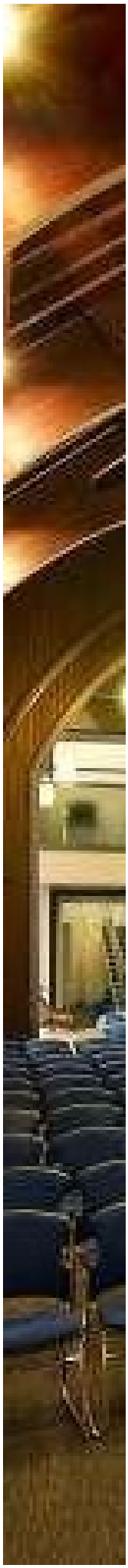

Anglican Parishes – Environment Audit 2008

In 2008 the Anglican Church Property Trust Diocese of Sydney commissioned an environmental audit of a selection of parish buildings from architectural firm AJ + C. Five parishes were chosen with a range of properties that represented the buildings typical of Sydney's parishes.

A summary of the findings of the report and suggestions for mitigating the poor environmental performance of some of the buildings follows.

Findings in Common

Building age
Essentially, the older the church, hall or rectory building

- the higher the thermal mass (eg. sandstone, full cavity brick);
- the poorer the orientation (eg. they face the street rather than the sun);
- the lesser the amount of insulation (if any at all);
- the draftier the building whether from open chimneys or poorly fitting doors/windows/floorboards –
- and the greater the discomfort for anyone using the building.

Such findings are not so unusual for heritage properties from the 1800's, but unfortunately the trend has continued almost to this day. The buildings of the 1950's right up to the past few years (including the alterations and additions) all display the same limitations: a lack of concern for solar orientation, natural illumination, a marked lack of insulation, single (energy in-efficient) glazing and the like. Instead, all these buildings have relied upon cheap electricity or gas to buy their way out of energy-inefficiency, with attendant higher operational costs and building-user discomfort. Unfortunately, with electricity prices likely to rise this will be of increasing concern.

Building construction
Cost 'savings' made at time of original construction (typically insulation, in-efficient glazing) will now cost vastly more to improve. The single most cost-effective measure for building upgrading is better insulation, starting with the roof cavity, thence walls then under-floor (where possible). In the next few years, retro-fitting existing buildings for human comfort and reduced impacts will become an increasingly essential norm. Each building needs to be assessed individually, with starting observations made earlier within the body of this report.

Alterations and additions
Too much single glazing facing east or west means major heat loss or gain depending upon the season. Appropriate assessment and up-grading should be considered at the earliest opportunity.

Lighting
Most parish buildings have older-style (in-efficient) lamps within whatever light fitting is installed. There has been a quiet revolution in lighting efficiencies (lumens per watt of energy) which means that substantial operational and GHG savings can be made. Most especially these include replacing incandescent bulbs with compact fluorescents (typically 6 times more efficient and lasting ten times longer), and now replacing these with LED (light emitting diode) lamps (3 – 4 times further efficient and lasting 50 times longer!). Maintaining light quality (eg. 'warm white' and flicker-free) is important, so more expert advice for the individual buildings should be sought.

Heating
Whilst Sydney generally is a 'temperate' climate which allows much passive warmth and 'coolth' from the sun and controlled ventilation, this largely depends upon building orientation and construction. All the parish buildings audited fall short in one or more seasons – some excessively so. Hence the higher heating and cooling bills than otherwise necessary, and too often without overcoming the basic (built-in) problem that determines human comfort (or otherwise). Church buildings or halls that require people to passively sit are especially demanding as people's tolerance zone is reduced. Hence improved performance of the building fabric should be considered as well as before heating upgrading.

Directions for improvements

Below are some general observations and requirements from low cost to higher cost.

'Button-Up'	Weather-strip doors and windows, gaps and cracks – all of which markedly affect comfort and energy-efficiency.
Insulate water heaters	Old-style hot-water storage heaters lose enormous energy, especially if hardly used. At minimum, add an insulation blanket and install temperature thermostat (50^0 max. so no-one gets burned). Preferably, replace.
Install low-flow taps and showers	New low-flow fittings can reduce water use by two-thirds at little cost and still do the job pleasantly. This also reduces the energy costs from hot water.
'Harvest' rainwater - install water tanks	Connect gutters to 'first-flush' device, collect in appropriate tanks and use water for toilet flushing, laundries (both uses requiring a pump), gardens. Do NOT use for drinking /cooking if runoff is from old roofs with lead flashings.
Replace incandescent light-bulbs	Before they're banned! Compact fluorescents and new(er) LED lamps provide the same output at a fraction of the running costs and last 8 to 20 times longer! This means the cost of replacement is usually repaid within the first year. Use task lighting, rather than full illumination everywhere.
Install lighting controls	These may include dimmers, time-switches (avoid burning lights all night!), passive infra-red ('Infra-scan') sensors (only switch on when necessary).
Install fans	Where cooling is necessary, install fans with speed controller and reverse (for gently spreading warmth in winter). This has much less environmental impact than AC.
Replace old inefficient refrigerators /appliances	Modern appliances can be three times more energy-efficient than the old (check the 'star-rating'). Don't just dump the old (fridges, air-conditioners), find out where they can be drained of operational gas which are highly damaging greenhouse gas emissions (eg. CFCs are 140 – 11,700 times worse than carbon dioxide).
Tune heating, cooling, air-conditioning	Service all mechanical equipment, tune up and replace filters, pumps and the like. Install electronic thermostats with timers ('set and forget') appropriately regulated. Use the least-impact space heating – sun, gas, electric…
Insulate everywhere	Starting with roof/ceiling, walls and then underfloor (last). Fill every gap and crack.
Efficient hot water systems	Install energy-efficient hot water systems with minimal greenhouse gas emissions. For low/occasional water use this may be instantaneous gas (with temperature control); otherwise consider 'heat-pump' (on roof or walls not necessarily facing the sun); 'evacuated tube' technology; or solar panels (roof-top facing sun) with gas boost (NOT electric boost). Government subsidies may be available.
Maximise natural light – minimise heat gain	Creative retrofitting can often add value and opportunity for natural light deep within buildings, through double-glazed roof windows, solar-tubes and the like. At the same time ensure this doesn't lead to excessive heat gain from un-shaded windows.
Use trees and landscape	Not only are they pleasant, they lock up carbon and give off oxygen, they can provide energy-efficiency and cost savings (eg. shade from excess sun or wind. Design for sun /wind protection, to minimise maintenance, to attract birds, for fragrance and aesthetics, using hardy stock of species suitable for that place ('native', 'endemic').
Photo-voltaics (PV) solar cells	These generate electricity, sitting on rooftops. 'Grid-connect' systems generate (usually spare) electricity during the day, which is drawn back at night-time – with a meter that flows both ways (providing or drawing electricity).