habitat

Solar centre provides a showcase of innovations

□ A new solar information centre in WA is showing that cheap, energy-efficient heating for homes and offices is now a reality. DENNIS LINGANE reports.

The new Solar Information Centre in Canning Highway, Como.

FOR a country averaging eight hours of sunshine a day year round, West Australians have been extremely slow to take advantage of this free energy when designing their homes.

A home or office designed to use the sun's natural energy can save up to 64 per cent in power bills, according to the design team which created WA's first Solar Information Centre in Canning Highway.

Our climate is suited to solar equipment, yet we are nowhere near Japan in applying these alternative technologies.

Japan says it will be 20 per cent solar reliant by the year 2000 — a challenge indeed for a country with long winters.

The solar engineers have managed to achieve two ambitions with the Canning Highway centre.

They have created a building that they say is the most solar efficient in Australia, and within it established a permanent exhibition for new solar technologies.

As well as being an example of what can be done using ingenuity instead of electricity, the Solar Information Centre is also manned by 30 companies staging exhibitions of solar technology.

The centre, which was officially opened last Wednesday, will be open seven days a week. There will be a service which will advise you on how to build a solar home and solar seminars for architects, builders, and home improvement enthusiasts. Murdoch University is also involved in the project and will run some of the advisory services.

Products on show range from passive insulation to wind turbines, solar outdoor lighting, and a solar roof heating system similar in concept to the popular solar hot water system.

In this case the unit stores hot air instead of hot water. It is blown into the house in winter to warm the interior.

Architect Garry Baverstock says that builders have to learn you don't create buildings and then try to cool or heat the space within them.

"The secret is to make a building with high thermal mass and then heat or cool the structure. This will then continue to cool or heat the space throughout the night," he says.

"Feel the heat from bricks when they have been in the sun. These would go on heating a home all night because the heat would transfer from them into the building."

Solar engineer Ken Bartell takes up the story: "This building is designed so that the very structure is cooled or warmed. Then it gives off heat or coolness during the night to maintain the temperature close to what we want.

"The mistake most people make when fitting out a new office is to insulate the floor with carpets and the concrete ceiling with a false foam ceiling to hide the air conditioning ducting and the wiring.

"This looks good but it means the conditioned air is not able to reach the concrete, the ceilings or floors and it is these that have high thermal mass and are capable of absorbing the temperature."

The information centre is designed to run year-round, using only fans and heat exchange technology to cool and heat the building at a fraction of the price being paid in other office buildings around Perth.

The heart of the environmental control system is a Dricon reverse evaporative system made by the NSW company Dricon.

Evaporative air conditioning is cheaper to run than refrigerated air conditioning. Its major problem is that the cooled air blown into the building is loaded with humidity. This means doors and windows have to be kept open, otherwise there is a build-up of moisture. This Dricon system works in reverse.

The hot air leaving the building is passed through pipes in which sprinklers operate to cool this outgoing air. The cooled air is run through a series of pipes in a radiator through which the incoming air is passed. The incoming air is therefore cooled without picking up any water vapour.

So doors and windows can then be kept closed without the danger of a build-up of moisture.

THIS dry evaporative system eliminates the danger of Legionnaires' disease, introduces constant filtered fresh air into the building and, because the air conditioning isn't of the refrigerated type, there is no risk of ozone-damaging CFCs being released into the atmosphere.

This cooling cycle runs throughout summer operated by a series of fans and recycled water for the sprinklers. In winter the building is warmed with the same fans and ducting. But the hot air is collected via a Tecto pergola and a glass roof.

The roof of the building is metal sheeting painted dark brown. Over this is laid a glass roof with a gap left between the glass and metal, and finally on top of these is the Tecto pergola.

The Tecto pergola is a series of wide battens set at an angle. This ensures sun can reach the glass in winter when it is low on the horizon, but not in summer when the sun is high overhead.

So in winter the sun's rays hit the glass during the morning, warming the air trapped between the glass and the dark metal roof.

This hot air flows upwards by natural convection into a duct.

A small computer runs the various passive heating and cooling systems by tracking the temperatures, anticipating which system needs to be activated (depending on the time of the year and inside ambient temperature), and then opening and closing the specific ducts.

● See also HABITAT 2

Reflective coatings worth investigation

AS THE hype about global warming maintains momentum, so does the need for new and innovative products that offer greater protection against a harsher environment.

Meeting part of the technology innovation in this area is a range of reflective coatings and paints.

About seven types are known to the Solar Energy Information Centre, which include brand names such as Woodkon Heat Reflective Coating, Gecko Paints, Insultec, Wattyl and Sovereign Agencies.

All seem to perform within a few degrees of each other on any given application.

The main purpose of this product range is to prevent the sun's energy from entering the structure and thus helping to manage internal temperature at optium required levels.

Some also serve as a waterproof seal to the roofs and walls.

All suppliers offer well documented case studies of performance levels, however as it is much harder to make a same-situation comparison, the physics of heat transfer needs to be appreciated by prospective customers.

Some data and samples on this subject is available at the Solar Energy Information Centre.

Making light work of house cooling

AN Australian-made solar powered home ventilation system has just been released in WA and will be demonstrated at the Solar Energy Information Centre on Tuesday afternoon as part of Solar Energy Week.

Each room of the house, or just those that get hot in summer, is fitted with a Solartech ceiling mounted exhaust fan which are totally powered free from the sun via a photo voltaic (PV) panel on the roof.

Three models are all 12 volt direct current (DC) powered and have the ability to exhaust between 95 to 170 cubic metres of air per hour at absolutely zero running cost.

The units are easily installed and because they are 12V DC no electrician is needed.

Once the hot, stale air has been extracted into the ceiling cavity, it is then vented to atmosphere through a turbine wind ventilator.

By exhausting or venting out the hot air build up in the ceiling cavity, a householder can improve the performance of insulation if it is installed.

The ceiling vents can either be shut off in the winter or switched to reverse cycle so that any ceiling cavity heat buildup can be blown into rooms as space heating, thereby reducing or eliminating the need for artificial space heating devices.