

**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 (M<sub>2</sub>M) 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 <sup>1</sup>		Indirect <sup>2</sup>	Total
		CH <sub>4</sub> (MT CH <sub>4</sub> / yr)	CO <sub>2</sub> e (MT CO <sub>2</sub> e / yr)	Fuel replacement (MT CO <sub>2</sub> e / yr)	Direct + Indirect (MT CO <sub>2</sub> 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 <sup>3</sup> ; WW: ~11-33 m <sup>3</sup> / 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 <sup>3</sup> , WW: ~0.5 m <sup>3</sup> / 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 <sup>3</sup> , WW: ~12-20 m <sup>3</sup> /m <sup>3</sup>	69,000	1,450,000	261,000	1,711,000
<b>Total</b>		<b>199,900</b>	<b>4,200,000</b>	<b>756,000</b>	<b>4,956,000</b>

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

<sup>1</sup>. Baseline methane emissions due to the current waste management system

<sup>2</sup>. 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.