

## SUMMARY OF BRAZIL FINDINGS TO DATE

July 2010

Methane to Markets Support for Livestock and Agro-Industrial Wastes

**1. THE METHANE TO MARKETS PARTNERSHIP (M2M)**

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. CURRENT BRAZIL FINDINGS TO DATE (Brazil RA, 2010)**

Sector	Description of the sector and assumptions	Direct emissions <sup>1</sup>		Indirect <sup>2</sup>	Total
		CH <sub>4</sub> (MT CH <sub>4</sub> / yr)	CO <sub>2e</sub> (MT CO <sub>2e</sub> / yr)	Fuel replacement (MT CO <sub>2e</sub> / yr)	Direct + Indirect (MT CO <sub>2e</sub> / yr)
Swine	~38 million pigs, only considered industrial operations w/o methane recovery (~23 million pigs)	566,300	11,891,500	1,053,400	12,944,900
Distilleries	22.5 MMT ethanol, 1.5 MMT cachaça, COD: 28 kg/m <sup>3</sup> , WW (m <sup>3</sup> /MT): 12.5 (ethanol), 9 (cachaça)	174,400	3,661,800	324,400	3,986,200
Slaughter houses	43 million cattle, 35 million pigs, 5 billion chicken COD (kg/m <sup>3</sup> ): 4.1 (cattle/swine), 2.4 (poultry) WW (m <sup>3</sup> /MT): 4 (cattle), 1.3 (swine), 0.3 (poultry)	114,200	2,397,500	212,400	2,609,900
Cassava starch	565,000 MT cassava starch, 93% use open lagoons COD: 10 kg/m <sup>3</sup> , WW: 3.7 m <sup>3</sup> /MT	17,100	359,100	31,800	390,900
Dairy cattle	21.5 million dairy cows, only considered full and semi confinement (70,000 cows)	9,200	193,100	17,100	210,200
Beverages	10 MMT beer, 14 MMT carbonated drinks, COD (kg/m <sup>3</sup> ): 4.5 (beer), 2.1 (carbonated drink) WW (m <sup>3</sup> /MT): 4.5 (beer), 4 (carbonated drink)	7,500	157,200	14,000	171,200
<b>Total</b>		<b>888,700</b>	<b>18,660,200</b>	<b>1,653,100</b>	<b>20,313,300</b>

MMT: Million metric tons – ML: million litres – COD: Chemical Oxygen Demand – WW: Wastewater generation

<sup>1</sup>. Baseline methane emissions due to the current waste management system; assume CO<sub>2</sub> GWP is 21

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

**3. BENEFITS**

Based on field visits and interviews, environmental compliance is the main driver for waste management systems at livestock and agro-industrial operations. The use of lagoons is common in these sectors. Anaerobic digestion provides the following benefits:

**1) Environmental and sanitary benefits:** 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 eliminates fly attracting odours thereby reducing this disease vector while also directly reducing pathogen levels in the treated wastewater. It also improves kitchen air quality when gas is used as a cook fuel that replaces conventional woody biomass as a fuel source.

**2) Economic benefits:** 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 lagoon installation.