

Cornell Cooperative Extension *CCE St. Lawrence County*

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See more at: <http://ccetompkins.org/energy/biomass-energy/cce-st-lawrence-county#sthash.MctxG2IX.dpuf>

CCE of St. Lawrence County began project in **2009** aiming to demonstrate on-site grass pellet production. It was funded mostly by NYSERDA. Several species of grass (including switchgrass, reed canarygrass, timothy, and orchardgrass), in addition to crop byproducts such as soy bean and corn stover, are being grown at the CCE Learning Farm in Canton, NY and being harvested in large round bales. The hay is first reduced in size by a New Holland Model 777 field chopper, then chopped in a hammer mill, fed into an extruder (Pellet Pros Model 650 with a 15 HP self-contained diesel engine), and used for testing and field demonstration in a 200,000 BTU Superior Biomass corn and pellet-burning warm air furnace and a Harmon PC 45 corn parlor-type stove. Both pieces of equipment will be in a publicly accessible building at the Learning Farm. Only commercially available equipment will be used at every stage.

Hay will initially have about a 20% moisture content, which will be reduced to about 12%, simply by the heat created by friction in the pressing process. According to the report by Brent Buchanan, Agriculture Issue Leader at CCE St. Lawrence County (p: 315-379-9192 x 231, e: bab22@cornell.edu), stoves designed for corn work better for grass than those designed for wood. He also reports that research by Dr. Jerry Cherney has concluded that some modification to feeding and/or ash removal mechanisms is necessary, or else grass pellets may be mixed with the unit's intended type of pellets for proper functioning. Observation and data collection will help CCE (assisted by SUNY Canton) determine what modifications would be necessary to burn grass pellets in commercially available appliances, as no grass-burning stoves are known to be available in North America. Testing is to include particulates in the exhaust, combustion temperatures, exhaust temperatures, and general combustion efficiencies.

Buchanan reports that grass feedstock for pellet production can be purchased for about \$60 per ton. Grass pellets produce 8,000 BTU per pound, compared to 8,700 BTU per pound of wood pellets. Corn, though cheaper than wood pellets (\$167 a ton as compared to \$220-239 a ton),

produces only about 7,000 BTU per pound-12.5% less heat per pound than grass pellets.

In April 2009 a Harmon PC Corn/Pellet Stove was purchased, delivered, installed, and placed in service at the Canton facility. It has been used to burn corn, wood pellets, grass and grass-mix pellets (both from their own pelleting operation and commercial sources). Additionally, a Superior Biomass Double Burner 200,000 BTU warm air pellet furnace was purchased, and has been installed in CCE's Martin Farm Classroom facility in Canton. It includes a 16 foot stainless steel multiwalled insulated chimney pipe, and was modified at the factory to accommodate grass pellet combustion.

A PelletPros Model PP650-D portable pellet mill was purchased and mounted to a utility trailer they had modified with equipment anchors, pellet drying screen racks, and tool holders. The mill is advertised to be able to produce 250-650 pounds of pellets per hour. A used hammermill was also purchased and modified to be powered by a modern tractor, in addition to modifications that permit it to produce ¼ inch diameter pellets. The hammermill can be attached to the trailer as well, for increased portability. Tools have been assembled specifically to maintain and repair the four pieces of equipment.

The equipment has been used to make 100% grass pellets (from reed canarygrass, switchgrass, timothy, and mixed grasses), as well as pellets containing corn starch, commercial pellet binder, vegetable oil, dried distiller grains, waxy cardboard, and shredded office paper.

updated 8/09

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