

SUMMARY OF THAILAND FINDINGS TO DATE
Methane to Markets Support for Livestock and Agro-Industrial Wastes

1. THE METHANE TO MARKETS PARTNERSHIP

The Methane to Markets Partnership (M₂M) is an initiative to reduce global methane emissions in four main sectors: agriculture, landfills, oil and gas and coal mines. USEPA is conducting livestock and agro-industry *Resource Assessments* (RA) in twelve countries. The objective is to identify and characterize the potential for incorporating anaerobic digestion into waste management systems to reduce methane emissions and provide a renewable source of energy. These RAs, together with feasibility studies and demonstration projects of appropriate technologies will serve as the basis for future country-level policy planning and development of an agricultural methane implementation plan to replicate technologies in targeted sectors.

2. THAILAND FINDINGS TO DATE

The table below summarizes the findings of the Thailand RA.

Sector	Description of the sector	Direct emissions ¹		Indirect ²	Total
		CH ₄ (MT CH ₄ / yr)	CO ₂ e (MT CO ₂ e / yr)	Fuel replacement (MT CO ₂ e / yr)	Direct + Indirect (MT CO ₂ e / yr)
Swine	~ 8 million pigs, ~ 3,400 standard farms and > 200,000 backyard farms	61,900	1,300,000	234,000	1,534,000
Tapioca Starch	~ 25 MMT/yr cassava roots, ~ 3 MMT/yr starch ~ 70 tapioca factories (~ 40 capture biogas) COD: ~13-20 kg/m ³ ; WW: ~11-33 m ³ / MT	53,300	1,120,000	201,600	1,321,600
Palm Oil	~ 8.7 MMT FFB, ~1.5 MMT crude palm oil ~ 50 palm oil mills (~ 29 capture biogas) COD: ~ 21-98 kg/m ³ , WW: ~0.5 m ³ / MT FFB	15,700	330,000	59,400	389,400
Ethanol	~ 1.7 ML/day from molasses and tapioca 11 ethanol distilleries (~ 5 capture biogas) COD: 100 kg/m ³ , WW: ~12-20 m ³ /m ³	69,000	1,450,000	261,000	1,711,000
Total		199,900	4,200,000	756,000	4,956,000

MMT: Million metric ton – ML : million litres – COD: Chemical Oxygen Demand – WW: Wastewater generation – FFB: fresh fruit bunches

¹. Baseline methane emissions due to the current waste management system

². Indirect emissions reduction potential: the emissions that would be reduced by fuel replacement through the use of biogas

3. BENEFITS

Anaerobic digestion provides the following benefits:

1) *Water, Greenhouse Gases, and Renewable Energy*: Stabilization of organic wastes and reduction of methane emissions, via combustion of captured methane (biogas) in either a flare or for use as a renewable energy resource. This improved waste management practice also improves kitchen air quality when gas is used as a cook fuel that replaces conventional woody biomass as a fuel source.

2) *Sanitation and Human Health*: Eliminates fly attracting odours thereby reducing this disease vector while also directly reducing pathogen levels in the treated wastewater

3) *Economics*: Off-setting of purchased fossil fuel energy as methane can be used as a fuel for electricity generation, and/or direct heat, or as a cooking fuel. In addition, many such facilities have availed themselves of carbon credits, further improving the economics of anaerobic digestion.