Deployment of the Canadian low temperature AD technology and transfer of R&D knowhow in Mexico

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Canada

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HIGHLIGHTS

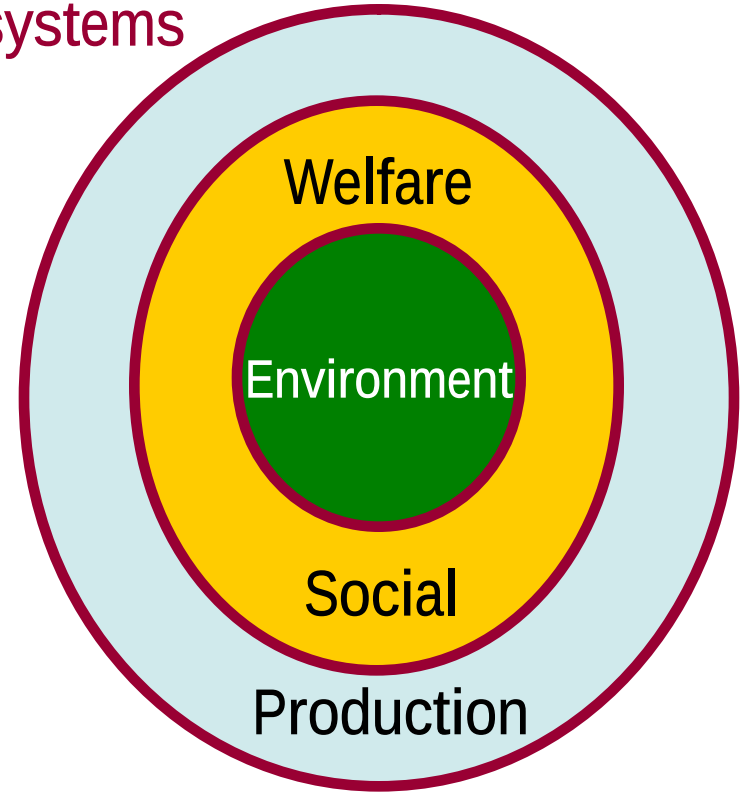
- *AAFC - DSRDC*
- *AAFC interest in AD goes beyond renewable energy*
- *Low temperature AD process performance*
- Initiatives for showcasing the low temperature AD in Mexico
  - *Partners involved in the project*
  - *Capacity building*
  - *Ongoing preliminary study financed by EC*

Dairy and Swine Research and Development Centre
Agriculture and Agri-Food Canada

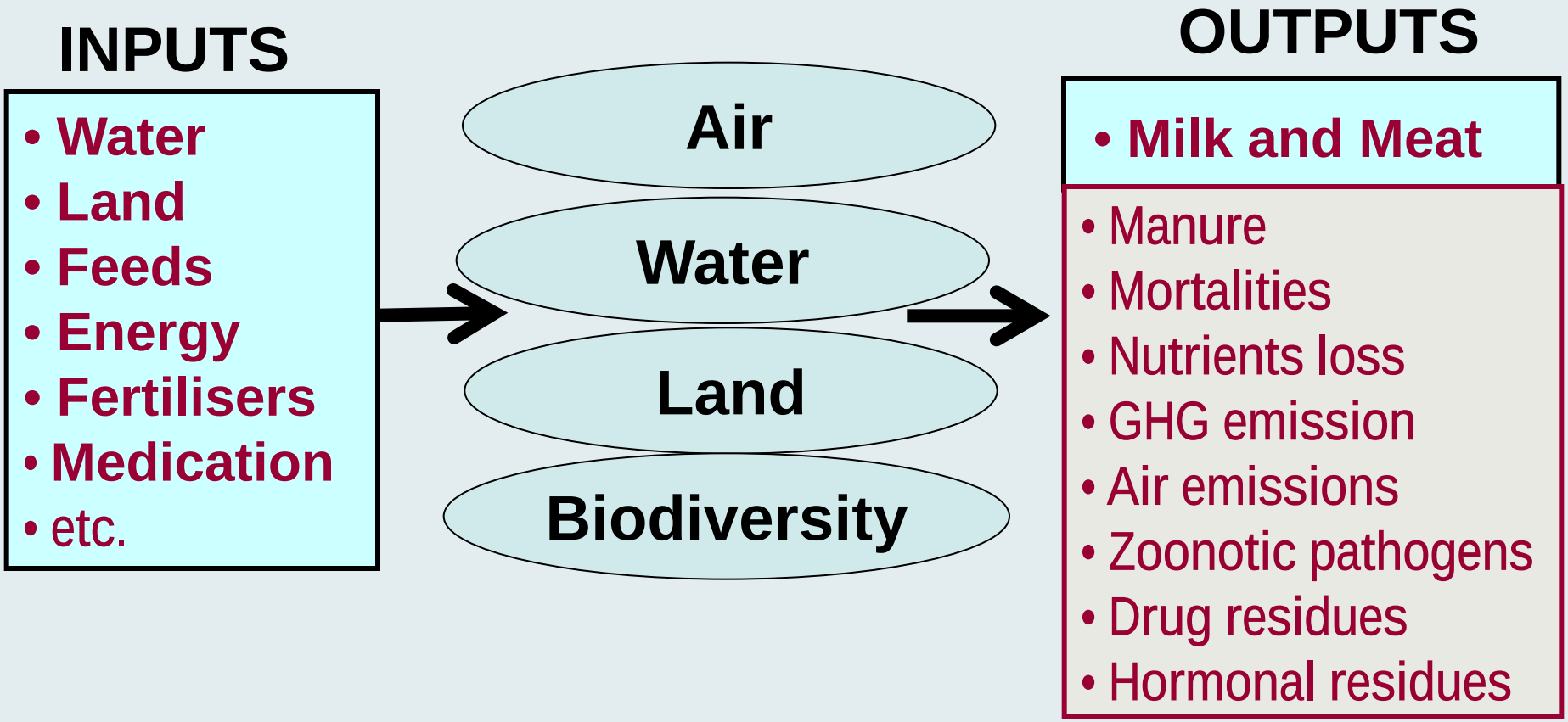
Mission

Sustainable dairy and swine production systems

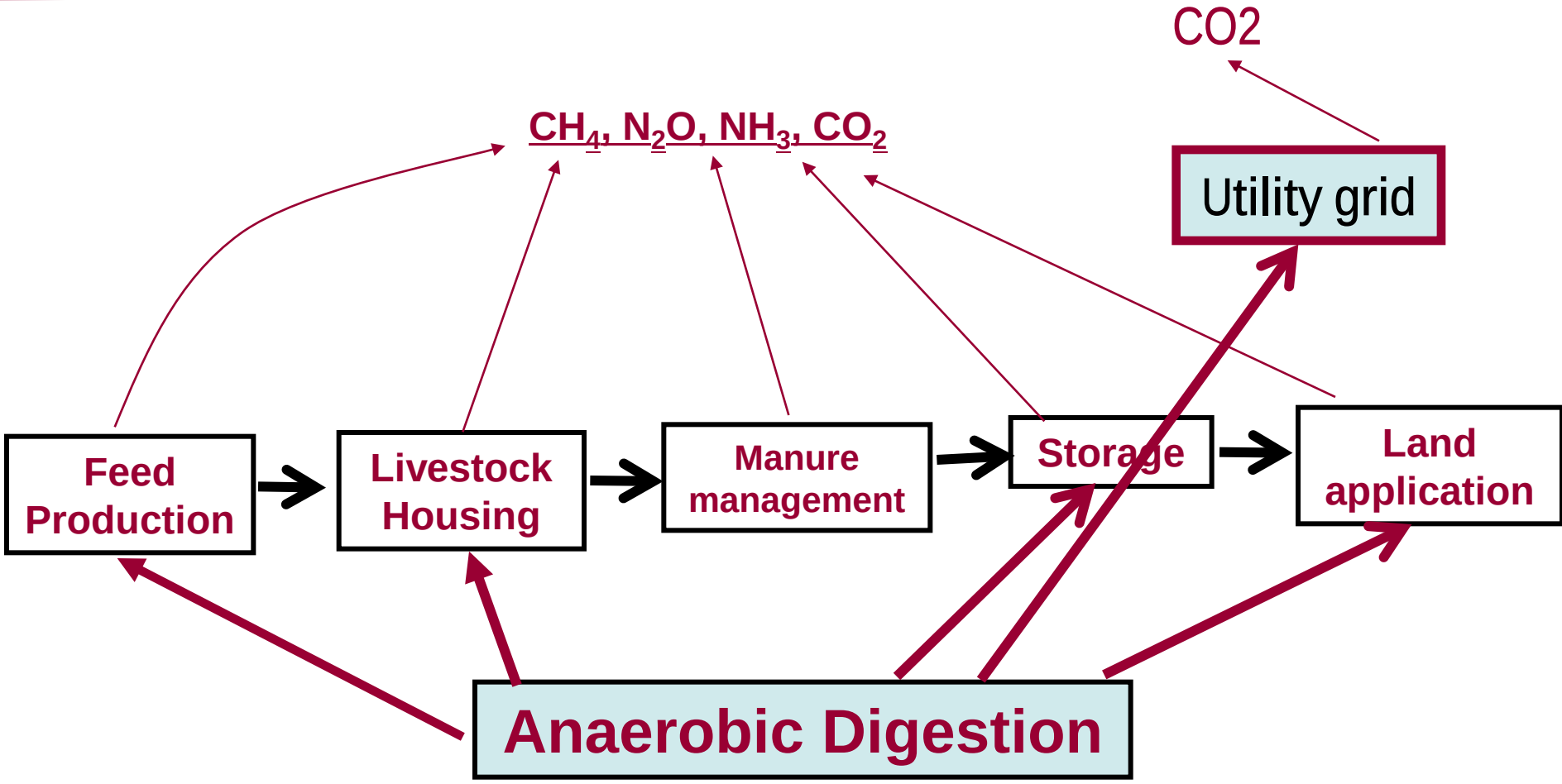
- Positive environmental footprint
- Animal welfare
- Socially acceptable



AAFC interest in AD goes beyond renewable energy



Integrated R&D projects to establish the carbon footprint for BAU and mitigation strategies



AAFC low temperature AD biotechnology

R&D Objective: to develop robust AD process for on farm operation:

- *Process stability*
- *Simplicity of operation*
- *Value added outcomes:*
  - *Bioenergy*
  - *Odorless and pathogens free organic fertilizer*
  - *Reduce environmental impacts*

    on natural resources

Requires a low energy input

- *Design operating temperature ranges between (15 – 25 ^{o}C)*
- *Highly suitable for diluted and concentrated farm wastes*

Process Stability

- Stable process at:

- **Ammonia up to 10 500 mg/l**
- **Increase the number of potential users**

- Not affected by antibiotics

Simplicity of operation

- Can be fed once per week
  - minimised interference with daily farm operations
- Easily adapted to existing manure handing systems
- Can stay Idle for months
- No mixing requirement with animal manure
- Low energy input
- Does not require specialized labor

Process Performance

- *Methane recovery compares very well with mesophilic and thermophilic processes*
  - *0.25 l of CH_4 / g of DCO fed*
  - *15 to 30 m^3 of CH_4 per m^3 of swine manure slurry*
- *Biogas is of high quality with a methane content exceeding 70%*

Contribution to GMI and carbon footprint

- *Production of green energy*
- *Reduction of fugitive methane emission from manure storages*
- *Reduce Nitrous oxide emission by more than 50%*
- *Reduce ammonia emission by more than 20%*
- *Reduce needs for fossil fuel based chemical fertilizers*

Improves nutrients balance for crops

	Nitrogen / Phosphorous
Raw manure	**3.9**
Treated manure	**5.2**
Supernatant fraction of treated manure	**9.6**

Technology deployment

Lochmead Farm – Junction City – Oregon USA
Dairy farm production, 1 250 heads

Partner:

REVOLUTIONENERGYSOLUTIONS

1st of 60 to 80 installations to be built in the next 5 years

180 kW cogen equipment and remote control

Showcasing Canadian AD technology and technological expertise in Mexico

- M2M meeting in Mexico in 2009
  - Strong interest by Mexican partner in the PAD
    - SEMARNAT (Ministry of the Environment and Natural Resources)
    - SAGARPA (Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food)

Showcasing Canadian AD technology and technological expertise in Mexico

- **Workshop on low temperature AD potential in Mexico (2011). Under the Umbrella of the GMI and the Canada-Mexico Partnership (CMP)**

- **Canadian Partners**
  - Bio-Terre systems inc.
  - Environment Canada
  - Agriculture Canada
- **Mexican Partners**
  - FIRCO (SAGARPA Shared Risk Trust),
  - SEMARNAT (Ministry of the Environment and Natural Resources),
  - Comisión Federal de Electricidad, University of Yucatán
  - Yucatán State government, Association of swine producers of Yucatán, CONAGUA (National Water Commission)
  - SAGARPA (Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food),
  - Mexican companies that work on biodigesters.

Workshop Outcomes

- It was agree to showcase the Canadian technology in Mexico. The Canadian and Mexican company are investigating exchanging type of partnership agreements

- AAFC and the Autononous University of Yucatan agree to work on a collaborative research agreement for R&D transfer and development of scientific expertise to support the low temperature technology deployment and to broaden the technology application for specific organic substrates in Mexico

In Progress: Showcasing Canadian AD technology

Environment Canada has mandated Bio-Terre Systems inc. to carry out a **preliminary study with their Mexican partners to provide:**

- **Data on livestock, building and waste management practices that are required to:**
- **Provide a preliminary design for the demonstration project;**
- **Assess the green energy recovery potential with the PAD process;**
- **Assess the reduction in GHG emission and the potential agronomic and environmental benefits of the PAD.**

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QUESTIONS ?

Canada