

GREEN BUILDINGS BOOST PRODUCTIVITY

Health and wellbeing are increasingly being considered during the integrated design of new buildings and retrofit of existing ones. What are the benefits from green buildings for owners and occupants?

By **Alex Cutler**, Chief Executive, New Zealand Green Building Council

The environmental benefits of green building have been widely demonstrated internationally. But what about the social benefits? With staff costs significantly outweighing all other costs during the lifetime of a building, the financial upside of investing in buildings that have been proven to enhance employee satisfaction and productivity is increasingly apparent.

Negative effects on health

Internal environment quality is affected by several conditions: microbial contaminants, particulates, gases, noise, daylight, temperature and lighting. New Zealand and US studies provide evidence of adverse effects on health from poor internal building conditions.

In America, a 2007 study on the economic and public health impacts of damp and mould concluded an increased risk of adverse health effects for building occupants. Of the 21.8 million asthma sufferers in the US, approximately 4.6 million cases are estimated to be attributable to dampness and mould exposure in the home, at a national annual cost of approximately US\$3.5 billion.

An earlier 2006 Ministry for the Environment study suggested that, in spaces with poor internal environment quality, there is a 5–15% loss of productivity. This is from higher levels of sickness and absence and lower-quality work.

Green buildings foster productivity

In New Zealand, there is growing evidence alluding to significantly increased productivity in green buildings. Staff in the Meridian building in Wellington measured productivity levels 10 months after occupation. At the time of this survey in 2008, the New Zealand Building Use Studies (BUS) Benchmark for Productivity

was significantly worse than its international equivalent. However, Meridian's productivity score was significantly better than the international benchmark, and it rated second for occupant satisfaction out of 20 New Zealand buildings surveyed at the time.

A study of Melbourne's CH2 building (Australia's first 6 Green Star-rated building) showed productivity had risen by 10.9% since staff moved into their green office, providing an estimated annual cost saving of \$2 million.

Users prefer sustainable buildings

Current research by George Baird at Victoria University of Wellington comparing the performance of sustainable buildings with conventional ones from the point of view of users (see page 53), has found that, on average, sustainable buildings performed much better. Operational and satisfaction factors were higher for sustainable buildings, and productivity increased significantly. Data from this study will be published soon, but more data is needed across New Zealand before substantive national evidence will be available.

Schools benefit too

The good news is also applicable to schools. When increased ventilation rates and reduced temperatures were used in a US study with groups of 10-year-old children, task completion rates in subtraction and reading increased and fewer errors were noted when checking a transcript. Comparing the capital costs of building new green schools with the increased financial benefits, the evidence is overwhelmingly positive (see Table 1).

Green schools provide a range of additional benefits, such as reduced:

- teacher sick days

- operations and maintenance costs
- insured and uninsured risks
- social inequity.

Also noted are increased competitiveness and educational enrichment.

Although there is insufficient data to quantify these additional benefits, they are substantial. If calculated, they would greatly increase the recognised financial benefits of greening schools.

More than just buildings

As more research is undertaken to quantify the health and wellbeing benefits of green building in New Zealand, it will become easier to identify the significant financial advantages. It is also about more than just buildings. In the US, there are calls for built environment professionals to be trained in public health impacts, and the use of health impact assessments in the design of healthy communities is not that far away. ■

Table 1: Financial benefits of green schools (\$/ft²). (Source: *Greening America's Schools – costs and benefits*, Gregory Kats, October 2006)

Energy	\$9
Emissions	\$1
Water and wastewater	\$1
Increased earnings	\$49
Asthma reduction	\$3
Cold and flu reduction	\$5
Teacher retention	\$4
Employment impact	\$2
Total	\$74
Cost of greening	(\$3)
Net financial benefits	\$71