



## EnergyXchange: Still in Business After 12 Years

15<sup>th</sup> Annual LMOP Conference and  
Project Expo

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**ALTAMONT ENVIRONMENTAL, INC.**

ENGINEERING & HYDROGEOLOGY

# Discussion Items

- History Of EnergyXchange
- Recent Upgrades
- Successes
- Challenges
- Acknowledgements

# History of Energy Exchange

- Created Through a Partnership of Three Organizations:
  - Blue Ridge Resource Conservation and Development Council (USDA)
  - HandMade in America
  - Mayland Community College
- Purpose
  - Utilize the LFG from the closed landfill
  - Utilize waste and establish renewable energy resources
  - Promote and improve the local economy
  - Protect the environment
  - Educate the public

# Artist Incubator

- Ceramic and glass arts are very popular in this area
- Energy costs for these media are very expensive
  - LFG and wood waste allows financial flexibility for artists to perfect their craft and develop their business
- 4 ceramic and 2 glass artists are selected by a jury process to have a 3-year term
- 23 artists have completed the program
  - Many have started new businesses in the area

# Ceramic and Glass Products



# Project Branch-Out

- Propagation of rare and native ornamental plants
- Growers used to remove plants from wild, depleting population and causing erosion
- Plants are grown from seed and young stock is sold to wholesale growers
- Use of LFG (and wood waste) facilitates low-cost greenhouse operation

# Greenhouse Products



Catawba Rhododendron



Mountain Laurel



Bakeri Azalea

Flame Azaleas, Pinkshell Azaleas, Sweet Azaleas,  
Doghobble, Mountain Ivy, Blueberries.

# Greenhouses





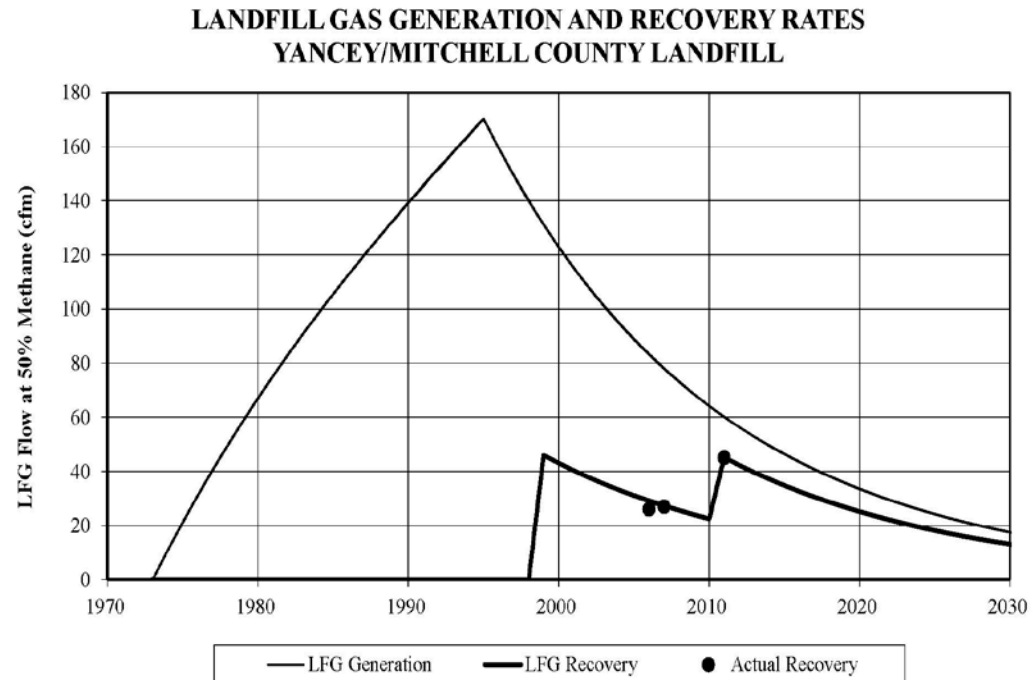
# Focus of Recent Upgrades

- Reduced dependency on declining LFG
- Improve GCCS operations and reliability
- Increased usage of wood waste
  - Pallets
  - Unadulterated wood waste
- Implementation of solar energy
  - Electric
  - Thermal
- Improve overall energy efficiency
- Greenhouse upgrades and new shade houses

# Landfill and Landfill Gas History

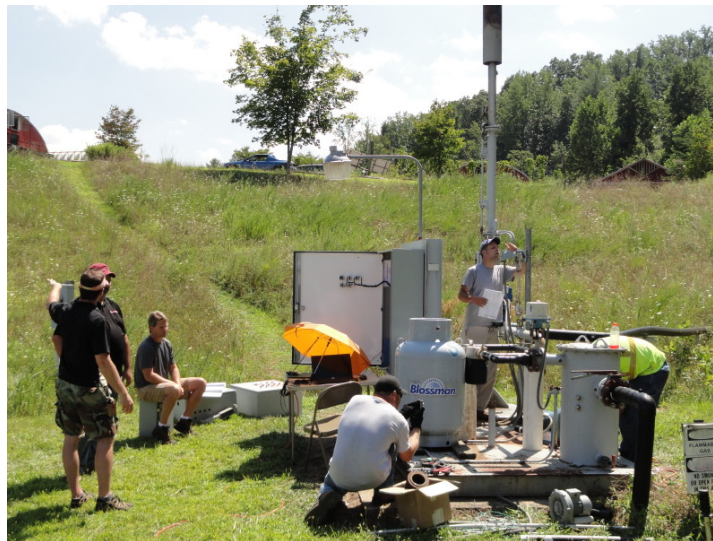
- Municipally-owned and operated landfill servicing Mitchell and Yancey Counties
- Opened 1973, closed in 1994
- ~385,000 tons of waste, 7 acres
- GCCS start-up in 1999
- 2011 GCCS improvements
  - New blower and control system
  - Two new remote wells
  - New well heads
  - Improved LFG recovery and system reliability

# Landfill Gas Modeling/Data



1/11/2012

# Landfill and Blower/Flare



# Solar Power

- Photovoltaic Cells
  - 5.52 kW of PV as “sell-all” to Progress Energy with RECs from NC GreenPower
  - 1.52 kW of PV as “net metering” for facility
- Thermal Solar
  - Designed new boiler house for extensive thermal solar development

# EXC - Solar PV



# Location for New Thermal Solar



# World's First Whole Pallet-Fired Kiln

- NC banned pallets from landfills
  - What to do with the growing pile of pallets?
- Wood-firing for pottery is an ancient method of firing
- New kiln burns ~ 130 pallets per firing
- Kiln designed to allow use of whole pallets
  - No need to break-down pallets before use



# Whole Pallet-Fired Kiln



# Glass Furnace Upgrade

- Glass furnace requires LFG
  - Not enough on-site PV generation potential to operate an electrical glass furnace
  - Wood does not reach high enough temperature
- Improve Efficiency
  - New furnace design
  - Waste heat recovered to for combustion air
  - Reduction in LFG demand by glass studio operations to 14 scfm of LFG

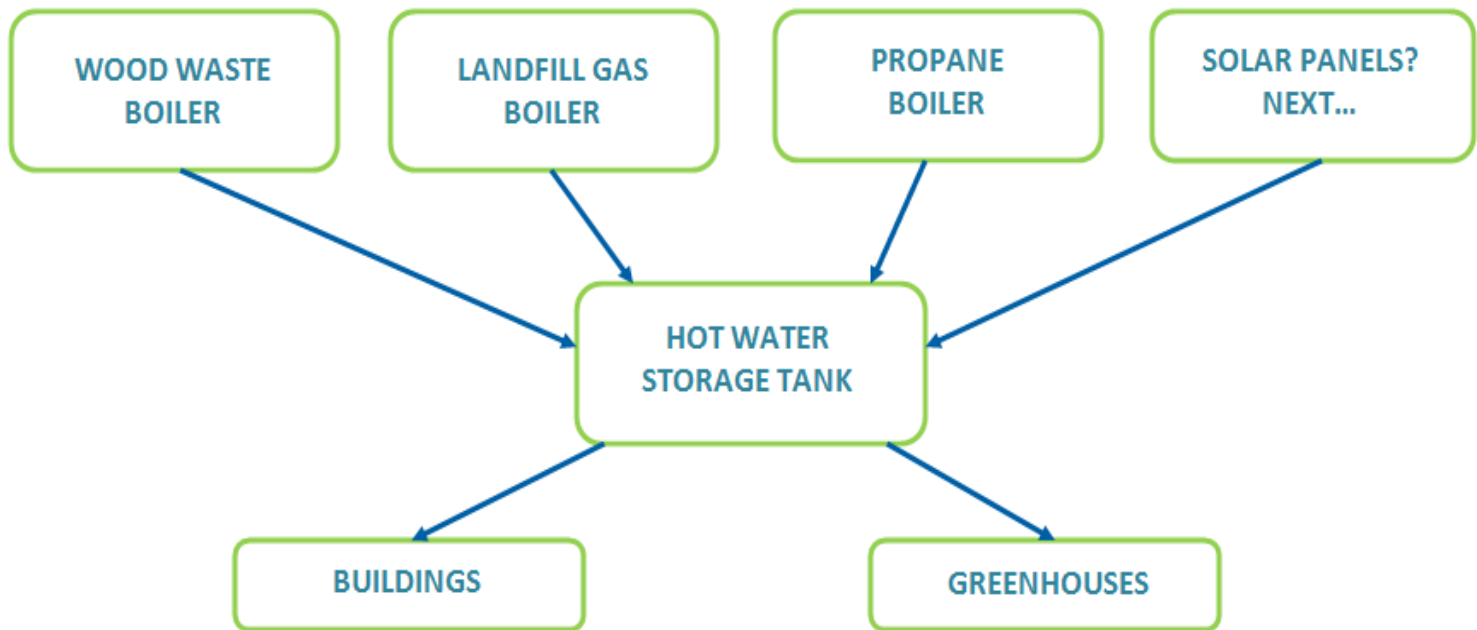
# Reconstructed Glass Furnace



# Energy Distribution System

- Hydronic heating system for buildings and greenhouses
- All thermal energy generation systems feed a 10,000 gallon insulated storage tank
- Thermal energy is dispatched via thermostat controls in each building and greenhouse

# Energy Distribution System



# Energy Distribution



# Wood-Waste Boiler

- Max-Ox Wood Gasification Boiler
- 0.9 MMBtu/hr heat input
- 165 tons of wood waste needed per heating season
- County receives and processes approximately 2,000 tons per year of wood waste
- Reduction in wood waste disposal costs
  - \$50/ton to haul, \$8/ton to grind and process

# Wood Waste for Heat





# LFG and Propane Boiler

- Old LFG boiler failed due to cracked heat exchanger
  - Power outage and hard freeze
- LFG still good option for heat
  - 1 MMBtu/hr rated ~ 33 scfm of LFG
- Propane boiler included for back-up heat when power fails
  - Can run off emergency generator
  - LFG not option as emergency generator would also have to run blower/flare

# LFG and Propane Boilers



# Other Conservation Upgrades

- Insulation of buildings
- Energy-efficient light bulbs
- Automated irrigation system to conserve water and reduce labor requirements
- Heat mats in greenhouses to reduce heating needs for germination room
- New, small tractor for moving wood wastes and pallets (as opposed to large loader at transfer station).

# Successes

- We're still here!
- Significant improvement in plant quality and sales
- Diversification of renewable energy resources
- Reduction in County's wood waste disposal costs
- Marked impact in local economy
  - New businesses (artists and local growers)
  - Green Tourism

# Challenges

- Maintaining board interest and enthusiasm
- Economic slowdown
- Grant funding
  - We're not the new thing in town!
  - Most grants are capital focused, so how do you pay the power bill?
  - Increased competition for grant funding
- Operating budget issues
  - Shut-down of the Avery County operation
  - Mothballed the hydroponic growing system, aquaculture project, and associated thermal solar heating unit
  - Maintaining staff

# Shameless Plug

- Consider Corporate Sponsorship
  - Various levels of support
  - High-end: Building Names
  - Medium: Company Name at Tour Station
  - Low-end: Company Logo on Website
- Think about EnergyXchange Products for Client Gifts and Office Décor!
- On-line Donations Accepted
  - [www.energyxchange.org](http://www.energyxchange.org)

# Acknowledgements

- Chris Gilbert – Altamont Environmental
  - Past President and Co-Author
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- Board of Directors
- Yancey County
- Mitchell County
- HandMade in America
- Mayland Community College
- NC Cooperative Extension
- Atomic Solar
- Progress Energy

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