Bismarck's g3 Sustainability Series

Making the Community Livable

RECYCLING PROGRAM

How is Bismarck's Recycling Program Sustainable?

- Saves landfill air space
- Reuses materials already in production
- Revenue from sale of recycled materials helps offset the expense of recycling – Revenue of $138,800 in 2008
- Save the community money by lengthening the life of the landfill


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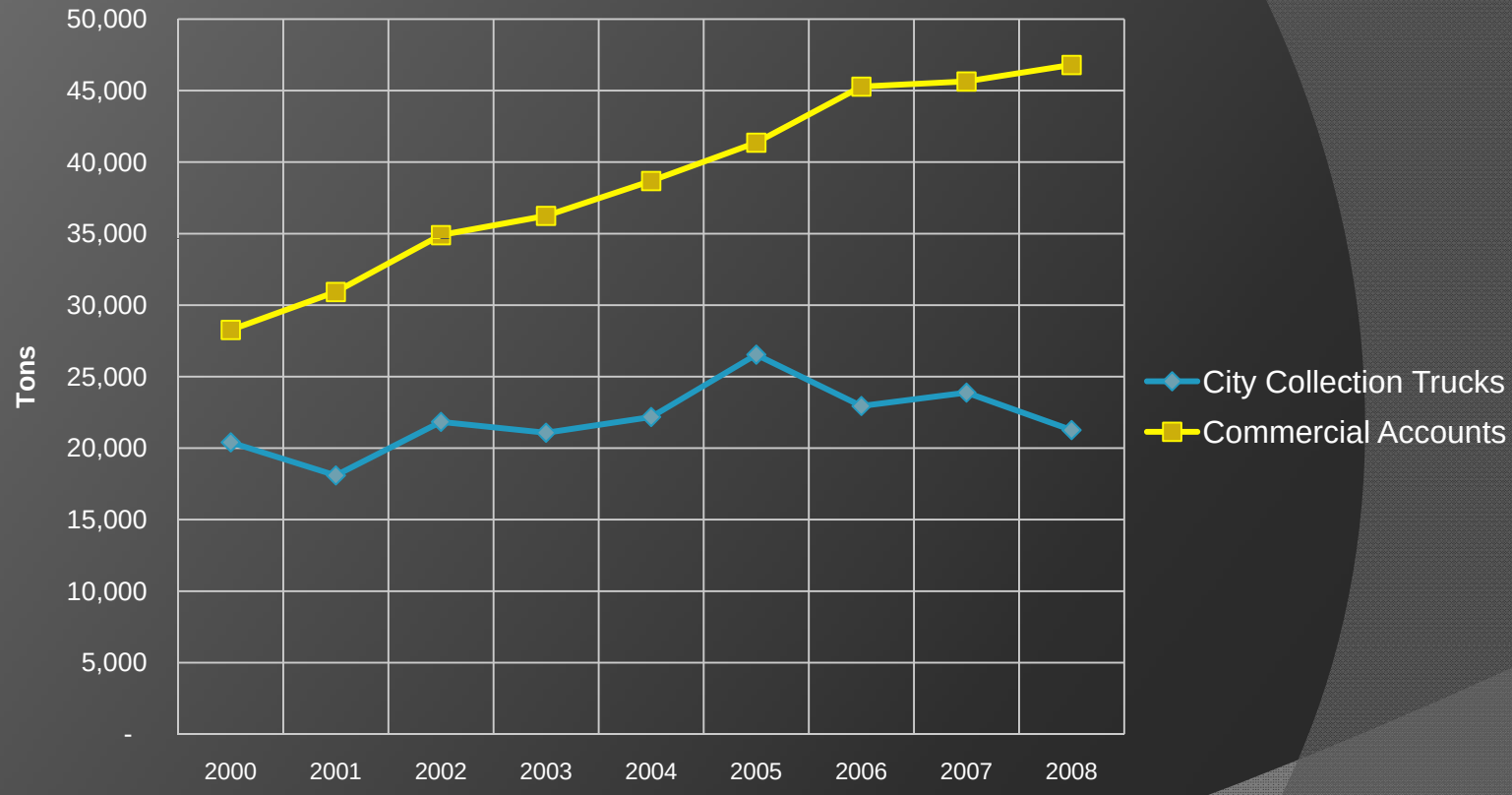
2497ft

City vs Commercial Garbage Collection



Bismarck Recycles and Reuses:

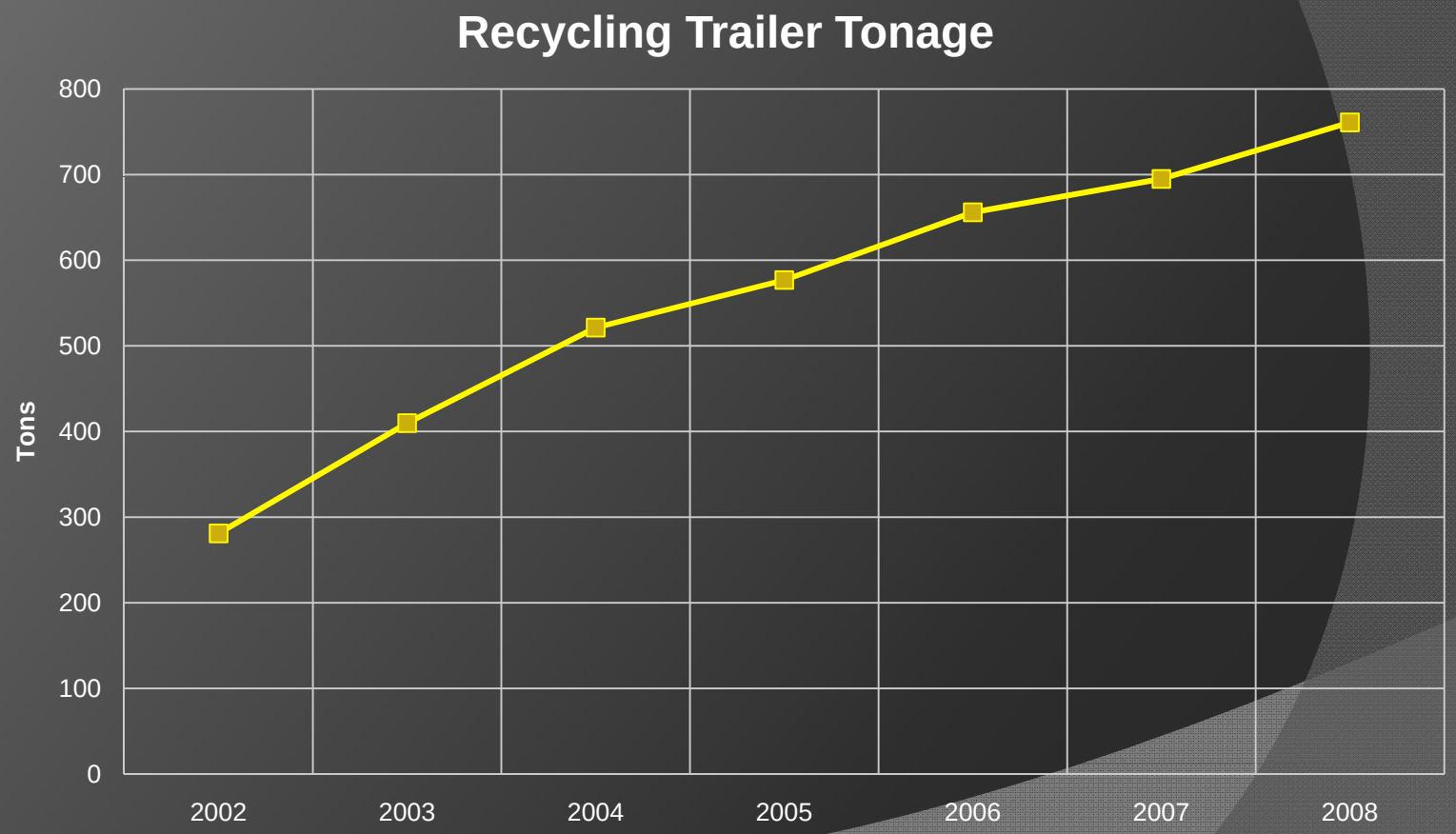
Landfill Recycling and Reuse:

Household Electronics
Household Hazardous Waste
Woody debris
Metal
Concrete
Asphalt
Tires
Appliances
White Office Paper

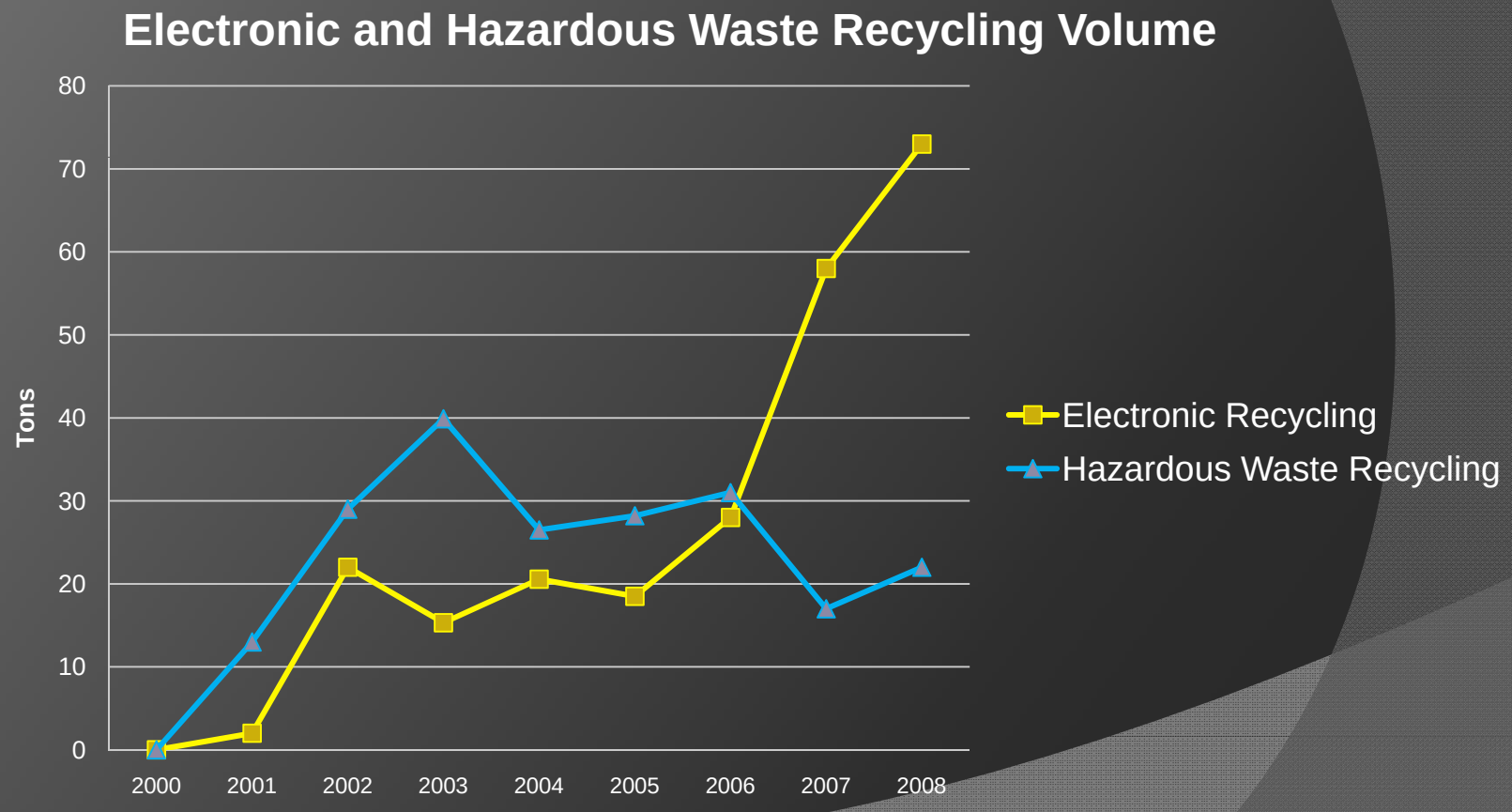
Residential Recycling Drop Off Trailers:

News Paper
Phone Books
Plastic bottles
Aluminum
Tin
Corrugated Cardboard
Grass Clippings

Bismarck's residential recycling trailers and grass dumpsters have kept over 20,820 tons of material from being landfilled.



The Household Hazardous Waste and Electronics Recycling program has kept over 443 tons of waste from entering the landfill.



Bismarck's residential drop off recycling trailer program has removed over 3,000,000 cubic feet of material from the landfill between 2004 - 2008. That's equal to an area the size of the Civic Center Exhibition hall, 60 feet deep in recycled materials.

Bismarck Passive Recycling Program Costs:

Recycling Trailers	= $ 6.55/household/year
Plastic Recycling Dumpsters	= $ 1.46/household/year
Grass/Leaf Dumpster	= $ 9.37/household/year
Net Cost of Passive Recycling Program	= $17.38/household/year

2008 Recycling trailer Expense	= $265,000
Revenue from sale of recycled material	= $138,800
Net Expense of Recycling in 2008	= $126,200

Value of landfill airspace saved by recycling = ?

Estimated commercial curbside recycling program= $36/household/year

Adding curbside recycling could result in an estimated 40% increase in our existing recycling volumes.

An estimated 1,200,000 cubic feet of landfill air space could have been saved with a curbside recycling program.

Bismarck's Recycling Task Force Recommendation to the City Commission:

1. Implement a two-sort curbside recycling program
2. Institute a volume based fee structure, or "Pay as You Throw" to encourage recycling
3. Create a recycling education program for residents
4. Contract with one or more commercial garbage haulers for the recycling program

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Making the Community Livable

BIOMASS BOILER PROJECT

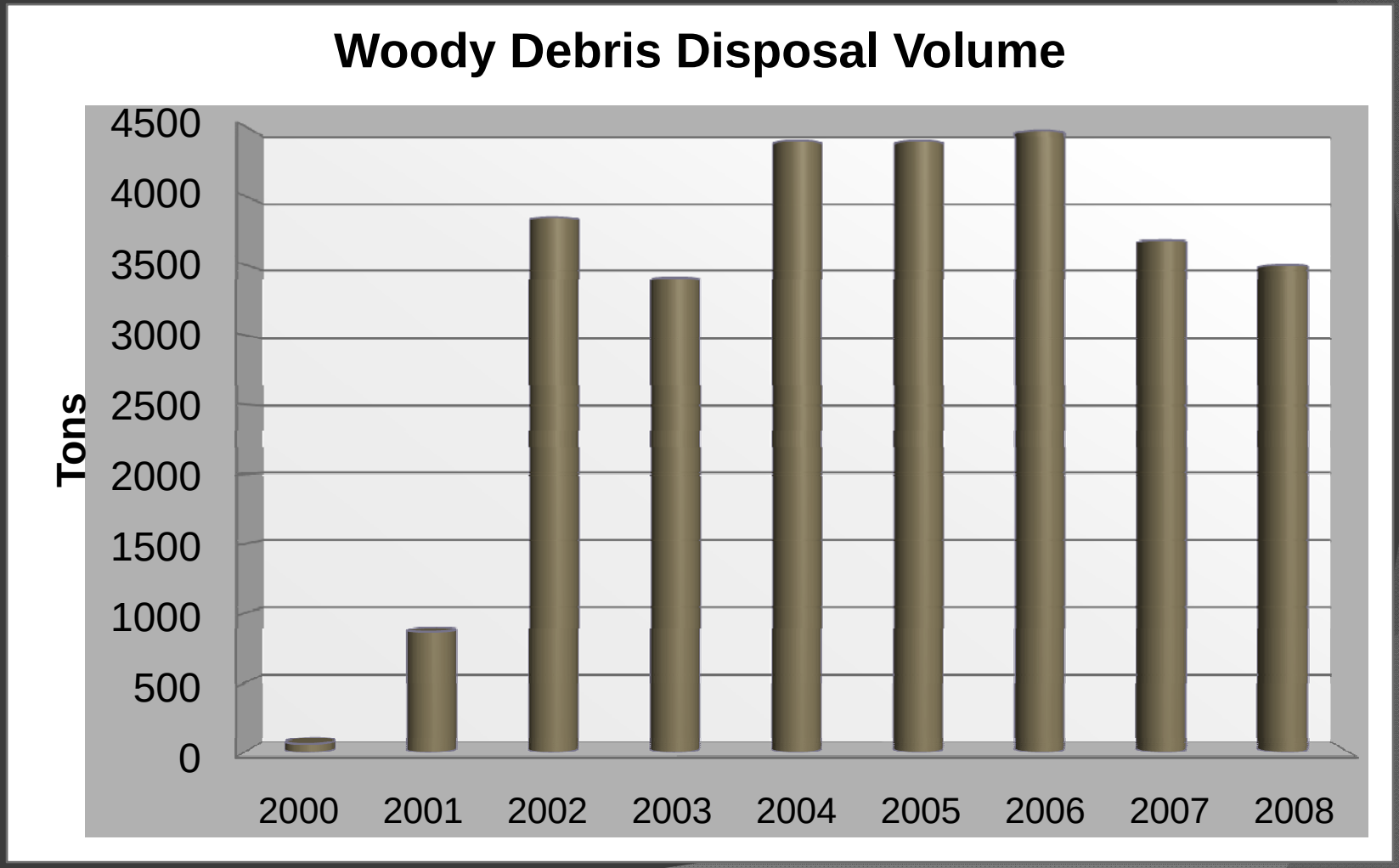
Fuels for Schools - North Dakota Forest Service Matching Grant

- $125,000 NDFS Grant
- King Coal Biomass Boiler cost $211,001

The biomass boiler heating system utilizes wood waste from the municipal landfill to heat a 9,000 square foot HHW and Electronics Recycling Center and the 9,000 square foot equipment storage facility.

The city receives approximately 4,000 tons of wood waste per year from commercial arborists, residential customers and City Forestry pruning and removal operations.

Wood Disposal Volumes at the Bismarck Landfill 2000 - 2008

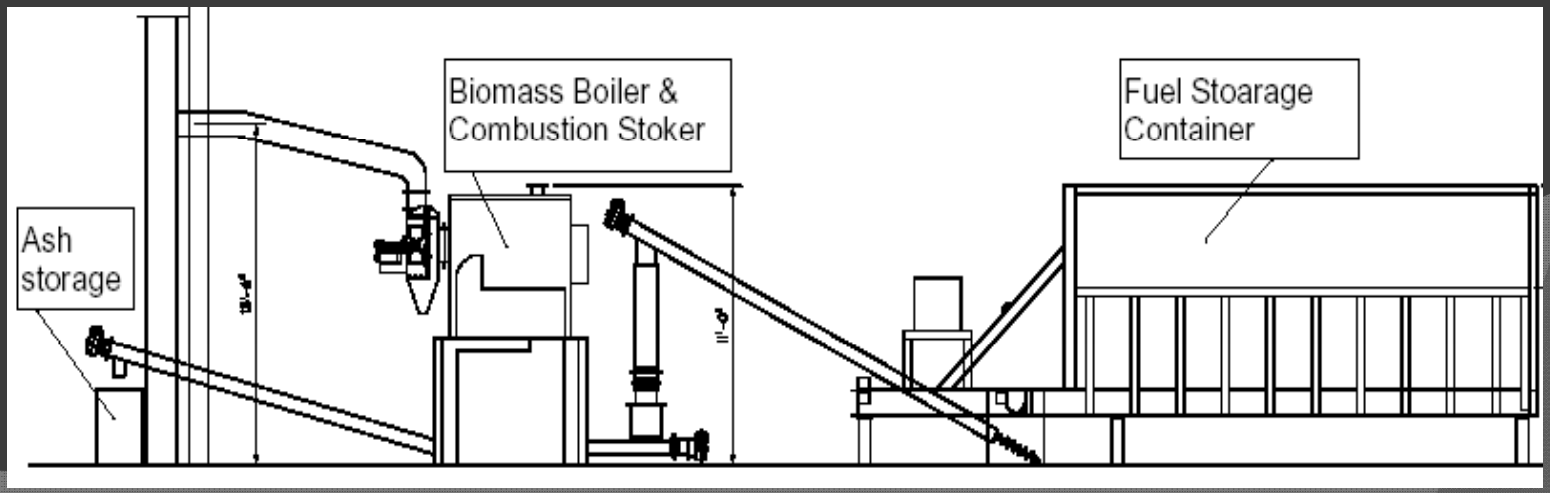


The cities biomass boiler utilizes approximately 300 tons (2,000 cubic yards) of wood waste per year to heat the two buildings. The wood chips are produced with the cities tub grinder.


2007 10 30

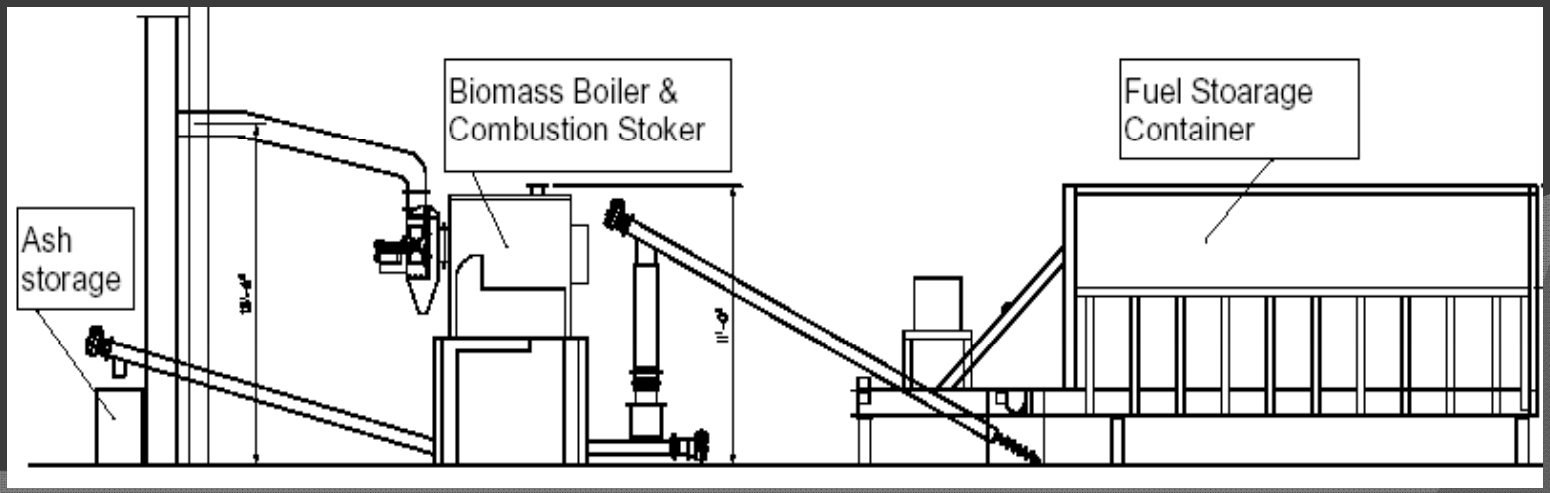

11/20/2007


2008 4 3


Biomass Boiler &
Combustion Stoker
Fuel Stoarage
Container
Ash
storage

Boiler fired up on Dec 2007

Fully Automated system with natural gas backup

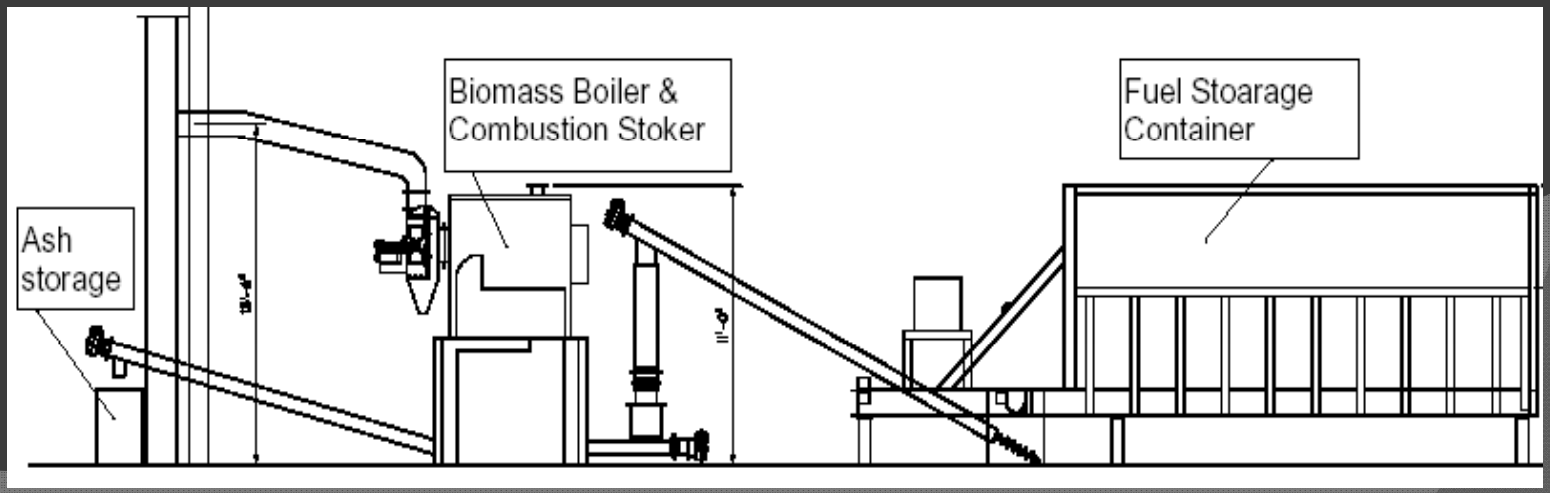


Biomass Boiler = 50 hp, 1.5 MBTU

$20,000 - $30,000 heat value savings per year

City double grind wood chips cost = $13.33/ton

Natural Gas would need to cost less than $1.57/DKT to be more economical than what the biomass costs the city to produce. Natural Gas prices were $7.21/DKT in June 2009 for commercial accounts in North Dakota.



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METHANE RECOVERY PROJECT

- Methane is a byproduct from organic material decomposition. Captured methane from capped landfill cells can be used as fuel for electric generators, furnaces, or flared off to qualify for carbon credits.
- Methane generation in landfills decreases continually over the years, with a life span of 15 – 25 years until the organic material breaks down completely.
- Bismarck is analyzing its methane production in the present landfill site. Analysis will be completed by the summer of 2010.