

Singapore's Climate Action Plan

Singapore is a tropical island state that is low-lying and heavily inhabited. It remains vulnerable to the effects of climate change, which include sea-level rise, higher temperatures, longer dry seasons, and more heavy rainfall. Any of these may be minor annoyances, while others may be more severe. Since 1972 its mean temperature has risen from 26.6 C to 28.3 C. 2015 was the hottest and driest year on record. It is estimated that if things remain the same average temperature could rise between 1.4C to 4.6C and sea level between 0.25m to 0.76m by the end of this century. Singapore is responsible for only about 0.11% of global greenhouse gas (GHG) emissions but still is making great efforts to reduce its carbon footprint. Its per dollar CO2 emissions are among the lowest in the world and are consistently placed in the top 20 best-performing countries. It ranked 14th out of 180 countries in the 2016 Environmental Performance Index (EPI), in 2013 it ranked among the top 22 cities in the Asian Green City Index¹.

In 2015 Singapore pledged to reduce its GHG emissions by 36% of 2005 levels by the year 2030. This is quite a challenging task as Singapore is a small city-state having limited alternative/renewable energy options. Power generation, industry, and transport are the main primary sources of GHG emissions, if we consider secondary sources (the sources which consume power) then industry, transport, buildings, and households are the main GHG emission sources. Overall industry, transport, buildings, and households are responsible for 59%, 17%, 17%, and 6.4% GHG emissions (combining both primary and secondary emissions) respectively.

In 2016 Singapore's then-president Tony Tan Keng Yam at the joint opening ceremony of the World Cities Summit, Singapore International Water Week, and CleanEnviro Summit Singapore this evening, announced the launching of Singapore's Climate Action Plan. Singapore's climate action plan is the result of the pledge it made as a participant in the Paris agreement. Paris agreement which replaced Kyoto Protocol in 2020 reaffirms to keep global warming between 2C above the pre-industrial levels. Singapore signed the agreement in April 2016.

Singapore sent its improved Nationally Determined Contribution (NDC) and Long-Term Low-Emissions Development Strategy (LEDS) documents to the UNFCCC on March 31, 2020. The improved NDC paper updates Singapore's climate commitment submitted under the Paris Agreement in July 2015 and notes an absolute emissions goal of 65MtCO₂e by 2030. Singapore's LEDS builds on the increased NDC target by aiming to cut emissions in half from

¹<https://www.nccs.gov.sg/docs/default-source/publications/take-action-today-for-a-carbon-efficient-singapore.pdf>

their height to 33MtCO₂e by 2050, with the goal of reaching net-zero emissions as soon as possible in the second half of the century².

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There are two main target areas of Singapore's climate action plan.

1. Making Singapore Carbon Efficient

The first main feature of the Singapore Climate Action Plan is to make the country as carbon efficient as possible by reducing greenhouse gas (GHG) emissions and fulfill the pledge it made at the Paris agreement. Singapore has pledged to reduce its greenhouse gas emissions by 36% of 2005 levels by 2030. The main strategy to reduce GHG emissions will be to improve energy efficiency in all sectors consuming it, namely the industry, buildings, transport, household, water and waste sectors.

1) Industry

As the industrial sector accounts for more than 50% of GHG emissions therefore it is vital to make it more energy-efficient. It is estimated that by 2030 Singapore's industrial sector can achieve 20% energy saving as compared to business as usual levels. Significant energy conservation opportunities have been identified in the petroleum, petrochemical, and semiconductor sectors.

Singapore has launched many schemes for companies to achieve greater energy efficiency. Energy Conservation Act (ECA) requires all energy-intensive industries to appoint an energy manager who will monitor and report energy use and GHG-emission information annually. These energy managers are trained through Singapore Certified Energy Manager (SCEM) program. Energy Efficiency National Partnership (EENP) program is a voluntary program for companies. It promotes energy management standards like ISO 50001, organizes learning events like National Energy Efficiency Conference, and promotes best practices in energy management.

Energy Efficiency Financing Pilot Program provides up to 100% of upfront capital investments on energy efficiency projects to companies. National Environmental Agency (NEA) funds up to 50% of design workshops to integrate resource efficiency in designing new facilities. NEA also co-funds up to 50% of costs (capped at SG\$200,000) of energy audits to identify gaps in energy efficiency. Economic Development Board (EDB) and NEA fund up to 20% of costs of new energy-efficient equipment and technologies. The Accelerated Depreciation Allowance Scheme (ADAS) allows energy-efficient capital expenditure to depreciate in one year. Investment Allowance-

²<https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/singapore%27s-efforts-in-addressing-climate-change>

Energy Efficiency Scheme (IA) allows an additional 30% investment allowance on top of existing capital allowances against taxable income³.

As Singapore is the leading data center hub of Southeast Asia, therefore, the government is focusing to make data centers more energy-efficient. Infocomm Development Authority (IDA) of Singapore has developed a Green Data Center Technology Roadmap which aims to make data centers in Singapore 50% more energy efficient by 2020 as compared to business as usual levels. IDA initiatives to improve the energy efficiency of data centers include the Green Data Center Standard, the Investment Allowance scheme for energy-efficient projects, and the Green Data Center Program (GDGP). Under GDGP trials are being conducted on the world's first Tropical Data Center (TDC) with the aim to reduce the energy consumption of data centers by 40% at temperatures up to 38C and humidity exceeding 90%.

2) Building

Building and Construction Authority (BCA) strives for making buildings and construction energy efficient. Under BCA's mandate, green building projects have increased from 17 in 2005 to 2700 in 2016. BCA Green Building Masterplans aim to reduce GHG emissions and increase the sustainability of Singapore's buildings. BCA's third Green Building Masterplan focuses on making the energy consumption of tenants and occupants more efficient. BCA has stepped up efforts to refit buildings with energy-efficient equipment, for example, light fittings. BCA in collaboration with Singapore Green Building Council (SGBC) aims to make 80% of all buildings green by 2030.

3) Transport

The transport sector accounts for 15% of GHG emissions in Singapore. Singapore is constantly expanding its rail network and has an ambitious target of expanding it to 360km by 2030 from its current network of around 200km. 120 new trains will be added to existing train lines making Singapore's rail density comparable to other cities like Tokyo and London. The Bus network is also constantly expanding. Singapore aims to increase public transport use from 60% in 2015 to 75% by 2020 and 85% by 2050.

Singapore is also encouraging walking and cycling. In 2018 it completed the target of expanding covered walkways to 200km. Cycling paths will be doubled from 355km in 2015 to more than 700km in 2030. On the other hand, the government discourages the use of private vehicles by increasing Certificate of Entitlement (CoE) fees, electronic Road Pricing (ERP) rates, vehicle taxes, registration fees, and fuel duties. At the same time, Electric Vehicle (EV) adoption is

³<https://www.nccs.gov.sg/docs/default-source/publications/take-action-today-for-a-carbon-efficient-singapore.pdf>

encouraged by the increasing number of charging kiosks. Singapore will require all new car registrations to be cleaner energy models from 2030.

4) Household

To make households more carbon-efficient Singapore is progressively increasing the Minimum Energy Performance Standards (MEPS) for household appliances like air conditioners, refrigerators, cloth dryers, televisions, and water heaters. NEA has introduced the Mandatory Energy Labeling Scheme (MELS). MELS allows consumers to compare the energy efficiency of different appliances and make informed decisions. NEA is also promoting the use of energy-efficient appliances through public messaging campaigns.

5) Waste & Water

The second part of the strategy to reduce GHG emissions is to invest in cutting-edge low carbon technologies and scale up and deploy these technologies in Singapore. For example, Singapore Public Utility Board (PUB) is constantly testing new technologies like electrochemical desalting to reduce the carbon footprint of water desalination and wastewater treatment processes. NEA aims to reduce waste incineration by increasing the overall recycling rate from 61% in 2015 to 70% in 2030. NEA is investing in new Waste-to-Energy plants based on the latest technologies to optimize resource and energy recovery. Agencies including BCA, Energy Market Authority (EMA), HDB, EDB, NEA, and PUB are increasing the adoption of solar power for energy needs.

2. Making Singapore Resilient to Climate Changes

The second part of the plan is to make Singapore resilient to climate changes. It details how Singapore may be affected by climate change and the whole government's strategy to deal with it. To reduce the impact of sea-level rise, to mitigate the possibility of flooding due to intense rainfall PUB has adopted measures like the Source-Pathway-Receptor approach, widening and deepening of drains, on-site detention tanks, and raising platform levels and flood barriers. To prepare Singaporeans for hotter weather NEA and the Ministry of Health (MOH) are developing a heat stress information system to help the public better plan and manage outdoor activities. To strengthen the country's food supply resilience, Agri-Food and Veterinary Authority of Singapore (AVA) is diversifying the regions where food is imported from. BCA and the HDB are conducting studies to better understand the impact of higher temperatures and strong winds on buildings and building attachments and mitigation measures. Other agencies including EMA, the IDA, Land Transport Authority (LTA), Civil Aviation Authority of Singapore (CAAS), and Maritime and Port Authority of Singapore (MPA) are conducting reviews and developing

solutions to strengthen the resilience of critical infrastructure including power stations, telecommunication, and transport⁴.

Conclusion

As Singapore looks to improve its national response to climate change, some important immutable realities remain, such as geographical limitations, scarce renewable energy opportunities, and a lack of a hinterland and natural capital. Over the years, the nation has preserved and improved ecologically valuable places as green spaces and carbon sinks through its “City in Nature” vision. Since renewable energy choices are small, Singapore is taking a comprehensive approach⁵.

Singapore also gives due importance to collective action to tackle climate change. Ground-up initiatives by businesses, environmental NGOs, and community groups complement the government's outreach efforts. Ricoh Asia Pacific Pte Ltd, for example, organizes an annual Eco Action Day to encourage businesses and individuals to be environmentally friendly, while utility company Singapore Power promotes energy efficiency through mobile exhibitions and activity tool kits. On the consumer front, the Singapore Environment Council (SEC) creates awareness about environmentally friendly products through its Singapore Green Labeling Scheme. The government will continue to provide resources and support to encourage more of such ground-up efforts.

Climate change also presents significant prospects for green development. The government encourages collaboration between the science and industry community in order to expand the environmental and renewable technology sectors. Singapore continues to invest heavily in R&D to create and apply groundbreaking climate change solutions, such as solar energies, energy conservation, green buildings, and clean transportation. This will increase work opportunities for Singaporeans while also improving our quality of life and living conditions.

Carbon-cutting policies, along with climate change adaptation measures, will ensure that Singapore remains a prosperous, thriving, and livable city for current and future generations.

⁴<https://www.nccs.gov.sg/docs/default-source/publications/a-climate-resilient-singapore-for-a-sustainable-future.pdf>

⁵<https://www.channelnewsasia.com/news/singapore/singapore-green-plan-climate-change-sustainability-goals-14088522>