

Conserve a building, save the planet

There's a new reason to preserve Singapore's landmark modernist buildings: the reduction of carbon emissions by extending their lives instead of demolishing them

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For The Straits Times

Many heritage enthusiasts have been discussing the value of 1950s-1970s modernist icons as cultural capital that embodies the visionary ideals and architectural prowess of Singapore's pioneering planners, developers, builders and architects.

But buildings such as Golden Mile Complex – which the Urban Redevelopment Authority has recently proposed for conservation, People's Park Complex and Wing On Life Building are not just cultural capital that speaks to our sense of history. They are also environmental capital suggesting a pathway to a low carbon future.

Extending the lives of old modernist buildings is not just to commemorate the human imagination and skills that went into producing them, the communities that lived in them, and the society that experienced and knew them – though these are worthy enough reasons.

We also reduce material waste, conserve embodied energy and significantly reduce our contribution to the climate crisis.

In 2007, the United Nations decided to rehabilitate, not demolish and rebuild, its New York headquarters – and not just because it is a 1951 modernist masterpiece. Calculations showed that even if a highly energy-efficient, new structure were to replace the ageing complex, it would still take 35 to 70 years to offset emissions incurred by demolition and rebuilding.

Modernist buildings are composed mainly of concrete, which is particularly high in embodied carbon content. Globally, the manufacture of cement, a key ingredient of concrete, is the fourth-largest contributor to carbon emissions, behind petrol, coal and natural gas.

So what is the actual amount of embodied carbon in a building? Engineering firm Web Structure director Hossein Rezai estimates that erecting just the concrete



Buildings like Golden Mile Complex (left) – which the Urban Redevelopment Authority has recently proposed for conservation – are not just cultural capital that speaks to our sense of history, say the writers. They are also environmental capital suggesting a pathway to a low-carbon future. PHOTO: LIANHE ZAOBAO

performance-based evaluation, and exemptions given to conservation rehabilitation projects.

Building guidelines, such as Green Mark criteria, would need to evolve quickly to pave the way for more sustainable urban development. As with the unprecedented raft of planning incentives offered to potential buyers of Golden Mile Complex, this would necessitate inter-agency and inter-ministry collaboration, perhaps coordinated by Ministry of National Development.

RETHINKING 'BLANK-SLATE'

Such a fundamental shift in approach calls for a change in mindset; we have to relook current definitions of urban growth and the heavy reliance on the "blank slate" approach to development.

We need to raise awareness about the real, long-term cost across the real estate ecosystem, from the Government, construction industry, planners and professionals to property owners and building users.

National, regional and global movements have sprung up in the past year, in response to the climate change crisis, to question current practices and assumptions in the building industry.

Prime examples of such movements include Singapore Architects Declare Climate and Biodiversity Emergency (sg.architectsdeclare.com), Architects' Journal Retrofirst (architectsjournal.co.uk/news/retrofirst) and the Climate Heritage Network (climateheritage.org).

If creative and green retrofitting is used in revitalising older concrete buildings and the larger urban landscape, it will go a long way to help Singapore in meeting its target of peak carbon emission by 2030 and halving the peak by 2050, as spelt out recently by the Inter-Ministerial Committee on Climate Change.

One of the three thrusts of the climate strategy it laid out is the transformation of Singapore's industry, economy and society through bold plans such as capturing more solar energy and phasing out internal-combustion engine vehicles.

Creative and green retrofit of modernist buildings can likewise be part of the transformation of the construction industry, real estate market and heritage conservation needed for a vibrant low-carbon future.

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frame of a typical 40-storey structure in Kuala Lumpur will produce up to an emission of 51 million kg of carbon dioxide – the equivalent amount sequestered by 8.75 million trees in a year.

Building a similar concrete structure in Singapore is estimated by Dr Rezai to emit 25 per cent to 50 per cent more carbon dioxide.

A 2019 report by the World Green Building Council (WGBC) addressed a common misconception that carbon emissions of a building only need to be measured in operational terms – energy consumption by air-conditioning, lighting, water heating and so on. The report estimated that of the total carbon emission in the lifespan of a typical building, as much as 30 per cent is embodied – incurred by its construction – with the rest due to building operations.

WGBC chair Lisa Bate assessed that the percentage of embodied carbon would be even higher for a typical building in Singapore, given the much shorter property development cycles here that see many buildings being prematurely demolished.

In this light, conserving ageing modernist high-rise concrete buildings, such as Golden Mile Complex, will lead to a significant reduction in carbon footprint.

Going further, if rehabilitation were to become an accepted, and even mainstream, mode of urban redevelopment, there would be an exponential effect on carbon savings. This is especially so given Singapore's large stock of ageing concrete buildings, including public housing flats. They have

great potential to be imaginatively and sustainably retrofitted.

ENHANCING THOSE ASSETS

Local property developers with large-scale commercial properties increasingly recognise the advantages of investing in a green retrofit, as what is termed an Asset Enhancement Initiative (AEI) centred on reconfiguration, design update and upgrading energy efficiency.

Financial gains include cost savings from improved building performance and increased rental from upgraded facilities.

In addition, more key tenants –

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especially multinational corporations whose corporate social responsibility policy invariably prioritises environmental sustainability – are seeking low carbon-footprint premises, and favouring properties that are well "rehabilitated", rather than rebuilt anew.

A recently completed AEI project is the renovation of the former DBS Tower in Shenton Way. The tallest building in Singapore when completed in 1975 and designed by pioneer architect Lim Chong Keat, its iconic segmented tower dominated the skyline then.

In 2017, it was reborn as OUE Downtown, a mixed-use development in glass and steel. Though not carried out with the intention of conservation – and the outcome is no longer recognisable as DBS Tower – the project showed how the rehabilitation of an ageing high-rise is technically and economically viable.

This contrasted starkly with the demolition of the neighbouring CPF Tower of similar vintage.

The retrofitting of existing buildings to improve energy performance is already encouraged by the Building and Construction Authority (BCA) through its Green Mark rating system. However, in assessing energy efficiency, the focus is mainly on building operation practices and construction methods. Despite the significant carbon-footprint reduction, the embodied carbon captured within a conserved or retained

building structure does not count towards total energy savings in Green Mark assessment criteria.

This omission should be rectified so that developers and building professionals who embrace the more sustainable practice of building rehabilitation are given due recognition.

INNOVATION IN CONSERVATION

Beyond a regular building retrofit, more design parameters would come into play with conserving an ageing high-rise modernist structure of exceptional architectural, historic and social significance such as Golden Mile Complex.

Developers and building professionals would need to step up their game in creatively reprogramming and reconfiguring a modernist masterpiece without compromising its inherent attributes, working sensitively to optimise its architectural character and heritage value, while deftly engaging its original stepped form, inclined atrium and colonnaded sky deck.

A key challenge is building code compliance.

Given that the structure was erected according to building codes, a prescriptive approach to compliance may lead to the loss of many original features.

In Britain and Germany, performance-based building codes are developed to incentivise green retrofit projects and help overcome regulatory limitations. More flexibility could be similarly introduced by the BCA and the Fire Safety and Shelter Department by embracing