List of Figures

Figure 1.1	IEA World Primary Energy Consumption Outlook by Scenario (2050)	3
Figure 1.2	Population and GDP Outlook in ASEAN	4
Figure 1.3	Primary Energy Consumption Outlook in ASEAN	5
Figure 1.4	Final Energy Consumption Outlook in ASEAN	5
Figure 1.5	CO ₂ Emission from Fuel Combustion Outlook in ASEAN	6
Figure 2.1	Countries and Regions that Announced CN as of November 2021	
Figure 4.1	ExxonMobil's Methane Measurement Technology	29
Figure 4.2	ExxonMobil's CCS Project Map	30
Figure 4.3	Shell's GHG Emissions Transition (Scopes 1+2)	31
Figure 4.4	Shell's Net Carbon Footprint Reduction Targets	32
Figure 4.5	Shell's Methane Measurement Using a Drone in Permian Basin	33
Figure 4.6	Shell's CCS Project Map	34
Figure 4.7	Shell's EV-Charging Station	37
Figure 4.8	BP Scope 1 (Direct) and Scope 2 (Indirect) GHG Emissions	38
Figure 4.9	BP's Scenario	40
Figure 4.10	New Commitment Scopes 1+2: –40 $\%$ in 2030 vs 2015	44
Figure 4.11	TotalEnergies's Two-demand Scenario	46
Figure 4.12	TotalEnergies's Methane Measurement Technology	48
Figure 4.13	History of TotalEnergies's CCS Project	58
Figure 4.14	CCS Project Map of TotalEnergies in Europe	50
Figure 4.15	Location of Solar and Wind Power of TotalEnergies	52
Figure 5.1	PETRONAS's CN Declaration	58
Figure 5.2	PTT's Road Map	59
Figure 5.3	Shell's Road Map to 2030	60
Figure 5.4	Examples of ASEAN NOCs' Collaboration	64

List of Tables

Table 1	Comparison of Strategy and Activity between ASEAN NOCs and Western Majors	xii
Table 2.1	Year of Carbon Neutrality as of November 2021	10
Table 3.1	Selected NOCs in ASEAN	12
Table 3.2	Decarbonisation Activities of Selected ASEAN NOCs	12
Table 3.3	GHG Emissions Scope 1 Comparison by Segment	14
Table 3.4	GHG Emission and GHG Intensity, PETRONAS	15
Table 3.5	Solar Power Generation by PETRONAS	16
Table 3.6	GHG Emission by Segment under Pertamina	17
Table 3.7	GHG Emission by PTT	20
Table 3.8	Year of CN and 2030 Interim Target, Nationwide and NOC	22
Table 3.9	Example of a Strategic Matrix for Energy Transition	24
Table 3.10	Strategic Matrix of GHG Emission Reduction Initiative Form	24
Table 4.1	Comparison of GHG Emission Reduction Target by Western Majors	26
Table 4.2	GHG Emission Reduction Target and Activities in Upstream by Western Majors	27
Table 4.3	Shell's GHG Scope 1 Emissions Transition by Business and Source (Scope 1)	32
Table 4.4	BP GHG Emissions and Intensity (Scopes 1+2) by Unit	39
Table 4.5	Indicators Related to Climate Change (TotalEnergies)	45
Table 4.6	Decarbonisation and Energy Transition Efforts in Oil Supply Chain	55
Table 4.7	Comparison of Strategy and Activity between ASEAN NOCs and Western Majors	56
Table 5.1	Shell Investment Criteria	61
Table 5.2	Example of Capital Investment Policies of Western Majors	62