

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



CommunityTIES Partnership



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



Z. SMITH REYNOLDS FOUNDATION



Since 2005...

10 New projects

15 initiated

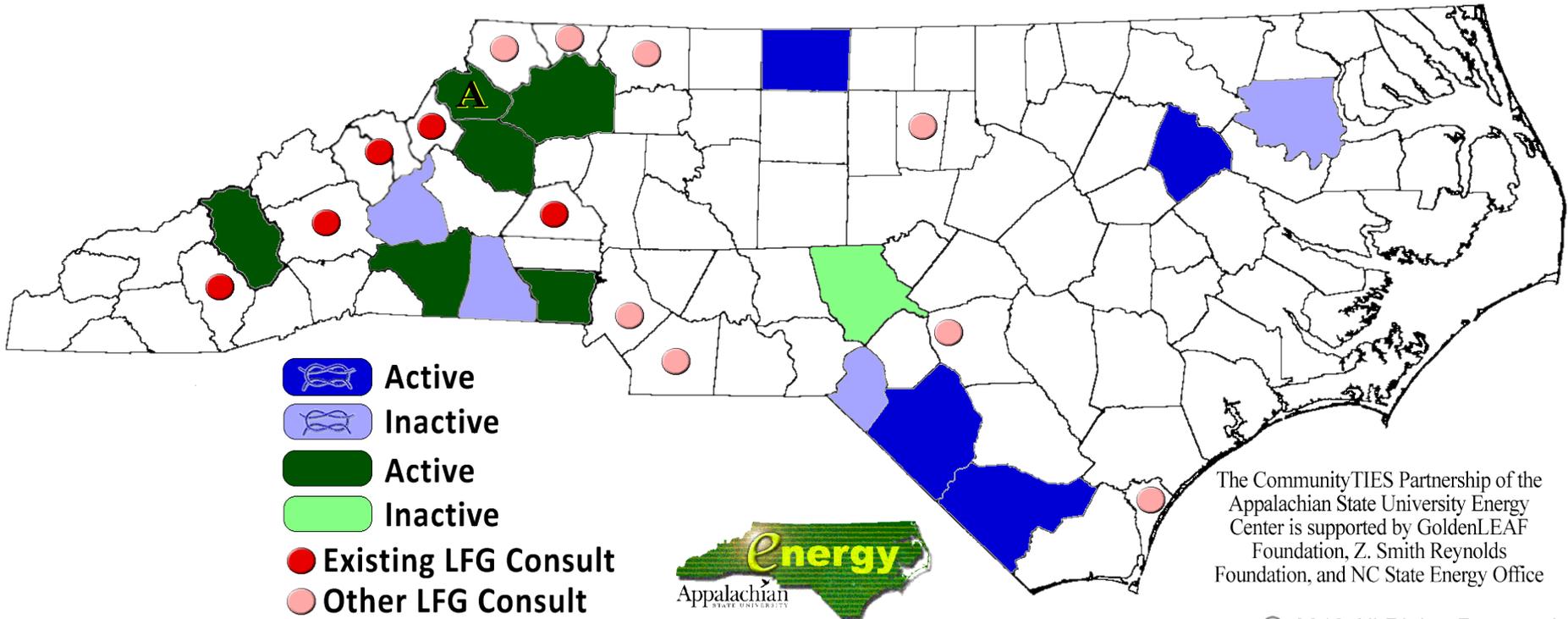
91%
Increase in # of
NC LFG Projects

\$10+ mill. investment

\$5 mill. ARRA funds

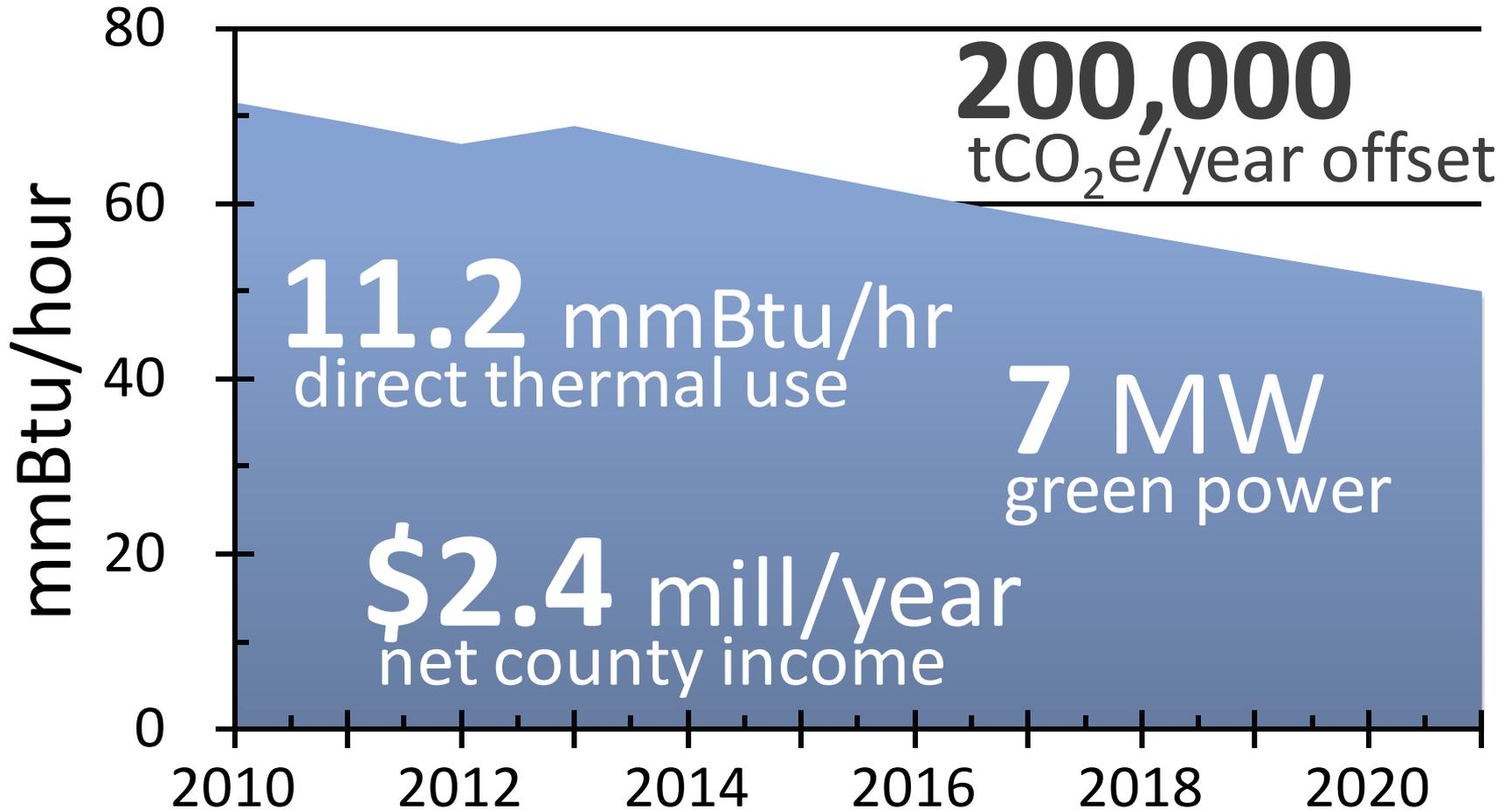
Countless lessons

28 counties



The Community TIES Partnership of the Appalachian State University Energy Center is supported by GoldenLEAF Foundation, Z. Smith Reynolds Foundation, and NC State Energy Office

Output of 10 New Projects



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

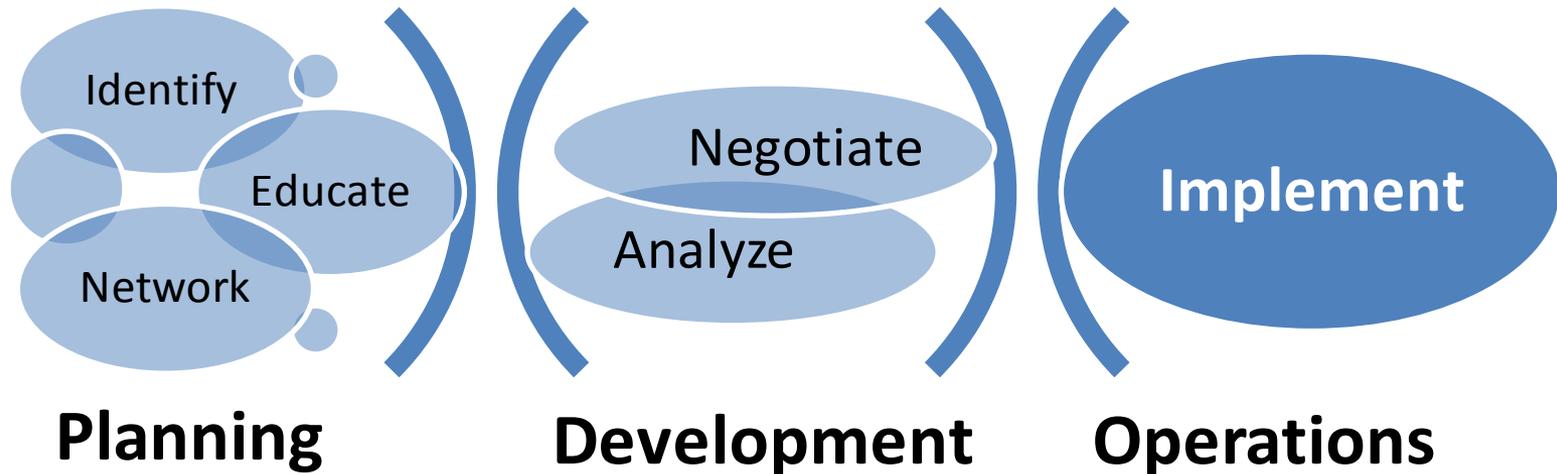
Prevention: Reduce Risk

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

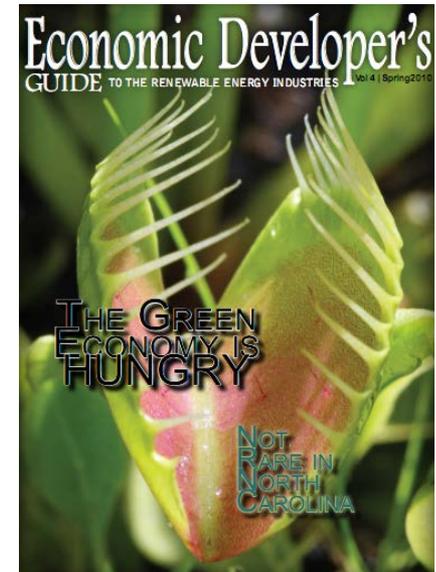
Commercial greenhouse operation

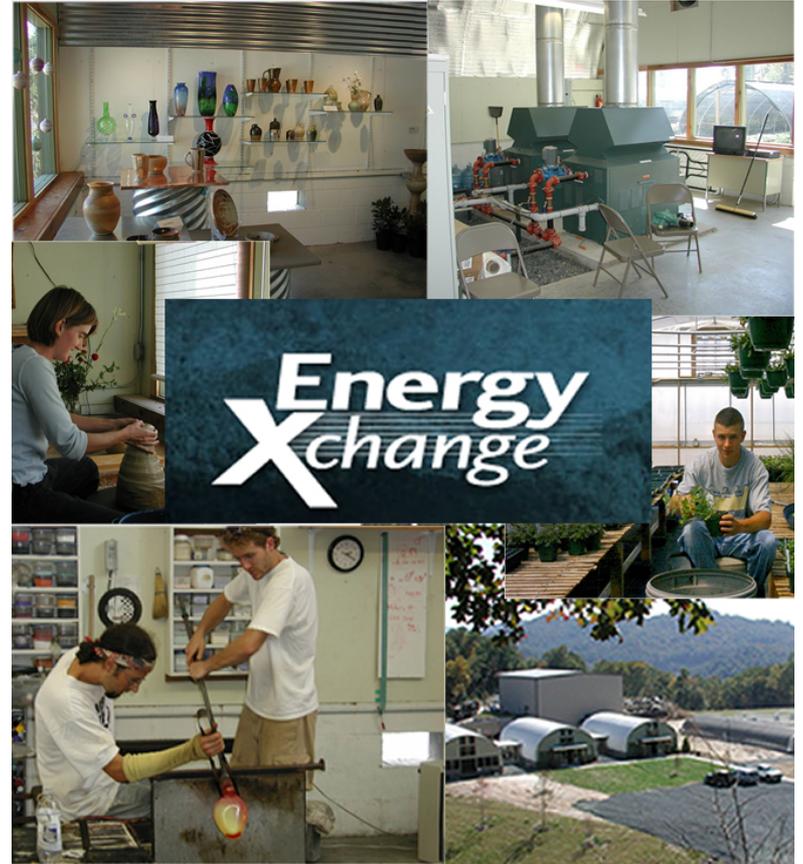
Biodiesel & ethanol production

Small animal meat processing

Biotech business incubator

Poultry feed manufacturer





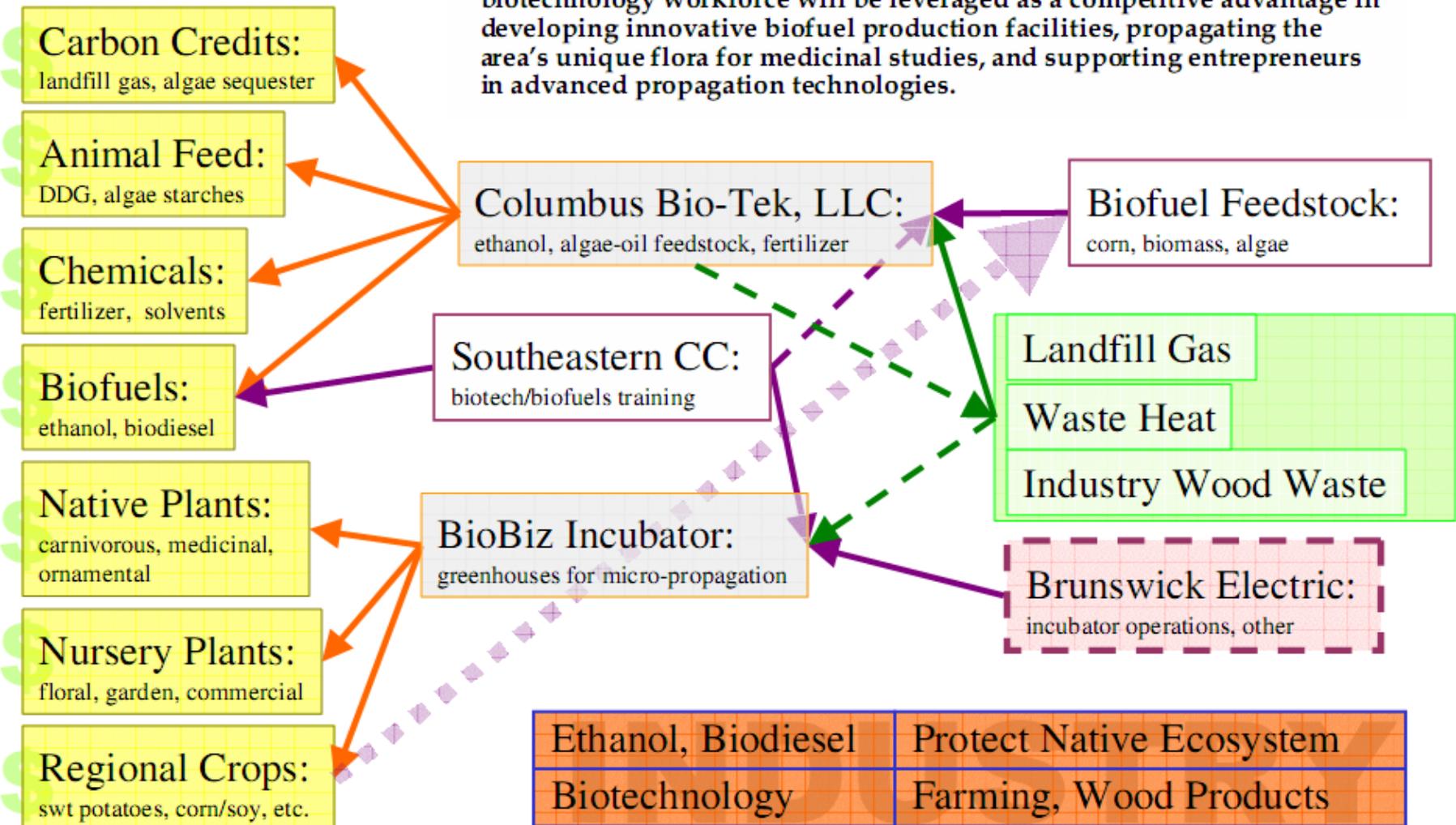
Lessons learned, insights and observations from projects

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.



Contrast Among County Projects

- **Self-Starters**

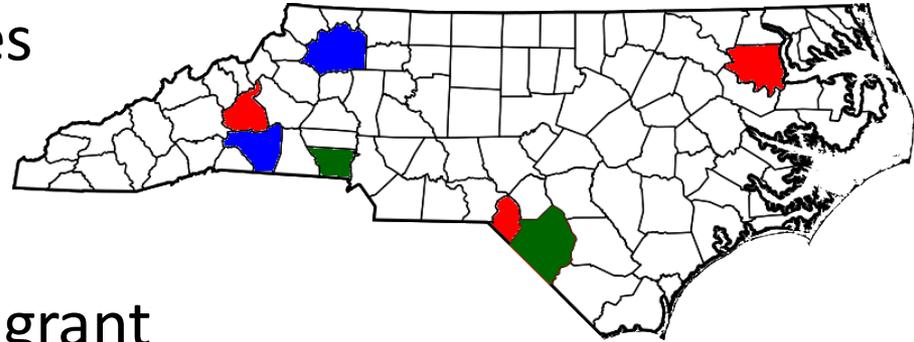
- Robeson & Gaston Counties
- GHGs, Electricity, Industry

- **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

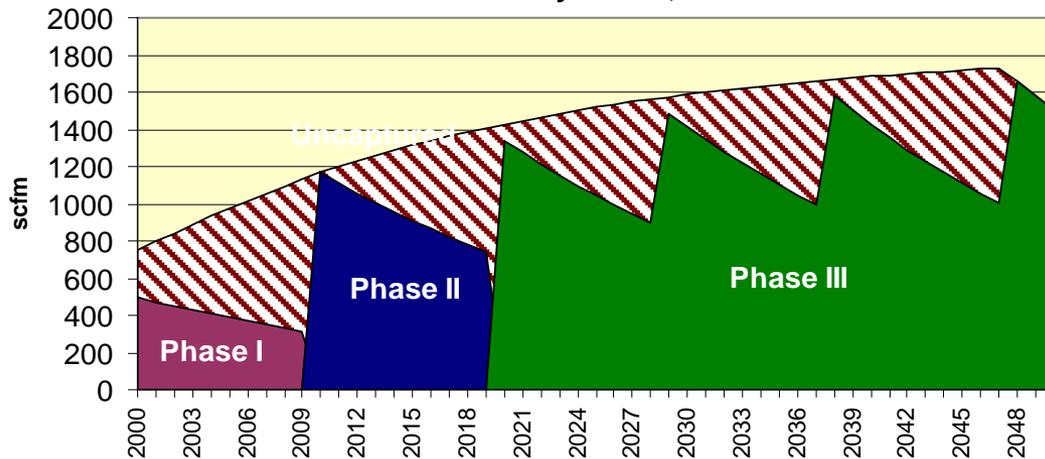


Rockingham: Long-term View

- 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



Gas Resource By Phase, scfm



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

Lehman, John. *Developing Human, Social, and Financial Capital in Rural Collaborative Organizations: An Evaluation of Eight Rural Landfill Development Projects*. Federal Reserve Bank of Kansas City. Economic Development in Underserved Communities: Where Research and Practice Meet, conference paper. 9-10 September 2010.

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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