



Resources for increasing the energy & water efficiency of church properties



Love the Creator, love creation.

"So faith by itself, if it has no works, is dead." (James 2:17)

Increasingly, Uniting Church congregations and individual members are seeing that their love for the Creator should be lived out through practical, loving actions on behalf of the rest of creation.

At the Presbytery and Synod meeting in November 2006, the Resources Board was given the task of investigating some concrete options which might be made available to churches, such as solar panels and on site water collection. This work was undertaken by the Environmental Church Properties Working Group.

Now with a new name, the Church Environment Working Group has been focused on the application of environmental strategies to church property, rather than the adoption of existing fixed measurement rating schemes. This has been achieved through the consultancy of Energy Architecture, who has designed a universal application which can be used in conjunction with the information provided in this booklet, to guide congregations toward the measures most applicable to their particular property.

The Matrix for Energy Efficiency & Water Efficiency of Church Properties will be made available on the Uniting Church SA website.

*"So faith by itself,
if it has no works,
is dead."
James 2:17*

Resources for increasing the energy & water efficiency of church properties

Alongside power generation and water storage, sits the need to *reduce* power and water use. This booklet suggests some specific starting points, including websites where you can get further information.

Energy

The steps to minimising the environmental impacts of a church's energy consumption are:

1. **minimise consumption as far as possible**
2. offset the environmental costs of whatever energy is still used
 - a. by purchasing accredited green power, which helps support the installation of additional renewable energy such as wind power
 - b. and/or using alternative technologies to generate energy.
 - c. and/or by calculating how much extra green power would cost, and donating that amount to church environment initiatives, bush regeneration projects or environment groups.



Congregations should be targeting Step 1: energy reduction.

If energy consumption can be reduced sufficiently, then switching to green power should cost no more than the current power bill. Cost savings on your current electricity expenditure may also be available via UnitingCare Synergy (www.sa.uca.org.au/goto/synergy). Your savings could be put towards purchasing green power.

Task 1: Minimising Energy Consumption

The major sources of energy use in churches are likely to be lighting, heating and cooling. There are many options for reducing these elements of energy bills.

Lighting

When lights are turned on and off

It sounds obvious, but making sure that lights are turned off when they are not being used is one of the most important energy efficiency measures a congregation can take. This is not just the obvious step of turning off all the lights at the end of the day's activities, but also being aware of lights during the day – for example, do you need lights on in the kitchen while the worship service is taking place?

You can get reminder stickers for lights from the Energy Advisory Centre (8204 1888 or country callers 1800 671 907). In some churches, sensor lights in certain corridors may make sense.

Turn lights off when not required

For years, many of us have thought that if we had fluorescent lights then it was more efficient to leave them on. However, the Energy Division advises that this is a fallacy. Fluorescent lights require only a small amount of energy to switch on, so you do save energy by switching them off.

Placement

Take a walk around your church building. Where are the lights located? Are they located in the areas where they are actually needed? Sometimes changing the position of lights can make a big difference to the overall effectiveness of lighting in your building. For example, lighting situated close to walls where nobody ever goes will be less effective than lighting walkways. If you want more expert advice on this, you could consult an electrical/lighting engineer for expert direction in making lighting layout and light fittings as efficient as possible.

*Are lights placed
where you actually
need them?*

Another thing to think about as you look around - are you making the most of the natural light available to your building? Skylights can save large amounts of energy, and provide a more natural ambiance.

Type of lighting used

The type of powered lighting that will best suit your building will depend on the nature of that building and, in particular, the ceiling height, natural lighting and types of occupation.

Low/normal ceilings (less than 4-5 metres)

Fluorescent lights (compact fluorescent or fluorescent tubes) and LEDs (Light Emitting Diodes) are the most energy efficient lights for buildings with ceiling height of less than 4-5 metres. Compact fluorescent lights (or CFLs) use around 20 per cent of the electricity used by standard incandescent light bulbs to produce the same amount of light and can last between 4 and 10 times longer than the average incandescent light bulb.

LEDs (Light Emitting Diodes) for general lighting purposes are an emerging lighting technology which is expected to be the future of household lighting. They are familiar in applications such as lighting displays in household appliances, mobile phone screens, and traffic signals.

Most lighting companies are developing LED bulbs for direct replacement into normal fittings, some of which are available now, but most are expected to be available for some applications over the next couple of years.

The benefits of LEDs include lifetimes of up to 100,000 hours, and potentially very high efficiency levels, some with wattage of electricity use as low as 3 watts.

High ceilings (greater than 4-5 metres)

If your church has high ceilings (greater than 4-5 metres) you may need to use high intensity discharge lights such as mercury vapour, metal halide or high pressure sodium lamps.

Sodium lamps

Sodium lamps are high intensity discharge lamps and are useful in exterior situations such as car parks and loading yards, or internally where factory ceilings are high. They combine the benefits of high output and efficiency, but have a yellowish colour which some people dislike. In some cases they may need to be augmented by fluorescent tubes at workstations where good task lighting is needed.

Mercury high discharge lamps

Mercury high discharge lamps are widely used in warehouses, factories and gymnasiums with high ceilings. They have a low initial cost but poor efficiency overall. In addition, they create significant disposal problems as a result of their use of the heavy metal mercury. In most situations, mercury lamps can be replaced by metal halide lamps with much improved efficiency.

The following website contains extensive information about Energy Efficient Lighting, covering all topics including:

- Judging ideal light levels
- Saving money at the switch
- Key lock switches
- Time switches
- Lighting controllers
- Voltage reduction technology
- Sensors
- Energy smart lighting strategies
- De-lamping

*Check out energy
efficient lighting
ideas*

Go to: http://www.energy-toolbox.vic.gov.au/information_sheets/energy_efficient_lighting.html

Heating & Cooling

Heating and cooling church buildings efficiently can be difficult, especially with older buildings with high ceilings. However, even in these buildings, the efficiency of your heating and cooling systems can be increased significantly by addressing issues such as insulation, shading, draft proofing and zoning.

Insulation

Is your building insulated? If not, it may be worth looking into the costs of insulation. However, you will need to weigh up the costs of insulation versus the energy savings you will make. Some older insulation material does collapse over time and become less effective. More modern materials claim to maintain their properties for the life of the building. Congregations with very old insulation may wish to consider getting someone in to assess its effectiveness.

Shading and draft proofing

Shading and draft proofing are simple, cost effective ways to make your building more energy efficient.

Simple steps include:

- fit weather stripping around door frames and draught excluders to the bottom of external doors
- use caulking compounds to seal any cracks or gaps to keep draughts out
- add boxed pelmets over existing curtains, to reduce heat loss in winter and heat gain in summer.

*Draft proof
your church
building*

More major steps, which would cost more, but could also make a bigger difference, include:

- fitting partitions, curtains, moveable screens or doors to enable zoning (see below for more information)
- installing closely-woven, tight fitting curtains in a boxed pelmet, or double glazing, to reduce heat loss through large windows
- making sure that windows are well shaded, preferably with light coloured external shading devices such as awnings, blinds and louvres. Shading walls and paved areas close to the building also helps. Planting trees, bushes and vines around the building can help to keep the building cool by providing shade in summer. Start with the north side of the building, then the west if your church is exposed to hot summer afternoons. Make sure that shading devices on the north side still allow winter sun to enter windows and warm walls. (The winter sun is an additional source of free heating.)

Zoning

Another way to increase the energy efficiency of your building is to use zoning. This will be particularly effective in areas such as halls, where using the entire space may not always be necessary. Zoning involves closing off areas that don't need to be heated or cooled so that the heating or cooling is concentrated in the areas that need it. For example, a church hall may be able to be partitioned into two or more sections and where only a small group is using the hall, only the section of the hall that is being used by the group needs to be heated. An added bonus is that this enables more groups to be using the church property at any one time!

Choosing a heating system

Most existing church buildings will already have heating systems in place. However, in some cases, congregations may wish to think about replacing their heating system, especially if it is very inefficient or if it is coming to the end of its lifespan. In addition, congregations undertaking extensions to their buildings or congregations without heating may wish to consider installing heating systems. For all of these situations, it is worth taking the time and energy to establish what will be the most efficient heating for your particular building.

The *Energy Advisory Service* website has further heating and cooling information, go to: http://www.dtei.sa.gov.au/energy/energy_action/household/saving_energy/heating_and_cooling

Water

Task 2: Minimising Water Consumption

The main sources of water use in a church building are usually toilets, dish washing and the garden.

Toilets

Dual flush systems are much more efficient than single flush. Converting to a dual flush system requires a plumber's assistance, and can be relatively expensive. But you can install a water saving device (available from most hardware stores) yourself to make immediate savings while you are waiting.

In the men's toilets, if your church building has urinals, switching to desert ecosystems blue cubes can save huge amounts of water. These cubes reduce water usage in urinals by up to 98%. For more information, go to www.desert.com.au or phone 1300 721 825. However, retrofitting should be undertaken with caution, as it may not be as successful as a completely new installation. Since conversion to this system for the offices at 212 Pirie Street, Adelaide, Synod has required a plumber to provide maintenance.

The South Australian Government has a rebate scheme under which not for profit and charitable organisations can claim rebates for water saving toilets, showerheads, and washing machines. For eligibility criteria go to: http://www.sawater.com.au/SAWater/YourHome/SaveWaterInYourHome/rebates_overview.htm

The main sources of water use in a church building are toilets, dish washing & the garden

Dishwashing/Kitchen

There are as many kinds of church kitchens as there are church buildings, but there are a range of products which can help reduce water use, depending on whether you have a dishwasher, how hot your water is and how far it is from the water heater etc. Pay particular attention to ways in which you can adjust your thermostat so that you only have the temperature at the level you require.

Rainwater

The collection and use of rainwater for use in toilets and the garden can have a significant impact on water consumption. Rainwater tank installations are relatively simple, but you should consult your plumber in regards to connecting a rainwater supply to fixtures currently connected to mains water supply.

Rural congregations who's primary source of drinking water is rainwater, should ensure that gutters and tanks are kept clean and a risk management strategy is in place to ensure that water is safe for the purpose. Refer to Uniting Church SA Property Services for further advice in relation to rainwater for consumption.

The Commonwealth Government ceased community water grants program in July 2008, and it appears that the new scheme, *The National Rainwater and Greywater Initiative* commencing March 2009 provides rebates to owner occupied residences. For eligibility criteria go to: <http://www.environment.gov.au/water/programs/nrgi/index.html#households>

Gardens

Gardening water restrictions are now a reality around SA for those of us on mains or town water. Many non-native plants use very little water, but if it is possible to focus on native plants, then the garden can become both low water, and habitat for native animals.

One example of this approach is the "sustainable" garden at Scots Church (<http://ecofaith.org/garden/>). It is not only low water and good habitat, but a great point of interest for passers-by. City churches will be able to access funding from the city council as Scots did, but other councils may also have funding. The *Sustainable Landscapes* Project Coordinator, based at the Royal Adelaide Botanic Gardens, may be able to help with funding sources.

Native plants use little water & can be habitat for native animals

Another approach to this has been used by the Kensington Park congregation. This congregation decided to remove some trees (that were blocking the front of the church) and a grassed area and replace them with a water-wise garden. As the congregation didn't have specific funds to do this, they invited people to donate plants with low water needs. They now have a new garden, one that doesn't need lots of water to keep it alive.

A third approach is that used by the Woodville Gardens congregation. This congregation had a significant piece of land which has been converted into a community garden. Not only is this a great use of church property that benefits the environment, but it is a wonderful way of making real connections with the community.

The approach to take to the church's garden will depend on the church's location and the size of the area being used. Nurseries can provide information on the best type of plants for your area, and many congregations will have keen gardeners in their membership who can assist with converting the garden into a much more water wise one. A wealth of information on sustainable gardens can also be found on the Sustainable Gardening Australia website at www.sgaonline.org.au and the Sustainable Landscapes website at <http://www.environment.sa.gov.au/botanicgardens/sustainable.html> or 08 8222 9311.

Sustainable Gardening Australia
www.sgaonline.org.au

Materials

Task 3: Materials for Maintenance and New Building Works

For new building works, property site selection, which can optimise north/south orientation can improve energy efficiency.

Most people spend a vast amount of time indoors. The materials and finishes which are used in buildings can have a big impact on the people who inhabit these buildings.

Thought should be given to the materials used during building works and for maintaining the church property:

- Do paints and timber products off-gas dangerous and harmful chemicals?
- Do building materials produce fine particles which can irritate respiratory systems?
- Are building materials sourced from the local community? Importing materials requires the use of transportation, which contributes to the ever increasing Carbon Dioxide emissions - increasing the greenhouse effect. Also, selecting local materials can have a positive effect on the local community with an increased capacity of local employment opportunities.
- Are timber products sourced from a sustainable or managed forest?
- Do selected building materials have a large embodied energy? For example was there a lot of electrical power or water required in producing the material?
- Product lifecycle – can products be recycled in the future, when they are replaced?
- Be aware of new efficiency requirements and **Renewable Energy Certificates** in relation to new and replacement hot water systems coming into effect on installations undertaken from February 2009. For further information go to:
<http://www.environment.gov.au/energyefficiency/solarhotwater/>

*When possible,
source timber
products from
sustainable or
managed forests*

*Are building
materials sourced
locally?*

*Consider materials &
finishes used in your
church buildings*

Checklist for energy & water efficient church properties

Energy

Lighting

- Always turned off when not needed
- Appropriate placement (*page 2*)
- Use of natural light
- Most efficient lighting for building

Heating & Cooling

- Insulation
- Shading
- Draft proofing
- Zoning
- Choice of heating/cooling system appropriate for building
- Thermostat set at appropriate level (*page 3*)
- Regular maintenance carried out
- Thermostats checked and recalibrated if necessary

Use this checklist for every building on your church property

Appliances

- Existing appliances checked for energy efficiency (*page 4*)
- New appliances are energy efficient

Water

Toilets

- Dual flush
- Water saving device installed
- Blue cubes in urinals

Other

- Dishwasher energy and water efficient (check star ratings)
- Rainwater tank installed and used
- Sustainable garden
- All water systems maintained and leaks promptly attended to

The energy efficiency strategies suggested in this workbook are based on the booklets “Heating, Cooling and Ventilation” & “Commercial and Factory Lighting” published by the Department for Transport, Energy and Infrastructure, Government of South Australia

<http://dtei.sa.gov.au/energy/publications>

Level 8 ANZ Building (City Central Tower 1)
11 Waymouth Street, Adelaide SA 5000
8204 1888

Additional lighting notes have been provided by Energy Architecture

For more information on how to implement any of the strategies suggested in this booklet, please contact Property Services at the Uniting Church SA office on 8236 4240 or cstock@sa.uca.org.au

Uniting Church SA
... towards an
environmentally
sustainable Church

This workbook can be found on the Uniting Church SA website at
<http://resources.sa.uca.org.au/property/property>
or <http://environment.sa.uca.org.au>



Uniting Church SA

**Uniting Church in Australia
Presbytery and Synod of South Australia**

Level 2, 212 Pirie St, GPO Box 2145, Adelaide SA 5001

Ph: 08 8227 0822

Ph: (country callers free call) 1300 766 956

www.sa.uca.org.au