



**Asia-Pacific
Economic Cooperation**

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Agenda Item: 12a(i)

**Summary Report: Strategy for Large-Scale
Implementation of Biogas Capture from Palm Oil Mill
Effluent and Reuse for Renewable Electricity
Generation (EWG 25 2015A)**

Purpose: Information
Submitted by: United States



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Background

The worldwide palm oil industry has undergone rapid expansion over the past three decades, but advances in the utilization of palm oil's methane-intensive waste stream for electricity generation have not kept pace. This is despite positive technology, market, and environmental drivers. The result has been a significant missed opportunity to reduce greenhouse gas (GHG) emissions and increase renewable electricity production.

From a “bird’s eye view,” palm oil mill effluent (POME)-to-energy technology implementation should be “low-hanging fruit” from both economic and government policy perspectives. In addition to the positive impact on GHGs and electricity access, the technology is increasingly understood and has been widely used in other contexts. Positive project economics and a legal framework for feed-in-tariffs indicate the potential for solid financial returns, and capital markets “are looking” for investments in renewable energy. Yet the technology is not widely adopted, strikingly so in Indonesia, where less than 10 percent of the industry POME is utilized for electricity production. The primary reasons behind this are multiple market and political challenges that complicate policy and project implementation.

Purpose and Methodology

The objective of this project is to develop a strategy to finance and implement biogas capture for renewable electricity generation at large scale encompassing a significant portion of the APEC region’s palm oil mills. The strategy proposes the design for a public-private partnership (PPP) to address the challenges that hinder implementation of palm oil mill effluent (POME)-to-electricity projects in APEC economies.

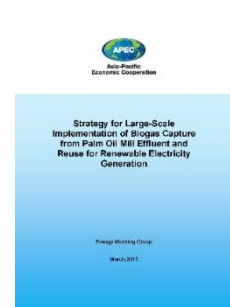
The approach toward developing the strategy was to first document stakeholder perspectives on the challenges that hinder implementation of POME-to-electricity projects in APEC economies, and then to propose a solution in the form of a PPP. Interviews were conducted with 32 stakeholder organizations from subsectors of the POME-to-energy landscape, including government, NGO/civil society, development agency, finance, and industry. The project focused on Indonesia, but also looked at Malaysia.

Implementation

The project was implemented by Winrock International, in partnership with Allotrope Partners, under a contract with the APEC Secretariat. The United States Department of Energy managed the work on the project.

Outputs

- The published strategy (APEC#216-RE-01.31, http://publications.apec.org/publication-detail.php?pub_id=1830) proposes the design for a PPP to address existing barriers and to finance and implement POME-to-energy projects at “low-hanging fruit” mills.
- Functions of the proposed PPP:
 - Vetting parties for participation in the PPP
 - Sustainability screening
 - Early-stage development activities
 - Facilitating buy-in of electric utilities and governments
 - Feasibility studies
 - Construction partnering and advising
 - Finance partnering and advising
 - Monitoring
 - Communications and capacity building



Multiplier Effects

The project is designed to generate multiplier effects in order to reach its long-term objectives:

- The renewable electricity generated from captured methane can provide electric power to the nearby communities that are remotely-located and off-grid, thereby increasing electrification ratios, driving economic productivity, and displacing generation from high-cost and carbon-intensive diesel fuel.
- Palm oil mills will earn additional revenues from the sale of renewable electricity to the grid or reduction in the costs of fuel that would otherwise be used to generate electricity at the mills.
- The renewable electricity generated from biogas combustion will displace a portion of the government revenues often spent on subsidies for electricity generation from diesel fuel in developing economies.
- The project promotes open trade and investment in Environmental Goods and Services, including gas turbines for electrical power generation from recovered biogas, biogas generator sets, biogas refinement equipment, and anaerobic digesters and reactors.
- The project's resulting strategy can be adapted to other industries concentrated in APEC economies that involve biogas-emitting wastewater lagoons, including the tapioca starch and rubber industries.

Contribution to Meeting the EWG Goals

This project directly supports the Energy Working Group's goals to double renewable energy's share in the APEC energy mix by 2030 and reduce the APEC region's energy intensity by 45% by 2035. It will lead to replacing electricity generation from high-cost and carbon-intensive diesel fuel with renewable electricity. It will result in more environmentally and economically sustainable growth and lead to electrification of remote communities surrounding palm oil mills, which can foster increased productivity and economic empowerment for the people in these communities.

Next Steps

Key decision point: Which stakeholders from APEC economies are interested in collaborating to form the PPP and implement the strategy?

Depending on available resources, the PPP could be implemented in full or as disaggregated stand-alone activities that would still reduce project risks.

- Priorities for full implementation of the PPP:
 - Identify and engage interested donor and financing partners
 - Secure donor funding for PPP start-up
- Priorities for partial implementation of the PPP through stand-alone activities:
 - Develop case studies and technical resources
 - Conduct in-depth analysis of regions with electric utilities to prioritize project locations
 - Conduct a market-level screening to identify mills with characteristics most likely to result in cost-effective projects
 - Conduct mill outreach, engagement, and awareness-raising
 - Develop and disseminate project-assessment templates and procedures
 - Elaborate on the design of a blended capital facility

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