

# **Growing Oregon's Biogas Industry: A Review of Oregon's Biogas Potential and Benefits**

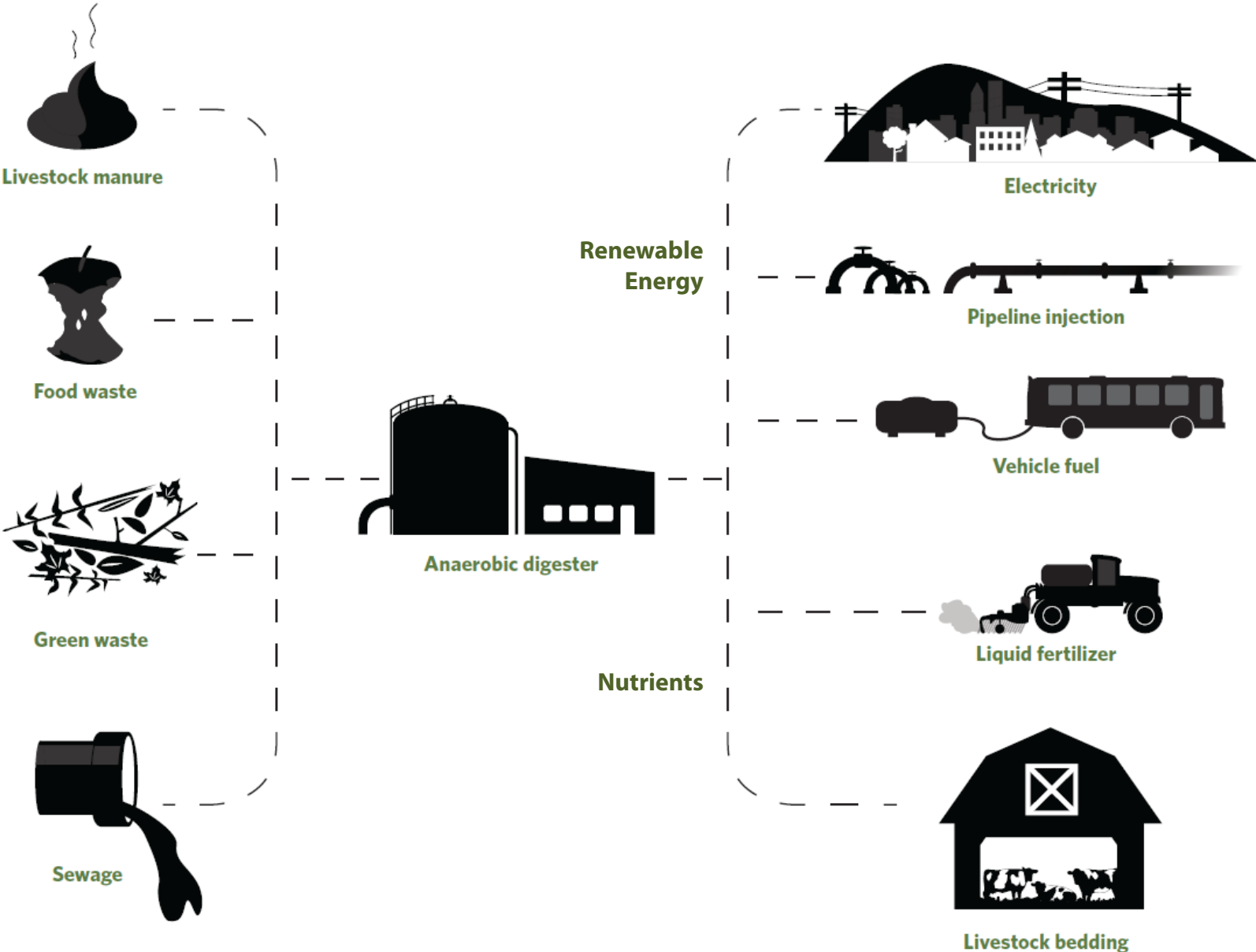
Oregon Energy Forum Breakfast Meeting  
May 25, 2011

Peter Weisberg and Thad Roth

# Overview

1. Introduction to Biogas
2. Biogas Opportunity
3. Biogas Benefits
4. Policy Possibilities

# Introduction to Biogas



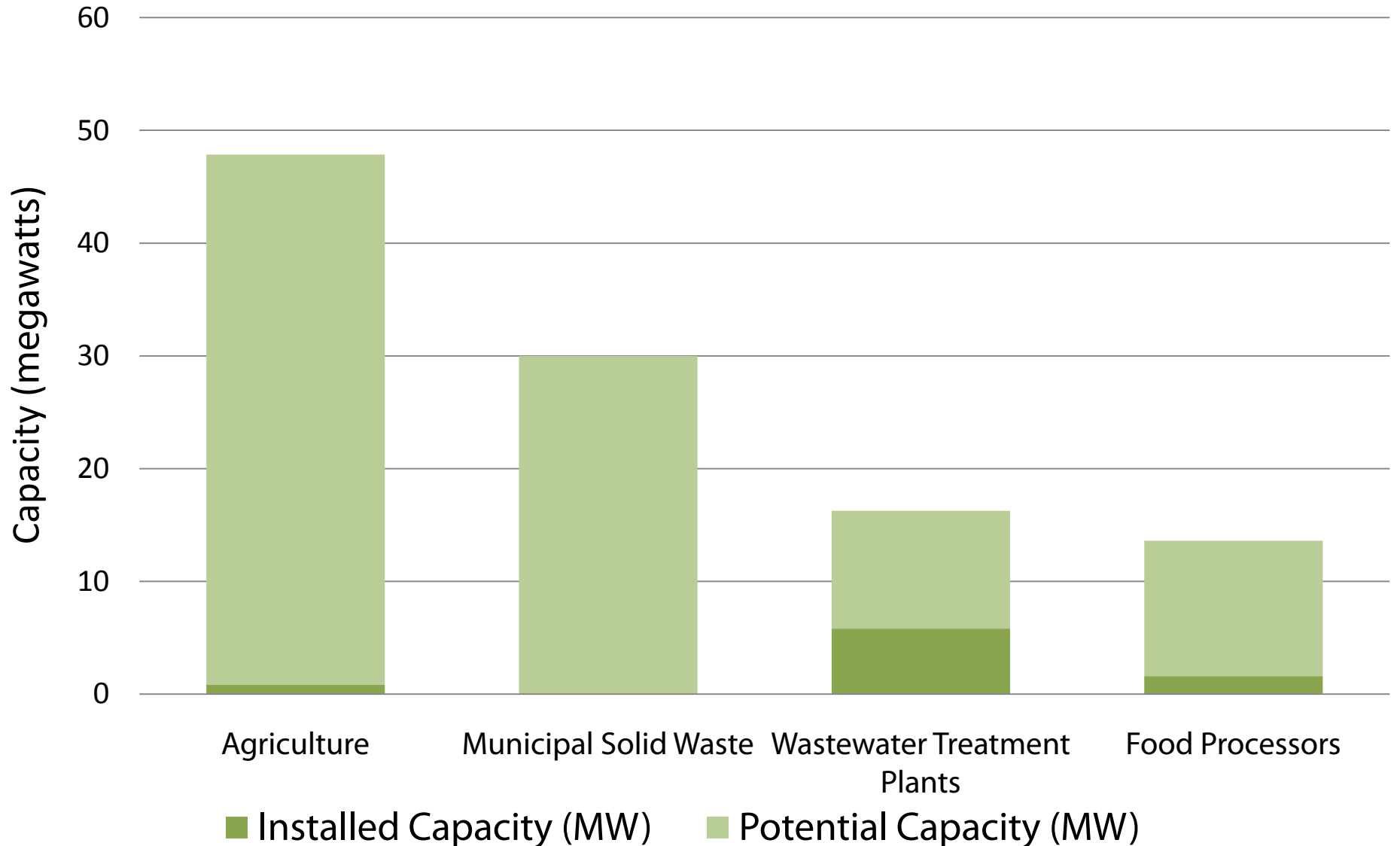
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# Biogas Opportunity

1. Agriculture
2. Municipal solid waste
3. Food processors
4. Wastewater treatment plants

# Biogas Opportunity



# Agriculture

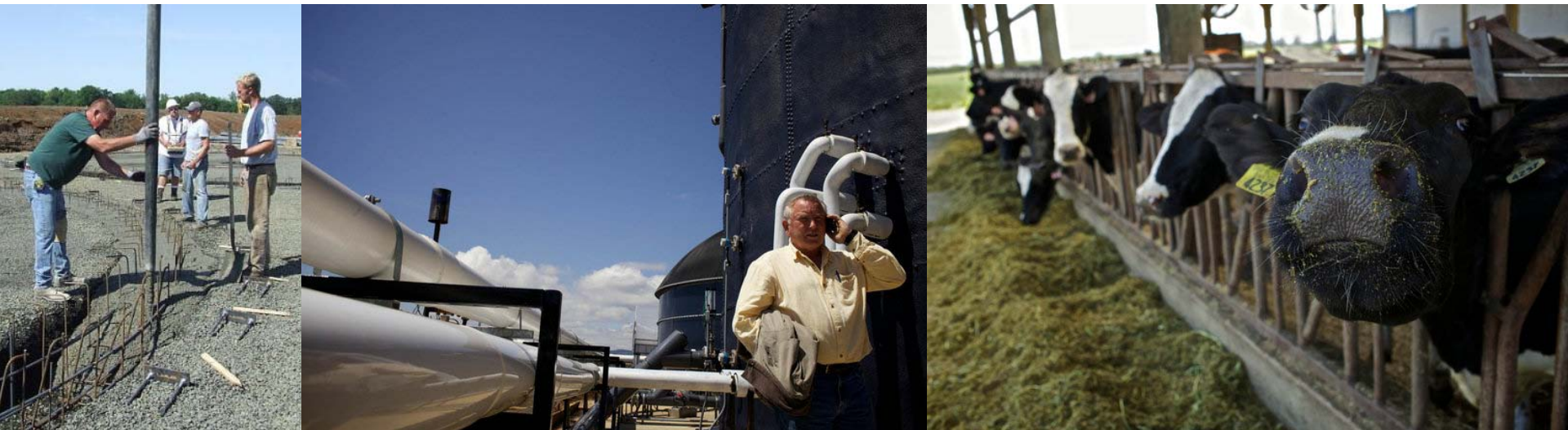
Currently installed capacity	0.85 MW Four small biogas plants in operation
Capacity in development	7 MW Nine biogas plants in development
Total potential capacity	46 MW



# Case Study:

## Lochmead Farms Biogas Plant

- \$2.2 million capital cost for 750 cows
- Began operation December 2010
- Developed By: Revolution Energy Solutions
- Capacity: 180 KW
- GHG Emission Reduction: 3,500 mt CO<sub>2</sub>e





# Municipal Solid Waste

Currently installed capacity	0 MW
Capacity in development	5 MW Columbia Biogas in Portland, OR
Total potential capacity	30 MW



# Wastewater Treatment Plants

Currently installed capacity	5.8 MW Nine plants operating
Capacity in development	2 MW Two plants expanding through co-digestion
Total potential capacity	16.25 MW



# Food Processors

Currently installed capacity	1.6 MW Stahlbush Island Farms in Corvallis, OR
Capacity in development	0 MW
Total potential capacity	12 MW



# Case Study:

## Stahlbush Island Farms Biogas Plant

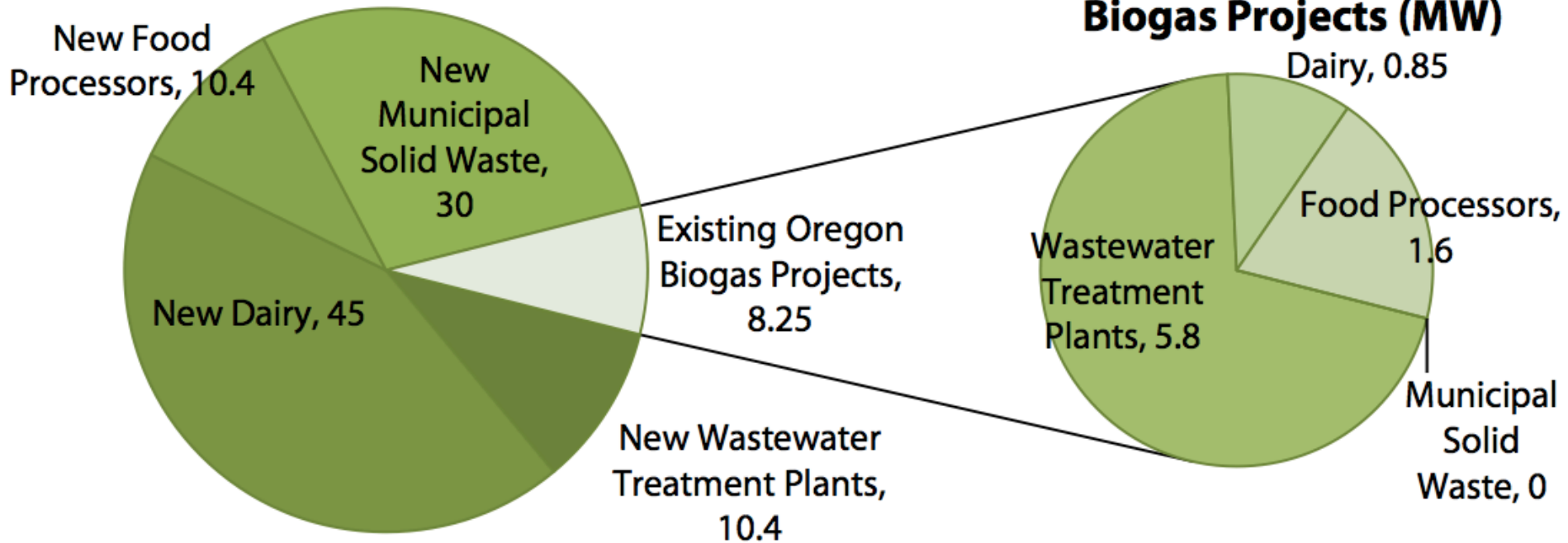
- \$10 million capital cost
- First food waste only US digester
- Capacity: 1.6 MW
- Jobs: 4 new full-time positions



# Biogas Opportunity

## Oregon's Potential Biogas Capacity (MW)

## Oregon's 2010 Existing Biogas Projects (MW)



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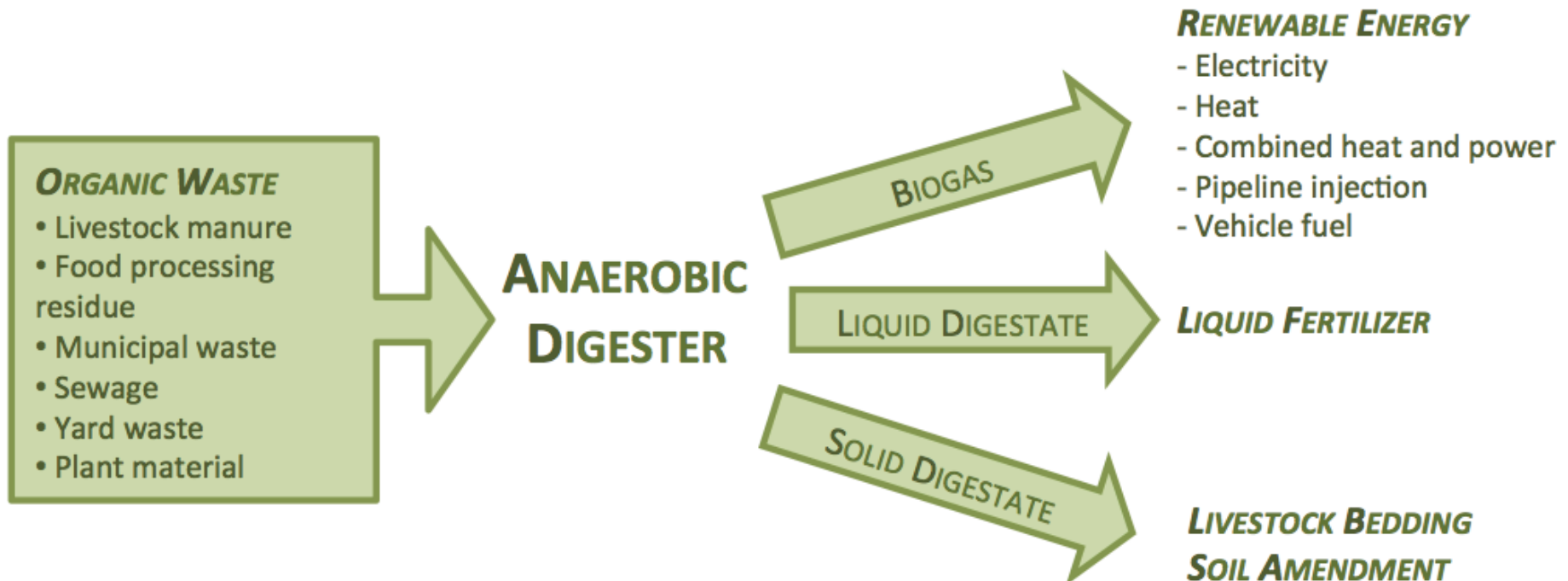
# Biogas Benefits: Economic Development

- Oregon- 300 permanent new rural jobs
- Germany - 1,750 biogas plants built between 2004 and 2010 created 21,660 jobs
  - 12.4 new jobs associated with each plant



# Biogas Benefits: Economic Development

- Diversified revenue streams
- Energy security
- Reduced operating expenses





# Biogas Benefits: Economic Development

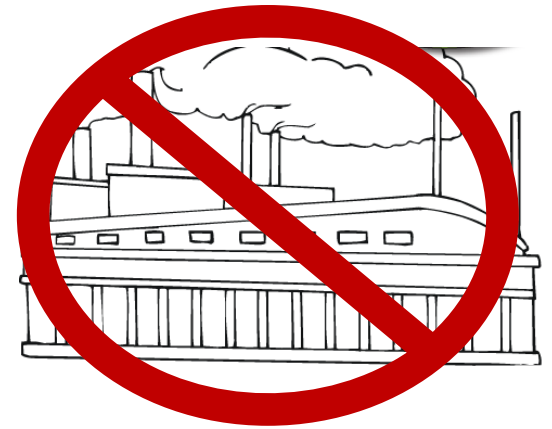
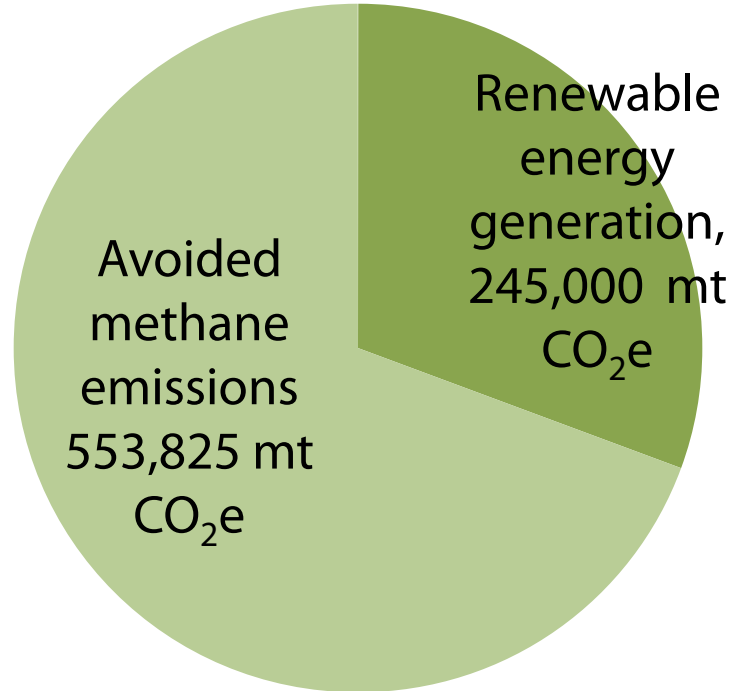
- Dairy bedding at 1,500 cow farm = \$200,000/year



Photo Credit: Torsten Kjellstrand, The Oregonian

# Biogas Benefits: GHG Emission Reductions

## Multiple Greenhouse Gas Benefits of Biogas



# Biogas Benefits: Odor Reduction



# Biogas Benefits:

## Water Quality Improvement

- Heat of digestion eliminates salmonella, E. coli and other dangerous pathogens



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# Policy Possibilities: Production Incentives

1. Renewable Avoided Cost Rates
2. Renewable Portfolio Standard
  1. Carve Out
  2. Credit Thermal Biogas

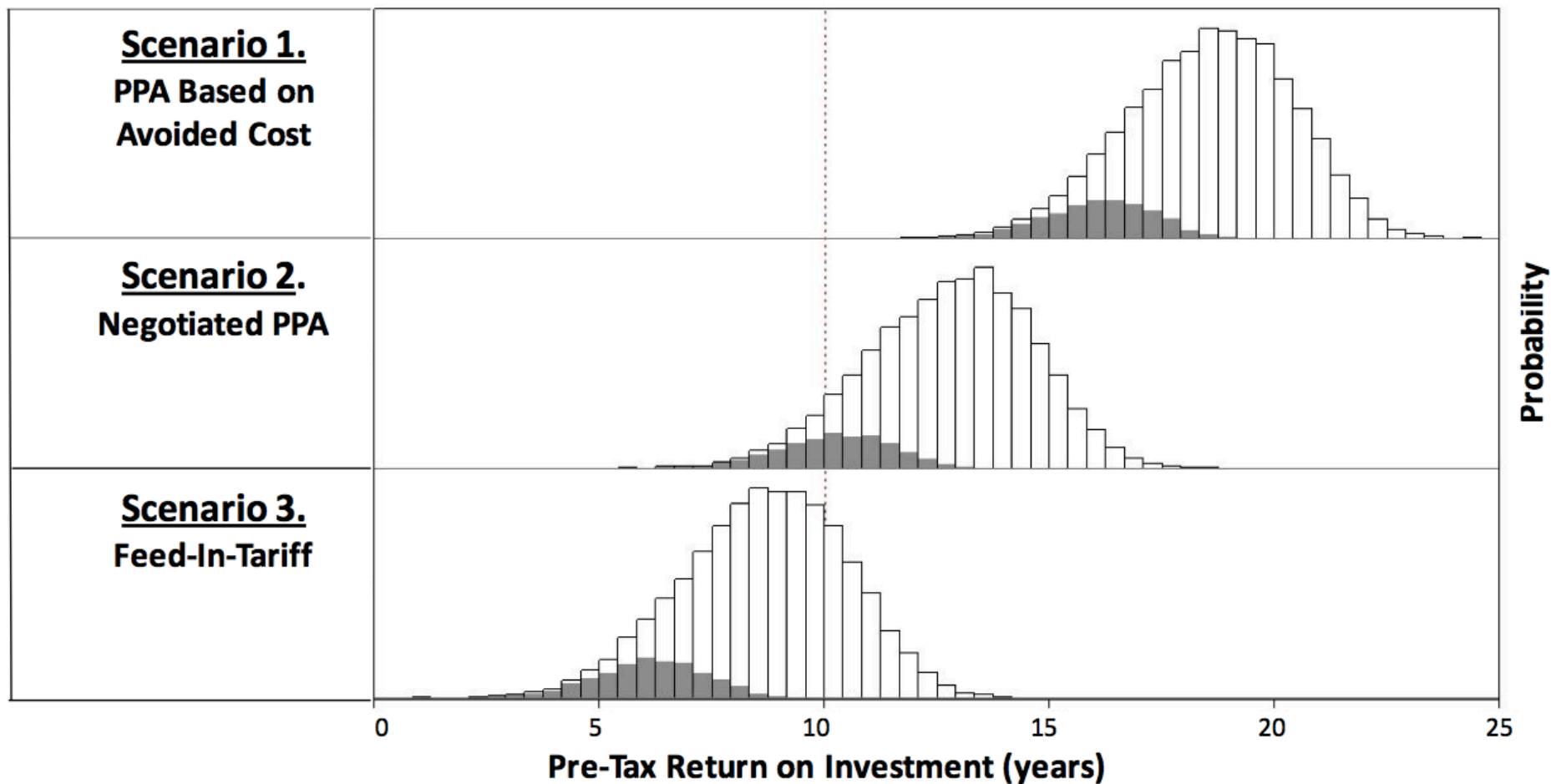
# Policy Possibilities: Production Incentives

## 3. Feed-in Tariff

### Example Oregon Biogas Feed-in Tariff

Rate	\$0.12-\$0.15/kWh
Term:	15 years
Projects that qualify:	<ul style="list-style-type: none"><li>- Less than 2MW</li><li>- New projects</li><li>- Oregon</li></ul>

# Policy Possibilities : Production Incentives



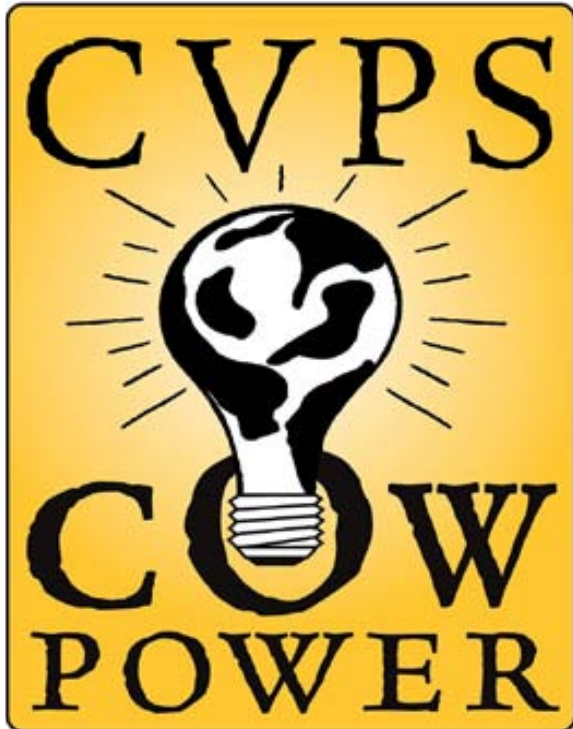
Source: Ecoregon. "Oregon Dairy Digester Feasibility Assessment Summary Report." January 2010.



# Policy Possibilities: Production Incentives



# Policy Possibilities: Production Incentives



## Vermont's Cow Power Program

- 2003
  - Voluntary \$0.085/kWh
  - 6 new biogas plants
- 2009
  - Mandatory \$0.135/kWh
  - 4 new biogas plants in construction

# Policy Possibilities: Construction Financing Program

## Planning

- State and Federal Incentives for Feasibility Studies
  - Energy Trust of Oregon
  - USDA Programs

## Construction

- Equity
- Debt
  - Bridge loans for construction financing

## Commercial Operation

- State Incentives- State Energy Loan, BETC
- Federal Incentives - Federal Investment Tax Credit, USDA REAP Loan

# Acknowledgments

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# Thank you!

Peter Weisberg

[pweisberg@climatetrust.org](mailto:pweisberg@climatetrust.org)

503.238.1915 x207

Thad Roth

[thad.roth@energytrust.org](mailto:thad.roth@energytrust.org)

503.445.7632

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