Biomass in Food and Energy Production

Heating the Midwest Conference
Carlton, MN
April 25th-26th, 2013
How it Began:

In October 2008, an inter-disciplinary Project Team of local stakeholders and regional renewable energy experts began discussing the possibility of transforming the Silver Bay Business Park into an Eco-Industrial Business Park.
Sustainable Industrial Development

- A Minnesota Pollution Control Agency grant for "Sustainable Industrial Development" was applied for and received in June 2009. The MPCA Grant assesses two elements. First, the ability to use wind, biomass and biodiesel to generate heat and power to make the park self-sustainable using renewable energy. Second, using industrial ecology and industrial clustering to achieve the ideology of "zero waste - zero emissions".
2 Concepts

• Industrial ecology is achieved by designing clusters of businesses and industries to network with each so that one industry's waste becomes another nearby industry's feedstock.

• The goal of the park is to be self sustainable, i.e., off the grid and powered by renewable energy production systems that are locally owned. It is strongly believed that the park is an ideal location for integrating three types of renewable energy (wind, biomass, biodiesel).
Cluster Based Economic Development

- Cluster based economic development refers to similar manufacturing processes or infrastructure needs, related feedstocks or resources that are typically positioned in a defined geographical area.
  - Reduces waste and pollution
  - Provides for resource conservation
  - Reduces transportation costs
  - Greater efficiency within related manufacturing processes.
Clusters Identified and Placed

- Energy Cluster
- Office Cluster
- Education Cluster
- Retail Cluster
- Tourism Cluster
- Biofuel – Food Cluster
Economic Development Tool

Businesses will be attracted to locate within the park as they will benefit from predictable renewable, sustainable energy costs. In addition, the need for fossil fuel consumption will be eliminated, which ultimately results in reductions in greenhouse gas emission, reductions in carbon footprint and reductions in waste.
The Victus System

1. Water starts in one 3000 gallon fish tank. From a central pressure driven, water moves to the airen filter. The airen filter removes suspended solids that accumulate in the fish tanks.

2. Once the suspended solids are removed, the water flows to three intermediate tanks. These tanks contain PH and water treatment chemicals.

3. From the three tanks the flow converges into the mixing tank. The mixing tank ensures the nutrients are evenly mixed before feeding to the plants.

4. Once mixed, the water flows to the four growth tanks where the plants and algae absorb the nutrients, and the water for the return to the fish.

5. The water is continuously recomposed. It will take each drop of water approximately three hours to make the full trip.
PHASE 2 QUALIFIED
U.S. Environmental Protection Agency
Hydronic Heater Program

Phase 2 Qualified models are cleaner and pollute less than those models that have not met this emission level. Exposure to smoke has been associated with respiratory illness and other health problems. Models that have lower smoke emissions may reduce your risk.

For more information go to www.epa.gov/burnwise

HYDRONIC HEATERS
SMOKE EMISSIONS RANGE

Lower Emissions                   Higher Emissions
0                                   2.0

0.04 EPA PHASE 2 EMISSIONS LEVEL

0.04

This model.

Heaters with lower emissions produce less smoke when installed and operated properly.

MANUFACTURER:
Northwest Manufacturing, Inc. (Woodmaster)

MODEL NUMBER:
Flex Fuel 60KW indoor/indoor

B-HOUR OUTPUT RATING:
219.831 BTU/HR (Black Medium)

6-HOUR AVERAGE EFFICIENCY:
99% (using higher heating value)
99% (using lower heating value)

PARTICLE EMISSIONS:
2.6 GRAMS/HR (average)
4.6 GRAMS/HR (maximum test result)
0.04 LBS/MILLION BTU INPUT
0.04 LBS/MILLION BTU OUTPUT
0.04 GRAMS/HR/10,000 BTU OUTPUT

EPA has determined, based on testing by an accredited independent laboratory, that this model qualifies at the Phase 2 emissions level for U.S. EPA heavy-duty program.