

**Bio-Gen  
Energy  
Solutions**



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*Biomass Boiler  
Opportunities for  
Southeastern based  
Manufacturers*

**Why are we here today? A real life example.**

A North Carolina based agricultural  
manufacturer's annual boiler fuel cost:

2002: \$2,542,000 (@ \$5.00 DT @ 50K pph)

2008: \$5,211,000 (@ \$10.25 DT @ 50K pph)

Company has experienced a \$2.7M per  
year increase in annual fuel costs with no  
incremental increase in production!

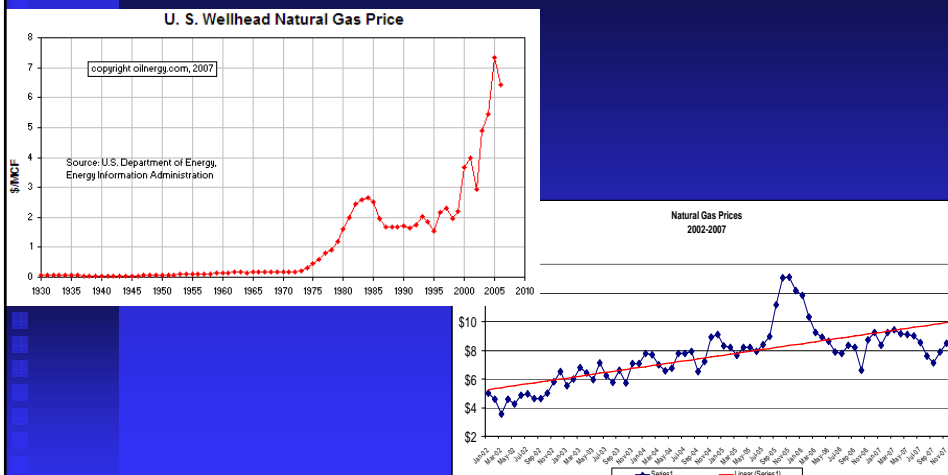
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## *Impact to the business with rapidly increasing, unpredictable fuel costs.*

- Inability to pass on multiple (any) price increases to customers
- Deteriorating margins as utility costs increase
- Inability to adequately budget manufacturing costs

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## *Is this a short-term issue?*



**Historical data suggests that it is not!**

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## How can industrial steam users respond?

By implementing a project that results in the installation of a solid fuel, biomass steam generation station.

- Annual Fuel savings in excess of 60%.
- IRR of 35% and payback typically less than 36 months.



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## How are such strong savings generated?

Simple a matter of cost per million Btu input!

Green Wood Chips

**\$2.67 per  
MMBtu.**

Assumes \$28 per ton, 48% moisture, avg. Btu per lb of 5,251



Natural Gas  
**\$10.50 per  
MMbtu**

Assumes 10.50 per DT Spot price Henry Hub

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## ***Biomass Fired Steam Plant***

- Biomass boilers are an established, reliable source of producing steam.
- There are 287 permitted biomass boilers in North Carolina.
- Successful history of providing dependable steam in forest related industries for more than 80 years.
- Existing biomass boilers range in size from a small 5,000 lb/hr up to 80,000 lb/hr.

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## ***Biomass includes a multitude of users; manufacturing, government and health institutions.***

- Corn Products: 2, 2400 HP steam generators, 160,000 lb steam co-generation plant producing 8.5 MW of electricity and process steam.
- New South Lumber: 1-1,200 HP, 2-600 HP and 1-400 HP, 95,000 lb of process steam per hour.
- Freightliner Corp: 1- 800 HP generating 27,000 lb of process steam per hour.
- Southern Correctional Institute: 1-250 HP generating 8,000 of process steam per hour.
- Dorothea Dix Hospital: 600 HP water tube boiler for steam heating

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## ***What is a Biomass Boiler and Furnace?***

- Biomass boiler utilizes woody biomass material for combustion that results in a pressure vessel producing steam.
- Package boilers and modular designs results in lower engineering and design costs.
- Standard pressure of 150 psi, 400 psi super-heater option for turbine generation possible.
- Extensive installed base with multiple customer sites being available for visitation.



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***Facility appears similar to other manufacturing structures on a typical industrial plant site.***



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***By utilizing “fuel bunkers”, facility minimizes height and safety issues.***



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***Resulting in a project that utilizes a renewable energy source for production of low cost steam.***



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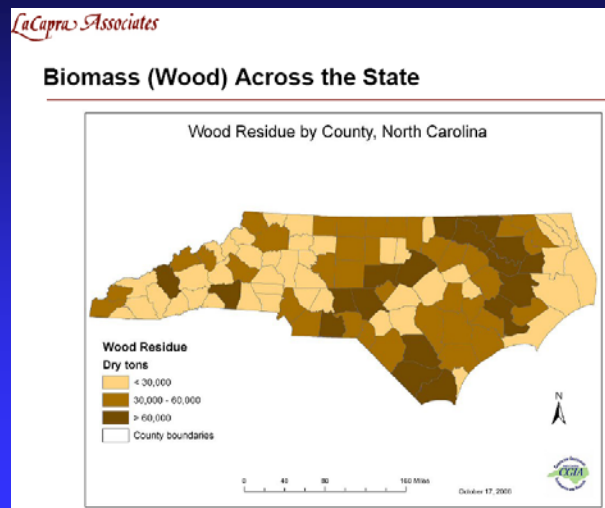
## ***Biomass Fuel availability?***

- Biomass fuel consists of “dirty chips”.
- Dirty chips are produced from logging residues (tops, limbs, etc.).
- Dirty refers to bark and leaves that are not suitable for use in paper-making.
- Market analysis from NC State and NC Dept. of Forestry supports adequate supply of biomass fuel going forward.



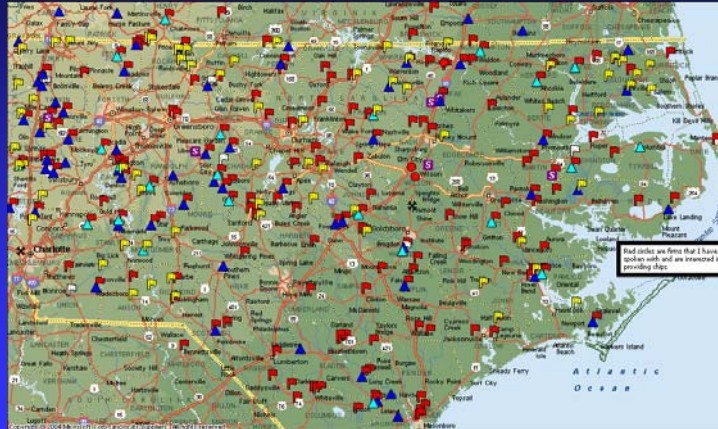
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***As indicated below, empirical studies support the availability of biomass material.***



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***A closer look at sources indicate adequate supplies to meet anticipated demand as well.***



***Bio-Gen proprietary database of loggers, recycling operations and forest related manufacturing centers.***

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### ***Biomass Usage Today.***

- Today, biomass power plants provide 2,420 MW of BASE LOAD power to the national power grid, and an additional 5,035 MW of power directly to industrial energy users without adding net new carbon emissions to the environment.
- Biomass power generation consumes more than 100 million tons of fuel per year, virtually all of which is material or residue material that requires some form of treatment and disposal.

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## ***Environment Conservatism***

Unlike the burning of fossil fuels such as natural gas or oil, which many believe to be upsetting our climate for the worst, burning a wood derived fuel releases no more harmful greenhouse gases than would be produced were the wood to simply rot on the forest floor. If we are responsible in the ways we select, cut, and burn the wood fuel, wood burning can actually be the correct choice for the environment too.

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## ***Governmental incentives impacting purchasing.***

### **North Carolina Renewable Tax Credit**

- North Carolina implemented a 35% tax credit for renewable energy projects effective in 2006.
- Tax credit is 35% of project costs.
- Maximum tax credit is \$2,500,000.
- Credit must be taken over a five year term (sunset provision in 2011).

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## ***Financing and Purchase Options.***

### **Steam Contract Option:**

*Bio-Gen Energy will purchase, install and maintain biomass steam generation unit and customer agrees to purchase steam. Minimum purchase quantity of 80% of capacity, over a 5 year contract term.*

### **Direct Purchase Option:**

*Direct purchase with Bio-Gen Energy providing Engineering, Procurement and Construction Services. Operating, maintaining and fuel supply responsibility of customer upon successful commissioning.*

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## ***Benefits of a steam contract proposal.***

- **Energy Cost Savings:** Typical 5 year contract has immediate savings impact, typically ranging from 8-15% savings on annual basis.
- **Energy Price Increase Protection:** Bio-Gen's 5 year energy contract eliminates exposure to rising and volatile energy prices.
- **Operational Risk:** As existing boilers are not decommissioned, operational risk is minimal while providing for 100% backup with state-of-the-art equipment.
- **Capital Expenditure:** No capital expenditures as Bio-Gen provides all capital for engineering, procurement, construction and operation of the biomass steam plant.
- **Balance Sheet Impact:** As this contract is not considered a capital item, a customers Return on Assets are positively impacted.

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In summary, it is our belief that the implementation of a biomass combustion system results in;

Substantial reduction in annual fuel costs for a utility that is required by industrial manufacturers in the southeast.

Enhanced environmental sustainability via the combustion of a renewable resource that is currently not being utilized.

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***Thank you for your time and consideration***

***Questions?***

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