Get SMART! Resource Efficiency Program

FIRST UNITED METHODIST CHURCH, Corvallis

Get SMART! Resource Efficiency Program
Corvallis Environmental Center
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Location:
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Employees: 17 full-time employees
Hours of operation: 16 hours per day M-F, 8 hours Sat; approximately 4580 hours per year

The First United Methodist Church is located in Corvallis near the Oregon State University campus. The facilities include the original chapel built in 1923, the education wing built in 1959, and a new meeting facility built in 2002. The older facility houses a daycare, numerous meeting rooms, and offices for staff. This original building is in process of numerous remodeling projects many of which include efficiency measures.

The First United Methodist Church has already taken many steps towards using its resources efficiently. Examples include:

- Various lights throughout the facility are turned off when not in use, saving energy.
- Many incandescent lamps have been replaced with compact fluorescent lamps, saving energy.
- Seven of the nine office computers and all printers are turned off at night, saving energy.
- Hot water heater has been turned down to 120 degrees, saving energy.
- Spent printer cartridges and cell phones are collected from the congregation and donated to a local group for recycling and reuse.
- Approximately 40% of the bathrooms have been remodeled with low-flow fixtures, conserving water.
- The irrigation system is set on a timer to provide watering in early morning hours only, maximizing water efficiency by minimizing evaporation.
- Only reusable dishware is used in the dining areas, saving resources and reducing waste.
- Roll-style paper towels are used in many of the bathrooms instead of folded-style toweling, saving resources and reducing waste.
- Nearly all locally recyclable items are recycled on a regular basis (office paper, glass, plastic, cardboard, magazines, metals, pop cans), decreasing the garbage load and supporting recycling markets.

These examples demonstrate the dedication of the First United Methodist Church and its employees towards being resource efficient. Other establishments can benefit from these examples.

This report is intended to both illustrate current successes, and to indicate opportunities for additional improvements. It will include recommendations, ideas and evaluation methods for energy, water, and materials use.

I) ENERGY USE

The following section offers recommendations on conserving energy. Energy conservation calculations are based on a conservative $0.05 per kilowatt-hour charge; some power customers maybe paying even more per kilowatt further increasing the estimated savings. Energy at First United Methodist Church is primarily used for lighting, HVAC, refrigeration, and general office use. The facility was built in the 1920's and added onto in 1959 resulting in many characteristics that make it inefficient and expensive to retrofit including aluminum framed single-pane windows and inefficient HVAC system design.

LIGHTING

- **In front entryway, replace incandescent lamps with compact fluorescents (CFLs) and turn off lights during daylight hours.** The south facing front entry has a total of 46, 60W incandescent bulbs turned on during open hours. Turn these lights off during daylight and retrofit these fixtures with 20W CFLs to maximize energy savings.

  Estimated Savings: There is a combination of energy saving opportunities for this walkway; experiment with these ideas to determine which recommendation will best accommodate the lighting needs for this area. Savings include the cost of electricity, bulb purchasing, and labor for changing the bulbs, and are calculated with the use of spreadsheets. Calculations are available upon request.

Recommendations to choose from	Energy Savings (in kilowatt hours)	Annual Savings
Turn off existing lamps during 75% of existing operating hours	9,500 kWhr	$870
Remove one-half of the existing lamps and keep remaining lamps on during business hours	6,320 kWhr	$580
Replace all incandescent lamps with CFLs	8,430	$740
Replace existing incandescent lamps with CFLs AND turn-off during daylight hours	11,590 kWhr	$1050

- **Replace incandescent lamps located in the chapel with compact fluorescent lamps.** Currently, the light fixtures located in the chapel use 96 incandescent bulbs. In 1996, compact fluorescent bulbs were tried and the resulting light output was not satisfactory. The lighting industry has continued to improve the lighting output and quality of CFLs and it is worth experimenting once again by exchanging existing incandescent bulbs in one of the hanging fixtures with energy efficient CFLs.

  Estimated Savings: Replacing all 75 W incandescent lamps in the chapel with equivalent light output 20W CFLs results in savings of $280 and 3200 kWhr per year. Savings include the cost of electricity, bulb purchasing, and labor for changing the bulbs, and are calculated with the use of spreadsheets. Estimated occupancy of the chapel is 832 hours per year. Calculations are available upon request.

- **Replace remaining incandescent lamps with compact fluorescent lamps.** There are numerous locations throughout the facility, including the front lounge and hall area, with incandescent bulbs. For every bulb that is changed, an approximate savings of 250 kWhr and $20 per year in electricity and labor costs would be realized. Adding up this savings for the first floor main area results in up to $400 and 5,000 kWhr per year. It was noted during the on-site visit that compact fluorescents have been installed in previous years, and burnt out within a month of installation. Causes of this rapid burn-out could be:
  - Overheating of the bulbs. Most compact fluorescents need to be in open fixtures. Purchase high quality bulbs that indicate they are approved for use in enclosed fixtures.
  - There could be inconsistent voltage at the fixture.

- The bulbs that were purchased were defective or a low quality brand.

- **Remove or replace all burned out or flickering lights.** Lighting ballasts continue to send energy to each bulb even when no light is produced, using the same energy as a fully lit bulb.
  Estimated Savings: There were numerous locations throughout the facility where lights were on with only a portion of the bulbs in working order. For *every* (4) burned out bulbs that are removed from existing fixtures, annual savings would be $18 and 320 kWhr.

- **Use only T-12 bulbs in existing T-12 fixtures.** Do not install T-8 lamps into existing T-12 lighting fixtures. T-12 fixtures have magnetic ballasts that overload T-8 bulbs, significantly reducing their life and productivity. T-8 bulbs are only designed fro T-8 fixtures, which have electronic ballasts.

- **Turn off lights when areas are not in use.** During REP's on-site visit, numerous locations had lights on without employee occupancy including Wesley Hall and restrooms. Provide signage to remind employees to turn off lights when leaving a room. REP staff can supply signage upon request.

- **Install occupancy sensors (motion detectors) in restrooms.** Occupancy sensors will turn off lights and fans when rooms are not occupied, saving energy and the life of the lights and fan. Sensors can be purchased for $20 for wall mounted units and up to $100 for ceiling mounted units, plus cost of installation. Energy Trust of Oregon's incentives are available for occupancy sensor installations ranging from $20 for wall mounts and $50 for ceiling mounts. See below for Energy Trust of Oregon Contact Information.

- **Install daylight sensors for all outside spotlights.** Daylight sensors will automatically turn off lights during daylight hours, saving energy and the life of the lights. Sensors can be purchased for $20, plus cost of installation. Energy Trust of Oregon's incentives may be available for daylight sensor installations. See below for Energy Trust of Oregon Contact Information.

- **Retrofit four-lamp T-12 fluorescent light fixtures with energy-efficient two-lamp T-8 fixtures and lamps.** There are numerous locations in the facility where lighting can be changed to provide desired lighting output and improve energy efficiency. Because exact numbers and lighting locations have not been determined, this calculation reflects the savings for every (1) four-lamp T-12 fixture that is retrofitted.
  Estimated Savings: Each retrofitted fixture will save up to 410 kWh and $25 per year. This calculation assumes exchanging the existing T-12 four-lamp fixtures with T-8 two-lamp fixtures, which provide equivalent lighting output. In the basement alone, there are 18 four-lamp fixtures providing an estimate of total savings in the basement lighting of 7380 kWh and $450 per year.
  Cost and Simple Payback: Installation plus ballast equipment and reflector costs for retrofitting existing fixtures are approximately $90 per fixture. Incentives and tax credits provide a reduction in cost for each fixture of $30 from the Business Energy Tax Credit (35% of total cost) and $25 per fixture cash back from the Energy Trust of Oregon. Total installation cost for each fixture is approximately $35 resulting in a 1.4-year payback.

- **Replace incandescent lamp-style exit signs with LED-style exit signs.** LED exit fixtures last 60 times longer than incandescent-style exit fixtures, and use 1/20th the wattage. New LED exit signs can be purchased for up to $75 each. Energy Trust of Oregon's incentives are available for replacing exit signs, providing $15 cash back per exit sign installed. See below for Energy Trust of Oregon Contact Information.
  Estimated Savings: There are approximately 20 exit signs located throughout the facility. Each existing sign has two, 20-Watt bulbs that are on 24 hours per day. Changing these to LED signs (each using 0.73 watts each) results in an energy and cost savings of 6880 kWhr and $340 per year.
  Energy Conservation Calculation: *40W per incandescent exit sign - 0.73W per LED exit sign x*

20 signs x 8760 hours per year (x $0.05/kWhr).

Cost and Simple Payback: Equipment costs for retrofitting existing fixtures would be $75 per fixture, plus approximately 30 minutes labor to install each fixture. Taking an average retrofit cost per fixture of $90 results in a total capital cost of $1800. Incentives and tax credits provide a reduction in total cost of $630 from the Business Energy Tax Credit (35% of total cost) and a further reduction of $300 cash back from the Energy Trust of Oregon ($15 per fixture). These assistance programs reduce the total cost to $870 and the simple payback from 5.3 years to 2.5 years.

COMPUTERS

- **Set monitors and CPUs to go into "sleep mode" during inactivity periods of 10 minutes or more.** Most monitors use 85W when active and are reduced to 25W when in "sleep mode". Screen savers are not enough, as they do not actually reduce energy use; they merely prevent screen imprint. CPUs use 55W when active and are reduced to 25W when in "sleep mode". Thus, for each computer there is an average 80W savings when both CPU and monitor are in "sleep mode". This option is available on most computers under the display menu/screen savers/energy star settings.

  Estimated Savings: There are nine computers in operation. For each additional (1) hour that all nine computers are in "sleep mode" each day, the annual savings would be 190 kWhr and $10 per year. The potential for savings will vary dependent upon actual computer use of employees.
  Energy Conservation Calculation**:** *80W per computer x 9 computers x 1 hour per day x 5 days per week x 52 weeks per year (x $0.05/kWhr).*

- **Turn off all computers at night and over weekends.** Computer and monitor energy requirements are 55W and 85W respectively, for a total energy use of 140W. Computers set to go into "sleep mode" are still using approximately 50W per hour.

  Estimated Savings: Currently, seven of the nine computers are turned off after hours. Two computers are left on after hours and are not set to go into "sleep mode". Turning off these two computers after hours saves approximately $60 and 1170 kWhr per year.
  Energy Conservation Calculation: *140W per computer x 2 computer x (8760 hours per year-4580 hours of operation) x 1kWhr/1000Whr (x $0.05/kWhr).*

HVAC

- **Turn off heat in unused areas and offices.** In seldom-used areas with individual thermostats, manually turn heat off and close doors. In seldom-used areas without individual thermostats, close heating vents and doors. For maximum efficiency turn the heat on in these areas just prior to room occupancy.

- **Keep blinds closed after-hours in all offices with windows.** Existing office windows are single pane glass with aluminum framing. This older style of window dramatically loses heat during the winter months. Keeping blinds closed after hours reduces the heat transfer and loss from the building. Also check seals on these windows and replace as needed.

- **Check effectiveness of fireplace dampers:** Chimney dampers should be tightly closed when the fireplace is not in use. The damper should be checked periodically to assure proper closure. If the fireplace is never used, the damper can be sealed with weather stripping and the chimney stuffed with fiberglass insulation. Place a sign to indicate that the fireplace is not to be used and why.

- **Install a programmable thermostat for the main HVAC system.** After installation, program the thermostat to turn down after office hours and back on again to regain comfortable temperature prior to employees arriving each morning. Turning the thermostat down 10 to 15 degrees for 8 hours can save approximately 5% to 15% per year on heating costs and energy use.

Programmable thermostats also save employee time used for manually adjusting the temperature each day. Programmable thermostats range in price from $30 to $300.

GENERAL EQUIPMENT

- **Turn-off all equipment when not in use especially over night and weekends**. This recommendation includes printers and copy machines. An example cost and energy savings is as follows:

  Estimated Savings: Standard copiers use 180W when on and are reduced to 120W when in "sleep mode". Turning off copiers at the end of every workday can result in total annual energy and cost savings of 500 kWhr and $25 per year.

  Energy Savings Calculation: 120W per copier x 1 copier x (8760 hours per year- 4580 hours of operation) x 1 kWhr/1000Whr (x$0.05/kWhr).

- **Address phantom loads for additional energy savings.** For many types of equipment, energy is used even when the equipment is turned off. Phantom loads can range from 3W to 10W for small equipment and up to 50W for larger items such as coffee makers. Phantom loads can be found in equipment that has a light or clock operating at all times and plugs that have the transformer box located at the end of the cord. Unplug equipment after hours or keep equipment plugged into a power strip for ease in turning off.

- **Service refrigeration units regularly.** Clean refrigeration coils several times per year to maximize refrigeration efficiency. Regularly check seals on all refrigeration units and replace as needed. Keep refrigeration units relatively full to maximize cooling. When replacing refrigeration units, research and purchase high-efficiency models. High-efficiency refrigeration units can save up to *one half* of the energy associated with refrigeration.

RETROFIT ASSISTANCE (Always contact these agencies at the beginning of any project planning process, to avoid disqualification)

- Oregon Office of Energy's BETC program: 35% of a lighting retrofit project's eligible costs can be taken as a tax credit, so long as the retrofits result in a reduction in energy usage of at least a 25% and has at least a one-year payback period. Projects under $20,000 may take this credit all in one year, and can be carried over into additional years if the entity has no tax liability. For more information on the BETC program, please contact the program manager, Evan Elias at the OR Office of Energy: #(800) 221-8035, or visit http://www.energy.state.or.us/bus/tax/betcbrtx.htm.

- Energy Trust of Oregon: the Energy Trust of Oregon offers standard incentives for a variety of energy efficiency retrofits. Cash incentives are paid upon project completion, which reduces overall installation costs and helps the lighting fixtures pay for themselves sooner over time. For example, retrofitting of four-lamp 4-foot fluorescent fixtures can receive up to $25 per fixture when converting to two lamp T-8 fixtures with efficient electronic ballasts. For more information contact Energy Trust of Oregon at 1-877–510–6800, or visit http://www.energytrust.org/buildingefficiency/standard.html

GREEN POWER FROM PACIFIC POWER

Businesses can invest in renewable energy, such as wind, solar, geothermal and biomass, which has a much lower impact on the environment than traditional methods of electricity generation. Visit Pacific Power online at http://www.pacificpower.net/Article/Article49267.html, or contact them directly at 1-800-769-3717.

II) WATER USE

The following summarizes methods to conserve water and save on water and sewer costs. Water use includes irrigation, general restroom use, and kitchen needs.

RESTROOM WATER USE

- **Install low-flow toilets.** Numerous toilets throughout the facility are the original toilets installed in 1959. Toilets of this age may be using up to 5 gallons per flush (gpf) each. Exchange toilets in high use bathrooms with a low flow model (1.6 gpf) and encourage employees and visitors to use these bathrooms. Assuming the existing toilets have 5-gpf current water usage, the low-flow model will reduce water use per flush by at least 3.4 gallons.

  Estimated Savings: On average between men and women, employees use toilets two times per average workday. It is assumed that half of the visitors use the toilets once per visit, and half of the toilets used by visitors and employees are older, higher flow models. Switching to low-flow 1.6 gpf toilets could result in water savings of up to 29,400 gallons and $160 per year.

  Water Conservation Calculation: *(17 employees x 2 flushes per day x 5 days per week) + (325 visitors/week x 0.5 flushes per visit) x 3.4 gallons per flush water savings x 50% of toilet use occurs at an old model high-flow toilet x 52 weeks per year x 1/748 ccf/gal (x $4 per ccf). Cost savings include both water and sewer rates. (ccf =one hundred cubic feet)*

- **Install low-flow aerators in restroom sinks.** Approximately half of the sinks located in the bathrooms do not have aerators. Sinks without aerators can use up to 5 gallons per minute (gpm) compared to low flow faucets, which flow at 1.5 gpm. Installing aerators would provide a water savings of 3.5 gpm per faucet. Aerators can be purchased for around $2 each and are easily installed by screwing into faucet tip.

  Estimated Savings: There are 17 full-time employees and approximately 325 visitors each week using the restrooms. Employees in a normal workday use the restroom up to four times per day and half of the visitors use the restroom each visit. A standard hand wash is 15 seconds each. For this calculation it is assumed that half the number of hand washes occur at a faucet without an aerator. Installing faucet aerators will result in annual savings of 11,400 gallons and $60 per year.

  Water Conservation Calculation: *(17 employees x 4 hand washes per day x 5 days per week) + (325 visitors/week x 0.5 hand wash per visit) x 0.25 minutes per hand wash x 50% of total hand washes occur at a sink without aerators x 3.5 gallons per minute water savings x 52 weeks per year x 1/748 ccf/gal (x $4 per ccf). Cost savings include both water and sewer rates. (ccf =one hundred cubic feet)*

- **Fix faucet and toilet leaks immediately.** During the REP on-site visit, faucets in the Sunday school room had leaks. Faucets that drip 1 drop per second can be wasting up to 200 gallons of water per month, or 2400 gallons and $22 per year per faucet. Toilet leaks can also add up quickly. To determine if there are toilet leaks, place 10 drops of food color in the toilet tank. If color appears in the toilet bowl after 15 minutes try repairing leak by replacing the flapper valve.

III) MATERIALS USE

The following section identifies recommendations for material savings and reduction in solid waste.

PURCHASE RECYCLED MATERIALS

- **Whenever possible, purchase paper products that are made from 100% recycled materials with at least 30% post-consumer waste paper.** Items that are available with recycled content include:
  - Paper for office use
  - Paper towels
  - Toilet tissue

Buying recycled products supports the recycled material market, reduces waste generation, and conserves natural resources.

RECYCLING (Please contact Amy Muno at the Corvallis Recycling and Disposal for thorough assistance with recycling at 754-0444)

- **Provide recycling containers desk sides and in common areas such as copier rooms for paper, and in lunch areas for other recyclables.** To encourage recycling by employees, make recycling bins easily accessible; paper-recycling bins in areas such as copier rooms, paper recycling containers for desk sides, and general recycling containers in break rooms. Determine where containers would be most utilized and provide containers and appropriate signage. Ask employees where additional recycling bins should be located. Label the bins and educate employees about new recycling locations. Ensure custodial staff are also aware of any new recycling bins and distinguishes them from garbage containers.

  Current recycling pick-up allows for commingling of the following recycled materials (glass must be collected separately):
  - Magazines, newspapers, office paper, and mail
  - Plastic bottles and tubs (no need to remove lids or labels);
  - Aluminum/tin cans, aluminum pie plates, aluminum foil, and empty steel aerosol cans (no need to remove lids and libels, no need to flatten);
  - Paper bags, paperboard, and cardboard.

  Providing convenient methods for recycling keeps recyclable materials from entering the waste stream and could result in more opportunities for materials to be reused. In addition, once materials are separated make sure custodial staff and/or facility personnel places recyclables in the appropriate containers outside the facility.

- **Recycle spent fluorescent lights.** All fluorescent lights, including tube fluorescent lights and compact fluorescent lamps, contain mercury and should not be disposed of with garbage. Environmental Protection Services (503-408-8956) will pick them up from for a small fee. They can also be delivered, with prior arrangement, to the quarterly, hazardous waste collection events provided by Corvallis Recycling and Disposal for a fee.

- **Recycle printer, fax and copier cartridges (inkjet and laser jet, not toner cartridges) and purchase remanufactured cartridges whenever possible.** Many programs are available for these services. Local companies that provide recycling and refill services are Redundant Cartridge on North 9th street and Rapid Refill in downtown Corvallis. An Oregon company who accepts spent cartridges for recycling and remanufacturing and also sells remanufactured cartridges is Step Forward Activities. Contact www.stepforwardactivities.org to find out more information. Sometimes remanufactured cartridges can be less expensive than OEM (original equipment manufacturer) cartridges; also, the use of remanufactured does not void equipment warranties, contrary to popular belief.

PAPER

- **Maximize paper conservation for weekend programs and newsletters.** Currently First Methodist Church mails approximately 500 newsletters every two weeks. Newsletters consist of two double-sided pages and are self mailers, eliminating the need for envelopes. There are currently 140 members who receive their newsletter electronically further conserving paper. Determine a method to check in with members to make sure the newsletters are being used and if members would accept electronic copies. For service programs, print on both sides of inserts whenever possible and reuse programs and inserts for the different services. Make sure to tell the congregation why paper conservation is being encouraged to increase their participation.

- **Reduce overall paper consumption.** The following ideas can be integrated into printer and copier

use policies and may require a concerted effort by staff to change behavior. Periodic reminders, descriptions of cost and waste savings, and signage are recommended. (REP staff can provide signage) It is difficult to project the savings that could be realized in any one-office setting, but a conservative guideline is that if an office were to actively institute all of these measures, paper expenses could be cut by at least 25% or more! This list is comprehensive; some may be less applicable than others.

- Print double-sided whenever possible. Change the printer and computer defaults to automatically produce double-sided printing for employees whose work does not require single sided copies. Purchase duplexing units for existing printers or when replacing printers, purchase models that provide double-sided printing. Duplexer units are available for both laser and inkjet printers. Prices range from $70 to $200 and like most printer accessories, are designed specifically for your printer series.
- Collect and re-use paper that is only printed on one side (from mistakes, fax transmission reports, etc.) These sheets can be used for scratch paper, draft printing or cut up and used as memo pads. To encourage more use of draft paper, dedicate one main printer drawer for used paper, making sure the paper is clean and wrinkle free, and encourage staff to use this paper for all draft documents. Provide specific boxes at printing locations and recycling centers to collect this paper
- Refrain from printing emails.
- Use email messages or ½ sheets and scratch paper for printed memos and announcements.
- Fax Machines: Reformat faxes to eliminate cover sheet. Use fax Post-Its® rather than a full sheet cover page when faxing documents. Set the fax machine to only print out periodic transmission reports, or to print on command, rather than automatically after every transmission.
- Print thumbnails of long documents (2 or more pages per sheet of paper) for checking overall layout, draft proofing.
- Use print-preview and spell check options before printing.
- Ask staff to pay attention to margins, type font, and spacing. One half to one-inch margins, a maximum of 11-point fonts, and single spaced documents are recommended.
- Use reusable internal mail envelopes.
- For documents that require comment from more than one person, print just one copy and circulate with a document routing sheet that allows employees to signoff that they have received and read the document.

- **Switch from folded paper towels to roll-style brown paper towels.** In bathrooms and kitchens switch from folded paper towels to roll-style paper towels. Some vendors will provide dispensers at no cost with the purchase of the towels, further increasing savings. Studies show that roll-style towels can cut usage and costs by up to *one third,* decreasing the use of paper (and the wood, water, and energy used to manufacture and transport the towels), reduce purchasing costs, and reduce the clutter and cost of over-flowing garbage containers. In addition, for increased water quality, purchase unbleached paper towels with recycled content to reduce the use of bleaching agents used to manufacture white towels.

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Thank you for participating in the *Get SMART!* Resource Efficiency Program. We appreciate the chance to demonstrate how this program works, and hope that you will find a few recommendations that will work for your organization. Please feel free to use these recommendations as a guideline for any changes that you would like to consider. We hope you will call on us with questions or for assistance with implementation.

Please note that any professional services or products mentioned are only examples and are in no way intended to be endorsements of a particular company. In addition, any prices used in calculations are unofficial and subject to change.

It would be beneficial to record any savings you are able to make using these recommendations. We will call you soon to discuss the recommendations you have decided to implement, and to provide you with additional resources. We look forward to continuing this work with you.

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