Energy Security and Carbon Neutrality: ASEAN realistic pathway

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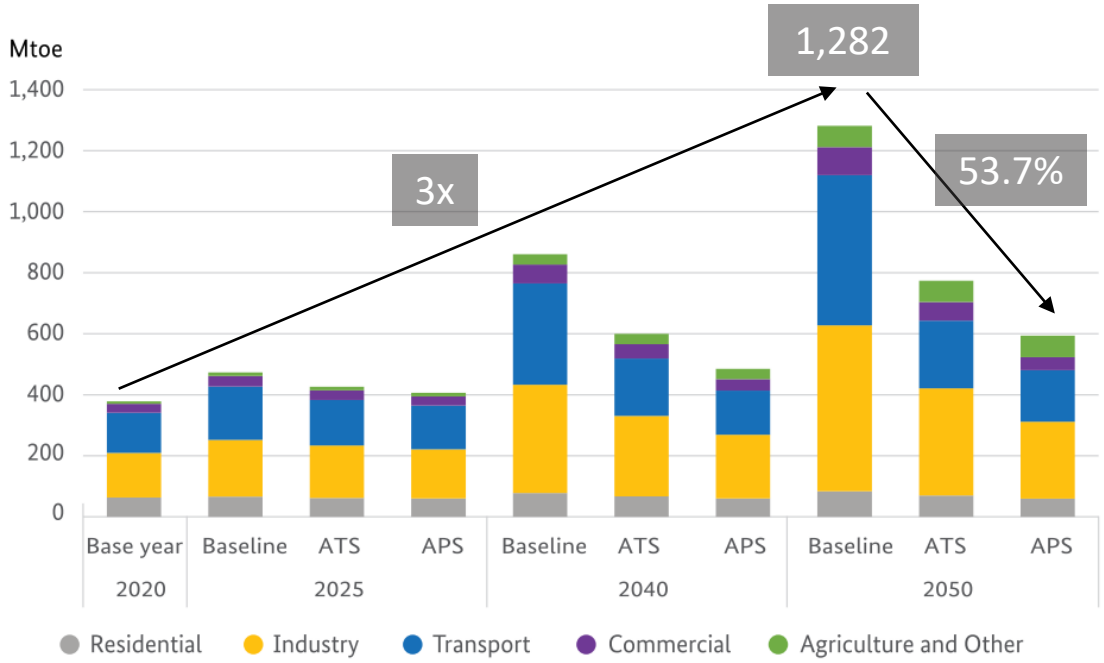
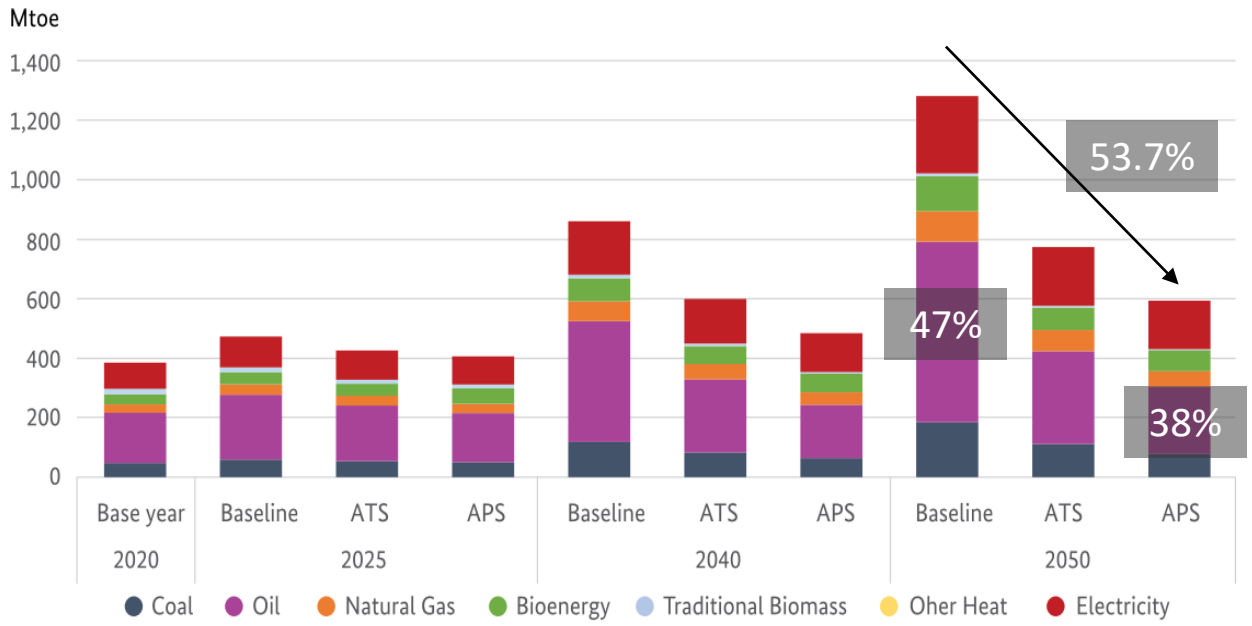
1. Energy landscape of ASEAN: demand side

By Sector



By Fuel

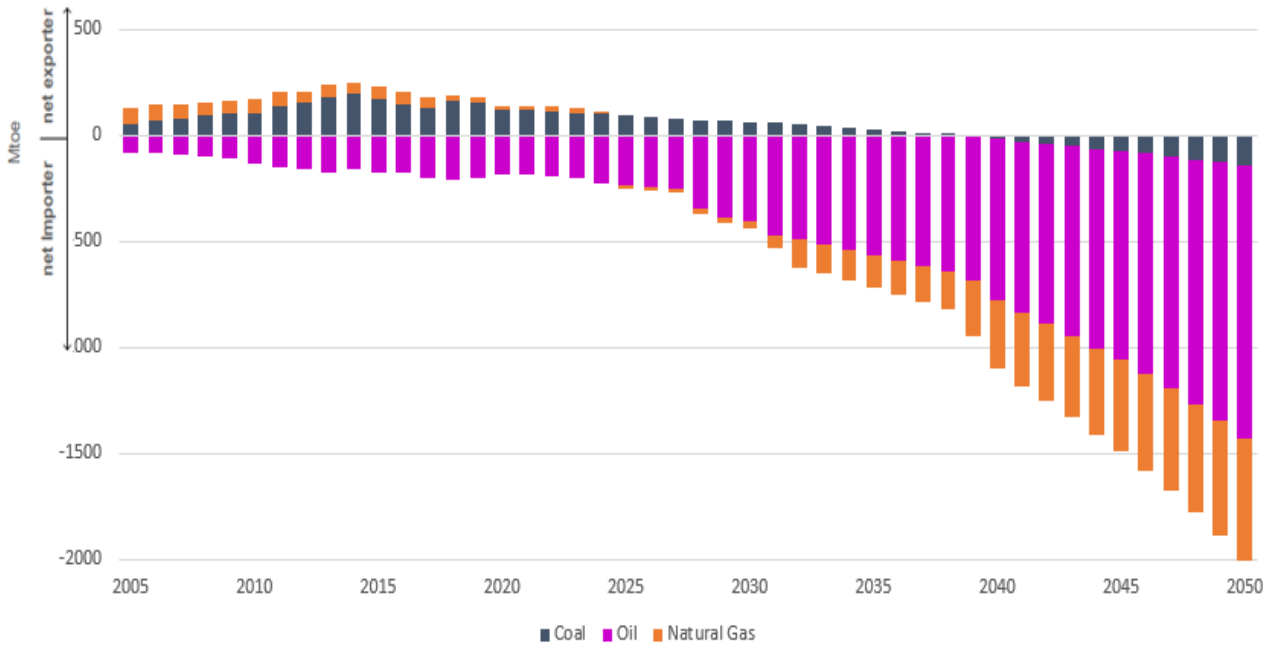


Industry and transport sectors continue to be the highest energy consuming sectors in the region

Electricity demand value is reduced from 260 Mtoe in Baseline to 163 Mtoe in APS, but its share increases from 20% in Baseline to 27% in APS, due to the bigger reductions in the fossil fuels consumption

1. Energy landscape of ASEAN: Import dependency

Net Import, Baseline Scenario



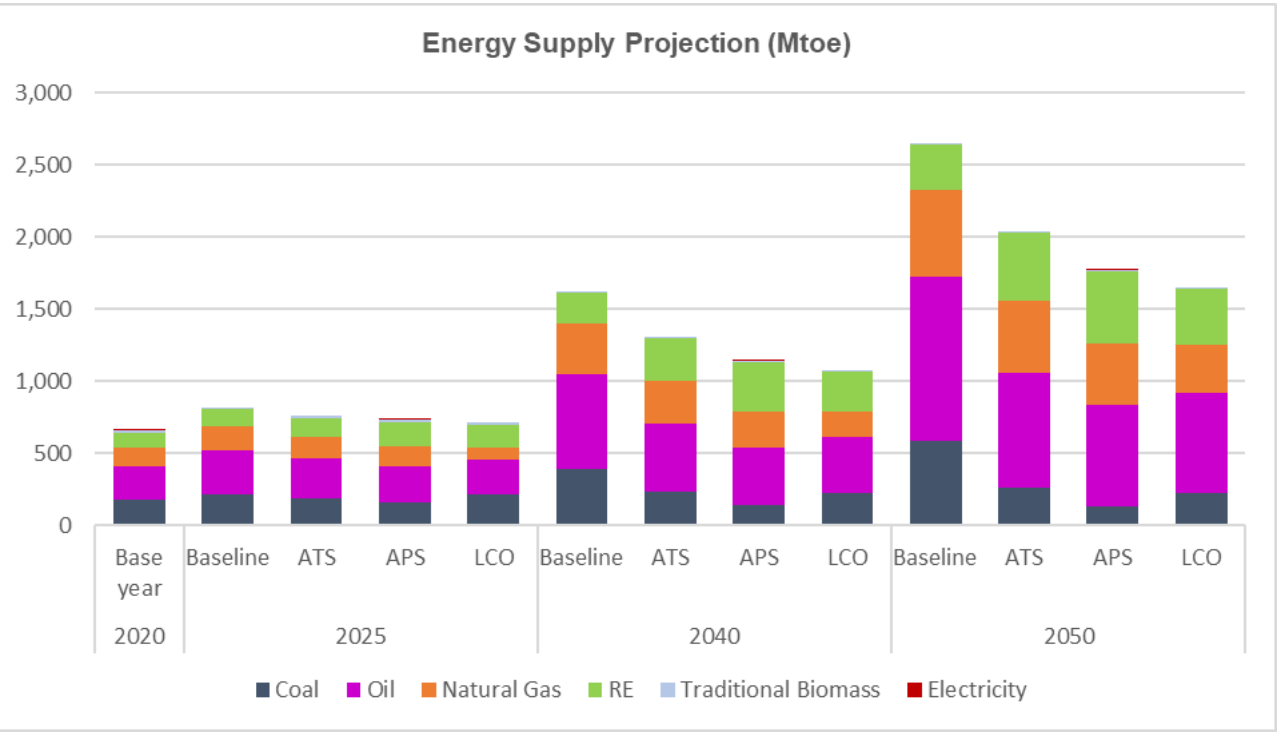
Net Importer Status of ASEAN

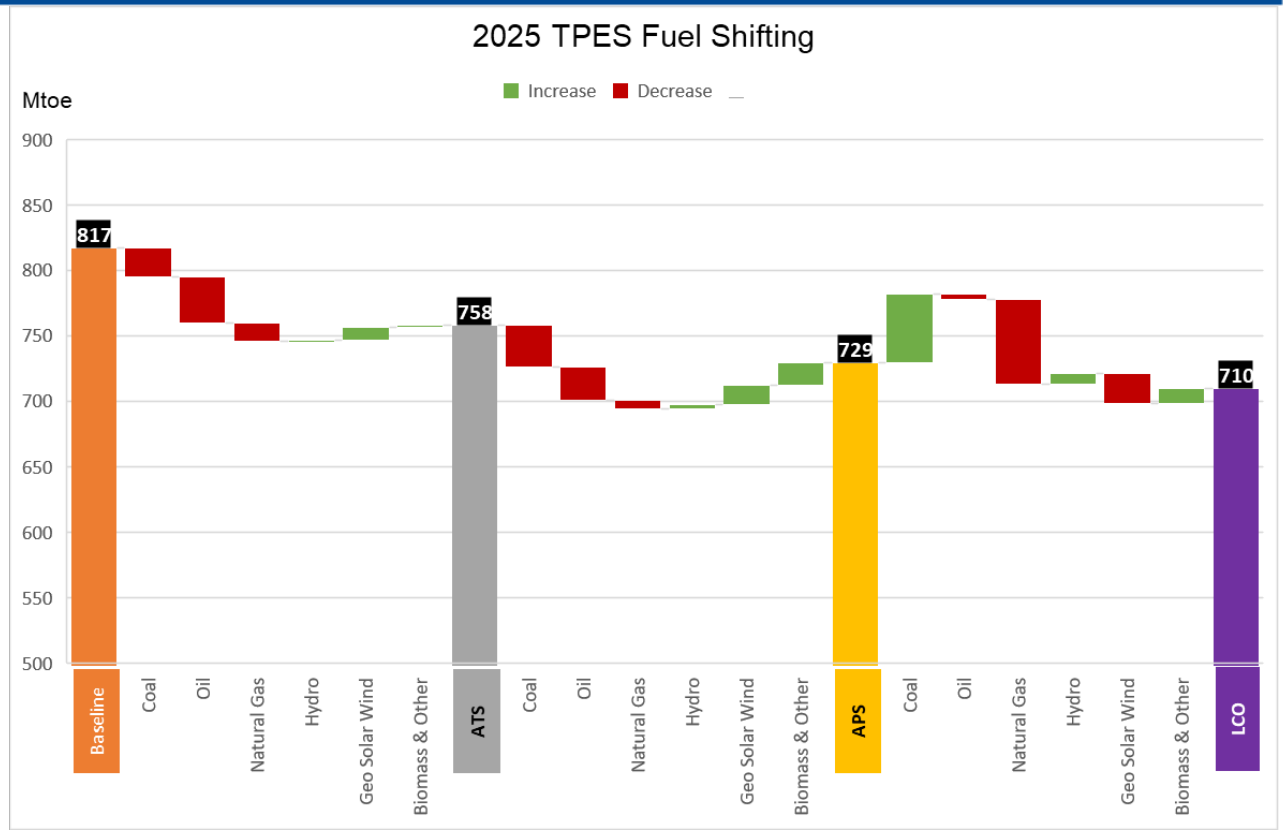
		Oil	Gas	Coal
Baseline	Start Year	Historical	2025	2039
	2050	-1289	-577	-143
ATS	Start Year	Historical	2025	Post 2050
	2050	-947	-479	53
APS	Start Year	Historical	2026	Post 2050
	2050	-847	-402	138
LCO	Start Year	Historical	2035	Post 2050
	2050	-846	-309	79

- In Baseline Scenario, without significant discoveries and/or additions to existing production infrastructures, and with continuous utilization of fossil fuels, ASEAN would become net importer of natural gas and coal starting from 2025 and 2039, respectively.
- Previously, AEO6 projected the years to be 2024 and 2035.

- With increasing share of RE in the energy mix and implementation of EE&C measures, ASEAN would remain net exporter of coal during the projection period.
- Natural gas net import starts similarly, in 2025 and 2026, respectively. Meanwhile, oil net import can be reduced by 26% (ATS) and 34% (APS) compared to the Baseline in 2050.

1. Energy landscape of ASEAN: supply side

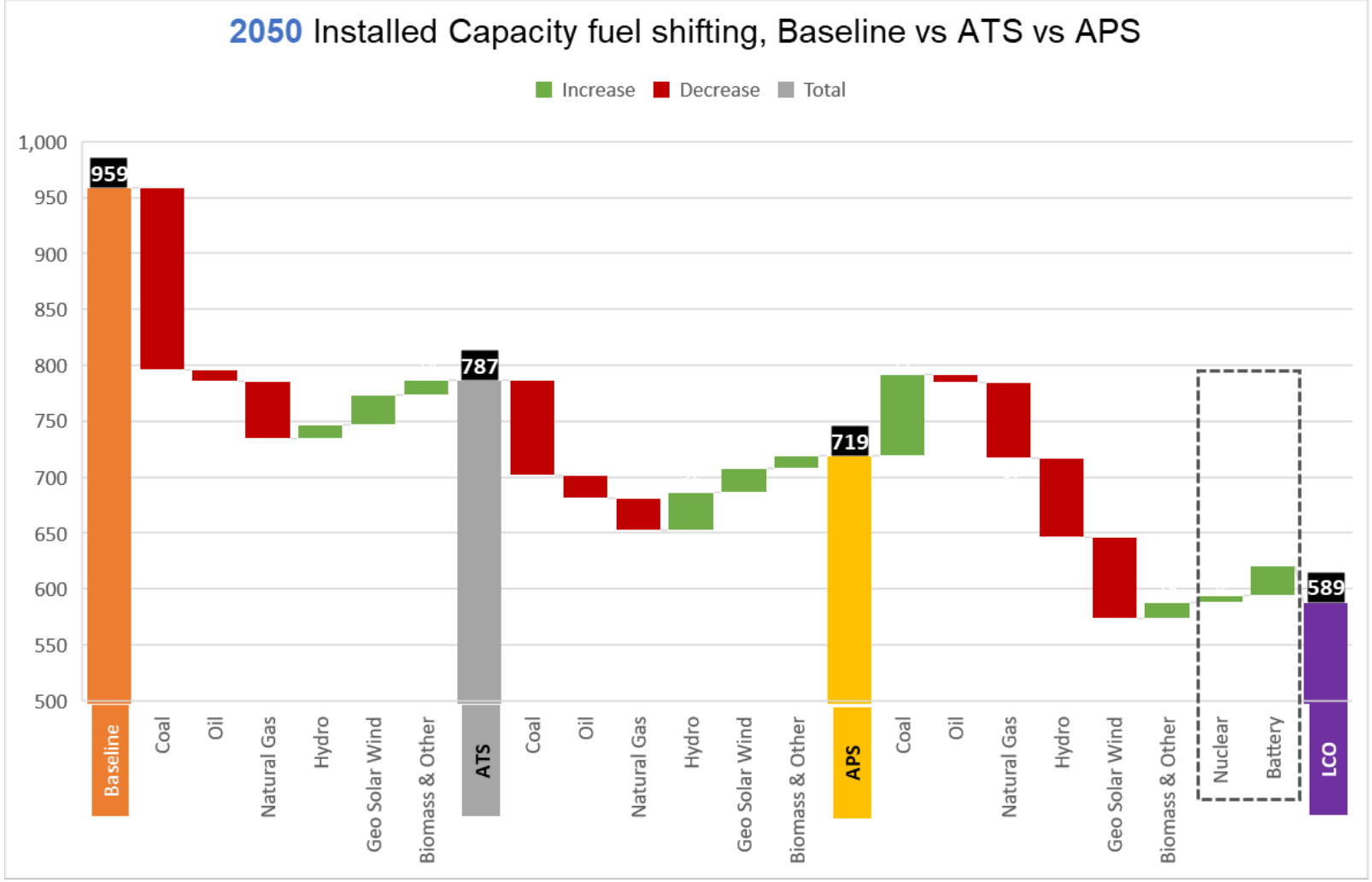




- Baseline Scenario projected a 4x of energy required to fuel the economic growth from 2020 to 2050. Energy efficiency measures reduce the need of energy to 3x and 2.7x in ATS and APS
- LCO scenario reduces the demand further to 2.5x of 2020.
- In all scenarios, **fossil fuels remain the largest component**

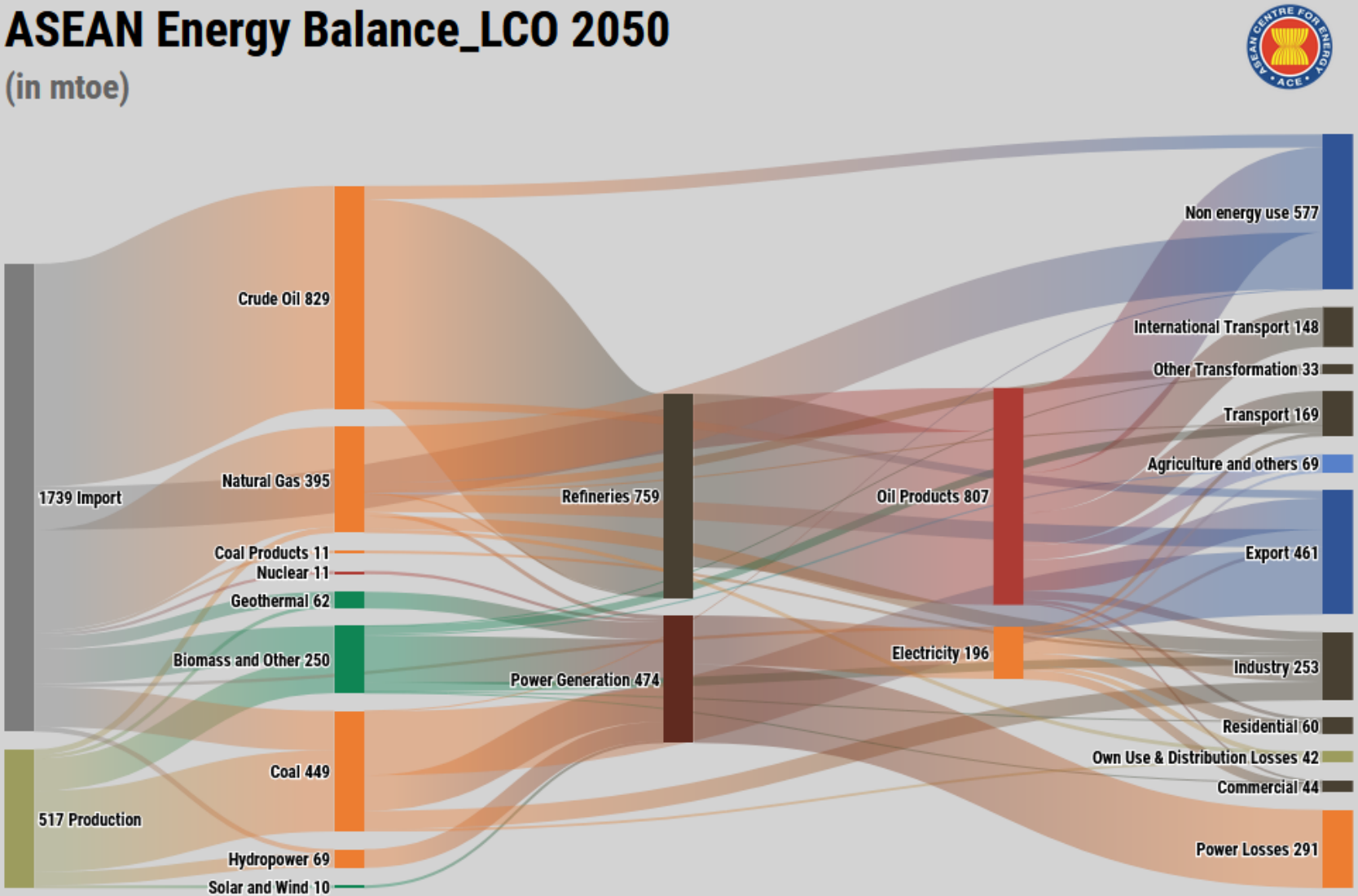
- To reach APAEC targets in 2025, energy efficiency measures need to be coupled with increasing share of RE.
- LCO Scenario further reduce the TPES, shifting the system away from natural gas and solar-wind, replaced by coal and bioenergy.

1. Energy landscape of ASEAN: supply side



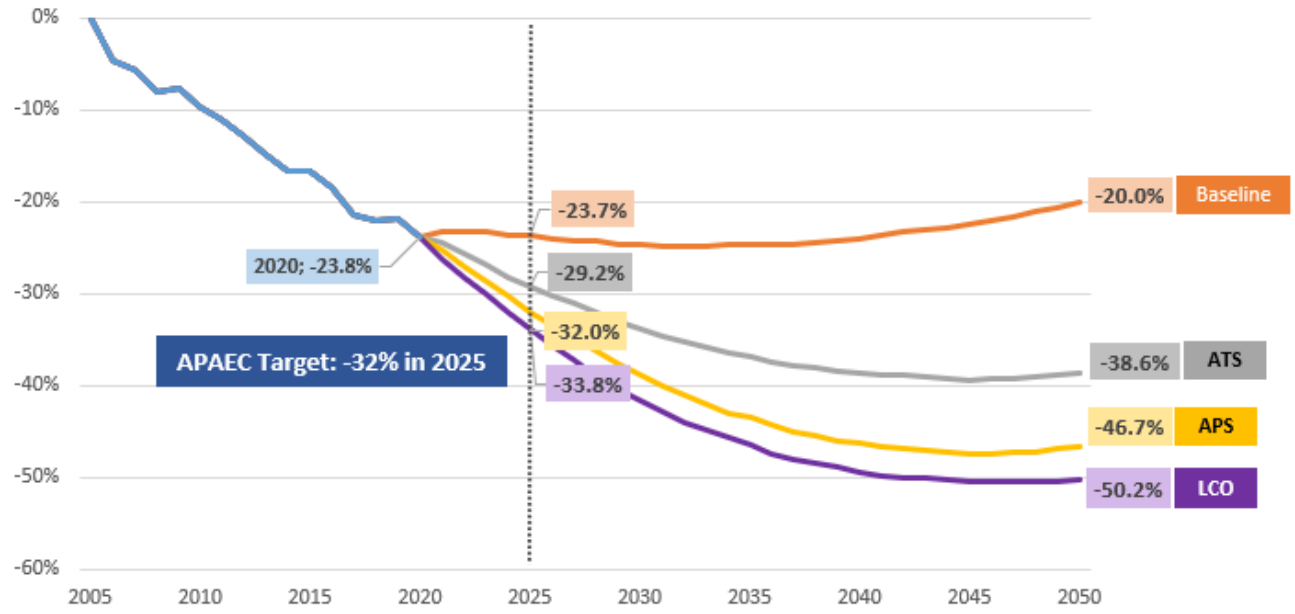
- As the needs of installed capacity decrease due to energy efficiency, clean energy penetrates the power system.
- With the same level of electricity need, LCO requires less installed capacity than APS. **Bioenergy & nuclear** along with **storage** enters the mix, also coal.
- **Interconnections** are selected as cost-optimized solution.

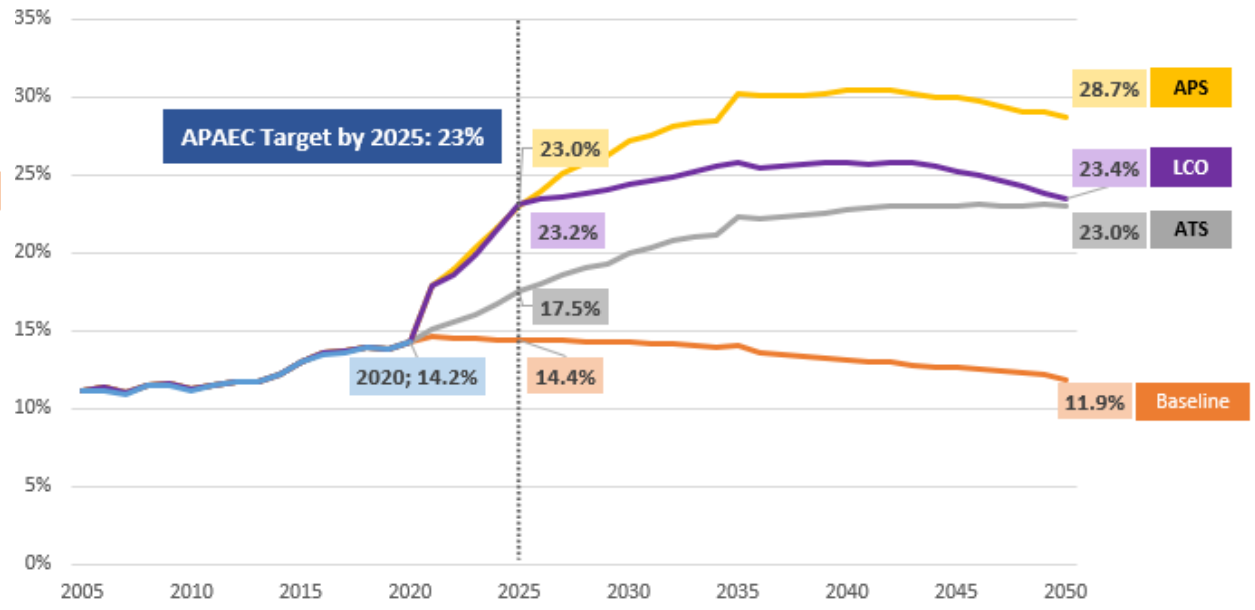
1. Energy landscape of ASEAN: conversion



Source: https://aeds.aseanenergy.org

1. Energy landscape of ASEAN: RE and EE progress





- In 2020, EI Reduction reached 23.8% based on 2005 level, due to the economic contraction caused by the pandemic. Even so, AMS is projected to not reach 2025 target, with a 2.8%-point gap.
- In the long term, the region is projected to reach 38.6% and 46.7% of EI reduction in ATS and APS, respectively.
- With cost-efficient power system in the LCO Scenario, a higher EI reduction can be achieved in 2050.

- Amidst increasing installed capacity, RE share in TPES reached 14.2% in 2020. The same trend of national policy would result in 17.5% of share in 2025, 5.5%-point shy of the aspirational target.
- In the long term, RE share in TPES might reach 28.7% in APS. Its progress slowed down in the future, requiring more innovative measures to increase RE, especially in end-use sector.

2. Position of ASEAN in global supply chain of energy

- **Fossil fuels:**

✓ Most of ASEAN countries are positioned **as big importer of oil and have trade deficit** along global supply chain of oil in 2021.

✓ Most of ASEAN countries is positioned as **importing countries in global supply chain of coal** in 2021 (only Indonesia is the key exporter of coal among others).

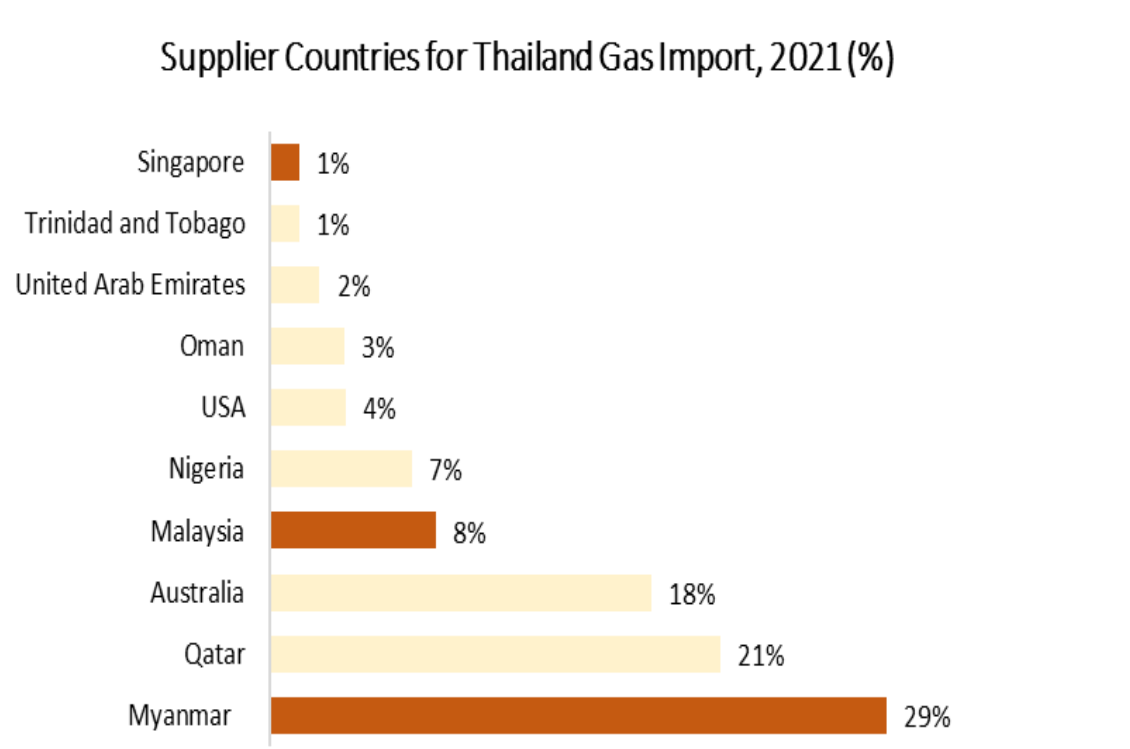
- **Critical minerals:**

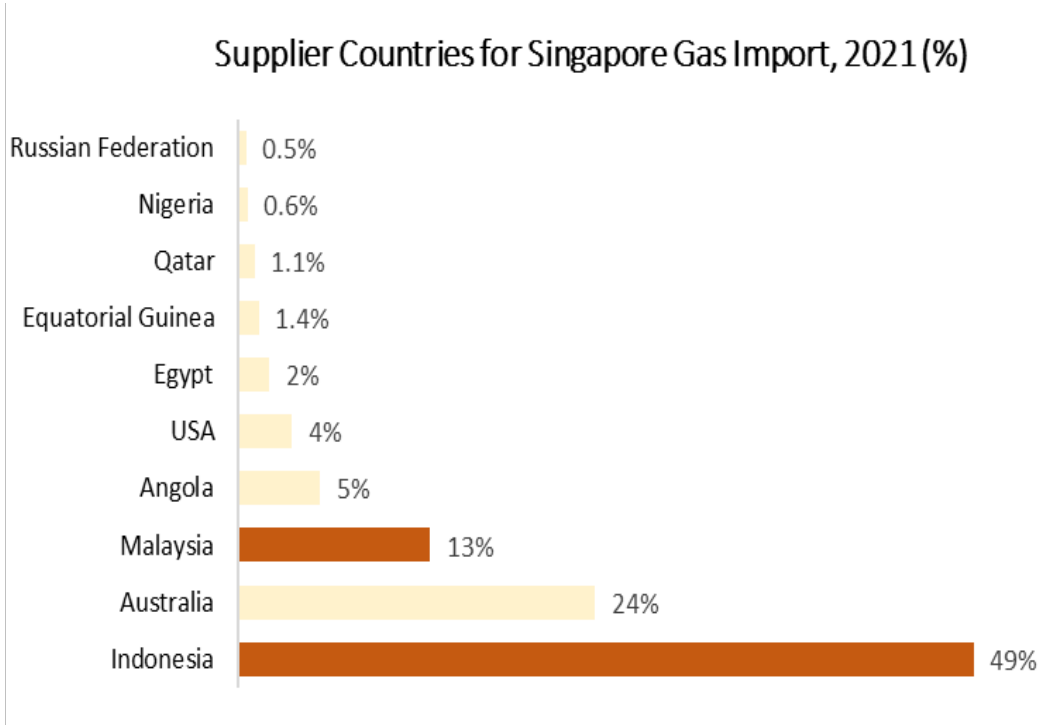
✓ ASEAN (Indonesia, Philippines, and Myanmar) in on the key positions in global supply chain of critical minerals particularly on **nickel, tin, rare earth, and bauxite.**

✓ ASEAN accounts for **6% of global bauxite production.**

- **RE technologies manufacturing industries** (solar PV, EV, and battery industries) – Malaysia, Vietnam, Thailand, and Indonesia are key players in these sectors.

2. Position of ASEAN in global supply chain of energy





- ASEAN has trade surplus of natural gas by having larger amount of export than its import in 2021.
- ASEAN is highly dependence on other ASEAN countries in natural gas trade.

3. Ways forward to pursue both energy security and carbon neutrality in the region

- Under the context of energy landscape in ASEAN, **energy security** still needs to be done in the priority actions particularly on transition period towards carbon neutrality (medium term).
- **"Availability, accessibility, and affordability"** of energy is needed to support region's efforts not only on economic goals, but indeed it is strongly related to efforts in other goals (climate and SDGs).
- **Optimal technological choice** would be more critical for ASEAN to pursue both carbon neutrality and energy security targets.
- Utilizing the ASEAN position in global supply chain of critical minerals, the region needs to maximize it **by upscaling investment in the sector to also cover more downstream production stages.**

3. Ways forward to pursue both energy security and carbon neutrality and energy security in region

- **Upscaling private sector investment** would be more urge for the region.
- **Energy demand management measures** would be also critical to manage the speed of energy demand growth of the region – power, transport, industry.
- **Embed the circular economy** action into energy security and carbon neutrality actions of the region would be also necessary.
- Regional efforts need to be translated into diversity of each AMS circumstances too**– one size doesn't fit all.**

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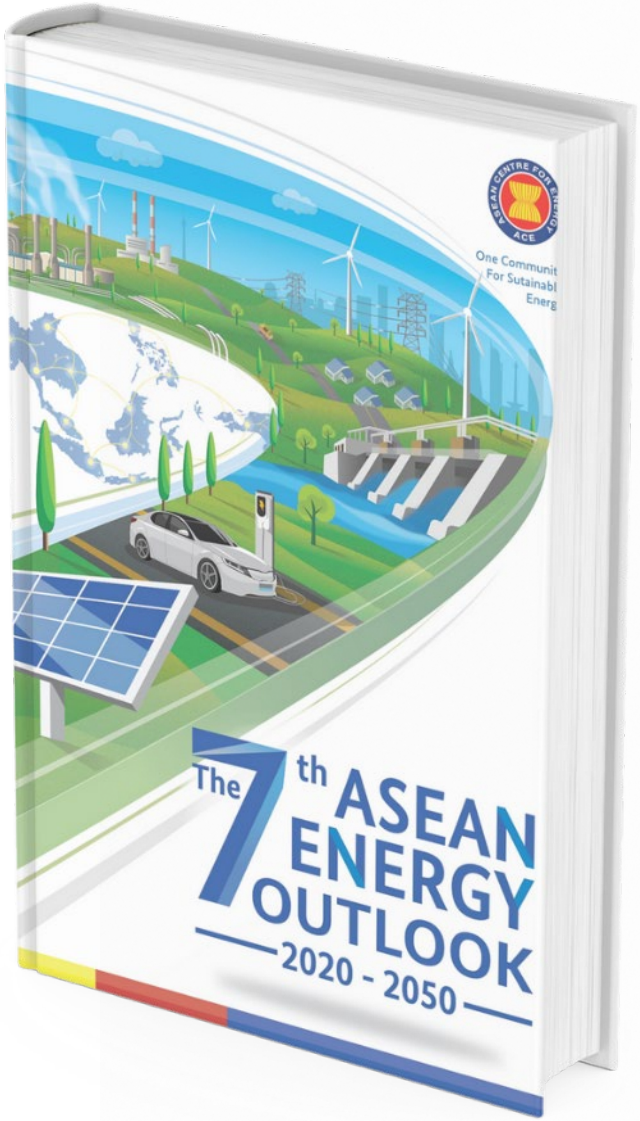

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