Lost Valley Visitor Center: Building a “GREEN” future...
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Many of the resources the earth provides us are limited. We don’t know how long coal and oil will last. There is no more water on earth today than there was a billion years ago. But there are six billion more humans trying to use it. Sharing the available resources among the world’s population becomes more and more difficult, as does keeping our environment clean. No one wants polluted water and air or a landfill in their backyard. But our waste has to go somewhere. Going green is learning how to reduce our use of resources and how to reduce the waste we produce. It is about making our lives sustainable. How do we change our lifestyles in order to leave Earth a healthier place for our grandchildren and their children?

When McHenry County Conservation District renovated the Lost Valley Visitor Center, we attempted to make the building as green as possible. We looked to 1) reduce our use of traditional energy sources; 2) preserve and protect our area’s clean water supply; and 3) reduce our use of the earth’s resources. As you tour the building, look for the symbols below to learn more about how green technologies were applied at the Lost Valley Visitor Center and what you can do to green your home.

Preserving Nature

Green grass symbolizes conserving our land and its natural resources. By reducing our use of the resources that the land provides, we can preserve more natural areas and open spaces.

Clean Water

A blue river symbolizes conserving clean water. By finding ways to reduce our use of water in the building and preventing water pollution outdoors, we help protect our water supply.

Alternative Energy

A sun symbolizes conserving energy. By reducing our use of traditional energy sources and by harnessing the earth’s renewable, natural energy sources, such as the sun, we save energy.
The Lost Valley Visitor Center: LEED certified

The United States Green Building Council is a national organization that developed the Leadership in Energy and Environmental Design program, or LEED. They define the program:

“The LEED® green building certification program is a voluntary, consensus-based national rating system for buildings designed, constructed and operated for improved environmental and human health performance. LEED addresses all building types and emphasizes state-of-the-art strategies in five areas: sustainable site development, water savings, energy efficiency, materials and resources selection, and indoor environmental quality.”

McHenry County Conservation District chose to pursue LEED certification for the Lost Valley Visitor Center to lend credibility to the green technology efforts being installed in the building and to ensure national standards were being followed. LEED certification can be awarded on 3 levels—silver, gold, and platinum. The Conservation District is pursuing Gold certification.

* In the United States alone, buildings account for:
  - 72% of electricity consumption
  - 39% of energy use
  - 38% of all carbon dioxide (CO2) emissions
  - 40% of raw materials use
  - 30% of waste output (136 million tons annually)
  - 14% of potable water consumption

* Figures taken from the United States Green Building Council
Reuse
The front desk in the lobby was created using reclaimed lumber from existing barns on McHenry County Conservation District property. No longer being used by anyone else, this lumber would have gone to waste if we had simply placed an order for new lumber. In addition, the pine siding found in the rooms, hallways, and on the support posts and on ceilings were reclaimed from the building’s previous design. Instead of buying new lumber, the District made a commitment to reuse the old, saving trees and money in the process.

What You Can Do
You may not have a stockpile of out-of-use lumber lying around, but someone else could! Buying used materials helps to save the earth’s resources and saves you money. Shop at garage sales and resale shops or take something off someone else’s hands for free on the website, freecycle.org. There are also several warehouses in the Chicagoland area that specialize in reclaiming household building materials and fixtures from demolition sites. Someone else’s trash could very well be your treasure!
Recycling
When looking to purchase new materials for the Lost Valley Visitor Center, the Conservation District, architects and builders attempted to find as many items as possible made from recycled materials. That way, the amount of new resources needed for the building project could be limited. One good example is the glass terrazzo floor in the main lobby. All the bits of glass in the floor are pieces of old plate glass windows. The shiny shell pieces are recycled mother of pearl buttons. The recycled content is held together with a thin set epoxy binder that contains no volatile organic compounds, or VOCs and requires no harsh chemicals to clean.

It is just as important to consider what will happen to the materials once they have passed their useful life. The furniture in the building is not only largely recycled, but recyclable too. Chairs, tables, and other pieces of office furniture are made from 30–100% recycled materials and are up to 97% recyclable.

What You Can Do
Having recycling pickup at your house is a convenient way to ensure that your family recycles. The Lou Marchi Total Recycling Institute at McHenry County College maintains a recycling directory at www.mchenry.edu/recycling to locate where other items from your home can be recycled. The average American family creates 3.3 tons of landfill waste each year, or 4.5 pounds of trash per person, per day. Recycling even a small percentage of that will make a huge difference. In addition, producing recycled materials takes less energy. Recycling an aluminum can, for example, uses only 5% of the energy it takes to manufacture a new one! Don’t forget to buy recycled too! Recycling only works if there is a demand for recycled products.
Clean Water: Natural Filtration

When sources of pollution reach our waterways through means such as run-off, changed patterns in the hydrology, or snow melt, we call it non-point source pollution or NPS. NPS pollution is currently the greatest threat to water quality across the United States.

Rapid development has increased the NPS pollution threat. When we replace soft soil with concrete, asphalt, and shingled roofs, rainwater no longer has a place to go. Since the water cannot naturally seep into the ground, it rushes quickly across the land, causing flooding and property damage. In addition, when runoff flows across parking lots, roads, and driveways, it picks up motor oil, salt, and other toxic substances which flow directly into the water supply.

Responsible development can decrease non-point source pollution. When the Conservation District renovated the Lost Valley Visitor Center, more parking lot space and wider roads were needed. But rather than contribute to a run-off problem, we chose several management practices that protect Glacial Park’s high quality wetlands and prevent a decline in water quality.
Rain Garden
Rain gardens allow water to seep slowly into the ground, filtering it through the soil and recharging the water table. Rain gardens are simple landscape features that are planted with deep-rooted, native vegetation. The gardens allow the rainwater to be captured, absorbed and filtered in the soil, replenishing groundwater instead of creating runoff. These small stormwater features can also effectively trap and filter as much as 99% of the pollutants associated with urban stormwater runoff. As part of the Lost Valley Visitor Center project, 3,250 square feet of vegetated rain gardens were installed, located behind the building.

Level Spreader / Filter Strips
Level Spreader / Filter Strips convert concentrated water flow into low-velocity sheet flow, allowing the runoff to be dispersed, filtered and absorbed into the native landscape.

Permeable Pavers
Permeable pavement allows seepage and therefore decreases storm water run-off. Water passes through instead of off. Interlocking pavers tolerate modest amounts of frost heave and are extremely long lasting and flexible, combining the benefits of asphalt and poured concrete without the negatives. Beneath the pavement surface is a layer of open graded stone that serves as the structural base as well as temporary storage, which either infiltrates in the subgrade soil or slowly drains to the surface via an underdrain system. The discharge from the underdrains of the porous pavers then discharge to native landscape systems. Permeable paving is used for all parking areas, some walkway areas, and the back patio.

Bioswales
Bioswales use topsoil and vegetation to filter within a shallow depression to gather and filter water, letting it slowly return to the ground. They act similarly to rain gardens, but are usually adjacent to roads and parking lots. Bioswales are being used to manage roof runoff and excess runoff from some of the permeable paving areas.
Native Plants
Native plants protect the soil and decrease erosion. The installation of native landscaping represents far more than just an alternative landscape treatment. Native landscapes are an important component of an environmentally sustainable and economically sensible approach to land planning and development for all types of land use. Native plants create a living landscape composed of diverse communities of plant species that can sustain themselves and thrive. From an aesthetic point of view, native landscapes produce a constantly changing pattern of striking colors and textures throughout the seasons. In addition, native landscaping offers a variety of environmental and cost saving benefits including the reduction of surface water runoff and downstream flooding, increased groundwater recharge, enhanced regional air and water quality, and restored wildlife habitat. Once established, native landscapes do not require mowing or the use of fertilizers, pesticides, herbicides or supplemental watering.

Low Flow Fixtures
All toilets, urinals, sinks and showers in the facility are low flow fixtures. In other words, they dispense less water per use than conventional fixtures. For example, the toilets use only 1.3 gallons per flush. The showerheads show an even more drastic decrease in use. The standard residential showerhead in the United States uses between 5 and 8 gallons per minute. At this facility, the staff shower heads use 1.5 gallons per minute. The sinks too, are greatly decreased from a typical 2.5 to 5 gallons per minute down to 1.5 gallons per minute. In addition, sinks in the bathrooms are automatic shut-off so that they cannot be left to run longer than they are needed. The overall water usage for the fixtures in the building is 48.1% less than if conventional fixtures had been installed!

What You Can Do
If installing new fixtures in your home is not feasible at this time, try fitting your existing faucets with low flow aerators. These little devices cost only $2–$10, but can make a big difference in reducing water use in your home. If a family of four, in which each member uses a sink for about six minutes a day, switches from a conventional 2.5 gallon per minute output to an aerator that allows only .5 gallons per minute, the family would use 48 gallons less per day, or reduce their use by 17,250 gallons per year!
Energy Efficient Lighting
The lights in the main bathrooms and offices are fitted with motion sensors. That way, lights are only on when the room is in use. In addition, Compact Fluorescent Lamp bulbs, or CFLs, are used in many lamps throughout the building. Almost 90% of the energy generated by an incandescent bulb is wasted to heat instead of light. CFLs are 75% more efficient than traditional incandescent bulbs and last longer. Light Emitting Diodes, or LEDs waste even less energy and are cool to the touch. Task lights at employee work stations are fitted with LED lights.

What You Can Do
CFL bulbs may initially be more expensive than incandescent, but they last much longer. When you replace 10 60 watt incandescent bulbs with 10 Energy Star rated 13 watt CFLs, you can save roughly $420 over the lifetime of the bulbs. The U.S. Department of Energy estimates that if every American replaced one bulb with a CFL, it would create enough energy to light three million homes for a year, saving $600 million and reducing emissions equivalent to taking 750,000 cars off the road for a year.

Energy Efficient Windows
Windows in the Visitor Center were carefully chosen to afford the greatest benefit in energy efficiency, light transmission, and solar heat gain. Windows are rated by their U factor, which indicates the rate of heat loss—the lower the U factor, the less degree of heat loss, and therefore the better the insulating properties. A dual layer insulating window was chosen to provide resistance to heat loss. In addition, these windows rate a U factor of .26, providing a benefit in the winter as they let passive solar contribute to heating the building. In addition, by utilizing as much natural light as possible, overall lighting costs were reduced.

What you can do
By replacing single layer windows with energy star rated windows, you could save 20%–35% in energy costs. If you cannot afford to replace windows, you can also cut heat transfer through windows by installing heavy, lined drapes with valances or by applying an inexpensive window film kit. Transparent films can block up to 38% of heat loss in the winter and up to 70% of the solar energy in the summer, saving both heating and cooling costs.

Harvesting Daylight
Using daylight to help eliminate the need for artificial lighting saves energy. Studies show that increased exposure to natural light can also boost concentration and enhance moods. At least 90% of occupied spaces in the Lost Valley Visitor Center have a direct line of sight to the outside. Furniture is placed specifically so it does not block windows, and extra windows were added where necessary. The clerestory above the lobby adds extra light to a large room that has few external walls, while solar tubes in the hallways also let in more outside light.

What You Can Do
Energy for lighting typically accounts for about 10% of a household’s energy bill. Solar tubes are a relatively affordable alternative to adding new windows or skylights. Requiring minimal space, they are also less trouble to install, requiring no re-framing. A professional can install one in less than two hours and do-it-yourselfers can finish the project in a day.
Geothermal

The heating system in this building relies primarily on the earth’s natural thermal energy, a free and clean resource that will not run out. Thermal energy is essentially solar energy that has been absorbed by the earth’s surface. To take advantage of it, vertical closed loops were dug 400 feet into the ground and fitted with pipes filled with environmentally safe glycol. The liquid moving through the pipes captures the heat from the ground and comes into the building warmed to 55°F. A high efficiency electric compressor and heat exchanger raise the temperature to the desired degree and transfer the warmth to air that is then sent via duct work. Because the earth already provided the energy to warm the air to 55°, less energy is expended raising it to a comfortable level. This makes a geothermal unit 300% to 400% efficient, or in other words, we will get $3 to $4 worth of heat for every $1 spent on electricity. The geothermal system cools the building in the summer as well, working in reverse. Warm air is removed from the building and cooled using the underground loops.

Energy Efficient Insulation

The exterior walls of this facility contain a spray foam insulation that is better able to fill in all gaps and creates a stronger thermal insulator, air barrier, and vapor barrier than traditional batting insulation. Typically, insulation is compared by its R value, a test result that describes the insulation’s thermal resistance—the higher the number, the better the building insulation’s effectiveness. While cotton batting has an R value of 3.7, and fiberglass batting has an R value of 3.1 to 4.3, the Demilec Heatlok Soy brand insulation used here has an R value of 4.45. In addition, the materials used to make the spray foam are environmentally friendly. Heatlok Soy is made from recycled plastics and soy oil and gives off no volatile gasses that can reduce air quality.

What You Can Do

Heating and cooling accounts for about 56% of energy use in a typical home. Although a geothermal system may not be in your budget, what you can do is install an energy star programmable thermostat. You can save 1% of your energy bill for every degree you turn the thermostat back—10% if you turn the thermostat down 10 degrees during the eight hours you are sleeping or at work. Studies have shown that the furnace does not work harder or less efficiently to get back to normal temperature. Also, consider where the thermostat is placed—avoid drafts and direct sunlight so the in-house temperature readings are not overly cold or hot.
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