Sustainability Recommendations

First Presbyterian Church

100 N. Franklin St. | Danville IL | 61832

ILLINOIS SUSTAINABLE TECHNOLOGY CENTER
PRAIRIE RESEARCH INSTITUTE

Illinois Sustainable Technology Center (ISTC)

The Illinois Sustainable Technology Center ISTC's Mission is to encourage and assist citizens, businesses and government agencies to prevent pollution, conserve natural resources, and reduce waste to protect human health and the environment of Illinois and beyond. ISTC's applied research lab and technical assistance teams' work together to advance best practices in pollution prevention, water conservation, energy efficiency, renewable energy and waste reduction.

Technical Assistance Program

The Technical Assistance Program (TAP) works with organizations in Illinois to reduce consumption of energy and natural resources and to minimize waste. TAP performs research, spreads awareness, and facilitates implementation regarding practices, technology and systems that improve sustainability. The Zero Waste Illinois Program, one of many services and initiatives offered by TAP, helps organizations achieve zero waste by acting as a resource for identifying innovative disposal and reuse of materials. ISTC provides information and technical assistance that help organizations improve their environmental footprint. We conduct waste audits and assist with materials management planning, supply chain optimization, and stakeholder engagement.

Background

In support of its mission, TAP visited the First Presbyterian Church, Danville IL. Located at 100 North Franklin Street. First Presbyterian is housed in a very large building that is comprised of two sections. The Sanctuary was constructed in the 1890's while the school/office section was built between 1959 and 1963. First Presbyterian leadership' sought out the assistance of ISTC to help in developing a plan for being more sustainable. TAP's role is to assist in identifying opportunities in support of this plan. Troy Walker, a Technical Assistance Engineer with ISTC, conducted the site visit on July 26, 2016. The visit was hosted by Bob Iverson.

Figure 1. Church Monument Sign

Observations

First Presbyterian demonstrates a commitment to sustainability through the desire to establish a plan. In the school/office section, significant steps have already been taken to reduce the facility's overall carbon footprint. Some lighting upgrades have been implemented. Incandescent bulbs have been changed out in favor of lower wattage CFLs. Some cooling units have been replaced allowing for more efficient environmental controls in certain sections of the facility.

Challenges

The Church facility is essentially two buildings combined into one; the sanctuary and the school. The sanctuary was constructed in approximately 1890 and the school between 1959 and 1963. Due to the

age differences in the facility's two sections, needs vary greatly. Some improvements that have been made over time can be viewed as sustainable. However, overall building and system deficiencies and related improvements should be considered from a facility-wide perspective.

A. Sustainability Program

Many organizations, regardless of type, reap great rewards from adoption of a formalized sustainability program. A formalized program for First Presbyterian will help to (a) instill a sense of vested ownership for church leadership and all involved, (b) engage everyone in the necessary thinking to impart change on the organization, and (c) empower and encourage "sustainable" decision making at all levels of the church. One key component of a formal program is the creation of a sustainability committee or "Green Team".

- Formalize a team and develop a written policy followed by a management plan with an executable implementation strategy. Other key components include metrics development, a viable communication plan, and a road map.
- Baseline metrics should be established relative to building characteristics in electricity, gas, water and waste. Key sustainability measures such as Carbon footprint and Green House Gas Emissions (GHG) should be regularly calculated and communicated.

ISTC's Technical Assistance Team assists with Sustainability Program Development and is more than willing to provide a scope of work and proposal to help First Presbyterian move forward in this effort.

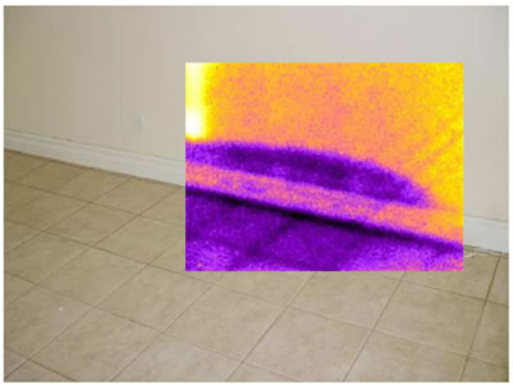
B. Building Envelope

The building's envelope is the physical separator between the interior of the building and exterior environment. It encompasses doors, windows, skylights, foundations etc. The envelope is related to and effects the energy efficiency of the building and plays an important role in determining the amount of energy required to maintain a comfortable environment for its occupants.

Over time, building deficiencies materialize. Utilizing thermography (infrared cameras) to scan for temperature differences allows building inspectors to instantly determine if components are damaged, missing, or out of place. Using infrared technology, inspectors see problems such as water penetration of walls, roof leaks, leaks in plumbing, electrical problems, and defects in the insulation. It is a relatively inexpensive tool to pinpoint air leaks, energy loss and moisture problems as well.

Figure 2. Indication of an envelope breach in a school classroom.

Figure 3. Example of an Infrared overlay revealing elevated moisture levels inside wall and under flooring.



- ISTC recommends a building envelope analysis to identify building deficiencies to target for improving building energy efficiency and cutting costs.

The ideal state or stretch goal for First Presbyterian could include "Net Zero" achievement. The Illinois Clean Energy Community Foundation sponsors a Net Zero Energy Building Program. The program awards grants to new construction or retrofit projects that achieve site net zero energy performance or better, over the course of a year. Buildings must, at a minimum, offset all of their energy consumption with on-site generation from renewable resources. They encourage construction of buildings that are beautiful while maximizing energy efficiency through renewables, thereby helping to educate the public and professionals. This is done all while paving the way for the shift in renewable/sustainable building construction.

C. Energy Efficiency

The size, age of building, addition(s), and fixtures allow for several opportunities to upgrade to and adopt energy saving technologies.

- Conduct a lighting audit to identify locations and fixtures where retrofitting to higher efficiency, lower wattage fixtures can achieve significant financial savings. Although some lighting has been changed from Metal Halide to lower wattage CFL, additional efficiencies can be achieve by adopting LED. LED technology is as affordable as ever and should be considered where it makes sense. Currently, many variations of lighting exists throughout the facility. Setting a strategy for upgrading lighting, fixture by fixture, room by room allows for the lowest cost, smoothest transition to efficient lighting.
- Consult with an Ameren Energy Performance Contractor to evaluate options to improve Lighting efficiency. Ameren Program Allies are performance contractors that are lighting experts with the ability to assess your building's needs. They are adept at identifying applicable incentives to help reduce the financial cost of your lighting projects.
- Implement Daylighting wherever possible. Daylighting is the controlled admission of natural light (direct sunlight or diffuse skylight) into a building to reduce electric lighting and saving energy. The gymnasium appears to be a location that could take advantage of more daylighting.

Figure 4. Gymnasium windows shown covered.

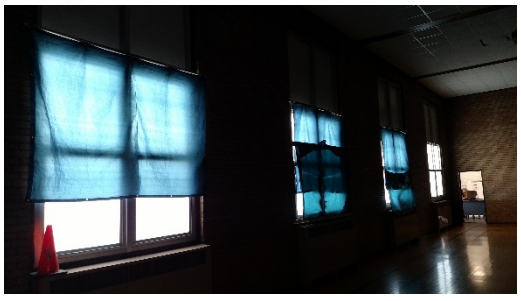


Figure 5. Diffused light in gym.

- Add flexible lighting control(s) to offices, hallways and bathrooms. Occupancy sensors are in place in some rooms but not others. Lighting controls such as Dimmers, Motion/Occupancy Sensors and Timers should be evaluated for application throughout the facility. According to the Department of Energy, occupancy sensors can cut wasted electricity used for lighting by 30%.

Figure 6. Occupancy Sensor.

Figure 7. Dimmer.

- Install programmable thermostats with setbacks wherever possible. Programmable thermostats are a little used but significant tool for increasing a building's energy savings. Operators can save as much as 10% per year on heating and cooling with the proper settings.

Figure 8. Examples of various environmental control devices in-place.

- Consult with an Ameren Energy Performance Contractor to evaluate options to improve HVAC performance. Ameren Program Allies are performance contractors that are building analysis and envelope certified. They are able to assess your buildings needs in addition to identifying applicable incentives to help reduce the financial cost of your projects.

D. Water

Water is one of the most important natural resources our plant has to offer. Sustainable water use ensures that there are adequate supplies of fresh, clean water for present and future generations.

Water efficiency plays a huge role in our water conservation efforts; not to mention, when we save water, we save money.

Water use at First Presbyterian falls under the category of domestic use. Domestic uses consist of faucets, toilets, urinals, showers, clothes washers and leaks.

Numerous sinks with varied style fixtures and faucets were found throughout the facility. Some faucets were equipped with aerators, some were not.

- Sink faucets should be equipped with aerators or throttles back via shutoff valve to control flow and conserve water. According to the EPA's *WaterSense at Work: Best Management Practices for Commercial and Industrial Facilities*, non-metered faucets in public restrooms should be set at a maximum flow rate of 0.5 gpm.

Figure 9. Examples of style of sinks, faucets and fixtures found throughout the facility.

Two general styles of toilets were found on-site, tank and flushometer valve. There appears to be varied models of each throughout the facility. Most recently manufactured tank toilets have the gallons per flush (gpf) rating marked on the top surface. The current federal standard for flush volumes is 1.6 gpf.

Figure 10. Existing tank and flushometer valve toilets.

Water displacement bags are recommended as a low cost, effective way to reduce the amount of water consumed per flush in tank style toilets.

Figure 11. Toilet tank bag.

The Niagara Toilet Tank Bank can be accessed via this link:
http://www.conservationmart.com/p-319-niagara-toilet-tank-bank-n3137-toilet-tummy.aspx?gclid=CK32jaHnqs0CFQ6PaQodc_QI9w

Dual flush technology is an excellent way to conserve water in toilets. It can be incorporated into both tank and flush valve technology.

Figure 12. Pictures of dual flush controls on a toilet tank and a high efficiency flushometer valve.

High-efficient dual flushometer valve and tank products are wide ranging and readily available on the market such as this flushometer valve by Sloan. http://www.sloanvalve.com/Specifications/WES-213.pdf and this tank by TOTO.

- Retrofit Toilets with Dual-flush technology to conserve water.
- Use tank water displacement bags to conserve water where appropriate.

The urinals whithin the facility are the old style "built in" models. Removing and replacing would be a challenge. Whenever appropriate, ISTC recommends one pint or 0.125 gpf high efficiency urinals as a more practical solution for industrial facilities. One such model is available from Riverbend.

Figure 13. Existing urinals.

- Install one pint per flush urinals when and where appropriate to conserve water.

E. Waste

The primary "opportunities" in waste for First Presbyterian are in solid waste recycling and E-waste. Overall, the outlook on recycling in general, electronics or otherwise, in Vermillion County is not very promising. The county web site does not list a department which has responsibility for municipal solid waste concerns. The Vermillion County Health Department has a page on their site discussing solid waste as it relates to environmental health: http://vchd.org/environmental/solid-waste-management/. However nothing on recycling. Perhaps the folks at Keep Vermillion County Beautiful may offer some assistance (http://www.keepvermilioncountybeautiful.org/contact.html), but there's no real mention of recycling anywhere on their web site.

A Google search for "recycling in vermillion county illinois" yields a couple of leads: Coultas Recycling, Advantage Recycling, Republic Services, and Illini Castings. Coultas looks interesting, but a check of their website does not provide any useful information. Advantage is just a division of Mervis.

Susan Monte, Champaign County's Recycling Coordinator, at smonte@ccrpc.org could provide additional leads on recycling opportunities. She and Courtney Kwong (crkwong@urbanaillinois.us), City of Urbana Recycling Coordinator are co-coordinators for the IL Recycling Association region which includes Vermillion County and may be of help in establishing various forms of recycling.

- Start of a "recycling program" by collecting and sorting obvious recyclables such as card board, ink and toner cartridges, CFL bulbs and electronics.
- Make a plan for periodic delivery (once per month) or whenever a member "goes that way" to locations in Champaign and drop off recyclables at designated locations. Champaign provides a nifty recycling guide to aid in this process: http://ci.champaign.il.us/wp-content/uploads/2010/08/Recycle-guide1.pdf plastic wrap to avoid placing in the landfill and added disposal costs.

Specific to E-Waste, Vermillion County appears to have options available. ISTC funded an Illinois Electronic Products Recycling Survey, which identifies a mix of electronic recycling options available in Vermillion County, where a "mix" means: "e-waste collection(s) held and/or e-bins are available; and/or local retailer or not-for-profit accepts electronics."

Illinois EPA maintains a list of electronics recyclers and collectors, since such entities have to register with the agency. See http://epadata.epa.state.il.us/land/eWaste/collection-sites.asp. This lists Mervis Industries, Land of Lincoln Goodwill Industries Inc., and Bryant Industries as operating electronics collection sites in Danville.

- **Mervis:** http://www.mervis.com/locations/danville/. Does not mention electronics recycling for their Danville site; only batteries. Based on information found on their site, it looks as if aluminum cans and some other items such as appliances can be recycled at this location but there's no paper or plastic recycling offered.
- **Land of Lincoln Goodwill:** http://llgi.org/programs-and-services/computer-recyclingdell-reconnect/ and http://llgi.org/donate/ways-to-donate/.
- **Bryant:** http://www.bryantindustries.net/about/locations-hours/danville-recycling and http://www.bryantindustries.net/materials/what-can-be-recycled. This company may be able to provide can and corrugated cardboard recycling.
- **There's also an Office Depot/Office Max in Danville,** which was listed on the "find a service" map available on the IEPA web site: http://www.officedepot.com/storelocator/findStore.do?requestor=flyout&zip=61832. According to its site, that location offers "tech recycling" and "tech trade in." Finding information on their site isn't easy, so it is probably best to call them for more info.
- **Lowe's** in Danville: http://www.lowes.com/store/IL-Danville/0052. They might recycle cell phones, and possibly items like batteries and various light bulbs. Finding information on their website is not easy. Please call them to investigate.

The options in Danville for electronics recycling should be thoroughly investigated. Local recycling of these items is preferred as unnecessary transportation is minimized.

- Investigate and recycle electronic items locally.

An additional aspect to consider as it relates to waste is the food waste generated from on-site events and commercial kitchen activities. ISTC developed a guide specific to food waste: http://www.istc.illinois.edu/info/library_docs/TN/Waste-Free-Lunches.pdf

The University of Illinois Extension has made information available to assist local communities in getting started in composting: https://my.extension.illinois.edu/documents/1144110703110311/compostingtoreduce.pdf

- Develop a plan and begin composting food waste. On-site compost can be used to supply an on-site community garden. This can aid in drawing in visitors and potential new members to the church.

If interested, I can donate a brand new compost bin and rain barrel to the church. Contact your ISTC Technical Assistance Engineer if interested.

Green Products

Facility maintenance and upkeep is a big part of operational activities for a church. General cleaning is required, while more specific and targeted efforts are needed in restrooms and food service areas. Special care should be taken when selecting cleaning products in particular, those used in food service areas.

USEPA encourages the use of "Green Chemistries" in our daily lives. The benefits include cleaner air, cleaner water, safer consumer products, safer food, and less exposure to toxic chemicals. USEPA's Safer Choice program helps consumers, businesses, and purchasers make smart decisions through Safer Choice Labeling. Over 2,000 products are listed here that qualify because they perform well and are safer for human health and the environment.

There are a couple of companies ISTC has experience with that can assist in the Green products area. The first is PortionPac Corporation and the second is Earth Friendly Products Company.

- Implement a green products purchasing plan replacing environmentally harmful products.

Safer Choice helps consumers, businesses, and purchasers find products that perform well and are safer for human health and the environment.

Exterior

A number of sustainable choices can be incorporated into upkeep and maintaining the exterior or grounds of the facility.

Landscaping and irrigation plays a significant role in water conservation. Staff should develop a knowledge base on different irrigation/landscaping techniques.

- Use low flow sprinkler/spray nozzles when watering landscaped areas.
- Prevent irrigation water from running into streets.
- Use reclaimed water for irrigation whenever possible.
- Use sprinkler systems before sunrise and after sunset to minimize evaporation.

Incorporating gardens on church grounds is beneficial. Garden "tending" can be viewed as favorable activities for community involvement. Locally grown vegetables are much more sustainable than those trucked from many miles away. Locally grown vegetables can be added to dishes prepared in the on-site kitchen.

- Start a "community garden.

- Use rain barrels to collect rain water, conserve city water and reduce costs. Rain water collection is an excellent option for use in gardens and general landscaping.
- Start Composting food waste generated on-site to enrich soil for the garden.

Many public and private facilities have trouble with ice on walkways in the winter. This is always a problem, especially for those with limited mobility. Ecotraction manufactures a salt substitute for ice control.

- Use a less toxic substance for walkway and parking lot ice control.

Conclusion

ISTC provides sustainability leadership through guidance and application of proven sustainability methods, techniques and technologies by accessing years of accumulated research data and experience. First Presbyterian should strongly consider advancing recommendations outlined herein. Many of the costs of adopting energy reduction and resource conservation technologies can be off-set through accessing utility and state supported incentives. ISTC assist clients with identifying appropriate incentives, costs and calculating return on investments.

Disclaimer

Information provided in this report is for reference only. The appropriate and proper authorities should address issues regarding permitting, safety, and/or fire protection. ISTC is a non-regulatory agency (a Division of the Prairie Research Institute at the University of Illinois). ISTC has been providing assistance to Illinois businesses and the public since 1985.

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