ICS 2023 - SOUVENIR

3RD INTERNATIONAL CLIMATE SUMMIT

14 - 15 SEPT 2023 | VIGYAN BHAWAN, NEW DELHI

SUSTAINABILITY THROUGH GREEN GROWTH

GREEN HYDROGEN | BIOFUELS | RENEWABLES

LiFE
Lifestyle for Environment

A NEW PATHWAY TO CLIMATE CHANGE MITIGATION

LiFE
Lifestyle for Environment

ANCIENT WISDOM, CIRCULAR ECONOMY & CLIMATE CHANGE MITIGATION.

I USED TO THINK THE TOP ENVIRONMENTAL PROBLEMS WERE BIODIVERSITY LOSS, ECOSYSTEM COLLAPSE, AND CLIMATE CHANGE.

I THOUGHT THAT WITH 30 YEARS OF GOOD SCIENCE WE COULD ADDRESS THOSE PROBLEMS.

BUT I WAS WRONG.

THE TOP ENVIRONMENTAL PROBLEMS ARE SELFISHNESS, GREED, AND APATHY.

TO DEAL WITH THOSE WE NEED A SPIRITUAL AND CULTURAL TRANSFORMATION, AND WE SCIENTISTS DON'T KNOW HOW TO DO THAT.

James Gustave Speth

> Former Administrator of the United Nations Development Programme

> Former Dean, Yale School of Forestry and Environmental Studies

> Founder, World Resources Institute and Co-founder, Natural Resources Defense Council

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ABOUT THE SUMMIT

Office of the Principal Scientific Adviser to the Government of India

Manthan

India has assumed the G-20 Presidency. Under the bold and visionary environmental leadership of **Hon'ble Prime Minister Shri Narendra Modi**, the country has unveiled a new pathway for Climate Change Mitigation, through mainstreaming of Lifestyle for Environment (Mission LiFE) - urging the world to adopt sustainable practices and climate friendly actions in everyday life.

When it comes to climate change mitigation, the importance of individual action and collective responsibility cannot be ignored; and the time to act is now.

India is also building significant capacity in areas of biofuels, renewables, and alternate energy solutions like Green Hydrogen, to define its long-term national energy strategies, accelerate its climate commitments, and put the country on a sustainable growth path.

The **International Climate Summit 2023**, organised by **PHD Chamber of Commerce and Industry** on **14 & 15 September 2023**, sets the stage immediately after the 2023 G20 New Delhi Summit for a global dialogue and actionable outcomes on climate change mitigation from an Indian perspective, blending our repository of ancient wisdom, and circular economy to become the third largest economy in the world with a focus on Green Hydrogen, Biofuels and Renewables.

Only peace can lead to a shared purpose, so that our planet, its people and profits thrive collectively.

3RD INTERNATIONAL CLIMATE SUMMIT 2023

14 & 15 SEPTEMBER 2023
VIGYAN BHAWAN
NEW DELHI 110011

MESSAGE

Dr. Jeewan Prakash Gupta

Summit Chair and
Chair of Enviroment &
Green Hydrogen Committee,
PHDCCI

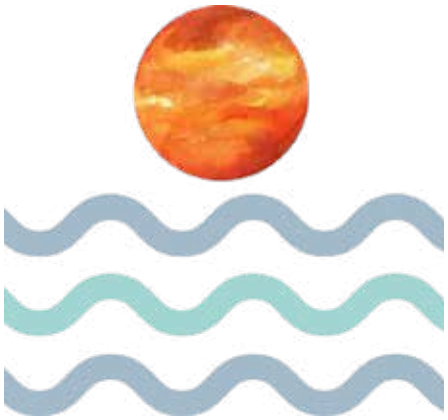
SUMMIT CHAIR

Climate Change is a huge crisis, seriously endangering humanity because we're using too much fossil fuels like crude oil, natural gas, and coal. Additionally, rampant deforestation exacerbates the problem. Renowned US scientist Prof. James Gustave Speth aptly identified selfishness, greed, and apathy as the root causes of the top environmental problems. The seriousness of this crisis means we have to find alternatives to fossil fuels and move to energy sources that don't produce carbon emissions. Our very survival depends on it.

This book aims to provide an informative and insightful approach to climate change mitigation by proposing a new pathway known as the Fusion of Ancient Wisdom with Green Energy. Ancient Wisdom emphasises the interconnectedness of the world, viewing it as one global family with the Earth as a unified country and all individuals as its citizens. This perspective acknowledges that the environment knows no boundaries. Achieving acceptance of this worldview can be facilitated through spiritual and cultural transformation.

Our Hon'ble Prime Minister emphasises the importance of making lifestyle changes that support the environment and promote sustainable development. This new pathway involves embracing sustainable consumption, adopting a circular economy, and placing spirituality at its core. By recognising our natural environment as our spiritual environment, we can foster a sense of inner peace and reduce restlessness. Materialistic pursuits, driven by a lack of spiritual knowledge, often lead to a narrow definition of success centered around wealth, pleasure, possessions, and status. However, by adopting a spiritual way of life, individuals can forge a deeper connection with nature and cultivate a more caring attitude toward the environment.

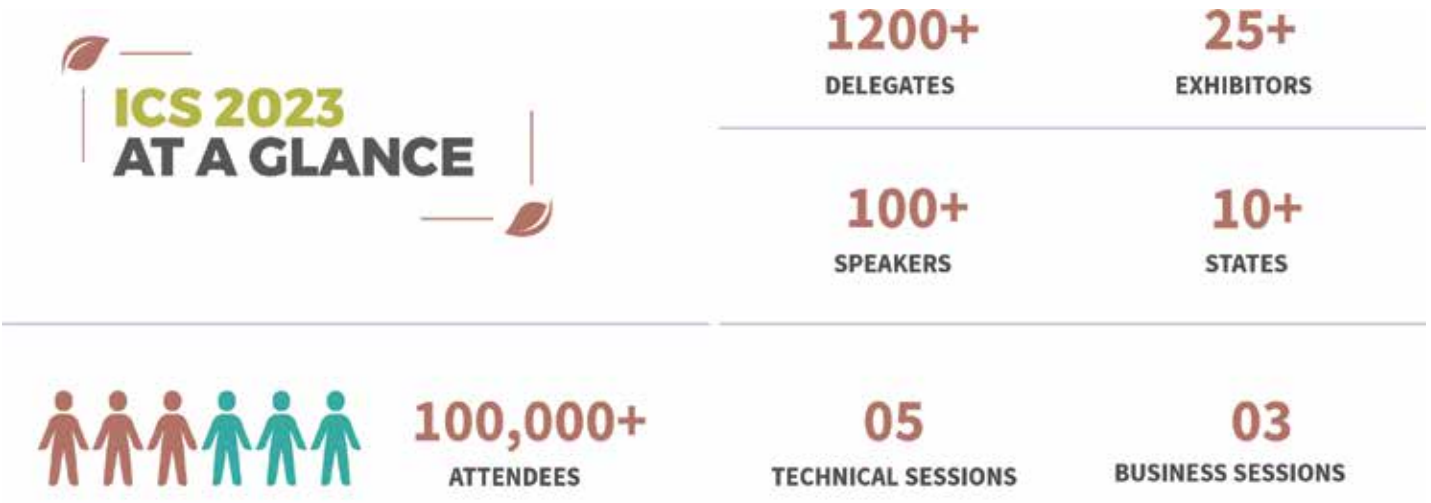
As the current president of the G20 nations, India has a unique opportunity to convey a significant message and spearhead a global movement. Our message stems from the belief of India's 1.4 billion



citizens who view the world as a single family—a message of peace and togetherness. The movement, initiated by our Hon'ble Prime Minister, aims to mobilise collective action and inspire individuals worldwide to embrace simple, eco-friendly practices in their daily lives for the betterment of the environment. We seek to create a lifestyle for the environment where sustainable choices become the norm.

Our mission is for India to become a year-round producer of renewable energy at the lowest possible cost, leveraging our abundant research and development resources and IT professionals to establish ourselves as a global hub for renewable energy production. Achieving this objective requires collaborative partnerships that promote accelerated growth and innovation.

In conclusion, the objective of this book is to present the collective knowledge and insights of both scientists and spiritual masters who have joined forces to convey this valuable information. The vision of our esteemed Prime Minister highlights the fusion of ancient wisdom with renewable energy as the sole solution to safeguard our natural surroundings and address the climate change crisis. The movement we are launching today calls for active participation from all individuals as we collectively adopt simple, eco-friendly practices in our daily routines for the benefit of the environment. By embracing a lifestyle that harmonises with nature, we can strive towards a sustainable and resilient future for generations to come.



MESSAGE

HON'BLE MINISTER OF ROAD TRANSPORT & HIGHWAYS GOVERNMENT OF INDIA

सत्यमेव जयते

Shri Nitin Gadkari

Hon'ble Minister of
Road Transport & Highways
Government of India

I am happy to learn that PHD Chamber of Commerce and Industry is organizing the International Climate Summit 2023 on 14th & 15th September, 2023 at New Delhi.

Climate change is an urgent global challenge with long-term implications for the sustainable development of all countries. I am confident that outcome of this summit will play a crucial role in promoting investment in green energy and addressing the urgent need to combat climate change. I am sure the summit will also undoubtedly inspire governments, businesses, and communities to prioritize sustainable practices and take decisive steps toward a cleaner and greener future. On this occasion, I convey my best wishes to PHD Chamber of Commerce and Industry for the grand success of International Climate Summit 2023.

MESSAGE

HON'BLE MINISTER FOR JAL SHAKTI GOVERNMENT OF INDIA

सत्यमेव जयते

Shri Gajendra Singh Shekhawat

Hon'ble Minister for Jal Shakti
Government of India

I convey my best wishes to the PHD Chamber of Commerce and Industry for organising the International Climate Summit 2023. Climate change is a serious issue that the world is dealing with today. To save the earth and human civilization, the world needs to come together, discuss and implement appropriate measures.

I am extremely happy that the PHD Chamber of Commerce and Industry is attempting to tackle an important global issue through this international event. The views expressed in this conference, as well as the discussion of important steps to address the climate crisis, will be beneficial for both the government and society.

For years, India has been the guiding light on spirituality. Under the leadership of Hon'ble Prime Minister Shri Narendra Modi, India, over the last eight years, has also given the world a new definition of sustainable development by integrating its culture and eternal knowledge with development.

Lifestyle plays a huge role in climate change. Our Prime Minister proposed the "One Word Movement" at the COP-26 conference in Glasgow. One word, that is LIFE, which stands for Lifestyle for the Environment, is what we need today to tackle climate crisis. Hon'ble Prime Minister Modi ji also gifted 'Panchamrit', which will make an unprecedented contribution to preventing climate change. These are epoch-making steps in terms of tackling carbon emissions and achieving greater harmony with nature.

India will preside over the G-20 summit this year, and it is a matter of pride for us. This is an opportunity for India to take a lead in tackling global challenges, including the climate change.

I can say with certainty that the steps taken by our government for the conservation of nature, as articulated by the Hon'ble Prime Minister Modi, will become a model not only for India but for the entire world.

Once again, I extend my best wishes to the PHD Chamber of Commerce and Industry for organising the International Climate Summit in 2023.

MESSAGE

Shri Jyotiraditya M. Scindia

Hon'ble Minister
Civil Aviation & Steel
Government of India

HON'BLE MINISTER OF CIVIL AVIATION & STEEL GOVERNMENT OF INDIA

सत्यमेव जयते

Greetings to the members of the PHD Chamber of Commerce and Industry, and my heartiest congratulations for organising the International Climate Summit 2023"!

In the last one decade, India has taken on the mantle of leading the global fight against climate change. To that end, under the leadership of Prime Minister Narendra Modi, we have shown a new path for sustainable development that integrates culture and indigenous knowledge with modern development practices.

From the International Solar Alliance (ISA) to the "One Sun, One World, One Grid" project to the Swachh Bharat Mission. India has already kick-started its journey towards net-zero emissions by 2070. Simultaneously, its G20 presidency is helping shape the climate and energy transition agenda at a global level.

This Summit, therefore, could not have taken place at a better time than now. I am pleased to learn that it shall bring top policy makers and climate change advocates together to define a roadmap for the use of green hydrogen- an important piece of the puzzle

My best wishes for its success. May we continue the momentum to build a more sustainable planet for all!

MESSAGE

Dr. (Mrs) N. Kalaiselvi

Secretary
Department of Scientific
& Industrial Research and
Director General CSIR, Ministry
of Science and Technology
Government of India

SECRETARY DEPARTMENT OF SCIENTIFIC & INDUSTRIAL RESEARCH AND DIRECTOR GENERAL CSIR MINISTRY OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF INDIA

सत्यमेव जयते

India hosting the G20 Presidency is a landmark opportunity for the Nation to showcase our technologies and achievements at International forums.

I am happy to note that the International Climate Summit 2023 "LEADING THE CLIMATE CHANGE MITIGATION: Mainstreaming Lifestyle For Environment (LIFE), Spiritual Awakening and Green Energy, Fusion of Ancient Wisdom with Green Energy" is being organised on 11th September, 2023 at New Delhi in which, the mega major stakeholders from across the globe including International Policy Makers, Investors, Scientists, Noble Laureates, Titan of Industries, Vice-Chancellors, etc. are participating.

Climate Change Mitigation is a crucial subject that directly relates with each living being. Generating Clean & Green Energy and having sustainable energy devices are the key necessities to mitigate climate change. The Summit will open path for the stakeholders to interact on a single platform and come up with novel and progressive ideas. I am sure that the extensive deliberations by the eminent speakers from academia and industry during the Summit will stimulate the participants in advancing their thought process for research & career development and in serving Mother Nature. The Summit will bring to the participants, the leading and right roadmaps needed to mitigate the climate crises across the Globe.

I wish, the International Climate Summit on Climate Change Mitigation, a grand success.

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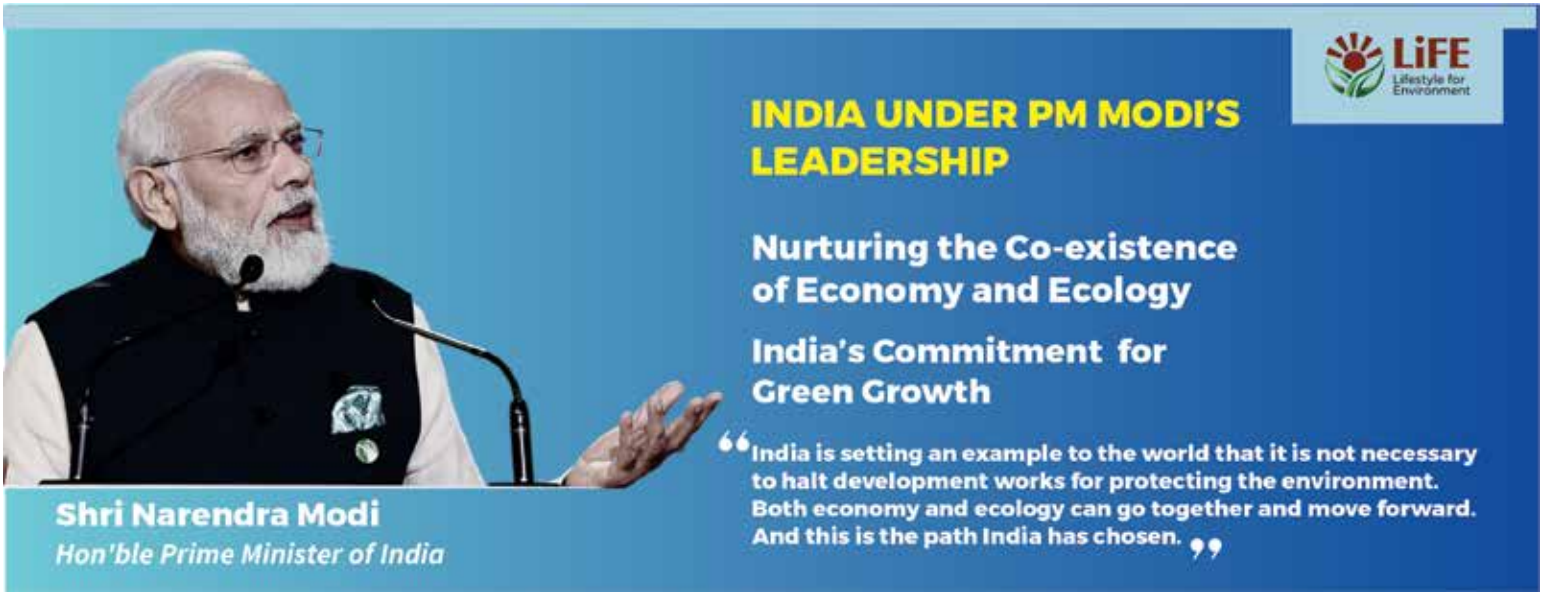
INAUGURAL SESSION



Gurudev Sri Sri Ravi Shankar
Spiritual Leader

Gurudev Sri Sri Ravi Shankar is a humanitarian, spiritual leader and an ambassador of peace and human values. Through his life and work, Gurudev has inspired millions around the world with a vision of a stress-free, violence-free world. He has designed programs that provide techniques and tools to live a deeper, more joyous life and has established nonprofit organizations that recognize the human identity beyond the boundaries of gender, race, nationality, and religion.

Mr. Saket Dalmia
President, PHDCCI

Mr. Saket Dalmia is currently serving as President of PHD Chamber of Commerce and Industry. He has been designated Programme Directorate for the newly initiated Startup20 engagement group under G20. Mr. Dalmia is Co-chair of the Finance Taskforce under Startup20.He is the Mentor for the IIM Lucknow Enterprise Incubation Centre. He is also the Managing Director of Marble City India Limited for more than 20 years.

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14 SEPTEMBER 2023

PLENARY SESSION

Speakers

Dr. Jitendra Singh
Union Minister of State (Ind. Charge) Science & Technology and Earth Sciences, Govt. of India

Dr. Jitendra Singh is the Minister of State (Independent Charge) for the Ministry of Science and Technology and Minister of State for the Prime Minister's Office; Personnel, Public Grievances and Pensions; Department of Atomic Energy and Department of Space. He is a physician known for his work on diabetes and endocrinology. He has been a professor, consultant, clinical practitioner, author of eight books, and a newspaper columnist. He is also the ex-chairman for the National Scientific Committee of Diabetes and the Research Society for the Study of Diabetes in India.

Mr. Amitabh Kant
G20 Sherpa, Govt. of India

Mr. Amitabh Kant is presently G20 Sherpa of India during its Presidency year. He was the second CEO of NITI Aayog and prior to that he hold the position of Secretary, Department of Industrial Policy & Promotion. Mr. Kant is a member of the IAS (Kerala Cadre: 1980 Batch). He is the author of “Branding India – An Incredible Story”, and Incredible India 2.0. His campaigns such as “Make in India”, Startup India, “Incredible India” and “God’s Own Country” have won several international awards.

Mr. Raj Kumar Singh
Hon'ble Minister of Power and New & Renewable Energy, Govt. of India

Mr. Raj Kumar Singh is currently the Minister of State for the Ministry of Power, Ministry of New and Renewable Energy, and Ministry of Skill Development and Entrepreneurship. He is a 1975 batch Bihar cadre Indian Administrative Service officer and a former Home Secretary, Govt. of Bihar.

Mr. Hardeep Singh Puri
Hon’ble Minister of Petroleum & Natural Gas, Govt. of India

Mr. Hardeep Singh Puri is serving as the Minister of Petroleum and Natural Gas and Minister of Housing and Urban Affairs in the Government of India. He presently also holds the record as the longest-serving Minister for Housing and Urban Affairs in history. He is a 1974-batch Indian Foreign Service officer. During a career spanning 39 years, served in senior positions at the Ministries of External Affairs and Defence. He is a former diplomat and author. He served as the Permanent Representative of India to the United Nations in Geneva and New York and served additionally in Tokyo and Colombo. He also held many roles in the International Peace Institute (IPI), New York, after his retirement from the Indian Foreign Service.

Prof. Ajay Kumar Sood
Principal Scientific Adviser
Govt. of India

Prof. Ajay Kumar Sood is the Principal Scientific Advisor to the Government of India (PSA to GoI). He is also the Chairperson of the Prime Minister's Science, Technology & Innovation Advisory Council (PM-STIAC). Prof. Sood is also a National Science Chair at the IISc Bangalore. He is a physicist and researcher known for his pioneering research findings on graphene and nanotechnology. He was honoured with the Padma Shri by the Government of India in 2013 for his contributions to the fields of science and technology.

Mr. Espen Barth Eide
Minister of Climate and the
Environment of Norway

Mr. Espen is currently serving as the Minister of Climate and the Environment in Norway. He is an academic, and political scientist, and has been a member of the Norwegian Parliament since 2017. He was a member of the SIPRI Governing Board, Managing Director of the World Economic Forum, and Norway's Minister of Foreign Affairs.

Mr. Ola Elvestuen
Member of Parliament in Norway

Ola Elvestuen is a Member of Parliament in Norway and also a Member of Nordic Council. Mr Elvestuen served as Minister of Climate and the Environment, City councillor for Environment and Transportation in Oslo and headed the City Development Committee. He has since 2013 chaired the parliamentary Committee on Energy and Environment. He won the hydrogen award in 2017.

Ms. May-Elin Stener
Norwegian Ambassador to India

Ms. Stener is the Norwegian Ambassador to India. She has been associated with the foreign service since 1995. Before taking this current role, she served as the Deputy Director General of Department in the Norwegian Ministry of Foreign Affairs 2018–2023.

Mr. Erik Solheim
Former Executive Director, UN
Environment Programme

Mr. Erik Solheim is a Norwegian diplomat and former politician. He served in the Norwegian government from 2005 to 2012 as Minister of International Development and Minister of the Environment, and as Under-Secretary-General of the United Nations and Executive Director of the United Nations Environment Programme from 2016 to 2018. Mr. Solheim is a member of the Green Party.

Mr. Nobuo Tanaka
Chair, the Steering Committee of
Innovation for Cool Earth Forum
(ICEF), Executive Director Emeritus,
International Energy Agency (IEA),
CEO, Tanaka Global, Inc. Tokyo, Japan

Nobuo Tanaka is the CEO of Tanaka Global Inc. He is the Chair of the Steering Committee of Innovation for Cool Earth Forum (ICEF). He is a Global Associate at the Institute of Energy Economics in Japan. He served as Executive Director of the International Energy Agency from 2007-11 and previously as a senior official at Japan's Ministry of Economy, Trade, and Industry.

Smt. Nivruti Rai
MD & CEO
Invest India

Ms. Nivruti Rai is the Managing Director & CEO of Invest India. Ms. Rai is the recipient of the prestigious Nari Shakti Puraskar for her remarkable contributions in the field of technology. Ms. Nivruti Rai joins Invest India after an illustrious 29 years at Intel as a global business and technology leader. She led Intel India as Country Head for the past seven years driving growth and investment of Intel in India. She has been part of the leadership team in various industrial bodies and government committees.

Mr. Bernt Skeie
Founder and Chairman
Greenstat ASA, Norway

Skeie is the founder and chairman of Greenstat ASA. He has served as both CEO and CFO for listed companies on Oslo Stock Exchange and been in charge of several Initial Public Offerings. He has a deep understanding of the energy market and is currently very much focused on clean-tech and renewable energy.

Dr. Gunnar Yttri
Rector, Western Norway University of Applied Sciences, Norway (HVL University)

Dr. Gunnar Yttri is the rector at Western Norway University of Applied Sciences (HVL). Prior to this, Dr. Yttri served as Pro-rector at the HVL University and he was an associate professor at the Department of Social Sciences. In addition, he researched economic and technological history, research, and education policy as well as renewable energy. Before HVL, Yttri worked for two periods as dean at the Department of Social Sciences at Høgskulen i Sogn og Fjordane.

Mr. Vegard Frihammer
Founder & CEO
Greenstat ASA, Norway

Mr. Vegard Frihammer is the founder and CEO of Greenstat ASA. He has an industrial background as an engineer and manager from the Oil and Gas and the Maritime industry in Norway, and as head of Renewables at Christian Michelsen Institute, located in Bergen, Norway. Mr. Frihammer is the Chairman of the Board at the Norwegian Hydrogen Association and has previously been the Chairman of the steering committee of H2 Cluster – The Norwegian Hydrogen Cluster.

Dr. Karen Landmark
Chairperson
Greenstat Asia

Dr. Karen Landmark is the Director for Strategy & Business Development at Greenstat ASA, and Chair of the Board, Greenstat Asia. She has worked with sustainability-related issues for the last 20 years, both in the private sector and through R&D.

Mr. Arun Kumar Singh
Chairman & CEO
ONGC

Mr. Arun Kumar Singh is the Chairman and CEO of Oil and Natural Gas Corporation Limited (ONGC). Previously, he was the CMD of Bharat Petroleum Corporation Limited (BPCL) and Chairman of Indraprastha Gas Ltd. (IGL). He has over 36 years of experience in the dynamic oil and gas industry.

Mr. Shrikant Madhav Vaidya

Chairman
Indian Oil Corporation Ltd.

Mr. Shrikant Madhav Vaidya is the chairman of IOCL. He was named as the top Indian CEO and # 81 globally in the CEOWORLD Magazine's list of most influential global CEOs in 2023. He has over 36 years of extensive experience in the downstream petroleum industry and in refinery-petrochemical integration. He is a Non-Executive Chairman on the Board of Chennai Petroleum Corporation Ltd. and Ratnagiri Refinery & Petrochemicals Ltd. He is also a Non-Executive Director on the Board of Petronet LNG Ltd. and President of World LPG Association, Paris.

Mr. Alok B Shriram

Sr. Managing Director & CEO, DCM
Shriram Industries Ltd.

Alok B. Shriram is the Deputy MD of DCM Shriram Industries Ltd, a part of The Shriram Group. He is also the Chairman & MD of DCM Hyundai Ltd. He previously occupied the position of Divisional General Manager at Honda India Power Products Ltd. and President at PHD Chamber of Commerce & Industry.

Mr. Sanjeev Agrawal

Sr. Vice President
PHDCCI

Mr. Sanjeev Agrawal is the Chairman of MMG group, a philanthropist and Sr. Vice President of PHDCCI. McDonalds appointed Mr. Sanjeev Agrawal as the new Development Licensee for North and Eastern region in India in 2020. He was conferred the 'Capital Foundation National Award' in 2017 in recognition of his outstanding entrepreneurial skills.

Mr. Cristian Rodrigo Valdes Carter

Director, Innovation Norway India and Commercial Counsellor, Royal Norwegian Embassy in New Delhi

Cristian Valdes Carter is the Commercial Counsellor at the Royal Norwegian Embassy in New Delhi and Director of Innovation Norway in India. Prior his current position, he served as CEO of CCB Subsea. With extensive leadership experience in various industries such as Fisheries, Smart Cities, Tourism, Transport and communications, Port Developments, Offshore Energy, and Subsea, Cristian brings a wealth of knowledge from the Norwegian business community.

Mr. Ashwani Dudeja

President and Director
(Green Hydrogen and Ammonia)
ACME Group

Ashwani has nearly 30 years of marketing and business development experience in the energy sector and has worked across Asia and Europe in various functional and leadership roles. He has contributed to the development of gas and power markets, enabling policies, and regulatory frameworks. He is currently leading the green hydrogen and ammonia business for ACME Group as the President and Director based out of Dubai.

3RD INTERNATIONAL CLIMATE SUMMIT 2023
14 SEPTEMBER 2023

SESSION 1
LIFESTYLE FOR ENVIRONMENT

Objective

The objective of this summit session is to examine the intricate connection between lifestyle choices and their environmental repercussions, exploring strategies for promoting sustainable living across various sectors. It aims to foster a comprehensive understanding of sustainable lifestyles and their global significance, showcasing the pivotal role of technological innovations, policy frameworks, and industry initiatives. This summit session can provide an insightful platform for exploring the critical relationship between lifestyle choices, environmental impact, and technological innovations in the pursuit of a sustainable and eco-conscious future.

Topics

- Understanding Sustainable Lifestyles: Begin with an overview of what sustainable living entails and its relevance in environmental conservation.
- Global Environmental Challenges: Discuss the worldwide environmental challenges and the contribution of sustainable lifestyles to addressing them.
- Technological Innovations for Sustainability: Explore innovations and technologies that facilitate sustainable living, such as green energy and eco-friendly products.
- Policy and Advocacy for Green Living: Delve into the role of policies and advocacy in encouraging sustainable lifestyles and adopting eco-friendly technologies.
- Industry Initiatives for Environmental Responsibility: Explore how different industries are taking steps to promote eco-friendly living practices.
- Carbon Markets and Achieving Net Zero: Discuss the

Chair

Dr. Karen Landmark
Chairperson
Greenstat Asia

Dr. Karen Landmark is the Director for Strategy & Business Development at Greenstat ASA, and Chair of the Board, Greenstat Asia. She has worked with sustainability-related issues for the last 20 years, both in the private sector and through R&D.

Co - Chair

Dr. Vijay Sardana
Advisor, Shriram Institute for Industrial Research

Vijay Sardana is a well-known and experienced Advocate, Arbitrator and Techno-Legal Expert for Food, Consumer Products, Agrochemicals, Biotechnology, Nutraceuticals, International Trade and Environment Laws and Commercial Contract matters. He is also an Independent Director on various Boards & a Member of Expert Committees. He has been awarded by Hon'ble President of India, for the development of commodity markets in India and the Global Agriculture Leadership Award by the Governor of Haryana and Uttar Pradesh.

importance of carbon markets in reaching net-zero emissions and the role individuals can play in this effort.

- Air Quality Control Measures: Examine air quality control equipment and relevant policies, with a focus on India's unique environmental challenges.
- Advancements in Clean Energy: Highlight the latest advancements in clean energy, including green hydrogen technologies, and their potential impact on environmental sustainability.

Outcomes

- Enhanced awareness among participants regarding the significance of adopting sustainable lifestyles.
- Inspiration for diverse stakeholders to take action towards a more environmentally friendly future.
- Opportunities for collaboration and partnership to implement sustainable initiatives.
- A roadmap for integrating green technologies and clean energy solutions into various aspects of society.
- Recommendations for policy adjustments and incentives to encourage sustainable living and environmental conservation.
- Networking opportunities for businesses and organizations involved in eco-friendly projects.
- A collective call to action for individuals to make environmentally responsible choices in their daily lives.

Speakers

Mr. Erik Solheim

Former Executive Director
UN Environment Programme

Mr. Erik Solheim is a Norwegian diplomat and former politician. He served in the Norwegian government from 2005 to 2012 as Minister of International Development and Minister of the Environment, and as Under-Secretary-General of the United Nations and Executive Director of the United Nations Environment Programme from 2016 to 2018.

Dr. J.P. Gupta

Summit Chair & Chair
Environment & Green Hydrogen
Committee, PHDCCI

Dr. J. P. Gupta, is currently the Managing Director of Green Hydrogen India. He is also chair of the Environment and Green Hydrogen Committee of PHD Chamber of Commerce and Industry. He has been the chairman and managing director of many companies including Degussa AG, the largest specialty chemical company in the world. Dr. Gupta has several patents to produce Lychee, Mango, and Ayurvedic wines for the first time in the country. He has been holding the position of Chairman (Industry-II) for Environmental Clearance with the Ministry of Environment, Forests, and Climate Change and member of different government organizations. He is a prolific writer in contributing to national dailies.

Mr. Sunil Panwar

CEO
Symphony Environmental Pvt Ltd

Sunil holds extensive experience being part of the senior leadership teams in developing and implementing growth-driven strategies while collaborating & building partnerships with key stakeholders in business. He has nearly 32 years of experience in managing diversified businesses in manufacturing, marketing, supply chain management, and project management in textiles, apparel, technology, agro, plastics & polymers in India, Sri Lanka and Europe.

Dr. Preeti Jain
Global Director
LanzaTech

Dr. Preeti Jain is Global Director (Policy, Chemicals & Carbon Solution) with 'LanzaTech: a carbon capture and transformation' leader creating a sustainable future for all. A 'World Economic Forum Agenda Contributor', she is passionate advocate for science-based policies. She brings 20 years of diverse geographical experience spread across refining & petrochemicals, renewables energy, R&D, International Advisory etc. where she contributed to craft conducive policies and support businesses towards energy transition, sustainability & climate change.

Dr. Ajay Deshpande
Adjunct Professor, AD-Centre
for Policy Studies, IIT Bombay

Dr. Ajay Deshpande is an Environmental professional with more than 30 years' experience working in various capacities including consulting organisation, environment regulator, development organisation and environmental review/justice. Recently, Dr. Deshpande worked with Asian Development Bank as a Member of its Compliance Review Panel.

Mr. Kavin Kumar Kandaswamy
CEO, Proclime

Kavin Kumar Kandasamy is a socially responsible entrepreneur and educationist. He is the founder of "PROCLIME," a climate-focused initiative that aims to make climate a profitable industry and avert the climate crisis. In addition to his entrepreneurial ventures, Mr. Kandasamy founded "WISKILL" to provide skilling.

Mr. Sourabh Mukherjee
Executive Vice President,
TATA projects

Mr. Sourabh Mukherjee serves as the Executive Vice President – Clean Energy and Sustainability at Tata Projects. Sourabh comes with a rich experience of close to 3 decades and held leadership positions in the Technology, Consulting & Engineering Industry. Sourabh has worked extensively in the Refining and Petrochemicals market globally and has deep understanding of the various technologies used in this space for transitioning towards building a clean and sustainable energy in this sector.

Mr. Yogi Sarin
CEO and Founder, Petron
Scientech Inc. Princeton, New
Jersey, USA

Mr Sarin is the CEO and Founder of Petron Scientech Inc. USA. He brings over 35 years of Global industry experience in leadership positions in sustainable and low carbon Process Technology development and commercialization, Biorefinery operations and joint venture management from concept to commissioning having operated multi-billion-dollar chemical and biorefinery projects in various global locations.

Mr. Mahendra Rustagi
Co-Chair, Environment & Green
Hydrogen Committee, PHDCCI

Mahendra Rustagi, a Chartered Accountant, Cost Accountant and Company Secretary by profession, after over 35 years of working in the corporate sector is presently CEO of Kreston SNR. He is presently the Co-chair of the Environment and Green Hydrogen Committee of PHD Chamber of Commerce and Industry.

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SESSION 2
GREEN FUEL - 1

Objective

We delve into India's journey towards 2030, where renewable energy and green hydrogen take center stage. Guided by the expertise of Dr. R.K. Malhotra, President of the Hydrogen Association of India, and Mr. Nishaanth Balashanmugam, India Director of The Green Hydrogen Organisation, this session brings together distinguished speakers from diverse backgrounds. We aim to explore India's ambitious renewable energy goals, gain insights into policy nuances, and uncover exciting business prospects in the realm of green hydrogen.

Topics

- India's Road to 2030 in Renewable Energy and Green Hydrogen: A comprehensive view of India's plans and strategies to integrate green hydrogen into its energy landscape.
- Policy Insights and Business Opportunities in Green Hydrogen: In-depth discussions on the regulatory framework, investment opportunities, and the business ecosystem surrounding green hydrogen.
- Indo-German Energy Forum: Perspectives from Mr. Tobias Winter, Director of the Indo-German Energy Forum, on fostering international cooperation in the green energy sector.
- Emerging Business Opportunities: Insights from industry leaders on new and exciting avenues in green hydrogen development.
- Energy Transition Diplomacy: A discussion with Ms. Paulina Chromik, Diplomat from the Embassy of the Netherlands, shedding light on EU policy and clean energy ambitions in India.

Chair

Dr. R.K. Malhotra
President, Hydrogen Association of India

Dr. Malhotra is a distinguished Energy professional with over 45 years of experience which included long tenure of 37 years at Indian oil Corporation, the largest commercial enterprise of India where he rose to the board level as Chairman & Director R&D. He also served for nearly 6 years as Director General of the Federation of Indian Petroleum Industry. He is presently Professor of Practice (adjunct) in the Department of Energy Science & Engineering at Indian Institute of Technology, Delhi.

Co - Chair

Mr. Nishaanth Balashanmugam
Director
The Green Hydrogen Organisation

Nishaanth is leading the India chapter of the Green Hydrogen organisation's global effort to accelerate the adoption of Green Hydrogen. He is a highly accomplished professional with a diverse background spanning the automobiles and renewable energy.

Outcomes

- Enhanced understanding of India's ambitious renewable energy and green hydrogen targets.
- Insightful perspectives on policy frameworks and business opportunities within the green hydrogen sector.
- Opportunities for international collaboration, particularly Indo-German partnerships.
- Valuable insights for industry leaders seeking to explore green hydrogen opportunities.
- Awareness of the EU's clean energy ambitions and potential collaborations with the Netherlands.

Ms. Ingebjørg Telnes Wilhelmsen
CEO,
Norwegian Hydrogen Forum

Ingebjørg Telnes Wilhelmsen is the Secretary General of the Norwegian Hydrogen Forum (NHF). Ingebjørg has previously worked in Drivkraft Norge, the Norwegian trade association for companies that sell liquid fuels and energy. As well as this, she has experience working with emergency preparedness, incident, and crisis management from her time with the Norwegian Directorate for Civil Protection and Emergency Planning (DSB).

Dr. Jan Roar Bakke
Senior Vice President,
Gexcon Norway

Dr. Jan has more than three decades of experience in process / technical safety, explosion and fire safety, risk analysis, and management. He is the Senior / Executive Vice President of Gexcon. Also, he is the Chairman of the Process Safety Subcommittee, International Association of Oil and Gas Producers (IOGP).

Mr. Sturle H. Pedersen
Chairman, Greenstat Hydrogen India Pvt. Ltd

Mr. Sturle Pedersen, Chairman of Greenstat Hydrogen India, is an esteemed Chief Executive Officer with a remarkable career spanning over 40 years in the global business landscape. Mr. Pedersen brings a wealth of experience and expertise in driving successful business initiatives and ventures.

Dr. Alok Sharma
Executive Director, Centre for High Technology, MoPNG

Mr. Alok Sharma is Executive Director at Centre for High Technology under Ministry of Petroleum and Natural Gas since Nov 2021. He has over 32 years of experience at IndianOil including R&D & Refinery including the areas of Process, Projects and Production. He has been instrumental in setting up Hydroprocessing, Gasification, Biofuels, Hydrogen and Fuel cell-related facilities at IndianOil R&D.

Dr. Chitra Rajagopal
Director, CoE in Process Safety, Risk Management and Hydrogen, IIT Delhi

Dr Chitra is Director, Centre of Excellence in Process Safety and Risk Management for a Hydrogen Economy at IIT Delhi. She is a distinguished scientist and former Director General of DRDO and the Indian representative in RCS Task Force in Quad Global Green Hydrogen partnership and Member of Advisory Group to advise Empowered Group under National Green Hydrogen Mission.

Mr. Tobias Winter
Director,
Indo-German Energy Forum

Mr Winter is leading the Support Office of the Indo-German Energy Forum, to promote cooperation in energy security, energy efficiency, renewable energies, investments in energy projects and collaborative research and development with participation from India and Germany. He has professional experience in renewable energy and energy efficiency projects.

Mr. Pascal Aroule
President, Solvam

Mr. Pascal is the president of Solvam, involved in Consultancy for Small and Medium scale Enterprises (SMEs) in the fields of Aluminium, Energy and Logistics. During a career of 40 years with PECHINEY, ALCAN and RIO TINTO, he has occupied several managerial and executive positions in various countries. In India, he was instrumental in the construction of the National Aluminum Company (NALCO), and he was the Commercial Director of the last Magnesium plant of the EU in France.

Mr. Harish Jayaram
Vice President - Business Development, Hygenco

Mr. Harish is currently the Vice President, Business Development at Hygenco Green Energies in Large Green Hydrogen/Ammonia Projects including Refinery, Fertilizer, Steel, Chemicals, and CGD. He has 25 yrs experience in Renewable Energy, Green Hydrogen, Telecom, & Manufacturing.

Ms. Paulina Chromik
Diplomat, Economic and Commercial Affairs, Embassy of Netherlands

Paulina Chromik is the Second Secretary Economic & Commercial Department at the Netherlands Embassy in New Delhi since August 2020. Prior to her posting to India she was working in the Ministry of Agriculture, Nature and Food Quality where she was coordinating the climate and energy dossiers. At the Embassy she is in charge of startups, Corporate Social Responsibility, Sustainable Development Goals, climate & energy, green hydrogen and communication.

Mr. Anjan Dasgupta
Partner, DSK legal

Mr. Anjan is a partner at DSK Legal. He has more than 20 years of experience advising international and domestic banks, funds and financial institutions, multilateral agencies, sponsors, developers, investors and governments. He is currently advising on some of the largest and most complex infrastructure and energy projects in Asia. He is also currently advising on Green Hydrogen and Carbon credits.

Mr. Tushar Agarwal
Chief Manager - Business Development
Siemens Energy

Mr. Tushar has more than 17 years of experience in energy sector across the business value chain from business development, strategy, sales across Asia Pacific. He is a thought leadership in energy transition. He is an Instrumentation and Control Engineer from Pune University, Business Management from IIM, Kozhikode.

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SESSION 3
GREEN FUEL-2

Objective

We take a deep dive into innovative clean energy solutions. Under the guidance of Dr. J S Sharma, Former Group General Manager - Head Environment, ONGC, and moderated by Dr. Heli Antila, Chairman of Chempolis Oy, this session assembles experts to discuss the integration of renewable energy into hydrogen production, synthetic paraffin kerosene, coal gasification's role in sustainable energy, and more.

Topics

- Integration of Renewable Energy into Hydrogen Production: Exploring the synergy between renewable energy sources and hydrogen production.
- Synthetic Paraffin Kerosene: Delving into the possibilities and implications of synthetic paraffin kerosene in the context of clean energy.
- Role of Coal Gasification in Achieving Energy Sustainability: Examining how coal gasification can contribute to sustainable energy solutions.
- Gaseous Fuels Testing and Standard Compliance: Addressing safety and regulatory considerations in fuel testing and compliance.
- Solid Oxide Technology for Green Hydrogen Fuel Cells: A closer look at solid oxide technology's potential in fuel cell development.
- Biomass to Green Molecules: Discussing the conversion of biomass into eco-friendly molecules.
- Environmental Regulations and Incentives for Green Hydrogen: Insights into legal frameworks and incentives for green hydrogen.

Chair

Dr. Heli Antila
Chairman, Chempolis Oy

Dr. Heli acts as CEO, Chempolis Oy and Vice President, Biobased Solutions in Fortum. Before Heli acted as Chief Technology Officer for Fortum, as an energy sector management consultant and as a researcher. Heli has also other positions of trust such as a Member of the Academy of Technical Sciences and Member of the non-executive board for startup company Infine.

Co - Chair

Dr. J S Sharma
Former Group General Manager - Head Environment, ONGC

Dr. Sharma has more than 38 years of experience and specializes in Environment pollution prevention and control. He served ONGC as Group General Manager - Head Environment, and Oil Industry Safety Directorate, MOPNG as Additional Director. He is presently the President of the Indian Association of Air Pollution Control (IAAPC) and the co-chair of the Environment and Green Hydrogen Committee at PHD Chamber.

Outcomes

- Understanding the critical role of renewable energy in sustainable hydrogen production.
- Insights into innovative clean energy technologies and their implications.
- Discussions on safety, compliance, and regulatory aspects within the clean energy sector.
- Awareness of advancements in solid oxide technology for fuel cells.
- Exploration of biomass utilization and its environmental benefits.
- Understanding the legal frameworks and incentives supporting green hydrogen.
- Insights into India's potential as a center for hydrogen innovation.

Speakers

Mr. Saad Ashraf

Regional Business Head – India, Ceres Power

Saad is a seasoned business leader with over 17 years of industry experience in clean energy and automtive sectors. Curtently heading Ceres Power in India for its solid Oxide technology for electrolyser and fuel cell applications. Previously, Saad worked for Ricardo India as the VP.

Mr. Nilay Ball

VP – Business Development, LRQA

Mr. Nilay is working with LRQA Inspection Services India LLP for 26 years. He is the Principal Consultant for Asia & Middle East. He has over 30 years' hands on experience in development and management of customised supply chain assurance services, for a wide portfolio of Power, Oil and Gas sector clients.

Prof. R R Sonde

Professor, Dept. of Chemical Engineering, IIT Delhi

Prof. R R Sonde is currently working as a Fulltime Professor of Practice at IIT Delhi, Adjunct Professor - IIT Jammu, Advisor CSIR-NEERI, Member CII committee on MSW, Chairman DST committee on CCUS. He is also the Chairman of the Task Force constituted by Niti Aayog on the Production of Methanol using High ash coal.

Dr. K.K. Pant

Director, IIT Roorkee

Prof. K K Pant is the Director of the Indian Institute of Technology Roorkee. He has over 30 years of academic and research experience and he published 240+ Journal articles and is granted several patents. Prof. Pant also serves as an editor for many reputed peer-reviewed journals. He is a fellow of several national and international academies and has been visiting professor at many foreign universities.

Mr. David Dwek

Senior Analyst - Future Fuels, SKYNRG

David is a Senior Analyst within SkyNRG's 'Future Fuels' team which focuses on R&D SAF projects, Pre-commercial SAF production projects, Advisory projects. David has a BSc Aviation from the Amsterdam University of Applied Sciences and a MSc Management of Technology from Delft University of Technology.

Mr. Sanjeev Gupta
Head & Executive Director, Corporate Strategy Group, IOCL

Mr. Sanjeev Gupta heads the Corporate Strategy Group at Indian Oil Corp. Ltd. He has an experience of almost 30+ years in IndianOil covering functions such as Sales & Marketing, Operations, Human Resources, Business Development followed by a stint at Chairman Office before heading the Corporate Strategy Group. Corporate Strategy Group at IndianOil looks after new business opportunities specially e-mobility, green hydrogen, renewable energy, emerging technologies, global M&As , formation of Joint Ventures.

Mr. Brijesh Kumar
Advisor,
Centre for High Technology

Mr. Brijesh is currently the Advisor of the Centre of High Technology (CHT). He is the Ex-Executive Director of CHT. He has experience of 17 years working in different capacities in Refineries such as IOCL and Mathura Refinery and 17 years in the R&D Centre of IndianOil in the development and commercialization of refining technologies. He has several patents to his credit and recipient of several prestigious innovation awards.

Dr. Kiran Piduru
Market Development Specialist,
Markes International

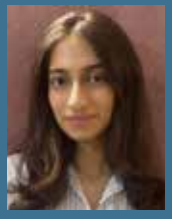
Dr. Kiran Piduru is a Business Development Specialist at Markes International based in UK. He is a specialist in market development with focus on Industrial application such as Hydrogen fuels cells, biogas, Semiconductors, Occupational hygiene, and Environmental Air applications.

Mr. Sanjay Jain
Head - Business Development
Bladon Jets UK Ltd.

Mr. Sanjay Jain is currently serving “Bladon Jets”, a pioneer in providing clean power and an early adopter in getting on the road to Net Zero emissions. He worked with multiple reputed Indian & MNC’s for successful challenging roles in the field of Distributed Energy Business and having professional experience of over 27 years. He is a hard core sales and marketing professional initially in mechanical power transmission and later major part of his career in distributed energy business now focussing totally on sustainability solutions in distributed energy field.

Dr. Mishma S Stanislaus
Research Scientist, IISc

Dr. Mishma works as a Research Scientist at IISc. Her current work at CGPL, IISc entails the characterization of hydrogen produced from biomass as per ISO 14687-2019 for PEMFC application. She is also volunteering as a researcher and co-author for UN-SDG 4, 7 and 13 Corporate Guidebooks at SHERPA Institute.



Ms. Priyanka Sahasrabudhe
Head- Hydrogen Energy Strategy,
ADOR - India

Priyanka leads international business strategy for Ador Powertron, a leading supplier of DC power electronics to green hydrogen projects globally. Previously, Priyanka has worked with the Australian Department of Foreign Affairs and Trade (DFAT) on research and policy. Her research has been featured in publications such as Observer Research Foundation and the Global Policy Journal.

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SESSION 4
RESEARCH AND DEVELOPMENT AND CAPACITY BUILDING

Objective

In the "Research and Development and Capacity Building" summit session, we embark on a journey through the world of cutting-edge research, innovation, and capacity building in the field of hydrogen and clean energy. Guided by Mr. Umesh Sahdev, Executive Chairman of Hydrogenium Resources in India, this session gathers a distinguished panel of experts. These experts, including Dr. Sapna Poti from the Office of the Principal Scientific Adviser to the Government of India, Prof. GD Yadav, Padma Shri awardee and internationally renowned scientist, and others, will shed light on the latest advancements in hydrogen research, capacity building initiatives, and their implications for a sustainable future.

Topics

- Government Initiatives and Strategic Alliances: Insights into government-led initiatives and strategic alliances in hydrogen research and development.
- Cutting-Edge Research in Clean Energy: Exploring the forefront of research in clean energy technologies and their impact on the hydrogen sector.
- Capacity Building for a Hydrogen-Powered Future: Discussions on capacity building programs and their role in nurturing talent for the hydrogen industry.
- International Collaborations and Knowledge Exchange: Highlighting the importance of global partnerships and knowledge sharing in advancing hydrogen research.
- Innovation in Nanomaterials for Clean Energy: A deep dive into nanomaterials and their applications in clean energy and healthcare, led by Prof. Dhayalan

Chair

Mr. Umesh Sahdev
Exec. Chairman
Hydrogenium Resources, India

Umesh Sahdev is the Executive Chairman of Hydrogenium Resources, Pvt Ltd, India. He has more than five decades of professional experience in planning & development of Industrial projects in a vast spectrum of industries, managing businesses of global companies, identifying business opportunities and strategic planning for investment projects, Sustainability, Decarbonization, carbon offset projects and managing Private Equity and investments in Sustainability and Climate Change mitigation projects.

Speaker

Dr. Sapna Poti
Director, Strategic Alliances
o/O Principal Scientific Adviser, GoI

Dr. Sapna Poti is the Director, Strategic Alliances in the Office of the Principal Scientific Adviser to the Government of India. She has played a vital role in the development of Manthan – India's platform for Research and Innovation to promote collaborations at scale. She has around 30 years of experience in Industry, Consulting and Government. Dr. Poti is a member of Niti Aayog's Expert Group on 'Skill Development for Mountain States', Member of GIZ MSME committee and MESA's advisory committees.

Velauthapillai from HVL University, Norway.

- Industry Insights and Operational Efficiency: Real-world experiences and insights into the operational aspects of hydrogen-related industries.
- Hydrogen Value Chain Research: Understanding the holistic approach to the hydrogen value chain, as presented by Dr. Velaug Myrseth Oltedal from the Norwegian Center for Hydrogen Value Chain Research.
- Carbon Capture, Utilization, and Storage (CCUS): Dr. Rakesh Kumar discusses the importance of CCUS technologies in reducing emissions and enhancing sustainability.
- Academic Contributions to Clean Energy: Dr. Vikram Vishal's perspective on academic research and its role in driving innovations in clean energy.

Outcomes

- A comprehensive understanding of government-led initiatives and strategic alliances in hydrogen research.
- Awareness of the latest breakthroughs and research findings in clean energy, particularly within the hydrogen sector.
- Insights into capacity building programs and their significance in nurturing skilled professionals for the hydrogen industry.
- Recognition of the importance of international collaborations and knowledge exchange in advancing hydrogen research.
- Knowledge about the innovative applications of nanomaterials in clean energy and healthcare.
- Practical insights into operational efficiency within hydrogen-related industries.
- An understanding of the holistic approach to the hydrogen value chain.
- Insights into the role of CCUS technologies in reducing carbon emissions.
- Recognition of the contributions of academic research to the development of clean energy solutions.

Speakers

Prof. GD Yadav
Padma Shri and Internationally renowned scientist

Prof. G D Yadav is a chemical engineer, inventor and academic. He is known for his research on nanomaterials, gas absorption with chemical reactions and phase transfer catalysis. He served as the vice-chancellor of the Institute of Chemical Technology, Mumbai from 2009 until November 2019. He is currently the Emeritus Professor of Eminence at ICT Mumbai. The Government of India awarded him the fourth highest civilian honour of the Padma Shri, in 2016, for his contributions to science and engineering. In 2022, he was elected as a member of the United States National Academy of Engineering.

Dr. Vibha Dhawan
Director General, The Energy and Resources Institute (TERI)

Dr. Vibha Dhawan is the Director General of The Energy and Resources Institute. She also served as the Vice-Chancellor of TERI School of Advanced Studies. She is a Fellow of the National Academy of Sciences, India. Dr Dhawan is actively involved in research as well as policy development, both at the national and international level. She is a task force member of a number of committees and a recepient of many prestigious awards. She has authored 6 books and over 50 publications.

Mr. Steffen Møller Holst
Vice President- Marketing,
SINTEF

Møller-Holst has more than 30 years' experience within hydrogen technologies. Over two decades, Møller-Holst has also contributed to shaping the political agenda in Norway, as advisor to the Ministry of Petroleum & Energy and the Ministry of Transportation, and as the Chairman for the Norwegian Hydrogen Association. Currently, he is the Vice President- Marketing, SINTEF.

Dr. Umish Srivastava
Executive Director (Alternative Energy), Indian Oil R&D

Dr. Umish is leading IndianOil Centre for Alternative & Renewable Energy (iCARE) innovating in areas of Solar, Bioenergy, Hydrogen, Gasification, Batteries etc. He is involved in the project execution of "IndianOil Technology Development & Deployment Centre" comprising of iCARE and Centres of Excellences in Nanotechnology, Material Sciences, Bio-Technology, Pipelines etc. He has been granted 38 patents.

Mr. James Khong
Co-Founder & Chief Operating Officer, Galaxy FCT

James Khong is a Co-founder and the Chief Operating Officer of Galaxy FCT, a hydrogen technology company which has a patented process which allows rapid and efficient release of H2 gas from solid feedstock. He has extensive work experience in energy and infrastructure project development and project financing in various capacities.

Prof. Dhayalan Velauthapillai
Head - Advanced Nanomaterials for Clean Energy and Health Applications, HVL University, Norway

Prof. Dhayalan Velauthapillai is attached to Western Norway University of Applied Sciences (HVL), Bergen, Norway and has established Advanced Nanomaterials for Clean Energy and Health Applications. He is also a partner in the Hydrogen Renewable Energy Center, HyValue and co-leads research on innovative methods for Hydrogen production. He is an associate of Norwegian Academy of Technological Sciences and has a number of national and international awards and recognitions to his credit.

Dr. Rakesh Kumar
Programme Director - CCUS, CSIR

Dr. Rakesh Kumar is currently working as Officer on Special Duty and coordinates the CSIR Mission Programme of CCUS as Programme Director. Earlier he was Director of CSIR-National Environmental Engineering Research Institute (CSIR-NEERI). He has also served as 'Adjunct Professor' at Centre for Environmental Science and Engineering, IIT-Bombay. He was in the expert team from India on delegation for IPCC Report for Policy Makers besides chairing a committee for "CO2 removal and relating engineering solutions" formed by MOEFCC.

Mr. Sachin Chugh
DGM and CEA to Director (R&D),
IOCL

Mr. Sachin Chugh is Dy. General Manager (Hydrogen & Fuel Cells) at IndianOil R&D. He has been making scientific and engineering contributions in the area of hydrogen and fuel cells for the past 18 years. He has contributed to nation's first commercial experiment on HCNG in Delhi. Mr. Chugh is also operating as Technical Chief Executive Assistant to Director (R&D), the member of the Board of IndianOil for critical contributions in scientific and business matters including energy transition, net zero, fuel efficiency and evolving technology landscape.

Dr. Vikram Vishal
Associate Professor, Department of
Earth Science, IIT Bombay

Prof. Vikram Vishal is an Associate Professor at the Indian Institute of Technology Bombay, Mumbai. He serves as a Visiting Professor at the MIT Energy Initiative, MIT, USA, and Adjunct faculty at Monash University. Prof. Vishal serves as a faculty at the US-Department of Energy-sponsored 'Research Experience in Carbon Sequestration' school since 2017 and is the Convener of the DST-sponsored National Centre of Excellence in Carbon Capture and Utilization at IIT Bombay since 2021. He is also the co-founder of UrjanovaC Pvt Ltd, a clean energy and net-zero solutions company.

Abhijeet Inamdar
Chief Executive Officer
SiriNoR

Abhijeet Inamdar is a co-Founder of SiriNoR, a Norwegian/ Indian startup, that is creating the future of sustainable aviation using their innovative electric propulsion technology. Abhijeet has 20 years of experience in the Energy Industry with various roles in service company, E&P operators as well as in corporate venture group. He has vast experience in developing and commercializing new products/services and building strong teams. He has served as a board member/Advisor for 10+ companies. In 2019, Abhijeet has been featured by the Hart Energy Journal as 40-under-40 investors in North America, and in 2022 as one of the Most Admired Global Indians by the Passion Vista Journal.

Dr. Velaug Myrseth Oltedal
Deputy Director, HyValue- Norwegian
Center for Hydrogen Value Chain Research

Velaug Myrseth Oltedal is associate professor at the Department of Mechanical and Marine Engineering, at Western Norway University of Applied Sciences (WNUAS) and works interdisciplinary with research within nanotechnology, drilling of oil wells and green energy. Oltedal is also Deputy Director of the Norwegian research center HyValue and works to strengthen cooperation between research institutions and industrial partners.

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SESSION 5
CLIMATE FINANCE

Objective

In the "Climate Finance" summit session, we venture into the dynamic realm of financial strategies aimed at mitigating climate change and fostering sustainability. Under the guidance of Mr. Rajnish Kumar, former Chairman of the State Bank of India, and Mr. Shiva Rajaraman, CEO of NIIF (National Investment and Infrastructure Fund), this session assembles a distinguished panel of experts. These experts, including representatives from global financial institutions, legal experts, industry leaders, and policy advisors, will delve into the intricacies of climate finance, sharing insights on innovative approaches, policy dynamics, and investment opportunities in the green economy.

Topics

- Climate Finance Landscape: An overview of the current climate finance landscape, presented by Ms. Surbhi Goyal from the World Bank.
- Tax and Legal Aspects of Climate Finance: Insights into tax and legal considerations in climate finance, led by Mr. Bimal Jain, Founder of A2Z Taxcorp LLP.
- Role of Financial Institutions: Mr. Manish Chourasia, MD of Tata Cleantech Capital Limited, discusses the role of financial institutions in promoting sustainable investments.
- Green Energy Development: Mr. Bimal Jindal, Head of Green Energy Development at L&T Energy, explores strategies for green energy financing.
- Innovative Energy Solutions: Mr. Shardul Kulkarni, MD & CEO of Deesha Power Solutions, presents innovative energy solutions and their financial implications.
- Sustainability Reporting: Insights into sustainability reporting and its influence on climate finance, presented by Ms. Prarthana Borah, Country Director of CDP India.

Chair

Mr. Rajnish Kumar
Ex-Chairman,
State Bank of India

Mr. Rajnish Kumar is former chairman of State Bank of India. He completed his 3 years term as chairman in October 2020. He is credited with steering the bank successfully through very challenging times. During his tenure, Bank developed YONO, a digital platform, which has established bank as a global leader in adoption of technology and innovation. Mr. Kumar is a career banker with nearly 4 decades of service with State bank of India.

Co - Chair

Mr. Shiva Rajaraman
CEO, NIIF

Mr. Shiva Rajaraman is the Chief Executive Officer (CEO) of NIIF Infrastructure Finance Limited (NIIF IFL). He has over 26 years of experience in infrastructure finance, innovative & sustainable funding, and advisory.

- Impact Investing: Ms. Ravneet Mann, Head of Strategy & Policy at Stride Ventures, delves into the world of impact investing in the context of climate finance.
- Investment Promotion: Mr. Anagh Singh, AVP at Invest India, highlights opportunities and strategies for promoting climate-friendly investments.
- Government Initiatives: Dr. Abhinav Trivedi, former Consultant at NITI Aayog, shares insights into government policies and initiatives driving climate finance.

Outcomes

- A comprehensive understanding of the current climate finance landscape, including global perspectives and challenges.
- Awareness of tax and legal considerations in climate finance, enabling informed decision-making.
- Insights into the pivotal role of financial institutions in advancing sustainable investments.
- Strategies for financing green energy projects and their potential impact on the energy sector.
- Knowledge of innovative energy solutions and their financial feasibility.
- An understanding of sustainability reporting and its significance in climate finance.
- Insights into impact investing as a vehicle for promoting sustainability.

Speakers

Ms. Surbhi Goyal
Senior Energy Specialist,
World Bank

Ms. Surbhi Goyal is a Senior Energy Specialist with the World Bank's Delhi office. She has over 17 years of experience and is leading some of most innovative projects in the renewable energy sector in India.

Mr. Deger Saygin
Industry Programme Lead
OECD

Deger Saygin works at the OECD Environment Directorate, where he leads the industry and hydrogen work under the Clean Energy Finance and Investment Mobilisation (CEFIM) programme. He was the director of SHURA Energy Transition Centre. In his former role at the IRENA, Deger has developed and led the global renewable energy roadmap programme. Prior to IRENA, he worked as a researcher at the Utrecht University for government organisations, countries and the private sector on sustainable uses of energy and resources. He is the author of more than 80 scientific articles, book chapters and technical reports.

Mr. Bimal Jain
Founder,
A2Z Taxcorp LLP

Mr. Bimal is FOUNDER of A2Z Taxcorp LLP - a boutique Indirect Tax firm. He is having more than 24 years of experience in Indirect Taxation. He is the Chairman of Indirect Tax Committee of PHD Chamber of Commerce. He is the author of a book on Goods and Services Tax, titled "GST law and commentary (with analyses & procedures)".

Ms. Prarthana Borah
Country Director,
CDP India

Ms. Prarthana leads the implementation of the CDP India strategy. She has over two decades of experience in strategy planning, building networks and program leadership on diverse sustainability issues like climate change, air pollution and biodiversity conservation. Prior to joining CDP, she was Country Director of India of Clean Air Asia.

Ms. Ravneet Mann
Head – Strategy & Policy Stride Ventures

Ms. Ravneet Mann is currently Head of Strategy and Policy at Stride Ventures and overlooks international relations as well. Ravneet has had a professional career of over 17 years, with experience in market entry and business expansion strategy, starting with Merrill Lynch and then moving on to Strategy Consulting at a boutique Consultancy from New York.

Mr. Anagh Singh
AVP Invest India

Mr Anagh Singh currently is part of the Government of India's AGNIi Mission: an emerging technology strategy programme under the Office of the Principal Scientific Adviser and the Prime Minister's Science, Technology, and Innovation Advisory Council where he leads the defence & cyber security team. He is also responsible for building the emerging technologies and R&D Investment unit at Invest India - the national FDI promotion and facilitation agency under DPIIT, Govt. of India

Dr. Abhinav Trivedi
Ex Consultant,
NITI Aayog

With over 11 years of experience in clean energy, decarbonisation and green financing, Dr Abhinav Trivedi is working at present as Manager with Acuity Knowledge Partners. He worked with NITI Aayog on multiple projects of national importance during his 5 year stench as Consultant.

Mr. Manish Chourasia
MD, Tata Cleantech Capital Limited

Mr Manish Chourasia is a financial service professional with 27 years of experience in origination, credit risk assessment and syndication in the Asia- Pacific Region. As part of the above-mentioned functional categories, he has handled various products covering project finance, trade finance, and investment banking.

Mr. Bimal Jindal
Head – Green Energy Development, L&T Energy

Mr. Bimal Jindal is Business Head for Green Energy Development with Larsen & Toubro Limited focusing on Green Hydrogen and its derivatives. Bimal has more than 2 decades of diversified experience at decision making roles in Green Hydrogen projects, Power plants (Solar, Wind, Hydro, Thermal, Gas), Airports, Oil & Gas projects handling high value transactions.

Mr. Shardul Kulkarni
MD & CEO,
Deesha Power Solutions

Mr. Shardul Kulkarni is an energy transition professional with ~22 years of experience in power, renewable energy and energy intensive sectors like steel, cement, chemicals, sugar etc. During this tenor, he has worked and facilitated investments in energy transition projects with cumulative investment of USD 1 billion+ across multiple geographies viz South-East Asia and Western Africa.

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GREEN ENERGY MEET

Objective

In the "Green Energy Meet" summit session, states and countries will discuss on what they offer in green Hydrogen, biofuels and renewables. The states and countries will present on their climate actions, policies, legislations and way forward.

Message

His Holiness Sadhguru
Internationally acclaimed
Spiritual Master

Sadhguru (Jagadish Vasudev) is the founder and head of the Isha Foundation. He is the author of the New York Times bestsellers Inner Engineering: A Yogi's Guide to Joy and Karma: A Yogi's Guide to Crafting Your Destiny, and a frequent speaker at international forums. Sadhguru also advocates for protecting the environment against climate change. In 2017, he received the Padma Vibhushan for his contributions to spirituality and humanitarian services.

Moderator

Mr Alok Sharma
Executive Director, Centre for High Technology, MoPNG

Mr. Alok Sharma is Executive Director at Centre for High Technology under Ministry of Petroleum and Natural Gas since Nov 2021. He has over 32 years of experience at IndianOil including R&D & Refinery including the areas of Process, Projects and Production. He has been instrumental in setting up Hydroprocessing, Gasification, Biofuels, Hydrogen and Fuel cell-related facilities at IndianOil R&D.

Speakers

Mr. Sanjeev Kumar
IAS, Principal Secretary, Climate Change & Forest Department

Mr. Sanjeev Kumar is an officer of the 1998 batch of the Indian Administrative Service (IAS) and Principal Secretary to the Government of Gujarat currently spearheading the Forest & Environment Climate Change and Urban Development & Urban Housing departments. He served in various capacities in Panchayats, Rural Development, Finance, General Administration, Commercial Taxes, Energy & Petrochemicals, Forest & Environment, and other departments, and listed state PSUs like Gujarat Gas and GSPL. He has been honored with India's Best CEO Award in the 'Emerging Companies' category by Business Today in 2021 and India's Best CEO in the Oil & Gas business.

Dr. Sanjay Srivastava, IFS
Principal Chief Conservator of Forest & Head of the Forest Force, Jharkhand

Dr. Sanjay Srivastava is the Principal Chief Conservator of Forest & Head of Forest Force, Jharkhand. He has more than two decades of experience in various roles in different sectors of the Government of Jharkhand. He also served as a Professor at Indira Gandhi National Forest Academy and Assistant Director General of Indian Council of Forestry Research & Education (ICFRE).

Mr. Devendra Kumar Sharma
Chairman Himachal Pradesh
Electricity Regulatory Commission
(HPERC)

Mr. Devendra Kumar Sharma is the chairman of the Himachal Pradesh Electricity Regulatory Commission (HPERC). He has more than four decades of experience in the energy and water resources sectors in India and abroad. Mr. Sharma is Vice President of the International Commission on Large Dams, Paris and President of the Committee for International Commission on Large Dams, India (INCOLD). He is also a member of the National Security Advisory Board and the National Committee on Dam Safety.

Dr. Arup Kumar Misra
Chairman
Pollution Control Board Assam

Dr Arup Kumar Misra is the Chairman of Assam Pollution Control Board. He has been a full-time Professor at Assam Engineering College in the Department of Chemical Engineering for 30 years and currently serves as the Director, Assam Science Technology and Environment Council (ASTEC) which is under S&T Department, Govt. of Assam. He has held several honorary positions during his brilliant career. He is the founder Secretary of North East Technical Education Society.

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INDO-NORDIC COOPERATION

Cities and Country Perspectives on Clean Energy and Renewables

The Indo-Nordic Cooperation session focuses on Clean Energy and Renewables The aim is to foster collaboration between India and the Nordic countries in the field of clean energy, sustainability, and renewable technologies. This session within the summit will focus on two key aspects: cities and the unique offerings of individual Nordic countries towards the Indian market. The session will provide a platform for knowledge sharing, idea exchange, and identifying potential areas of cooperation.

SESSION 1: SUSTAINABLE CITIES

Objective

To explore opportunities and challenges for clean energy and renewables collaboration between cities in India and the Nordic region.

Topics

- Urban Planning and Sustainable Infrastructure: Highlighting best practices in urban planning, sustainable infrastructure development, and smart city initiatives from both India and the Nordic countries.
- Integrated Energy Systems: Discussing the integration of renewable energy sources, energy storage solutions, and grid management in urban environments.
- Energy Efficiency and Demand-Side Management: Exploring strategies for improving energy efficiency, demand-side management, and the role of digital technologies in energy optimization within cities.
- Waste-to-Energy and Circular Economy: Showcasing successful waste-to-energy projects, circular economy models, and resource management practices.

Outcomes

- Identification of potential city-to-city partnerships and collaboration opportunities.
- Sharing of successful case studies, lessons learned, and innovative approaches.
- Exploration of policy frameworks, incentives, and regulatory aspects to support clean energy initiatives in urban areas.
- Collaborative opportunities between companies across the Nordics and India.

Moderators

Ms. Rina Sunder
Founder,
Det Moderne India

Rina Sunder is an investor and regular commentator and speaker on India and sustainability. She is the author of the text book “Det Moderne India”, and the founder of the NGO Det Moderne India (DMI). DMI is a business-driven climate initiative and a knowledge hub on India in Norway.

Mr. Umesh Sahdev
Exec. Chairman,
Hydrogenium Resources, India

Umesh Sahdev is the Executive Chairman of Hydrogenium Resources, Pvt Ltd, India. He has more than five decades of professional experience in planning & development of Industrial projects in a vast spectrum of industries, managing businesses of global companies, identifying business opportunities and strategic planning for investment projects, Sustainability, Decarbonization, carbon offset projects and managing Private Equity and investments in Sustainability and Climate Change mitigation projects.

Speakers

Ms. Arati Davis
COO, Sweden India Business
Council (SIBC)

Arati Davis is a Chief Operating Officer at Sweden India Business Council (SIBC). She is a development professional with over twenty years in the environment and sustainable development sector, encompassing issues of low-carbon transition, and inclusive growth.

Mr. Ola Elvestuen
Member of Parliament in Norway

Ola Elvestuen is a Member of Parliament in Norway and also a Member of Nordic Council. Mr Elvestuen served as Minister of Climate and the Environment, City councillor for Environment and Transportation in Oslo and headed the City Development Committee. He has since 2013 chaired the parliamentary Committee on Energy and Environment. He won the hydrogen award in 2017.

Mr. Mads Schlosser
Director, Indian Danish
Chamber of Commerce

Mr. Mads is the director of the Indian-Danish Chamber of Commerce. Mads holds a BA in South Asia Studies and an MA in Asia Studies and Geopolitics from Aarhus University, Denmark. The pivotal importance of creating partnerships with India that enable India to succeed with its ambitious green transition, utilizing the strong Danish experiences in the same, while creating jobs and sustainable growth in the two countries drives his work with IDCC.

Ms. Shruti Narayan
Regional Director for South
and West Asia, C40

Shruti Narayan is the C40 Regional Director for South and West Asia. Shruti has almost 20 years of global work experience specializing in energy efficiency and sustainability. Prior to this she was an Upstream Officer with International Finance Corporation’s (IFC, World Bank Group) Asia Pacific Cities Platform and has also led IFC’s Green Building program in South Asia.

Ms. Vaishali Chopra
Head of Public Affairs,
Yara

Vaishali Chopra is leading Public Affairs and Communications for Yara International in India. After working in Rabobank as Assistant Vice President, Food& Agri Strategic Advisory & Research for a decade joined Monsanto (now Bayer) as a Stakeholder Engagement lead.

Ms. Varda Taneja
VP, Invest India

Ms. Varda Taneja is currently a Vice President at Invest India with close to 9 years of experience in market – entry and business expansion strategy. She is leading investment promotion in the Europe region along with the facilitation of companies in the Consumer Goods industry. Varda has led multiple public–private engagements at global platforms as a part of the outreach strategy to highlight investment opportunities and drive FDI into India. Additionally, she has also worked in close capacity with the Office of the Prime Minister of India and with senior officials from Federal Ministries and State Governments to work on policy and develop an investor outreach strategy.

Mr. Vegard Frihammer
Group Director, Greenstat ASA

Mr. Vegard Frihammer is the founder and CEO of Greenstat ASA, a Norwegian energy company with a specific focus on green hydrogen production. He has an industrial background as an engineer and manager from the Oil and Gas and the Maritime industry in Norway, and as head of Renewables at Christian Michelsen Institute, located in Bergen, Norway. Mr. Frihammer is the Chairman of the Board at the Norwegian Hydrogen Association and has previously been the Chairman of the steering committee of H2 Cluster – The Norwegian Hydrogen Cluster.

Dr. Geir Kåre Resaland
Pro-rector for Research,
HVL University, Norway

Dr. Geir Kåre Resaland is the vice-chancellor for regional development at the Western Norway University of Applied Sciences (HVL). He is also the vice-chancellor for research position at HVL. He has published 76 peer-reviewed articles in international journals. He was the founder and leader of the Center for physical active learning. He was the leader of ACTivate, an Erasmus+ collaborative project.

SESSION 2: NORDIC COUNTRIES AND THEIR UNIQUENESS TOWARDS THE INDIAN MARKET

Objective

To highlight the distinctive strengths and expertise of individual Nordic countries in the clean energy and renewables sector, and their relevance to the Indian market.

Topics

- Country Presentations: Representatives from each Nordic country will provide an overview of their country's clean energy sector, including renewable energy sources, policies, initiatives, and success stories.
- Technology Transfer and Capacity Building: Discussing mechanisms for technology transfer, knowledge sharing, and capacity building between Nordic countries and India, focusing on areas such as wind energy, solar power, bioenergy, and energy storage.
- Investment Opportunities and Business Partnerships: Exploring potential investment opportunities and establishing business partnerships between Nordic companies and Indian stakeholders in the clean energy sector.
- Research and Innovation Collaboration: Identifying avenues for research collaboration, joint projects, and innovation exchange between Nordic research institutions and Indian counterparts.

Outcomes

- Enhanced understanding of the unique clean energy offerings from each Nordic country.
- Identification of potential areas for collaboration, investment, and technology transfer.

Moderators

Mr. Knut Linnerud
Senior Developer International
Greenstat ASA

Mr. Knut works as the Senior Developer International of Greenstat ASA. He is an experienced serial entrepreneur with many years of management experience. Linnerud has led the start-up of the H2Cluster – the Norwegian Hydrogen Cluster. Linnerud has relevant experience from the hydrogen industry and many years of experience in establishing and further developing companies through various, demanding growth phases.

Mr. Umesh Sahdev
Exec. Chairman
Hydrogenium Resources, India

Umesh Sahdev is the Executive Chairman of Hydrogenium Resources, Pvt Ltd, India. He has more than five decades of professional experience in planning and development of Industrial projects in a vast spectrum of industries, managing businesses of global companies, identifying business opportunities and strategic planning for investment projects, sustainability, and decarbonization.

Speakers

Mr. Azam Ali Khan
Local Energy Advisor India, Norwegian Energy Partners (NORWEP)

Azam Ali Khan has diverse experience in the field of Upstream Offshore Oil & Gas, Power Generation and financial services in Indian Market. He has worked in roles ranging from Offshore Drilling Services, Oil & Gas Asset Acquisition, Investment Banking, Treasury Management, Strategy and Business development with some of the major Global O&G players and financial institutions.

Dr. Indra N. Mitra
Director Cambi (Europe)

Dr. Mitra is an International Expert in Wastewater and Sludge Treatment with 25 years of experience in USA and India in Technology & Process, Policies and Regulations and Leadership Management. He was recognized as a "Who's Who" in Water and Wastewater by American Academy of Environmental Engineers. He was awarded the "Man of Excellence Award, 2021" for Environment and Water in India. He has authored several books and papers.

Dr. Heli Antila
CEO, Chempolis Oy Fortum

Heli acts as CEO, Chempolis Oy and Vice President, Biobased Solutions in Fortum. Before Heli acted as Chief Technology Officer for Fortum, as an energy sector management consultant and as a researcher. Heli has also other positions of trust such as a Member of the Academy of Technical Sciences and Member of the non-executive board for startup company Infine.

Ms. Usha Subramaniam
Country President for India
Grundfos

Ms. Usha is a business and HR leader with over two and a half decades of experience in varied functions, with the longest stint within Human Resources. Currently, she holds the esteemed position of Country President at Grundfos Pumps India Pvt Ltd. Apart from Grundfos, Usha has held senior positions in both Indian and multinational companies like IKEA, TAFE, and TATA Infotech Ltd. She has worked with strategy, process implementation and operational delivery responsibility within the areas of Business Development, Profit Center Management and Human Resources.

Ms. Vidya Basarkod
Managing Director,
Ramboll India

Vidya is currently the Managing Director Ramboll India & Director Ramboll Engineering Center. She has been delivering large and complex infrastructure projects in India as well as in Europe in sectors spanning Transport, Buildings, Water, Climate Change, and Sustainability. She brings over 35 years of rich work experience in civil engineering, urban infrastructure, integrated urban transport, airports planning and management, engineering global work-sharing, real estate sales and marketing, integrated and golf-centric townships, business management and public-private partnerships.

GREENSTAT NORWAY

Norwegian Energy Partners

Danfoss ENGINEERING TOMORROW

Mr. Prashant Agarwal
CEO and Chairman
Serneke International Group

Prashant Agarwal is the Chairman & CEO of Serneke International Group (SIG), is at the helm of one of Sweden's largest global engineering, procurement, and construction (EPC) companies. He also has created a group of successful companies under his family holding with Ajna Holding AB. Notably, he served as the President of the Delhi Dynamos FC, a prominent Indian Super League Club, for two years. Today he is sitting on Board of SIBC (Sweden India Business Council) and a member of ISBLRT (India-Sweden Business Leaders Round Table). With an impressive 15+ years of experience spanning sports, finance, real estate, entertainment, IT, and infrastructure, he brings a wealth of expertise to his leadership role.

Ms. Anju Kuruvilla
Director - Industry Affairs, Corporate Communications & Sustainability
Danfoss India

Ms. Anju has Around 20 years of experience working with leading organizations in India and abroad like Standard Chartered, Star Group, RBS, UNHCR, Manipal Group, etc. prior to joining Danfoss. She is an author, lyricist and passionate sustainability ambassador. She has been awarded the Golden Peacock Award by IOD, CSR Abroad award by the Ministry of Denmark, CSR Social Impact Award and recognition by the Government of Tamil Nadu, the Government of Telangana and select industry bodies for excellent work in CSR, university engagement and environment initiatives.

Dr. Vijay Chauhan
CEO, CEO, Geotropy ehf

Mr. Vijay is the CEO of Geotropy ehf. He has served as a Chief Research Officer (CRO) at GEG for three years. He is also actively involved as an adjunct faculty member and researcher at Reykjavik University, including project supervision of Master's and PhD students, with the objective of narrowing the gap between industry and academia. He has several publications in various international journals and conferences related to the field of geothermal energy research. His research interests include Computational fluid dynamics (CFD), thermo-economic optimization of geothermal power plants and mitigation technology development for the treatment of geothermal fluid with acid gas and solid impurities.

Mr. Pranshu Singhal
Founder, Karo Sambhav

Pranshu heads the helm at Karo Sambhav. Prior to founding Karo Sambhav, Pranshu has led global education and sustainability operations for brands like Microsoft and Nokia. He is a globally recognised expert on systems thinking, product policies, take-back and recycling systems, LCA, environmental management systems, and education transformation. Pranshu has been a part of prestigious fellowships including Ashoka, Aspen, Chevening Gurukul, and Aspire Circle. He was also recently selected as a finalist for the Social Entrepreneur of the Year Award (2021) by Schwab Foundation.

RAMBØLL Bright ideas. Sustainable change · CAMBI · GRUNDFOS · SERNEKE · chempolis pure future · Geotropy · KARO SAMBHAV

3rd INTERNATIONAL CLIMATE SUMMIT HONORS 2023

Celebrating the Achievements of Climate Change Captains for their Path-Breaking Achievements in Sustainability through Green Solutions

Acknowledging the growing significance of Green Energy Captains of Industries, R&D's, Government Institutions, Policy Makers, Industries and Media are working together, towards Self-Reliant-India (Aatam Nirbhar Bharat) to achieve Net Zero by 2070.

PHD Chamber of Commerce and Industry's ICS 2023 Green Awards are in the following categories

- Private/ Government Institutions in Research and Development
- Government Institutions- Promoting Green Fuel/ Green Energy
- Media- Creating awareness among communities
- International cooperation in promoting green energy
- Industries promoting green energy/ green fuel
- Government/ Private- Climate Mitigation

Chief Guest

Mr. Nitin Gadkari

Hon'ble Minister of Road
Transport and Highways of India

Mr. Nitin Jairam Gadkari is the current Minister for Road Transport & Highways in the Government of India. He is also the longest-serving Minister for Road Transport and Highways currently running his tenure for over 9 years. He is often referred to as the "Expressway Man of India". The World Economic Forum has recognized him as the "pioneer of public–private partnership (PPP) in the road sector in India. Mr. Gadkari is also an agriculturist. He has promoted Water Management, Solar Energy Projects and the use of modern technology and management tools in agriculture. He has a passion for biofuel and non-conventional sources of energy. Mr. Gadkari has also carried out many social welfare projects in the Vidarbha region including making several villages self-sufficient by solar energy, couple of thousand heart surgeries and solar rickshaws for the needy.

Guest of Honour

His Excellency Dolpo Tulku Rinpoche

Dolpo Tulku Rinpoche is also called Tulku Sherab Zangpo. He became a monk at Kanying Shedrub Ling Monastery, Nepal, at the age of 9 in 1991 and was recognized by Dilgo Khyentse Rinpoche to be the reincarnation of the third Dolpo Nyingchung Drubthob. He completed his study of philosophy, practice and rituals under the guidance of His Holiness Penor Rinpoche from Namdroling Monastery in Bylakkuppe. Upon completion of his studies, he began to teach Sutra and Tantra at the Ngagyur Nyingma Institute, the advanced center of philosophy study at Namdroling Monastery from 2007. In 2008, Dolpo Tulku Rinpoche went to Dolpo to be enthroned in his monasteries in Dho Tarap, Saldang and Namgung and to take more active responsibility of his people there.

ERA OF HYDROGEN FUEL CELLS

See one promontory, One mountain, One sea, One river and See
- Socrates

A fuel cell uses the chemical energy of hydrogen or other fuels to produce electricity. If hydrogen is the fuel, the only products are electricity, water, and heat. Fuel cells can use a wide range of fuels and feedstocks and can provide power for systems for variety of applications such as transportation, industries and commercial/residential buildings. Also for long term energy storage for the grid, fuel cells can operate at higher efficiencies and can convert the chemical energy in the fuel directly to electrical energy with efficiencies exceeding 60%. Fuel cells have lower or zero emissions.

Hydrogen fuel cells emit only water. Fuel cells are quiet during operation as they have few moving parts. Fuel cells work like batteries, but they do not run down or need recharging. They produce electricity and heat as long as fuel is supplied. A fuel cell consists of two electrodes—a negative electrode (or anode) and a positive electrode (or cathode)—sandwiched around an electrolyte. A fuel, such as hydrogen, is fed to the anode, and air is fed to the cathode. In a hydrogen fuel cell, a catalyst at the anode separates hydrogen molecules into protons and electrons, which take different paths to the cathode. The electrons go through an external circuit, creating a flow of electricity. The protons migrate through the electrolyte to the cathode, where they unite with oxygen and the electrons to produce water and heat.

Types of Fuel Cells

Fuel cells are classified primarily by the kind of electrolyte they employ. This classification determines the kind of electro-chemical reactions that take place in the cell, the kind of catalysts required, the temperature range in which the cell operates, the fuel required, and other factors. These characteristics, in turn, affect the applications for which these cells are most suitable. There are several types of fuel cells currently under development, each with its own advantages, limitations, and potential applications. Learn more about the following types of fuel cells.

Polymer electrolyte membrane (PEM) fuel cells—also called proton exchange membrane fuel cells—deliver high power density and offer the advantages of low weight and volume compared with other fuel cells. PEM fuel cells use a solid polymer as an electrolyte and porous carbon electrodes containing a platinum or platinum alloy catalyst. They need only hydrogen, oxygen from the air, and water to operate. They are typically fueled with pure hydrogen supplied from storage tanks or reformers.

Alkaline Fuel Cells

Alkaline fuel cells (AFCs) were one of the first fuel cell technologies developed, and they were the first type widely used in the U.S. space program to produce electrical energy and water on-board spacecraft. These fuel cells use a solution of potassium hydroxide in water as the electrolyte and can use a variety of non-precious metals as a catalyst at the anode and cathode. In recent years, novel AFCs that use a polymer membrane as the electrolyte have been developed. These fuel cells are closely related to conventional PEM fuel cells, except

that they use an alkaline membrane instead of an acid membrane. The high performance of AFCs is due to the rate at which electro-chemical reactions take place in the cell. They have also demonstrated efficiencies above 60% in space applications.

Solid Oxide Fuel Cells

Solid oxide fuel cells (SOFCs) use a hard, non-porous ceramic compound as the electrolyte. SOFCs are around 60% efficient at converting fuel to electricity. In applications designed to capture and utilize the system's waste heat (co-generation), overall fuel use efficiencies could top 85%.

SOFCs operate at very high temperatures—as high as 1,000°C (1,830°F). High-temperature operation removes the need for precious-metal catalyst, thereby reducing cost. It also allows SOFCs to reform fuels internally, which enables the use of a variety of fuels and reduces the cost associated with adding a reformer to the system. SOFCs are also the most sulfur-resistant fuel cell type; they can tolerate several orders of magnitude more sulfur than other cell types can. In addition, they are not poisoned by carbon monoxide, which can even be used as fuel. This property allows SOFCs to use natural gas, biogas, and gases made from coal. High-temperature operation has disadvantages. It results in a slow startup and requires significant thermal shielding to retain heat and protect personnel, which may be acceptable for utility applications but not for transportation. The high operating temperatures also place stringent durability requirements on materials. The development of low-cost materials with high durability at cell operating temperatures is the key technical challenge facing this technology.

Scientists are currently exploring the potential for developing lower-temperature SOFCs operating at or below 700°C that have fewer durability problems and cost less. Lower-temperature SOFCs have not yet matched the performance of the higher temperature systems, however, and stack materials that will function in this lower temperature range are still under development.

Reversible fuel cells produce electricity from hydrogen and oxygen and generate heat and water as by products, just like other fuel cells. However, reversible fuel cell systems can also use electricity from solar power, wind power, or other sources to split water into oxygen and hydrogen fuel through a process called electrolysis. Reversible fuel cells can provide power when needed, but during times of high power production from other technologies (such as when high winds lead to an excess of available wind power), reversible fuel cells can store the excess energy in the form of hydrogen. This energy storage capability could be a key enabler for intermittent renewable energy technologies.

AUTHOR

DR. J.P. GUPTA
Chairman, Environment Committee , PHD Chamber of Commerce and Industry
Managing Director, Greenstat Hydrogen India Private Limited
Email: jpglobalconsultinggroup@gmail.com

HYDROGEN-A SOLUTION FOR SELF SUFFICIENCY AND NET ZERO CARBON EFFORTS OF INDIA

AUTHOR

MR. ALOK SHARMA
Executive Director at Centre for High Technology
Ministry of Petroleum and Natural Gas

The world is at an inflection point in the climate crisis. Unless determined and concerted action to reduce greenhouse gas (GHG) emissions is taken globally—and immediately—global warming could spiral to irreversible levels. India has so far contributed relatively little to the world's cumulative greenhouse gas emissions, but the country is already feeling their effects. The energy transition is foreseen due to the increasing share of renewables in the energy mix, electrification of all sectors of the economy including mobility sector. Green hydrogen is becoming an interesting and powerful strategy to developing countries to support their national sustainable energy objective while meeting environmental, and decarbonization strategies.

India announced the National Green hydrogen Mission. The Mission is pathbreaking and paves the way for meeting the target of production of 5 million tonnes of Green hydrogen by 2030 and the related development of renewable energy capacity. Govt of India is also supporting a lot of R&D and demonstration Initiatives for various facets of Hydrogen, including Production, storage and transportation of hydrogen through a Hydrogen Corpus Fund (HCF). In India, many corporates have announced business strategies to promote hydrogen which will be discussed.

India cannot work in isolation and has to continuously engage with the global energy community to steer its own course for developing Hydrogen economy. Some of my thoughts for promotion of hydrogen in the country are;

- Production is expected to go through an evolutionary process with R&D and deployment taking place concurrently
- Deploy other forms of hydrogen (blue, grey, etc.) in parallel to get the infrastructure ready and resolve technology issues in the hydrogen supply chain.
- Allow use of any grid power for water electrolysis and focus on greening of the grid. Eventually, hydrogen will also become fully green.
- Develop steam electrolysis (SOEC) for greater efficiency as a long-term solution.
- Refining, Fertilisers, steel and coal Industry will be the early users of Green Hydrogen
- Hydrogen Storage and Transportation will be key for Hydrogen usage in Transport sector

Impact of High Temperatures on Outdoor Workers and Economy

" Only When the last tree has died and the last river has been poisoned and the last fish has been caught will we realize that we cannot eat money "
- Cree

It is sad that more than 11 people died and more than 300 people admitted to hospital of heat stroke at a recent function organized by Maharashtra state government. Global warming leading to climate change is playing havoc with changing weather patterns, Polar Ice Caps melting, Forest fires raging, Unseasonal floods and droughts, slowing down of Atlantic gulf stream, unseasonal heat waves, water stress etc. All those who are not in offices and buildings are classified as outdoor workers. Prominent among them are the agricultural labour, construction labour, street vendors and all other wheeler service providers etc. The temperatures more than 36oC to 38oC are beyond human tolerance levels. The three important risks are Heat stress, UV impact and Ambient Air quality. Only the first two are addressed hereunder Heat Stress and UV impact.

UV light (ultraviolet light) has a wavelength between 10 and 400 nm that is shorter than the visible light but longer than the X-rays and is a type of electromagnetic radiation. These are present in sunlight and contribute 10% of the total light from the sun. It varies during the day and also seasonally.

Health Effects of UV Radiation

Ozone layer depletion decreases our atmosphere's natural protection from the sun's harmful ultraviolet (UV) radiation. An overview of the major health problems linked to overexposure to UV radiation is presented.

Understanding these risks and taking sensible precautions will help you enjoy the sun while reducing your chances of sun-related health problems.

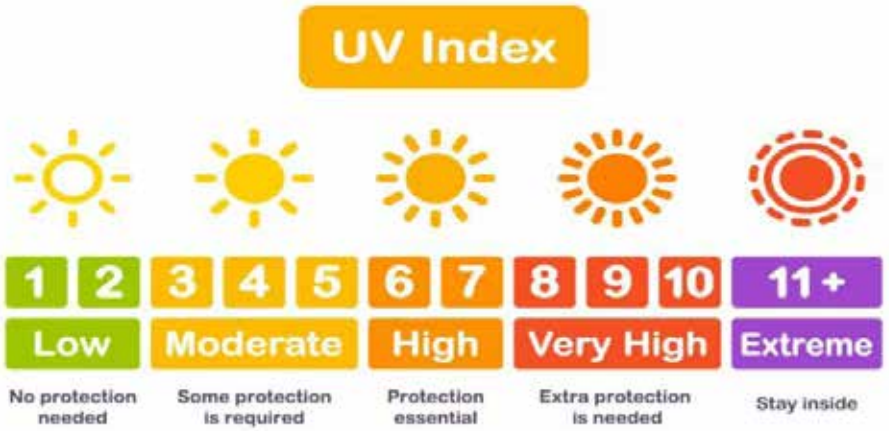
- Skin cancer (melanoma and nonmelanoma)
- Premature aging and other skin damage
- Cataracts and other eye damage
- Immune system suppression

UV Index Scale

The UV Index scale used in the United States conforms with international guidelines for UVI reporting established by the World Health OrganizationEXIT Learn how to read the UV index Scale to help you avoid harmful exposure to UV radiation.

MISSION "CHHAYA"

It has been observed that heat waves have been increasing in intensity with each passing decade since 1988. The combination of high temperatures and humidity levels can be dangerous. Even if, the temperature is between 36oC to



0 to 2 : Low	A UV Index reading of 0 to 2 means low danger from the sun's UV rays for the average person. • Wear sunglasses on bright days. • If you burn easily, cover up and use broad spectrum SPF 30+ sunscreen. • Watch out for bright surfaces, like sand, water and snow, which reflect UV and increase exposure.
3 to 5 : Moder-ate	A UV Index reading of 3 to 5 means moderate risk of harm from unprotected sun exposure. • Stay in shade near midday when the sun is strongest. • If outdoors, wear protective clothing, a wide-brimmed hat, and UV-blocking sunglasses. • Generously apply broad spectrum SPF 30+ sunscreen every 2 hours, even on cloudy days, and after swimming or sweating. • Watch out for bright surfaces, like sand, water and snow, which reflect UV and increase exposure.
6 to 7 : High	A UV Index reading of 6 to 7 means high risk of harm from unprotected sun exposure. Protection against skin and eye damage is needed. • Reduce time in the sun between 10 a.m. and 4 p.m. • If outdoors, seek shade and wear protective clothing, a wide-brimmed hat, and UV-blocking sunglasses. • Generously apply broad spectrum SPF 30+ sunscreen every 2 hours, even on cloudy days, and after swimming or sweating. • Watch out for bright surfaces, like sand, water and snow, which reflect UV and increase exposure.
8 to 10 : Very High	A UV Index reading of 8 to 10 means very high risk of harm from unprotected sun exposure. Take extra precautions because unprotected skin and eyes will be damaged and can burn quickly. • Minimize sun exposure between 10 a.m. and 4 p.m. • If outdoors, seek shade and wear protective clothing, a wide-brimmed hat, and UV-blocking sunglasses. • Generously apply broad spectrum SPF 30+ sunscreen every 2 hours, even on cloudy days, and after swimming or sweating. • Watch out for bright surfaces, like sand, water and snow, which reflect UV and increase exposure.
11 or more : Extreme	A UV Index reading of 11 or more means extreme risk of harm from unprotected sun exposure. Take all precautions because unprotected skin and eyes can burn in minutes. • Try to avoid sun exposure between 10 a.m. and 4 p.m. • If outdoors, seek shade and wear protective clothing, a wide-brimmed hat, and UV-blocking sunglasses. • Generously apply broad spectrum SPF 30+ sunscreen every 2 hours, even on cloudy days, and after swimming or sweating. • Watch out for bright surfaces, like sand, water and snow, which reflect UV and increase exposure.

37oC, with humidity of 50-60%, the wet-bulb temperatures can reach around 30oC, which is life threatening for labours and populations in the open-field. Therefore, there is a need for a new heat code based on wet-bulb temperatures. Many regions are now experiencing wet-bulb temperatures, exceeding 30oC during certain part of the year. The extreme high temperatures impact our immune system, the spread of vector-borne diseases, and health risks for children worldwide.

High temperatures are costly to developing economies; a one-degree rise in heat can reduce economic growth by two percent. High temperatures are bad for the agricultural sector, with both crops and workers exposed to heat. Also, there is a significant impact on manufacturing. There is less output from manufacturing plants and factories. This is linked to impacted Labor productivity, with workers being able to do less per hour.

The government should consider to launch Mission "CHHAYA" for outside workers. Risk mitigation strategies should be shared and coordinated with all states.

Risk Mitigation Strategies

- Educate people on hazards
- Avoid /Minimize exposure
- Display Dynamic Data on mobile

- Stay in Shade (Dense foliage Trees)
- Drink plenty of water (provide earthen pots with potable water)
- Keep stomach full
- Wear suitable clothing
- Stagger working hours
- Communicate as phone ring tone (similar to COVID management)
- Need for new heat code based upon wet-bulb temperatures
- Use of natural ventilation intelligently
- Need to install 'Roshandans'
- All schools with room coolers and filtered water to mitigate adverse effects of extreme high temperature.

Modi's government is highly compassionate and sensitive towards the welfare of workers and farmers. A special budget allocation should be made under the Mission "CHHAYA" to ensure that no outside worker dies at least to extreme heat. Mission "CHHAYA" could be under Ministry of Environment, Forest and Climate Change to formulate Risk Mitigation Strategies. The central government could also co-ordinate with respective states to implement risk mitigation strategies for their workers and farmers working outdoors.

AUTHOR

DR. J.P. GUPTA
Chairman, Environment Committee , PHD Chamber of Commerce and Industry
Managing Director, Greenstat Hydrogen India Private Limited
Email: jpglobalconsultinggroup@gmail.com

PRODUCTION OF HYDROGEN FROM AGRICULTURAL BIOMASS: AN APPROACH TOWARDS SUSTAINABLE ENERGY

AUTHOR

MR. KK PANT
Director, IIT Roorkee
Professor, Department of Chemical Engg. IIT Delhi

In the present scenario, there is a need to generate clean energy sources for power, industry and transport which is essential to reduce carbon emissions and pollution. The need for clean, sustainable energy sources is increasing due to environmental concern because of excessive use of fossil fuels. One of the preferred sustainable sources of clean energy is biomass, as it is renewable and a relatively green energy source. The recommended method to complement solar power is to utilize biomass for producing clean fuels and feedstocks like hydrogen and syngas, respectively.

Hydrogen is produced from biomass/waste by gasifying and then thermally cracking it flowed by reforming of the syngas and hydrocarbons. Agro waste, municipal solid waste, carpentry, and food processing wastes are various types of biomasses. Since India has vast amounts of agricultural residue and waste generated every year, gasification-based hydrogen production is a promising approach to generate low cost green hydrogen. Agri Biomass/waste can be gasified using oxygen and/or steam along with water gas shift reaction to produce hydrogen rich syngas from which, the Hydrogen is subsequently separated and stored or dispatched for the end-use. Biomass and waste are renewable feeds and therefore the hydrogen derived from it will be carbon neutral and therefore green.

The technology of agricultural waste gasification is based on a twin chamber gasification system followed by a thermal cracker and, a subsequent elaborate gas purification and CO shift and a hydrogen via PSA purification process. The syngas is a mixture of carbon monoxide, carbon dioxide, hydrogen, and is produced by the gasification of biomass using steam and/or oxygen. Further conversion of syngas can be done to produce power, hydrogen, chemical and hydrocarbon fuels. The gasified fuel, syngas, is more convenient and efficient for utilization for various applications as mentioned above, as well as its transport (via pipelines). The gasification of biomass also allows to centralized capture carbon dioxide present in syngas, at plant site, thereby, making both syngas and hydrogen green fuels. Besides hydrogen, syngas also can be used for cleaner power generation at higher efficiency by the means of combined cycle gas turbine. It can be utilized for producing hydrocarbons by the means of Fischer Tropsch process to produce green fuels, for existing automotive infrastructure, and industrial feedstocks. The hydrogen has huge present and future demands for industrial applications as well as decentralized fuel cell based power generation and fuel cell based vehicles. In a well designed unit 12 kg of the agricultural residue can produce approximately one kg hydrogen at an approximate cost of 120 Rs.

ELECTROLYSERS: A ROADBLOCK TO OPPORTUNITY IN THE HYDROGEN SECTOR

The launch and approval of the National Green Hydrogen Mission with an initial outlay of US$ 2.5 million has led to a massive increase in green Hydrogen projects and a big push for the Hydrogen market and decarbonisation efforts in India. The question now is whether India has the manufacturing ecosystem and production capacity to meet India's ambitious green Hydrogen targets. One of the critical areas that pull its reins in India's green Hydrogen projects and the transition is Electrolysers.

Electrolysers are one of the key components in green hydrogen production that split water into its constituent components powered ideally by electricity from renewable energy sources. Currently, India has only a 300 MW electrolyser manufacturing capacity. The country needs 60 -100 GW of electrolyser manufacturing capacity by 2030 to produce 5 MTPA of green Hydrogen. Globally, the situation is not very different. According to the IEA, the global capacity to manufacture electrolysers is at 8 gigawatts in a year today. But based on announcements and commitments by the industries, it could exceed 60 gigawatts a year by 2030.

Unfortunately, the lack of electrolyser capacity and non availability of domestic manufacturers in the country right now is a big challenge to realize India's ambitious programmes in green Hydrogen. In fact, India initially needed to import electrolysers as we see many Indian companies like Reliance, Greenko, etc. form joint ventures with foreign companies for technology development and manufacturing of electrolyzers in India. As per the studies by EY on the shortage of electrolyzers for green Hydrogen, the limited number of international electrolyser manufacturers are now overloaded with orders beyond their current production capacity because of a surge in Hydrogen projects all around the world.

As we usually say, every threat can turn into an opportunity depending on our perspective. Unarguably, the global and local crunch in electrolyser supply is a great opportunity for indigenous manufacturers to rise up and seize the market and make India a global hub in electrolyser manufacturing. The incentives proposed under the National Green Hydrogen Mission and the green Hydrogen policies are providing a favorable atmosphere for electrolyser manufacturing and the other Hydrogen industries associated with it. Added to this, considering PLI and subsidies for manufacturers in the green Hydrogen sector, demand creation through renewable purchase obligations for different industries based on their usage, suitable financing options, and subsidizing the cost of green Hydrogen by union and state governments will boost the investment, manufacturing, and production of green Hydrogen. Globally it is expected that if all the electrolyser projects in the pipeline are completed and the planned scaling up in manufacturing capacities takes place, the cost of green Hydrogen could fall by around 70% by 2030 compared with today. India's goal is to bring down the

green Hydrogen cost to $1 per 1 kg in 1 decade.

One of the key areas that electrolyser manufacturers need to consider is their choice of technology. Alkaline and Proton Exchange Membrane (PEM) electrolysers are dominating the market now. Solid oxide and Anion Exchange Membrane (AEM) are the emerging ones and are still under research and development. All of these technologies have their own pros and cons in terms of cost, efficiency, lifetime, flexibility, availability of raw materials, compactness, etc. Other low-cost, highly efficient electrolyser technologies are also reported by companies like Hysata, H2Pro, etc.

Cost is another major factor. Manufacturers and suppliers of different electrolyzer components are almost negligible in India which increases the cost of production. Indigenous manufacturing of end-to-end components and proper linkages between different industries are essential to bringing down the cost of manufacturing and building a robust electrolyser manufacturing and green Hydrogen production ecosystem. Also, it takes almost 2-3 years to set up an electrolyser manufacturing factory and to be operational. Access to low-cost renewable electricity, large-scale projects, standardization of equipment, advancement in technologies, and scaling up the Hydrogen market are essential to reduce the cost.

It is not a brainer to understand that research and innovation is the key to unlocking the untapped potential of green Hydrogen. While scaling up the mature electrolyser technologies, it is equally important to focus the research efforts on improvising the technology of electrolysers but also on other components in a plant like power supply, power electronics, and storage systems to bring down the cost. More funding for research and development, investments for setting up pilot and demo projects, and an increase in academia-industry collaborations will accelerate the developments in this industry. Not only water electrolysis, other innovative breakthrough technologies for green Hydrogen production and the emergence of new startups in this sector can revolutionize the green Hydrogen industry for a better world tomorrow.

AUTHOR

DR SIBIMOL LUKE
Joint Secretary
PHDCCI Centre of Excellence in Green Hydrogen

ARTICLE

ENERGY SECURITY THROUGH RENEWABLE FUELS IN INDIA

" He who plants a tree, plants hope "
- Lucy Larcomare

A basket of fuel options has emerged in India - Ethanol, Biodiesel, Bio-CNG, Methanol and Green Hydrogen - that can help address the challenge of Energy Security. As alternatives to conventional energy sources, they will play a huge role in taking us to the net zero goal. However, their role as mainstream alternative fuels towards the 2070 net-zero emissions target remains to be evaluated. The objective is to push future fuels into the mainstream narrative for energy security and low carbon mobility, which is required to drive towards net-zero targets.

While India is a net exporter of petroleum products, the dependency on the import of crude oil and natural gas creates a persistent sense of vulnerability.

Many oil companies have been investing in biofuels for decades, especially through research efforts and venture capital spending. In recent times, they have also entered into green hydrogen and have committed to huge investments towards the same. Much of this in current times is being driven by the need to remain relevant in a post energy transition scenario and also to address concerns of environmentally conscious large shareholding groups.

Bioethanol

First Generation Feedstock: Sugarcane Juice, Sugar B-Molasses, Sugar C-Molasses, Sugar beet, Cassava, Sorghum, Corn, Sweet Potato, Grains, Petrochemical route.

Second Generation Feedstock: Lignocellulose, cellulose, forestry residues, agro-waste, wood residues, other organic wastes rich in sucrose content can be used to produce ethanol. Such feedstocks are typically rich in cellulose, hemicellulose and lignin. Energy crops are also counted as a second generation feedstock as they don't compete with food, and are typically cultivated on wastelands.

Third Generation Feedstock: Ethanol can also be produced from algae, but it is currently not considered economically viable.

India relies on sugarcane as the primary feedstock for its ethanol plants. Sugarcane farming is increasingly tilting towards catering to ethanol production, thanks to aggressive fuel blending mandates from the government. Supply chain mechanism is relatively more organised and centralised with participation from large refineries, with them enter into contracts with Oil Marketing Companies (OMCs) to support national level fuel blending programmes and demand from the medical, liquor and cosmetic industry.

Feedstock is supplied by the farmers to the ethanol refineries in trucks and tractors against a minimum procurement price.

India produced 500 million metric tonnes of sugarcane for the year 2021-22. Major sugarcane producing

states are UP, Maharashtra, Karnataka, Tamil Nadu, Bihar, Gujarat, Haryana, Andhra Pradesh, Punjab, Uttarakhand. Currently, around 6 million metric tonnes of sugar is utilised to produce ethanol. This is sourced from the surplus sugar production that takes place in India. India produced an estimated 23.1 million tonnes of corn in the Kharif Marketing Season (KMS) 2022-23. Major corn producing states in India are Andhra Pradesh, Karnataka, Rajasthan, Maharashtra, Bihar, Uttar Pradesh, Madhya Pradesh, Himachal Pradesh and Arunachal Pradesh in the north-east

Another grain in consideration is rice. 130 Million metric tonnes of rice was produced in the year 2021-22 in India. Currently, the government intends to utilise around 17 million tonnes of surplus foodgrains, particularly surplus rice and corn apart from sugarcane molasses, for manufacturing ethanol to achieve the target of 20 per cent blending with petrol by 2025. This is necessary because the amount of sugar that can be diverted remains limited.

Bio-CNG

The organic fraction of Municipal Solid Waste (MSW), representing roughly 40-50% of the total mixed waste, is a suitable feedstock. Organic waste is biodegradable, therefore can be broken down into simpler gaseous and solid compounds. Other than MSW, the feedstock could also include sewage water sludge and industrial organic waste.

Non-woody agricultural waste (like paddy straw, wheat straw, bagasse, etc), animal waste (cow dung, faecal waste) and more such feedstock options. Cow dung, in particular, is considered a good feedstock making a rich culture for digesters in biogas/bio-CNG plants.

Urban Local Bodies (ULBs) collect MSW from households, hotels and industries. In a favourable case, waste goes through primary segregation, where recyclable inorganic fraction is separated by ragpickers (who mostly belong to the informal economy). The remaining portion, consisting of non-recyclable inorganic and decomposable organic fraction, gets transported into a storage cum segregation facility where the inorganic fraction is removed and sent to landfills for dumping. The remaining part is almost fully organic in nature and is ready to be sent to the digestor of a bio-methanation plant.

Usually stored by farmers in fallow lands. Cellulose-rich agro-waste is typically harder to digest, and therefore has a lower gas yield. In India, the waste is transported to the bio-methanation plant either by the farmer or the plant agency, as per the decided contract, against a minimum price in tractors or trailers.

Sewage water waste sludge supplied by the ULBs through a wide distribution of piping networks to Sewage Treatment Plants (STPs). A co-located biogas plant is a resourceful way to dispose of the sludge.

Organic solid waste is found across all human settlements - rural and urban. In cities, MSW is the dominant form of waste, growing rapidly. According to World Bank estimates, 277.1 MMT of MSW is generated in India annually. Estimates suggest that over 1.5 million tonnes per annum (MTPA) of automotive-grade Bio-CNG can be generated by treating MSW alone in India. India produces upto 350 MMT of agricultural waste per year. This translates in to 0.12 MTPA of automotive grade bio-CNG, depending on the type of stubble. India generates upto 1.7 MMT of faecal waste per annum, 78% of which is left untreated.

Biodiesel

Palm, Jatropha, Rapeseed, Soybean, Sunflower, Cottonseed, Safflower, Peanut Oil, Used Cooking Oil. Biodiesel can also be prepared from hydrotreated Vegetable Oil, Animal Fat, Pongamia, coal to oil. Algae is another source now being seriously considered.

Plant/refinery operated collection system - used cooking oil from hotel

industry, energy crops collected from farmers under National Biodiesel Mission.

Jatropha plantations are spread across the states of Telangana, Rajasthan, Chhattisgarh and Andhra Pradesh primarily. As of 2018, It is reported that Jatropha occupied around 0.5 million hectares of low-quality wastelands across the country, of which 65-70 per cent were new plantations of less than three years.

Used cooking oil (UCO) is being promoted under RUCO programme of the Food Safety and Standards by Authority of India (FSSAI). India produces 2,700 crore liters of UCO as per Ministry of Petroleum and Natural Gas.

Palm stearin oil is currently being imported from Indonesia, primarily. It is estimated that India's annual demand for palm oil, mostly led by cooking medium requirements, is 9 million tonnes each year. Over 62% of edible oil import in India constitutes palm oil.

Methanol

Oil, Natural Gas, Agricultural Waste, Forestry Residues, Municipal Solid Waste, Hydrogen, Carbon Dioxide. Natural Gas, Indian High Ash Coal, Biomass, MSW, Stranded and Flared Gases.

Wood was one of the earlier feedstocks for the production of methanol. The destructive distillation of wood was the method adopted in the process. However, this biomass type was abandoned long back in favour of fossil fuel based production. The shift away was also prompted by the large requirements of wood, leading to large scale deforestation.

Thanks to the shift to fossil fuel based technologies, coal and natural gas are the preferred mainstream sources, which are processed to first produce syngas and then methanol subsequently. However, given the associated environment and carbon footprints, alternatives are being sought.

Bio-methanol is methanol produced from biomass or solid waste. The production method is significantly different from that of conventional methanol. Also, renewable energy can be used to produce methanol from these sources. As the demand for green methanol rises, this combination of biomass/MSW and renewable energy can potentially lead to a shift in the methanol production method away from the present industry practice.

e-methanol is another alternative where carbon dioxide is used to generate methanol with the help of electricity generated from renewable resources like wind and solar.

India is a net importer of natural gas, importing 30,776 MMSCM of liquified natural gas (LNG) in 2021-22. As per September data, natural gas was used primarily by fertiliser (32%) followed by City Gas Distribution (cooking, transport etc.) (21%) and other uses liked creating petrochemicals (22%). Thus, its utilisation for methanol production remains unlikely.

Abundant coal reserves in India (estimated at 319.02 billion tonnes) has driven interest towards adoption of methanol for a variety of industrial and mobility purposes. However, the exact estimates of coal availability are contested. Biomass stocks, especially crop stubble, is an easy source for bio-methanol production. However, seasonal availability and logistical issues need to be sorted out to enable its utilisation. As noted for bio CNG, India produces upto 350 MMT of agricultural waste per year.

Municipal solid waste is another option. However, the technology around it is still considered expensive. 277.1 MT of municipal solid waste is generated each year in India.

Green Hydrogen

Water and Electricity are needed to produce Green Hydrogen.

Water sourcing as feedstock would be necessary via pipelines since most

plants related to green hydrogen are intended to be setup near green energy generation plants.

India is officially listed as a water stressed nation. Of course, the quantum of water needed still remains debatable, ranging between 22-32 kg of water for every kilogram of hydrogen. Even desalination-based strategy is not preferred due to the high cost implications it carries.

Green hydrogen is still a frontier in some respects, given its rather modest production figures. By 2030, India estimates to produce 5MT of green hydrogen. Comparatively, India's current grey hydrogen production from natural gas is 6MT per annum. While the feedstock is essentially water and the cost of production is theoretically low thanks to cheap renewable energy. This has to be accompanied by a necessary fall in the cost of electrolysers. Globally planned announcements have taken place on targets and promised investments. However, transport and storage issues still need to be addressed suitably to ensure a larger uptake across mobility. Water consumption is also another area where concerns remain. Some pilots have started in India and announcements related to setting up of large scale production units have also been made. Some states have also made policy announcements around green hydrogen, pre-empting significant investment opportunities in this space. However, actual ground level action will take time to show results. The long distance trucking segment is emerging as a contender for deployment of hydrogen. Niche areas like shipping and aviation are other contenders.

AUTHOR

DR. J.P. GUPTA

Chairman, Environment Committee , PHD Chamber of Commerce and Industry
Managing Director, Greenstat Hydrogen India Private Limited
Email: jpglobalconsultinggroup@gmail.com

SPONSORS AND PARTNERS - ICS 2023

Indian Oil Corporation Ltd

Shrikant Madhav Vaidya

Chairman

As a Brand with one of the largest customer interfaces in India, IndianOil reaches precious petroleum fuels to every nook and corner of the country through its network of over 60,000 plus customer touch-points, surmounting the challenges of tough terrain, climate and accessibility. The marketing network is bolstered by 70.05 MMTPA of Refining Capacity and more than 17,000 KM of cross-country pipelines. Moreover, IndianOil's R&D Centre at Faridabad, one of Asia's finest in downstream petroleum R&D, offers a competitive advantage to the Corporation through world-class technology and process solutions and innovative products. IndianOil R&D has also been instrumental in pioneering path-breaking research to leverage the potential of Hydrogen and other cleaner fuels for the sustainable progress of the nation.

One of India's most socially responsive brands, IndianOil, has successfully combined its corporate social responsibility agenda with its business offerings. The Corporation has been partnering with communities in which it operates by supporting numerous initiatives connected with health, family welfare, education, environment protection, potable water, sanitation, empowerment of women and other marginalised groups.

Sheela Foam Ltd

Sheela Foam Limited established in 1971, listed on Bombay Stock (BSE) and National Stock Exchange(NSE), manufactures mattresses, other foam-based home comfort products and technical grades of PU Foam. The Company manufactures various foam-based home comfort products like mattresses, furniture cushions, as well as technical grades of polyurethane foams for end-use in a range of industries like automobile, acoustics, etc. The flagship household brands include: 'Sleepwell' for mattresses and home comfort, 'Feather Foam' a pure PU Foam and 'Lamiflex' a polyester foam for lamination.

The Company also selling its products through online channels under the brand name SleepX through aggregators and its own website. The company has a global manufacturing footprint with 11 nationwide manufacturing plants in India, 5 in Australia, and 1 in Spain. The company has an integrated manufacturing facility 123,000 MTPA with a robust distribution network of 110+ exclusive distributors, 5,400+ exclusive retail dealers, and 6,100+ multi-brand outlets. The Company is also exporting technical foam to Middle East, South Asia, Europe, United States, Brazil, and Argentina etc. It has a strong presence and market share in Australia through its wholly-owned subsidiary, Joyce Foam Pty Ltd. and also in Spain through its subsidiary, Interplasp S.L. .

Rahul Gautam

Chairman &
Managing Director

Mangalore Refinery and Petrochemicals Ltd

Mangalore Refinery and Petrochemicals Limited (MRPL) is Category 1 schedule 'A' Miniratna, Central Public Sector Enterprise (CPSE) under the Ministry of Petroleum & Natural Gas. MRPL is located in a beautiful hilly terrain, north of Mangaluru city, in Dakshina Kannada District of Karnataka State (India). The 15 Million Metric Tonne Refinery has got a versatile design with complex secondary processing units and a high flexibility to process Crudes of various API, delivering a variety of quality products.

Arun Kumar Singh

Chairman &
ONGC Nominee

ACME Group

Manoj Kumar Upadhyay

Founder & Chairman

ACME Cleantech Solutions Pvt. Ltd., popularly referred to as the ACME Group, is one of the leading global sustainable and renewable energy companies. Founded by Mr Manoj K. Upadhyay in 2003, it is headquartered at Gurugram in the state of Haryana in India.

In 2003, the Company invented fit for market products in telecom passive infrastructure space including Power Interface Unit (PIU) and Phase Change Material (PCM). This helped in significant energy savings, contributing lowering calling rates. In the next decade, ACME became India's first IPP to achieve, build and operationalize a solar power plant with subsidy free tariff of INR 2.44 INR/kWh. This tariff broke the grid parity barrier for renewable electricity making it cheaper compared to average cost of thermal power by around 25% and accelerated adoption in solar power in India.

ACME envisions becoming a leading green energy provider in the world by 2032 and producing 10 million tonnes/year of Green Ammonia and equivalent-Green Hydrogen. ACME has started working with various Governments, partners, and stakeholders to develop projects in various geographies like India, Oman, Egypt, and the USA.

ACME Group is committed to bringing sustainability in some of the toughest sectors to decarbonize like food, agriculture, steel, shipping, cement, aluminum, etc.

Oil and Natural Gas Corporation

Arun Kumar Singh

Chairman & CEO

ONGC is the largest crude oil and natural gas Company in India, contributing around 71 per cent to Indian domestic production. Crude oil is the raw material used by downstream companies like IOC, BPCL, HPCL and MRPL to produce petroleum products like Petrol, Diesel, Kerosene, Naphtha, and Cooking Gas LPG. ONGC has a unique distinction of being a company with in-house service capabilities in all areas of Exploration and Production of oil & gas and related oil-field services. ONGC is the winner of the Best Employer award, this public sector enterprise has a dedicated team of around 27,000 professionals who toil round the clock in challenging locations.

Synergen Green Energy

Skeiron Group has launched a new venture known as Synergen Green Energy Inc., which is aimed at leading the energy market of the future. The company's focus is on producing Green Fuels, namely Hydrogen and Ammonia, through innovative and collaborative approaches.

To realize this objective, Synergen Green Energy intends to establish green fuel production facilities across the United States and other locations in stages. This plan will involve partnering with top electrolyser manufacturers and leveraging wind and solar energy plants. Drawing on its vast expertise in renewable energy, the company seeks to increase production levels and expand operations rapidly. Synergen Green Energy has set an ambitious target of achieving 3.6 GW of power generation capacity and producing 1,000,000 million Tonnes Per Annum (MTPA) of ammonia by 2030. With this strategic plan in place, the company is poised to become a significant player in the green energy industry.

Pranav Tanti

Chief Executive Officer

Nayara Energy

Nayara Energy is a new-age downstream energy & petrochemicals company of international scale with a unique mix of young and experienced minds and a robust foundation of best-in-class infrastructure and processes with a desire to deliver excellence, every step of the way. It owns India's second-largest single-site, state-of-the-art refinery, and one of the most modern and complex refineries in the country having businesses across the hydrocarbon value chain, from refining to retail, and is geared up to drive the vision of delivering crude to chemicals.

As the fastest growing Pan-India fuel retail network, Nayara Energy is powering India's growing energy demands by expanding its retail network at an extensive scale. We aim to build one of the largest integrated petrochemicals complexes in the world. With our Phase 1 of the petrochemical expansion project underway Nayara Energy is setting up a 450 KTPA capacity Polypropylene plant. Driving inclusive growth and delivering value for the stakeholders is at the core of its beliefs. Through various sustainable development projects in areas of health & nutrition, education & skill development, and sustainable livelihoods, Nayara Energy continues to play a pivotal role in improving their quality of life.

Prasad K Panicker

Chairman &
Head of Refiney

Maxbyte Technologies

Maxbyte is an industrial digitalization, robotization, decarbonization solutions provider to enable smart and sustainable industrial enterprise for productivity, flexibility, efficiency and growth.

DIGITAL TWIN SOLUTIONS - Enable smart connected engineering, manufacturing & aftermarket using Edge Devices, IIoT, AI/ML & AR products and Services.

ROBOTICS SOLUTIONS - Enable autonomous factory using mobile robots, autonomous vehicles, cobots, drones and custom process automation systems.

LEARNING & INNOVATION - Enable industry x.0 competencies and drive innovation using structured learning and innovation programs.

Ramshankar C S

Chief Executive Officer

Symphony Environmental India Pvt. Ltd.

Symphony Environmental offers following solutions to make plastic products smarter, safer and sustainable:

d2w® Biodegradable Plastic Technology – an environmentally responsible solution for plastic products, film, or packaging needs. This is a solution to the problem of Single-Use-Plastics.

d2p® (designed to protect) is a family of specialist masterbatches, including antimicrobial, insect repellent, anti-rodent, anti-odour, ethylene adsorbers and flame retardants designed to protect and enhance plastic products.

Symphony Environmental has been doing R&D in biodegradable plastic technologies and in protective plastic technologies for over 25 years and now have customer base in over 100 countries. Symphony Environmental India is now doing manufacturing of biodegradable additives in India. Biodegradable plastic technology has lately gained lot of importance worldwide due to the increasing awareness of climate change. There are many Governments world-wide acting in terms of plastic waste management. As a solution, we have introduced a range of products developed by Symphony Environmental, a three-decade old award-winning global leader in making plastic packaging materials sustainable.

Sunil Panwar

Chief Executive Officer

DCM Shriram Industries Ltd (DSIL)

Alok B. Shriram

CEO & Senior Managing Director

DCM Shriram Industries Limited is a diversified group with operations in Sugar, Alcohol, Co-generation of Power, Organic and Inorganic Chemicals, Drug Intermediates, Industrial Fibres and Engineering Projects related to Defence production. As a business group that has inherited the rich legacy of sound governance, effective corporate management, technological sophistication & above all the goodwill & loyalty of numerous stakeholders & associates, the Company continue to build its business on the vision & values endowed by its founder chairman Late Dr. Bansi Dharji.

Shriram Institute for Industrial Research (SRI) is an independent, self sustaining, not-for-profit multidisciplinary contract research institute conducting research and development in the areas of special significance to industry, government agencies and other organizations. SRI is committed to develop, innovate, analyse and apply technology for products and processes.

Dalmia Bharat Sugar and Industries Ltd

Pankaj Rastogi

Chief Executive Officer

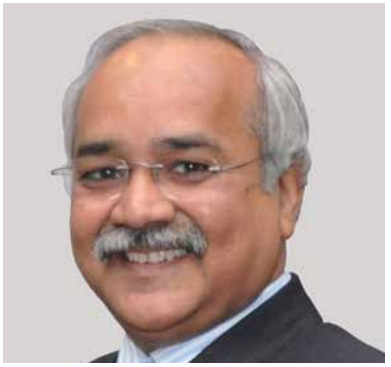
Dalmia Bharat Sugar and Industries Limited has been one of the fastest-growing success stories in the Indian sugar industry. The company's foray into the sugar business was made in the mid-90s and the first unit of 2500 TCD was set up at Ramgarh, a village in the Sitapur district of Uttar Pradesh in 1994. During 2006-2007, the company embarked on a major growth path by setting up two greenfield plants at Jawaharpur (Dist. Sitapur, U.P.) and Nigohi (Dist. Shahjahanpur, U.P.) and expanding existing facilities at the Ramgarh unit.

The total cane crushing capacity of the company is now 37150 TCD which makes it one of the leading sugar producers in the country. It is now a fully integrated player with 126 MW of co-generation capacity and a distillery of 710 KLPD along with incineration boilers. It also has facilities for processing of raw sugar. These state-of-the-art facilities serve as a role model for the sugar industry since the company has achieved excellence in plant operational metrics and holds a technological leadership position in the industry. Dalmia Bharat Sugar and Industries Limited has robust quality systems and has also embarked upon 5S and TPM initiatives to create world-class systems and processes. After having received wide acceptance for its world-class systems, it now produces high-quality sugar which has found wide acceptance in markets in U.P. and Eastern India. The company is a preferred sugar supplier to brand-enhancing institutional giants such as Coca-Cola, PepsiCo, Mondelez, Perfetti, Britannia, Wal-Mart India, Dabur, D-Mart and many others in the alcohol segment.

HPCL-Mittal Energy Ltd

HPCL-Mittal Energy Limited (HMEL) is a joint venture between Hindustan Petroleum Corporation Limited (HPCL) and Mittal Energy Investment Pte Ltd, Singapore, a Lakshmi N Mittal Company. HMEL owns and operates a world-class Integrated Refinery-Petrochemical Complex 'Guru Gobind Singh Refinery' at Bathinda, Punjab (India) comprising of an 11.3 MMTPA Crude Oil Refinery and a 1.2 MMTPA Multi-Feed Cracker along with 1.2 MMTPA Polyethylene (PE) and 1.0 MMTPA Polypropylene (PP) Plants. It also operates a 1017 km long crude pipeline from Gujarat to Punjab along with associated facilities.

HMEL produces superior quality, high value and environmentally safe petroleum and petrochemical products using world-class technologies. HMEL is a board-run company committed to high standards of safety, health and sustainability with a strong focus on preserving the environment. HMEL has received a Five Star Rating and the 'Sword of Honour' from British Safety Council for excellence in the management of health and safety risks at work.



Prabh Das

Managing Director & Chief Executive Officer

Pioneer Industries Pvt Ltd

Pioneer Industries Private Limited promotes agricultural activities and the development of Agro Based Industries at Pathankot (Punjab). It is a young and vibrant organization engaged in the manufacture and export of various cereal-based products. The company manufactures safe and hygienic products of natural organoleptic and nutritive value which meet international quality standards and customers' expectations.

Pioneer Industries Pvt. Ltd. has been recognized & accredited with the reputed kosher certification, Halal certification and ISO-22000:2005 certification. The company establishes new standards using latest process technology & focusing on eco-efficient ways of production is the key to unlock new growth opportunities. Pioneer is committed to be an environment friendly manufacturing Industry and continue reinvesting on Improvisation & Innovation to make efficient use of technology to manufacture value bio-produces for human consumption.

Jagat Mohan Aggarwal

Managing Director

NHPC Ltd

Rajeev Kumar Vishnoi

Chief Managing Director

NHPC Limited is a Mini Ratna Category-I Enterprise of the Government of India. It is India's premier organization for hydropower development having capabilities to undertake all the activities from 'conceptualization to commissioning' of hydro power projects. NHPC has also diversified in the field of Solar & Wind power. The company was listed on NSE & BSE with effect from 01.09.2009 and has an authorized share capital of Rs. 15,000 crore. The company has achieved generation of 24907 Million Units in FY 2022-23 and has earned Net Profit of Rs. 3834 crore in FY 2022-23.

NHPC Limited presently has an installed capacity of 7097.2 MW from 25 power stations including 1546 MW from 3 power stations with its joint venture companies, NHDC and BSUL. NHPC is presently engaged in the construction of 15 projects including 9 hydroelectric and 6 solar projects aggregating to a total installed capacity of 10449 MW, 13 Projects with aggregate capacity of 4722 MW are under clearance stage and 2 projects with aggregate capacity of 890 MW are in Survey & Investigation stage. In addition, 4 new Hydroelectric projects & 2 Pumped Storage Projects identified by Ministry of Power for possible allotment aggregating of 19070 MW. NHPC has taken a new initiative for 13355 MW projects in India and in neighbouring country Nepal. NHPC is also actively looking at strengthening its portfolio in all forms of renewable energy.

Hydrogenium Resources Pvt. Ltd.

Umesh Sahdev

Executive Chairman

Hydrogenium Resources Pvt Ltd, is an ethical independent advisory services company and projects developers providing innovating solutions with in the entire low carbon & green Hydrogen eco-system. It's been promoted by highly experienced sustainability focussed techno-commercial professionals with international network of innovating technology/ hydrogen / energy services companies, projects developers and cleantech investors. Hydrogenium facilitates project owners and developers in the entire spectrum of project planning including technology sourcing, collaborations, project planning, innovating project financing solutions, investments with services till project development – all services from Ideation till Ready for Implementation. As transformation agents and change leaders for Sustainability initiatives and Net Zero transition, Hydrogenium tends to create value by providing innovative solutions for the low carbon Hydrogen and Renewable Energy projects. Hydrogenium can play preeminent parts in all Sustainability and Net Zero transition initiatives.

Kreston SNR

Mahendra Rustogi

Chief Executive Officer

Kreston SNR is an ESG services and Business Advisory Firm having its headquarters in New Delhi and branches in Pune and Bangalore. The firm provides end-to-end business advisory services in the areas of ESG, Sustainability, finance, tax, legal, and human resources consultation.

A team of world-class professionals and experts from diverse fields provides solutions to the clients' specific needs. The firm offers customized services according to the unique needs of its clients from diverse industries. The firm also offers services to overseas clients to set up their business in India by extending personalized services starting from registration with the government, company formation, arranging funds, land allotment, project set-up etc. Kreston SNR is affiliated to Kreston Global, UK the 13th largest international accounting network firm having presence in over 110 countries.

ESG and sustainability services encompasses ESG assessment, ESG framework development, ESG reporting and ESG audit. In the areas of sustainability and carbon market, the firm has collaborated with Greenstat, a leading Green Energy company of Norway and with Hydrogenium Resources Private Limited a leading Net Zero and Carbon advisory company and with Ecofav Services Private limited a leading ESG services company.

Ecofav Services Pvt Ltd

Sanjay Sharma

Chief Executive Officer

Ecofav Services Private Limited, headquartered in Indore, a city renowned as India's cleanest, stands as a global and acclaimed ESG consulting firm. Our expertise extends across sectors including Renewables, Energy, Oil & Gas, Ports & Special Economic Zones, Highways, Food & Logistics, Electrical Transmission, Data Centres, Cement, and more.

Established in 2015 by a group of visionary young professionals, Ecofav has emerged as a UNGC Signatory and a proud member of the Environmental Committee of PHDCCI. Notably, we hold empanelment with the Indian Ministry of New and Renewable Energy and the U.S. International Development Finance Corporation (DFC). In a span of eight years, we've successfully undertaken over 300 projects, catering to governmental bodies, Indian corporations, and international clients. Our mission is to empower these entities to navigate the growing sustainability challenges confronting the world.

Ecofav serves as a trusted partner to Banks, PE Funds, and Lenders, conducting independent reviews and due diligence. Our role extends to providing advisory support for transactional closings and investments. Additionally, we collaborate closely with investee companies, enhancing their capabilities and performance to meet the stringent standards set by IFC and lenders over the investment horizon.

Indian Association for Air Pollution Control - Delhi

The Indian Association for Air Pollution Control was formed at B.H.U. Varanasi, India on 18th September 1976. The Association has been very active in promoting an understanding of the Air environment and of its pollution, its effects on human beings, animals, plants and materials and control of such pollution. It is an active and effective forum for exchange of views and information on the air quality and its conservation. Association publishes a technical journal titled "Indian Journal of Air Pollution Control" and recognises contribution of scientific professionals.

The Association has organised Conferences on some very important topics, which have contributed in development of standards on Ambient Air Quality standards in 2009, Air Pollution problems due to burning of Agricultural residues (2006), Evolving stretegis for improving Air quality of Indian cities (2008) and Indoor Air Quality (2014). Association also organizes an annual event in the month of September in the memory of some Late eminent scientist.

This is a unique body of professionals in this field and is silently playing a very constructive role in the society. It has may eminent persons as its member. One of our president (Late) Prof. Delip Biswas received Padma Shree in 2007 in recognition of his out-standing contributions for Environment Protection. Currently, Association is headed by Dr. J. S. Sharma, President and eminent scientist with Vast experience in Environment.

Dr. J. S. Sharma

President

Greenstat ASA

Greenstat is a broad energy and technology company which seeks commercial opportunities in various business areas within renewable energy. Through cooperation, we will be an instigator for the energy transition and contribute to others understanding the challenges and opportunities we face – and get engaged to act. With the help of existing technology and knowledge, we believe that we can achieve a zero-emission society and embark on a new Norwegian industrial adventure.

As a company by and for the public, we invest in establishments with long-term environmental and economic value creation. As an energy company, we develop and own projects and companies that create green value and work towards a zero-emission society. By focusing on energy production such as wind and solar power, the production of the energy carrier hydrogen, and offering analysis around profitable green transition, we will not only provide long-term returns, but also a crucial service that is required to reach international climate targets.

Bernt Skeie

Founder & Chairman

Green Hydrogen Organisation

The Green Hydrogen Organisation (GH2) is a Swiss non-profit foundation. In addition to its office in Geneva it is present in Beijing, Buenos Aires, Chennai, London, Nairobi, Oslo, Perth, and Sydney. The GH2 has three priority areas: The Global Green Hydrogen Charter, The Global Green Hydrogen Development Plan and The Green Hydrogen CEO Roundtable.

Det Moderne India

DMI is a business-driven climate initiative where the sustainability goals and diversity, equity and inclusion are the frameworks of our activities. DMI's activities and initiatives will challenge and stimulate debate, and build a bridge between Norwegian and Indian intellectual and business environments. DMI's podcast and numerous of its events are funded by Oslo municipality.

Norwegian Hydrogen Cluster

H2Cluster – The Norwegian Hydrogen Cluster is a national hydrogen cluster, powered by Kjeller Innovasjon. We aim to maximise the national and global business opportunities with the most ambitious Norwegian hydrogen players. The core value of the hydrogen is collaboration to open new business opportunities and overcome barriers for expansion. The cluster works in all parts of the value chain, from production, storage, distribution and applications in all sectors.

We are the industrial coordinator, for the first hydrogen export programme in Germany, where we work with hydrogen experts and Innovation Norway. In the cluster we are developing resource groups that is critical for business success. H2Cluster has created the resource group "Hydrogen Safety and Standards".

Norwegian Hydrogen Forum

The Norwegian Hydrogen Forum (NHF) was founded in 1996 and is the national industry association for hydrogen and ammonia. NHF represents large and important parts of industry, the transport sector, authorities, organizations and the research and educational environments in Norway.

Indian Danish Chamber of Commerce

The Indian Danish Chamber of Commerce is a committed non-profit organization with a clear mission. The Indian Danish Chamber of Commerce brings together people whose business is India. In our networks and forums, experts and members exchange knowledge, intelligence, and hands-on experiences. At IDCC, we directly engage with our members to collect and share critical knowledge on the ever increasing trade opportunities between India and Denmark. We offer expert advice and foster dialogue on a wide range of business critical topics. Together with our members we proactively enhance Indo-Danish business relations by strengthening capabilities around business critical agendas.

Sweden India Business Council

The Sweden India Business Council (SIBC) is the primary knowledge council between Sweden and India. We focus on people,by increasing decision making knowledge and understanding to do better business by engaging in deeper dialogues. SIBC runs executive roundtables and workshops for startups, SMEs, large enterprises and public institutions. Since 2005 over 500 events have been successfully executed promoting business with a focus on modern India. SIBC is also the Secretariat on the Swedish side for the "India Sweden Business Leaders Forum" (CEO Forum), co-chaired by Marcus Wallenberg and overseen by both Prime Ministers.

Engineers India Ltd

Engineers India Ltd (EIL) is a leading global engineering consultancy and EPC company. Established in 1965, EIL provides engineering consultancy and EPC services principally focused on the oil & gas and petrochemical industries. The Company has also diversified into sectors like infrastructure, water and waste management, solar & nuclear power and fertilizers to leverage its strong technical competencies and track record.

Today, EIL is a 'Total Solutions' engineering consultancy company providing design, engineering, procurement, construction and integrated project management services from 'Concept to Commissioning' with highest quality and safety standards. EIL's QMS, OHSMS and EMS are certified to ISO 9001, ISO 45001 and ISO 14001 respectively.

Western Norway University of Applied Sciences

Western Norway University of Applied Sciences (HVL) is one of the largest educational institutions in the country, with about 17,000 students.

Every year around 3000 candidates graduate from HVL and contribute to important societal missions in companies, organizations and other parts of working life.

HVL stretches over 5 campuses and 400 kilometers on the western coast of Norway. The university offers a broad range of academic programmes at Bachelor's, Master's and PhD levels.

We have strong and innovative professional environments within health- and social sciences, engineering, teacher education, maritime sciences, nature sciences, culture and sports, social sciences, economics and management.

HVL has a clear professional-oriented profile. Through education, research and development we create new knowledge and expertise, anchored internationally and with solutions that work locally.

मध्य प्रदेश

Madhya Pradesh Pollution Control Board

The Board has been vested with considerable authority and responsibility under various environment legislation to prevent the pollution. M.P. Pollution Control Board presently looks after the implementation of following Acts/Rules:-

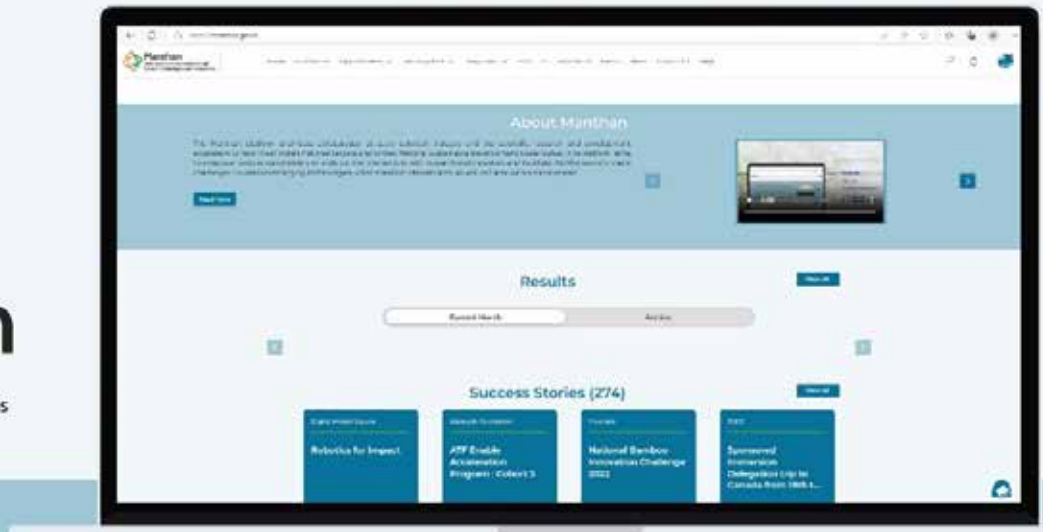
- Water (Prevention Control of Pollution) Act,1974
- Air (Prevention & Control of Pollution) Act, 1981
- Environment Protection Act, 1986 (certain sections)
- Public Liability Insurance Act,1991
- Madhya Pradesh Jaiv Anaashya Apashista(Niyantran) Act & Rule

The main objective of M.P. Pollution Control Board is to maintain water, air and soil in healthy and usable condition for various purposes. There are 2 Zonal Offices (Jabalpur, Mandideep), 13 Regional Office, 4 District Office, equipped with trained personnel and sophisticated instruments, are constantly keeping watch on environmental activities in the state to attain the objectives.

Office of the Principal Scientific Adviser to the Government of India

Manthan

Ideas and implementation through Science, Technologies, and Innovations



Manthan platform won the **'Dun & Bradstreet Business Excellence Award'** for the **Best Tech initiative of the year 2022.**

Office of the Principal Scientific Adviser to the Government of India

Manthan

01

Opportunity creation that includes a call for early-stage innovation, market-ready innovation, implementation projects, Centres of Excellence, fellowships, etc.

02

Submitting proposals for collaboration, R&D, and proposal submission against opportunities.

The platform is built on four pillars

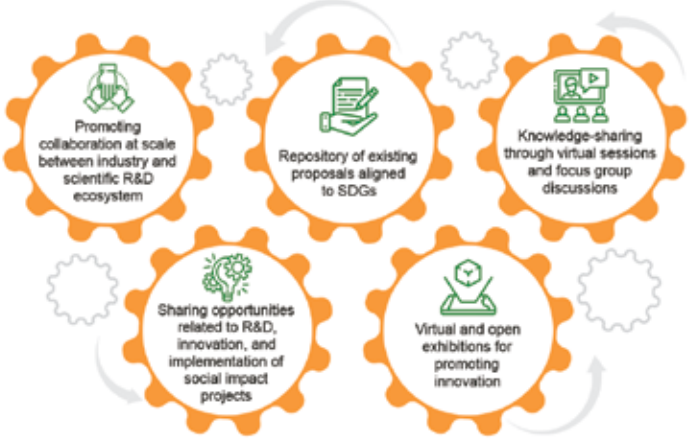
03

Exhibitions by partners to showcase innovations through virtual events and expositions

04

Conference/Meeting facility to collaborate using virtual meeting rooms for organising webinars, conferences, stakeholder consultations, etc.

How does Manthan work?



International Center for Climate and Sustainability Action Foundation

ICCSA

ICCSA is a not-for-profit organisation incorporated in 2021 under the companies act 2013. It is committed to providing a better world for the people and the planet. This organisation was established with a focus on plugging the gaps in environmental management to provide an institutional platform for coordination, facilitation, advocacy, and regional and international collaboration, with an aim of development of targeted solutions. Its focus is to restore ecosystem health and regenerate nature on Earth to drive sustainable development for a bright, positive and resilient future.

CLIMATE GOALS
TECHNOLOGICAL ROADMAP TO NET ZERO

ICCSA through its flagship Initiative **"Climate Goals: Technological Roadmap to Net-Zero"** unveiled by Hon'ble Minister of Road Transport and Highways of India, Shri Nitin Gadkari, is driving India-Centric climate-linked strategies through policy dialogues across relevant stakeholders to develop sector-specific roadmaps, which can be implemented with a specific timeline.

ICCSA's key priorities are to promote local, regional and global partnerships to take effective action for climate and sustainability and to assess the impacts of environmental and climatic variability on livelihoods, well-being and economic development.

ICCSA provides knowledge base on environmental matters for effective responses by delivering basic science and technology solutions at grass root for inclusive development of the communities. Provide design, research and evidence-based support to government and industries on policy formulation. This also facilitates new coalitions and partnerships to accelerate climate action and transform our societies towards a sustainable future without sacrificing human development goals.

ICCSA Verticals

- Policy Research & Advocacy
- Capacity Building & Implementation
- Urban Management& Environmental Systems Modelling
- R3 (Rejuvenation Restoration and Remediation)
- Green & Sustainable Technology
- Valsuation & Inpect Assessment
- Environmental, Social and Governance (ESG)
- Climate Linked Strategies

Director

DR. J. S. SHARMA
Director, ICCSA
President, IAAPC, New Delhi
Former GGM
Head Environment, ONGC

Advisors

PROF. C. K. VARSHNEY
Former Dean and
Professor of Ecology,
Jawaharlal Nehru University,
New Delhi

DR. B. SENGUPTA
Former Member &
Secretary,
CPCB, New Delhi

DR. RAKESH KUMAR
Officer on Special Duty
CSIR, New Delhi
Former Director,
CSIR-NEERI, Nagpur

DR. RAJESH SETH
Professor
University of Windsor
Canada

Registered Office :
C-83, Gamma - 1, Gautam Buddha Nagar,
Greater Noida, Uttar Pradesh - 201310, INDIA.
E-mail : jssharma@iccsaf.com

Corporate Office :
313, 3rd Floor, Prabhadevi, Unique Industrial, PCSL Twin Tower Lane,
Off V S Marg, Prabhadevi, Mumbai - 400025, INDIA
E-mail : project@iccsaf.com

LiFE
Lifestyle for Environment

3RD INTERNATIONAL CLIMATE SUMMIT 2023

14 & 15 SEPTEMBER 2023
VIGYAN BHAWAN
NEW DELHI 110011

GOVERNING COUNCIL

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Chair, Environment & Green Hydrogen Committee, PHDCCI
Summit Chair, ICS 2023

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President - Jaladhikar Foundation
National Spokesperson of BJP

Mr. Amarnath
Additional Secretary, Department of Administrative Reforms & Public Grievances, Ministry of Personnel, Public Grievances and Pensions, Govt. of India

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Distinguished Fellow
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Mr. Vegard Frihammer
Green Executive Officer/ Founder
Greenstat Norway

Mr. Alok Sharma
Hydrogen Association of India (HAI)

Dr. Chitra Rajagopal
Director General, COE in Hydrogen Economy at IIT Delhi

ORGANIZING COMMITTEE

Dr. J.P. Gupta
Chair, Environment & Green Hydrogen Committee, PHDCCI
Summit Chair, ICS 2023

Dr. J.S. Sharma
Co-Chair, Environment & Green Hydrogen Committee, PHDCCI

Mr. Mahendra Rustagi
Co-Chair, Environment & Green Hydrogen Committee, PHDCCI

Mr. Umesh Sahdev
Co-Chair, Environment & Green Hydrogen Committee, PHDCCI

Dr. Ranjeet Mehta
Executive Director, PHDCCI

Mr. Naveen Seth
Dy. Secretary General, PHDCCI

Dr. Jatinder Singh
Asst. Secretary General, PHDCCI

Ms. Kanchan Zutshi
Director, Environment Committee, PHDCCI

Ms. Aparajita Mangotra
Secretary (Media), PHDCCI

Mr. Kasber Thomas
Secretary (Creative), PHDCCI

Dr. Sibimol Luke
Joint Secretary, PHDCCI

Ms. Ankita Pal
Executive Officer, PHDCCI

PHDCCI
CENTRE OF EXCELLENCE
GREEN HYDROGEN

PHD Chamber of Commerce and Industry, in association with Knowledge Partners GREENSTAT Norway, Western Norway University of Applied Sciences (HVL University) Norway, CoE Process Safety & Risk Management at IIT Delhi, Shriram Institute for Industrial Research, has created an exclusive Centre of Excellence for Green Hydrogen to create Hydrogen Specialists to transform future of energy through the promotion of best practices and knowledge sharing within Hydrogen ecosystem, specifically for MSME sectors. It is a first-of-its-kind centre within Industry Chambers that seeks to facilitate government, academia, and industry interaction for creating a vibrant Hydrogen ecosystem to support Government developmental policies.

PHDCCI CoE-GH as the specialist knowledge centre for MSMEs, caters to top decision-makers, higher management and at senior technical level specialists with curated learning curriculums for companies, created in association with key knowledge partners and elite groups of senior experts from leading global universities, research centres and industry professionals, to augment industry transformational experts to facilitate Hydrogen economy.

PHDCCI CoE-GH Innovation Hub is the specialist centre for the facilitation and development of Hydrogen projects through sharing of internationally developed technologies and collaborations through its close association with various Hydrogen clusters and Hydrogen forums within Norway and Nordic countries, bringing up-to-date technological innovations for MSMEs and states.

PHDCCI CoE-GH LEAD AND SECRETARIAT

Dr V. K. Saraswat
Member, NITI Aayog
Patron-in-Chief

Dr J. P. Gupta
Mentor-in-Chief

Mr Umesh Sahdev
Chief Convenor

Dr J. S. Sharma
Advisor

Mr Mahendra Rustagi
Advisor, ESG Centre

Mr Rajender Sharma
Energy Expert

Dr Ranjeet Mehta
Executive Director

Ms Kanchan Zutshi
Director
kanchanzutshi@phdcci.in
Mob: +91 98187 78399

Dr Sibimol Luke
Joint Secretary
sibimol.luke@phdcci.in
Mob: +91 63630 11818

PHD CHAMBER
OF COMMERCE AND INDUSTRY

PHDCCI
CENTRE OF EXCELLENCE
GREEN HYDROGEN

PHDCCI CENTRE OF EXCELLENCE IN GREEN HYDROGEN

EMPOWERING MSMES: UNLOCKING THE POTENTIAL OF GREEN HYDROGEN

Activities and Services

- Learning programs within the entire Hydrogen value chain, process safety and techno-commercial Courses
- Green Hydrogen Projects development advisory
- International Innovation Hub for MSMEs and states

- Associated COEs in Green Hydrogen with Chambers of neighbouring and developing countries
- Government-sponsored programme and policy advocacy for MSME in Green Hydrogen

- Carbon management, Carbon projects development - Decarbonization / Net zero advisory, Carbon assets evaluation
- Environment, Social and Governance (ESG) services

- Facilitating technology transfer and Hydrogen based Start-ups
- Organising events on renewable energy focusing on H_2
- CoE and Universities collaboration program

PHD CHAMBER
OF COMMERCE AND INDUSTRY

About Us

PHD Chamber of Commerce and Industry (PHDCCI) has been working as a catalyst for the promotion of Indian industry, trade and entrepreneurship for the past 118 years. It is a forward looking, proactive and dynamic PAN-India apex organization. As a partner in progress with industry and government, PHDCCI works at the grass roots level with strong national and international linkages for propelling progress, harmony and integrated development of the Indian economy.

At the global level, we have been working with the Embassies and High Commissions in India and overseas to bring in the international best practices and business opportunities.

PHDCCI, acting as the "Voice of Industry & Trade" with a large membership base of 1,50,000 direct and indirect members consisting of large, medium and small industries, has forged ahead leveraging its legacy with the industry knowledge across multiple sectors to take Indian economy to the next level.

PHD Chamber has special focus on the following thrust areas

- **Economic & Business Policy Advocacy**
- **Industry**
- **Infrastructure**
- **Housing**
- **Health**
- **Education & Skill Development**
- **Agriculture & Agri-business**
- **ICT**
- **International Trade**
- **Defence & HLS**

PHD CHAMBER OF COMMERCE AND INDUSTRY

PHD House, 4/2 Siri Institutional Area, August Kranti Marg, New Delhi - 110 016 (India)
• Tel. : +91-11-2686 3801-04, 49545454, 49545400 • Fax : +91-11-2685 5450 • E-mail : phdcci@phdcci.in • Website : www.phdcci.in