

Methane from the animal protein industry in Brazil

Hamilton K. M. Ida
Founder

Methane to Market Partnership
Exposition
Beijing, China
30 October, 2007 – 1 November, 2007

Who we are

LOGICarbon

1. Brazilian company
2. Development and management of ER projects in Latin America
 - a) CDM
 - b) Voluntary Market
3. Focus on
 - a) Agriculture
 - b) Wastewater
 - c) Land use and forestry



Methane from the Animal Protein Industry

Animal Waste Management Systems (AWMS)



&



Meat Processing Plants (Slaughterhouses)

Brazil – a few aspects

1. Tropical climate is predominant
2. Environmental legislation tougher everyday
 - a) Increased awareness on water and soil contamination
 - b) Control on water consumption
 - c) Need of adequate effluent control
3. Need to reduce energy costs
 - a) Electricity
 - b) Wood

Ambient Temperature Anaerobic Digesters

1. Covered lagoons
 - a) Mainly using PVC (some HDPE)
 - b) Currently, the main solution adopted by the animal producing and meat processing industries
2. No standard is enforced by environmental legislation
 - a) Current practice considers variable HRT
 - i. Animal manure – 15 to 35 days
 - ii. Wastewater – from a few hours up to 15 days
 - b) VOL variable from 0,5 to 2 kg VS/m³ of digester

Methane from AWMS

- Main livestock in Brazil

- Cattle

- Beef
- Dairy

- Swine

- Poultry

- Broilers
- Layers

- Others

- Goat
- Sheep
- Buffalo
- Turkey
- Ostrich
- Shrimp
- Fish
- Alligator
- ...

Composting

Methane from AWMS

Swine

1. 1.5 Mill Sows F-F (CAFOs)
2. Average operation size ~ 250 Sows F-F (est.)
 - a) 6,000 swine operations in Brazil (est.)

Dairy Cattle

1. 20 Mill Milking Cows
 - a) 23,000 Mill L milk (14,000 Mill L received in dairy plants)
 - b) Avg production 3.2 L/cow/day
2. Avg operation size < 50 Milking Cows
3. Most are not confined

Beef Cattle

1. 200 Mill heads
2. Mainly in extensive grazing in pastures
3. Intensive in feedlots
 - a) 5 Mill heads (2,5% of the total)



CH₄ Emission Reduction Projects

1. Swine – 700 installed ATAD units
 - a) 250,000 Sows F-F
 - b) 1.2 Mill tCO₂e/year
2. Dairy – < than 10 installed ATAD units
3. Beef – first one under construction
4. Material
 - a) 95% PVC
 - b) 5% HDPE
5. Main drivers
 - a) Energy savings
 - b) Carbon credits (poor for beef)
 - c) Environmental adequacy



Opportunity for CH₄ ER projects

1. There are still 1.25 Mill Sows F-F
 - a) 20% size bigger than 500 Sows F-F (est.)
 - i. 260,000 Sows F-F (~ 500 farms)
 - ii. 400,000 m³ biogas/day (65% CH₄)
 - iii. 200,000 MWh/year
 - iv. 1.3 Mill tCO₂e/year
 - b) 50% 100 – 500 Sows F-F (est.)
 - i. 600,000 Sows F-F (~ 2,400 farms)
 - ii. 900,000 m³ biogas/day (65% CH₄)
 - iii. 500,000 MWh/year
 - iv. 3 Mill tCO₂e/year



Opportunity for CH₄ ER projects

1. Few free-stall or semi-confined operations

a) ~ 20 farms size bigger than 500 Milking Cows

- i. 16,000 Cows
- ii. 20,000 m³ biogas/day (65% CH₄)
- iii. 11,000 MWh/year
- iv. 65 K tCO₂e/year

b) ~ 60 farms size 250 - 500 Milking Cows

- i. 20,000 Cows
- ii. 23,000 m³ biogas/day (65% CH₄)
- iii. 13,000 MWh/year
- iv. 75 K tCO₂e/year



Opportunity for CH₄ ER projects

1. Feedlots

- a) 5 Mill Heads
- b) 25,000 m³ biogas/day (65% CH₄) (low est.)
- c) 14,000 MWh/year
- d) 80 K tCO₂e/year
- e) In general, no Carbon Credits



Issues for CH₄ ER projects

1. Most producers wait for external finance (carbon funds) to implement projects
2. Small operations don't offer attractive return for investors
 - a) Own investment is the key to make projects viable
3. Free range production of cattle in Brazil - infrastructure
4. Adequate O&M is key for high efficiency

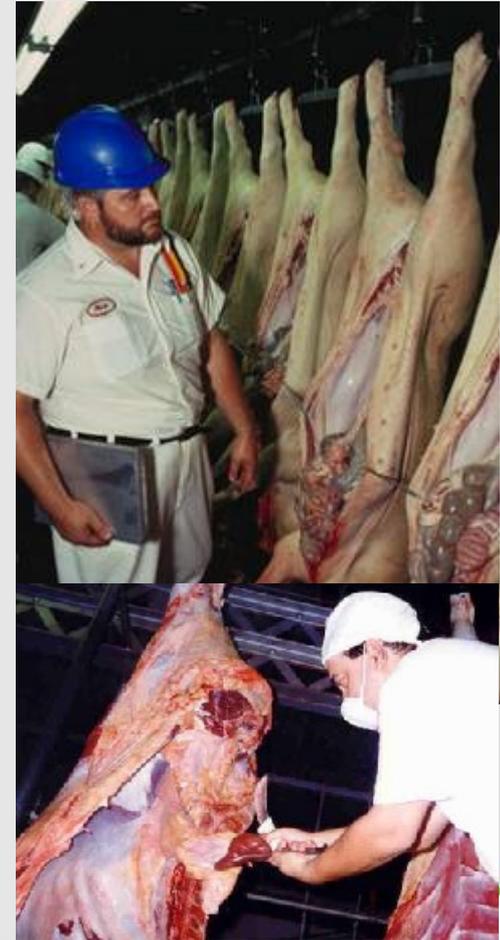


Methane from Meat Processing Plants

Meat Processing Industries

1. Beef 130+ Companies
2. Pork 35+ Companies
3. Chicken 45+ Companies

300+ Slaughterhouses (est.)



Methane from Meat Processing Plants

Opportunity for CH₄ ER projects

1. Ambient temperature anaerobic digesters for slaughterhouses?
 - a) 2 installed and other 4 under construction (PVC)
 - b) Main drivers
 - i. Environmental compliance
 - ii. Energy savings (wood for boilers)
2. UASB (Upflow Anaerobic Sludge Blanket)
 - a) About 1% of the industry
3. Issues
 - a) Mixing of red and green lines, high fat content
 - b) Large wastewater daily volumes
 - c) Current system's efficiency (ERs)



Methane from Meat Processing Plants

Meat Production Brazil 2006		Meat Category		
		Beef	Pork	Chicken
Kills	Heads/year	44.400.000	36.440.000	4.576.500.000
Kills	Heads/day	121.644	99.836	12.538.356
Wastewater Production	L/hd/day	1.200	400	15
COD Content	kg/m3	5,0	2,5	2,0
COD Production	kg/day	729.863	99.836	376.151
Methane Potential	m3/day	204.362	27.954	105.322
Energy Generation Potential	MWh/ano	172.135	23.546	88.714
Emission Reduction Potential	tCO2e/ano	1.049.509	143.559	540.887
Meat Production	tonnes	9.000.000	2.870.000	9.353.700

Fonte: CNPC

Fonte: ABIPECS

Fonte: Avisite/APINCO

Opportunity for CH₄ ER projects

1. Assumption
 - a) 30% of the facilities meet the minimum criteria
2. ~ 100 slaughterhouses
3. ~ 100,000 m³ CH₄/day
4. ~ 500,000 tCO₂e/yr
5. ~ 85,000 MWh/yr
6. ~ 128.000 m³ of wood/yr



General Issues

1. Biogas technology still needs more development in Brazil
 - a) Flares, engines, boilers, filters, instrumentation, valves, etc.
2. Cost of energy generation equipment is too high
3. Awareness on the need for reducing GHG emissions still needs to be increased among general public

Project Example 1

Swine Operation

1. Southeast region of Brazil
2. 23,000 Sows F-F (28 sites)
3. 35,000 m³ CH₄/day
4. Investment:
 - a) Infrastructure USD 4,500,000
 - b) CDM regulatory process USD 500,000
5. Revenues
 - a) 115,000 tCO₂e/yr USD 2,300,000
 - b) 7,000 MWh/yr USD 1,000,000 (savings)

Project Example 2

Beef processing company (6 operating units)

1. Midwest and Southeast regions of Brazil
2. 6,500 heads/day
3. 10,700 m³ CH₄/day
4. Investment:
 - a) Infrastructure USD 3,000,000
 - b) CDM regulatory process USD 200,000
5. Revenues
 - a) 45,000 tCO₂e/yr USD 950,000
 - b) 15,000 m³ of wood/yr USD 420,000 (savings)

Thank you!

Hamilton K. M. Ida
hamilton.ida@logicarbon.com
+55 (19) 8689-7576



LOGICarbon