## ASIA CLEAN ENERGY FORUM 2025

Empowering the Future: Clean Energy Innovations, Regional Cooperation and Integration, and Financing Solutions

2-6 June | ADB Headquarters, Manila





# **Empowering ASEAN Low Carbon / Zero CarbonGreen Transition**

# in Industrial Parks

# A Perspective from Key Energy Technologies Research

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In cooperation with In cooperation with ENERGY FOUNDATION 能源基金会

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**Featured Speaker** 

## **1. Significance of Green Transition in Industrial Parks in ASEAN**





Total final consumption by energy source in industry sectors by scenario, 2023 and 2050

(Source: IEA, World Energy Outlook 2024)



(Source: ACE, 8th ASEAN Energy Outlook 2023-2050)



- Developing low/zero-carbon industrial parks (L/ZCIPs) offers a synergistic path to achieving industrial advancement and green transformation.
- Industrial parks serve as **demonstration zones** for energy conservation and emissions reduction.
- The differences in energy resource endowments and industrial structures among ASEAN member states (AMS) lead to variations in carbon reduction technologies, necessitating **technical guidelines** tailored to typical parks.

## **2. Research Methodology**





Source: Report on Key Energy Technologies for Developing Low/Zero Carbon Industrial Parks in AMS June 2025 (Compiled by the research team)

## **3.** Definition of Low/Zero-Carbon Industrial Parks (L/ZCIPs)



#### **Coordinated development** between society, economy and environment

Low/Zero-carbon Industrial Parks aim to achieve coordinated development between society, economy and environment, ensuring that economic development is not at the expense of environmental damages.



#### Minimizing CO<sub>2</sub> emissions

By deploying advanced technologies and management strategies, Parks intend to reduce CO<sub>2</sub> emission, fulfilling least system-related emission.

#### Technology integration and application in multi-sectors

Low/Zero Carbon Industrial Parks adopt comprehensive integration on multi-sectors technologies, including energy, industry, construction, building, transportation, and ecology. They aim to effectively achieve resource optimization and environmentally sustainable development.

#### Innovative practices on management mechanisms



Parks intend to innovate management mechanisms. Formulating and implementing new management mechanisms would help parks promote inner transition and upgrading towards decarbonization.

#### A self-balanced system of carbon emissions and absorption

Low/Zero Carbon Industrial Parks commit to achieving a self-balanced carbon emission and absorption system. By plantation and using renewable energy, they intend to achieve near net-zero carbon emissions.

#### Harmonious development of industrial activities, living and ecology



Low/Zero Carbon Industrial Parks

promote deep integration of product activities and ecological living. They encourage green production to enhance citizens' life guality and build a harmonious ecosystem.

## 4. Global Practices in Low/Zero-Carbon Industrial Parks Construction





• Enhance coordination and cooperation among stakeholders.

## **5.** Technical Pathways on Low/Zero Carbon Industrial Parks (L/ZCIPs)





Supply Side: the Use of Renewable Energy, Low-Carbon Technology

Consumption Side: Electrification, Low-Carbon Consumption

Comprehensive Smart Energy System and Circular Economy System

Certified Emission Reduction (CER)

Renewable Energy Certificates

International Carbon Offsetting Mechanisms

Ecological Carbon Sinks

Negative Carbon Technologies (such as BECCS)

Fossil Fuels Coupling for Decarbonization (and CCUS)

*Source:* Report on Key Energy Technologies for Developing Low/Zero Carbon Industrial Parks in AMS June 2025 (Compiled by the research team)

## 6. Country Typology through Cluster Analysis

According to the cluster analysis through 4 dimensions, including resource endowment, geographical features, economic development level and renewable energy development potential, the AMS are categorized into 4 types:

Export-oriented

Archipelagic-type country:

#### Indonesia, the Philippines

A large economy and population base, with numerous and highly scattered islands.

#### Malaysia, Thailand and Vietnam

country:

Export oriented countries, with relatively sound economic development, huge decarbonization potential.

## Cambodia, Myanmar and Lao PDR

country:

**Resource-abundant** 

Abundant resource endowment, hugh potential for sustainable development in the energy sector. Resource-dependent country:

#### Singapore and Brunei

Relatively developed economy, lack of renewable energy resources, development potential in clean energy technology, green finance.

Source: Report on Key Energy Technologies for Developing Low/Zero Carbon Industrial Parks in AMS June 2025 (Compiled by the research team)

## 7. Country-Specific Identification of Key Technologies





Source: Report on Key Energy Technologies for Developing Low/Zero Carbon Industrial Parks in AMS June 2025 (Compiled by the research team)

## **8.Development Pathways and Typical Models**





Main Grid Green Power Supply Model

Self-Sufficient Low/Zero-Carbon Energy Supply Model

Source: Research on Key Issues of Promoting Green Production, Lifestyle and Energy Consumption Revolution State Grid

## **9. Policy Recommendations**

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- Position the Development of Low/Zero-Carbon Industrial Parks as a Core Measure of Regional Climate Governance. AMS should leverage L/ZCIPs as strategic platforms to advance national and regional climate goals. These parks offer unique potential in renewable energy, green buildings, low-carbon transportation, digital technologies, and circular resource utilization.
- Embed Low/Zero-Carbon Park Development into National Industrialization Strategies Their construction requires comprehensive planning from the start rather than later retrofitting. AMS governments shall include energy transition and green economy goals in their blueprints of national industrial development.
- Localize and Sequence Implementation Pathways. AMS shall adopt tailored and staged development roadmaps for low/zero-carbon industrial parks construction based on regional energy resources, economy and market conditions.
- Strengthen capacity building and innovation in regional cooperation. ASEAN countries should promote regional knowledge sharing and local capacity building. This will help enhance industrial foundations, climate resilience, and competitiveness across ASEAN, moving steadily towards net-zero emissions.
- Boost Public Awareness and Environmental Education. It is recommended that governments use multi-channel communication, community education, policies, and pilot projects to boost public awareness, acceptance of decarbonization, and green development across ASEAN.





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