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Co-firing with biomass in Indonesia: Debunking Emission Reduction Claims

Co-firing coal with biomass in power stations is claimed by Indonesia's state electricity company (PT PLN) to be a necessary part of the country's transition to renewable energy. Currently, 52 coal power stations plan to co-fire with 5-10% biomass in order to meet the countries Nationally Determined Contributions, as outlined by the Paris Agreement. However, research by Trend Asia has found that co-firing even just this amount will lead to the deforestation of millions of hectares of land and its conversion into tree plantations for energy. In addition to this, instead of reducing carbon emissions as is claimed, burning coal with biomass will actually *increase* carbon emissions, especially in the forest and land sector.

How policies in Indonesia support co-firing with biomass

Under its Enhanced Nationally Determined Contributions[1] Indonesia has committed to reduce GHG emissions by 32% if unassisted under Business as Usual, or by 43% with international assistance. For the energy sector specifically, Indonesia's GHG emission reduction target is 12.5% if unassisted and 15.5% with international assistance. Its mitigation policies in the energy sector consist of (1) energy efficiency, (2) the development of new and renewable energy, (3) clean energy generation/Clean Coal Technology and (4) the use of low-carbon fuels.

This mitigation commitment in the energy sector is supported by policies issued by the government. Presidential Regulation (PR) Number 79 of 2014, concerning National Energy Policy, states that the use of renewable energy from biomass will be directed to electricity and transportation. PR number 22 of 2017, concerning the General National Energy Plan, also ensures that business entities providing electricity are required to purchase electricity from Biomass Power Stations (Pembangkit Listrik Tenaga Biomassa or PLTBM for short), and encourages the construction of at least 1 PLTBM unit in each province outside Java. PR 112 of 2022 guarantees that electricity purchases from PLTBM will use the highest standard price. The General Plan for the Provision of Electricity (RUPTL) 2021-2030, also clearly states that the use of biomass through co-firing technology to reduce GHG emissions, will be incentivised.

Forestry and land sector policies guarantee the supply of wood pellets through a derivative regulation of the Job Creation Law, namely PR number 23 of 2021, which allows multi-business licensing in the forestry sector. The Ministry of Environment and Forestry gives the private sector exclusive access to forest areas, through Environment and Forestry regulations numbers 7 and 8 of 2021. This exclusivity includes the

provision of forests for energy security as well as permits related to energy security, which do not need to follow the usual stages of structuring forest area boundaries. Converting forests for wood pellet production is permitted without a governor's recommendation letter, and companies are not required to pay PNBP (non-tax revenue) for the use of forest areas used to produce wood pellets for the energy sector. Allocating forests for the production of wood pellets in order to meet energy security targets will accelerate deforestation, which in turn releases carbon emissions.

The Indonesian Forest Entrepreneurs Association (Asosiasi Pengusaha Hutan Indonesia/APHI) supports co-firing policy at the Coal Power Plant (Pembangkit Listrik Tenaga Uap/PLTU), through a commitment to convert its forests from Industrial Tree Plantations (Hutan Tanaman Industri/HTI) to Tree Plantations for Energy (Hutan Tanaman Energi/HTE), on the condition that it will receive financial incentives for doing so. Despite knowing the potential for deforestation and subsequent release of carbon emissions that will result from the implementation of biomass co-firing, the energy, forest, and land sectors, as well as APHI, support and encourage biomass co-firing policies.

Burning forests for electricity

In Indonesia, there are 52 coal power stations that have begun co-firing with biomass, and these have a combined total capacity of up to 18,800 MW. Initial estimations made by Indonesia's national electricity company (PLN) show that these 52 power stations would require 8 million tonnes/year of biomass to meet their 10% co-firing target. Currently, the production capacity of the wood pellet industry in Indonesia is still below 1 million tonnes/per year. To meet the demand for such a large amount of biomass, a minimum area of 2.3 million hectares of Tree Plantations for Energy will be required to supply this. This is worrying if we reflect on the history of Industrial Tree Plantations (Hutan Tanaman Industri/HTI) in Indonesia, since, from the total area covered by these plantations in 2019, 38% or 3.5 million hectares were created as a direct result of the deforestation of natural, biodiverse forests.

Trend Asia's research predicts that Tree Plantations for Energy will be made up of just six tree species recommended by the Forestry Research and Development Agency of the Ministry of Environment and Forestry: *Acacia Mangium*, *Calliandra Calothyrsus*, *Gliricidia Sepium*, *Eucalyptus Pellita*, *Sesbania Grandiflora* and *Leucaena Leucocephala*. Taking into account the crop rotation time needed for each species, calculations show that the land required for each in hectares (ha) is 3.8 million ha for *Acacia Mangium*, 2.8 million ha for *Calliandra Calothyrsus*, 7.8 million ha for *Gliricidia Sepium*, 3.7 million ha for *Eucalyptus Pellita*, 3.1 million ha for *Sesbania Grandiflora*, and 2.3 million ha for *Leucaena Leucocephala*. Using a percentage value based on land cleared in the past for Industrial Tree Plantations, the potential for deforestation to create Tree Plantations for Energy, at the lowest is 629,000 ha for a plantation consisting of *Leucaena Leucocephala*, ranging to about 2 million ha for a plantation consisting of *Gliricidia Sepium*.

The impact of deforestation

Deforestation has a direct impact on the loss of large carbon stocks in natural forests. The implementation of co-firing with 10% biomass in 52 coal-fired power plants has the potential to generate total emissions of up to 26.5 million tonne of carbon dioxide equivalent (CO_2e) per year. These emissions are calculated from the start of land clearing for Tree Plantations for Energy (HTE), up to the production of wood pellets. The potential emissions resulting from the management of plantations alone to meet the 10% co-firing target of 52 PLTUs, ranges from 1.1 to 3.7 million tCO_2e. Co-firing targets of 1% and 5% each have emission values ranging from 112,000 to 374,000 tCO_2e and 561,000 to 2 million tCO_2e respectively.

The claim of the State Electricity Company (Perusahaan Terbuka Pembangkit Listrik Negara/PT PLN) that biomass is a carbon neutral energy source, is not proven. Although there is the potential for Tree

Plantations for Energy (HTE) to sequester carbon, the net difference between this and the carbon emissions that are generated when natural forests are cut down, is an overall gain of around 6.8 million - 11.3 million tonnes of CO2e. The emissions will be calculated in Indonesia's Biennale Update Report (BUR), but the method used in the Forestry Sector will be "Forest and Other Land Use" (FOLU) which only measures the total change in forest cover and not emissions, so it will be recorded as a Net Sink. Using this method, the emissions from deforestation are reduced through the creation of plantations. But trees in a plantation are continually harvested on a regular basis, so that the absorbed emissions will be released again, unlike a forest which is not being used commercially.

The impact of deforestation from wood pellet production is not only related to emissions, but also related to access to forest and to land rights of Indonesian people. A publication by the IPCC in 2022 [2] warns that, if wood pellet production is carried out on a large scale, on land that does not have a strong tenure protection system, then it will have negative social, economic and environmental impacts. Deforestation for the production of wood pellets has the potential to damage ecosystems, threaten the availability of food and water, and threaten local livelihoods and the rights of indigenous peoples. One example of this is forest clearing by PT. Biomass Andalan Energi [3], a company which supplies wood pellets on Siberut Island, Mentawai, West Sumatra. Land clearing for Tree Plantations for Energy, resulted in deforestation of natural forests and caused flooding in twelve villages in four sub-districts on Siberut Island. Additionally, Certainty of Access to forests through Social Forestry Approval (a permitting scheme which is meant to allow communities to manage forests and is provided by the Government of Indonesia) is vulnerable to exploitation by wood pellet companies looking to gain access to forests.

Extending the life of a dirty polluter

Co-firing with wood pellets at the PLTU coal power station, only serves to extend the life of a dirty polluter which would otherwise be nearing retirement and by doing so, prolongs the use of coal. Therefore, it stands to reason that the use of biomass does not decrease coal consumption in the long term. In fact, while the use of biomass increased from 9,731 tonnes in 2020 to 282,000 tonnes in 2021, coal consumption increased from 66.7 million tonnes to 68.5 million tonnes over the same period. The PLN 2021-2030 RUPTL [4] document also projects that coal demand will increase to 153 million tonness by 2030. Ultimately, the use of biomass in place of coal to generate electricity is only slowing Indonesia's transition to clean renewable energy. It is a false solution which does nothing to help the country genuinely reduce its GHG emissions and address the climate crises.

What can be done?

- Current Energy Policies, which incentivise the creation of Tree Plantations for Energy, must be retracted and amended.
- All support and incentives given to the wood pellet industry must stop.
- Indonesia's remaining natural forests, which are a carbon sink and crucial to sequestering carbon emissions, must be protected.
- Immediate and substantial support must be given to the creation of genuine renewable energy infrastructure, such as wind and solar, to ensure decarbonisation of Indonesia's energy supply and energy security.
- The rights of local communities and indigenous peoples, dependent on Indonesian forests for their survival, must be safeguarded.
- Financial support should be given to communities to develop appropriate, small scale, clean renewable energy solutions to meet the needs of energy poor communities.

This briefing is based on the report by Tend Asia "Battle on Emission Reduction Claims" [5]

References

[1] Enhanced Nationally Determined Contribution, Republic of Indonesia. (2022) Accessible from:

https://unfccc.int/sites/default/files/NDC/2022-09/23.09.2022_Enhanced%20NDC%20Indonesia.pdf

[2] IPCC (Intergovernmental Panel on Climate Change) Sixth Assessment Report: Impacts, Adaptation and Climate Change (2022) Accessible from: https://www.ipcc.ch/report/ar6/wg2/downloads/

[3] Rainforest Journalism Fund (2020) The Threats to Siberut Island, the Galapagos of Asia (Bahasa Indonesia). Accessible from:

https://rainforestjournalismfund.org/stories/threats-siberut-island-galapagos-asia-bahasa-indonesia

[4] PLN 2021-2030 RUPTL document. Accessible from:
https://web.pln.co.id/statics/uploads/2021/10/ruptl-2021-2030.pdf

[5] Battle on Emission Reduction Claims. Tend Asia (2022) Accessible from: https://trendasia.org/wp-content/uploads/2022/11/Battle-on-Emission-Reduction-Claims.pdf

Did you Know?

Over 190 organisations around the world have signed a statement calling for an end to burning forest wood for large-scale energy production. Read and sign on here:
https://environmentalpaper.org/the-biomass-delusion/

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