

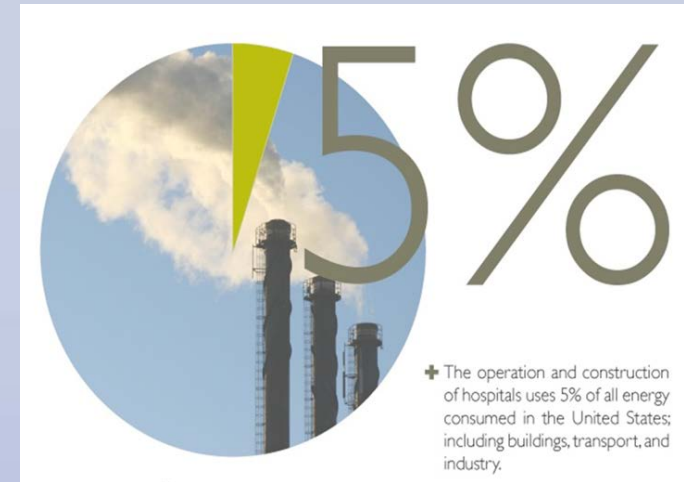
- **Non-For-Profit**
- **Physician-led organization**
- **Headquartered in La Crosse, Wisconsin**
- **Integrated Delivery System**
  - 6,500 employees
  - 770 providers / 500 medical staff
  - 50 facility locations
  - 325-bed tertiary medical center
- **Gundersen Medical Foundation**
  - Residency and Medical Education Programs
  - Research Programs
  - Children's Miracle Network



# Hospital Energy Use

*Hospitals use 836 trillion BTU's of energy annually and have more than 2.5 times the energy intensity and carbon dioxide emissions of commercial office buildings.*

*U. S. Dept. of Energy 2010*



- High ACH/OA
- Energy intensive equip.
- High filtration
- Pressure relationships
- Exhausted air
- 24/365 operations
- Data centers
- Food service
- Sterilization
- Laundry services
- 4000 patients, visitor & staff entering & leaving facility everyday

# Big Hairy Audacious Goal

## In 2008, Gundersen Set out to Achieve Energy Independence

Produce as much power as we consume from fossil fuel



We are the first known health system in the nation to offset 100% of our fossil fuel use with locally produced energy.

## GUNDERSEN REACHES ENERGY INDEPENDENCE



October 2014



## Gundersen Reaches Energy Independence

**First health system in nation to achieve this distinction**

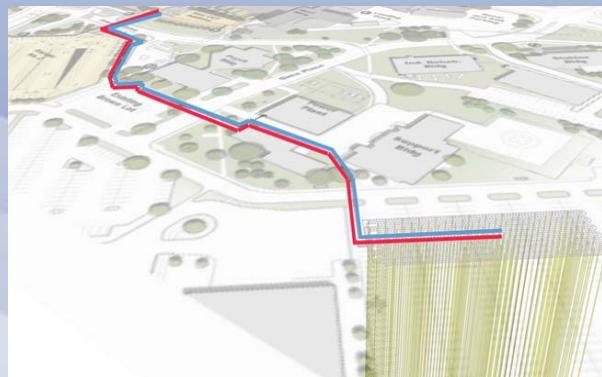
LA CROSSE WI – Gundersen Health System achieved its first day of energy independence, becoming the first hospital network in the nation to attain the distinction. On October 14, 2014 Gundersen produced more energy than the health system consumed.



# How Do We Do It?

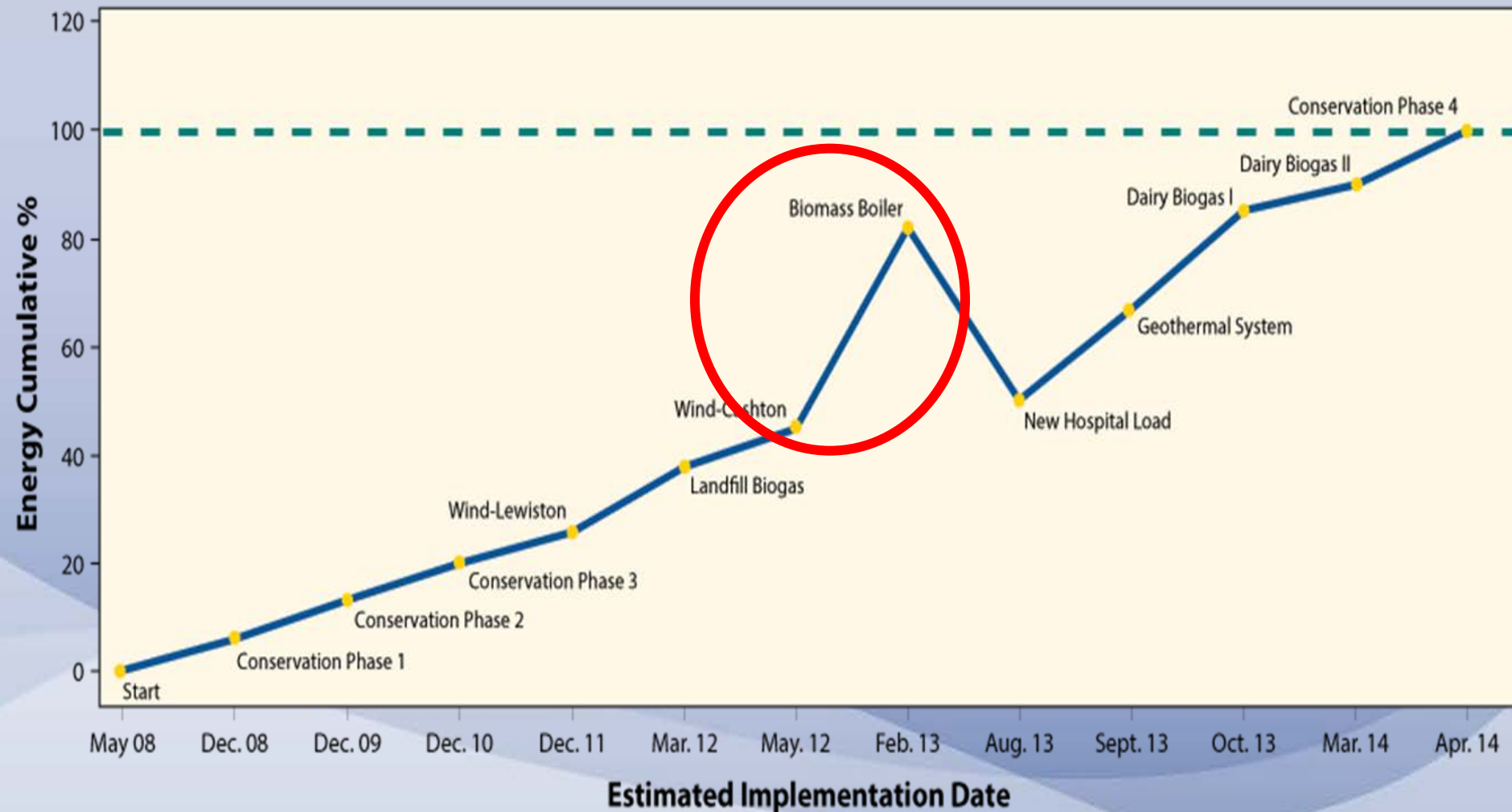


- **Energy Conservation**
- **Sustainable Design of New Facilities**
- **Renewable Energy**



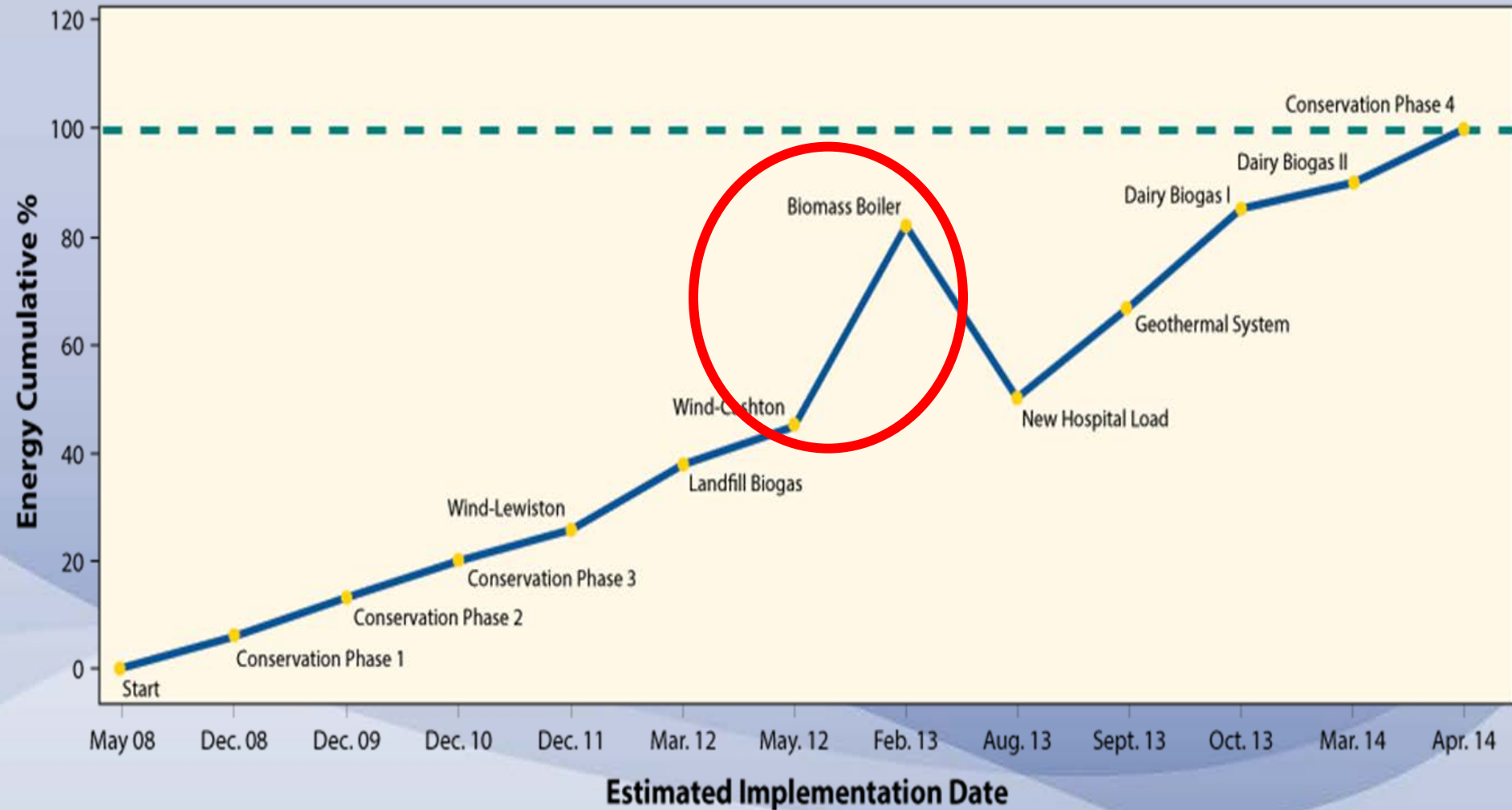
# Road to Independence

## Gundersen's Road to Energy Independence Percent Fossil Fuel Energy Use Offset



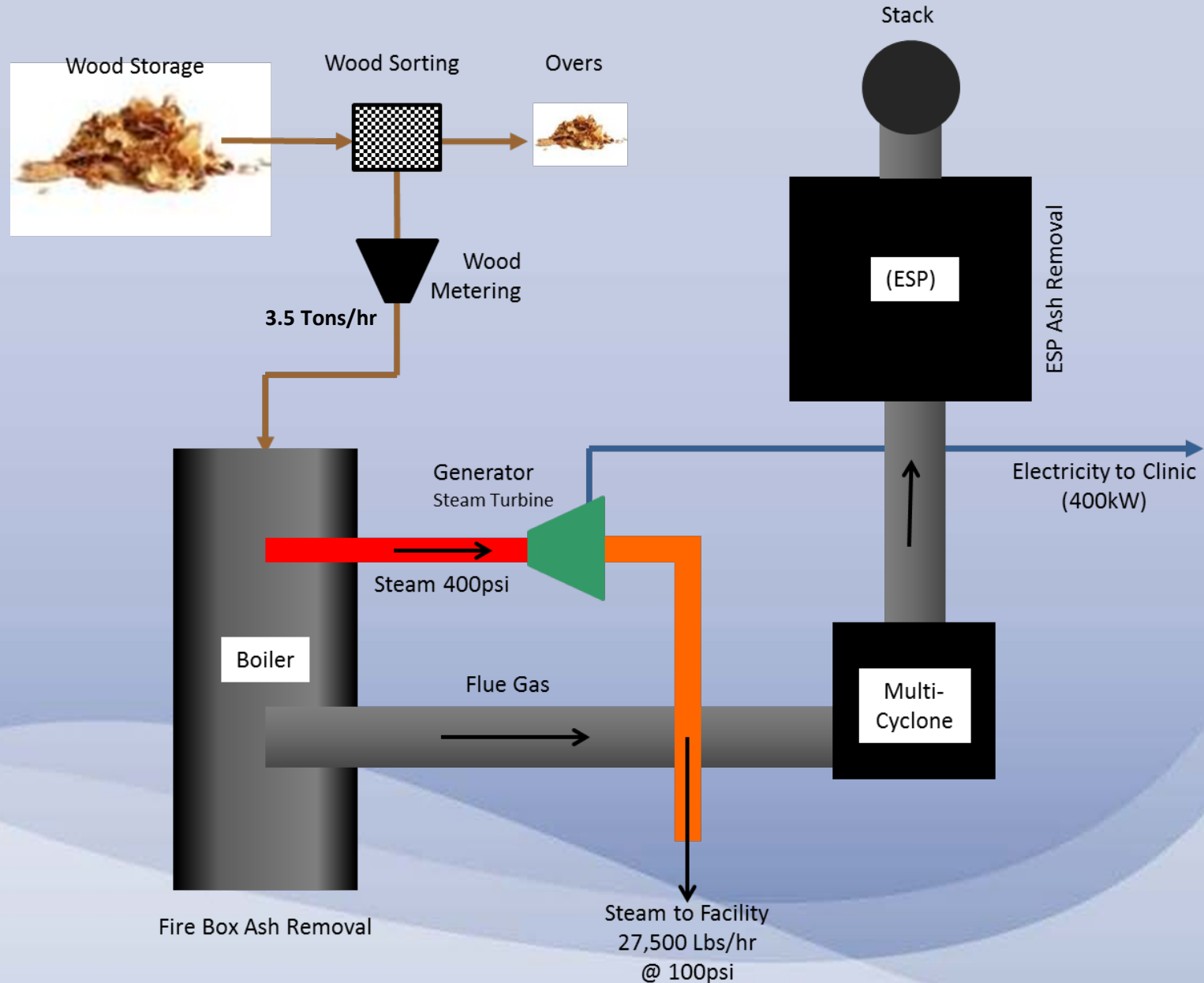
# Road to Independence

## Gundersen's Road to Energy Independence Percent Fossil Fuel Energy Use Offset





# Biomass CHP Process



## 2014 Utilization

- Uptime = 82%
- 1.3M Therms
- 16,300 tons
- 1.1M kWH

# Risk Assessment

Risk Item	Likelihood of Issue	Severity of Issue	Actions Recommended	Action Priority Score	Owner	Status
What is the potential Risk/Issue?	How likely is this issue to occur?	How large an impact would this issue cause?	What are the actions for reducing the occurrence of the Issue?		Who is responsible for this action item?	When will the action item be implemented?
Operators not accepting ownership after project complete	6	9	1) Daryl Brye to help with design and implementation. 2) Daryl visited other sites and manufacturing facility.	54	Eber/Moore	On-going
Obtaining DNR permitting delays project.	6	6	Work with symbiont to set up application. Meet with DNR periodically to answer questions early. Pay for expedited permitting	36	Eber	On-going
Lack of adequate space for on-site storage capacity for 2 weeks of fuel (30 semi-trailer loads)	6	6	Looking at indoor fuel storage and 18 hour walking floor. Total fuel storage of 4 days	36	Eber	On-Going
Exceed emissions permit for our site	6	6	1) Hired Symbiont to help with DNR permitting. 2) Will use ESP and Cyclonic emission control. 3) Last case resort will be ceramic baghouse	36	Eber	On-going
Reduced steam pressure during ash removal	9	3	Use East building to maintain pressure during shoulder months. Expected not to be issue during summer months. Use Murrays to maintain load during winter months. Set up controls to deal with issues.	27	Eber	On-going
Fuel source ceases to exist, goes out of business	3	9	Locked into a 3 year contract with multiple suppliers	27	Rich	Complete
Safety of operators around fuel/ash system	3	9	Design safety precautions around fuel handling/ash systems	27	Eber	Complete
Emissions / small particulate / smell is excessive	3	9	1) Specify proven emissions technology to handle particulates, NOX, SOX, CO that may come from burning 2) Specify fuel sources that reduce emissions concerns (more wood based w/o construction materials, ink, etc. or use pelletized fuel) 3) Visit hospitals with similar systems to understand successful countermeasures 4) Work closely and proactively with DNR to ensure compliance	27	Eber	On-going
Excessive or inflationary price of biomass fuel	3	6	Locked into a 3 year contract with multiple suppliers	18	Rich	Complete



# DNR Permitting

Item	Description	Frequency
<b>Capacity</b>		
Wood Usage	2500 ton/month averaged over 12 consecutive months	
Steam Usage	Max flow = 27,500 lbs/hr Averaged over a month	
<b>Operation</b>		
Shutdowns	Must record reason for every shutdown	
Startups	Not more than 3 starts per day	
Ash Removal	See Fugitive Dust Plan	
Malfunction & Abatement	See Malfunction & Abatement Plan	
Firebox Temp	Minimum Temp = 1250F	
Records	Must be kept 5 years	
Boiler Tune Up	Every 2 years. Not more than 25 months.	
<b>Fuel</b>		
Source	May only burn wood or Natural Gas: Permission to test other fuels with approval of DNR.	
<b>Particulate</b>		
Stack Test	See DNR Permit	Every 3 years
ESP	Amp & Volts continuously monitored	
	Inspection	Every 6 months
Opacity Monitor	Max = 27% opacity: Max Ave = 20% over 6 minutes: Does not apply during startup, shutdown, cleaning or malfunction.	
	Inspection/Calibration	Every 6 months
Multi-Clone	Delta P not to exceed = 3.5 inH2O	
	Inspection	Every 6 months
<b>Carbon Monoxide (CO)</b>		
CO Meter	Max = 600ppm	Once per shift
	Inspection/ Calibration	Once per year
<b>Flue Gas</b>		
Stack	Min height = 60ft	
	Max dia at outlet = 3 ft	
	No rain hat while running	
<b>Reporting</b>		
Compliance Reporting	Annual report to DNR	
Exceedence of Emmisions Limit	45 days	





**Good Wood  
= Good Operation  
= Happy Operators**

- 100% Virgin Wood
- Debarked
- 5 Local Sources Within 55 Miles
- Two Trucking Sources
- 3-Days Storage On Site
- Wood Deliveries Planning

**Instead of paying \$920,000 for Nat Gas  
Paid \$660,00 for Delivered Wood**

# Lessons Learned

- Involvement from operators key to success.
- Work closely with DNR on air permitting.
- Proactively communicate to community & staff.
- Listen to and challenge consultants.
- Make sure lines of construction responsibility are thought out and clear.
- Expect start up issues and growing pains.

