Title:	**Sydney 2050: A Sustainable City Vision for Greater Height, Public Benefit & Tall Building Resurgence**
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Subjects:	History, Theory & Criticism Sustainability/Green/Energy Urban Design Urban Infrastructure/Transport
Keywords:	Sustainability Urban Design Urban Planning
Publication Date:	2015
Original Publication:	Asia & Australasia: A Selection of Written Works on the World's Tall Building Forefront
Paper Type:	1. Book chapter/Part chapter 2. Journal paper 3. **Conference proceeding** 4. Unpublished conference paper 5. Magazine article 6. Unpublished

Sydney 2050: A Sustainable City Vision for Greater Height, Public Benefit & Tall Building Resurgence

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Sydney 2050 investigates how an increased height limit in Central Sydney can allow for both sustainable population growth and also benefit the public The vision links the city's economic development to the public benefit of a sustainable transport network. For Sydney to be sustainable with increased density it needs a rapid transit system. To link development to this transport network, supertall buildings are allowed within 200 meters of a Metro station in the city centre. This creates a city skyline that is directly linked to and celebrates its transport system. Financially, the economic uplift of additional floor space above the current height limit is linked to financing this transport system through the purchase of "Supertall Floor Space" from the government. Revenue raised will fund the Metro system by phasing out government infrastructure bonds. These principles have been quantified in a parametric model to generate a vision of Sydney in 2050.

Sydney 2050 Commission

In early 2014 the Urban Taskforce, a developer lobby group funded by members, commissioned three Sydney architecture firms to investigate how the city could accommodate growth and increased density up to 2050. Specifically in question was the city's statutory height limit of 235 meters. The commission resulted in three very different approaches to accommodating growth, height, and density. The results were published in the Urban Taskforce magazine "Urban Visions." (http://www.urbantaskforce.com.au/urbanideas/may2014/), and a public seminar was held to discuss and debate the outcomes. The issue was picked up by local media including newspapers, radio, television and web blogs, generating considerable debate about the future urban form of Sydney's CBD.

"We . . . protest with all our strength, with all our indignation . . . to the erection of (these) useless and monstrous tower(s). To bring our arguments home imagine for a moment . . . giddy, ridiculous tower(s) dominating . . . like gigantic black smokestack(s) . . . stretching like a blot of ink (their) hateful shadow."

These words could easily sum up one element of the public's reaction to the

Sydney 2050 Visions. They are in fact the objection from a group of Parisian artists against the Eiffel Tower in 1886. Ironically the same words were used verbatim nearly 100 years later in protest against the Centre Pompidou. As we know both structures are now much loved by Parisians.

Why is it then that change in a city is attracts so much criticism? Is it simply that anticipated change in the scale of a city and its buildings causes a public reaction of fear and distress? Knowing that a vision for a taller, denser city would cause adverse reactions, part of this study was about educating the public in the nature and necessity of city growth and change. It is our belief that even with supertall buildings Sydney can maintain its beauty, romance and importantly its status as a global city.

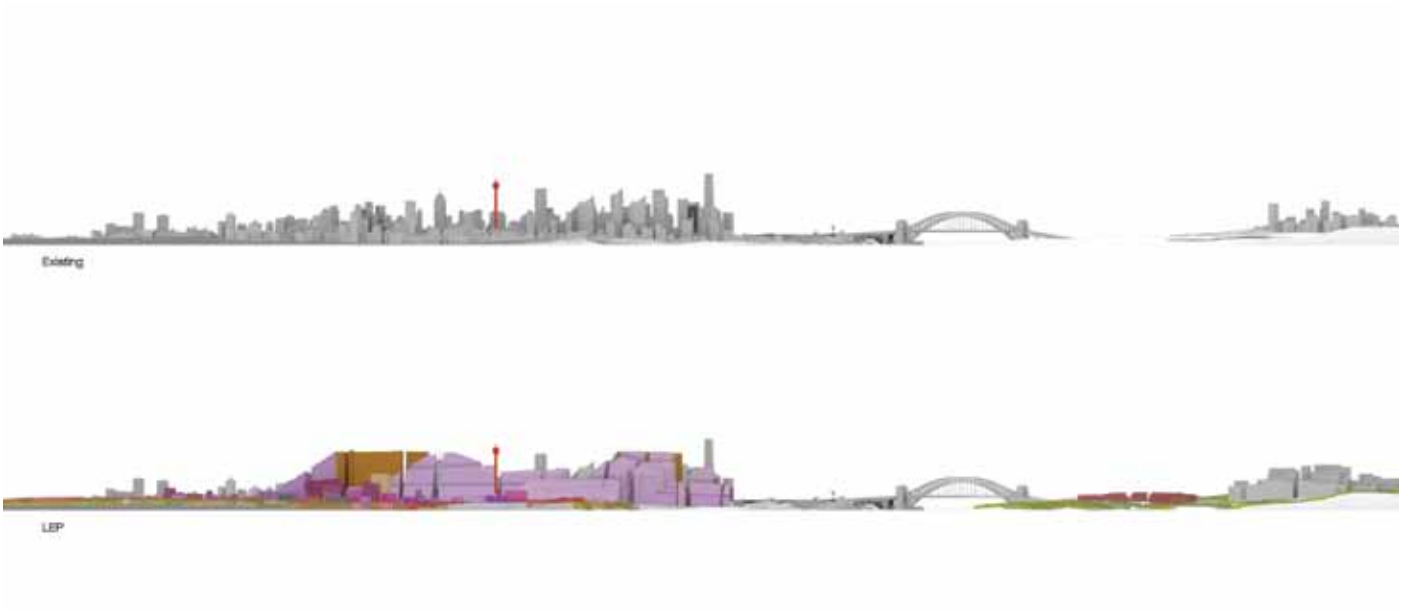
Cities and Skylines

Cities have long been defined by their skylines, whether it be reaching for the heavens, or extending to the horizon. Throughout history we can think of "Level Cities" created by their restriction in height either through circumstance or regulation. New York in the 1800s had its height limited by the reach of a fireman's ladder for public safety; while in Paris Baron von Haussmann defined the street wall and mansard height of new boulevards through that city. Even the island paradise of Bali, while experiencing a growth boom in the 1970s, limited the maximum height of new structures to not exceed the height of a palm tree to maintain its aesthetic character.

At the opposite end of the spectrum there are "Cities of Towers". One immediately thinks of the archetypal modern tower cities of New York and Chicago, whose fascination in the early twentieth century with the new technology of steel frame construction and elevators resulted in the first modern high-rise city skylines. Of course there have been high-rise city skylines long before the modern era. In the middle ages in San Gimignano the local merchants built towers on that hill town's skyline as symbols of their power and wealth; while London's skyline in the 1700s was defined by the architecture of church spires, as was captivatingly portrayed in paintings by Canaletto. Hong Kong has long had a vertical skyline created through a combination of land scarcity and economic demand.

Opposite: City of Towers, San Gimignano, Italy. Source: Bates Smart

Top: City of spires, Canaletto's 1746 painting of London "The Thames and The City." Source: Canaletto



Today a new breed of city is defining itself on the global landscape through their skyline. The Asian Tiger economies are declaring their ascendency through the height of their skylines. Shanghai's Pudong was a rice paddy only 30 years ago. Today it has dozens of high-rise buildings and boasts three of the tallest buildings in the world. Other cities across China are racing to building supertall towers as expressions of economic ascendency and power.

Between these two extremes there are many other ways for a city to define its skyline. Some cities have chosen public monuments to limit their height. The height of Philadelphia's skyline was limited by common agreement not to surpass the height of a statue of the city's founder, William Penn, atop the city hall. This self-imposed height limit was not exceeded until the mid-1980s. In London a "View Management Framework" was created by the City of London to protect views to historic monuments, particularly St. Paul's Cathedral and Westminster Abbey, from various locations around London, enshrining the historic dominance of these public buildings. In Melbourne Bates Smart's ICI House was the first building to be allowed to break the city's 132-foot height limit by providing a public sculpture garden; while MLC North Sydney was at the time the tallest building to be built outside the CBD.

Sydney's Skyline – Then and Now

Sydney consists of a small Central Business District (CBD) surrounded by a large low-density metropolitan area. The CBD, colloquially known as "the City," is governed by the City of Sydney as a separate Local Government Authority to the surrounding metropolitan area. The City of Sydney sets height limits for the City, which have as a maximum height 235 meters, a height based on the underside of the habitable floors of Centre Point Tower. Centre Point Tower is a landmark "observation" tower designed by Donald Crone in 1970. It is similar to other landmark observation towers developed around the Pacific Rim at the same time, namely towers in Auckland, Vancouver, and Seattle.

Thus in Sydney there is a similar situation to Philadelphia's self-imposed height limit to maintain the status of its landmark, however in Sydney it is defined by law. While Centre Point was in the 1970s the focus of the Sydney skyline, one can observe how after 45 years the statutory (LEP) Height Limit has encouraged a horizontal skyline and the city profile is tending towards being level at 235 meters.

We believe that if Sydney is to maintain its status as a global city it must have aspirations beyond a 1970s landmark. As Sydney grows it is simply not sustainable to continue the outward sprawl of the city, thus it is vital to look at increasing density. The central CBD is tightly constrained by the harbour to the north and west, parklands to the east, and Central Railway Station to the south; thus it is clear that additional growth in the CBD can only be accommodated by additional height.

The question is how to distribute the height and, in effect, reimagine the skyline of Sydney. Several options were investigated, ranging from clusters of towers to linear skyline. Cities that have opted for a centralized "clustering" of height include Shanghai's Pudong, the City of London, or Paris' La Defense. Other cities have a linear expression of height, such as Jakarta or Beijing, where high-rises follow the highways or ring roads. Sydney's skyline currently reinforces the lineal topography of its headland, gradually increasing in height towards the harbour in response to real estate values.

Our challenge was to how to reimagine the skyline, rather than simply suggesting an increase in overall height limits across the entire city.

Background

To understand the concept it is necessary to explore some background thinking about cities and their growth. Issues were considered about the growth of cities, the connection of sustainability and density, and our public transport system. From these issues, the following three principles were developed to guide the vision:

1. Cities grow
2. Density is sustainable
3. Rapid transit is sustainable urban transport

1. Cities Grow

Successful cities increase in population over time. At the last census in 2011 Sydney's population was 4.39 million. This was an increase of 57% from the 1971 population of 2.8 million, over a 30 year period. Indeed

Opposite: Current Sydney skyline elevation shown from parametric model. Source: Bates Smart

Bottom: Diagram of population growth in Sydney. Source: Australian Bureau of Statistics

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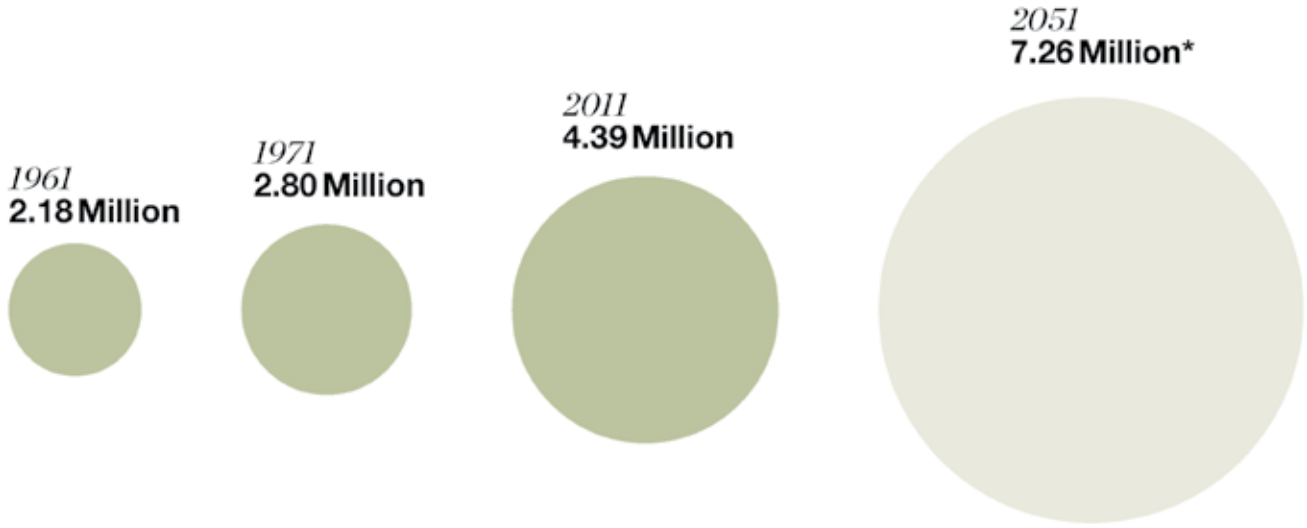


*projected

the population had increased 28% during the period from 1961-1971.

The Australian Bureau of Statistics predicts that in 2051 the population of Sydney will increase a further 65% up to 7.26 million. The question is where to place the additional development required to accommodate growth.

2. Density is Sustainable

It is not sustainable for cities to continue to grow outwards by suburban sprawl. Studies such as those by Newman and Kenworthy and Peter Calthorpe have clearly demonstrated that cities with higher densities use less energy per capita for both transport and household energy consumption. Higher densities reduce energy usage per capita and are therefore more sustainable.

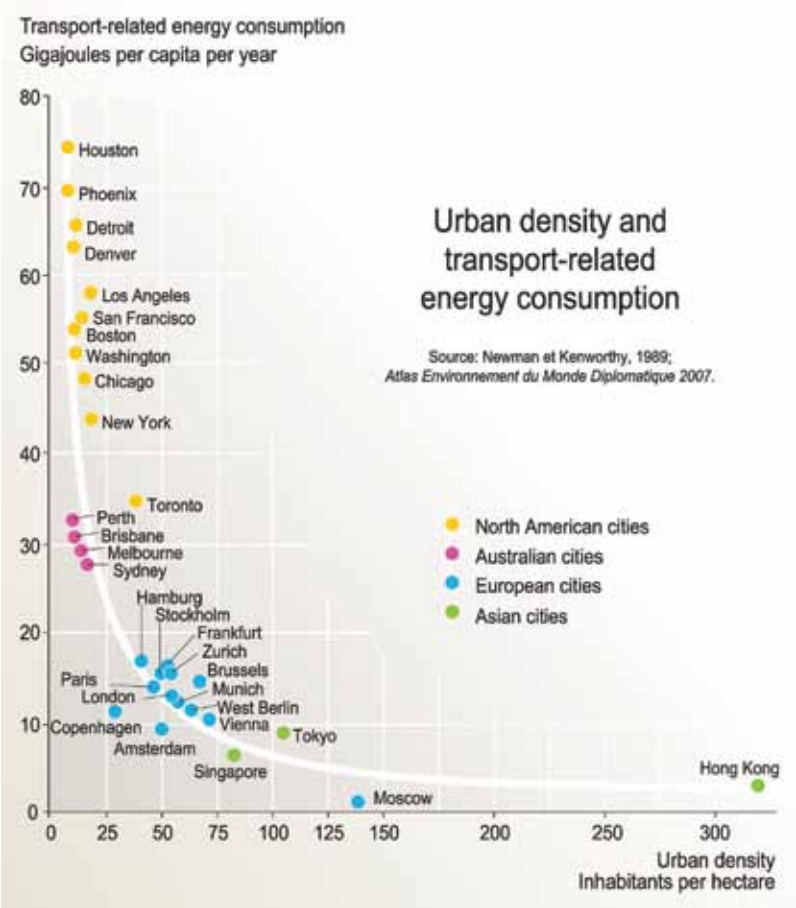
We believe that the most sustainable location to explore additional density is the CBD. However Sydney CBD is geographically highly constrained, being located on a peninsula, with the harbour to the west, parklands to the east, and the Central Railway Station to the south. Thus, the only opportunity to increase density is through increased height.

3. Rapid Transport is Sustainable Urban Transport

Increasing density in the CBD of Sydney would require investment in public transportation. As the government advisory body Infrastructure NSW (New South Wales) notes, "Reliable, frequent, and fast passenger trains are essential to the economic success and to the amenity of life, particularly in global Sydney."

Sydney's public transport system is currently near capacity, however. Returning to Infrastructure NSW, they state, "Additional capacity will be required in the core of the network, particularly the CBD . . . Demand for rail services is forecast to increase by 37% over the next 20 years." To accommodate additional density Sydney would need to upgrade its existing public transport network.

For the sake of simplicity, this study adopts the route proposed by the former New South Wales State Labour Government for the Sydney Metro. This was to be a Rapid Transport Network built and funded by



Left: Urban density and transport-related energy consumption. Source: Newmann & Kenworthy, 1989

Opposite: Comparative aerial view of Sydney skyline in the early 1960s and today. Source: Bates Smart

private enterprise before it was cancelled. The state government had already committed to purchasing properties along the route, and so much of the necessary compulsory land acquisition was already in place.

Sydney's metropolitan area is now serviced by a heavy rail network that connects the suburbs to the CBD and its secondary centres, including Parramatta, Chatswood, and North Sydney. Creating a separate inner ring rapid transit system with transport nodes that connect to the heavy rail system would result in an efficient multi-modal transport system, with each mode designed to cater to its specific function. This way we would not have a heavy rail network trying to function as a rapid transit network in the City. Further, we assumed that the existing heavy rail network would terminate at Central Station to the south and North Sydney Station across Sydney Harbour to the north. This required all localized transport throughout the CBD to be on the proposed rapid transport network.

Understanding that Cities Grow and Change

Finally, taking into account of how difficult it is—particularly for the public—to imagine visions of a city as taller and denser, part of the study obtained comparative views of Sydney in the past thirty to forty years to illustrate the concept that cities change and grow in a lifetime. For instance in the late 1960's with Australia Square, one of Sydney's first true skyscrapers nearing completion, and just a few other high rise buildings on the skyline, it would have been hard to imagine that the city would look as tall and dense as it is today. Today, Australia Square is almost invisible on a dense skyline crowded with skyscrapers craning for a harbour view.

The Economics of Supertall in Sydney

To grow sustainably Sydney needs to consider higher densities than the current city model. As we have shown there is very little geographical area for Sydney to grow, and thus to increase density it needs to grow upwards.

Sydney is founded on a hard sedimentary rock known as Sydney Sandstone; which is an ideal foundation for high-rise buildings. Indeed of all the Australian capital cities, Sydney has the best foundation to build on, and thus should be the most economical city to develop supertall buildings. In addition it has long held the title of Australia's financial capital, and is viewed from our Southeast Asian neighbors as the capital of Australia. Despite this, however, in the last fifteen years both Melbourne to the south and Brisbane to the north have built significantly taller buildings than Sydney.

In part, these cities are aiming to challenge Sydney's preeminent status and draw investment towards their city. Simultaneously, Sydney City's height limits have prevented consideration of supertall buildings. Ironically, even the regional centre of Parramatta, known as Sydney's second city, has taller height limits than the CBD and has just approved a building at 306 meters. In other words Sydney's height restriction is seen as its Achilles heel, and other Australian capitals are taking advantage of it, as well as competing with capitals such as Shanghai and Hong Kong for global economic investment.

Thus there is a strong case for investment in constructing supertalls in Sydney, the reasons for which include but are not limited to opportunities for growth, excellent foundations, and competition for global investment.

Sydney 2050 Vision

Based on the three principles outlined above a vision for Sydney in 2050 was developed around the core idea of linking the city's future economic development to the public benefit of a sustainable transport network. The three pillars of the concept are:

1. Sustainable Transport
2. Public Benefit
3. Economic Development

These are vital ingredients to the ability of a city to be successful and thrive.

The following concepts were proposed as Development Controls to guide the City Vision.

1. Sustainable Transport

To be sustainable with increased population density, Sydney needs a fully functioning rapid transit system, providing transport throughout the inner ring suburbs. The proposal is to separate the functions of heavy and light rail in Sydney to deal with differing commuter needs. This is a similar concept to many large cities such as New York or London, where there are separate rail networks providing differing levels of access around the city and into the outer suburbs.

The proposal recommends that the existing heavy rail network service the outer ring suburbs, and then continue express to the city centre. This would be complemented by a rapid transit system that services the city centre and the inner ring suburbs.

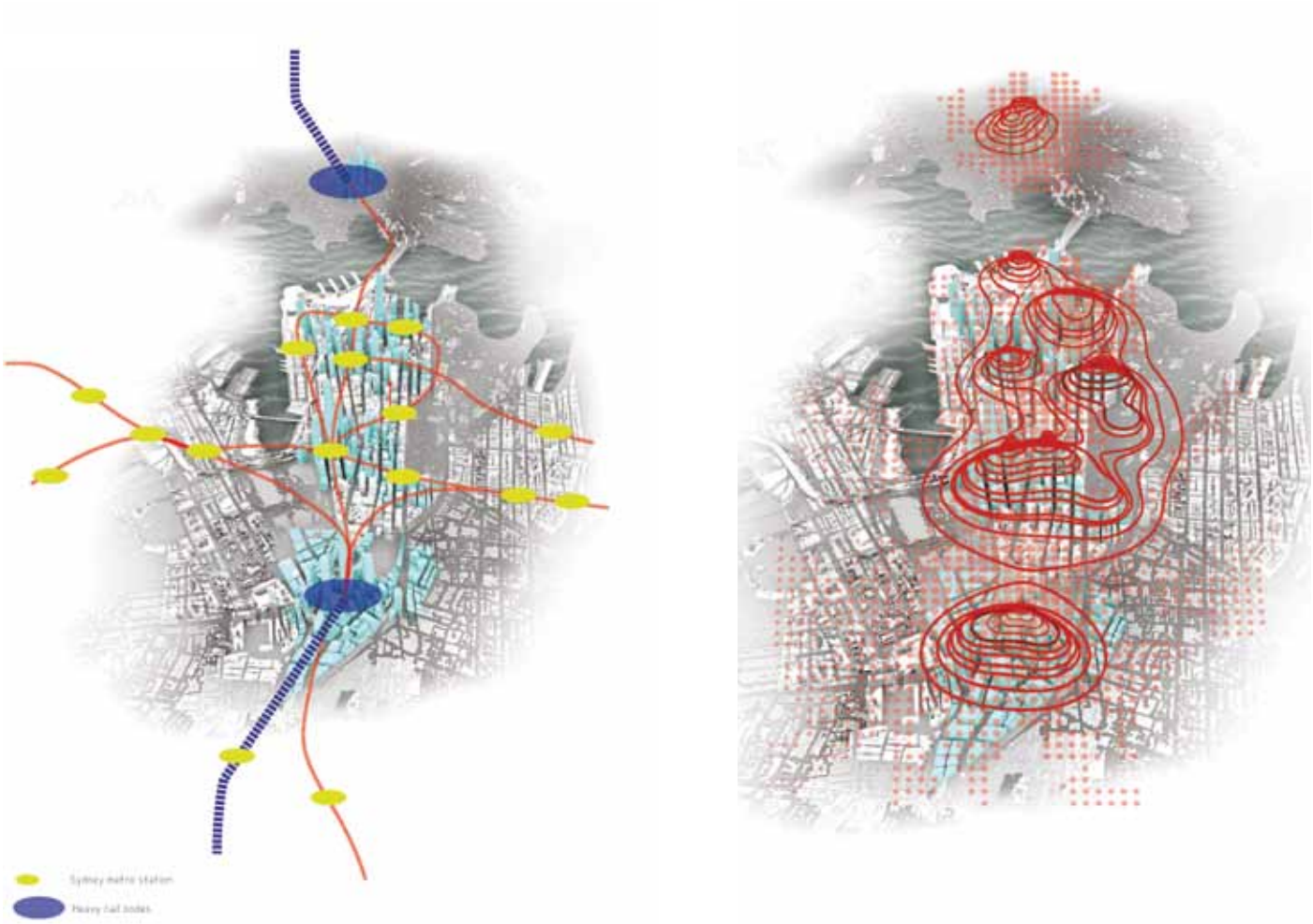
2. Sustainability

Density and mixed-use buildings and neighborhoods are inherently sustainable. Building supertall mixed-use developments creates both density and live/work buildings that reduce travel-related and household energy consumption. To create a diverse mixed-use city it is proposed that future supertall buildings in Sydney must contain a mix of uses, with the minimum mix being 25%.

Secondly, to be sustainable with an increased density we believe Sydney needs a fully functioning rapid transit system. Our vision has allowed the development of supertall buildings within 200 meters of a Metro station in the city centre to directly link development to this sustainable transport network. This will create a city form and skyline that is directly linked to and celebrates its transport system. The skyline thus created is a city form of "hills and valleys." Interestingly, Centre Point maintains its presence on the skyline in a valley.

3. Economic Development

Financially, the economic uplift of additional floor space for supertall developments above the current height limit is proposed to be directly linked to the provision of a sustainable



rapid transit system. This would be achieved through the purchase of "supertall floor space" from the state government. Supertall floor space would be applied to all floor area over the current city height limits for developments proposed within 200 meters of a rapid transit station. The sale of floor space is not a new concept in Sydney. Currently there is a register of and a market for "Heritage Floor Space" maintained by the City to reallocate floor space that cannot be used on a site due to heritage restrictions. This proposal follows the same rationale.

It is proposed that the state government raise capital from the equity market through the sale of infrastructure bonds to build the new rapid transit network. Then revenue raised through the sale of "supertall floor space" will be used to fund the Metro system by retiring government infrastructure bonds over time.

4. Amenities

Amenities are vital for people's wellbeing; however, the protection of amenities in a city should not prohibit economic development. Although, sunlight to public spaces is important, it needs to be balanced with the need for economic development. For instance, the Centre Point Tower was allowed to overshadow Hyde Park.

In a similar vein, a proposal to relax the current prohibition of overshadowing of public space by allowing a defined maximum of one hour of additional shadow on public spaces that currently prohibit overshadowing for supertall buildings. This control will influence both the width of supertall buildings as well as their distance from public spaces and parks.

5. Urban Design/Public Domain

To ensure that supertall buildings make a positive contribution to the public domain and urban design of the city a series of controls are proposed to make them contribute to the public life of the city. To increase the variety and type of publicly accessible spaces in the city we propose supertall buildings must provide publicly accessible spaces within them. Further, to reduce visual bulk supertall buildings must taper or setback as they rise; and finally to ensure a varied skyline supertall buildings must be 35% taller than their current context.

Parametric Supertall Urbanism

The development of the control principles outlined above have been quantified in a parametric model of the City of Sydney to create a future vision of the city if height limits were increased and supertall floor space sold to pay for a Rapid transit system. The parametric model was then integrated into aerial photos of the city to provide a photo realistic vision of how the city may look in 2050. These visions illustrate a new city skyline of hills and valleys corresponding directly to the new rapid transit network. While the visions are initially disconcerting in their scale, a quick reference back to the photo of Sydney in 1960's demonstrates that they are not beyond the likely increase in city scale required to accommodate the predicted population increase.

The parametric vision has also been quantified to determine the growth potential and revenue available from the revised development controls. The vision allows for the potential of 12.5 million square meters of additional floor space above the current height limits. Using the current value of heritage floor space as a benchmark, and compounding its value over 35 years, it is

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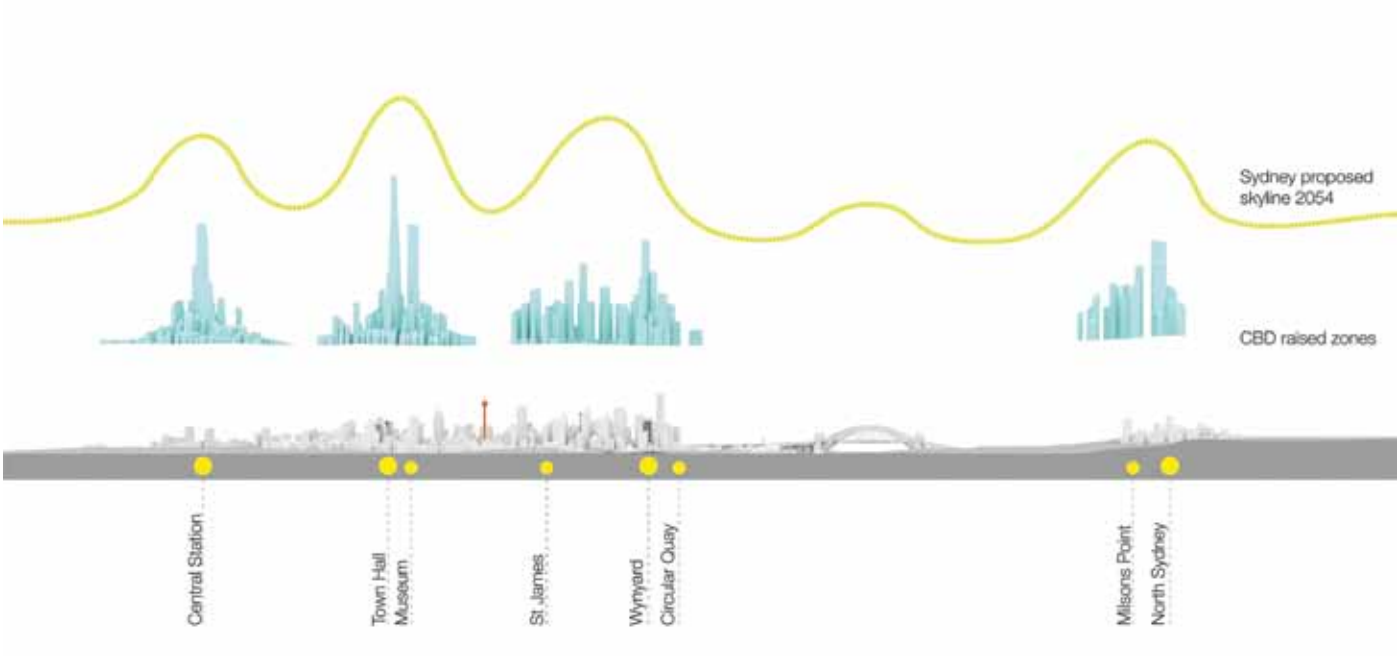

estimated that this will realize $7.1 Billion Australian Dollars to fund a sustainable transport network.

Media and Response

The publication of the Urban Taskforces "Urban Visions" created a media storm in Sydney. It was reported on the television news, radio talk-back, and in the local and national papers. In part this reaction is due to the fact that the City of Sydney has a more complex and restrictive planning legislation than any other Australian city. As a result there are seldom proposals put forward that challenge the status quo of the city. This privately funded vision provided visual material for professionals and citizens of the city to engage in a discussion about the future form of their city.

In addition the "Urban Visions" publication was criticized by the Planning Authority, presumably for not engaging with them. The local Chapter of the Australian Institute of Architects also took a conservative line siding with the City, saying "We promote better, not bigger." While being a thinly veiled criticism of bigger, this populist line doesn't deal with how to accommodate a growing city.

Final Thoughts

This vision of Sydney's Central Business District in 2050 is a critique of the current height controls in the city, the ability to develop the city as a taller and more sustainable city centre, and the need for the state and federal governments to invest in transport infrastructure for Australia's largest city to remain globally competitive. The Urban Taskforce commission generated considerable public debate, and ultimately led to the New South Wales State Premier and Planning Minister declaring their support additional height in the future development of the city, which has put them in conflict with the City of Sydney.

Opposite Left: Diagram showing the relationship between heavy rail and light rail service in the Sydney CBD. Source: Bates Smart

Opposite Right: Diagram showing the influence on the morphology of the skyline of increasing the height limit in relation to Rapid Transit Stations. Source: Bates Smart

Top: Comparison of existing city skyline, proposed rapid transit stations, and potential development around Metro stations. Source: Bates Smart