Density: drivers, dividends and debates

Appendix 3

Case studies

Urban Land Institute

About ULI

The Urban Land Institute (ULI) is a non-profit research and education organisation supported by its members. Founded in Chicago in 1936, the institute now has over 34,000 members in 75 countries worldwide, representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service.

ULI has been active in Europe since the early 1990s and today we have over 2,200 members across 27 different countries. We have a particularly strong presence in the major European real estate markets of UK, Germany, France and the Netherlands but are also active in emerging markets such as Turkey and Poland.

ULI's mission is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide. We are committed to:

- Bringing together leaders from across the fields of real estate and land use policy to exchange best practices and serve community needs
- Fostering collaboration within and beyond ULI's membership through mentoring, dialogue, and problem solving
- Exploring issues of urbanisation, conservation, regeneration, land use, capital formation, and sustainable development
- Advancing land use policies and design practices that respect the uniqueness of both the built and natural environments
- Sharing knowledge through education, applied research, publishing, and electronic media
- Sustaining a diverse global network of local practice and advisory efforts that address current and future challenges

To download information on ULI reports, events and activities please visit http://europe.uli.org

Supported by:

ULI Urban Land Institute

ULI Urban Land Institute Charitable Trust

Appendix 3
Case studies

The following case studies demonstrate some of the different 'stories' of density from cities around the world.

Singapore

Singapore is among the five leading finance and business services cities in the world[1], with strong international trading links and per capita GDP equal to that of the wealthiest nations of Western Europe. Upon independence in 1965, led by prime minister Lee Kuan Yew, Singapore pursued a major industrialisation policy and experienced rapid urbanisation. The unique city-state is now home to around 5.3 million people, inhabiting an area of only 714 square kilometres, and is one of the most densely populated cities in the world. The city expects to add more than a million additional people to its population by 2050.[2]

City planning in Singapore is shaped by the long-term Concept Plan, a strategic land use and transportation plan that guides the overall land use strategy over a 40- to 50-year period. The Master Plan then translates the strategies of the Concept Plan into more detailed plans to guide development over a ten- to 15-year time frame. Development controls are put in place to ensure that the city develops according to the prescribed land use and intensity spelt out in the Master Plan. The plans are reviewed at regular intervals and are flexible enough to allow for adjustment as conditions change. Portions of land are identified and set aside for future infrastructure development, which allows transit to be built easily as and when needed.[3]

Singapore's government has embraced high density in its long term planning, partly through necessity as a result of the city-state's limited size. This high density is achieved through "checkerboard planning" in which high-rise developments are separated by lower-rise developments to provide a spacious sense of liveability. Singapore's new towns-which tend to be densely populated- are set apart by large swathes of green or open spaces. The city aims to be "a city in a garden" – and almost 50% of its land is green space.[4] Population growth has also been accommodated in part through land reclamation, and the island has grown by roughly 100 square kilometres since its independence in 1965.[5]

Mexico City

Mexico City is the world's second biggest city with around 22 million residents and a sprawling metropolitan area covering 3,700 square miles. The city has a core metro area of roughly 9 million residents and a huge sprawling outer ring whose growth has not been constrained by topographical limitations. In the twentieth century, urban growth took place in an informal, unplanned manner - more than half of the metropolitan area's buildings were built without regulations and 60% of the population still live in low quality housing in former squatter settlements.[6] The city has a consistently low rise form.[7]
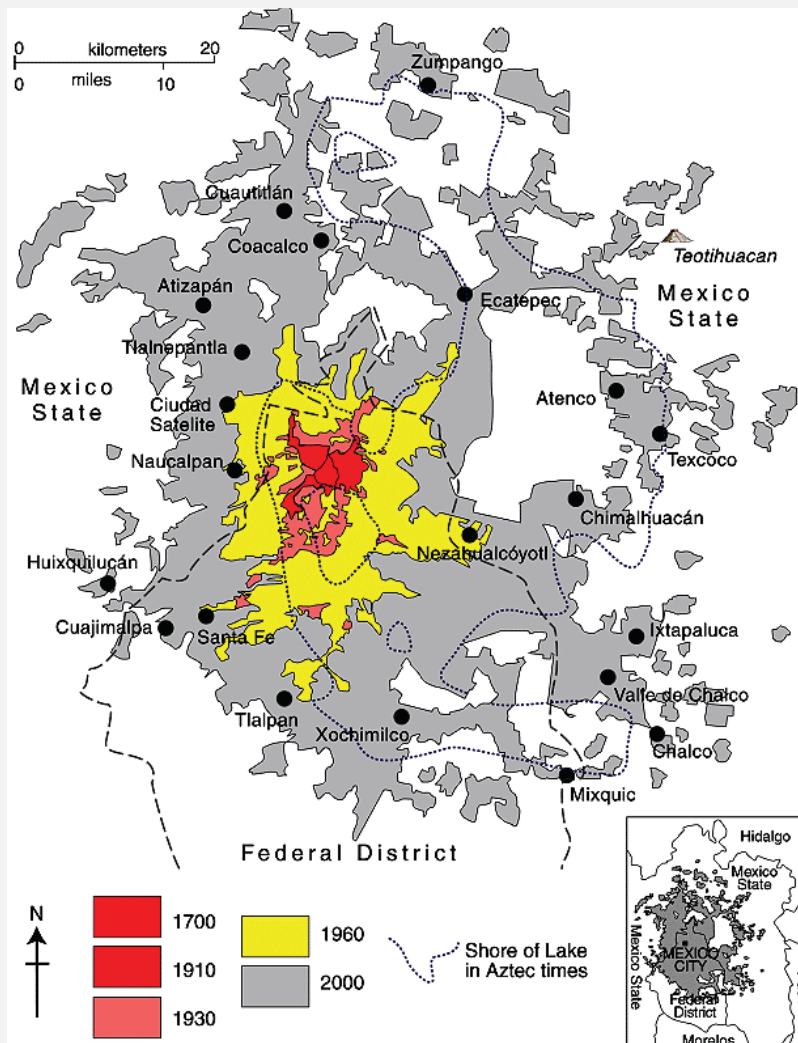
Mexico City struggles with severe traffic congestion in part due to the relatively high cost of public transport.[8] Although the city has a metro system which transports as many passengers each day as London's underground, one third of journeys are still made by private car.[9]

In 2001 Bando Dos – a set of policy guidelines - was introduced to re-densify the inner city and control peripheral sprawl. The policy promotes building in four central districts and puts a limit on construction of new housing elsewhere. Major public and private investments have also been focused on the city's neglected historic core, and a revitalisation programme has been implemented to reactivate the local economy, restore buildings and the streetscape, and to attract new residents. The densification process has not been without issues: the approach was met with fierce opposition from local residents arguing that the rising demand for sewage, electricity, water and transport infrastructure will overwhelm their neighbourhoods. The subsequent increase in land values in central districts (estimated between 30-50%) has also created issues of affordability and access.[10]

Paris

Haussman's Paris[11]

According to the 2012 Urban Audit, Central Paris has the highest population density of any urban area in the European Union, recording more than 20 000 inhabitants per square kilometres[12] - a density which is twice that of New York.[13]

Paris was redeveloped on a large scale in the mid-nineteenth century, in response to the squalid, crowded and insanitary living conditions that had developed in the city. The works were directed by the Seine area prefect Baron Haussman, and consisted of the wholesale demolition of neighbourhoods, and their replacement with a more ordered system of boulevards, parks and squares. Central Paris today is largely unchanged since Haussman's redevelopment, and as a result its high density is perhaps

surprising, given that all buildings built in the period were limited to a maximum height of six storeys.[14]

By the 1930s, Paris was again struggling with growing squalor and slum living. City authorities proposed the creation of garden cities as a means of reorganising their suburbs, following and adapting the earlier precedent set by the UK's Garden City movement. 34 garden cities were built in the greater Paris agglomeration, housing a relatively small number of people - 22,000.[15] The authorities' garden city plans were opposed most famously by the architect Le Corbusier, who argued in favour of higher core densities and high rise living. Le Corbusier proposed his own schemes for more efficient urban living – first in the 'Ville Contemporaire' (1922) and later in the 'Ville Radieuse' (Radiant City) in 1935. These plans were characterised by skyscrapers set within park like green space, and by pedestrian / automobile segregation. Neither scheme was put into action by the French authorities.

Today, density is once again on the agenda in the Paris region. The wider Paris metro area – Ile de France – consists of 128 municipalities, and has traditionally favoured a polycentric approach to planning. In 2008 the Masterplan for the Ile De France Region (SDRIF) explicitly approved compactness as a goal for 2030. The plan supports building in existing urban areas without compromising forest and agricultural lands, supported by the development of a strong regional transport system. It recommends that all existing urban areas in Ile de France, including central Paris, should increase their densities.[16]

Hamburg

Image Source: www.hafencity.com

Hamburg is one of Germany's most dynamic cities. In a country where many urban areas are suffering population decline,[17] Hamburg is growing and predicted to continue growing up to 2030. It has proven particularly attractive to young people, who are drawn to the city's dynamic economy, educational institutions and a range of leisure facilities and cultural events.[18] The metropolitan area has around 1.74 million people and a population density of 2,296 people / square km.[19]

After a long period of growth, Hamburg's suburban population is stagnating, with population growth being largely absorbed in central areas. In the city's latest urban development plan *'Hamburg 2030'* (published in 2014) the city government has adopted the overriding development principle *"More City in the City"*. This effectively promotes inner development before outer development, *'channelling growth momentum'* into areas which are already built up[20], including former military and port areas. The city has also designed a programme to raise citizens' awareness of a comprehensive land saving approach to settlement development, and of the costs of living in suburban zones.[21] The rationale behind this approach is explained in Hamburg 2030, which states that *"high density is the chance to create urbanity and quality of life"*.

The most significant brownfield development in the city is the *HafenCity* project. One of the largest inner-city redevelopment projects in Europe, *HafenCity* is a major effort to redevelop the city's old port and industrial areas along the River Elbe into a new urban waterfront location blending residential, retail, leisure and commercial uses. A 157 ha project, HafenCity is scheduled to expand the city centre by 40%, create 6,000 new homes and 45,000 new jobs by its completion in 2025.[22]

Even more recently, Hamburg has also launched its bid to host the 2024 Olympic Games, with a central feature of the bid being the city's compactness. In March 2015 Mayor Olaf Scholz promised *"a compact, sustainable games that are free from any gigantism and will be an excellent fit in the urban development"*. He added *"we want to bring the Olympics to the middle of the city"*. Hamburg's plans include the conversion of an area of the city's port into an Olympic Park, which would become a new city district after the Games.[23]

Oslo

Percentage of occupied dwellings in blocks of flats. Urban districts in Oslo. 2011
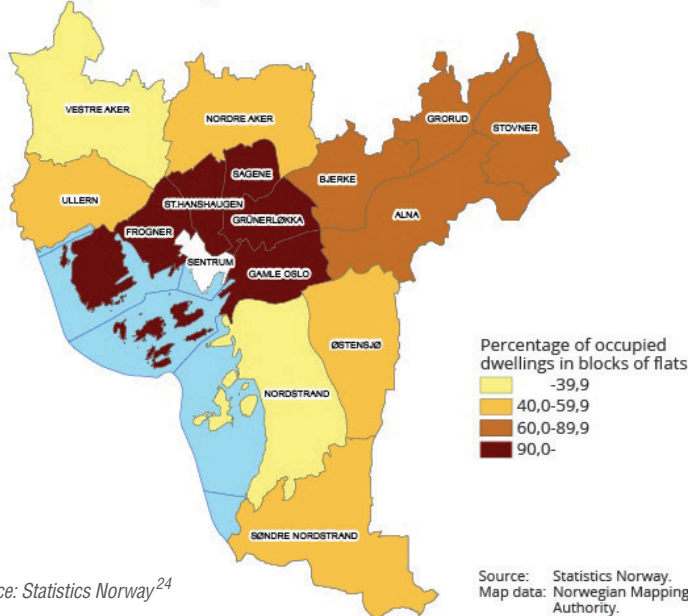

Image source: Statistics Norway [24]

Source: Statistics Norway.
Map data: Norwegian Mapping
           Authority.

Oslo is one of the fastest growing cities in Europe.[25] The central city currently has a population density of around 3,500 / square km.[26]

Prior to the mid-1980s, and especially between the 1950s and 1970s, population growth in Oslo was accommodated largely through spatial expansion of the city.[27] However, since that time the city has followed clear densification and urban containment policies, using national and regional land use instruments to limit the establishment of new suburban areas. Of particular note was the 2002 introduction of a greenbelt to protect the forest areas around the city.[28] Today two thirds of the wider metropolitan area's 450 square km consists of protected forest or recreational areas.[29]

A large proportion of new building undertaken under the city's densification policy has taken place on brownfield land, in particular in derelict warehousing, industrial and harbour areas. Some greenfield land in core areas has been built on however, with a resultant 7% loss in green space in the central city between 1992 and 2002. As a result, the city subsequently implemented tighter controls to protect green urban space. A recent emphasis has also been placed upon opening up the city's waterfronts.

Oslo has benefitted from a wide consensus – both amongst politicians and professionals - that densification / urban containment was the appropriate strategy to pursue. Naess et al (2009) claim that the compact city has *'obtained hegemonic status as a model for sustainable urban development'* in Norway.[30]

The effects of Oslo's compact city strategy are largely perceived to be positive - the core city's population density increased by 11% between 2000 and 2009 alone, and growth of car traffic has reduced.[31] Nonetheless, the Oslo Capital Region is composed of many municipalities, and it has been a challenge for the city to co-ordinate action across the wider metropolitan area. In recent years there has been significant investment in and efforts to coordinate public transport planning across the wider city- region.[32]
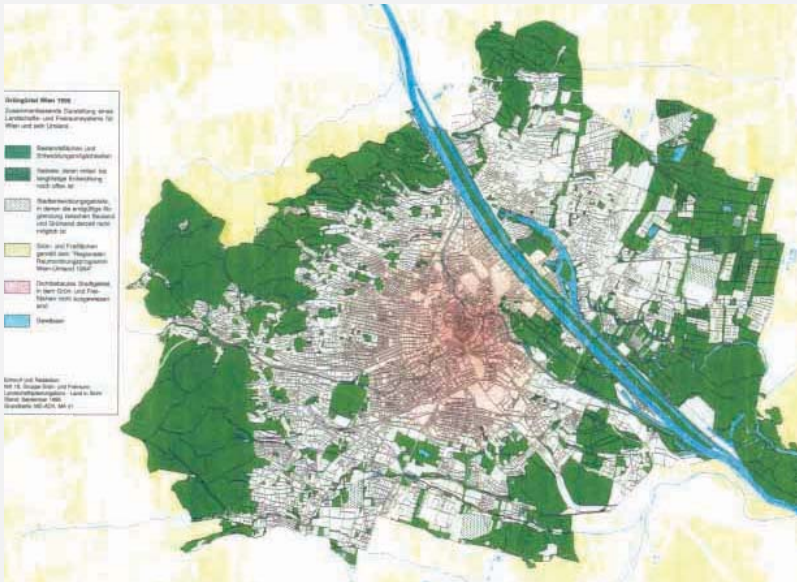
Vienna

Image source: Wien.gv.at [33]

At the end of the nineteenth century, Vienna was the centre of the cultured world. Musicians, artists, architects, academics and scientists flocked to live in the city, and population trebled between 1880 and 1910 to more than 2 million.[34] The rapid population growth created huge demand for housing and dense and extensive construction followed.[35] The city also expanded outwards, with communities on the outskirts of the city being incorporated within the city limits.[36] However, two world wars later had the effect of decimating the city's population, in particular its large Jewish population. By 1995, the city had only just over 1.5 million residents.

The city prepared Urban Development Plans in 1984, 1995, 2005 and 2014 to strategise for the development of the entire Vienna metropolitan area. The plans have aimed to pursue compact settlement development through:

- the definition of greenbelt zones;
- development priorities, with development zones designated along high-capacity public transport routes and in brownfield sites;
- density recommendations; and
- traffic infrastructure requirements, with a particular focus on increasing the share of environmentally friendly transport forms.[37]

Today, Vienna is the fastest growing city in the German speaking world, and the latest development plan, STEP 2025, was published in 2014. This strategy recognises that the scale of anticipated growth will necessitate new neighbourhoods, but plans that these should grow in a compact manner. It follows the city's previous development plans by encouraging growth in existing potential spaces, whether undeveloped space in the city centre, rail station sites or well-connected areas in the outer districts.[38] The 'secondary' ring of urban space in Vienna, surrounding the immediate inner city core, is seen as particularly appropriate for densification due to its relatively sparse built environment. Current densification projects include the infilling of space in existing social housing projects, originally built in the 1960s and 70s.[39]

Toronto

From 1991 to 2001, the urban footprint of Greater Toronto and Hamilton expanded by 26 per cent to accommodate roughly one million new residents. In the following decade, another million new residents were added to the metropolitan area, yet the urban footprint expanded by only 10 percent.[40]

Two key 2005 policies contributed to this densification. Firstly, The Greenbelt Act designated 1.8 million acres of farmland, wetlands, watersheds and green spaces surrounding the city core as permanently protected land, unavailable for development. Secondly, the (national) Places to Grow Act allowed for the identification and designation of growth plan areas and the development of strategic growth plans for those communities. The Growth Plan for the Greater Golden Horseshoe (loosely the Toronto metropolitan area) directed development to specific places within the pre-existing metro region.[41]

Development in the city itself is guided by Toronto's Official Plan, which came into force in June 2006 and oversees development until 2026. Its central geographic theme is to direct growth to appropriate areas and away from the city's stable residential neighbourhoods and green spaces. The Official Plan targets new development to approximately 25% of the City's lands and strives to protect the remaining 75% from significant intensification.[42]

The Downtown and Central Waterfront area is the main area targeted for residential and office development, and between 2009 and 2013 comprised 40% of the residential units and 38% of the non-residential Gross Floor Area proposed in the city.[43] Four other 'Centres' and a series of 'Avenues' - corridors along major streets well served by transit - are also targeted development areas. The targeted approach has been inspired and bolstered by a growing trend amongst the Millenial generation for central living and amongst businesses for core city locations. Accordingly, condominium construction has boomed in downtown Toronto – 50,000 condo units were sold in the downtown core between 2000 and 2011. The trend is set to continue in the current decade – in June 2014, 46,000 units (154 individual condo projects) were in planning, the majority of which were to be housed in high rise buildings.[44] Indeed in 2014, Toronto had more high-rise buildings under construction than any other city in North America.[45]

The intensification of Downtown Toronto has certainly been effective in terms of population absorption – between 2006 and 2011 the population of Downtown tripled, outpacing growth in the suburbs.[46] Based on municipal projections, 81 per cent of land that is currently available for development in the GTA will still be unused by 2031.[47]
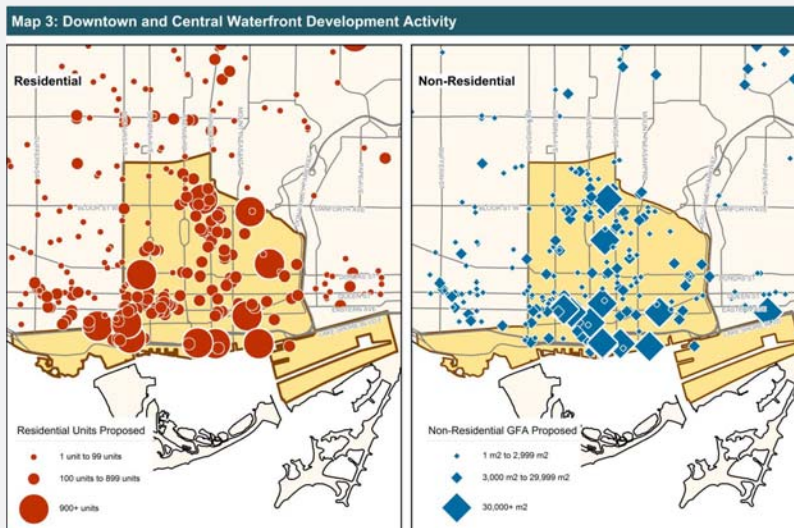
Downtown and Central Waterfront development activity (Source: City of Toronto)

Seoul

Seoul is a megacity of 10.4 million people which also has one of the largest metropolitan areas in the world, home to approximately 23.5 million people. The metro area has a density of 10,400 people per square kilometres.

The city has experienced stratospheric growth, hurtling through the development trajectory from a large developing world city to a high skilled World City in only a 40 year period. This success story is fairly unique, even in Asia, where most established World Cities e.g. Tokyo, Hong Kong, took much longer to reach the same level of development. The city has the highest population density amongst OECD capitals.[48]


With economic development and rapid urbanisation in the late 1960s came mass in-migration from rural areas: between 1960 and 1980, about 800 people moved into Seoul every twenty-four hours[49], creating huge demand for housing and expansion of the built up urban area. In 1971 the national government established green belts around the city boundary to limit urban sprawl, which had the effect of densifying population in the city core. In the early 1980s, the city also implemented various decentralisation policies including the construction of five suburban New Towns, supported by tax breaks for people or businesses relocating to them. The towns were planned, constructed and occupied within 6 years.[50] Simultaneously national government engaged in the promotion of polycentric development based around other regions located some distance from Seoul.

By the late 1980s, urban redevelopment policy was directed at the old part of the city. A programme known as the Joint Redevelopment Programme saw old residential, squatter and low density apartment areas replaced with high rise and dense residential complexes and commercial buildings.[51] Offices were built downwards as well as upwards – typical Seoul office buildings today have at least six floors below ground level.[52] No high-income urban area except Hong Kong has a greater density of high rise condominium developments.[53]

High rise developments in recent years have been particularly focused on suburban areas in the city's metropolitan hinterland. The high rise community of Ilsan, to the West of Seoul, for example was developed in the early 2000s, whilst Songdo, a new low carbon city to the north of Incheon (which forms part of the wider Seoul metro region) is currently under construction and is planned to be home to 250,000 inhabitants by 2025.[54] Songdo has a high density urban centre with high rise residential and commercial towers surrounded by green space - some 40% of the overall area of 1,500 acres will consist of green space, including a large central park modelled on New York and waterways inspired by Venetin canals.[55] The development has an emphasis on the pedestrian scale.[56]

Comparative Densities: Atlanta and Barcelona

Image Source:
Better Growth, Better Climate
(New Climate Economy)[57]

ATLANTA'S BUILT-UP AREA   BARCELONA'S BUILT-UP AREA

0   10   20 (km)

0   10   20 (km)
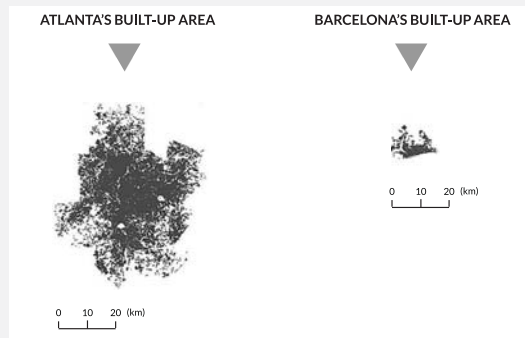
Barcelona and Atlanta both have populations of around 5.3 million people in their wider metropolitan areas.[58] However whilst Barcelona is an example of a medium dense global city, Atlanta is a prime example of the type of suburban sprawl which typified US city growth in the twentieth century. Indeed a 2014 survey by Smart Growth America labelled Atlanta the most sprawling city in the USA.[59] Density in Barcelona is around 28 times higher than that in Atlanta.[60]

Barcelona's potential for sprawl has been limited to a certain extent by its geographical position between mountains and

the sea. Different districts within Barcelona have developed different density characteristics, as the medieval central city has developed on a neighbourhood by neighbourhood basis. In contrast, in Atlanta, SmartGrowth America suggest that the almost limitless hinterland to the city has positively encouraged a steady sprawl.

Population Growth

Both cities have experienced population booms at various points in their histories. In Barcelona, the city's first intentional attempt to deal with its rising population was in its planning of the Eixample district, which today has a remarkable density of more than 35,000 people per square km.[61] The Eixample district formed a key part of the expansion out of the historic city walls, and was planned in the mid nineteenth century in reaction to high mortality rates which were perceived to be linked to increased population and high density in the working class areas. The district's grid formation of residential blocks was designed to avoid hierarchy in land property values. Although the original plan for the district specified a maximum height of four stories, during implementation buildings were allowed to grow in height and depths, thereby considerably increasing the density of the plan.[62]

Atlanta witnessed a population boom in the 1990s, adding more than 650,000 people and 350,000 jobs to its metropolitan area during that decade.[63] The rate of growth was around 6%[64], the fastest of any southeastern city in the USA. However the city's urban land area has expanded at an even greater rate, expanding 25% between 1980 and 1990 and a further 47% between 1990 and 1996.[65] Over 600,000 acres were converted to urban uses in Atlanta between 1982 and 1997.[66] The core city of Atlanta was home to 22.4% of the metropolitan region's population in 1980, but only 13.3 percent in 1999. From April 1998 to April 1999, the region grew by 94,300 people, yet the city itself gained a mere 900 residents.[67]

Olympic Games
In the 1980s, Barcelona utilised the catalyst and funding opportunities of the 1992 Olympic Games to transform the city's built environment. The Games planners redeveloped neglected brownfield sites close to the coast, and built more than 200 parks, plazas and schools in the city – many of which were inserted into neglected central areas where crime was high.[68] Buildings were retrofitted and declining or disused industrial sites, particularly around the port, were redeveloped.

Although Atlanta hosted the following Summer Olympics, in 1996, it has not been until the new millennium that the city has begun to promote smart growth projects - the opportunity that the Games presented for urban regeneration appears to have been largely overlooked. Belatedly however, Atlanta is also proactively planning to increase its core density with projects such as the Atlanta BeltLine Eastside Trail – an award winning redevelopment of a former rail corridor into a multi-use trail and connected park system. It is investing in redevelopment of iconic downtown landmarks such as the Civic Center, Georgia Dome and Turner Field in an effort to provide a high density, mixed use boost to the downtown area.[69] Local government has also introduced incentives to reduce smog-inducing traffic and to conserve water (serious side effects of sprawl). [70]There is some evidence that the city's efforts to density and revitalise the downtown area may be gaining traction–a 2013 report by George Washington University revealed that walkable urban development represented a growing share of development in the city region.[71]

Methodology for Comparative Benchmark Table

- The position / score that each case study city has achieved on eight different indexes / benchmarks is recorded.
- Five indexes are intended to be indicative of 'good' density (environment, liveability,innovation,productivity, human capital) and three to be indicative of 'bad' density (congestion, crime, pollution).
- Case study cities are then awarded a score for each indicator according to their performance relative to the other case study cities. Scores are:
  - Between 1 (worst) and 10 (best) for positive indicators; and
  - Between -1 (best) and -10 (worst) for negative indicators.
- Where cities do not feature in a given index a value of NA is entered and the scale of possible scores reduced accordingly.

City	Density (Demographia Yearbook 2015)	Score	Position in EIU Hotspots Environment and Natural Hazards 2012	Score	Position in EIU Liveability Ranking 2012	Score	Position in Tom Tom Congestion Ranking 2014	Score	Position in 2thinknow Innovation Index 2014	Score	Score in Numbeo Crime Ranking May 2015	Score	WHO PM10 and PM2.5 Pollution rating 2014	Score	Position in UN State of World Cities Productivity Index 2012	Score	Position in EIU Hotspots Human Capital 2012	Score
Atlanta	700	10	19	4	37	7	93	-1	49	8	63.72	-9	37	-3	Na	Na	11	7
Barcelona	4400	4	43	8	35	6	71	-3	56	9	41.86	-7	41	-4	20	6	29	3
Hamburg	2700	9	19	4	14	3	44	-6	18	5	38.69	-5	42	-6	Na	Na	32	2
Mexico City	9700	3	84	10	105	10	2	-9	187	10	65.57	-10	118	-10	27	4	23	4
Oslo	3400	7	19	4	24	5	87	-2	32	7	39.09	-6	36	-2	9	7	6	9
Paris	3800	6	6	1	16	4	22	-8	5	1	54.8	-8	41	-4	6	9	4	10
Seoul	10400	2	43	8	58	9	NA	NA	12	4	16.46	-1	71	-9	24	5	69	1
Singapore	10900	1	8	2	53	8	39	-7	27	6	16.79	-2	44	-7	Na	Na	13	6
Toronto	2800	8	32	7	4	2	47	-5	11	3	32.46	-4	32	-1	8	8	10	8
Vienna	3900	5	8	2	2	1	57	-4	6	2	29.86	-3	46	-8	2	10	15	5

References

[1] http://www.brookings.edu/~/media/Multimedia/Interactives/2013/tentraits/Singapore.pdf

[2] http://www.reuters.com/article/2013/01/29/us-singapore-population-idUSBRE90S05U20130129

[3] http://uli.org/wp-content/uploads/ULI-Documents/10PrinciplesSingapore.pdf

[4] http://uli.org/wp-content/uploads/ULI-Documents/10PrinciplesSingapore.pdf

[5] Oakley et al (2010) Singapore,
https://books.google.co.uk/books?id=LdAV8XaHDTgC&pg=PA37&lpg=PA37&dq=singapore+grown+by+100+sq+km+since+independence&source=bl&ots=14
o5W8CXp3&sig=K6Ch8ZAFvo9rFgOvhfYsP3dq4q8&hl=en&sa=X&ei=Xqd0Vdm7F8Wa7gaE44PQDw&ved=0CDQQ6AEwAw#v=onepage&q=singapore%20gro
wn%20by%20100%20sq%20km%20since%20independence&f=false

[6] http://news.harvard.edu/gazette/story/2015/02/the-makeover-of-mexico-city/

[7] https://lsecities.net/media/objects/articles/urban-age-cities-compared/en-gb/

[8] https://lsecities.net/media/objects/articles/urban-age-cities-compared/en-gb/

[9] https://lsecities.net/media/objects/articles/urban-age-cities-compared/en-gb/

[10] http://lsecities.net/media/objects/articles/mexico-city-housing-and-neighbourhoods/en-gb/

[11] Source: http://www.arthistoryarchive.com/arthistory/architecture/Haussmanns-Architectural-Paris.html

[12] http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/database and http://www.livablecities.org/articles/high-
density-livability-question

[13] http://www.forbes.com/sites/joelkotkin/2013/04/16/megacities-and-the-density-delusion/

[14] http://www.robertgordonarchitect.com/RGA/Paris_Density.html

[15] http://www.iau-idf.fr/en/know-how/scope-of-activities/edition/garden-cities-an-ideal-to-be-pursued.html

[16] http://issuu.com/uclgcglu/docs/urbanstrategic/83

[17] http://www.theguardian.com/world/2013/sep/20/germany-shrinking-cities-view-salzgitter

[18] http://www.hamburg.de/contentblob/4357518/data/broschuere-perspektiven-englisch).pdf

[19] http://www.urbistat.it/AdminStat/en/de/demografia/dati-sintesi/hamburg/2/3

[20] http://www.hamburg.de/contentblob/4357518/data/broschuere-perspektiven-englisch).pdf

[21] Compact City Policies: A Comparative Assessment (2012)

[22] http://www.hafencity.com/en/overview/hafencity-facts-and-figures.html

[23] http://www.bangkokpost.com/news/sports/499275/hamburg-promise-ustainable-compact-olympics

[24] Source: http://www.ssb.no/en/befolkning/statistikker/fobbolig/hvert-10-aar/2013-02-26

[25] http://urbact.eu/oslo

[26] https://www.oslo.kommune.no/

[27] https://www.toi.no/planning-land-use-and-public-transport/the-challenge-of-sustainable-mobility-and-urban-planning-in-oslo-article27748-825.html

[28] https://books.google.co.uk/books?id=QQ0sBgAAQBAJ&pg=PA436&lpg=PA436&dq=oslo+green+belt+boundary&source=bl&ots=vbCN0rLeFw&sig=lv8HX-
vAKb-p1-ZqfR4oPn2qP4zk&hl=en&sa=X&ei=wBQ1VayYLcHUapbsgIAP&ved=0CC4Q6AEwAg#v=onepage&q=oslo%20green%20belt%20boundary&f=false

[29] http://natureneedshalf.org/oslo/

[30] Naess et al (2009) Oslo's Farewell to Urban Sprawl available at http://www.tandfonline.com/doi/abs/10.1080/09654313.2011.530395

[31] https://www.toi.no/planning-land-use-and-public-transport/the-challenge-of-sustainable-mobility-and-urban-planning-in-oslo-article27748-825.html

[32] Oslo's Farewell to Urban Sprawl: European Planning Studies (2010) available at http://www.tandfonline.com/doi/full/10.1080/09654313.2011.530395#ab-
stract

[33] https://www.wien.gv.at/stadtentwicklung/projekte/landschaft-freiraum/landschaft/gruenraum/entwicklung/gruenguertel/gruenguertel95.html (German Lan-
guage site)

34 http://www.tate.org.uk/whats-on/tate-modern/exhibition/century-city/century-city-vienna-1908-18

35 http://www.academia.edu/189782/Urban_Renewal_in_Vienna

36 https://www.wien.gv.at/english/history/overview/growth.html

37 https://www.wien.gv.at/stadtentwicklung/studien/pdf/b007575c.pdf

38 https://www.adjacentgovernment.co.uk/lg-edition-003/vienna-urban-development/; https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008379d.pdf

39 Interview with Dr Zenja Antalovsky, Vienna Urban Forum

40 http://www.thestar.com/opinion/commentary/2015/03/17/greenbelt-makes-gta-more-not-less-livable.html

41 https://www.placestogrow.ca/index.php?option=com_content&task=view&id=1&Itemid=8

42 https://www1.toronto.ca/Grow/grow-july2014.pdf

43 https://www1.toronto.ca/Grow/grow-july2014.pdf

44 http://www.td.com/document/PDF/economics/special/ff0113_toronto.pdf

45 http://www.cbc.ca/news/business/130-highrise-building-projects-in-toronto-lead-north-america-1.2504776

46 http://www.td.com/document/PDF/economics/special/ff0113_toronto.pdf

47 http://www.pembina.org/reports/priced-out.pdf ; http://www.thestar.com/opinion/commentary/2015/03/17/greenbelt-makes-gta-more-not-less-livable.html

48 http://www.who.int/kobe_centre/interventions/intersectorial_action/2-2_Dr-Park_11JUN13.pdf

49 https://koreanarchitecture.wordpress.com/2010/10/05/hyper-density/

50 ibid

51 http://personal.lse.ac.uk/shin/Shin_2009_Geoforum_Gentrification_Korea.pdf

52 https://koreanarchitecture.wordpress.com/2010/10/05/hyper-density/

53 http://www.newgeography.com/content/002060-the-evolving-urban-form-seoul

54 https://books.google.co.uk/books?id=fl6IrYZABkcC&pg=PA179&lpg=PA179&dq=songdo+city+high+density&source=bl&ots=Gc11VmLFUE&sig=XdOgcvE-zoC_I6mDd0lxXgU5gOak&hl=en&sa=X&ei=pxpjVZWFCYerU62DgfgD&ved=0CCIQ6AEwAA#v=onepage&q=songdo%20city%20high%20density&f=false

55 http://www.westminster.ac.uk/?a=119909

56 https://books.google.co.uk/books?id=yBPA9kYZXTMC&pg=PA272&lpg=PA272&dq=songdo+city+high+density&source=bl&ots=RRZytL-78u&sig=WQiYH5YVLFHF7M3oDYwMF-EM9ww&hl=en&sa=X&ei=pxpjVZWFCYerU62DgfgD&ved=0CCUQ6AEwAQ#v=onepage&q=songdo%20city%20high%20density&f=false

57 http://files.lsecities.net/files/2014/11/NCE-2014-Better-Growth-Better-Climate-Cities-Chapter.pdf

58 http://files.lsecities.net/files/2014/11/NCE-2014-Better-Growth-Better-Climate-Cities-Chapter.pdf

59 http://www.smartgrowthamerica.org/documents/measuring-sprawl-2014.pdf

60 http://reason.org/files/0d642e267c868322f65139ee573965c4.pdf

61 http://iberianature.com/barcelona/2010/02/10/the-population-density-of-barcelona/

62 http://www.citymetric.com/, http://densityatlas.org , http://geographyfieldwork.com/BarcelonaUrbanDetail.htm

63 http://www.brookings.edu/~/media/research/files/reports/2000/3/atlanta/atlanta.pdf

64 http://www.nytimes.com/2001/03/23/us/the-census-shows-growth-in-atlanta-s-population.html

65 http://www.georgiaencyclopedia.org/articles/geography-environment/urban-sprawl

66 http://www.brookings.edu/~/media/research/files/reports/2006/8/metropolitanpolicy-pendall/metro_summaries.pdf

67 http://www.brookings.edu/~/media/research/files/reports/2000/3/atlanta/atlanta.pdf

68 http://depts.washington.edu/open2100/Resources/1_OpenSpaceSystems/Open_Space_Systems/BarcelonaCaseStudy.pdf

69 http://www.investatlanta.com/

70 http://www.frontdoor.com/places/atlanta-urban-sprawl

71 http://www.smartgrowthamerica.org/2013/10/03/new-report-reveals-historic-shift-in-real-estate-demand-in-atlanta-ga/ ; http://www.usatoday.com/story/news/nation/2013/10/03/atlanta-sprawl-development/2915631/