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Driving a Just Energy Transition Through Biomass Co-Firing at PLTU Palabuhanratu: *Key Challenges and Strategic Policy Recommendations*



Theofillius Baratova Axellino Kristanto

Emerging Scholar, Center for World Trade Studies
Universitas Gadjah Mada, Indonesia

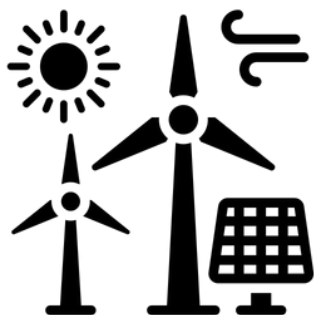
This policy brief is an outcome of the 2024 research grant program of SHAPE-SEA, developed as part of its commitment to advancing evidence-based policy and practice in the region.

Executive Summary



Indonesia's continued reliance on coal locks the country into a carbon-intensive energy pathway, undermining national commitments to renewable energy expansion and climate goals. **As one of West Java's largest coal-fired plants, PLTU Palabuhanratu has begun integrating biomass co-firing to displace a portion of its coal use. If implemented with justice and inclusion at its core, this initiative presents a strategic opportunity to advance decarbonization while stimulating local economies.**

Current practices, however, reveal critical risks: uneven economic gains, exclusion of vulnerable groups from supply chains, and uncertainty in securing a sustainable, locally-sourced biomass supply. Without corrective action, co-firing risks becoming a technical fix that fails to deliver equitable outcomes. Policymakers must embed social safeguards by prioritizing smallholder participation, securing long-term local procurement contracts, ensuring fair pricing for sustainable biomass, and establishing transparent monitoring of social and environmental impacts.



Done right, co-firing can catalyze both cleaner power generation and a genuinely just energy transition.

Background



Indonesia's Rencana Umum Energi Nasional (RUEN) (National Energy Plan) targets 23% renewable energy by 2025, aligning with its Paris Agreement commitments (MEMR, 2017; UNFCCC, 2016). Coal-fired power plants remain central to the grid, including PLTU Palabuhanratu in Sukabumi, a key electricity provider and local employer (PLN, 2022).

Biomass co-firing—substituting 5–10% of coal with biomass—aims to reduce emissions while maintaining generation capacity (MEMR, 2021). At Palabuhanratu, implementation is underway, yet its social implications are critical: **equitable benefit distribution, inclusion of smallholders, and protection of local livelihoods**. Ensuring these safeguards is essential for advancing a just energy transition that respects local rights and promotes social inclusion.

Problems

The biomass co-firing initiative at PLTU Palabuhanratu faces two interconnected challenges:



First, **limited involvement of local communities in biomass supply chain planning and management** has led to low participation by smallholders and marginalized groups.



Second, **this exclusion poses threats to local livelihoods**, as economic opportunities from biomass procurement are often captured by external actors, reducing potential income for rural households.

Project Aims

1. This study investigates how biomass co-firing operations at the Pelabuhan Ratu power plant affect the socio-economic rights of vulnerable communities.

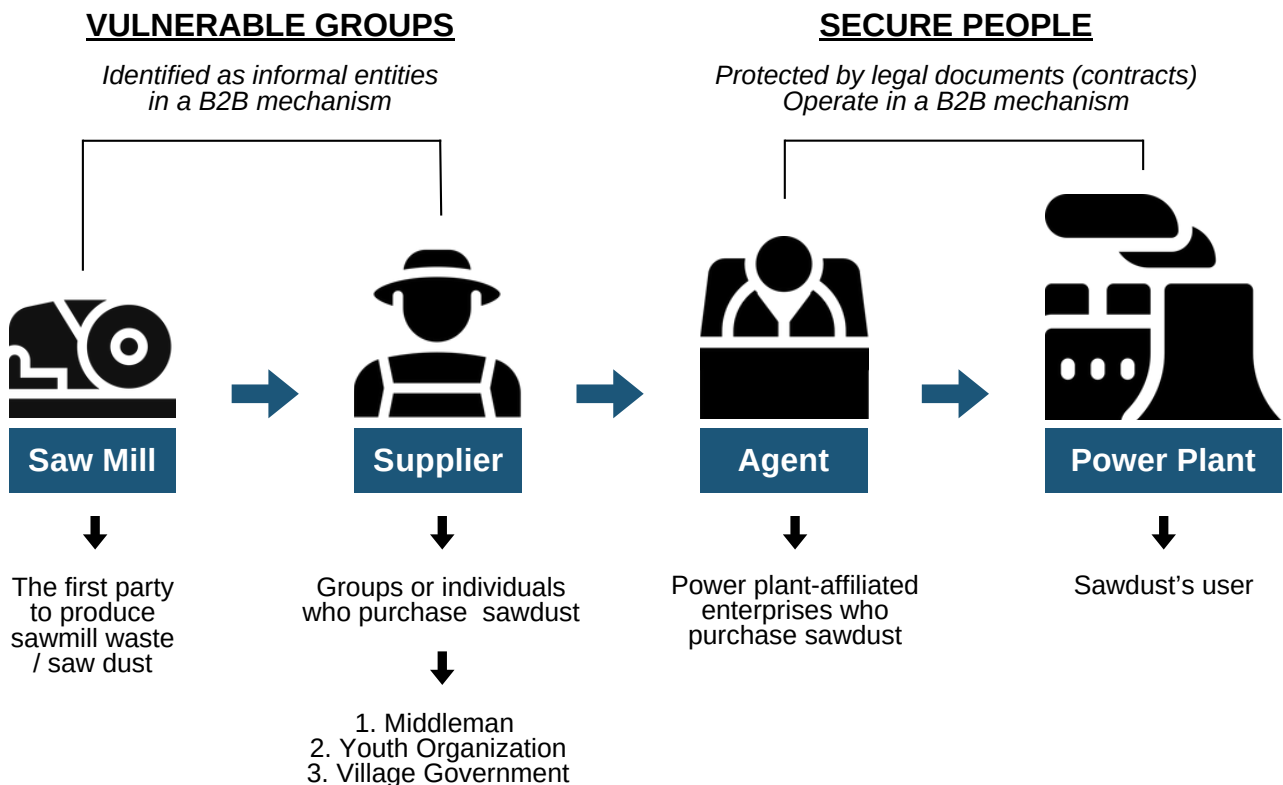


2. The research assesses the role of co-firing in advancing a socially just energy transition.



Key Findings

1. This diagram illustrates the supply chain process of sawdust from a source (sawmill) to the end user (power plant), with intermediaries such as suppliers and agents in between.



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		POWER TO INFLUENCE	
		HIGH	LOW
LEVEL OF INTEREST	HIGH	• Agent • CFPP	• Village Government • Middleman
	LOW	• Sawmill	• Youth Organization

Community Engagement and Supply Chain Dynamics



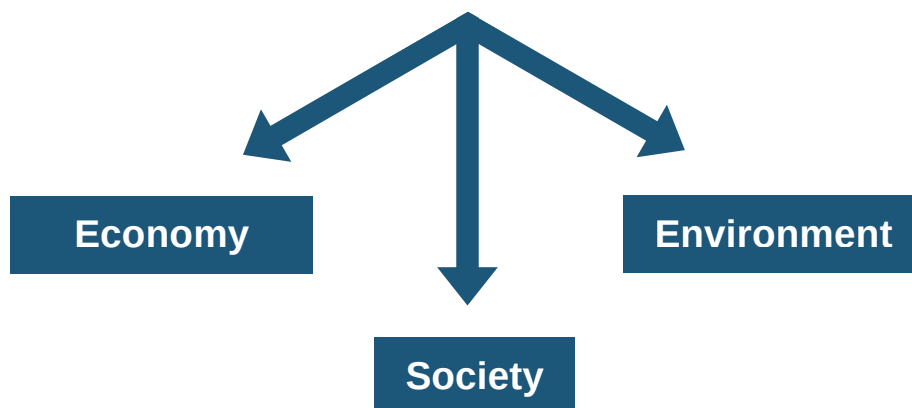
The local community, although actively involved in the supply chain, is **excluded from the company's decision-making processes**.



The community's role is primarily **limited to that of a supplier**, functioning mainly to fulfill external market demands.



The Just Energy Framework

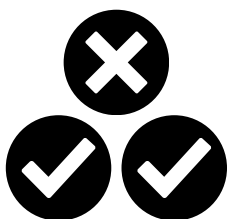


“...an energy transition in which the resulting social, economic, and environmental risks and opportunities are equitably distributed among stakeholders...”

Meanwhile in Palabuhanratu

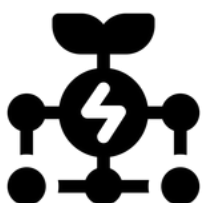
ECONOMY	• Creates new business opportunities for local people in the sawdust industry.
SOCIAL	• Enables local people to make a living, thus empowering them to feed their family and educate their children. • Provides no affirmative programs or many job vacations for women due to the local patriarchal values.
ENVIRONMENT	• Contributes higher emissions from new areas planted to support sawdust needs. • Air and water pollution cause respiratory and skin problems and fewer fishery products.

In Short



Among the three main pillars—economic, social, and environmental—the **program only meets at most two of them**, with a half score in the social aspect since there is not yet an affirmative program to empower gender equality.

Recommendations for PLN (State Electricity Company)



1. Strengthen Local Biomass Supply Chains

Establish long-term procurement contracts with local smallholder farmers, cooperatives, and community groups to secure sustainable biomass feedstock while maximizing local economic benefits.



2. Ensure Inclusive Participation

Create structured mechanisms, such as community liaison forums and participatory planning workshops, to involve vulnerable groups in decision-making and integrate them into all stages of the biomass supply chain.



3. Implement Social Safeguards and Monitoring

Develop and enforce a monitoring framework to track the social and environmental impacts of co-firing, including livelihood stability, income distribution, and equitable access to benefits for marginalized communities.



References

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