities arising from the Indian Hydrogen Policy and understanding the future policy direction with a session on European Hydrogen Policy, Research Directions and the cluster approach being followed there. The participants were exposed to the complete package and techno-economics comprising a Green Hydrogen Project and also worked on sample tenders brought out recently in India. Thereafter the electrolyser technology, social and legal issues and safety issues were discussed by subject matter experts. The last session covered important topics such as the Global Green Hydrogen Alliance for Research and Technology Management, Technological Challenges in Manufacturing Green / Bio-Hydrogen, Hydrogen fuels for high power applications, Techno-Economics and challenges of a typical Hydrogen Mobility project.

The experts involved as Faculty were Mr. Vineet Kumar Goyal, Director, Steinbeis India & Coordinator – Steinbeis Indo-German Hydrogen Consortium, Dr. Michael Schlick, Technische Hochschule Ulm, Core Member - Fuel Cell Cluster of the State of Baden-Württemberg, Agency for New Mobility and Advisor – Hydrogen Energy, Steinbeis India, Dr. Shivani Sharma, Principal Technical Consultant, Hitachi Energy India, Dr. Bertram Lohmueller, Director EABW, SGIT and DSE Green Technologies European Hydrogen Consortium, Dr. Debasish Roy, CXO - Engineering Industry, Ex-L&T, Suzlon Energy and ABB, Prof. Indrajit Shown, Department of Chemistry, Hindustan Institute of Technology & Science (HITS),

Participants of the training workshop on Green Hydrogen Economy, Technology and Transition.

Chennai, Prof. Dr. Chitra Rajagopal, Director, Centre of Excellence, Indian Institute of Technology Delhi, Ms. Jyotsna Chaturvedi, Principal Associate, Maheshwari & Co., Advocates & Legal Consultants, Dr. S. Venkata Mohan, Chief Scientist & Co-Chair, Department of Energy & Environmental Engineering, Indian Institute of Chemical Technology – CSIR, Government of India, and Mr. Gurusathya Rajasekar, Director – Engineering and Research - India, Rolls-Royce Solutions.

Over 35 participants from Government, Research Institutions and Industry participated in the Training Program. On the sidelines of the training workshop, there were discussions on setting-up of a Green Hydrogen Training Centre with CSIR, technology transfer and setting-up of an Electrolyser Manufacturing Plant with Waaree Energies Ltd., and setting-up a Green Hydrogen Industrial Estate with Indo-German Industry Cluster with Mahatma Phule Renewable Energy and Infrastructure Technology Limited (MAHAPREIT), (Subsidiary Of MPBCDC, Government of Maharashtra Undertaking).

For more information please contact Mr. Vineet Goyal, CEO, vineet(at)steinbeisindia.com.

Roundtable on 'Green Hydrogen' in Kolkata & Mumbai

22 November and 8 December 2022 | Kolkata & Mumbai, India

The Indo-German Energy Forum (IGEF) Support Office along with the Indo-German Chamber of Commerce organised a round table and networking dinner on the topic of 'Green Hydrogen' in Kolkata and Mumbai, on 22 November and 8 December 2022, respectively.

The aim was to discuss the current green hydrogen market developments, the German funding schemes for green hydrogen projects and the potential for Indo-German Green Hydrogen projects.

The session in Kolkata started with welcome remarks from Mr. Manfred Auster, Consul General of the German Consulate, Kolkata. He deliberated on the 'National Hydrogen Policy' in Germany; the importance of using Green Hydrogen and the need to collaborate with other countries, especially with India to shift the whole infrastructure to using Green Hydrogen. The session in Mumbai opened with welcome remarks from Mr. Achim Fabig, Consul-General of the Federal Republic of Germany, Mumbai, who encouraged Indo-German cooperation by recognising the opportunities for partnerships; while Dr. Nicole Glanemann, Federal Ministry for Economic Affairs and Climate Action (BMWK), reiterated the need for private businesses to take an active role in building the roadmap for green hydrogen in India. Notable speakers included Mr. Sidharth Jain, Founder & CEO of MEC Intelligence and Mr. Tobias Winter, Director, IGEF-SO.

Mr. Jain presented his views on the Green Hydrogen Market Developments in India, the usage of Green Hydrogen in India, the aim of the 'National Hydrogen Mission' by the Government of India, and several policies pertaining to Green Hydrogen.

Mr. Tobias Winter, Director, IGEF-SO briefed the audience about the German funding schemes for Green Hydrogen projects. He laid out the objectives of Germany's 'National Hydrogen Strategy' and

The business roundtable participants in Kolkata agreed upon the severe need for Indo-German collaboration.

Dr. Nicole Glanemann, BMWK, joined the business roundtable meeting in Mumbai.

provided insights into Green Hydrogen trading in Germany and the grant funding for Indo-German Green Hydrogen Projects. He also emphasised the immense potential of Indo-German cooperation in the field of Green Hydrogen.

The presentations were followed by thought-provoking discussions which were moderated by Ms. Sabina Pandey, Regional Director of IGCC, Kolkata and Mr. Stefan Halusa, Director General of IGCC. Organisations belonging to varied industry sectors participated in the round table meetings.

For any further details please contact Ms. Shivani Chaturvedi at shivani.chaturvedi(at)indo-german.com.

ARE Conference and Energy Swaraj Awards

24 - 25 November 2022 | New Delhi, India

Actions for Restoring Environmnt (ARE) Conference, organised in collaboration with All India Council for Technical Education, one-of-its-kind conference, was organised on 24 - 25 November 2022 at Vasant Kunj, New Delhi. The conference saw 8 intensive sessions - each representing one sector of society followed by the Energy Swaraj Awards which applauded the exemplary efforts by individuals to mitigate climate change. With 21 Partners and over 35+ speakers on-board, the ARE Conference engaged 350+ participants who attended the conference physically and many more who watched the conference in online mode. The Indo-German Energy Forum (IGEF) was the supporting organisation of the event.

Mr. Anil Kumar Bellary, Co-Director, IGEF-SO, spoke in the session on Industries, their sustainability, environmental goals and outcomes - ARE they enough? other panellists in the session were: Mr. Anirban Ghosh, Chief Sustainability Officer, Mahindra Group; Dr. Pravir Deshmukh, Senior Counsellor, CII-ITC Centre of Excellence for Sustainable Development; Mr. Sandeep Tandon, National Project Manager, UNIDO; Mr. Venkat Rajaraman, CEO, Cygni Energy Private Limited and Director, Energy Swaraj Foundation (Panel Moderator) and special speaker Dr. Rajiv Kumar, Former Vice Chairman, NITI Aayog.

Speakers from the session on Industries, their sustainability, environmental goals and outcomes - ARE they enough?. ©Energyswaraj

International Seminar on Hydrogen-The fuel of the future is here

27 January 2023 | New Delhi, India

STEAG Energy Services (India) in association with the Central Electricity Authority (CEA), International Solar Alliance and GIZ organised an International Seminar on "Hydrogen-the fuel of the future is here" on 27 January 2023 at the India Habitat Centre in New Delhi.

India is prioritising Green Hydrogen as a potential solution for the de-carbonisation of hard-to-abate sectors and the Government of India has recently announced a package of Rs. 19,744 crores for funding initiatives as part of the National Green Hydrogen Mission. Therefore, the seminar was aimed at sharing knowledge and experiences at the international and national level in all aspects of hydrogen as a fuel and discussing the way forward, for expanding the hydrogen ecosystem, amongst various stakeholders.

About 240 participants attended the seminar including delegates from CEA, NTPC, policymakers, renewable energy developers, contractors, large industrial consumers, oil and gas companies, electrolyser manufacturers, technology providers, grid operators, researchers, consultants, and investors. The deliberations made during the seminar will surely help stakeholders in deciding the way forward in the exciting journey towards a hydrogen economy.

Emphasising the goals to be achieved by India, Dr. Winfried Damm, Head Energy Division, GIZ India in his inaugural speech said, "100 GW per year additional renewable energy capacity is required to achieve India's goal of 10 MM tonnes of green hydrogen and 500 GW renewables by 2030".

Following the inaugural, technical sessions were held on topics such as "Regulatory and Financial Issues" wherein Mr. Tobias Winter, Director, Indo-German Energy Forum (IGEF-SO), presented on certified sustainability criteria for green hydrogen exports to Europe. The sessions hosted notable speakers from NITI Aayog, IOCL, Fraunhofer Germany, Toshiba, JSW, IHI from Japan, KfW Development Bank, IIT Mumbai, Greenko Group & STEAG Germany.

Dr. Winfried Damm, Head Energy Division, GIZ India gave inaugural remarks.

9th International Hydrogen and Fuel Cell Conference (IHFC)

4 - 6 December 2022 | New Delhi, India

The Hydrogen Association of India (HAI) organised the 9th International Conference on Hydrogen and Fuel Cells 4 - 6 December 2022 at the Lalit Hotel, Barakhamba Road, New Delhi. The conference was supported by the Indo-German Energy Forum (IGEF-SO). With a focus on decarbonisation as the crucial solution for climate change, the conference addressed a variety of areas and applications that could use hydrogen as fuel and its significance in the future energy transition.

IGEF-SO together with HAI organised a special session on Women working for the Hydrogen Economy. Following are the key highlights from the session:

- Greater contribution of women will drive a greater hydrogen economy.
- NITI Aayog suggests that by 2025 GDP growth can be increased from 9% - 11% if the women workforce is increased from 25% - 50%.
- As the economy is related to the participation of women and renewable energy is related to an economy where hydrogen is a major part, so ultimately, a greater contribution of women will drive a greater hydrogen economy.
- Green hydrogen gives opportunities for women in terms of startups, women engagements in oil and gas sectors etc. which concludes that the green hydrogen economy is always related to women's participation.

Speakers from the session on Women working for the Hydrogen Economy. ©HAI

Speakers for Panel Session: Hydrogen Application for Mobility. ©HAI

Mr. Rolf Behrndt, Senior Hydrogen Advisor, GIZ spoke in a session on Hydrogen Application for Mobility. Please find the key highlights from the session:

- Hydrogen can play a key role to achieve India's decarbonisation targets. In the transportation sector as well, hydrogen can be the key to decarbonisation. The government also has the vision of embracing hydrogen mobility, for which they have formed a group as well.
- The group has mapped global standards and conducted a gap analysis with existing standards.
- They are in consultation with industry bodies of various segments – road transport, locomotives, ships, gensets and construction vehicles to develop standards for hydrogen mobility in India.
- Hydrogen can be used in ICE engines with minimal modifications, thus helping in the reduction of CO_2 emissions from ICE vehicles. H2 ICE can serve as an intermediate step in the transition from diesel to fuel cell vehicles. Ashok Leyland conducted a study on H2 in ICE engines, and the following were the results:
- Backfiring in H2 engines is a challenge and can be avoided by specific design and calibration efforts. 7% – 10% Exhaust Gas Recirculation (EGR) is required at higher speeds and loads to manage backfiring.
- Thermal efficiency of hydrogen operated vehicles is lower than CNG and gasoline.
- Total cost of ownership (TCO) of H2 ICE would be lower than diesel as in the future prices of H2 are expected to reduce significantly.
- There is no starting difficulty with H2, and the engine runs quieter than CNG/Diesel.

Speakers on Panel – Safety, Regulatory and Policy Issues to promote H2 Economy.©HAI

Mr. Tobias Winter, Director, IGEF-SO spoke in a session on Regulatory and Policy issues to promote the H2 Economy. A few highlights from the session were:

- National and international codes, standards and the creation of clear procedures, safety standards and regulations are essential for the safe implementation and adaptation of hydrogen systems which will lead to the successful progress of the hydrogen sector in India.
- Petroleum & Explosive Safety Organization (PESO) has licensed 4 hydrogen dispensing stations in India – 3 for Indian Oil Corporation Limited (IOCL) and 1 for Reliance Petroleum. The standards considered for granting a licence were ISO 19880, ASME 31.12 and NFPA 2. PESO has also licensed a Solid Oxide Fuel Cell (SOFC) based EV charging station for Indian Oil Corporation Limited (IOCL). The safety distance between two auto-dispensing hydrogen stations is 6 meters.
- Composite type IV cylinders will play an important role in hydrogen infrastructure as they can be used under high pressure, are light weight and corrosion resistant, easy to handle and easy to mount in a vehicle.
- Bureau of Indian Standards (BIS) have various standards catering to all elements of the hydrogen value chain – Hydrogen generation (IS 1090 : 2002, IS 16512 part 1, etc.), Hydrogen storage & transportation and hydrogen dispensation (IS/ISO 1728 : 2020, IS/ISO 13985 : 2006, etc.).
- Europe would float H2 global tenders in the near future, in which any country can participate to export green hydrogen to Europe in the form of ammonia.

- The green hydrogen must conform to the standards set by different countries to be accepted as 'green' in that country.
- For green hydrogen not produced on site with the RE plant, there are some specific requirements that have to be met, to be qualified to export to Europe.

- Hydrogen has a wide range of flammable concentrations in air, has low ignition energy and burns invisibly. Hence, adequate ventilation, leak protection detection systems and special flame detectors are very important elements that are to be incorporated in hydrogen safety standards. Proper training is also required to ensure hydrogen systems are handled safely.
- Oil Industry Safety Directorate (OISD) has been made the convenor for the hydrogen safety committee and for the formulation of hydrogen safety guidelines for the Oil and Gas sector.
- Arup, Singapore conducted the Hy4Heat Mission for Department for Business Energy and Industrial Strategy, UK.
- The objective was to establish if it is technically possible and safe to replace natural gas with hydrogen in residential and commercial buildings and gas appliances.
- They conducted experimental testing and Comparative Quantitative Risk Assessment (QRA) and recommended the government to undertake community trials.

Session on Green Hydrogen in India – Prospects and Opportunities

11 October 2022 | New Delhi, India

Under the Indo-German cooperation project "Supporting the Institutionalisation of Capacities on Climate Change Studies and Actions (ICCC)", the Ministry of Environment, Forest, and Climate Change (MoEFCC), Government of India, and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH along with the Vasudha Foundation organised an event on "Green Hydrogen in India: Prospects and Opportunities" with various stakeholders including ministries, industry, academics and civil society on 11 October 2022 at the India Habitat Centre, New Delhi. With the objective to develop and institutionalise capacities of the concerned stakeholders across the green hydrogen value-chain in India, the panel discussions conducted as part of this initiative focused on the following themes:

- Building knowledge and understanding of Government perspectives on Green Hydrogen including the current Hydrogen fuel ecosystem in India.
- Understanding developers' and manufacturers' experiences in executing Green Hydrogen Projects in India including the various approaches for project implementation.
- Exploring ways to bolster the efforts made by the Indian Government to boost Green Hydrogen uptake.

The session on "Understanding developers' and manufacturers' experiences in executing Green Hydrogen Projects in India including the various approaches for project implementation" was moderated by Mr. Gaurav Sharma, Advisor, Indo-German Energy Forum (IGEF-SO) with Mr. Tirtha Biswas, Business Development Manager, Ohmium India Private Limited and Mr. Abhinav Ashish, Manager at NETRA, NTPC as panellists for the session. The key topics discussed were around understanding key safety standards and guidelines in collaboration with industry partners, approaches and strategies adopted in implementing projects, financing methods employed in the project and challenges faced in executing green hydrogen projects.

While the session brought to fore the issues faced by the developers and manufacturers in efficiently executing their projects, the overall event facilitated a knowledge exchange among different stakeholders to formulate a set of potential solutions and recommendations for large-scale uptake and usage of the fuel.

IKI India Networking Workshop

13 - 14 October 2022 | New Delhi, India

The International Climate Initiative (IKI) along with the German Federal Ministry for Economic Affairs and Climate Action (BMWK) organised a two-day workshop on 13 and 14 October 2022 to learn about the developments or progress of the IKI India projects and discover possible synergies between these projects.

The workshop kickstarted with a welcome address by Ms. Karin Deckenbach, GIZ, and swiftly moved onto presentations by different IKI India projects. As part of the highlights, Dr. Winfried Damm, Head of GIZ Energy Team India, presented the Indo-German Energy Forum (IGEF-SO) and the work being carried out. The two projects presented as part of the Indo-German cooperation were, PtXHub and H2Uppp, both commissioned by BMWK in 2022.

Ms. Deckenbach invited Mr. Neelesh Kumar, Joint Secretary, Indian Ministry for Environment, Forest and Climate Change (MoEFCC); Mr. Philipp Behrens, Head of Division, IKI, BMWK; Sophia Engel, Head of Division, BMWK; and Elke Steinmetz, Head of Division International Cooperation on Biodiversity, German Federal Ministry for Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) to deliver the keynote address.

The notable takeaway from the discussion among the delegates was that climate action plans have mostly been financed by domestic sources in India, and it is now time for international funding. After having received a brief idea on each IKI India project, working groups were created on the themes of Mitigation, Adaptation & Biodiversity, and Cross-cutting projects.

The working groups focused on five main areas:

1. Identifying the pros and cons of working with the respective partners while learning about the experiences and challenges of each project.
2. Seeking potential contributions to the Indo-German partnership on green and sustainable development.
3. Indicating potential synergies between projects.
4. Learning how to incorporate actions from other projects.
5. Raising questions or suggestions for the German Ministries and MoEFCC.

While the first day of the workshop ended with deep discussions, the second day began with each thematic working group presenting their ideas to the ministry delegates and receiving feedback. The day ended with Ms. Vatsala Sharma, Associate Fellow, The Energy and Resources Institute (TERI), launching the IKI India – We Share website to the participants.

Symposium on "International Cooperation for Green Hydrogen"

7 December 2022 | Virtual

The Indo-German Symposium on International Cooperation for Green Hydrogen organised by the German Centre for Research and Innovation (DWIH) on 7 December 2022, aimed to foster a robust exchange of ideas and perspectives surrounding the current policies and research in the field of green hydrogen, particularly in its storage and transport. The symposium brought together an array of experts from both India and Germany, as they shared their insights on Green Hydrogen technology, which is the fuel of the future.

During the keynote, Prof. Dr. Olivier Guillon (Forschungszentrum Jülich) offered a comprehensive overview of Germany's national hydrogen strategy, illuminating the key research activities and flagship projects that have arisen from this strategy. A panel discussion followed thereafter, featuring researchers and advisors on the topic from Zukunftscluster Wasserstoff, Forschungszentrum Jülich, CSIR- National Chemical Laboratory (NCL) & IIT Madras. Prof. Dr. Ralf Peters, Dr. Heidi Heinrichs, Dr. Ashish Lele, and Dr. Jitendra Sangwai, delved into the current research on the storage and transport of green hydrogen in India and Germany, a topic of immense interest as India strives to become a prominent supplier, and Germany anticipates a shortfall in its own production. The final session saw presentations from experts from industry and academia, namely Mr. Sammy Wittop (National Organisation Hydrogen and Fuel Cell Technology NOW GmbH), Prof. Daniel Markthaler (Fraunhofer IPA), and Prof. S. Dasappa (Indian Institute of Science). These presentations showcased pilot and international research projects that demonstrated the tremendous potential of hydrogen in mobility.

The symposium served as a testament to the wide-ranging R&D initiatives underway in the hydrogen economy, which are being supported by numerous funding organisations in both India and Germany. The overarching objective of these initiatives is to create new materials, methods, components, systems, and potential cooperation that will help to advance the field and bring us closer to a sustainable future with net-zero emissions. By providing a platform for meaningful discussions, the event played a vital role in promoting international collaboration and expanding the collective knowledge of this critical technology. The DWIH New Delhi is a part of the Indo-German Green Hydrogen Taskforce, led by the Indo-German Energy Forum (IGEF), which also supported the event.

An event recording is available here.

The symposium highlighted the wide-ranging R&D initiatives underway in the hydrogen economy. ©DWIH

3 Developments in Indo-German Energy Cooperation

Hydropower in Himalayas

10 - 11 October 2022 | Himachal Pradesh

On 10 and 11 October 2022, an 80 Million Euro interest-rate subsidised loan and 1.5 Million Euro grant for accompanying measures were signed between the Government of India, the Government of Himachal Pradesh, the Himachal Pradesh State Electricity Board (HPSEB) and KfW for the construction of four small run-of-river power plants including related infrastructure with 67 MW cumulative capacity. All four small Hydro-Electric Power Plants are designed as run-of-river schemes on the river Baira nallah and its tributary Cheni nallah. Baira nallah is a tributary of the Suil nallah and a sub-tributary of Ravi River in the Chamba District in Himachal Pradesh. The projects will be implemented by the HPSEB.

The project comprised the following four small hydropower plants:

1. Sai Kothi I – with a project capacity of 15 MW
2. Sai Kothi II – with a project capacity of 18 MW
3. Devi Kothi – with a project capacity of 16 MW
4. Hail – with a project capacity of 18 MW

The objective of the project is to increase the planned power generation capacities in the hydro region in Himachal Pradesh and thereby contribute to a CO2 reduction in India's energy mix. The project has been prepared with comprehensive and encompassing technical and environmental & social studies and corresponding designs including necessary mitigation measures. Along with this, the Himachal Pradesh State Electricity Board will benefit from capacity building to further increase environmental & social quality standards and procedures, as well as technical skills and planning within the organisation.

For more information, please contact Mr. Nisheeth Srivastava, Nisheeth.Srivastava(at)kfw.de.

Four small Hydro-Electric Power Plants are designed as run-of-river schemes. ©KfW

Strengthening synergies between the Energy and the Environment Cluster projects of GIZ India

1 February 2023 | Guwahati, Assam

Strengthening GIZ's sustainability goal for the Aquaculture sector the Promotion of Solar Water Pumps (IGEN-PSWP) and the Sustainable Aquaculture for Food and Livelihood (SAFAL) projects collaborated. In Assam and Odisha, PSWP projects have been working to integrate Decentralised Renewable Energy (DRE) technologies in Aquaculture value chain. SAFAL project in collaboration IGEN PSWP hosted a workshop as a part of the three-days "Monitoring and Evaluation Framework, Indicator Identification for SAFAL and Decentralised Renewable Energy activities included in the SAFAL project and strategy development workshop" from 01 - 03 Feb 2023. On 1 February, the PSWP team shared the objective of integrating DRE and explained several DRE technologies, their cost economics, and benefits to the participants. A group activity was organised to brainstorm on (I) areas of convergence with different state policies and schemes in the state such as PMMSY, CMSGUY etc. (ii) how finance can be accessed and financing for DRE applications can be integrated into financial institutions instruments, (iii) how awareness among fish farmers can be strengthened, leading to increased adoption of DRE technologies, and (iv) capacity building requirements of relevant partners.

Key partners comprising of- Department of Fisheries, Assam Government, NABARD, World Fish, CSOs working for the sector - Kalong Kapili, SESTA, Gram Uthan, Darbar Sahitya Sansad, Farmer Producer Organizations members and Community Resource Persons, representatives from Innovative Change Collaborative Services Pvt. Ltd (ICCSPL) participated in the workshop and provided their valuable inputs.

DRE applications, such as solar water pumps for watering and dewatering, solar refrigerators for enhancing the shelf life of fish and fish products, solar aerators to support in maintaining dissolved oxygen level and circulation of water, and solar dryers to add value to the processing of fish products would be demonstrated in due course of time.

GIZ PSWP and SAFAL project team interacted with DoF, Assam, Govt. line departments and other partners from aquaculture sector of Assam and Odisha to integrate DRE technologies in the value chain. ©GIZ

The project is intended to demonstrate sustainable business models by unlocking the resources available with relevant partners of the sector. The group had emphasized on the use of innovative Information education and communication (IEC) materials to create awareness among the partners to learn and adopt DRE, which is a sustainable approach for the sector to reduce the input cost in long run and to optimize profits. Partners present in the workshop had appreciated the joint effort and provided valuable inputs, suggestion, and feedback to further strengthen the objective of the collaboration.

For more information, please contact Mr. Anuj Hemant Xess, anuj.xess(at)giz.de and Dr. Jeherul Islam, jeherul.islam(at)giz.de

75 Trainings under RACHNA - Resilient, Affordable and Comfortable Housing through National Action

April – August 2022 | States Across India

The Ministry of Housing & Urban Affairs (MoHUA) in collaboration with the Building Material and Technology Promotion Council (BMTPC) and GIZ's Climate Smart Buildings Program launched the initiative RACHNA: Resilient, Affordable and Comfortable Housing through National Action. Under RACHNA 75 trainings and events were hosted on innovative construction technologies and thermal comfort for Affordable Housing to acquaint various stakeholders from the building construction industry with the nuances of thermal comfort through a multi-layered understanding of affordable housing. The trainings were designed in one-day and two-day formats targeting different stakeholders including government officials, policy makers, academicians, students, architects, engineers, real estate developers, construction workers, masons etc. The 75 trainings were conducted in 113 days covering 29 cities across India training 5,142 stakeholders including 1,199 Government Officials, 1,322 practitioners, 1,638 students in 12 Academic institutions and 983 construction workers. Over 39 experts were engaged with GIZ's Climate Smart Buildings team to complete RACHNA trainings.

For more information, please contact Mr. Nitin Jain, nitin.jain(at)giz.de.

Rachna training at Indore with workers and contractors. ©GIZ

Rachna training in Delhi with Joint Secretary, MoHUA with dignitaries from MoHUA, BMPTC and GIZ. ©GIZ

BEE-IGEN SDA Partnership Summit 2022

11 - 12 October 2022 | Goa, India

The BEE-IGEN SDA Partnership Summit 2022 was held on 11 - 12 October 2022 in Goa to establish continuous dialogue and interactions with the State Designated Agencies (SDAs). The program was inaugurated by Shri Ajit Roy, Secretary (Power), Goa and the keynote address was given by Shri R.K Rai, Secretary, Bureau of Energy Efficiency (BEE).

The event acts as a platform to review physical and financial progress of SDAs. Officials from 35 SDAs, BEE, the representatives from Energy Efficiency Services Limited (EESL), and consultants along with GIZ Experts attended the event. The summit recorded 99% participation for the first time.

During the summit, all the SDAs were made aware of recent developments, amendments, vision and action plans, towards India's goal of energy transition. The key highlight of the event was intense discussions on the development and adoption of State Energy Efficiency Action Plans. The event was a big success!

For more information, please contact Ms. Priyanka Chandra, priyanka.chandra(at)giz.de.

Lamp Lighting by Shri R.K Rai, Secretary, BEE. (Left) ©GIZ

Welcoming Shri Ajit Roy, Secretary (Power), Goa. (Right) ©GIZ

Representatives from BEE, 35 SDAs, EESL, consultants & GIZ Experts.©GIZ

Study tour on long-term energy planning to Germany

20 - 27 August 2022 | Frankfurt and Freiburg region

The Indo-German Energy Programme (IGEN-Access II) project organised a study tour on long-term energy planning to Germany. The study tour focused on how the energy transition happens in Germany and introduced best practices as well as innovative solutions to the participants. High-ranking decision-makers from the Ministry of New and Renewable Energy (MNRE) and four Indian states joined the study tour that took place in the Rhine-Main region around Frankfurt as well as Freiburg. The study tour included meetings and discussions, inter alia, with the Ministry of Climate Action, Environment, Energy and Mobility in Rhineland-Palatinate, the Energy Agency of Hesse, the Passive House Institute as well the Fraunhofer ISE and ISI. Additionally, the participants visited various field sites, for instance, Agriphotovoltaics, waste-to-energy and hydrogen. The study tour fostered active discussions around long-term energy planning and the required enabling ecosystem with the right policies and framework conditions to achieve a clean, affordable and secure energy supply.

For more information please contact Mr. Florian Postel, florian.postel(at)giz.de.

Meeting on energy transition with the Ministry for Climate Protection, Environment, Energy and Mobility of Rhineland-Palatinate. ©GIZ

Consultative Workshop on "Decentralised Renewable Energy for Net Zero Transition with maximum social impact"

29 September 2022 | Noida, India

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) IGEN – Access II Program, Ministry of New and Renewable Energy (MNRE), Association of Renewable Energy Agencies of States (AREAS) and Clean Energy Access Network, organised a consultative workshop on 'Decentralised Renewable Energy for Net Zero Transition with maximum social impact' at Renewable Energy India Expo on 29 September 2022 at Raman Hall, India Expo Centre and Mart, Gurgaon.

The workshop was the first of its kind where different stakeholders – MNRE (policy makers), implementation agencies, end users, technology suppliers, and bilateral agencies came together to discuss the theme. In addition, representatives from the Government department, Maharashtra Energy Development Authority (MEDA), Ms. Prerna Ojas, UPSRLM, and Meghalaya State Rural Livelihood Society participated and shared their learnings.

Among the speakers at the event were Dr. Veepin Kumar, Deputy Director, MNRE; Ms. Himani Mehta, Assistant Director, MNRE; Ms. Nidhi Sarin, Senior Advisor, GIZ, and Lt. Col. Monish Ahuja, President, CLEAN. The event also brought together 16 DRE adopters and beneficiaries from five Indian states who shared their insights and experiences relating to DRE adoption and integration within different livelihood activities.

Stakeholders from the DRE workshop. ©GIZ

Use of DRE in livelihood - Experience Sharing by End Beneficiaries. ©GIZ

Key Takeaways from the Workshop:

- Decentralised Renewable Energy (DRE) has an important role to play in achieving the 2030 ambitious goals set by the Government of India and its overall commitment of 500 GW.
- DRE technology integration in farm and non-farm livelihood can directly impact the end users and has huge potential to support rural economic growth, particularly women and can act as a catalytic engine to enhance the green village economy.
- Awareness and sensitisation about DRE technologies for end users and stakeholders including financial institutions is important and required immediately across geography.
- Pilot projects by different organisations are implemented with the support of government institutions and bi/multilateral agencies across geography.
- Huge potential to learn from the existing experience exists that includes understanding the demand of a particular DRE product within the value chain using energy gap study, designing of business loan for procuring DRE technology for integration in farm and non-farm livelihood activities, convergence and leverage funds from existing government programs and schemes.
- The experience shared by beneficiaries across geography from different organisations helps demonstrate DRE integration within livelihood can help promote additional income, employment generation and opportunity for women entrepreneurship in the rural regions.
- Highlighting the impact of DRE intervention, Mr. Lakhpat Pandit from Giridi Farmer Producer Organisation (Odisha) noted that with DRE integration the earning increased from Rs10/kg to Rs16/kg. The DRE technology was integrated with different local livelihoods, for instance, leaf plate making unit, dryers for turmeric and potato drying and pulveriser.
- In the closing remarks, MNRE representatives highlighted that the framework on "DRE for Livelihood" is currently in process of development by the ministry and if implemented will support all relevant stakeholders and help scaleup the pilot initiatives at a larger level across geographies.

Supporting Distributed Energy Resource (DER) Integration in India-Workshops for Dissemination of Recommendations Towards "Technical Requirements for DER integration"

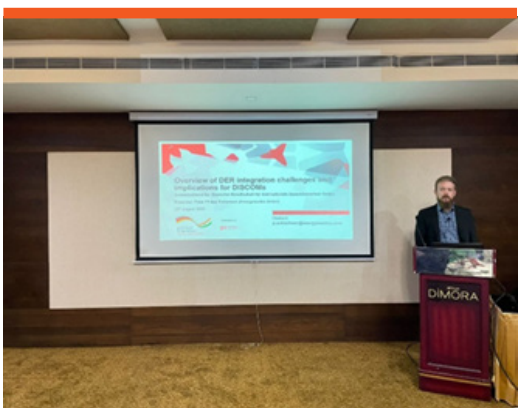
22 & 26 August 2022 | Gandhinagar and Thiruvananthapuram

As part of the Indo-German Energy Program, GIZ led stakeholder discussions on "Technical standards for DER Integration in India" in collaboration with Energynautics and Idam Infrastructure. The workshops were part of an activity of the GIZ-implemented project "Energy Transition with DISCOMs". As a part of the activity, international technical standards for DER integration were reviewed, gap analyses for India were performed, and recommendations were developed.

Two workshops were held to disseminate the findings of the activity between 22 and 26 August 2022 in the cities of Gandhinagar and Thiruvananthapuram, respectively. Over 100 key stakeholders from each state participated, including representatives of the Central Electricity Authority (CEA), Gujarat Urja Vikas Nigam Ltd. (GUVNL), Kerala State Electricity Board (KSEB), Gujarat Energy Development Agency, Gujarat Energy Research and Management Institute, and EPC companies. The events provided the opportunity to collect feedback from these key stakeholders to further work on the roadmap recommendations.

The major technical difficulties with DER integration were discussed in the session, along with several potential mitigating measures. Additionally, recommendations for identifying the technical requirements for integrating DERs in low voltage distribution systems were discussed, highlighting the significance of technical standards and compliance mechanisms. The beneficiaries of this assignment, like officials from GUVNL and KSEB, praised the efforts of the project team and the experts for their recommendations about technical connectivity standards. Moreover, the officers from KSEB mentioned the need to standardise the technical requirements to mitigate the impact of DER integration. It was mentioned that they are observing voltage surges on solarised feeders and mitigating such voltage surge is one of the various challenges they are facing due to DERs. They acknowledged the need to work on the technical standards for low voltage systems as well. The roadmap recommendations have been submitted to CEA for their future perusal.

For more information please contact Ms. Vibhuti Nougain, vibhuti.nougain(at)giz.de.



Energynautics' expert Peter Schierhorn presents at the workshops. ©GIZ (Left)

Energynautics, Idam and GIZ experts at the workshops. ©GIZ (Right)

4 Quote of the Month from India and Germany

Quote of the Month from India

Shri Narendra Modi,
Prime Minister of India

"India is one of the strongest voices in the world for energy transition and for developing new resources of energy. Unprecedented possibilities are emerging in India that is moving with a resolution of a Viksit Bharat."

Source: PIB

Quote of the Month from Germany

Dr. Robert Habeck,
Federal Minister for Economic Affairs and Climate Action, Govt. of Germany

"The focus is now on driving our common shift away from coal, oil and gas through a sustainable, socially just, global energy transition and the decarbonisation of industry."

Source: BMWK

5 Energy Transition News

New offshore agreement for more wind energy at sea

By 2030, some 30 gigawatts of offshore wind energy are to be installed off the German coast. To make sure the offshore grid connections are ready in time, the Federal Government, the Länder and the transmission system operators have now agreed on important steps.

The revised Wind Energy at Sea Act entered into force in the summer of 2022, introducing new and ambitious targets: at least 30 gigawatts of offshore capacity is to be installed by 2030, and 70 gigawatts, i.e. more than twice that amount, by 2045. These targets could significantly advance the expansion of renewables beyond the mainland.

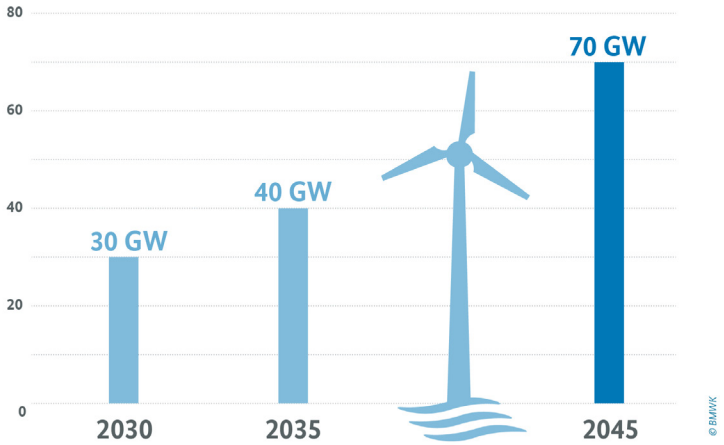
To feed this wind energy into the electricity grid, the relevant offshore grid connections and offshore wind farms need to be ready on time. To set the course, a new 2022 Offshore Realisation Agreement was concluded on 3 November 2022 between the Federal Government, the city states of Bremen and Hamburg, the federal states of Mecklenburg-Western Pomerania, Lower Saxony, North Rhine-Westphalia and Schleswig-Holstein, as well as the transmission system operators 50Hertz, Amprion and TenneT. This is an updated version of an initial agreement from 2020 which has been amended to take account of the new expansion targets.

Federal Minister Robert Habeck said: „The offshore agreement is an important milestone towards increasing offshore wind energy capacity and represents a strong joint commitment to achieving the 30 gigawatt expansion target by 2030. In it, we have agreed on a clear process to align things step by step so that we can reach the 30 gigawatts. What's key here are the agreed milestones and timetables for constructing the connection lines we need to reach the 30 gigawatt target."

The new offshore agreement also contains steps for designating areas at sea, ensuring offshore expansion is environmentally friendly, crossing the territorial sea and for accelerating the individual processes involved. In particular, it sets specific, binding timetables and milestones for the construction of the grid connections needed.

More offshore wind energy

Offshore agreement to ensure expansion targets are reached



©BMWK

6 Publications

Solar PV Global Supply Chains

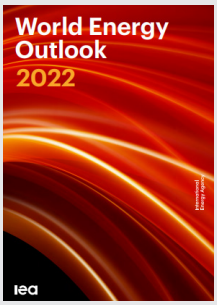
The report by IEA examines solar PV supply chains from raw materials all the way to the finished product, spanning the five main segments of the manufacturing process: polysilicon, ingots, wafers, cells and modules. The analysis covers supply, demand, production, energy consumption, emissions, employment, production costs, investment, trade and financial performance, highlighting key vulnerabilities and risks at each stage.

The full report is available for download here.

Global Hydrogen Review 2022

The Global Hydrogen Review is an annual publication by the International Energy Agency that tracks hydrogen production and demand worldwide, as well as progress in critical areas such as infrastructure development, trade, policy, regulation, investments and innovation.

The full report is available for download here.



World Energy Outlook 2022

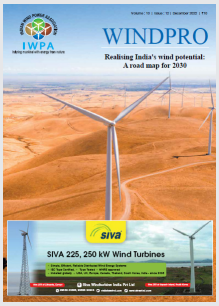
World Energy Outlook 2022 shows that the global energy crisis can be a historic turning point towards a cleaner & more secure future.

The full report is available for download here.

Farmers' experiences with Solar Irrigation Pumps: Discussing results from a large GIZ-KPMG survey

The podcast series of six-episode is an attempt to share with wider stakeholders the findings of a survey-based study executed by PSWP to ascertain learnings from state solar water pump schemes, focusing on installed asset conditions and implementation designs.

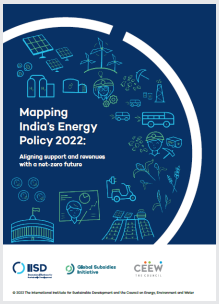
Please visit here for all six episodes.



Windpro – Realising India's wind potential: A road map for 2030

IWPA Publishes a monthly Windpro Journal disseminating information to members and conducts an annual International Conference & Exhibition on Wind Energy.

The full report is available for download here.



Mapping India's Energy Policy 2022

This report provides an updated assessment of public resources that support fossil fuels, renewables, and electric vehicles.

The full report is available for download here.

Land Suitability Assessment for Distributed Solar Energy in Tamil Nadu

The objective of this report is to identify unused lands for this district and evaluate to what extent these unused lands can be utilized to meet the state's solar energy target of 20 GW by the year 2030.

The full report is available for download here.

Hydrogen Insights 2022

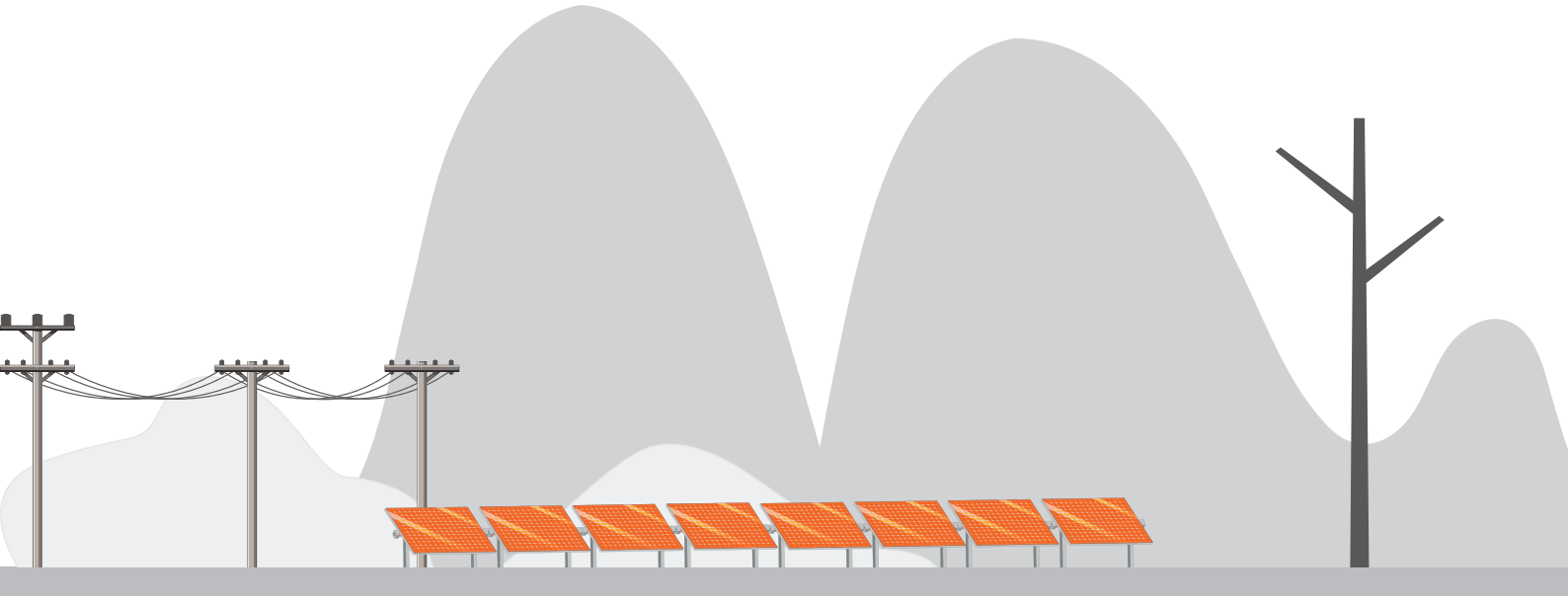
Authored by the Hydrogen Council in collaboration with McKinsey and Company, Hydrogen Insights 2022 presents an updated perspective on hydrogen market development and actions required to unlock hydrogen at scale.

The full report is available for download here.

Global Hydrogen Flows

Authored by the Hydrogen Council in collaboration with McKinsey and Company, Global Hydrogen Flows addresses the midstream challenge of aligning and optimizing global supply and demand. It finds that trade can reduce overall system costs.

The full report is available for download here. Comment by Mr. Liebreich can be read here.



7 Upcoming Events

6th Best Practices Study Tour and International Workshop on Agri PV Plants, RE Grid Integration and Green Hydrogen

15 - 17 March 2023 | Jodhpur, India

India Smart Grid Forum (ISGF) has been organising its flagship annual event, India Smart Utility Week (ISUW) since 2015 and it is considered as one of the top five international events on Smart Grids, Electric Mobility and Smart Cities.

The 9th edition of ISUW 2023 is scheduled from 28 February – 04 March 2023 in New Delhi, India as an International Conference and Exhibition on Smart Energy and Smart Mobility. ISUW 2023 will include plenaries, bilateral workshops, keynotes, technical sessions, technical paper presentations, tutorials and technical tours. Bi-lateral Smart Grid workshop with the EU, USA, Germany and Sweden are also being planned. The seventh edition of ISGF Innovation Awards will be organised as part of ISUW 2023 on 03 March 2023.

For further information please click here.

SET Tech Festival 2023

28 March 2023 | Westhafen Event & Conference Center (WECC), Berlin

Do you want to meet a global network of cutting-edge start-ups, investors and innovation-driven industry leaders and explore the latest trends, technologies, and best practices in the energy sector?

Start Up Energy Transition
Global Innovation Platform

Then join the 7th edition of the SET Tech Festival from our partners at Start Up Energy Transition. Enjoy a day full of panels on the future of mobility, urban space, as well as the VC landscape, numerous networking opportunities and pitches from the SET 2023 finalists as well as the annual SET Award ceremony as part of the Berlin Energy Transition Dialogue Evening Reception.

Secure your pass with up to 33% off before 28 February here.

HydrogenNow Europe 2023

28 - 29 March 2023 | Amsterdam, Netherlands

To unlock the opportunity, you're invited to join global businesses at Reuters Events: Hydrogen 2023, returning to Amsterdam with the single aim - accelerating hydrogen from pilot to scale. Joint ventures, investment decisions, and large scale projects - this is where hydrogen announcements are made.

Backed by a brand you can trust, Reuters Events: Hydrogen 2023 is the world's most senior public and private collaborative event. Join major project developers, investors, contractors, industrial off takers, and manufactures, no single entity can build the global hydrogen economy alone.

For further information please click here.

Berlin Energy Transition Dialogue

28 - 29 March 2023 | Berlin, Germany

In the past years the Berlin Energy Transition Dialogue (BETD) has become a leading international forum for key stakeholders of the energy sector. High-level policymakers, industry, science and civil society are given the opportunity to share their experiences and ideas on a safe, affordable and environmentally responsible global energy transition. Over 2,000 participants from more than 90 countries, 50 foreign and energy ministers and state secretaries, and over 100 high-level speakers gather in the German capital every spring to be part of the Berlin Energy Transition Dialogue.

The Berlin Energy Transition Dialogue is hosted and supported by the German Federal Government and is a joint initiative of the German Renewable Energy Federation (BEE), the German Solar Association (BSW), the German Energy Agency (dena) and eclareon.

For further information please click here.

European Hydrogen Conference

29 March 2023 | Vienna, Austria

The European Hydrogen Conference (EHC) has been created to focus on the latest projects, finance and investment, technologies and regulations needed to achieve the European Commission's net-zero target.

After a successful gathering in March 2022, they look forward to the 2nd edition of the European Hydrogen Conference live in Vienna on 29 March 2023, bringing together key industry players playing a role in accelerating the hydrogen economy, both low-carbon and renewable.

For further information please click here.

Hydrogen Tech World

4 - 5 April 2023 | Essen, Germany

Hydrogen Tech World is a unique platform dedicated to advancing and promoting the latest technology along the hydrogen production and distribution chain. With a widespread community of researchers, engineers, procurement officers, project managers, etc., manufacturers, systems integrators, engineering companies, fabricators and end users, Hydrogen Tech World is a powerful network for information exchange and knowledge transfer.

Hydrogen Tech World
Expo & Conference | Essen | 4–5 April 2023

The Hydrogen Tech World Expo & Conference in Essen will be a technology-focused event where visitors can see and discuss the very latest products and services available to facilitate the mainstream usage of hydrogen as an energy carrier and an energy source.

For further information please click here.

AgriVoltaics2023

12 - 14 April 2023 | Hybrid | Daegu, South Korea

AgriVoltaics2023 - the fourth edition of our conference will be held April 12-14, 2023, as a hybrid event both online and on-site in Daegu, South Korea! Launched in 2020, the AgriVoltaics conference is now in its fourth year and will be held outside Europe for the first time. The AgriVoltaics2023 conference will be chaired by Prof. Jae Hak Jung from Yeungnam University. Scientific Committee Chair will be Prof. Soo-Young Oh.

For further information please click here.

Hannover Messe | Hydrogen and Fuel Cells

17 - 21 April 2023 | Hannover, Germany

300+ exhibitors from 25 countries present their latest products and developments on a 5.500 m² exhibition area. International corporations, SMEs and research institutes showcase the full spectrum of the industry. The combination of the exhibition, two forum areas and numerous networking events is worldwide for 29 years.

The Indo-German Chamber of Commerce (IGCC) in collaboration with the Indo-German Energy Forum (IGEF) Support Office is organising a business delegation to Hannover Messe 2023 in Germany from 15 - 20 April 2023. Highlights of the business delegation include a guided tour through the trade fair with presentations by experts from companies with a special interest in India and visits to green hydrogen projects in Germany. For more information about the delegation please contact Ms. Sumati Sud, sumati.sud(at)indo-german.com.

For further information please click here.

Green Hydrogen Summit

18 - 19 April 2023 | Lisbon, Portugal

The fourth annual Green Hydrogen Summit will return to Lisbon as Portugal's premier Green Hydrogen event to inspire and educate delegates on how to take advantage of the opportunities Green Hydrogen will offer financially and environmentally and provide the connections to make it possible.

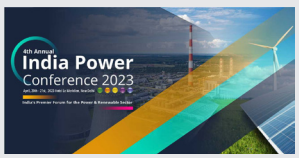
This year, the Summit will move beyond an introduction to the concepts of green hydrogen and begin to look at the larger challenges on the horizon for the sector, including securing the energy supply for Hydrogen production with limited sources of renewable energy and limited grid capacity. They are also expanding the range of the event to include some of the more significant renewable hydrogen derivates and their applications, including biogas, methanol, methane, LOHCs, and of course ammonia.

For further information please click here.

4th Annual India Power Conference

20 - 21 April 2023 | New Delhi, India

India Power Conference 2023 is India's largest power gathering providing a platform to enable business opportunities for solution providers of all forms of power generation from conventional to renewable energy and associated energy storage. This leading forum is where the energy industry can meet, share and discuss solutions for India's energy future.



The aim of the event is to add even more value for delegates and to make attendance at the 4th Annual India Power Conference as productive, informative and enjoyable as possible.

For further information please click here.

RenewX

28 - 29 April 2023 | Hyderabad, India

The 7th edition of RenewX aims to bring together renewable energy and sustainable mobility professionals under one roof and to set a growth trajectory for the sector to network, collaborate and learn from industry experts & thought leaders.

For further information please click here.

India Energy Storage Week

01 - 05 May 2023 | New Delhi, India

India Energy Storage Week (IESW) is a flagship international conference & exhibition by India Energy Storage Alliance (IESA), will be held from 1 - 5 May 2023. It is India's premier B2B networking & business event focused on renewable energy, advanced batteries, alternate energy storage solutions, electric vehicles, charging infrastructure and micro grids ecosystem.

The forthcoming edition of IESW is expected to attract global participation with an intent to facilitate bi-lateral trade, which will invite 20+ countries, 100+ regulators & policy makers, 300+ industry leaders, 100+ partners & exhibitors and 1000+ delegates.

For further information please click here.

World Hydrogen Summit & Exhibition

09 - 11 May 2023 | Rotterdam Ahoy, Netherlands

As Hydrogen accelerates into the mainstream energy sector, it's crucial for policy makers and industry stakeholders to increase collaboration, cross-sector dialogue and knowledge-share to ensure the rapid scale-up and delivery of a global hydrogen economy.

World Hydrogen 2023 will be doubling in size to enable more companies than ever to showcase, establish partnerships and sign deals. Packed with insights, showcases and networking activities for the entire value chain, World Hydrogen 2023 brings together government, research, innovation and private sector leaders for three full days dedicated solely to Hydrogen industry advancement.

The Indo-German Chamber of Commerce (IGCC) in collaboration with the Indo-German Energy Forum (IGEF) Support Office is organising a business delegation to the World Hydrogen Summit 2023 in Rotterdam. For more information about the delegation please contact Ms. Sumati Sud, sumati.sud(at) indo-german.com.

For further information please click here.

World Energy Storage Exhibition & Forum

10 - 11 May 2023 | Rotterdam Ahoy, Netherlands

As we work towards a decarbonised world, energy supply will be primarily sourced from renewable power sources such as wind, solar, hydro, thermal, creating an unprecedented need for huge energy storage capacity, innovation and technology enabling the world to shift to a new energy reality.

The World Energy Storage Exhibition & Forum brings together the world's energy and battery technology pioneers paving the way for crucial energy storage advancements to solve many of the current energy issues. Book your stand today to showcase your storage technology and solutions and establish key cross-sector partnerships to enable a resilient energy future.

For further information please click here.

Intersolar Europe

14 - 16 June 2023 | Munich, Germany

Intersolar Europe is the world's leading exhibition for the solar industry. Under the motto "Connecting solar business," manufacturers, suppliers, distributors, service providers and project planners and developers from around the world meet in Munich every year to discuss the latest developments and trends, explore innovations firsthand and meet potential new customers.

Intersolar Europe takes place as part of The smarter E Europe parallel to the three energy exhibitions ees Europe, Power2Drive Europe and EM-Power Europe. The Indo-German Chamber of Commerce (IGCC) in collaboration with the Indo-German Energy Forum (IGEF) Support Office is organising a business delegation to Intersolar Europe 2023. For more information about the delegation please contact Ms. Sumati Sud, sumati.sud(at)indo-german.com.

For further information please click here.

German Chancellor Fellowship for Tomorrow's Leaders at German Solar Association BSW in Berlin

The Alexander von Humboldt Foundation is searching for the Indian leaders of tomorrow. The German Chancellor Fellowship offers you an opportunity to take the next step in your career in Germany – irrespective of your field of work. In order to apply, develop your own project idea and find a host of your choice to mentor you. Once your host has confirmed, you can apply for a fellowship. German Solar Association BSW in Berlin has already offered to be a host for you. The Chancellor of the Federal Republic of Germany is the patron of this fellowship programme. The Foundation grants up to 50 German Chancellor Fellowships annually – up to ten for each country.

Alexander von Humboldt
Stiftung/Foundation

If you are interested in a fellowship with the German Solar Association BSW you should get in touch with Ms. Luz Alicia Aguilar via aguilar(at)bsw-solar.de.

Retired German Energy Experts Offering Their Support to Indian Institutions

You are a freshly retired German engineer with experience in Energy Efficiency and already familiar with India's rich culture? Become part of the largest retired expert's database of the world, a group of more than 10 000 experts offering their German know-how to the world free of cost.

You are an India-based company or institution looking for a German expert to lower your expenditures for Energy?

Senior Experten Service (SES) India is constantly matchmaking German experts and Indian institutions in several potentially supported fields and is also able to finance such expert visits. SES is the worldwide leading organisation for voluntary assignments carried out by retired specialists and executives.

For further information please click here or contact Mrs. Sharon Mogose via sharon.mogose(at)indo-german.com.

Information about DeveloPPP

DeveloPPP.de is a mechanism by the German Federal Ministry for Economic Cooperation and Development (BMZ) to promote the involvement of the private sector in its development work. The BMZ provides financial and technical support to companies that want to become active in developing and emerging countries or already are, and whose investment has long-term benefits for the local population. The company bears at least half of the total project costs.

Interested companies cooperate with one of the two public partners that implement the program on behalf of the BMZ: DEG - Deutsche Investitions- und Entwicklungsgesellschaft GmbH or Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The companies receive individual advice, benefit from regional market knowledge of the locations worldwide and gain access to local networks and political decision-makers.

Projects cover a wide range of sectors, such as training local skilled workers, piloting innovative technologies and demonstration plants, securing value chains and improving ecological and social standards in production plants.

Four times a year, companies can submit their project ideas to DEG or GIZ. The project should be developmentally effective and go beyond investments in the company's core business. To be eligible for funding, companies must have an annual turnover of at least 800,000 EUR, employ no less than 8 people and have a minimum of 2 audited annual financial statements. The duration is up to 3 years.

For further information please click here.

Information about H2Uppp

The H2-Uppp programme accompanies and supports efforts to ramp-up the market for green hydrogen (H2) and power to X (PtX) applications in India and other selected developing countries and emerging economies in cooperation with the private sector. Unlike other hydrogen support initiatives, H2- Uppp focuses on the early stages of green hydrogen project development.

H2-Uppp aims to identify, prepare and accompany the implementation of projects for the production and use of green hydrogen and power-to-X application, and to raise awareness and promote knowledge transfer for the development of projects relating to green hydrogen. Together with the partner countries, this approach enables GIZ to identify cost-effective production paths and uses, pinpoint project opportunities along the value chain and develop business models.

To achieve the programme objectives, H2- Uppp focuses on three fields of action: In the field of action 1 (Networking & Project Scouting), H2-Uppp supports companies in identifying project ideas and building networks, for example with project partners or potential off-takers. Partners from the private and financial sectors are also offered training on green hydrogen, and public-private dialogue is strengthened through conferences and trade fairs. In the field of action 2 (PPP – Public-Private Partnerships), H2-Uppp works with private companies to jointly implement pilot projects in the field of green hydrogen and power-to-X. Formal public-private-partnerships (PPPs) are set up for this purpose (see following section). In the field of action 3 (Know-How and Capacity Development), H2-Uppp accompanies the various project ideas with in-depth studies and technical trainings. Through specialist conferences, the activities of local institutions are further strengthened and joint measures are developed to ensure a successful market launch.

The programme has been commissioned by the German Federal Ministry for Economic Affairs and Climate Action (BMWK). Support is provided for PPPs along the entire hydrogen value chain (production, storage, conversion, transportation and usage). It is important that the PPP project focuses on public-benefit activities and contributes to the promotion of sustainable development in the project country. To be eligible for funding, companies must contribute at least 50% of the volume of the PPP project and comply with sustainability standards during the project.

For further information on H2-Uppp, support opportunities or to receive the PPP application form, please contact H2Uppp(at)giz.de.

All Upcoming Events in the Next Six Months – Save the Date!

6th Best Practices Study Tour and International Workshop on Agri PV Plants, RE Grid Integration and Green Hydrogen
15 - 17 March 2023 |
Jodhpur, India
http://cbip.org/ExternalFile/Agri%20PV%20
15-17%20March%202023.pdffc42870/summary

HydrogenNow Europe 2023
28 - 29 March 2023 |
Amsterdam, Netherlands
https://events.reutersevents.com/renewable-energy/hydrogen-europe/

Berlin Energy Transition Dialogue
28 - 29 March 2023 | Berlin, Germany
www.energydialogue.berlin

SET Tech Festival 2023
28 March 2023 | Westhafen Event & Conference Center (WECC), Berlin
https://bit.ly/3kRLJbM

European Hydrogen Conference
29 March 2023 | Vienna, Austria
https://energycouncil.com/event-events/european-hydrogen-conference/

Hydrogen Tech World
04 - 05 April 2023 | Essen, Germany
https://hydrogentechworld.com/news-category/news

AgriVoltaics2023 - Hybrid Conference
12 - 14 April 2023 | Daegu, South Korea
www.agrivoltaics-conference.org

Hannover Messe | Hydrogen and Fuel Cells
17 - 21 April | Hannover, Germany
https://www.hannovermesse.de/en/expo/topics/hydrogen-fuel-cells/hydrogen-fuel-cells-europe/

Green Hydrogen Summit
18 - 19 April | Lisbon, Portugal
https://greenhydrogen.solarenergyevents.com

4th Annual India Power Conference
20 - 21 April | New Delhi, India
https://ipc-2023.com/

RenewX
28 - 29 April 2023 | Hyderabad, India
https://www.renewx.in/

India Energy Storage Week
01 - 05 May | New Delhi, India
https://www.energystorageweek.in/

World Hydrogen Summit & Exhibition
09 - 11 May | Rotterdam Ahoy, Netherlands
https://www.world-hydrogen-summit.com/

World Energy Storage Exhibition & Forum
10 - 11 May | Rotterdam Ahoy, Netherlands
https://www.world-energy-storage.com/

International Conference on Hydrogen Production and Storage
11 - 12 May | Berlin, Germany
https://waset.org/hydrogen-production-and-storage-conference-in-may-2023-in-berlin

3rd Hydrogen Forum
06 - 07 June | Hybrid
https://www.h2-forum.eu/

8 DISCLAIMER

The views expressed in this newsletter are solely those of the Indo-German Energy Forum (IGEF) Support Office team. The IGEF Support Office cannot assume any responsibility for the contents of other websites linked in this newsletter.

The Support Office of the Indo-German Energy Forum provides liaison services for all stakeholders. It serves as a first point of contact both to the Indian and German governments as well as companies seeking to get involved in the process. The Support Office answers queries regarding proposals for the IGEF dialogue or IGEF projects and any other subject relevant to the private sector.

9 CONTACT INFORMATION

New Delhi ››

Indo-German Energy Forum Support Office
c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
1st Floor, B-5/2, Safdarjung Enclave
New Delhi – 110 029
India

E: communications@energyforum.in
T: +91 11 4949 5353
W: www.energyforum.in

Berlin ››

Indo-German Energy Forum Support Office
c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Köthener Strasse 2
10963 Berlin
Germany

E: info@energyforum.in
T: +49 (0)30 338424-462
W: www.energyforum.in

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