

## **NDSU's Facilities Management current "green" and sustainable efforts on campus:**

1. A Campus Master Plan was completed that incorporates sustainable practices to guide the University into the future.
2. An energy performance contract has been entered into with Energy Services Group (ESG). Energy audits and evaluations will be gathered to help identify energy saving measures and related deferred maintenance projects. This project will greatly help NDSU to get a true sense of its energy usage and reduce our energy footprint.
3. Renaissance Hall, in downtown Fargo, has achieved U S Green Building Council LEED (Leadership in Energy and Environmental Design) certification.
4. The NDSU Dakota Coteau Field School, near Pingree, ND, is being designed as a potential LEED-Platinum facility.
5. Geo-thermal is being used for Barry Hall in downtown Fargo.
6. The Heating Plant is a multi-fuel (coal, natural gas and fuel oil) plant that primarily burns non-lignite coal from Montana because of its high BTU-output, low sulfur and CO<sub>2</sub> emissions to meet EPA permit.
7. Roof insulation of R-34 is our standard requirement; "green" roof feasibility was reviewed for the Stevens Hall roof replacement, but additional structural support was required for the higher roof loading. A "green" roof application is reviewed for projects
8. Low-e glass and films are used to provide better insulation and to reduce heat gain in spaces that would then require more cooling.
9. Bentson-Bunker Field House window replacement project installed a Kal-Wal window system that is energy efficient and provides translucent light.
10. Building designs attempt to bring more light into spaces to reduce dependency on artificial lighting.
11. Full-building emergency generators have been installed in buildings that have a high energy load and critical systems; this allows load-shedding during high regional electricity demands by the electricity provider and reduces the need for them to construct new generating facilities.
12. T-8 ballasts are the most common energy efficient ballasts available today; they are used in all new construction, renovation and major re-lamping. T-5 (even more efficient) are beginning to be installed recently.
13. LED (light emitting diode) lights are used where possible; mostly in exit signage and other continuously lighted applications.
14. Sidewalk and parking lot lighting is being upgraded over several phases and in conjunction with other projects to provide for more energy efficiency and more lumens per fixture for better security.
15. Energy efficient motors are standard with any piece of major equipment.
16. Occupancy sensors are used in classrooms, restrooms and other locations that would typically have lights on for long periods of time without occupants.
17. Lighting controls have been installed on the dining area lights in Residence Dining Center to gradually come on as it gets darker.
18. Building metering and sub-metering is being installed in all new construction and renovation projects instead of relying on a few master meters; this helps to identify energy that is being wasted and how much is being saved.

19. Air-cooled chillers are replacing traditional chillers with cooling towers to reduce the use of water and chemicals as well as to provide quicker response to the changing seasons for people comfort; cooling systems using ice storage are being reviewed for possible application with the first application being the Center for Transportation building.
20. Direct digital controls (DDC) are replacing pneumatic controls for better control of space temperatures and more efficient use of the heating and cooling system. CO<sub>2</sub> monitoring is used to provide adequate fresh air.
21. Heat recovery is used in research and other buildings that require 100% outside air to help reduce high energy use and to re-use the heat that would typically go up an exhaust stack.
22. Life-cycle cost is considered for any major piece of equipment and not just the initial cost to install; variable air volume (VAV) systems are used in order to provide the necessary air for a space instead of constant volume; variable frequency drives (VFD) are installed on major pieces of equipment to reduce the use of electricity during less than peak demands.
23. Electro-static filters and other high efficiency filters are used to provide better filtration of outside air and to reduce the likelihood of indoor air quality (IAQ) problems.
24. Instantaneous hot water heaters are being installed to eliminate large hot water storage tanks and the energy required to maintain water temperature in the tanks.
25. The EPA Phase II National Pollution Discharge Elimination System (NPDES) and the subsequent Storm water Pollution Program Plan (SWPPP) has completed a 5-year plan to prevent run-offs into the groundwater and other bodies of water; the plan has had a tremendous effect on construction sites and how they are managed.
26. Detention ponds have been constructed to help reduce storm water run-off.
27. Even though the irrigation system is expanding because of the growth of the campus and the new turf areas, use of more native plants and grasses across campus will help reduce the amount of water needed.
28. Planting new trees and different varieties near roads and parking lots will help reduce the "heat island effect"; using "long-lived" trees will have a more lasting positive environmental affect than quick growth trees.
29. Protecting and saving mature trees during construction projects is difficult, because of the additional square footage needed by the university to meet program needs; each tree is reviewed for significance and importance and attempts are made to save, and protect or relocate them.
30. Our Landscape Arboretum crew is starting the process to have NDSU awarded and designated as a "Tree Campus USA" through The Arbor Day Foundation.
31. Facilities Management is partnering with the Student Environmental Advisory Council (SEAC) to increase recycling across campus as well as in partnership on the Adopt-A-Parking Lot program. SEAC has been the sponsor of the annual campus clean-up the past two years. Grant funding is being requested to help expand the recycling program; it is critical that students are a part of any recycling effort to be successful.
32. The old "wishing well" trash containers were replaced with new concrete, collection containers that allow for recycling of plastic, aluminum or both.
33. Old concrete and asphalt is recycled and used for base in new parking lots and roadways.

34. Reviewing the applicability of "porous" asphalt to allow water to percolate through into the groundwater; this may have limited use in the Red River Valley because of the heavy clay soil and cold temperatures.
35. Black soil and clay from construction sites are stored and re-used on the project or stockpiled and used on other projects.
36. "Beet juice" is used to supplement our salt application for snow/ice melt; the juice is more environmentally-friendly, reduces the amount of salt, better for vegetation, but the negative is it tracks into buildings so it is only applied in parking lots and streets.
37. Rocks that have traditionally been used for bedding and weed control are being removed and mulch used; the mulch comes from a stockpile made from chipped tree branches and limbs and other vegetation. Reducing the amount of chemicals in turf areas and landscaping through aeration, mulching and top-dressing.
38. Using the newer recycled plastic instead of wood for benches and other applications.
39. Constructing residence halls help reduce the use of vehicles by having more students reside on campus and reduce the use of the automobile to commute to campus.
40. The campus shuttle system continues to expand to reduce the dependency on vehicles to move within and around the campus; NDSU and MAT (Metro Area Transit) continue to work together to expand bus opportunities for the community.
41. Bio-diesel is now used year round. NDSU is a motor pool dispatch site for ND Department of Transportation vehicles for the campus and Fargo area. Hybrid and flex-fuel vehicles are continually being added to the fleet.
42. Electric GEM vehicles are used to replace gasoline-powered vehicles used by some of our maintenance staff.
43. Parking for motorcycles is being increased to provide another transportation option for automobiles.
44. The number of bicycle racks across campus have increased to encourage an alternative to the automobile as a means of travel.
45. Custodial staff cleans primarily during day hours, which helps with energy conservation; the use of "green" cleaning supplies continues to expand.
46. A wind study was undertaken to determine the feasibility of wind energy on campus; the location of the campus near the airport and the unreliable winds in the Fargo area did not make it feasible; however, the Equine Science Center and ND Horse Park would be viable with a larger connected load; with growth of that area, it will continue to be monitored as a potential site.
47. Recycling on campus is being examined and a new vendor contract is being sought to allow comingling of recyclable materials which will allow for increased numbers of items being recycled on campus.