INCREASE THE CLIMATE RESILIENCE OF YOUR BUILDING FACT SHEET

In the design of new buildings and redevelopment of existing buildings, climate resilience should be considered as part of the decision-making process. Climate resilience can include daylighting, ventilation, thermal comfort and considers not only the building but also the site and surrounds.

The practical measures which can be considered to increase climate resilience are broadly consistent for existing and proposed buildings. There are a few other opportunities that are unique to new developments, including sitting, orientation and form.

When considering increasing the resilience of existing buildings, constraints such as building age, structure, build quality, materials and existing mechanical and electrical systems can have implications in terms of the design, cost and implementation of retrofit measures.

For new developments much of the responsibility for action falls to the project proponent and their design team (e.g. architects, engineers, ESD consultants). Measures can often be integrated at low or no cost if they are considered from the outset. Once a building is operational, actions to maintain resilience fall to the asset or facilities manager.

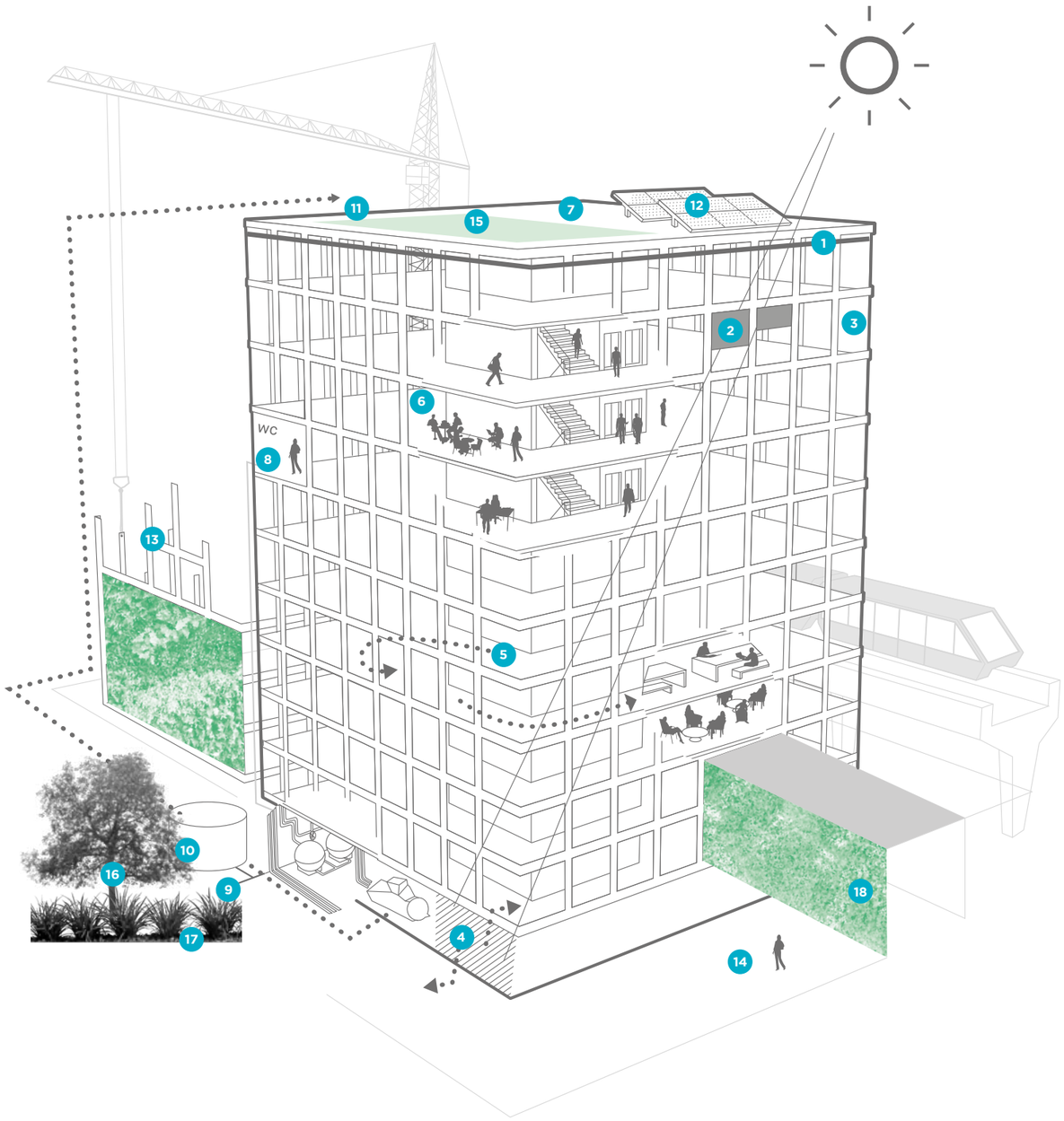
Early consideration of climate hazards and potential responses can reduce risk for building owners and does not necessarily need to add cost to projects. In the City of Melbourne, the focus should be on reducing future overheating and mitigating impacts from potential flood and drought.

This fact sheet provides practical steps you can take to increase the climate resilience of your building.

CITY OF MELBOURNE

WHAT SHOULD I DO?

There are a number of practical actions that can be taken to increase climate resilience in new and existing buildings. These are grouped below under heat, water and holistic adaptation benefits.



HEAT

These measures can reduce heat in buildings. They can be further categorised into passive solar design, resource efficiency and materials selection.

1. **Fixed external shading –** Permanent building fixtures that are either solid or translucent blade / fin systems and can provide total shading or direct solar radiation.
2. **Blinds –** Shading devices that can be adjusted and are either solid or translucent. Blinds can provide total shading of direct and diffuse solar radiation.
3. **High performance (solar control) glazing –** Can provide partial shading of direct and diffuse solar radiation, although will impact on daylight levels.
4. **Utilise thermal mass –** Thermal mass is the ability of the mass of a building to store heat, providing "inertia" against temperature fluctuations. It needs to work in tandem with the building ventilation system to allow night 'coolth' to be stored for release during the day. Some renewable energy solutions take advantage of inter-seasonal air and ground temperature differences to provide cooling of ventilation air.
5. **Ventilation strategy –** Buildings can be ventilated naturally, mechanically or using a hybrid approach. Ventilation approach is often vital to support other actions to reduce overheating in buildings.
6. **Reducing internal heat gains -** Internal heat gains come from people and from electrical equipment (e.g. computers). Switch off electrical devices when not in use to reduce internal temperatures.
7. **Cool roofs -** A cool roof reflects the sun's heat and emits absorbed radiation back into the atmosphere at a higher rate than standard materials, keeping a building cooler and at a more constant temperature. For further information, see cool roofs information on the City of Melbourne website.

WATER

These measures can reduce water use and flood risk in buildings.

8. **Water efficient fittings -** Using water efficient fixtures, fittings and appliances reduces water use and dependency on water infrastructure.
9. **Water recovery -** Incorporating storm / rainwater harvesting and grey water recycling reduces water use and dependency on water infrastructure.
10. **On site water storage –** Both grey and rainwater harvesting systems (as above) require the installation of water storage tanks on site.
11. **Flood risk assessment and preventative measures –** Flood risk assessments can help identify the need for preventative measures such as placing essential services on higher floors in new buildings or lifting electrical plug circuits in an existing building retrofit.

HOLISTIC

These measures can deliver benefit in response to multiple climate hazards.

12. **Decentralised and renewable energy –** Onsite energy generation such as combined heating, cooling and power and solar can provide energy resilience but also support emissions reduction. For further information see the City of Melbourne website.
13. **Durable materials -** Specify sealants and finishes that are able to withstand extreme heat, rain and storms to reduce costs for repair and maintenance.
14. **Hard landscaping and surface treatments -** Albedo is the ratio of radiation reflected by a surface. Low albedo surfaces readily absorb insolation while high albedo surfaces reflect it. Soil albedo varies depending on the moisture content, surface roughness and colour. Identifying and installing appropriate landscaping and surface treatments can decrease heat, flood and drought impacts.
15. **Green roofs and walls -** Introducing vegetation offers a cooling benefit through shading and a process known as evapo-transpiration. Green walls, roofs and external planting can reduce the urban heat island effect as well as local temperatures, and help to reduce stormwater runoff.
16. **Planting trees -** Plants and trees intercept solar radiation before it reaches the ground, providing shading and helping to reduce external surface temperature of roofs, walls and paths. The benefits vary considerably depending on the tree species and condition. For further information see the Urban Forest page on the City of Melbourne website.
17. **Water Sensitive Urban Design (WSUD) –** Aims to more closely mimic natural processes by reducing run-off and increasing infiltration in to the ground. Consideration should be given to attenuating rainfall. This can be done using swales, permeable paving (porous sub-base), rainwater tanks or rain gardens. For further information see the WSUD Guidelines on the City of Melbourne website.
18. **Transitional spaces –** Transitional spaces are the space where inside meets the outside. Clever use of pergolas, planting and porches can help to temper ventilation air before it enters a building and also provide external shading.

WHY ACT?

Our built assets are worth protecting

The City of Melbourne municipality is comprised of buildings used for a range of purposes including commercial, residential, retail, industrial, accommodation, education and leisure. The municipality contains around 3,000,000 m2 (NLA) of commercial floor space and around 42,000 dwellings. The number of homes almost doubled between 2001 and 2014.

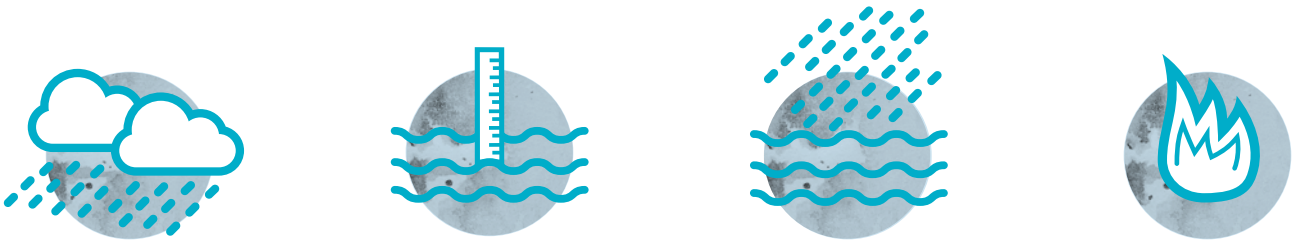
Climate resilience is important for existing building stock and also for proposed development. Buildings built now are expected to have a typical lifespan of 50 years or more.

Climate change adaptation is the principal way to deal with the impacts of climate change. It can help to manage risks, adjust economic activity and reduce vulnerability. For building owners and managers it can also improve long term business certainty.

We understand the climate hazards

Australia's climate is changing. The City of Melbourne has identified four priority climate change impacts relevant for the municipality. These are extreme heat, drought and water scarcity, sea level rise, and extreme storm and flash flood. Climate change projections show that the occurrence of these events will increase, as well as the intensity.

Climate change directly impacts Melbourne and Victoria



Reduced Rainfall | Sea Level Rise | Flooding | Extreme Heat

Currently

From 1996 to 2007, Victoria experienced rainfall

14%

below average.

Every year since 1993, there has been an average sea level rise in areas near Melbourne of up to

2.8MM

Flood risks exist in precincts near the Yarra and Maribyrnong rivers and Moonee Ponds Creek including Docklands, Southbank and Fishermens Bend. This is due to high tides and extreme rainfall events.

On average we experience

9 VERY HOT DAYS

in Melbourne (temperature exceeds 35°C)

And in the future

By 2070, annual average rainfall is expected to decrease by

11%

but come in more intense bursts.

By 2070, the sea level along Victoria's coast is expected to increase by

26-59CM

Increased likelihood and

SEVERITY

of floods and events such as storm surges in Melbourne.

By 2070, we expect to experience

26 VERY HOT DAYS

in Melbourne and increased frequency of heat waves (five or more consecutive days of temperatures exceeding 35°C)

FURTHER INFORMATION

Contact

melbourne.vic.gov.au/sustainability
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