EcoCom Overview

August 2010

Eco Combustion Energy Systems Corp.

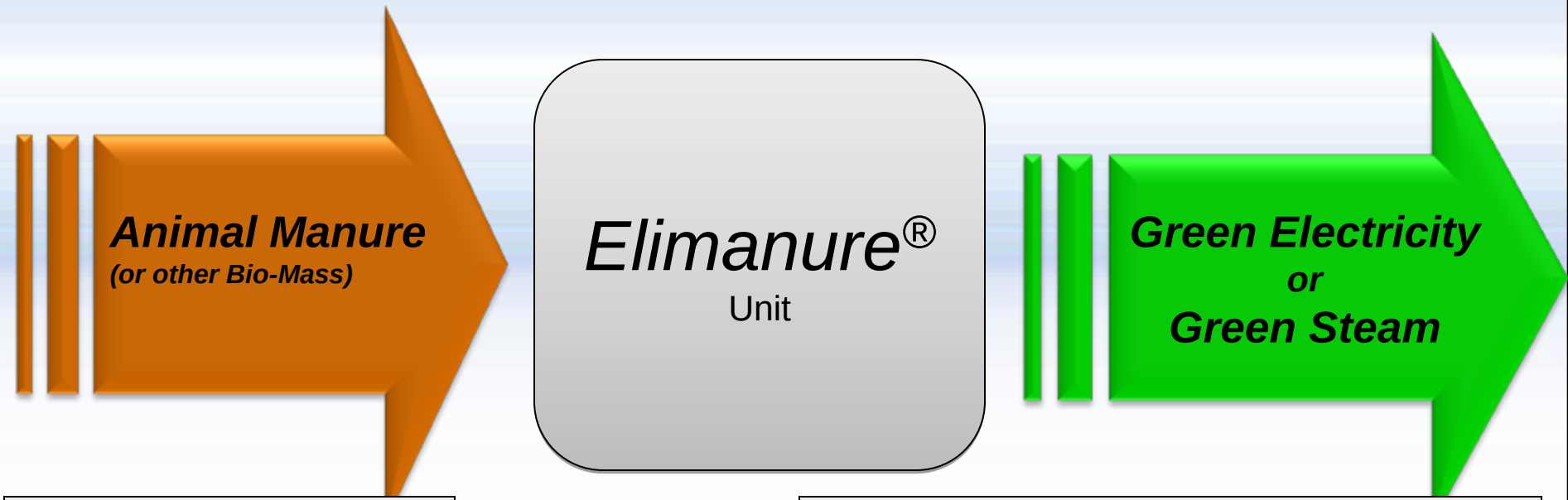
EcoCom Overview

- EcoCombustion Energy Systems (EcoCom) is focused on distributed (smaller scale) waste-to-energy conversion (and consequent waste handling cost reduction)
- *Elimanure*® liberates heat energy from high ash content bio-mass
  - Energy output in the form of steam
    - ❖ Utilize steam directly
    - ❖ Convert steam to electricity in a turbine/generator set
    - ❖ Additional low grade waste heat usually available for organic-Rankine-cycle or water heating
  - "High Ash" is 8-20%
    - ❖ Level where typical combustion/gasifiers have operational difficulty
    - ❖ Low ash (<8%) also works well with unit (but is not unique)
    - ❖ Ash is a valuable fertilizer by-product
- Extensive experience with Dairy Manure, beef manure, paunch, barn waste, some experience with poultry
- Customer Benefits
  - Energy Revenue (or cost savings if self-consumed)
  - Waste Handling Cost Reduction (e.g. disposal costs)
  - Several potential secondary benefits (e.g. Sale of resulting ash as fertilizer, carbon credits, etc)

Agenda

- Company
  - Description of Elimanure®
  - Customer Benefits
  - Market Space
  - Summary & Questions

Elimanure® Overview



- *Environmental Issue*
- *Disposal Problem*
- *Operations Nightmare*

- *Energy Revenue (or cost savings)*
- *Disposal Cost Reduction*
- *Secondary Benefits (e.g. sale of ash, create hot water)*
- *Cleaner Water / Air (practical Global Warming Initiative)*

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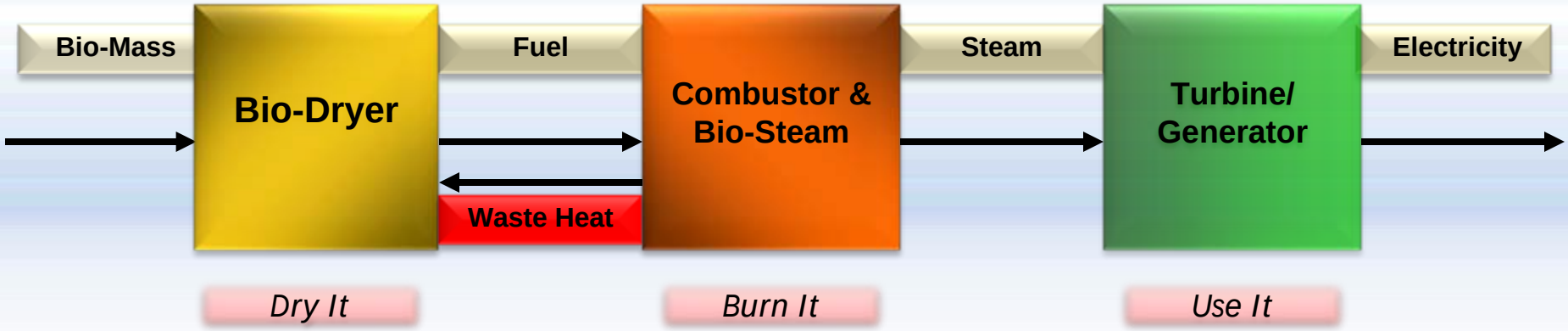
Elimanure®



- *One patent issued, several pending*
- *Residual ash is a valuable by-product*
- *Low-grade waste heat available for other uses:*
  e.g. organic-Rankine-cycle or water heating

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Elimanure® Demonstration Unit *(prototype)*
Wiese Brother's Farm -- Greenleaf, WI

3,700 Animal Units (~2,000 Milking Cows) = 600 kW…
…enough for 600 homes

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What's Unique about EcoCom & *Elimanure*® ?

- Ability to sustain combustion with high-ash-content feedstock
  - High ash content bio-mass feed stocks (>8% ash) are prone to slagging, fouling and poor runnability
  - Works well with up to 20% ash/non-combustibles (limit of 25%?)
  - Also works with low-ash-content feedstock (<8% – wood is ~2% ash and is done by others)
  - High ash content is a barrier to entry for competitors
- EcoCom is focused on modular units which enable distributed energy generation
  (e.g. sizes small enough to locate the unit at the point of waste bio-mass generation, minimizing transportation costs and community impact)
- Modular designs to support cost-effective replication
- Will sell directly to customer or arrange 3rd party ownership & operation
- One U.S. Patent Issued, several pending

Customer Benefits

- *Cash-flow positive year 1 / Payback within 4 years*
  - \+ Cost Savings (manure management)
  - \+ Revenue (electricity)
  - \- Capital & Operating Costs
- *Customer Specific Benefits*
  - \+ Land and operational flexibility (e.g. ~$150/cow/year if rented land)
  - \+ Environmental (phosphorus & nitrogen benefits)
  - \+ Carbon Credits
  - \+ Ash Sales (or internal use)
  - \+ Bedding
  - \+ Hot Water
  - \+ Grants & Tax Credits

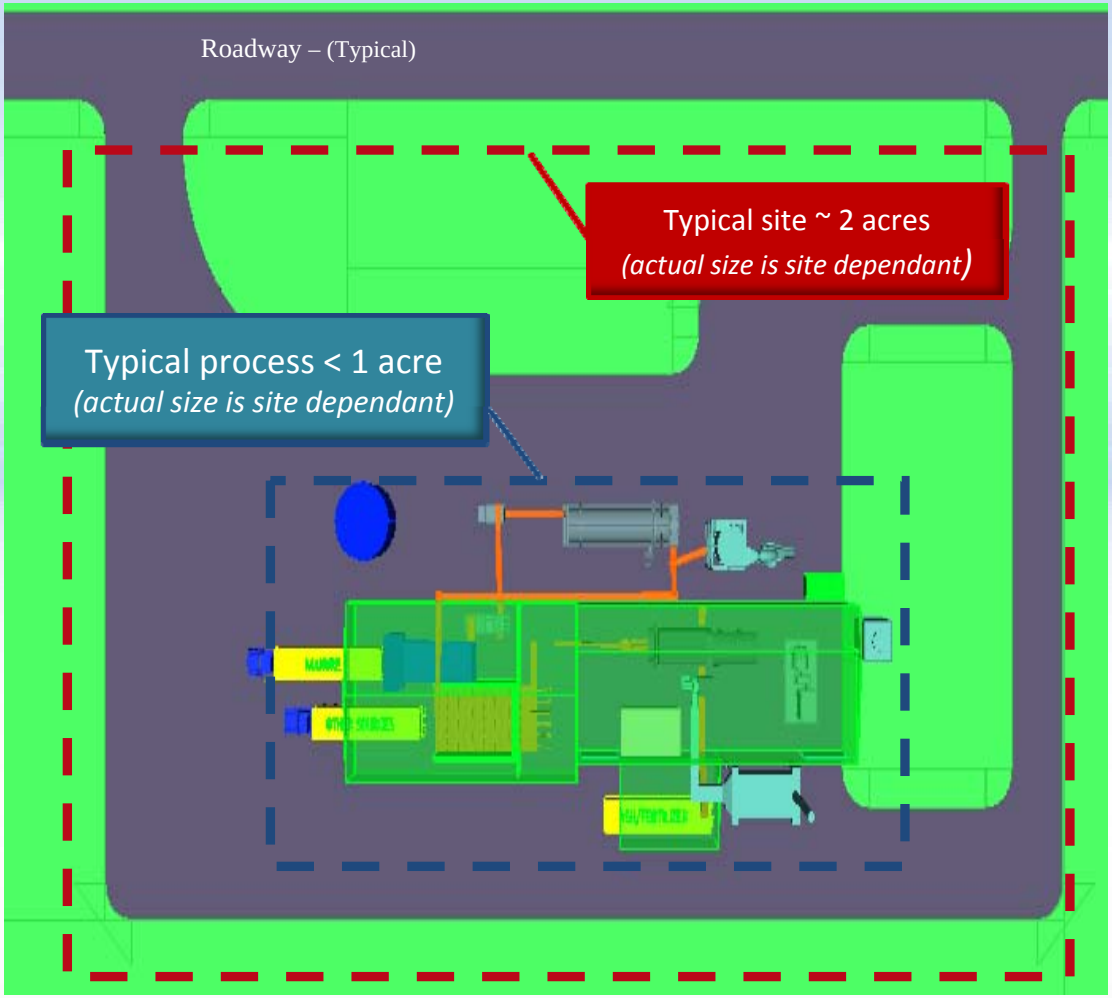
Elimanure® Footprint

Modular approach

Small 0.6 – 1.5 mW
Medium 1.5 – 4.0 mW
Large 4.0 - 8.0 mW

Sketch @ right is typical sizing for a Small-Medium installation

Multiple Units in parallel best solution for some applications



Elimanure® General Specifications

Description	Raw Material (ton/hr)	Dry Solids % (incoming raw material)	Fuel Value (BTU/dry pound)	Steam Output (000's #/hr @ 300psi)	Electrical Output (kW)
"Small" (e.g. 2-3K cows)	4 - 15	20% - 60%	6,000 – 8,000	10,000 - 20,000	600 – 1,500
"Medium"	10- 30	20% - 60%	6,000 – 8,000	20,000 - 40,000	1,500-4,000
"Large"	25- 50	20% - 60%	6,000 – 8,000	40,000 - 80,000	4,000-8,000

Actual Output (steam &/or electrical) dependant on:

- *amount of raw material*
- *moisture level (dry solids %)*
- *fuel value*

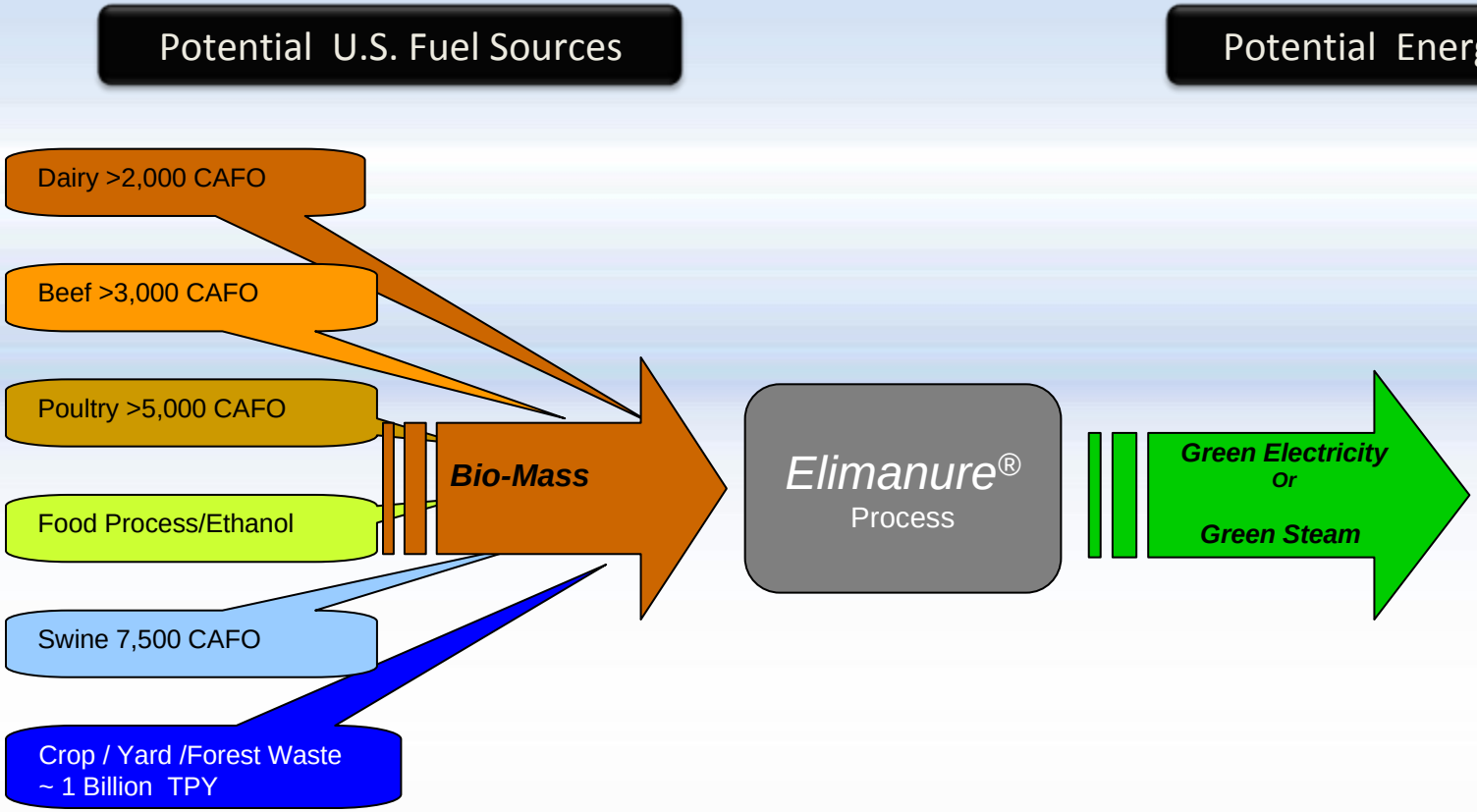
Elimanure® Design Principles

- Modular system
  - Standardized modules
  - Standardized construction approach
  - Flexible adaptation to individual businesses/sites/farms
  - Water utilization a big variable (evaporate vs. pre-separation and irrigation)
    - Percent moisture varies by region and process
    - How valuable is water in the region?
    - How much water needs to be managed?
- Accommodate site specific revenue/cost savings opportunities
- Process Principles
  - Simple to Operate 24/7
    - Highly automated
    - One extra person if integrated into farm or other process plant (e.g. ethanol plant or food processing)
  - Maximize BTU utilization
    - Minimize heat losses/waste heat recovery – no supplemental heat required
    - Low-grade waste heat available to heat water or an Organic-Rankine-Cycle

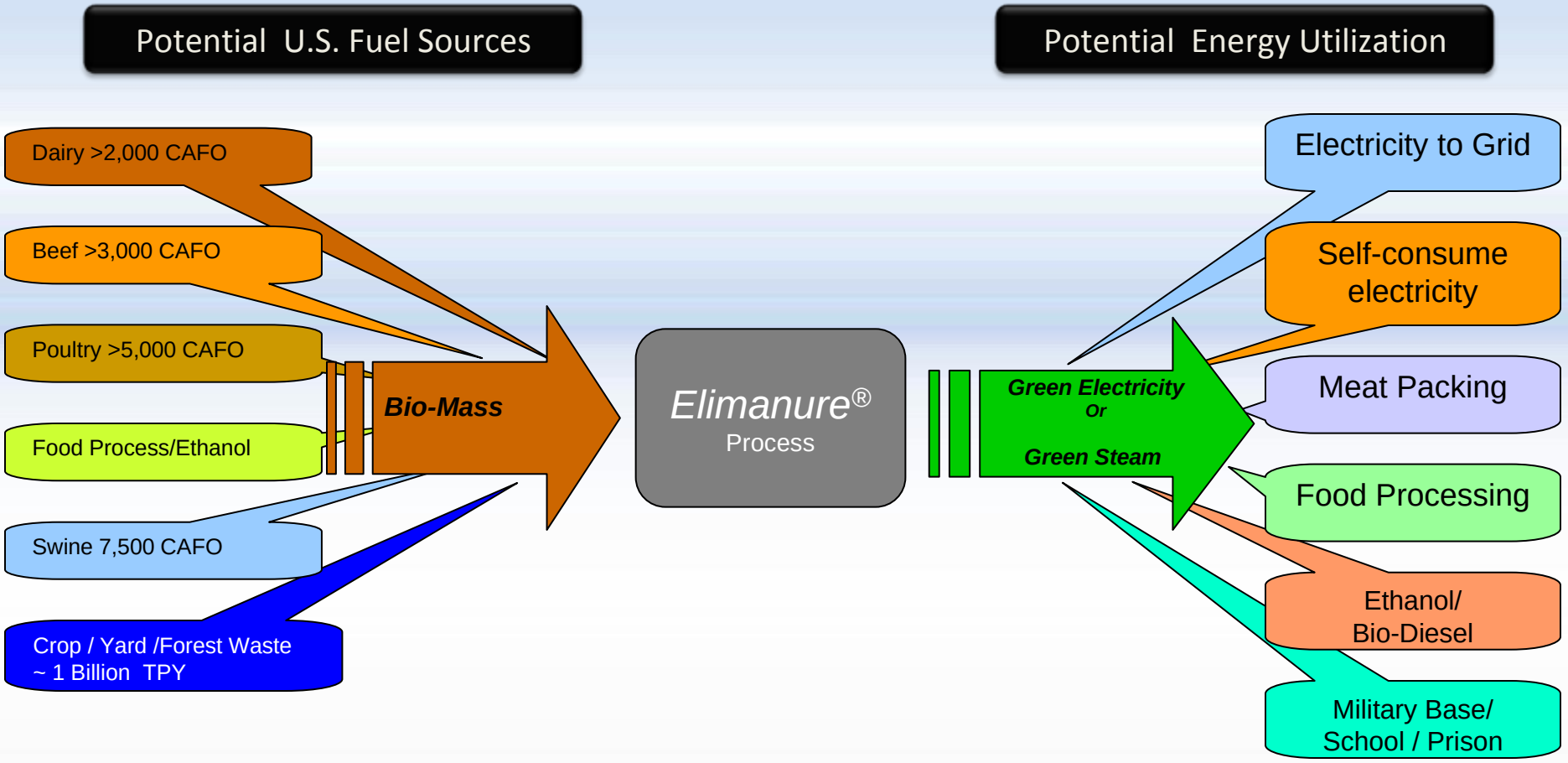
Elimanure® Design Principles

- Large Animal Production Facilities Ready
  - Have Maintenance Personnel
  - Utilize Automation
  - Operate Sophisticated Equipment
  - Utilize Scheduled Maintenance Programs
- EcoCom designs and installs a Turn-Key system
- Customer Benefit Study is the beginning
  - Design the system per Farm individual requirement
  - Determine Cost
  - Determine Revenue opportunity
  - Determine Cost Avoidance opportunities
  - Identify Permit Requirements
  - Identify Grant opportunities

Several potential applications



Several potential applications



Appendix

U.S. Trend – Fewer But Larger Farms

- *Elimanure*® targeted at large farms
- Over 17,600 large animal farms
- Over 400 very large dairies in our backyard (Upper MW)

What Goes In & Out Of A Cow?

Feed 55+ #/day

Drinking Water 25+ gal/day
Wash Water 10+ gal/day

Gas

M&M

Milk

~11 g/d

Manure

~ 30 g/d

Ratio 1 : 3

1. *Data taken from various sources and is approximate for a high output adult Holstein cow*
2. *Gas output does not take into account respiration*

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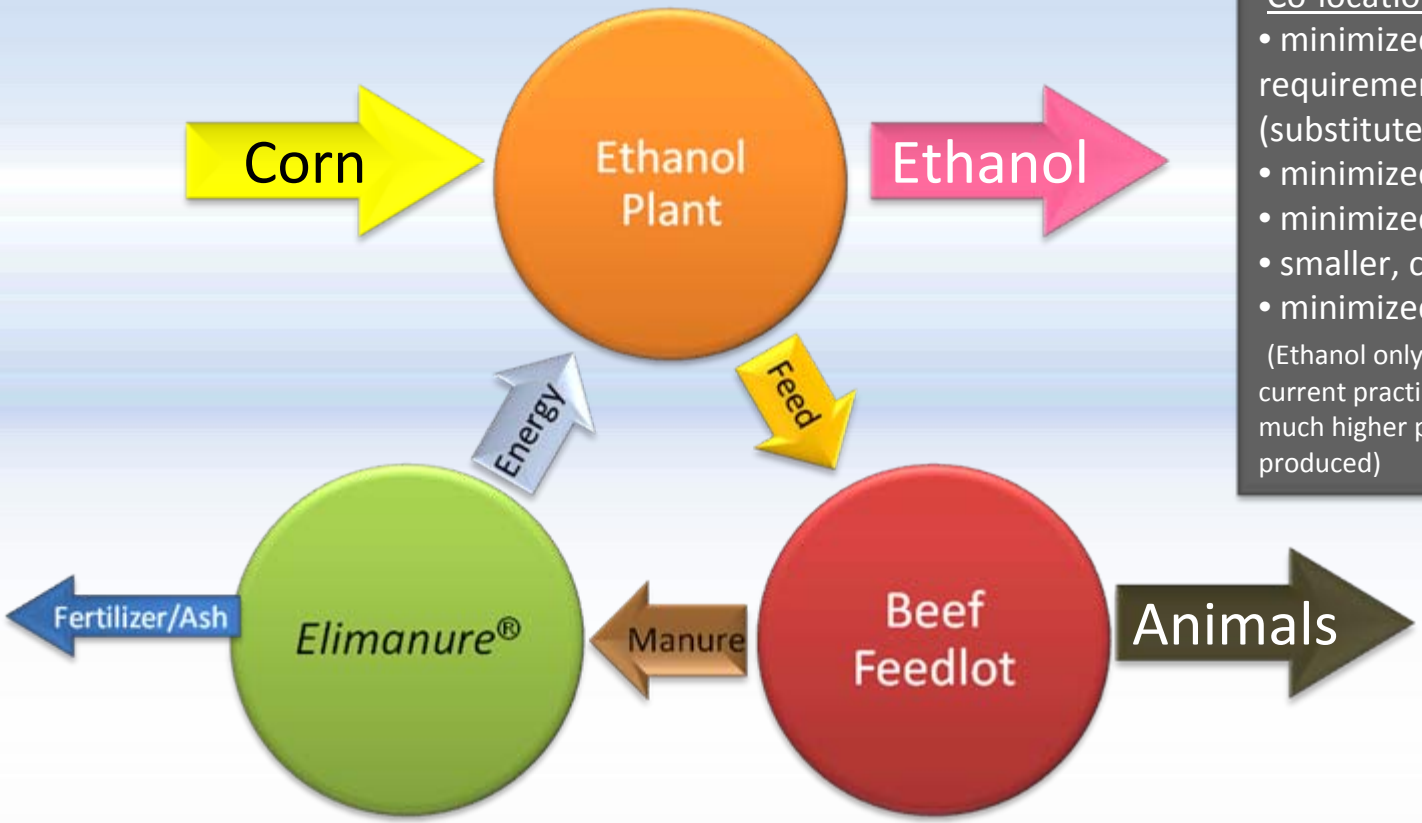
Process Integration Example 1

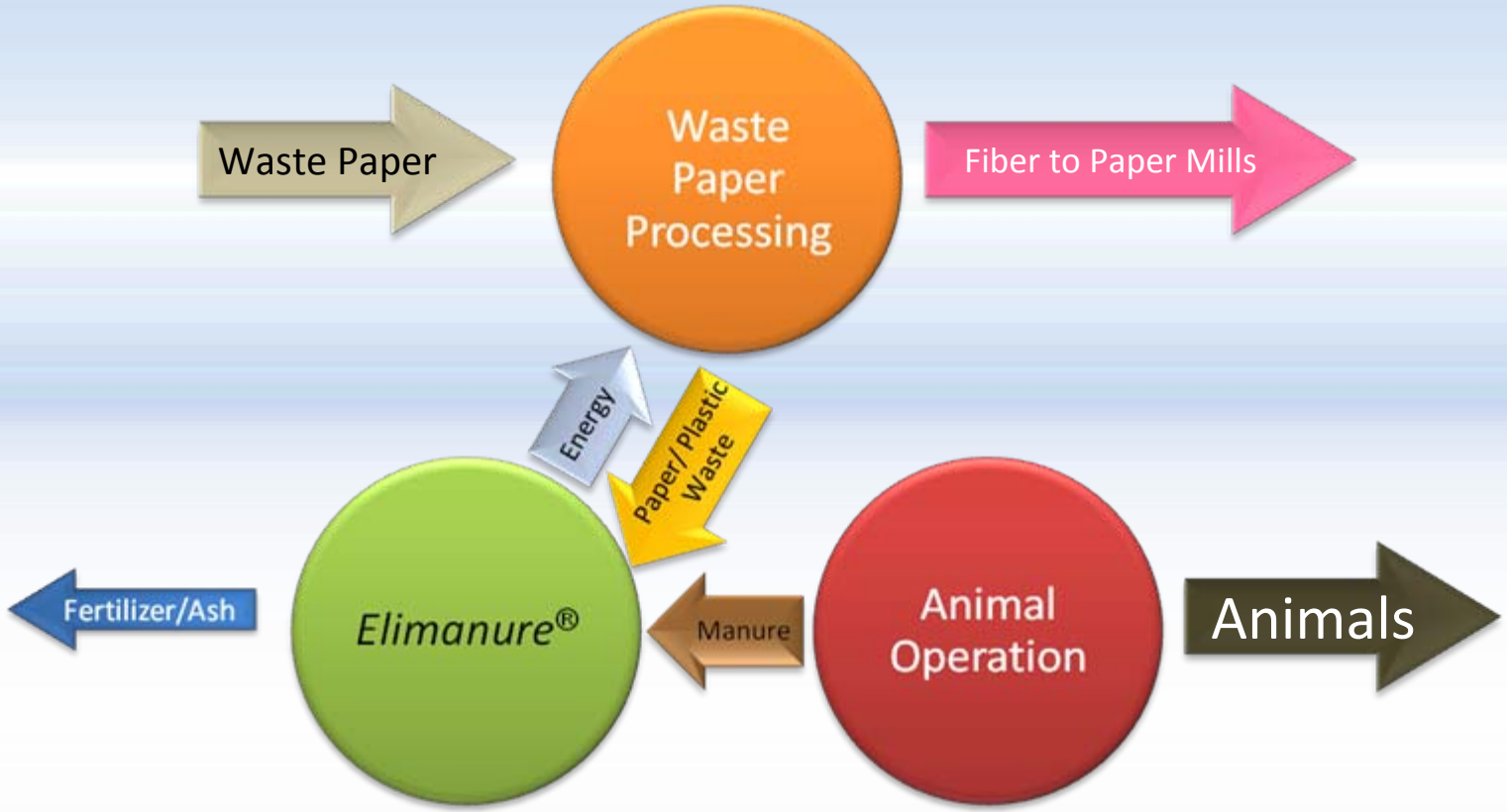


Co-location enables:

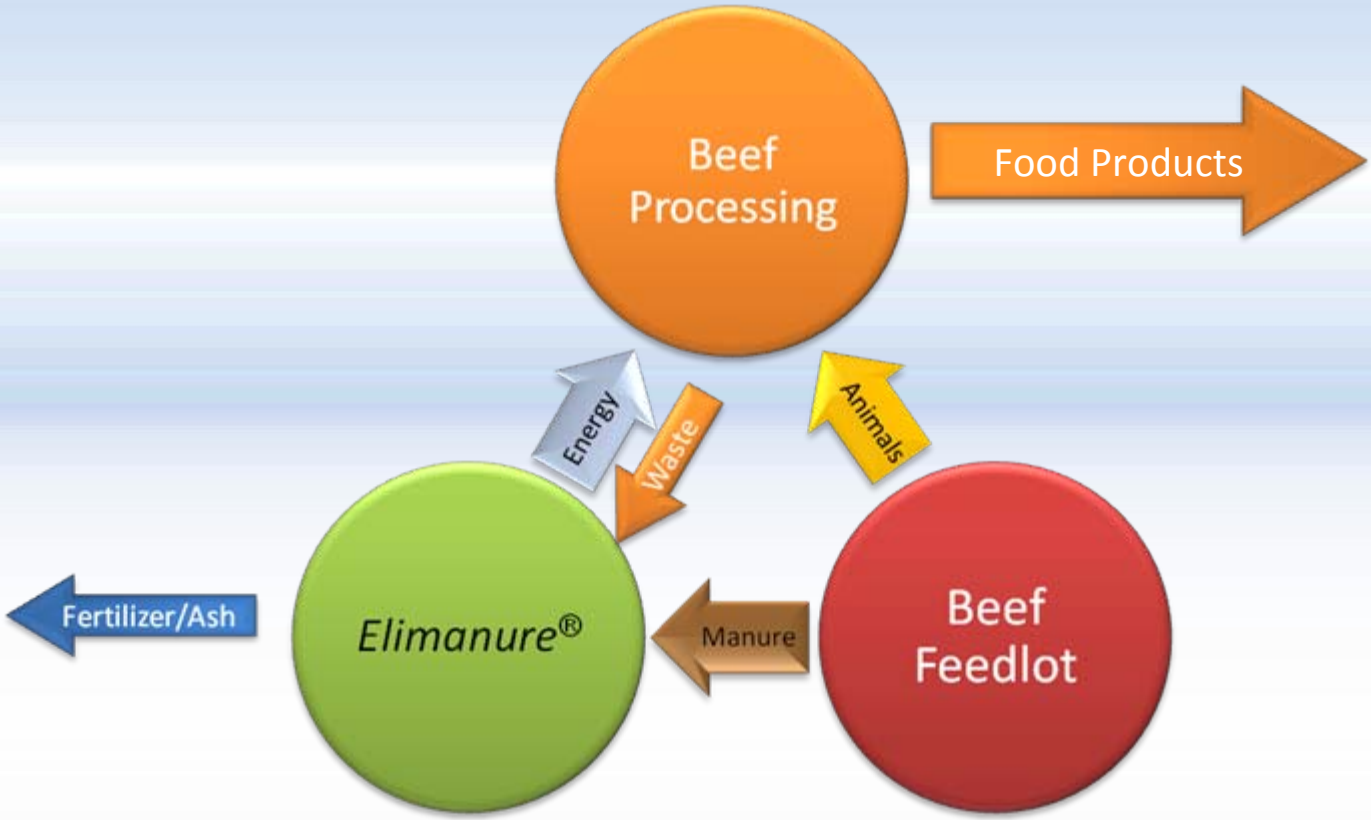
- minimized/eliminated fossil fuel requirement for ethanol production (substitutes for electricity and gas)
- minimized transport cost
- minimized waste
- smaller, cost-effective plants
- minimized food v. fuel competition

(Ethanol only requires ~1/3 the feed value vs. current practice & waste which consumes a much higher percentage per gallon of ethanol produced)

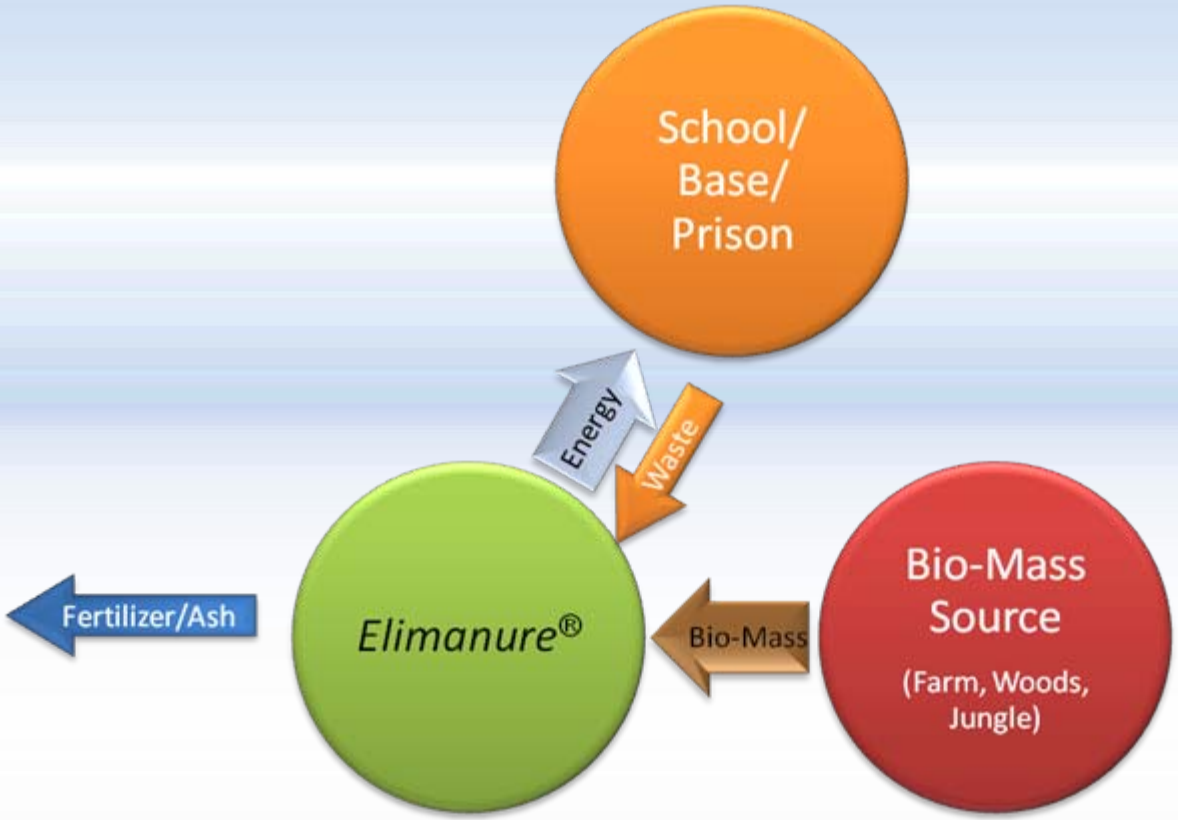
Process Integration Example 2



Process Integration Example 3



Process Integration Example 4



Execution of Business Strategy

- ✓ Active sales discussions underway in WI, AZ, CO, OH & NY
- ✓ Wisconsin -- Dane County & Brown County
- ✓ Colorado
  - o 5 target feedlots, could be direct sale or own/operate
  - o Possible process integration with ethanol
- ✓ Ohio
  - o LOI signed 12/09 with 2,500 head feedlot --- planning expansion to 10,000 head
  - o LOI signed 12/09 with large dairy operator/designer (30+ US Dairies built)
- ✓ AZ
  - o Development group working on own/operate model
  - o Contacts and other project potential throughout AZ, NM and CA
- ✓ NY
  - o In discussion for PA/NY demonstration project
  - o Large Horse Race Track discussions underway

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Comparison with Anaerobic Digesters

	Elimanure ®	**Anaerobic Digester**
What does it do?	***Chemi-mechanical process*** that liberates heat energy from BioMass materials via direct combustion	***Biological process*** to create methane gas from wet bio-mass
How is electricity generated?	Steam is created to turn a ***high efficiency turbine generator***	Methane gas is burned in a ***low efficiency internal combustion engine***
Target Inlet Solids (Moisture)	>20% Solids (< 80% Moisture)	<10% Solids (>90% Moisture)
If supply material too dry?	***No problem***	***Add water***
If supply material too wet?	Separate some water (to achieve >20% solids)	Separate some water (to achieve >6% solids)
Air Emissions	"green" CO_2 ; traces of other gases	"green" CO_2 ; traces of other gases
Residual Solid/Liquid	***<5% of original volume*** as dry solid "fertilizer ash" (water evaporated)	***>95% of original volume*** as a liquid slurry

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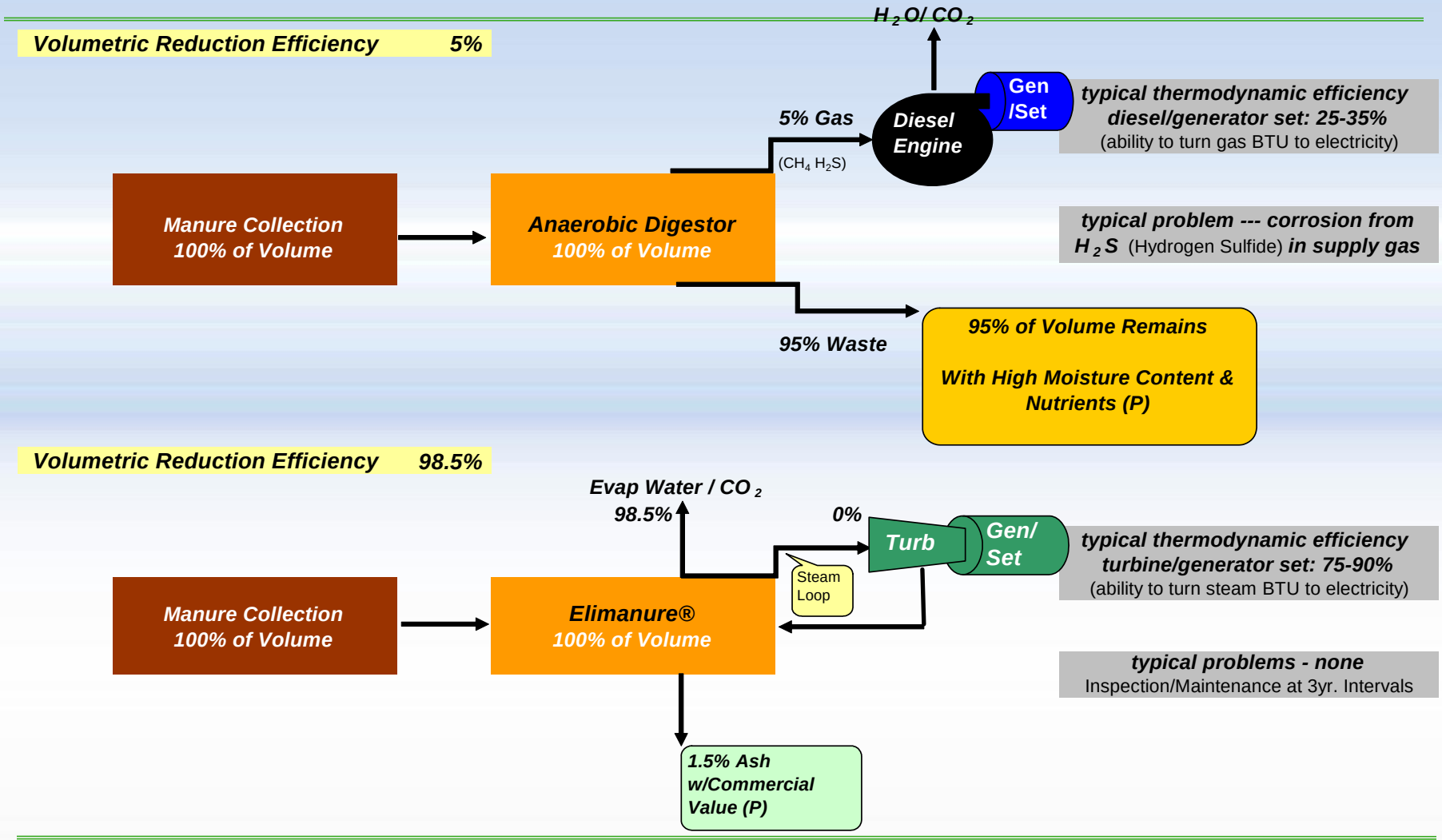
AD & Elimanure® Comparisons



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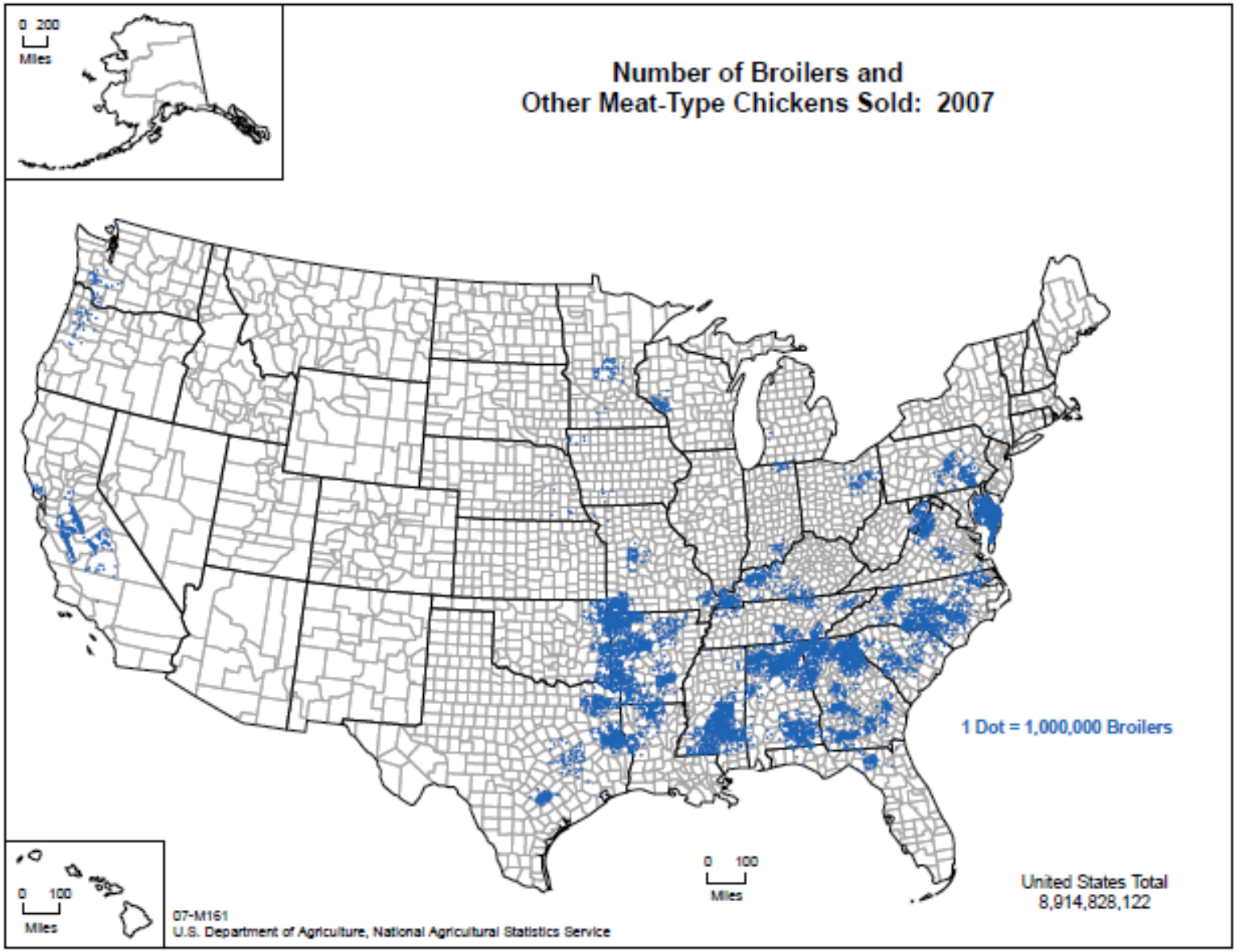
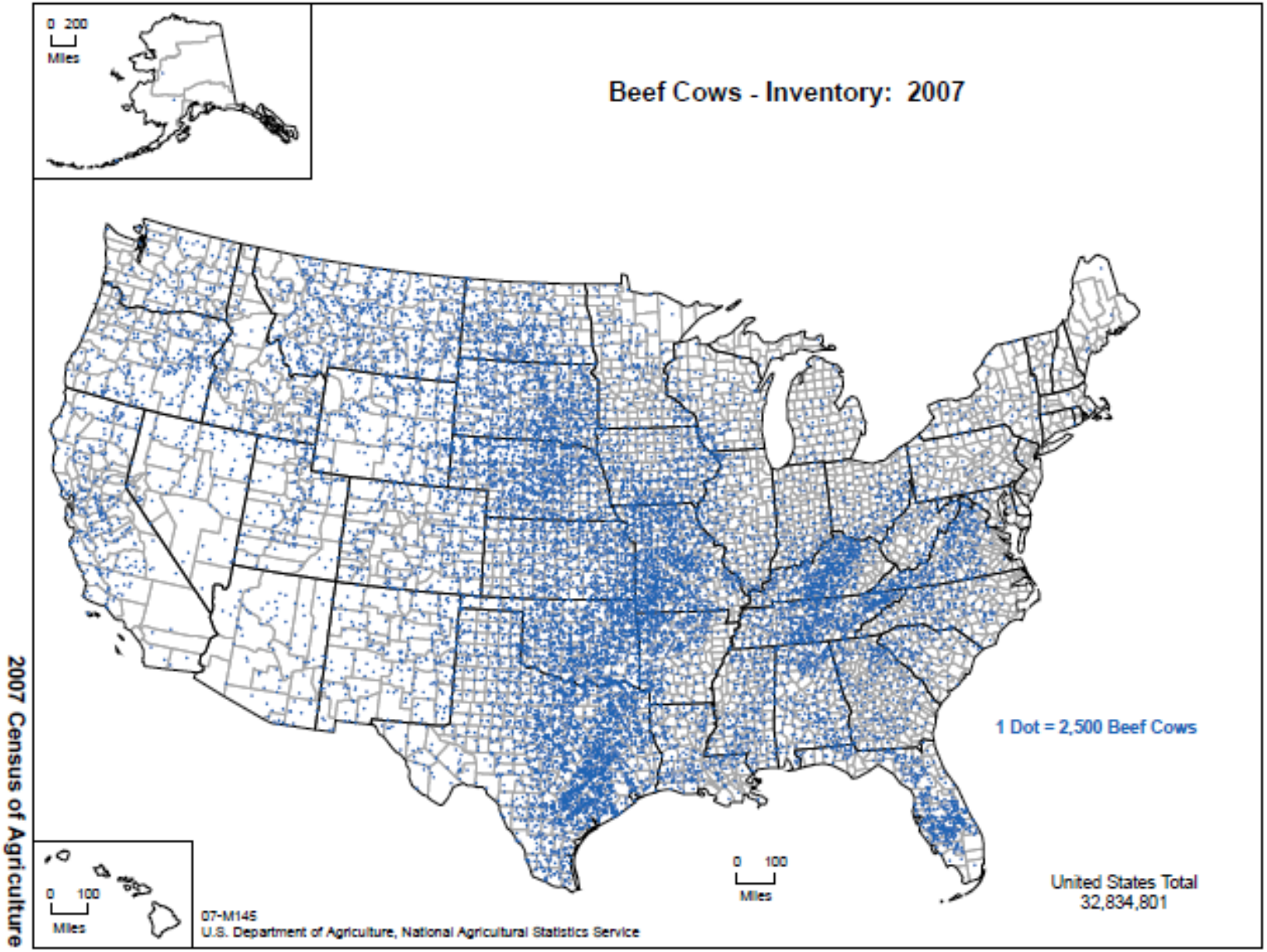

Number of Broilers and
Other Meat-Type Chickens Sold: 2007
0 200
Miles
1 Dot = 1,000,000 Broilers
0 100
Miles
0 100
Miles
United States Total
8,914,828,122
07-M161
U.S. Department of Agriculture, National Agricultural Statistics Service
2007 Census of Agriculture



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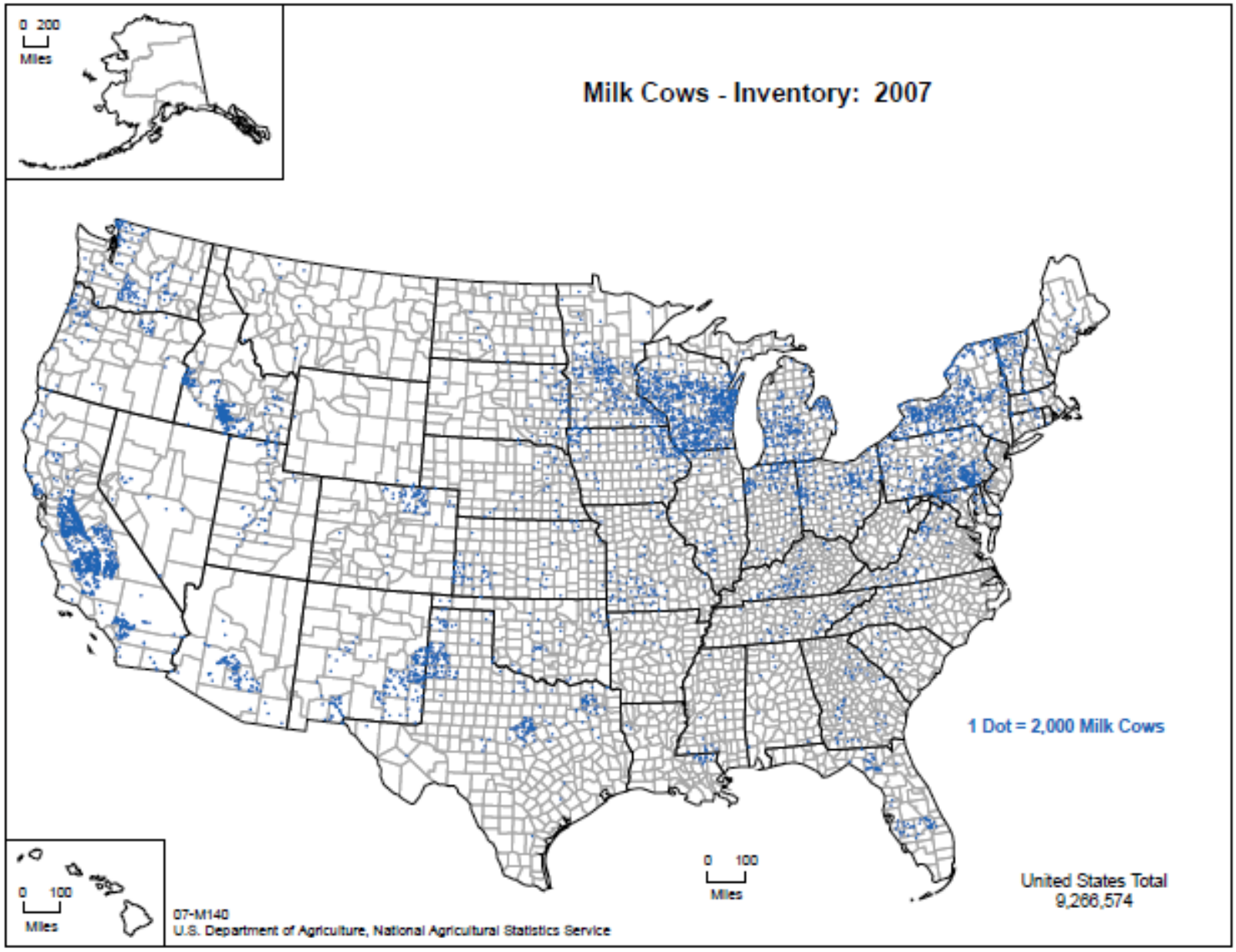

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Payback Illustration

	Primary Benefit Only (Electrical & Manure Handling)	**Primary & Secondary Benefit Illustration**	**All Benefits** (Including, tax credits and grants)
Purchase Price* (see note at bottom of page 5)	$4,500,000		$4,500,000
Less Eligible grants (see table below, p.7)			$950,000
Net Purchase Price	$4,500,000	$4,500,000	$3,550,000
Primary Benefits (Electrical generation and manure handling, net of operating costs)	$797,000	$797,000	$797,000
Secondary Benefits (see table below, assumed 50% or less of potential, p.6)		$117,000	$117,000
Tax Credits			$134,000
Total Annual Benefit	$797,000	$914,000	$1,048,000
Simple Payback Calculation	**5.6 years**	**4.9 years**	**3.4 years**

Primary Benefit Calculations

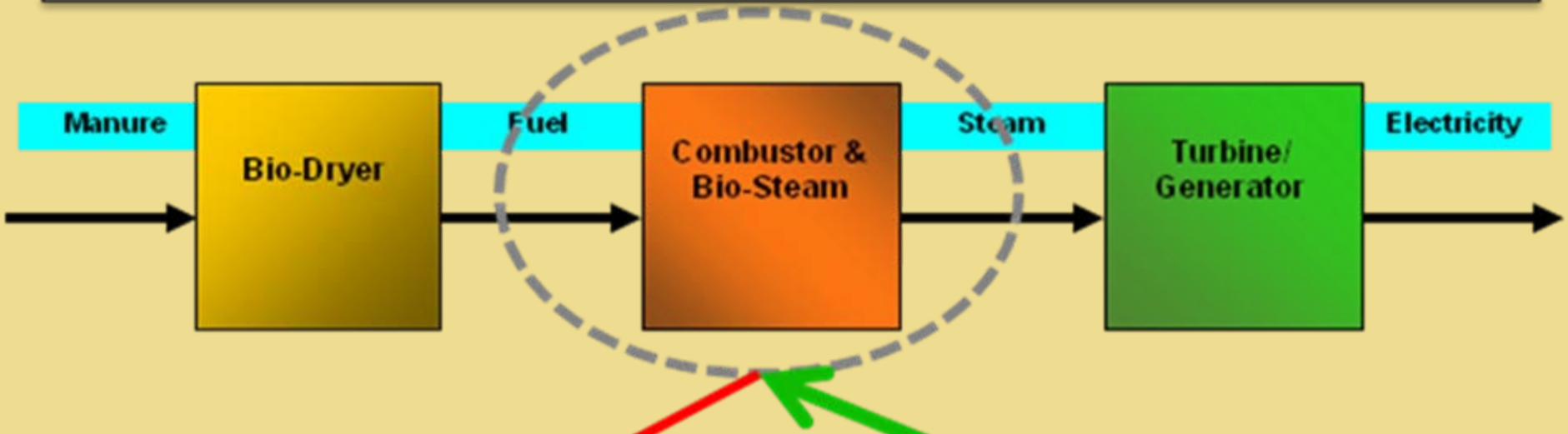
Annual Electrical Revenue Projection	Net Utility Payment Rate $/kW-H	Renewable Energy Credit	Utility Charges and Fees $/kW-H	Gross Utility Payment Rate $/kW-H	Net Annual Electrical Production kW-H/Yr.	Operating Days/Year	Average Output kW-H/Day	Average Output kW	Efficiency	Parasitic Load - kW	Gross Output - kW
$ 399,000.00	$ 0.100	$ 0.020	$ (0.02)	$ 0.100	3,990,000	350	11,400	475	0.95	100	600
read this chart from right to left											
Annual Manure Handling Savings		% Reduction in cost savings (to be conservativ	Total Cost	Manure Handling Cost/Gal	Annual Gallons of Manure Generated	Daily Gallons of Manure Produced					
$ 447,125		30%	$ 638,750	$ 0.025	25,550,000	70,000					
Total Annual Benefit											
$ 846,125											

Manure handling costs vary widely by farm, but typically range from $0.02/gal to over $0.04/gal when all real costs such as equipment depreciation and labor are included. To be conservative, it was assumed that 30% of the available manure handling cost savings are unrealized. Operating costs for the unit include labor, maintenance, supplies and some operating electricity (which is accounted for in the net electrical generation). The labor increase is negligible when netted against labor savings associated with manure handling. Maintenance and insurance net operating cost increases are estimated at $49,000/yr.

Secondary Benefit Calculations

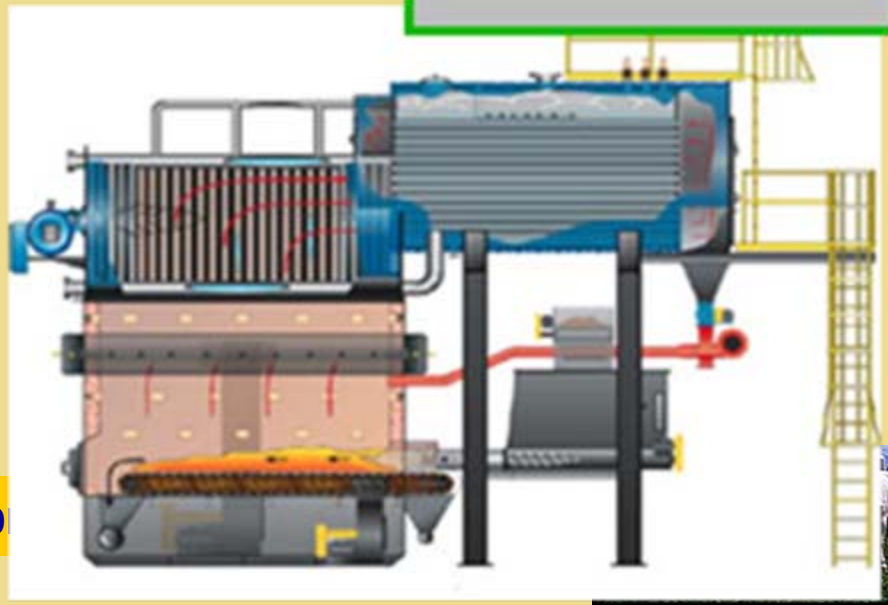
Benefit	Key Drivers	Estimated Annual Benefit	Conservative Annual Benefit
Land and operational flexibility	• Unlocking the Dairy operation from the land requirement is the biggest benefit in most cases (Approximately 1.5 acres to feed a cow, ~ 3 acres to meet manure spreading best practices, this process frees up the additional ~1.5 acres per cow required for manure spreading) • Actual land required varies substantially between operations, and it is extremely difficult to develop an estimate of the benefit that applies to all operations • Additional benefit for crop rotation flexibility not included in this estimate (crop location and sequencing usually driven by manure spreading plans) • Additional benefit of not building manure lagoons for new or expanded operations not included in this estimate • Additional benefit of not buying additional land for a new or expanded Dairy not included in this estimate (~1.5 acre/cow required beyond land needed for feeding) • A proxy estimate for Elimanure land benefit: o 2,000 cows x 1.5 acres "extra" for manure = 3,000 acres o Land rent ~ $150/acre x 3,000 acres= $450,000 • **Note --- this proxy for land/operational flexibility vastly understates the benefit for new or expanded operations**	$450,000	$50,000
Carbon Credits	• Current U.S. Carbon Credits are worth $2/carbon credit (Europe current over $20/credit) • Environmental Credit Corp estimates 6 credits/cow/yr with Elimanure	$24,000	$12,000
Ash Sales	• Measured value $150/T in 2008 • ~1,300 t/yr generated • 25% of maximum used for conservative estimate	$195,000	(25%) $45,000
Hot Water	Offset farm consumption of natural gas	$20,000	$10,000
Environmental	Eliminate excess Nitrogen and Phosphorus application	$0	$0
Total	**Secondary Operating benefits**	**~$689,000**	**$117,000**

Indoor View of Combustor/Boiler Replacement Project



Step 1 -- Remove Current Equipment

Step2 - - Install New Equipment



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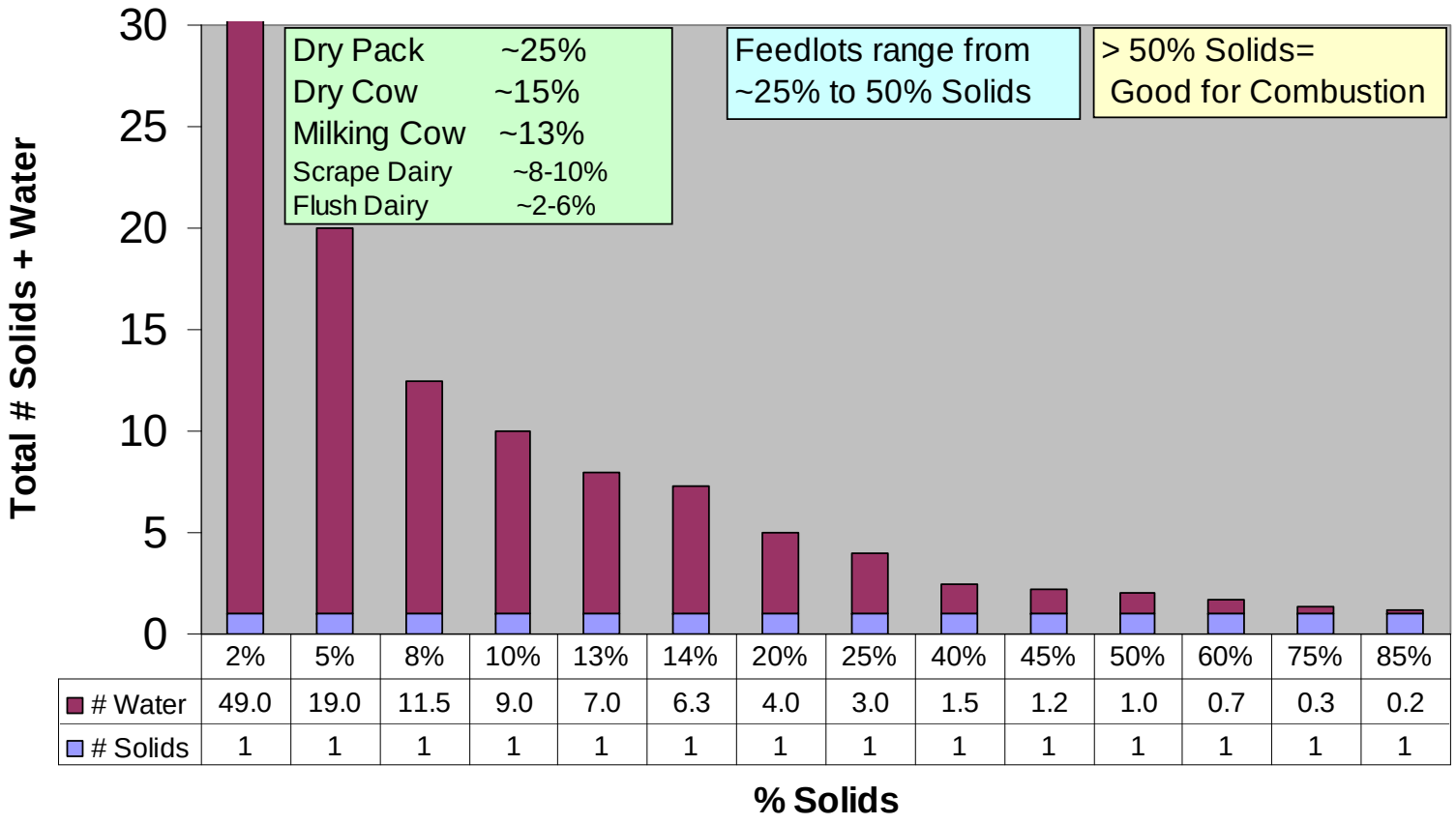
Outside View of Combustor/Boiler Replacement Project

Area to be modified

EcoCom

Pounds of Water compared to 1 Pound of Solid Manure



	2%	5%	8%	10%	13%	14%	20%	25%	40%	45%	50%	60%	75%	85%
# Water	49.0	19.0	11.5	9.0	7.0	6.3	4.0	3.0	1.5	1.2	1.0	0.7	0.3	0.2
# Solids	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Endorsement letter from
U.S. Senator Russ Feingold
for a recent grant application

RUSSELL D. FEINGOLD
WISCONSIN

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United States Senate
WASHINGTON, DC 20510-4904

COMMITTEE ON THE BUDGET
COMMITTEE ON FOREIGN RELATIONS
COMMITTEE ON THE JUDICIARY
SELECT COMMITTEE ON INTELLIGENCE
DEMOCRATIC POLICY COMMITTEE

April 8, 2009

Ms. Christine Sarcone
Acting Deputy Assistant Secretary for Congressional Relations
U.S. Department of Agriculture
212A Whitten Building 1400 Independence Ave, SW
Washington, DC 20250-0001

Dear Ms. Sarcone:

I am pleased to write in support of the grant application submitted by Glacierland Resource Conservation and Development Council, Inc. in collaboration with EcoCombustion Energy Systems Corporation for funding through the USDA Natural Resources Conservation Service (NRCS) Conservation Innovation Grants program (Funding Opportunity Number USDA-NRCS-NHQ-09-01).

As the application explains, EcoCombustion Energy Systems Corporation (EcoCom) has developed a pilot scale system that eliminates manure from animal operations by converting it into clean, renewable energy through direct combustion. The pilot system currently operates at a large scale dairy farm in Central Wisconsin. The proposed project will upgrade the pilot system to a commercial scale demonstration system. With successful commercial demonstration, EcoCom hopes to validate the effectiveness and feasibility of this technology as a best practice solution to manure management and as a new source of renewable energy.

According to the proposal, the objectives of the project are to eliminate the nutrient loading problems associated with the land spreading of animal manure and to improve farm economics and energy efficiency by converting manure into energy. The project is designed to demonstrate the commercial availability of technology that has technical, environmental and economic impact through a broad range of animal agriculture issues.

I urge you to carefully review Glacierland's application and give it full and fair consideration.

Sincerely,

Russ Feingold

Russell D. Feingold
United States Senator

RDF/jmb

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(414) 276-7282

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ROOM 410
WAUSAU, WI 54403
(715) 848-5660

425 STATE STREET
ROOM 225
LA CROSSE, WI 54601
(608) 782-5585

1640 MAIN STREET
GREEN BAY, WI 54302
(920) 465-7508

Recent E-Mail

From: Pearson, Bill, NMENV [mailto:bill.pearson@state.nm.us]
Sent: Monday, December 15, 2008 10:25 AM
To: Paul J. Schneider
Subject: RE: New Mexico Manure burners needed

I have talked with several dairymen in Las Cruces about the idea and they very interested. They have had a lot of discussion with companies about anaerobic digesters but it has never gone anywhere. I gave them your number, not sure if they called you. Digester aren't useful here because the manure is already dried in the corrals and would need to be wetted down again to make a digester work and it doesn't reduce the manure volume.

We have about 180 active dairies in the state with an average herd size of 2,000 cows. I can give you a list of names and numbers if you would like.

I think the sky is the limit.

Let me know what you need from me.

Bill Pearson
Geoscientist
New Mexico Environment Department
Ground Water Quality Bureau