Community-Based Landfill Gas Development In Ceará, Brazil

Appalachian Energy Center At Appalachian State University

Presented By Stan Steury
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• 17,000 Students
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  o Business
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  - Wind
  - Small hydro
  - Bio-fuels
  - Solar
  - Biogas and landfill gas

Appalachian State University
Energy Center (Est. 2001)

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North Carolina Models For Community-Based LFG Projects
- EnergyXchange
- Catawba Eco-Complex
- Jackson County Green Energy Park
Landfill Gas Assistance Under Community TIES

• 34 Landfills - Small to Medium Sized
• Rural, Tier 1 Counties (Economically Challenged)
• Sweet potato dehydration, sweet potato fries, heat for ethanol, chicken litter to fertilizer plant, electricity generation (200-1,000 kW), pottery & glass, lumber drying, greenhouses for food crops & rare native medicinals, feed production, poultry processing.
Universal Resource
Most Garbage In North Carolina and Ceará, Goes To A Landfill. Decomposing It Produces Landfill Gas
Universal Community Needs

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

- ASU Encouragement – Internally, externally
- From India To Brazil
- ASU Contacts In Ceará
- Brazil Demand For Renewable Energy
- Community-Based Planning A Good Fit
- ASU Available Resources
Brazil Landfill Gas Industry

- Few Projects
- Large Landfills

23 MW LFG project in Sao Paulo

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State of Ceará, Brazil

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

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Travel to Brazil

• Visited 7 Landfills, 8 State & Local Government Offices, 3 University Offices
• State Congressman
• Excellent Guide
• Portuguese Speakers
• 2nd Trip By University
• Coordinated by Chris Godlove, LMOP
Maracanaú Landfill

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

- Catadores = Waste Pickers
  - 62 million worldwide
  - 300,000 to 1 M in Brazil
  - 10,000 in Ceará
  - 250 in Maracanaú

- Recycling System

- Government Regulation & Associations
Social Needs

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

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Ceará LFG Task Force Visits North Carolina

• Visited Community-Based Projects
• 8 people
  o Mayor of Maracanaú
  o Staff of Social Services
  o Landfill Engineer/Engineering Professor
  o Engineer with SEINFRA
• Small Amount of Grant Money
• Selected Carlson Environmental & Green Energy Partners – Price, Small Landfills Experience
  o Design & Cost Estimate LFG Collection System
  o Evaluation LFG Utilization Options
  o Future Vision – Waste Management Options
  o Work With Landfill Engineer at Maracanaú
Planning Meeting

• After Visits, At Appalachian State
• Ceará LFG Task Force, Appalachian State University Personnel, US Consultants
• Identified Local Needs
• Vision of Uses For LFG
• Collection System In Phases
• Public/Private Partnerships
• Energy Park

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Energy Park

- Combined Heat & Power
- Value Added Processing – Recyclables
- Food Processing and/or Cold Storage
- Future Waste Digesters or Gasifiers
- Public/Private Partnerships
- Expand Industrial Park
Combined Heat & Power

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

• Maracanaú Industrial District – 200 Facilities
• Fruit Biss – Ice Cream Interest
• Bricks & Tile – Major Industry, Deforestation, Carbon Credit Double Dip
Phase II – Global Methane Initiative

- Construction Design LFG Collection
- Preliminary Design Energy Park
- Construction Grant – Other Sources
- Continue Development LFG Task Force
- Collection System Construction Supervision
- Seed For Ceará LFG Development Plan

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Project Financing

• Grants
• Corporate Donations
• Carbon Trading
• Financing – Federal, State, Banks, International Programs

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Social Aspects

- Waste Land Movie
  Vik Muniz
- Cross Trade
- Enviroglass
- Poor Communities Adjacent to Landfills
- Waste Sorting Efficiency
- Mayor’ Vision
  Industrial Instead of Arts

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Lessons Learned

- Must Have Local Involvement/Support
- Team Members Understand Culture
- Overcome Preconceived Notions
- LMOP Guidance Necessary
- Must Develop Local Expertise
- Dedicated Project Manager
Future Vision – Waste/Energy

- Better Sorting Than U.S.
- Value-added Technologies - Recyclables
- Gasification, Anaerobic Digestion
- Other Countries
- Network with NGOs, International Programs, Industry, Foreign National/State Agencies

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• Document Problem Of “Waste Pickers” Worldwide
• Other Countries More Severe Problems
• Network With NGOs, Industry, International Programs, Foreign National/State Agencies

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Why Appalachian State University?

- Energy Center
  - LFG Facilitation & Consulting
  - Watauga LFG Small Generator Testing Center
- Departments of Technology, International Studies, Sustainable Development, Biology, Chemistry, Economics, Walker School of Business
- Faculty, Students, Staff
• International Studies in 35 Countries on all Continents
• Exchange Study Programs in 4 Focus Countries
  India, China, Brazil, South Africa
• Energy Center Director now teaching in South Africa, The University of the Free State for 6 months