

GREEN IS THE COLOR OF NEW ISU FACILITIES

By Ed Adcock

BUILDING BY BUILDING, A SPIRIT OF ENVIRONMENTAL stewardship is spreading across Iowa State. “The college will continue to find ways to reduce energy consumption, recycle materials and use green products in its existing and new buildings,” says Joe Colletti, senior associate dean. “We’re dedicated to sustaining the environment, the economy and our communities while seeking science-based solutions to the world’s growing food, feed, fiber and biofuel demand.”

BioCentury Research Farm

Larry Johnson, director of the college’s new BioCentury Research Farm, said it made perfect sense using green technologies to construct the farm’s bioprocessing facility.

“This is the country’s first facility that will promote sustainability by researching the production and processing of the next generation of biorenewable crops and products. It is consistent that the building leaves a small environmental footprint,” he says.



Photo: Bob Elbert

About 1,000 acres of cropland are devoted to the BioCentury Research Farm. The buildings include the biomass processing facility; a harvest, storage and transportation facility; a biomass drying, grinding and storage building; and an equipment storage building.

Mark Huss, who oversaw the facility’s design and construction for ISU, says recycled concrete, steel and other materials were used from floor coverings to ceiling tiles. Higher tech touches include geothermal heating and cooling, efficient pumps and equipment, energy recovery units and occupancy sensors and daylight sensors that automatically control artificial lighting.

Biorenewables Resource Laboratory

A similar vision went into designing the Biorenewables

Resource Laboratory, now under construction on campus. The new facility will be built with sustainable products and building materials, optimized energy performance, rainwater recovery and native plants in the landscape, including biomass crops like miscanthus and switchgrass.

“It will comply with guidelines adopted by the Leadership in Energy and Environmental Design (LEED®) and may earn a gold LEED® rating, the second highest among four ratings given by the U.S. Green Building Council,” says Jonathan Harvey, project manager. The gold rating is based on points awarded in site development, water savings, energy efficiency, materials and resource selection, indoor environmental quality and innovation in design.

Seed Science Center

The Seed Science Center addition, which was finished last year, included an exterior metal sunshade installed between the addition and the existing building to block direct sun in the summer months while allowing winter rays to enter the building. Designers also replaced air-cooled condenser units in its growth chambers with a much more efficient water-cooled system.

Paper Stone, a resinous, compressed, recycled paper product, was used for countertops, millwork trim and bench seats. A white roof membrane was installed to reflect solar radiation and reduce cooling loads on the mechanical system.

Dairy Farm

Some of the new Dairy Farm south of campus is sitting on 60,000 tons of crushed concrete recycled from the demolition of Knapp and Storms halls at the Towers Residence Association. Rubble from the old dormitories was used in the farm’s parking areas, drives and building foundations.

Other recycled material at the farm includes steel, floor coverings, ceiling tiles and furnishings. Geothermal heating and cooling in the milking center, heat recovery from the milk coolers, high efficient pumps and equipment and natural ventilation in animal buildings were some of the green innovations built into the farm.

Borlaug Learning Center

Soy-based foam insulation is one of the features of the new Borlaug Learning Center, which opened last September at the Northeast Research and Demonstration Farm near Nashua. Other green elements include a ground-source geothermal system, carpet tiles made from recycled materials, a rainwater collection system and the use of nontoxic and environmentally friendly paints and wood finishes. ⑤

NEW COMPOSTING FACILITY TURNS WASTE INTO WANT

By Susan Thompson

WASTE NOT, WANT NOT HAS TAKEN ON A NEW meaning with the opening of a composting facility at Iowa State University. Now waste generated across the university is turned into a valuable ‘want’ to be used in a variety of ways.

The facility, which can handle more than 10,000 tons of compost-ready wastes annually, was planned as part of the new ISU Dairy Farm to handle solid dairy manure in an environmentally responsible manner. While the majority of product comes from the nearby Dairy Farm, there are many other sources.

“Iowa State wants to be a leader in sustainability, and this compost facility contributes to that goal,” says Mark Honeyman, professor of animal science and coordinator of Iowa State’s research farms. “Composting is a great way to demonstrate an alternative use for manure and the end result is an organic, usable product on campus.”

The compost facility was constructed west of the Dairy Farm in late 2008 and was fully operational by fall 2009.

To reduce the risk of runoff and leaching, all operations occur inside seven large hoop barns. Products coming into the compost facility include manure and bedding from ISU farms, yard waste, greenhouse waste, biomass research waste and food waste from campus dining facilities.

The process begins when nitrogen-rich manure is mixed with carbon-rich campus yard waste, cornstalks or livestock bedding to make windrows. The proper mix balances carbon and nitrogen at the correct moisture and density to promote aerobic microbial decomposition, which reduces the volume of materials by about half over an eight-week period.

The windrows are turned and aerated periodically to promote composting and minimize odor. “A well-run composting facility should not generate odor,” Honeyman says. “This is an alternative to field application of manure and superior to stockpiling manure and other waste materials during times when field application isn’t possible because of weather conditions.”

The facility generates about 100 tons of compost each week. Finished compost is cured and stored until ready to be used. The compost is blended with sand and soil to create amended soil for landscaping around new construction projects, existing buildings and planting beds across campus, including Reiman Gardens.

Compost is available to researchers for amending soil structure in horticultural and agronomic plots. It also is being tested as bedding for ISU dairy cows.

The compost facility is a self-supporting service unit. All material brought to the facility is weighed on an electronic scale. Compost leaving the site is weighed and charged to the department using the material.

“We are working hard to make the project not only resource sustainable but also budget sustainable,” says Tim Goode, compost facility superintendent. “We have structured the fees to be advantageous for the departments supplying material, as well as those using the finished product.”

Only waste material generated by the university is used. The resulting compost is not available to the public.

“I think it is quintessential for an agriculture-focused, land-grant university to have this kind of project,” Honeyman says. “It serves as a learning center for students, extension staff, agriculture and engineering research projects — and it’s all right here on campus.” ⑤



Photo: Bob Elbert

Windrows in ISU’s new composting facility at the Dairy Farm are turned and aerated periodically to promote composting and minimize odor. The facility generates about 100 tons of compost each week.