OFFICE BUILDING CONSTRUCTION: during the past five years are, in general, more energy efficient than older buildings. This is to be expected.

Prior to the advent of the National Australian Built Environment Rating Scheme, NABERS®, and the Green Building Council of Australia’s Green Star® rating scheme, it was difficult for developers to define an eco-efficiency objective for a new office development. Now architects and engineers have ‘star’ ratings to target, and the buildings they design often display attributes and operational performance that exceed those targets.

This is a positive development, of course, however, it will take considerable time before today’s new buildings transform the sector’s emissions profile. Statistics from the Property Council of Australia indicate that over the past five years the Australian office market has grown by at least 2.5 million square metres in net terms. If we guess that number up to 5 per cent (to allow for the replacement of demolished stock), it is likely that in the order of 3.6 million square metres of office accommodation was constructed during the period 2003–2008. This implies that of the estimated 3.2 million square-metre Australian commercial office market, 8 per cent is at least five years behind the times.

It takes a typical medium-sized Australian CBD office building 24 years to use more energy through operating than it has embodied in its materials.

The bright side to this apparently sluggish rate of churn through the existing stock is that while ‘operational’ energy use is one part of the emissions profile, the product delivery approach to their design, maintenance and ongoing management.

For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock.

The concept of a new building paying back its embodied energy over its lifetime is itself, in fact, highly suspect. This is especially true where the construction of a new building requires the demolition of existing premises.

Consider the following two scenarios modelled on 25,000 square metres (NLA – net leasable area) ~ 35,700 square metres (GFA – gross floor area) office buildings in Sydney’s CBD.

Scenario 1: Well-managed existing building allowed to decline.

This scenario compares an existing 5-star NABERS Office Energy-rated building to a new building designed and constructed to achieve an ‘exceptional’ 6-star NABERS rating. The existing building improves to 4.5 stars after five full years of excellent monitoring and maintenance as well as modest improvements to its technology. The new green building starts out operating at 5 stars, but its performance declines to slightly below average (3 stars) due to relatively poor maintenance over the first six years of operation.

As can be seen, the energy embodied in the new building at construction (399 gigajoules/square metre GFA) is never repaid.

(Note: the energy embodied in the existing building has been ignored because it is a sunk cost, it cannot be repaid.) After 34 years, the new building will have been responsible for 2.7 times more greenhouse emissions than the well-maintained older building.

Scenario 2: Well-managed existing building compared to a well-managed new building.

Let’s now assume the operating performance of the new green building is maintained at the 5-star NABERS Energy level due to excellent monitoring and maintenance plus ongoing investment in technology.

The good news is that the embodied energy in the new green building will eventually be repaid thanks to its superior operating performance. The bad news is that it will be responsible for almost two times more greenhouse emissions for the first 24 years of its life and it will take 190 years to pay back its embodied energy debt.

In practice, embodied energy is never paid back. There are many reasons for developing new green buildings, just as there are many reasons for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock. For new green buildings to be justified they must be needed, stand some reason for replacing old, underutilised and dilapidated stock.

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References

*Administrators from both the National Australian Built Environment Rating Scheme (NABERS) and the Green Building Council of Australia’s “Green Star®” using diverse expert market leading performance is being achieved by new, constructed buildings seeking accreditation.>*

