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National Productivity Council
(Under DPIIT, Ministry of Commerce and Industry, GoI)

Proceedings of the Conference

on

Productivity and Green Growth: New Interlocking Paradigms

14 - 16 June 2023

Chennai

NATIONAL PRODUCTIVITY COUNCIL

5-6 Institutional Area, Lodi Road,

New Delhi 110003

National Productivity Council
DPIIT, Ministry of Commerce and Industry, Government of India.

Asian Productivity Organization,
Japan.

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Productivity and Green Growth: New Interlocking Paradigms

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Context:

National Productivity Council (NPC) supported by Asian Productivity Organization (APO), Tokyo, Japan, successfully organised and conducted the International Conference on **"Productivity and Green Growth: New Interlocking Paradigms"** during 14 – 16 June 2023 at Chennai, Tamilnadu. The conference schedule is placed as **Annexure -1**. Some photographs of the conference are placed as **Annexure -2**. List of international participants is enclosed as **Annexure -3**. List of Indian participants is enclosed as **Annexure – 4**. List of resource persons of the conference is enclosed as Annexure **– 5**. Some media clips on the conference are enclosed as **Annexure – 6.**

Due to overdependence on fossil fuels to meet energy needs and the existing "take–make–waste" model of industrialization, the World today faces a myriad of challenges including climate change, pollution, and environmental degradation. COP26 adopted the Glasgow Climate Pact 2021 as part of efforts to limit the global temperature rise to 1.5°C. While it focused on mitigating emissions, adaptation to climate change, financing, and collaboration, the recently concluded COP27 reaffirmed commitments to limit the temperature rise. It went a step further through an agreement to provide "loss and damage" funding to countries facing adverse impacts of climate change.

India assumed G20 presidency in 2023 with the motto of "One earth, One family, One future," emphasizing the value of all life forms. This is in synergy with the government initiative known as Mission Lifestyle for Environment (LiFE) to create a cleaner, greener, bluer future launched in October 2022. For several decades, the APO has been conducting activities related to environmental protection. The Green Productivity (GP) concept developed by the APO provides industry a framework for simultaneous improvement of productivity, quality, and profitability with the least environmental impact.

This conference, held from 14th – 16th June 2023 at Hotel Vivanta, Chennai, brought together experts, policymakers, industry leaders, and stakeholders to discuss and explore strategies for institutional strengthening for green growth, financing mechanisms, leveraging ESG ratings to boost green finance and realising Net Zero Emission Targets for achieving higher productivity and green growth. The event was supported by the Asian Productivity Organization, Tokyo, Japan.

Objectives:

a. To commemorate the 60th anniversary of the APO and highlight contributions to cleaner industrialization and green growth.
b. To rejuvenate the productivity movement for achieving green growth.
c. To incorporate a focus on productivity enhancement in government policies and programs for increasing resource efficiency and energy productivity.

Inaugural Session:

The Conference began with welcoming the distinguished guests by Shri Sundeep Kumar Nayak, IAS, Director General, National Productivity Council and APO Alternate Director for

India. He welcomed all the dignitaries, Dr. Indra Pradana Singawinata, Secretary-General, Asian Productivity Organization; Dr. Hung Suck Park, Distinguished Chair Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK; Mr. Nicholas Gandolfo, Director, Sustainable Finance Solutions (Asia-Pacific), Sustainalytics, Singapore; and Dr. Kaushik Deb, Senior Research Scholar, Center on Global Energy Policy, Columbia University, USA; with a bouquet of flowers and honoured them with a shawl and memento. The Head (AIP), NPC, Chennai, Shri. D. Sreenivasulu, welcomed and honoured the Director General, NPC, Shri. Sundeep Kumar Nayak, IAS.

To commemorate the 60th anniversary of APO (which was to be held in 2021, due to COVID, this one could not be organized physically and hence was scheduled on this occasion), the esteemed dignitaries performed the ceremonial lighting of the lamp as a customary practice, to reinforce our resolve for the collaborative productivity movement in APO member countries.

The Conference commenced with Opening Remarks by the Chief Guest, Dr. Indra Pradana Singawinata, APO Secretary General. He emphasized the need for inclusive, sustainable productivity growth, which rewards the workforce and nature alike. He highlighted approaches to make productivity enhancement sustainable, inclusive, and innovation-based through investment in the right kinds of infrastructure, fostering innovation and technological change, effective implementation of policies, and mobilizing adequate financing and resources.

There were special remarks by Director General, NPC, Shri Sundeep Kumar Nayak, IAS. He mentioned that India was in forefront of driving green productivity and green growth and also explained NPC's efforts to promote productivity enhancement through green growth at national level. He also highlighted that the countries can learn from other economies on how to move forward in the path of green growth and productivity. He added that India's track record in environmental sustainability has been exemplary, while seen in the context of Net Zero targets set by the Hon'ble Prime Minister.

This was followed by announcement of APO National Award 2022 Winners by APO Second Vice Chair and DG NPC.

- Shri G M Rao, Group Chairman, GMR Group was conferred with APO National Award 2022 (in absentia) for Productivity Advocate for his exemplary work in championing the cause of productivity.

- Professor Pradip Kumar Ray, Emeritus Professor, Department of Industrial & System Engineering, IIT Kharagpur, was conferred with the APO National Award for Productivity Technical Expert in recognition to his grass root level work encompassing productivity modelling, ergonomics, safety engineering, and lean engineering, and operations management. He delivered the award acceptance speech.

The dignitaries along with Mr. Sandip Kumar Ghosh, Publisher Outlook, then released the magazine, Outlook Special Collector's edition on Sustainable Development, with the support from Indian Potash Limited and National Productivity Council of India.

This special edition of Outlook highlights and focuses on Green Growth and Green Productivity in the transition to the circular economy, which is particularly significant in the context of India, as it assumes global leadership in pursuing low-carbon growth. Case studies and examples from various countries make the publication useful in multiple economies. This edition would serve as a guiding light and green growth & productivity as an economic model towards Sustainable Developmental Goals (SDGs).

The dignitaries hold the Outlook special edition cover page cut out for photo session.

Shri Sundeep Kumar Nayak, IAS, DG, NPC, made a keynote presentation on "Prioritizing Green Finance for Overall Socio-Economic Growth" from the perspective of ESG reporting, which focussed on the need to prioritize green finance in decoupling industrial growth from environmental degradation along with practical approaches. The highlights of his presentation have been summarized below.

- Shri Sundeep Kumar Nayak, IAS mentioned that 2023 marked the 31st anniversary of World Scientists' warning to climate emergency due to GHG emissions, and that there had been 40% increase in global GHG emissions since then. He also mentioned that the current policies are focussed on 3^0C warming by 2100, the consequence of which could be societal collapse.
- He mentioned that Net Zero was important in this context and that it referred to the balance between the amount of GHG produced and the amount that is removed from the atmosphere.
- He stressed the need to consume energy in a sustainable way and the need for scaling up carbon removal. He dwelt upon the innovation maps of carbon removal technologies and explained about the concept of Green Finance.
- He highlighted the fact that transition to Net Zero will require 275 trillion dollars, which will require unprecedented reallocation of capital. He also mentioned that mobility will attract most investment in developed economies and that developing economies needed to channel capital to decarbonise power.
- He mentioned about transition finance which included investments, typically bonds or loans, designed to help companies in heavy emitting industries to be more energy efficient and reduce GHG emissions. He mentioned that China was creating a transition taxonomy to power sectors including steel and agriculture. He also mentioned that corporate transition bonds are booming in Japan which planned to issue $154 billion sovereign transition bonds over the next decade.

- He mentioned that investment in low emission growth must be high for counties like India & China. He also described about the facilitative ecosystem to be created for green financing which included data on different projects, robust disclosure mechanism, taxonomy and policy stability. He briefly touched upon the cases of green financing mechanisms in Korea, Indonesia, and India.
- He suggested to the APO to consolidate the gains of CoEs to venture into new mechanisms to facilitate access to Green Finance by MSMES.

Technical Sessions:

The conference featured insightful sessions, engaging panel discussions, and keynote addresses by esteemed speakers. The details of the sessions that took place, are elaborated below, day wise:

Day 1, 14th June 2023

Session 1: Dr. Hung Suck Park, Distinguished Chair Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK, deliberated his presentation on "Building an Innovative, Productive, Greener Future" The key highlights of this session have been summarized below:

- Dr Park began the lecture by describing the Earth energy balance and how environment was vital to human beings for physical, economic, social, and cultural reasons, and its preservation and sustainability were critical for current and future generations' wellbeing.
- He described how humans were living far beyond planet's means and that humans would need 2 planets every year by 2050 by the current trends. He then mentioned about the agricultural and industrial Revolutions and stressed the need for increasing production through innovation. He described how pollution and resource scarcity

started to impact industrial production, and then food in decades 2010 – 2030, and thus acted as a limit to growth.

- Dr Park mentioned that the focus should be on how to minimize pollution impact while maximizing the GDP and stressed the need for achieving considerable progress in pollution control as GDP grows. He then described the IPAT equation. He dwelt upon the economic development and environmental impact trajectory and mentioned that from year 2000 onwards, we were in stage 4 of economic development, where the emphasis was on sustainable development, resource reduction and pollution reduction.
- Dr Park then described Green Growth, South Korea's National Policy, and gaining global attention. He described Green Growth as achieving rapid growth without compromising environmental sustainability while focusing on Environmental Sustainability & Ecological Efficiency (EE) and stressed that Green Productivity (GP) was a strategy for simultaneously enhancing productivity and environmental performance for an overall socio-economic development that leads to sustained improvement in the quality of human life.
- He then described the concepts of eco efficiency and resource productivity and how eco efficiency can be applied to infrastructure. He mentioned how Green Growth is a possibility and mentioned about industrial ecosystems to get closer to how natural ecosystems operate and to reverse the image of industrial activities having negative impacts on the environment. He also mentioned about eco-industrial parks with the "Kalundborg Symbiosis", where there were recycling of materials and wastes, local energy flows, co-operation and trust between local actors.
- Dr Park then described the Circular Economy concept and its perspective in Korea, and dwelt upon the enabling transformation technologies and methodologies for Circular Economy. He stressed the need for resource efficient and cleaner production and described how Industrial Ecosystem, and Industrial Symbiosis can help to maximize energy, resource & environmental efficiency.
- He discussed about the common and differentiated responsibilities for sustainable future can be achieved by international partnership and cooperation. He also discussed how the Sustainable Development Goals (SDGs) aimed to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. He discussed cases about Korean EIP and World Bank EIP Projects.

Session 2: "Accelerating Technological Adoption for Enhancement of Energy Productivity" by Dr. Kaushik Deb Senior Research Scholar, Center on Global Energy Policy,Columbia University,USA. The highlights of this session have been summarized below:

- Dr Kaushik Deb explained the concepts of energy intensity and productivity and why energy productivity mattered. He mentioned that the global emissions in 2050 would be 25% lower than what they are today and what it meant in terms of energy productivity.
- He described the energy consumption sector wise and mentioned that the sectors that consume the largest amounts of energy need to be focused. He mentioned that solid fuels were the main source of energy in industry, and that chemical, iron and steel and cement industries contributed to 50% of energy use in industry.

- He mentioned that waste heat recovery can help to improve energy efficiency and reduce energy consumption significantly. He mentioned that implementing comprehensive energy management systems can help monitor and optimize energy consumption across production processes and that energy audits, performance indicators, and continuous improvement initiatives could be employed to identify energy-saving opportunities and to reduce energy waste. He also mentioned that process optimization and automation, data analysis, machine learning, and predictive models can help in improving energy efficiency and productivity.
- He described the various energy efficiency measures that can be used to improve the productivity in cement, iron and steel and chemicals sector.

- He mentioned that the Inflation Reduction Act (IRA) was a turning point in US energy policy, which provided clarity to support investment, and boosted US climate credentials. The IRA contained many energy transition-related elements including: extension of federal production and investment tax credits for low-carbon power generation through 2032, new fiscal incentives for CCS and direct air capture (DAC), hydrogen, EVs, energy storage and other technologies, and a new federal fee penalizing methane emissions. He mentioned that the IRA also helped the US to claim a role as a climate leader, and mentioned that the other countries may adopt similar policies.
- He described how EU remained committed to speed up its low carbon transition by reducing the dependence on Russian gas and diversifying its energy mix that focussed on renewables, nuclear energy, energy from Hydrogen, and by energy efficiency to cut energy waste.
- He also described how the Perform Achieve and Trade (PAT) scheme launched in April 2012 in India, as part of the National Mission for Enhanced Energy Efficiency to improve energy efficiency in energy intensive industries helped 1073 industrial units

(designated consumers) in six cycles to achieve energy efficiency. The projected energy savings was 26 MTOE.

- He also described about the other schemes in India like the standards and labeling scheme which helped to reduce appliance energy consumption, energy conservation building codes, which set minimum energy standards for buildings beyond 100kW, and Ujala scheme which reduced lighting energy consumption thereby helping manage peak demand, in which around 770 million LED bulbs were distributed.

***Session 3*: Mr. Nicholas Gandolfo, Director, Sustainable Finance Solutions (Asia-Pacific), Sustainalytics, Singapore deliberated on "Financing Sustainability through Bonds: Asia-Pacific Market Trends". Highlights of his deliberations are given below.**

- He stressed that transitioning to a greener economy requires long-term investment and sustained financing and discussed some interesting innovative structures, products and current market trends in the Asia Pacific region stating that environmental and sustainable projects gets better and more access to funding in the global market.
- He mentioned that bonds mainly focusing on financing energy transition, mitigating climate change, enhancing social impact and reducing carbon emissions provided a range of benefits to enterprises and society alike.
- He stated that sustainability linked bonds and finance instruments were utilized for funding the new projects to reach the net zero emission level commitments, to be productive with strong policy support to finance the decarbonization goals, and finance products for green / ESG labelling.
- He highlighted the positive impacts of bonds through relevant case studies from industry and key market drivers in terms of regulations and policies, viz., Singaporean

communication technology & wireless service provider, Japanese airlines company transition bond, Malaysian SDG framework and Indonesian infrastructure finance and the best practices to be adapted for setting up key Performance Index (KPI) and Sustainability Performance Targets (SPTs).

***Session 4*: Dr. J. Nagesh Kumar, Director, Centre for Energy, Environment and Productivity, Chennai, deliberated on "Green Reskilling: A Human Capital Development Approach for a Greener Future". Highlights of his presentations have been summarized below.**

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- He mentioned that one of the greatest challenges that mankind faced at present was transitioning to a net zero world, which called for a complete transformation and well managed ecological transition towards green economy, requiring a skilled workforce capable of driving innovation and implementing sustainable practices.
- He emphasized the need for green skilling, wherein many existing jobs require upskilling or reskilling to reorient and align towards the new green technologies, that drive economic growth by fostering innovation and entrepreneurship.
- He quoted examples of various green skilling opportunities, viz., renewable energy installation and operations, energy efficiency specialists, green building and

construction, Electric Vehicle (EV) industry, sustainable transportation and logistics, Carbon Capture and Storage (CCS), specialists environmental analysts and consultants, sustainable water technologies, that promoted to environmental sustainability, resource efficiency and climate action.

- He also indicated that Governments worldwide are prioritizing sustainability and enacting policies to support the green economy. The programs and policies framework for green skilling in India were National Skill Development Mission (NSDM), National Skill Development Corporation (NSDC), Skill India Mission, Green Skill Development Program (GSDP), Ministry of New and Renewable Energy (MNRE) initiatives; all of which offered training programs and certifications in green sectors, targeting skill development in renewable energy, energy efficiency and energy auditing, waste management, sustainable agriculture, sustainable construction and entrepreneurship development to enhance their employability in green sectors.
- One of the success stories presented by him was the implementation of Energy Conservation Act, under BEE, GoI, which created a breed of skilled energy efficiency specialists (18000+) in the country, and enabled the industries to implement a market-based transformation mechanisms like Perform Achieve and Trade (PAT) in the energy intensive industrial sectors to achieve specific energy and carbon emission reduction targets.

***Session 5*: Panel Discussion: Drivers of and Barriers to the Green Economy**

The day-1 of the proceedings ended with a panel discussion on Drivers of and Barriers to the Green Economy.

The following experts were a part of the panel discussions:

- **Dr. Kaushik Deb, Senior Research Scholar, Centre on Global Energy Policy, Columbia University, USA;**
- **Dr. Hung Suck Park, Distinguished Chair Professor, Dept. of Chemical Engg., Ulsan College, ROK;**
- **Mr. Nicholas Gandolfo, Director, Sustainable Finance Solutions (Asia Pacific), Sustainalytics, Singapore; and**
- **Dr. J. Nagesh Kumar, Director, Centre for Energy, Environment and Productivity, Chennai, India, who also moderated the session.**

- All the speakers addressed the queries of the gatherings with interesting interactions, concepts and facts.

- The discussion highlighted that Resources, Human (HR), Finance and Government policies were the four pillars that ultimately promotes the sustainability.

- Government policies play a vital role in productivity enhancement projects. Finance is attractive for projects wherever there are good returns, especially for decarbonisation projects which have higher yield, and for energy efficiency projects with payback period of less than an year.

- It was concluded that in order to bring down the carbon dioxide levels and greenhouse gas emissions, lifestyle change is important; it's not the quality of life, but the style of life that mattered, as per the concept of *'Lifestyle for the Environment (LiFE)'*.

- *LiFE,* the mission brought out by Prime Minister of India at COP26 in Glasgow on 1st November 2021, called upon the global community of individuals and institutions to drive LiFE as an international mass movement towards "mindful and deliberate utilisation, instead of mindless and destructive consumption", to protect and preserve the environment.

➢ People should reduce their consumption levels first and then by lifestyle changes or simplifying their lifestyle. This concept would probably have big impact on greenhouse gas emission reduction in near future.

Technical Sessions conducted on Day 2, 15th June 2023.

Session 6: Institutional Strengthening Strategies for Green Growth by Dr. Ganesan Kannabiran, Director, Indian Institute of Information Technology, Chittoor, Andhra Pradesh. The highlights of his deliberations have been summarized below:

- Dr Ganesan mentioned that the productivity paradigm included the green and sustainable development concepts for overall socio-economic development that leads to sustained improvement in the quality of human life. He mentioned that the public sector organizations and government organizations need to rethink the way they perform.
- He mentioned about diverse organizations, their mechanisms, institutional orientations, and their changing roles in green growth. He also stressed the underlying philosophy and institutional factors for strengthening and sustaining green growth.
- He described the green growth planning which involved four steps namely diagnosis, assessment, action planning and implementation. He mentioned that green finance was a key strengthening component for green growth. Green finance covered the gamut of financial services, institutional arrangements, country initiatives and policies through variety of products -debt, equity, insurance, or guarantees.
- He highlighted the roles of Asian Productivity Organization (APO), and NPC, focusing on green productivity by establishing Centres of Excellence, conducting multi country training programmes, undertaking research activities, offering consultancy services, and documenting case studies in strengthening of green growth. He also mentioned that innovation, technical advisory, capacity building, training, mentoring, and coaching as the strengthening components for achieving green growth.
- He mentioned that India is moving forward firmly towards net-zero carbon emission by 2070 to usher in green industrial and economic transition, and that a budget of Rs

35,000 crore had been allotted in support of net zero and energy transition objectives. He also mentioned that the recently launched National Green Hydrogen Mission, with an outlay of Rs 19,700 crore, would facilitate the transition of the economy to low carbon intensity, and reduce dependence on fossil fuel imports.

Session 7: Leveraging ESG Ratings to Boost Green Finance by Nicholas Gandolfo, Director, Sustainable Finance Solutions (Asia Pacific), Sustainalytics, Singapore. The highlights of the presentation have been summarized below:

This session focused on embedding the principles related to the environment and social development into corporate strategy.

- Dr Nicholas discussed the Environmental, Social and Governance (ESG) landscape and trends globally and, in the Asia Pacific region.
- He mentioned the various frameworks and standards related to ESG, including the Paris Agreement, Global Biodiversity Framework, and Corporate Disclosure requirements.
- He discussed a business case for improving sustainability performance, in which he highlighted the benefits of improving a company's sustainability performance, including managing investment risks, meeting client demands, gaining reputational benefits, and improving financial returns.
- He discussed the ESG considerations for institutional investors and mentioned that the number of signatories to the Principles for Responsible Investment (PRI) continued to grow globally and domestically, with institutional investors considering ESG factors in their investment analysis and decision-making.
- He mentioned that the demand for ESG investments in the Asia-Pacific region was rising, with a significant growth rate of 133% for ESG funds in APAC from 2020 to

2021. Various drivers, including commitments to the Paris Agreement and Sustainable Development Goals (SDGs), regulatory requirements, and investment opportunities in India, contributed to this growth.

- He mentioned the distribution of ESG risks across regions and countries was examined, with Europe having the highest share of low-risk companies and APAC having the highest share of severe risk-rated companies.
- While discussing the global ESG regulations scenario, he mentioned that the number of ESG-focused regulations and standards globally had increased, with a focus on ESG disclosure. He discussed Task Force on Climate-Related Financial Disclosures (TCFD), along with regulatory developments in different countries, including China, Japan, Singapore, South Korea, Hong Kong, New Zealand, and Australia.
- He mentioned that regulatory authorities Worldwide were demanding ESG disclosures from companies going public, with efforts towards globally harmonized disclosure standards. International organizations, such as the International Financial Reporting Standards (IFRS) Foundation, are working on developing sustainability information criteria.
- He mentioned various sustainability frameworks and disclosure frameworks, including the Global Reporting Initiative (GRI), Carbon Disclosure Project (CDP), and Task Force on Climate-Related Financial Disclosures (TCFD) frameworks. He also discussed the proposed frameworks for ESG rating providers and sustainable finance key references.
- He discussed a business case for improving a company's sustainability performance. He highlighted the shift towards corporate sustainability, with a clear link between a company's ESG practices and its bottom-line performance. He mentioned that sustainable companies tend to outperform their peers, and ESG-related investments have shown market outperformance. Sustainable finance instruments also offered better pricing and comparable or lower funding costs compared to conventional debt.

Session 8: Realizing Net-Zero Emission Targets by Dr. Kaushik Deb, Senior Research Scholar, Center on Global Energy Policy,Columbia University,USA. The highlights of this session have been summarized below:

Dr Deb's presentation focused on realizing net-zero emission targets and provided an overview of the origins of net zero, commitments to achieving net zero, and assessing progress and likelihood of meeting the targets. It also includes a case study on India's efforts towards net zero.

- Dr Kaushik Deb mentioned that the UNFCCC (United Nations Framework Convention on Climate Change) process is an international treaty established in 1992 to address climate change. He also mentioned that the COP (Conference of the Parties) meetings were held annually to develop international agreements and actions.
- He mentioned that Nationally Determined Contributions (NDCs) were voluntary commitments made by each country to reduce emissions. The IPCC (Intergovernmental Panel on Climate Change) and IEA (International Energy Agency) provide scenarios for achieving net-zero emissions.

- The concept of net zero emissions was explained. Many countries have made long-term goals to achieve net zero emissions.
- He highlighted that the IEA's pathway to net-zero emissions was one of many possibilities and outlined the expected and required trajectories for carbon reductions. He stated that the current trends and policies would lead to a nearly 25 percent increase in energy consumption by 2050. But, meeting the 1.5°C target for temperature rise, would require a reduction of nearly 25 percent of CO2 emissions.
- He presented four scenarios describing different levels of carbon reductions: Blowout, Accelerate, Boost, and Net-Zero scenarios. The probability of each scenario was also discussed.
- He then provided an overview of evolving policies and challenges faced by different countries in transitioning to low-carbon economies. He also outlined India's targets and commitments under the Paris Agreement and the Glasgow COP26 conference. He then mentioned India's progress in reducing emissions and the challenges it faced in meeting its ambitious targets.
- Concluding, he mentioned that, while progress has been made in realizing net-zero emissions, there was still a substantial gap. The need for increased ambition and prompt action by countries and companies was emphasized to achieve the net-zero goal.

Session 9: Dr. Hung Suck Park, Distinguished Chair Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK, deliberated his presentation on "Decoupling Industrial Growth from Environmental Degradation through Eco Industrial Parks: Examples from the Republic of Korea". The highlights of his session have been summarised below.

- Industrial Park (IP) is an economic infrastructure of the region and the nation, that has several issues like ozone-depleting and greenhouse gases, air pollution, exposure to toxic chemicals, spills, waste dumping nuisances: noise, lighting/transport, water pollution, habitat degradation, landscape disturbance, soil contamination, groundwater contamination, marine pollution etc.
- The issues caused an emergency shifting to Korean Eco-industrial Park (EIP) Program: Transformation of IP to EIP through Industrial symbiosis.
- He deliberated on Eco Industrial Parks (EIP), which is a community of manufacturing and service business located on common property, where members seek enhanced environmental, economic and social performance through industrial symbiosis.
- Various attributes of eco-industrial parks contributing to meeting the UN SDGs were highlighted, with successful and interesting case studies from the establishment of eco industrial parks including the governance and supporting structure, tangible and intangible benefits, and challenges.
- He stated that Korean EIP initiative was an investment, gave competitive edge in business, and was also an employment strategy highly bench marked by developing and emerging economies. He also indicated that this initiative must be customized to the national, regional contexts and designed to the minimum government engagement and maximum private participation.

***Session* 10: Dr. M.V. Rao, Chairperson, West Bengal Electricity Regulatory Commission, Kolkata, India, deliberated the session on "Prioritizing Green Growth: The Indian Perspective". The focus of his discussions and interactions have been highlighted below.**

- The session focussed on the significance of green growth in India's long term development plans and discussed on various initiatives, policies and schemes driving innovation, promoting local manufacturing, sparking entrepreneurship, increasing the ease of doing business, leveraging ICT advances, transitioning to green energy and streamlining the financial barriers.

- He discussed about the promotion of electric vehicles, development of market for RE, REC, green credit, reduction in emission intensity by 45% by 2030, achieving Net Zero target by 2070, Renewable Purchase Obligation (RPO (%)) target by 2030 with focus on wind (6.94%) and hydro (2.82%), and 33.57% from other RE sources and total 43.33% from all RE.
- He highlighted that Govt. of India had focussed on green development market like green open access, green hydrogen mission of 5 MMT of production and allocation of INR 19000 crores to incentivise private sector, INR 20,700 crores for RE evacuation from Ladakh, energy storage obligation & budgetary support (26.7 GW of pumped storage, 4000 MWh battery storage with VGF, etc.,), clean mobility, and 10,000 bio input resource centre to facilitate natural farming.
- He also quoted some good case examples from Singapore green plan 2030, renewable energy integration Denmark, Korea global commitment to green growth, Japan green growth strategy, Hong Kong green and sustainable financing and addressed the gathering with informative inputs and interactions.

Session 11: Knowledge Sharing by the Participants / APO Delegates

The day-2 ended with knowledge sharing session by the APO delegates. The APO delegates from various countries presented their respective country papers.

- This session was chaired by all the resource speakers of the day, which are mentioned below:

  - **Dr. J. Nagesh Kumar, Director, Centre for Energy, Environment and Productivity, Chennai, India;**
  - **Dr. Ganesan Kannabiran, Director, Indian Institute of Information Technology, Chitoor, Andhra Pradesh, India;**
  - **Dr. Kaushik Deb, Senior Research Scholar, Centre on Global Energy Policy, Columbia University, USA;**
  - **Dr. Hung Suck Park, Distinguished Chair Professor, Dept. of Chemical Engg., Ulsan College, Republic of Korea; and**
  - **Mr. Nicholas Gandolfo, Director, Sustainable Finance Solutions (Asia Pacific), Sustainalytics, Singapore.**

- About 16 country papers from various countries, viz., Cambodia, Fiji, Bangladesh, Indonesia, Loas, Malaysia, Mongolia, Nepal, Philippines, ROC, ROK, Sri Lanka, Thailand, Turkey, Vietnam and India were presented on policy frameworks, and emerging trends in industry focussing on green growth in their respective countries.

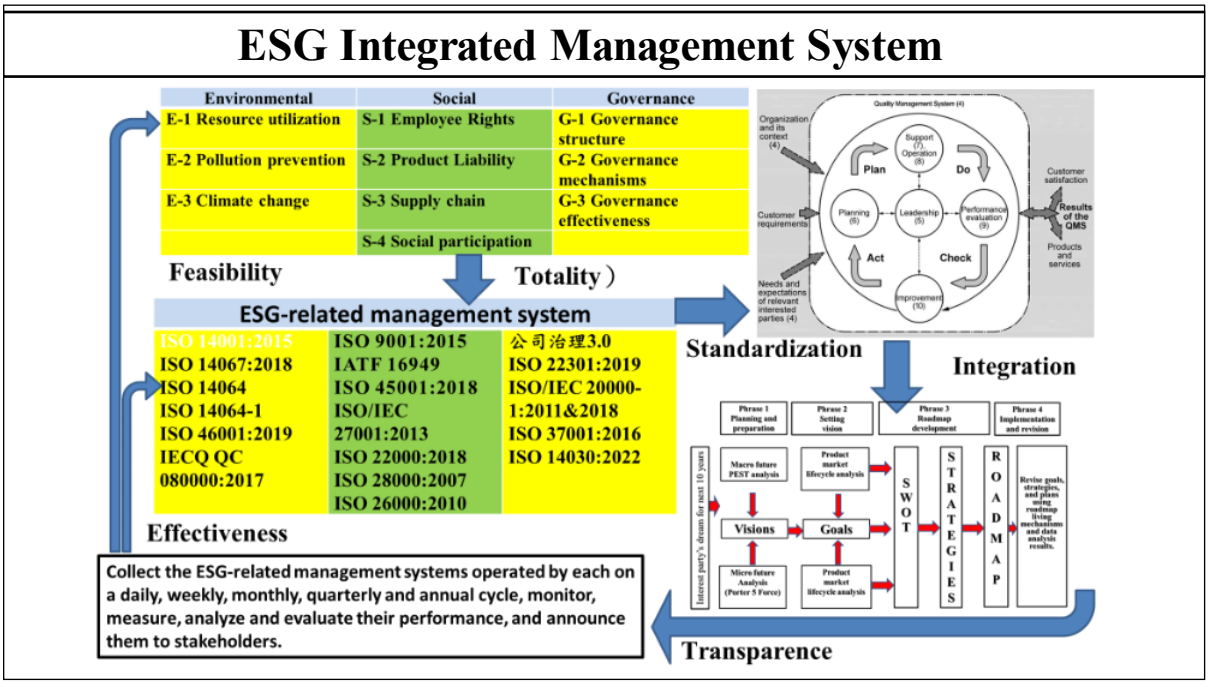
- The country papers presented by the delegates highlighted the policy initiatives instilling behavioural shifts among consumers and steering industry towards procuring and manufacturing greener products.

- The challenges and barriers in transitioning to a green growth path were also highlighted, while striving to achieve net-zero targets.

- The presentations showcased different tasks undertaken and target levels set by different countries for meeting their commitments, from which few key points have been extracted and shared below.

  - ✓ Vietnam has framed 750 standards towards promoting green growth, actively contributing to the implementation of the "National Strategy for Green Growth in the 2011-2020 period and a Vision to the Year". Various target levels have been set to implement clean industrialization.
  - ✓ Thailand has invested in transition to non-fossil fuel-based electricity, zero waste models, EVs, innovations and collaborations for emission level reductions

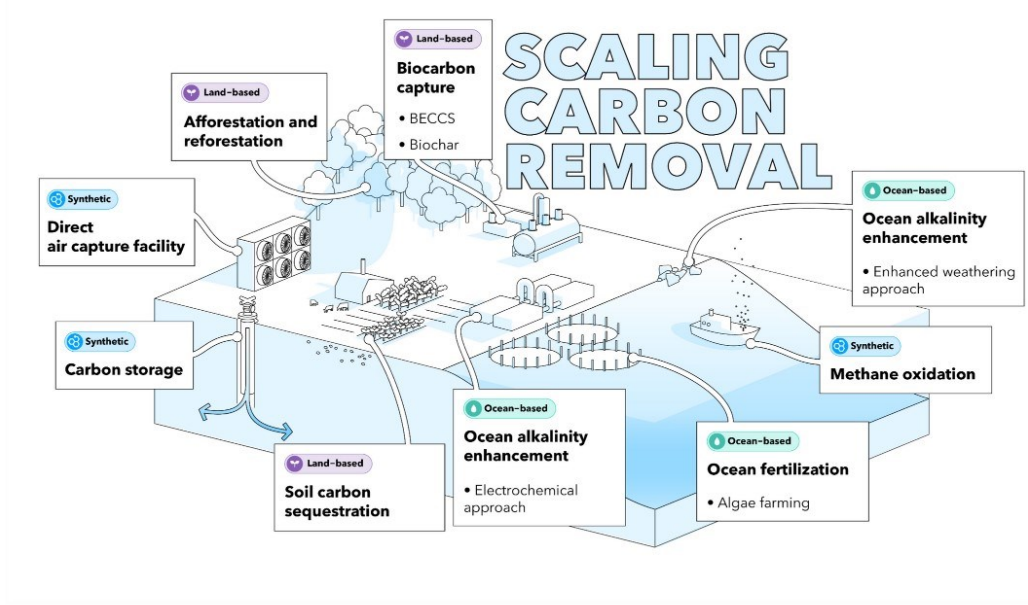
- ✓ Sri Lanka has launched 'Climate Prosperity Plan' to power faster economic recovery and achieve net-negative carbon emissions by 2050 through nature-based solutions and initiatives.
- ✓ Philippines has enacted laws for energy efficiency and conservation act similar to India's Energy Conservation Act, EV Industry development act, Philippine green building code & green building & sustainable buildings similar to energy conservation building code of India, and extended producer responsibility act of 2022. This measure requires large companies to reduce their plastic footprint by 20 to 80 percent by 2028.
- ✓ Cambodia has introduced monitoring and evaluation framework under National Energy Efficiency Policy 2022-2030. Fiji envisions to achieve 10% emission reductions which will be achieved "unconditionally" using available resources in the country and 20% would be achieved "conditionally ". It has further committed to reducing domestic maritime shipping emissions by 40%, and confirmed its commitment to achieving carbon neutrality by the year 2050.
- ✓ China is globally leading in green energy technology installations and an example of operation of their ESG integrated management system is showcased below.



- ✓ All other countries also have policies and frameworks for shifting and transitioning towards green technology and resource efficiency similar to the above-mentioned countries' commitments.

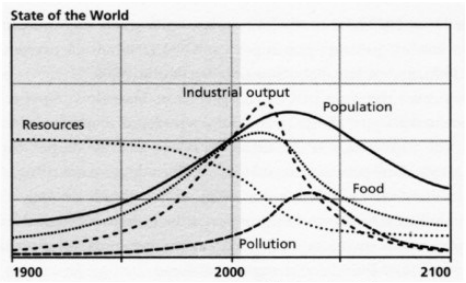
- The experts thanked the delegates for sharing their viewpoints in their presentations, in which most of them had indicated that their countries had plans to achieve Net Zero by 2050.
- Th key points discussed by the panellists revolved around the main factors which included training, certification, upskilling, financing, and spiritual transformation for achieving Net Zero in the future.

Few Slides from Day-1 & Day-2 Technical Sessions Presentations



Source: BloombergNEF

Limits to Growth



- BAU Computer Model for "World 3"
- Pollution and resource scarcity starts to impact ind.productn and then food in decades 2010-2030

https://en.wikipedia.org/wiki/The_Limits_to_Growth

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Market Updates February 2023

Green / Social Loan Principles

- Definition of Green / Social Loans
  - Green / Social are any type of loan instruments and/or **contingent** facilities (e.g. bonding lines, guarantee lines or letters of credit) made available exclusively to finance, re-finance or guarantee, in whole or in part, new and/or existing eligible Green / Social Projects
- Application to **Revolving Credit Facilities**
  - RCF may include a specific **Green / Social Tranche** but need to report to lenders the use of any revolving borrowings and/or **identify Green / Social Projects** supported by the RCF throughout the tenor of the RCF
  - RCF for general corporate purposes should not be categorized as 'green'/'social' without satisfying the **components listed in the GLP / SLP**
- Extended list of **Documentary Issues**
  - Disclosure, Conditions Precedent, Declassifications, etc.
- Recommendations for **External Reviews**
  - Recommend that borrowers appoint (an) external review provider(s) to assess alignment of the green and/or social loan or programme with the four core components of the GLP and/or SLP.

Sustainability-linked Loan Principles

- Highlight the importance of **KPIs being material** to the borrower's core sustainability and business strategy, and addressing relevant ESG challenges of its industry sector;
- Recommend that **annual SPTs** are set for each KPI for each year of the loan term;
- Clarify that for a loan to be a SLL, the KPIs and SPTs and all other core components of the SLLPs must be documented at origination.

The Four Core Components of the ICMA Green/Social/Sustainability Bond Principles act as Guidance for Issuers

- Are the projects aligned with a long-term transition to a low-carbon economy?
- Are the proceeds financing impactful projects as per market norms?
  - Alignment with taxonomy
  - Are social and environmental risks managed or mitigated?

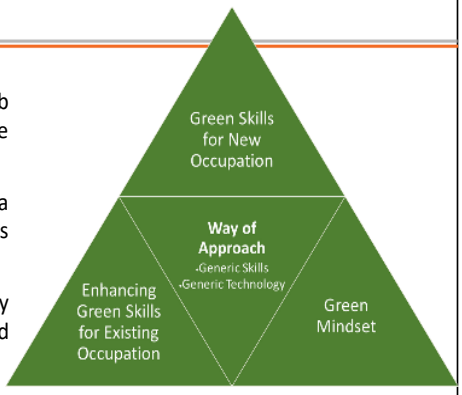
- Is there an internal process/person responsible for ensuring projects are selected as per the eligibility criteria in the framework?
  - Screening criteria
  - Processes and committees

- Are disbursements being tracked to green projects?
  - Timeline for full allocation
  - Tracking approach
  - Use of unallocated proceeds

- Is the issuer able to disclose allocation to and impact of green projects financed (post-issuance)?
  - KPIs mentioned in the Framework
  - Timeline of allocation and impact reporting

Need for green reskilling

- While the transition to a green economy can bring about numerous job opportunities, it is true that certain sectors and job roles may experience job losses or changes.
- As the focus shifts towards renewable energy sources, there may be a decrease in employment within traditional fossil fuel industries, such as coal mining or oil extraction
- Jobs in these sectors may be replaced by positions in renewable energy production, but the transition can result in short-term job losses and require retraining for affected workers



- The adoption of green technologies and automation in various industries can lead to job displacements.
  - For example, improved energy efficiency measures and automation in manufacturing can reduce the demand for certain manual labor jobs.
- Changes in Industries and Supply Chains:
  - The transition to a green economy may impact certain industries and their associated supply chains.
  - For instance, the decline in demand for non-sustainable products or materials can lead to job losses in industries heavily reliant on those resources.

Green Growth Planning

Step 1: Diagnosis
Situation Analysis Step
Stakeholder Mapping and Political Alignment
Green Growth Opportunity Assessment
Green Growth Planning Project Establishment

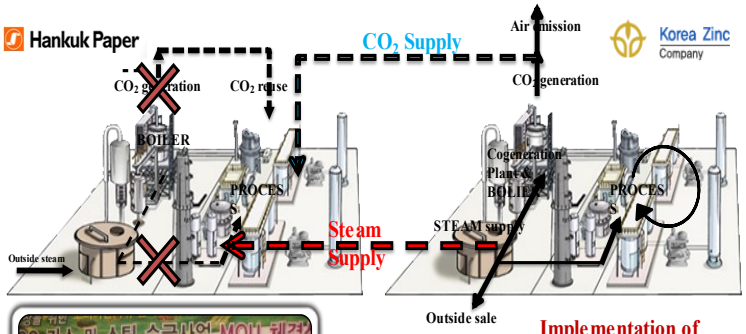
Step 2: Assessment
Stakeholder Input from Local Experts
Data Collection and Analysis
Identification of Effective Interventions
Green Growth Pathway Analysis
Prioritizing and Costing Interventions by Sector

Step 3: Action Planning
Local Ownership and Validation
Financial Mechanism or Budgets Developed
Project Design and Selection
Target Setting and Results Framework
Political and Financial Approval

Step 4: Implementation
Governance Structure Established
Capacity and Advisory Support
Monitoring and Reporting
Evaluation and Learning

Source: Bochańczyk and Pęciak (2015).

Carbon dioxide and steam network (2010)



Implementation of Top-Down IS Network

- Economic benefit : 6.6 million US$/yr (Steam selling and B -C replacement)
- Environmental benefit: Reduction of 63,643 ton CO_2/yr, 1,691.5 ton /yr air pollutants

GREEN HYDROGEN MISSION

India target production 5 MMT of green hydrogen

1. Allocation of Rs 19 K cr to incentivize private sector
2. Opportunities like electrolyzer, green steel manufacturing, long-haul fuel cells

RENEWABLE PURCHASE OBLIGATION

- RPO (%) Target by 2030 with focus on Wind and Hydro

YEAR	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Wind	1.60	2.46	3.36	4.29	5.23	6.16	6.94
Hydro	0.66	1.08	1.48	1.80	2.15	2.51	2.82
Other RE	24.81	26.37	28.17	29.86	31.43	32.69	33.57
Total RE	27.08	29.91	33.01	35.95	38.81	41.36	43.33

Closing Session and Certificate Distribution

The closing session of the event began with the opening remarks by Sh. Jittin Kapoor, APO. His remarks reflected on the significant discussions held throughout the conference and emphasized the importance of the conference's theme in driving productivity and green growth.

The APO delegates were issued with certificate for their active participation in the conference.

During the valedictory session of the conference, Shri D Sreenivasulu, Regional Director, Dr. Ambedkar Institute of Productivity, National Productivity Council (NPC), Chennai, delivered a vote of thanks. His speech expressed gratitude to Dr. Indra Pradana Singawinata, Secretary General of APO for gracing the occasion as the Chief Guest. He thanked DG NPC, Shri Sundeep Kumar Nayak, IAS, for his support and for choosing Chennai as the venue for the

programme. He thanked Shri KD Bhardwaj, Director, Environment, Energy & International Services, HQ, New Delhi, and Shri Mayank Verma, Deputy Director, International Services, HQ, New Delhi for their support and cooperation. He also thanked all the distinguished guests, speakers, delegates, and organizers for their valuable contributions and active participation in making the event a resounding success.

The conference witnessed active participation and fruitful discussions, enabling participants to gain new insights, exchange ideas, and foster collaborations. The event's success can be attributed to the collective efforts of the organizing committee, distinguished speakers, partners, and attendees.

A site visit was organized on day 3 (16th June 2023) to the M/s. Danfoss Industries, Chennai, to gain insights on the products manufactured at Danfoss from the perspective of energy efficiency and reduction in carbon emissions. The participants observed the innovations in clean energy transition, environmental protection, social responsibility initiatives, and workforce health and safety. They also witnessed and observed the best operating and manufacturing practices during this industry visit.

Annexure - 1

Schedule of the Conference

Time (IST)	Agenda	Speaker
Day 1: Wednesday, 14 June 2023 Venue: Concorde Hall (Ground Floor)		
9:00–9:30	Registration	NPC Project Team
9:30–10:30	Welcoming of Distinguished Guests Lamp lighting Ceremony Opening Remarks by APO Secretary-General Special Remarks by Director General, NPC Introduction of APO National Awards and Process of Selection (5 mins) Announcement of APO National Award 2022 Winners by APO Second Vice Chair and Director General, NPC Conferment of APO National Awards ▪ Prof. Pradip Kumar Ray, Emeritus Professor, Department of Industrial & System Engineering, IIT Kharagpur, APO National Award for Productivity Technical Experts Award Acceptance Speech (5 min) Release of Outlook Special Collector's edition on sustainable development Group Photo APO Corporate Video (2 mins)	Dr. Indra Pradana Singawinata Sundeep Kumar Nayak, IAS, APO Alternate Director for India and NPC Director General Mayank Verma, DD, NPC Sundeep Kumar Nayak, IAS Dr. Indra Pradana Singawinata and Sundeep Kumar Nayak, IAS
10:30–11:00	Introduction of resource persons and participants and conference overview	Jittin Kapoor, Program Officer, APO
11:00–11:15	**Coffee/Tea Break**	
11:15–11:30	**Keynote Presentation: Prioritizing Green Finance for Overall Socioeconomic Growth** The keynote presentation will focus on the urgency of efforts to mitigate climate change. The need to prioritize green finance in decoupling industrial growth from environmental degradation along with practical approaches will be highlighted.	Sundeep Kumar Nayak

Time (IST)	Agenda	Speaker
11:30–12:30	**Session 1: Building an Innovative, Productive, Greener Future** The significant role of innovation in sustained growth with minimal environmental impact will be emphasized. Interconnections among innovation and desired outcomes will be examined along with national policy initiatives. Approaches to strengthening cooperation in developing conducive ecosystems to encourage innovation at grassroots level will be introduced.	Dr. Hung Suck Park Distinguished Chair Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK
12:30–13:30	**Session 2: Accelerating Technological Adoption for Enhancement of Energy Productivity** Rapid developments in technologies at sectoral level to reduceoverall costs and energy consumption during the manufacturing and operation of finished goods will be introduced. Policies to enhance the energy productivity of industry through innovation and technology adoption will be analyzed.	Dr. Kaushik Deb Senior Research Scholar, Center on Global Energy Policy, Columbia University, USA
13:30–14:30	**Lunch Break**	
14:30–15:30	**Session 3: Financing Sustainability through Bonds: Asia-Pacific Market Trends** Transitioning to a greener economy requires long-term investment and sustained financing. Bonds mainly focusing on financing energy transition, mitigating climate change, enhancing social impact, and reducing carbon emissions provide a range of benefits to enterprises and society alike. The benefits are aligned with the UN SDGs and overall socioeconomic development. This session will focus on current market trends in the Asia-Pacific region, positive impacts of bonds through relevant case studies from industry, and key market drivers in terms of regulations and policies prevailing in the region.	Nicholas Gandolfo Director, Sustainable Finance Solutions (Asia Pacific), Sustainalytics, Singapore Aditi Bhatia Senior Regional Sales Manager-South Asia, Morningstar Sustainalytics, Mumbai, India
15:30–15:45	**Coffee/Tea Break**	
15:45–16:45	**Session 4: Green Reskilling: A Human Capital Development Approach for a Greener Future** A shortage of skills can represent a strong barrier to ecological progress, delaying transformation to a greener economy. A well-managed ecological transition can become a driver of job creation and social justice, although job losses can also be expected in the most polluting sectors. Therefore, some form of skill transition must be anticipated. Public intervention is needed to help labor markets and education and training systems adapt to the new demands of a green economy.	J. Nagesh Kumar Director, Center for Energy, Environment and Productivity, Chennai, India
16:45–17:15	**Session 5: Panel Discussion: Drivers of and Barriers to the Green Economy** The green economy could help overcome socioeconomic challenges through the transition to a more environmentally friendly,low-carbon, resource-efficient model. Achieving this transition is hampered by weak institutions and political will, human and institutional capacity gaps, lack of effective policy formulation and implementation, a lack of data for impact assessment, insufficient awareness of the benefits of green economy concepts, and poor coordination among green economy actors. This session will identifythe potential drivers of and barriers to achieving a green economy.	All Experts

Time (IST)	Agenda	Speaker
18:30–20:30	**APO Welcome Dinner** **Venue: Concorde Hall (Ground Floor), Hotel VIVANTA Chennai-IT Expressway**	
End of Day 1		
Day 2: Thursday, 15 June 2023 **Concorde Hall (Ground Floor)**		
9:00–9:30	Registration	
9:30–10:20	**Session 6: Institutional Strengthening Strategies for Green Growth** This session will elaborate on ways to help public-sector and financial institutions work toward overall socioeconomic development with the least dependence on limited natural resources. Examples showcasing the integration of green finance in national development plans and its positive outcomes will be highlighted. Emerging market trends to reduce regulatory uncertainty and make stable financing available to projects contributing to green growth will be summarized.	Dr. Ganesan Kannabiran Director, Indian Institute of Information Technology Chitoor, Andhra Pradesh, India
10:20–11:15	**Session 7: Leveraging ESG Ratings to Boost Green Finance** This session will focus on embedding the principles related to the environment and social development into corporate strategy. The framework and standards developed and adopted by organizations globally will be explained. Through selected case studies, the approaches to leveraging ESG ratings to finance sustainable business growth will be illustrated. Strategies to inculcate the reporting mindset within SMEs will be summarized.	Nicholas Gandolfo and Aditi Bhatia
11:15–11:30	**Coffee/Tea Break**	
11:30–12:30	**Session 8: Realizing Net-zero Emission Targets** This session will explore the key elements of the net-zero emission targets/pledges by major global contributors of greenhouse gas (GHG) emissions. The implications of GHG reduction plans and linkages with keeping global warming within 1.5°C of preindustrial levels will be explained. Gaps in climate action plans and recommendations will also be analyzed.	Dr. Kaushik Deb
12:30–13:30	**Lunch Break**	
13:30–14:30	**Session 9: Decoupling Industrial Growth from Environmental Degradation through Ecoindustrial Parks: Examples from the Republic of Korea** This session will highlight various attributes of ecoindustrial parks contributing to meeting the UN SDGs. Successful cases of the establishment of ecoindustrial parks in the ROK will be summarized including the governance and supporting structure, tangible and intangible benefits, and challenges.	Dr. Hung Suck Park
14:30–15:30	**Session 10: Prioritizing Green Growth: The Indian Perspective** This session will focus on the significance of green growth in India's long-term development plans. Various initiatives, policies, and schemes driving innovation, promoting local manufacturing, sparking entrepreneurship, increasing the ease of doing business, leveraging ICT advances, transitioning to green energy, and streamlining financing barriers will be showcased. Case studies along with approaches to address implementation issues will be presented.	Dr. M.V. Rao Chairperson, West Bengal Electricity Regulatory Commission, Kolkata, India

Time (IST)	Agenda	Speaker
15:10–15:30	**Afternoon Break**	
15:30–16:30	**Session 11: Knowledge Sharing by Participants** Selected participants will be invited to give presentations on policy frameworks and emerging trends in industry focusing on green growth in their countries. They will highlight policy initiatives instilling behavioral shifts among consumers and steering industry toward procuring and manufacturing greener products. The challenges and barriers to transitioning to a green growth path while striving to achieve net-zero targets will also be highlighted. The need to look beyond net-zero pledges will be discussed.	Selected Participants and facilitated by J. Nagesh Kumar
16:30–17:00	**Session 12: Panel Discussion on Visualizing a Carbon-neutral Future within the 21st Century** The discussion will revolve around the practical time frame for de-coupling economic growth and industrialization from environmental degradation. The experts will discuss progress in meeting the UN SDGs at national level, its implications, and roadmaps to achieve green development.	All Experts
17:00–17:30	Closing and Certificate Presentation: Program Evaluation Closing Remarks by NPC Closing Remarks by APO Certificate Presentation	
	End of Day 2	
	Day 3: Friday, 16 June 2023	
12:30–12:45	Assemble in hotel lobby	
12:45	Depart for site visit	
14:00–16:30	**Session 13: Site visit to Danfoss, Chennai** Danfoss is a bellwether engineering company providing energy efficiency and innovative engineering solutions to industry. Participants will gain insights on the products manufactured inthe Danfoss plant from the perspective of energy efficiency and reduction in carbon emissions.	Facilitated by NPC
	Day 4: Saturday, 17 June 2023	
	Departure of Participants and Resource Persons	

Annexure - 2

Some Photographs of the Conference

Shri Sundeep Kumar Nayak, IAS, Director General, NPC welcoming APO Secretary-General, Dr. Indra Pradana Singawinata

Lighting the lamp

Head (AIP), Shri D Sreenivasulu welcoming Shri Sundeep Kumar Nayak, IAS, Director General, NPC

The Distinguished Dignitaries on the Dais

A Section of the Delegates During the Session

Group Photograph with the Foreign Delegates

Welcome Address by Shri Sundeep Kumar Nayak, IAS, Director General, NPC

Participants from Thailand Presenting their Country Paper.

Dr Park Distributing the Course Certificate to a Participant.

Dr J Nagesh Kumar Distributing the Course Certificate to a Participant.

Annexure - 3

List of International Participants of the Conference

S. No	Name	Credentials/ Role/ Professional Details
1	Mr. Ahsan Mahmood	Assistant Secretary, BSTI Section, Ministry of Industries, Bangladesh.
2	Mr. Md. Zafor Iqbal Bhuian	Deputy General Manager, Salt Cell, Bangladesh Small and Cottage Industries Corporation (BSCIC), Bangladesh.
3	Mr. Sophanna Nun	Managing Director, Green Move Consulting, Cambodia.
4	Mr. Krishan Pratap	Drua Incubator Partnership and Project Coordinator, Climate Change Division, Office of the Prime Minister Fiji
5	Mr. Rajneel Prasad	Quality Service Officer, Department of Quality Awards, Fiji National University
6	Mr. Eduard Feco Indriadi	Sub-Coordinator for follow-up of Supervision Result/Inspectorate General, Ministry of Manpower, Indonesia.
7	Ms. Reiza Syarini	Senior Planner, Center for Facilitating the Implementation of Standards of Environment and Forestry Instruments, Ministry of Environment and Forestry, Indonesia.
8	Mr. Sa Siriphong	Deputy Director General, SME Promotion, Ministry of Industry and Commerce, Lao PDR
9	Mr. Mohammad Danial Mohd Yusof	Assistant Manager, Delivery Management Office, Malaysia Productivity Corporation, Malaysia
10	Ms. Luvsanchultem Batgerel	Senior Consultant of Improvement, Mining Association, Mongolia.
11	Mr. Zamanbyek	Enrichment Engineer, Grinding and Flotation Section, Mineral Processing Plant, Mineral Processing Plant of "Erdenet mining corporation" SOE, Mongolia.
12	Mr. Umesh Prasad Singh	President, Central, Federation of Nepal Cottage and Small Industries (FNCSI), Nepal.
13	Mr. Rupesh Raj Khanal	Section Officer, Supply Division, Ministry of Industry, Commerce and Supplies, Nepal.
14	Mr. Raoul Vicente Abraham S. Perez	Sustainability Manager - Program Consultant for Sustainability Management Systems, Sustainability Management Systems, Business for Sustainable Development, Philippines.
15	Ms. Rowena G. Elayda	Senior Staff, Secretariat, Philippine Green Building Council, Philippines.
16	Mr. Sheng-Pin Kuan	Chairman, Quality Sustainability Committee, Chinese Society for Quality, Republic of China
17	Ms. Bobi Kim	Researcher, Green Value Creation Center, Korea Productivity Center, Republic of Korea
18	Dr. Joun Won Lee	Research Fellow, Productivity & ESG Research Center, Korea Productivity Center, Republic of Korea.
19	Ms. Semasingha Mudiyanselage Amali Shivanthika Semasingha	Productivity Development Officer, National Productivity Secretariat, Divisional Secretariat, Sri Lanka
20	Dr. Natthawan Prasongthum	Research Officer, Expert Centre of Innovative Clean Energy and Environment, Thailand Institute of Scientific and Technological Research (TISTR), Thailand
21	Dr. Parawee Pumwongpitak	Research Officer, Expert Centre of Innovative Materials, Thailand Institute of Scientific and Technological Research (TISTR), Thailand.
22	Mr. Hayati Kecelioglu	SME Expert, Department of Technology, Innovation and Indigenization, KOSGEB, Turkyie.
23	Mr. Koray Yenigürbüz	Group Head, Energy and Environment, Turkish Standards Institution, Turkyie.
24	Ms. Hoang Thi Thanh Tuyen	Productivity and Quality Officer, Productivity and Quality Division, Quality Assurance and Testing Center 2, Vietnam.

Annexure - 4

List of Participants from India

S. No	Name	Designation & Company Name
1.	Mr. A. Kannan	Unit Head Supreme Petrochem Ltd
2.	Mr. Shishir Kumar Behera	Professor & Former Dean School of Chemical Engineering (SCHEME) Vellore Institute of Technology (VIT)
3.	Mr. Karthikeyan KP	Director Laundry Care and Cooking Factory, BSH (Bosch-Siemens Household Appliances
4	Mr. Nishant Baghchandani	Manager- Impact Technical Sales Morningstar Sustainalytics
5	Mr. Prashant Trivedi	Asst. Director Depart. Of Micro Small and Medium Enterprises, Gov of Madhya Pradesh
6	Mr. Rohit Dabar	General Manager DTIC- Betul, Depart. Of Micro Small and Medium Enterprises, Gov of Madhya Pradesh
7.	Mr. Prabhakarn S	Deputy Commissioner CBIC, Ministry of Finance
8.	Mr. Arush Xavier Martins	Manager- Marketing and Communications FiiRE - Forum for Innovation Incubation Research and Entrepreneurship
9.	Mr. Tushar Venkatesh Sawant	Enterprise Development Manager FiiRE - Forum for Innovation Incubation Research and Entrepreneurship
10.	Mr. G. Rama Babu	Additional General Manager - M Indian Potash Limited
11.	Ms. E. Prema Sundari	Assistant, Specific Computer Printers Limited, Chennai
12.	Mr. Manoj Sakharam Badave	Senior Manager TATA Motors Ltd.
13.	Mr. Gopakumar Parameswaran Pillai	Chartered Engineer & Valuer Ennar Engineers
14.	Ms. Yukti Choudhary	Director Sustain Consulting
15.	Mr. Ajithkumar. S	Director Acuchi Exim Private Limited
16.	Mr. Murugesan, Vinayagaraj	Head Environmental & Safety
17.	Dr. Kurian Joseph	Professor of Environmental Engineering, CEG Campus, Anna University, Chennai
18.	Mr. K.N RAVI	Deputy G.M Kitex Limited
19.	Ms. Zaphia Fareed	Chief Finance Officer Scoobee Day Garments (India) Limited
20.	Mr. Jeff Jacob	Chief Executive Officer Kitex Limited.
21.	Mr. R. Ramesh	Sr. Manager M/s Brakes India Private Limited, Chennai
22.	Mr. Lakshminarayana	Senior Manager M/s Brakes India Private Limited, Chennai.
23.	Mr. S. Murali	Manager M/s Brakes India Private Limited, Chennai.
24.	Dr. Mahesh Ganesapillai	Professor VIT University, Vellore
25.	Mr Pravin Kumar N	Student, BTech Chemical Engineering VIT Vellore
26.	Mr. Rakesh B	Student, BTech Chemical Engineering, VIT, Vellore
27.	Mr. C. Balasubramani	CEO, GERABAA TECH
28.	Dr. Subhasis Pradhan	NCCR, Chennai
29.	Dr. Bubindra Kumar Saho	Scientist-D National Centre of Costal Research Chennai
30.	Dr. D. Gnana Prakash	Associates Professor, SSN Engineering College, Chennai.
31.	Thamizhazhagan	Founder ACTIU
32.	Mr. V.M. Chandira Sekaran	Chief Director NCDC
33.	Mr. Rahul Meghwal	Asst. Director NCDC
34.	Mr. P.V. Rajesh	Manager –Marketing Andrew Yule & Company Ltd

S .No	Name	Designation & Company Name
36.	Mr. R. Ganeshan	Sr. Manager Larsen & Toubro Ltd
37.	Dr. Saju.B	Vellore Institute of Technology, Chennai.
38.	Dr. Perarasu. V.T	Professor, Dept. of Chemical Engineering, Alagappa College of Technology, Anna University, Chennai.
39.	Mr. G. Babu	
40.	Dr. S. Joseph Jeya Anand	VIT Chennai
41.	Mr. S. Suresh Babu	Director MSME Chennai
42.	Mr. Sanjay Babuji	MSME Chennai
43.	Dr. C. Sethuraman	CSIR- CSIO
44.	Mr. S. Sundaram	Proprietor
45.	Dr. L. Ramesh	Dr. MGR Educational Institutions
46.	Mr. T. Mathevanan Pillai	Professor, Hindustan Institute of Technology & Science, Chennai
47.	Mrs. Indumathi	Asst. Prof. Hindustan Institute of Technology & Science, Chennai.
48	ABJ Ravi	Director MERC Training Academy, Chennai.
49.	Mr. Balamurugan	Manager, Andrew Yule & Co., Chennai.
50.	Mr. Chellappan	
51.	Mr. S.Senthil Kumar	AE C/o DEE, TNPCB
52.	Mr. R. Rahul Sailesh	B.E Student, Velammal Engineering College, Chennai
53.	Mr. Prince Jeba Kumar	B.E Student
54.	Mr.K. Suresh babu	Assistant
55.	Mr. Prabhakarn	NCCR
56.	Mr. R. Senthil Kumar	Deputy Director, MSME
57.	Mr. Jithu George	ENV Scientist
58.	Mr. Varun Godara	Person Dept.
59.	Mr. A. Thilak Raj	Technical Associate, Department of Electrical Engineering, Anna University, Chennai.
60.	Mr. S. Mugundan	President
61.	Mr. Shanmugam	MD
62.	Mr. K. Sangameshwar	
63.	Mr. R.K. Navaneeth	Deputy Manager, Chola MS Rich Service
64.	Mr. M. Ramesh	Sri Mirdu enterprises
65.	Megha.P	Environmental Engineer
66.	Ms. Oviya	MSME Dept, Chennai.
67.	Ummul Farzaver	MSME
68.	Birendra	SRASIA
69.	Mr. M. Vijayakumar VP	
70.	Mr. Supratheesh	WRI India
71.	Dr. C. SharmeelaDr	Professor, Department of Electrical Engineering , Anna University, Chennai.
72.	Mr. K. L. Vasudevan	EHS Officer, Lucas TVS Ltd, Chennai.

Annexure - 5

List of Resource Persons of the Conference

S. No.	Name	Designation
1	Dr. Hung Suck Park	Distinguished Chair Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK
2	Dr. Kaushik Deb	Senior Research Scholar, Center on Global Energy Policy, Columbia University, USA
3	Mr. Nicholas Gandolfo	Director, Sustainable Finance Solutions (Asia Pacific), Sustainalytics, Singapore"
4	Dr. Ganesan Kannabiran	Director, Indian Institute of Information Technology, Chitoor, Andhra Pradesh, India
5	Dr. M V Rao	Chairperson, West Bengal Electricity Regulatory Commission, Kolkata, India
6	Dr J Nagesh Kumar	Director, Centre for Energy, Environment and Productivity (CEEP)

Annexure - 6

Some Media Clips on the Conference

From the website of Outlook India

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APO National Awards Given Away At NPC's International Conference On Green Growth

BY OUTLOOK PLANET DESK JUNE 17, 2023

More than 100 participants deliberated on strategies for institutional strengthening for green growth, financing mechanisms, leveraging ESG ratings for green finance and realising net zero emission targets for achieving higher productivity and green growth

The conference was timely for India in view of the emphasis placed on green growth in the recent budget and Prime Minister Narendra Modi's vision to achieve net zero by 2070.

With climate change posing a real and imminent challenge, the Government of India is taking actionable steps to progress towards becoming a low carbon economy. National Productivity Council, DPIIT, Ministry of Commerce and Industry, GoI and Asian Productivity Organization, Tokyo held an international conference on "Productivity and Green Growth: New Interlocking Paradigms" from 14 to 16 June 2023 in Chennai, Tamil Nadu.

It brought together more than 100 experts, policymakers, industry leaders, and stakeholders to discuss and explore strategies for institutional strengthening for green growth, financing mechanisms, leveraging ESG ratings to boost green finance and realizing net zero emission targets for achieving higher productivity and green growth.

About 26 international participants from 16 countries such as Republic of Korea, Taiwan, Malaysia, Philippines, Indonesia, Singapore, Fiji etc joined the conference representing the Asia-Pacific region. The conference was timely for India in view of the emphasis placed on green growth in the recent budget and Prime Minister Narendra Modi's vision to achieve net zero by 2070.

APO Secretary General Dr. Indra Pradana Singawinata opened the conference and said that we needed to go beyond environmental protection and adopt a broader, more holistic measure of sustainable development that captures not only the ecological but also the social, cultural, and human dimensions of well-being.

Ensuring that sustainability is inclusive means guaranteeing the involvement of all stakeholders in decision-making processes, especially those most affected by environmental challenges

Tuesday, Jun 27, 2023

Outlook

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Productivity And Green Growth: New Interlocking Paradigms

National Productivity Council DPIIT, Ministry of Commerce & Industry, Government of India PRESS RELEASE.

Dr Indra Pradana Singawinata, Secretary General, Asian Productivity Organization

UPDATED: 13 JUN 2023 6:13 PM

The world is faced with a climate emergency. During the Amritkal, India is decisively moving towards Lifestyle for Environment (LiFE). The Asian Productivity Organization, Japan has also outlined several activities under its Vision 2026. In this context, the National Productivity Council (NPC), an autonomous body under the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India, is going to organize a three-day APO supported international conference on "Productivity and Green Growth: New Interlocking Paradigms" from 14-16 June 2023 in Chennai. Chennai headquartered diversified company, Indian Potash Limited is the industry partner for the conference.

The deliberations in the conference will cover different interlocking paradigms of green growth, such as leveraging ESG, enhancement of energy productivity, green finance, green re-skilling, institutional strategies and net-zero emission targets.

Experts and delegates from sixteen countries would physically assemble in Chennai to discuss strategies for enhanced green growth and sustainable development. There would be keynote presentations, panel discussions, and knowledge sharing sessions on policy frameworks and emerging trends in industry focusing on green growth.

Secretary-General of APO, Dr. Indra Pradana Singawinata, will deliver the opening address of the conference as Chief Guest. APO National Awards 2022 would be conferred upon Shri G.M. Rao, Group Chairman, GMR Group and Prof. Pradip Kumar Ray, Emeritus Professor, IIT Kharagpur.

speaking about the forthcoming conference, Sh. Sundeep Kumar Nayak, Director General, NPC said that an APO conference was being held in Chennai after a long gap and, it was highly focused on India's sustainable development paradigms. He added that India's track record in environmental sustainability has been exemplary, while seen in the context of Net Zero targets set by Hon'ble Prime Minister.

Some of the international experts who would speak at the conference include Dr. Hung Suck Park from Korea, Dr. Kaushik Deb from USA, Mr. Nicholas Gandolfo from Singapore, Dr. Ganesan Kannabiran (Director, IIIT Chitoor), and Dr. J. Nagesh Kumar (Director, CEEP, Chennai). --XXX--

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Asian Productivity Organization

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APO 60TH ANNIVERSARY EVENT IN INDIA: CONFERENCE ON PRODUCTIVITY AND GREEN GROWTH: NEW INTERLOCKING PARADIGMS

23 Jun 2023

APO Secretary-General Dr. Indra (L) delivering the Opening Remarks.

As part of the series of events commemorating the APO's Diamond Jubilee, the Conference on Productivity and Green Growth: New Interlocking Paradigms was organized 14–16 June in Chennai, India. The conference was attended by around 100 participants from 16 APO members.

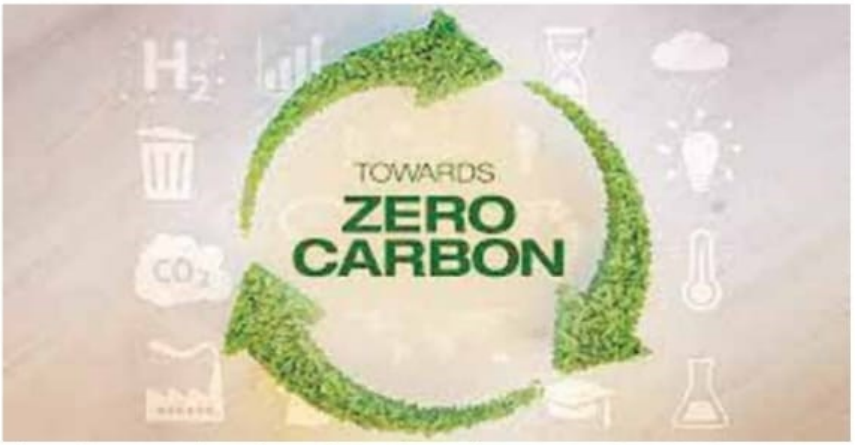
The Opening Remarks by APO Secretary-General Dr. Indra Pradana Singawinata emphasized the need for inclusive, sustainable productivity growth, which rewards the workforce and nature alike. He highlighted approaches to make productivity enhancement sustainable, inclusive, and innovation-based through investment in the right kinds of infrastructure, fostering innovation and technological change, effective implementation of policies, and mobilizing adequate financing and resources.

The Special Remarks by APO Alternate Director for India and Director General, National Productivity Council, Sundeep Kumar Nayak explained the NPC's efforts to promote productivity enhancement through green growth at national level. He also gave the keynote presentation, elaborating on the need to prioritize green finance in decoupling industrial growth from environmental degradation and citing practical approaches to achieve this.

From the Press Report by The Pioneer, New Delhi

Green Growth conference held to achieve Carbon Net Zero

PIONEER NEWS SERVICE
NEW DELHI



Various measures are being taken to achieve green growth which is a safe handle to confront the threats of global warming and shape a safe economic future with an ultimate aim to achieve Carbon Net Zero by 2070 as envisaged by Prime Minister Narendra Modi, India told representatives from the Asia-Pacific region who had gathered recently at an international conference.

At the conference on "Productivity and Green Growth: New Interlocking Paradigms", Sundeep Kumar Nayak, IAS, Director General, National Productivity Council (NPC) explained how the Council has been promoting productivity enhancement making the country move towards green growth. He also elaborated the need to prioritize green finance in decoupling industrial growth from environmental degradation and highlighted practical approaches to achieve the same.

Earlier, Asian Productivity Organization, Tokyo Secretary General Dr. Indra Pradana Singawinata echoed similar views saying that we needed to go beyond environmental protection and adopt a broader, more holistic measure of sustainable development that captures not only the ecological but also the social, cultural, and human dimensions of well-being. Ensuring that sustainability is inclusive means guaranteeing the involvement of all stakeholders in decision-making processes, especially those most affected by environmental challenges, said Dr Singawinata.

The event witnessed participation from experts, policymakers, industry leaders, and stakeholders who discussed strategies for institutional strengthening for green growth, financing mechanisms, leveraging ESG ratings to boost green finance and realizing net zero emission targets for achieving higher productivity and green growth.

International participants were those from countries such as Republic of Korea, Taiwan, Malaysia, Philippines, Indonesia, Singapore, Fiji etc.

APO National Awards for the year 2022 were also announced during the conference. GMR Rao, Group Chairman, GMR Group was conferred with APO National Award for Productivity Advocate for his exemplary work in championing the cause of productivity while Professor Pradip Kumar Ray, Emeritus Professor, IIT Kharagpur was conferred with APO National Award for Productivity Technical Expert in recognition to his grass root level work encompassing productivity modeling, ergonomics, safety engineering, and lean engineering operations management.

The conference was addressed by international experts including Dr Hung Suck Park Distinguished Chair, Professor, Department of Chemical Engineering, Ulsan College, Ulsan, ROK; Dr. Kaushik Deb, Senior Research Scholar, Center on Global Energy Policy, Columbia University, USA and Nicholas Gandolfo, Director, Sustainable Finance Solutions (AsiaPacific), Sustainalytics, Singapore.

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National Productivity Council

NATIONAL PRODUCTIVITY COUNCIL

(Under Ministry of Commerce & Industry, Govt. of India)

Utpadakta Bhavan, 5-6, Institutional Area,
Lodi Road, New Delhi -
110003Email:
info@npcindia.gov.in Tel.:
011-24690331

Website: www.npcindia.gov.in