FIFTH ASIA PACIFIC CLEAN AIR PARTNERSHIP (APCAP)
JOINT FORUM
20-21 March 2025 | Yokohama, Japan

SESSION CONCEPT NOTE

Session 4: Thematic discussion on technology and innovative solutions to improve air quality

20 March 2025 | 16.00 – 17.30
Venue: Pacifico Yokohama (Meeting Room: 315)

BACKGROUND

The **Asia Pacific region continues to face significant air pollution challenges**, with high levels of $PM_{2.5}$ and other pollutants affecting human health, ecosystems, and economic productivity. In 2021, air pollution accounted for 8.1 million deaths globally, making it the second leading risk factor for mortality, including among children under five.[1] These alarming statistics highlight the urgent need for action to mitigate air pollution.

Addressing air pollution requires a multi-sectoral approach, focusing on major contributors such as combustion of fossil fuels for power generation, industry and transport, residential biomass burning for cooking, heating and lighting, construction, unregulated burning of agricultural and municipal waste, agricultural practices, among others. Cost-effective solutions to address air pollution exist and have been identified to address the major sources of air pollution. In Asia Pacific, the report *Air Pollution in Asia Pacific: Science Based Solutions* by UNEP and CCAC have identified 25 policy and technological solutions to address the five key sectors contributing to air pollution in Asia Pacific.

Promising action and innovative solutions are on the rise to improve air quality. There have also been advancements in remote sensing, AI-driven analytics, and IoT-based sensor networks which present an opportunity to enhance policy effectiveness of sector interventions. This thematic discussion aims to explore sector-specific and technology-driven solutions that can advance clean air initiatives while delivering multi-benefits for climate mitigation, economic development, and public health. The insights gained from this thematic discussion will contribute to the Roadmap of APCAP for its Third Phase, reinforcing the region's commitment to reducing air pollution, enhancing climate resilience, and improving public health outcomes.

OBJECTIVES

The session aims to:

- Showcase innovative technological solutions for emission reductions in high impact sectors, with focus on transport and agricultural crop residue burning.
- Identify enabling conditions necessary to support innovation and scale up of these solutions.
- Introduce mechanisms to scale up air quality monitoring using remote sensing and other AI-driven technologies and potential application to monitor progress of clean air action.
- Discuss barriers and opportunities in implementing technology-driven solutions for air pollution detection and mitigation.

STRUCTURE & KEY DISCUSSION AREAS

The session will focus on three critical intervention areas in air quality management: air quality monitoring using remote sensing and AI, and emission control at sources in open burning and transportation. Advancements in air quality monitoring will be discussed, focusing on AI-driven analytics and satellite-based remote sensing to enhance real-time air pollution tracking, early warning and inform policy interventions. Moreover, the session will explore technological solutions to mitigate emissions from open

[1] Health Effects Institute. 2024. *State of Global Air 2024. Special Report.*

burning, including advanced residue management and waste-to-energy alternatives, while addressing the challenges of air pollution through regional cooperation and remote sensing. In the transportation sector, the session will explore clean mobility innovations, such as EVs, alternative fuels, retrofitting, intelligent traffic management.

Session moderator: Dr. Ekbordin Winijkul, Associate Professor, Asian Institute of Technology

Time	Items	Note
16.00 - 16.05 (5 minutes)	**Introduction of the Session and Panelists** by the moderator **Dr. Ekbordin Winijkul**, Associate Professor, Asian Institute of Technology, Thailand	
16.05 - 16.35 (30 minutes)	**Setting the scene:** • **High-impact sectors in Asia Pacific and key emissions reduction interventions** | Presentation by **Dr. Zbigniew Klimont**, Research Group Leader and Principal Research Scholar, International Institute for Applied Systems Analysis (IIASA) (*15 minutes*) • **Advancements in air quality monitoring and application in air quality management** | Presentation by **Dr. Hiroshi Tanimoto**, Deputy Director, Earth System Division, National Institute for Environmental Studies (NIES) (*15 minutes*)	
16.35 - 17.25 (50 minutes)	**Panel Discussion: Technology and innovative solutions to improve air quality** **Panelists** 1. **Dr. Zbigniew Klimont**, Research Group Leader and Principal Research Scholar, IIASA 2. **Dr. Patrick Bueker**, GIZ SEACAI (Southeast Asia Clean Air Initiative) 3. **Dr. Sachiko Hayashida**, Research Institute for Humanity and Nature (RIHN) and Nara Women's University (NWU) 4. **Dr. Hiroshi Tanimoto**, Deputy Director, Earth System Division, National Institute for Environmental Studies (NIES) 5. **Ms. Bidya Banmali Pradhan**, Senior Atmospheric Environment Specialist, ICIMOD (online) 6. **Ms. Vanisa Surapipith**, Head, Air Pollution Cluster, Regional Resource Centre for Asia and the Pacific	
17.25 - 17.30 (5 minutes)	**Summary**	

Guide Questions for Discussion *[long list and can be distilled further by the moderator]*

[Common questions for discussion]

- What are the key innovative technologies to improve air quality that are being considered in the region/ specific countries?
- How can local communities be encouraged to adopt these solutions?
- What are the barriers to adopting technological solutions? How can investment and financing be mobilized to implement the innovation?
- How can regional initiatives such as APCAP support in the scale up of these technological solutions?

[Guided questions for the panelists relating to open burning]

- What are the most effective technological alternatives to open burning, such as mechanization, biochar production, waste-to-energy systems, or advanced composting techniques?
- How can these technologies be scaled up?
- What are the technological, financial, or policy-related key barriers that hinder the adoption of open burning alternatives, and how can they be addressed?
- How can investment and financing be mobilized to scale up sustainable agricultural waste management technologies?

[Guide questions for the panelists relating to transport Emissions]

- What cutting-edge vehicle emission reduction technologies (e.g., hydrogen fuel cells, EV battery advancements, smart traffic management) are being adopted globally?
- How can alternative fuel and electrification initiatives be effectively implemented, particularly in cities with limited infrastructure?
- How can local communities and businesses be incentivized to adopt low-emission transportation options?
- What are the main barriers (technological, economic, infrastructure-related) to scaling up clean transportation solutions, and how can they be overcome?
- How can investment and financing be mobilized to accelerate the adoption of electric vehicles, public transport electrification, and fuel-efficient technologies?

[Guide questions for the panelists relating to monitoring & remote Sensing]

- What are the latest advancements in satellite-based air pollution monitoring, and how can they complement and integrate ground-based monitoring systems for better monitoring?
- How can satellite-based remote sensing and AI-driven analytics improve the detection and tracking of transboundary air pollution, and how can these methods support regional cooperation?
- What are the major barriers to adopting advanced monitoring technologies (e.g., data standardization, cost, integration with policy enforcement)?
- How can investment and financing be mobilized to expand real-time air quality monitoring networks, particularly in developing regions?

Expected Outcomes

- Identification of priority sectoral interventions to reduce emissions from transport and open burning of agricultural crop residues.
- Policy recommendations to enhance remote sensing and technology adoption for air pollution monitoring.
- Insights to inform the Roadmap for the Third Phase of APCAP.