



# CTBUH Research Paper

[ctbuh.org/papers](http://ctbuh.org/papers)

---

- Title:** The Future of Skyscrapers in Melbourne: From Hyper-Density to the Uplift Principle
- Author:** Giorgio Marfella, Lecturer in Construction Management and Architecture, University of Melbourne
- Subjects:** Construction  
Urban Design
- Keywords:** Construction  
Density  
Form  
Residential  
Urban Planning
- Publication Date:** 2016
- Original Publication:** Cities to Megacities: Shaping Dense Vertical Urbanism
- Paper Type:**
1. Book chapter/Part chapter
  2. Journal paper
  3. **Conference proceeding**
  4. Unpublished conference paper
  5. Magazine article
  6. Unpublished

© Council on Tall Buildings and Urban Habitat / Giorgio Marfella

# The Future of Skyscrapers in Melbourne: From Hyper-Density to the Uplift Principle

## 墨尔本摩天大楼的未来：从“超密度”到提升原理



**Giorgio Marfella**  
Lecturer in Construction  
Management and Architecture  
施工管理与建筑学讲师

The University of Melbourne  
墨尔本大学

Melbourne | 墨尔本

Giorgio Marfella is a Lecturer of Construction Management and Architecture and Subject Coordinator of Construction Methods B, Applied Construction, and Advanced Construction Technology at the Melbourne School of Design (MSD), University of Melbourne. Before becoming a full-time academic, he practiced in Australia with leading architectural firms developing a specialist profile in building envelopes and high-rises. Marfella also serves as a member of the CTBUH International Expert Committee. He is active in research on the innovation and design management of tall buildings, and he has authored several papers in the disciplines of architecture, construction technology, and construction management.

Giorgio目前担任墨尔本大学设计学院建筑与工程管理方向的讲师，讲授课程包括建造方法B，应用建造与先进建造技术。在成为全职大学教师前，他曾就职于澳大利亚领先的建筑公司并参与了建筑围护与高层建筑领域的专家团队建设。Giorgio是高层建筑与城市人居环境委员会国际专家委员会的成员。他目前活跃于高层建筑的设计管理与创新领域，同时在建筑学、建造技术和建造管理等方向皆有论著。

### Abstract | 摘要

*Melbourne is theater to an ongoing skyscraper boom. Considering the recent projects completed, under construction, approved, or under proposal, the outlook of high-rise activity in the central business district and Southbank seems to be indicative of a world-class, supertall megacity. In the near future, Melbourne will compete with cities like Chicago, Seoul, Singapore, and Tokyo for having a large number of buildings of 200-plus meters. In early 2016, as the effects of the boom have become more visible, debate and controversy about hyper-dense developments has prompted the State of Victoria to introduce new built-form controls. Based on a sample of buildings of 150-plus meters, this paper describes the “tall” component of this boom to date. The entity, forms, agents, typologies, and technologies of this urban transformation are summarized and, in view of recent developments, the possible impact of newly implemented planning controls is discussed.*

**Keywords: Construction, Density, Form, Melbourne, residential skyscrapers, Urban Planning**

拥有高度超过200米的摩天大楼数量最多的全球前十座城市之一；换句话说，即拥有这个星球上高度超过200米的建筑数量最多的城市之一，预计将超过芝加哥、吉隆坡、东京与新加坡。接下来是对于此前景的描述性总结。尽管条件处于动态变化中，围绕这一繁荣现象（如何和为什么）的性质仍存在着争议。根据建筑开发的关键性参数例如区位、规模、场地密度、功能、预制板尺寸与布局、建造技术和项目股东的背景等，位于中心商业区（CBD）和南岸地区的65栋高度超过150米的建筑被作为样本加以研究。摩天大楼一经落成，则须长期矗立于此。最新的对于城市“建筑形式”控制的评论是具有历史意义的。然而，新的措施通过分配公共利益来充分施加影响的能力取决于乐观预期：对于高层住宅建设需求会进一步增加。在这一意义上，除非假设会有进一步的发展和更多的建筑投标，公共利益“提升”似乎旨在作为削减场地密度和高度的机制，而不是对于建筑质量的奖励。

**关键词：施工、密度、形式、墨尔本、摩天大厦住宅、城市规划**

### Hyper-Density and New Regional Hubs

In the twentieth century, tall building activity spurred chiefly in urban centers akin to the definition of “global” cities – the hubs of a network of corporate international business, like New York, London, Hong Kong, Tokyo, Singapore, Shanghai, or Sydney (Sassen, 1994). Within this century, the geography of skyscrapers has continued to change and expand. Cities that were once outside of the primary network of global businesses are now surging as new hubs of high-rise construction. In China, secondary regional centers, such as Shenzhen, Shenyang, Chongqing, Guangzhou, and Chengdu, are now hubs of world-class skyscraper activity. In the near future, some of these cities may outnumber their “global” counterparts of the region, like Tokyo, Singapore, and Seoul.

Based on the latest (as of this paper’s composition) number of tall building completions, it seems that Australian cities play a peripheral role in this global context,

### 超密度与新区域集中

在二十世纪中，高楼的建设活动主要发生在被定义为“全球性”的城市中心，这些城市诸如纽约、伦敦、香港上海和悉尼，也是国际性商业网络的焦点(Sassen, 1994)。而在本世纪，这些摩天大楼的地理属性发生了改变并产生延展。原本处于全球主要商业网络外围的城市开始成为新的高层建设活动的中心。一些中国的二线城市例如深圳、沈阳、重庆、广州和成都，现已成为新的世界级摩天大楼建设的焦点，在不远的将来其中某些城市或许会在数量上超过“全球性”区域中心例如东京、新加坡和首尔。

基于最新的高层建筑竣工数据，尤其是当与高速发展的中国大城市相比时，澳大利亚的城市似乎在这一全球化背景下扮演着次要角色。截至2016年，按照高度超过150米的竣工建筑数量计算，墨尔本和悉尼分别排在全球的第29和第31位。2015年对于世界上的高层建筑是创纪录的一年，但是在成百幢200多米高的竣工建筑中，仅有一栋位于澳大利亚（Gabel, Carver and Gerometta 2016）。

particularly in comparison to the fast-growing megacities of China. In 2016, judging by the number of buildings higher than 150 meters and completed to date, Melbourne and Sydney rank respectively at the 27th and 30th place worldwide. The year of 2015, was one of world records for the tall building industry, yet only one of the more than a hundred 200-plus-meter buildings completed that year was located in Australia (Gabel, Carver and Gerometta 2016).

In Melbourne, however, the outlook of tall building activity differs substantially from this instantaneous picture. In prospect, the Victorian capital is destined to be a major skyscraper hub in Australasia. Today, Melbourne has 31 buildings taller than 150 meters, and among these, residential and office towers take an almost equal share. The prospect of tall building activity over the next five years reveals that, by the early 2020s, Melbourne will have tripled its number of towers taller than 150 meters. The breakdown by destination of use shows that only 22 percent of this outlook will consist of commercial offices and more than 50 percent would be mono-functional apartment towers.

Making a local comparison, Melbourne is set to double the amount of skyscrapers of Sydney, the Australian “global” city par excellence, and become one of the top-ten skyscraper cities of the world. At the time of writing, taking buildings higher than 150 meters as an indicator – and including buildings completed post-GFC, under construction, approved, and under proposal – the inner city boom of Melbourne counts at least 65 skyscrapers. Among these buildings, a significant share is taken by towers taller than 200 meters. Making a global comparison based on data of the CTBUH, the prospect is staggering. Potentially, by 2020, Melbourne could be one of the top-ten cities of the world for number of skyscrapers taller than 200 meters; or in other terms, one of the cities with the highest number of buildings taller than 200 meters on the planet, potentially outnumbering Chicago, Kuala Lumpur, Tokyo, and Singapore (Figure 1 & 2).

What follows is a descriptive summary of this prospect. Notwithstanding the dynamic nature of the situation, some arguments are presented to pin-down the qualities (how and why) of this boom. A sample of 65 150-plus-meter tall buildings located in the central business district (CBD) and in Southbank is

然而在墨尔本，高层建设活动的前景却与上述背景有着很大的差别。人们期待着维多利亚州成为整个泛大洋洲摩天大楼的重要集聚中心。而今墨尔本拥有31栋超过150米高的建筑，其中住宅与办公楼几乎各占一半。按照过去五年的高层建设速度，到21世纪20年代早期墨尔本的高度在150米以上的建筑数量会达到目前的三倍。对于这一目标具体而言，其中仅有22%会成为办公楼，而单一功能的公寓住宅楼占比将超过50%。

同一区域相比，悉尼是澳大利亚最卓越的“全球性”城市，而墨尔本的摩天大楼数量预计将两倍于其，并成为全球前十的摩天大楼之城；在行文之时，假如将高度超过150米的建筑一包括全球竣工于金融危机后、仍处于施工状态、得到批准以及处于审批状态下的所有建筑一当作指标的话，墨尔本内城涌现的摩天大楼至少有65幢。在这些建筑中，有相当一部分的高度超过了200米。若将其置于基于高层建筑与城市人居环境委员会（CTBUH）数据的全球背景下进行比较，会得到更加令人震惊的结果。到2020年，墨尔本很可能会位列拥有高度超过200米的摩天大楼数量最多的全球前十座城市之一；换句话说，即拥有这个地球上高度超过200米的建筑数量最多的城市之一，预计将超过芝加哥、吉隆坡、东京与新加坡（图1、2）。

接下来是对于此前景的描述性总结。尽管条件处于动态变化中，围绕着这一繁荣现象（如何和为什么）的性质仍存在着争议。根据建筑开发的关键性参数例如区位、规模、场地密度、功能、预制板尺寸与布局、建造技术和项目股东的背景等，位于中心商业区（CBD）和南岸地区的65栋高度超过150米的建筑被作为样本加以研究。

高层建筑不仅仅是复杂的人工技术产物：它们同时揭示了关于城市经济前景的重要信息。高层建筑被认为是一座城市经济文化的象征代表，一条城市变化与全球资本间的“重要纽带”（Thornton 2005）。从上述假设出发，本文基于一系列同质项目对于此繁荣现象进行了描述。并且根据维多利亚州环境陆地水文与规划部（DELWP）于2016年4月新颁布的《中心城市建筑形式评论》简介，对于新的城市控制可能造成的影响进行了讨论。

### 墨尔本的“全球本土化”繁荣

墨尔本中心商业区的天际线建设大致分为三个阶段。第一个阶段自20世纪50年代中期至60年代中期，第一组现代化的办公楼群于内城西侧拔地而起。第二阶段开始于容积率控制的引入，自20世纪60年代中期至70年代末期，两组楼群分别与内城边缘的东部和西部“山丘”相接。其后的开

City	+ 150 (built)	+ 200 (built)	"+ 150m (outlook)"	+ 200m (outlook)	+ 250m (outlook)	+ 300m (outlook)	+150m Office (%)	+150m % variance	+200m % variance
Shenzhen	84	39	170	112	50	29	66%	102%	187%
New York	242	59	323	112	43	27	50%	33%	90%
Dubai	152	64	191	100	62	36	18%	26%	56%
Hong Kong	315	63	318	66	17	6	n/a	1%	5%
Shanghai	130	47	154	60	23	7	68%	18%	28%
Chongqing	86	28	143	58	28	10	25%	66%	107%
Shenyang	52	7	144	53	16	10	27%	177%	657%
Jakarta	64	26	98	52	18	7	49%	53%	100%
Melbourne	31	10	94	45	12	2	22%	203%	350%
Toronto	43	15	115	45	8	1	18%	167%	200%
Kuala Lumpur	49	18	74	40	21	9	50%	51%	122%
Guangzhou	92	21	118	37	23	13	50%	28%	76%
Chicago	116	27	132	36	17	7	44%	14%	33%
Tokyo	130	23	149	34	4	1	44%	15%	48%
Singapore	78	30	88	33	7	0	52%	13%	10%
Chengdu	68	10	95	27	4	1	53%	40%	170%
Bangkok	52	10	66	21	10	5	30%	27%	110%
Sydney	33	8	62	20	4	1	53%	88%	150%
Seoul	70	14	87	19	5	2	24%	24%	36%

Figure 1. Skyscraper cities: global outlook including current proposals ordered by 200-plus-meter-tall buildings (Source: CTBUH / Giorgio Marfella)

图1. 摩天大楼城市：包括目前投标200米以上建筑的全球本土化概览（来源：世界高层建筑与都市人居学会摩天大楼中心/Giorgio Marfella）

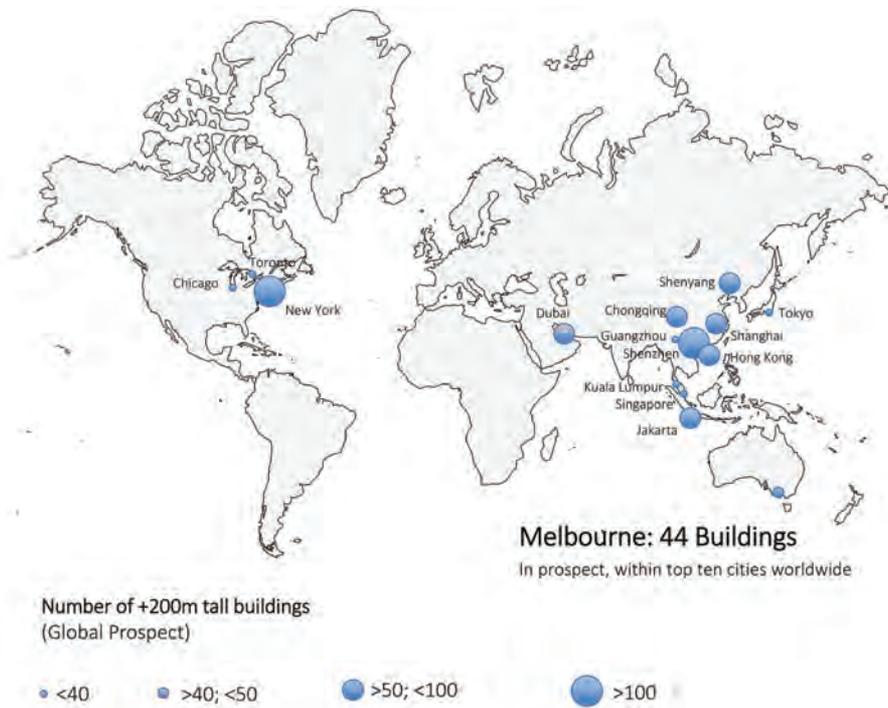


Figure 2. Prospective location and number of 200-plus-meter-tall buildings in the world (Source: CTBUH / Giorgio Marfella)  
图2. 世界上200米以上高楼位置与数量概览 (来源: 世界高层建筑与都市人居学会摩天大楼中心/Giorgio Marfella)

reviewed according to key architectural and development parameters, such as location, size, site density, function, floor plate size and configuration, building technologies, and origin of project stakeholders.

Tall buildings are not only complex technological artifacts, they are also conveyors of critical information about the economic prospect of urban habitats. They are a meaningful manifestation of the economic culture of a city – a “critical nexus” between urban transformation and global capitalism (Thornton 2005). Taking these assumptions as a starting point, the description of this boom is made in virtue of a homogeneous family of projects. Given the recent introduction of the Central City Built Form Review, published by the Victorian Department of Environment Land Water and Planning (DELWP) in April 2016, the possible impact of the new urban controls is also discussed.

“hills” at ends of the grid. Tall buildings thereon expanded vigorously with a third phase of activity that started in the 1980s and stopped suddenly in the early 1990s. During this last stage, tall buildings drove an unprecedented oversupply of office area, which peaked in 1992 when commercial vacancy rates soared to 27 percent. After the crash of the early 1990s, tall building activity in the city stopped for a decade. The contemporary skyline of Melbourne was built in prevalence by these three historical waves, which are complemented by a handful of commercial and residential towers completed before the Global Financial Crisis (GFC) (Figure 3). Since the GFC, the tall building map of the inner city has slowly started to change again, and by 2014 there was evidence that a new skyscraper boom was imminent (Marfella 2014).

### Melbourne’s “Glocal” Boom

The modern skyline of Melbourne’s CBD was built broadly in three stages. The first was from the mid-1950s to the mid-1960s, when the first modernist office towers clustered in the western side of the inner city grid. The second stage was after the introduction of plot ratio controls, from the mid-1960s until the late 1970s, when two clusters were consolidated on the eastern and western

始于20世纪80年代的第三阶段经历了高楼大厦的迅猛发展，而在90年代早期戛然而止。在最后一个阶段，摩天大楼导致了前所未有的办公楼面积的过度供给，于1992年达到了顶峰。此时的商铺空置率猛增至27%。经历了90年代早期的崩盘后，城市内部的高楼建设活动停滞了十年。上述三个历史建设阶段主要构成了墨尔本当前的天际线，而后被于21世纪初期、全球金融危机（GFC）前落成的一些商业和住宅楼又加以补充（图3）。金融危机迄今，内城的高楼分布重新开始发生变化，至2014年有证据表明一个新的摩天大楼繁荣期即将到来（Marfella 2014）。

近年来，开发商将注意力从高层办公楼转向了投机性的公寓楼。导致高楼建设的因素不是单纯的全球化进程，而是地区性和国际性力量的共同作用。来自外国的影响驱动了这一转变，但是它们是源自中国、马来西亚、新加坡和澳洲发达地区等区域性的力量，而不是全球性的。住宅楼的激增是具有投机性的，也是各方利益博弈的结果。房屋产品的对象并不是大型国际公司，也不是全球奢侈品消费者群体，而是更普通的寻求一般化或低品质、小户型的房地产投资者。

繁荣是在不同级别的区位、经济与文化中都存在的势力共同的产物。毫无疑问中国的区域力量贯穿开发商、消费者以及许多的终端用户，但是特定区位的吸引力同样重要。在本案例中，与“历史性”的内城中心相邻的地区在招商引资方面胜过了处于城市扩张边缘的港口区。换个角度看，这一开发模式与墨尔本的全球最“宜居”城市的声誉紧密相关（EIU, 2015）。借用城市社会学的定义，摩天大楼住宅的繁荣可以被认为是与Roland Robertson的“全球本土化”（1995）相似的生产过程—更进一步说是大型国际公司力量下的全球化产物。

坐落于内城的这些住宅楼大致按照活动组团大致可以分为四组：前三个位于内城路网内（分别在霍德尔路网的北部、东部和西部），第四个位于南岸地区。这些建筑半数以上是由来自中国、新加坡和马来

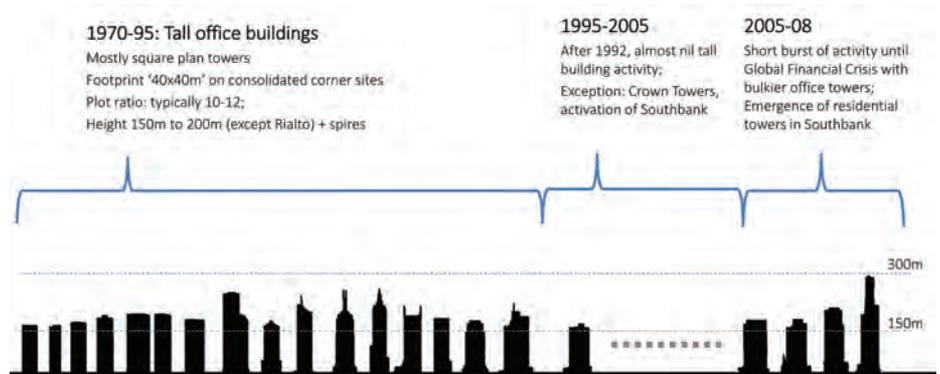


Figure 3. Stages of skyline development in Melbourne from 1970 to 2010 (Source: Giorgio Marfella)  
图3. 墨尔本天际线的发展阶段，1970-2010年 (来源: Giorgio Marfella)



Figure 4. Clusters of current high-rise activity in Melbourne and radar charts of development origin (Source: Giorgio Marfella)  
图4. 墨尔本当前高层建设活动分布与开发商来源雷达图 (来源: Giorgio Marfella)

In recent years, the interest of developers has shifted from tall office buildings to speculative apartment towers. The trigger of this tall building expansion is a blend of local and international forces, which do not align simply with an outright process of globalization. Foreign influences drive this transformation, but rather than being global, these forces are regional, originating from China, Malaysia, Singapore and, in good part, from Australia. The residential boom is both speculative and driven by a myriad of stakeholders. The target of the product is not large global corporations, nor a global niche of luxury buyers, but rather more ordinary real estate investors who seek investment apartments of average to low quality and small size.

The boom is the product of influences that coexist on multiple levels of place, economy, and culture. The regional power of China is present among developers, buyers, and end-users; but, the magnetic influence of a specific place is equally important. In this case, location in the inner historical city center outperforms for marketing appeal the newest outer rim urban expansion of the Docklands. On another level, the economic success of this typology of development is connected with Melbourne's global reputation as the most "livable" city on the planet (EIU, 2015). Borrowing a definition used in urban sociology, this residential skyscraper boom can be described as a product-making process akin to Roland Robertson's theorem of "glocalization" (1995) – and not as much as a product of globalization driven by large multinational corporate powers.

These residential towers are located in the inner city, and they can be broken down roughly in four clusters of activity: three in the inner city grid (at the northern, eastern, and western sectors of the Hoddle Grid) and the fourth in Southbank. More than half of these buildings are initiated by foreign investments of Chinese, Singaporean, and Malaysian origin (Figure 4). The clusters present variations in quality and type of real estate product. Broadly speaking, smaller cut apartments (one- or two-bedroom) and foreign developers are more present in the northwest of the city, while the high-end (three-plus-bedroom) Australian or Australasian joint-venture driven developments are more present at the eastern end of the city and in Southbank.

Considering the intensity of use of the land (e.g. the amount of built area produced in relation to site area), Melbourne's recent skyscrapers can be defined as "hyper-dense." The word "density" is meant here simply in the numeric sense as the floor area ratio (FAR) which, in the context of this discussion, is a parameter of private development. The FAR of Melbourne's most recent residential skyscrapers varies significantly from site to site, and affects land parcels that range in size from 500 to 3,000 square meters. Extraordinary FAR levels are present across the four clusters, where they vary widely – and not linearly – from 20 up to 60. In the western side of the CBD, for example, developments were approved with gross floor areas (GFAs) ranging from 25,000 to over 60,000 square meters on

西亚开发商的投资支持的 (图4)。在质量和开发模式上, 这些组团存在着一些区别。一般来说, 小户型公寓(卧室在1至2间)和国外开发商多见于城市的西北部, 而豪华型(卧室在3间以上)澳大利亚或者泛大洋洲联合投资开发的项目多见于城市东边与南岸地区。

考虑到土地使用密度, 例如给定建筑物场地面积后的实际建筑面积, 墨尔本近来的摩天大楼可谓是“超密度”的。“密度”一词这里仅代表数值上的容积率, 即FAR, 在本文中是针对私人开发项目的一个指标。容积率在不同的场地中区别很大, 其影响的地块面积范围达到500至3000平方米。超常规的容积率在四个组团中皆有, 变动范围较大一但并非线性变化—从20最高可至60。例如在中心商业区的西侧, 在地块面积为1000至1500平方米大小的土地上, 批准建设项目的总楼面面积达到了25000至超过60000平方米 (图5)。

这些建筑的宽高比显著但并不突兀, 除了个别“超纤细”的案例, 大体上宽高比处于1比6至1比10之间 (图6)。这些摩天大楼有时需要阻尼装置, 但是一旦落成后, 最初提供的调谐液体阻尼器被弃置不用也不少见。根据已完工的项目案例, 这些建筑结构的设计通常围绕着普遍可预测的钢筋混凝土结构。预知楼面通常是长方形一间或在角处微微刻有“饼干”式样的花纹—中心钻孔。钻孔用爬升模板技术当场自动完成。其余部分的结构是由事先或当场灌筑的混凝土剪力墙所支撑的后张法预应力混凝土板所构成。围护结构通常是铝玻璃单元式幕墙, 产自东南亚地区通过集装箱海运至墨尔本。尽管每栋建筑的结

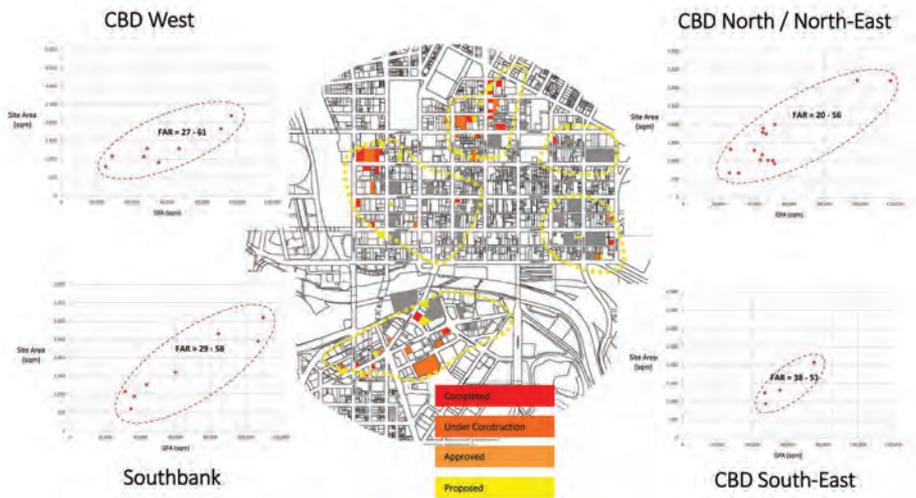


Figure 5. FAR scatter charts of recent high-rise developments in Melbourne from 2010 to 2015 (Source: Giorgio Marfella)

图5. 近年来墨尔本高层开发的容积率散点图, 2010-2015年 (来源: Giorgio Marfella)

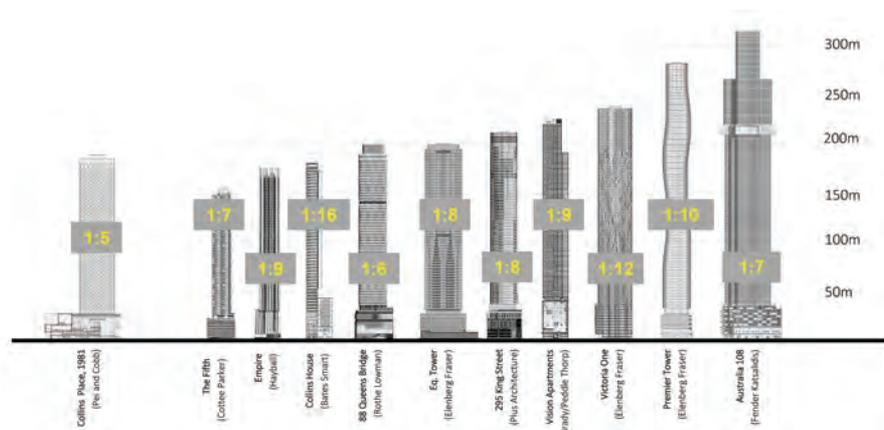


Figure 6. Slenderness ratio comparison of recent residential skyscrapers in Melbourne (Source: Giorgio Marfella)

图6. 墨尔本新近住宅摩天大楼宽高比的比较 (来源: Giorgio Marfella)

plots that range from 1,000 to 1,500 square meters in size (Figure 5).

Slenderness in these buildings is significant, but not extraordinary so, and apart from some isolated “superslim” exceptions, it ranges generally from one to six, to one to 10 (Figure 6). At times, these skyscrapers may require damping systems, but it is not unusual to see initial provisions for tuned liquid dampers to become unnecessary once the buildings are topped out. Judging from the examples completed thus far, these structures are typically conceived around pervasive and predictable all-concrete structural systems. The floor plate is generally rectangular – or enriched by subtle curving of the corners that produce a “cookie-shaped” plan – and served by a central core. The core is constructed in-situ with automated jump-forming techniques. The rest of the structure is comprised by post-tensioned flat concrete slabs supported by concrete shear walls poured in-situ or precast. The enclosure, commonly, is an aluminum-glass unitized curtain wall fabricated in southeast Asia and shipped by container to Melbourne. Although the construction systems may

differ little from one building to another, more variety and innovation transpire from the ability of contractors to adapt to restrictive conditions in small sites and vis-à-vis a labor-expensive local construction market (Figure 7).

### The Uplift Principle

The built form implications of Melbourne’s boom were recently reassessed by local planning authorities, but other broader consequences of socio-economic impact may be understood once the long pipeline of residential towers is exhausted. Many projects are still just a prospect, and there is a legitimate concern that the apartment boom of the present may deflate too suddenly. It cannot be excluded that this outlook may pass as an inflated prospect of oversupply that did not reach full fruition. In any case, the built form outcome of many recent buildings prompted to question their alignment with the Melbourne’s highly rated standards of “livability.” These concerns are at the origin of the Central City Built Form Review (CCBFR) that was

构系统稍有不同, 为了适应小型场地的严苛条件和人工成本高昂的当地建筑市场, 承包商们在能力范围内进行着创新和多样化 (图7)。

### 提升原理

规划部门最近审视了墨尔本繁荣的建筑格局的可能影响, 而其他更广泛的社会-经济影响可能直到住宅楼的长链条断裂后才能显现。许多项目仍需面向市场, 但不能排除当供给面过度膨胀时情况或许无法达到预期。在法律方面的一个担忧是今天公寓繁荣的场景可能会衰退得太过突然, 而新建筑带来的格局令人疑问其与评价甚高的“宜居性”是否相配。维多利亚州政府新近起草并颁布的《中心城市建筑形式评论》(CCBFR) 将这些忧虑作为出发点 (Hodyl 和 Co 2016)。

最新的《澳大利亚国家建设准则》全部围绕着基于性能的建筑这一理念, 而与之相反《中心城市建筑形式评论》取代了自1999年以来城市高度自由化的规划审批系统, 转而在金融危机之后放松了对“超密度”高层建筑项目扩张的管控。新的建筑形式的控制回到了容积率—FAR—这一现代主义原则。这一原则自20世纪50年代起被城镇规划当局发现并接受, 最终在1964年正式采纳。历史上, 城市的容积率伴随着一些严格的“奖励”性条例, 允许将密度提高到名义书面协议之上, 但是通常不能超过12比1的上限。奖励部分最初是为了缓解内城拥堵而进行的“市民”利益导向的设计, 包括公共空间、巷道、商厦截角退后等措施。

新的墨尔本内城基础容积率书面规定为18比1起, 从开发商的角度这应该算是全世界最慷慨大方的规定之一了。新的控制辅以修订后的“奖励”机制, 以求在超过基础容积率的地方让出一定面积给公共利益。额外面积被定义为建筑面积提升 (FAU), 即“若建筑物超过18比1的容积率, 建筑物顶部超出部分的建筑面积”。面积提升方案被提供给开发商, 以换取易见的和货币化的宝贵的社区公共利益。这些利益包括公共开放空间、公共可达性封闭区域、福利性住房、竞争化的设计过程、商业办公楼的使用或上述的组合。这些利益应当是“就地”的或者在涉及建筑的“内部” (DELWP 2016)。

新的建筑形式控制并没有对高度作出明确限制, 但是考虑到其它控制条例的存在, 内城的限高理论上不会被未来的建筑活动所打破。这些限制源于第二座城内机场 (埃辛顿) 的“巡回”航线, 基于与机场的距离整体上限制了建筑物的高度在任何情况下都不得超过350米 (Thompson, 2016)。建筑物高度同时也受到了已有的雅拉河沿岸以及一些公园

recently prepared and released by the State Government of Victoria (Hodyl + Co 2016).

In counter-tendency with the latest National Construction Code of Australia, which is entirely designed around the concept of performance-based design, the CCBFR supersedes the highly deregulated system of planning approval that was established in the city since 1999 and that, after the GFC, has allowed an uncontrolled escalation of high-rise developments. The new built form regulations revisit the modernist principle of plot ratio, which, in Melbourne, was envisaged and accepted by town planning authorities since the 1950s and eventually formally adopted in 1964. Historically, city plot ratios were accompanied by a set of rigid "bonus" provisions that allowed for increased density beyond a nominal prescription, but generally only up to a cap of 12:1. The bonus was initially proposed to seek "civic" design benefits such as open space, laneways, arcades, cut-off corners, and other measures meant to de-congest the inner city.

The new base plot ratio prescription of inner city Melbourne starts at 18:1. The new controls are flanked by a re-vamped mechanism of "bonus" that seeks public benefits in return for area that exceeds the base FAR. This additional area is defined as the Floor Area Uplift (FAU), or namely "that part of a building containing the uppermost floor area of the building, without which the building would not exceed a floor area ratio of 18:1." The area uplift is given to developers in exchange for transparent and monetary valuable public benefits for the community. The benefits include public open space, publicly accessible enclosed areas, social housing, a competitive design process, commercial office use, or a combination of these. The benefits are recommended to be "onsite" or "within" the proposed building (DELWP 2016).

The new built form controls do not specify height limits, but in combination with other controls, the inner city has a theoretical ceiling height that is unlikely to be penetrated by future construction activity. These limits are set by the "go-around" flight path of a secondary inner-city airport (Essendon), which overall restricts building height depending on proximity of the airport and in any case below 350 meters (Thompson, 2016). Building height is limited also by pre-existing overshadowing controls prescribed around the Yarra River and a number of parks and civic open spaces. Last but not least, the built form review prescribes tower setbacks from the main street frontage (five meters) and from the rear and side boundaries (five meters up to 80 meters in height and six percent of the building height for buildings taller than 80 meters). The setback provisions, combined with the economic assumption to keep structural slenderness below one to 10, suggest that the new built form regulations may have the effect to set an economic height of development that is unlikely to penetrate the bulk of the existing skyline.

The architectural implications are demonstrated by a study commissioned to Hayball (2016). Although it is not easy to pinpoint a number that may apply for the entire inner city, Hayball's study for the Hoddle Grid and Southbank suggests that economic feasibility may be less likely met for buildings taller than 200 meters, and more likely for buildings around the 150-meter-mark, unless large land parcels are redeveloped or created by consolidation.

## Discussion

At the origin of the built form shortcomings that preceded the CCBFR there are arguably cultural and urban design trends that in

和市民开放空间遮蔽物控制的限制。最后同样重要的是，建筑形式评论规定了高楼在主要街道向正面的退缩（5米）以及向后与侧面的边界（80米以下高度的建筑为5米，80米以上的建筑为总高度的百分之六）。这一退缩措施与保持结构宽高比在1比10以下的经济学假设共同表明新的建筑形式规范有可能间接影响建筑的经济高度，从而使其不可能超过已有的大部分天际线。这些建筑上的可能影响被一家当地建筑公司Hayball得到授权进行的研究所证实（2016）。尽管精确地给出一个适用于整个内城的数值比较困难，Hayball针对霍德尔路网和南岸地区的研究表明对于200米以上高度的建筑，其经济可行性不如150米左右高度的建筑—除非大面积的地块被重新开发或进行集约化建设。

## 讨论

促成《中心城市建筑形式评论》的核心原因是墨尔本建筑格局的缺陷，其文化与城市设计的导向自20世纪90年代早期至今一直排斥着高楼大厦式的城市形态。经历了20世纪90年代早期的衰退和高办公楼的过度供给，商业摩天大楼的核心和理由受到了质疑。城市决定将其办公楼的集群—其中可能还有些中高层建筑—转移到港口区，而规划部门仍旧执行并鼓吹着不合时宜的内城控制措施。以南岸地区为例，当地确立了100米的建筑限高和30至40米裙房高度的体量控制，但是由于不够清晰、缺乏目的性等原因，这些措施几乎没有得到实施。对于一座在传统上倾向于通过投机性建筑活动进行更新的城市而言，这些规定对于接受、了解、规划、更重要的是控制高楼建设活动来说是个重大失败。

墨尔本的建筑面积提升原理在城市政策方面相当于法兹勒汗的“高度额外费用”，用工程学术语来说，即随着建筑物高度的增加，为了承载横向负荷必须增加额外的结构材料和复杂的结构系统（Khan, 1971）。针对高度的公共补偿



Figure 7. Recent tall residential buildings under construction in Melbourne ; From left to right: 35 Spring Street, EQ Tower, Empire Melbourne, and Light House (Source: Giorgio Marfella)  
图7. 墨尔本最近建设中的高层住宅楼（来源：Giorgio Marfella）

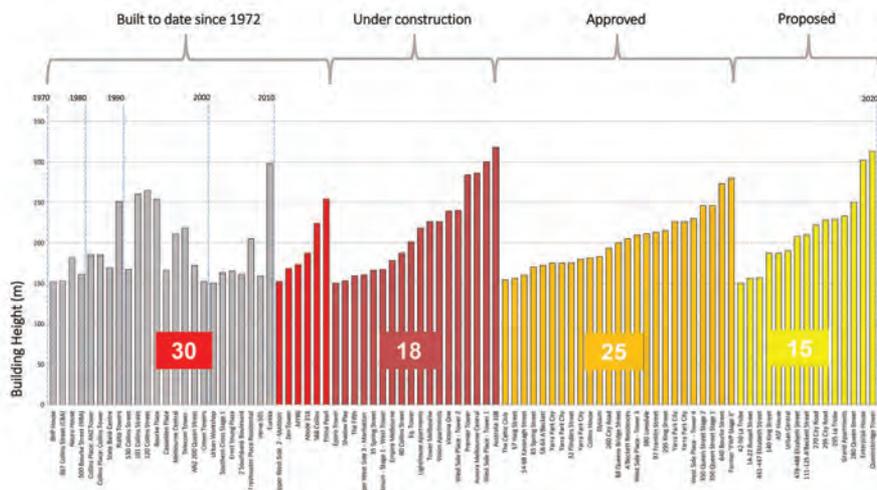


Figure 8. Summary and outlook of 150-plus-meter-tall buildings in Melbourne from 1970 to 2020 (Source: Giorgio Marfella)

图8. 墨尔本150米以上高楼总结与一览 (来源: Giorgio Marfella)

Melbourne, from the early 1990s onwards, have refused to engage positively with the urban typology of tall buildings. After the crash and the oversupply of tall office buildings of the early 1990s, commercial skyscrapers were questioned to their core and reason d'être. The city decided to shift its office stock – with questionable medium-rise results – to the Docklands, whilst planning authorities continued to implement and advocate anachronistic urban controls for the inner city. In Southbank, for example, a building height limit of 100 meters and massing controls that envisaged building podiums 30 to 40 meters high were established; but these were seldom enforced for lack of clarity and purpose of these measures. For a city traditionally inclined to regenerate through speculative building activity, these provisions were an epochal failure to acknowledge, understand, plan, and most of all, control tall building activity.

Melbourne's floor area uplift principle is the urban policy equivalent of Fazlur Khan's structural principle of the "premium for height," which in engineering terms, states that, with increasing building height, additional structural material and complex structural systems must be put in place to carry lateral loads (Khan, 1971). The idea of a civic premium for height is not new: it is a civic principle of modernist origin that suits, in particular, tall buildings. The size, visibility, and unavoidably long life-span of skyscrapers commands that this building typology – even when privately funded – is not exempted from a duty of contribution to the public realm. In Melbourne, the reintroduction of FAR built form controls is an overdue adjustment that offsets decades of laissez-faire and neglect of the need to regulate – rather deny, ignore, abandon to self-regulation, or oppose a priori – the construction of tall buildings.

In view of the current boom, the impact of the new controls is dependent on a "glocal" residential market that has grown since the aftermath of the GFC. The FAU, by definition, targets the "uppermost" area of a building as a mechanism to rebalance between public and private interest; so, unless planning authorities promote large land consolidation in the inner city or retreat from the implementation of the new setback controls, any significant contribution of public benefits is likely to arise from a continued boom of tall, or perhaps supertall and super-slender building activity. Given that Melbourne is set to triple its tall building stock, which in prospect is faster than most cities of the Australasian region, including new Chinese megacities (Figure 8), it is worth questioning if is the CCBFR may ultimately end up curtailing tall building activity rather than generating new public benefits and innovative building outcomes.

The new provisions contemplate to create benefits "on site" and/or "within" the buildings, but the highly discretionary tradition of urban planning in Australia presents some concerns. There is a risk that in the future, particularly during less prosperous development times or following a change of government, discretionary decision making may transform the FAU into a mechanism of monetary exchange, thus preventing the city to achieve the generation of civic value, design excellence, and built-quality that it is auspicated by the new controls. A third concern relates to matters of functional zoning. The new controls are heavily geared – and almost entirely conceived – in response to tall residential developments, and this mono-functional focus raises questions about the capacity of the city to plan long-term "livability" through quality workplaces, attraction of global businesses, public and semi-public commercial development, and

这一理念并不新鲜：这是源自现代主义，尤其适用于高楼大厦的市政原则。摩天大楼的体量、可见度以及必要的长寿命要求这一建筑形式一即便是私人资助下一也免不了要承担回馈公众社会的责任。墨尔本重新引入容积率建筑形式控制是对过去数十年放任主义的应有补偿，其忽视了有必要去管理一不如说否认、忽略、抛弃了自我管理或反对先验的一高楼大厦的建设。

面对当前的繁荣，新管控的影响取决于全球金融危机后建立的“全球本土化”的住宅市场。建筑面积提升在定义上针对的是建筑物“超出部分的”面积，借此机制来平衡公共与私人利益。因此，除非规划部门促成大面积的内城土地集约化或是撤销实施新的退缩控制，高楼或者超级高楼和超纤细高楼建设活动将很有可能为公共利益作出巨大贡献。鉴于墨尔本预计会将高楼大厦翻一番，这一速度超过了泛大洋洲的任何其他城市和中国的新的大型城市（图8）。因此有必要怀疑《中心城市建筑形式评论》是否会最终削减高楼建设活动而不是产生新的公共利益和创新性的建筑产品。

新的条例注重于“当场”和/或在建筑“内部”产生利益，但是澳大利亚高度自由化的城市规划传统带来了一些忧虑。未来的一个风险是，尤其当发展缓慢或政府换届之时，自由化的决策过程可能会将建筑面积提升变成一个变现的机制，并阻止城市获得新的控制措施所希冀的市政价值、杰出规划和高质量建筑的诞生。

第三个忧虑是关于功能性区划的问题。新的控制措施大量迎合一基本上全部构想于一高层住宅楼的开发。这一单功能导向令人担心城市对于“宜居性”的长期规划的能力，这还需要有高质量的办公场所、国际性的招商、公共和半公共的商业开发以及建筑创新。

最后但同样重要的是，受“杰出设计”的启发，《中心城市建筑形式评论》提出建筑面积提升以求选择性的竞争过程。这一条例看似公平，但其背后存在着虚报实际建筑质量的风险，有可能隐藏在明星建筑师光环下的申报文件中。杰出设计原则应当被内城所有的高楼大厦所拥护。墨尔本值得拥有寻求“建筑面积提升”的所有建筑都参与的竞争过程，包括那些超过150米高的。然而竞争并不是质量的保证，除非同时设定一系列透明的标准，使其在更广阔的跨学科领域中一不仅限于建筑学名词一一定义杰出。这些标准应该包括商业空间质量、长期机动性、鲁棒性和高效建设系统、科技创新以及可验证的竣工后能源效率。

building innovation. Last but not least, the CCBFR contemplates a FAU in return for selective competition processes informed by “design excellence.” This provision seems just, but it runs the risk to remain a spurious surrogate for effective building quality, possibly hidden behind an instrument for star-architect attraction. The principle of design excellence is one that should be espoused by all tall buildings in the inner city. Melbourne would deserve a competition process that is established for any building that seeks FAU or any building, say, in excess of 150-meter height. Competitions, however, are not a guarantee of quality unless accompanied by a set of transparent criteria that defines excellence in broader interdisciplinary terms – not only for architectural expression. These criteria should include commercial space value, long-term flexibility, robust and efficient construction systems, technological innovation, and verifiable as-built outcomes of energy efficiency.

## Conclusions

How long can Melbourne’s high-rise apartment boom last? The public benefits sought by the CCBFR rely on an ever-growing forecast of tall building activity, but they seem to contrast with an evident trend of the oversupply of tall buildings. The city may be now equipped with an innovative set of regulations – although generous by global

standards for base FAR – but this may not find the widespread conditions to push developers to “uplift” in exchange for public benefits.

Skyscrapers, once built, are destined to remain in place for a very long time. The latest review of the “built form” controls of the city is of historical importance; however, the capacity of the new measures to sufficiently impact city by distributing public benefit is dependent on an optimistic expectation that the demand of high-rise residential activity will rise further. In this sense, unless further growth and even higher numbers of building proposals are assumed to eventuate, the public benefit trade-offs seem conceived as a mechanism to curtail site density and height, rather than as a reward for building quality.

Meanwhile, the “hyper-dense” tall building boom has entered the executive phase and an unprecedented level of construction activity is underway. Irrelevant of the future scenarios opened by this “glocal” boom, there may be further questions related to technology, productivity, and innovation which are still latent. The new controls mitigate the outcomes of a decade of *laissez-faire* and failure to acknowledge and plan tall buildings in the city, but the opportunity to realize the overdue community benefits is still subordinated to the ongoing – but questionable – expansion of high-rise residential supply in a city that is already set to triple its number of tall buildings.

## 结论

墨尔本的高层公寓繁荣还能持续多久？《中心城市建筑形式评论》所寻求的公共利益依赖于高层建筑活动的持续增长，但是这一预期似乎与高楼大厦的过度供给这一明显趋势相违背。城市目前或许具备了一些创新性的规定——尽管基础容积率按全球标准看依然宽松——但并未营造促使开发商进行“提升”以换取公共利益的大环境。

摩天大楼一经落成，则须长期矗立于此。最新的对于城市“建筑形式”控制的评论是具有历史性意义的。然而，新的措施通过分配公共利益来充分施加影响的能力取决于乐观预期：对于高层住宅建设需求会进一步增加。在这一意义上，除非假设有进一步的发展和更多的建筑投标，公共利益“提升”似乎旨在作为削减场地密度和高度的机制，而不是对于建筑质量的奖励。同时，“超密度”的高楼繁荣已经进入实施阶段，前所未有的建设活动正在进行。抛开造成“全球本土化”繁荣的未来情景，关于科技、生产力和创新或许还有更多潜在的问题。新的控制措施缓和了十年间的自由放任主义与城市拒绝接纳并规划高楼大厦的后果。但是对于一个旨在将高楼大厦的数量翻三番的城市，有机会意识到早应实现的社区利益依然让位于大方向的一然而值得质疑的一高层住宅供给的膨胀。

---

## References:

- Department of Environment, Land, Water and Planning (2016). **“How to Calculate Floor Area Uplifts and Public Benefits.”** Melbourne: Victoria State Government, Department of Environment, Land, Water and Planning.
- EIU - The Economist Intelligence Unit (2015). **Global Liveability Ranking 2015.** Available at: [http://www.eiu.com/public/topical\\_report.aspx?campaignid=Liveability2015](http://www.eiu.com/public/topical_report.aspx?campaignid=Liveability2015)
- Gabel M., Carver, M. and Gerometta, M. (2016). **“The Skyscraper Surge Continues.”** CTBUH Journal (1): 38-47.
- Hayball (2016). **“Architectural Testing of Built Form Controls, Melbourne Hoddle Grid / Southbank.”** Melbourne: Victoria State Government, Department of Environment, Land, Water and Planning.
- Hodyl + Co (2016). **Central City Built Form Review Synthesis Report,** Victoria State Government, Department of Environment, Land, Water and Planning.
- Marfella, G. (2014). **“Interactions Between Residential and Office Towers in Melbourne.”** In *Future Cities: Towards Sustainable Vertical Urbanism*, 315-319, edited by A. Wood T. S. Zheng and T. Johnson. Chicago: CTBUH.
- Robertson, R. (1995). **“Glocalization: Time-Space and Homogeneity-Heterogeneity.”** In *Global Modernities*, 25-44, edited by M. Featherstone, S. M. Lash and R. Robertson. Thousand Oaks (CA): Sage.
- Thompson, I. (2016). **“Aviation Challenges With Building Tall.”** CTBUH Melbourne Committee Seminar.
- Thornton, M. (2005). **“Skyscrapers and Business Cycles.”** *Quarterly Journal of Austrian Economics*, 8 (1): 51-74.