Climate Change Actions in Singapore

Assoc. Prof. Robert Tiong L.K.
School of Civil & Environmental Engineering
Nanyang Technological University
Singapore

School of Civil and Environmental Engineering
Stay in-line and updated with IPCC

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change.

Singapore is a Member of the IPCC together with 195 countries.

Adopted the IPCC AR5 for adaptation planning
Singapore Aims to Meet Climate Targets via Innovation – Prime Minister (PMO)

Key notes from Singapore Prime Minister, Mr Lee Hsien Loong on the Virtual Leaders Summit on Climate (27 May 2021):

1. Singapore may be small and without access to resources, but it will strive to achieve its climate targets through innovation.
2. Smart Nation Program adopting advance climate modeling to incorporate with infrastructure, urban development and planning.
3. Singapore Green Plan 2030 – launching of the nation’s road map to sustainable development.
4. Setting up of the Green Investments Programme (US$2 billions) to promote environmentally sustainable projects and mitigate climate change risk in Singapore and across region.
5. Enhancing emission verification, including the use of new technology to measure and monitor carbon footprint.
Climate Change in Southeast Asia

- In 2013, Singapore experienced the hottest day in January (35.2°C), followed by the wettest February in the last 25 years (395.2mm), while the longest dry spells on record (27 days) were found in 2014.

- It was found that the mean sea level around Singapore could rise by up to 0.65m and temperatures could increase by up to 4.2°C in 2100 (NCSS, 2015).

- From the past records, Singapore experienced comparatively less damage from climate changes than other Southeast Asia countries.

Research has shown that Southeast Asia region could be the most vulnerable to the effects of climate change.

Climate Change Vulnerability Mapping for Southeast Asia (A.A. Yusuf, 2009)
Look Global, Work Local – Facts about Singapore

- Urban city-state of just 719km²
- Tropical climate on equator
- Low-lying, gentle topography
- Highest point 164m
- Population: 5.54 million in 2015
- Population density: 7,712 persons/km²
- GDP: S$402 billion in 2015 at current market prices
- Per capita GDP: S$72,711 in 2015
- Contribution to global emissions: 46,831.68 gigagram CO2-equivalent, 0.11% of global emissions
- Per capita emissions: ~12.49 tCO2/person in 2011 (Ranked 15th in 2011 by WRI CAIT 2.0)

Facts about Singapore

From 2000-2012, while the economy grew at annual rate of 5.7%, GHG emissions grew at only 2.1%.

**Singapore’s 2020 pledge**
- Reduction of GHG emissions by 16% below Business-as-Usual (BAU) levels in 2020, contingent on a global legally binding agreement
- Unconditional pledge of 7 – 11% below 2020 BAU levels

**Singapore’s 2030 pledge**
- Singapore intends to reduce its Emissions Intensity by 36% from 2005 levels
- Stabilize its emissions with the aim of peaking around 2030
- 2 pages on “Singapore’s Adaptation Efforts”

Source: National Climate Change Secretariat, Climate Action Plan 2016
Singapore Climate Change Actions

The National Climate Change Secretariat (NCCS) was established on 1 July 2010 under the Prime Minister’s Office (PMO)

To develop & implement Singapore's domestic & international policies & strategies to tackle climate change

NCCS is part of the Strategy Group which supports the Prime Minister & his Cabinet to establish priorities & strengthen strategic alignment across Government

The inclusion of NCCS enhances strategy-making & planning on vital issues that span multiple Government ministries & agencies.

NCCS' areas of responsibility are to:
1. facilitate efforts to mitigate carbon emissions in all sectors
2. help Singapore adapt to the effects of climate change
3. harness economic and green growth opportunities arising from climate change
4. encourage public awareness and action on climate change
Singapore Climate Change Actions

The Meteorological Service Singapore (MSS) is Singapore’s national authority on the weather & climate

It is an operations division under the National Environment Agency (NEA). The key departments within MSS are:

**Weather Services Department (WSD)**
WSD provides round the clock weather forecasts, warnings, monitoring and assessment for critical sectors such as civil aviation, military, maritime, private/public agencies and the general public.

**Meteorological Systems Department (MSD)**
MSD provides support in key installations, meteorological equipment and computer systems, to meet MSS’s operational and technical requirements.

**Risk and Resource Department (RRD)**
RRD analyses risks and assesses their impact from the corporate/organisational angle.

**Centre for Climate Research Singapore (CCRS)**
CCRS is a leading centre in tropical climate and weather research focusing on the Southeast Asia region.
To advance scientific understanding of tropical climate variability and change and its associated weather systems affecting Singapore and the wider Southeast Asia Region.
Educating the Publics

- Mitigation: 
  *Climate Action Plan: Take Action Today, for a Sustainable Future*

- Adaptation: 
  *A Climate-Resilient Singapore, for a Sustainable Future*

Source: National Climate Change Secretariat, Singapore
Climate Change Policies – Institutional Structure

IMCCC, RWG, RSG & Clusters

**Inter-Ministerial Committee on Climate Change (IMCCC)**
Chair by Deputy Prime Minister and Coordinating Minister for National Security

- Minister for the Environment and Water Resources
- Minister for Finance
- Minister for Foreign Affairs
- Minister for National Development
- Minister for Trade and Industry (Trade)
- Minister for Trade and Industry (Industry)
- Minister for Transport

**IMCCC Executive Committee**
Chaired by Permanent Secretary (National Climate Change)

- PS (Environment and Water Resources)
- PS (Finance) (Performance)
- PS (Foreign Affairs)
- PS (National Development)
- PS (National Research and Development)
- PS (Trade and Industry)
- PS (Transport) and Chairman (Economic Development Board)

**Resilience Working Group (RWG)**
Chair by PS (National Development) and PS (Environment and Water Resources)

**International Negotiations Working Group (INWG)**
Chair by PS (Foreign Affairs)

**Long Term Emissions and Mitigation Working Group (LWG)**
Chair by PS (National Climate Change) and PS (Trade and Industry)

**Recent restructuring:**

- **Prime Minister’s Office**
  - Strategy Group
  - Chaired by Head of Civil Service/Permanent Secretary
  - Peter Ong

**Department/Divisions**

- Economic
- Land & Liveability
- National Climate Change Secretariat
  - National Population And Talent Division
  - Security & Resilience
  - Social
  - Strategic Planning & Futures
  - Technology & Data

Source: National Climate Change Secretariat, Singapore
Specific cluster targeting specific climate change issues & mitigation strategies formulation

Resilience Working Group, RWG
Chaired by PS(ND) & PS(EWR)

Resilience Sub Group, RSG
Chaired by DS(ND) & DS(EWR)

Cluster Level

Cluster 1
Coastal Protection

Cluster 2
Water Resources & Drainage

Cluster 3
Biodiversity & Greenery

Cluster 4
Public Health

Cluster 5
Network Infrastructure

Cluster 6
Building, Structure and Infrastructure
Mitigation Measures Across All Sectors of Economy

Power Generation
- Fuel mix switch
- Encourage solar

Waste/Water
- Incinerate sludge
- Reduce plastics incineration

Households
- Minimum Energy Performance Standards – air-conditioners, fridges, lighting etc.

Buildings
- Green Mark legislation for new and existing buildings
- Mandatory energy audits & reporting

Transport
- 70% modal split
- Carbon Emissions-based Vehicle Scheme

Industry
- Grant for energy efficient technologies
- Encourage cogeneration plants

Capability development measure
- Energy Conservation Act (ECA) for large energy users to develop energy efficiency improvement plans and take other measures
Adaptation Measures

Adaptation must be dynamic, adopting flexible planning perspectives & deferring “inflexible” decisions as much as possible.

1. Adaptation should take into account costs and benefits from economic, environmental and social perspectives, and should consider benefits and trade-off across other domains.

2. Adaptation should be calibrated through a risk management approach. We cannot wait for full clarity from climate science and should first look out for cost-effective, flexible options.

3. Planning for adaptation should proceed based on best current knowledge and be updated by subsequent scientific, societal and environmental developments.
Singapore’s Preparation

Source: National Climate Change Secretariat, Singapore
Climate Change Adaptation in Singapore

- **Institutional**
  - Resilience Working Group (RWG) under the Inter-Ministerial Committee on Climate Change (IMCCC), chaired by Permanent Secretaries of Ministries of National Development and Environment & Water Resources

- **Research & Risk Assessments**
  - Gov has set aside $50 million for climate resilience related studies to support Singapore’s adaptation planning efforts
    - Phase 2 National Climate Change Study
    - Building and Construction Authority’s (BCA) Risk Map Study
    - BCA’s Coastal Adaptation Study
Climate Change Adaptation in Singapore

- **International Partnerships**
  - C40: Singapore is an active member, contributing in a number of C40 networks such as the Connecting Delta Cities (CDC) network.
  - Co-organised events and workshops with C40, such as the “City-scale Climate Action Planning in East and Southeast Asia” by the World Bank, Australia Aid, C40 and our course, our own Centre for Liveable Cities.
  - Oct 2015: Organised a one-day programme in Singapore for delegates to understand more about the challenges of climate change adaptation as well as Singapore’s approach to addressing them.
  - Singapore’s Marina Barrage was also highlighted as a case study in the C40 Guide on Climate Change Adaptation in Delta Cities, alongside cities like Hong Kong and Copenhagen.
Thank you!