



Community-Based LFG & Biogas Development To Address Social Needs

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Goals of This Presentation

- Define and Report On “Community-based” LFG Projects
- Describe How Social Needs Which Can Be Met With Community-based LFG Projects
- Identify Keys To Project Success
- Show How To Link “Community-Based” Benefits With Commercial LFG Projects
- Encourage Incorporation of “Community-based” Principals In LFG Development



Assett or Liability?





Why Address Social Needs

- Expand Landfill Gas Benefits
- Community “Buy-In”
- Expand Project Funding
- Add Project Partners –
Government Agencies, NGOs,
Universities, Communities





Appalachian State University

- Boone, NC
- 17,000 Students
- Leader In
 - Business & Economics
 - Technology
 - Public Administration
 - Geography & Planning
 - International Studies
 - Sustainable Development
 - Education





Appalachian State University

- International Studies in 35 Countries on all Continents
- Exchange Study Programs in 4 Focus Countries
 - India
 - China
 - Brazil
 - South Africa





Appalachian State University Energy Center (Est. 2001)

- Mission - Committed to research, development, policy analysis and demonstrations in all areas of energy, including...
 - Energy efficiency
 - Wind
 - Small hydro
 - Bio-fuels
 - Solar
 - Biogas and landfill gas



energy Community-based LFG Models



North Carolina Models Of Community-based LFG Projects

- EnergyXchange
- Catawba Eco-Complex
- Jackson County Green Energy Park





ASU Landfill Gas Assistance In North Carolina

- 34 Landfills - Small to Medium Sized
- Rural, Economically Challenged Communities
- LFG uses recommended by local task forces





LFG Heated Greenhouses





SECC Micro-Propagation



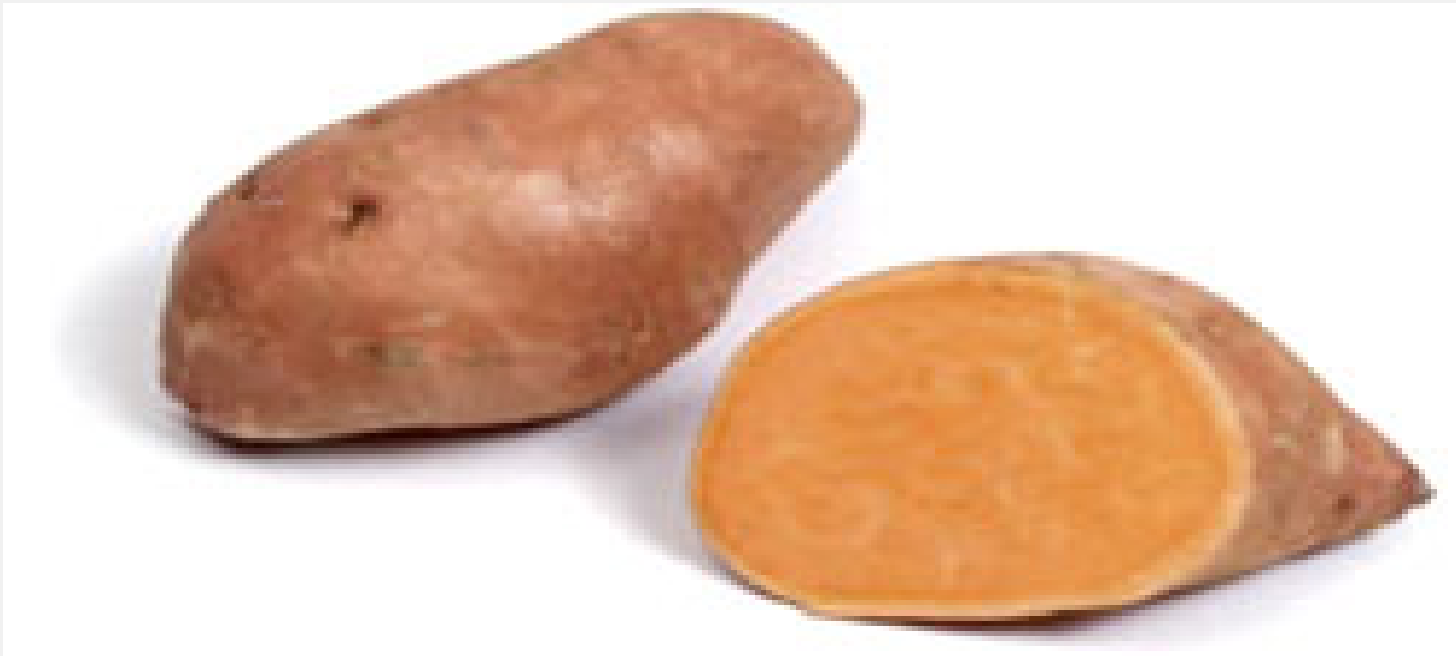


Highly Technical Work



Sweet Potato Processing

- Dehydration – Dietary Supplements, Pet Food
- Sweet Potato Fries





Landfill Gas Fueled Glass Furnace





Watauga County LFG Combined Heat & Power

- Affordable
- Simple Technology
- Ease of Maintenance
- ASU/Watauga Small Generator Testing Center





ASU International LFG

- ASU Encouragement – Internally, externally
- From India To Brazil
- ASU Contacts In Ceará
- Brazil Demand For Renewable Energy
- Community-Based Planning A Good Fit
- Global Methane Initiative Grant
- Will Work Anywhere There Are Waste Pickers
On Landfills





Travel to Ceará Brazil

- Visited 7 Landfills, 8 State & Local Government Offices, 3 University Offices
- State Congressman
- Excellent Guide
- Portuguese Speakers
- Previous University Contacts
- Coordinated w/ US EPA





State of Ceará, Brazil

- 8.5 M People
- 3.2 M Fortaleza
- Poor & Rural
- Semi-arid
- Solid Waste
- Industry Transition
- No LFG Projects





Universal Community Needs

- Sources of energy, jobs, a rallying point, jobs for unemployed/underemployed, business incubation, improved quality of life, protection for the environment.



Universal Resources - Garbage & Waste Pickers



Maracanaú Landfill

- Opened 1999
- 1.7 million metric tons waste in place.
- Political Support
- Well Qualified Engineer & Good Management
- Industrial Center



- Waste Pickers
 - 62 million worldwide
 - 300,000 to 1 M Brazil
 - 10,000 in Ceará
 - 250 in Maracanaú
- Recycling System
- Government Rules
- Associations
- Compatibility w/Commercial LFG Projects



Community Social Needs

- Safety & Health
- Income
- Ladder to Success
- Standard of Living
- Education
- Crime





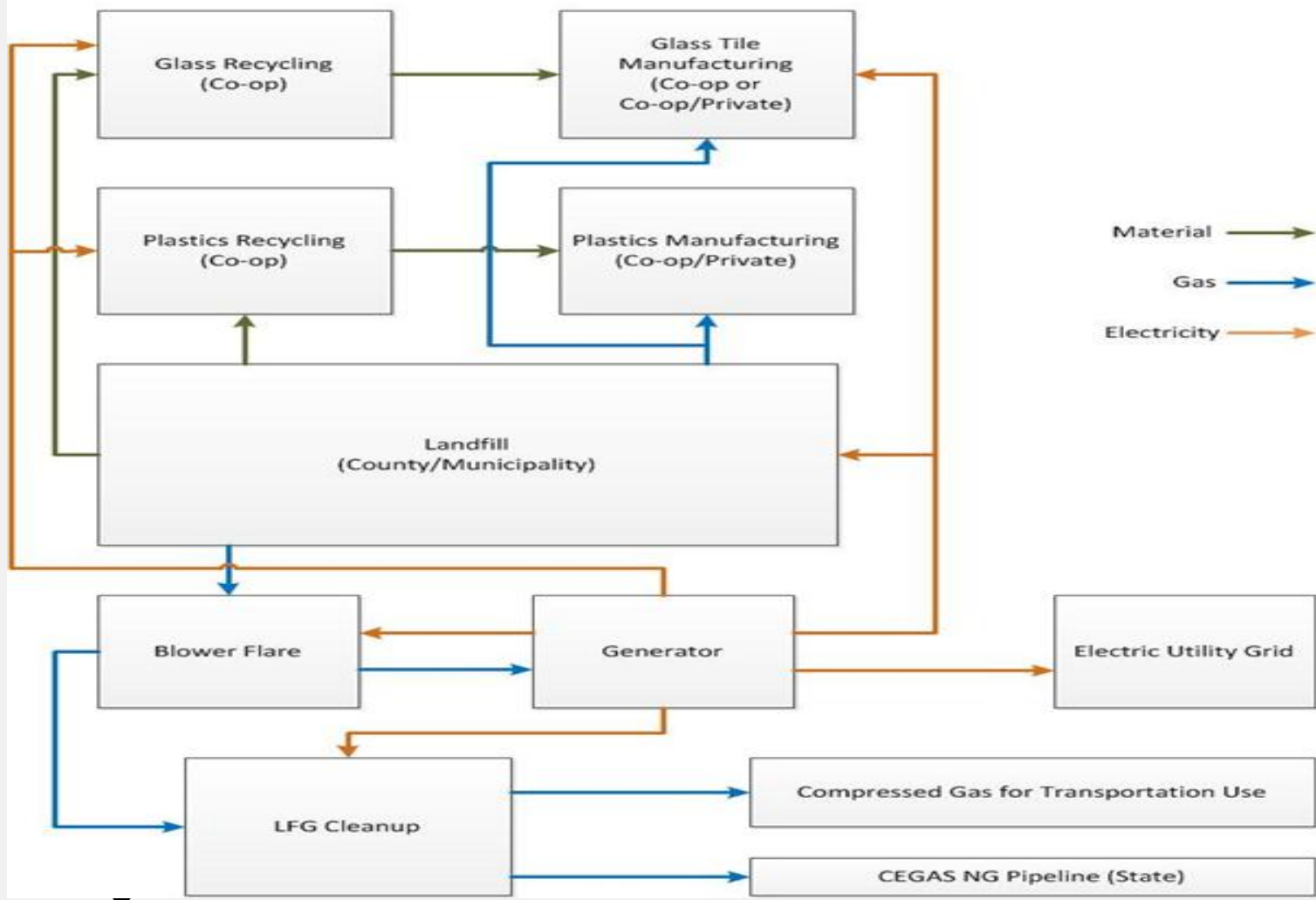
Ceará LFG Task Force Visits North Carolina



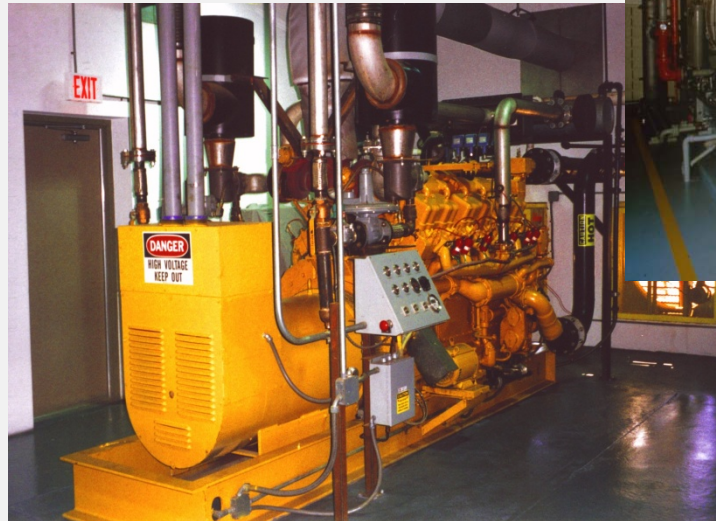


Conceptual Plan for Maracanaú

Maracanaú Landfill Material Processing Design



- LFG to Electricity May Be Commercial Use
 - Reciprocating engines
 - Gas turbine
 - Microturbine
 - Other



Caterpillar 3516 800 kW Genset
Short Mountain LF
Eugene, OR

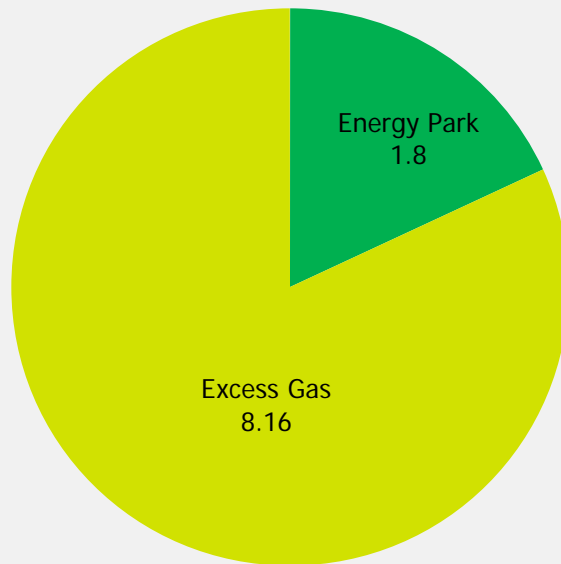


Solar 3 MW Gas Turbine
Milwaukee, WI

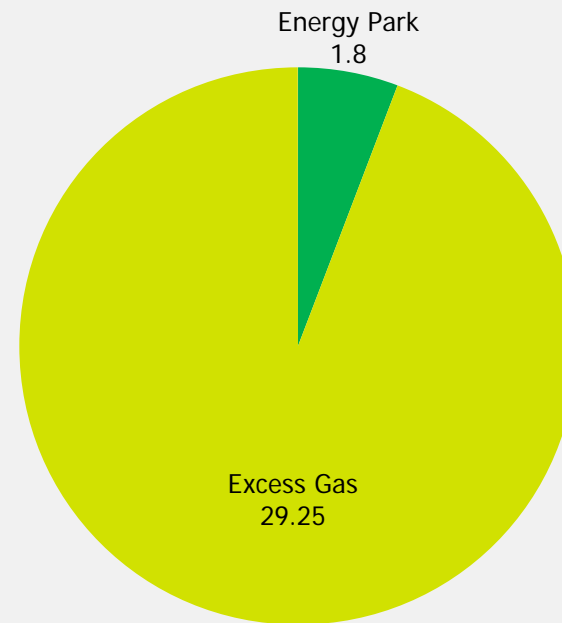


Gas Needed for Value-added Process

2012



2041



Gas Values in Million BTUs





Recyclable Sorting Facility





Value-added Glass Model

STUDIO Xaquixe







Injection Mold Process

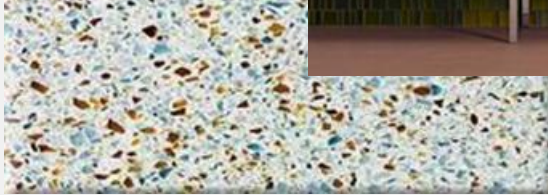
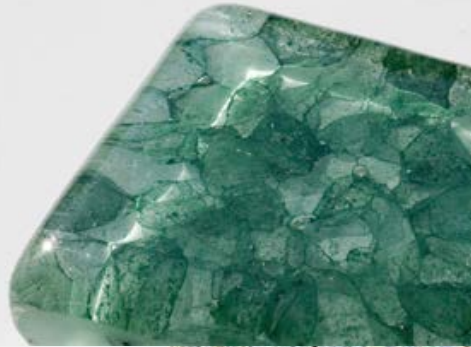


Glass Arts By Community





Mayor's Vision – Glass Tile





Plastic Value-added Model

TECPLAST Vertically integrated plastic recycling of low density polyethylene to trash bags, concrete forms, wall/floor/ceiling sections, tables, chairs.



<http://www.energy.appstate.edu>

Plastic Recycling



Plastic recycling is energy intensive roughly 30% of costs according to Marlito.



Plastic Building Panels





Other Potential Gas Uses



<http://www.energy.appstate.edu>





Maracanaú Industrial District

- 200 Industries, Many Energy Intensive
- Interest In Gas From Several Industries
- 12 km – Probably Too Far To Pipe Gas
- Source Of Project Support





Community-based Project Needs

- Medium-sized LFG Or Biogas Project Or Add-On To Commercial Scale
- Team Members Understand Culture
- Overcome Pre-Conceived Notions
- Community Support
- Commercial Scale Helpful





Community-based Project Needs

- Funding
 - Corporate
 - Foundations
 - Government
 - International programs
 - Carbon
- Identified partners & local task force
- Dedicated local project manager





ASU Community-Based LFG Program Worldwide

- Document Problem Of “Waste Pickers” Worldwide
- Identify Countries With Needs and Potential
- Network With NGOs, Industry, International Programs, Foreign National/State Agencies



Assett or Liability?





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