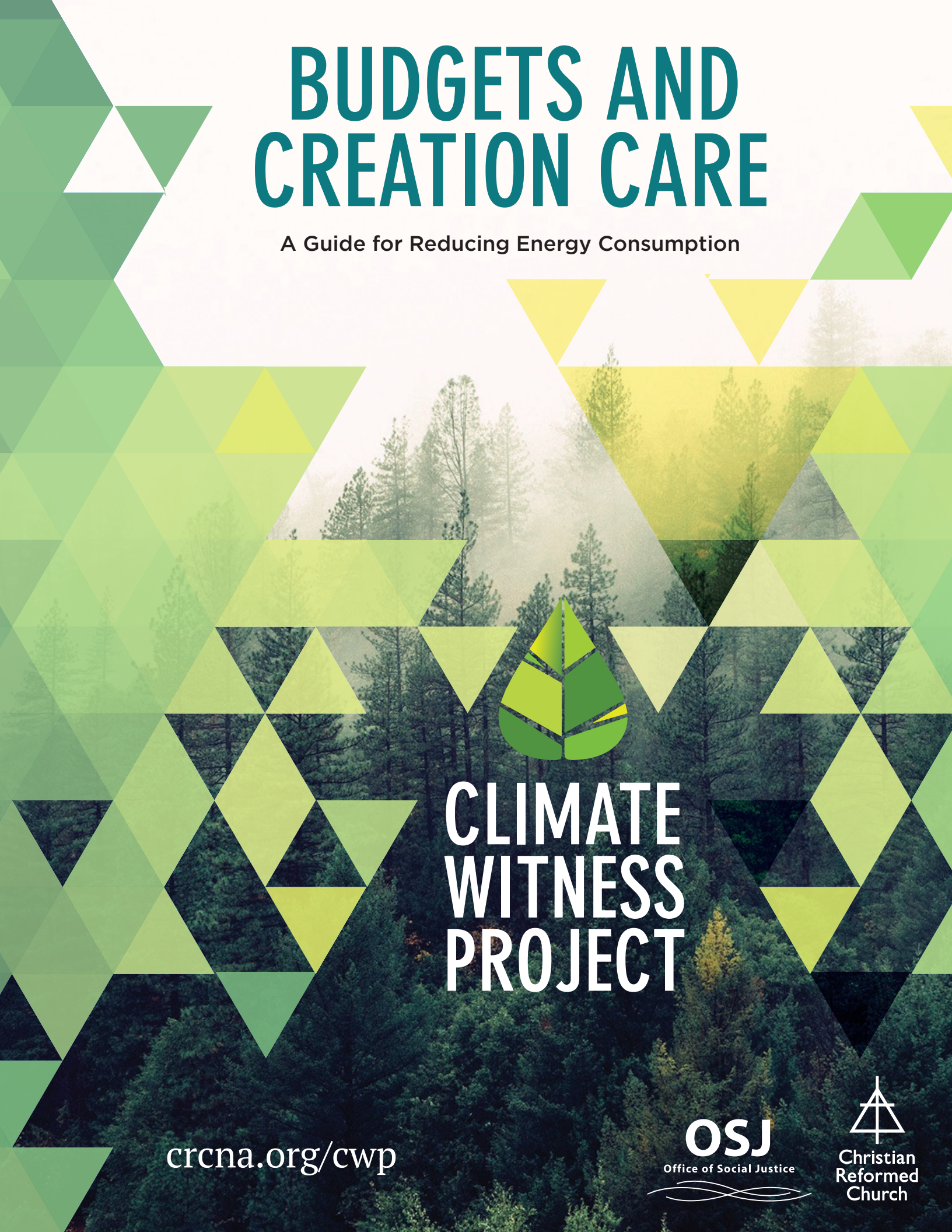
BUDGETS AND CREATION CARE

A Guide for Reducing Energy Consumption



CLIMATE WITNESS PROJECT

crcna.org/cwp

OSJ
Office of Social Justice

Christian Reformed Church

Many churches would be happy to see their facility/operating expenses reduced so that more money would be available for other causes. I would like to show that this can be done for most churches and organizations while at the same time reducing their impact on the creation by lowering energy consumed.

Hi! My name is Henry Brouwer and I am one of the regional coordinators (Hamilton, ON area) for the Climate Witness Project (CWP), tasked with the implementation of recommendations in the Creation Stewardship Task force Report adopted by the CRC Synod of 2012. One of the goals of the CWP, initiated by the Office of Social Justice, is to reduce the energy consumption of church facilities as a very concrete response to the Paris climate agreement reached by 195 nations in December, 2015 and now in effect for all nations. The Canadian government is committed to the reduction of carbon emissions; reducing energy consumption is one way by which churches can show their support of this plan while at the same time also reflecting their concern for justice and a healthy creation.

First of all, here is a simple calculation to show how to calculate the cost of electricity used on an annual basis, assuming a cost of $0.15/kWh (1 kWh is the amount of electrical energy to operate a 100W light bulb for 10h). In some regions, the cost may be lower, in others higher; just adjust the number to the local situation. The cost to operate a 100W (or 0.100 kW) light bulb on 24/7 for one year is:

$$\text{Cost} = (0.100\text{kW}) \times (24\text{h/day}) \times (365\ \text{d/y}) \times (\$0.15/\text{kWh}) = \$131.40/\text{y}$$

Below are some examples of Energy Savings that could be achieved in your facilities. Keep in mind that these are only to show what may be achieved and will vary for each facility and location.

POTENTIAL ENERGY SAVING IDEAS

- **Exit signs** Many older buildings use two screw-in 15W incandescent light bulbs for their exit signs; newer ones use LED units. The annual cost of electricity to operate these is $39.42/y (see how to do the calculations above). These light bulbs can be replaced by two 1.2W red LED lights costing less than $10 each (without having to replace the fixture); this would cost $3.15/y for electricity (and they last much longer, thus reducing replacement costs). As you can see from these numbers, the savings can be quite significant and pay the for cost of replacement in less than a year.
- **Security Lighting** Most commercial and institutional buildings have a number of fluorescent fixtures that are on 24/7 throughout their building. These units normally operate with two fluorescent tubes (T8), rated at 32W each or 64W/fixture. The annual operating cost would be about $84.10/fixture. Replacing the tubes with 18W LED tubes (costing around $12 each) reduces the annual cost to $47.30, a savings of about $37/fixture every year. In addition the LED tubes contain no mercury, can be used directly in most fixtures and have a longer life expectancy. Some types of LED tubes can be used without the ballast, but this requires removal of the ballast and simple rewiring.
- **Spot lights** Older spot lights are generally rated between 65W and 100W; these can be replaced by LED spot lights rated at 10W. Many of these are also dimmable.
- **Sanctuary Lighting** Many of the hanging sanctuary lights use incandescent bulbs, some

as much as 500W. There are again a wide variety of LEDs available to replace these bulbs. If the fixtures use, for example, four 100W incandescent bulbs, they could be replaced with 8W to 10W LEDs, leading to a 90% reduction in energy use.

- **Parking Lot/Driveway Lights** These are generally metal halide bulbs that require a ballast to operate. Typical power ratings for these are 175W for driveways to 400W for parking lots. A qualified electrician can rewire these to accommodate appropriate-sized LEDs, which can operate directly off a 120V or 240V supply.
- **Exterior Building Lights** Most buildings have lights on the exterior of the building for security purposes. Often these are 100W metal halide bulbs which can be replaced (with some rewiring) by 20W LEDs. Assuming that these lights are on an average of 12h/day, the difference in cost per unit per year is $52.56 ($65.70 for metal halide vs $13.14 for LED).
- **Office Lighting** The office lights are probably on the most of any room in the building. If the fluorescent tubes are replaced with LED tubes and assuming the office lights are on 10h/day and 5 days a week, the difference in annual operating cost per fixture is $10.92 ($24.96 for the fluorescent and $14.04 for LED). In this case the payback period is about 2 years, since the lights are not on as much.
- **Motion Sensors** Of course, any time the lights are turned off, no energy is used. For some areas in your building, motion sensors can be installed (again by a qualified person) so that the lights are automatically turned off if the room is not occupied. Some examples where these could be installed include washrooms and classrooms.
- **Programmable Thermostats** Perhaps parts of your building are only used certain times per week. In that case, it may make sense to use a programmable thermostat to replace a fixed thermostat, so that the area can be heated or cooled only when in use. The sanctuary is one possible area if it is normally only used on Sundays.
- **Hot Water Heater(s)** Many hot water heaters are set rather high; a lower temperature would be quite adequate for many uses (hot water for bathrooms, for example); the higher the tank temperature, the greater the heat loss. Normally, a dishwater will have its own built-in heater to ensure that the water temperature is at the required temperature.
- **Insulation of Hot Water Pipes** Wrapping hot water pipes with foam insulation (especially near the HW tank) will help reduce heat loss.
- **Building Insulation** Depending on the construction of your building, you may be able to add more insulation to the space between the ceiling and roof. Commercial and institutional buildings were often built with lower insulation requirements than homes, so this is one area where energy loss can be reduced.
- **Solar Panels** In addition to reducing energy demand, your facility could also become a producer of electricity using solar panels; the cost of solar systems has dropped significantly in the last few years. Many utilities now allow for net metering, so that if you generate excess energy, it will flow into the electrical grid; since your facility would likely use more than you could generate annually, you would only pay for the net energy you used from the grid. If you are being charged different rates, depending on the time of day, you may find that a solar panel can pay for itself in just a few years, since daytime use of electricity is the most expensive.
- **Renovating or Rebuilding?** Consider using a geothermal heating/cooling system for lowering fossil fuel dependence.

IMPLEMENTATION

Obviously, not all the things mentioned above can be done at once. And there may be additional opportunities as well. This task could be assigned to your property committee or some individuals who may be passionate about this. An external energy audit for your facility (through your local electricity provider) can make specific suggestions and also direct you to programs that may assist with the cost of up-grading. Local electrical suppliers may have a greater selection of LEDs than hardware stores. Fund raising for covering the costs of upgrades will likely be easier if the donors know that their contributions will have a lasting impact on both the budget and on the creation.

It is important that the governing board/council endorses this work; the board/council should also ensure that the reasons for doing the work are not just economic, but also reflect a desire on behalf of the organization to implement and encourage creation stewardship.

Doing the right thing benefits both the creation and the budget!

On behalf of the Climate Witness Project,

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For further information or clarification, or to learn more about getting involved in the Climate Witness Project, contact Steve Mulder at steven.mark.mulder@gmail.com.