

1. Background

Environmental Sustainability and Climate Change

1.1. Singapore has always sought to balance the twin goals of environmental sustainability and economic growth. As a small country endowed with few natural and physical resources, it is important that we optimise the use of our available environmental resources such as clean air, land, water and energy. We have therefore adopted an action-oriented approach to environmental sustainability that recognises our environmental resources are finite and valued. Our development is underpinned by long-term vision, holistic urban planning, sound environmental policies and high regulatory standards. Over the years, we have strived to do the following:

- Maintain our good ambient air quality;
- Manage our waste to reduce the need for landfill;
- Conserve our water resources; and
- Increase our energy efficiency.

1.2. This practical approach has enabled Singapore to achieve economic prosperity, social progress and a quality living environment.

1.3. A similar approach is required to address climate change. It is a multi-dimensional challenge that cannot be disconnected from policies in other areas, such as energy and economic policy. Synergies have to be achieved across the policy objectives of environmental sustainability, economic competitiveness and energy security.

Science of Climate Change

1.4. There is widespread international consensus that climate change is a major global environmental challenge. According to the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4)¹ released in 2007, there is no longer any serious doubt that our climate is warming. The report also concludes that most of the warming is very likely² due to increasing greenhouse gas (GHG) concentrations in the atmosphere resulting from human activities such as the burning of fossil fuels in power stations for electricity and in vehicles, as well as deforestation.

1.5. The build-up of greenhouse gases, in particular carbon dioxide (CO₂), in our atmosphere leads to global warming by enhancing the greenhouse effect. Global CO₂ concentrations are now higher than they have been in the past 650,000 years. The 2005 CO₂ concentration was 379 parts

¹ The IPCC AR4 is available online at <http://www.ipcc.ch/>

² The IPCC defines "very likely" as having a >90% likelihood.

per million (ppm), while historically, CO₂ concentrations in the last 650,000 years ranged from 180 to 300ppm.

The Intergovernmental Panel on Climate Change

The Intergovernmental Panel on Climate Change (IPCC) is recognised as the foremost authority on climate change science, and received the Nobel Peace Prize in 2007. It was established by the World Meteorological Organisation (WMO) and the United Nations Environmental Programme (UNEP) to provide objective information about the causes and potential impacts of climate change. IPCC reports on climate change science are authored and reviewed by hundreds of experts around the world.

Rising Temperatures and Associated Impacts

1.6. According to the IPCC AR4, global average temperatures have risen by about 0.74°C in the last 100 years. While this may not seem like much, it has already led to a sea level rise of an estimated 17cm in the 20th century. The frequency of heavy rainfall events has also increased, consistent with scientific models of a warming climate.

Future Climate Change

1.7. If global CO₂ emissions continue to grow unabated, climate change is projected to occur at an even faster rate in the future. The IPCC AR4 projects that if atmospheric CO₂ concentrations ranging from 600 to 1550ppm are reached, global temperatures would increase by 1.1 to 6.4 °C in the next 100 years. This can lead to worldwide impacts on coasts, water supply, ecosystems, food supply, and health. Even if global GHG emissions are capped at 2000 levels, global temperatures will still increase by about 0.3 – 0.9 °C in the next 100 years.

Necessary Response

1.8. Urgent international action is needed to reduce the amount of GHG emissions worldwide and thereby limit climate change. At the same time it must be noted that the world is likely to face climatic changes in the near future as a result of GHG emissions over the past few decades. Adaptation measures are needed to prepare countries for them.

Reasons for Climate Change Action

Better Preparedness for Climate Change

1.9. As an island state, Singapore will be affected by climate change impacts. For example, due to rising sea levels and more frequent heavy

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rainfall events, Singapore may face increased flooding and coastal land loss. Supporting international actions to mitigate climate change and undertaking adaptation efforts will help address projected climate change effects and impacts (see Chapter 2).

Cleaner Air

1.10. The burning of fossil fuels in power stations, industries, and vehicles is the main source of both CO₂ emissions and air pollution in Singapore. Adopting cleaner fuels and more energy efficient technologies to reduce CO₂ emissions will contribute significantly towards cleaner air, as well as a better quality of life for Singaporeans.

1.11. For instance, the move towards using natural gas in our power generation plants, has not only reduced our CO₂ emissions but also our emissions of key air pollutants such as particulate matter and sulphur dioxide. Using fuel-efficient hybrid or compressed natural gas (CNG) cars can similarly reduce air pollutant emissions.

Economic Opportunities

1.12. Measures to address climate change can also generate economic opportunities. There are opportunities in providing energy efficiency services such as energy audits, developing alternative energy solutions, as well as in the Clean Development Mechanism of the Kyoto Protocol.

Energy Cost Savings

1.13. Being more energy efficient can translate into lower energy consumption for both businesses and households. For businesses, this will lower their production costs and increase their competitiveness. For households, this will mean lower energy bills.

Enhanced Energy Security

1.14. Singapore is almost entirely dependent on imported fossil fuels. Making more prudent use of energy through increased energy efficiency will help reduce this dependence.

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1.15. Singapore is a city-state with limited natural resources. We are heavily dependent on imported fossil fuels as the forms of renewable energy applicable to Singapore (e.g. solar energy) are not yet cost-competitive with conventional fossil fuels. As an export-oriented economy, much of the energy used by our industry is not used to make products for local consumption but rather products for export.

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1.16. Nevertheless, the government is committed towards addressing climate change in an environmentally sustainable manner that is compatible with economic growth. We have become a Party to the Kyoto Protocol in 2006. As a further sign of our commitment towards addressing climate change, the government has developed this National Climate Change Strategy (NCCS).

1.17. The NCCS represents Singapore's comprehensive and holistic response to climate change. It documents our ongoing efforts and future plans to address climate change in (i) vulnerability and adaptation (V&A) and (ii) mitigation of greenhouse gas emissions. To support our V&A and mitigation efforts, we will engage in local competency-building efforts. As no country can address climate change alone, we will also participate actively in international climate change discussions and efforts (see Figure 1.1).

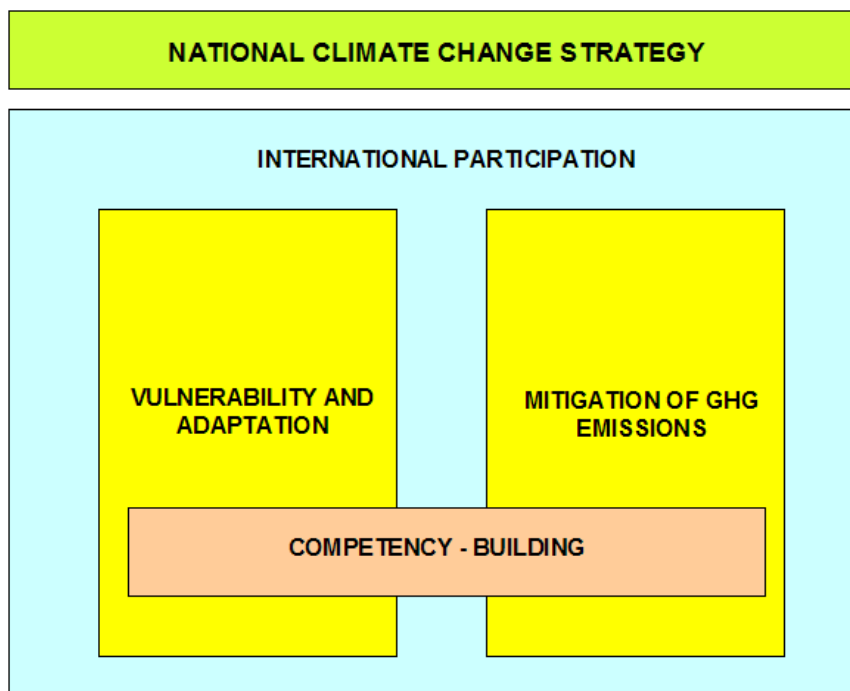


Figure 1.1 Schematic of National Climate Change Strategy

Guiding Principles

1.18. In developing the NCCS, we have adopted these guiding principles:

Climate change response must be sustainable

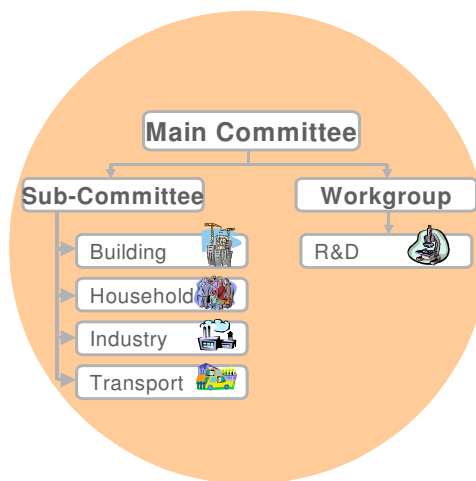
We will adopt actions that address climate change, are environmentally sustainable and are compatible with economic growth and social development. Measures that yield complementary benefits such as cleaner air, cost savings and industry development will be pursued where possible.

Climate change response needs individual, corporate and government effort

Due to the pervasive nature of energy use, effective measures to mitigate climate change begin at the individual and business level through personal and corporate decisions on energy use. Meeting the challenge of climate change cannot solely be a government initiative. Singaporeans have to join in this national effort and take action in their daily lives, at work, at play, or at home, to become more energy efficient and choose cleaner fuels.

The National Climate Change Committee

To bring together efforts by all sectors on climate change, the Ministry of the Environment and Water Resources chairs a National Climate Change Committee (N3C) with representatives from various government agencies, industry representatives (e.g. from the Singapore Manufacturers' Federation and the Real Estate Developers Association of Singapore), academia, and non-governmental organisations (e.g. the Singapore Environment Council). The N3C comprises several subcommittees and workgroups as shown below. It is a platform for policymakers to engage the private and people sectors on climate change issues and policies, gather feedback and provide the platform for key stakeholders to debate and share ideas on climate change issues.



Consultative approach

As climate change has implications for many sectors of the economy and society, we developed the NCCS through a consultative, multi-stakeholder approach. The views of our stakeholders and the public at large were sought through the following channels:

- E-Consultation
A draft NCCS consultation paper was posted on the website of the Ministry of the Environment and Water Resources (MEWR), along with a questionnaire for the public to provide feedback over a 4-month period. Over 1300 comments were received from the public.
- Dialogue sessions with stakeholders from the private and people sectors
MEWR and the National Environment Agency held dialogue sessions with the representatives from the private and people sectors in the National Climate Change Committee (N3C) and various environmental/youth groups. The N3C comprises of members representing the following sectors: buildings, households, industry, transportation and academia. (Please see Acknowledgements.)
- NCCS consultation forum
A consultation forum was held with in early 2007 with our key stakeholders from the N3C and environmental/youth groups, to seek their comments. (Please see Acknowledgements.)

1.19. Going ahead, the NCCS will be a strategy roadmap that will continually be updated to reflect public awareness and action, as well as developments in technology and climate science.