

Singapore's diversification challenges as an alternative energy disadvantaged city-state

The complementary role of the UNFCCC: Governance of the impact of implementation of response measures



Peter Govindasamy

Statements of fact on economic diversification



No two country are alike. National circumstances differ

All parties will be affected in the carbon constrained world. Impact become more pronounced as parties implement current and successive NDCs

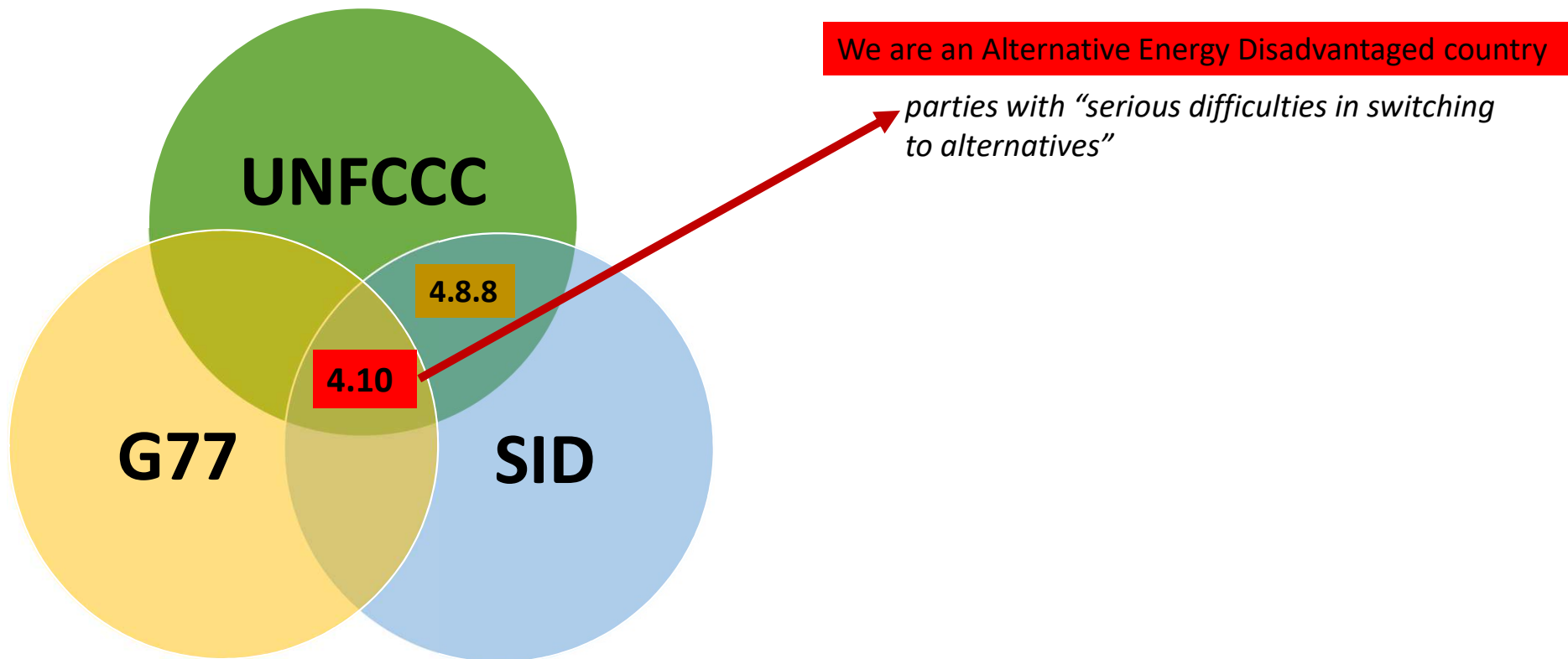
The impact of response measures is not limited to national boundaries

Economic diversification is necessary to build resilience, need to be tailored to the unique national circumstances of each country

Programmes for economic diversification has to be undertaken at the national level. International cooperation has an important facilitative role in economic diversification initiatives

Singapore in the UNFCCC process

- We are a SID
- We are a G77 member
- We are committed to the UNFCCC's multilateralism, and its objectives



National Circumstances Matter

- This Agreement will be implemented ...in the light of different national circumstances (Art 2.2)
- Each party's successive NDC will represent a progression beyond the party's current NDC... in the light of different national circumstances (Art 4.3)
- All parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies...in the light of different national circumstances (Art 4.19)

Everyone has agreed on the direction of travel so that the next battle is to speed up along that direction of travel. The strength of Paris is that it builds a broad highway and allows countries to choose their lane of choice

Christina Figueres
Former Executive Secretary, UNFCCC

National Circumstances
Snapshot of our constraints

Singapore's national circumstances

Small island city state



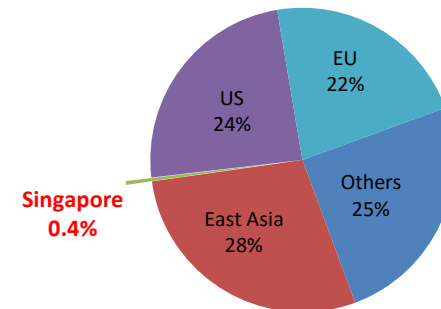
With small physical geography

- Small size (750km²)
- Densely populated
- Flat (Highest point - 165m)
- Low lying (Mostly <15m above sea)
- No natural resources

Confronting numerous constraints

- Land
- Manpower
- Water
- Food
- Energy

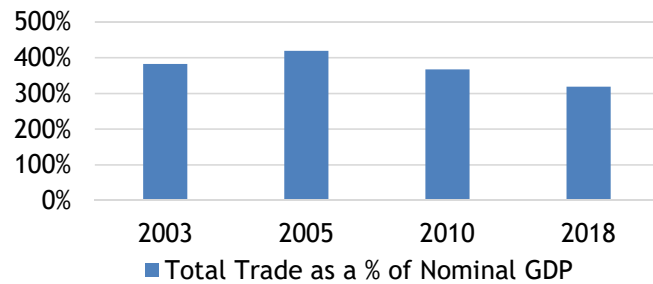
And a small share of global GDP (2018)



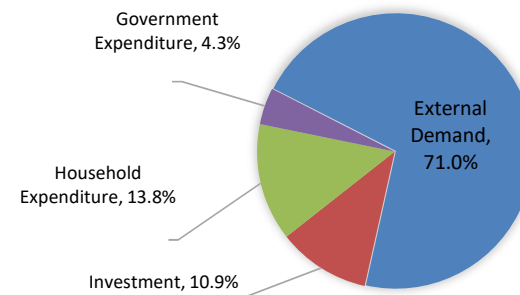
Singapore's national circumstances

☐ An open economy needing to be connected to the world

Highly dependent on international trade

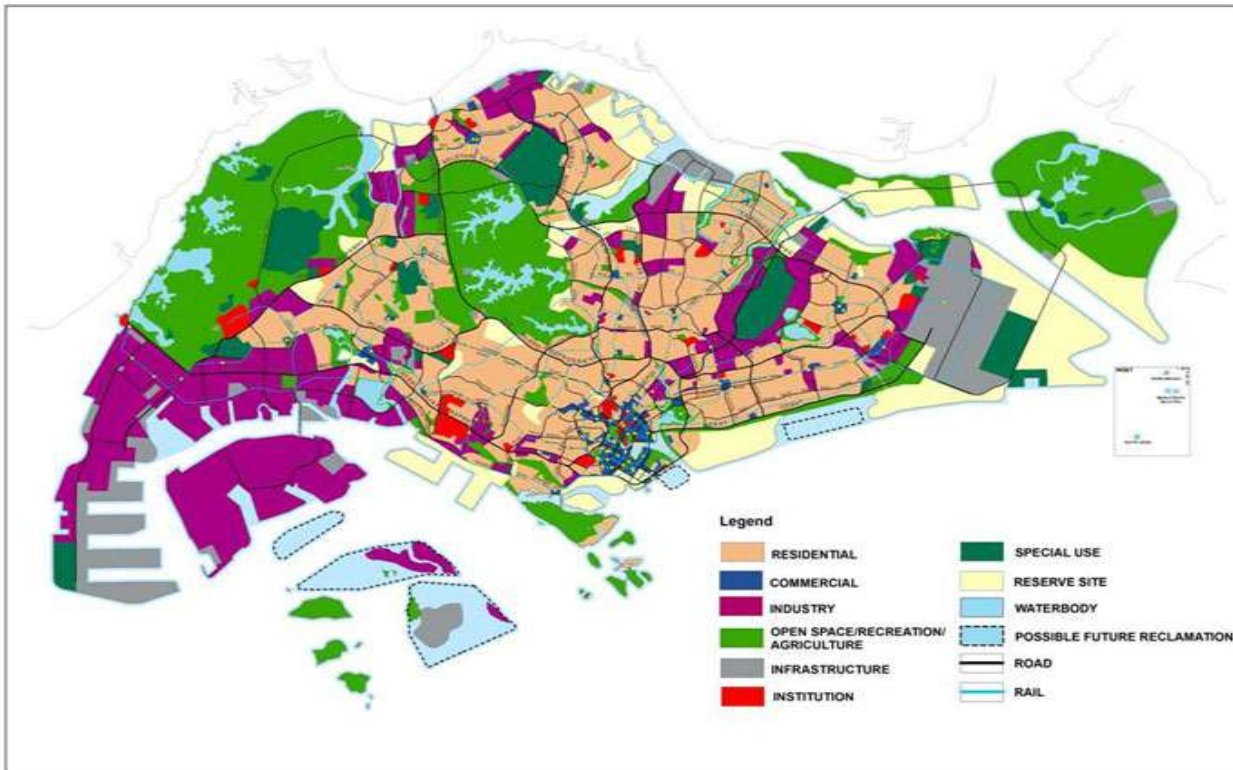


External demand forming the largest component of Singapore's Total Demand (2018)

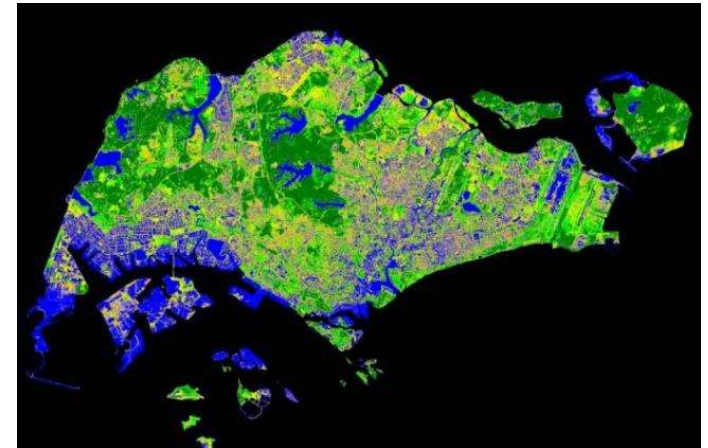


Singapore's national circumstances

Land Constraints



- Limited land (750 km²) must meet many different uses
- There is limited land for economic activities: 80% of industrial land space is already allocated
- We also have to ensure that we have enough green areas (“City in a Garden”)



(Singapore's vegetation cover in green)

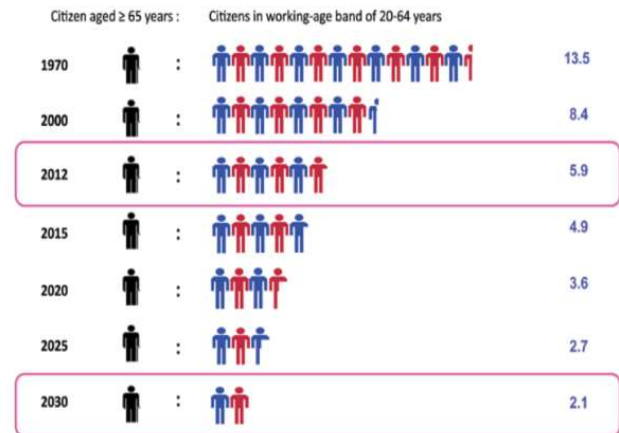
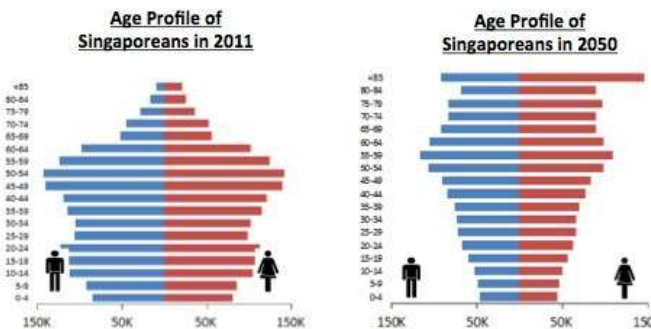
Singapore's national circumstances

Manpower constraints

- Singapore faces an aging population
- Our manpower needs cannot be met by the citizen workforce
- Reliance on foreign manpower has its limits



Age Profile of Citizen Population



Assuming current birth rates and no immigration from 2013 onwards
Source: DOS

Singapore's national circumstances

Food and Water Constraints

- No natural water supply, water imported from Malaysia
- Food security: almost all our food are imported
- Food and water constraints likely to be compounded with climate change









Singapore's national circumstances

- ❑ Singapore relies on imported fuels, particularly natural gas, to meet our energy needs.
- ❑ Exposed to volatility of global energy markets and supply risks.
- ❑ We do not have the natural resources, land area and climatic conditions necessary for the large-scale deployment of renewable energy sources such as hydro, wind and geothermal energy. Solar is the most promising renewable source, but there are space constraints – small land, dense population.

Energy constraints

Alternative-Energy Disadvantaged

Solar		<ul style="list-style-type: none">• Intermittency is an issue. Limited land area for deployment as well.
Micro Wind Turbines		<ul style="list-style-type: none">• Low wind speeds (<3.3m/s) in Singapore with insufficient land.
Offshore Wind Turbines		<ul style="list-style-type: none">• Not possible due to heavy marine traffic.
Tidal Energy		<ul style="list-style-type: none">• Mean tidal range (1.7m) is too low.
Geothermal		<ul style="list-style-type: none">• Geothermal potential for power generation is weak in Singapore.
Nuclear		<ul style="list-style-type: none">• No carbon emission but has stringent land requirements. Safety and disposal of nuclear waste are issues.
Electricity Imports		<ul style="list-style-type: none">• Frees up land but there are energy security concerns.

Responding to constraints:

Nationally, we have to adapt, we need to diversify

Responding to constraints
We have to adapt, we need to diversify



Trade Diversification

Singapore's Network of FTAs
25 agreements in Force with 37 Trading Partners



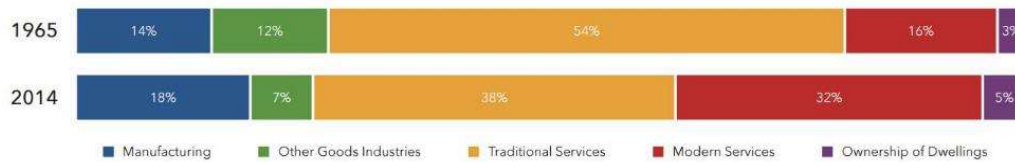
Responding to constraints
We have to adapt, we need to diversify



Economic (Sectoral) Diversification

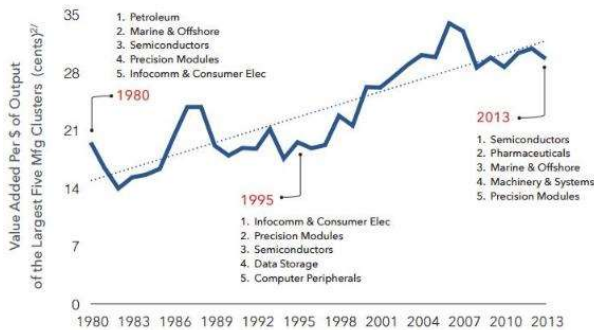
Economic Structure (Share of Nominal GDP)

The domestic economy has evolved into a high-end manufacturing and modern services hub.

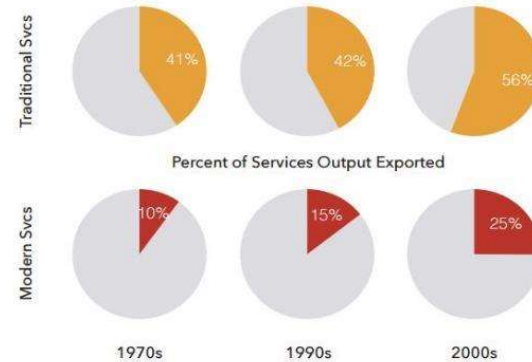


- Focus on growing demand areas (eg., high end manufacturing, services)
- Re-skilling, Up-skilling workers
- Ensure optimal land use and diversified industry base
- Diversified geographical dependencies

The manufacturing sector has constantly moved up the value chain ...



... while services have become more exportable.



Responding to constraints We have to adapt, we need to diversify

Food and Water Diversification



- Invested in desalination and reverse osmosis to recycle water (“NEWater”)
- Creation of artificial reservoirs to collect rainfall
- Reduce dependency on water imports.



- Import food from a variety of sources for food security
- Set up a Sino-Singapore food zone in Jilin, China
- Optimize local production
- Exploring the use of vertical farms



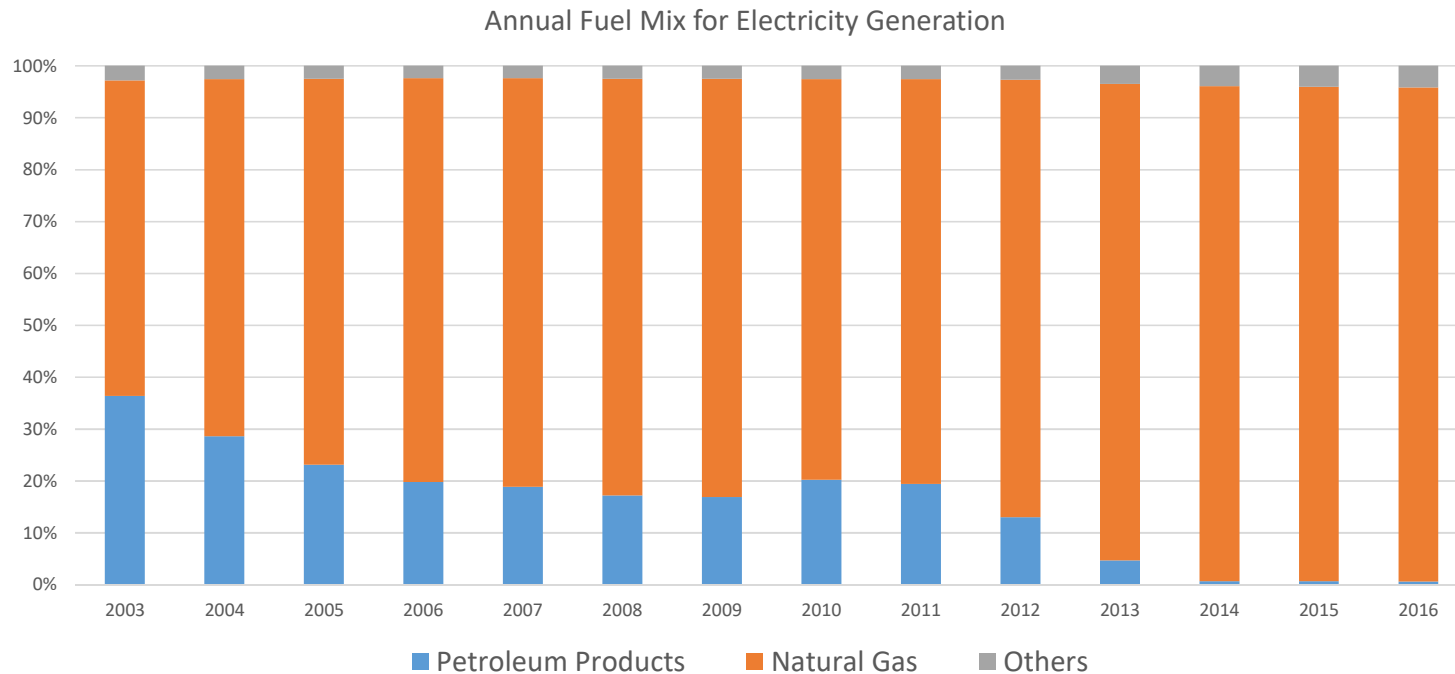
Responding to constraints
We have to adapt, we need to diversify



Energy Diversification

Natural Gas has become our primary fuel for electricity generation

Since the early 2000s, we have switched from fuel oil to natural gas to generate electricity.
Today, more than 95% of our electricity is generated using natural gas, the cleanest form of fossil fuels.



LNG terminal has helped to diversify fuel sources

- ❑ We previously relied entirely on piped natural gas (PNG) from immediate neighbouring countries.
- ❑ The LNG terminal commenced operations in May 2013, enabling access to the global liquefied natural gas (LNG) market.
- ❑ Today, about 70% of our electricity is generated from PNG and 30% from LNG. About 5% is from various other sources including waste incineration and solar.
 - Proportion of LNG as a percentage of natural gas supplies is set to increase over time

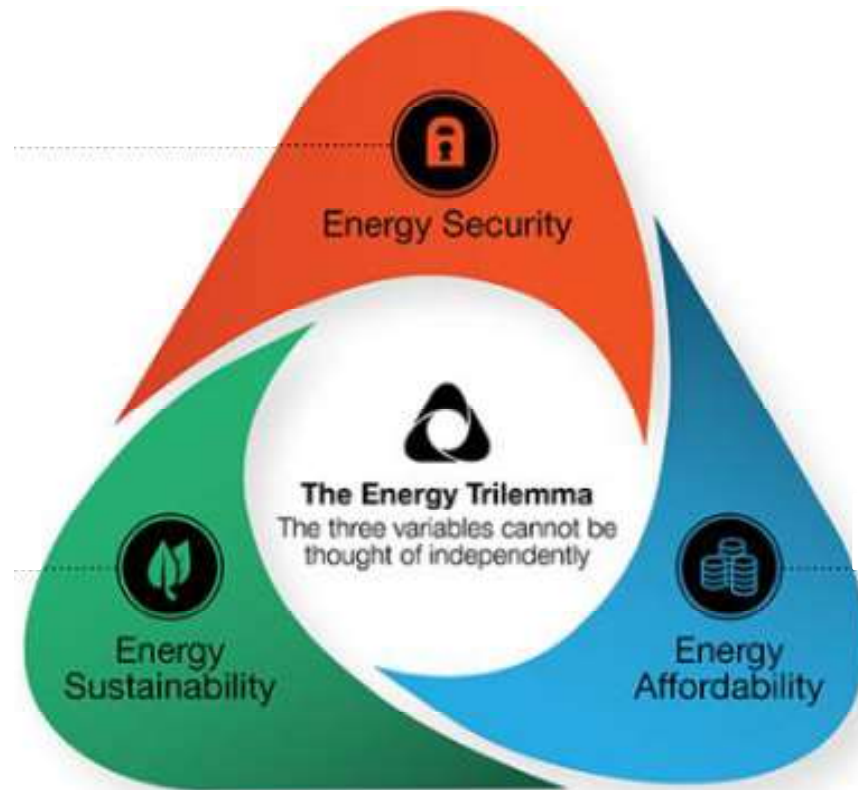


We are also looking at deploying solar energy

- ❑ Among various alternative energy options, solar photovoltaic (PV) has some potential for deployment
- ❑ We will need to overcome challenges such as land limitations (e.g. competing uses for rooftop space) and effects of intermittency, i.e. moment to moment power dips due to clouds etc.
- ❑ Our efforts to raise the adoption of solar PV in Singapore include Floating PV



Energy needs to be secure, affordable and sustainable



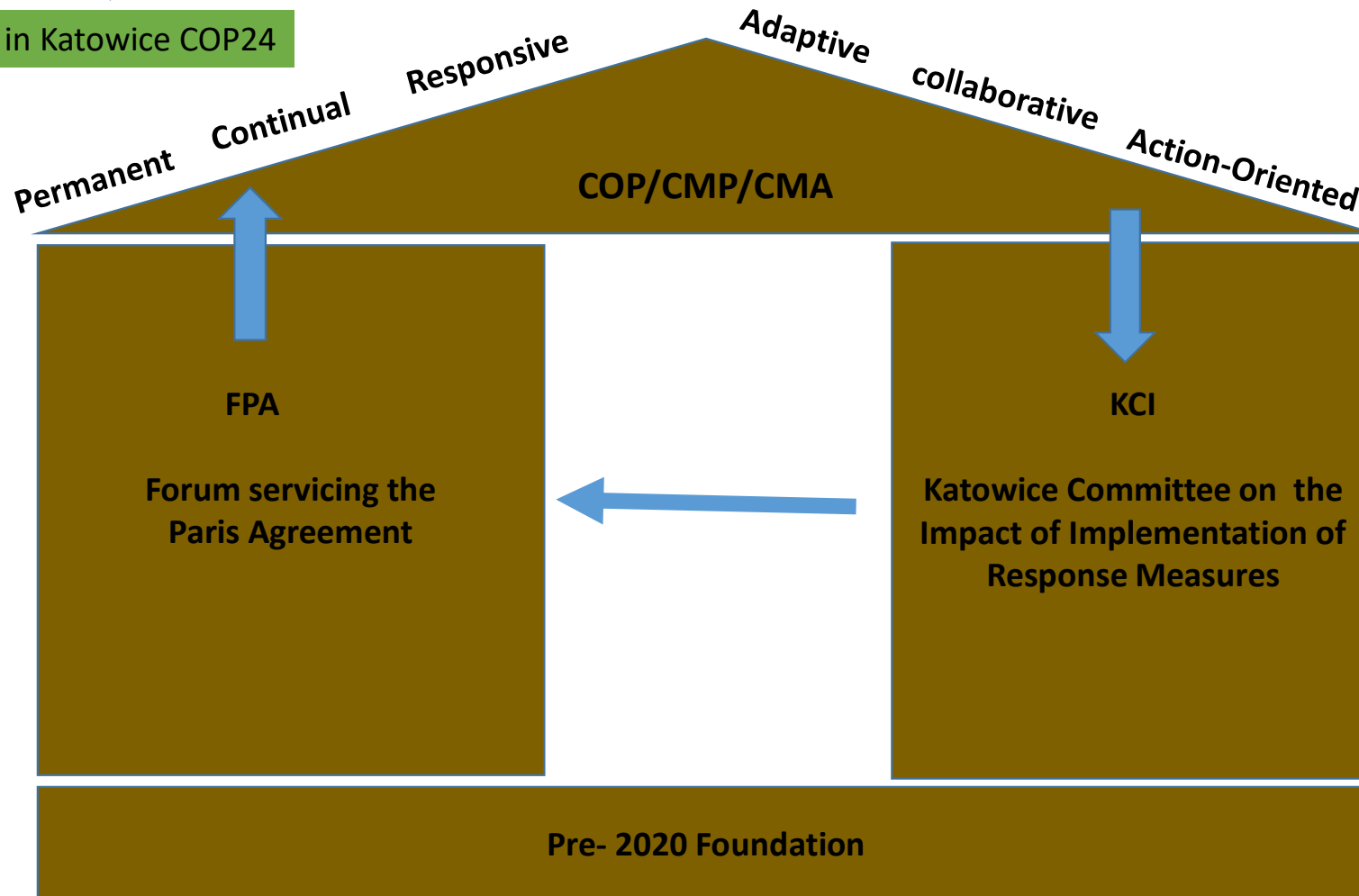
Addressing the impacts of implementation of response measures:

Multilateral cooperation at the UNFCCC, to complement national efforts

Response Measures House

Governance of the impact of implementation of response measures

Created in Katowice COP24



Governance of mitigation (response) measures

Paris Agreement

recognises that parties “may be affected not only by climate change, but also by impacts of measures taken in response to it”.



Mitigation measures such as:

- Carbon taxes
- Cap-and-trade schemes and related offsets
 - Carbon border tax adjustments
 - Carbon standards and labelling
 - Subsidies for low carbon goods

According to the UNFCCC Secretariat, these measures have most impact on developing countries

These measures regulated by WTO agreements and FTAs

Impact trade flows and economies

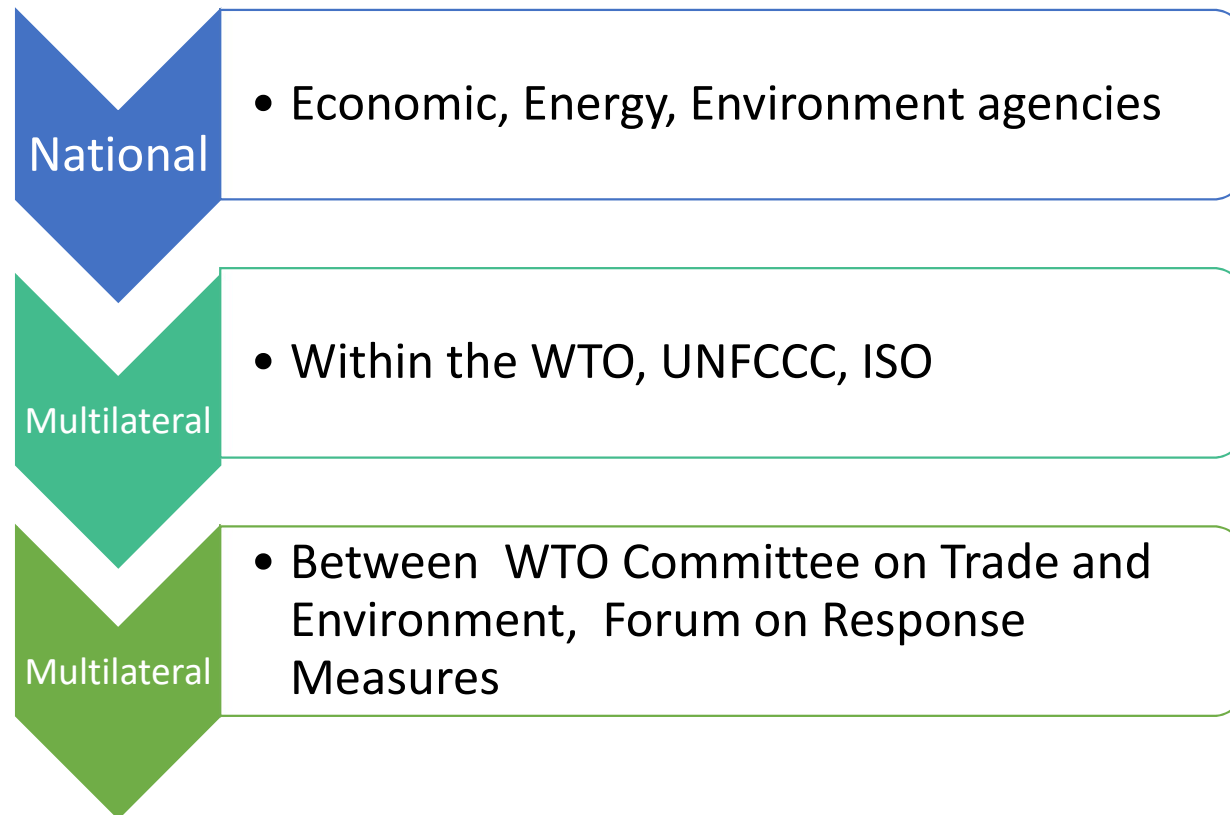
Pre-emptive cooperation

IPCC AR5

- “there are numerous and diverse explored opportunities for greater international cooperation in trade-climate interactions. While mutually destructive conflicts between the two systems have thus far been largely avoided. While mutually destructive conflicts between the two systems have thus far been largely avoided, pre-emptive cooperation could protect against such developments in the future”

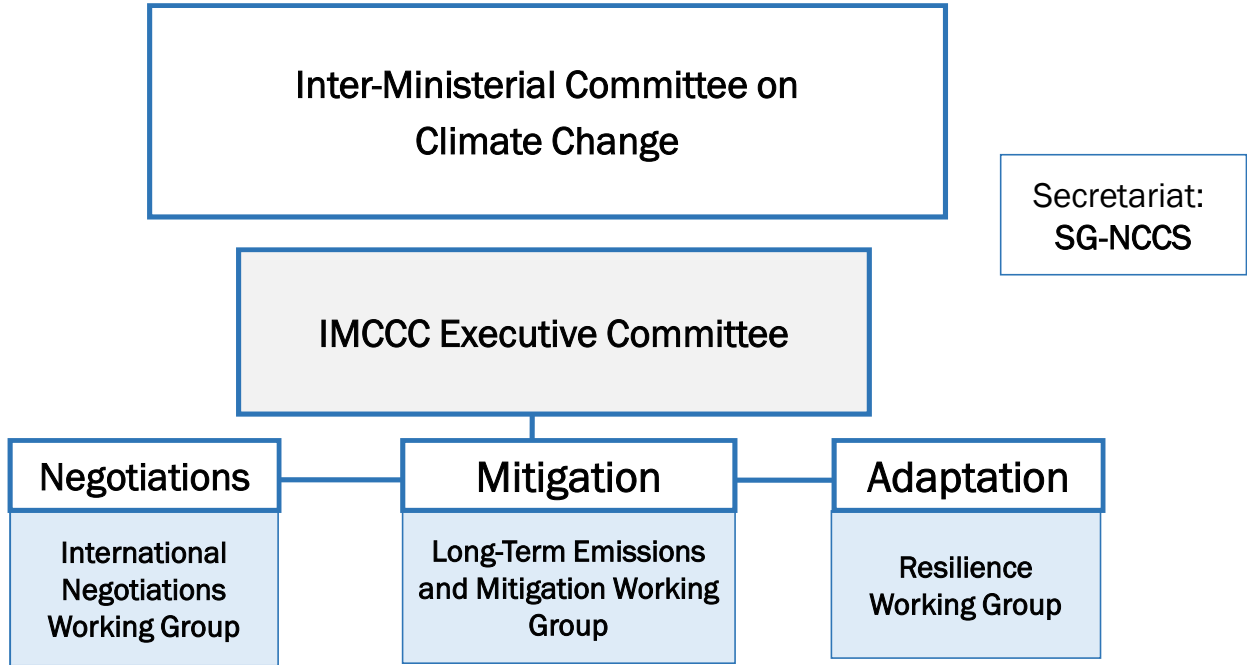
Pre-emptive cooperation

“Pre-emptive” cooperation need to take place at three levels:




Institutional Arrangements for whole-of-government coordinated approach

Pre-emptive cooperation



Governance of Response Measures for Economic Diversification

- ❑ Economic development is essential for adopting measures to effectively address climate change (Convention Art 3:4)
- ❑ Economic Development will be facilitated if developing countries are able to diversify their economies.
- ❑ A necessary condition for economic diversification is open markets for goods and services; Open markets is an international requirement (Convention Art 3:5)
- ❑ Outcomes from the UNFCCC process and response measures by other IOs must recognise national circumstances, eg. LDCs, SIDs, Art 4.10 countries
- ❑ Respect for rules-based multilateral system is critical for economic diversification. Such a system will reduce the risk of harmful unilateral protectionist measures.

A photograph of a dense forest with sunlight filtering through the trees, creating a dappled light effect on the ground and foliage. The text is overlaid in white on this background.

We live in a carbon and energy
constrained world today. If there is one
natural resource that that the world has
left in infinite quantity, that would be
human ingenuity...

Let a hundred ideas bloom

- **Additional Slides**

Pre-emptive cooperation

5 elements

1. Respect for Multilateralism

- The risks of unilateral actions would be high without a robust multilateral system.

2. Not to introduce protectionist restrictions

- Inconsistent with Convention Art 3.5
- WTO-inconsistent practices undermines the open, equitable and non-discriminatory nature of the multilateral trading system
- Counter-productive to meeting economic development and climate objectives

3. Recognition of national circumstances, parties' right to determine national policies

- Convention and Paris Agreement recognise that Parties have right to establish domestic policies in accordance with their national circumstances.
- This includes parties' natural endowments, development conditions, needs and priorities

Pre-emptive cooperation

5 elements

4. Respect mandate of other IOs

- Response measures involving sectors with distinct multilateral rules should respect the mandate and longstanding competence of relevant international organisations dealing with such sectors, and be consistent with relevant and applicable international law.

5. UNFCCC is neither a ruling nor enforcement body

- The UNFCCC Forum on Response Measures is an avenue for discussions and is not intended to serve as a basis for the interpretation or enforcement of specific provisions of the Convention or to impose new commitments on parties.

Pre-emptive cooperation

Transparency:

A key aspect of pre-emptive cooperation

Ex-ante notification:

Providing opportunities for parties to comment on response measures before they are implemented

Ex-post assessment:

Checking and evaluating the actual impact of responses measures

Next Steps – elements for further work



Draw up an inventory of response measures.

What are the potential economic and social consequences of these response measures?

What are lessons learned on successful diversification strategies?

Draw up detailed guidelines for economic diversification initiatives.

What could be the elements of pre-emptive cooperation?

What could be the elements of enhanced transparency provisions?