

# Thailand Utilities - EV

## EV boom is coming to town

- We believe the soon-to-be-announced incentive package will lead to a demand boom for EVs in Thailand.
- A retail selling price below THB2m should trigger demand growth for EVs in Thailand to be on track to achieve the government's ZEV mission.
- We expect the share prices of EA and NEX to outperform in 2022.

### 3x EV sales growth in 2022 likely following the government's EV package approval

Under the government's current zero-emission vehicle (ZEV) plan, we project Thailand's demand for EVs to grow, with BEV usage rising from a mere 11.4k at the end of 2021 to 30k in 2022, 225k in 2025, and 440k in 2030, growing by almost 40x in the next 10 years. Meanwhile, the NEVPC projects the accumulated EV production to grow from just 20k in 2021 to 50k in 2022, 400k in 2025, and 2.94m in 2030. This implies that the Thai government aims to fully replace the current ICE vehicle production in Thailand of around 2m annually with EVs within 2030. We believe that in 2022, assuming the government's incentive plan for EVs is announced within 1Q22, the number of new EV registrations should jump markedly to over 15,000 – up over 2x from a mere 5,781 new EVs in 2021.

### EV package to trigger an EV demand boom

We believe the soon-to-be-announced incentive package will lead to a demand boom for EVs in Thailand, particularly for imported passenger EVs from China and Europe, thanks to potential price cuts by up to 20-40%. The government has indicated that import taxes will be lowered from 80% to 40% for EVs imported from Europe, 40% to 0% from South Korea, 20% to 0% from Japan, and no change at 0% from China. Subsidies of THB70,000 per EV with battery capacities under 30kWh and THB150,000 per EV with battery capacities over 30kWh, all with retail selling prices below THB2m, should trigger demand growth for EVs in Thailand to be on track to achieve the government's ZEV mission.

### EV growth is sanguine but “switching cost” may slow sales

With an expected 28% drop in the battery cost by 2026, ARK Investment (ARK) forecasts the price of EVs to drop markedly in 2021-26. ARK's research indicates that the price of an EV with a similar quality and size to a Toyota Camry in 2019 could be on par with the price of a Camry by 2023 and even lower than a Camry's price by 2025 due to declining battery costs. However, we think ARK's global EV sales forecast of 40m by 2026 is too optimistic based on 1) the high “switching cost” for consumers due to the long product lifecycle; 2) the battery cost passed through from battery to EV producers may not be equal and immediate; and 3) sparsely populated countries may be slow to develop charging infrastructure.

### EA-NEX remain two winning brothers in Thailand's EV boom

We think EA and NEX – Thailand's two leading players in the battery and EV businesses – will see their share prices outperform in 2022, thanks to the strong net profit growth momentum that we project in 2021-23 due to their fully integrated, first-mover advantage over competitors that has allowed them to timely capture regulatory benefits ahead of the booming demand for EVs expected in 2022 onward.



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## Thailand's EV growth is coming

After a month's delay, we think the government's EV package should soon be on track for approval by the cabinet in Feb-22.

In its most recent move to approve the comprehensive EV promotion plan by the National Electric Vehicle Policy Committee (NEVPC), the Thai government has clearly signalled that Thailand is committed to fully transforming the country's existing internal combustion engine (ICE)-based automotive industry into an EV industry.

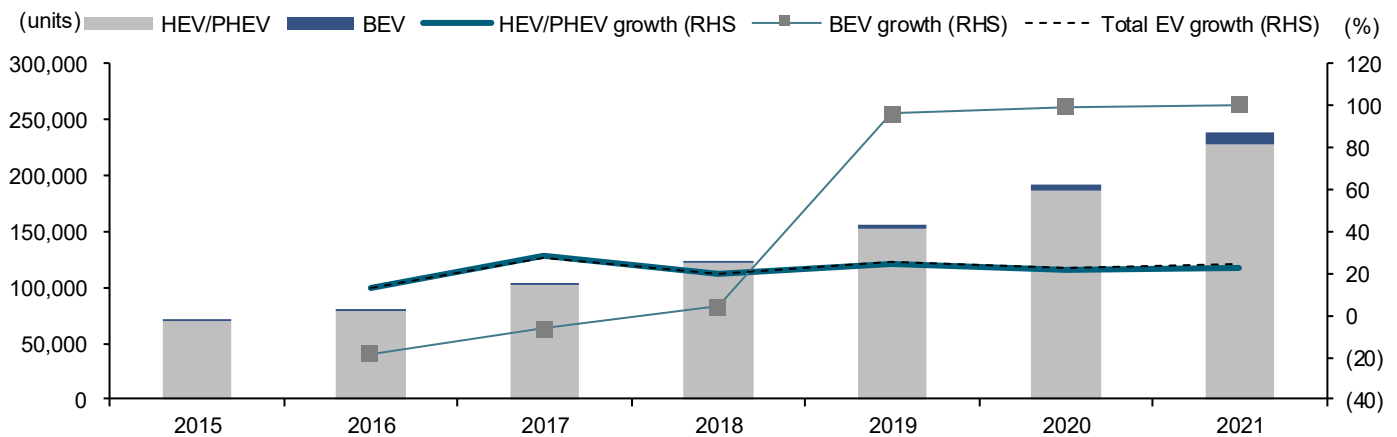
### Exhibit 1: ZEV targets for Thailand's EV industry

	2022E	2025E	2030E	2035E	Unit
<b>Usage</b>					
No. of EVs	30,000	225,000	440,000	1,154,000	EV
% of total vehicles in use	4	30	50	100	%
<b>Production</b>					
No. of EVs	30,000	225,000	725,000	1,350,000	EV
Accumulated	50,000	400,000	2,935,000	8,265,000	EV
% of total vehicle production	2	10	30	50	%

Source: NEVPC

**Recap of Thailand's ZEV mission.** Thailand has set clear goals for a net-zero emissions target. We believe the 30/30 pledge set by the government that targets an increase to 30% ZEVs out of the total vehicles produced by 2030 (725k units), 50% of the vehicles in use (440k) by 2030, and 13k fast-charging stations, should be highly achievable, given the recently announced regulations by the Provincial Electricity Authority of Thailand (PEA).

### Exhibit 2: Number of accumulated EV registrations and growth

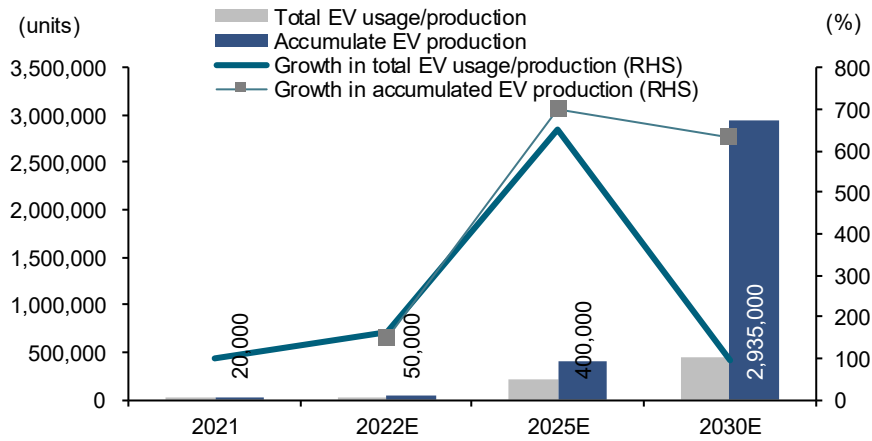


Sources: Electric Vehicle Association of Thailand (EVAT); NEVPC

Under the Thai government's ZEV target, we estimate that battery EV (BEV) usage will grow from a mere 11.4k at the end of 2021 to 30k in 2022, 225k in 2025, and 440k in 2030, growing by almost 40x in the next 10 years.

Meanwhile, the NEVPC projects the accumulated EV production to grow from a mere 20k in 2021 to 50k in 2022, 400k in 2025, and 2.94m in 2030. This implies that the Thai government aims to fully replace the current internal combustion engine (ICE) vehicle production in Thailand of around 2m annually with EVs within 2030.

**Exhibit 3: BEV growth projections and targets by NEVPC**

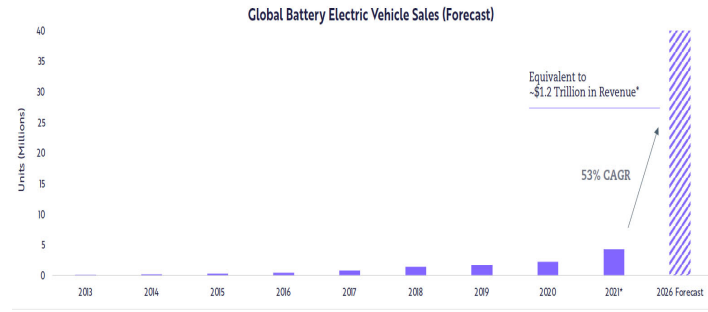


Sources: EVAT; NEVPC

### Global EV growth projections by ARK Investment

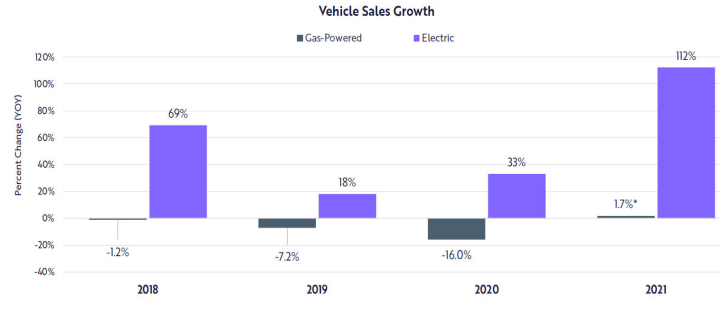
According to ARK’s annual research report, “Big Ideas 2022”, dated 25 Jan-22, ARK forecasts global EV sales to grow by almost 8x or at a 53% CAGR in 2021-26, growing from 4.8m EVs in 2021 to 40m in 2026, based on a Wright’s Law model.

**Exhibit 4: ARK’s forecast of EV numbers globally to reach 40m by 2026**



Source: ARK

**Exhibit 5: EV sales growth almost tripled y-y in 2021 to grow at 112% y-y vs 17% growth for ICE vehicles**



Source: ARK

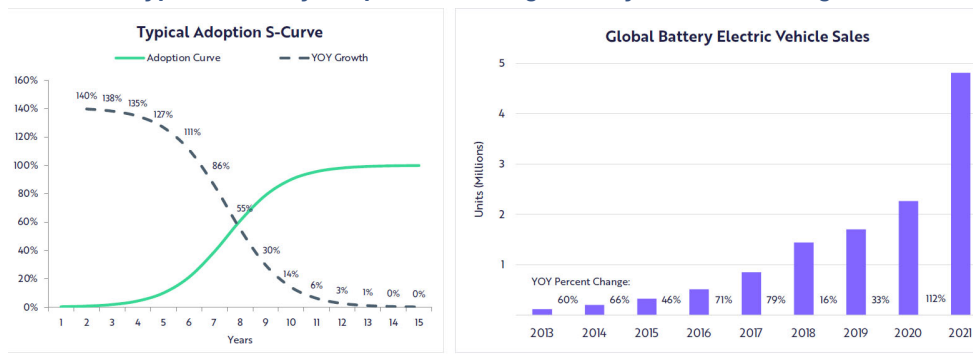
In the past four years (2018-21) EV sales growth globally has grown at a much higher rate than ICE vehicle sales. However, the growth rate slowed sharply in 2019-20 when the Covid-19 pandemic hit the global economy and led to lockdowns worldwide.

Yet, in 2021, EV sales growth rebounded markedly to grow at 112% y-y vs only 17% y-y for ICE vehicles, despite the much lower base for ICE vehicle sales in 2020 as a result of two consecutive years of negative growth rates at -72% y-y in 2019 and -16% y-y in 2020.

**Battery cost is key.** ARK expects the cost of batteries to decline by 28% from 2021-26, led by the sharp cost reduction of lithium iron phosphate (LFP) batteries, which are less expensive than nickel manganese cobalt (NMC) lithium-ion batteries due to the high prices of cobalt and manganese for NMC batteries vs the lower cost of iron as a key material for LFP batteries.

In addition, ARK argues that in a typical industry cycle, the growth of a new technology will decelerate as the penetration rate increases due to the larger base effect. However, the EV industry has seen a different growth rate pattern, except for during the 2019-20 Covid pandemic period, with EV sales growth rising higher over the past 10 years.

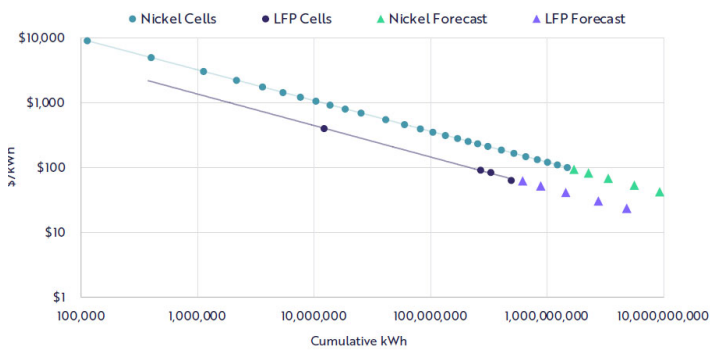
**Exhibit 6: Typical industry adoption S-curve growth cycle vs EV sales growth rate**



Source: ARK

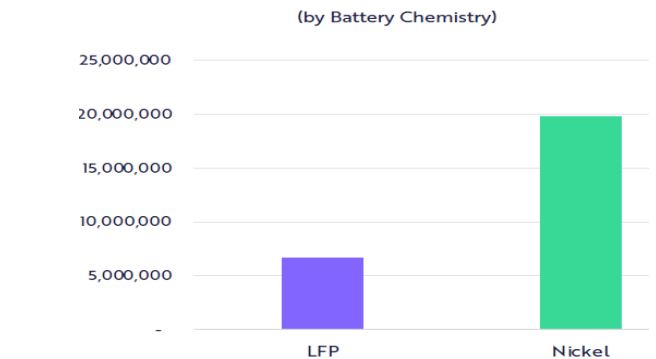
According to Wright’s Law, every cumulative doubling of units produced will lead to a 28% cost reduction. ARK believes that EV sales growth of 7m for LFP-based EVs and 20m for NMC-based EVs will result in a 28% cost reduction by 2026.

**Exhibit 7: Battery cost reduction to continue on economies of scales**



Source: ARK

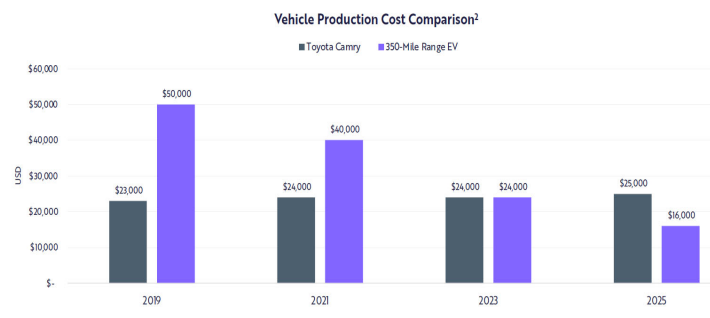
**Exhibit 8: EV units needed to reach a cumulative doubling of production by chemistry**



Source: ARK

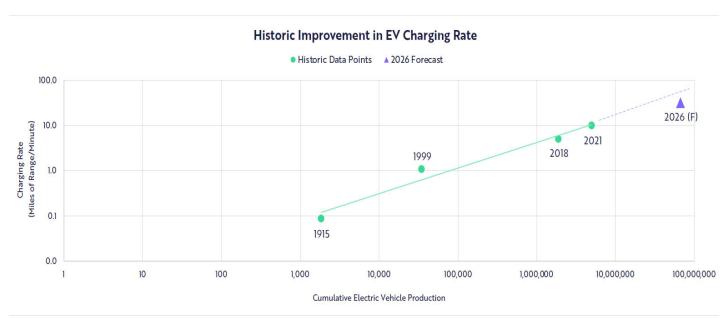
As a result of the expected decline in the battery cost, ARK forecasts the price of EVs to drop significantly in the next four years. ARK believes that the price of an EV with a similar quality and size to a Toyota Camry in 2019 could be on par with the price of a Camry by 2023 and even lower than a Camry’s price by 2025 due to declining battery costs.

**Exhibit 9: EV selling price to be on par with a Toyota Camry by 2023 and lower by 2025, based on ARK’s estimates**



Source: ARK

**Exhibit 10: EV charging rate improvement as the number of EV sales grows**



Source: ARK

We think ARK’s view is too optimistic but that EV growth will be significant in 2021-30. ARK’s EV sales target of 40m by 2026 is too optimistic, in our view, based on:

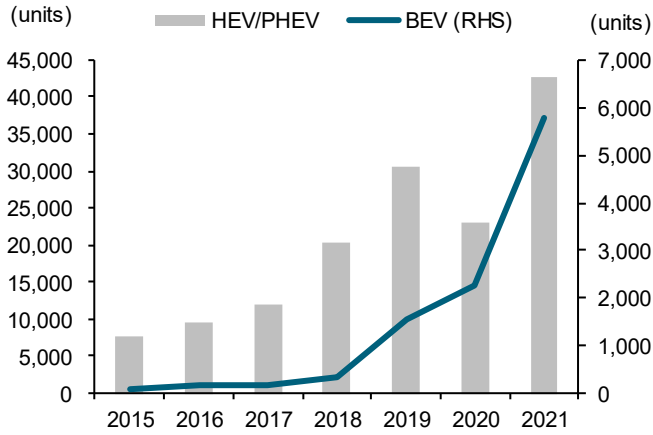
- 1) The high “switching cost” for consumers. Unlike other products with a short to medium product lifecycle, including mobile phones, flash memory, and personal computers, car owners will normally use their vehicles for 5-10 years on average. Hence, even though the cost and benefits of EV usage may be manifest, consumers may be reluctant to change from an ICE vehicle to an EV in the near term if their ICE vehicle’s useful life is long.
- 2) Although the battery cost could decline by 28% by 2026, the cost passed through from the battery producers to the EV manufacturers could be at the lower rate than the battery cost reduction.
- 3) The infrastructure of charging stations, particularly for large and sparsely populated countries or areas, would be uneconomic for EV charger operators to install, potentially resulting in a slower-than-expected consumer adoption rate for EVs.

We think the most critical drivers to achieve ARK’s EV sales forecast of 40m are the battery cost reduction rate and the market adoption of autonomous ride-share platforms. We believe it could take more than 10 years for global consumers to adopt EVs as their primary vehicles vs secondary vehicles for the initial adoption phase.

### Recent EV growth in Thailand

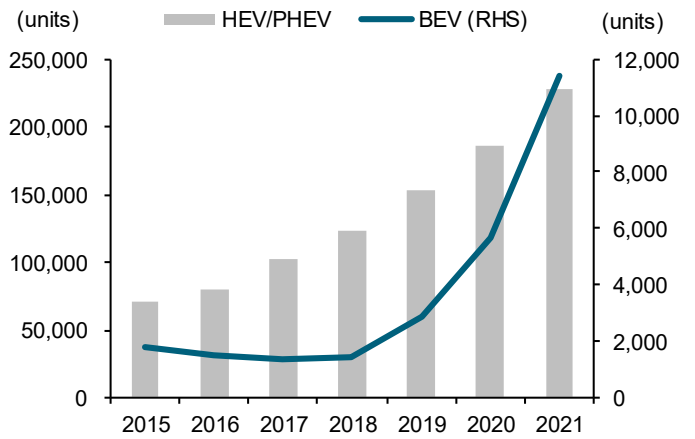
According to the Electric Vehicle Association of Thailand (EVAT), the number of BEVs remains low, with registered BEVs from 2018 to 2021 totalling 11,382 – comprising 6,749 e-bikes, 4,132 EV cars, 238 e-buses, and 263 e-tricycles (Tuk-Tuks). Hybrid EVs (HEVs) and plug-in hybrid EVs (PHEVs) amounted to 227,727, comprising 219,121 cars, 11,382 motorbikes, one bus and one truck.

**Exhibit 11: Number of new EV registrations**



Source: Department of Land Transportation (DLT)

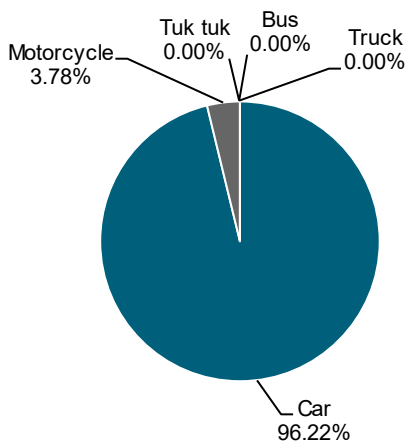
**Exhibit 12: Number of accumulated EV registrations**



Source: DLT

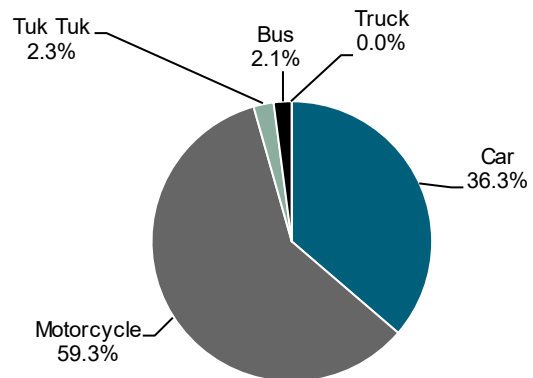
Up until recently, the alternatives to ICE vehicles were mainly HEVs and PHEVs. However, in 2021, the number of new BEVs in Thailand totalled 5,781, growing over 2x from 2,267 in 2020, accounting for 11.9% of all new non-ICE vehicles, up from 2,267 BEVs (9% of total EVs) in 2020 and 1,572 (4.9%) in 2019. The 239k BEVs, HEVs, and PHEVs in Thailand represent 8.9% of the country’s total domestic car sales as of 2021, up from 5.5% in 2020.

**Exhibit 13: Proportion of HEVs/PHEVs by vehicle type as of Dec 2021**



Source: DLT

**Exhibit 14: Proportion of BEVs by vehicle type as of Dec 2021**

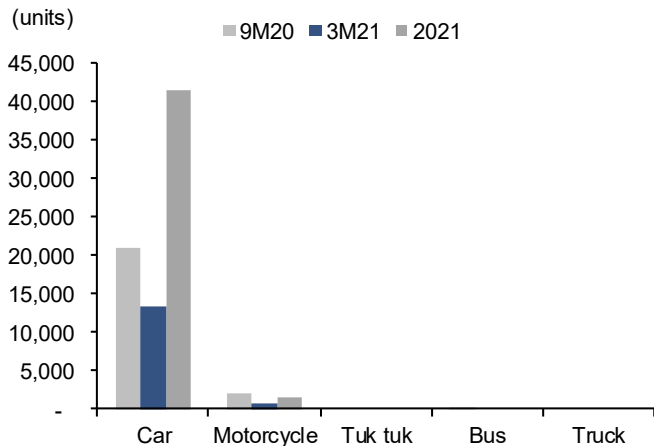


Source: DLT

The number of new registered PHEVs/HEVs jumped markedly in 2021 to 42,800, surpassing 22,971 in 2020, thanks to more attractive prices and improved functional competitiveness which attracted a higher number of Thai consumers.

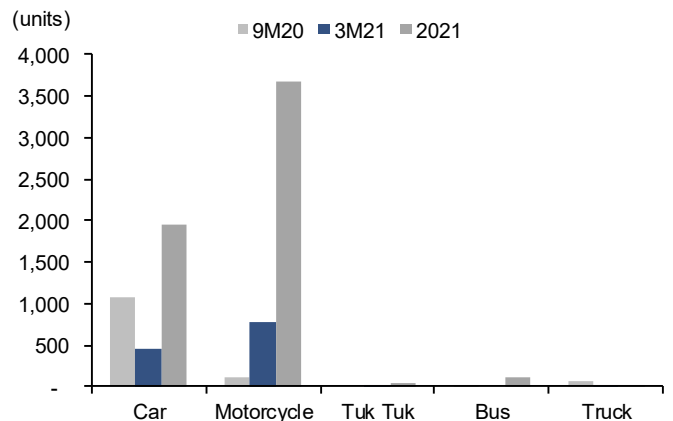
Although many consumers are waiting to see the government's upcoming EV package, the number of new BEVs surged to 5,781 in 2021 as we believe that consumers are now increasingly adopting EVs as their first cars. We think that new BEV sales should jump markedly y-y in 2022 as a number of consumers are still waiting for the new BEV models and the government's subsidies that could reduce prices by up to 10-20%, based on our estimate.

**Exhibit 15: New PHEV/HEV registrations by vehicle type**



Source: DLT

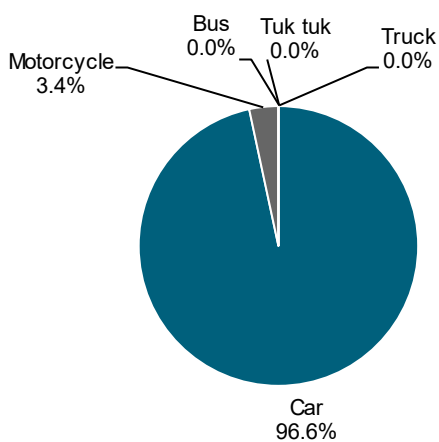
**Exhibit 16: New BEV registrations by vehicle type**



Source: DLT

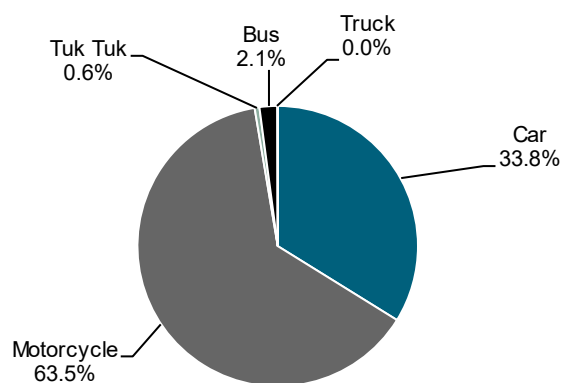
In 2022, we believe the most significant increase for new BEVs will occur in the passenger car segment, followed by buses, trucks, and motorcycles, given the price competitiveness and greater availability of BEV models on the market. Many new EV passenger models have been announced by major car producers, but sales may mostly come from imports, given Thailand's limited number of EV manufacturing facilities.

**Exhibit 17: Proportion of new HEVs/PHEVs by vehicle type as of Dec 2021**



Source: DLT

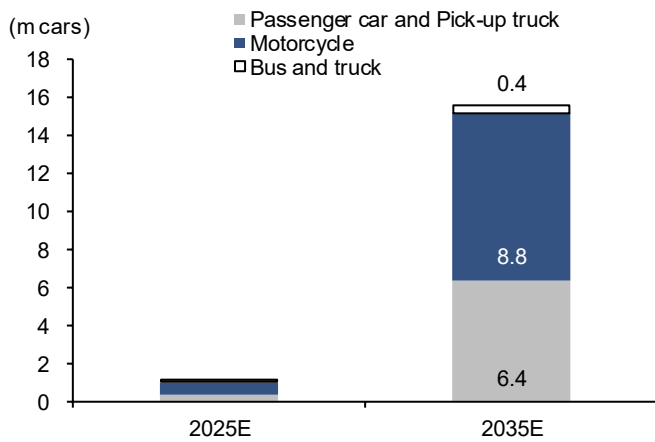
**Exhibit 18: Proportion of new BEVs by vehicle type as of Dec 2021**



Source: DLT

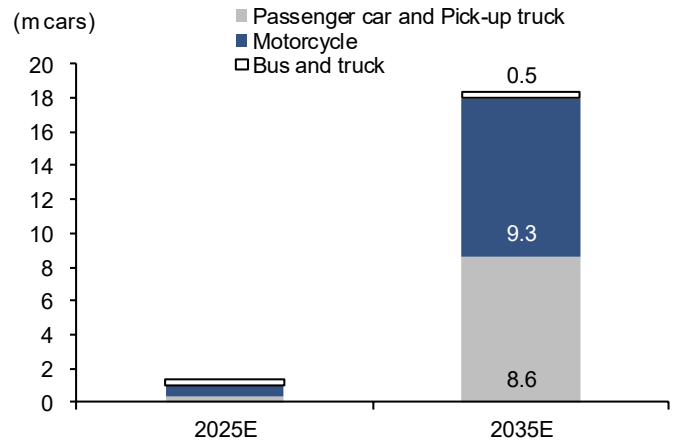
In the commercial vehicle segment, the NEVPC expects e-truck and e-bus sales to grow to 31k in 2025, 160k in 2030, and 430k in 2035 (vs the current 150k total buses and 1.5m trucks). The number of charging stations is forecast to rise to 2,460 stations in 2025, 13,450 in 2030, and 40,500 in 2035, up from 693 stations as of Sep-21.

**Exhibit 19: EV usage target**



Source: NEVPC

**Exhibit 20: EV production target**



Source: NEVPC

**Expect over 3x growth in new EVs in 2022.** In 2021, the number of new EV registrations surged by over 2x y-y, even though consumers have been waiting for the government’s plan to subsidise the price of EVs and offer multiple tax incentives for producers in the EV value chain (batteries, EVs, charging stations).

We believe that in 2022, assuming the government’s incentive plan for EVs is announced within 1Q22, the number of new EV registrations should jump markedly to over 15,000 – up over 2x from a mere 5,781 new EVs in 2021.

We expect the battery demand for EVs to grow to 20GWh in 2025, 38GWh in 2030, and 100GWh in 2035. In comparison, EA plans for its full-phase battery production capacity to be 50GWh by 2026.



## EV package is poised to stimulate BEV demand growth in Thailand

One of the three obstacles that we think could slow the government's EV growth target down is the high retail price, which is now still much higher than ICE vehicles by 20-30% for a similar model and efficiency. However, with the government's upcoming EV package, we think this obstacle could soon be resolved.

The upcoming comprehensive EV promotion plan is supplementary to the previous policies issued by Thailand's Board of Investment (BOI), creating a comprehensive set of incentives covering all major aspects of the EV supply chain, with a focus on BEVs, local production of critical parts, and the inclusion of commercial vehicles of all sizes, as well as ships.

At present, the price of imported EVs, despite benefitting from zero import tax under the bilateral free trade agreement between Thailand and China, remains high, due to the excise tax, value-added tax, and other taxes, that together account for over 25% of the final retail selling price.

### Great Wall Motor's ORA Good Cat EV case study

One good example to showcase just how sensitive Thai consumers are to the retail price of EVs is Great Wall Motors' (GWM) recent announcement of the three models of ORA Good Cat that are being sold in Thailand. The prices in Thailand are much higher than the original prices in China due to the multiple taxes levied, including excise tax (8%), municipal tax (10%), and VAT (7%).

### Exhibit 21: ORA Good Cat passenger BEV models imported from China



Source: [beartai.com](http://beartai.com)

While the ORA Good Cat 400 model costs RMB110,000 (THB550,000) in China, it costs around THB989,000 in Thailand, more than double. Similarly, the ORA Good Cat model 500 costs RMB143,900 (THB660,000) in China vs THB1,199,000 in Thailand, almost 2x the price in China.

Three ORA Good Cat passenger BEV 2021 models have been launched by GWM, which are:

**ORA Good Cat 400 TECH at cTHB989,000**, which offers a 47.788kWh lithium-ion-based, LFP-type battery with a range of 400km. It can be DC charged within 46 minutes or AC charged within 8 hours from 0-80% battery capacity.

**ORA Good Cat 400 PRO at cTHB1,059,000** uses the same battery size and type as the '400 Tech' model.

**ORA Good Cat 500 ULTRA at cTHB1,199,000** offers a 63.139kWh lithium-ion-based, NMC-type battery with a range of 500km. It can be DC charged within 60 minutes and AC charged within 10 hours from 0-80% battery capacity.

## Exhibit 22: GWM's promotion for ORA Good Cat models in Thailand

**เปิดราคา**

# ORA Good Cat

รถไฟฟ้า 100 %

รุ่น 400 Tech	989,000 บาท
รุ่น 400 Pro	1,059,000 บาท
รุ่น 500 Ultra	1,199,000 บาท

Source: [MGRonline](#)

All models are imported from China. Deliveries to buyers began in Nov-21. The cars come with a factory warranty & roadside assistance covering five years or 150,000km and a battery warranty for eight years or 180,000km.

**Up to 20-40% lower retail price for EVs post the implementation of EV package.** If BEVs are imported from other countries, the taxes imposed are even higher. The import tax rate for BEVs from EU producers is 80%, followed by South Korea (40%), and Japan (20%).

## Exhibit 23: Price structure analysis of ORA Good Cat 400 Tech

ORA Good Cat (400 Tech model)	Prices, margins, and taxes	Unit
Original price in China (RMB110,000)	550,000	THB
Freight	16,000	THB
Total cost before taxes and margin	566,000	THB
Assumed margin	25	%
Price before tax	707,500	THB
Taxes		
<b>1 Import tax</b>	<b>0</b>	<b>%</b>
<b>2 Excise tax</b>	<b>8</b>	<b>%</b>
Price after excise and import taxes	764,100	THB
<b>3 Municipal tax</b>	<b>10</b>	<b>%</b>
Price after municipal tax	840,510	THB
<b>4 VAT</b>	<b>7</b>	<b>%</b>
Price after VAT	899,346	THB
<b>5 Retail margin mark-up</b>	<b>10</b>	<b>%</b>
<b>Final retail price</b>	<b>989,280</b>	<b>THB</b>
Total margin	231,435	THB
Total tax	191,846	THB
Margin as % of retail price	23.4	%
Tax as % of retail price	21.3	%

Sources: GWM; FSSIA estimates

**Current tax scheme for EV and ICE vehicles (issued in 2020):** In 2016, Thailand changed its excise tax structure from one based on engine size (cubic centimetres) to a carbon dioxide (CO<sub>2</sub>) emission-based tax scheme. EV cars have benefitted the most from the excise tax changes, with the excise tax dropping from 10% to 8% for EV cars, and to 2% for EV cars produced in Thailand at plants with BOI privileges. EA falls into the 2% excise tax bracket for its SPA1 cars and e-buses.

#### Exhibit 24: Thailand's automotive excise tax structure

Old rate based on engine size Tax structure before 1 Jan 2016			New rate based on CO <sub>2</sub> emissions Tax structure implemented from 1 Jan 2016				Adjusted rate based on CO <sub>2</sub> emissions Tax structure according to recommended retail price			
Auto type	Engine (litre)	Tax rate (%)	Auto type	CO <sub>2</sub> (g/gm)	Tax rate			Tax rate		
					E10/E20	E85/NGV	Hybrid	E10/E20	E85/NGV	Hybrid (BOI)
Passenger car (below 10)	2.5 - 3.0	40	Passenger car (below 10)	≤ 100	30*	25*	10	25*	20*	8* / 4*
	2.0 - 2.5	35		101 - 150			20			16 / 8
	< 2.0	30		150 - 200	35	30	25	30	25	21 / 10.5
	> 3.0	50		> 200	40	35	30	35	30	26 / 13
				> 3,000 CC	50	50	50	40	40	40
PPV		20		≤ 100 (HV)		23* / 10			18* / 8	
Eco car		17		≤ 200		25* / 12 / 5 / 3, 18			20* / 10 / 4 / 2.5, 15	
Electric hybrid		10	PPV DC	> 200		30 / 15 / 7 / 5, 18			25 / 13 / 6 / 4, 17	
E20		(5)	Space cab Pick-up	> 3,250 CC		50			40	
				≤ 100		14* / 12*			12* / 10*	
				101 - 120		17			14	
			Electric vehicle Fuel cell/ EV (BOI)			10 / 2			8 / 2	

\*Active safety for passenger cars of below 10 passengers with CO<sub>2</sub> ≤ 150g/km / PPV with CO<sub>2</sub> ≤ 200g/km / Eco car with CO<sub>2</sub> ≤ 100g/km

Sources: Excise Tax Department; Fiscal Policy Office

**EV package should soon be granted by cabinet.** While Thailand could import EVs from China without import tax under the free trade agreement, the zero-import tax only applies to four-wheel vehicles, but not EV buses, trucks, and boats, which are still subject to a 40% import tax. This maintains a higher cost and better price competitiveness for local EV producers.

We believe the soon-to-be-announced incentive package will lead to a demand boom for EVs in Thailand, particularly for imported passenger EVs from China and Europe, thanks to potential price cuts by up to 20-40%. The government has indicated that import taxes will be lowered from 80% to 40% for EVs imported from Europe, 40% to 0% from South Korea, 20% to 0% from Japan, and no change at 0% from China.

Meanwhile, the subsidy of THB70,000 per EV with battery capacities under 30kWh and THB150,000 per EV with battery capacities over 30kWh, all with retail selling prices below THB2m, should trigger demand growth for EVs in Thailand to be on track to achieve the government's ZEV mission.

#### Exhibit 25: EV promotion plan for passenger BEVs and motorbike BEVs with retail selling prices under THB2m

Policy	Beneficiary	Amount	Effective promotion duration
1 Subsidy from energy fund	Consumers/EV buyers	THB70,000 per EV under 30KWh THB150,000 per EV over 30KWh	1-3 years
2 Excise tax reduction	Producers/EV buyers	From 8% to 2%	2-3 years
3 Import duty tax reduction	Producers/EV buyers	From 20-80% to 0-40%	2-3 years

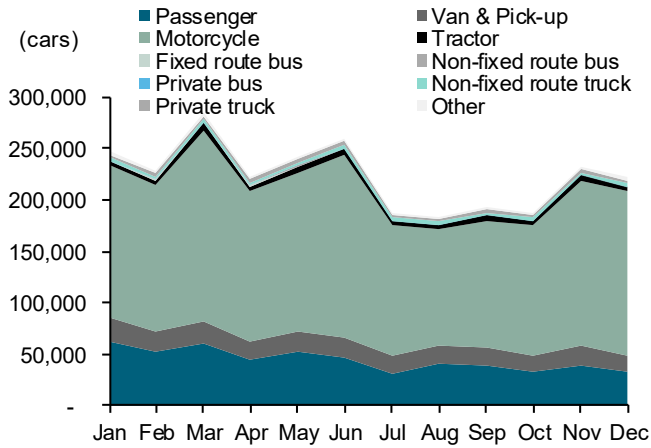
#### Conditions for eligibility

- 1 Must be domestic manufacturers
- 2 Must produce EVs at 1.0x to 1.5x the number of imported and subsidised EVs during the promotion's duration
- 3 Must produce and use a domestically produced battery (from cell level) for EVs produced domestically
- 4 Must produce the same models as the imported models

Source: Bangkok Post

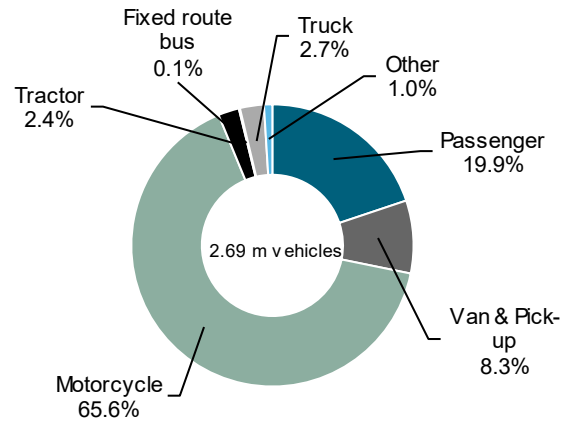
**Transition underway from ICE to EV market and industry.** According to the Department of Land Transportation (DLT), most of Thailand's new vehicles are still ICE motorcycles, making up 52% of the 2.69m vehicles sold in the domestic market in 2021, along with one-tonne pick-ups (8.3%) and passenger cars (19.9%). In the commercial vehicle segment, 3,542 buses (0.1% of total new vehicles), and 73,873 trucks (2.7%) were sold.

**Exhibit 26: Thailand's new vehicle registrations in 2021**



Source: DLT

**Exhibit 27: Thailand's new vehicle registrations (%) in 2021**

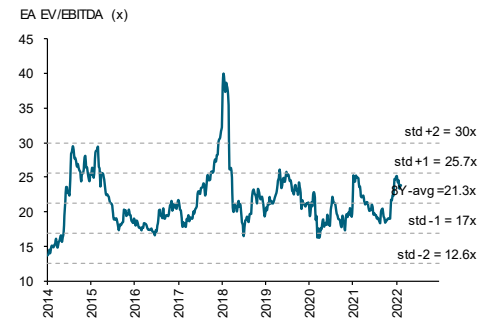


Source: DLT

### EA and NEX stand out as two EV plays in Thailand

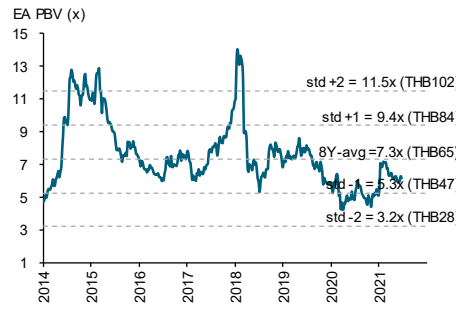
We think EA and NEX – Thailand’s two leading players in the battery and EV businesses – will see their share prices outperform in 2022, thanks to the strong net profit growth momentum that we project in 2021-23 due to their fully integrated, first-mover advantage over competitors that has allowed them to timely capture regulatory benefits ahead of the booming demand for EVs expected in 2022 onward.

**Exhibit 28: EA’s EV/EBITDA band**



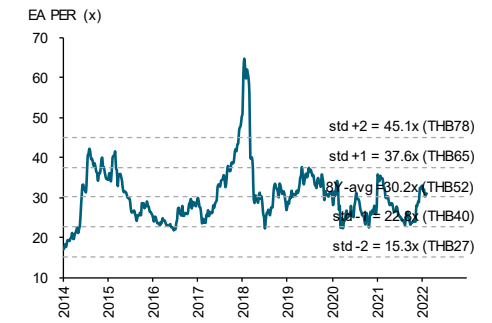
Sources :EA, Bloomberg, FSSIA estimates

**Exhibit 29: EA’s P/BV band**



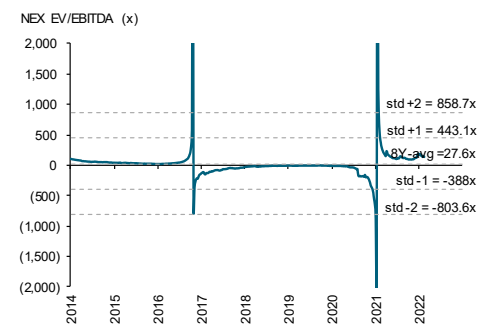
Sources: EA, Bloomberg, FSSIA estimates

**Exhibit 30: EA’s P/E band**



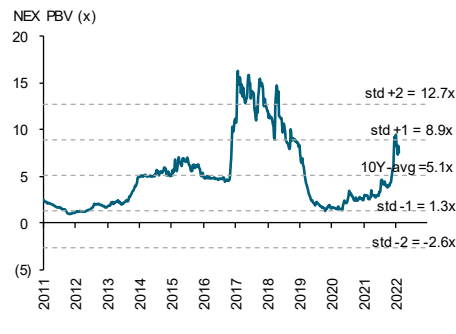
Sources :EA, Bloomberg, FSSIA estimates

**Exhibit 31: NEX’s EV/EBITDA band**



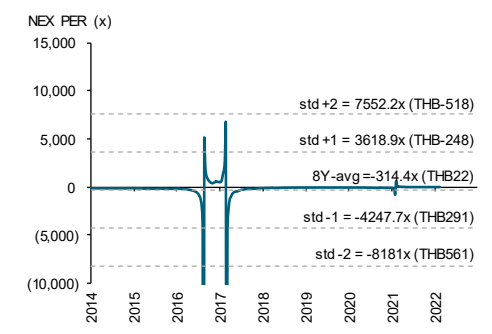
Sources: NEX, Bloomberg, FSSIA estimates

**Exhibit 32: NEX’s P/BV band**



Sources: NEX, Bloomberg, FSSIA estimates

**Exhibit 33: NEX’s P/E band**



Sources: NEX, Bloomberg, FSSIA estimates

### Exhibit 34: Peer comparisons

Company	BBG code	Rec	Share Price (LCY)	Target price (LCY)	Up side (%)	Market Cap (USD m)	3Y EPS CAGR (%)	PE		ROE		PBV		EV / EBITDA	
								21E (x)	22E (x)	21E (%)	22E (%)	21E (x)	22E (x)	21E (x)	22E (x)
<b>THAILAND</b>															
Energy Absolute	EA TB	BUY	91.5	122	33	10,508	36.5	52.6	31.2	21.3	28.7	10.3	7.9	34.1	22.3
BANPU	BANPU TB	BUY	11.5	16.9	47	2,396	nm	5.7	6.5	15.7	14.7	0.8	0.9	4.2	5.2
Banpu Power	BPP TB	BUY	16.7	20	20	1,567	15.0	15.5	9.4	7.9	12.4	1.2	1.1	64.6	34.4
Nex Point	NEX TB	BUY	18	26	44	928	nm	(262.7)	24.0	(4.0)	37.0	10.6	7.7	(4,216)	144.4
Global Power	GPSC TB	BUY	74	90	22	6,424	6.2	23.4	29.4	8.4	6.5	1.9	1.9	13.8	18.6
<b>Thailand avg</b>						<b>21,823</b>	<b>20.4</b>	<b>22.8</b>	<b>26.1</b>	<b>14.8</b>	<b>19.8</b>	<b>6.1</b>	<b>4.9</b>	<b>(154)</b>	<b>25.4</b>
<b>US</b>															
Tesla Inc	TSLA US	NA	875.76	NA	NA	905,105	164.8	133.9	84.9	23.3	26.2	30.5	23.0	77.6	48.6
Nio Inc - Adr	NIO US	NA	23.79	NA	NA	38,463	(172.0)	nm	nm	(26.0)	(8.2)	9.5	10.7	nm	1,097
Nikola Corp	NKLA US	NA	8.02	NA	NA	3,263	(11.1)	nm	nm	(73.4)	(207.5)	4.3	7.3	nm	nm
Workhorse	WKHS US	NA	3.19	NA	NA	498	(179.9)	nm	nm	(269)	(476.3)	3.6	26.6	nm	nm
<b>US avg</b>						<b>947,328</b>	<b>169.0</b>	<b>127.9</b>	<b>81.1</b>	<b>20.8</b>	<b>23.8</b>	<b>29.5</b>	<b>22.4</b>	<b>74.1</b>	<b>91.0</b>
<b>Alternative energy under coverage</b>						<b>21,823</b>	<b>20.4</b>	<b>22.8</b>	<b>26.1</b>	<b>14.8</b>	<b>19.8</b>	<b>6.1</b>	<b>4.9</b>	<b>(153.7)</b>	<b>25.4</b>
<b>Average (all)</b>						<b>969,152</b>	<b>164.4</b>	<b>125.6</b>	<b>79.9</b>	<b>20.6</b>	<b>23.7</b>	<b>29.0</b>	<b>22.0</b>	<b>69.0</b>	<b>89.5</b>

Share price as of 14 February 2022  
Sources: Bloomberg, FSSIA estimates

## Corporate Governance report of Thai listed companies 2020

EXCELLENT LEVEL										
AAV	ADVANC	AF	AIRA	AKP	AKR	ALT	AMA	AMATA	AMATAV	ANAN
AOT	AP	ARIP	ARROW	ASP	BAFS	BANPU	BAY	BCP	BCPG	BDMS
BEC	BEM	BGRIM	BIZ	BKI	BLA	BOL	BPP	BRR	BTS	BWG
CENTEL	CFRESH	CHEWA	CHO	CIMBT	CK	CKP	CM	CNT	COL	COMAN
COTTO	CPALL	CPF	CPI	CPN	CSS	DELTA	DEMCO	DRT	DTAC	DTC
DV8	EA	EASTW	ECF	ECL	EGCO	EPG	ETE	FNS	FPI	FPT
FSMART	GBX	GC	GCAP	GEL	GFPT	GGC	GPSC	GRAMMY	GUNKUL	HANA
HARN	HMPRO	ICC	ICI	III	ILINK	INTUCH	IRPC	IVL	JKN	JSP
JWD	K	KBANK	KCE	KKP	KSL	KTB	KTC	LANNA	LH	LHFG
LIT	LPN	MAKRO	MALEE	MBK	MBKET	MC	MCOT	METCO	MFEC	MINT
MONO	MOONG	MSC	MTC	NCH	NCL	NEP	NKI	NOBLE	NSI	NVD
NYT	OISHI	ORI	OTO	PAP	PCSGH	PDJ	PG	PHOL	PLANB	PLANET
PLAT	PORT	PPS	PR9	PREB	PRG	PRM	PSH	PSL	PTG	PTT
PTTEP	PTTGC	PYLON	Q-CON	QH	QTC	RATCH	RS	S	S & J	SAAM
SABINA	SAMART	SAMTEL	SAT	SC	SCB	SCC	SCCC	SCG	SCN	SDC
SEAFCO	SEOIL	SE-ED	SELIC	SENA	SIRI	SIS	SITHAI	SMK	SMPC	SNC
SONIC	SORKON	SPALI	SPI	SPRC	SPVI	SSSC	SST	STA	SUSCO	SUTHA
SVI	SYMC	SYNTEC	TACC	TASCO	TCAP	TFMAMA	THANA	THANI	THCOM	THG
THIP	THRE	THREL	TIP	TIPCO	TISCO	TK	TKT	TTB	TMILL	TNDT
TNL	TOA	TOP	TPBI	TQM	TRC	TRC	TSC	TSR	TSTE	TSTH
TTCL	TTW	TU	TVD	TVI	TVO	TWPC	U	UAC	UBIS	UV
VGI	VIH	WACOAL	WAVE	WHA	WHAUP	WICE	WINNER	TRUE		

VERY GOOD LEVEL										
2S	ABM	ACE	ACG	ADB	AEC	AEONTS	AGE	AH	AHC	AIT
ALLA	AMANAHA	AMARIN	APCO	APCS	APURE	AQUA	ASAP	ASEFA	ASIA	ASIAN
ASIMAR	ASK	ASN	ATP30	AUCT	AWC	AYUD	B	BA	BAM	BBL
BFIT	BGC	BJC	BJCHI	BROOK	BTW	CBG	CEN	CGH	CHARAN	CHAYO
CHG	CHOTI	CHOW	CI	CIG	CMC	COLOR	COM7	CPL	CRC	CRD
CSC	CSP	CWT	DCC	DCON	DDD	DOD	DOHOME	EASON	EE	ERW
ESTAR	FE	FLOYD	FN	FORTH	FSS	FTE	FVC	GENCO	GJS	GL
GLAND	GLOBAL	GLOCON	GPI	GULF	GYT	HPT	HTC	ICN	IFS	ILM
IMH	INET	INSURE	IRC	IRCP	IT	ITD	ITEL	J	JAS	JCK
JCKH	JMART	JMT	KBS	KCAR	KGI	KIAT	KOOL	KTIS	KWC	KWM
L&E	LALIN	LDC	LHK	LOXLEY	LPH	LRH	LST	M	MACO	MAJOR
MBAX	MEGA	META	MFC	MGT	MILL	MITSIB	MK	MODERN	MTI	MVP
NETBAY	NEX	NINE	NTV	NWR	OCC	OGC	OSP	PATO	PB	PDG
PDI	PICO	PIMO	PJW	PL	PM	PPP	PRIN	PRINC	PSTC	PT
QLT	RCL	RICHY	RML	RPC	RWI	S11	SALEE	SAMCO	SANKO	SAPPE
SAWAD	SCI	SCP	SE	SEG	SFP	SGF	SHR	SIAM	SINGER	SKE
SKR	SKY	SMIT	SMT	SNP	SPA	SPC	SPCG	SR	SRICHA	SSC
SSF	STANLY	STI	STPI	SUC	SUN	SYNEX	T	TAE	TAKUNI	TBSP
TCC	TCMC	TEAM	TEAMG	TFG	TIGER	TITLE	TKN	TKS	TM	TMC
TMD	TMI	TMT	TNITY	TNP	TNR	TOG	TPA	TPAC	TPCORP	TPOLY
TPS	TRITN	TRT	TRU	TSE	TVT	TWP	UEC	UMI	UOBKH	UP
UPF	UPOIC	UT	UTP	UWC	VL	VNT	VPO	WIJK	WP	XO
YUASA	ZEN	ZIGA	ZMICO							

GOOD LEVEL										
7UP	A	ABICO	AJ	ALL	ALUCON	AMC	APP	ARIN	AS	AU
B52	BC	BCH	BEAUTY	BGT	BH	BIG	BKD	BLAND	BM	BR
BROCK	BSBM	BSM	BTNC	CAZ	CCP	CGD	CITY	CMAN	CMO	CMR
CPT	CPW	CRANE	CSR	D	EKH	EP	ESSO	FMT	GIFT	GREEN
GSC	GTB	HTECH	HUMAN	IHL	INOX	INSET	IP	JTS	JUBILE	KASET
KCM	KKC	KUMWEL	KUN	KWG	KYE	LEE	MATCH	MATI	M-CHAI	MCS
MDX	MJD	MM	MORE	NC	NDR	NER	NFC	NNCL	NPK	NUSA
OCEAN	PAF	PF	PK	PLE	PMTA	POST	PPM	PRAKIT	PRECHA	PRIME
PROUD	PTL	RBF	RCI	RJH	ROJNA	RP	RPH	RSP	SF	SFLEX
SGP	SISB	SKN	SLP	SMART	SOLAR	SPG	SQ	SSP	STARK	STC
SUPER	SVOA	TC	TCCC	THMUI	TIW	TNH	TOPP	TPCH	TIPIP	TPLAS
TTI	TYCN	UKEM	UMS	VCOM	VRANDA	WIN	WORK	WPH		

## Description

## Score Range

Excellent

90-100

Very Good

80-89

Good

70-79

## Disclaimer:

The disclosure of the survey results of the Thai Institute of Directors Association ("IOD") regarding corporate governance is made pursuant to the policy of the Office of the Securities and Exchange Commission. The survey of the IOD is based on the information of a company listed on the Stock Exchange of Thailand and the Market for Alternative Investment disclosed to the public and able to be accessed by a general public investor. The result, therefore, is from the perspective of a third party. It is not an evaluation of operation and is not based on inside information.

The survey result is as of the date appearing in the Corporate Governance Report of Thai Listed Companies. As a result, the survey results may be changed after that date. FSS International Investment Advisory Company Limited does not confirm nor certify the accuracy of such survey results.

\* CGR scoring should be considered with news regarding wrong doing of the company or director or executive of the company such unfair practice on securities trading, fraud, and corruption SEC imposed a civil sanction against insider trading of director and executive; \*\* delisted

Source: Thai Institute of Directors Association (IOD); FSSIA's compilation



## Anti-corruption Progress Indicator 2020

CERTIFIED										
2S	ADVANC	AI	AIE	AIRA	AKP	AMA	AMANAHA	AP	AQUA	ARROW
ASK	ASP	AYUD	B	BAFS	BANPU	BAY	BBL	BCH	BCP	BCPG
BGC	BGRIM	BJCHI	BKI	BLA	BPP	BROOK	BRR	BSBM	BTS	BWG
CEN	CENTEL	CFRESH	CGH	CHEWA	CHOTI	CHOW	CIG	CIMBT	CM	CMC
COL	COM7	CPALL	CPF	CPI	CPN	CSC	DCC	DELTA	DEMCO	DIMET
DRT	DTAC	DTC	EASTW	ECL	EGCO	FE	FNS	FPI	FPT	FSS
FTE	GBX	GC	GCAP	GEL	GFPT	GGC	GJS	GPSC	GSTEEL	GUNKUL
HANA	HARN	HMPRO	HTC	ICC	ICHI	IFS	INET	INSURE	INTUCH	IRPC
ITEL	IVL	K	KASET	KBANK	KBS	KCAR	KCE	KGI	KKP	KSL
KTB	KTC	KWC	L&E	LANNA	LHFG	LHK	LPN	LRH	M	MAKRO
MALEE	MBAX	MBK	MBKET	MC	MCOT	MFC	MFEC	MINT	MONO	MOONG
MPG	MSC	MTC	MTI	NBC	NEP	NINE	NKI	NMG	NNCL	NSI
NWR	OCC	OCEAN	OGC	ORI	PAP	PATO	PB	PCSGH	PDG	PDI
PDJ	PE	PG	PHOL	PL	PLANB	PLANET	PLAT	PM	PPP	PPPM
PPS	PREB	PRG	PRINC	PRM	PSH	PSL	PSTC	PT	PTG	PTT
PTTEP	PTTGC	PYLON	Q-CON	QH	QLT	QTC	RATCH	RML	RWI	S & J
SABINA	SAT	SC	SCB	SCC	SCCC	SCG	SCN	SEAOIL	SE-ED	SELIC
SENA	SGP	SIRI	SITHAI	SMIT	SMK	SMPC	SNC	SNP	SORKON	SPACK
SPC	SPI	SPRC	SRICHA	SSF	SSSC	SST	STA	SUSCO	SVI	SYNTEC
TAE	TAKUNI	TASCO	TBSP	TCAP	TCMC	TFG	TFI	TFMAMA	THANI	THCOM
THIP	THRE	THREL	TIP	TIPCO	TISCO	TKT	TTB	TMD	TMILL	TMT
TNITY	TNL	TNP	TNR	TOG	TOP	TPA	TPCORP	TPP	TRU	TSC
TSTH	TTCL	TU	TVD	TVI	TVO	TWPC	U	UBIS	UEC	UKEM
UOBKH	UWC	VGI	VIH	VNT	WACOAL	WHA	WHAUP	WICE	WIJK	XO
ZEN	TRUE									

DECLARED										
7UP	ABICO	AF	ALT	AMARIN	AMATA	AMATAV	ANAN	APURE	B52	BKD
BM	BROCK	BUI	CHO	CI	COTTO	DDD	EA	EFORL	EP	ERW
ESTAR	ETE	EVER	FSMART	GPI	ILINK	IRC	J	JKN	JMART	JMT
JSP	JTS	KWG	LDC	MAJOR	META	NCL	NOBLE	NOK	PK	PLE
ROJNA	SAAM	SAPPE	SCI	SE	SHANG	SINGER	SKR	SPALI	SSP	STANLY
SUPER	SYNEX	THAI	TKS	TOPP	TRITN	TTA	UPF	UV	WIN	ZIGA

Level	
Certified	This level indicates practical participation with thoroughly examination in relation to the recommended procedures from the audit committee or the SEC's certified auditor, being a certified member of Thailand's Private Sector Collective Action Coalition Against Corruption programme (Thai CAC) or already passed examination to ensure independence from external parties.
Declared	This level indicates determination to participate in the Thailand's Private Sector Collective Action Coalition Against Corruption programme (Thai CAC)

**Disclaimer:**

The disclosure of the Anti-Corruption Progress Indicators of a listed company on the Stock Exchange of Thailand, which is assessed by Thaipat Institute, is made in order to comply with the policy and sustainable development plan for the listed companies of the Office of the Securities and Exchange Commission. Thaipat Institute made this assessment based on the information received from the listed company, as stipulated in the form for the assessment of Anti-corruption which refers to the Annual Registration Statement (Form 56-1), Annual Report (Form 56-2), or other relevant documents or reports of such listed company. The assessment result is therefore made from the perspective of Thaipat Institute that is a third party. It is not an assessment of operation and is not based on any inside information. Since this assessment is only the assessment result as of the date appearing in the assessment result, it may be changed after that date or when there is any change to the relevant information. Nevertheless, FSS International Investment Advisory Company Limited does not confirm, verify, or certify the accuracy and completeness of the assessment results.

Note: Companies participating in Thailand's Private Sector Collective Action Coalition Against Corruption programme (Thai CAC) under Thai Institute of Directors (as of June 24, 2019) are categorised into: 1) companies that have declared their intention to join CAC, and; 2) companies certified by CAC.

Source: The Securities and Exchange Commission, Thailand; \* FSSIA's compilation

## GENERAL DISCLAIMER

### ANALYST(S) CERTIFICATION

Suwat Sinsadok, CFA, FRM, ERP FSS International Investment Advisory Securities Co., Ltd

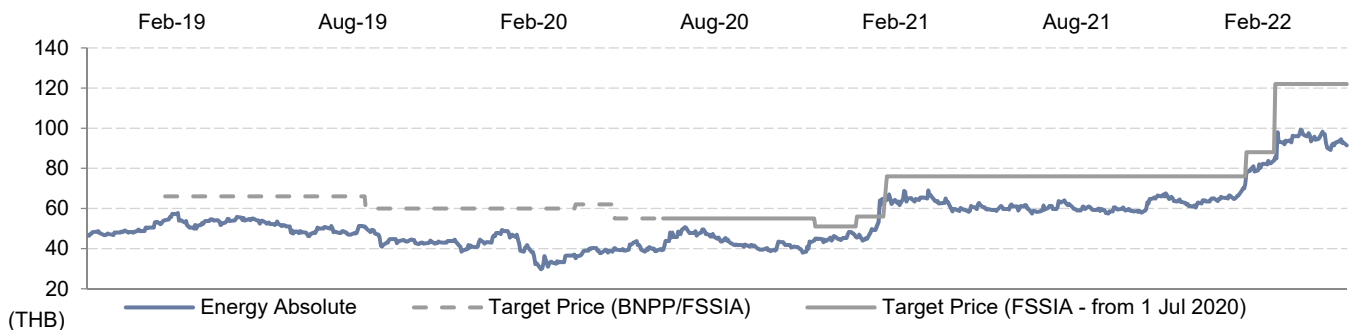
The individual(s) identified above certify(ies) that (i) all views expressed in this report accurately reflect the personal view of the analyst(s) with regard to any and all of the subject securities, companies or issuers mentioned in this report; and (ii) no part of the compensation of the analyst(s) was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed herein.

This report has been prepared by FSS International Investment Advisory Company Limited (FSSIA). The information herein has been obtained from sources believed to be reliable and accurate; however FSS makes no representation as to the accuracy and completeness of such information. Information and opinions expressed herein are subject to change without notice. FSS has no intention to solicit investors to buy or sell any security in this report. In addition, FSS does not guarantee returns nor price of the securities described in the report nor accept any liability for any loss or damage of any kind arising out of the use of such information or opinions in this report. Investors should study this report carefully in making investment decisions. All rights are reserved.

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### History of change in investment rating and/or target price

#### Energy Absolute (EA TB)



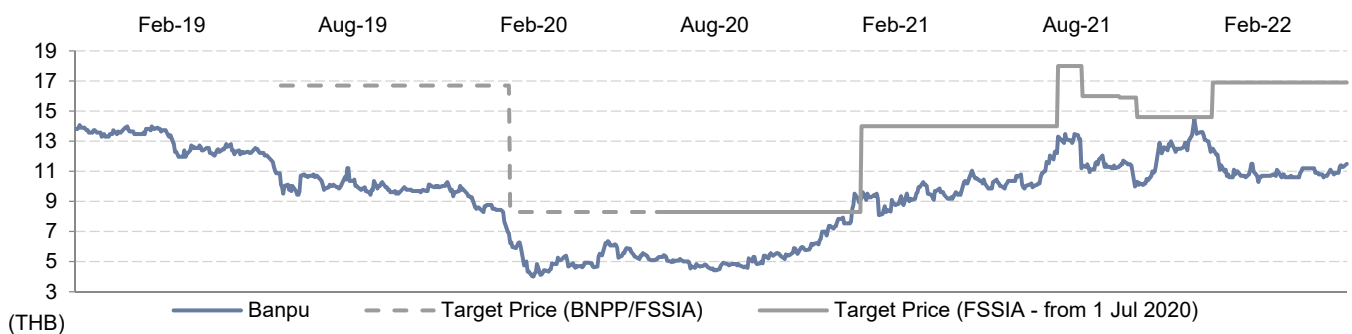
Date	Rating	Target price	Date	Rating	Target price	Date	Rating	Target price
26-Apr-2019	BUY	66.00	20-May-2020	BUY	55.00	08-Jan-2021	BUY	76.00
17-Oct-2019	BUY	60.00	09-Nov-2020	BUY	51.00	18-Nov-2021	BUY	88.00
16-Apr-2020	BUY	62.00	15-Dec-2020	BUY	56.00	13-Dec-2021	BUY	122.00

Suwat Sinsadok, CFA, FRM, ERP started covering this stock from 09-Jul-2020

Price and TP are in local currency

Source: FSSIA estimates

#### Banpu (BANPU TB)



Date	Rating	Target price	Date	Rating	Target price	Date	Rating	Target price
13-Aug-2019	BUY	16.70	23-Dec-2020	BUY	14.00	02-Aug-2021	BUY	15.90
26-Feb-2020	HOLD	8.30	10-Jun-2021	BUY	18.00	17-Aug-2021	BUY	14.60
09-Oct-2020	BUY	8.30	01-Jul-2021	HOLD	16.00	21-Oct-2021	BUY	16.90

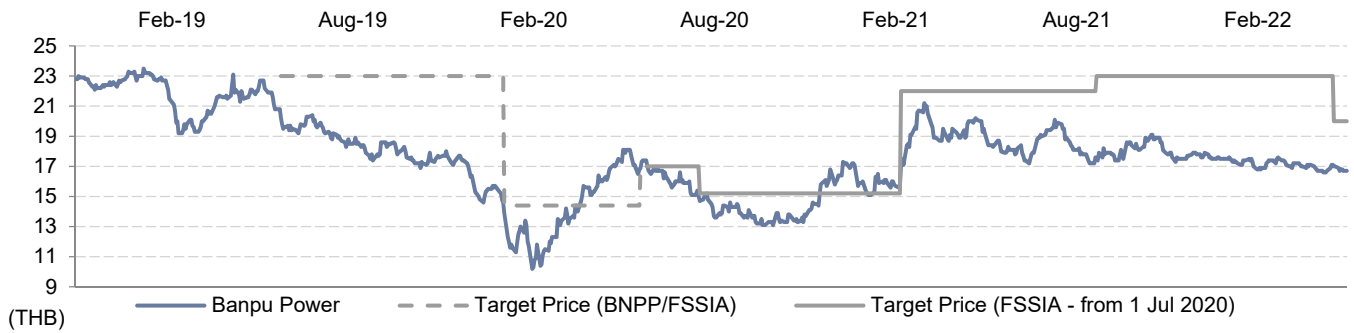
Suwat Sinsadok, CFA, FRM, ERP started covering this stock from 26-Feb-2020

Price and TP are in local currency

Source: FSSIA estimates



**Banpu Power (BPP TB)**



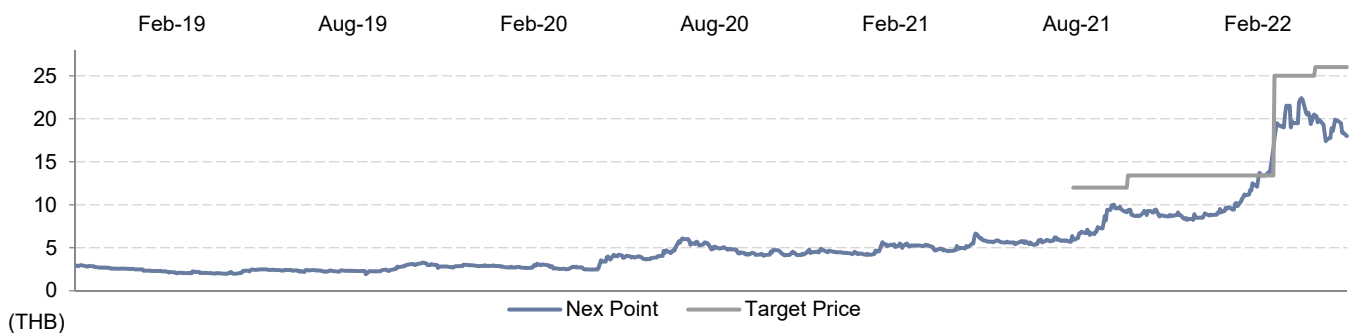
Date	Rating	Target price	Date	Rating	Target price	Date	Rating	Target price
13-Aug-2019	HOLD	23.00	06-Aug-2020	HOLD	15.20	02-Feb-2022	BUY	20.00
21-Feb-2020	HOLD	14.40	26-Jan-2021	BUY	22.00			
17-Jun-2020	HOLD	17.00	13-Jul-2021	BUY	23.00			

Suwat Sinsadok, CFA, FRM, ERP started covering this stock from 17-Jun-2020

Price and TP are in local currency

Source: FSSIA estimates

**Nex Point (NEX TB)**



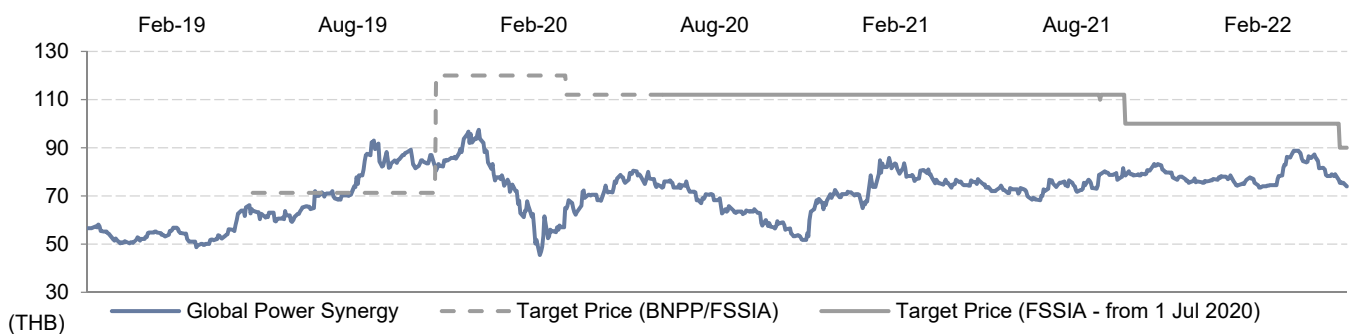
Date	Rating	Target price	Date	Rating	Target price	Date	Rating	Target price
23-Jun-2021	BUY	12.00	13-Dec-2021	BUY	25.00	-	-	-
09-Aug-2021	BUY	13.40	17-Jan-2022	BUY	26.00			

Suwat Sinsadok, CFA, FRM, ERP started covering this stock from 23-Jun-2021

Price and TP are in local currency

Source: FSSIA estimates

**Global Power Synergy (GPSC TB)**



Date	Rating	Target price	Date	Rating	Target price	Date	Rating	Target price
11-Jul-2019	BUY	71.27	14-Jul-2021	BUY	110.00	07-Feb-2022	BUY	90.00
17-Dec-2019	BUY	120.00	15-Jul-2021	BUY	112.00			
08-Apr-2020	BUY	112.00	05-Aug-2021	BUY	100.00			

Suwat Sinsadok, CFA, FRM, ERP started covering this stock from 08-May-2020

Price and TP are in local currency

Source: FSSIA estimates

Company	Ticker	Price	Rating	Valuation & Risks
Energy Absolute	EA TB	THB 91.50	BUY	Downside risks to our SoTP-based TP include: 1) lower-than-expected demand for electricity in Thailand; 2) lower crude prices; and 3) lower-than-expected demand for batteries.
Banpu	BANPU TB	THB 11.50	BUY	We see downside risks to our SoTP-based TP from lower coal prices, higher diesel costs and any unplanned shutdowns of its power plants.
Banpu Power	BPP TB	THB 16.70	BUY	Downside risks to our SOTP valuation are the start-up delays of its new projects and government intervention in the electricity tariff.
Nex Point	NEX TB	THB 18.00	BUY	Downside risks to our SOTP-based TP include: 1) a lower-than-expected bus sales volume; 2) delays in bus deliveries; and 3) risk from regulatory changes.
Global Power Synergy	GPSC TB	THB 74.00	BUY	The downside risks to our SoTP-based TP on GPSC include 1) lower-than-expected demand for electricity in Thailand; 2) a lower crude price; and 3) lower-than-expected demand from industrial users.

Source: FSSIA estimates

### Additional Disclosures

Target price history, stock price charts, valuation and risk details, and equity rating histories applicable to each company rated in this report is available in our most recently published reports. You can contact the analyst named on the front of this note or your representative at Finansia Syrus Securities Public Company Limited

FSSIA may incorporate the recommendations and target prices of companies currently covered by FSS Research into equity research reports, denoted by an 'FSS' before the recommendation. FSS Research is part of Finansia Syrus Securities Public Company Limited, which is the parent company of FSSIA.

All share prices are as at market close on 14-Feb-2022 unless otherwise stated.

## RECOMMENDATION STRUCTURE

### Stock ratings

Stock ratings are based on absolute upside or downside, which we define as  $(\text{target price}^* - \text{current price}) / \text{current price}$ .

BUY (B). The upside is 10% or more.

HOLD (H). The upside or downside is less than 10%.

REDUCE (R). The downside is 10% or more.

Unless otherwise specified, these recommendations are set with a 12-month horizon. Thus, it is possible that future price volatility may cause a temporary mismatch between upside/downside for a stock based on market price and the formal recommendation.

\* In most cases, the target price will equal the analyst's assessment of the current fair value of the stock. However, if the analyst doesn't think the market will reassess the stock over the specified time horizon due to a lack of events or catalysts, then the target price may differ from fair value. In most cases, therefore, our recommendation is an assessment of the mismatch between current market price and our assessment of current fair value.

### Industry Recommendations

**Overweight.** The analyst expects the fundamental conditions of the sector to be positive over the next 12 months.

**Neutral.** The analyst expects the fundamental conditions of the sector to be maintained over the next 12 months.

**Underweight.** The analyst expects the fundamental conditions of the sector to be negative over the next 12 months.

### Country (Strategy) Recommendations

**Overweight (O).** Over the next 12 months, the analyst expects the market to score positively on two or more of the criteria used to determine market recommendations: index returns relative to the regional benchmark, index sharpe ratio relative to the regional benchmark and index returns relative to the market cost of equity.

**Neutral (N).** Over the next 12 months, the analyst expects the market to score positively on one of the criteria used to determine market recommendations: index returns relative to the regional benchmark, index sharpe ratio relative to the regional benchmark and index returns relative to the market cost of equity.

**Underweight (U).** Over the next 12 months, the analyst does not expect the market to score positively on any of the criteria used to determine market recommendations: index returns relative to the regional benchmark, index sharpe ratio relative to the regional benchmark and index returns relative to the market cost of equity.