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Antony Wood is a lecturer in architecture at the School of the Built Environment at the University of Nottingham in the United Kingdom. A Royal Institute of British Architects-registered architect, Mr. Wood has worked in architectural practice in Hong Kong, Thailand, Malaysia, and Indonesia, as well as the United Kingdom. He has considerable expertise in the design and construction of high-rise/large buildings.

Mr. Wood currently leads the 5th Year design studio and construction courses. His teaching and research specialties include all aspects of the design and construction of high-rise buildings, including the masters-level design module "The Tower and the Bridge."

In the realm of professional organizations, Mr. Wood is leader of the U.K.-based Tall Buildings Teaching and Research Group (www.tallbuildingstarg.com), vice chairman of research for the Council on Tall Buildings and Urban Habitat, head of the CTBUH European office, co-chair of the Editorial Board for the CTBUH World Congress 2005, and editor of the upcoming *Journal of Tall Buildings* with Taylor & Francis.

He has published many papers in the field of tall buildings, including "New Paradigms in High-Rise Design," (*CTBUH Review*, Fall 2004) and "Pavements in the Sky: The Use of the Skybridge in Tall Buildings," (*Architectural Research Quarterly*, 2003).

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The Shortfall of Tall: The Rise of an Environmental Consciousness in Tall Building Design

The negative effects of our consumer society on the environment are well documented. The creation, running, and maintenance of buildings account for approximately 50% of both energy usage and climate-change emissions globally. Yet, progress for change is slow.

Against this backdrop, the international community is divided on the sustainability credentials of tall buildings. Some believe the concentration of population through high-density (therefore reducing transport costs and urban/sub-urban spread), combined with the economies of scale of building tall, make the typology an inherently sustainable option, while others believe the embodied energies involved in constructing at height, combined with the impact on the urban environment, make them inherently anti-environmental. The rectilinear, air-conditioned, North American "box," rolled out in cities across the world without regard for either the impact on environment or the specific requirements of place, has not helped in this debate.

In recent decades however, a small-but-growing number of professionals have looked to appropriate environmental responses as the main design generator for tall buildings. In doing this they have, perhaps unwittingly, created a new vernacular for the skyscraper — an appropriate, sustainable model for future tall buildings. This presentation will outline the development of this environmental consciousness in high-rise architecture, including some of the experimental work undertaken by the presenter in conjunction with design-research students.

The Shortfall of Tall: The Rise of an Environmental Consciousness in Tall Building Design

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The effects of our global-consumer society on the environment are now well documented, and yet progress on change seems painfully slow. Latest figures predict that the impact of climate change emissions will result in a likely increase in average global temperatures between 1.4 and 5.8 deg C during this century and that the critical level of CO₂ concentration in the atmosphere (currently at 400ppm) could reach 750 – 1000 ppm by the latter part of the century⁽¹⁾. This is, without doubt, going to have a devastating impact on the planet we inhabit. The uncomfortable truth is that unless the world achieves an 80% cut in anthropogenic CO₂ emissions, there is little chance that the atmosphere will be stabilised at a level which avoids catastrophic climate disruption.

Despite this forewarning, few people in the construction industry seem prepared to listen. The creation, running and maintenance of buildings is estimated to account for 50% of all energy usage and more than 50% of all climate-change emissions globally and yet changes to legislation governing building construction and operation is, at best, limited.

Against this backdrop, the international community is divided on the sustainability credentials of Tall Buildings as an appropriate typology in our urban fabric. There are those that believe that the concentration of population through high-density (therefore reducing transport costs and urban / sub-urban spread) combined with the economies of scale of building tall make the typology an inherently sustainable option⁽²⁾, whilst others believe that the embodied energies involved in constructing at height, combined with the impact on the urban environment, make them inherently anti-environmental⁽³⁾.

The vast majority of owner-occupiers and professionals involved in the creation of Tall Buildings have not helped to convince the international community in this debate. The standard model for the high rise – the rectilinear, air-conditioned, North American 'box' – has been rolled out in cities across the world, without regard for either the impact on environment or the specific requirements of place. This has served to create an alarming homogeneity across global urban centres – a creation of a 'one size fits all' skyscraper 'mush' – which matches in negativity the detrimental effect these buildings are having on the planet we inhabit. In short, these tall buildings are helping to destroy both the local and the global.

But not all is lost. For the past two decades or so, there have been a small but growing number of professionals who have looked to appropriate environmental responses as the main design generator for tall buildings. In doing this they have, perhaps unwittingly, created not only tall buildings which are rooted to the specifics of 'time' (responsibility) and 'place' (indigeneity), they have created a new vernacular for the skyscraper – an appropriate, sustainable model for future tall buildings.

This paper outlines the development of this environmental consciousness in high-rise architecture, investigating the design / technical approaches taken. The paper concludes with a summary of the current-state-of-the-art in environmental tall building design, including some of the experimental work undertaken by the author in conjunction with design-research students.

Key Words: *Tall Buildings, Design, Environmentalism, Sustainability*

⁽¹⁾ Intergovernmental Panel on Climate Change (IPCC), Third Assessment Report, 2001.

⁽²⁾ Pank, W., H. Giradet & G. Cox. *Tall buildings and sustainability*. Report. Faber Maunsell for the Corporation of London. 2002.

⁽³⁾ Roaf, S., Crichton, D. & Nicol, F. *Adapting Buildings and Cities for Climate Change; A 21st Century Survival Guide*. Architectural Press Oxford. 2005.