Facilitating Community-based Landfill Gas Statewide: 6 years, 14 counties, 10 projects

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Introduction

• Appalachian Energy Center
  – Multi-disciplinary applied research center at Appalachian State University formed in 2002
  – Involved in broad spectrum of energy areas, including: resources, technology, finance, economics, and public policy

• CommunityTIES Partnership
  – Supporting job creation since 2005
  – Facilitate community-led projects at marginal-value landfills in economically distressed counties
LEVERAGE LFG FOR ECONOMIC DEVELOPMENT

• Technical support, industry networking, independent analysis
• Develop community capacity, not LFG
• Partnership program implementation:
  – Phase I (‘05–’06) Workshops, 4 counties
  – Phase II (‘06–’08) Additional 4 counties
  – Phase III (‘08 on) Statewide expansion
Since 2005...

10 New projects

$10+ mill. investment

15 initiated

$5 mill. ARRA funds

Countless lessons

28 counties

91% Increase in # of NC LFG Projects
Output of 10 New Projects

- **11.2 mmBtu/hr** direct thermal use
- **7 MW** green power
- **$2.4 mill/year** net county income
- **200,000 tCO₂e/year offset**
Making It Happen

Economically speaking...
- Developed human, social, and financial capital in rural collaborative organizations
- Reduced transaction costs
- Provided facilitation, leadership & information
- Affirmed the return on investing intangible knowledge assets

Boots on the ground...
- Talked with every interested local person we could find
- Recommended against unfavorable commercial development proposals
- About one project designed per county per year

PERSISTENTLY STUBBORN DETERMINATION
Green Economy Paradigm Shift

Compliance: Avoid Penalty

Prevention: Reduce Risk

Capitalize: Financial Reward

Invest: Socioeconomic Reward
Community Facilitation Model

- Identify -> Educate -> Network -> Evaluate
- Pursue development opportunities
- Analyze, advise, and negotiate contracts
- Support construction and operations
Energy is Worth its Use

**Energy Application**

- **Power:** Electricity sales and savings
- **Waste Heat:** Buildings, greenhouses, water
- **Direct Heat:** Industry/Manufacturing

**Industry Applications**

- Sweet potato dehydration & processing
- Brick manufacturing
- Commercial greenhouse operation
- Biodiesel & ethanol production
- Small animal meat processing
- Biotech business incubator
- Poultry feed manufacturer
Lessons learned, insights and observations from projects

PROJECT EXAMPLES
Columbus County: Bio-Energy Park

Vision for Competitiveness

- The combination of renewable energy resources and a trained biotechnology workforce will be leveraged as a competitive advantage in developing innovative biofuel production facilities, propagating the area’s unique flora for medicinal studies, and supporting entrepreneurs in advanced propagation technologies.

Carbon Credits:
- landfill gas, algae sequester

Animal Feed:
- DDG, algae starches

Chemicals:
- fertilizer, solvents

Biofuels:
- ethanol, biodiesel

Native Plants:
- carnivorous, medicinal, ornamental

Nursery Plants:
- floral, garden, commercial

Regional Crops:
- swt potatoes, corn/soy, etc.

Columbus Bio-Tek, LLC:
- ethanol, algae-oil feedstock, fertilizer

Biofuel Feedstock:
- corn, biomass, algae

Southeastern CC:
- biotech/biofuels training

BioBiz Incubator:
- greenhouses for micro-propagation

Landfill Gas

Waste Heat

Industry Wood Waste

Brunswick Electric:
- incubator operations, other

Ethanol, Biodiesel

Biotechnology

Protect Native Ecosystem

Farming, Wood Products
Contrast Among County Projects

- **Self-Starters**
  - Robeson & Gaston Counties
  - GHGs, Electricity, Industry

- **Non-Starters**
  - Scotland County: Declined grant
  - McDowell County: Flooded landfill
  - Bertie County: Corporate landfill

- **Slow Starters**
  - Wilkes County: 4-well system initially
  - Rutherford County: limited electricity generation
Rockingham: Long-term View

- Gas collection from 2 closed cells and currently open Subtitle-D cell
- Decision to increase height of Subtitle-D cell = added waste
- Electricity, RECs, and carbon credits
- Possibilities: brick manufacturing, biofuels production, others
Expanding on Gas Collection

Watauga County

- Gas collected since 2006, energy use online in 2012
- Produce 5x landfill facility’s power consumption
- A $38,000 expense is now $72,200 income per year

Caldwell County

- Gas collection funded by Google, Inc. (2009)
- Electricity generation online in 2012
- Catalyst-driven development
Lessons Learned Along the Way

• 80% of partners felt their group was successful in recruiting key community members
• 80% rated the level of trust within their group as “above average” or “excellent”
• 70% rated facilitation as “very important”

Variables that Fostered Success

1. Facilitation
2. Accumulation of knowledge and information
3. Leadership
4. Trust

Lessons Learned Along the Way

• Private capital is available for small-scale LFG projects, but the price may be community benefits
• Today’s custom solution may become tomorrow’s unique migraine
• Community ownership, vision, leadership, and commitment are the ultimate determinants
• Encouragement, the most valuable service
Lessons Learned Along the Way

• PULL uphill & PUSH downhill
• Avoid non-decisions and inventing barriers
• Always work towards the core objective – economic development, in our case - everything else is negotiable
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