

News analysis

# Finding the best way forward in tackling climate change

## Mitigation efforts can be sharpened with local context and socio-economic data



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A warmer climate and its consequences of more extreme weather by the end of 2100 was predicted for Singapore in the third national climate change study released on Jan 5.

The Centre for Climate Research Singapore (CCRS) and the National Supercomputing Centre (NSCC) ran climate data through supercomputers to generate simulations for 3½ years that painted scenarios of Singapore's climate in the long term.

However, to prevent higher temperatures, heavier rainfalls, stronger winds, and longer and more frequent dry spells locally, Singapore will need the help of the world to collectively reach the goal of net-zero carbon emissions.

This is because the Republic produces only about 0.1 per cent of total emissions globally, making it difficult to lower global warming even if Singapore reaches net-zero emissions by 2050, which it aims to achieve by stopping greenhouse gas emissions into the atmosphere.

Residual emissions from hard-to-abate sectors can be cancelled out by buying carbon offsets or using carbon capture technology.

But even so, Singapore can play an important part in the global effort – by influencing change and encouraging improvements – and also concurrently implement adaptations.

Singapore is already importing renewable energy, encouraging the adoption of electric vehicles (EVs) and imposing carbon taxes to reduce the reliance on burning fossil fuel for energy – the main culprit of global warming.

But the Republic will need to count on global efforts, particularly from large emitters like China, the United States and European Union nations, to move the needle on mitigating climate change. For Singapore, perhaps the most important facet of the 28th Conference of the Parties (COP28) hosted in Dubai in

December was speaking with world leaders there.

Minister for Sustainability and the Environment Grace Fu, who had co-facilitated talks on mitigation at COP28, said at the launch of the third climate change report that global efforts are currently insufficient to limit world temperature rise to 1.5 deg C, the goal of the Paris Agreement in 2015.

Professor Benjamin Horton, director of the Earth Observatory of Singapore at Nanyang Technological University, agreed, telling The Straits Times that the world will likely be warmer by 2.7 deg C by the end of the century "if we follow current policy settings".

Singapore, however, has been doing its part, to steer global efforts away from further global warming.

Ms Fang Eu-Lin, sustainability and climate change leader at PwC Singapore, who attended COP28, said: "Singapore's involvement in the COP28 negotiations and its outcomes allows us to facilitate and appreciate the nuances of transition pathways."

The collective decision reached at COP28 to transition away from fossil fuels will need to be acted on.

"Developing countries, which are not as advanced in their transition, may have concerns around jobs and livelihoods," said Ms Fang.

Setting examples to transition away from fossil fuels is another way Singapore can influence the global community.

Another COP28 attendee, Assistant Professor Simon Schillebeeckx from Singapore Management University's business school, said that for Singapore, "our goal is to demonstrate that high development and high well-being are possible at a fraction of our current footprint".

"Our part to mitigate emissions should be significantly bigger than our footprint, simply because we are a much more affluent nation and benefit enormously from importing embedded carbon," he said.

While the world gets its act together to reduce global warming, Singapore is making moves to ensure that the country can adapt to climate change.

The latest climate change study echoes findings from the last two studies that started in 2007, with updated forecasts on how weather elements would change by 2100,



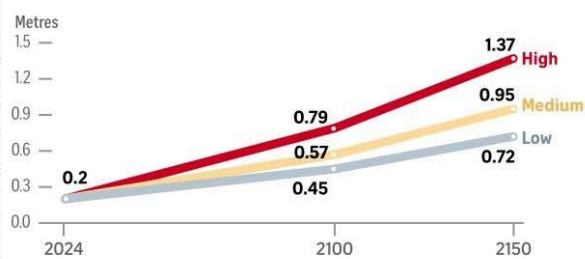
Temperatures in Singapore have already hit record highs. The hottest day in 2023 – May 13, which saw 37 deg C in Ang Mo Kio – equalled the record mark for the highest daily maximum temperature, logged in 1983. ST PHOTO: AZMI ATHNI

## How hot Singapore might be in 2100

A national climate change study has projected higher temperatures for Singapore, categorising the change in weather elements according to three emission scenarios: low, medium and high. These levels indicate the concentration of greenhouse gas in the atmosphere.

|   | Present | EMISSION SCENARIO |              |              |
|---|---------|-------------------|--------------|--------------|
|   |         | Low               | Medium       | High         |
| Annual mean daily temperature (deg C)   | 27.9    | 28.5 to 29.5      | 29.3 to 30.7 | 30.7 to 32.9 |
| Annual mean maximum daily temperature (deg C)                                   | 31.4    | 31.9 to 33.1      | 32.8 to 34.4 | 34.3 to 36.7 |
| Number of hot days in a year with daily maximum temperatures exceeding 35 deg C | 21      | 41 to 125         | 103 to 261   | 252 to 351   |
| Number of warm nights in a year with temperatures of at least 26.3 deg C        | 76      | 312 to 361        | 360 to 365   | 365          |

## Projections of average relative\* sea-level rise in Singapore in 2100 and 2150



\*NOTE: Averaged over six locations in Singapore.

Source: CENTRE FOR CLIMATE RESEARCH SINGAPORE STRAITS TIMES GRAPHICS

allowing policymakers to better plan for adaptation measures.

In the worst-case scenario, the report estimates that as global warming melts glacier ice sheets, mean sea levels will rise by more than 1m by the end of 2100, and 2m by 2150.

One clear example of Singapore's adaptation measures – in this instance, implementing coastal protection – is the Long Island plan for the East Coast area. Engineering and technical studies have been initiated to explore the feasibility of reclaiming three tracts of land spanning about 800ha – twice the size of Marina Bay – off East Coast Park in the coming decades.

Singapore's climate change study was based on three of five Shared Socio-economic Pathways, or SSPs, from the sixth Intergovernmental Panel on Climate Change report released in 2021.

SSPs are the result of complex calculations based on global factors like future population growth, education, urbanisation, gross domestic product and technology to determine the amount of greenhouse gas emissions that would end up in the atmosphere.

These quantifiable SSPs help decision-makers develop more accurate climate model projections, and consequently determine key policies.

Unlike forecasts on the impact of global warming on Singapore's climate, the study did not specify projections on Singapore's socio-economic factors in the long

term.

Assistant Professor Zhu Wenjun from the Nanyang Business School at Nanyang Technological University noted that the study indicates "profound" impacts on business.

"Research indicates that higher temperatures can significantly impair human productivity, leading to reduced incomes. Global agricultural production will be disrupted, potentially affecting food prices and security," she said.

The National University of Singapore's chief sustainability scientist Koh Lian Pin said that quantifying mitigation benefits can help project the societal impact of climate change. In other words, how these findings can be taken to the next step and connect actions with the CCRS projections.

"For example, is it enough to fully phase in EVs by 2040, or is it too late? Maybe if we phase in EVs by 2030, we would have a bigger beneficial effect in terms of reducing temperatures, or reducing the risk of sea-level rise," said Professor Koh.

Mr Brian Ho, sustainability climate leader at Deloitte South-east Asia, said: "Singapore's current focus is more on adaptation, with significant investments directed towards adaptation measures rather than emissions reduction. This approach might need to shift towards more proactive mitigation measures."

There is little doubt that the planet continues to get warmer.

Temperatures in Singapore have already hit record highs. The hottest day in 2023 – May 13, which saw 37 deg C in Ang Mo Kio – equalled the record mark for the highest daily maximum temperature, which was logged in Tengah on April 17, 1983.

Singapore's experience follows global trends. The World Meteorological Organisation confirmed that 2023 was the world's hottest year, at 1.35 deg C above the pre-industrial average, while 2022 was the sixth warmest.

Adaptation measures must be planned for and implemented to ensure Singapore's survivability in a warmer future. But just as science and technology have utilised data for adaptation, data must also be channelled to stem the tide of climate change in the present.

As both Prof Koh and Deloitte's Mr Ho have noted, mitigation measures cannot be ignored, and instead must be sharpened with local context and socio-economic data, for more effective climate action.

More data-based analysis on the socio-economic impact of mitigation efforts will provide a clearer line between individual action and environmental impact. That clarity could help bring more Singaporeans on board with environmental issues, and spark more ideas to help with the country's cause.

This balance of mitigation action for change in the present, and the planning and implementation of adaptation measures for future survivability, is perhaps Singapore's best way forward.

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