

Climate challenges and Singapore's strategy

Singapore is taking further steps to better prepare for global warming. Environment and Water Resources Minister Masagos Zulkifli gave an update on ongoing and upcoming efforts yesterday.



WATER

- Singapore has developed its four national taps – reservoirs, piped water from Johor, Newater and desalination – to harden its resilience against sudden shocks to its water supply.
- Singapore had a dry spell in 2014,

and a prolonged dry period in 2016 saw water levels at Johor's Linggiu Reservoir go down to a historic low of 20 per cent.

- Changing rainfall and temperature patterns have affected water supply worldwide, and the new Climate Science Research Programme Office

will look at how Singapore's water supply and drainage infrastructure will be impacted.

- Singapore has spent \$1.8 billion on drainage improvements since 2011, and is spending another \$400 million in the next two years.

FOOD

- Extreme weather has caused crop failure worldwide and driven up prices, raising concerns about food security for Singapore, which imports almost all its food needs.
- The Republic aims to diversify its food imports, and has set a target of producing 30 per cent of its nutritional needs locally by 2030, as well as to grow more of its food needs overseas.
- It will also look into research on how climate change will impact biodiversity and Singapore's food supply.



HEALTH

- Climate change poses threats to the island's biodiversity as well as health.
- Singapore has invested in new technologies, such as Project Wolbachia to suppress the mosquito population as dengue cases spike.
- It is also researching how changing weather patterns will affect human comfort and health.



TEMPERATURE

- Greenery can have a moderating impact on rising ambient temperatures.
- Scientists at Hawaii's Mauna Loa Observatory recently reported that carbon dioxide concentrations were the highest they have ever been, and will likely rise.
- Singapore's hottest month in the 1960s had a temperature of about 27 deg C on average. Today, that is the average temperature of the coolest months, and hottest days exceed 34 deg C.
- But an intensive tree-planting programme started in the 1960s has helped moderate rising ambient temperatures.
- Still, Singapore's annual mean temperatures have continued to climb steadily at 0.29 deg C per decade in the last 40 years (1979 – 2018).
- And it could face an increase in daily mean temperatures of between 1.4 deg C and 4.6 deg C by 2100. It could also face more intense and frequent heavy rainfall events.



EMISSIONS

- Singapore currently contributes 0.11 per cent of global greenhouse gas (GHG) emissions.
- The Republic has put a price on carbon to incentivise industries to reduce their GHG emissions, and is the first country in South-east Asia to implement a carbon tax and make no exemption to any industry.
- Though the price of the tax is arguably low today, industries have been given notice that it will double, if not triple, by 2030.



SEA LEVELS

- Climate scientists project that mean sea levels could rise by up to around 1m by 2100.
- But if ice sheets melt more rapidly or ice shelves in Antarctica collapse, the sea levels could rise by up to around 1m much earlier – and Singapore has no hinterland to retreat to.
- If high sea levels, high tide and high surge all occur at the same time, this rare scenario could cause sea levels to rise almost 4m above the current mean, and overwhelm low-lying coastal areas (One-third of Singapore is less than 5m above mean sea level).

- And should a tropical storm happen at sea, sending surge waters at the same time as a heavy rainstorm hits, these could be the ingredients for a "perfect storm".
- New projects such as the Tuas Port Terminal and Changi Airport Terminal 5 are being built at higher platform levels.
- A \$10 million National Sea Level Research Programme will be launched over the next five years to strengthen Singapore's understanding of sea levels around it and develop more robust projections.

ENERGY

- National water agency PUB and the Economic Development Board are supporting innovative floating solar photovoltaic projects at Tengah Reservoir and offshore, off Woodlands, that will be among the world's largest such systems when ready.
- Singapore is also on track to achieve its target of 350 megawatt-peak (MWp) of solar adoption by 2020 and aims to raise this to 1 GWp beyond 2020.
- Tuas Nexus, a used water and waste treatment plant, should also be ready by 2025. It will reduce the



amount of energy required in the used water treatment process, and cut carbon emissions by over 200,000 tonnes a year – that is equivalent to taking more than 42,500 cars off the road.

- Singapore is also striving for zero-energy buildings that push the boundaries for energy efficiency and savings, and to cap car-ownership growth.
- And it is putting in place a public transport system where most peak-hour commutes to the city will be under 45 minutes by 2040.