

Renovate! Rebuilding Office Buildings and Condos Accelerates Climate Change

All across Singapore, office buildings and condos are continually being pulled down and rebuilt. Little thought is often given, though, to the environmental impact of that destruction. It turns out that renovating buildings is far better for the environment than rebuilding. Changing mindsets and construction practices could help Singapore achieve its climate goals faster.

Renovating is More Sustainable

Studies comparing the environmental impact of rebuilding and renovating have been underway for more than a decade. As far back as 2010, the Singapore Building & Construction Authority (BCA) said that a study by the Building Research Establishment found that refurbishment solutions for buildings are generally lower both in environmental impact and whole-life costs than comparative redevelopments.

Around the same time, the National Trust for Historic Preservation (NTHP) in the UK similarly concluded that building reuse almost always offers environmental savings over demolition and new construction. NTHP said it can take between 10 and 80 years for a new energy-efficient building that is 30 percent more efficient than an average-performing existing building to overcome the negative climate change created during construction.

In Canada, the Public Forum for the Public Good said that constructing new low-carbon “green” buildings is no longer seen as the fastest path to mitigating climate change. “Instead, the most accelerated strategies for decarbonization of the built environment focus on retrofits to existing buildings, which can achieve as much as a 70 percent reduction in energy use.” As former American Institute of Architects (AIA) president Carl Elefante put it, ‘the greenest building is one that is already built’.

The financial benefits for renovation can be huge. Analysis by Philips Lighting suggests that businesses around the world could achieve savings totalling up to US\$1.5 trillion in reduced rental costs alone if their office buildings were refurbished to the most efficient standards of today. Refurbishment can significantly reduce bills for energy, water and air conditioning, and also improve employee productivity.

Strategies for Green Renovation

The methods for achieving these gains are multifaceted.

As the BRE Trust in the UK noted, old buildings may have less-than-ideal working conditions for their occupants due to factors such as poor lighting, poor ventilation, solar penetration, glare, and poor control of cooling. The opportunity to address the environmental impacts within refurbishment, BRE said, fall under four categories: materials, waste, water and energy. Simple water-efficient fittings provide favourable rates of return, for example, while an HVAC plant update or improving thermal insulation can increase energy efficiency. It concluded that refurbishment may be considered more sustainable in terms of saving in the embodied impact of materials, waste disposal and even architectural value.

Researchers at the Council on Tall Buildings and Urban Habit (CTBUH) similarly noted that tall buildings suffer from the passing of time. However, CTBUH said their aging is rarely caused by structural decay due to the characteristics of the materials used to construct them. “Instead, the decline of tall buildings is more often a consequence of functional obsolescence” and not meeting the expectations of occupants in terms of comfort, functionality, environmental performance and cost. CTBUH found that renovating a tall building is often a better option than demolition and reconstruction, as renovation can cost 50-to-90 percent less than the demolition of the present building and the erection of a new tower of a similar size. The renovation of an existing building affords important savings in building material, as it eliminates the needs for the energy required to tear down the old building, clear the site, and produce and transport the new construction materials. In a recent renovation at the Empire State Building, for instance, elevator refurbishment alone improved typical travel times by up to 40 percent and cut energy consumption by 70 percent.

The AIA explained that energy-efficient retrofits achieve dual savings by conserving embodied energy and curtailing operations emissions. “If you renovate and reuse the biggest parts of existing buildings you can save 50 percent of your carbon on a project right off the bat,” says Larry Strain, a principal at Siegel & Strain Architects told the AIA. “It’s the first thing all architects and owners should try to do.”

The NTHP noted that care must be taken in the selection of construction materials in order to minimise environmental impacts, as the benefits of reuse can be reduced or negated based on the type and quantity of materials selected for a reuse project. Savings from reuse range from 4 percent to 46 percent over new construction when comparing buildings with the same energy performance level.

As Swedish building consultancy Memoori observed, the pyramids of Giza have been standing intact for more than 4000 years, the Pantheon in Rome has been in continuous use for more than 2000 years and Istanbul’s intricate Santa Sophia appears pristine despite its 1483-year age. “We have known how to construct and maintain buildings to last for thousands of years, yet the average life of a modern building is just 60 years, and many are now calling that unsustainable.” The average lifespan in Singapore is a much-lower 16 years, according to *Eco-Business*.

Mindsets need to change so that we focus on renovating buildings rather than destroying them and erecting new ones. Continuing to use the buildings we already have can reduce climate change tremendously and enable Singapore to achieve its environmental goals faster.