GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

Singapore's Heat Resilience Approach & Beat the Heat Study Tour

10:00-10:30

UN environment programme | Cool Coalition, a UNEP-convened initiative

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Petrina Leo

Deputy Director, Climate Adaptation and Heat Resilience Policy Office, Energy and Climate Policy Division
Ministry for Sustainability and Environment

Singapore's Heat Resilience Efforts

Heat Resilience Policy Office
Energy and Climate Policy Division
Ministry of Sustainability and the Environment

15 September 2026

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UN environment programme | Cool Coalition a UNEP-convened initiative

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Context

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Climate trends in Southeast Asia and Singapore

- Asia is warming nearly twice as fast as the global average
- Southeast Asia (SEA) is among the most climate-vulnerable regions in the world
- Heat is a pressing issue that will disproportionately impact SEA and Singapore. This is even if our populations are used to the tropical climate and should have a level of heat acclimatisation

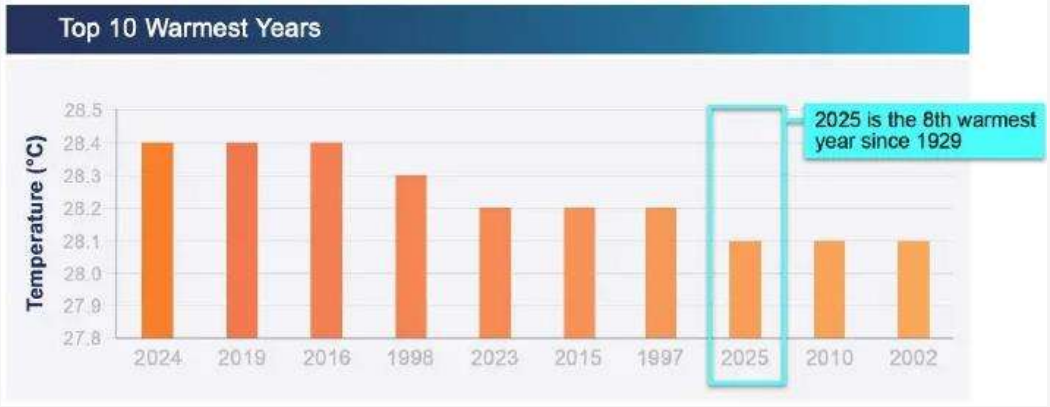
Sources

World Meteorological Organization. (2025, June 23). *State of the Climate in Asia 2024.* State of the Climate in Asia 2024

Climate Tracker Asia Team. (2024, December 3). *Observed climate trends in Southeast Asia*. Climate Tracker Asia. https://climatetracker.asia/observed-climate-trends-in-southeast-asia/

Singapore's temperatures are rising, and effects are expected to intensify due to climate change

In the past decade, Singapore has faced record temperatures



The ten warmest years on record at the Changi climate station since temperature records began in 1929.

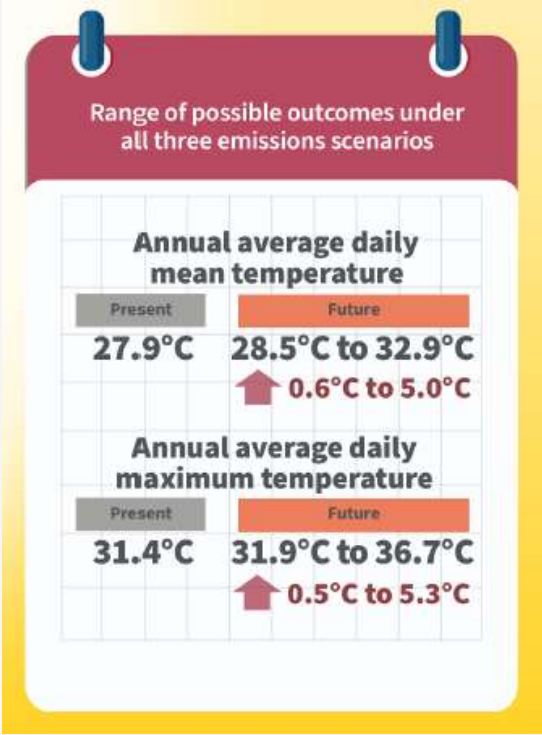
Note: 2024 was the warmest year on record for Singapore, tied with 2019 and 2016 (with average temperature of 28.4℃ recorded at the Changi climate station).

By end-century, very hot days and warm nights will be the new normal in Singapore

Number of **high heat stress days** will increase to between 54 and 326 days per year.

Number of **very hot days** will increase to between 41 and 351 days per year.

Annual number of **warm nights** are projected to increase from 76 nights per year to most nights.



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The effects of extreme heat are becoming more real and are hitting closer to home

‘Staggering’ number of workers facing climate change-induced health hazards: UN

Workers who carry out he
exposed to a “cocktail of
REUTERS

30 died from heatstroke in Thailand so far in 2024 as South-east Asia bakes

Temperatures in the concrete sprawl of the Thai capital hit 40.1 deg C on April 24. PHOTO: EPA-EFE

Singapore

2024 was Singapore's joint-warmest year on record; temperature highs in April, July and December

Two wom
Singapore

2025 a year of weather extremes for S’pore, with hottest June and November on record logged: Report

Sign up now: Get ST’s newsletters delivered to your inbox

Singapore experienced 29 days of high heat stress in 2025, up from 21 days in 2024.
ST PHOTO: LIM YAOHUI

‘Heat stress is a silent killer’: How heat can affect mental health in workers

In th
from
well

5 ways hotter weather will affect Singapore – and what you can do to cope

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Being exposed to extreme heat can be detrimental to one’s physical health, with vulnerable groups being more susceptible to heat illnesses.
ST ILLUSTRATION: NG WENG CHI

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If we do not take steps to adapt, rising temperatures could impact public health, society, economy and infrastructure

Public Health

- Increased risk of heat stress and heat-related illnesses
- Increased risk of diseases e.g. food-borne, insect-borne, transmitted through animal hosts

Society

- Heightened risks (e.g. to health, wellbeing and finances) to vulnerable groups, such as the young and old, persons with disabilities, and lower-income households
- Weaker social cohesion if people stay indoors and avoid activities in outdoor/public spaces
- Disruptions to outdoor leisure activities

Economy

- Poorer health and productivity amongst workers
- Disruption to businesses' operations (e.g. more stop-work orders, or more cooling needs)

Infrastructure

- Potential damage to infrastructure, equipment, and assets

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Heat Resilience Approach

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Singapore's heat resilience issues are coordinated through the Inter-Ministerial Committee on Climate Change (IMCCC)

- The IMCCC is supported by an Executive Committee (**IMCCC EXCO**), comprising the Permanent Secretaries of the respective Ministries
- The IMCCC EXCO oversees various working groups including the **Resilience Working Group (RWG)** co-chaired by the Permanent Secretaries of the Ministry of Sustainability and the Environment and the Ministry of National Development
- Heat resilience issues are discussed and tabled through the Heat Resilience Working Group to IMCCC

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Singapore's heat resilience strategy is a Whole-of-Government approach, with three key pillars

Design effective cooling strategies and scale them up

- Employ a suite of cooling strategies in the built environment

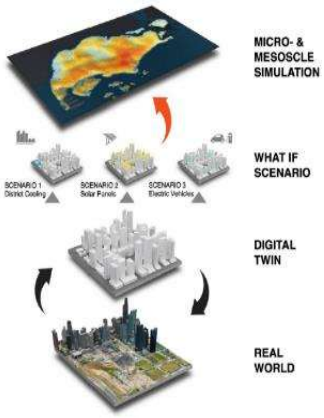
External Environment

Building and Facade

Indoor Spaces

Deepen understanding of the science on the effect of heat in Singapore

- Better understand climate change projections through the Third National Climate Change Study (V3)
- Enhance sensor network for more granular heat monitoring
- Carry out modelling efforts (e.g., Cooling Singapore 2.0 project)



Source: Cooling Singapore 2.0

Strengthen community resilience to heat

- Prepare Singapore for more frequent and intense heat events
  - Launched Heat Stress Advisory in Jul 2023 to better guide members of the public for prolonged outdoor activities
  - Reviewed sector-specific guidelines (e.g. outdoor workers)

Singapore's Heat Resilience Policy Office was also set up this year to drive heat resilience efforts across the Whole-of-Government

The Heat Resilience Policy Office's work spans three key pillars:

Coordinate Action	Oversee Research	International Engagement
• Drive the development of a comprehensive Heat Resilience Action Plan to coordinate efforts across the built environment, public health, economic and social sectors • Work with government agencies to engage businesses and communities	• Oversee research and technology efforts for heat resilience across Government • Build capabilities and deepen our understanding of heat resilience • Ensure measures under the Heat Resilience Action Plan are backed by science	• Lead Singapore's international engagements and collaborations on heat resilience in a coordinated and strategic manner

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Design and scale effective cooling strategies

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External Environment: Climate-sensitive urban planning & design

Street & Building Alignment

Explore urban breezeway patterns to optimise the arrangement of street and corridor networks.

Varying Building Heights

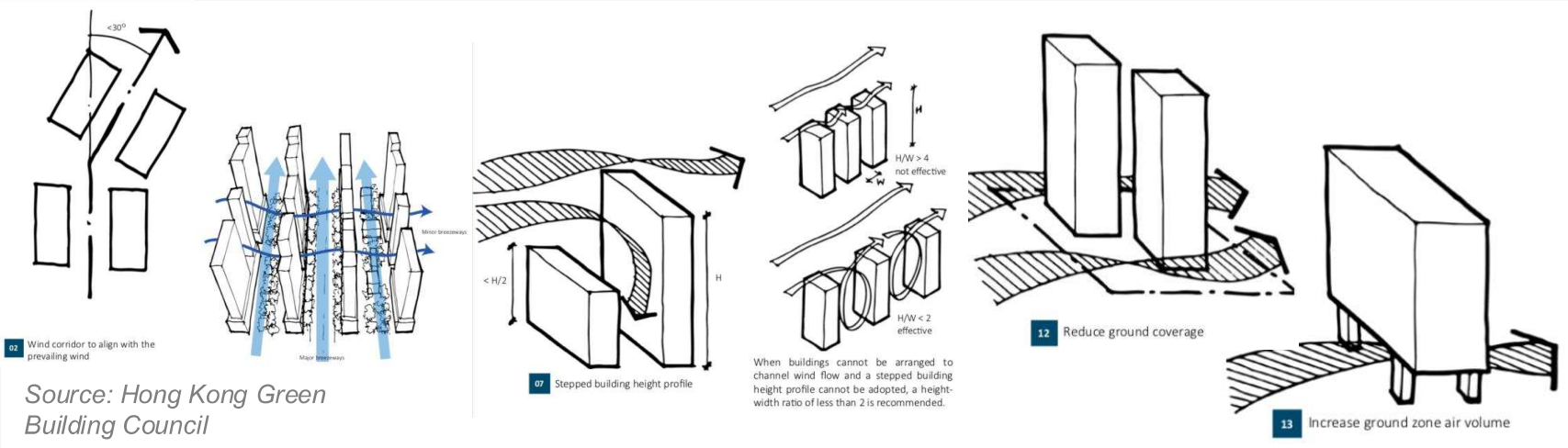
Improve wind capture by varying building heights.

Site Coverage & Building Spacing

Site coverage controls to ensure provision of open spaces / green buffers, to allow for natural ventilation of pedestrian spaces and integration of greenery into developments.

Building Form & Permeability

Increasing building permeability encourages air flow through and around the buildings.



Source: Hong Kong Green Building Council

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External Environment: Microscale Environmental Modelling for Urban Design

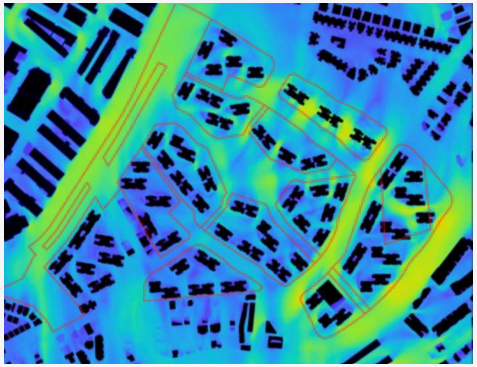
Case Study: Wind Flow Studies in Lentor Hills Estate

Location of Lentor Hills Estate

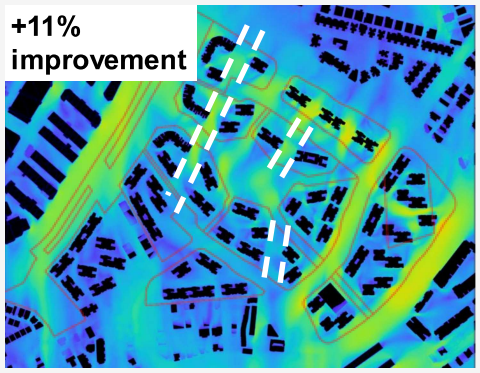
- Located in North East region near the Central Catchment Nature Reserve
- ~30ha greenfield precinct surrounded by existing residential estates

Iterative Environmental Modelling & Urban Design Process

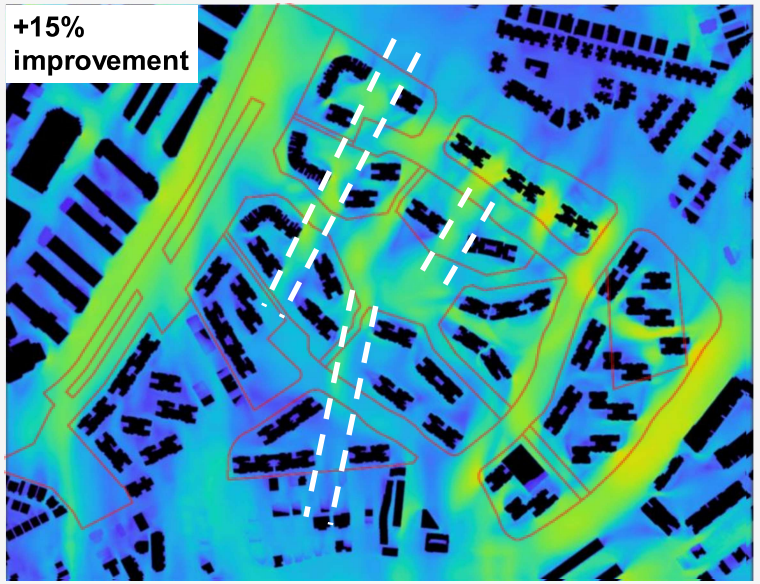
BASELINE



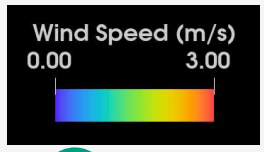
WITH WIND CORRIDORS



REVISED WIND CORRIDORS DUE TO NEW DEVELOPMENT PROPOSAL



30 metre wide no-built zone



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External Environment: Greenery integration and intensification to reduce urban heat absorption

Example 1. Roadside Streetscapes

Under the City in Nature pillar of the Singapore Green Plan 2030, we are on track to plant one million more trees by 2030 in support of our **OneMillionTrees movement** and to develop 300km of **Nature Ways** by 2030**.**

Source: NParks


Sky Terrace@Dawson


Oasia Hotel Downtown


Khoo Teck Puat Hospital


Lee Kong Chian Natural History Museum


Tree House


Westgate

Example 2. Vertical Greenery

Skyrise greenery has been mandated and/or encouraged in buildings via **URA's Landscaping for Urban Spaces and High-Rises (LUSH) scheme** since 2009. LUSH has played a key role in the introduction of more than 440ha of greenery within new developments.

NParks' Skyrise Greenery Incentive Scheme (SGIS) offers financial support for the installation of rooftop and vertical greenery on existing buildings.

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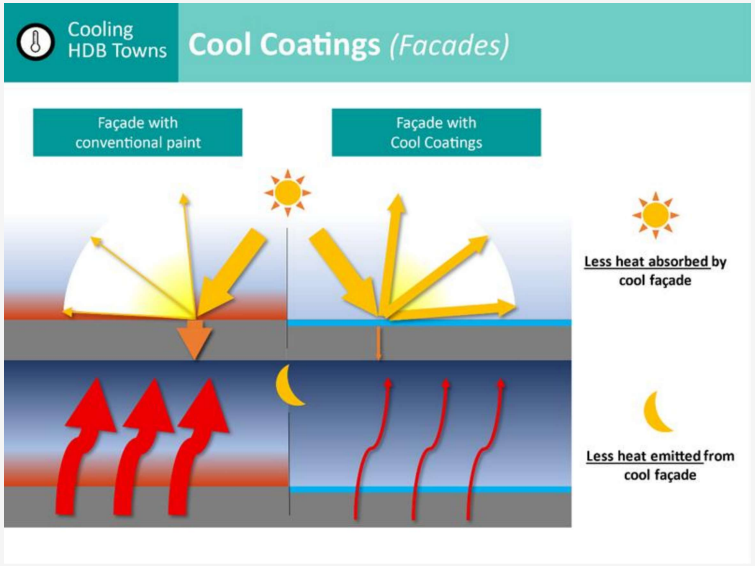
Building and Façade: Leveraging technology and innovations to reduce urban heat absorption and emission

Cool Coatings

Cool coatings absorb less heat in the day and so emit less heat into the surroundings at night, compared to conventional materials, e.g. paint.



Source: HDB

District Cooling Systems

District-level measures to green the building sector will enable even greater energy efficiency improvements. District Cooling Systems also help to reduce the waste heat generated from air-conditioning.

Source: NCCS

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Indoor Spaces: Promoting energy-efficient indoor cooling

Natural ventilation

Non-air conditioned spaces are required to comply with a minimum natural ventilation requirement to maximise wind flow, as part of our Building Control regulations.

Building designs that promote natural ventilation beyond the minimum requirements are encouraged under BCA's Green Mark Scheme.

Energy Efficient Cooling Systems

For the public sector, the GreenGov initiative encourages government buildings to retrofit and optimise their cooling systems for energy efficiency.

For the private sector, Green Mark Incentive Scheme for Existing Buildings 2.0 supports building owners to install energy efficient alternative cooling technologies through lowering upfront capital costs.

For households, NEA's Mandatory Energy Labelling Scheme (MELS) and Minimum Energy Performance Standards promotes the adoption of more energy efficient appliance

Cooling Practices

Under the recent Go 25 initiative, launched by MSE and the Singapore Green Building Council, buildings and residents are encouraged to set their indoor air conditioning temperatures to 25°Celsius in support of sustainable cooling to reduce emissions and waste heat.

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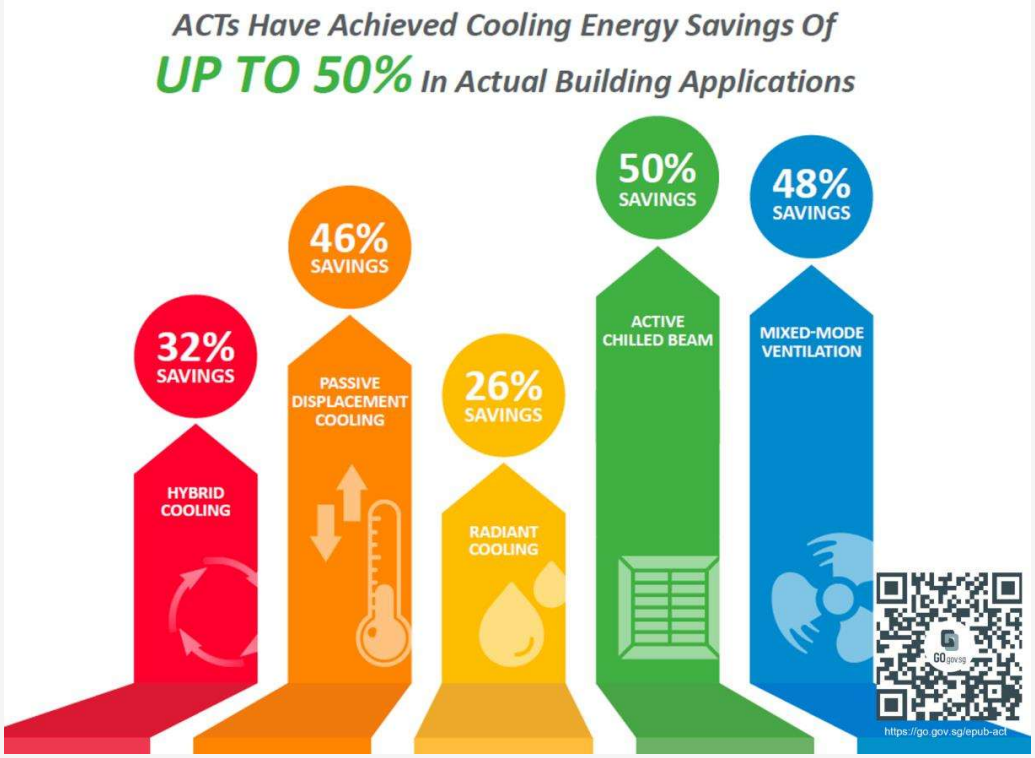
Indoor Spaces: Advancing the adoption of Alternative Cooling Technologies

Alternative Cooling Technologies (ACTs)

- ACTs cool indoor spaces using less electricity under the same thermal conditions
- They **improve building energy efficiency** and lower the environmental impact of active cooling compared to conventional air-conditioning systems



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Deepen understanding of the science on the effect of heat in Singapore

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Using Wet Bulb Globe Temperature (WBGT) as a common heat index

- WBGT is an internationally recognised heat indicator, e.g. for heat stress. We have used it for the Heat Stress Advisory.

- WBGT takes into account the combined effects of:
  - **Air temperature**
  - **Humidity**
  - **Wind speed**
  - **Solar radiation**

- We are expanding our network of WBGT sensors to provide the public with more location-specific heat stress information.

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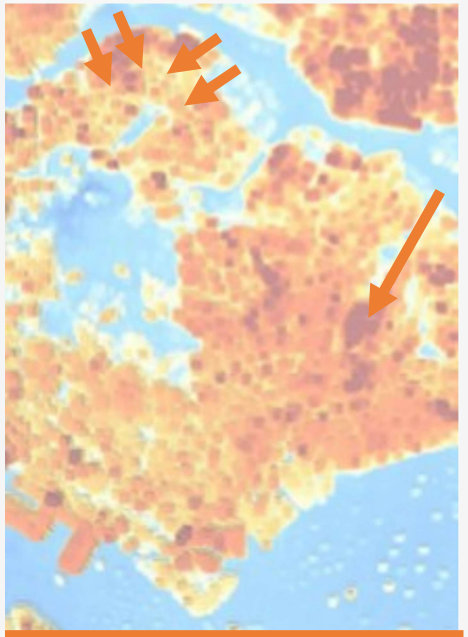
Leveraging Urban Simulation Platforms to inform Policy & Planning

WHAT-IF SCENARIOS

Comprehensively assess the efficacy of cooling strategies



Define temperature hotspots for targeted interventions

Plan for urban density and urban geometry to minimise the UHI effect

Calibrate urban plans against future heat scenarios

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Strengthen community resilience to heat

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Singapore's heatwave definition

- A heatwave is declared when:
  - The **daily maximum temperature averaged** across all weather stations is **at least 35°C for three consecutive days**, and
  - The **average daily mean temperature** throughout the period is **at least 29°C**.

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Singapore's national heatwave response plan

- **Established an inter-agency taskforce** to coordinate inter-agency action plans and public communications during heatwave episodes.
- If the Meteorological Service Singapore (MSS) forecasts a high likelihood of a heatwave, a **joint advisory** will be issued and will remain in place until high temperatures are not expected to persist.
- Agencies will implement **measures to manage heat stress** based on the dynamic heat stress levels on the ground, **including sector-specific measures** if a heatwave is impending.
- **Cooling centres will be opened islandwide at community facilities** so that members of the public can seek respite from the heat.

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The Heat Stress Advisory helps the general population make more informed decisions on undertaking prolonged outdoor activities

- The Heat Stress Advisory was launched in July 2023.
- It consists of **three** heat stress levels based on WBGT bands.
- 3 “A” framework informs users to manage **Activity**, take **Action** and adjust their **Attire**.

Managing Heat Stress

Heat stress occurs when our body is not able to cool itself sufficiently, and excess heat builds up, which may cause damage to the body. Warmer or more humid weather could lead to an increased risk of heat stress and related illnesses, such as heat cramps, heat exhaustion and heat stroke.

Heat Stress Advisory for General Population For Prolonged Outdoor Activities

LOW HEAT STRESS WBGT(°C) < 31	MODERATE HEAT STRESS 31 ≤ WBGT(°C) < 33	HIGH HEAT STRESS WBGT(°C) ≥ 33
Activity: • Continue normal activities	**Activity:** • Reduce outdoor activities • Take regular breaks (indoors/ under shade)	**Activity:** • Minimise outdoor activities; stay under shade where possible • Take more frequent and/or longer breaks (indoors/under shade)
Action: • Hydrate normally	**Action:** • Drink more fluids • Monitor body for signs and symptoms of heat-related illness	**Action:** • Drink more fluids • Monitor body for signs and symptoms of heat-related illness • Cool actively during breaks (e.g. sponging, pouring water over arms and legs)
Attire: • Wear normal attire	**Attire:** • Avoid multiple layers of clothing • Use an umbrella or wear a hat	**Attire:** • Avoid multiple layers of clothing • Use an umbrella or wear a hat • Wear lightweight and light-coloured clothing with thin and absorbent material

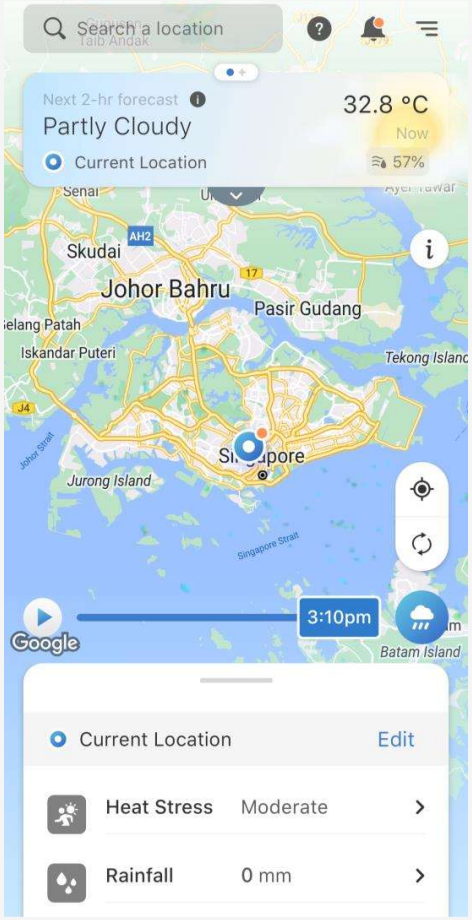
The Wet Bulb Globe Temperature (WBGT) provides an indication of heat stress by taking into account the combined effects of:

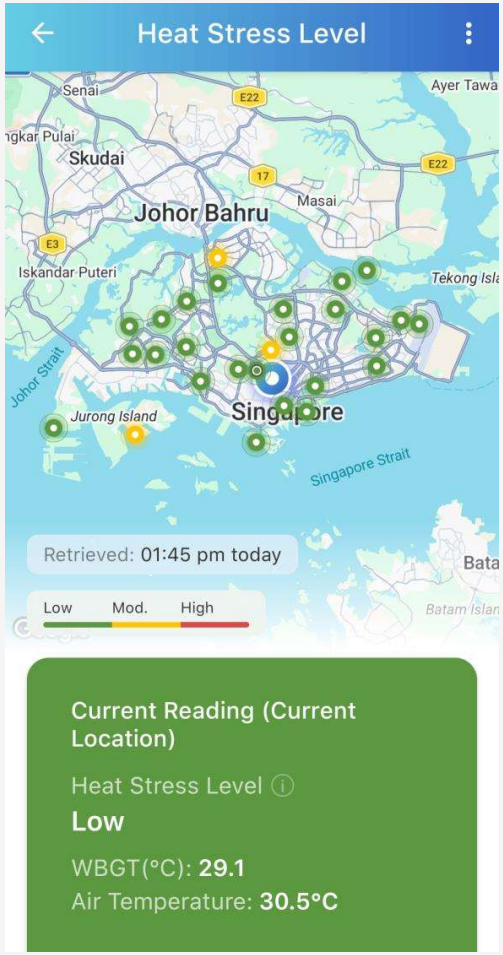
Air temperature | Humidity | Wind speed | Solar radiation

The Heat Stress Advisory is easily accessible through the myENV application

- The myENV app is the main weather and environment app (includes information on rainfall, PSI).
  - Focus on the prevailing **heat stress level** at first glance.
  - **Detailed heat stress level information**; colour-coded.

- Users can opt for **notifications of moderate / high heat stress levels at their selected location**.





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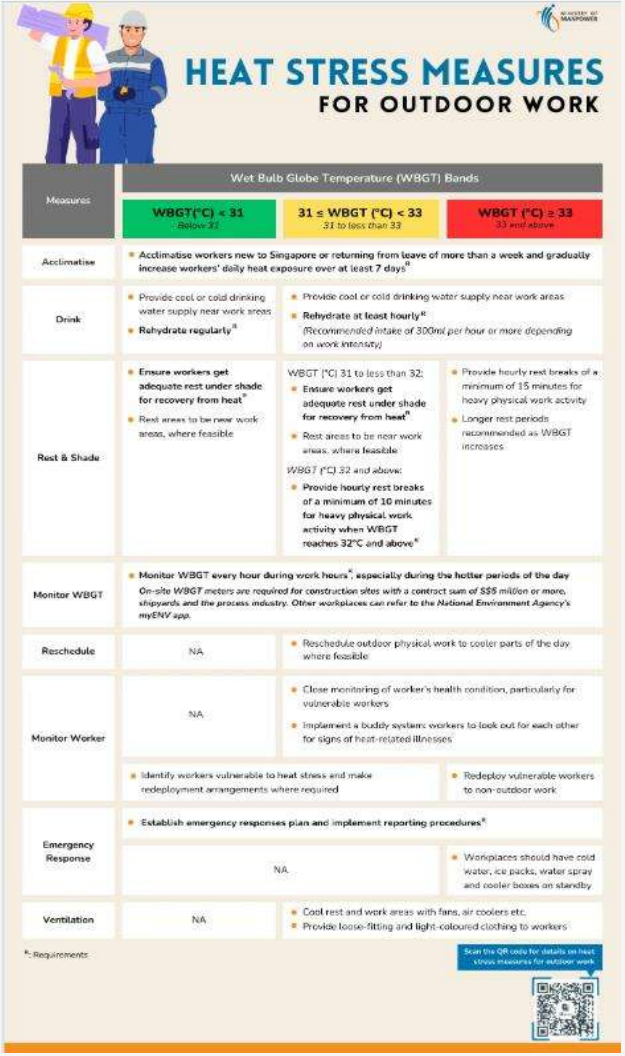
The Heat Stress Advisory is complemented by sector-specific guidelines

- For example, **MOM's Heat Stress Measures for Outdoor Workers**:
  - Employers are to implement the required heat stress measures based on WBGT bands focusing on the four aspects of Acclimatise, Drink, Rest, and Shade.
- **Schools may exercise flexibility in students' attire** to allow them to better manage the heat (e.g. Physical Education attire).
- **Groups that are more vulnerable* to heat stress** to exercise caution and regularly monitor heat stress levels.



**Vulnerable groups include elderly, children and infants, people who are ill or recently recovered, or have chronic conditions, pregnant women, and recent travellers from cooler climates*

As temperatures rise, we are enhancing efforts to holistically address impacts of heat

- Develop a **Heat Resilience Action Plan** that will identify priority areas and develop measures to address them across the **built environment, public health, economic and social sectors.**

- Work with agencies across government to think of the **next bound of moves**. This includes:
  - Studying and protecting those who are more vulnerable to heat, and those who are more exposed to heat
  - Better understanding how heat affects us all
  - Developing tailored guidelines and solutions to help everyone thrive in a warming world.

- Launch a **Heat Resilience R&D Programme** to advance capabilities and investments in heat resilience research. This includes a S$40 million “Adapting to Heat Impacts” Funding Initiative which will step up research in emerging areas such as heat impact and community heat resilience.

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Singapore Study Trip

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The Singapore Study Trip component on Days 1 and 2 will facilitate peer learning across cities, countries and partners, drawing on Singapore's experience

Day 1

1. **Expert Panel Discussion** on evidence-based decision making for extreme heat and sustainable cooling
2. **Regional Country and Partner Dialogues** to localise efforts
3. **Beat the Heat Training** on planning and integration into policy frameworks
4. **Site Visits**

Day 2

1. **Implementation Roundtables** on efficient, climate-friendly cooling appliances, national and multi-level cooling action, scaling passive cooling in buildings, and sustainable cooling, clean energy, and demand flexibility
2. **Beat the Heat Training** on implementing nature-based and passive cooling solutions and financing
3. **Site Visits**

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The Site Visits will show a range of Singapore's examples of heat resilience

Heat Resilience & Performance Centre

- Future Climate Condition Experience
- Cooling Modalities
- Research Tools and Technology
- Cooling Solutions for Worker Dormitories

BCA Braddell Campus

- Zero Energy Building (offset energy consumption with energy generated from PV panels)
- ZEB Plus (positive energy building, an "Office of the Future")

Punggol Digital District

- Hawker Centre (CFD modelled)
- Collaboration Loop (incorporation of Greenery)
- Digital Canyon and Nexus (naturally ventilated spaces)

Sentosa

- Resort World Sentosa WEAVE
- Cool Node at Central Beach Bazaar and Microforest

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Please take note of the following administrative details

- Site visits are on a **sign-up basis**.
  - Existing sign-ups have been reflected by the stickers at the back of your Assembly Badge.
  - Please approach us if you have not signed-up but are interested.

- Participants will be **split into groups** for management of manpower flow.
  - Check the number on the stickers for your group number, and please follow your group closely.

- Transport to the hotel is only provided after the end of the site visits.

- For **Heat Resilience Performance Centre**, extra security will be applied:
  - Please bring your photo identification for entry into the building.
  - Participants will be escorted, as the environmental chamber is located within a classified environment.
  - Handphones and other image-capturing devices are strictly prohibited at the environmental chamber. These devices will be left at the secured location on a different floor of the building before proceeding. A check will be done before proceeding to the environmental chamber.

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Thank you

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