



## Energetic Use of Palm Oil Residues in Indonesia and Thailand

One of the key measures for climate change mitigation is the energetic use of biomass. According to the International Energy Agency (IEA) the share of bioenergy in global primary energy supply could sustainably increase from currently 10% to 33% in 2050. Vast resources in agricultural residues make Southeast Asia one of the most important regions to tap unharnessed bioenergy potentials. In palm oil mills (POMs) almost 70% of fresh fruit bunches are turned into waste in shape of empty fruit bunches (EFBs), fibres and shells as well as liquid affluent. By using innovative waste-to-energy technologies these resources can be transformed into electricity and heat or bio-refineries, while capturing methane, an very harmful greenhouse gas (GHG).

Indonesia and Thailand are among the world's biggest palm oil producers. At the same time, both countries have set ambitious mitigation and RE targets for themselves. In Indonesia RE are planned to contribute one fourth of the power supply by 2025 or 9GW in total, of which bioenergy shall generate 1.2GW. This shall inter alia lead to a reduction of GHG emissions by 26-41% in 2020. Thailand plans to expand RE to 15-20% until 2030, again including a major share from bioenergy, thereby reducing 7-20% of GHG emissions. The International Climate Initiative (IKI) supports both countries in reaching those targets.

### Promotion of Least Cost Renewables in Indonesia (LCORE)

The LCORE project, implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), has received EUR 3.5 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 vast RE deployments under the best cost-benefit ratios in terms of electricity generation and CO<sub>2</sub>eq avoidance.

The project published a study<sup>1</sup> which shows that the total electricity production potential on the basis of POMs residues amounts to at least to 43TWh annually. This would translate into CO<sub>2</sub>eq savings of approximately 39 million tons per year, thus fully covering the national climate change mitigation target in the energy sector. The various barriers that hinder private project developers in investing into bioenergy power projects were also analysed<sup>2</sup>. The findings support NREEC in the revision and recalculation of an existing feed-in tariff (FIT) for biogas and biomass power. The new FIT was introduced with higher base tariffs and regional factors in October 2014<sup>3</sup> together with an E-guidebook<sup>4</sup> that guides project developers through all necessary procedures.

On the supply side, LCORE developed together with its private partners many pilot projects to showcase innovative solutions. A GIS-based mapping of biogas power potential at POMs in East Kalimantan has been undertaken in cooperation with the local government, which strives to increase the regional electrification rate from 67% to 80% by 2018. The identified biogas potential from POMs can meet two thirds of this target. As a result, 12 mills were identified as able to generate in total 20MW power, with a CO<sub>2</sub>eq reduction potential of 485,000 tonnes per year. LCORE also supported energy saving and efficiency

measures, for instance in a new POM in Kalimantan. The private project partner is about to implement the efficiency measures, which will generate around 2MW of additional power, compared to a business as usual approach. Investment will pay off after five years. Another potential for optimization concerns the biogas yield from POM effluent. The IKI project thus advises on an efficient treatment of wastewater streams and improved pond management. Adding nutrients to a pond at a mill in Belitung, for instance, will result in an additional electricity production of up to 40%.



## 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 with roughly EUR 3.7 million of BMUB funding in order to identify and prevent any adverse effects.

The project started by carrying out field examinations and came to the conclusion that in Thailand, sustainable biodiesel from palm oil leads to an average saving of 63% in CO<sub>2</sub>. In Thailand, up to 80% of oil palms are planted by small-scale farmers. Accordingly, the GIZ trained approx. 1,000 smallholders on sustainable farm management and developed a concept for sustainability certification in this segment. This scheme has been integrated into the palm-oil sector's five-year strategic plan of the Thai government and led to the establishment of the Roundtable on Sustainable Palm Oil (RSPO) in Thailand. The sustainability of certified products is verified on the basis of a monitoring system, which the project developed for its partners, to depict the social and ecological aspects. In 2012, 412 small-scale farmers and two POMs started using the RSPO standards in their production and processing activities

and received sustainability certificates after completing the entire administrative process. The income of those farmers increased by around 25%, including health and safety benefits at work.

Subsequent to the project, a Forum for Sustainable Palm Oil (FONAP) was founded in Berlin on 2 September 2013 to further increase the demand for certified palm oil. To date (2015) the Forum has 43 members, including large private businesses, civil society actors and governmental representatives.

- 1 Overview of the Waste-to-Energy Potential for Grid-connected Electricity Generation in Indonesia, March 2014, [www.lcore-indonesia.co.id](http://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](http://www.lcore-indonesia.co.id)
- 3 For example, in Sumatra, where 70% of all palm oil mills are situated, FIT stands now at IDR 1,320/kWh (EUR 0.08) for biomass power plants connected to the middle voltage grid.
- 4 2nd Edition Renewable Energy Guidelines on Biomass/Biogas Project Development in Indonesia, [www.lcore-indonesia.co.id](http://www.lcore-indonesia.co.id)

## Imprint

**Published by:** Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB)

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**Design:** MediaCompany – Agentur für Kommunikation GmbH

**Photo credits:** GIZ

**Date:** September 2015



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