

URBAN PLANNING HONG KONG STYLE: THE HIGH-RISE WAY

RETHINKING OUR VISION OF SUSTAINABLE CITIES



Hong Kong Skyline from Victoria Peak, (Z.Jacobs, Stock Photo ID: 733062226)

Maya de Souza

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The Author

Maya de Souza works in public policy in the UK, for central government. She has worked on a range of areas of environmental policy, on the natural environment, flood risk management, and circular economy.

For 8 years, Maya was a Green Party councillor at the London Borough of Camden, and took a strong interest in town planning as a member of the Development Control committee and the Culture & Environment Scrutiny Committee. She was involved in exploring and making planning decisions that related to the conflicting demands for landspace and the complex interplay between density and well-being. She played an active part in the development of the revised local plan. Currently, she is involved in the planning system, chairing the Dartmouth Park Neighbourhood Forum, established pursuant to the Localism Act.

From 2015-2018, Maya lived in Hong Kong working with businesses on collaborative environmental projects as well as lobbying on environmental policy. She steered the work of several taskforces, and co-wrote reports on climate resilience, low emission transport and buildings energy efficiency. In addition, she initiated and took forward projects on supporting businesses set science-based targets and a comparative study of policies to show how governments can best support investment in energy efficiency.

Her time in the territory, as well as visits to cities in China from Hangzhou to Shenzhen, gave her insights into the nexus between density and safeguarding the natural environment as well as reducing emissions. Through living in different parts of the territory, Hong Kong Island and the New Territories, Tseung Kwan O, she has first hand experience of extremely high density living and how different objectives can be reconciled as well as the challenges of this style of living.

Maya is currently on Green House's Advisory Group and in the past, was a member of the Green House Core Group. She has also co-authored another Green House report on housing need in the UK and how this can best be met.

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This article is based on my research and experience of living and working on environmental policy in different cities. I'd like to thank friends and colleagues in Hong Kong, for talking through the benefits and disbenefits of high rises. Thanks are due to Simon Ng, Director of Policy & Research at the Business Environment Council, Hong Kong and previously of Civic Exchange, to Robert Gibson, Adjunct Professor at Hong Kong University of Science and Technology and fellow of Civic Exchange, and Fiona Sykes, Arup, Hong Kong, as well as my husband, Prashant Vaze. Thanks also to Professor Antonia Layard, University of Bristol for her comments.

I'm also grateful to Jessica Jacobs on the Dartmouth Park Neighbourhood Forum and other members of this forum who have put the disbenefits of high-rise housing to me. There is never a one-size fits all solution to urban development and regeneration.

I appreciate the challenge from Jonathan Essex, Green House, as to my proposition that urbanisation is inevitable and positive in many ways. It is right to question whether urbanisation is at all possible if we are "facing climate reality". A dialogue on this subject of the level of urbanisation that is needed and inevitable and how best to manage this is necessary at this point in time, before we arrive at the wrong form of settlement and land use.

Most importantly, my huge gratitude to Anne Chapman of Green House for commenting, challenging, editing and drafting a preface for this report.

Preface

The image of high-rise development in the UK is not a good one. High-rise tower blocks have been seen as one of the mistakes of the 1960s; they were where the urban poor were moved into from cleared terraces and tenements. Unlike what was swept away they had central heating, bathrooms, and inside toilets, but the destruction of former communities and the lack of maintenance of their communal spaces meant that too many became crime-ridden, or at least perceived as such. The Green movement in particular never looked favourably on high-rise development. There is a strand of environmentalism in the UK that sees rural areas and small towns as preferable to cities, even though Green politics generally has more adherents in major urban areas than the countryside.

I would say that I am part of that strand: I would not live in a big city (but do live in a small one), and value my garden and having access to the countryside. This report therefore challenges my preconceptions about high-rise development. Maya de Souza's first-hand account of Hong Kong is particularly interesting. It demonstrates that when well-planned high-rise developments can provide a good living environment and have clear benefits over more sprawling urban forms. Of course, we have recognised for years that compact urban areas have advantages, but arguing for the density of development seen in somewhere like Hong Kong, which can only be achieved with high-rise building, takes this a step further than the three to four storey terraces recommended by Friends of the Earth their 1998 book, *Tomorrow's World*.¹

This report takes the view that further urbanisation is inevitable, at least in Asia and Africa. Not least this is because of the impacts of a changing climate on the viability of rural livelihoods. On this view the alternative to well-planned urban development is not rural living but sprawling slums. A contrary view, put forward by Jonathan Essex in his chapter of Green House's book *Facing up to Climate Reality, Honesty, Disaster and Hope*, is that continued urbanisation is a choice, not inevitability, and it should be resisted. He points out that if, as predicted, 75% of people live in urban areas by 2050 and the global population reaches nine billion, the number of people in urban areas then will be double what it is today. That implies "new construction equal to all the existing urban built environment" and that "Assuming buildings continue to be built as they are today, then the amount of 'embodied carbon' (even before subsequent 'in use' energy) could be enough to cause runaway climate change – even if subsequent living is zero carbon..." By way of example, Essex states that in the early 2000s over 50% of Shanghai's carbon emissions were due to the construction industry alone (p.74 of Foster, 2019). Essex argues that Urbanization has been driven by a globalising economy that has prioritised links between large cities. Instead, we need to reconnect cities to their rural hinterlands (p.83), localise investment in city-regions to make them more resilient (p.85) and stop expanding cities that are vulnerable to the changing climate and sea-level rise. He argues that it is easier for smaller communities and city-regions to become sustainable than mega-cities (p.88).

Is it possible to "improve the livelihoods (and resilience) of the poorest [in poorer nations] whilst not increasing their (minimal) carbon emissions" (Foster, 2019, p.87) and thereby enable people to stay in rural areas rather than migrating to the cities? Could construction, including that of high-rise buildings, be made zero-carbon? The right course of action in the face of the changing climate is not clear but I hope this report provides some useful input into the debate on the future of cities.

Anne Chapman
Green House Co-chair

¹ See p.132 of McLaren, Bullock and Yousef, 1998

Summary

The aim of this report is to encourage greater consideration of high-rise, high-density cities as a strategy for ensuring climate-resilient and low carbon living.

My proposition is that this approach to city design is an important part of a strategy for those countries in the process of mass urbanisation, but even countries with well-established cities should consider this approach. In facing up to climate reality we need to consider design of this nature with an open mind. The low-rise medium density development option often preferred by the environmentalist has major downsides.

My aim is to explore an approach which achieves multiple objectives, essentially finding a way of living within the parameters we face whilst also ensuring well-being. This is in effect the goal of sustainable development, neatly encapsulated more recently in Kate Raworth's Doughnut Economics model.

The parameters are the need to reduce GHG emissions from infrastructure construction, transport, cooling and heating buildings, noting a rising population and urbanisation, whilst also providing for rising living standards and well-being. That means a need to find space for farmland and market gardens, protecting biodiversity from encroachment, and providing sites for leisure activities. It's also necessary to ensure there is space for water when it floods, which can otherwise wreak havoc, as we have seen in cities from Beira to Chennai. These parameters affect the sort of city we can afford to build.

With reference to the Hong Kong model of design and urban planning, I seek to show that high-rise, high density living if done well is a good way to manage within the parameters we face. Illustrating this with examples, I show how high-rise high-density living can be appealing, taking on board the possibilities in terms of shared community space and roof gardens, as well as ease of access to public transport. One of the high-density developments we lived in had a bus stop underneath it. Within half an hour, one could drive over the hills and through the forests of Hong Kong Island to arrive at Stanley Beach, the equivalent of London's Brighton or Margate.

So shifting away from the tourist brochure, what are the overall advantages of this style of development? Several, including: affordable mass transport which reduces time and pollution, combined with the potential to reduce other infrastructure costs, plus the protection of local farmland, enhancement of leisure space and making nature – beaches or hill walks in the case of Hong Kong, accessible by avoiding traffic and urban sprawl.

Are there any downsides? It is fair to say that there are, but my contention is that they can be addressed. Some studies suggest that energy usage and the heat island effect can increase, however these problems can be mitigated by good design. It is accepted that without some security of supply very tall buildings are not manageable. Embodied carbon is another issue: construction materials can be highly carbon intensive. However new materials such as cross-laminated wood make it easier to build in hybrid form. Tall buildings using this are being designed and built every year.

Other arguments that are put against high-rise, high density are far from compelling. For example, supply chains and logistics can be an issue – but this is less of an issue in high density cities which do not have roads clogged up with traffic. And that is one of the benefits of this approach: there is less need for private cars. Another is heritage and

identity plus crime and community, and benefits of wellbeing from nature. These issues do need to be taken on board, but solutions can be found.

I suggest that active blueprint planning is vital to make this happen, as the benefits are only fully obtained through an integrated approach to planning. A lot of planning theory has focused on the normative, but we do need to explore positive theories. There is a need for blueprint planning - in particular an integrated approach to transport, housing, leisure and access to nature, if we are to meet the goals of maximising well-being within the parameters we are faced with.

1. Introduction

Towns must be conceived and planned throughout their entire extent in the same way as were planned the temples of the East and as the Invalides or the Versailles of Louis XIV were laid out.

Le Corbusier, 1989 p.51-52.

Cities that control sprawl and are built around efficient public transport systems can both stimulate economic performance and reduce GHG emissions. Synthesis Report p.20, Global Commission on the Economy and Climate, 2014

Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.

IPCC (2018) p.4

The aim of this report is to encourage greater consideration of high-rise, high-density cities as a means of ensuring climate-resilient and low carbon living. I argue that this is an important strategy to take on board in facing up to climate reality. With reference to the Hong Kong approach, I show what a resilient low-carbon city may look like in terms of density and height, and how the downsides of high-rise cities may be addressed.

I am writing predominantly for those countries that are in the process of large-scale urbanisation: my focus is on new cities. African countries are beginning this journey – Nigeria’s Eko Atlantic is one example of a planned city. It will be a protected enclave for the rich, protected against sea level rise as well as crime,² but this report seeks to answer the question of developments for the not so rich as well. Kenya now proposes six new cities in the central part of the country. There are many other proposed cities in countries like the Philippines and Indonesia – even Jakarta is to be relocated to the island of Borneo.

I seek to show that these ideas on height and density are relevant to wealthier, older cities too, especially to new towns or additions to towns. Density in many OECD countries is now falling – people are moving out of cities to neighbouring towns.³ These new lifestyles are attractive in many ways – houses surrounded by gardens with local schools and workplaces, Sunday fruit and vegetable markets *etc.* It’s an appealing picture of a better future, brought very successfully into reality in places like Vauban, Freiburg. But is this the right solution?

I would like to challenge the view on sustainable cities that favours low height and moderate density, drawing in part on my personal experience of Hong Kong and the Greater Bay Area (Pearl River Delta) – a collection of nine large cities (with a combined population of over 50 million). However, I recognise that high-rise high-density is not the solution for every site or city and that factors like heritage and history can outweigh the benefits. My main arguments are that high-rise, high-density development reduces the need for urban infrastructure: roads, rail, sewerage networks and also for flood defences which will be critical in low lying coastal cities. Just as

² Goodell (2018)

³ OECD (2018)

important a reason is making space for biodiversity, water, market gardening and leisure. In the context of mitigating and adapting to climate change, I argue that we need to think high-density, and this means high-rise. It does not necessarily mean 60 storeys high – it may just mean 10 or 20 – depending on the city.⁴

Small towns and low-rise development are often perceived as most sustainable. Achieving resilience in small cities and towns at first sight seems more manageable. Co-operation and even infrastructure systems – water, sewage, transport – seem easier and less complex. But although high-rise cities may create pressures in the form of demand for complex energy, water and transport infrastructure, sprawling cities have greater problems in terms of sustainability primarily because of infrastructure and mobility requirements. They also take up valuable space which we need for other purposes.

However, I share the view taken by many experts on cities that it is not only the level of density but the detail of the design that is important. High-rise development can be soulless, dehumanising, hugely carbon intensive – but it need not be that way. The specifics are critical - from the construction materials to green space and provision of shared space for leisure and community activities.

For those who feel that this would be a shift in the wrong direction and that urbanisation *per se* is the problem, renowned experts on cities have for many years made the case for cities. For example, Edward Glaeser, argues that cities have many benefits:

*The success of cities in the 21st century — the urbanization of the world — reflects a very deep connection between urban density and what it means to be human Miraculous things happen when human beings learn from one another. That's what cities do.*⁵

Saskia Sassen asks whether it is urbanism *per se* that is problematic or the types of urbanism, and concludes:

*It is, doubtless, the latter – the specific urban systems we have made: systems and processes we have created collectively and historically.*⁶

Rural living can be just as damaging as urban: witness the deforestation from burning wood for fuel or pollution of rivers and streams with waste. As Sassen contends:

*Our extreme capitalism has made the rural poor, especially in the global South, so poor that for the first time, many now are also engaging in environmentally destructive practices, notably practices that lead to desertification.*⁷

High-rise compact development is not a new idea: it's the approach supported by architects like Corbusier and academics like Philipp Rode.⁸ However, reports such as the recent OECD report on urban sprawl⁹ do not go so far as suggesting that high-rise,

⁴ Colin Buchanan and Partners (2008)

⁵ Glaeser (2018)

⁶ Sassen (2012) p.301.

⁷ Ibid p.301

⁸ Rode (2018)

⁹ OECD (2018)

high-density may be the better approach but emphasize the importance of an integrated approach to planning and transport, which is explained in this report.

I show the relevance of this concept to climate mitigation and adaptation: how new cities with high rises, podium gardens and roof gardens; towns which are for walking and cycling and have high ratios of public to private space can be the answer. They may also use smart technologies, for entry into private estates, for finding parking or for picking up a smart bicycle or e-bike. These cities will be well-governed with layers of democratic participation and involvement. Rather than the sprawling homes of the US suburbs, they would have the compact apartments of East Asia. I hope to show high rises even work for the middle classes who tend to aspire for that house and garden or at least a duplex of sorts, though there is of course no one size fits all solution, and the detailed planning of high-density development is all important.

What I propose is a modification of the Hong Kong model. Figure 1 below shows the pattern of development in Hong Kong, including the large proportion of open space. Figure 2, a picture of Victoria Park and Tai Hang on Hong Kong Island shows what the built-up area looks like. This can be contrasted with two other forms of urban development: the low-rise, high density development of Vauban in Freiberg, Germany (Figure 3) and the low rise, low density Welwyn Garden City in the UK (Figure 4).

The crux of the issue is whether the high-density approach should be the preferred option in the context of a climate emergency, with increasing populations and where cities need to have both low embodied carbon emissions as well as low operational emissions. The second question is, how can we best address the downsides of high-rise developments?

I explore the risks of heat islands, of isolation, of crime and poor governance, and how to mitigate those risks. High-rise cities appear to carry a risk of loss of community through scale, a disconnect from the environment through distance from nature just from feet above the ground, and an absence of the scope for individuality and character. In carbon terms, the high embodied emissions of buildings the height of those in Hong Kong are an issue. Can these problems be resolved?

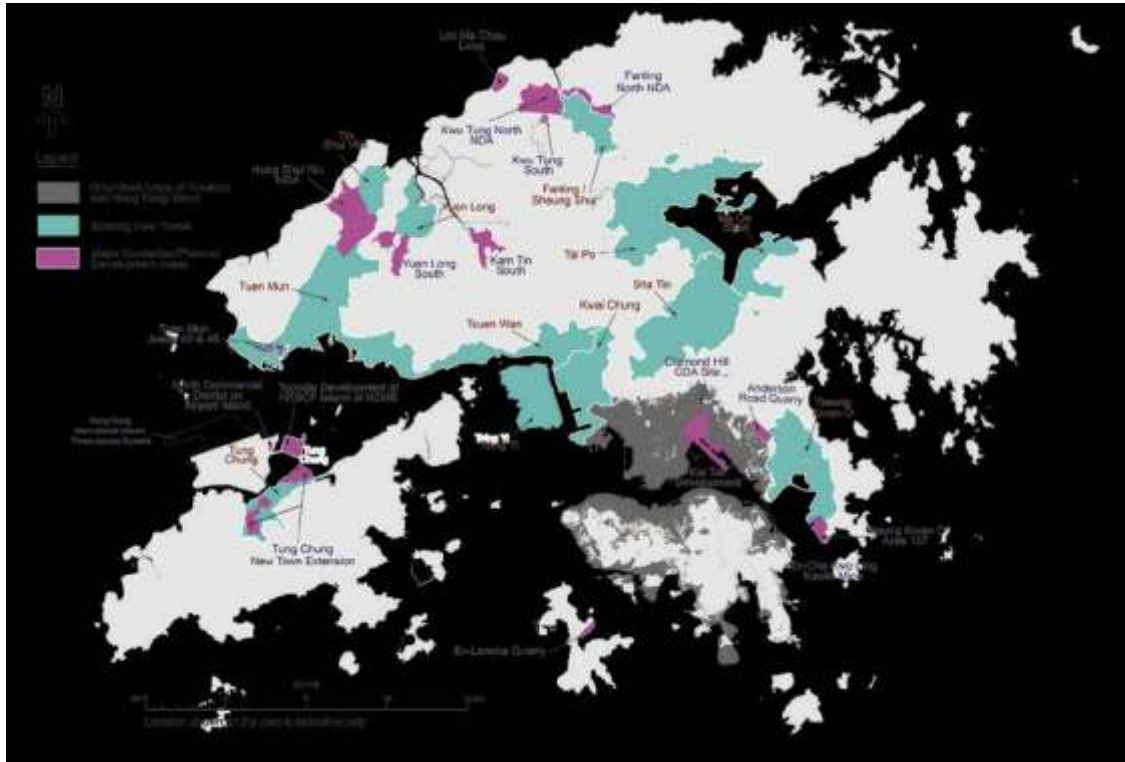


Figure 1: Map of Hong Kong showing built-up land, new towns and planned new developments.
Source HK 2030+ Booklet (p.63) ¹⁰



Figure 2: Victoria Park and Hong Kong skyline (by Jose Mario Lerma). Royalty-free stock photo ID: 766265134

Hong Kong average across the territory 6,780 people per km². The population density of highly populated areas are: Central and Western 19,391 per km²; Wan Chai 17,137 per km², and Eastern is 30,861 per km², giving the highly urbanised part of the island a density of around 24,000 persons per km² in its approximately 41.3 km². (15.9 sq miles) area. (Hong Kong District Profiles, 2016 Census data.)¹¹

¹⁰ From https://www.hk2030plus.hk/document/2030+Booklet_Eng.pdf

¹¹ <https://www.censtatd.gov.hk/fd.jsp?file=D5320189B2019AN19B.xlsx>



Figure 3: Low-rise High-density – Vauban, Freiberg, Germany

136.5 people per hectare, 13,650 people per km².¹²



Figure 4: Low rise, low density – Welwyn Garden City

Early garden city with a population density of 3,681 per km².¹³ This is similar to the density of another “garden city” built as a suburb rather than a city – Hampstead Garden Suburb. 33.7 per hectare, 3370 per km².¹⁴

¹² <https://freiburg-vauban.de/en/vauban-in-numbers>

¹³ https://www.citypopulation.de/en/uk/eastofengland/hertfordshire/E35001153_welwyn_garden_city/

¹⁴

<https://www.barnet.gov.uk/sites/default/files/assets/citizenportal/documents/councilanddemocracy/wardprofiles/GardenSuburbwardprofileCTMarch2013v2.pdf>

Hong Kong

As shown in Figure 1 (Map of Hong Kong), the territory has 9 new towns shown in green on the map, with the older areas shown in brown. The large amount of open space in the territory – in the middle of Hong Kong Island, Lantau, the middle of the new Territories, Sai Kung, and close to Fanling is shown unshaded.

The four main new towns Sha Tin, Tseung Kwan O, Tuen Mun, and Tung Chung have populations of about half to one million people each on small areas of around 2 km², if you leave out the parks on the edge of these towns.

In terms of transport, social and leisure facilities, Tseung Kwan O (TKO), to take one example, is a mix of public and private developments with five “mass transit stops” including Lohas Park a satellite to a satellite town and several big shopping malls. It has a library, a large public pool, sports centres, cinemas *etc.* Homes are close to the sea. It has the other familiar features of new towns – office buildings, cycle ways, and little parks. In the hills, you will find the occasional community garden and some spaces for outdoor exercises like Tai Chi.

As to public housing, examples in TKO include Choi Ming Court in Tiu Keng Leng with ten residential blocks – four for rental and six for home ownership. It adjoins an MTR station plus a small shopping mall and a wet and dry market. Extra, if rarely advertised facilities include just a five minute walk (albeit a steep one) to the hills above. Private housing is not so different but has shinier entrance ways and five star clubhouses.

Design is very standard in these towns; one development looks much like another. The good points are tall thin buildings enabling wind movement and also avoiding blocking out views entirely.

There are other good examples of developments that are not formally new towns, like Tai Koo Shing an estate built on Swire’s old sugar factory just east of Quarry Bay. Its population is around 40,000 (2011 census) living in six terraces of housing, about eight blocks per terrace, nearly all of which have podium gardens. Some also have shared pools and sports facilities. The terraces connect up with street level and raised walkways. The entire area is only about 3.5 ha in total and adjoins the waterfront where there is space for tai chi and running. There is a vast shopping area and the site adjoins office blocks too making it almost a mixed-use development.

The upmarket Belchers Estate in Kennedy Town on the other side of the island was recorded as having a population of just under 7000 in 2016. It comprises six tower blocks of just over 60 storeys each (over 700ft tall). The floor area is 271,500 m²: about 27 ha of accommodation as well as shopping centre, parking and extensive clubhouse plus outdoor pool, on just over 1 hectare of land. That’s considerably over 500,000 people per km².

There are villages too in Hong Kong, which have led to controversy. As a result of the colonial government’s negotiations with the local people, men from new territories families can build three storey houses in their village. They make full use of this right, build the houses and then put them up for sale, leading to some sprawl. So HK is not entirely immune to sprawl and encroachment onto green spaces. It’s a bit of a loophole. Having said that the villages do offer some choice, enabling those who wish to do so to live in such communities.

As a result of Hong Kong’s system of planning, in some older parts of the city, such as Kwun Tong, the population is up to 57,530 people per km² and in some new developments it is even higher, as I have discussed above. But the average density in Hong Kong as a whole is just 6780 per km². This should be compared with Mumbai which has 31,700 people per km². The difference between the two is the much greater amount of open space in Hong Kong compared to Mumbai: country parks rich in biodiversity, as well as land for food growing. Many third world cities have very little accessible space. This is not true for Hong Kong where much of the land outside the city is publicly owned and has many trails such as the famous Maclehoose and Wilson trails, enabling 100km hikes just a few miles from the city.

2. Theoretical Framework & methodology

The theoretical frameworks underlying modern urban planning are complex and politicised. The first formal approach is often regarded as being the “blueprint model”. This shifted to an approach which was less about planned physical spaces and more about planning as a process, “the systems school”. Blueprint planning focuses on spatial frameworks led by professionals and use of predictive modelling and quantitative assessment. In the UK, this was the model pioneered by Charles Booth and Ebenezer Howard. Actual examples include Henrietta Barnett’s Hampstead Garden Suburb (low rise with gardens) and Corbusier-influenced ‘towers in the park’ developments in New York such as Co-op City in the Bronx.¹⁵ This was followed by another form of “rational planning”, synoptic planning¹⁶ which places greater emphasis on goals and targets as well as on evaluation of options and public participation.

Another approach – Lindblom’s¹⁷ views on incrementalism more generally - would see the planning process as about “muddling through” with bargaining approaches to land-use. This approach may be more pragmatic. It may result in the history of a place being preserved, by avoiding single grand plans.

In the 1960s, a new empirical school, influenced by Marxian thinking, characterised planning as being part of a broader structure of power, with planners playing a role in designing cities and housing in a manner that supports the social and economic order of the time.¹⁸ This would in effect amount to at best a bargaining approach to decision-making. What this theoretical framework gives is a description of the process, rather than a normative view of what the planning system should look like.

What I contrast here is a rational model versus an incremental one: blueprint planning and synoptic planning on the one hand and incrementalism and bargaining models on the other.¹⁹ I think we need a greater emphasis on the former – strategic, rational approaches that consider the space available as a coherent whole and develop an integrated plan for housing, transport, other infrastructure and leisure needs. High-rise, high density development necessitates this form of planning if it is to work. Having said this, participation and citizen involvement is fundamental considering the need to make places desirable localities to live. Pragmatism and consideration of the social and historical heritage of a place are also important and add value, however intangible.

As to the methodology, there are few data sets that enable consideration of the relationship between density and social factors as density is often measured at a city rather than a locality level. Hong Kong with its concentration of buildings and vast areas of open space comes out as low density in comparison with a more sprawling city like Mumbai. So my methodology is not a quantitative one but one based on observation and attempts to draw out possibilities from this observation.

The criteria used in this analysis of *the best mode of urbanisation* are:

- (a) environmental considerations, including pollution, climate change mitigation and adaptation;

¹⁵ Schulz (2015)

¹⁶ Lane (2005)

¹⁷ Lindblom (1959)

¹⁸ Hall (2014), Chapter 10

¹⁹ Fainstein, de Fillipis (Editors) (2016)

- (b) social – levels of social interaction and leisure space; and
- (c) economic – jobs and efficiency.

There are other questions which I would have liked to address but which are not for this report, which include whether we need cities in the first place - I am taking that as a given - and whether cities should be designed as a series of satellite towns as in Hong Kong rather than a single contiguous city.

3. Context - the trends

The context we are facing is a challenging one: how to feed and house rising populations at a time of both climate and biodiversity crises, whilst also ensuring a local environment conducive to well-being including safety. Well-being requires community rather than isolation, safeguarding people from crime, and adequate leisure time as well as space. In this section, I look at some of the key challenges and drivers of change, before (in Sections 4 and 5) going on to examine the benefits and downsides of high-rise urban development.

3.1 *Rising Population and Urbanisation*

We may have reached peak birth rates but that is not the same as peak population. In 2018, the global population stood at almost 7.5 billion people. It is projected to rise to 8.5 billion by 2030 and peak at 11 billion by 2100,²⁰ with most of that growth in Africa and Asia. This means an increasing need for resources including food, water and energy. It means increasing pressure on land, impacting biodiversity and leisure space.

Alongside population growth we have continuing rapid urbanisation. It is anticipated that the proportion of the world's population living in cities will rise from over 50% today to approximately 70% by 2050.²¹ The immensity of the change needs to be recognised: the urban population by 2050 is expected to be double what it was in 2000.²² Over 90% of this growth will occur in Asia and Africa. This is expected to mean 416 million new urban dwellers in India, 255 million in China, and 189 million in Nigeria.²³

People are driven to cities by various reasons including an agricultural sector that no longer provides sufficient security of income, and is affected by water scarcity and climate change²⁴. These conditions have been exacerbated by climate change, which in many parts of the world is making traditional rural livelihoods unviable. In Mongolia, for example, which has already warmed by 2°C, the nomadic, herding lifestyle is under threat as the climate becomes less predictable and grasslands are no longer able to sustain the herds of animals they once did. This is driving people to the cities where they are living in shacks and burning poor quality coal to keep warm. The result is a capital city with the worst air pollution in the world, and the health problems that go with that.²⁵

Some countervailing pressures are in place: renewable energy requires land, so there is the potential for the growth in renewables to provide jobs in rural areas. Development of broadband will also enable some people to locate away from cities. But my contention – supported by formal projections – are that those numbers are not large enough to stop this shift away from the rural society we once knew.

It may be possible to halt this movement as with China's hukou system, that regulates rural-urban migration. The sacrifice would be the “right to seek a better life” which we

²⁰ <https://www.un.org/development/desa/en/news/population/world-population-prospects-2019.html>

²¹ <https://population.un.org/wup/Publications/Files/WUP2018-KeyFacts.pdf>

²² OECD (2018) p.5

²³ As note 18.

²⁴ Hassan and Tularam (2018)

²⁵ BBC News (2019)

are accustomed to at least within a country. China's hukou system, has been described as: "a tool for social and geographic control that enforces an apartheid structure of rights enforcement" that "denies farmers the same rights and benefits enjoyed by urban residents."²⁶ So I am assuming that we will respect these rights and a level of urban drift.

This means that the alternative to the high-rise compact cities, that I advocate, is low-rise low-density cities, rather than a halt to urbanisation.

3.2 Climate Mitigation

It is clear that we need a massive reduction in carbon emissions over the next 30 years, and a deep reduction over the next 12 years.²⁷ What will this take?

The three most significant issues for a city in climate terms are:

- transport and distribution – the distances travelled by goods and people as well as how they travel.
- the amount of energy required for cooling or heating and lighting; and
- embodied carbon – the carbon emissions of the processes used to construct buildings and infrastructure and to make the materials used.

The operational emissions from buildings and transport (bullet points 2 and 3) are in effect a function of the energy efficiency of our buildings and transport systems, the materials we use to construct them, and the length of time we travel and how long buildings are retained.

As to the relationship of high-density cities with transport, transport accounts for approximately 30% of carbon emissions in the UK²⁸ and 14% globally,²⁹ lower but still substantial. This is partly because emissions from the power sector and industry have declined more in Western countries, but transport emissions have not. By planning cities to reduce the distance people need to travel as well as changing the mode of transport, we can reduce carbon and other emissions. In carbon terms, operationally electric bicycles and electric trains are best, followed by electric cars, cycling and walking. However, cycling and walking have low embodied emissions and health benefits too, especially compared with the construction of road and rail³⁰. Diesel and petrol vehicles also add significantly to air pollution³¹, so sprawling cities which necessitate large numbers of private vehicles harm our health.

The urban form also influences the amount of energy required for heating and cooling. Some forms of high-rise development increase the ease of cooling and reduce the heat island effect, whereas in others heat can build up. Hong Kong's planners have taken big strides forward here which I describe below in section 5.1. So finding that urban form, in which zero operational emissions can be achieved, whilst also limiting embodied carbon is vital.

²⁶ Zhou (2019)

²⁷ <https://www.ipcc.ch/sr15/chapter/summary-for-policy-makers/> high confidence;
<https://www.ipcc.ch/sr15/>

²⁸ 2018 UK Greenhouse Gas Emissions, provisional figures

²⁹ IPCC (2018) p.88

³⁰ Berners-Lee (2019) p.103

<https://www.unenvironment.org/news-and-stories/story/cycling-better-mode-transport>

³¹ Berners-Lee (2019)

The relative contribution of embodied emissions can be substantial, and this is a challenge for high-rise buildings. A recent study for the UK³² shows that for a residential block assumed to have a 60 -year lifespan, 69% of the greenhouse gas emissions are embodied carbon and 31% from heating and lighting. High-rise buildings are particularly problematic being to date dependent on high-carbon materials like cement and steel. However, this proportion is not a given. For example, if this lifetime can be doubled the proportions will shift making operational greenhouse gas emissions much higher. Alternatively, if we use low carbon materials such as wood, which is a carbon store, these ratios will change. One of the propositions of this report is that a high-rise, high-density approach should be combined with actively seeking to reduce embodied carbon emissions by changing the materials used.

3.3 Climate Resilience

It is no longer sufficient just to focus on mitigation of greenhouse gas emissions. Whatever actions we take we will face significant climate change. That is the climate reality. So it is vital that urban areas are designed to be resilient to the changing climate.³³ Exactly how the climate is going to change in any one place is uncertain; it necessitates planning for several scenarios, flowing from the direct and indirect consequences of climate change. Compact high-rise cities may work best in ensuring resilience.

The direct consequences are extreme weather and sea level rise, increasing the frequency of coastal flooding combined with surface water flooding and coastal erosion. The most vulnerable people are likely to be those living in shanty towns in low lying areas. The United Nations Development Programme (UNDP) claims that those with the highest vulnerability to climate impacts are the 40% of urban residents – 2 billion by 2030 – who live in ‘informal settlements’, or slum areas.³⁴ The costs of protecting these populous areas will be high. Reducing the coastline that needs flood risk protection for coastal cities will make this easier. It could, for example, have reduced the impact of the recent cyclones on the Mozambican city of Beira.³⁵ Creating fire breaks around big cities may additionally be an easier task than protecting innumerable small towns or suburbs.

Designing for resilience also involves factoring in the indirect consequences: from increasing migration to possible collapse of governance systems. Changing rainfall patterns combined with increased evaporation and exhausted groundwater reserves will mean frequent droughts causing extreme water shortages in some places. Drought will affect food supplies in places like sub-Saharan Africa but also Australia, as witnessed in 2019.

Facing up to climate reality means taking on board the possibility of increased movement to cities in search of jobs and basic needs as a result. Tensions may arise, for example, with those upstream of the cities in rural areas seeking to protect water supplies for their own use. This conflict has emerged in wealthy areas like California³⁶

³² RICS (2017)

³³ This is the argument of the recent book by Green House, *Facing up to Climate Reality*, Foster (2019).

³⁴ Klugman (2009)

³⁵ <https://www.africanews.com/2019/03/18/90-percent-of-mozambican-city-of-beira-destroyed-by-cyclone-idai-red-cross/>

³⁶ Weiser, M. (2017)

and New South Wales.³⁷ It has also arisen in poorer parts of the world. For example, in Chennai, South India, poor peri-urban planning has meant that as these cities expand water supplies have been affected, creating tensions between urban areas at the edge of cities.³⁸ I will explore in section 4 whether minimising this tension is a compelling argument against high density cities.

3.4 Biodiversity loss

Why is biodiversity loss an issue for urban design? Cities around the world are close to areas rich in biodiversity – wetlands and riverine areas in particular. For example, urban sprawl in Mumbai means loss of rich aquatic life in mangrove swamps. Growth of cities like those on the Gangetic Delta affects valuable aquatic areas. How can we best design cities to protect these ecosystems recognising the importance of biodiversity and the threats involved?³⁹

3.5 Securing food supplies and protect fertile land for agricultural usage

Food security is yet another consideration. The Food and Agriculture Organisation highlights the increasing pressures on our agricultural resources from climate change and urbanisation.⁴⁰ The latter is not surprising considering that settlements are often in fertile areas. Egypt is a good example: a country that imports more wheat than any other, and where 40% of incomes are spent on food. Cairo is a city of 9.5 million with a density of 16,000/km² but poor urban planning nonetheless results in the city spreading onto agricultural land. This is becoming a political issue with recent presidents striving to stop encroachment.⁴¹

3.6 Comparative Living Standards

Another pressure is the need to increase living standards in poorer countries. Massive investment in everything from sanitation to sufficient living space as well as the provision of fresh food and leisure space is required. New housing needs to be built, or poor quality slums will appear. Redevelopment of tenements in China reflects higher standards – proper bathrooms and cooling or heating. The question is how should this be done: how can we do this most cost-effectively?

3.7 The context: in summary

Deciding on the right urban form requires consideration of the context: population growth; the collapse of rural livelihoods partly as a result of climate change driving people to urban areas; the need for a low carbon and resilient economy combined with decent living standards; and the need to safeguard biodiversity and food production systems.

³⁷ AECOM (2010)

³⁸ Janakarajan, S., Llorente, M. & Zerah, M.H. (2006)

³⁹ Rockstrom et al (2009)

⁴⁰ <http://www.fao.org/3/I8429EN/i8429en.pdf>

⁴¹ Radwan, et al (2018)

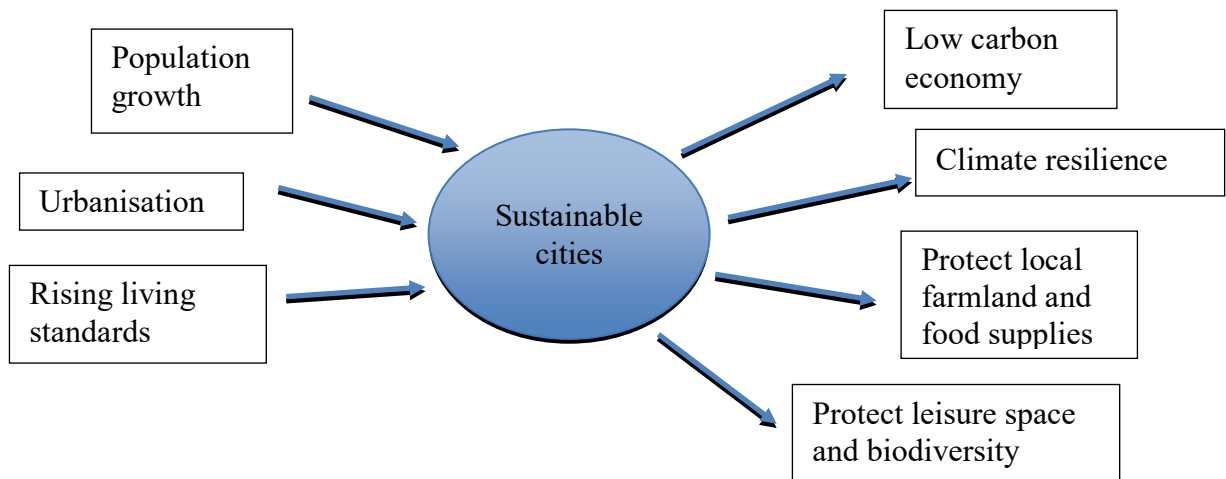


Figure 5: The drivers for and benefits of sustainable cities

4. High Rise – High Density: the benefits

<u>The benefits</u> of high-density urban development	<u>The risks</u> of high-density urban development
Lower emissions from transportation	High embodied emissions
Reduces the need for expensive high carbon infrastructure including flood defences	Dehumanising, soulless urban areas
Minimises land use so making more land available for leisure, wildlife or agriculture.	Mobility affected e.g. by lifts or mass transport not functioning.

My case for favouring a high-rise approach relates to three essentials of a city:

- the transport and other infrastructure for example water supplies, drainage and leisure facilities;
- saving space for farmland and leisure;
- lower costs of protection against flooding.

I am using Hong Kong as a case study to demonstrate what is possible.

4.1 Affordable Mass Transport

Many studies show the reduced greenhouse gas emissions from transport where urban sprawl is avoided.⁴² Others show the well-being benefits: a 2018 OECD study,⁴³ found that commuting times have increased as cities have become fragmented and lower density, with increased dependency on cars.

Hong Kong shows how public transport can work extremely well in high-rise high-density cities, because, I would suggest, the proximity of dwellings and workplaces to the public transport network. Most people live within 500m of a transport hub so convenience levels are exemplary,⁴⁴ and over 90% of journeys are by public transport. As Luk and Olszewski (2003) explain, the success of the transport system in Hong Kong and Singapore (where 90% and 60% of journeys respectively are made by public transport) is in part because of the high returns on investment in public transport, possible as a result of this density. High rise-high density enables a viable network to be put in place, without a vast number of stations, and high usage levels make the system self-financing through user charges. Government subsidies are not required. Hong Kong's "integrated rail-property development model",⁴⁵ with the part publicly-owned MTR buying land at its pre-development value and on which they build shops,

⁴² OECD (2018) p.126

⁴³ OECD (2018) p. 5

⁴⁴ Luk and Olszewski (2003).

⁴⁵ Gottlieb and Ng (2017)

housing and facilities, has enabled this network to be built without significant public expenditure.

As to how high-rise high-density compares with other cities in practice, let's contrast the above with Nairobi, a low-rise garden city (for some at least). Nairobi's traffic condition index⁴⁶ which reflects commute time is the 5th highest globally and on average, Nairobians spend 56.94 minutes on a one-way journey. This is despite the fact that many live fairly centrally in shanty towns and are able even to walk to work. However, considering how spread out the city is, and assuming that shanty towns are low rise, the cost of a mass transport network to suburban areas would be high. Stations would be far from homes and safe travel home would be an issue. As a result Rapid Mass Transport is not likely to pay its way financially. Nor would it be effective in cutting commuting times; cars and buses would travel slowly as a result of a large number of private cars continuing to be on the road.

New Delhi's experience gives us an indication of what may happen. It is a sprawling city but with a public transport network. It does not fare much better than Nairobi: it is the 4th worst globally and with average one-way journeys of 57 minutes. Hong Kong and Singapore by contrast - high rise cities and mass transit systems - are at 116 and 110 respectively in the world, with average commute times 42.30 minutes and 41.23 minutes for a one-way journey. The distance of Hong Kong's satellite towns – approximately 28km by road to Central needs to be noted as well as the relative comfort of those journeys.

Commuting times are not all about urban form but also about size and investment in public transport. But it is this potential to have an efficient, integrated transport system which can be affordably financed which is important to note. A minimalist set of lines also reduces embodied carbon. Planning the wrong sort of city or letting the wrong sort of city grow will make mass rail transport much harder to introduce successfully. Rapid bus transport may be possible in such circumstances, but does not have the low carbon intensity of electrified train travel, particularly where this uses electricity from renewable generation.⁴⁷

However, as Luk & Olszewski conclude, high density is not sufficient for a strong integrated system; other measures are also needed. In Hong Kong, we see high road taxes and in Singapore high sales taxes on cars, area licensing schemes and congestion charges are reinforced by a quota policy. Both now have a highly integrated bus and metro systems with local hubs that operate as interchanges as well as locations for shops and services.

4.2 Reducing other Infrastructure costs

It is not only transport infrastructure that can be expected to reduce with density, but other costs of services from water and sanitation to policing and other services. This however requires further study to establish how these broader costs would be impacted, as most relevant studies focus on the transport rather than wider infrastructure.

⁴⁶ Traffic Index is a composite index of time consumed in traffic due to job commute, estimation of time consumption dissatisfaction, CO₂ consumption estimation in traffic and overall inefficiencies in the traffic system. See https://www.numbeo.com/traffic/indices_explained.jsp

⁴⁷ <https://www.iea.org/data-and-statistics/charts/transport-sector-co2-emissions-by-mode-in-the-sustainable-development-scenario-2000-2030>.

4.3 Protecting local farmland

The proliferation of markets in Hong Kong selling piles of fresh colourful vegetables and fruit⁴⁸ – from choi sum to lychees in season – suggest proximity to market gardens. Much of this comes from across the border in China where there is another city similarly built as a high-rise city, but an increasing proportion comes from local farms. A local back to the land movement is supporting this growth in local farms, organic farming in particular.⁴⁹ It is the high-rise nature of development in Hong Kong which means that there is space for this farmland.

4.4 Enhancing leisure and making nature accessible

There are a number of cities in the world where natural spaces almost crowd into the city – one doesn't have to step far to be in nature. This may not be most people's view of dense cities like Hong Kong and Taipei, but that is the reality. For Hong Konger's a country park is generally no more than a 15 minute bus ride away. Attractive public beaches as nice as you can find in any part of the world are generally also no more than an hour away.

This of course is not only the result of planning for a high-rise compact cities but of government ownership of the vast majority of land and in interest in rationing its supply, combined with legal protections for country parks. So for planners seeking to replicate this approach, thinking about protection of areas from development and providing public access to such areas is necessary to capture the benefits.



Figure 6: View from the Maclehoose Trail, above Kowloon, Hong Kong

⁴⁸ <https://www.greenqueen.com.hk/hong-kongs-best-farmers-markets-organic-produce/>

⁴⁹ <https://www.scmp.com/news/hong-kong/health-environment/article/1996597/hong-kongs-agricultural-revolution-rise-farming>

4.5 Resilience – making space for water, flood risk management, and fire protection

Climate resilience is increasingly important. This means making space for water and potentially, increasingly expensive flood defence mechanisms. It is more relevant to coastal cities than any others, given the cost of building defences to protect long stretches of urbanised coastlines.

The high-rise city enables defences to be less extensive than for sprawling cities and for space to be made for water. The first point is self-explanatory. As to the second, to the extent that space taken up by urban areas is limited, there is space for managed flooding, as practised in the UK⁵⁰. This means that the sea can be allowed to inundate parts of the coast, the uninhabited areas, reducing the risk of flooding elsewhere. Safeguarding settlements from fire is also easier with concentrated settlements. Australia's bushfires (2019/2020) showed the challenges and costs involved.

To address tensions in relation to water, with increasing scarcity a huge problem in cities such as in India, careful planning is needed to ensure water sources are protected and lakes and ponds not simply filled in and developed.⁵¹ Rainwater harvesting using artificial reservoirs is also important, and making space for these is critical. Hong Kong is an example of a city with a carefully planned and innovative water supply, making use of natural underdeveloped spaces in Sai Kung, Tai Tam, Plover Cove and other parts of the territory. It also holds rainwater run-off under the racecourse in Happy Valley⁵² and close to Kowloon Tong in the New Territories. Ultimately, even these sources have proven to be insufficient, and water has had to be imported from rural China. Other cities in water scarce areas may not have this solution as an option.

4.6 Conclusions

A compact form of urban development – which can be achieved more easily with high-rise properties - reduces the distances that need to be travelled and makes public transport more viable, thereby reducing transport-related carbon emissions. It may also reduce other infrastructure costs, such as that for water supplies and drainage. This sounds self-evident, but further research would help establish this. It also saves space for farmland, for water and for leisure space, close to where people live.

Some studies suggest wider benefits from agglomeration including competitiveness through clustering of commercial properties.⁵³ So this compact urban model can work well. But there are downsides, which I come to next. I will consider how we may resolve the issues that undoubtedly arise.

A strategic blueprint or synoptic approach to planning makes it possible to achieve a broad set of goals at the same time. This approach is evident in some other countries as well as Hong Kong - for example in Australia with its Smart Cities Plan⁵⁴ and with

⁵⁰ <https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england>

⁵¹ Janakarajan, S., Llorente, M. & Zerah, M.-H. (2006).

⁵² https://www.dsd.gov.hk/EN/Files/Technical_Manual/technical_papers/DP1201.pdf

⁵³ Colin Buchanan and Partners (2008)

⁵⁴ Australian Government (2020)

Sydney's plans for a 30 minute city - but less evident in others, for example the Mumbai Development Plan⁵⁵, which in the words of one commentator can be summed up as “more land, more Floorspace Index (FSI), less restrictions.”



Figure 7: Shatin & Tolo Harbour – New Territories, Hong Kong (Photo Chensong)

⁵⁵ Indorewala, H. The Economic Times (18 May 2018)

5. High-Rise High Density: The downsides

The story so far is a fairly positive one, but there are of course several potential downsides, from embodied carbon to losing one's connection with nature, and the need for fully functioning lifts. How serious are these problems? Can we reduce their severity? My contention is that through good design we can do so.

5.1 *Is energy usage & the heat island effect considerably worse?*

Though high-rise small apartments may mean low emissions per person, in terms of energy usage per square foot, research suggests that energy use may in fact rise. A study⁵⁶ of 610 of London's buildings found that electricity usage was two and a half times greater and gas use 40% greater in buildings of 20 storeys or more, compared with buildings of 6 storeys or less. This will in part be due to the use of mechanical air-conditioning but this does not fully explain the difference: the carbon emissions from high-rise air-conditioned offices are only around 60% higher than those from low rise offices with natural or mechanical ventilation. The team conducting the study thought that the difference was probably a result of higher exposure to sun and wind.

This would appear therefore to be a design issue – the problem with high rise curtain glass buildings is more or less self-evident. But high rises can be designed to have zero-emissions, as demonstrated by the planned Canada's Earth Tower in Vancouver designed by Perkins+Will⁵⁷ (see Figure 8). As well as low carbon technologies, and low carbon materials, this building will be sheltered by balconies and plants. High-rise towers can also be sheltered by each other, or by ridges of hillsides as we see in Hong Kong.

The "Heat Island effect" is also a problem with a solution. Cities built of concrete and other such materials act as heat stores: they store heat during the day and release it in the night. Buildings can do the same. One of our Hong Kong apartments was a good example of this with an exposed exterior wall which remained warm in the night challenging our aircon system. However, this can be mitigated by good urban ventilation ensuring sufficient air movement and green spaces plus trees. Natural areas which are sources of cold air production as well as drainage need to be planned in. Air paths need to be constructed. This can be achieved through good planning and design combined with careful modelling of air flow movements, as now required by Hong Kong's planning rules.⁵⁸ The heat island effect is worse in Hong Kong's older areas with lower rise buildings. Newer developments are generally tall and thin, with provision for wind movement. There are other possibilities too, like cladding those exposed surfaces with solar PV panels. This still needs to be investigated as a means of reducing the heat storage problem.

Another difficulty is the energy usage in lifts in high rises. Lifts are the alternative to a car, for vertical journeys, and they are a significant source of energy consumption in

⁵⁶ <https://www.cibsejournal.com/news/carbon-emissions-rise-with-height-of-a-building/>

⁵⁷ <https://www.dezeen.com/2019/05/29/canadas-earth-tower-perkins-will-vancouver-canada/> and existing tallest building here: <https://www.dezeen.com/2019/03/19/mjostarne-worlds-tallest-timber-tower-voll-arkitekt-norway/>

⁵⁸ See: https://www.pland.gov.hk/pland_en/p_study/prog_s/ucmapweb/ucmap_project/content/reports/executive_summary.pdf

high-rise buildings. They account for an average of 5% to 17% of a high rise building's energy consumption, according to a study conducted by the American Council for an Energy-Efficient Economy (ACEEE).⁵⁹ Considering the efficiency of modern lifts with their regenerative braking combined with the chances of sharing a ride, there is potential to reduce energy use, and of course lifts, unlike most cars, currently run off electricity which can be provided by renewables. The ACEEE study shows that use of energy efficient technologies can reduce consumption by as much as 75%.



Figure 8: The planned Canada's Earth Tower in Vancouver (Perkins+Will)

The reliance on lifts, and their need for electricity is, however, a resilience challenge. This is a particular issue in countries where the stability of the power supplied is variable, but is likely to be an increasing problem if more frequent and more severe extreme weather events knock out power supplies. We cannot therefore have a one size fits all solution. In some situations lower rise buildings – possibly more in the region

⁵⁹ <https://aceee.org/press/2015/01/study-finds-global-opportunities-greater-elevator-efficiency>

of 10-15 floors, may be preferable. Good examples to consider include Vauban, Freiburg (see Figure 2), Charles Correa's low-rise high-density developments in India⁶⁰ as well as some of the UK's well-designed housing estates. Some famous London examples are at: Boundary Street, Shoreditch, Camden's Whittington Estate and Rowley Place, and earlier ones like Woodberry Park, Hackney. Where high rise developments are built consideration should be given to providing back up generation to power lifts and other essential services such as water.

5.2 Can we reduce Embodied Carbon?

The next big challenge for high-rise development is the embodied carbon of buildings. This isn't just an issue with high rises, it's an issue with all new houses and buildings: using current technologies and materials, their construction requires the emission of greenhouse gases. I argued in Section 3 that the alternative to high rises is not the array of villages and towns which people are moving away from, but low-rise urban development, which also has embodied carbon. That is the comparator which I will consider.

High-rise buildings typically require a lot of steel and cement. Producing these not only requires lots of energy but involves the release of carbon dioxide from limestone (calcium carbonate). The question is how to reduce this embodied carbon. There is evidence to show that substantial reductions can be made.

Firstly, using secondary materials – recycling steel, bricks etc – is fundamental. Recycled steel, for example, is significantly lower in terms of carbon emissions than steel made from iron ore.⁶¹

Secondly, we are seeing developments of new materials – generally wood or cross-laminated wood - which have potential as carbon stores as well as reducing the need for carbon intensive materials. For example, for Vancouver's Earth Tower, the core will be steel and concrete but much of the exterior wood⁶². The planned Sumitomo Forestry's W350 building (shown in Figure 9) in Tokyo will be a hybrid structure, with timber expected to make up 90% of the structure. It therefore has the potential to store large quantities of carbon.

Thirdly, what is often called circularity in design can make a significant difference. At its most basic this is about ensuring the building will last a long time by making it possible to repurpose it. Can small homes be turned into larger ones, family homes turned into homes for older people, and offices and car parks turned into homes? Can we design for disassembly so modules can be reused? This all looks within the realms of possibility⁶³.

And finally, as explained in section 4, high density cities can require less infrastructure, reducing embodied carbon from roads, bridges, tunnels *etc*.

⁶⁰ <http://www.yamunariverproject.org/incremental-social-housing.html>

⁶¹ Allwood and Cullen *et al* (2015)

⁶² See <https://www.dezeen.com/2019/05/29/canadas-earth-tower-perkins-will-vancouver-canada/>

⁶³ Cheshire (2016)



Figure 9: Proposed/planned buildings, Tokyo (Sumitomo Forestry)

5.3 Are Supply Chains & Logistics a problem?

Another argument we often hear is that large cities mean goods must travel longer distances.⁶⁴ Is this correct? There is no reason to think so. The advantage of high-rise compact cities is that space is saved for market gardens. As to staple foods – carbohydrates – that may have to travel from further afield to feed large cities, density is of little relevance.

In any event, only a small percentage of greenhouse gas emissions are associated with the distribution of goods.⁶⁵ The IPCC's 5th assessment report does not even draw attention to this source of emissions indicating that it is not a major part of the problem. On a micro-level, for example, Unilever calculates that only 3% of its total carbon footprint is from distribution,⁶⁶ though it does highlight the greenhouse gas emissions from transportation of refrigerated food. Other policies could help address those emissions.

Moreover, the retail sector, dominated by brands and large supermarket chains, means that even for small towns, products are moved around a great deal. In high rise, high-density cities, having the space to situate facilities like bottling plants just outside a city can reduce distribution-related emissions.

5.4 Heritage and identity

What about heritage and identity? It is hard to see that cities that look like the planned Eko City in Nigeria (see Figure 10) can really reflect culture and identity. China's development appears to be a case in point. To the outsider, there are huge losses that have been suffered in Chinese cities in terms of a sense of place and history. In swapping the Beijing hutongs (narrow lanes) and siheyuan (traditional courtyard residences) for apartment blocks, something has been lost. Chor Bazaar, a poor commercial and residential part of Mumbai which is due to be redeveloped, may be another loss of culture and history.

⁶⁴ Foster *et al* (2019)

⁶⁵ IPCC 5th Assessment Report (Synthesis Report), p.47. Industry emissions are 32% of the total; transport just over 14%.

⁶⁶ <https://www.unilever.com/sustainable-living/reducing-environmental-impact/greenhouse-gases/reducing-transport-emissions/>

This is a challenge and, at least in part, where there are existing buildings that could be renovated and restored as in the case of old cities, this may be the better option. Beijing's balance between new and old may not be a bad one.

But retaining a sense of culture and heritage is within the capacity of our planners and architects. It may be achieved by retaining some of an old city – even creating a museum – and ensuring some features from the old are reflected in the new. We could reuse the facades of Chor Bazaar, Mumbai, for example. The facades and styles of Masdar City, Abu Dhabi are another example of taking the local aesthetic and using it in a new development. I have every faith that architects can design high rises with character and individuality – the fact that the basic shape will need to be the same still leaves plenty of room for creativity.



Figure 10: Simulation of Downtown Eko Atlantic City

On a more micro scale, another issue of identity is the individualisation of homes: Is this harder to do with huge numbers of identical apartments? Hong Kong over time has increased the variety of configurations of apartments but still a uniformity is necessary for high-rises. But once again, this is an issue which can be solved through interior design, and it may be that tenure is the real issue. Do people have secure enough tenure to be prepared to invest in their own apartments?



Figure 11: Masdar City, Abu Dhabi – a new low carbon city (Anna Ostanina)

5.5. Crime & Community

What about the issues of crime and anti-social behaviour that have reared their heads in the past? Think “Wired” in Baltimore, and in the UK, high crime rates were one of the reasons why tower blocks from the 1950s were demolished in the 1990s. Many were pleased to see high rises crumble into a cloud of smoke, given their association with crime, drugs and lost community.



Figure 12: A London housing estate being demolished (Lotte Grønkvær)

High density urban living surprisingly perhaps may not facilitate the level of social interaction and sense of connection to create what one may call community. There may just be too many people. People may interact less if they are tucked away in their apartment 20 storeys up: every time one takes the lift you see a different person.

Also being 50 storeys up or even 20 can be a bit of a psychological barrier to walking to the shops or the library. It's not quite the same as opening your front door and walking to the local shop. It's not the same as standing on your porch and chatting with your neighbour. Living in Zone 2 London, that is how things are: people tend to know a fair few of their neighbours – whether from the local schools or friends of the library group, even just bumping into each other on the Heath.

So community can be an issue as there may be less of a sense of neighbourliness. But this can be mitigated through design that creates public spaces. Podium spaces are part of Hong Kong's approach to design of developments. These are a public realm on perhaps the whole 3rd or even 6th floor of a building, on top of car parking and other facilities. They feature widely in Hong Kong's buildings, combined with club houses containing gyms, swimming pools, party rooms *etc.* These spaces can be extensive and are often equipped with what's needed for interaction – Tai Chi classes, playgrounds and cafes can make spaces more inviting. With higher density such services become viable. A garden café may not be viable for a thousand people but it is for five thousand.



Figure 12: Raised Podium Gardens at Ocean Shore, Tiu Keng Leng (Visions of Travel)

much activity in public spaces with large gardens and cycling routes by the sea in new towns. This is often segmented into spaces, with trees and screens that offer privacy from prying eyes, and allows group activity such as dance and tai chi. Quarry Bay Park alongside Tai Koo is a good example.

Crime may not all be about community and modern Hong Kong (post the Triad era) has low crime rates, coming sixth lowest on incidence of homicides in the WEF 2019

Those spaces may be under-used: it is common to see private podium spaces little-used whilst public spaces are crowded. Roof gardens with benches on top of each tower block are being experimented with. They can add spaces for meaningful interaction.

A focus on private open space may create an issue of equity: some have access to considerable open space, but that space is only for occupiers of a particular development. Hence, the continuing push in Hong Kong for genuinely public open spaces. But another issue here is ensuring that tenants as well as landlords have a means of influencing and improving their local environment. To date in Hong Kong, as a result of this increasing private domain tenants often have less control over their local environment than those who live in traditional cities with municipal elections.

Well thought through public space is important. In Hong Kong, there is

survey.⁶⁷ Proximity can help. People are constantly around – there are eyes on the street. Kids happily walk around estates on their own. I never once came across a teenage gang. Perhaps the large number of concierge and caretakers help. Or perhaps it's just not the way of Hong Kong kids, or it's all about the economy in reality.⁶⁸ With a healthy job market, young people may be convinced of the importance of good behaviour, though the recent political protests show that they are willing to take some risks. Good housing high-density style at a reasonable distance from work can contribute – people are not so tired when they arrive at work, and they get home early enough to look after their children.

No doubt, of course, if not designed well, tower blocks can lead to shadowy corners, stairways can be dangerous when lifts don't work. Whether this is more likely to be the case in tower blocks is hard to tell as the estates in Europe of such a nature have often been places of poverty, where those without any other option are sent to live. There are estates, like the Barbican, which have a good safety record. But again, research suggests that the detail is important. Avoiding the dark corners and well-lit podiums combined with concierges may help “design out” and “manage down” crime. The solution may to some extent lie elsewhere in economic success and jobs that ensure people have a stake in society. However, looking at London's borough of Camden, from my experience as a local Councillor⁶⁹, it appears that design combined with security – enclosing estates and only allowing residents to enter – can lead to safer estates.

5.6 What about our general sense of well-being? Won't we be cut off from Nature?

Low space thresholds per person may create a sense of being trapped and oppressed. Space guidelines akin to England's Parker Norris standards initially for council housing but used by some UK planning authorities⁷⁰ more generally are important to address this.

Communal shared gardens may not appeal. However shared gardens in low-rise, medium density developments are also often under-used. Gardens in and around Hong Kong's many developments from Tai Koo Shing to Ocean Shore, Tiu Keng Leng, are in fact well-used, especially by older people doing their Tai Chi.

Another potential problem – though not one that is often discussed – is dislocation from the natural environment. Evidence suggests that interaction has many benefits.⁷¹

In high-rise homes, height above ground level can be a barrier to going outside: it is not as easy as popping out of a back door into a garden. But in fact how much value is the interaction with nature that residents of low-rise developments have? How much do we get from stepping out into one's little garden and mowing a handkerchief sized lawn?

Also, it is fair to suppose that limited interaction with nature dulls our interest in it and we value it less. If communities don't recognise the value of nature protecting it may lose political support, threatening legal protections. This is to the longer-term

⁶⁷ The Global Competitiveness Report (2019) www3.weforum.org

⁶⁸ Ibid

⁶⁹ Author was a Camden Councillor, Highgate Ward (2006-2014),

⁷⁰ Mayor of London, Supplementary Housing Guidance (2016), section 2.3

⁷¹ Keniger, Gaston, Irvine and Fuller (2013)

detriment of the community through loss of biodiversity and also loss of leisure space with negative health impacts. How do we address this?

I would argue that the compact, high-rise style of development in Hong Kong means that nature is never far away. Admittedly, it may be a bit of a climb to get to the top of the hills. But once you have got there – say the hills above Kowloon (see Figure 6 above) – it is possible to walk through hills and villages all the way from Sai Kung on a ridge before descending into the heart of the city at Kowloon. Nature is a big beneficiary of compact development as Hong Kong's hillsides show, and there are not only the hillsides but the waterfront parks and cycle lanes.

More can be done to turn parks into havens for wildlife, to grow mangrove as flood defences, to create rooftop and podium gardens and green roofs. Urban spaces could be less sanitised with more space for wildlife. It could be easier to access beaches and rockpools on the seaside. One example of a roof garden is shown below. This is right in the middle of Tsim Tsa Tsui, Hong Kong's second central business district.



Figure 13: 2000 sq ft garden, 8th Floor, K11, TsimTsa Tsui (K11 Musea)



Figure 14: Public & Private Housing – Tseung Kwan O. Royalty-free [stock photo](#) ID: 1295168824

Has Hong Kong managed to address urban sprawl and create cities that work well in terms of day to day well-being?

We have seen dreary East European or even British apartment blocks, which have not been popular places to live and have now been demolished. In contrast, my experience of living in high-rise developments in Hong Kong is that they can be good places to live. The efforts put into sustainable public housing is also noticeable (approximately 50% of Hong Kong's housing supply).

Here are the distinctive and attractive features of Hong Kong's approach.

The podium floor

The podium floor creates what can be the "village space" in tower blocks that are 30-70 storeys high (see pictures 6 & 7 above). It is a few floors above ground level and in private blocks, below it is generally the "clubhouse" or social facilities, parking space or shopping malls. But the important thing to note is the possibility to take away the alienating canyon streetscapes.

Extensive shared facilities

These are common and range from courtyard and rooftop gardens in public buildings to clubhouses in private developments. The latter routinely have a swimming pool, gym and reading room or shared kitchen/party room but the higher end blocks will stretch to a cinema, bowling alleys and indoor play areas. Some even have rooftop gardening with a few raised beds. Even in public housing which does not have the clubhouses, there may be ball courts and play areas, and simple podium areas with quiet, well-lit gardens.

Proximity to public transport

This is probably what the population in Hong Kong most appreciate. Convenience is the buzzword. New cities in Hong Kong and now China have public transport as a pre-condition. Roads tend to follow too, but easily accessible public transport makes travel by train and bus convenient: there is no need to own a car. The end result is that public transport is viable, roadspace is saved; and commutes are short.

Small dwelling sizes

This is a rather less popular aspect of the current approach. Apartment sizes vary from microscopic to manageably small: a reasonably well-off family of four may live in housing of under 500 square feet. These are affordable spaces to cool or heat, but many complain they are too small. While small apartments increase density, there is a point at which rooms are too small for be liveable. Introducing space standards to make apartments and rooms adequately sized is important.

Ventilation and wind movement

Tall thin buildings are the norm, careful wind modelling is carried out at the planning stage, air quality is an important consideration in commercial buildings and malls, and efforts have been made in public housing for good natural ventilation. Following the SARS epidemic in 2002-4, research was carried out to improve ventilation and drainage approaches. See Deng, Chan and Poon (2016).

Public open spaces

Public open spaces include Shatin Park, with its frontage onto the Tolo River and a cycling route all along to the Science Park and on to Tai Po – a journey of 10 miles or so. Other "public spaces" are easily accessible natural country parks and trails. There is more too – islands and beaches largely unaffected by urban development and which provide excellent leisure facilities.

6. Conclusions

There are substantial environmental benefits from a compact high-rise city in terms of transport-related emissions and energy usage. This approach to cities is also an affordable way to develop considering the lower transport infrastructure costs and land requirements, reducing the need for roads. However integrated transport planning and good design are essential to reap these benefits; getting this right is all important.

Other gains relate to space being freed up: for leisure, for nature and for food growing. All these benefits point to the need for a holistic, blueprint approach that enables land to be captured for these beneficial purposes, rather than for sprawling private homes, golf courses or such uses.

There are however some major challenges: from elevators and stability of energy supply to embodied carbon. The former may place a limit on manageable height for the moment. As to the latter, materials are evolving, and design with circularity in mind has lots of potential – so that buildings can be repurposed and reassembled.

As to the human well-being elements, the risks and potential detriment need to be borne in mind, but for heritage, community and crime aspects a sufficiently rigorous and far-sighted approach can address these problems. High-rise high-density development should not be used in a manner that destroys too much of our heritage – though there is a trade-off and we may need to lose some. This approach is really best suited to new towns or parts of cities.

Participation and social interaction can assist in finding the right solutions. Moreover, in managing these developments recognition needs to be given to tenants rights; it is important to develop the right local governance systems as high-rise high-density turns a private space into what for practical purposes is a town within a city. Representation for all is needed to be democratic. Otherwise many will be disenfranchised in relation to their local environment.

To arrive at this form of urbanisation a review of planning policies is needed, especially in countries with rapidly growing cities. Maximum building heights need rethinking. Public transport will be much more desirable and more affordable as a result for cities in the process of development. Bicycles rather than cars work well in these dense cities. Car parking requirements can be cut down. Cities need to be ready to embrace blueprint or synoptic planning to achieve these multiple goals. Incrementalism and bargaining approaches may be unavoidable to some extent but are not the best way of achieving well-designed cities.

For reasons especially related to elevators and power, low-rise, high-density in some circumstances may be optimal, especially if power supplies are poor and pressure on land is lower. So the Vauban example mentioned at the outset and other low-rise high-density approaches need to be considered. My own area of Camden has excellent developments on these lines too, such as the famous Whittington Estate and Croftdown Road “homes for heroes” built in the 1920s. India’s well-known architect Charles Correa was a famous proponent of low-rise high-density developments, for being close to nature as well as being low maintenance and practical in the face of the costs of lifts and power shortages.

Rapid action is needed to ensure that the current round of urbanisation in Africa and Asia takes on board the threats and challenges we face – from population growth and

urbanisation to climate change and food production. High-rise high-density development needs to be considered as one of the solutions, which can lever in other benefits. But it is critical that planners and developers learn from the past including the Hong Kong experience as to how to do this well.



Figure 15: Tai Koo Shing, Hong Kong Island – approaching Island East (from <http://www.landezine.com>)

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