

# **Economic Development from Landfill Gas:** *Carbon Credits Facilitate Job Creation*

**Jason Hoyle**  
**11<sup>th</sup> Annual LMOP Conference**  
**Appalachian State University Energy Center**  
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# The Appalachian State University Energy Center

*Multidisciplinary Center with staff from Business, Political Science, Economics, Building Science, Appropriate Technology, Physics, Chemistry, and Geography*

## CommunityTIES Project

**Community-based projects leveraging landfill gas as a resource for local economic development**

- Based on EnergyXchange model
- Led by Stan Steury
- Grant funded by GoldenLEAF Foundation, NC State Energy Office, and Z. Smith Reynolds Foundation



[www.CommunityTiesProject.org](http://www.CommunityTiesProject.org)



# Facilitating Local Economic Development from Landfill Gas



**Establish Local  
Taskforce &  
Leadership**

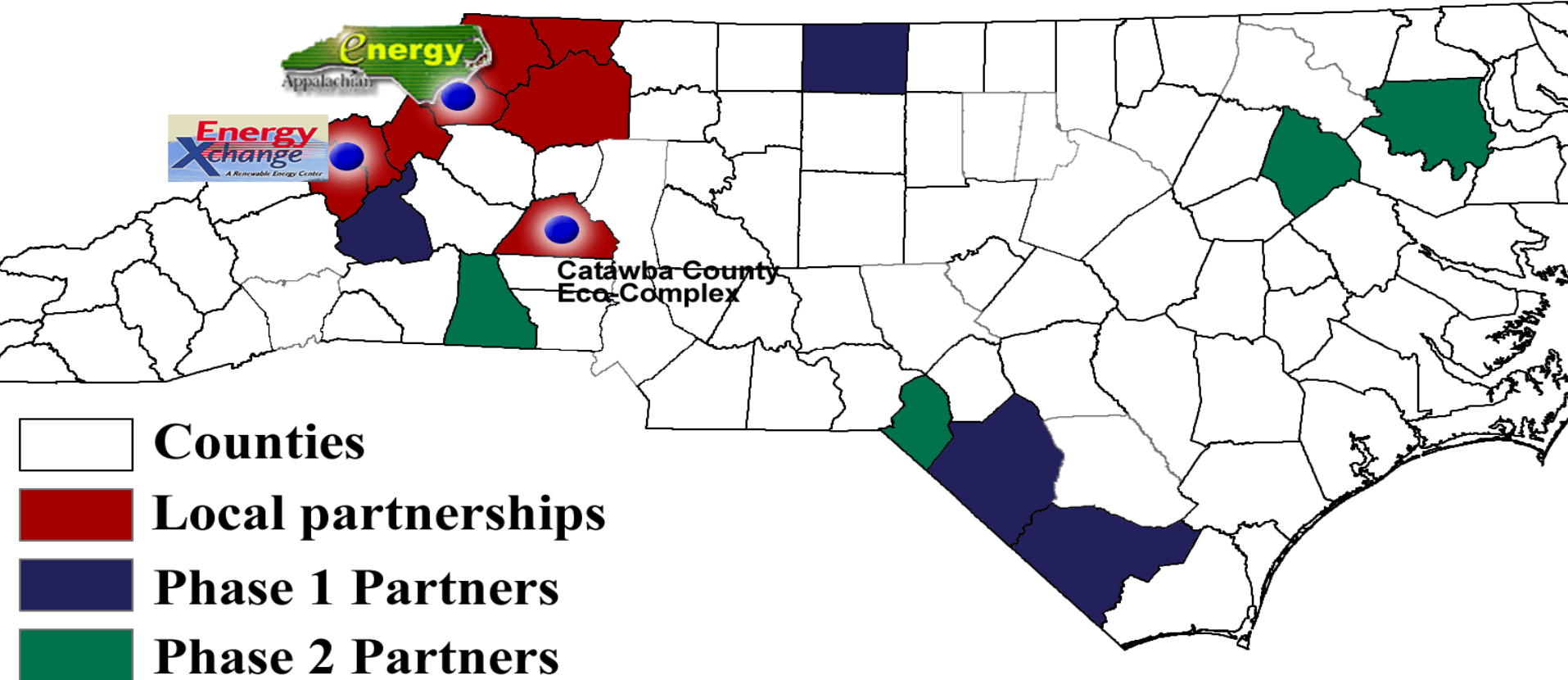


**Provide  
Information  
and Industry  
Contacts**



**Assist Project  
Identification,  
Funding &  
Development**

# County Partners



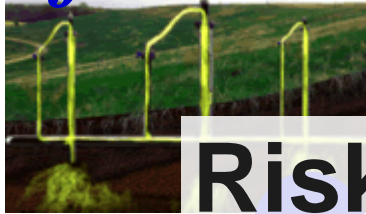
# Value Impacts of Carbon Credits

- ⌘ **A new perspective on the role of the collection system in project development**
- ⌘ **For 30 years, the collection system has literally been a 'sunk' cost**
- ⌘ **A major barrier to project development**
  - High investment risk for unknown resource quantity
  - Uncertainty deters potential end user commitment
  - Collection system cost often makes uses unprofitable, especially in small landfills
  - Availability of up-front funding ~ \$1 million
- ⌘ **What happens when collecting landfill gas adds value independent of the end use?**

# Create Economic Opportunity

Carbon Credits

*Before*



**Risk**

**Use:** highly reliable, income generating use priority

**Limited Benefits**

PROJECT INCOME-BIAS

*After*



**\$\$\$\$**

**Support Economy** industry expansion, education, entrepreneurship

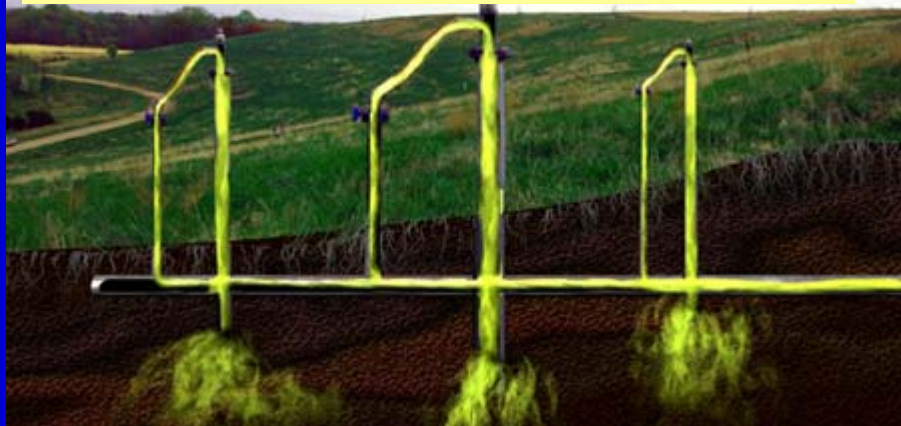
**Reduce Risk** fuel price & volatility, electric reliability/security, GHG limits, environmental non-compliance

MEET LOCAL NEEDS

# Carbon Credits and the Micro-Economy

**1 ton CH<sub>4</sub> = 21 tons CO<sub>2</sub>e**

Source: IPCC TAR



Greenhouse gas emissions are  
an asset PROVIDING FREE  
ENERGY.

*Give a man a fish...  
Teach a man to fish...*

CO<sub>2</sub>e income = quicker profitability and increase return

CO<sub>2</sub>e can be a store of value, or a speculative investment to hedge  
against future regulations or anticipated CO<sub>2</sub>e price increases

CO<sub>2</sub>e credits \*could be\* an economic development incentive

# NC Landfill Example

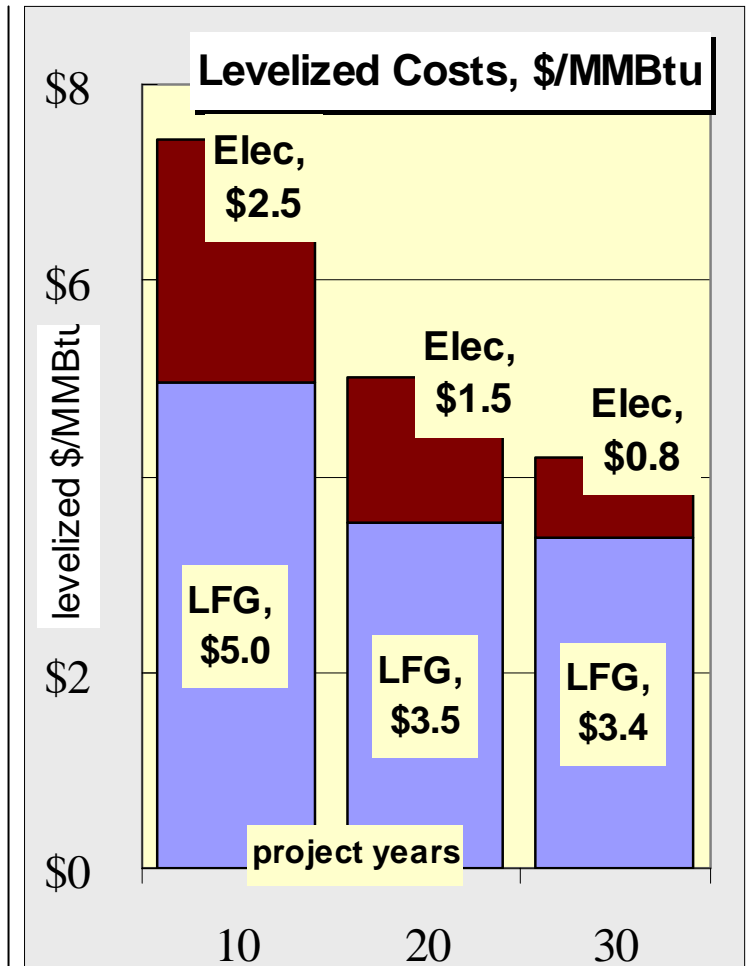
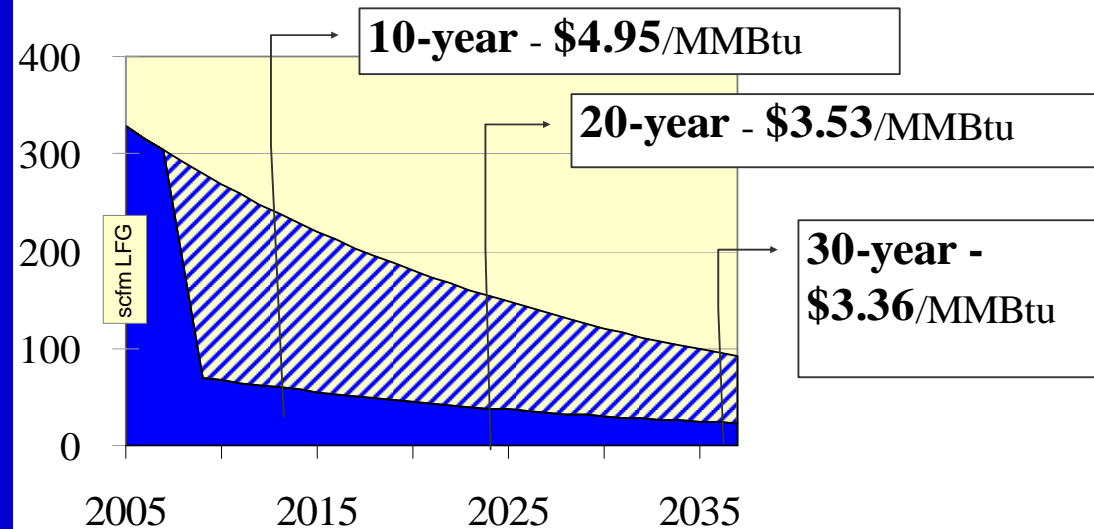
## Example County Landfill for North Carolina

Closed since 1997

Waste-in-Place ~1,000,000 metric tons

LandGEM using 'Inventory Conventional' (k, L)

### Volume & Levelized Cost per \$mill Invested



# 20-Year Project Up Close

## Gas Use Scenarios

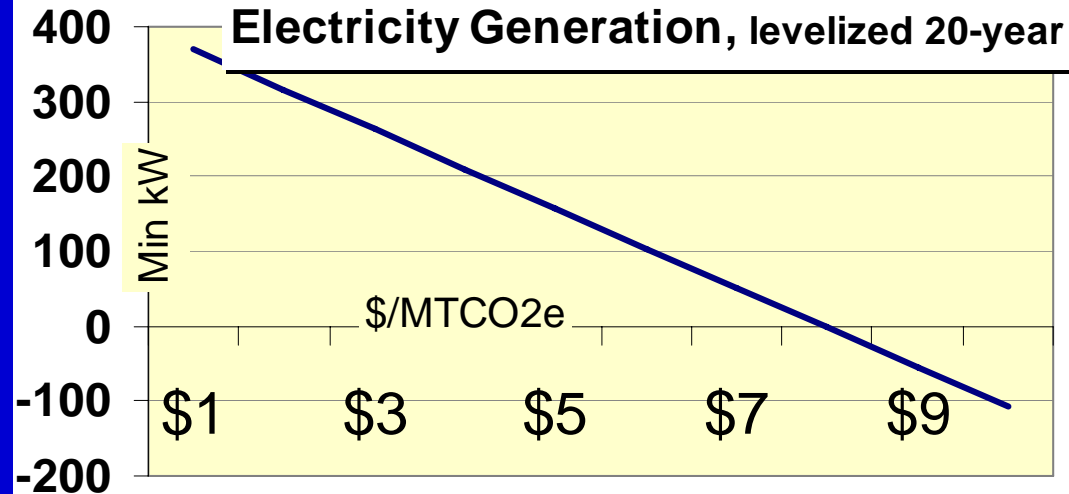
With carbon less electricity is needed for economic feasibility

## Project Implications of High Carbon Prices

- 1) Fundamental shift in project economics ▼ *B/E End-Use Price*
- 2) *Value redistribution* from end-use to collection point
- 3) Carbon value can be realized in more ways than money, i.e. *new jobs, industry recruitment, community project support*

### Carbon Price & Break-Even

Electricity Generation, levelized 20-year



**If carbon prices are high enough, all the gas is 'free'**

# What to do with 'Free' LFG

## **Robeson County:**

- Recruited new ethanol facility, 15+ FTE

## **Rockingham County:**

- Exploring eco-industrial park

## **Columbus, Edgecombe:**

- Value-added sweet potato processing, biotech education

## **Bertie County:**

- Community agriculture collaborative

# Approaching the Carbon Market Today

## Consider future regulatory uncertainties

## Guiding principles

- Awareness of potential opportunity cost
- Ensure clear ownership of CO<sub>2</sub>e assets
- Plan for change until a global market is established
- Consider options appropriate to local situation

## Define priorities for LFG goals

- County government income
- Compliance risk reductions
- Economic development
- Environmental quality

# Conclusion Summary

## **What is known today about carbon markets?**

- Regulation is coming – uncertainty reigns
- A full spectrum of markets exist today, with great variety
- Opportunity cost of acting/not acting is double-edged
- Regulation tends to increase the price of carbon reductions

## **How are opportunities best evaluated?**

- Define LFG project goals: jobs, income, compliance, etc.
- Consider tradeoff between value and complexity
- County-specific context: debt availability, operational capability, willingness to absorb risk