

ANTONY WOOD

Integrity of PLACE

Future tall building design needs to be inspired by both the physical and the environmental aspects of place and reinvent itself as the ideal solution for both a dense, sustainable city and all-inclusive urban living.

FEW WOULD DISPUTE THAT THE WORLD IS IN the midst of a tall building boom unprecedented in terms of its global scale, with ever-denser cities and ever-taller buildings being proposed from Moscow to the Middle East, and from Shanghai to San Francisco. Even taking into account such golden periods of skyscraper building during turn-of-the-20th-century Chicago or art deco New York City, this is probably the most active period of tall building development ever, and certainly the most active on an international scale. But what is driving this unprecedented international boom? The following discussion identifies some of the usual drivers, and perhaps some surprising ones.

Land Prices

Always a driver for tall buildings, high land prices are playing a larger role in many cities in the United States, the U.K., and other countries that are seeking to repopulate urban centers with residential/recreational complements to the predominantly commercial/retail central business district building stock. These relatively new markets are helping drive up city center land prices, which makes building tall for investment return increasingly necessary.

© EVA YOUNG/ANTONY WOOD/COUNCIL ON TALL BUILDINGS AND URBAN HABITAT



Global Icons

Building supertall has never been prompted solely by the desire to increase the commercial return on a development. On the contrary, many believe that above a certain height, the economic justifications simply do not stack up. The desire to create an architectural icon to soar above the city has always been a factor in the history of tall construction, but now the focus has changed: tall buildings increasingly are being built to project the vitality of a city on a global scale—to create skylines with international brand recognition.

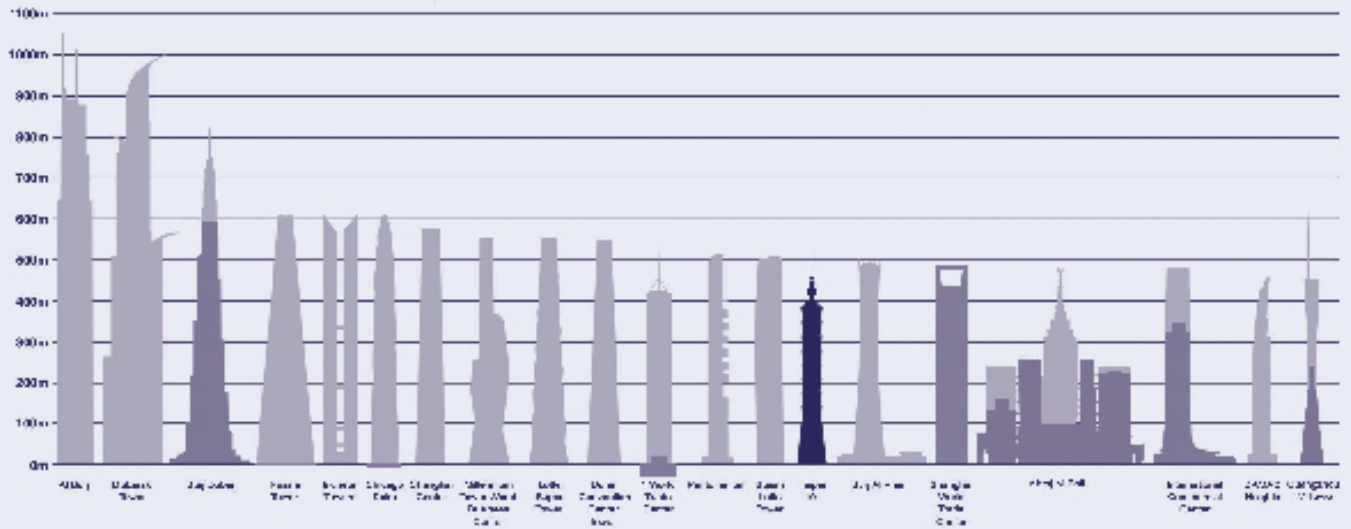
This shift from corporate to city—or even government—ambition is reflected in the titles of the world's tallest buildings. Icons such as the Chrysler Building in New York City and the Sears Tower in Chicago have given way to Taipei 101 in Taiwan and Burj Dubai in Dubai, United Arab Emirates, where the building itself takes on the responsibility of helping promote the city on the world stage, as well as at the national and regional level.

Sustainability

The threat to the planet from climate change and the need for more sustainable patterns of life as a

A hypothetical design for a new generation of tall buildings—or high-rise villages—is inspired by the physical and environmental aspects of place and breaks away from the tall building as an extruded orthogonal box or anonymous iconic sculpture.

Tallest 20 Buildings in 2020



SOURCE: Antony Wood/Council on Tall Buildings and Urban Habitat.

response are now generally accepted. Denser, more concentrated cities are seen as an essential part of this more sustainable way of life because they cut energy consumption and climate-change emissions by reducing the suburban spread of cities, and thus the need for new transportation and infrastructure networks. Tall buildings play a key role in creating denser cities by accommodating more people on smaller parcels of land. In addition, the investment in every tall building project—both financial and professional—provides the opportunity to embrace sustainable design and technologies that could lead the way for other, smaller building types.

Collapse of the World Trade Center Twin Towers

The collapse of the World Trade Center twin towers—perhaps the most far-reaching event in the past half century—created a big question mark over the tall building as an acceptable proposition for future cities. Should people continue to build tall in the post-9/11 world? Six years later, judging by the number of tall buildings being proposed and constructed, it seems the answer is a resounding yes. But why? The event induced perhaps the largest introspective analysis of tall buildings ever, while focusing attention on the

building type. This has resulted in better-designed, safer buildings that relate to urban centers better than ever before. Governments, city officials, financiers, and developers have become increasingly aware of these benefits through the global reexamination of this building form.

The world of tall buildings has changed much in the past decade or so since the Sears Tower last held the title of world's tallest for the United States. There are now more tall buildings in Asia than in North America, and of the ten tallest buildings completed in 2006, four were built in the Middle East and four in China, according to the Council on Tall Buildings and Urban Habitat (CTBUH).

During the 1980s and earlier, the assumption would have been that the world's tallest building would be located in North America, built of steel construction, and designed to accommodate office space. Today, almost none of those assumptions is true: the world's tallest buildings currently are likely to be proposed for construction in Asia, built of concrete, and designed to accommodate predominantly residential uses. This is certainly the case with Burj Dubai, already the world's tallest building though still under construction and due for completion next year.



The world's tallest building, Burj Dubai, located in the United Arab Emirates, is due for completion next year. Yet, it will only be a short time before it, too, is overtaken by other structures already in the planning process.

The Burj Dubai offers a case study in what is currently being achieved with tall buildings. In terms of pure height, the increment by which buildings are now surpassing each other is increasing dramatically. For a little over 100 years this height increment was an average of 115 feet (35 m) and never surpassed 223 feet (68 m). Although its height is a closely guarded secret, Burj Dubai is expected to be taller than 2,625 feet (800 m), about 955 feet (300 m) taller than the world's current tallest completed building, Taipei 101, at 1,670 feet (509 m).

What will be the tallest buildings a decade or two from now? Recent research by the CTBUH has projected a list of the "Tallest 20 in 2020" (see figure on facing page). Using the criterion that these be "real" projects in the public domain—that is, that they are either built or under construction, or that a developer and a full professional consultant team is advancing the design beyond the concept stage—the list places Taipei 101 as the 14th tallest in 2020. On this trajectory, it is plausible that the dizzying heights of Frank

Lloyd Wright's 1956 hypothetical mile-high tower, the Illinois, are not that far from being realized.

Challenges

There is a tendency, given this picture of a worldwide tall building construction boom, to consider that tall buildings have progressed to their most advanced state. But this is not the case. While tall buildings are beginning to incorporate sustainable design approaches and technologies, they have a long way to go before they can be considered truly sustainable.

The embodied energy and carbon emissions involved in constructing tall buildings—increased, in part, by the higher-performance materials required—combined with the large amount of energy required to operate air conditioning, lighting, and vertical transport, means that these buildings have to take every opportunity both to reduce energy consumption and harvest energy. The potential of energy harvesting at height—through wind, solar, and other energy technologies—cannot be denied. A minimum goal for future tall buildings should be zero net energy consumption. A better goal would be true carbon neutrality through the creation of an energy surplus that eventually could offset the embodied energy use/carbon emissions involved in the building's construction—and eventual destruction when the structure becomes obsolete.

A second challenge for the tall building is to advance in design terms, and especially in regard to its relationship with its urban location. Historically, many tall buildings seem to have been designed as either vertical extrusions of an efficient floor plan or as stand-alone pieces of high-rise urban sculpture. In both cases, the only relationship with the urban setting is a visual one, with the tall building usually dominating. This has led to the syndrome of tall buildings constituting "isolationist" architecture—stand-alone, non-site-specific models that are readily transportable around the cities of the world. This has served to create an alarming homogeneity across global urban centers—a one-size-fits-all skyscraper "mush." Future tall buildings need to relate to their specific location beyond just becoming synonymous with it. Their design needs to be inspired by both the physical and environmental aspects of place.

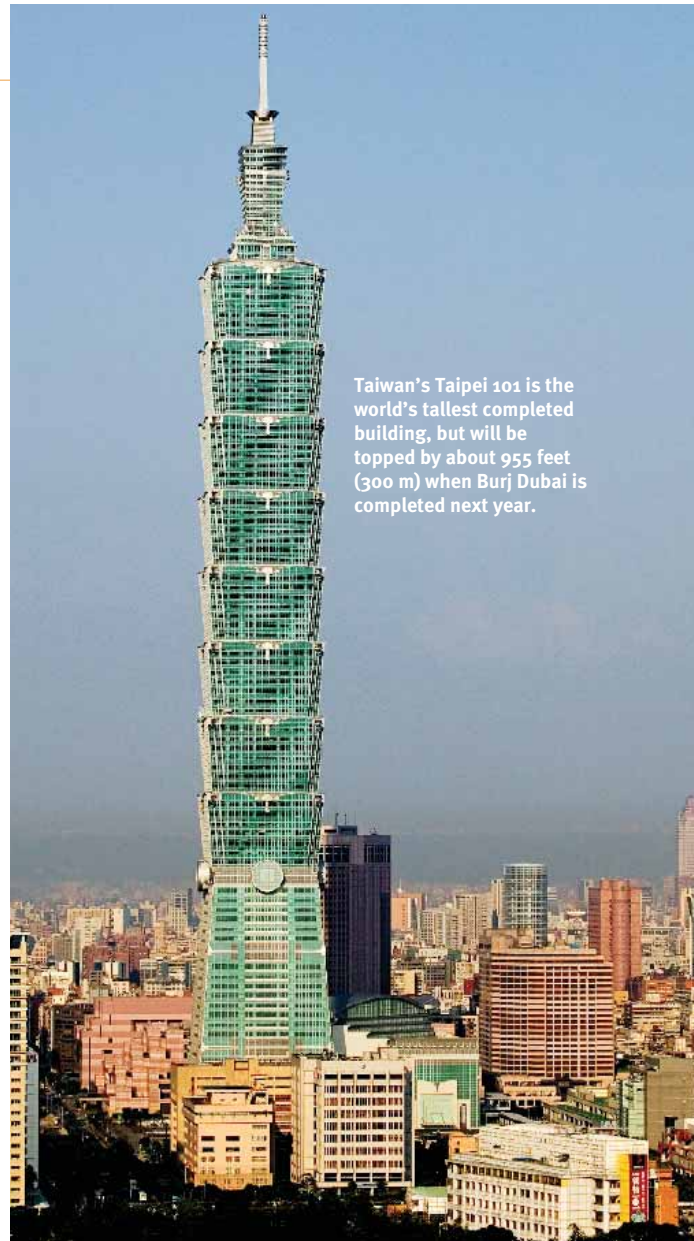
The third challenge for tall buildings lies in their functional programs. To create a truly vibrant, mixed-use

facility within both the building and the city, tall buildings need to innovate beyond the standard functions—office, residential, and hotel space—that account for perhaps 95 percent of space in tall buildings worldwide. Research by the CTBUH and its affiliate division, the Tall Buildings Teaching and Research Group, into alternative design approaches has resulted in a number of not only innovative tall building forms, but also tall building functions. Among these are vertical farms to help alleviate the environmental problems of agricultural imports—and resulting food miles; sporting functions in which swimming pools double as mass-tuned dampers and facade solar shading doubles as a climbing wall; vertical “aquifers” that maximize rainwater capture and recycling to help address the growing global decline of water resources; vertical solar and wind farms; and other elements.

Most cities in the U.K. and the United States now recognize that the suburban ideal chased by the general populace for a large part of the 20th century has been detrimental not only to city centers generally—through loss of a predominantly work-based population in the evenings—but also to the global environment, specifically through the increase in energy consumption and climate change emissions prompted by expansion of the suburban periphery beyond the urban core. Inner-city living and dense, concentrated cities are now becoming generally accepted as essential elements for the ongoing success of a diverse, sustainable future city.

If providing inner-city residences is a key to this future, then perhaps it is not surprising—given high urban-core land values—that tall buildings have become an omnipresent tool in increasing the urban residential population. On the face of it, success stories abound in both the U.K. and the United States—from Leeds to Liverpool and from Miami to Chicago. Manchester, England, with a massive urban center that saw its population increase from fewer than 100 people in the early 1990s to more than 15,000 a little more than a decade later, is the usual case study highlighted.

However, a closer look at the statistics reveals that most of these new urbanites repopulating city centers belong to one socioeconomic group made up of young professionals who are single or recently married. People from other socioeconomic groups whose presence is



Taiwan's Taipei 101 is the world's tallest completed building, but will be topped by about 955 feet (300 m) when Burj Dubai is completed next year.

required in order to return a long-term, nontransient population to city centers—predominantly families—are still primarily living in the suburbs; the continued migration of young professional couples from urban to suburban areas when they have children undermines the rosy regeneration statistics overall. Without families, little need exists for the other vital elements of a truly diverse, vibrant, sustainable city, such as places of learning, care, and recreation.

The tall buildings built so far have been an unwitting pawn in this narrowing of the urban population demographic. Because virtually the entire high-rise housing stock of the U.K. built immediately after World War II, for example, was largely undesirable, the building type is seen as unsuitable for families. Thus, in a self-perpetuating cycle, the small, trendy apartment blocks provide space intended primarily for single people or childless couples, and, in turn, this demographic group—rather than families—seeks such buildings.

This does not need to be the case, however. The tall building has an opportunity to reinvent itself as the ideal solution, addressing the need for both a dense, sustainable city and all-inclusive urban living. The main reason tall buildings are viewed as unsuitable for family living is the traditional lack of open, recreational communal space such as streets, sidewalks, plazas, and parks. The solution is to create these spaces within buildings at the upper heights—gardens and plazas in the sky—providing the added benefit of security and cover from the elements.

The argument from the standpoint of developers has been that a tall building costs too much to allow them to provide open space that does not bring in added revenue. Yet, high-quality design and, more recently, sustainable design are being recognized as significant factors in generating revenue: people today are much more willing to pay a premium for well-designed space, especially when that space is sustainable.

Numerous examples exist of residential sky gardens and communal spaces provided in upper stories of tall buildings, such as the Duxton Plain Housing project in Singapore, 340 on the Park in Chicago, and the Q1 Tower in Gold Coast City, Australia. However, an example from the world of commercial offices could help point the way forward.

Against a generally expected saleable floor efficiency of 70-plus percent, the 50-plus percent efficiency of the Commerzbank Frankfurt building in Germany would seem like a developer's nightmare. But the spaces created through the loss of floor space—an entire central atrium, semi-open sky gardens that step up around the building, and operable windows no more than 20 to 30 feet (6 to 7 m) from workers—have created a series of green, communal areas. Though the building was built for a single tenant that still occupies the building—Commerzbank—it would be logical to assume that, should the building enter the commercial market, this higher internal environmental quality would result in much higher revenues per square foot. Also augmenting the building's value to a buyer would be harder-to-quantify benefits such as higher worker productivity through the improved environment.

This type of building could become a model for a residential tower, with all residents having the benefit of a view, natural light, and a communal garden with

The Commerzbank Frankfurt building could become a model for a residential tower, giving all residents the benefit of a view, natural light, and a communal garden. Individual gardens collected in shared spaces at height could be linked to provide revenue through cross-programming of building functions—for instance, creating a restaurant with a sky garden terrace.



access at every level. Also, the individual gardens collected together in shared, maintained spaces at height could be linked to provide commercial revenue through cross-programming of the building's functions in the upper stories—for instance, providing a kindergarten or restaurant with a sky garden terrace.

To truly carry out a socially sustainable urban agenda, the next generation of tall buildings needs to better respond to environmental, design, and functional concerns. At its eighth World Congress in Dubai next March, with the theme Tall and Green: Typology for a Sustainable Urban Future, the CTBUH plans to convene world leaders in the design, construction, and operation of tall buildings to discuss how the form is reinventing itself in the current international building boom. **UL**

ANTHONY WOOD, executive director of the Council on Tall Buildings and Urban Habitat, specializes in sustainable design of tall buildings. An associate professor in the College of Architecture at the Illinois Institute of Technology, he previously worked in architectural practice in Hong Kong, Bangkok, Kuala Lumpur, Jakarta, and London.