MEDIA RELEASE

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Deakin researchers find way to predict environmental impact of buildings

Deakin University researchers have developed a quick and easy method to predict the environmental impact of Australian buildings.

Using data gathered from 30 buildings in Melbourne, including hospitals, offices, schools and houses, the researchers with Deakin's Built Environment Research Group discovered for the first time a strong relationship between building costs and energy performance. From this information they have been able to develop a quick and reliable way to calculate energy consumption by simply knowing a building's capital cost budget.

"Our research has shown that lower capital cost leads to lower energy use. Therefore, cost effective construction leads to better environmental performance—a fact that is not well understood," said Professor Craig Langston, Director of the Built Environment Research Group with Deakin's School of Architecture and Building.

Professor Langston said that their results were vital given the pressure all buildings placed on the environment.

"The built environment demands 40 to 50 per cent of global energy, consumes 40 per cent of non-renewable resources, generates 40 per cent of landfill waste and uses 30 per cent of fresh water reserves. Obviously this is not sustainable, particularly as buildings increase in number and size," he said.

"With Australia having the world's highest rate of energy and water use per capita, it is timely for these issues to be aired."

During the three-year study, the researchers found that estimates of a building's embodied energy (the energy used to manufacture a building's materials) were directly tied to its capital cost budget. This enabled them to produce an equation or 'calculator' based on a building's budget to predict energy performance that could then be used to inform more energy efficient building design.

Professor Langston said that embodied energy was generally not considered in building design and construction by industry practitioners.

"There is a lack of professional knowledge about embodied energy, with few practitioners able to calculate it, which has led to its absence in routine design decision-making," he said.

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“However, embodied energy represents about 40 per cent of total energy needs for a typical building over 30 years (when the embodied energy of operational maintenance is included). With increasing energy efficient initiatives, greater use of prefabrication and transportation, and renovation to ensure market appeal, embodied energy is becoming more significant than ever.”

The researchers also found that the same principles could be applied to determine a building’s operational energy (heating, cooling, lighting etc) over the next 100 years.

“What we have been able to produce is a model that not only reduces time but also eliminates the complexity of energy, particularly embodied energy, calculations from a few weeks of expert effort to a few minutes by a relative novice,” Professor Langston said.

“By putting this useful tool into the hands of building practitioners, the widespread use of energy analysis can be routinely incorporated in the early design stages of new building projects to ensure an appropriate and sustainable deployment of resources.”

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Professor Craig Langston is available for interview.

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