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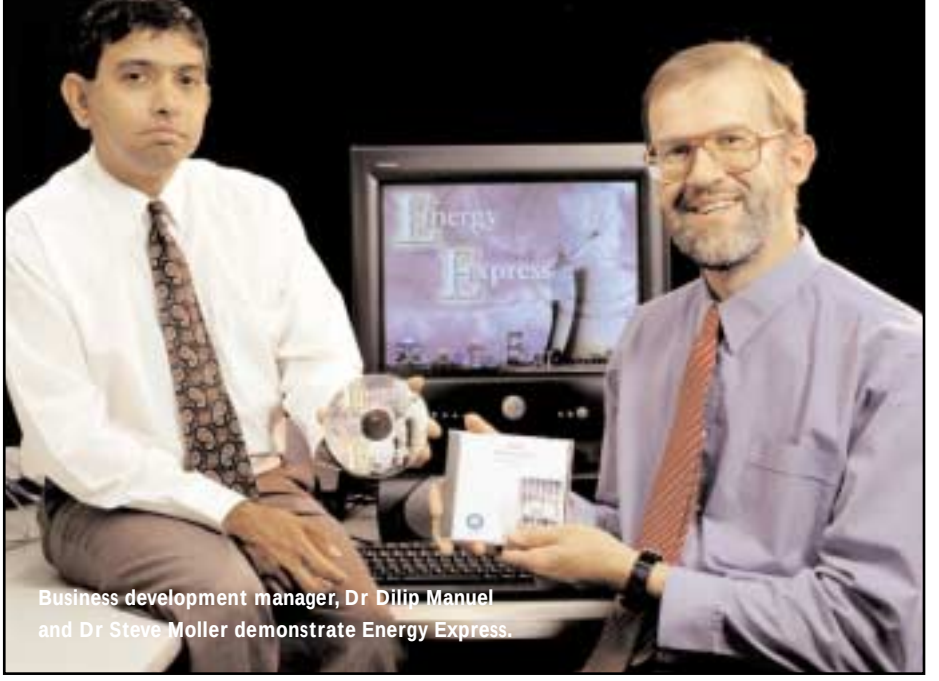
A model of efficiency



Business development manager, Dr Dilip Manuel and Dr Steve Moller demonstrate Energy Express.

A new tool is set to revolutionise the design of energy-efficient buildings. Energy Express, a modelling program developed by Steve Moller of CSIRO Thermal and Fluids Engineering, evaluates the energy efficiency of commercial buildings by estimating the operational energy the building is likely to consume, at the design stage.

The program looks at variations in a building's design, such as layout, orientation, materials, insulation, shading, lighting, and 'HVAC' (heating, ventilation and air conditioning). It also considers operational variations such as thermostat settings (whether a building will be cooled to 24°C or 26°C for example), schedules (if a building is operated during business hours or over 24 hours for example), and control of HVAC. Operating energy costs are then estimated using electricity and gas tariff data included with the program

'At the design stage, people are mainly interested in the fabric of a building and the services that go into it. But the way the building is operated also influences energy consumption,' Moller says.

'Energy Express will allow clients to see the impact of their building requirements on energy consumption, but it will also allow them to see the impact of changing those requirements. The energy cost savings of different design and operation options can then be evaluated to produce the most effective combination, before construction.'

The software will soon be available in two versions, one for architects and the other for engineers. The architect's version incorporates a simple air conditioning model that evaluates the impact of the building envelope, shading and operating options on energy consumption, without the need for detailed HVAC data.

The engineer's version includes additional tools to calculate the size of the air-conditioning system required, and detailed models for exploring HVAC options. For example, the impact of air-conditioning options, such as variable speed fans and pumps, duct insulation and outdoor air dampers can be evaluated.

Energy Express for Architects is scheduled for 'beta testing' in April and will be released in mid 2002. The engineers' version will be released some months later.

'The program will provide architects with a tool they haven't had before, while engineers will receive a tool that incorporates features not available in existing air-conditioning sizing models,' Moller says.

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Wendy Pyper

In 2002, it's **easier** to be **green**

HOW MUCH could you save on your energy bill by swapping the electric heater for a gas furnace? What difference would it make if you took the train instead of the car?

These are some of the questions answered by a new CD-ROM published by EPA Victoria and developed by CSIRO and the Curriculum Corporation. The Australian Greenhouse Calculator enables householders to estimate annual energy costs and level of greenhouse gas emissions and other pollutants.

Homes can be compared with a 'typical' household to see the likely impact of changing appliances or behaviour on greenhouse gas emissions and energy costs.

A 'quick calculator' takes users through a number of screens, each representing a room in the house, and assesses the type of appliances and their level of use. The calculator considers, for example, the household's transport use, (car and use of public transport), hot water, heating, cooling and refrigeration.

In the backyard screen, click on the rubbish bin and you will be asked to nominate the degree of recycling carried out by your household. You can also look at how many trees a year you need to plant to offset your greenhouse gas emissions.

The calculator is driven by a mass of data (120 pages of formulae and tables).

For example, entering your postcode links you to a particular energy source – a coal-fired power station or hydro-electric plant – which will affect the level of emissions from your home.

As well as the 'quick calculator', the CD contains a 'detailed calculator' and a browser based reference section with information about air pollution and the greenhouse effect, and a number of activities designed for students.

The Greenhouse Calculator is available from CSIRO Publishing for $49.95. Freecall: 1800 645 051, publishing.sales@csiro.au.

Robin Taylor