Activities for Biomass

Japan Carbon Frontier Organization (JCOAL)

The 9th Government-Private Forum
on the Cleaner Energy Future Initiative for ASEAN (CEFIA)

22 April 2026

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

Contents

1. Introduction of JCOAL
2. CEFIA Biomass Flagship Activities in Sep 2025-Mar 2026
3. Why Biomass and Biochar?
4. Biomass utilization as a part of a circular agricultural business in the Philippines: The case of Biotech FARMS
5. A proposal by SHI for Technologies, Modernizations and Upgrades for Decarbonization Realization in the Philippines
6. Biomass is to make multifaceted contribution to APAEC 2026
7. Plan for Apr 2026-Mar 2027

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

1. Introduction of JCOAL

JCOAL: A Long-standing Partner of ASEAN in the resources sector, the power sector and the industrial sector

Established in 1990, with its origin back to 1948

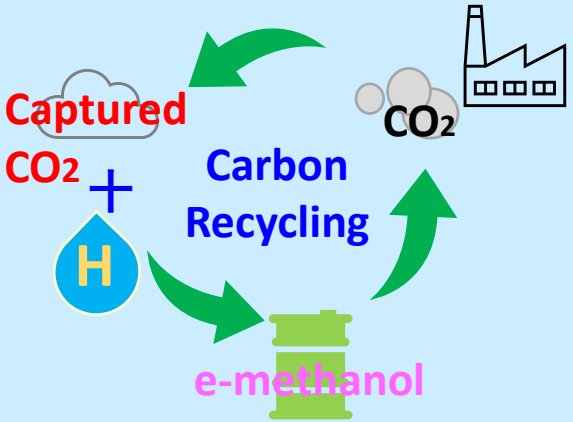
- Deals with technologies and measures for carbon neutrality with a broad scope of work involving various energy technologies such as biomass, ammonia and hydrogen utilization, and carbon recycling in addition to all coal related issues from upstream to downstream of the coal value chain.
- The unique team with engineers and analysts covering a broad range of areas enables well fabricated advisory and consultancy work that is deep-rooted in engineers' spirit.
- JCOAL embraces a membership system, under which 149 domestic/international organizations and companies get together. They may work together with JCOAL in pursuit of decarbonization.
- JCOAL is a DP of ACE since 2009.

Coal Ash Utilization

Biomass Co-firing

Ammonia Co-firing

Technologies for energy transition & the future carbon neutrality



Source: Edited by JCOAL based on information in the public domain

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

2. CEFIA Biomass Flagship Activities in Sep 2025-Mar 2026

Sep 2025

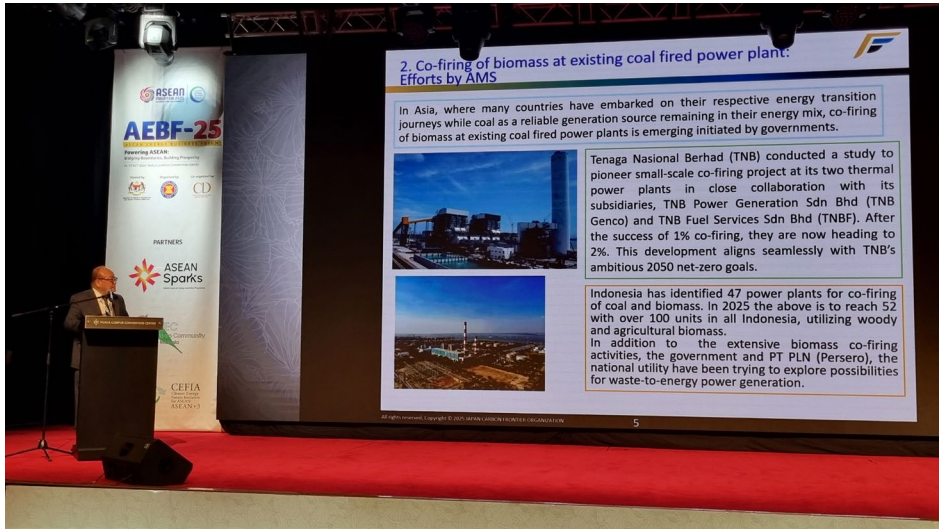
JCOAL was appointed to undertake CEFIA Biomass Flagship

Oct 2025

JCOAL participated to speak at the 8th CEFIA Forum

Jan 2026

CEFIA Flagship Biomass Webinar



8th CEFIA Forum in Kuala Lumpur, Malaysia
Source: CEFIA Digital Platform

CEFIA Flagship Biomass Webinar
Source: JCOAL

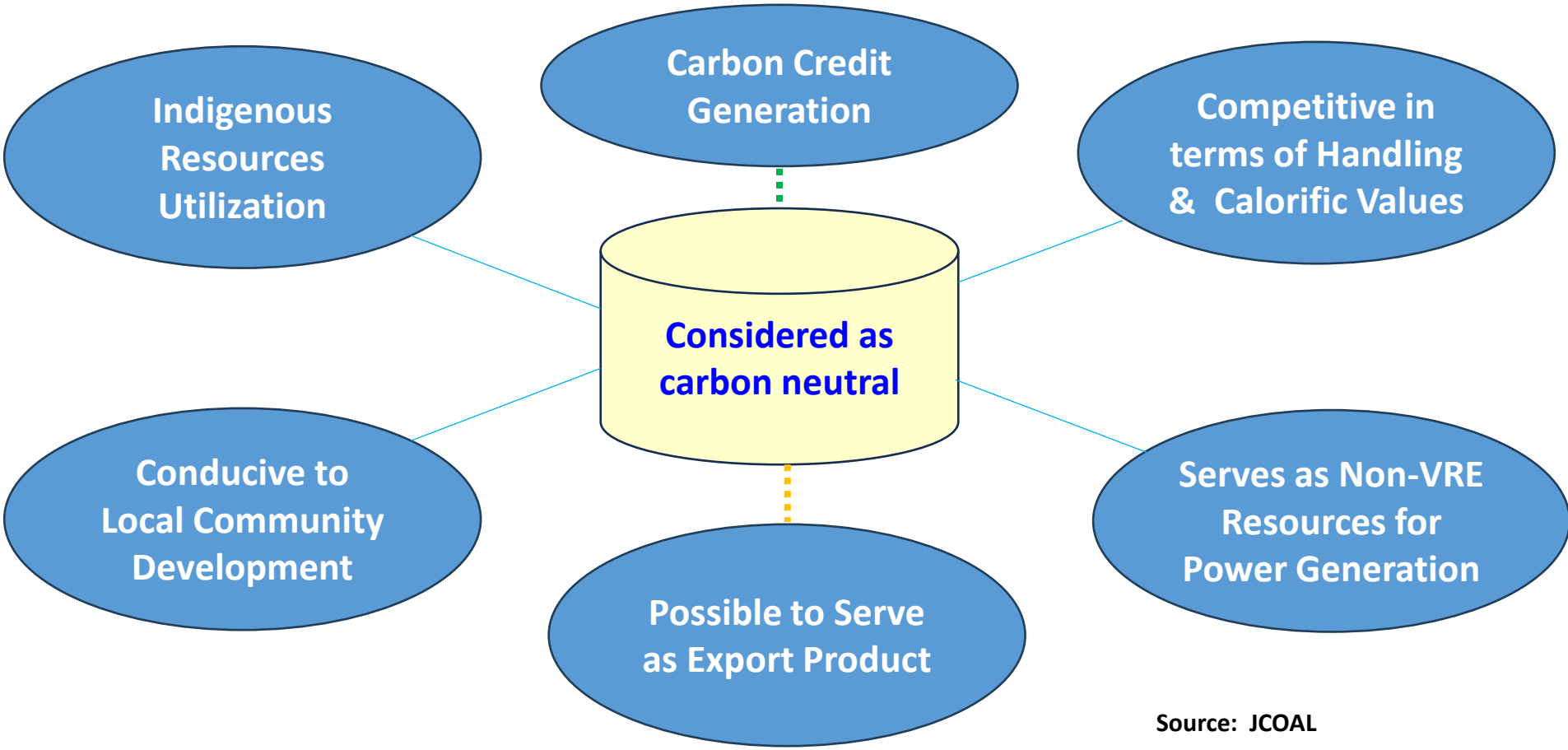
Constituted by presentations on biomass firing and biochar utilization technology and relevant policy updates as well as on-going efforts and perspectives by utility, CEFIA Biomass FP Webinar tried to share ASEAN-applicable, Japan-initiated biomass technology and supporting policy information. Presentation and the following discussion in the form of Q&A were intended to enhance and ensure the trust from ASEAN utilities and relevant institutions toward such technology.

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

3. Why Biomass and Biochar? (1)

Biomass

Biomass is renewable and inherently carbon-neutral, derived from biological resources such as plants, animals, and other living organisms and municipal wastes. Biomass has come to be re-emerging while countries are trying hard to go their respective transition pathways, for the features such as renewable nature, geographical diversity and availability.



Source: JCOAL

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

3. Why Biomass and Biochar? (2)

Biochar

Biochar is a porous, carbon-rich (70-80%), black, solid, fine-grained structure prepared through the thermal breakdown (300-850°C) of agricultural wastes in which oxygen is absent or depleted. Biochar is also a valuable material for agriculture, carbon removal and storage, land-use challenges, remediation, and economic development.

Carbon Fixation (CF)

Pyrolysis chemically transforms the carbon in biomass more stable.

High-quality biochar made through controlled, high-temperature pyrolysis, are more stable and effective at locking up carbon.

Environmental Protection

Through sorption, biochar can decrease atmospheric ammonia emissions, limit nitrate leaching and runoff, decrease phosphate pollution and remediate contaminated soils effectively.

Improve soil water properties

Biochar is highly porous at multiple scales, giving it a vast pore volume.

This structure can absorb significant amounts of water and dissolved nutrients within. Biochar can improve the water-holding capacity of soils that plant available water by up to 28.5%.

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

4. Biomass utilization as a part of a circular agricultural business in the Philippines: The case of Biotech FARMS

"Sustainability from Farm to Plate with Circular Economy"

Bagasse Stockpiling

Source: Biotech FARMS

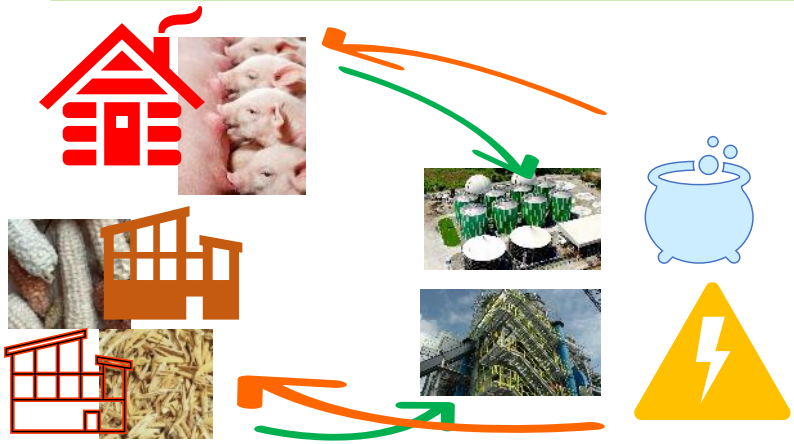
Biomass Power Plant of Biotech FARMS

Source: Biotech FARMS

Agricultural sector in the Philippines contributes to GDP by 9.4%, while employment in agriculture remains over 20% of the total labor force.

DOE targets at min. 277 MW of additional biomass power capacity by 2030. the Biomass Renewable Energy Alliance (BREA) says Philippines could tap 4.7 GW

Biotech FARMS engages in grain, sugar, and swine industries.
They utilize agricultural by-products in well-designed circular mode.



Source: Edited by JCOAL based on information from OECD, The World Bank, Philippine Statistics Authority, and Biotech FARMS

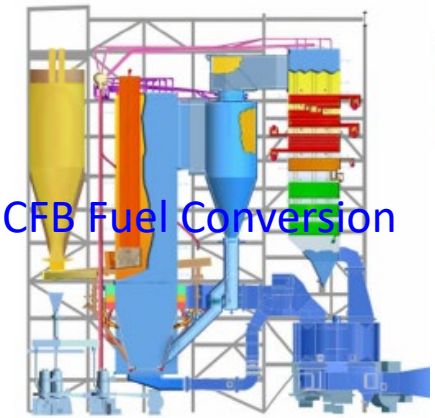
All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

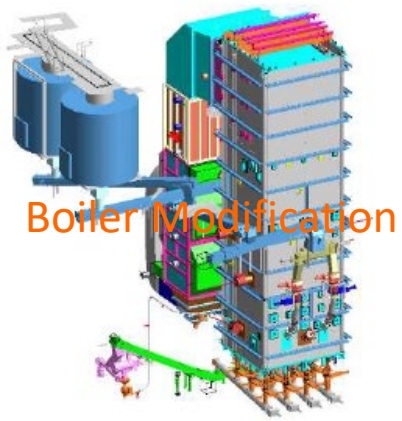
5. A proposal by SHI for Technologies, Modernizations and Upgrades (TMU) for Decarbonization Realization in the Philippines

With more than 50 track record, SHI offers TMU services for the conversion of existing coal-fired boilers to biomass-fired boilers.

Country	Boiler Type	COD	Capacity (MWth)	Design Fuels	Alternative Fuels
Bulgaria	CFB	2021	327	Bituminous Coal, Pet Coke	Agro Biomass 30%, Bituminous Coal
South Korea	CFB	2019	315	Coal, PKS	PKS, Demolition Wood, Wood Pellets
Finland	BFB	2018	110	Natural Gas	Various Biomasses
South Korea	CFB	2017	750	Coal	Coal, Wood Pellets
Thailand	CFB	2006	140	Coal, Lignite	Coal, Sludge 20%, Paper Reject 20%, Bark
Finland	CFB	2002	81	Coal, Peat	Coal, Peat, Waste Wood

Source: SHI





Source: Sumitomo Heavy Industries (SHI)

CFB Boiler Upgrade in coal-to-biomass fuel conversion at Hanwha G2, Gunsan, South Korea

Source: Google Map & Hanwha Energy Corp.

Hanwha Gunsan #2	Original Spec	Post-upgrade Spec
Installed Capacity	99 MW	99 MW
Fuels	▪ Sub-bituminous Coal 0-100% ▪ Wood Pellets <50%	▪ Wood Chips* 60-80% ▪ Wood Pellets* < 35% Sewege Sludge Pellets <10%
Steam Output	435 tph 100 Mwe	435 tph 100 Mwe
Steam Parameters	125 bar 540 ℃	125 bar 540 ℃
COD	2017	2025

*Wood Chips and Pellets made from scrap wood

Source: SHI

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

6. Biomass is to make multifaceted contribution to APAEC 2026

Key Strategy	Accelerate the scale-up of RE deployment on power system transition, energy supply and end-use sectors towards a low-carbon ASEAN vision and across the ASEAN countries

Outcome-based Strategies		Action Plans
1. Accelerate renewable energy deployment for a low-carbon energy future	1.1.	Enhance regional cooperation to achieve ASEAN RE goals through cohesive energy transition policy planning
	1.2.	Promote the mobilisation of financing for the deployment of renewable and low carbon energy
	1.3.	Accelerate RE technology innovation and advancement to enhance competitiveness and drive market-led expansion
2. Accelerate the rapid expansion and integration of RE across ASEAN's power sector	2.1.	Enhance the integration of larger amounts of RE sources into the grid, addressing the technical issues, policy framework and institutional dimension
	2.2.	Promote advanced decentralised power systems and community-based RE projects
3. Advance RE applications in decarbonising end-use sectors	3.1.	Promote RE to reduce oil dependency and decarbonise the transport sector, including sector coupling
	3.2.	Expand RE deployment potentials for the industrial sector in a cost-effective manner
	3.3.	Promote RE application in the building sector to promote sustainability

ASEAN is to advance an affordable, just, and low-carbon energy transition

Biomass is to contribute to grid stability enhancement by serving as non-VRE clean energy and dispatchable resources

Biomass has high potentials for the industrial sector as well as for the agricultural sector

Source: ASEAN Plan of Action for Energy Cooperation (APAEC) 2026

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

7. Plan for Apr 2026-Mar 2027

22 Apr 2026 ONLINE

11-12 May 2026 HYBRID

https://jprsi.go.jp/ew2026idn/en/index.html

Keep updating ASEAN and Japan stakeholders throughout Apr 2026-Mar 2027, to facilitate actions toward project implementation

Autumn 2026 HYBRID

CEFIA Flagship Biomass Webinar

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION

We look forward to continuously working with you

Japan Carbon Frontier Organization (JCOAL)
Website: https://www.jcoal.or.jp/eng/
Email:
takeshita@jcoal.or.jp
fyamada@jcoal.or.jp
oshima@jcoal.or.jp

All rights reserved, Copyright © 2026 JAPAN CARBON FRONTIER ORGANIZATION