

# CTBUH Journal

International Journal on Tall Buildings and Urban Habitat

Tall buildings: design, construction, and operation | 2013 Issue I

**Kingdom: Creating a One-Kilometer High Tower**

Skyscraper Reborn in Venezuela

Vertical Universities

Fire Safety in Hong Kong

The Year in Numbers: 2012

Talking Tall on Saudi Arabia

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“The fact that Torre David is a continually changing, evolving organism is perhaps its least unexpected feature. The only truly static element in Torre David is the concrete structure — everything else is in flux.”

Brillembourg et al., page 32

# Global Tall Building Completions Drop, But Uptick Expected in 2013

Report by Kevin Brass, Antony Wood & Marty Carver, CTBUH

**Note:** Please refer to "Tall Buildings in Numbers: 2012 A Tall Building Review" in conjunction with this paper, pages 46–47

For the first time in six years the number of tall buildings completed annually around the world declined in 2012, as the consequential effects of the 2008/2009 global financial crisis became evident in tall building construction in many Western countries. Sixty-six buildings taller than 200 meters were completed during 2012, the third most in history, but down from the 82 finished in 2011. This number of completions was slightly lower than expected, with some projects under construction delayed or stalled. However, several of the projects forecast to finish in 2012 are now expected to complete in 2013 and 2014, with global completion numbers expected to rise again next year.

The year also saw several important milestones:

- Makkah Royal Clock Tower Hotel was completed in Saudi Arabia, at 601 meters now the second tallest building in the world. It is only the world's second megatall, defined by the CTBUH as a building of more than 600 meters.
- Four of the six tallest buildings completed in 2012 were in Dubai, including the world's tallest hotel, the 355-meter JW Marriott Marquis.
- The title of Tallest Residential Building exchanged hands twice in 2012, with both recipients located in the Dubai Marina.
- Fast-growing China finished 22 buildings taller than 200 meters in 2012, 33 percent of the global number.
- Mecca was the city with the most 200 meter+ completions in the world, with five.

- The United States completed only two buildings over 200 meter, including the 257-meter Devon Tower in Oklahoma City.
- Canada added four buildings taller than 200 meters, the most Canada has ever completed in a single year.
- Twelve of the 66 buildings completed in 2012 broke onto the list of the 100 tallest buildings in the world, representing a 12% change in the tallest 100 in a single year.

With the addition of 66 buildings in 2012, the global number of buildings taller than 200 meters has almost tripled since 2000, increasing from 263 to 756 at the end of 2012. The recent slowdown in the West was partially offset by tall building construction in the Middle East and Asia, particularly China. In total, 35 buildings taller than 200 meters were completed in Asia in 2012 and 16 in the

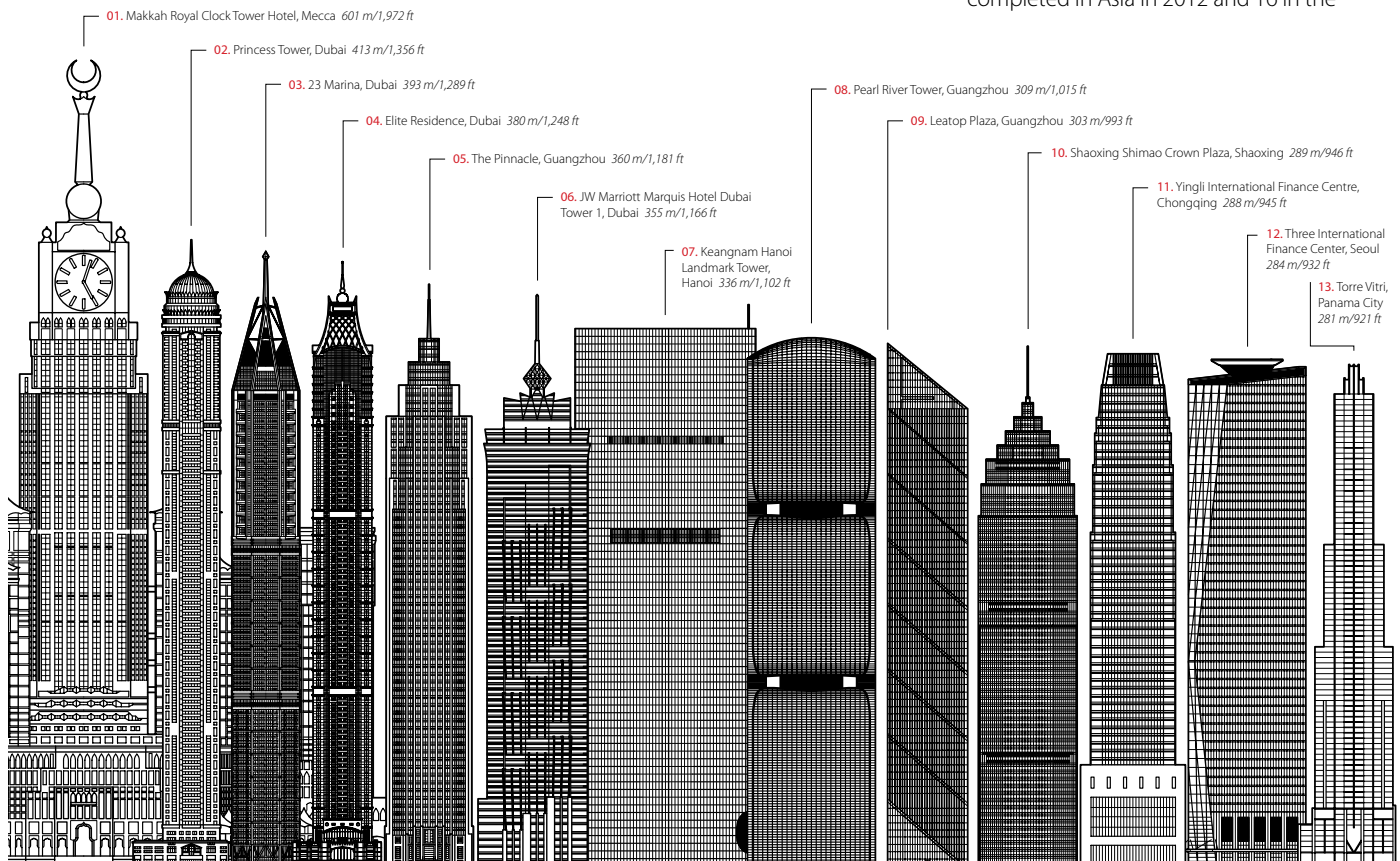


Figure 1. The tallest 20 buildings completed in 2012, including Makkah Royal Clock Tower Hotel, only the second megatall building ever completed.



Middle East. In contrast, six were completed in North America, including only two in the United States, which once dominated tall building development.

Several factors are spurring this move toward taller development. The limited availability of land in urban centers is driving up prices and prompting developers to build taller to recoup their investments. Several countries, including China, are also in the midst of a dramatic shift from rural to urban economies. In addition, new technologies and building systems are increasing the efficiency of tall buildings, allowing developers to cost-effectively create taller projects.

But the biggest factor, in some cities, is a sharp increase in prices for luxury apartments. In New York, a full-floor apartment in One57, a project still under construction, sold for US\$90 million in 2012. Forty-one of the tallest 100 projects completed in 2012 featured a residential component. Early in 2012, 23 Marina earned the title of world's tallest residential building at 393 meters. A few

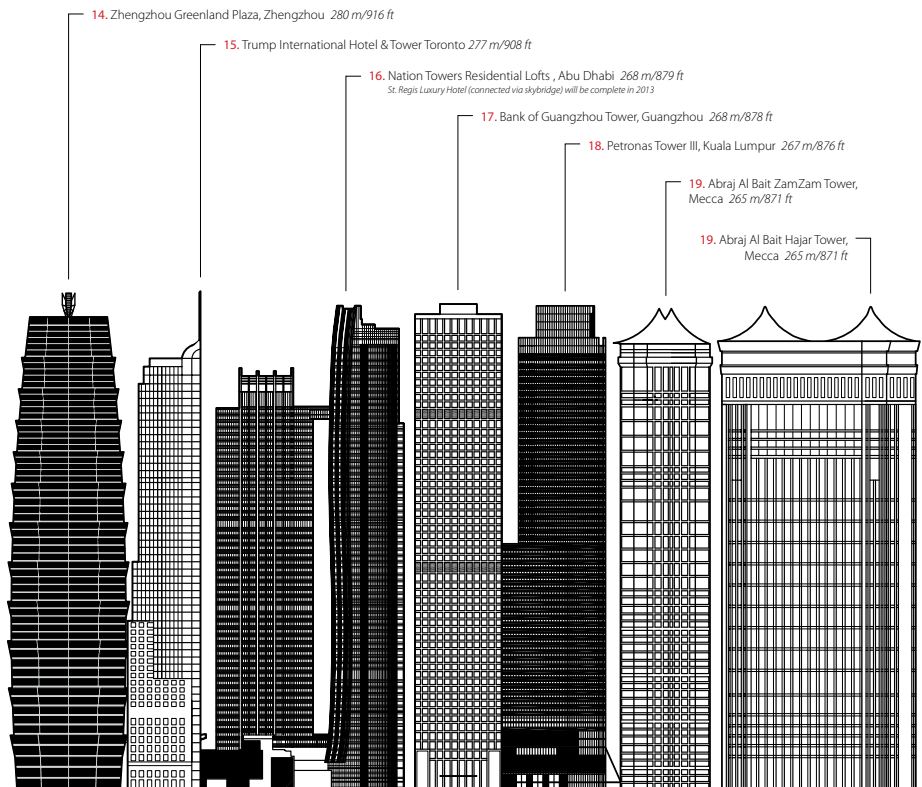
months later the 413-meter Princess Tower completed construction, taking the title of world's tallest all-residential building. The four tallest residential buildings in the world are now located in Dubai.

Snapshots of key markets around the world:

### China

The 22 buildings completed in China in 2012 were spread around 13 cities; Guangzhou was the busiest, completing four projects. Notable projects completed in 2012 include the 309-meter Pearl River Tower in Guangzhou, a Skidmore, Owings & Merrill-designed tower hailed for its energy efficient elements. The project includes wind-turbines to generate energy for the building, as well as a double façade curtain wall, radiant ceilings, solar panels, daylight harvesting, and an underfloor ventilation system.

Far from slowing, China's tall building boom will continue in the next few years. Projects far along in construction include the 660-meter Ping An Finance Center in Shenzhen, the



## World's Tallest 100: Analysis

In recent years the industry has seen a dramatic shift in why, where, and how tall buildings are built, a trend that continued in 2012.

In 2000, 85 of the 100 tallest projects were office buildings; in 2012 only 49 of the tallest 100 were offices.

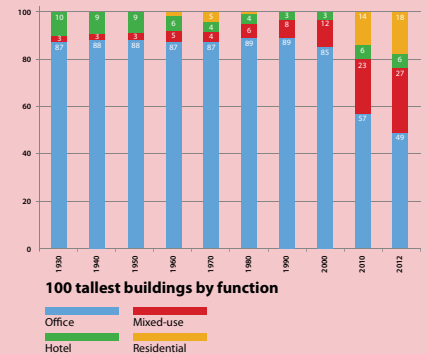


Figure 2. World's tallest 100 buildings by function.

Tall building construction was once dominated by North America. However, by the end of 2012 only 23 North American buildings made the list.

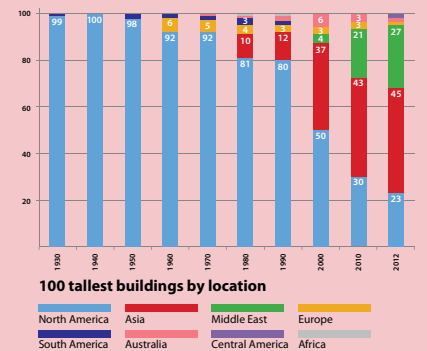


Figure 3. World's tallest 100 buildings by location.

By the end of 2012, only 17 of the tallest 100 tallest buildings were made of steel, once the dominant construction material for tall buildings.

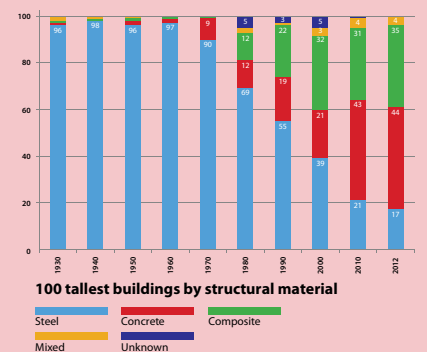


Figure 4. World's tallest 100 buildings by structural material.



**2012 Tallest #1:** Makkah Royal Clock Tower Hotel, Mecca. © Fauzia Andrini

636-meter Wuhan Greenland Center and 632-meter Shanghai Tower – three of the tallest towers in the world. Also on the horizon: the much-discussed 838-meter tower built using a pre-fabricated system proposed by Broad Sustainable Building.

#### South Korea

South Korea, one of the most active builders in recent years, only completed three buildings over 200 meters in 2012, the fewest since 2008, when it completed two. The tallest completed last year was Three International Finance Center, a 284-meter tower located in Seoul. South Korea now has 38 buildings taller than 200 meters – ranking it fourth in the world behind China, the United States, and the United Arab Emirates – and it continues to



**2012 Tallest #2:** Princess Tower and The Dubai Marina. © Tameer Holding Investment

build new tall building districts, with nine buildings over 200 meters scheduled to complete in 2013.

#### Australia

Australia completed three buildings over 200 meters, the first buildings to surpass the 200 meter threshold since 2007. Tall building development in Australia has always been sporadic, with an increase in development often followed by constructions droughts. In 2005 Australia completed four buildings over 200 meters, including the 323-meter Q1 on the Gold Coast, which remains Australia's tallest. From 2007 to 2011 there were no towers over 200 meters completed. The three 200 m+ buildings completed in 2012 mark the second highest completion total in Australia's history, tying the output in 1992.

#### Dubai

Dubai continues to be a significant market for tall building construction, despite the much-publicized drop-off in development after 2008. Four of the six tallest buildings completed globally in 2012 are in Dubai. The average height of these four buildings was 385 meters; in contrast to an average of 319 meters for the five buildings completed in Mecca and an average of 310 meters for the four buildings completed in Guangzhou. Dubai, which boasts the world's tallest building, the 828-meter Burj Khalifa, did not



**2012 Tallest #6:** JW Marriott Marquis Hotel Dubai. © JW Marriott Marquis Hotel Dubai

have a single building over 200 meters before 1999. In 2012 several new projects were proposed by the government, although 25 projects taller than 400 meters have been either stalled or cancelled in Dubai, according to data tracked by the CTBUH's Skyscraper Center.

#### Saudi Arabia

Saudi Arabia has not been known for significant numbers of tall buildings, but that is changing. Seven buildings taller than 200 meters were completed in 2012, more than any other city in the world, including the Makkah Clock Tower Hotel. The clock tower is part of the Abraj Al-Bait complex, which features seven buildings taller than 200 meters. Four more of the towers in the project completed in 2012, the 265-meter Zam Zam Tower and the Hajar Tower, which is also listed at 265 meters. Another notable building completed in 2012 was the 258-meter Tamkeen Tower, the third tallest building in Riyadh.

Saudi Arabia currently has 12 buildings that are 200 meters or taller, but in the next few years that number could double. Three supertall towers (buildings over 300 meters) are under construction in Riyadh, with two supertalls in development in Jeddah. The under construction numbers don't include Kingdom Tower, the one-kilometer-plus

“For the first time in six years the total number of tall buildings completed annually around the world declined.”

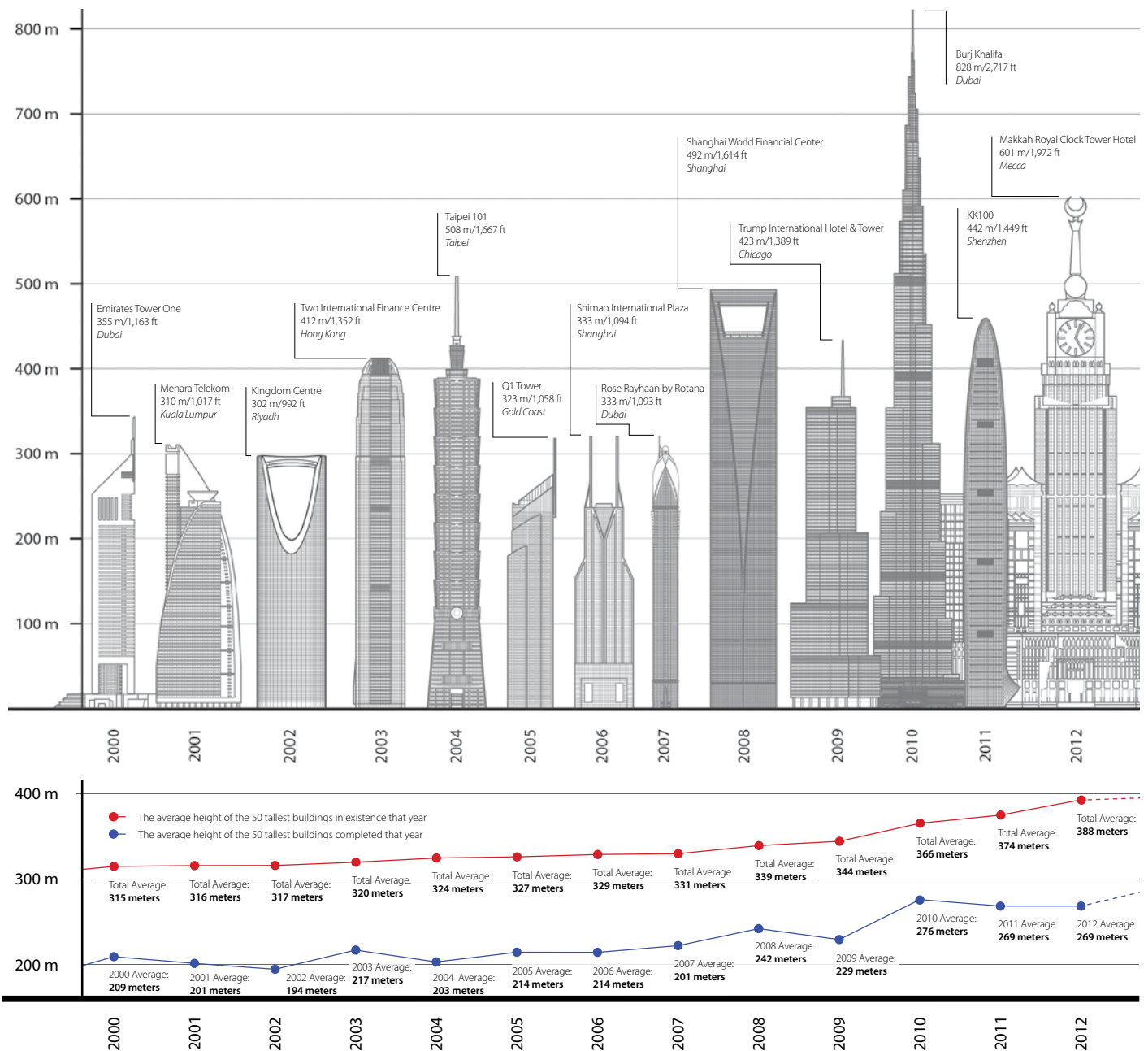


Figure 2. Above: The tallest building completed each year since the year 2000. Bottom: The average height of the 50 tallest buildings in existence that year and of the 50 tallest buildings completed during that year.

project in Jeddah. Construction is expected to begin on Kingdom Tower in 2013.

#### Abu Dhabi

Abu Dhabi only completed one building taller than 200 meters in 2012, the 268-meter Nation Towers, with a distinctive skybridge connecting two towers. This lone completion in 2012 compares to seven towers finished in 2011. But the number is deceiving. The pace of construction slowed in the emirate in the wake of the economic slowdown which hit

sister emirate Dubai particularly hard, but construction is continuing on several large scale developments around Abu Dhabi. Another 13 towers over 200 meters are under construction and expected to complete in the next three years.

#### Canada

Canada has become a hot spot for tall building development (see CTBUH Journal 2012 issue IV pp 40–41). Four buildings taller than 200 meters were completed in Canada,

including the 277-meter Trump International Hotel and Tower Toronto. The list of notable completions also included The Bow, a 237-meter tower in Calgary with a unique diagrid structural system.

But the epicenter of Canadian tall building development is Toronto, where 15 buildings taller than 150 meters are under construction, more than any other city in the western hemisphere. All five of the towers taller than 200 meters under construction are residential,





2012 Tallest #12: Three International Finance Center, Seoul, South Korea. © Arquitectonica

as the city looks to create new urban centers. By 2015, Toronto will likely have 44 buildings taller than 150 meters, up from 13 in 2005.

However, Toronto is not alone. Vancouver and Calgary are also growing taller. By the end of 2015 the number of buildings in Canada taller than 150 meters is expected to grow to 73, almost triple the 26 in the country in 1995.

#### Panama

The residential market is powering the construction surge in Panama City, which is developing into a Miami-like center for second-home buyers from across the region. The expansion of the Panama Canal has also attracted a new level of business interest. The tallest building completed in the country in 2012 was the residential Torre Vitri, which is only three meters shorter than the 284-meter Trump Ocean Club International, the tallest building in Central America, which opened in 2011. The list of tall buildings completed in

2012 also includes the 233-meter Rivage and the 209-meter Oasis on the Bay, which are also residential towers. In the past five years, Panama City has completed 17 tall buildings over 200 meters, including 10 in 2011; before 2008 there were none.

#### United States

Once the undisputed leader of skyscraper development, the United States dropped down the tables significantly for the number of annual 200 m+ tower completions. Only two buildings taller than 200 meters were completed in 2012, led by the 257-meter Devon Headquarters in Oklahoma City, which is only the 38<sup>th</sup> tallest tower in the U.S. The tall building slowdown is largely attributed to the economic crisis, as well as the hangover of the previous building boom, which left many cities with an oversupply of office space.

But there are signs that the U.S. is building again. In addition to the redevelopment of the World Trade Center, there are several tall projects under construction in New York, including the 426-meter 432 Park, a residential tower, and the 306-meter One57, a combination residential and hotel project. Tall building projects are also in the planning stages in San Francisco, Los Angeles, and Seattle. However only six buildings over 200 meters are expected to be completed in the next few years, a far cry from the building construction once seen in the United States.

“As 2012 closes, the industry is on the cusp of another burst of significant tall building development.”



2012 Tallest #14: Zhengzhou Greenland Plaza, Zhengzhou. © SOM, Si-ye Zhang

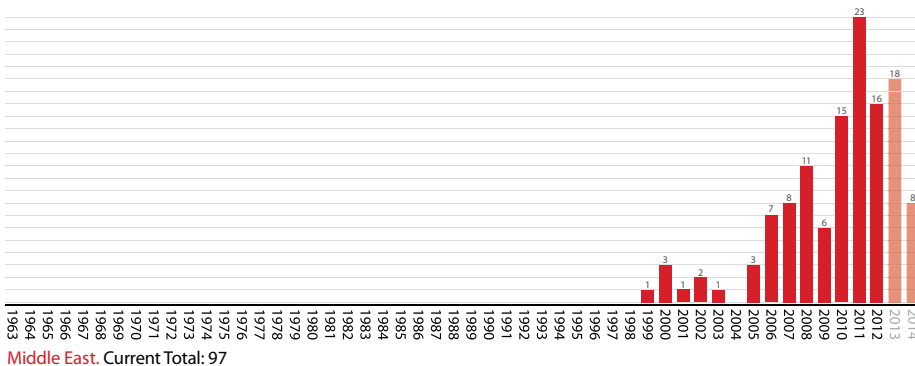
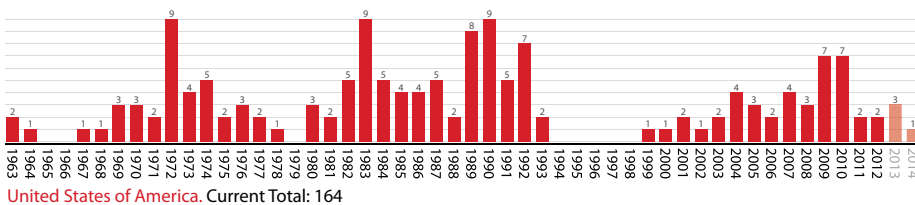
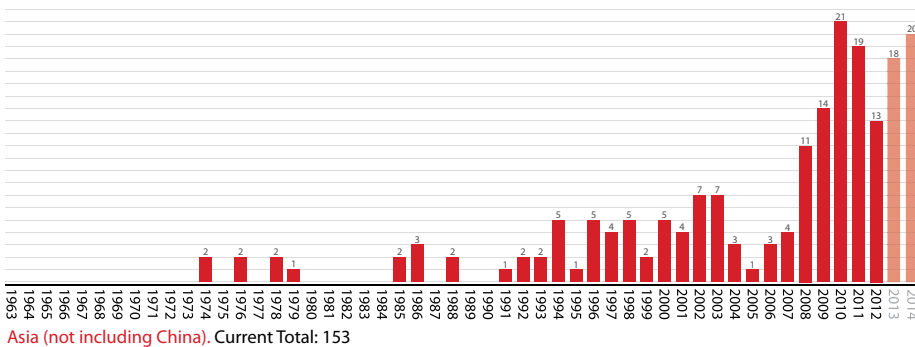
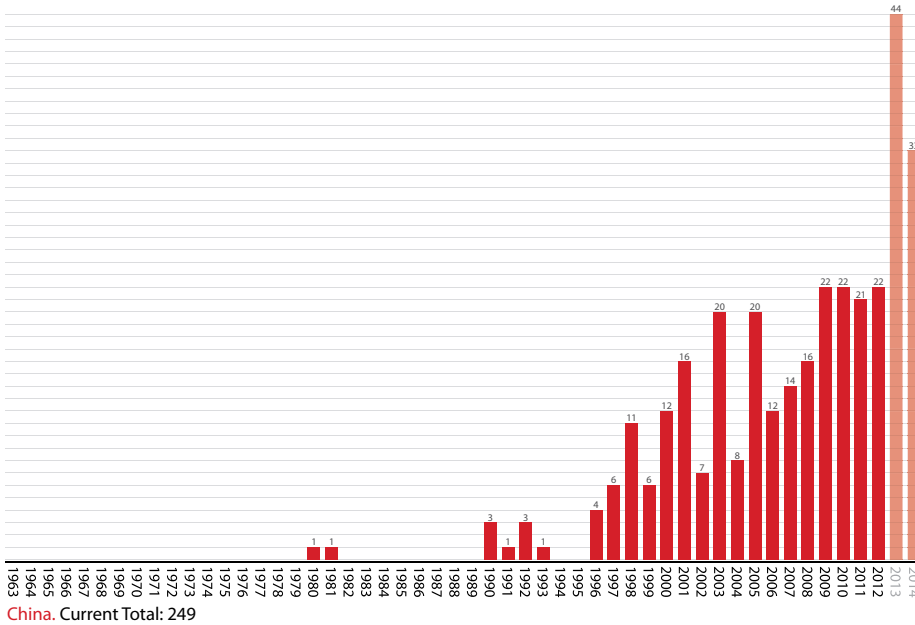
#### Conclusion

Although the pace of completions slowed in 2012, there is no indication of a tall building construction slowdown. As 2012 closes, the industry is on the cusp of another burst of significant tall building development. In total, there are 437 buildings taller than 200 meters under construction globally. It is likely the 2013 completion total will set a new record for tall building completions, surpassing the 2011 total.

In addition, the quest to grow taller continues. Of the projects under construction, 59 will join the list of the 100 tallest buildings in the world; eight will likely make the top 10. There are also 10 buildings taller than 500 meters under construction, including three megatalls over 600 meters.

Despite the economic crisis, tall building construction is still an important driver for the revitalization of fast-growing urban centers around the world, particularly in Asia and the Middle East. At the same time, cities in Europe, South America, and Africa are looking to grow vertically, while smaller markets like Panama City and Abu Dhabi continue to complete projects. The need to create efficient, high density districts for people to live and work is pushing skylines higher, and there is no evidence that those factors will subside any time soon. ■

## 200 m+ Buildings Completed Annually: Selected Areas



2012 Tallest #21: Tamkeen Tower, Riyadh.  
© Khatib & Alami



2012 Tallest #30: Bucheon Kumho Richencia Tower 1 and Tower 2, Bucheon. © Haeahn Architecture





2012 Tallest #32: Marina Bay Financial Center, Singapore. © Raffles Quay Asset Management Pte Ltd



2012 Tallest #34: The Bow, Calgary.  
© Nigel Young, Foster + Partners



2012 Tallest #36: Rivage, Panama City.  
© Saul Bassan Arquitectos



2012 Tallest #40: Kempinski Hotel Chongqing.  
© Kempinski Hotels



2012 Tallest #45: Revel Resort and Casino, Atlantic City. © The Harman Group





2012 Tallest #50: One Raffles Place Tower 2, Singapore.  
© Tange Associates



2012 Tallest #55: Minyoun Plaza, Chengdu.  
© MLA Architects



2012 Tallest #60: Huarun Tower Chengdu MixC. © Chris Eden, Callison



2012 Tallest #61: Japan Post Tower, Tokyo. © Jahn Architects