



Energetic Use of Palm Oil Residues in Indonesia and Thailand

The energetic use of biomass is one of the key measures used in efforts to mitigate climate change. According to the International Energy Agency (IEA), the share of bioenergy in the global primary energy supply could sustainably increase from currently 10% to 33% in 2050. Vast supplies of agricultural residues make Southeast Asia one of the most important regions in the world when it comes to tapping unharnessed bioenergy potentials. In palm oil mills (POMs) almost 70% of fresh fruit bunches are turned into waste in the form of empty fruit bunches (EFBs), fibres and shells as well as liquid effluent. Using innovative waste-to-energy technologies, these resources can be transformed into electricity and heat or processed in bio-refineries, while capturing methane, a very harmful greenhouse gas (GHG).

Indonesia and Thailand are among the world's biggest palm oil producers. While the palm oil industry is considered a major contributor to GHG emissions, there are several options available to make better use of existing palm oil waste and minimise GHG emissions using the innovative technologies mentioned above.

The utilisation of palm oil waste constitutes an opportunity for both countries to increase their renewable energy (RE) share as a mitigation action. In Indonesia, renewable energy is expected to contribute 23% of the power supply by 2025, or 45 GW in total, of which bioenergy is expected to generate 5.5 GW. Thailand, on the other hand, plans to expand RE to 20% by 2035, again including a major bioenergy share. The International Climate Initiative (IKI) supports both countries in their efforts to reach these targets.

Promotion of Least Cost Renewables in Indonesia (LCORE)

The LCORE project, implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), has received EUR 4.9 million in funding from the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). It supports the Indonesian partner, the Directorate General for New and Renewable Energy and Energy Conservation (NREEC), in setting up suitable policy programs for wide-scale RE deployment under the best cost-benefit ratios in terms of electricity generation and CO₂eq avoidance.

The project published a study¹ which shows that the total electricity production potential of residues from palm oil mills (POMs) amounts to at least to 43 TWh annually, equal to CO₂eq savings of approximately 39 million tonnes per year. GIS-based mapping of biogas power potential at POMs in East Kalimantan has also been undertaken in cooperation with the local government. As a result, twelve mills were identified as being able to generate 20 MW of power in total, with a CO₂eq reduction potential of 485,000 tonnes per year. In order to encourage private contributions to RE development, the project also analysed various barriers² that prevent private project developers from investing in bioenergy power projects and developed an e-guidebook³ that guides project developers through all the necessary procedures.

On the supply side, LCORE, together with its private partners, developed numerous pilot projects to showcase innovative solutions. The project supported energy saving and efficiency measures, for instance in a new POM in Ka-

limantan. The private project partner is set to implement efficiency measures which will allow an additional 2 MW of power to be generated. LCore also assessed a palm oil mill in Belitong for bio-digester optimisation, which can potentially increase electricity production by up to 40%. As part of the monitoring and evaluation measures, the LCore project also conducted technical and economic performance benchmarking and proposed improvement measures for nine POME (palm oil mill effluent) biogas power plants in Indonesia. This activity also included a series of focus group discussions at which the findings were presented to biogas power plant owners. The lessons learned that have been documented will contribute to the development of best practice guidelines and a biogas safety concept as a reference for developing optimal POME biogas plants in Indonesia.

Lastly, the project completed a study evaluating the impacts of bioenergy deployment policies. This will contribute to the on-going debate on how the Indonesian Government can best develop supporting policies to attract private sector investment in RE. Policies can highlight the positive contribution of bioenergy utilisation towards achieving RE and climate targets, while creating job opportunities, increasing productivity, stimulating the biomass industry and promoting rural development.

Sustainable Palm Oil Production for Bioenergy in Thailand

Between December 2008 and August 2012, GIZ supported the introduction of international sustainability standards for Thailand's palm oil production as well as the certification of its cultivation and processing, providing roughly EUR 3.7 million in BMUB funding. The aim was to identify and prevent adverse impacts.

The project started by carrying out field examinations which came to the conclusion that, in Thailand, sustainable biodiesel from palm oil leads to an average CO₂ saving of 63%.



In Thailand, up to 80% of oil palms are planted by small-scale farmers. Accordingly, GIZ trained approximately 1,000 small-holders in sustainable farm management and developed a concept for sustainability certification in this segment. This scheme has been integrated into the Thai Government's five-year strategic plan for the palm oil sector and led to the establishment of the Roundtable on Sustainable Palm Oil (RSPO) in Thailand. The sustainability of certified products is verified using a monitoring system, developed by the project for its partners, which depicts the social and ecological impacts of production. In 2012, 412 small-scale farmers and two POMs began using the RSPO standards in their production and processing activities and received sustainability certificates after completing the entire administrative process. The income of these farmers increased by around 25% and they also benefited from health and safety improvements at work.

As a result of the project, the Forum for Sustainable Palm Oil (FONAP) was founded in Berlin on 2 September 2013 to further increase the demand for certified palm oil. At the time of writing in 2017, the Forum has 44 members, including large private businesses, civil society actors and government representatives.

- 1 Overview of the Waste-to-Energy Potential for Grid-connected Electricity Generation in Indonesia, March 2014, www.lcore-indonesia.co.id
- 2 Grid-connected Biomass & Biogas Power Investment in Indonesia: Barriers and Policy Options, April 2014, www.lcore-indonesia.co.id
- 3 2nd Edition Renewable Energy Guidelines on Biomass/Biogas Project Development in Indonesia, www.lcore-indonesia.co.id

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