

# **Singapore's INDC Experience and Views on Post-2020 Market Mechanisms**

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# Singapore's National Circumstances

- Small, low-lying island state of 700 km<sup>2</sup>
  - Flat Coastline
  - Rising temperatures and sea levels, increasing frequency of days with intense rainfall
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- Highly urbanised, densely populated
  - Development constraints
    - Singapore's lack of natural resources and hinterland required the development of a strong export-oriented manufacturing base
  - Import almost all our energy needs
    - High dependency on fossil fuels

# Reducing Emissions: Considerations

## Limited access to alternative energy sources

**Solar:** Unlikely to provide base load due to intermittency, space constraints

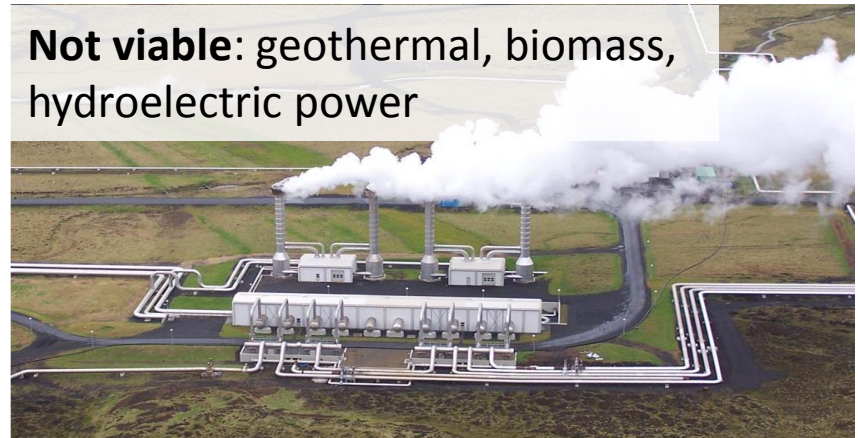


**Wind:** low wind speeds, lack of space



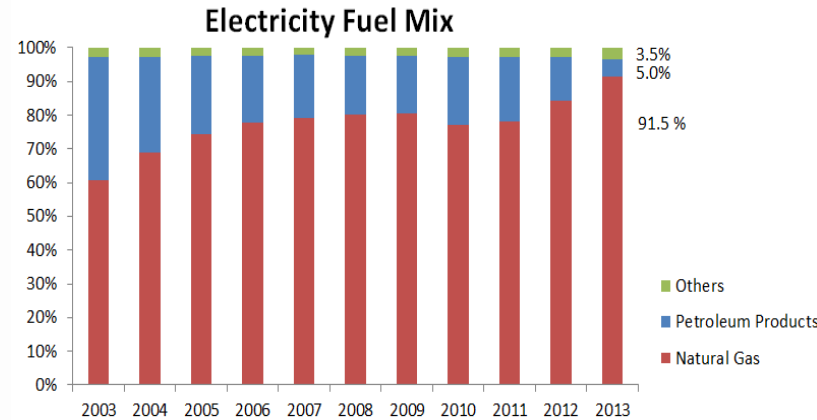
**Tidal** range is too low

**Not viable:** geothermal, biomass, hydroelectric power



# Early Efforts

- Early switch from fuel oil to natural gas for electricity generation
  - Today, natural gas constitutes over 90% of power generation mix
  - LNG terminal commenced operations since May 2013
- Despite challenges, Singapore is significantly increasing deployment of solar PV systems
- Price energy at market cost to reduce usage and encourage energy efficiency
- Pollution control laws encourage industries to switch to cleaner fuel sources



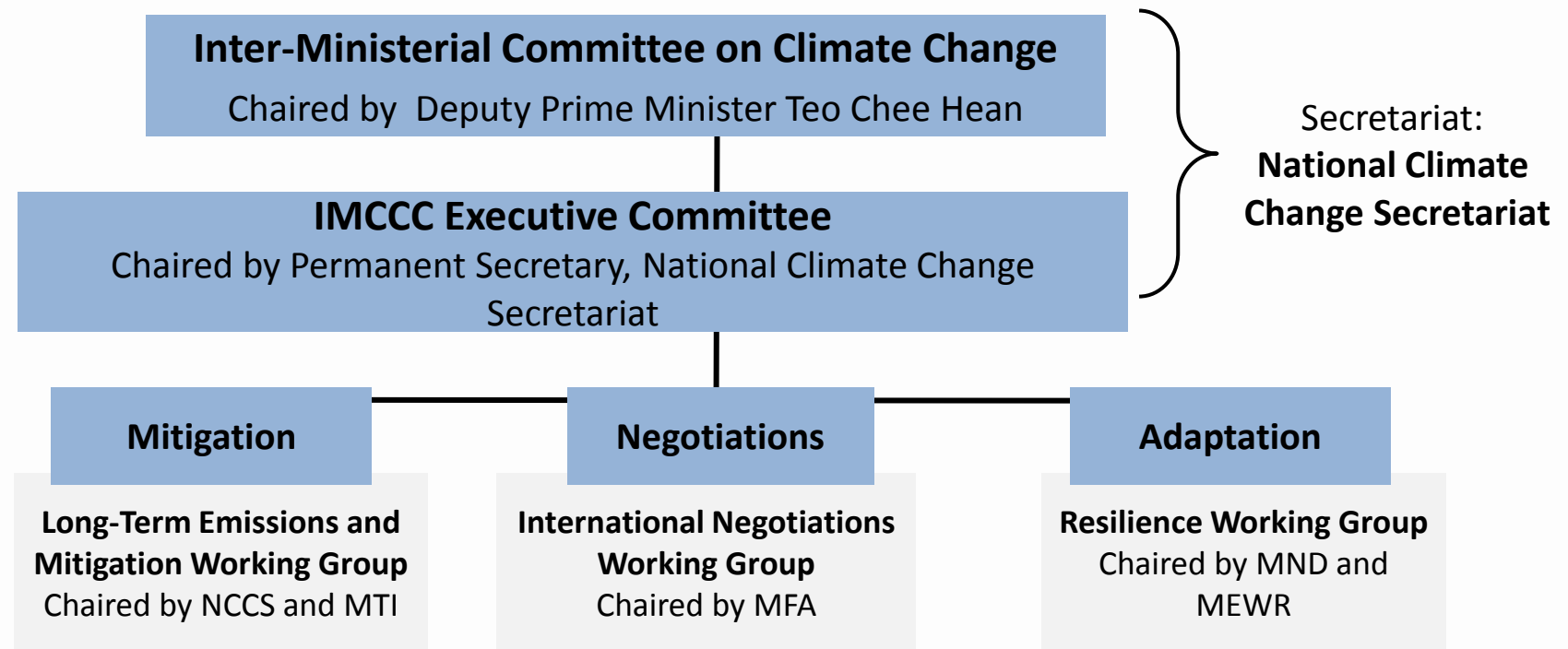
Source: Energy Market Authority (EMA), 2014



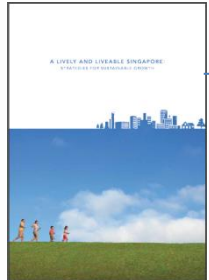
Solar panels at Punggol Housing & Development Board (HDB) blocks.



# Singapore's Climate Change Institutional Structure



# Recent Key Climate Policy Developments



1<sup>st</sup> Sustainable Singapore Blueprint published

2009



Announced 2020 pledge (Copenhagen)



2<sup>nd</sup> NC published



Formation of NCCS under PMO

2010



NCCS-2012 published

2012



Energy Conservation Act came into effect

2013



Roadmaps and EE Studies conducted



3<sup>rd</sup> NC/1<sup>st</sup> BUR published

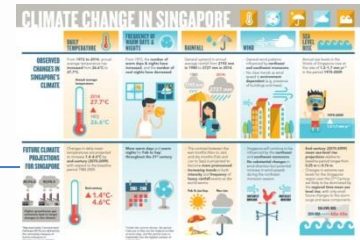


Ratified 2CP

2014



2<sup>nd</sup> Sustainable Singapore Blueprint published



2<sup>nd</sup> National Climate Change Study published

2015



INDC submitted

# Planning process of Singapore's INDC



## Energy Tech Roadmaps

McKinsey&Company



## Energy Efficiency Studies

- Economy-wide
- Industrial Sector



## Public Consultation

- Online Consultation
- Stakeholder/Sectoral Consultations

2012

2013

2014

2015

Singapore's  
INDC  
Submission

Inter-agency technical analysis under IMCCC

## WRI Open Book (Guide)



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# Public Consultation

1H 2015



Online Feedback



Stakeholder and  
Sectoral Consultations

- Many suggestions on opportunities across all sectors, and ways to achieve this (e.g. public education, incentives, regulation)
- Overview of feedback, and agencies' responses, have been published at <https://www.nccs.gov.sg/consultation2015>



# Singapore's 2030 INDC

**Reduce Emissions Intensity (EI)<sup>1</sup> by 36% from 2005 levels by 2030, and stabilise emissions with the aim of peaking around 2030**

- Submitted on 3 July 2015
- Accompanying information to facilitate clarity, transparency and understanding
- National Circumstances
- Adaptation efforts
- Singapore is currently ranked 123<sup>rd</sup> out of 142 countries for EI<sup>2</sup>, putting us in the best-performing 20 countries

	Emissions Intensity (kgCO <sub>2</sub> e/\$GDP)	
2005	0.176	36% reduction
2030	0.113	

<sup>1</sup>EI is defined as GHG emissions per \$GDP

<sup>2</sup>Source: IEA's CO<sub>2</sub> Emissions from Fuel Combustion 2015

# Pre-2020 Mitigation Measures

## POWER GENERATION

- Switch fuel away from fuel oil to natural gas
- Encourage solar test-bedding and research

## HOUSEHOLDS

- Mandatory Energy Labelling Scheme (MELS) for home appliances
- Minimum Energy Performance Standards (MEPS) for appliances and lighting

## BUILDINGS

- Require Green Mark Certification for all new and existing buildings when retrofitted
- Audit of building cooling systems every 3 years

## TRANSPORT

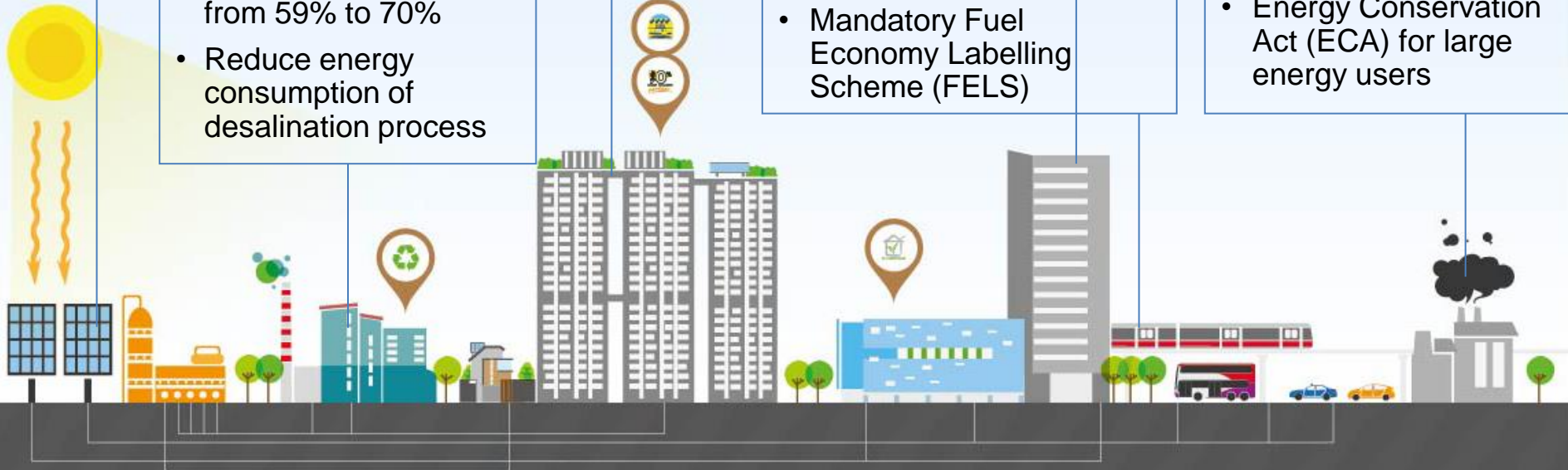
- Encourage greater use of public transport
- Carbon Emissions-based Vehicle Scheme (CEVS) to encourage purchase of low-emissions cars
- Mandatory Fuel Economy Labelling Scheme (FELS)

## INDUSTRY

- Co-funding schemes to help companies
- Encourage new co-generation plants in energy-intensive sectors
- Energy Conservation Act (ECA) for large energy users

## WASTE & WATER

- Increase recycling rate from 59% to 70%
- Reduce energy consumption of desalination process



# Post-2020 Mitigation Measures

**2005**

**36% reduction in Emissions Intensity;  
Stabilise emissions with the  
aim to peak around 2030**

**2030**

## Examples of New/Enhanced Sectoral Measures



### **Power Generation**

Adopt more efficient technologies

Facilitate greater deployment of solar PV



### **Buildings**

Raise energy efficiency standards

Support on-site generation of solar energy



### **Households**

Raise energy efficiency of household appliances

Promote energy-saving behaviour



### **Industry**

Improve energy efficiency

Provide incentives

Strengthen regulations



### **Transport**

Increase public transport mode share

Encourage walking and cycling

# Enhancing Resilience to Climate Change

## CLIMATE CHANGE IN SINGAPORE



<b>DAILY TEMPERATURE</b>	<b>FREQUENCY OF WARM DAYS &amp; NIGHTS</b>	<b>RAINFALL</b>	<b>WIND</b>	<b>SEA LEVEL RISE</b>
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### OBSERVED CHANGES IN SINGAPORE'S CLIMATE

From 1972 to 2014, annual average temperature has increased from 26.6°C to 27.7°C.



From 1972, the number of warm days & nights have increased, and the number of cool nights have decreased.



General uptrend in annual average rainfall from 2192 mm in 1980 to 2727 mm in 2014.



- General wind patterns influenced by northeast and southwest monsoons.  
- No clear trends as wind speed is environment dependent (e.g. presence of buildings and trees).

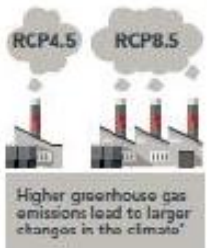


Annual sea levels in the Straits of Singapore rose at the rate of 1.2-1.7 mm yr<sup>-1</sup> in the period 1975-2009.



### FUTURE CLIMATE PROJECTIONS FOR SINGAPORE

Changes in daily mean temperatures are projected to increase 1.4-4.6°C by end-century (2070-2099) with respect to the baseline period 1980-2009.



More warm days and warm nights for Feb to Sep\* throughout the 21<sup>st</sup> century.



\*Under the current climate, the period February to May has the highest number of warm days, and the period June to September has the highest number of warm nights.

- The contrast between the wet months (Nov to Jan) and dry months (Feb and Jun to Sep) is projected to become more pronounced.  
- Increasing trends in both intensity and frequency of heavy rainfall events as the world warms.



- Singapore will continue to be influenced by the northeast and southwest monsoons.  
- No substantial changes in wind direction but potential increase in wind speeds during the northeast monsoon season.



- End-century (2070-2099) mean sea-level rise projections relative to baseline period ranges from 0.25 m to 0.76 m.  
- Changes in extreme sea levels for the Singapore region over the 21<sup>st</sup> Century are likely to be dominated by the regional time-mean sea level rise, with only small future changes to the storm surge and wave components.



\*Representative Concentration Pathways (RCPs) are defined by the cumulative emissions of greenhouse gases (GHGs).

# Singapore's International Partnerships



- Participation in **climate change negotiations** at the UNFCCC, as well as in other international and regional fora, such as ICAO, IMO, ASEAN and APEC
- **Exchanging climate-friendly practices** within and beyond the region
  - **C40 network**
  - Singapore Cooperation Programme
  - **Bilateral Cooperation Initiatives**

# Technical Cooperation with Developing Countries

- To date, over **10,700 officials** have participated in climate change and sustainable development programmes.
  - Sustainable Development and Climate Change (SDCC) Programme under the SCP
  - Agencies conduct capacity building courses
  - Centre for Climate Research Singapore (CCRS)
  - Technical Cooperation Package for SIDS



BCA and UNEP established the BCA Centre for Sustainable Buildings (2011)



Regional Workshop on Scaling up Climate Finance in the Asia Pacific (April 2013)

# SEAN-CC Workshop on Markets and Private Financing, 14-15 Oct 2015, Singapore

- 60 participants – government officials and practitioners (ASEAN), experts and academics, private sector financing
- Discussed carbon pricing approaches, global architecture on international market mechanisms and the role of the UNFCCC, enabling environment to mobilise private financing
- Key insights:
  1. UNFCCC should provide high-level guidance on the global architecture, with flexibility.
  2. UNFCCC should continue to maintain a centralised mechanism (CDM/ NMM/ SDM).
  3. Strengths of multilateral approaches: standardised rules, inclusivity.



# Paris Agreement – Unpacking Article 6

- **Art 6.2 – broad framework for cooperative approaches (FVA)**
  - ITMOs – defined as?
  - Promote sustainable development, ensure environmental integrity,
  - Double counting (corresponding adjustment) and transparency in governance
  - **Guidance** to be developed by SBSTA
- **Art 6.4 – sustainable development mechanism (NMM)**
  - Participation of public and private entities
  - Deliver an overall mitigation – role of mechanism beyond offsetting?
  - Double counting – can only be used in one INDC (different from corresponding adjustment?)
  - Share of proceeds
  - **Rules, modalities and procedures** on the basis of: real, measurable, long-term benefits, additional, scope of activities
- **Art 6.8 – Framework for NMA**
  - **Work programme** to consider linkages between mitigation, adaptation, finance etc.
  - Facilitate implementation and coordination on NMA
- **Linkages with Art 5 (REDD+), Art 13 (Transparency), Art 15 (Compliance)**



# Views on International Carbon Markets

## Carbon markets can help

- Markets drive innovation
- Complements existing carbon mitigation measures – over 80 INDCs indicate use of int. market mechanisms
- Shifts abatement efforts towards the lowest cost opportunities

## Integration increases effectiveness

- Linking markets help countries expand the range of abatement opportunities
- Greater liquidity
- Ensures a level playing field
- Greater convergence towards a global carbon price

## Key elements of the international carbon market architecture

- Common standards and accounting rules/ guidelines
- Balanced MRV
- Development of SDM to draw on experience of existing mechanisms, e.g. CDM.
- UNFCCC work programmes to be streamlined

***“Our vision for Singapore is a climate resilient global city that is well positioned for green growth... Together, we can ensure that Singapore remains a vibrant and liveable nation for our future generations.”***

***— DPM Teo Chee Hean, March 2012***





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**Thank you**