SUMMARY OF VIETNAM 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_2M) 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. VIETNAM FINDINGS TO DATE

The table below summarizes the findings of the Vietnam RA.

Sector	Description of the sector	Direct emissions[1]		Indirect[2]	Total
		CH_4 (MT CH_4 / year)	CO_2e (MT CO_2e / year)	Fuel replacement (MT CO_2e / year)	Direct + Indirect (MT CO_2e / year)
Swine	~ 27 million pigs ~ 15% in commercial farms	25,260	530,420	99,900	630,320
Cassava	~ 1 MMT tapioca starch. ~30% have lagoons. COD: ~15kg/m³; WW: ~12 m³/MT starch	10,800	226,800	42,720	269,520
Ethanol	~ 28 ML/year. (7 plants - 3 with biogas systems) COD: ~120 kg/m³; WW: ~12 m³/m³	8,100	170,100	32,040	202,140
Rubber	659,600 MT (FAOSTAT 2008). Assume 80% use lagoons. COD: ~3 kg/m³; WW: ~25m³/MT	7,900	166,220	31,310	197,530
Slaughter houses	~ 2.8 MMT COD: ~2 kg/m³; WW: ~3.3 m³ / MT	2,960	62,150	11,710	73,860
Sugar	~ 1,2 MMT refined sugar. Assume 80% use lagoons. COD: ~1.6 kg/m³; WW: ~6 m³/MT	1,880	39,500	7,440	46,940
Total		**56,900**	**1,195,190**	**225,120**	**1,420,310**

MT: Metric ton – MMT: Million metric ton – ML : million litres – COD: Chemical Oxygen Demand – WW: Wastewater generation

[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.