

included replacing the existing florescent ballasts and replacing all the fluorescent tubes with more efficient, low-mercury, T32 fluorescent tubes (figure 6). Besides improving energy efficiency, this upgrade eliminated a PCB (polychlorinated biphenyl) hazard from the old ballasts. Replacement of water heaters and HVAC upgrades will be accomplished later through other agreements with the BPA.



Figure 6—The new light fixtures in this packing shed at the Coeur d'Alene Nursery are far more energy efficient and contain far less toxic material than the old fixtures.

Conservation Saves Money, Time, and Energy

The Coeur d'Alene Nursery refrigeration project has dramatically reduced energy usage and eliminated many of the deferred maintenance issues that plagued the nursery for years.

The nursery now uses about 380,000 kilowatt hours of energy each year. The verification report commissioned after construction states that the nursery will save about 1.8 million kilowatt hours annually, an 80-percent reduction from the historic average of 2.1-million kilowatt hours. The water heater replacements have not yet been installed, but should reduce the nursery's energy use even more.

The project also solved ongoing maintenance problems with lighting, heating, refrigeration, and electric motors that had strained budgets and threatened system failure that could have brought nursery operations to a halt.

Because of the relative simplicity of the new system, the nursery manager has decided not to enter into a long-term service contract yet.

Energy savings have reduced the nursery's indirect costs and have substantially contributed to reducing energy use and costs as required by Forest Service policy and Federal regulations. Because the nursery is spending less on operating and maintenance costs, it will not need to increase the cost of nursery stock as frequently, and those increases will be smaller.

Because the new equipment is so much more compact, an area once occupied by the massive cooler evaporators now provides extra storage space—an unanticipated bonus.

Improvements Aren't Free

This project cost more than was available through cooperative funding by the BPA and the Forest Service. A loan arranged through the BPA must be repaid in annual installments of around \$208,700 over 10 years. Energy costs have been reduced about \$82,000 per year. The annual \$60,000 to \$100,000 cost of repairs has been eliminated. The cost reductions for energy and repairs aren't quite enough to make the loan payments, but they come close.

A capital investment project would have paid for the work without a loan, but it could not have been implemented as quickly. Even if the Northern Region had been able to divert capital investment funding rapidly to the nursery, other important maintenance work throughout the region would have had to be postponed for years—not a desirable outcome, considering the region's deferred maintenance backlog. Alternative financing through the BPA was the best solution in this case.

Future Conservation Possibilities

The nursery manager is pleased with the success of the energy conservation project. He would like to make the nursery operation even more efficient and sustainable by installing a biomass heating and energy generation system. Such a system would allow the nursery to reduce its energy purchases dramatically, and might allow the nursery to sell surplus energy, reducing its indirect costs. The manager also is considering other measures, such as water conservation in the irrigation system, which would save energy as well as water because the system's pumps wouldn't need to run as long.

Other Financing Methods

The Coeur d'Alene Nursery project clearly demonstrates that Forest Service personnel can accomplish needed energy conservation without going through the capital investment process.

In addition to the method used at the nursery, Utility Energy Services Contracts (UESCs) can help finance energy upgrades. A UESC is an agreement between a Federal agency and its utility company that applies cost savings generated by energy efficiency improvements to pay for the work. You can find out more about UESCs at <http://www1.eere.energy.gov/femp/financing/uescs.html>. An example UESC between the Forest Service and Southern California Edison is available to Forest Service and Bureau of Land Management employees on their internal computer networks at http://fsweb.wo.fs.fed.us/eng/programs/facilities/sus_green/excontra.htm.

Super Energy Savings Performance Contracts (Super ESPCs) are similar to UESCs, but use "umbrella" contracts arranged by the Federal Energy Management Program to allow agencies to undertake numerous projects without having to negotiate a separate agreement for each project. You can learn more about Super ESPCs at <http://www1.eere.energy.gov/femp/financing/superespcs.html>.

Some States offer incentives or bundled financing for energy efficiency projects. You can check out what's available in your State at http://www1.eere.energy.gov/femp/program/utility/utilityman_energymanage.html.

Will It Work For You?

If you're not sure whether your facilities have potential for energy savings, consider having an energy audit or retrocommissioning performed on your building.

You may be able to obtain a free energy audit through one of the State or Federal programs. A Web site detailing the programs is available to Forest Service and Bureau of Land Management employees on their internal computer networks at http://fsweb.wo.fs.fed.us/eng/programs/facilities/sus_green/audit.htm.

Retrocommissioning carefully examines existing systems and makes adjustments and modifications to optimize them. Such evaluations may be cost effective for larger buildings (30,000 square feet or more) or for a campus of several buildings. You can learn more about retrocommissioning at <http://www.fypower.org/bpg/module.html?b=offices&m=Commissioning>.

Acknowledgments

The authors would like to thank the following people for their assistance reviewing this tech tip:

Gary Kees, mechanical engineer, MTDC

Joseph Myers, Coeur d'Alene Nursery manager, Idaho Panhandle National Forests

Scott Vandegrift, central zone engineer, Idaho Panhandle National Forests

About the Authors

Jane A. Kipp, AIA, has worked as an architect in Northern Region Engineering since 1991. Before that, she had worked as an architect and design engineer for a variety of public and private employers. She graduated from the University of Arizona in 1980 with a bachelor's degree in architecture.

Kathleen Snodgrass came to MTDC as a project leader in 2001 from the Nez Perce National Forest, where she had been the

facilities architect for about 7 years. She had worked in facilities, landscape architecture, land line, and general engineering on the Nez Perce National Forest for about 10 years and had spent about 10 years in highway design and construction with the Idaho Division of Highways. She graduated from Washington State University in 1974 with a bachelor's degree in architectural studies.

Library Card

Kipp, Jane; Snodgrass, Kathleen. 2006. Modern systems cut energy use 80 percent at the Coeur d'Alene Nursery. Tech Tip. 0673-2326-MTDC. Missoula, MT: U.S. Department of Agriculture Forest Service, Missoula Technology and Development Center. 6 p.

The Coeur d'Alene Nursery in northern Idaho modernized its refrigeration, lighting, and heating, ventilation, and air conditioning systems to cut energy usage by an astonishing 80 percent. The nursery used third-party financing, a power

company financial incentive, and a design-build contract to accomplish the work with comparatively little capital outlay. This tech tip explains how the nursery did it.

Keywords: agreements, air conditioning, Bonneville Power Administration, BPA, electricity, energy audits, energy conservation, energy efficiency, Energy Savings Performance Contracts, financing, heating, HVAC, incentives, lighting, nurseries, pumps, refrigeration, retrocommissioning, Super ESPC, tree coolers, UESC, Utility Energy Services Contracts, ventilation

Single copies of this document may be ordered from:

USDA Forest Service, MTDC
5785 Hwy. 10 West
Missoula, MT 59808-9361
Phone: 406-329-3978
Fax: 406-329-3719
E-mail: wo_mtdc_pubs@fs.fed.us

Electronic copies of MTDC's documents are available on the Internet at: <http://www.fs.fed.us/eng/t-d.php>.

For additional information about energy use reduction, contact Kathleen Snodgrass at MTDC.

Phone: 406-329-3922
Fax: 406-329-3719
E-mail: ksnodgrass@fs.fed.us

Forest Service and Bureau of Land Management employees can search a more complete collection of MTDC's documents, videos, and CDs on their internal computer networks at: <http://fsweb.mtdc.wo.fs.fed.us/search/>.



The Forest Service, United States Department of Agriculture (USDA), has developed this information for the guidance of its employees, its contractors, and its cooperating Federal and State agencies, and is not responsible for the interpretation or use of this information by anyone except its own employees. The use of trade, firm, or corporation names in this document is for the information and convenience of the reader, and does not constitute an endorsement by the Department of any product or service to the exclusion of others that may be suitable.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable,

sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.