

Press release

Biomass co-firing in Indonesia's coal-fired power plants will prolong coal use without reducing air pollution, potentially release more pollutants

Jakarta, 30 May 2025 — Indonesia's state-owned power provider, PLN, is touting biomass co-firing at local coal-fired power plants (CFPPs) as a means to both create a green economy and lessen coal emissions. However, a new study from the [Centre for Research on Energy and Clean Air \(CREA\)](#) reveals that increasing co-firing share at all of the country's grid connected CFPPs would not only have virtually zero impact on fossil fuel-related air pollutant emissions, but may release other harmful biomass-related pollutants not monitored within coal emission thresholds.

Increasing the share of biomass co-firing in Indonesia not only poses huge economic challenges related to persistent barriers in supply and operations – the mitigation effects on air pollution would be nearly non-existent. The national electricity supply plan, Rencana Usaha Penyediaan Tenaga Listrik (RUPTL) 2021-2023, specifies that up to 2.7 GW capacity in 2025 can be claimed to be renewable-based under the 10% share scenario, utilising 14 million tonnes of biomass annually in 52 CFPP locations. However, CREA found that this scenario target is projected to deliver a trifling 9% reduction in particulate matter (PM) release, 7% in nitrogen oxides (NO_x), and 10% in sulfur dioxide (SO₂) at the plants where co-firing is applied. At the national level, biomass co-firing is only expected to only reduce around 1.5 to 2.4% of the aggregated coal power emissions.

On 26 May 2025, the Minister of Energy and Mineral Resources, Bahlil Lahadalia announced the release of [the new RUPTL for 2025–2034](#). As the full release of the policy document is pending, details on the implementation of biomass co-firing are still forthcoming, with anticipated updates to the targets.

What's more, biomass co-firing could also result in the release of additional pollutants due to the differing emission threshold limits set for coal and biomass power. For example, the limit for mercury release in biomass power generation is about 150 times higher than what is currently enforced for all coal power plants. Biomass generation also has limits set for gaseous releases of air pollutants not enforced for coal power plants, including carbon monoxide (CO), hydrogen sulfide (H₂S), ammonia (NH₃), hydrogen chloride (HCl), chlorine (Cl₂), hydrogen fluoride (HF), as well as traces of heavy metals such as arsenic (As), antimony (Sb), cadmium (Cd), zinc (Zn), and lead (Pb). This means other pollutants linked to the combustion of specific feedstock may be released without any monitoring at all.

Besides, claims on emission mitigation from biomass co-firing in PLN's coal power plants are made without comprehensive quantification, which not only includes the avoided coal use, but also life cycle emissions of the biomass supply chain that enables origin tracing, covering harvesting, processing, and transportation. The “true” environmental impacts of biomass co-firing therefore remain unquantified and undisclosed.

From these findings, CREA recommends:

- **Prioritising accountability and transparency through monitoring and evaluation** – A framework that enables proper assessment of plant-level implementation of bioenergy use could serve as a basis to develop a roadmap for bioenergy, which could help provide clarity for suppliers, allowing the market to naturally develop to fill unmet demands.
- **Implementing Life Cycle Assessment (LCA) for a comprehensive quantification of emission mitigation** – To justify the use of bioenergy as a sustainable initiative, PLN should require independent verification of emissions released throughout the value chain, enabling origin tracing and covering harvesting, processing, and transportation.
- **Raising the urgency to prioritise phase out of coal power generation and accelerate deployment of renewable energy for a genuinely sustainable and just energy future** – Quantifiable monetary losses from reduced efficiency and technical operational challenges associated with low-quality biomass should instead be used for renewables deployment, especially considering Indonesia's vast, widely diverse, and abundant potentials.

'The main issue with biomass co-firing is that national stakeholders view it as a viable solution to mitigate Indonesia's fossil fuel emissions rather than truly addressing the root causes of air pollution or prioritising accelerated deployment of renewable energy sources. PLN in particular has seized onto it as a corporate strategy, framing it as a way to support people-centred green economy and reduce emissions. Not backed by transparent and thorough assessment, these claims need to be questioned and a fact-based roadmap for bioenergy should be provided,' said Abdul Baits Swastika, Researcher at CREA.

'CREA's findings show that biomass co-firing has virtually no impact on air pollution attributed to coal power generation, such that reduction in health-harming pollutants would be negligible at the current aims. These inaccurate claims should serve as an entry point for a more rounded national discussion on air quality, which can only be improved when we recognise the urgency to map a retirement pathway assigned to all coal power plants in Indonesia - on-grid and captive. What's more, emissions mitigation in coal power plants through the transition decades can only be addressed by stringent emissions standards, which would entail the installation of air pollution control technologies at all CFPPs,' said Katherine Hasan, Analyst at CREA.

'It has been several years since biomass co-firing has been offered as a solution, yet there's no clarity regarding how the biomass will be sourced sustainably and how it can reliably be scaled up, considering the cost and biomass supply. Scrutiny on biomass use is rising in many countries, especially if such risks are not managed. South Korea reportedly ending subsidies for biomass is a telling sign of waning support globally,' said Putra Adhiguna, Managing Director at the Energy Shift Institute.

'In Indonesia, the initiative to produce biomass on a massive scale comes under the name of Energy Plantation Forest or Hutan Tanaman Energi (HTE) program. As revealed in [research by CELIOS](#), these plantations will surely be conducted on an accordingly massive scale and at the expense of the environment, especially the natural forest, to meet the demand for electricity generation. Existing biomass feedstock sources are insufficient to meet the future demand for co-firing in CFPPs, thereby driving the expansion of HTE as an inevitable measure to secure continuous biomass supply. This serves to demonstrate how the sustainability narrative that has been attached to biomass co-firing is a mere myth,' said Fiorentina Refani, Director of Socio-Bioeconomy Studies at Center of Economic and Law Studies (CELIOS).



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About the research

This study critically evaluates Indonesia's biomass co-firing strategy in coal power plants, assessing its implementation, economic feasibility, and environmental impact against its purported decarbonization role, drawing on diverse data from state utility PLN, plant-level metrics, national policy documents, and existing research on biomass potential and utilization. The full publication may be found [here](#).

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. We use scientific data, research and evidence to support the efforts of governments, companies and campaigning organisations worldwide in their efforts to move towards clean energy and clean air. www.energyandcleanair.org