Pork Industry Environmental Sustainability Initiative

C-AGG Meeting
July 21, 2011
Randy Spronk
Today’s Media

- 24/7
- Highly competitive
- Television news dominates
- Newspapers still viable
- Online sources rapidly growing
Headlines

Pork Producer Pollutes

HOG FARM STINKS

FARMING BAD FOR COMMUNITY

Incidence of Asthma Higher Near Hog Farms, Study Finds

ANIMAL FARMS ARE LAYING WASTE TO ENVIRONMENT AND PUBLIC HEALTH

Hog Farms Pollute Air and Water

STOP Factory Farms
Opinions

“Outlaw concentrated animal feeding operations and encourage the development of sustainable animal husbandry. The concentrated system degrades the environment, directly and indirectly, while torturing animals and producing tainted meat, poultry, eggs, and, more recently, fish. Sustainable methods of producing meat for consumption exist”

February 2011
A Food Manifesto for the Future
By MARK BITTMAN
The 9 billion-people question

The world’s population will grow from almost 7 billion now to over 9 billion in 2050.

“It points out that although the concerns of the critics of modern agriculture may be understandable, the reaction against intensive farming is a luxury of the rich. Traditional and organic farming could feed Europeans and Americans well. It cannot feed the world”.

Special Edition February 2011
The Economist
Andrew Revkin
NY Times Environmental/Climate/Sustainability writer
Propose & encourage development of swine feeding operations & system of all types and sizes that protect the environment, safeguard animal health and welfare, improve the food safety of pork, and are environmentally, socially and economically sustainable that recognize the need for protein to feed the world’s growing 6 billion population, now and in the future.

A Proposed Food Manifesto for Today
March 2011
What Do We Mean By Sustainability?

Resources are not depleted or permanently damaged compromising the ability of future generations to meet their own needs.

The resources we do use are used as efficiently as possible with little or no waste.
National Pork Board Sustainability Effort

Environmental Sustainability Program

Carbon Footprint 2011
Greenhouse Gas
Methane, Nitrous Oxide, CO₂

Water Footprint 2012
Water Use

Air Footprint 2013
Air Emissions
Dust, Ammonia, Hydrogen Sulfide

Land Footprint 2014
Land Use
Include Feed Crops
Swine A Small Part of Total U.S. GHG

U.S. Greenhouse Gas Emission Sources

- Swine: 0.35%
- Other Livestock: 2.77%
- Human Waste Systems: 2.46%
- All Other Sources: 94.42%

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10 years of service
pork checkoff
DOING WHAT’S RIGHT.
Pork’s Carbon Footprint

- A two year effort
  - Literature Review
  - Scan Life-Cycle Assessment (LCA) - Pork Chain
    - Understand live swine production role/contribution relative to the entire pork chain - “field to fork”
  - Detailed Life-cycle Assessment - Live Swine
    - Focus on swine production segment of pork chain- “field to farm gate”
  - Live Swine Carbon Footprint Calculator
    - A producer tool to help understand the carbon footprint for their specific operation.
Carbon Footprint Scan Level LCA

Region & Production Weighted Average Footprint

– Live weight  = 2.8 kg CO\textsubscript{2}e/kg \textit{at farm gate}

– Dressed carcass weight = 3.8 kg CO\textsubscript{2}e/kg \textit{at farm gate}
Carbon Footprint Scan Level LCA

Region & Production Weighted Average Footprint

- Live weight $= 2.8 \text{ kg CO}_2\text{e/kg at farm gate}$

- Dressed carcass weight $= 3.8 \text{ kg CO}_2\text{e/kg at farm gate}$
## Carbon Footprint Scan Level LCA

### Summary - U.S. & EU

(EU data from Literature Review)

<table>
<thead>
<tr>
<th>Country</th>
<th>(\text{CO}_2\text{e /KG} - \text{Carcass Weight Basis})</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Pork</td>
<td>3.8 (2.85 – 5.1)</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.6 – 4.3</td>
</tr>
<tr>
<td>Sweden</td>
<td>2.6</td>
</tr>
<tr>
<td>France</td>
<td>3.0*</td>
</tr>
<tr>
<td>UK</td>
<td>3.3 – 5.6</td>
</tr>
<tr>
<td>Canada</td>
<td>3.1</td>
</tr>
</tbody>
</table>

*value corrected from live weight to carcass
Carbon Footprint Scan Level LCA

Percentage Contribution to GHG Emissions

- Packaging
  - Consumption: 1.3%
  - Retail: 23.5%
  - Processing: 7.5%
  - Live animal production: 62.1%

- Fuel
  - Electricity: 3%

- Manure: 40%
- Feed: 42%
- Piglets: 15%

Life Cycle Total vs. Farm Gate Total
Live Swine Carbon Footprint Calculator

Version 1.0

- Easy-to-use software, PC-based tool
- Usable for sow farms and wean-to-finish production
- Data saved and recalled by users only
- Helps identify on-farm areas for alternative inputs/improved efficiency
- Helps quantify pork industry’s already small carbon footprint at individual farm level

pork.org | 800.456.7675
Before you Begin...

Although you will likely have most of the required information to input to the calculator, there are a few items to make sure you have before starting. These include:

- Size of barn/building and insulation value of walls and ceilings
- Feeding program (feedstuffs and phases)
- Total wattage of lights in the barn
- Size and number of barn fans (For wattage and CFM information, check fan housing, in materials that came with them or manufacturer’s website.)
- Average annual fuel (Gas & Diesel) used in relation to raising animals in this barn
- Average annual water used in relation to raising animals in this barn

If more than one barn is present at this site you may estimate the allocation of total annual use to each barn based on the percentage of total animals housed in each barn or if like barn sizes simply divide the total annual usage by the number of barns.
Live Swine Carbon Footprint Calculator

Grow Barn Model - Barn Information (Step 7 of 17)

Location
Herd
Barn
Manure
Feed
Heating & Cooling
Other Energy Used

What is the length of your barn? 241.0 feet
What is the width of your barn? 81.0 feet
What is the height of the ceiling of your barn? 8.0 feet
What is the insulation (R-Value) of barn walls? 18.0
What is the insulation (R-Value) of barn roof? 40.0

Typical insulation (R-Value) for barn walls is between 15 and 25.
Overall Summary

Herd
Manure
Feed Use Output

GHG Emissions Per Year By Source

- Water
- Dead Animal Disposal
- On-Farm Fuels
- Barn Heating
- Electricity to Lights
- Electricity to Fans
- Manure Spreading
- Manure N2O
- Manure CH4
- Feed Delivery
- Feed

All measurements in kg CO₂e/year.
## Grow Barn Model Outputs - Summary Details

<table>
<thead>
<tr>
<th>Source</th>
<th>Kg CO$_2e$/yr</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed production</td>
<td>1,282,267</td>
<td>61.74%</td>
</tr>
<tr>
<td>Feed delivery</td>
<td>2,093</td>
<td>0.10%</td>
</tr>
<tr>
<td>Manure CH$_4$</td>
<td>481,699</td>
<td>23.19%</td>
</tr>
<tr>
<td>Manure N$_2$O</td>
<td>120,396</td>
<td>5.80%</td>
</tr>
<tr>
<td>Electricity to fans</td>
<td>12,248</td>
<td>0.59%</td>
</tr>
<tr>
<td>Electricity to lights</td>
<td>17,116</td>
<td>0.82%</td>
</tr>
<tr>
<td>Barn heating</td>
<td>153,116</td>
<td>7.37%</td>
</tr>
<tr>
<td>On-Farm fuels</td>
<td>6,800</td>
<td>0.33%</td>
</tr>
<tr>
<td>Dead animal disposal</td>
<td>1,942</td>
<td>0.09%</td>
</tr>
<tr>
<td>Water</td>
<td>409</td>
<td>0.02%</td>
</tr>
<tr>
<td>Manure spreading</td>
<td>820</td>
<td>0.04%</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>2,076,813</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
Remaining Work – Carbon Footprint

• Comparison of Swine Footprint 1959 to 2009
  – In progress – Scheduled completion - December 2011

• Economic Impact Module for Live Swine Carbon Footprint Calculator
  – Proposal under review
  – If funded – Completion expected - December 2012
National Pork Board Sustainability Effort

Environmental Sustainability Program

- **Carbon Footprint 2011**
  - Greenhouse Gas
    - Methane, Nitrous Oxide, CO₂

- **Air Footprint 2013**
  - Air Emissions
    - Dust, Ammonia, Hydrogen Sulfide

- **Land Footprint 2014**
  - Land Use
    - Include Feed Crops

- **Water Footprint 2012**
  - Water Use
Sustainability Program
Remaining Work - Water Footprint

- Develop baseline water use footprint – Completion 2012
  - Literature review - Done
  - Life-cycle assessment & water use calculator – Proposal under review
National Pork Board Sustainability Effort

- **Carbon Footprint 2011**: Greenhouse Gas (Methane, Nitrous Oxide, CO₂)
- **Land Footprint 2014**: Land Use (Include Feed Crops)
- **Water Footprint 2012**: Water Use
- **Air Footprint 2013**: Air Emissions (Dust, Ammonia, Hydrogen Sulfide)

Environmental Sustainability Program
Sustainability Program
Remaining Work - Air Footprint

• Develop baseline air emission footprint for non-greenhouse gas emissions - *Completion* - 2013
  – National Air Emissions Monitoring Study – *Done*
  – Evaluation & analysis of NAEMS pork data – *In Progress*
  – Process-based model for operation specific air emissions - *In Progress*
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Land Footprint 2014

Land Use
Include Feed Crops
Sustainability Program
Remaining Work – Land Footprint

• Develop baseline land use footprint – *Completion 2014*
  – Include swine production units & land for feed production
  – Literature review, life-cycle assessment & land use calculator
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Environmental Sustainability Program
www.pork.org/sustainability