Energy-Efficient Wool Scouring Facility

A Project Designed to Support the NY Sheep Industry by Building a Facility that Scours Wool with Energy Efficiency and Environmental Responsibility

Project Manager

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Executive Summary

The concept of an energy-efficient scouring plant, particularly one that has tourism features associated with it, is a thoroughly viable concept. Ours will open at an operational level below what we had anticipated, but will achieve our original objectives – of providing an energy-efficient, small-scale scouring facility for NY sheep growers, and secondly, returning to them thereby, the potential of higher incomes from their agricultural activities.

Ours was a particularly ambitious undertaking – that of creating an environmentally sound, totally integrated washing facility for raw wool – one that could produce one or more retail wool products, while using what is universally referred to as "waste" from the scouring in a closed loop to produce energy as well as a beneficial by-product. We have achieved that goal, albeit at a somewhat modified scale. Originally, we had contemplated a processing scale of 500/lb. of wool per day; currently we can scour 100-200, but could, with additional financing, duplicate the washing vessel to double that amount. As additional funds are sourced, we believe the scale can be enlarged incrementally and the retail product array expanded.

The "Greenfleece" facility at Hoyt Farm Nursery opened at the end of August. It provides washing services for the wool of sheep growers who want to retain ownership of their wool, but have it washed or "scoured" of its hay, manure, and lanolin. Greenfleece will also buy wool to produce felted-wool weed barrier as demand for that product develops. The weed barrier is unique because it is processed in accordance with methods that meet proposed standards for "organic" certification. Secondly, it is biodegradable, easy to handle, and characterized by its breathable, water-retaining capacity. As a result, it is very well adapted to use on small, certified-organic berry or vegetable farms in NY State.

Water used for washing will be collected from rainfall, the organic wastes from the wool used to produce methane for fueling the plant, the filtered water used to grow a horticultural crop, and the then "polished" water, recycled for additional wool cleaning. Taken as a whole, this project provides several "firsts" for the State:

- The first and only small scale scouring plant for wool in NY
- The first and only scouring plant designed to scour by methods consistent with organic certification

- The first and only scouring plant to use wool wastes to generate energy
- The first and only plant to produce wool weed barrier from local growers
- And the first to use the organic material washed out of the wool as an asset in a horticultural business, rather that viewing it as an undesirable waste product requiring disposal.

Photographs

Figure 1.
Pond built to collect rainwater for scouring process.

Figure 2.
Solar panels on roof of barn, which increase the temperature in the loft, helping to dry wet wool and to heat the downstairs production area in winter.

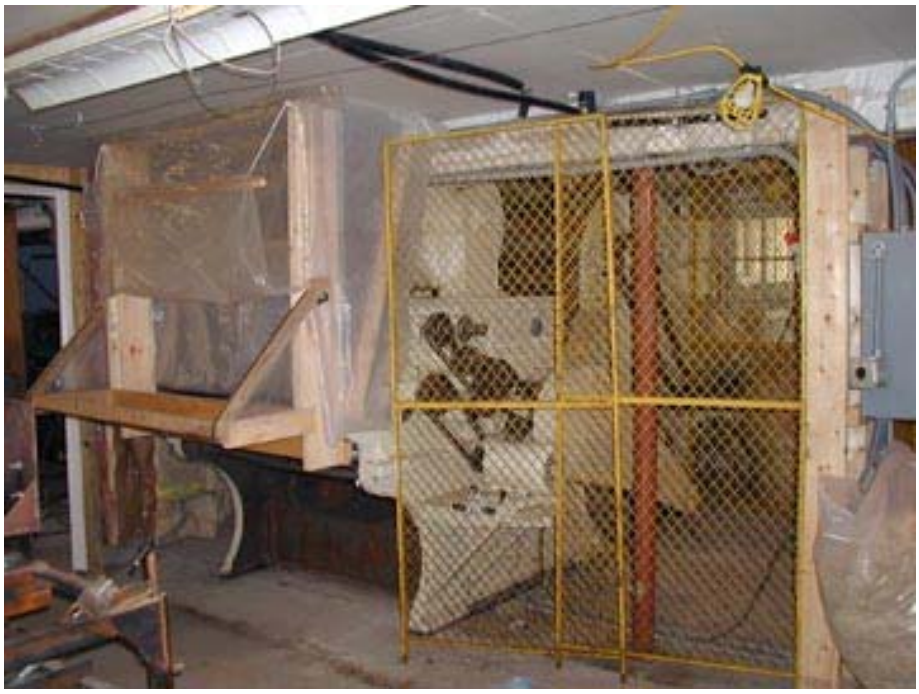

Figure 3..
Side view of picker exit, where wool is collected after it has been "picked" clean of any vegetable matter that remained after washing.

Figure 4.
Side view of felting machine with a 2-foot width of felted wool weed barrier on equipment.

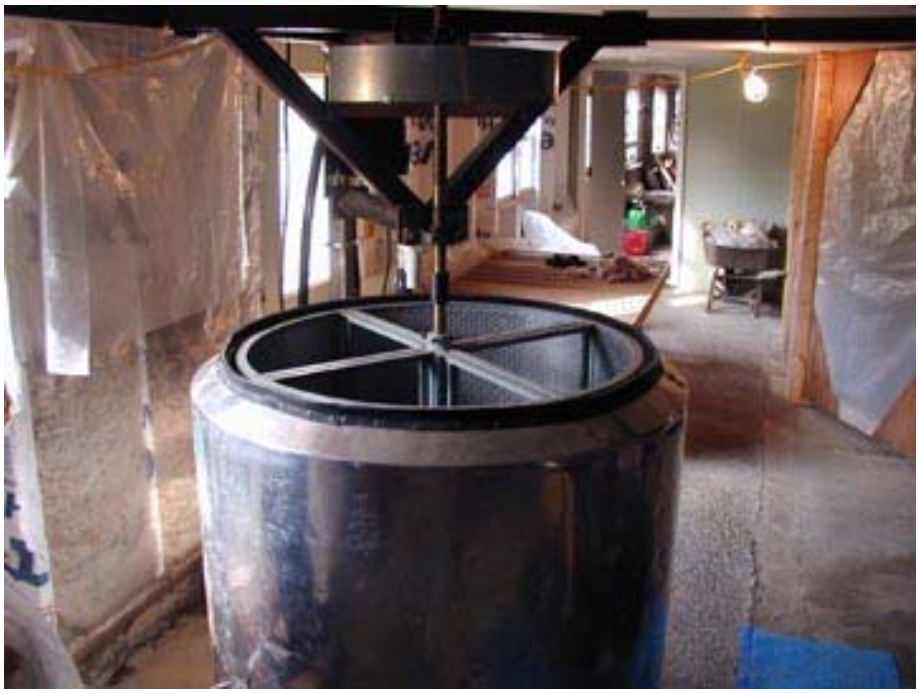

Figure 5.
Customized scouring vessel made from an old pasteurizer. Separate sections can segregate wool of different growers, and still allow a single washing to conserve energy and water.

Figure 6. The drying room where felt is hung to dry if it retains too much water after being felted.

Figure 7.
The drying tower on the left, where washed wool is blown dry. On the right is the air duct used to bring excess heat from the upstairs loft down to the production area.

Figure 8.
The digester built to take organic waste from the wool and create methane.

Figure 9.
The vacuum equipment for the picker, in the upstairs loft of the barn.

Figure 10.
The greenhouse adjacent to the barn, where plants are grown with water from the scouring process. The nursery plants benefits from the "organic waste" eliminated from wool. The center area grows wetland plants (mostly cattails) whose roots are used to "polish" water to its original level of cleanliness, at which point it is recycled to the pond for use in additional scouring.

Figure 11.
An exterior view of the greenhouse, with the barn and its solar roof panel in the background.

Figure 12. Clean wool about to run under the water jets and into the felting machines, where it is vibrated and rubbed together, causing the separate fibers to cling together in a felted mat.

Figure 13.
A roll of felted weed barrier at the finished end of the felting machine.