

# ASEAN-6 ENERGY TRANSITION: COMMITMENTS, OUTLOOK, AND PERFORMANCE

With the global push for energy transition, the countries of Indonesia (ID), Malaysia (MY), the Philippines (PH), Singapore (SG), Thailand (TH), and Vietnam (VN), collectively known as the ASEAN-6 member states (AMS-6), among other signatories to the United Nations Framework Convention on Climate Change (UNFCCC), submitted their commitments to reduce greenhouse gases (GHG) emission rates in certain sectors with corresponding timelines (Table 1). Targets were classified either as unconditional, referring to policies and measures which can be undertaken using nationally mobilized resources, or conditional which refer to those requiring support or the means of implementation under the Paris Agreement.

**TABLE 1**  
**NATIONALLY DETERMINED CONTRIBUTIONS (NDCs)**  
**ON REDUCING GHG EMISSIONS OF AMS-6**

	ID	MY	PH	SG	TH	VN
<b>Target (%) vs. BAU<sup>a/</sup></b>						
- Unconditional	29	45 <sup>b/</sup>	2.71	36 <sup>c/</sup>	20	9
- Conditional	41	n/a	72.29	n/a	20	27
<b>Sectors</b>						
- Energy	✓	✓	✓	✓	✓	✓
- Industrial processes and product use (IPPU)	✓	✓	✓	✓	✓	✓
- Agriculture	✓	✓	✓	✓	✓	✓
- Waste	✓	✓	✓	✓	✓	✓
-Transport			✓		✓	
- Land use, land-use change and forestry (LULUCF)	✓	✓		✓		✓
<b>GHG Coverage</b>						
- Carbon Dioxide (CO <sub>2</sub> )	✓	✓	✓	✓	✓	✓
- Methane (CH <sub>4</sub> )	✓	✓	✓	✓	✓	✓
- Nitrous Oxide (N <sub>2</sub> O)	✓	✓	✓	✓	✓	✓
- Hydrofluorocarbons (HFCs)		✓	✓	✓	✓	✓
- Perfluorocarbons (PFCs)		✓	✓	✓	✓	✓
- Sulphur hexafluoride (SF <sub>6</sub> )		✓	✓	✓	✓	✓
- Nitrogen trifluoride (NF <sub>3</sub> )		✓		✓		
<b>Timeline</b>	2020-2030	2021-2030	2020-2030	2021-2030	2021-2030	2021-2030

Notes: <sup>a/</sup>BAU means Business as usual baseline scenario or no RE transition  
<sup>b/</sup>Economy-wide carbon intensity (against GDP)

<sup>c/</sup>Reduction in energy intensity from 2005 at peak emissions of 65 MtCO<sub>2</sub>e

Source: ASEAN Center for Energy's ASEAN Energy for 2022, Table 1, p. 9.

In terms of sectors, the Philippines and Thailand did not make commitments to reduce GHG emissions in the use of land, land use change and forestry. On the other hand, Indonesia, Malaysia, Singapore, and Vietnam have not committed to reduce GHG emissions in their transport sectors.

In terms of GHG coverage, the Philippines has not committed to reduce the emissions of the following gases: i) sulphur hexafluoride, which is used in the

<sup>1</sup> David Nikel (2020-01-15). "Sulfur hexafluoride: The truths and myths of this greenhouse gas". phys.org.



electrical industry as a medium for circuit breakers, and other electrical equipment<sup>1</sup>; and ii) nitrogen trifluoride, which is increasingly used within the manufacture of flat-panel displays, photovoltaics, LEDs and microelectronics<sup>2</sup>. On the other hand, Malaysia and Singapore have committed to reduce emissions of all GHGs in the sectors they have committed under the Accord.

**TABLE 2**  
**SOCIO-ECONOMIC AND ENERGY INDICATORS OF AMS-6, 2020**

	ID	MY	PH	SG	TH	VN
GDP, trillion USD	1.1	0.3	0.4	0.3	0.5	0.3
Population, million	273.5	32.4	109.6	5.7	69.8	97.3
-GDP ('000 USD) per capita	3.9	10.4	3.3	59.8	7.2	2.8
-access to electricity, %	99.2	99.9	87.9	100.0	99.7	99.5
Installed Power Cap., GW	71.0	34.4	26.3	12.6	49.4	68.8
RE Share/Installed Cap, %	14.8	24.6	29.1	4.3	30.3	55.8
Target, RE share, %	23-31 <sup>a/</sup>	31.0	35-50 <sup>b/</sup>	22-43 <sup>c/</sup>	30.2	15-30
-by end period	2025/ 2050	2025	2030/ 2040	2030/ 2050	2037	2030/ 2050

Notes: <sup>a/</sup>23% of RE in Total Primary Energy Supply by 2025 and 31% by 2050  
<sup>b/</sup>Equivalent to RE installed capacity of 15.3GW in 2030 and 20GW in 2050

<sup>c/</sup>Represents updated solar target of 2.5GW in 2025 and 5GW in 2050  
Source: ASEAN Power Updates September 2021 Edition, ASEAN Key Figures 2021, and ASEAN Center for Energy's ASEAN Energy for 2022

As of 2020, the Philippines has the lowest proportion of the population having access to electricity at only 87.9% compared with the rest of the ASEAN-6 which all have more than 90% access (Table 2). Although having the largest population and a geography similar to the Philippines, Indonesia has 99.2% of its population with electricity.

On the other hand, with the smallest population among the group but with the highest GDP per capita and a considerably compact territory, Singapore is the only state with its population having complete (100%) electrification access.

<sup>2</sup> Richard Conniff (2008-11-13). "The Greenhouse Gas That Nobody Knew". Yale School of Environment.

Among the ASEAN-6, the Philippines has the fifth largest installed power capacity with 26.3GW which is next to Malaysia (34.4GW), Thailand (49.4GW), Vietnam (68.8GW), and Indonesia (71.0GW) (Table 3). The Philippines, however, is third in its share of renewable energy over installed capacity with 29.1%, against Thailand (30.3%), and Vietnam (55.8%). Further, the country plans to transition to clean energy with 35% of its installed capacity to be obtained from renewable resources by 2030, the highest among its peers, and at pace with the ASEAN target by 2025.

**TABLE 3**  
**2020 INSTALLED POWER CAPACITY (IN GW) OF AMS-6 AND 2021 RE ADDITIONAL CAPACITY, BY SOURCE**

2020 Source	ID	MY	PH	SG	TH	VN	Total
<b>Fossil fuels</b>	<b>60.5</b>	<b>25.9</b>	<b>18.6</b>	<b>12.0</b>	<b>34.4</b>	<b>30.5</b>	<b>181.9</b>
- Coal	35.2	12.8	10.9		6.1	21.6	86.7
- Oil	4.8	0.1	4.2		0.4	1.7	11.2
- Gas	20.5	12.9	3.5	12.0	27.9	7.2	84.0
<b>Renewable energy</b>	<b>10.5</b>	<b>8.5</b>	<b>7.7</b>	<b>0.5</b>	<b>15.0</b>	<b>38.4</b>	<b>80.5</b>
- Hydro	6.1	6.2	3.8		8.1	20.8	44.9
- Geothermal	2.1		1.9				4.1
- Solar	0.2	1.5	1.0	0.3	2.9	16.7	22.5
- Wind	0.2		0.4		1.5	0.6	2.7
- Bioenergy	1.9	0.7	0.5	0.3	2.2	0.4	5.9
- Others	— <sup>a/</sup>				0.4	— <sup>a/</sup>	0.4
<b>Total Capacity</b>	<b>71.0</b>	<b>34.4</b>	<b>26.3</b>	<b>12.6</b>	<b>49.4</b>	<b>68.8</b>	<b>262.4</b>
<b>Share of RE in Total Capacity, %</b>	<b>14.8</b>	<b>24.6</b>	<b>29.1</b>	<b>4.3</b>	<b>30.3</b>	<b>55.8</b>	<b>30.7</b>
<b>2021 RE Additional Capacity (GW)</b>	<b>0.6</b>	<b>0.1</b>	<b>—<sup>a/</sup></b>	<b>0.3</b>	<b>1.3</b>	<b>0.5</b>	<b>2.9</b>

Notes: <sup>a/</sup>With installed capacity less than a tenth of GW.  
Source: ASEAN Power Updates September 2021 Edition, breakdown may not add up to total sum due to rounding-off differences.

As to plant capacity available in 2020, the AMS-6 had a combined capacity of 262.4GW, of which 69.3% (181.9 GW) is supplied by fossil fuels. In turn, about 93.8% of fossil fuels comes from coal and gas and supplies 65% of the total energy in the AMS-6. Indonesia is the largest user of fossil fuels at 33.2% of total (Table 3).

Meanwhile, renewable resources account for only 30.7% (80.5 GW) of total energy in the AMS-6 with hydropower comprising 55.8% of total renewables followed by solar at 28%. Vietnam is an exception where renewables supply 55.8% of total mainly from hydro and solar power. In comparison, the installed capacity from renewables for the Philippines is only 7.7% of total, with the bulk coming from hydro and geothermal sources.

Additional RE capacities were installed in 2021 at 2.9GW for the AMS-6, with Thailand installing the biggest additional capacity of 1.3GW, followed by Indonesia at 0.6GW, and Vietnam with 0.5GW; meanwhile the Philippines added only 49MW

**TABLE 4**  
**ENERGY TRANSITION INDEX (ETI) RANKING OF AMS-6, 2020 AND 2021**

ASEAN-6	Overall ETI Rank <sup>a/</sup>		Systems Performance Score		Transition Readiness Score	
	2020	2021	2020	2021	2020	2021
ID	<b>70</b>	<b>71</b>	61.0	67.8	44.0	44.8
MY	<b>38</b>	<b>39</b>	64.0	68.5	55.0	59.5
PH	<b>57</b>	<b>67</b>	62.0	66.5	49.0	47.0
SG	<b>13</b>	<b>21</b>	67.0	67.1	65.0	66.9
TH	<b>53</b>	<b>55</b>	61.0	64.0	51.0	55.4
VN	<b>65</b>	<b>65</b>	57.0	61.0	50.0	54.0

Notes: <sup>a/</sup>Country rank for Overall Energy Transition Index was based on average of SP and TR scores from 1-100, with 100 as best performance/ transition case.  
Source: WEF's Energy Transition Readiness Index Report 2020 and 2021

The ETI ranking of the World Economic Forum (WEF) for 2020 and 2021, which benchmarks the progress of 115 countries' energy transition for a decade, showed that only Vietnam among the ASEAN-6 maintained its standing, while the rest slipped from their previous ranks (Table 4). In 2020, four ranked in the upper half, with Singapore earning the highest spot among its peers for both years, followed by Malaysia, Thailand, the Philippines, Vietnam and Indonesia. In 2021, the Philippines registered the biggest decline in rank among its peers from 57<sup>th</sup> to 67<sup>th</sup> (10 spots), along with Singapore which dropped eight spots from 13<sup>th</sup> to 21<sup>st</sup> position. As a result, the Philippines landed at 5<sup>th</sup> place among the ASEAN-6 from 4<sup>th</sup> place in 2020 as Vietnam, maintaining its global rank at 65<sup>th</sup> place, overtook the Philippines. The decline in Transition Readiness score for the Philippines, despite its improvement in System Performance score, caused the decline in its overall ETI rank.

**TABLE 5**  
**PWC'S ASEAN ENERGY MATURITY, 2021**

Group	Description	ASEAN Countries
1	Meeting basic energy requirement	Myanmar
2	Improving the quality of energy supply	Indonesia, Cambodia, Malaysia, Vietnam, Philippines, Lao PDR, and Brunei Darussalam
3	Driving innovation and energy excellence	Thailand and Singapore

Source: PWC's Transition Readiness in Southeast Asia, September 2021.

The report of PricewaterhouseCoopers (PWC) on the ASEAN Energy Transition Readiness – which assessed a country's maturity in meeting basic needs against energy sustainability and smart energy systems using the criteria of energy accessibility, reliability, affordability, sustainability, smartness and trading within the ASEAN Power Grid - grouped the member states in three tiers (Table 5). Thailand and Singapore were in the top tier of group 3, while the rest were in the middle group, except for Myanmar which was assigned in group 1.