UNH Organic Dairy Research Farm Composting System
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Purpose: An experimental facility designed to test management systems for the efficient composting of farm wastes with energy capture, improved manure management, and water quality protection.

Partners: Agrilab Technologies, LLC, Waste Not Resource Solutions (Brian Jerose, Consultant), the New Hampshire Agricultural Experiment Station, and the USDA Sustainable Agriculture Research and Education (SARE) program.

Justification: An existing system at Diamond Hill Farm in Vermont has proven cost-effective, generating over $10,000 in usable heat plus additional revenues through sales of high-value compost. Despite the multi-year success of this operation, only two other systems have been built. As part of our Land Grant mission UNH has, with donor support, constructed a facility that will allow testing of the components and processes that will optimize energy capture and usage, while minimizing overall environmental impact. The new facility is supported by grants from the USDA-SARE program, and the New Hampshire Agricultural Experiment Station which provide materials and student support for the projects.

Overview: The facility is housed in a 110’ by 55’ pole barn structure with a concrete floor in which PVC pipes with drilled holes are embedded. A fan system draws air slowly through composting bedding/manure mixtures. Air movement is just enough to ensure the pile remains aerobic.

Rapid aerobic decomposition of the mixture produces temperatures of up to 170 degrees (F) within the pile. The air drawn through the pile is near this temperature and at almost 100% humidity. This hot, moist air passes over an isobar system that transfers the heat to a bulk hot water tank. Hot water in the tank can then be used for space heating, pre-heating hot water, and other systems.

Effluent air from the system is warm (~120°F), and enriched in CO₂ and ammonia. A system that will use this effluent to heat and fertilize a greenhouse is being planned.