

# Smarter design is key to big savings

AUSTRALIAN scientists are pioneering a world advance in city planning: entire suburbs that can save energy and slash thousands of tonnes of greenhouse emissions through better layout.

Research undertaken by CSIRO Sustainable Ecosystems and the Cooperative Research Centre for Construction Innovation in South East Queensland (SEQ) has found a well-designed suburb can save its residents 20 per cent on their regular power bills or up to two thirds on their total power bills if they use solar hot water.

Energy Efficient Design Project Leader, CSIRO's Michael Ambrose, said: "A well-laid out subdivision where homes face the right way for passive solar heating and cooling, for solar hot water heaters, for natural light and to take advantage of local breezes, can collectively save millions of dollars to its residents in power bills - and thousands of tonnes of greenhouse gas emissions

through reduced electricity use." The concept has been trialled on recent urban developments at Brookwater and Kelvin Grove in Brisbane. If all the planned 8000 new homes at Brookwater were in a solar suburb, it would save 16,000 tonnes of greenhouse emissions a year - equal to taking 3000 cars off the road every year.

Change is occurring across Australia with new energy-efficiency regulations becoming mandatory for new residential dwellings. Energy-efficiency Rating (EER) was introduced in Queensland in 2003.

A typical Queensland subdivision can achieve the required 3.5 star energy rating for the average home. But one laid out for energy saving can achieve 4 or 4.5 stars per home, simply through better planning.

One problem is the narrow east-west block: even a well-designed energy-saver home may have trouble meeting its ratings on this. It will probably need extra insulation and blinds,

more cooling and heating and use more power for hot water.

The use of energy (electricity and gas) is the largest source of greenhouse gas emissions from Australian households. The average household's energy use is responsible for the production of about eight tonnes of CO<sub>2</sub>, the main greenhouse gas, per year.

CSIRO's Anne Miller, who heads a CRC for Construction Innovation project investigating the impact of natural cooling properties in a variety of SEQ dwellings, says the pattern of energy use in the average Queensland home is quite different from the rest of Australia.

"The single biggest consumer of energy in the average Queensland household is hot water heating, which accounts for some 38 percent of energy use," says Ms Miller.

Australia-wide, space heating and cooling is the main energy consumer in residential dwellings. But due to its subtropical climate, the average

Queensland house uses very little energy to heat or cool spaces. Queensland's average energy expended on heating and cooling is five percent, compared with the national average of 39 percent. However, this percentage is set to rise with the predicted increase in air-conditioned homes in Queensland.

Ms Miller's research investigates the role that natural ventilation can realistically play in cooling residences.

The research will inform the development of a lot rating methodology for SEQ.

Ms Miller says Australia's pattern of residential development highlights the need for development to be more sustainable to avoid unnecessary demand on natural resources.

"Targeting energy-efficient design at the sub-division stage could significantly reduce the amount of energy consumed to heat and cool dwellings and increase the sustainability of Queensland's future growth," she says.