Methane from the animal protein industry in Brazil

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Founder

Methane to Market Partnership Exposition
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Who we are

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
Introduction
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
Methane from the Animal Protein Industry

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
Methane from Swine

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
Methane from Dairy

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
Methane from Beef

Opportunity for CH$_4$ ER projects

1. Feedlots
   a) 5 Mill Heads
   b) 25,000 m$^3$ biogas/day (65% CH$_4$) (low est.)
   c) 14,000 MWh/year
   d) 80 K tCO$_2$e/year
   e) In general, no Carbon Credits
Methane from AWMS

Issues for CH$_4$ 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.)
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

<table>
<thead>
<tr>
<th>Meat Production Brazil 2006</th>
<th>Meat Category</th>
<th>Beef</th>
<th>Pork</th>
<th>Chicken</th>
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<tr>
<td></td>
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<td>Heads/year</td>
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<td>Kills</td>
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<td>Energy Generation Potential</td>
<td>MWh/ano</td>
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<td>Emission Reduction Potential</td>
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<td>9.353.700</td>
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</table>

Fonte: CNPC  Fonte: ABIPECS  Fonte: Avísite/APINCO
Opportunity for CH$_4$ ER projects

1. Assumption
   a) 30% of the facilities meet the minimum criteria

2. ~100 slaughterhouses

3. ~100,000 m$^3$ CH$_4$/day

4. ~500,000 tCO$_2$e/yr

5. ~85,000 MWh/yr

6. ~128,000 m$^3$ 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 m$^3$ CH$_4$/day
4. Investment:
   a) Infrastructure USD 4,500,000
   b) CDM regulatory process USD 500,000
5. Revenues
   a) 115,000 tCO$_2$e/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!

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