

## **Proceedings:**

**Forum on Promoting Article 6 Business Engagement and  
Matching through the JCM in New Delhi, India on 23  
September 2025**

**September 2025**

# Forum on Promoting Article 6 Business Engagement and Matching through the JCM in New Delhi, India on 23 September 2025

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## Background and objectives

In 2024, a new era for the global carbon market began, with the agreement to fully operationalize Article 6 of the Paris Agreement at COP29 (Baku). Amidst these international trends, Japan and India signed a Memorandum of Cooperation on the Joint Crediting Mechanism (JCM) on August 7, 2025. Prime Minister Modi visited Japan on August 29th and the leaders of the two countries demonstrated their strong commitment to the active use of the JCM, and the bilateral cooperation for decarbonization.

The JCM facilitates diffusion of decarbonizing technologies, products, systems, services, and infrastructure as well as implementation of mitigation actions, and contributes to sustainable development of partner countries. Through the sharing of advanced decarbonization technologies and knowledge, the JCM aims to contribute to sustainable development and the achievement of the goals of the Paris Agreement.

This forum co-hosted by the governments of the two countries, Ministry of Environment, Forestry and Climate Change (MOEFCC) and Ministry of the Environment Japan (MOEJ), aims to introduce and disseminate decarbonization technologies in India and strengthening cooperation between various stakeholders including private companies, local governments, and related organizations under the JCM framework.



## Executive Summary

The Forum on Promoting Article 6 Business Engagement and Matching through the Joint Crediting Mechanism (JCM), held on 23 September 2025 in New Delhi, marked the first official JCM forum jointly hosted by the Governments of India and Japan. Organized by the Ministry of Environment, Forest and Climate Change (MoEFCC) of India and the Ministry of the Environment, Japan (MOEJ), with support from the Article 6 Implementation Partnership (A6IP) Center and other relevant organizations, the event gathered more than 300 in-person and 400 online participants from governments, businesses, and research institutions, etc.

The Forum was convened in the wake of the signing of the India–Japan Memorandum of Cooperation on the JCM in August 2025, an agreement reaffirmed by the leaders of both countries at the Japan–India Summit. The discussions reflected strong momentum to translate this political milestone into practical cooperation, technology deployment, and business collaboration under Article 6 of the Paris Agreement.

Opening and keynote addresses emphasized the significance of Article 6 and the JCM as essential tools for decarbonization. India’s climate commitments—achieving 50% non-fossil electricity capacity by 2030, reducing emissions intensity by 45% by 2030, and pursuing net-zero by 2070—were underscored, alongside Japan’s updated NDC targets of 60% reduction by 2035 and 73% by 2040. Both governments highlighted the JCM as a transformative opportunity to channel investment, accelerate technology transfer, and strengthen bilateral cooperation toward these goals.

Session 1 focused on India’s domestic carbon market, its engagement in Article 6, the global status of implementation, and the operationalization of the JCM. Speakers highlighted that India’s Carbon Credit Trading Scheme is now functional, covering both compliance and offset mechanisms, and is designed for linkage with international markets including the JCM. Presentations by Bureau of Energy Efficiency (BEE) / Ministry of Power (MOP), MoEFCC, UNFCCC, MOEJ, and JCMA clarified institutional frameworks, eligibility criteria, and procedural steps for project development, while ADB showcased the role of carbon finance and the Japan Fund for the JCM in bridging investment gaps.

Session 2 introduced a broad spectrum of potential sectors and technologies for JCM cooperation. These included renewable energy with storage, compressed biogas, waste-to-energy, wastewater treatment, high-voltage direct current (HVDC) transmission, green hydrogen and ammonia, carbon capture, and process improvements in cement and steel sectors. Business leaders presented concrete case studies, highlighting the role of JCM credits in enhancing project viability and mobilizing private investment. The session emphasized that collaboration between Japanese and Indian companies is crucial to scale up implementation and generate high-integrity mitigation outcomes.

In closing, officials from MOEJ and MoEFCC reaffirmed their commitment to swiftly operationalize the JCM, encouraging companies to prepare and submit project information sheets as the next step toward project registration. They underlined that the JCM is not solely a government initiative but a cooperative platform engaging the private sector, investors, academia, and civil society.

Overall, the Forum represented a turning point in Japan–India climate cooperation. By combining strong political will, robust institutional frameworks, and active private sector engagement, the JCM is set to become a cornerstone of bilateral and global climate action.

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**URL of All Presentation Materials:** <https://a6partnership.org/training-events/forum-on-promoting-business-engagement-and-matching-through-the-joint-crediting-mechanism-jcm-to-expand-indias-carbon-market>

<b>Session 3: Business Matchmaking</b>
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**Overview**

This Business Matching Session will be held to facilitate direct communication and networking between Japanese and Indian companies, as well as with government representatives. The session is designed to maximize opportunities for business collaboration and project development under the JCM through open and dynamic exchanges among all in-person participants. Approximately 20 companies and organizations will set up consultation tables. General participants are free to move around the venue and join group discussions at any table.

**Operation Rules**

- **Group Discussions:**  
Each table will host group discussions rather than one-on-one meetings. Please use this time to exchange information and explore potential collaboration. For more detailed or confidential discussions, please arrange follow-up meetings separately.
- **Free Movement and Mandatory Shuffle every 15 mins**  
Participants are free to move between tables and join different group discussions at any time. Every 15 minutes, all participants are required to move to a different table or group. This ensures broader networking and maximizes opportunities for new connections. Please be mindful of the time at each table (15 minutes per group) to ensure everyone has a chance to participate.

- **If No Seats Are Available:**  
If you cannot find a seat at a table, please use the opportunity to network with other participants nearby.
- **No reservation system:**  
Due to the large number of participants (approximately 300 people), it is not possible to reserve seats at specific company or organization tables. We appreciate your understanding that the session is designed for open and flexible participation without reservations.

## Role of Participants

Role	Details
Participants with Consultation Tables	<ul style="list-style-type: none"> <li>● Japanese and Indian companies and organizations will each have dedicated consultation tables to introduce their technologies, services, and project ideas.</li> <li>● Please be ready to welcome groups of participants and facilitate interactive discussions.</li> </ul>
General Participants	<ul style="list-style-type: none"> <li>● All participants other than those hosting tables are free to move between tables and join group discussions.</li> <li>● If a table is full or unavailable, participants are encouraged to network with each other in the open area.</li> <li>● Please actively participate in group conversations and make use of the shuffle system to maximize your networking opportunities.</li> </ul>
Government Consultation Desks	<ul style="list-style-type: none"> <li>● Consultation desks will be jointly set up by the Japanese government (MOEJ, METI, JCMA) and the Government of India (MOEFCC).</li> <li>● Participants can consult with government representatives regarding JCM policies, support schemes, and project development.</li> </ul>
The Secretariat	<ul style="list-style-type: none"> <li>● The Secretariat will also manage the session flow and if support is requested (e.g., explanation of the JCM scheme), the Secretariat will join as a facilitator.</li> <li>● If you have any questions about the session rules or need assistance, please contact the Secretariat staff at any time.</li> </ul>

## Organizations and Companies with Booths

Government of Japan and India, The Energy and Resources Institute (TERI)& A6IP Center, Mitsubishi Heavy Industries, Ltd., Asian Development Bank, Mizuho Financial Group, HORIBA, Ltd., JFE Engineering Corporation, Air Water India Private Limited, TLV India Private Limited, Wire Consultancy Pvt. Ltd., Bhumi (Drawdown Technologies Private Limited), Pi Green Innovations Private Limited, ReNew, Indiahub E-governance Pvt. Ltd., Kosher Climate India Private Limited, General Carbon Advisory Private Limited, WeCare, Vayuguard Climate Tech Private Limited, Indian Institute of Management Ranchi (IIM Ranchi)

## Opening Session

### Opening Remarks H.E. Amandeep Garg, Additional Secretary, MoEFCC, India



The opening remarks were delivered by Mr. Amandeep Garg, Additional Secretary, Ministry of Environment, Forest and Climate Change (MoEFCC), India, at the first official Joint Crediting Mechanism (JCM) Forum jointly hosted by the Governments of India and Japan. In his address, he highlighted India's climate progress and outlined the direction for future cooperation under Article 6 of the Paris Agreement. Mr. Garg emphasized that the Forum represents an important milestone in the launch of JCM cooperation between India and Japan, bringing together leaders, experts, and stakeholders from both countries and beyond.

He noted that India has made notable progress in its climate actions. As of June 2025, 50% of the country's installed power generation capacity comes from non-fossil fuel sources, achieving this target five years ahead of schedule. By 2030, India aims to reduce the emission intensity of its GDP by 45% and create an additional carbon sink of 2.5–3 billion tons of CO<sub>2</sub> equivalent. The National Action Plan on Climate Change (NAPCC) with nine national missions, complemented by State Action Plans, drives adaptation, mitigation, energy efficiency, and climate-resilient infrastructure.

Mr. Garg also highlighted India's global leadership in renewable energy and its intention to further enhance action through Article 6 of the Paris Agreement. He explained that the JCM is positioned as an opportunity to expand green investment, technology transfer, and innovation. India has extensive experience in carbon markets through compliance schemes such as the Perform, Achieve and Trade (PAT) scheme, as well as voluntary projects under the Clean Development Mechanism (CDM). Studies suggest that effective implementation of Article 6 could reduce global mitigation costs by around USD 300 billion annually by 2030.

Cooperation with Japan has already been strengthened. India and Japan have signed a Memorandum of Cooperation on JCM under Article 6.2. India has also established a National Designated Authority (DNA) for Article 6 implementation, comprising representatives from key ministries and departments. The DNA has identified a positive list of 13 eligible activities under Articles 6.2 and 6.4, targeting high-cost but critical low-carbon technologies that are essential for achieving India's NDCs.

In conclusion, Mr. Garg invited businesses, financial institutions, and technology leaders to participate in scaling up green innovation. He emphasized that JCM should be viewed as a transformative opportunity to redefine growth and channel investment toward sustainable pathways, supporting both India and Japan's ambitions for a cleaner, greener, and more resilient future.

## **H.E. Keiichi Ono, Ambassador of Japan to India**



At the outset, Mr. Ono expressed gratitude to the Government of India, participants, and stakeholders, as well as appreciation to both Japanese and Indian counterparts for their efforts in organizing the Forum.

He referred to the exchange of the Memorandum of Cooperation (MoC) on the JCM, witnessed by Prime Minister Modi and Prime Minister Kishida in Tokyo last month, highlighting it as one of the major outcomes of Prime Minister Modi's visit. Since the signing, both countries have been working constructively, and at the first Joint Committee meeting held yesterday, discussions on the rules of implementation took place, with the expectation of their early adoption.

Mr. Ono explained that the Forum features sessions presenting the latest updates on the JCM, introductions of potential projects and technologies, and business matching sessions to enhance awareness of the JCM within the Indian business community and promote the advancement of potential projects. He sincerely appreciated the active participation of all stakeholders.

He also stressed Japan's climate goals, noting the target of reducing greenhouse gas emissions by 46% in FY2030 compared to FY2013 levels, consistent with the 2050 Net Zero goal. Furthermore, he referred to Japan's updated NDC submitted to the UN in February 2025, declaring targets of a 60% reduction by FY2035 and a 73% reduction by FY2040. He emphasized that the JCM is one of the key tools for achieving Japan's NDC while also serving as a valuable instrument for India's decarbonization efforts.

In addition, Mr. Ono noted that Prime Minister Modi's visit opened what he described as a "new golden chapter" in the Japan-India Special Strategic and Global Partnership. Through the realization of many JCM projects in India, both countries will work together towards their shared goals, including Japan's NDC, Net Zero by 2050, and India's 2070 vision.

In closing, he expressed his hope that the Forum would contribute to further strengthening the already profound partnership between Japan and India.

## Keynote Speeches

### Mr. Rajani Ranjan Rashmi, Distinguished Fellow, TERI



Mr. Rashmi, Distinguished Fellow at The Energy and Resources Institute (TERI), delivered a keynote address on India’s energy transition and the critical role of international cooperation, particularly the Joint Crediting Mechanism (JCM), in accelerating decarbonization. Her remarks combined policy insights, investment opportunities, and the broader historical trajectory of India’s climate policy.

He began by situating India’s energy transition within its development context. India is the world’s third-largest energy consumer, with demand projected to double by 2040. At the same time, India has pledged under its Nationally Determined Contributions (NDCs) to reduce the emissions intensity of GDP by 45% from 2005 levels by 2030, achieve 50% of electricity capacity from non-fossil sources by 2030, and pursue net-zero emissions by 2070. These commitments are ambitious given India’s growth trajectory, but they demonstrate the country’s determination to balance rapid economic development with environmental responsibility and global climate leadership.

Mr. Rashmi highlighted several policy instruments shaping India’s transition. The Perform, Achieve and Trade (PAT) scheme, the Renewable Energy Certificate (REC) system, and the Energy Efficiency Financing Platform are central to scaling efficiency and clean energy deployment. He stressed that clear regulatory signals—such as carbon pricing, green hydrogen missions, and renewable purchase obligations—are crucial for mobilizing private investment. India’s evolving carbon market architecture, including its integration with global Article 6 mechanisms, is expected to provide new avenues for investment and technology transfer.

He emphasized that international cooperation is indispensable. Japan-India collaboration through the JCM provides an important platform for technology transfer, cost reduction, and capacity building. By facilitating investment in renewables, energy efficiency, and industrial decarbonization, the JCM aligns with India’s twin goals of economic growth and environmental sustainability. Moreover, the mechanism supports India’s broader engagement with Article 6 of the Paris Agreement, enabling access to finance and crediting opportunities at the international level.

Key sectors for investment include renewable energy with storage, green hydrogen, energy efficiency in heavy industries such as steel and cement, sustainable transport, and waste-to-energy. Mr. Rashmi underscored that while India is a price-sensitive market, international partnerships can accelerate the diffusion of advanced technologies. Over time, such cooperation reduces costs, strengthens supply chains, and supports large-scale deployment. He noted that scaling these technologies is not only a climate imperative but also a means to strengthen industrial competitiveness and energy security.

Reflecting on the historical evolution, he recalled that India's climate policy has steadily integrated sustainable development, starting with energy conservation laws in the early 2000s, followed by missions under the National Action Plan on Climate Change (NAPCC). Today, these efforts converge in sectoral roadmaps, green hydrogen strategies, and market-based mechanisms. The role of the private sector is expanding rapidly, but predictability and transparent governance remain essential to attract investment and ensure sustainable implementation.

He also drew attention to finance. India requires trillions of dollars of investment for its clean energy transition, and mobilizing both domestic and international capital is urgent. Mechanisms such as the JCM provide a bridge between project developers, technology providers, and financiers, offering risk-sharing tools that lower barriers to entry. In this regard, business matching forums play a catalytic role by connecting Indian and Japanese stakeholders to design and implement joint projects.

In conclusion, Mr. Rashmi underlined that Article 6 and the JCM provide crucial pathways for India to meet its climate goals while sustaining growth. By leveraging cooperative approaches, India can mobilize investment, expand clean technologies, and strengthen bilateral and multilateral partnerships. He reaffirmed India's commitment to enhancing transparency, building institutional capacity, and ensuring that its participation in Article 6 contributes to both national NDCs and global climate objectives.

## Mr. Kazuhisa Koakutsu, Director, A6IP Center



Mr. Kazuhisa Koakutsu, Director of the Article 6 Implementation Partnership (A6IP) Center, delivered a keynote speech emphasizing the importance of robust frameworks, public-private partnerships, and international collaboration for advancing high-integrity carbon markets. Drawing on two decades of experience, including extensive engagement with India since 2004, he reflected on lessons from the past and outlined priorities for the future.

He recalled that under the Kyoto Protocol, carbon markets expanded rapidly but were undermined in some cases by insufficient regulatory frameworks and lack of environmental integrity. These lessons underscore the need for stronger governance under the Paris Agreement, where transparency, accountability, and alignment with Nationally Determined Contributions (NDCs) are central. Unlike the past, all countries now have NDCs, and international cooperation must demonstrably contribute to their implementation and enhancement in order to maintain credibility and drive global climate ambition, thereby ensuring that carbon markets deliver real, measurable, and lasting climate benefits.

Mr. Koakutsu stressed that under the Paris Agreement, carbon markets are no longer stand-alone tools but integral mechanisms to help countries implement and enhance their NDCs on the pathway to net zero. He highlighted Japan's NDC 3.0, which includes the 200 million tons of emission reduction achieved through the JCM by 2040, and noted that India is establishing eligibility criteria for Article 6.2 activities, enabling projects to contribute directly to its NDC targets. This reflects a fundamental shift in the role of markets from optional mechanisms to essential instruments for achieving national and global climate targets, moving from voluntary initiatives to structured systems embedded within national and international policy frameworks.

The keynote underscored the significance of the India-Japan Joint Crediting Mechanism (JCM), which was formalized with the signing of the Memorandum of Cooperation in August 2025 and the first Joint Committee meeting held in September 22<sup>nd</sup> 2025. The JCM not only supports both countries' NDCs but also provides a model for bilateral cooperation that can inspire other nations. Through concrete projects in renewable energy, energy efficiency, and industrial decarbonization, the JCM can deliver measurable climate benefits while fostering innovation, investment, and sustainable development in both countries.

Mr. Koakutsu emphasized that achieving these goals requires close collaboration between government and the private sector. Governments must provide a solid framework of rules, registries, and safeguards, while private actors bring investment decisions, innovation, and project development. Public-private partnerships will therefore be at the heart of scaling up implementation and unlocking the potential of Article 6.

He also pointed to the role of A6IP in building capacity and promoting business engagement. The Center supports countries by organizing training, developing knowledge products, and facilitating dialogue between policymakers and businesses. In India, A6IP has been particularly active in business matching forums, which connect Indian and Japanese companies to explore investment opportunities under the JCM. More than 300 participants attended in person and 400 joined online at this forum, highlighting strong momentum for business-to-business and government-to-business collaboration under the JCM framework, and demonstrating the growing interest of stakeholders in advancing high-integrity carbon market cooperation between India and Japan.

Reflecting on his long-standing involvement with India, Mr. Koakutsu emphasized that the foundation for success lies in credibility and predictability. Only when markets are built on trust and integrity can they attract the scale of finance required for the energy transition. He concluded with a call to action: “Let’s work together.” He encouraged participants to join A6IP’s initiatives through its website and Linked-In, underscoring that collective action is essential to achieve the Paris Agreement goals, ensuring that international cooperation translates into tangible emission reductions and long-term sustainable growth.

## Group Photo



## Session 1: India's Carbon Market, JCM and Article 6

### 1-1. India's Domestic Carbon Market

#### Speakers:

- **Mr. Dhiraj Kumar Srivastava, Director General, Bureau of Energy Efficiency (BEE), Ministry of Power, India**

- **Mr. Shri Saurav Diddi, Director, Bureau of Energy Efficiency (BEE), Ministry of Power, India**



Mr. Srivastava and Mr. Diddi, Bureau of Energy Efficiency (BEE), under the Ministry of Power, presented a detailed overview of the establishment and operationalization of the Indian Carbon Market (ICM). This initiative represents a milestone in India's climate policy, aligning domestic action with international mechanisms such as the Joint Crediting Mechanism (JCM) and Article 6 of the Paris Agreement.

The Indian Carbon Market is structured under the Carbon Credit Trading Scheme (CCTS), which was legislated through the amendment of the Energy Conservation Act in December 2022 and became operational from January 2023. The scheme is designed around two mechanisms: the Compliance Mechanism, which is mandatory for energy-intensive industries, and the Offset Mechanism, which is voluntary for non-obligated entities. Together, they provide a framework for regulated emissions reductions as well as additional voluntary mitigation.

BEE highlighted that compliance targets have been identified for eight energy-intensive sectors, including steel, cement, petrochemicals, chemicals, aluminum, refineries, textiles, and chlor-alkali. Industry-specific trajectories for emission intensity reductions have been drafted, with baseline calculations made for around 743 industrial units. Nearly 400 targets are to be finalized within the month, with the remainder

expected shortly thereafter. Entities exceeding their targets will earn carbon credit certificates, while those failing to meet targets must purchase credits or pay penalties. Compliance trading is set to commence by October 2026.

The Offset Mechanism broadens participation by enabling non-obligated entities to register projects that reduce, avoid, or remove emissions. Credits are awarded for reductions beyond established baselines. The mechanism currently covers ten sectors, including energy, transport, agriculture, forestry, waste, construction, and carbon capture, utilization, and storage (CCUS). Nine methodologies have already been published, such as renewable energy with storage, pump hydro, and afforestation or reforestation projects, with additional methodologies under development. Offset credits are not interchangeable with compliance credits, ensuring integrity between the two systems.

Central to the ICM is a robust institutional framework. A National Steering Committee (NSC), co-chaired by the Secretaries of the Ministries of Power and Environment, oversees the market. The Bureau of Energy Efficiency serves as administrator, while accredited carbon verification agencies provide third-party validation and verification. Technical committees for compliance and offset mechanisms ensure sector-specific expertise, and a blockchain-based registry system will underpin trading to ensure transparency and security.

Digital infrastructure will play a key role in enabling the system. The ICM Portal and Registry, scheduled for launch in 2025, will serve as the entry point for project registration, monitoring, verification, and credit issuance. Importantly, this system will also establish linkages with international mechanisms, including Article 6.2 cooperative approaches, Article 6.4 of the Paris Agreement, and the Joint Crediting Mechanism. This interoperability ensures that India's domestic market can integrate into global carbon trading frameworks.

BEE underscored that India's Nationally Determined Contributions (NDCs) require reducing the emission intensity of GDP by 45% by 2030 and achieving over 50% installed capacity from non-fossil energy sources. With the forthcoming NDC 3.0 expected to be even more ambitious, the ICM provides a critical policy instrument to meet these targets. The presentation also noted that voluntary offset trading may begin earlier than 2026, depending on project readiness.

Overall, the presentation emphasized that India's carbon market is designed not only to achieve national targets but also to link domestic efforts with international carbon finance opportunities. Through the ICM, Indian industries and project developers will be able to access both compliance-driven and voluntary markets, with potential to register JCM projects through the national portal. This creates a pathway for broader investment, technology transfer, and enhanced climate action.

**1-2. India's Engagement in the International Carbon Market and Article 6**  
**Speaker: Ms. Nameeta Prasad, Joint Secretary, Ministry of Environment Forest and Climate Change (MoEFCC), India**



Ms. Nameeta Prasad from the Ministry of Environment, Forest and Climate Change (MOEFCC) presented India's engagement in Article 6 of the Paris Agreement, highlighting the country's national climate commitments, institutional arrangements, and the role of the Joint Crediting Mechanism (JCM) in advancing decarbonization and international cooperation.

She explained that Article 6 provides three complementary approaches: cooperative approaches under Article 6.2, the Paris Agreement Crediting Mechanism (PACM) under Article 6.4, and non-market approaches under Article 6.8. For India, these frameworks are important for mobilizing finance, transferring technology, and ensuring environmental integrity in meeting its Nationally Determined Contributions (NDCs).

India's NDC includes reducing emissions intensity of GDP by 45% by 2030 compared to 2005, achieving 50% of electricity capacity from non-fossil sources by 2030, and reaching net-zero emissions by 2070. Ms. Prasad emphasized that Article 6 can play a pivotal role in mobilizing climate finance and facilitating access to advanced technologies necessary to achieve these goals.

She noted India's priority areas for cooperative approaches, covering 13 activities such as renewable energy with storage, offshore wind, green hydrogen, compressed biogas, fuel cells, sustainable aviation fuel (SAF), carbon capture utilization and storage (CCUS), HVDC, energy efficiency, industrial process improvements, and emerging marine renewable technologies. These sectors reflect India's dual priorities of economic growth and environmental sustainability, while also offering opportunities for collaboration with international partners to mobilize investment, transfer technology, and scale up low-carbon solutions.

A major development in this regard was the signing of the Memorandum of Cooperation (MoC) between India and Japan on 7 August 2025, which officially launched the JCM partnership. This was followed by the first Joint Committee meeting on 22 September 2025, where both governments discussed procedures for credit issuance, allocation, and registry operations. Each country will maintain its own registry, and credits will be issued and allocated based on verified monitoring reports. JCM credits may be used by

both India and Japan toward their NDCs, ensuring mutual benefit and contributing to strengthened bilateral cooperation.

She outlined the institutional framework of NDAIAPA, established in 2022 and revised in 2025, which involves multiple ministries including MOEFCC, NITI Aayog, the Ministry of Power, MNRE, the Ministry of Finance, and the Ministry of External Affairs. This body oversees project approval, sustainability assessment, and overall governance of cooperative approaches. The NDAIAPA will play a central role in ensuring environmental integrity and transparency in Article 6 implementation.

Ms. Prasad highlighted ongoing efforts to strengthen systems and transparency. A comprehensive JCM manual is scheduled to be finalized by December 2025, while an enhanced ICM portal with a dedicated JCM module is expected to be operational from January 2026. The portal will automate processes such as project registration, monitoring, and credit issuance, reducing administrative burdens and enhancing credibility. Importantly, the registry system is being designed with blockchain technology to further increase transparency, traceability, and trust in carbon market transactions.

In her remarks, she also noted that India is actively engaging with other partners, including Singapore, Sweden, and South Korea, in addition to Japan. This reflects India's recognition that international carbon markets are essential not only for meeting domestic climate goals but also for facilitating global cooperation. She stressed that India, as a fast-growing and price-sensitive market, requires international credits to balance development needs with climate ambition. Article 6 can help deploy high-cost technologies in the short term and drive long-term cost reductions, making advanced solutions accessible at scale.

In conclusion, Ms. Prasad underlined that Article 6 is a vital instrument for India's climate strategy. By leveraging cooperative approaches and the JCM, India can mobilize investment, scale up clean technologies, and strengthen bilateral and multilateral partnerships. She reaffirmed that India will continue to enhance transparency, build institutional capacity, and ensure that its engagement in Article 6 contributes to achieving both national NDCs and global climate goals.

### **1-3. Article 6 Implementation Status**

**Speaker: Mr. Perumal Arumugam, Manager, Mitigation Division, UNFCCC Secretariat**

Mr. Perumal Arumugam from the UNFCCC Secretariat presented the latest developments under Article 6 of the Paris Agreement, outlining its mechanisms, progress, and implications for countries such as India that are seeking to expand their use of cooperative approaches. His presentation highlighted the evolution of rules, institutional arrangements, and the growing momentum for implementation.

Article 6 establishes three distinct components: cooperative approaches under Article 6.2, the Paris Agreement Crediting Mechanism (PACM) under Article 6.4, and non-market approaches under Article 6.8. Article 6.2 enables countries to cooperate by transferring mitigation outcomes internationally as ITMOs, provided they apply corresponding adjustments to avoid double counting. Article 6.4 creates a centralized crediting mechanism supervised by the UNFCCC, issuing A6.4ERs that can be authorized (AERs) for use toward NDCs or CORSIA, or used voluntarily as mitigation contribution units (MCUs) without requiring corresponding adjustments.

Mr. Perumal emphasized that Article 6.2 is not a mechanism but a transparency and accounting tool, ensuring environmental integrity and preventing double counting. Currently, 14 cooperative approaches have been submitted, 13 initial reports have been filed, and 5 have completed expert review. Japan has submitted cooperative approaches with Thailand, Mongolia, Maldives, and Palau, while additional JCM-related projects are expected to be reviewed in the next round. These developments demonstrate the rapid progress being made in operationalizing Article 6.2 at the global level.

Article 6.4, the PACM, is progressing rapidly. The Supervisory Body has held 17 meetings and adopted key documents, including 12 methodological standards, 16 procedures, and over 80 forms. More than 1,500 CDM activities have applied for transition, of which 11 have been registered and 1,075 have submitted prior notifications. The first issuance of A6.4ERs is expected later this year. Mr. Perumal noted that once India approves projects under Article 6.4, credits can be internationally transferred and used for NDC achievement, CORSIA compliance, or corporate net-zero targets, broadening opportunities for both public and private stakeholders.

He recalled that it took nine years of negotiations to finalize the Article 6 rulebook, building on the legacy of the CDM since 2004. The resulting framework now covers accounting of NDCs, reporting and tracking of ITMOs, transition of CDM projects, and registry operations. This long process has provided both clarity and predictability for governments and private actors alike.

Mr. Perumal also provided insights on NDC updates. Under NDC 2.0, 78% of countries referenced the use of Article 6, while in NDC 3.0—due in 2025—over 90% are expected to include it. Japan has already stated that it intends to use 100 million tons of JCM credits between 2031 and 2040. This reflects the growing recognition of Article 6 as an essential tool for meeting national climate goals.

Capacity-building activities are another important aspect. The UNFCCC has conducted more than 120 training sessions and events, with over 150 experts certified as technical reviewers. Knowledge products and explanatory series are being developed to support countries in implementation, while partnerships with international financial institutions and development agencies are being strengthened.

In conclusion, Mr. Perumal highlighted that Article 6 represents a crucial architecture for international cooperation on climate change. For India, it provides opportunities to mobilize investment, transfer technology, and generate high-integrity credits under both bilateral and centralized approaches. The UNFCCC Secretariat will continue to provide technical guidance, capacity building, and transparency to ensure that Article 6 contributes effectively to the achievement of the Paris Agreement's goals, while the JCM crediting process provides the financial incentives necessary to accelerate decarbonization efforts.

## Q&A Highlights

- **Nature-based credits & JCM**
    - Not included in Article 6.2/JCM as focus is on high-cost technology deployment; included under India's domestic offset mechanism.
  - **Technology eligibility**
    - Japanese technology **not mandatory**; cooperation involves Indian and Japanese industry partnerships.
    - Selection based on technology cost, novelty, and investment potential; project-by-project evaluation.
  - **Market separation**
    - Compliance and offset credits remain **separate**; may reconsider in future based on market behavior.
  - **Price incentives**
    - JCM can reduce technology or project costs via investment support, offering potential price benefits.
  - **Dynamic updates**
    - Article 6.2/6.4 technology list valid for 3 years but can be revised based on viability and project uptake.
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## Key Takeaways

1. India's domestic carbon market is operational and structured to accommodate both compliance and voluntary offset projects.
2. Article 6.2 and JCM provide strategic support for high-cost, transformative technologies to aid India's long-term decarbonization and NDC goals.
3. UNFCCC oversight ensures environmental integrity, transparent accounting, and alignment between domestic and international carbon markets.
4. The Q&A emphasized flexibility in technology choices, market separation, and investment-driven benefits of international cooperation.

## 1-4. Current Implementation Status and Potential of the JCM

**Speaker: Mr. Satoru Iino, Director, Global Environmental Bureau, Ministry of the Environment (MOEJ), Japan**



Mr. Satoru Iino, Director at the Ministry of the Environment, Japan (MOEJ), presented an overview of the Joint Crediting Mechanism (JCM) with a particular focus on its recent launch in India. His presentation combined reflections on the long history of negotiations with India and the potential opportunities for businesses and governments following the signing of the Memorandum of Cooperation (MoC) in August 2025.

Mr. Iino recalled that bilateral negotiations on the JCM between Japan and India began more than a decade ago, long before the Paris Agreement. The signing of the MoC on 7 August 2025, followed by a document exchange witnessed by Prime Ministers Modi and Ishiba on 29 August 2025, marked the culmination of these efforts. He stressed that while the negotiations had taken over 13 years, the priority now is to accelerate practical cooperation, facilitate projects, and avoid delays in implementation.

The JCM is a carbon market tool through which Japan cooperates with partner countries in mitigation activities. Emission reductions are conservatively calculated below business-as-usual baselines, authorized jointly by both governments, and issued as JCM credits. These credits can be counted toward the NDCs of both Japan and its partner countries. In Japan, JCM credits can also be used for corporate compliance under the forthcoming GX-ETS, which will commence in 2026. Importantly, Mr. Iino emphasized that eligible technologies need not be exclusively Japanese—Indian or third-country technologies are also acceptable if they meet criteria for advanced decarbonization.

As of August 2025, Japan has signed JCM agreements with 31 countries, including India. More than 270 projects have been implemented globally, with over USD 3 billion in total investment. About 56% of these projects involve renewable energy, while 34% focus on energy efficiency, alongside initiatives in waste management, forestry, and agriculture. These experiences provide valuable lessons and models that can be adapted in the Indian context. While no projects have yet been launched in India, Mr. Iino underlined the need to move quickly to establish the first examples.

Case studies were shared to illustrate the range of eligible JCM activities. Examples include a 26.3MW solar power facility with a 48MWh battery system in Chile, a 6MW waste heat recovery power generation system at a cement plant in the Philippines, and the introduction of high-efficiency autoclaves at pharmaceutical factories in Indonesia. These projects demonstrate how advanced technologies can reduce emissions and improve efficiency, while also generating tradable JCM credits.

Japan's updated NDC highlights the ambition to achieve cumulative reductions and removals of 100 million tons of CO<sub>2</sub> by 2030 and 200 million tons by 2040 through the JCM. Mr. Iino reiterated that the JCM is not limited to Japanese technologies; Indian and third-country technologies are equally eligible if they meet criteria for best available technologies. The key objective is to mobilize investment, enhance profitability of decarbonization projects, and provide financial incentives through JCM credits.

The Government of Japan has also strengthened institutional support by establishing the Joint Crediting Mechanism Implementation Agency (JCMA) in April 2025. The JCMA serves as a one-stop focal point covering all aspects of JCM operation, including project facilitation, monitoring, and ensuring environmental integrity. This institutional innovation is expected to streamline project approval and implementation.

Looking ahead, Mr. Iino emphasized the urgent need to transition from negotiation to action. He encouraged Indian and Japanese businesses to leverage the JCM as a platform for investment and technology deployment. He highlighted the importance of business matching, capacity building, and close collaboration between governments and private sectors to accelerate project pipelines. The presentation concluded with a call for all stakeholders to engage proactively, ensuring that India soon features its first JCM project.

## 1-5. Rule of Implementation under JCM and Global Match

**Speaker: Dr. Yuji Mizuno, Secretary-General, JCM Implementation Agency (JCMA)**



Dr. Yuji Mizuno, Secretary-General of the Joint Crediting Mechanism Implementation Agency (JCMA), delivered a presentation on the crediting process of the Joint Crediting Mechanism (JCM) and introduced the Global Match platform for business collaboration. His remarks provided practical guidance for Japanese and Indian stakeholders interested in leveraging JCM for project development under Article 6 of the Paris Agreement.

Dr. Mizuno explained that emission reductions from JCM projects are calculated as the difference between reference emissions, determined with consideration of the host country's NDC, and project emissions. The resulting mitigation outcomes are divided into three categories: credits allocated to the host country, credits allocated to Japan, and outcomes not issued as credits but still contributing to the host country's NDC. The allocation is agreed bilaterally, based on the financial, technical, and operational contributions made by each party, ensuring a fair and transparent process.

He emphasized that the transfer of JCM credits must be authorized under Article 6 as internationally transferred mitigation outcomes (ITMOs), with corresponding adjustments applied to avoid double counting. To simplify procedures, Japan has proposed streamlined authorization processes to improve predictability for private companies. Importantly, authorization involves two distinct steps: entity authorization at the PDD registration stage and credit authorization at the issuance stage. These steps ensure credibility, transparency, and compliance with both countries' requirements.

Dr. Mizuno also outlined the JCM project cycle. It begins with the submission of a Project Idea Note (PIN), followed by methodology approval, development of a Project Design Document (PDD), validation and verification by Third-Party Entities (TPEs), and credit issuance. He underscored the critical importance of the PIN stage, as it enables early consultation with both governments to confirm eligibility and reduce risks of disqualification after investment. He advised proponents to clearly state two key elements in the PIN: the concrete benefits to India in terms of emission reductions and economic development, and the specific reasons why JCM support is indispensable, such as access to subsidies, carbon credit revenues, or essential technology transfer.

The list of eligible activities, published by India's Ministry of Environment, Forest and Climate Change (MOEFCC) in June 2024, includes renewable energy with storage, offshore wind, green hydrogen, biogas, fuel cells, sustainable aviation fuel (SAF), CCUS, and HVDC. Project proposals must demonstrate their contribution to both emission reductions and India's economic development, while also explaining why JCM support is necessary—for example, to overcome financing gaps, secure subsidies, or enable technology deployment that would not otherwise occur.

A significant part of the presentation focused on the Global Match platform, a free online matchmaking tool operated by JCMA. With about 1,000 registered users from more than 60 countries, it allows companies to search for potential partners by technology or country, share profiles and services, and conduct both open and closed discussions. While digital platforms are useful for initial networking, Dr. Mizuno stressed that direct dialogue and in-person meetings remain indispensable for building trust and advancing projects toward implementation.

In conclusion, Dr. Mizuno highlighted that successful JCM project implementation requires not only technical and financial preparation but also careful alignment with Article 6 procedures, early government consultation, and strong partnerships. JCMA, established in April 2025, now serves as a one-stop institution for supporting these processes. Tools such as Global Match expand opportunities for collaboration, while the JCM crediting process provides the financial incentives necessary to accelerate decarbonization and scale up investment in sustainable projects.

## **1-6. ADB Support for Carbon Markets and the Japan Fund for the JCM**

### **Speakers:**

- Mr. Virender Kumar Duggal, Head of Carbon Markets, Asian Development Bank (ADB)**
- Mr. Shohei Okano, Fund Manager of JFJCM, ADB**



Mr. Duggal and Mr. Okano, the Asian Development Bank (ADB) delivered a comprehensive presentation on its long-standing engagement with carbon markets and the role of the Japan Fund for the Joint Crediting Mechanism (JFJCM) in catalyzing low-carbon investments. This session highlighted ADB's integrated approach to leveraging carbon finance to accelerate climate action across its developing member countries (DMCs), with a particular focus on India following the bilateral JCM agreement with Japan.

At the outset, ADB congratulated the governments of Japan and India for concluding the JCM bilateral agreement. This milestone sends a strong signal to private sector stakeholders, encouraging them to invest in low-carbon technologies through the utilization of carbon finance. ADB emphasized that the JCM provides a real-world demonstration of how cooperative approaches under Article 6.2 of the Paris Agreement can be implemented effectively and cost-efficiently, enabling countries to pursue their mutual interest in greenhouse gas (GHG) emission reductions.

ADB's Carbon Market Program is a bank-wide initiative designed to create innovative financial mechanisms that drive climate mitigation. The program consists of three main instruments. The first is the Article 6 Support Facility, which enhances the readiness of governments and private sectors in Asia and the Pacific to participate in emerging international carbon markets. The second is the Climate Action Catalyst Fund, a dedicated carbon fund established with contributions from Sweden and Norway. It provides fixed-price, long-term carbon purchase agreements with upfront payment options, aimed at restoring market confidence and sending a clear price signal to investors. The third is the Japan Fund for JCM (JFJCM), launched in 2014 with financial support of approximately \$137 million from the Government of Japan. This fund has proven essential in supporting projects that deploy advanced low-carbon technologies in DMCs.

The JFJCM provides co-financing grants to both sovereign and non-sovereign ADB-financed projects, covering incremental costs associated with advanced technologies. Grants can amount to up to 10% of total project costs, capped at \$10 million. Eligible technologies must be advanced within the host country's context and capable of delivering measurable, reportable, and verifiable GHG reductions. By 2025, JFJCM had supported nine projects across six countries, including initiatives in Bangladesh, Mongolia, Maldives, Indonesia, Palau, and the Kyrgyz Republic. These projects demonstrate how carbon finance can significantly improve the financial viability of low-carbon investments.

Case studies illustrate JFJCM's practical impact. In Maldives, JFJCM supported advanced micro-grid technologies combining solar PV and battery energy storage systems. In Bangladesh, it financed energy-efficient transmission lines using high-temperature low-sag conductors. In Mongolia, it enabled the deployment of renewable energy with advanced battery systems and the construction of green hospitals with geothermal heat pump systems. Similar projects in Indonesia and Palau underscore the diversity of supported technologies and their broad socio-economic and environmental benefits.

ADB also stressed the importance of ensuring integrity and transparency in carbon markets. By aligning JFJCM and other mechanisms with Article 6.2 requirements, ADB contributes to the avoidance of double counting, while helping partner countries achieve their nationally determined contributions (NDCs). Moreover, JFJCM-supported projects are expected to deliver co-benefits such as reduced air and water pollution, improved waste management, enhanced energy security, job creation, and gender-inclusive opportunities.

A key message conveyed in the presentation is that carbon finance must catalyze transformative action at scale. Developing countries in Asia and the Pacific require an estimated \$1.7 trillion annually through 2030 for climate action, underscoring the urgency of mobilizing additional finance streams. By combining its technical support, innovative financing instruments, and concrete project experience, ADB is positioning carbon markets as a cornerstone of sustainable development pathways.

Finally, ADB invited potential project developers in India and elsewhere to make use of its guidance materials, including step-by-step publications on how to develop JCM projects. This knowledge-sharing initiative aims to broaden participation and expand the pipeline of high-integrity mitigation activities in the region. In conclusion, the presentation underlined that the JCM and carbon markets represent not just financial tools, but transformative instruments for accelerating climate action and fostering sustainable, low-carbon growth in India and across Asia and the Pacific.

## Interactive Q&A

Moderated by Mr. Kazuhisa Koakutsu, A6IP Center.

- **Use of JCM credits in Japan's GX-ETS (compliance market)**
  - *Response (MOEJ, Mr. Iino):*
    - No restriction is planned on the **type/substance** of JCM credits that can be used in the GX-ETS.
    - However, there will be a **limit on the amount** of offset usage allowed.
- **Requirement for Japanese technologies in JCM projects**
  - *Response (India, Ms. Nameeta):*
    - Japanese technology is **not mandatory**.
    - The key requirement is that the technology is **new** and contributes to **additional** mitigation.
    - Joint activities advancing more advanced technologies are strongly encouraged.
- **Eligibility of projects for early retirement of coal plants**
  - *Response (India, Ms. Nameeta):*
    - Early retirement of coal plants is **not considered an eligible activity** under India's approved list for Article 6.2/JCM.
    - Renewable energy projects (e.g., solar with batteries, ocean thermal) are eligible.
  - *Response (Japan, Mr. Iino):*
    - Clarified that detailed assessment could be done via the **Project Information Sheet**, which facilitates consultation between the private sector and governments.
- **Role of other organizations (ADB, research institutes, etc.)**
  - *Response (ADB, Mr. Duggal / Mr. Okano):*
    - ADB provides readiness support through its **Article 6 Support Facility** and funding through the **Japan Fund for JCM (JFJCM)**.
    - JFJCM can cover project documentation and technical support for credit issuance.
    - Strong engagement with India's decarbonization agenda.
  - *Additional note:*
    - Research institutes (including Indian ones) have an important role in **developing methodologies and PDDs**, which are much needed for JCM projects.
- **Eligibility of Indian carbon market registered projects under JCM**
  - *Response (India, Ms. Nameeta):*
    - If a project type is **not included in the approved activity list** under Article 6.2/6.4, it cannot be approved under JCM.
    - The list of eligible activities is **not fixed** and will be periodically reviewed/expanded based on strategic needs and new technologies.
- **IRR (Internal Rate of Return) expectations**
  - *Response (ADB):*
    - No fixed benchmark exists.
    - JCM projects are expected to face financial viability challenges, which carbon finance helps to overcome.
    - For general ADB lending, IRR expectations vary depending on technology and project type.
- **Methodology process under JCM**

- *Response (JCMA, Dr. Mizuno):*
  - Existing **CDM methodologies** (which credit against BAU emissions) are not directly applicable.
  - Under the Paris Agreement, all countries must reduce emissions, so crediting must be based on reductions **below BAU**.
  - Therefore, **new methodologies** need to be developed to align with JCM and Article 6 requirements.
- **Example: Waste-to-Energy project in India**
  - *Response (ADB):*
    - ADB approved a project (~USD 10 million) in waste-to-energy.
    - Main challenge: new technology with limited technical expertise/experience in India.

## Session 2: Potential Sectors and Technologies under Article 6.2 and the JCM in India

### 2-0. Introduction of the session

**Speaker: Mr. Norihiro Kimura, Senior Negotiator for Climate Change, Global Environmental Affairs Office, GX Policy Group, Ministry of Economy, Trade and Industry (METI), Japan**



Mr. Kimura (METI) opened the session, noting METI's role in promoting the JCM and engaging with Japanese companies.

### 2-1. Carbon Credits From Biogas/CBG Sector Speakers:

- Mr. Rohit Kumar, Secretary General, Carbon Market Association India (CMAI)
- Mr. Manish Dabkara, President, CMAI



Mr. Kumar and Mr. Dabkara, Carbon Market Association of India (CMAI), a three-year-old industry body, presented its commitment to advancing India's carbon markets and net-zero transition. CMAI collaborates closely with ministries such as MoEFCC, MNRE, and MoP, participating in committees on the Green Credit Programme, Extended Producer Responsibility, and environmental standards.

It has signed MoUs with IITs and other institutions, conducted over 50 capacity-building programs, facilitated 200+ meetings, and made 20+ policy representations. Mr. Kumar also represented Indian industry at the UNFCCC COP and Article 6 dialogues, and successfully advocated the inclusion of clean cooking solutions under Article 6.

In its presentation, Mr. Dabkara emphasized capacity building, climate finance, and matchmaking as priorities, noting that Article 6 and the Joint Crediting Mechanism (JCM) can provide reliable frameworks for project development. CMAI announced its plan to launch the first JCM program in India and to conduct project modeling across 13 technology areas. For example, in compressed biogas (CBG), carbon credit revenues at USD 20–30/tCO<sub>2</sub> could finance 10–12% of project costs, while biochar projects could achieve payback in just three years.

The CBG sector was highlighted as a key decarbonization opportunity, using agricultural residues, animal manure, municipal waste, and industrial effluents to replace open burning and fossil fuel use. Benefits include methane reduction, renewable energy, rural jobs, and organic fertilizer production. CMAI members target generating 5 million credits from bioenergy by 2030, with notable projects in Indore, Varanasi, and Amul’s household biogas program.

Challenges remain—feedstock variability, high setup costs, distribution gaps, technical hurdles, and community acceptance. To address these, CMAI stressed that Article 6.2/JCM credits are essential. Current prices of USD 15–41/tCO<sub>2</sub> in Asia-Pacific could rise to USD 30–75 by 2035, offering a strong investment case for Indian industry and global partners.

## **2-2. Renewable energy (solar, wind) with storage, hydro-hybrid projects, storage, green hydrogen**

**Speaker: Mr. Bishwa Ranjan Roy, AVP and Head of Carbon Sales & Business Development, ReNew**



Mr. Roy, ReNew, one of India’s largest renewable energy companies with more than 18 GW of projects (11 GW operational), presented its strategy for JCM collaboration. Listed on NASDAQ since 2021 and globally recognized for decarbonization, he highlighted the India–Japan partnership as a pivotal driver of international carbon markets. The company has generated over 20 million credits across voluntary, compliance, and Article 6 schemes, and is actively developing a robust pipeline of JCM projects.

A central case study was ReNew’s Battery Energy Storage Systems (BESS). India requires more than 2,300 GWh of storage by 2047, but added only 341 MWh in 2024. To stabilize its renewable-heavy grid, capacity must grow at 40% annually. ReNew has commissioned 150 MWh of BESS and is building a hybrid project with 400 MW solar, 250 MW wind, and 170+ MW batteries (400 MWh), equal to India’s current national capacity. Such projects, with high costs and adoption rates as low as 0.016%, are “automatically additional” under CDM ACM0002, justifying eligibility for Article 6 credits. At \$20–30/tCO<sub>2</sub>, credits could cover a significant share of financing needs.

Beyond BESS, ReNew is advancing CBG, AWD, and biochar projects within its JCM pipeline. These solutions deliver scalable, verifiable, and low-cost mitigation opportunities. The company emphasized the need for clear methodologies, price signals, and enabling frameworks, inviting Japanese and Indian partners to collaborate. Through JCM, ReNew aims to mobilize finance, expand its portfolio, and deliver secure, sustainable energy aligned with India’s NDC of 50% renewables by 2030 and net zero by 2070.

### **2-3. Best available technologies for process improvement in hard-to-abate sectors, Green ammonia, CCUS**

**Speaker: Mr. Rei Kimura, Managing Director, Mitsubishi Heavy Industries India Private Ltd.**



Mr. Kimura, Mitsubishi Heavy Industries (MHI) presented its decarbonization technologies at the Forum on Promoting Article 6 and JCM in India. The presentation, led by Managing Director Raj Kimura, emphasized MHI’s commitment to achieving carbon neutrality by 2040—ten years ahead of global targets—through its “Mission Net Zero” initiative.

MHI, founded in 1884, operates across diverse sectors including aerospace, defense, energy systems, and chemical plants. With annual revenues of ¥5 trillion (USD 33 billion), MHI has developed over 400 types of machinery and services. The company’s technologies applicable to JCM include waste heat recovery systems, advanced gas turbines, and carbon capture solutions.

A key JCM project highlighted was the installation of a 1.8MW Organic Rankine Cycle (ORC) waste heat recovery system at a flat glass manufacturing plant in Thailand. This system captures waste heat from the melting furnace and converts it into electricity, reducing reliance on grid power and lowering CO<sub>2</sub> emissions. The project aligns with Thailand’s energy-saving policies and demonstrates JCM’s role in reducing capital expenditure.

MHI’s advanced gas turbines, such as the H-25 model, offer high efficiency (up to 84% in cogeneration mode) and fuel flexibility, including natural gas, LPG, bioethanol, and under-development hydrogen and ammonia. The company successfully tested 100% hydrogen combustion and is developing multi-cluster combustors to address challenges like low calorific value and NO<sub>x</sub> emissions.

For carbon capture, Mr. Kimura introduced the KM CDR Process, an amine-based absorption system capable of capturing over 95% of CO<sub>2</sub> from flue gas. The system includes absorber and regeneration towers and achieves 99.9% CO<sub>2</sub> purity. MHI also offers modular CO<sub>2</sub>MPACT systems with capacities ranging from 0.3 to 200 tons/day, enabling faster deployment and customization.

The Petra Nova project in Texas, USA, was cited as the world’s largest post-combustion carbon capture plant, with a capacity of 4,776 tons/day. Supported by the U.S. DOE and Japanese government financing, it showcases MHI’s global leadership in carbon capture.

Mr. Kimura expressed its intent to collaborate with Indian stakeholders across business, finance, and government sectors to expand JCM utilization. The company’s group in India includes ten subsidiaries supporting energy systems, infrastructure, and logistics. MHI aims to contribute to India’s decarbonization efforts through technology transfer and strategic partnerships.

## **2-4. High Voltage Direct Current**

**Speaker: Mr. Karthik Krishnamurthi, Country Head – Marketing & Sales, Hitachi Energy India Limited**



Mr. Krishnamurthi, Hitachi Energy India presented a business pitch on high-voltage direct current (HVDC) technology, highlighting its potential to transform India’s energy system and contribute to Joint Crediting Mechanism (JCM) projects. The presentation showcased how HVDC enables efficient long-distance power transmission, reduces greenhouse gas (GHG) emissions, and supports sustainable urban and industrial development.

Hitachi Energy is a global leader with 45,000 employees, operations in 90 countries, 200 offices, and annual revenues of USD 13 billion. The company operates across four business units: grid automation, high-voltage products, grid integration, and transformers. Its customers include utilities, transport, infrastructure, and industrial sectors worldwide. With decades of expertise, Hitachi Energy has delivered more than 50% of HVDC projects globally, underscoring its role as a pioneer in advancing reliable, efficient, and sustainable power transmission systems worldwide.

HVDC technology provides significant advantages over conventional alternating current (AC) systems. It allows the transmission of large volumes of electricity over long distances with much lower losses, supports integration of renewable energy from remote regions into urban centers, and requires far narrower rights-of-way (ROW), reducing environmental and social impacts. For example, transmitting 3 GW of power through HVAC requires approximately 150 meters of ROW and three transmission towers, while HVDC can achieve the same transfer with only 50 meters of ROW and a single transmission line, significantly reducing land use and environmental impact.

Mr. Krishnamurthi emphasized the particular relevance of HVDC for India’s rapidly growing cities such as Mumbai and Delhi, where land constraints, regulatory approvals, and the need for reliable power supplies create challenges. HVDC’s smaller footprint and hybrid flexibility—using both overhead lines and underground cables—make it suitable for densely populated areas. In such contexts, HVDC can deliver renewable power directly into urban grids, decarbonizing city landscapes and supporting national energy security.

Case studies highlighted include the North-East Agra HVDC project, which transmits 6,000 MW of hydropower from northeastern India to the north, demonstrating successful integration of renewable energy at scale. Similar opportunities exist in Rajasthan, Gujarat, and other regions, particularly under the Green Energy Corridor initiative. These projects align well with JCM criteria for advanced transmission technologies that enable measurable GHG reductions through efficiency improvements and renewable energy integration.

Hitachi Energy is also advancing innovation through three pillars: power electronics products, digital technologies, and sustainable solutions. The company is developing new applications such as HVDC Light® technology, which enhances flexibility for medium-capacity projects and urban in-feed systems. These innovations support the deployment of renewables and decarbonization of energy systems while meeting JCM requirements for high-efficiency, low-carbon infrastructure.

He further explained how HVDC contributes to JCM eligibility by generating measurable mitigation outcomes. By reducing transmission losses and facilitating renewable integration, HVDC projects can deliver certified credits under Article 6.2 of the Paris Agreement. Revenues from these credits improve project viability, reduce financial risks, and support wider adoption in India. This makes HVDC not only a technological solution but also a financial and policy instrument for accelerating decarbonization.

In conclusion, Hitachi Energy positioned HVDC as a cornerstone technology for India's energy transition. With proven global expertise, successful project references, and alignment with JCM mechanisms, HVDC can play a decisive role in achieving India's climate and development goals. The company invited stakeholders to explore collaboration opportunities under the JCM framework to mobilize investment, accelerate renewable integration, and deliver sustainable, low-carbon growth.

## 2-5. Energy Efficient Technology in Wastewater Treatment

**Speaker: Mr. Minto Matsunaga, Business Development Manager – Environment, HORIBA, Ltd.**



Mr. Matsunaga, HORIBA India presented its ammonia nitrogen meter as a practical solution for energy efficiency, GHG mitigation, and operational cost reduction in wastewater treatment plants (STPs). He highlighted the severe challenges facing India’s water sector and demonstrated how HORIBA’s technology can provide measurable benefits aligned with Joint Crediting Mechanism (JCM) criteria.

India’s wastewater treatment sector faces multiple structural and operational challenges: inadequate treatment capacity (only about 30% coverage), poorly maintained infrastructure, high energy consumption (especially aeration), weak compliance with effluent norms, poor sludge management, and limited cost recovery. These issues are compounded by rising public health risks and GHG emissions, particularly methane and nitrous oxide. National initiatives such as the National Mission for Clean Ganga (NMCG) and AMRUT are attempting to address these challenges by expanding sewage treatment capacity, enforcing stricter effluent standards, and encouraging the adoption of energy-efficient technologies.

HORIBA’s ammonia nitrogen meter directly measures nutrient concentrations in aeration tanks, enabling optimal blower control. Conventional dissolved oxygen (DO)-based control often results in over-aeration, wasting energy and raising costs. By contrast, ammonia-based control responds to real-time wastewater conditions, ensuring that blowers run only as needed. Japanese case studies have shown 10–30% energy savings, with one EPC company achieving an average reduction of 16%. This technology is already gaining traction in multiple markets including Japan, China, Korea, and Europe, and is now being introduced in India through business-matching initiatives.

The expected impacts are substantial. A 25 MLD (million liters per day) STP could cut about 91 tons of CO<sub>2</sub> annually, while a 100 MLD facility could achieve reductions of nearly 368 tons per year. Financial savings are equally significant: a 25 MLD STP could save about INR 1 million annually in electricity costs, and a 100 MLD facility about INR 4 million. Scaling this technology across India’s 500+ STPs would unlock enormous national-level benefits in emissions reduction and energy conservation.

Technical strengths of the device were also presented. The SOE-type sensor requires no reagents, lowering operating costs. It has a fast response time, protective film that extends sensor life, diagnostic functions to detect deterioration, and an optional ultrasonic cleaner that allows more than one month of maintenance-free operation. Unlike conventional analyzers, HORIBA’s device can measure even low concentrations (1–2 ppm), making it versatile and cost-efficient.

Case studies were used to illustrate its impact. In one STP, blower energy consumption was reduced by approximately 20% without requiring major infrastructure upgrades. Compared to replacing entire blower systems, which is expensive and construction-intensive, installing HORIBA's analyzer provides a cost-effective retrofit solution with immediate benefits.

Beyond energy and cost savings, the technology supports multiple Sustainable Development Goals (SDGs). It reduces CO<sub>2</sub> and N<sub>2</sub>O emissions (the latter having 273 times the warming potential of CO<sub>2</sub>), improves water quality by ensuring treated water complies with discharge standards, and contributes to river and sea protection. It also indirectly increases electricity availability for surrounding communities by reducing STP power consumption.

In conclusion, Mr. Matsunaga presented its ammonia nitrogen meter as a small-scale but high-impact innovation. By enabling precise aeration control, it reduces energy demand, lowers costs, and mitigates GHG emissions. With strong applicability to JCM projects, the technology offers an effective pathway for India to improve wastewater management while advancing its decarbonization agenda and expanding opportunities for Japan-India cooperation.

## **2-6. Waste to Steam and Power**

**Speaker: Mr. Gen Takahashi, Deputy General Manager, Sales & Marketing Department, Global Business Division, JFE Engineering Corporation**



Mr. Takahashi, JFE Engineering Corporation presented its vision for advancing waste-to-energy (WtE) and circular resource management in India, highlighting how Japanese high-efficiency technologies can contribute to greenhouse gas (GHG) reductions under the Joint Crediting Mechanism (JCM). He emphasized JFE’s unique experience as the only company to have successfully implemented WtE projects under the JCM, positioning it as a leader in India-Japan collaboration for decarbonization.

JFE Engineering is part of JFE Holdings, with annual revenues of 569.8 billion JPY in FY2024. The environment-related sector accounts for 43.9% of its business, covering WtE plants, water treatment, and renewable energy projects. JFE Engineering India, established in 2011, has the country’s largest dedicated WtE team with over 170 specialists. By combining Japanese engineering excellence with local sourcing and EPC (engineering, procurement, and construction) capabilities, JFE delivers both advanced technologies and comprehensive project solutions tailored to the Indian market.

In FY2023, JFE’s environmental projects achieved CO<sub>2</sub> emission reductions of over 11 million tons, reflecting the company’s strong track record in deploying best available technologies for high-emission industrial sectors. A flagship case is the JCM-registered waste heat recovery project at the PT Semen Indonesia cement plant in Tuban. This initiative demonstrates how JFE technology delivers substantial energy efficiency improvements in hard-to-abate industries while supporting partner countries in achieving their climate and sustainable development goals.

Mr. Takahashi underscored the financial challenge of adopting advanced WtE technologies in India. Conventional WtE facilities are being developed domestically, but the higher upfront costs of Japanese high-efficiency systems remain a barrier. JCM support plays a catalytic role by bridging this “technology premium gap,” enabling next-generation solutions to become financially viable. By leveraging JCM incentives, Indian partners can reduce economic risks, deploy advanced facilities, and simultaneously contribute to significant greenhouse gas reductions and long-term sustainable growth.

A central example shared was JFE’s Bac Ninh WtE project in Vietnam. The facility processes 500 tons per day of municipal and industrial solid waste, generates 11.6 MW of power, and reduces approximately 41,800 tons of CO<sub>2</sub> annually. Its technology demonstrates effective treatment of high-moisture waste, a challenge common in Asia including India. A similar model could be replicated in India to strengthen urban and industrial ecosystems and to create significant environmental, social, and economic benefits that contribute to sustainable development and long-term decarbonization goals.

He also outlined next-generation innovations. These include WtE facilities designed to be CCU-ready, integrating CO<sub>2</sub> capture technologies to further mitigate emissions. Research in Japan is demonstrating how captured CO<sub>2</sub> can be converted into valuable products, contributing to circular economy pathways. Additionally, JFE is advancing waste-to-chemical technologies that transform plastic waste into raw materials and fuels, including sustainable aviation fuel (SAF). These approaches align with India's decarbonization strategy and support its commitments under the Paris Agreement, particularly the goals set out in Article 6.

Mr. Takahashi stressed that deploying WtE projects in India through JCM would not only support decarbonization but also create benchmarks for integrated urban-industrial ecosystems. By combining Japanese technology with local expertise, JFE aims to deliver reliable, safe, and environmentally sound facilities that generate clean electricity, reduce landfill dependence, and mitigate GHG emissions in line with India's long-term climate strategy.

In conclusion, Mr. Takahashi positioned JFE as a strategic partner for India's decarbonization journey. With proven JCM experience, high-efficiency WtE technologies, and innovative CCU and waste-to-chemical solutions, JFE is prepared to collaborate with Indian stakeholders to accelerate project adoption. Leveraging JCM as both a funding mechanism and a technology transfer platform, India can fast-track advanced WtE deployment, achieve its national climate goals, and promote sustainable and inclusive growth for the benefit of present and future generations.

## **2-7. Sustainable Aviation Fuel**

**Speaker: Sankalp Purwar, Manager - Energy & Environment, Indian Sugar and Bio Energy Manufactories**



Mr. Purwar explained that the Indian Sugar and Bio-Energy Manufacturers Association (ISMA), representing about 70% of India’s sugar and ethanol sector, outlined its strategy to transform sugar biorefineries into integrated bio-energy hubs under the JCM. He stressed its pivotal role in turning 55 million sugarcane farmers into “energy producers” and highlighted India’s global leadership in ethanol blending, achieving E20 in just 6–7 years compared to Brazil’s three decades.

Mr. Purwar noted global biofuel demand is set to rise 30% by 2028, largely from ethanol and Sustainable Aviation Fuel (SAF). India’s blending programme has saved INR 1.36 lakh crore in forex, cut 70 million tCO<sub>2</sub>eq emissions, and delivered INR 1.18 lakh crore to farmers. With supportive government policies and biomass aggregation systems, the sugar sector is positioned as a global biofuel leader. Japan’s ambitious blending targets—10% by 2030 and 20% by 2040—create natural synergies for Indo–Japanese cooperation under JCM.

The sector offers major opportunities in bio-CBG, green hydrogen, and 2G ethanol. Surplus bagasse alone could yield 2.6 MMT of hydrogen, meeting half of India’s 2030 target, while also supporting 2.5 billion litres of 2G ethanol. SAF is a key frontier: Deloitte projects India could produce 1,600–1,900 crore litres by 2040, with sugar contributing 400 crore litres.

ISMA estimates 4 billion litres of SAF potential, leaving 10 billion litres for export, supported by Japan collaborations and recent MoUs with industry players.

A life-cycle analysis shows Indian ethanol’s carbon intensity at 14–16 gCO<sub>2</sub>/MJ, lower than Brazil’s 20–21, underscoring its competitiveness. Mr. Purwar called for expanded Indo–Japanese cooperation through JCM to unlock this export potential and scale India’s role as a global biofuel hub.

## **2-8. Hard to Abate Sectors Ecosystem Curation Speaker: Ms. Arti Ahluwalia, Director, Dimex Green Energy Pvt. Ltd.**



Ms. Ahluwalia, Dimex Green Energy, a newly established company in India with a global brand legacy dating back to 1933, presented its vision for ecosystem curation and consulting in hard-to-abate sectors under the JCM. While relatively new in energy, Dimex has actively engaged at the United Nations for over three years, contributing to high-level forums, SDG summits, and COP negotiations, including drafting policy language such as Action Item 26 on transnational organized crime. This work underscores its capacity to integrate governance, sustainability, and development challenges.

She emphasized that Article 6.2 and 6.4 are important, but Article 6.8—non-market approaches—is often overlooked yet vital. Dimex argued that achieving systemic transformation requires going beyond crediting to include service architecture, policy reform, and social consensus. Its consulting portfolio aligns with the 17 SDGs and India’s NDCs, ensuring that climate action also delivers co-benefits for society and economy.

Ms. Ahluwalia presented its “Whole Systems Change” approach, embedding social and technical dimensions across project design. This includes project-based consensus building, ESG-led measurement and audit systems, future-focused learning ecosystems, and incubation of early-stage climate and energy technologies. By applying this model, Dimex seeks to accelerate adoption pathways, strengthen institutional capacity, and create scalable solutions for India’s decarbonization.

Finally, she introduced its “INFUSE” framework—covering Infrastructure, Food Security, Energy Systems, Water Leadership, Waste Consciousness, Wellbeing, and Security. This model reflects planetary boundaries thinking and a nature-reverent culture code. By combining UN-level policy experience with consulting innovation, Dimex positions itself as a unique partner for Indo–Japanese JCM collaboration, advancing both carbon and non-market approaches to support sustainable transitions.

**2-9. Best available technologies for process improvement in hard to abate sectors**  
**Speaker: Mr. Lovish Ahuja, Dalmia Cement (Bharat) Limited**



Mr. Ahuja, Dalmia Bharat, India’s fourth-largest cement producer with 49.5 million tonnes capacity and operations across 23 states, outlined its low-carbon transition strategy under the JCM. Representing a hard-to-abate sector, the company prefers to be known as “possible-to-abate,” demonstrating significant reductions in emissions while setting an aspirational goal of carbon negativity by 2040. Its footprint has fallen from 670 to 456 kg CO<sub>2</sub> per ton of cement, with a target of –30 kg by 2040.

Dalmia’s achievements include a 27% reduction in clinker factor over the last decade, increasing blended cement share from 46% to 85%, and expanding renewable electricity to 40% through waste heat recovery, solar, and wind. It has also achieved 23% fossil-free thermal substitution and improved energy productivity by 1.5 times. These interventions have positioned the company as a leader in sustainability while enhancing competitiveness.

Looking ahead, Mr. Ahuja presented a technology roadmap focusing on CCUS innovations such as mineralisation, oxyfuel, and carbon capture utilisation, alongside ambitions for 100% low-carbon cement, fossil-free electricity and thermal energy, and a full shift to electric and biofuel mobility. Achieving these goals requires climate finance, including grants and carbon credits, as well as global partnerships.

During its pitch, he stressed that JCM can play a catalytic role in addressing unknowns and scaling unproven technologies. The company invited Japanese partners to collaborate on technology co-development and funding, presenting itself as an open-minded and experimental partner willing to test and adapt solutions. Dalmia’s approach demonstrates how cement, often seen as a challenge, can actively contribute to India’s net-zero targets and become a global model for decarbonization through JCM cooperation.

**2-10. Electrical Arc Furnace (EAF)  
Speaker: Mr. Naveen Ahlawat, Chief  
Procurement Officer & Head, Jindal Steel and  
Power**



Mr. Ahlawat, Jindal Steel and Power presented its strategy for advancing green steel under the JCM, stressing the urgency of action in a hard-to-abate sector. The company emphasized that execution, not just narrative, will determine success. With over 60 years of experience in steelmaking, Jindal highlighted how collaboration with technology partners and global buyers is essential to transition toward low-carbon steel.

He outlined short-term measures including operational efficiency, circularity, renewable power adoption, and local resource utilization. Medium-term actions focus on fuel switching, ethanol use, CCUS deployment, and renewable integration with electrolyzers for green hydrogen. Across the value chain, efforts extend from mines—introducing EVs, green methanol, and ammonia in transport—to plants with CCUS and hydrogen injection, and downstream logistics to cut Scope 3 emissions.

Key enablers include securing high-grade iron ore pellets (>67% Fe) for DRI-EAF processes and building partnerships with EPC contractors to accelerate plant construction. Jindal underscored that Japanese technology and investment can play a catalytic role in scaling these innovations. Already, collaborations are underway with Japanese firms on CCUS and with IIT Bombay to convert CO<sub>2</sub> into CO.

Downstream, Jindal highlighted demand from global automakers—Nissan, Volkswagen, BMW, Honda, Toyota—whose Scope 3 emissions exceed 90%. Supplying green steel can reduce automotive CO<sub>2</sub> emissions by more than 50%. Although green steel carries a premium of €250–300/t, the consumer cost impact remains under 1% for cars, appliances, or wind energy projects, making the transition economically viable.

Positioning itself as a future exporter, Jindal aims to serve India’s domestic market and supply Japan, Korea, and Europe, leveraging JCM partnerships to accelerate the shift from grey to green steel.

**2-11. Electrical Arc Furnace (EAF)**  
**Speaker: Ms. Sugandha Jayaswal, Resident Executive, Tata Steel**



Ms. Jayaswal, Tata Steel presented its perspective on Electric Arc Furnace (EAF) technology under the JCM, highlighting its role in decarbonizing India’s steel sector. As the world’s second-largest steel producer, India faces pressure to align with net-zero targets, and EAFs are increasingly seen as a viable pathway for green steel.

She explained that EAFs operate in six stages—charging scrap, melting, refining, slagging, tapping, and secondary metallurgy. Advantages include lower CO<sub>2</sub> intensity compared to blast furnaces, recycling of scrap, smaller capital requirements, and flexibility in product grades. When powered by renewable electricity, EAFs can approach near-zero emissions, supporting circularity and reduced coal dependence.

However, Ms. Jayaswal stressed that challenges remain. High electricity demand strains local grids and increases costs, while using 100% scrap complicates control of chemical composition due to impurities. Operational difficulties, alloy limitations, and economic constraints persist. Globally, regions with abundant scrap like the US and Europe enjoy advantages, whereas Southeast Asia faces high costs due to scrap import dependence.

Policy support is critical. India’s 2019 Scrap Recycling Policy, the “Greening the Steel Sector” roadmap, and a planned ₹5,000 crore financial mission aim to improve scrap supply, provide concessional finance, and incentivize low-carbon steel. Additional measures include duty exemptions, tariff reforms, and the Production-Linked Incentive scheme for specialty steel. Tata urged greater government action to enhance scrap quality and availability.

Finally, Ms. Jayaswal emphasized international collaboration. Global automakers and infrastructure demand are reshaping markets, with Japanese buyers playing a key role in future offtake. Tata positioned EAFs as central to India’s decarbonization pathway and called for JCM partnerships to co-develop technology, finance, and policies to accelerate green steel adoption.

## **2-12 Summary of the Session**

**Speaker: Mr. Norihiro Kimura, Senior Negotiator for Climate Change; Global Environmental Affairs Office, GX Policy Group, Ministry of Economy, Trade and Industry**

Mr. Kimura provided a summary of the eleven presentations and the wide range of potential technologies and projects discussed. These included biogas, CCUS, HVDC, green hydrogen and green ammonia, wastewater treatment, waste-to-energy initiatives, and the production of green hydrogen from the sugar industry. Furthermore, decarbonization technologies in the cement and steel sectors, such as green steel and electric furnaces, were also highlighted.

Reflecting on the morning discussions, Mr. Kimura emphasized the importance of applying these technologies to Joint Crediting Mechanism (JCM) projects. Both environmental ministries announced that project information sheets will soon be published, which will serve as a foundation for further cooperation.

A key message was the significance of strengthening collaboration between Japanese and Indian companies. Mr. Kimura encouraged all participants to make full use of the upcoming business matching session, and expressed hope that many companies will submit project information sheets for further consultation with the governments.

He concluded by noting his expectation that this session will serve as a meaningful step toward concrete collaboration and the realization of new projects under the JCM framework.

## Way Forward / Closing Remarks

### Speakers:

#### - **Mr. Satoru Iino, Director, MOEJ, Japan**

In his closing remarks, Mr. Satoru Iino reflected on the day's discussions, which lasted from 10 a.m. until after 3 p.m., totaling about five hours of intensive dialogue. He emphasized that the forum provided a wealth of information and valuable opportunities for business and investment. He noted that participants' feedback would play a crucial role in shaping future collaboration and improvements.

He highlighted the upcoming business matching session, beginning at 3:30 p.m., as a particularly important opportunity for in-person participants, while acknowledging that online participants could still connect through platforms such as Linked-In or email. Mr. Iino stressed that feedback should go beyond satisfaction levels, encouraging participants to provide concrete suggestions, comments, and challenges to inform government action.

Mr. Iino also addressed the availability of project information sheets, clarifying that while these are posted on the Ministry of the Environment Japan's website, a direct link is necessary to access them. He emphasized that, although this process is not yet the official crediting procedure, it is practically equivalent and will serve as a foundation for information sharing between both governments and project participants. He encouraged companies to submit detailed proposals, including specific plans and needs, rather than only titles or general areas.

In conclusion, Mr. Iino underscored that the JCM stands for the Joint Crediting Mechanism, not the Japan Crediting Mechanism. For India, this marks the first-ever Article 6 partnership, while for Japan, it is the thirty-first such partnership. He highlighted that JCM represents a cooperative approach under Article 6 of the Paris Agreement, involving not only governments but also private companies, investors, research institutions, academia, and civil society. He described the JCM as a powerful symbol of collaboration and called on all participants to further explore possibilities for future cooperation. With this, he expressed his gratitude and formally closed the session.

#### - **Ms. Nameeta Prasad, Joint Secretary, MoEFCC, India**

In her closing remarks, Ms. Nameeta Prasad expressed sincere gratitude to the participants for remaining attentive throughout the sessions. She noted that the hall was still full, which she considered a great achievement in itself. On a more serious note, she emphasized that the projects presented today demonstrated strong potential and feasibility, giving her great hope that tangible actions could begin soon. She highlighted the significance of seeing a plan, prepared over the past one and a half years, reach a meaningful stage of conclusion, and she commended the presenters for their efforts in showcasing technologies, specific needs, and ongoing work.

Ms. Prasad underlined that the Joint Crediting Mechanism (JCM) holds enormous untapped potential, which should be harnessed effectively. She assured participants that the government is working hard to operationalize the mechanism as quickly as possible. Referring to the availability of the project information note, she encouraged stakeholders to begin filling it out and submitting details, even though the official JCM process will take additional time to finalize. Quoting the saying, 'the devil is in the details,' she pointed out that the current phase requires careful attention to every procedural aspect before full

implementation.

She concluded by expressing confidence that project registration could commence soon and by reaffirming her appreciation for all the presentations shared at the forum. She emphasized that listening to the diverse project ideas was a true pleasure, and she thanked everyone once again for their contributions.

**Other Photos from the Forum**



