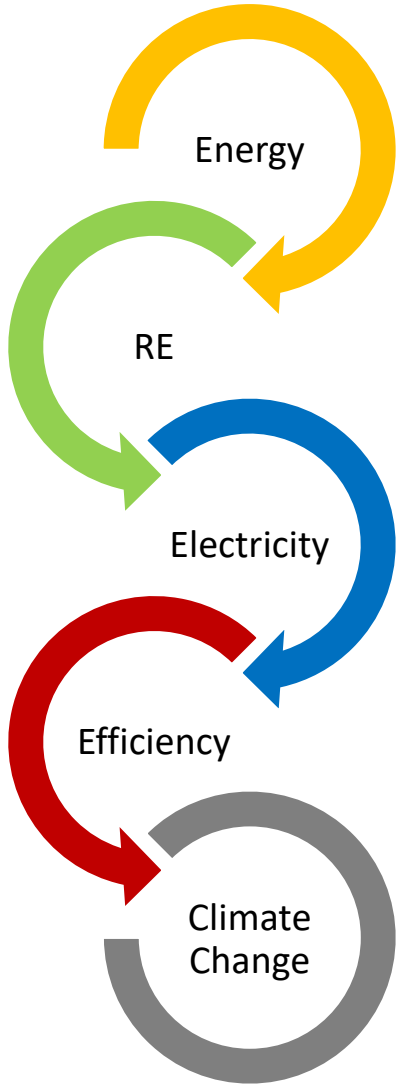
Renewable Energy Initiatives to support Malaysia's Climate Change Mitigation Actions

Hazrey Tomyang
Ministry of Energy and Natural Resources

APERC ANNUAL CONFERENCE 2020
14 September 2020

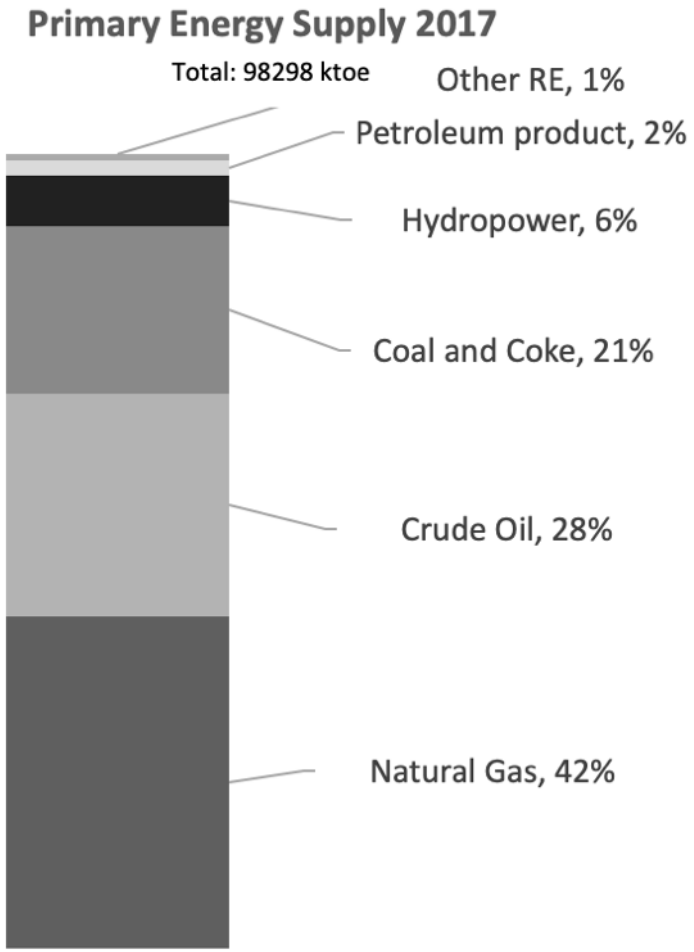
CONTENT

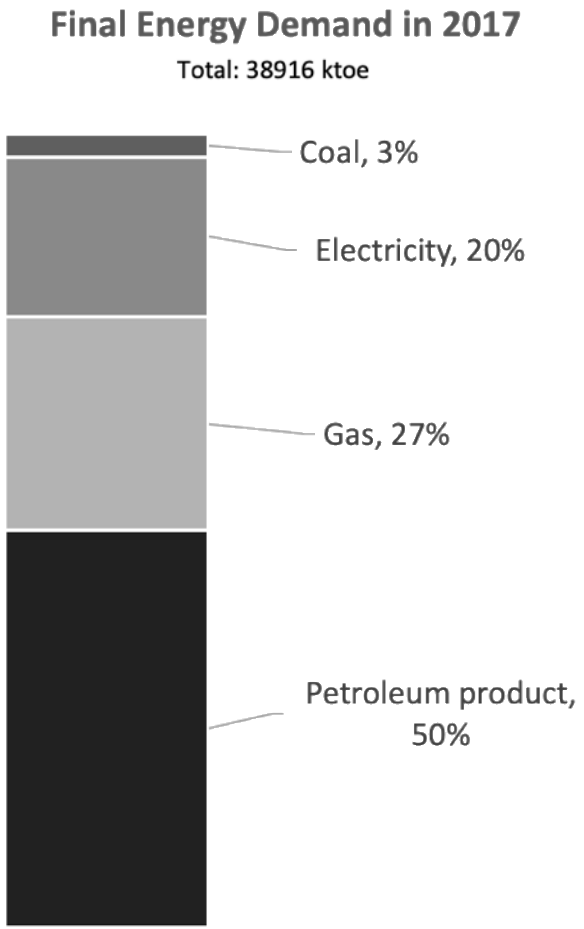
1. Introduction
2. Climate Change Targets & GHG Inventory
3. Sustainable Energy Development In Malaysia
4. Conclusion



INTRODUCTION

MALAYSIA ENERGY SNAPSHOT



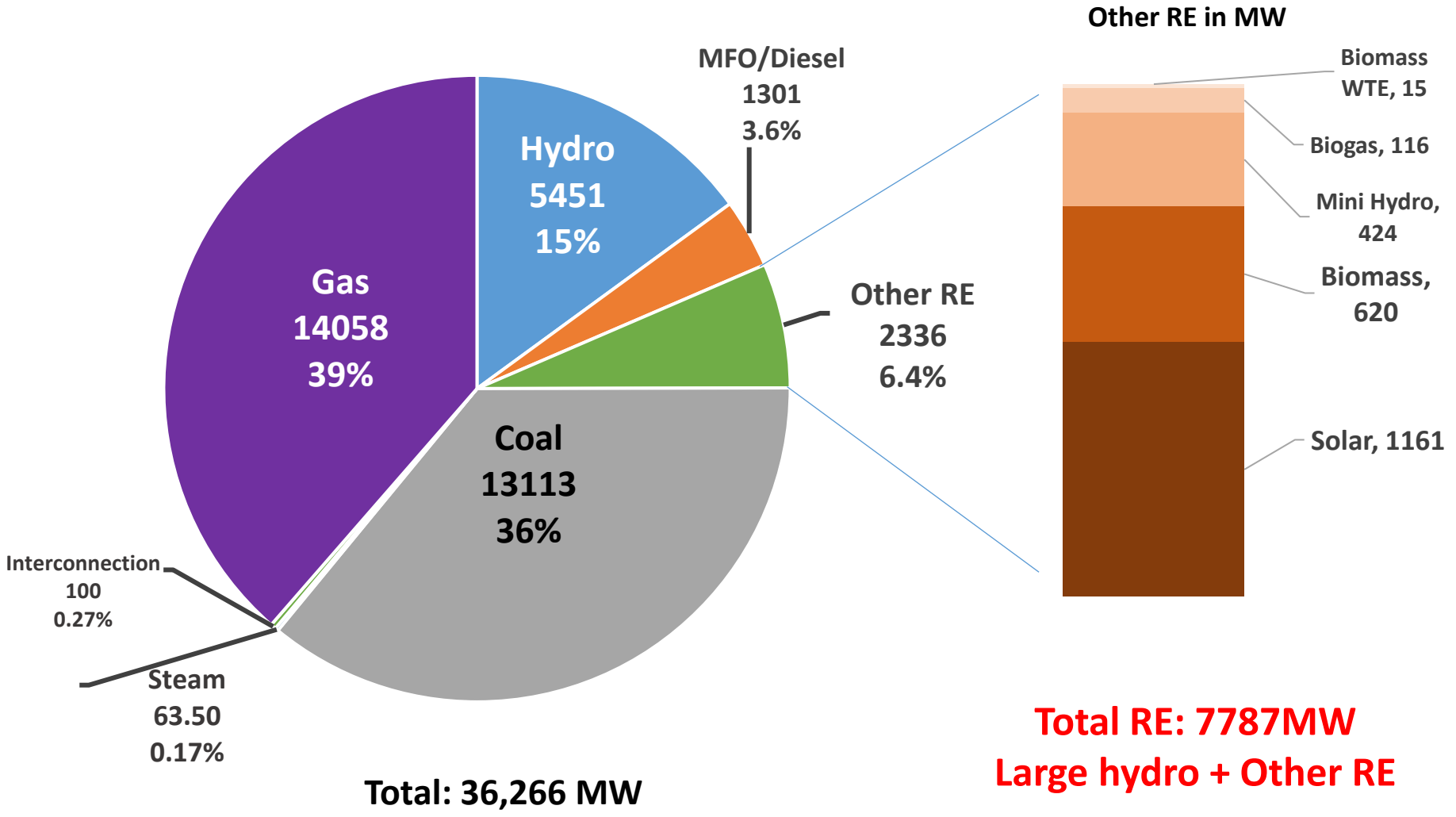


Electricity share is only about 20% of FED

Source: National Energy Balance 2017

MALAYSIA ENERGY SNAPSHOT

Malaysia 2019 Installed Capacity Mix

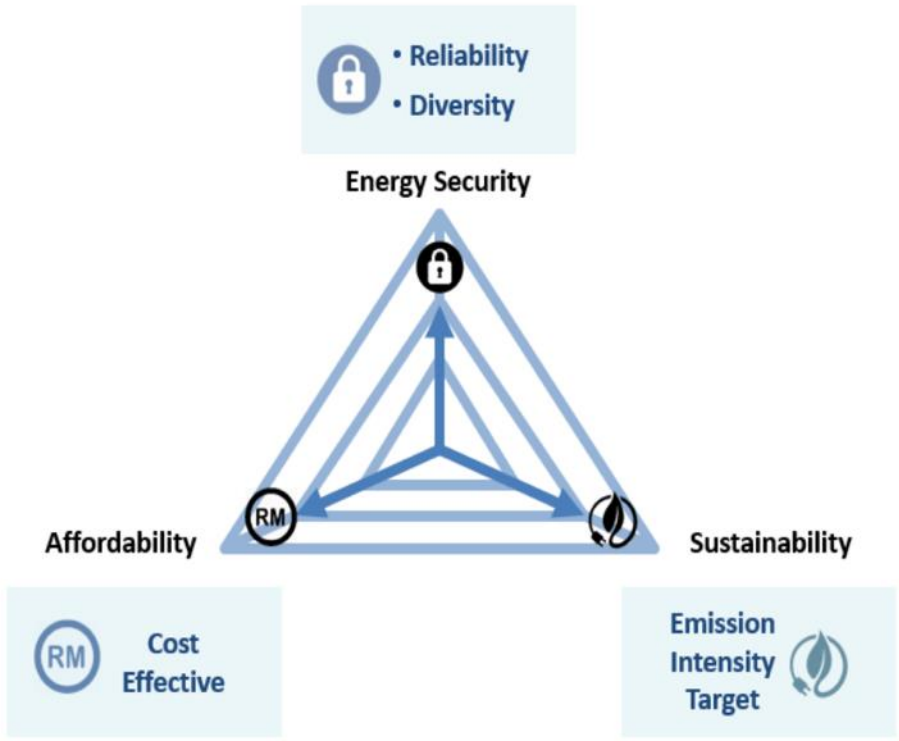


Total: 36,266 MW

Total RE: 7787MW
Large hydro + Other RE

Source: Energy Commission of Malaysia

THE GUIDING PRINCIPLE



Energy Security

Reliability

LOLE (Loss of Load Expectation)

- Expected days per year of firm load shed events
- Peninsular Malaysia 1 day/year

Reserve Margin

- Difference between total installed generating capacity and peak demand (%)
- Approved minimum Reserve Margin by ST

2020 – 2024 : 28%
2025 – 2029 : 25%
2030 – 2034 : 23%
2035 – 2037 : 20%

Diversity

Herfindahl-Hirschman Index (HHI)

- A measure of fuel mix diversity
- HHI = % $Fuel_1^2$ + % $Fuel_2^2$ + … % $Fuel_n^2$
- 2025: 0.4 target

Affordability

Cost Effective

- Optimal generation expansion plan
- Least cost dispatch

Sustainability

Emission Target

COP21 Target

- 2030: 45% emission intensity reduction from 2005 level with support from developed countries

Government Aspirations

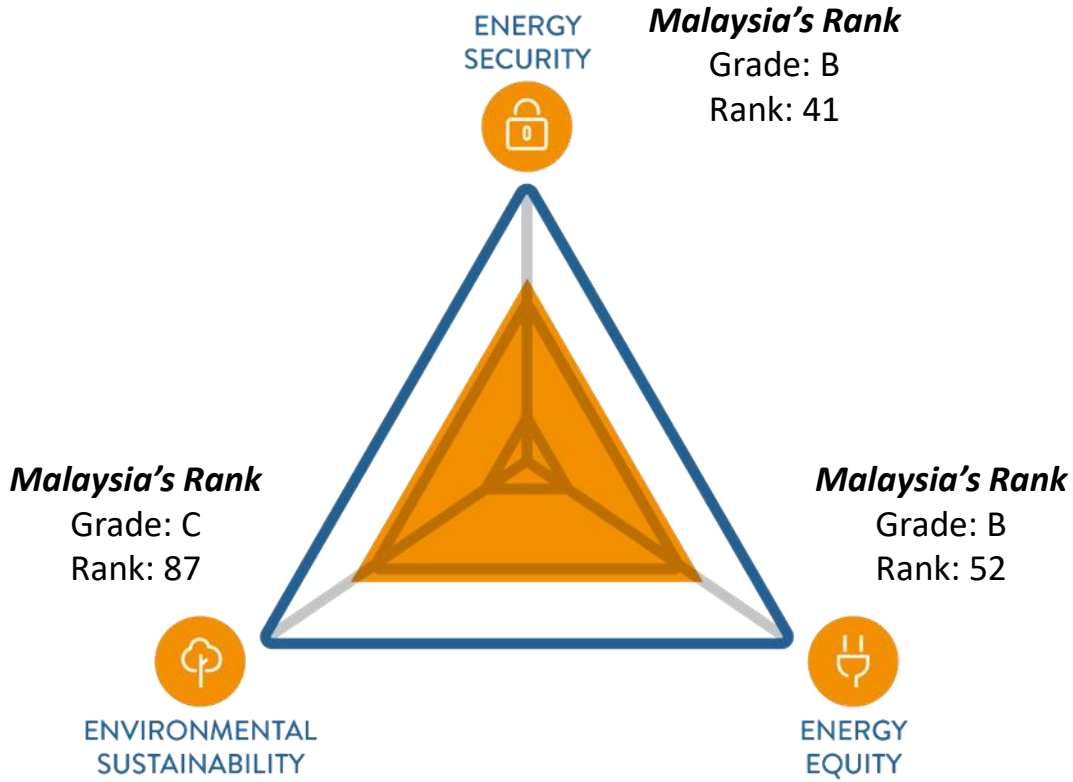
- 2025: 20% RE in capacity mix
- Reduce dependence on coal
- No Nuclear

Source: Report On Peninsular Malaysia Generation Development Plan 2019 (2020 – 2030)

Energy Trilemma as the guiding principle in power planning

MALAYSIA IN GLOBAL ENERGY LANDSCAPE

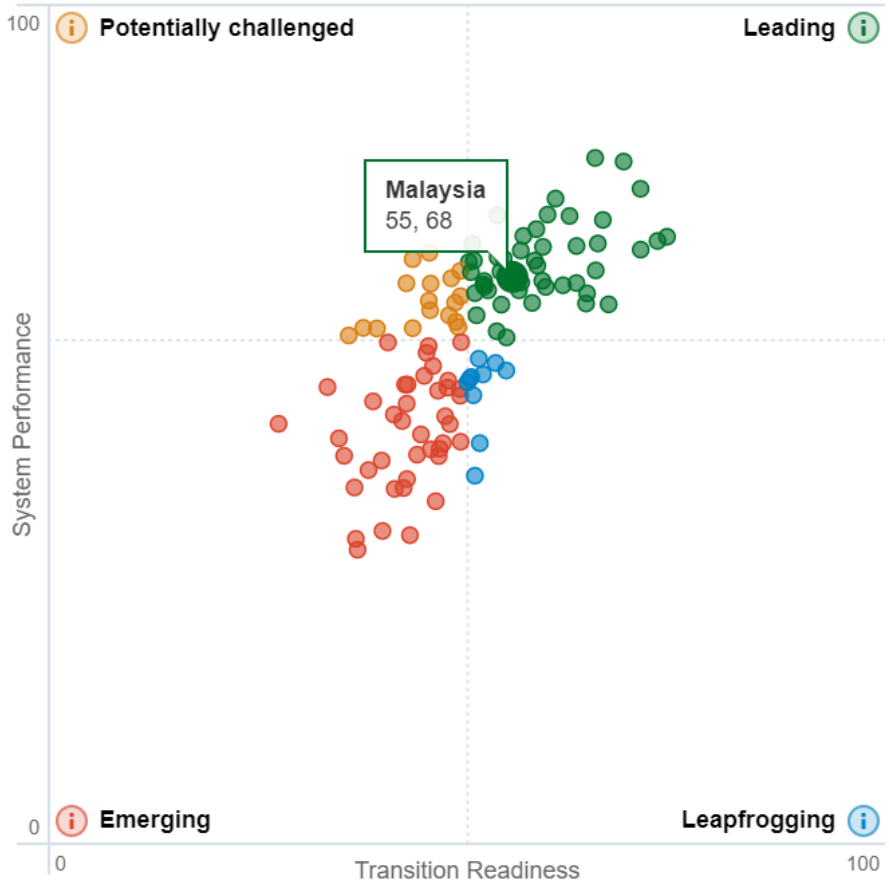
Energy Trilemma Index by World Energy Council 2019



Malaysia's rank over 128 countries

Calculations are based on 32 indicators chosen by WEC as part of their methodology
Source: WEC, Climate Watch

Energy Transition Index by World Economic Forum 2019

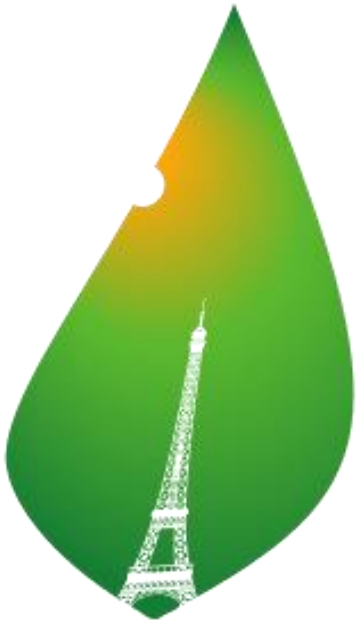


Malaysia ranks no 31 over 115 countries

The Index benchmarks countries on the performance of their energy system and their readiness for energy transition
Source: WEF

CLIMATE CHANGE CHALLENGES IN MALAYSIA

MALAYSIA NDC TARGET

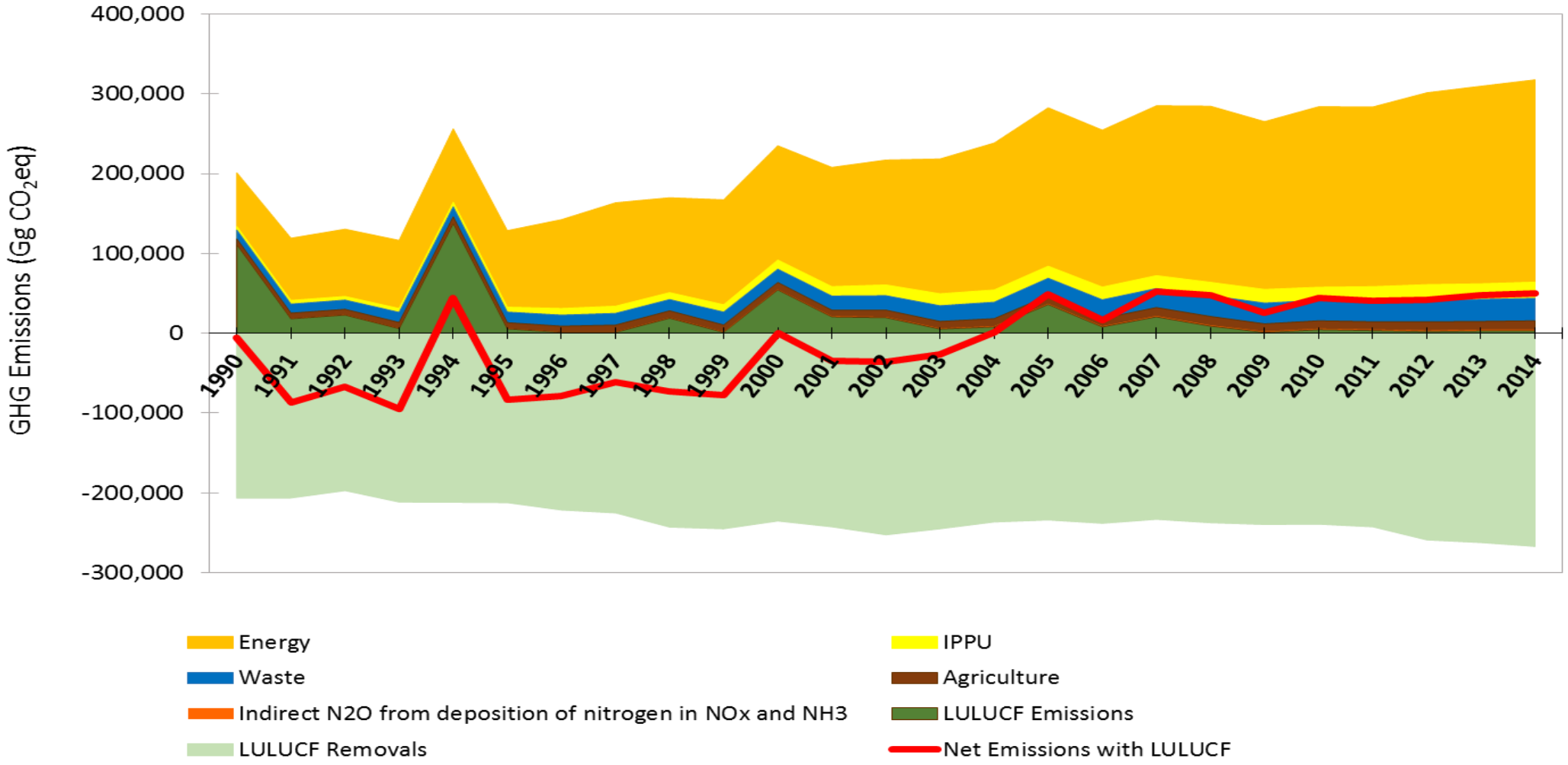


Malaysia intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005. This consists of 35% on an unconditional basis and a further 10% is condition upon receipt of climate finance, technology transfer and capacity building support from developed countries

Malaysia don't have Sectoral targets under NDC

Source: Third National Communication And Second Biennial Update Report to the UNFCCC, 2018

MALAYSIA'S GHG INVENTORY: 1990 - 2014



Source: Third National Communication And Second Biennial Update Report to the UNFCCC, 2018

MALAYSIA'S GHG INVENTORY: 1990 - 2014

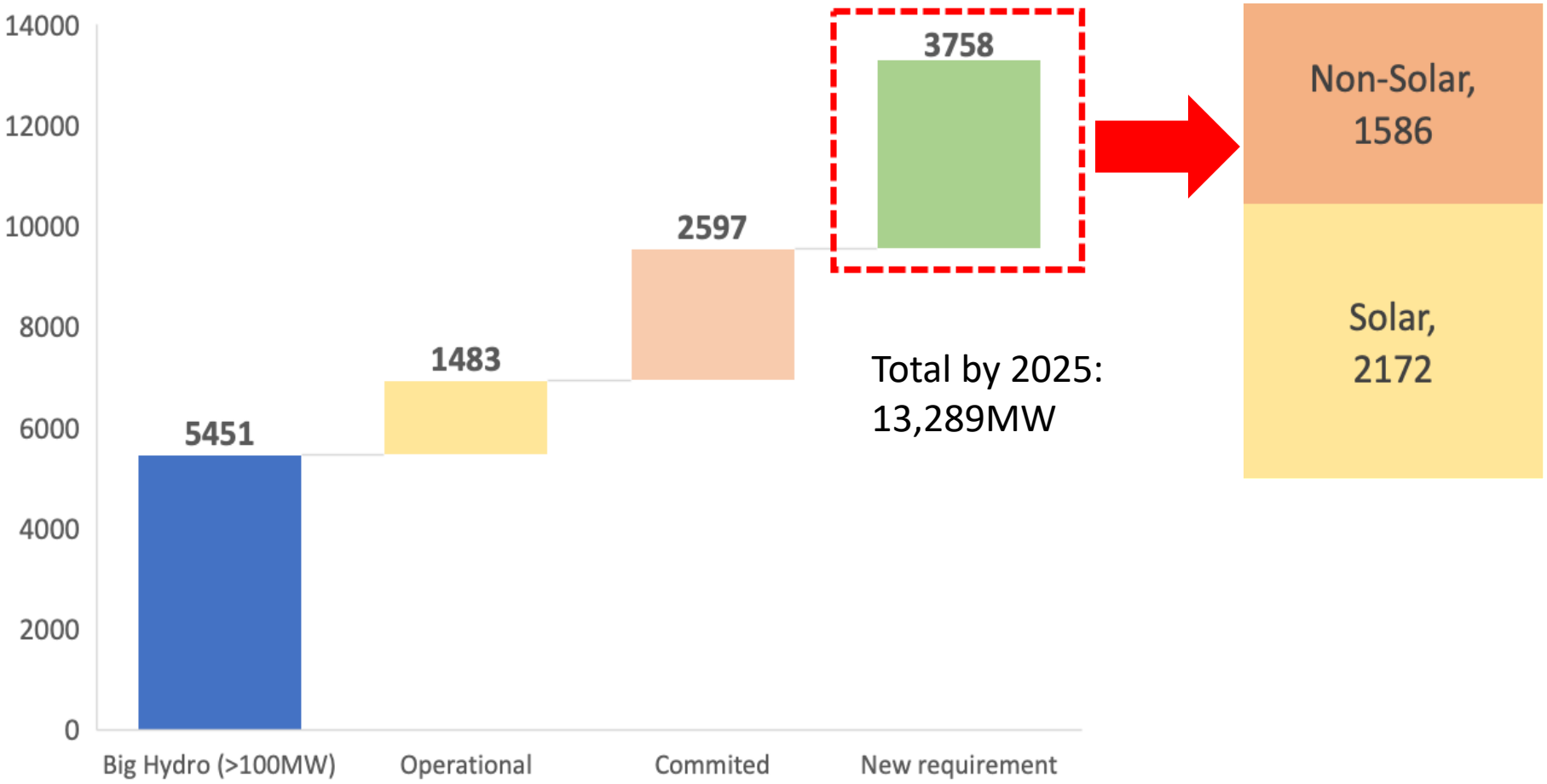
SECTOR	EMISSIONS / REMOVALS ($Gg\ CO_2eq$)
Energy	253,517.23 (80%)
Industrial Processes	20,257.83 (6%)
Agriculture	10,850.77 (3%)
LULUCF (Emissions)	3,317.15 (1%)
Waste	28,217.35 (9%)
Other	1,466.48 (1%)
Total emissions	317,626.83
Total sink	-267,147.77
Net total (after subtracting sink)	50,479.06

Energy Sub-Sectors:

Breakdown of GHG Emission by Sub-Sector in Energy		
	%	Gg CO2 eq
Electricity generation	39.2%	99,379
Transport	24.0%	60,844
Fugutive Emissions	10.2%	25,859
Manufacturing Industries	10.1%	25,605
Gas Transformation	10.0%	25,352
Petroleum Refining	3.2%	8,113
Agricukture	1.3%	3,296
Commercial	1.1%	2,789
Residential	0.8%	2,028
Others	0.2%	507

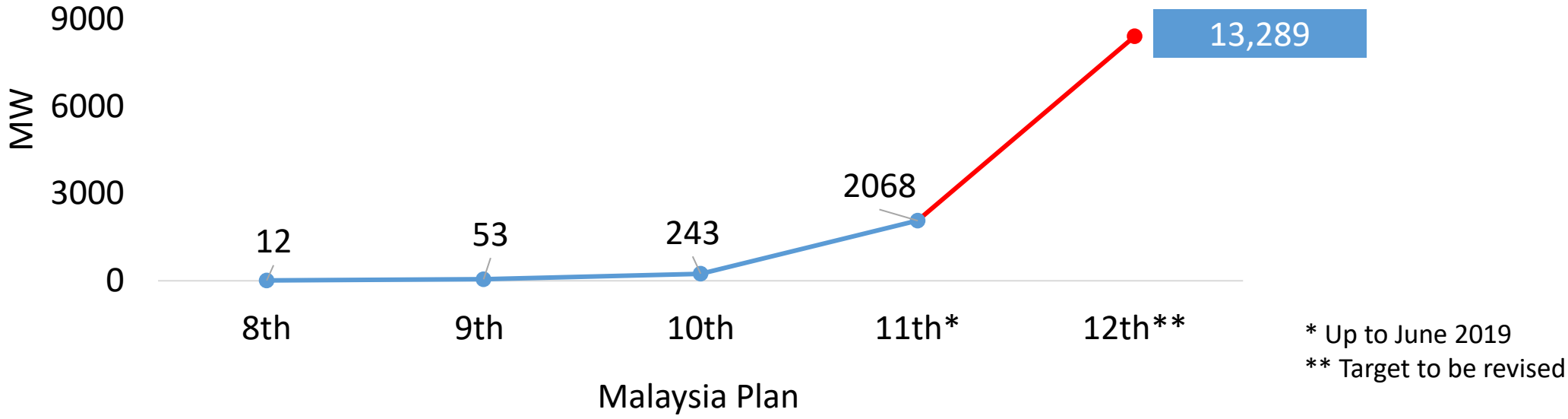
SUSTAINABLE ENERGY DEVELOPMENT IN MALAYSIA

RE TARGETS BY 2025



The new RE requirement needed to meet the 30% RE capacity mix

RE AS MAJOR FUEL IN THE FUTURE



8thMP (2001-2005)
RE as the 5th Fuel
SREP Programme
12 MW (2005)

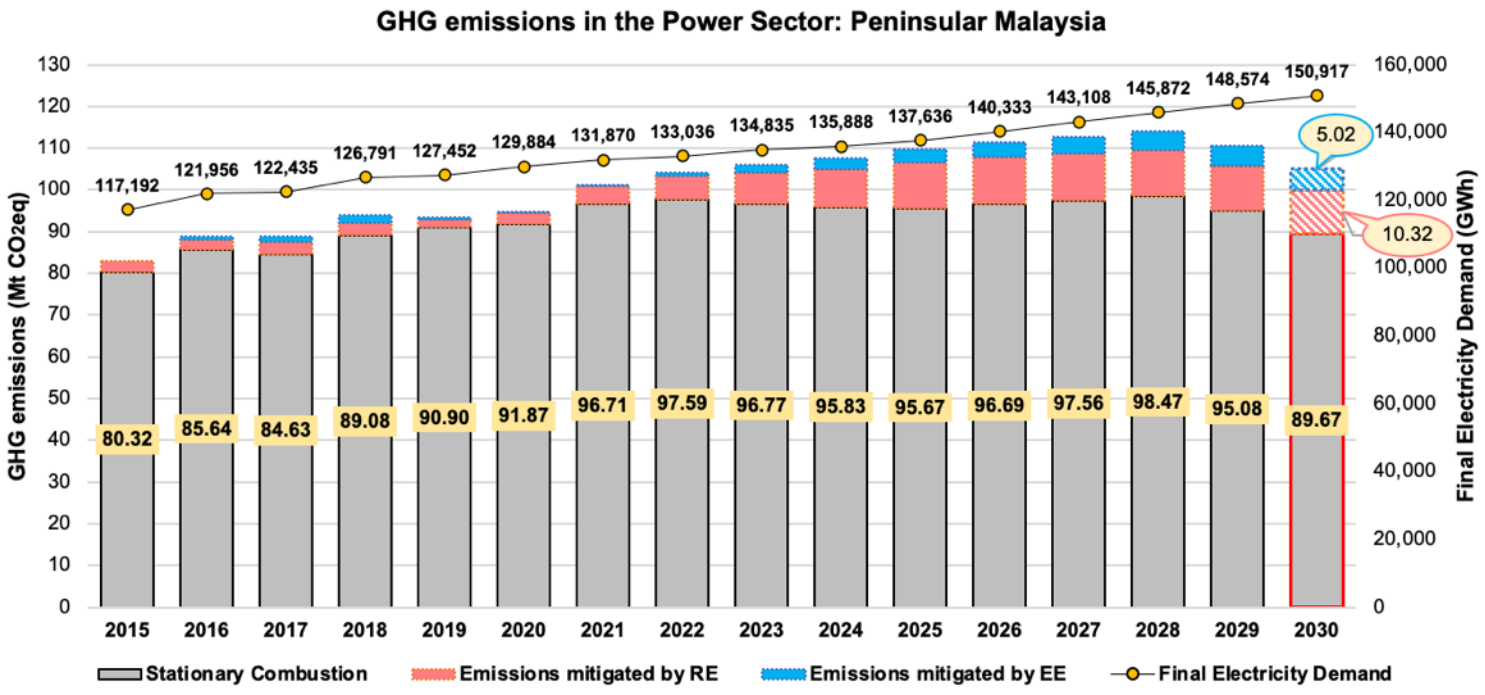
9thMP (2006-2010)
NREPAP formulated & launched
53 MW (2009)

10thMP (2011-2015)
Enactment of RE Act & SEDA Act
Introduction of FiT
243 MW (2014)

11thMP (2016-2020)
Implementation of Large Scale Solar Programme & NEM Scheme
2,068 MW (2019)

12thMP (2021-2025)
30% RE Capacity Mix in 2025
13 289 MW (inlc Large Hydro)

IMPACT ON GHG EMISSION REDUCTION



Notes: Numbers is preliminary. Exclude Sabah and Sarawak
The cheapest option of energy is being replaced by RE & EE

Electricity demand is projected to continuously increase.

Under cheapest energy sources option, GHG is expected to increase.

With policy interjection in RE & EE, GHG is expected to reduced despite the demand increases.

Avoided GHG emission is expected to reach about 11.5% (15.34 Mt CO_2) by 2030

CONCLUSION

CONCLUSION

1. Energy Trilemma is Malaysia's guiding principle for energy planning. Balancing between security, sustainability and affordability will be the ultimate aim in energy policy in Malaysia

2. Energy sector is the biggest GHG emitter in Malaysia. However, power sector contributes only one-third of total GHG emission.

3. Malaysia has been gradually increasing the RE capacity in support of climate change mitigation actions

4. Strategic partnership and collaboration between economies can help the region, including Malaysia to achieve a better technological advancement in reducing GHG emission.

THANK YOU