

Report to the Future Melbourne Committee

Agenda item 7.1

Participation by Councillor Nicholas Reece in C40 Global Mayors Summit, Copenhagen, Denmark, October 2019

4 February 2020

Presenter: Councillor Nicholas Reece

Purpose and background

1. To report to the Future Melbourne Committee on travel undertaken by Councillor Nicholas Reece to participate in the C40 Global Mayors Summit held in Copenhagen, Denmark in October 2019.
2. On 17 September 2019, the Future Melbourne Committee approved Councillor Reece's travel to present and participate in discussions that further Council's goal to be a city that cares for its environment and promote Melbourne's reputation as a global leader in initiatives on environmental sustainability and resilience.

Key issues

3. The C40 Global Mayors Summit provided an important opportunity for the 94 member international cities to knowledge share their leadership as sustainable communities through exchange and collaboration on programs and strategies by highlighting best practice and innovation from around the world.
4. Included as Attachment 2 are a series of 12 Factsheets that provide a detailed summary of the key observations and insights covering the following:
 - 4.1. City Storytelling
 - 4.2. City Market
 - 4.3. City Harbour
 - 4.4. C40 Global Mayors Summit
 - 4.5. Metro Transport
 - 4.6. Bicycles, Scooters and Shared Electric Cars
 - 4.7. Waste Innovation
 - 4.8. Building Typologies
 - 4.9. Urban Renewal
 - 4.10. Embodied Carbon and Building Materiality
 - 4.11. Urban Design and Greening
 - 4.12. Climate Adaptation
5. It is proposed that the observations and insights contained in the Factsheets be reviewed and considered by management and shared with external stakeholders as required. This will provide the basis for further discussion on potential opportunities for the City of Melbourne.

Recommendation

6. That the Future Melbourne Committee:
 - 6.1. Notes the report by Councillor Nicholas Reece on travel undertaken to Copenhagen in October 2019 to participate in the C40 Global Mayors Summit and related activities.
 - 6.2. Requests management to consider and share with external stakeholders the observations and insights outlined in Attachment 2 and explore potential opportunities for City of Melbourne.

Attachments:

1. Supporting Attachmen (Page 2 of 28)
2. Observations, insights and opportunities including summary including Factsheets 1 to12 (Page 3 of 28)

Supporting Attachment

Finance

1. The travel undertaken by Councillor Reece was jointly funded by C40 and Council. The cost to Council was \$12,141.64 which covered partial airfare costs (\$8,929.86), partial accommodation costs (\$1,620.74) and incidentals (\$1,591.04).

Conflict of interest

2. No member of Council staff, or other person engaged under a contract, involved in advising on or preparing this report has declared a direct or indirect interest in relation to the matter of the report.

Relation to Council policy

3. The General Manager Governance and Organisational Development has confirmed that the travel costs accord with the requirements of the travel guidelines outlined in the Councillor Expenses and Resources Guidelines. However, due to unforeseen circumstances, this post travel report was prepared post the period of 60 days.
4. The objectives of the travel align with the Council Plan goal of *A City that cares for its environment* and a range of international engagement, environmental and sustainability strategies and policies.

Health and Safety

5. Councillor Reece undertook standard safety precautions associated with international travel.

Environmental sustainability

6. Councillor Reece's participation in the 2019 C40 Global Mayors Summit aligns with Priority 6 within the Council plan, namely to 'demonstrate local and global leadership in conserving biodiversity and creating and sustaining healthy urban ecosystems'.
7. The carbon emission resulting from air travel identified in this report will be offset with the purchase of credits.

OBSERVATIONS, INSIGHTS AND OPPORTUNITIES**C40 Global Mayors Summit and related activities**

Twelve Factsheets have been prepared and will enable the key observations, insights and opportunities to be shared and discussed internally and with the community and key stakeholder groups as required. Outlined below is a list with a brief introduction to each Factsheet.

- **Factsheet 1: City Storytelling**
In many respects Copenhagen is the original smart city, it is a world leader in innovative approaches to city planning and design. More recently, Denmark has successfully marketed itself as a “Green Superpower” and this is generating opportunities for Danish businesses working in the sustainable industry sector.
- **Factsheet 2: City Market**
Torvellerne KBH is Copenhagen’s most popular food market. The redeveloped Copenhagen market has successfully incorporated underground parking facilities, food and dining experiences within the market, clever building features that allow the market to have the feel of being “open air” while providing shelter during challenging weather conditions.
- **Factsheet 3: City Harbour**
After 20 years of significant investment, Copenhagen is one of only a few cities in Europe where the harbour is now clean enough to swim. This is a source of enormous pride for the Danish people and the new harbour baths dotted along the shoreline have become extremely popular. Melbourne can and must achieve the same outcomes for the Yarra Birrarung River, Victoria Harbour and other waterways.
- **Factsheet 4: C40 Global Mayors Summit**
There are 94 member cities in the C40 Global Network, representing 700 million people and 25% of the global economy. Many summit presenters reinforced the influential and impactful collective power of the 94 C40 Cities to knowledge share and partner to accelerate action. The “Global Green New Deal” has emerged as a rallying point for cities recognising that environmental justice must be accompanied by social and economic justice.
- **Factsheet 5: Metro Transport**
The Copenhagen Metro City Circle Line (M3) opened 29 September 2019, the week prior to the C40 Summit. The Cityringen is 15.5km in length, fully automated/driverless with 17 stations, operating 24 hours every day, with 2-minute frequency during peak hours, and constructed to accommodate 1.0m sea level rise. The Copenhagen Metro station entrances are a discrete minimalist design which preserve streetscapes. This design aesthetic differs from the large canopy and awning structures proposed for Melbourne Metro.
- **Factsheet 6: Bicycles, Scooters and Shared Electric Cars**
Copenhagen was once a car centred city. But over several decades the City of Copenhagen has had a dedicated focus on ‘sustainable mobility’ and has significantly invested in projects and programs to achieve integrated transport and cycling solutions to reduce congestion and improve health outcomes for residents. In 2019, over 50 per cent of Copenhageners bike to work or school every day, contributing to the City’s goal to be carbon neutral by 2025.
- **Factsheet 7: Waste Innovation**
Outlines two site visits to experience initiatives the national Danish Government together with the City of Copenhagen have implemented to achieve their 10-year Urban Waste Strategy - ‘Less Waste, More Separation’. Three Copenhagen innovations stood out: Reverse Vending Recycling Machines supported by a strong container deposit scheme; “Hedonistic Sustainability” as way of popularising environmental action; Waste to Energy production.
- **Factsheet 8: Building Typologies**
The built form typology of Copenhagen is a consistent 5-7 storey height with black or red roofs, courtyard gardens, rhythmic fenestration and attic roof windows. This consistency has been achieved with mandatory planning controls to ensure the historic cathedral spires are the dominant visual landscape of the city. There are also a number of design examples of contemporary architectural design respectful and considered of the historic typology. Melbourne should explore the feasibility of this building typology.
- **Factsheet 9: Urban Renewal**
The City of Copenhagen is forecast to grow by 100,000 new residents by 2030. To accommodate this growth the city is constructing new residential neighbourhoods in a series of urban renewal precincts around the city. In Copenhagen they use dedicated development corporations to lead the development urban renewal projects and major new infrastructure projects.

- **Factsheet 10: Embodied Carbon and Building Materiality**

A feature of the Copenhagen building typology is the use of brick, render and stone with fine grain patterned and hatched brick at both street level and 1st floor level, present in both heritage buildings and new buildings. The inclusion of “embodied carbon” in emission reduction considerations has seen the innovative reuse of building materials from old buildings being reused in new developments. Both of these initiatives should be considered in Melbourne.

- **Factsheet 11: Urban Design and Greening**

Copenhagen has many urban design and greening principles and programs that deserve further consideration in Melbourne. Three urban design themes of particular note; Discrete car parking street entrances; Active urban design over the waterfront and; Conversion of streets to green urban parks

- **Factsheet 12: Climate Adaptation**

Limakvarter, the Climate Quarter, a living lab of experimental climate adaptation, water sensitive urban design, data capture and knowledge sharing.

City Storytelling – Denmark as a green super power

Across all levels of government, the Prime Minister Mette Freidriksen, Lord Mayor of Copenhagen Frank Jensen, city leaders and industry experts, there was a consistent country and city narrative. This became a powerful promotional device that resonated with visiting industry and civic organisations.

THE DANISH STORY INCLUDED:

- Promotion of Denmark as a **green super power**. Importantly, this is just as much a narrative about Danish innovation and industry capabilities as it is about the environment.
- The need for **all leaders to talk about and demonstrate “courage”** in our response to climate change and sustainable urban development.
- City of Copenhagen’s ambitious commitment to be **carbon neutral by 2025**, while the Danish Government has committed Denmark to a **national cut of 70 per cent by 2030**.
- The **UN Sustainable Development Goals** have been embraced by government, industry and civic groups. During a visit to an urban redevelopment area we even had a property developer outline where the UNSDG have been incorporated into a development.
- After two decades of action, a **swimmable harbour** is a source of enormous civic pride in Copenhagen – a public equitable swimming pool for all citizens.
- Pro-active **citizen engagement** in the past and future planning of the city.
- **Hedonistic Sustainability** is sustainability that improves the quality of life and human enjoyment. It sets out to challenge the misconception that sustainability means sacrifice and going without, promoted by Danish architect Bjarke Ingels.

STATE OF GREEN

Denmark has a large number of not-for-profit foundations and partnerships. ‘State of Green’ was an excellent example of a not-for-profit public-private partnership established to stimulate debate, spur partnerships and inspire others by sharing Danish industry knowledge, experience and solutions to accelerate global green transition. <https://stateofgreen.com/en/about-state-of-green/>

CITY MAP ON THE COPENHAGEN TOWN HALL

A giant city map on the main entrance hall of the Copenhagen Town Hall was a very popular exhibit (see pictures below). A city map floor wallpaper could be part of the Town Hall Commons project.



Copenhagen City Hall floor wallpaper





Harbour Pools @ Brygge

City Market

Torvellerne KBH is Copenhagen's most popular food market, with more than 60 traders. <https://torvehallernekbh.dk/>
Observations for the Queen Victoria Market are:

- Torvellerne has an expansive open feel, with a unique combination of indoor/outdoor stalls selling fresh food, drinks and cooked meals.
- Known locally as a 'glass market', the market includes two large glassed pavilions with fabric awnings on each side for sun protection and outdoor seating areas on all sides fronting the streets. Between the pavilions are outdoor fresh fruit stalls covered by fixed umbrellas.
- Inside the pavilions are a series of four-stall quadrants with stalls offering fresh produce, delicacies and a seating area for cooked meals and on-site hospitality.
- The market is located in a central public square surrounded by 5-storey mixed use residential and mixed use. On the fourth side is open space with an underground carpark.





City Harbour & Waterfront

In 1995, the discharge of wastewater from sewers and industry with 90 overflow channels went directly into Copenhagen's harbour, making the water highly polluted. Over 20 years the City of Copenhagen has invested significantly into modernisation of the city's sewer system including expanding its wastewater treatment capability and construction of rainwater reservoirs and reservoir conduits to store wastewater until the sewage system has capacity. Today, Copenhagen is one of only a few cities in Europe where the harbour is clean enough to swim. The Copenhagen "swimmable harbour" is an enormous source of pride for the Danes and was often referred to in meetings we attended.

The City of Copenhagen's success in transforming its harbour should be an inspiration for Melbourne and the Birrarung Yarra River Strategy. The new, well-designed harbour pools are very popular in summer. These pools provide a blueprint for what could be delivered as part of a swimmable Birrarung in the Draft Yarra Strategic Plan.

Useful link: <https://stateofgreen.com/en/partners/city-of-copenhagen/solutions/the-harbour-turns-blue-1/>

- Copenhagen Harbour Pools, a **swimmable harbour** is a source of enormous civic pride in Copenhagen – a public equitable swimming pool for all citizens.
- The Islands Brygge area is a popular summer destination, designed by Bjarke Ingels, founder of BIG.
- Nyhavn (New Harbour) is a 17th century waterfront, canal and entertainment district, lined by brightly coloured 17th and 18th century townhouses, bars, cafes and restaurants.
- The Harbour has a suite of recreation operations with hospitality (<https://www.green-island.dk/>), kayaking tours and rivercraft for hire. In addition, the Harbour also functions as part of the city's public transportation system. From 2020 a new fleet of electric harbour buses are proposed that are CO2-neutral, contributing to Copenhagen's goal to be carbon neutral by 2025.



C40 Global Mayors Summit

There are 94 member cities in the C40 Global Network, representing 700 million people and 25 per cent of the global economy. Many summit presenters reinforced the influential and impactful collective power of the 94 C40 Cities to knowledge share and partner to accelerate action to deliver the **Global Green New Deal**.



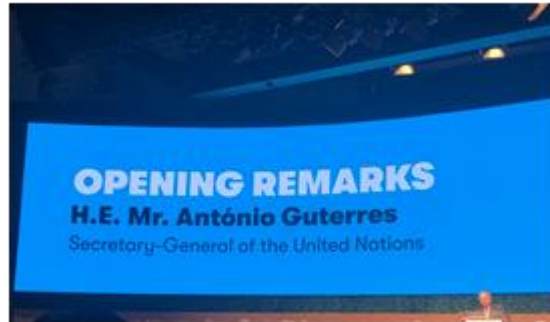
Key Messages from the Summit:

- A strong focus on inclusion for all – social inclusion and a just economic transition are core tenets of environmental justice
- Cities are doing more than everyone else but no-one is doing enough
- We need a decade of action
- All Cities need a strong narrative as to their actions in response to climate change. Development of a Climate Budget is an important communications tool for industry and citizen engagement to better understand the breadth and depth of City investment.
- Circular economies, also known as Donut Economics propositioned by Oxford University academic Kate Raworth, is an economic concept whereby the question to be answered is how can the needs of all be met within the means of the planet.
- Air Quality is a major issue in many C40 Cities requiring strong political leadership.
- A Food Declaration was signed by 14 Cities to discuss the relationship between food production, agricultural practices and environmental impact.

Other key insights from the Summit presentations and discussions were:

- Development of a communications strategy that clearly outlines the Cities' actions in response to climate change is critically important so the communities we represent know and understand the City's goals and targets.
- There was much discussion amongst many C40 Cities as to whether a more aggressive reductions target should be considered. Look to Copenhagen and Stockholm.
- The **Global Green New Deal** has become a key framework for rallying political and community support for action on climate change recognising that environmental justice must also be accompanied by economic and social justice.
- City of Sydney has won the rights to host the **2020 Women 4 Climate summit** to be held in Sydney in March. This provides an excellent opportunity for the City of Melbourne to further engage with and learn from C40 member Cities.

- **Donut economics** is the opposite of the current economic paradigm of linear degenerative economics. The Doughnut of social and planetary boundaries is an economic framing that challenges us to act as a compass for human progress for this century. <https://www.kateraworth.com/doughnut/>
- **Air Quality:** Many cities have developed a data governance partnership with Google to share data from Google Street View, given all Street View Cars are equipped with air quality monitors.



Cr Reece represented the City of Melbourne, speaking on two panels:

1. City and Business Forum
2. Green Energy Finance Forum



Copenhagen Metro Transport

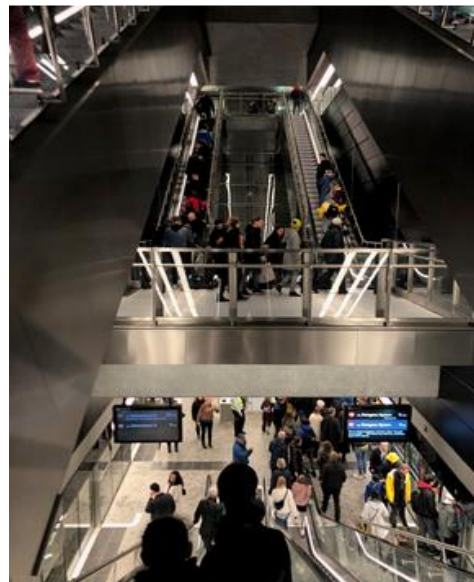
<https://intl.m.dk/>

The Copenhagen Metro City Circle Line (M3), named the 'Cityringen' opened on 29 September 2019, the week prior to the C40 Summit. The Cityringen is 15.5km in length, fully automated/driverless with 17 stations, operating 24 hours every day, with 2-minute frequency during peak hours and constructed to accommodate 1.0m sea level rise.

	Copenhagen Metro Cityringen M3
Tunnel length	15.5km
Stations	17
Geological studies commence	2007
Contract award	2011
Opened	2019
Project Cost	\$4.8 billion AUD

Following a meeting with Henrik Plougmann Olsen, CEO Copenhagen Metro and several site visits, observations of the Cityringen were:

- Stations were built in glass, concrete and steel with all stations having consistent materiality. Visual impact was one of high-quality intuitive design with a focus on safety, functionality and form. More station photos can be found: <https://m.dk/kontakt/presse-og-nyheder/pressebilleder/>



- Station entries were minimalist, subtle, unobtrusive, functional, intuitive and human-scale in design with no awning or canopy. The lack of a canopy entry ensured the beautiful streetscapes and public spaces were preserved. We were advised that this minimalist design aesthetic for the station entrances was not in the original design but chosen as part of a value management exercise to contain project costs.
- Inside the stations the escalators would run to an underground concourse with stairs and lifts taking people to street level. By not having the escalator come to ground level there is no need for a canopy structure to protect the escalator from the weather. This design aesthetic differs from the large canopy and awning structures proposed for Melbourne Metro.
- Low scale glass pyramids on station roofs allow daylight in, with prisms reflecting/splitting light.
- Air ventilation systems were low-to-no scale in height with little to no impact to the streetscape.
- Station roofs have been successfully planted with considered and beautifully designed indigenous landscapes with grasses and understorey planting, a visible demonstration of Nature in the City.



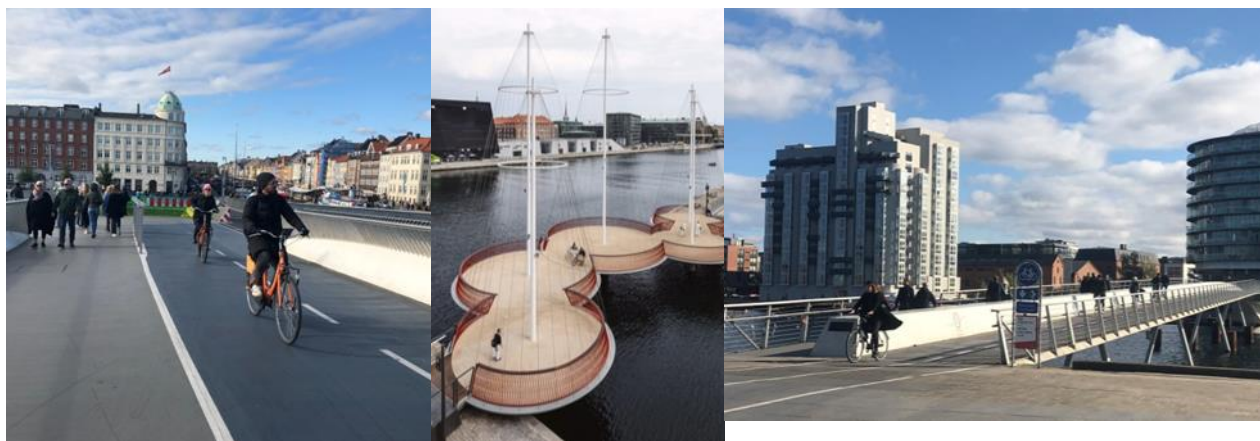
- Unlike Amsterdam and Utrecht, the new Copenhagen Metro M3 has been unsuccessful in delivery of high quality bicycle parking underground integrated with the new station design. Each station has 500-2,000 bicycle parking bays at street level creating visual clutter and requiring an expansive use of highly valuable public space.



Bikes, E-Scooters and Shared Electric Cars

The City of Copenhagen has a dedicated focus on 'green mobility' and over the past decade has significantly invested in projects and programs to achieve integrated transport and cycling solutions to reduce congestion and improve health outcomes for residents. In 2019, **over 50% of Copenhageners bike** to work or school every day, contributing to the City's goal to be carbon neutral by 2025.

- Copenhagen has not always been a bike city. In the decades following the Second World War the city gave primacy to private motor vehicles. Public squares were converted into car parks and roads were widened to accommodate more cars. However, since the 1970's, Copenhagen has been investing in sustainable transport solutions and this has gradually changed transport behaviour. Since 2005 the City has **invested \$1 billion DKK** in bike lanes and super cycle highways, including the Havneringen (Harbour Circle) opened in 2014.
- Five new cycle bridges have been built, funded and constructed by the private sector, exemplified by quality, beautiful architectural design, elegant structures and generous widths for bicycles and pedestrians, including Cirkelboen, the Circle Bridge designed by Danish-Icelandic artist Olafur Eliasson. This flagship infrastructure is a source of city pride.
- For large scale development projects and urban renewal, private sector funding for civic transport infrastructure is routinely offered as public benefit.

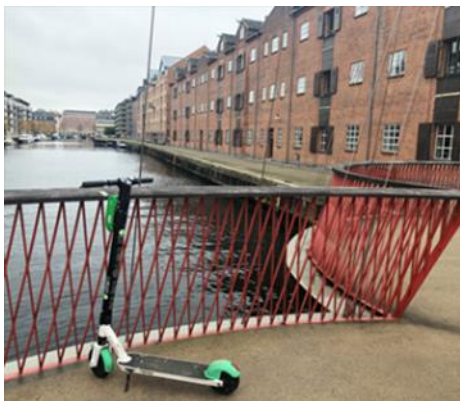


- **Bicycle lanes** are a minimum 2m width to allow for two bicycles to ride side-by-side, with dedicated lanes located adjacent to the footpath, a minimum half kerb on each side and minimal line marking.
- Entirety of the bike lane is **raised by a half kerb (75mm)** to provide physical vertical separation between both the parked cars and then another half kerb vertical separation of 75mm to the footpath.
- **All central city streets are 40 km/hr**, with 15 km/hr adjacent to schools/kindergartens.



- Bicycles are a visible presence in Copenhagen streets, travelling on dedicated bicycle lanes and with large public spaces allocated for on-street bicycle parking. In 2017 there were 180,000 publicly available bicycle parking bays at street level, compared to 126,000 publicly available car parking spaces kerbside.
- Each train/metro station has 500-2,000 bicycle parking bays at street level creating visual clutter and requiring an expansive use of highly valuable public space.
- Considered beautifully designed double-stacked bicycle parking is evident in urban renewal precincts.

- The **shared mobility economy** in Copenhagen is evidenced by a city-operated bike-share scheme, a private bike-share company (Donkey Republic), two e-scooter companies (Voi, Lime) and four car-share companies (Drive Now, Lets Go, Green Mobility, GoMore)
- Copenhagen City Bikes or Bicykler Kobenhavn launched in 1995 with 1,000 bicycles, and was the world's first organised large-scale urban **bike-sharing scheme**. Relaunched in 2014 as Bycyklen in cooperation with the Danish State Railways (DSB). The system has 1,860 all electric bikes and 105 docking stations.
- From 1 January 2019, driving **e-scooters in bike lanes has been legal** in Denmark for a one-year trial, with biking or driving an e-scooter on the footpath against the law. This new mobility has been the subject of considerable civic debate due to them often being left badly parked and dozens of people arrested for driving them under the influence of alcohol or drugs.
- E-scooters companies have a partnership with the City of Copenhagen focused on the business model with incentives for desired scooter parking in marked bays, climate footprint and data sharing. Companies have a one-year permit and the City has nominated a cap: 200 e-scooters and 200 rental e-bikes in the most crowded areas of the city, such as retail high streets and outside train/metro stations. In the less crowded parts of the city - 3,000 e-scooters and 3,000 e-bikes are allowed.
- E-scooters regulations include:
 - not faster than 20 km/h
 - minimum age 15 years
 - compliance with all traffic rules



Waste Innovation

Two site visits were organised to experience initiatives the Danish Government and City of Copenhagen have implemented to achieve their 10-year Urban Waste Strategy - 'Less Waste, More Separation' <http://www.urban-waste.eu/520-2/>

In 1988, over 40% of the city's waste was sent to landfill. Now in 2019, almost 60% of city waste is recycled with less than 2% of waste going to landfill. Residual waste that cannot be recycled generates heat for the city's district heating network. This 30-year transformation was achieved with 3 focus areas – recycling, legislation and waste-to-energy.

- **Recycling** - at a household level, paper, cardboard, glass, batteries, plastic, metal, electronics, garden waste, bulky waste and residual waste are collected separately, with separation also available for public collection.
- Established in 2000, Denmark has a **container-deposit scheme** with the main goal of creating and maintaining a circular business model.
- In 2018, 1.2 billion bottles and cans were collected via the deposit system, equivalent to 6,000 tonnes.



- TOMRA, the technology provider of the Danish CDS and also a supplier in NSW and Queensland, provided a site visit of their reverse-vending machines. In other global cities, a target of 90% recycling of all plastic beverage containers has been achieved. <https://www.tomra.com/en/collection/reverse-vending>

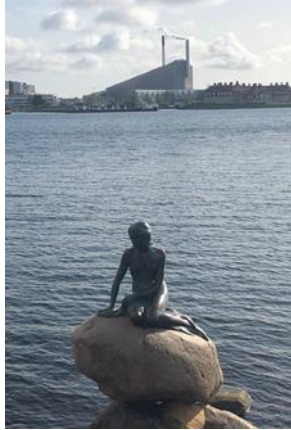


- **National legislation** to implement a waste-to-landfill tax of 62.56 €/tonne (\$101.50 AUD) compared to a waste-to-incineration tax of 6.69 €/tonne (\$10.85AUD). Due to the negative impacts of methane and technological advancement with incineration, it is illegal in Denmark to send waste to landfill if it can be incinerated.
- Generation of heat and power from residual waste - **Waste to Energy** makes a significant contribution to City of Copenhagen's goal to be carbon neutral by 2025.

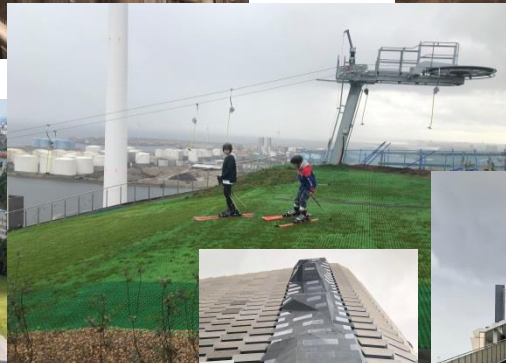
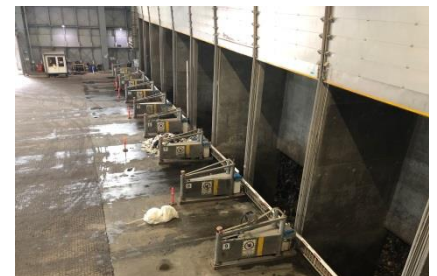
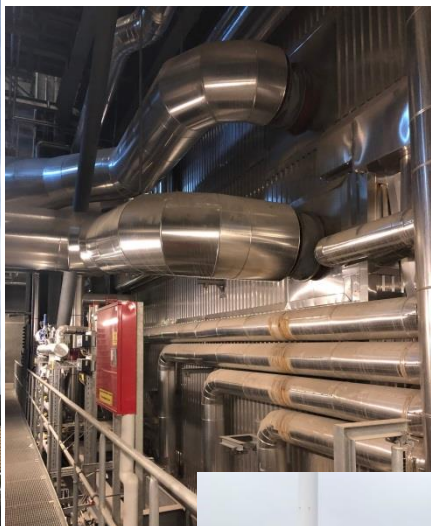
- Amager Bakke is the largest environmental initiative in Denmark and the cleanest waste-to-energy power plant in the world. Designed by Bjarke Ingels, Founder & Creative Director, BIG architects, on its' roof is Copenhill, an urban mountain:

'Its façade is climbable, its roof is hikeable and its slopes are skiable. Copenhill is a crystal clear example of Hedonistic Sustainability – that a sustainable city is not only better for the environment – it is also more enjoyable for the lives of its citizens.'

<https://www.archdaily.com/925966/copenhill-the-story-of-bigs-iconic-waste-to-energy-plant>



	Waste-to-Energy	Hedonistic Sustainability https://www.copenhill.dk/en/
Project size	41,000 sqm	<ul style="list-style-type: none"> • 450m Ski Slope, Slalom & Snowboarding • 85m x 10m wide Rock Climbing Wall (highest in the world) • Running / Hiking & Fitness Training • Mountain Bike Course
Annual waste conversion	440,000 tonnes	
Electricity and District Heating	150,000 homes	
Project Cost	3.5 Billion DKK (\$758million AUD)	



Building Typologies

The built form typology of Copenhagen is a consistent 5-6 storey height with black or red roofs, courtyard gardens, rhythmic fenestration and attic roof windows. This consistency has been achieved with mandatory planning controls to ensure the historic cathedral spires are the dominant visual landscape of the city.



- There are also a number of exquisite examples of contemporary architectural design that is respectful and considered of the heritage and historic settings.



- More recently a circular built-form typology has become popular, with several new circular residential and office developments.



Urban Renewal

The City of Copenhagen is forecast to grow by 100,000 new residents by 2030. To accommodate this growth the city is constructing new residential neighbourhoods in a series of urban renewal precincts around the city, such as:

- Ørestad, a new neighbourhood for 20,000 residents, 20,000 students and 80,000 jobs
- Nordhavn (North Harbor), a residential, commercial and office space with capacity for 40,000 residents and 40,000 workers



Much of the growth is being accommodated in former Port Authority land alongside the Harbour. Features of Danish urban renewal are:

- **Early establishment of a new governance authority - a public-private partnership** to lead and be accountable for delivery of the renewal outcomes. The key to Copenhagen's urban renewal transformation has been a publicly owned corporation called the Copenhagen City and Port Development Corporation, initiated in 2007 by the Lord Mayor of Copenhagen at the time, Jens Kramer Mikkelsen - a commercial development authority with a circular economy whereby all profits fund delivery of the required public infrastructure. There was a strong theme in all renewal discussions - 'if the City wants to get it done, they must create a corporation to execute the idea and deliver the endorsed policy agenda.'
<https://byoghavn.dk/>
<https://nextcity.org/daily/entry/copenhagen-model-regenerating-cities-norhaven>
https://www.brookings.edu/wp-content/uploads/2017/05/csi_20170601_copenhagen_port_paper.pdf
- Actively pursue opportunities for large-scale private sector developers, private sector industry partners, NFP and philanthropic foundations to contribute funding towards delivery of city projects.
- A contemporary interpretation of the 5-storey courtyard garden Copenhagen built form typology.
- A love of balconies as a way to extend the private space of apartments.
- Regional/neighbourhood scale public open spaces for both active and passive recreation.
- 20-25% affordable housing is mandated in all new developments.

- An exemplar mixed-use development is **Krøyers Plads** - a project consisting of 3x3 story housing units with 105 apartments ranging from 79 to 250 m² in size. The ground floor of the three buildings house restaurants, shops and a supermarket. Krøyers Plads' design is a modern, empathetic interpretation of its' context, the maritime history of the adjacent old Copenhagen warehouses informed by 'hyper-democratic' community engagement.

<https://www.archdaily.com/803510/kroyer-square-vilhelm-lauritzen-architects-plus-cobe>



The former Carlsberg brewery land located 10 minutes from City Hall is being redeveloped into a new mixed-use neighbourhood called **Carlsberg Byen, Carlsberg City District**. The renewal is well underway and when fully developed by 2024 will include 600,000sqm with 50% residential, 35% offices/retail and 15% educational institutions, culture and sport facilities. <https://www.carlsbergbyen.dk/erhverv/in-english>



- **Kødbyen, the Meatpacking District** is one of Copenhagen's hipster hot spots. Once fenced off and closed to the public, the precinct has been regenerated whilst retaining the historically listed characteristic white buildings from the 1930's. The mixed use retail and wholesale precinct is now home to artists, galleries, meat industries, creative and gastronomic restaurants.

<https://kodbyen.kk.dk/artikel/copenhagen-meatpacking-district>



- During the C40 Summit there were multiple opportunities to engage with industry leaders. A meeting and site tour with Henriette Vamberg, Partner & Managing Director, **Gehl Architects** was a fantastic opportunity to reconnect, given the long association of Gehl with the City of Melbourne over many decades. Much was discussed, including the rapid population growth forecast for our City and opportunities to continue to leverage the Gehl association with Melbourne, such as the pending opportunity to refresh the 2012 Southbank Structure Plan from 2020/21 onwards.
- A connection was made with **Sidewalk Labs** an Alphabet (Google) not for profit company that imagines, designs, tests and builds urban innovations to help cities meet their biggest challenges. This included a briefing on the work they have undertaken in Toronto. <https://www.sidewalklabs.com/> Key features of the Toronto Master Innovation and Development Plan (MIDP) include:
 1. Construction innovations with the adoption of an emerging building material called “mass timber” – strong, fire-resistant, easier to manufacture and better for the environment.
 2. Building design innovations to accommodate the full range of live-work needs and respond nimbly as those needs change.
 3. An ambitious affordability program with 40% of units below market rate, with 20 per cent consisting of purpose-built rentals to improve long-term affordability.
- At the Australian Embassy we heard a presentation by a Danish company called Suncil, a company focused on solar-driven micro energy outdoor lighting applications. <https://www.suncil.com/>
- The Ingka Group, owner of most IKEA stores, is actively purchasing and developing large land parcels in renewal precincts in Sweden and Denmark, and is looking for like-minded City partners across the world to explore opportunities. The Group recently purchased a site in Kalvebod Brygge, with a proposed development designed by BIG with a rooftop park and two ‘cactus towers’.
<https://www.designboom.com/architecture/big-cactus-towers-copenhagen-bjarke-ingels-group-ikea-denmark-08-08-2017/>
https://www.ikea.com/ms/en_KW/this-is-ikea/ikea-highlights/IKEA-secret-innovation-lab/index.html



- **Philanthropic Support for Public Buildings and Infrastructure**

Copenhagen has numerous contemporary examples of major new public buildings or infrastructure works which have been supported by philanthropy. These include:

- City Library known as the Black Diamond (Mersk)
- Copenhagen Opera House (Mersk)
- New cycling Bridge (Realdania)

Embodied Carbon and Building Materiality

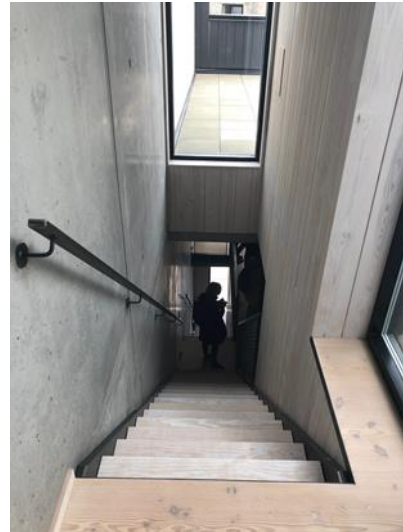
A feature of the Copenhagen building typology is the ever-present use of brick, render and stone with fine grain patterned and hatched brick at both street level and 1st floor level, present in both heritage buildings and new buildings. This is a noticeable difference to the façade building materiality in Melbourne of steel and glass. On many new projects, the brick façade is a skin constructed in a factory off-site (see photo to right).



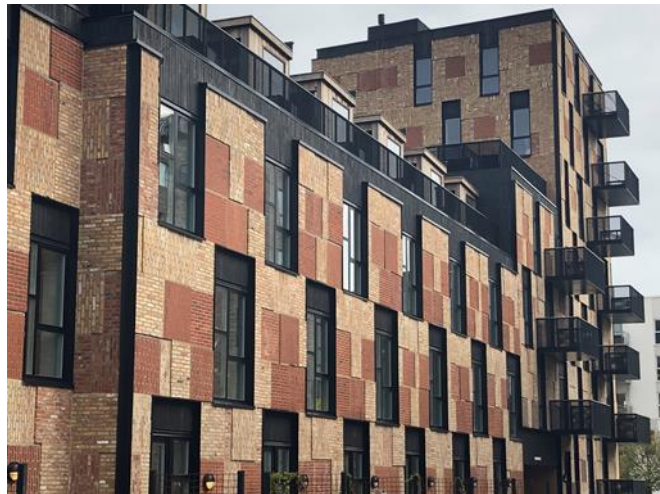
Consideration of the UN Sustainable Development Goals (SDG's) and the importance of embodied carbon in construction of new developments is an active conversation in the Danish property and development community. An informative site visit to the Ørestad neighbourhood was an opportunity to visit three insightful developments (two constructed and one planned) by the Ledenberger Group with a focus on recycled materials.



Upcycle Studios, a development of 12 townhouses seeks to exemplify the Sharing Economy in the physical realm, with upcycled concrete, wood and windows. <https://lendager.com/en/architecture/upcycle-studios-en/>



Recycle Row is a testbed residential development with its first residents moving in September 2019 – the development maximises the use of recycled materials from abandoned buildings, with a goal to reduce their CO2 footprint by up to 70 per cent in the construction phase, since the building materials already have had a life in another context. <https://lendager.com/en/architecture/resource-rows/>





The SDG Eco-Village is the next experimental development currently in the planning phase, a build-to-rent community housing development based on the UN SDG's – with a focus on social inclusion, economic prosperity and environmental stewardship. <https://www.dezeen.com/2018/12/10/un17-village-eco-housing-copenhagen-lendager-group-arstiderne-arkitekter/>

Emissions-Free Construction Sites was discussed by a number of C40 Cities. In 2017 the City of Oslo adopted a policy for fossil free construction sites as minimum criteria in all its public procurement procedures.

<https://www.oslo.kommune.no/politics-and-administration/smart-oslo/projects/zero-emission-construction-sites/#gref>

Passive House Certification is gaining momentum globally and also within Australia.

<https://passivehouseaustralia.org/>

Zero carbon buildings were a strong theme during the C40 Summit, transitioning to a discussion towards zero positive buildings, with a focus on commercial buildings. The opportunity to draw on the knowledge of other C40 Cities was evident for the City of Melbourne to consider an expanded package of incentives.

Key insights were:

- It is critically important that Cities are clear and distinguish between actions for existing buildings and actions for new buildings
- In October 2019 the City of Toronto endorsed the 'Green Will' – a new initiative to bring together commercial landowners, universities, hospitals and the City representing 300 million square feet of space, with a plan setting five-year targets to reduce energy consumption.
- <https://www.cbc.ca/news/canada/toronto/green-will-initiative-1.5305510>
- Deep energy retrofits are becoming increasingly popular – better to retrofit than demolish and rebuild
- Constructing buildings designed to be disassembled
- Green building programs being run in Vancouver, Seattle and Heidelberg deserve further examination as all presented good case studies that would be applicable to Melbourne
- The Berkley Group and Peabody Architects were two companies quoted.
- <https://www.berkeleygroup.co.uk/news-and-insights/news/2019/berkeley-net-zero-carbon>
- <http://greenhaus.wpengine.com/deep-energy-retrofits/>



Urban Design and Greening

Copenhagen has many urban design and city greening principles and programs that deserve further investigation as to their adaptability for Melbourne. Three urban design themes of note:

- **Discrete single lane car parking street** entrances – the impact of car park entry/exit within the streetscape was minimised through materiality and a single lane width entry point so only one car could enter/exit the underground car park at any one time.
- **Active urban design over the waterfront** - two new contemporary buildings front the Harbour, the Royal Library, known as the Black Diamond and the Copenhagen Opera House, funded and gifted to the City by the Danish shipping company, Maersk. Both have been constructed on reclaimed land with public waterfront access.
<http://www5.kb.dk/en/dia/index.html>
<https://arcspace.com/feature/copenhagen-opera-house/>



- **Conversion of streets to green urban parks** – aligned with the City's goal to prioritise road space for bicycles, a number of streets have removed traffic lanes (two lanes to one) and on-street car parking (both sides to one side). The result has been increased width for dedicated bike lanes and new urban parks in the central median.
- It was evident from our visit that the City of Copenhagen would benefit from knowledge sharing of City of Melbourne's multi-decade Urban Forest Strategy with a visible lack of street tree planting, urban canopy shading and greening.



- This poster is an excellent communications example of Nature in the City



- This photo shows the City of Copenhagen's approach to water retention for new street trees in their first year after planting. Three water bags are located per tree, with a water truck refilling bags as required.



Climate Adaptation in response to Flooding

On 2 July 2011, Copenhagen experienced an extreme cloudburst event when 150mm of rain fell in 2 hours, leaving 50,000 homes without heat for a week, 90,000 insurance claims, \$1 billion USD+ in property damage claims, transport delays and production halts.

<https://www.thesourcemagazine.org/copenhagen-unveils-first-city-wide-masterplan-for-cloudburst/>

- The neighbourhood of Østerbro was one of those most affected by the 2011 flooding. In response the neighbourhood is now known as Klimakvarter, the Climate Quarter, a living lab of experimental climate adaptation, water sensitive urban design, data capture and knowledge sharing.

<https://klimakvarter.dk/en/projekt/tasinge-plads/>

<https://www.citylab.com/design/2016/01/copenhagen-parks-ponds-climate-change-community-engagement/426618/>



- Another informative site visit was Langelands Plads in the neighbourhood of Frederiksberg. This square is Denmark's first climate-proof square developed to cover a three-storey underground car park with 207 parking spaces.
- The square's paving is an innovative trial paving system called Lapinus, developed by the Rockflow Group, whereby the paving has a water retention system below that collects and stores the rainfall before subsequently infiltrating the soil then discharging to the sewer system when it has capacity.
- In addition, the stone material binds 10% of toxic nitrogen oxide to improve air quality, and is coated to be self cleaning from sunshine absorption thereby preventing bacteria/moss growing.

<https://www.lapinus.com/applications/water-management/>

<https://dac.dk/en/knowledgebase/architecture/langelands-plads-the-tiles-eat-air-pollution/>

<https://www.dezeen.com/2018/10/02/tredje-natur-anti-flood-klimafislen-climate-tile-installed-copenhagen-street/>



