

13 DECEMBER 2021

Thailand Utilities – Electric Vehicle

EV growth to brighten in 2022-23

Thailand on track to meet its zero-emission vehicle target by 2035

Under the government's current zero-emission vehicle (ZEV) plan, Thailand's demand growth for EVs is projected to increase to 402k in 2025, rising to 2m in 2030, and 6.4m by 2035 (vs 10m total passenger cars as of 3Q21). The number of new commercial vehicles for the e-truck and e-bus categories is expected to grow from 31k in 2025 to 430k in 2035. The number of charging stations is forecast to rise to 2,460 in 2025, 13,450 in 2030, and 40,500 in 2035, up from a mere 693 stations as of Sep-21. Battery demand for EVs is expected to grow to 20GWh in 2025, 38GWh in 2030, and 100GWh in 2035, compared to EA's planned full-phase battery production capacity of 50GWh by 2026.

Over 4x growth in new EVs and 3x growth in number of charging stations in 2022

We believe that in 2022, after the proposed announcement of the government's incentive plan for EVs within 1Q22, the number of new EVs will jump markedly to over 10,000 in 2022, up over 4x from 2,300 in 2020. In 2022, we believe the most significant increase in new battery electric vehicles (BEV)s will be passenger cars, followed by buses, trucks, and motorcycles, given their price competitiveness and the available choices of BEV models. EA remains the largest charging station player in Thailand with a total of 417 stations as of Sep-21, followed by three private companies (VCharge, EVOLT, ChargeNow) and state-owned enterprises (PEA, PTT, MEA, and EGAT), with plans to increase the number of charging stations by 2-3x to 2,000 stations by 2023.

EV package offering subsidies and tax incentives is around the corner

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 of up to 20-30% from excise and import tax cuts, based on our estimates. The upcoming EV promotion plan supplements previous policies issued by Thailand's Board of Investment (BOI), offering 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 thanks to the excise tax, value-added tax (VAT), and other taxes, that together account for over 25% of the final retail selling price.

EA and NEX stand out as dual winners in Thailand's EV boom in 2022

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.



Suwat Sinsadok
 suwat.sin@fssia.com
 +66 2611 3558

Siriluck Pinthusoonthorn
 siriluck.pin@fssia.com
 +66 2611 3562

Thailand’s EV growth brightening from 2022 onward

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.

According to the Electric Vehicle Association of Thailand (EVAT), Thailand is now ahead of its ASEAN peers in transitioning its automotive industry from an ICE-based industry to an EV industry.

Exhibit 1: ZEV targets for Thailand’s EV industry

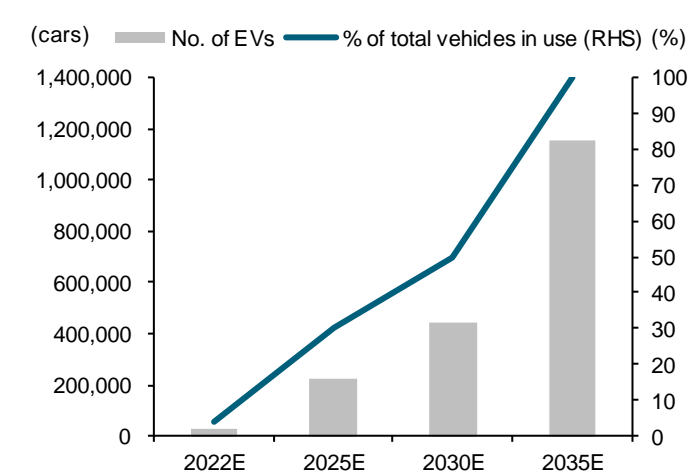
	2022E	2025E	2030E	2035E	Unit
Usage					
No. of EVs	30,000	225,000	440,000	1,154,000	EV
% of total vehicles in use	4	30	50	100	%
Production					
No. of EVs	30,000	225,000	725,000	1,350,000	EV
Accumulated	50,000	400,000	2,935,000	8,265,000	EV
% of total vehicle production	2	10	30	50	%

Source: NEVPC

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). In the upcoming Power Development Plan 2022 (PDP 2022), we expect the Thai Energy Regulatory Commission (ERC) to:

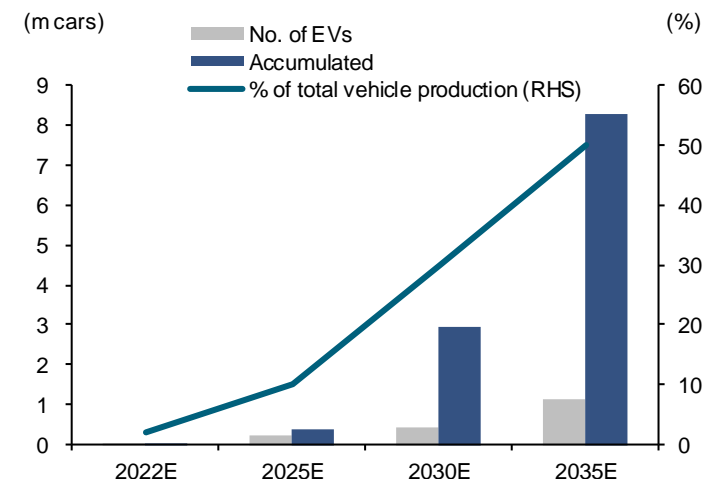
- 1) Raise its renewable energy capacity from 30% to 50% of the country’s total power generating capacity;
- 2) Incorporate energy storage systems (ESS) at hybrid renewable-ESS power plants and potentially extend the mandate for ESS to be deployed with large-scale conventional fossil-fuel based power plants to reduce Thailand’s excessive spare capacity that has increased power reserves to over 40% as of 3Q21.

Exhibit 2: EV usage target



Source: NEVPC

Exhibit 3: EV production target

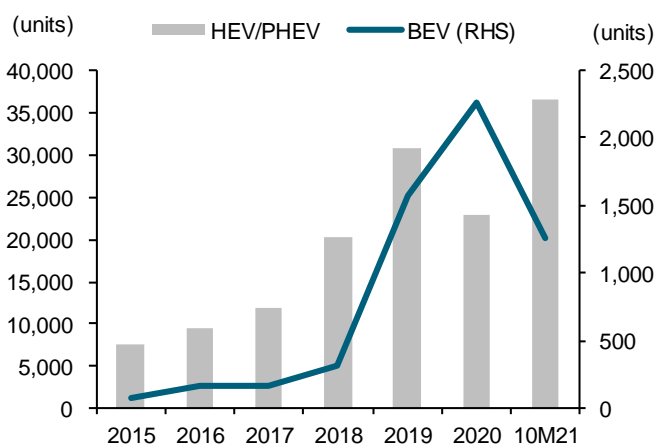


Source: NEVPC

According to EVAT, the number of BEVs remains low with registered BEVs from 2018 to Oct-21 totalling 10,115 – comprising 3,822 e-bikes, 5,843 EV cars, 191 e-buses, and 258 e-tricycles (Tuk-Tuks). Hybrid EVs (HEVs) and plug-in hybrid EVs (PHEVs) amounted to 221,567, comprising 213,021 cars, 8,544 motorbikes, 10 e-tricycles, one bus and one truck.

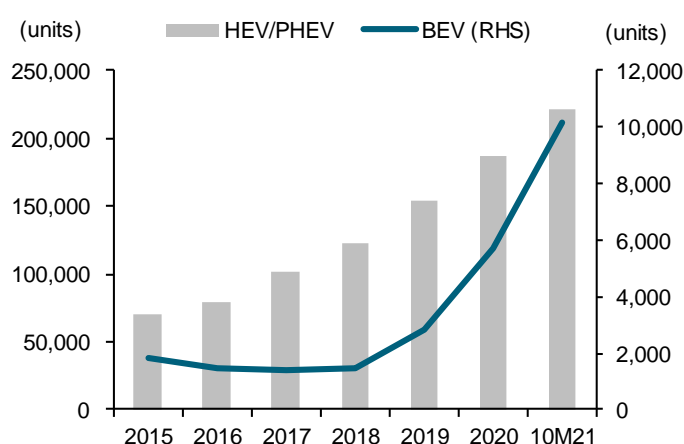
Expect over 4x growth in new EVs in 2022. In 10M21, the number of new EV registrations has declined y-y as consumers await the government’s plan to subsidise the price of EVs and offer multiple tax incentives for producers in the EV value chain (batteries, EVs, charging stations). We believe that in 2022, assuming the government’s incentive plan for EVs is announced within 1Q22, the number of new EV registrations should jump markedly to over 10,000 – up over 4x from a mere 2,300 new EVs in 2020.

Exhibit 4: Number of new EV registrations



Source: Department of Land Transportation (DLT)

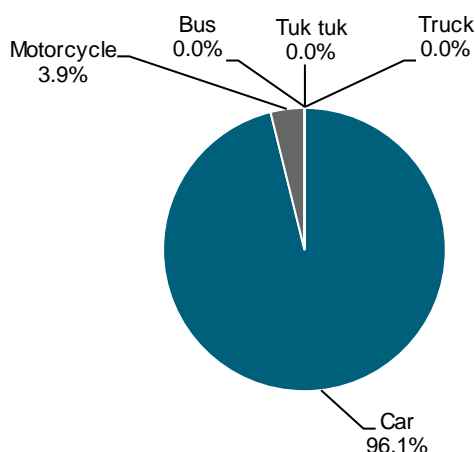
Exhibit 5: Number of accumulated EV registrations



Source: DLT

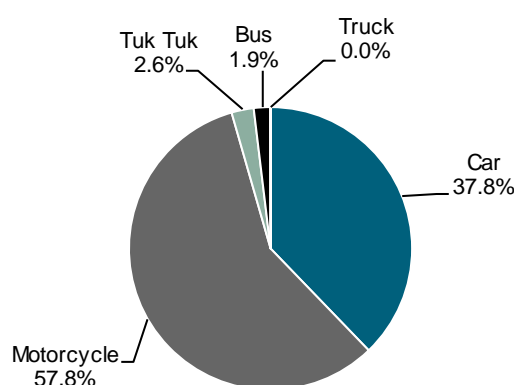
Up until recently, the alternatives to ICE vehicles were mainly HEVs and PHEVs. However, in 10M21, the number of new BEVs in Thailand was 1,253, accounting for 3.3% of all new non-ICE vehicles, down from 2,267 BEVs (9% of total EVs) in 2020 and 1,572 (4.9%) in 2019. The 222k BEVs, HEVs, and PHEVs in Thailand represent 5.5% of the country’s total domestic car sales as of 10M21.

Exhibit 6: Proportion of HEVs/PHEVs by vehicle type as of Oct 2021



Source: DLT

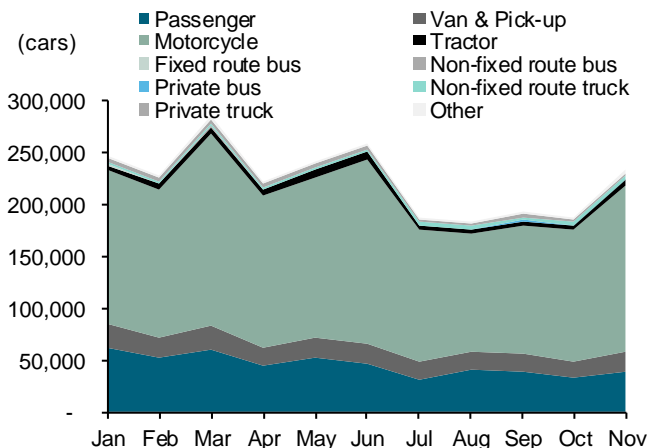
Exhibit 7: Proportion of BEVs by vehicle type as of Oct 2021



Source: DLT

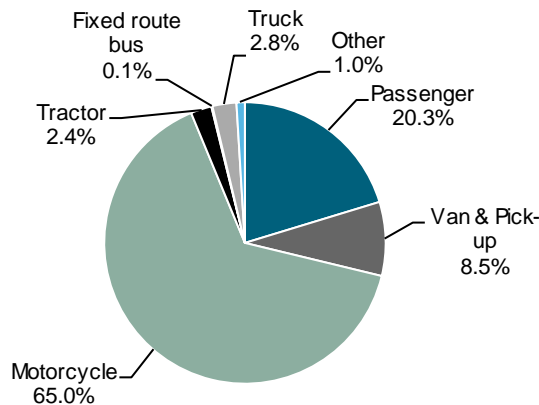
Transition underway from ICE to EV market and industry. According to the Department of Land Transportation (DLT), most of Thailand's new vehicles are still ICE motorcycles, making up 65% of the 2.5m vehicles sold in the domestic market in 11M21, along with one-tonne pick-ups (8.5%) and passenger cars (20.3%). In the commercial vehicle segment, 3,164 buses (0.1% of total new vehicles), and 68,036 trucks (2.8%) were sold.

Exhibit 8: Thailand's new vehicle registrations



Source: DLT

Exhibit 9: Thailand's new vehicle registrations (%) in 11M21

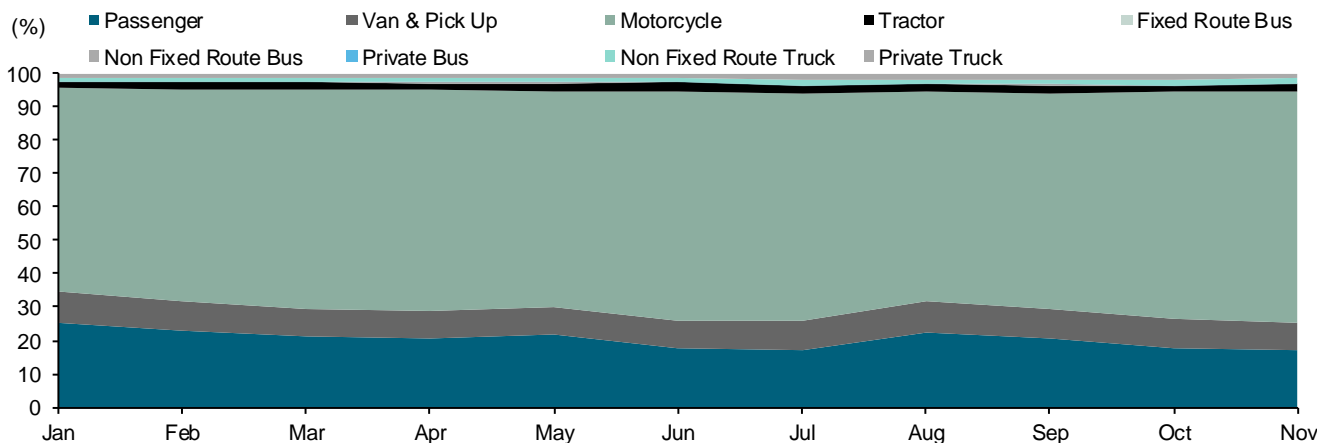


Source: DLT

Of the total new commercial vehicles purchased in 11M21, only a minuscule number were BEVs: 72 (2.3%) e-buses and one e-truck (0.001%). However, we think that from 2022 onward, the number of BEV trucks and buses will surge markedly to over 10-20% of the total of new buses and 1-3% of new trucks, given the order backlog of over 1,000 e-buses and potentially 500-1,000 e-trucks for Nex Point (NEX TB, BUY, TP THB25), based on management's guidance.

In the past 11 months (Jan-Nov 2021), Thailand has seen an increasing sales proportion of motorcycles as consumers access easier financing available for smaller, cheaper vehicles than other vehicle types due to the tightening policy by the Bank of Thailand. However, with the upcoming subsidy package for passenger and commercial vehicles, we think the number of non-motorcycle EVs purchased will significantly rise in 2022 onward.

Exhibit 10: Number of new vehicle registrations in Thailand in 2021 by vehicle type (%)

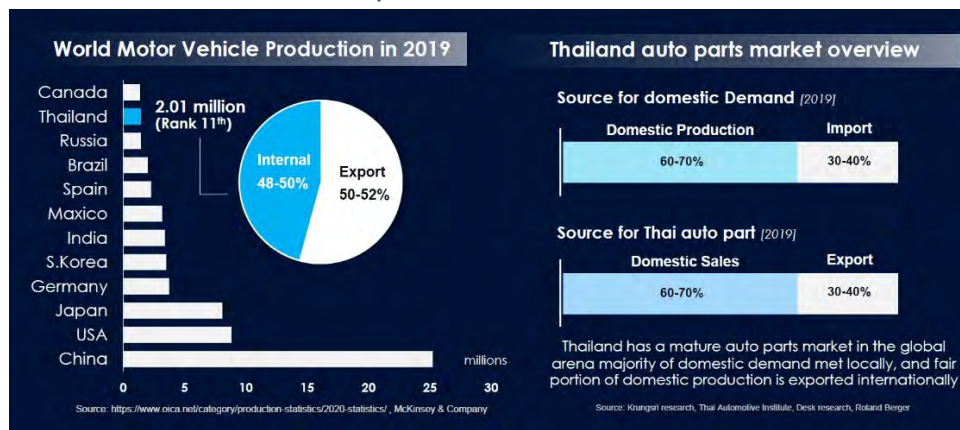


Source: DLT

Thailand is one of the global leaders in car production. In 2019, before the Covid pandemic hit the global economy, Thailand ranked 11th globally with an annual production of 2m vehicles. About 50% are sold to the domestic market while the remaining 50% are exported – mostly one-tonne pick-up trucks to Asian and Australian markets, according to the DLT.

Thailand’s automotive industry is well developed with a full cluster of complementary small and medium-sized producers of auto parts, which serve 60-70% of domestic demand.

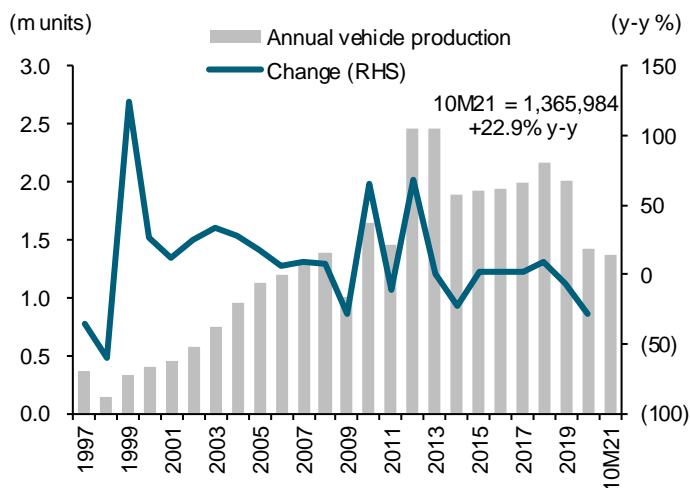
Exhibit 11: World motor vehicle production in 2019



Source: PTT

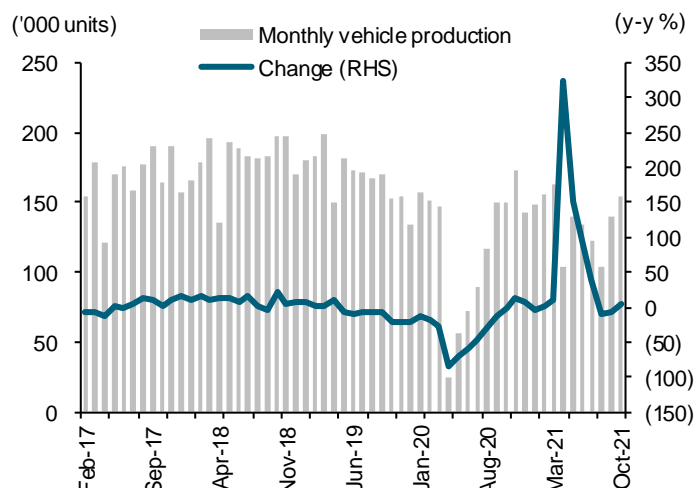
Car production remains solid in Thailand. Due to global supply disruptions and the electronic chip shortage, car production in Thailand has sharply recovered from only 24k units in Apr-20 (-84% y-y) to 153k in Oct-21 (+2% y-y), driven mainly by the higher number of cars produced for export markets. Thailand’s effective management of the Covid-19 outbreak allowed most car manufacturing plants to quickly resume production for both domestic and export markets.

Exhibit 12: Thailand’s annual car production



Source: The Federation of Thai Industries (FTI)

Exhibit 13: Thailand’s monthly car production

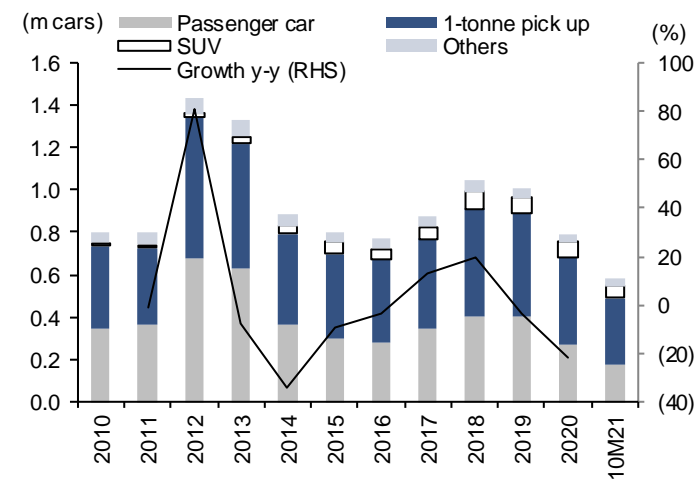


Source: FTI

Domestic car sales remain sluggish in 2021. The car sales volume in Thailand has remained weak since 2020 due to the impact of the Covid-19 pandemic on consumer purchasing power for durable goods like cars. In 10M21, the number of cars sold in Thailand plunged to only 0.58m, down from 0.78m in 2020 and 0.97m in 2019, pre-Covid.

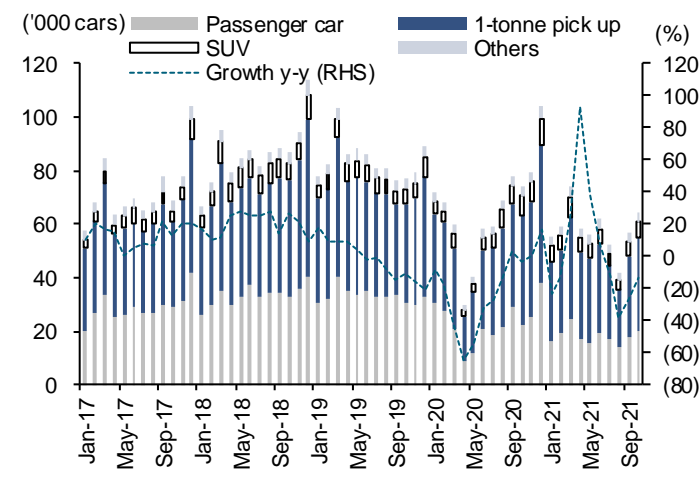
Even though car sales recovered to 65k in Oct-21, the monthly sales volume was still lower than the pre-Covid-19 monthly sales volume average of 72k. We expect the monthly car sales volume in the domestic market to rebound sharply in 2022 to over 75k after the government’s subsidy package takes effect in 1Q22, based on our estimate.

Exhibit 14: Thailand’s annual car sales



Source: Thailand Automotive Institute

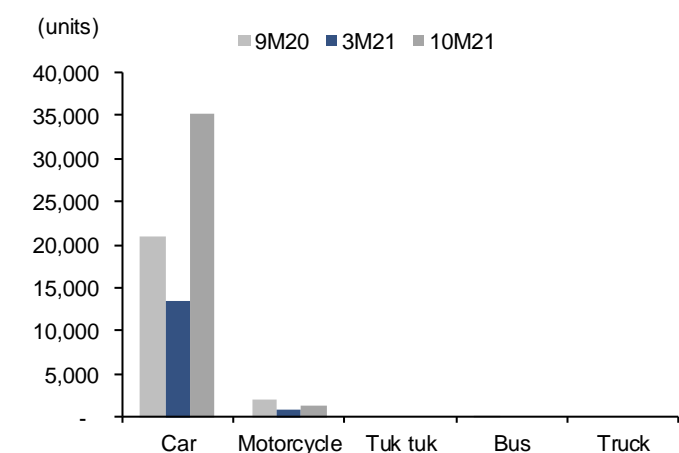
Exhibit 15: Thailand’s monthly car sales



Source: Thailand Automotive Institute

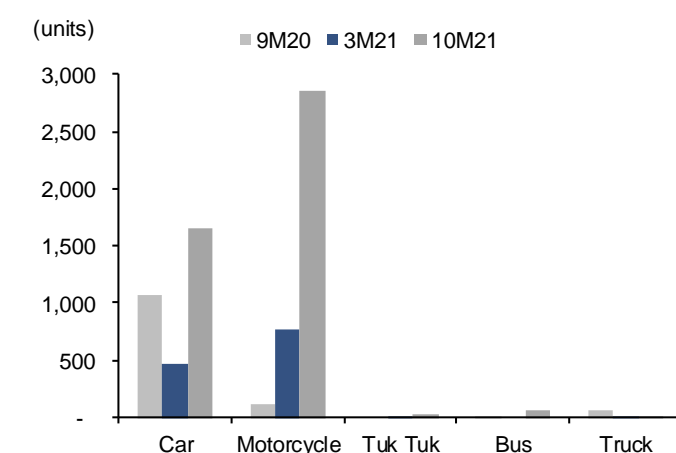
The number of new registered PHEVs/HEVs jumped markedly in 10M21 to 35,192, surpassing 22,971 in 2020, thanks to more attractive prices and improved functional competitiveness which attracted a higher number of Thai consumers. However, the number of BEV cars dropped to 1,653 in 10M21, down from 2,267 in 2020, as we believe that consumers are 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 16: New PHEV/HEV registrations by vehicle type



Source: DLT

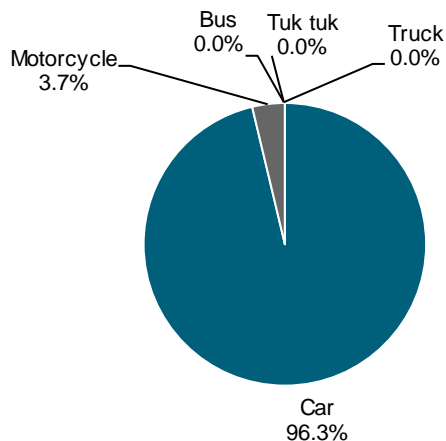
Exhibit 17: New BEV registrations by vehicle type



Source: DLT

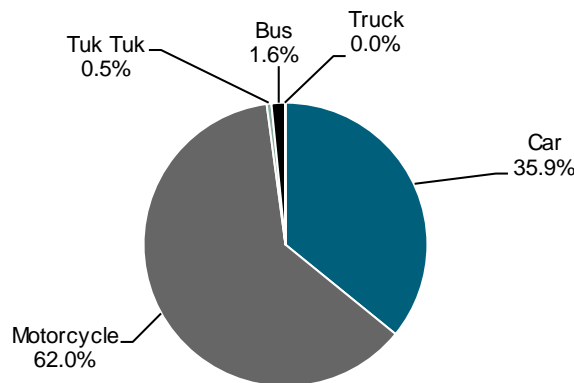
In 2022, we believe the most significant increase in new BEVs will be in passenger cars, followed by the bus, truck, and motorcycle segments, given their price competitiveness and more available choices of BEV models on the market. Many new EV passenger models have been announced by major car producers, but sales may be mostly imports given Thailand's limited number of EV manufacturing facilities.

Exhibit 18: Proportion of new HEVs/PHEVs by vehicle type as of Oct 2021



Source: DLT

Exhibit 19: Proportion of new BEVs by vehicle type as of Oct 2021



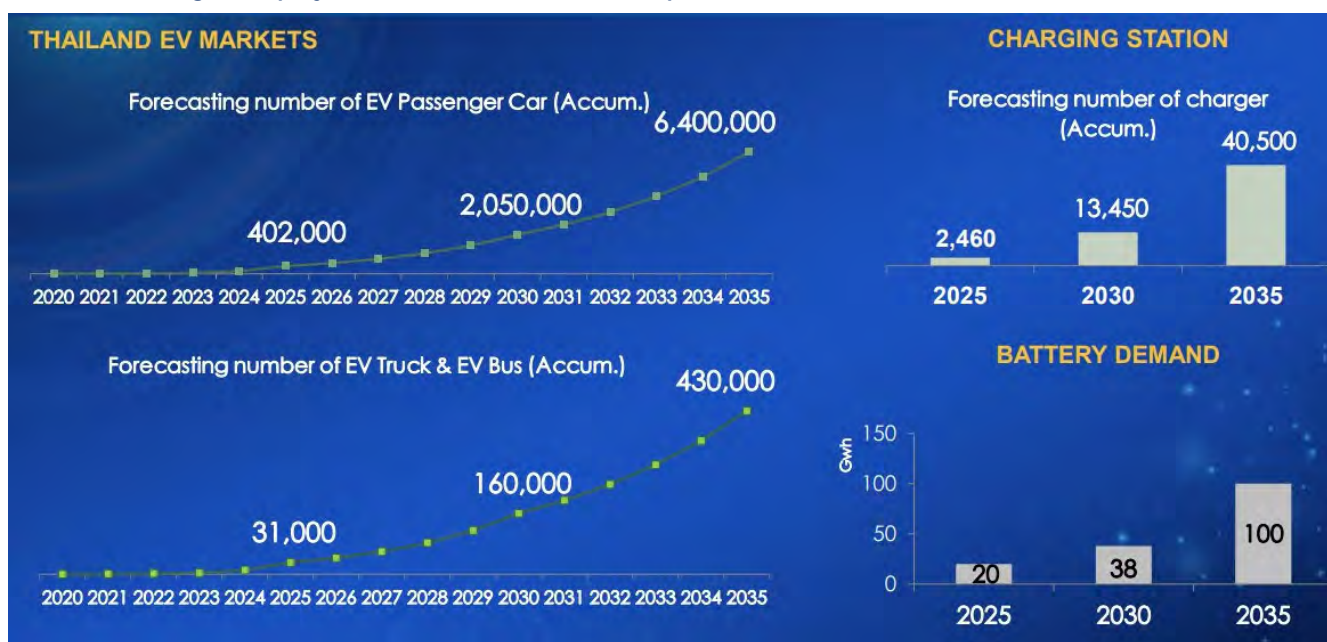
Source: DLT

Under the government's ZEV plan, Thailand's demand growth for EVs is projected to increase to 402k in 2025, rising to 2m in 2030, and 6.4m by 2035 (based on the projected annual sales of 10m total passenger cars as of 3Q21).

In the commercial vehicle segment, e-truck and e-bus sales are expected 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.

Battery demand for EVs is expected to grow to 20GWh in 2025, 38GWh in 2030, and 100GWh in 2035. In comparison, Energy Absolute (EA TB, BUY, TP THB122)'s planned full-phase battery production capacity is 50GWh by 2026.

Exhibit 20: Demand growth projections under Thailand's ZEV plan



Source: EA's 3Q21 analyst presentation: State Policies EV Committee

As of 3Q21, Thailand has three major EV production plants along with a few companies that plan to build EV plants in Thailand. To capture the upcoming demand growth for EVs in Thailand, three companies – EA, FOMM, and MG – have already gained footholds in the EV market with production plants and distribution networks.

Energy Absolute. The first plant, EA's THB1.5b, 3,000 EVs/year facility, has already produced 122 e-buses which were sold to buyers in in Sep-Oct 2021. EA plans to use in-house produced batteries from Amita (Thailand), which owns and operates a 1GWh battery plant phase 1 (expandable to 50GWh capacity), for its e-buses, e-ferries, EV cars, and e-trucks to achieve a zero-tax benefit. This would be achieved mainly via the 50% local content rule, enabling it to be exempt from the 40% import tax for e-buses and the 20% import tax for batteries.

To ensure product reliability and quality, EA uses state-of-the-art technology for its manufacturing plant designed by Dongfeng Design Institute, a company that built manufacturing plants for the leading EV brands in China, including Sunlong, Honda, Toyota, and Fiat.

In addition, EA has fully integrated all business units within its EV value chain for its e-buses, which includes importing parts from China's leading e-bus brands (Yutong, Sunlong, Golden Dragon, and Skywell) for assembly at its plant. The batteries used are produced by Amita Technology, and the EV chargers use technology from Growatt and Ates Power Technology.

Exhibit 21: EA's e-bus and e-truck production plant



BUILD TO HIGHEST QUALITY

1. The plant designed by professional team who had designed international automotive manufacturing
2. Machine Sourcing / Installation / Commissioning by expertise in the automotive industry
3. Monitoring production process by professional partners to meet global standards and high quality of electric vehicles

- **Company:** Absolute Assembly Co.,Ltd.
- **Location:** Chachoengsao
- **Capacity:** Up to 3,000 units per year
- **Standard Granted:** ISO:9001
- **Area:** Over 65,000 sq.m³

AAB – Global Standard E-Vehicles Plant

Source: EA

EA's THB1.2b acquisition of a 40% stake in NEX in May-20, and the additional THB1.3b investment cost for its e-bus manufacturing plant with a total capacity of 3,000 e-buses annually, should allow EA and NEX to see strong net profit growth in 2021.

NEX's e-buses, produced domestically at EA's THB1.3b plant and assembled from not less than 50% local material, should be able to capitalise on the government's favourable tax incentive scheme and projected demand growth in the next five years, based on the current Power Development Plan 2018 Revision 1.

Exhibit 22: EV bus by EA



Source: EA

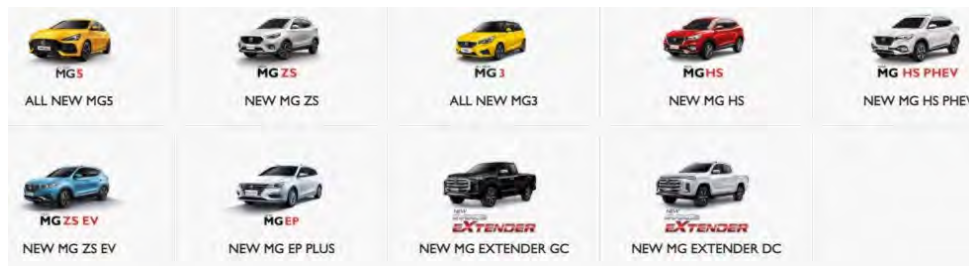
Exhibit 23: EA's SPA1 model



Source: EA

MG. The second plant, a Thai-Chinese JV between Charoen Pokphand group, Shanghai Hydrogen Propulsion Technology (SAIC) Motor, and the British automotive company MG Sales (Thailand), is a THB10b manufacturing plant in Chonburi in eastern Thailand.

Exhibit 24: MG car models in Thailand



Source: [MG](#)

Initially making five models (MG3, MG5, MG6, MG GS, MS ZS) the plant plans to produce nine models with a total production capacity of 100,000 EVs per annum. The plant is located in the Hemraj Eastern Seaboard industrial estate.

Exhibit 25: MG car being manufactured



Source: [MG](#)

Exhibit 26: MG's recent sales campaign, "the more you charge, the more you get"



Source: [MG](#)

FOMM (Thailand). The third EV production plant is owned by Japanese-based First One Mile Mobility (FOMM). The plant, located in the Amata City industrial estate in Rayong province in eastern Thailand, has enough capacity to produce 10,000 compact passenger EVs a year, priced at THB664,000/unit with a range of 160km per charge. After two years of production in Thailand, and annual sales of 400 EVs in 2019 and 3,000 EVs in 2020, FOMM's plant began exporting the made-in-Thailand EV car to the Japanese market in May-21, according to Nikkei Asia.

Exhibit 27: FOMM EV car model marketed in Thailand



Source: FOMM

Exhibit 28: FOMM EV car made in Thailand and exported to Japan



Source: Nikkei Asia

PTT – ambitious move into the EV industry. PTT (PTT TB, BUY, TP THB60), Thailand's largest integrated energy company with the largest market cap on the SET, plans to enter the EV industry via a JV called Arun Plus (ARUN+) with Foxconn, a Taiwanese electronics company, by building a manufacturing plant for EVs. According to PTT, ARUN+ aims to become the regional EV production hub in ASEAN with an investment of USD1b-2b. Current plans include a final investment decision in 2022, plant construction in 2023, and the commencement of commercial operations in 2024.

Exhibit 29: Foxconn EV portfolio: Foxtron MIH platform

Open EV Platform - Dimension

Track: 1500-1700
Width: 1820-2000
Wheelbase: 2100-2300
Length: 2800-3100

- New EV Design for OEM Customers
- Modular Design leveraging MIH Platform
- Tailor-made features & driving experience
- Target MSRP <30,000 USD (C-Segment)
- Shorten time-to-market
- New model opening in Oct 2021 & launch in 2023

Open EV Platform - Concept

Reference design: Modular Design

OEMs: Customization & Carry-over ratio

White-Label C-Segment

~50% (new top hat)
~80% (new style)
~100%

Open EV Platform - Modularization

Segment	DRIVE			Battery Capacity (kWh)	Suspension		Engine Compartment	FR Floor	RR Floor
	FWD	RWD	AWD		FF SUSP.	RR SUSP.			
B-	○							W/B 2750, Track 1590	Sheet Metal RR Side Member
C	○				MacPherson	Torsion Beam		W/B 2860, Track 1630	Sheet Metal RR Side Member
C+		○						W/B 2860, Track 1660	
D			○		MacPherson	S-Link Multi-Link		W/B 2950, Track 1690	
E			○		Double Wishbone			W/B 3100, Track 1700	S-Link RR Slugs, RR Side Member (over wheel) - Cast Aluminum

Flexible electric powertrain: 100kW, 150kW, 240kW, 340kW

Flexible vehicle type: Hatch Back, SEDAN, SUV, MPV

Source: PTT

Unlike EA, FOMM, and MG, ARUN+ plans to build an open EV platform plant that will facilitate and accommodate EV producers, including a press shop, body shop, paint shop, assembly & testing, and key component supply. Notably, ARUN+ will not produce its own EVs.

However, Hon Hai Technology, the parent company of Foxconn, has unveiled three models of its own EVs to showcase its key product designs, including its passenger EV models C & E and an e-bus.

Exhibit 30: Hon Hai Technology unveils three EV models

Foxconn unveiled three new EV models



HHTD event (Oct 18, 2021)

3 new EVs

Soon be ready to hit the world

Introduced at HHTD 2021, the SUV is expected to be in the Taiwan market by 2023 and the Sedan will come after that. In addition to these two vehicles, Foxconn's bus will bear the Foxtron badge, running in several southern Taiwan cities as of 2022.

Three new "Dark Horses" of EV industry

Model C



MIH Platform

Commercial launch 2023

Max Power : 400 hp
0-100 km/h : 3.8 sec
Max Range : 700 km

- ▶ Sleek Design
- ▶ Energy Efficient
- ▶ Spacious 7-seater

Model E



MIH Platform

Commercial launch 2023 - 24

Max Power : 750 hp
0-100 km/h : 2.8 sec
Max Range : 750 km

- ▶ Designed by Pininfarina
- ▶ Breakthrough Technologies
 - ▶ Facial recognition
 - ▶ Smart Glass
 - ▶ IOT Sync
 - ▶ Smart Surface

E-BUS



E-Bus Platform

Commercial launch 2022

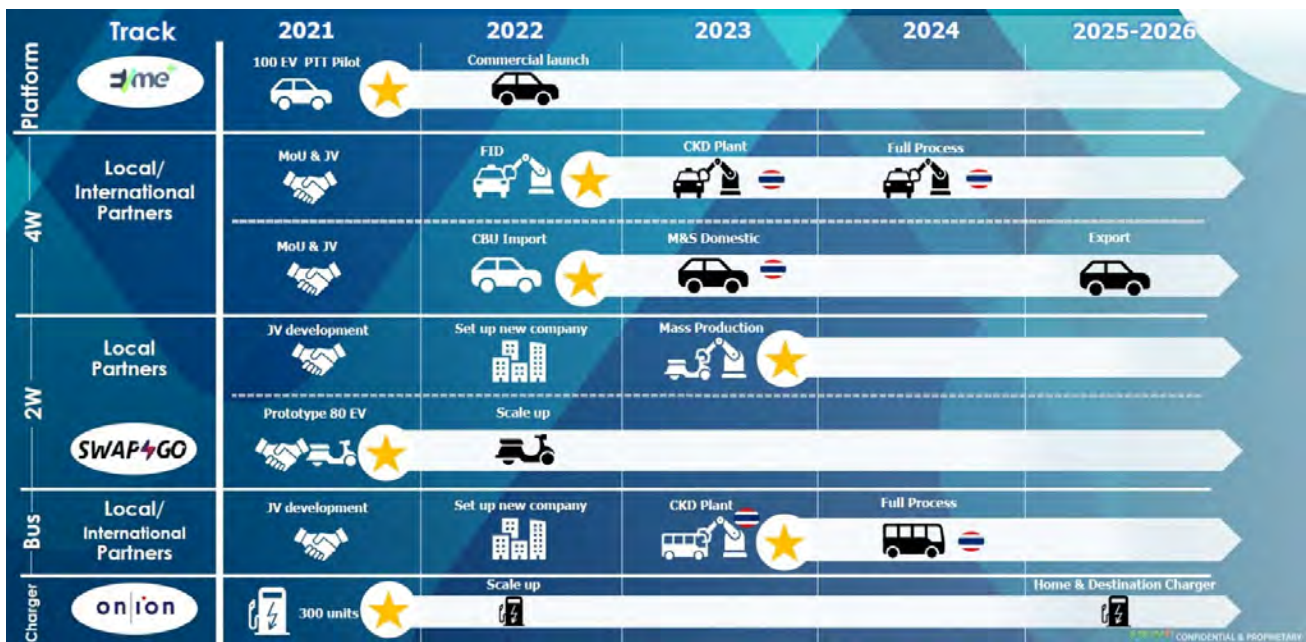
Max Range : 400 km
Top Speed : 120 km/h

- ▶ Super Durable chassis
- ▶ Futuristic Urban Design
- ▶ High-Tech Features

Source: PTT

ARUN+ has a clear execution plan to achieve its EV goals in 2022-26, starting with JVs for producing EVs and batteries in 2021, and constructing plants for EV manufacturing. The proposed commercial operation date (COD) is 2023-24, followed by plans to export EVs and build charging stations nationwide.

Exhibit 31: EV value chain execution plan in 2022-26 by ARUN+



Source: PTT

Global Power Synergy (GPSC TB, BUY, TP THB100), PTT's subsidiary, is also developing a pilot battery production plant to supplement PTT's upcoming EV production plant. We expect the COD and commercial success for the plant to be a few years away, as GPSC's battery technology appears to remain unproven for EVs and other applications.

Exhibit 32: PTT group's EV strategy



Source: PTT

With a well-established business value chain of existing gas stations (PTT Oil and Retail Business (OR TB, BUY, TP THB36)), a battery plant (GPSC), and plastic raw materials for auto parts (PTT Global Chemical (PTTGC TB, BUY, TP THB75) and IRPC (IRPC TB, TP THB5.8)), PTT believes that it can fully leverage ARUN+ with Foxconn to grow and compete in the EV industry, both locally and regionally, to diversify its business portfolio away from the oil & gas business value chain.

Exhibit 33: PTT group's strategy for EV ventures



Source: PTT

Affordability is the key to stimulating demand for BEVs in Thailand

The Bangkok Post newspaper on 26 Nov-21, reported that the Thai government, via the NEVPC, is poised to approve an EV promotion package to support the development of Thailand's EV industry. The new package includes both incentives for consumers and producers and the accelerated build-up of necessary infrastructure to support the projected growth of EV markets over the next 10 years.

The upcoming comprehensive EV promotion plan is supplementary to the previous policies issued by Thailand's 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.

Exhibit 34: ORA Good Cat passenger BEV models imported from China



Source: Beartai.com

Great Wall Motors launches BEV sales in Thailand

Founded in 1984, Great Wall Motors (GWM) is one of the leading BEV producers in China. It recently acquired a manufacturing plant in Rayong, Thailand, from General Motors (GM) in Feb-20. GWM focuses on three types of BEVs – pick-up trucks, SUVs, and passenger BEVs – with three major brands – Haval (SUV), ORA (passenger), and WEY.

In 2021, the first year of the GWM plant's operation, GWM plans to produce up to 80,000 HEVs and PHEVs, with the aim of positioning the plant as a production hub for export to other Southeast Asian countries and Australia, which are currently the major export markets for Thailand's automobile manufacturers.

Exhibit 35: GWM's assembly line at its plant in Thailand



Source: GWM

Exhibit 36: GWM's manufacturing plant in Thailand



Source: GWM

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

Ora Good Cat 400 TECH at THB989,000, which offers a 47.788kWh lithium-ion-based, lithium-ferro-phosphate (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 THB1,059,000 uses the same battery size and type as the '400 Tech' model.

Ora Good Cat 500 ULTRA at THB1,199,000 offers a 63.139kWh lithium-ion-based, nitrogen-manganese-cobalt (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 37: GWC's promotion campaign 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: [Manageronline](#)

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.

Exhibit 38: ORA Good Cat 2021 Muse Edition

Source: Sanook.com

Exhibit 39: Interior of ORA Good Cat BEV

Source: Sanook.com

Tax barriers remain a key obstacle for BEV demand growth in Thailand.

However, the retail prices in Thailand for the three models of ORA Good Cat 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%).

While the ORA Good Cat 400 model costs RMB103,900 (THB480,000) in China, it costs 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.

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 40: 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		
1 Import tax	0	%
2 Excise tax	8	%
Price after excise and import taxes	764,100	THB
3 Municipal tax	10	%
Price after municipal tax	840,510	THB
4 VAT	7	%
Price after VAT	899,346	THB
5 Retail margin mark-up	10	%
Final retail price	989,280	THB
Total margins	231,435	THB
Total taxes	191,846	THB
Margins as % of retail price	23.4	%
Taxes as % of retail price	21.3	%

Sources: GWM; FSSIA estimates

What could be included in the EV promotion plan?

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 imported from China and Europe thanks to potential price cuts by up to 20-30%, based on our estimates.

Exhibit 41: EV promotion plan for passenger BEVs and motorbike BEVs

Policy	Beneficiary	Amount	Effective promotion duration
1 Subsidy from energy fund	Consumers/EV buyers	Up to THB0.2m per EV	1-3 years
2 Excise tax reduction	Producers/EV buyers	From 8% to 2-4%	2-3 years
3 Import duty tax reduction	Producers/EV buyers	From 20-40% to 0-10%	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

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 (CO₂) 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 42: Thailand's automotive excise tax structure

Old rate based on engine size Tax structure before 1 Jan 2016			New rate based on CO ₂ emissions Tax structure implemented from 1 Jan 2016				Adjusted rate based on CO ₂ emissions Tax structure according to recommended retail price			
Auto type	Engine (litre)	Tax rate (%)	Auto type	CO ₂ (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	> 3,250 CC	50			40		
			Pick-up	≤ 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 CO₂ ≤ 150g/km / PPV with CO₂ ≤ 200g/km / Eco car with CO₂ ≤ 100g/km

Sources: Excise Tax Department; Fiscal Policy Office

Infrastructure support policy

On 2 Jun-21, PEA announced in the Royal Gazette three key electricity charges related to EV charging stations, effective Apr-21, comprising 1) a fixed THB2.6369/kWh electricity tariff; 2) a THB312.24/month fixed service fee; and 3) a fuel tariff under “low priority” conditions, which means that the electricity supply for EV charging stations will be the last priority after residential, industrial, and other demands are satisfied.

We believe this low electricity tariff charge for charging stations could lead to a higher number of charging stations nationwide. The number of chargers currently stands at 2,285 as of 22 Sep-21, comprising 1,511 normal chargers (AC) and 774 fast chargers (DC).

Exhibit 43: Number of EV charging stations has increased to 693 as of Sep-21



Source: EVAT

EA remains the largest charging station player in Thailand with a total of 417 stations (1,062 AC and 571 DC chargers), followed by three other private companies (VCharge, EVOLT, ChargeNow) and state-owned enterprises (SOEs), including PEA, PTT, the Metropolitan Electricity Authority of Thailand (MEA), and the Electricity Generating Authority of Thailand (EGAT), as of 21 Sep-21.

Many companies, both private and SOEs, plan to increase the number of charging stations by 2-3x within the next two years, according to the ERC, potentially driving up the number of charging stations in Thailand to 2,000 stations by end-2023.

Exhibit 44: EA’s charging infrastructure and charging locations



Source: EA

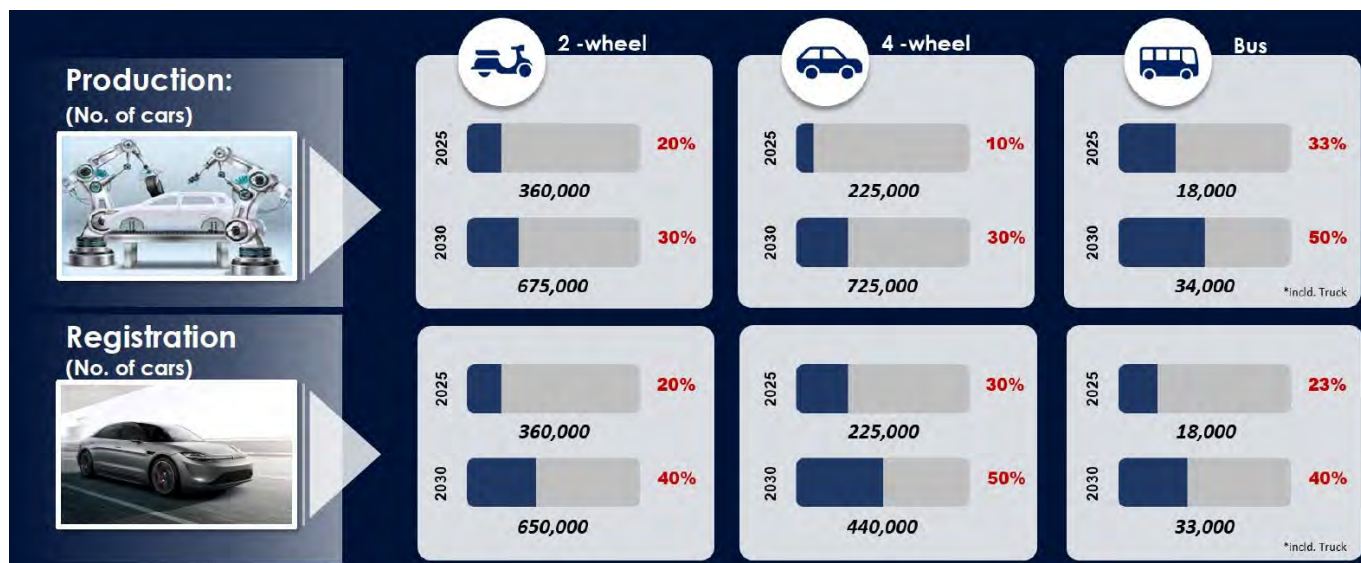
Note that out of the total chargers installed, over one-third (34%) or 774 are DC fast chargers (15-40 minutes charging time), which cost 5x more than AC chargers (3-4 hours charging time). The DC fast charger’s higher voltage means that it takes less time for the EV’s battery to reach at least 80% of its storage capacity.

For consumers, the current average charge cost ranges between THB5.5/kWh for state vehicles to THB7-9.0/kWh for private EVs. At this price range, EV consumers can save up to 50-60% of their fuel cost per km under the Dubai crude oil price of USD65/bbl, based on our assumption.

Current developments in the Thai automotive industry

Thailand’s major car makers also began ramping up production of EVs after Thailand’s BOI approved 24 new EV projects allowing car makers to produce EVs of all types, including HEVs, PHEVs and BEVs.

Exhibit 45: Thailand’s EV policy targets 30% ZEV production



Sources: PTT; NEVPC

In the ongoing shift toward EVs in the regional, domestic, and global markets, Thailand stands to benefit from its strong automotive and support sector foundations. The government is also proposing comprehensive investment incentives to attract car makers to the country to manufacture EVs.

Exhibit 46: With the 30/30 plan, Thailand could rank among the top 10 global BEV manufacturers by 2030



2020 global ICE vehicles manufacturing ranking

Rank	Country	volume, m units
1	China	25.23
2	USA	8.82
3	Japan	8.07
4	Germany	3.74
5	South Korea	3.51
6	India	3.39
7	Mexico	3.18
8	Spain	2.27
9	Brazil	2.01
10	Russia	1.44
11	Thailand	1.43
12	Canada	1.38
13	France	1.32
14	Turkey	1.30
15	Czech	1.16



2025 global BEV vehicles manufacturing ranking

Rank	Country	volume, m units
1	China	7.35
2	US	2.17
3	Germany	2.00
4	Japan	1.08
5	France	0.63
6	South Korea	0.62
7	Mexico	0.56
8	Czech	0.36
9	UK	0.31
10	Spain	0.27
11	Thailand	0.23
12	Italy	0.19
13	Poland	0.11
14	Hungary	0.10
15	India	0.08

2030 global BEV vehicles manufacturing ranking

Rank	Country	volume, m units
1	China	15.54
2	US	4.90
3	Germany	4.86
4	Spain	2.36
5	Japan	1.80
6	France	1.56
7	South Korea	1.10
8	Czech	1.09
9	Mexico	0.90
10	Thailand	0.73
11	Italy	0.71
12	UK	0.69
13	India	0.55
14	Hungary	0.45
15	Romania	0.26

Source: PTT

The 24 approved projects include Mitsubishi Motors' THB5.48b investment to increase the company's production of EVs in 2023. The company's car production line at Laem Chabang industrial estate in Thailand targets 39,000 vehicles produced in 2023, of which 9,500 are slated to be BEVs and 29,500 HEVs.

Sammitr Group is also set to produce 30,000 BEVs with a THB5.5b investment in another government-approved project. Both projects are aimed at the local market as well as exports to other ASEAN countries.

BMW has also been approved to produce PHEVs, while partnering with DRAXLMAIER Group for the production of high-voltage batteries and battery modules. Nissan is also getting a green light from the government to start producing BEVs after already making significant investments in hybrid car production in recent years.

Local company EA has already begun EV production, and Japanese EV-maker FOMM has started assembling compact BEVs at its Chonburi province plant. The BOI has also approved 10 battery production projects with a total capacity of 0.5m units per year. Two charging station production projects have also been approved that can make more than 4,400 outlets per year.

Ford plans to strengthen its foothold in Thailand. While Ford has ceased production in India and Brazil, according to the Detroit News, the company plans to invest USD900m to modernise its manufacturing plant in Thailand, making it Ford's largest investment in Southeast Asia where it has two assembly plants. The investment is intended to support the production of the next generation Ranger pickup truck model and the Everest SUV, bringing Ford's total investment in Thailand to USD3.4b over its 25-year history in the country.

Ford's plants in Thailand sell vehicles locally and serve as an export base for global markets. Ford's plant opened in 2012 and its JV AutoAlliance Thailand truck plant opened in 1995. Surprisingly, we have not yet seen any move by Ford to make an entry into EV production.

Exhibit 47: Ford's manufacturing plant in Thailand



Source: [The Detroit News](#)

Exhibit 48: Key Ford models in Thailand



MUSTANG



EVEREST



FX4MAX



NEXT-GEN RANGER

Source: [Ford \(Thailand\)](#)

EA and NEX are our top picks for Thailand’s EV theme

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 their strong net profit growth momentum that we project in 2021-23.

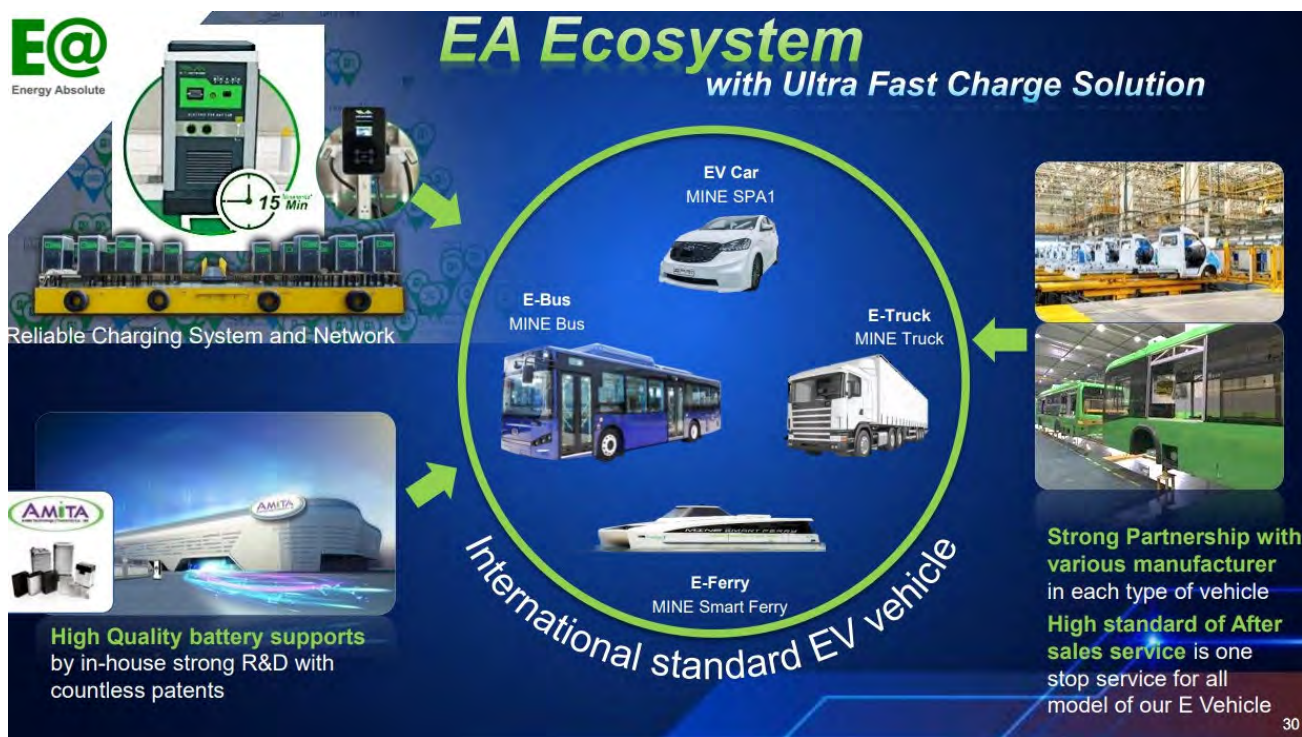
EA: Thailand’s only fully integrated, first-mover EV play. We believe EA’s share price is likely to follow the strong share price outperformance of global EV players, including Tesla (TESLA US) and NIO (NIO US), which have all seen their share prices rise significantly in 2021. In particular, two key EV car producers, TESLA and NIO, have seen their share prices rise YTD, reflecting investors’ confidence in and preference for EV car, bus and truck producers.

We believe that EA, as one of the key producers of EV cars, trucks, and buses, is likely to see its share price re-rate in the next 12 months, driven by net profit growth from its sales and deliveries of EV cars, e-buses, and e-ferries.

NEX: A turnaround and transformation EV play. NEX, via its 40% stake in the manufacturing plant for EVs with EA, and potential EV sales of over 3,000 units in 2022, should see an outperforming share price.

We think that with the launch of EA’s battery phase 1 plant (1GWh capacity) on 12 Dec-21 and the delivery of NEX’s and EA’s EV cars and e-buses in 3Q21 onward, investor confidence should rise further, driving NEX’s share price up again to price in its future strong net profit growth outlook from its EV ventures.

Exhibit 49: EA’s EV ecosystem



Source: EA

GPSC: EV upside still in the clouds. For GPSC, we think there is still an upside for its net profit and share price from the potential pricing in of the upsides from its gross margin expansion on lower gas costs, the announcement of its 600MW gas-to-power plant in Myanmar, and the upcoming COD of its 30MWh pilot battery production plant in 1Q22. However, we think GPSC’s earnings upside from its EV value chain remains low as the commercialisation of its battery technology still seems to be a long way out.

Exhibit 50: GPSC’s battery and digital power businesses

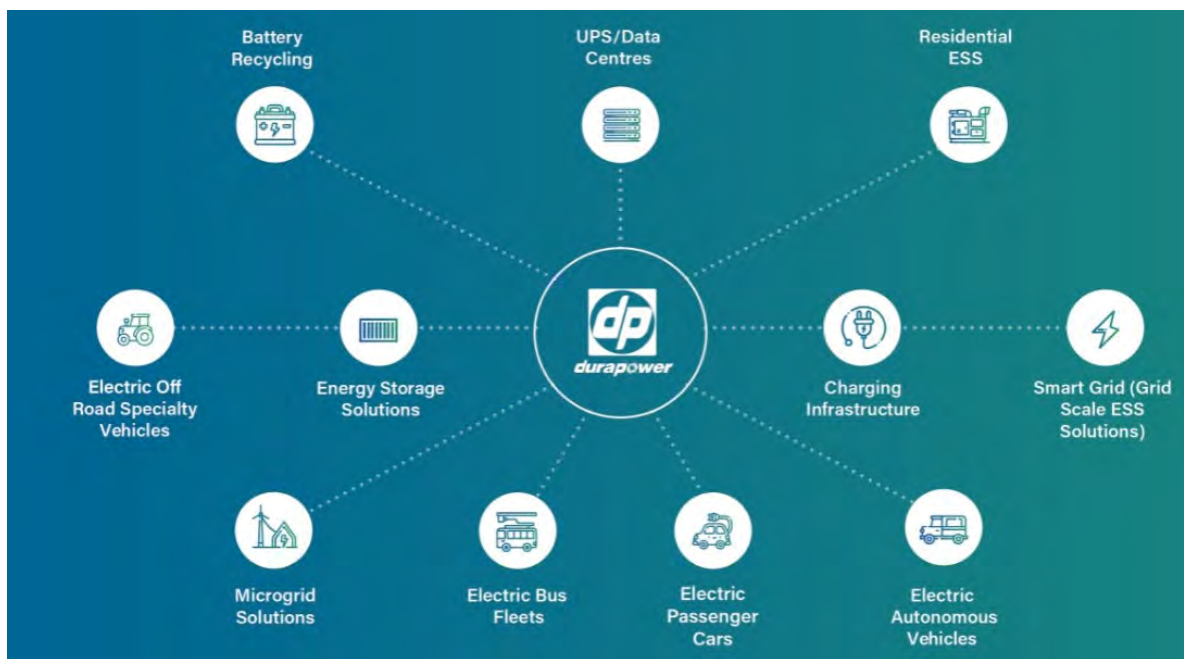


10

Source: [GPSC](#)

BANPU and BPP: EV upsides still less likely in 2022. Banpu (BANPU TB, BUY, TP THB16.9) and Banpu Power (BPP TB, BUY, TP THB23) each own a 50% stake in Banpu NEXT (not listed), which owns a 47.7% stake in Durapower, a battery manufacturing plant in China that is also a developer of e-ferry, e-truck, and EV products. However, given that Durapower remains a loss-making company with subscale production capacity and lower cost competitiveness, we think an earnings upside from Durapower to Banpu and BPP is unlikely in 2022.

Exhibit 51: Durapower’s system integration of lithium-ion battery technology for EVs and ESS



Source: [Durapower](#)

PTT: Still too early to see an upside. While PTT's ambitious plan to build a fully integrated platform and ecosystem for EVs is now clearly well-crafted, we remain cautious for the success of the plan given the uncertainty of demand, product quality, plant efficiency and competitiveness, and the execution risk embedded in this new EV venture for PTT. Hence, PTT is not our top pick in the EV industry in Thailand for 2022.

Exhibit 52: Automotive peer comparisons

Company	BBG code	Rec	Share Price (LCY)	Target price (LCY)	Upside (%)	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)
EV															
Energy Absolute	EA TB	BUY	82.50	122.00	48	9,194	3.3	36.2	30.2	27.0	25.6	8.7	6.9	28.5	21.1
Nex Point	NEX TB	BUY	13.80	25.00	81	690	nm	52.6	11.8	13.8	45.9	6.8	4.5	175.2	19.7
BANPU	BANPU TB	BUY	10.70	16.90	58	2,163	nm	5.3	6.0	15.7	14.7	0.7	0.8	4.1	5.1
Banpu Power	BPP TB	BUY	17.40	23.00	32	1,584	26.7	9.8	8.7	12.7	13.3	1.2	1.1	33.6	25.7
Global Power	GPSC TB	BUY	74.50	100.00	34	6,276	21.2	25.2	21.2	8.0	9.3	2.0	1.9	16.2	15.7
Tesla Inc	TSLA US	n/a	1,017.03	n/a	n/a	1,021,367	nm	439.9	166.0	13.0	21.6	54.4	35.7	171.5	96.1
Nio Inc - Adr	NIO US	n/a	34.26	n/a	n/a	57,965	nm	nm	nm	(81.0)	(28.0)	23.9	13.3	nm	nm
Nikola Corp	NKLA US	n/a	9.72	n/a	n/a	3,955	nm	nm	nm	(51.9)	(73.4)	3.4	5.2	nm	nm
Workhorse Group	WKHS US	n/a	4.99	n/a	n/a	778	nm	nm	nm	(89.0)	(269.4)	1.9	5.7	nm	nm
EV average						1,103,973	16.0	407.5	154.0	7.8	18.4	51.7	33.9	159.2	89.3
ICE															
Toyota Motor	7203 JP	n/a	2,002.00	n/a	n/a	287,498	10.1	13.1	13.8	11.1	9.4	1.4	1.3	14.9	16.7
Honda Motor	7267 JP	n/a	3,165.00	n/a	n/a	50,464	1.2	10.1	11.1	6.6	6.1	0.7	0.7	9.5	12.1
Mazda Motor	7261 JP	n/a	903.00	n/a	n/a	5,022	(15.4)	20.0	nm	2.1	(4.7)	0.5	0.5	4.8	6.6
Subaru Corp	7270 JP	n/a	2,065.50	n/a	n/a	13,984	(4.4)	10.1	17.6	9.4	5.0	0.9	0.9	3.3	4.3
Nissan Motor	7201 JP	n/a	550.60	n/a	n/a	20,455	(23.4)	nm	nm	(0.5)	(11.6)	0.4	0.6	5.4	25.6
Mitsubishi Motor	7211 JP	n/a	331.00	n/a	n/a	4,342	(35.1)	nm	nm	(0.9)	(48.4)	0.6	1.1	6.5	nm
Suzuki Motor	7269 JP	n/a	4,606.00	n/a	n/a	19,911	(5.7)	15.2	15.8	9.6	9.2	1.4	1.4	5.9	6.4
Geely Auto	175 HK	n/a	23.80	n/a	n/a	29,970	8.6	25.8	27.2	12.1	10.2	2.9	2.7	16.3	14.5
Dongfeng Motor	489 HK	n/a	7.12	n/a	n/a	7,866	2.4	5.2	3.9	7.3	8.8	0.4	0.3	13.9	6.5
Great Wall Motor	2333 HK	n/a	29.30	n/a	n/a	64,841	36.7	43.6	29.2	8.9	12.4	3.8	3.5	43.8	33.6
Saic Motor	600104 CH	n/a	21.73	n/a	n/a	39,896	8.8	11.5	9.8	8.5	9.7	1.0	0.9	11.3	10.1
Faw Jiefang	000800 CH	n/a	10.60	n/a	n/a	7,747	(14.7)	11.2	13.9	8.6	6.4	2.0	2.0	7.1	9.7
General Motors	GM US	n/a	63.21	n/a	n/a	91,772	12.4	14.0	9.5	14.1	19.6	2.0	1.7	7.7	6.4
Ford Motor	F US	n/a	21.45	n/a	n/a	85,719	19.2	nm	11.4	(2.6)	21.7	2.8	2.3	22.0	6.3
Porsche Auto	POAHF US	n/a	96.20	n/a	n/a	29,717	nm	12.4	6.8	5.7	9.9	0.7	0.7	19.7	nm
Bayerische Motor	BMW GR	n/a	89.53	n/a	n/a	65,955	25.6	15.8	5.4	6.5	16.1	1.0	0.8	6.9	3.8
Daimler Ag-	DAI GR	n/a	74.10	n/a	n/a	89,582	1.9	20.7	6.4	5.4	18.9	1.2	1.1	3.9	2.3
Volkswagen Ag	VOW GR	n/a	273.40	n/a	n/a	133,424	5.8	18.4	9.8	6.1	10.5	1.1	1.0	3.4	2.5
Tata Motors	TTMT IN	n/a	494.45	n/a	n/a	23,647	nm	nm	nm	(2.9)	(7.9)	2.8	3.1	11.7	9.8
ICE average						1,071,811	9.6	15.0	11.8	7.6	11.5	1.6	1.4	12.8	10.7

Share price as of 9 December 2021

Sources: Bloomberg, FSSIA estimates

Exhibit 53: Utilities peer comparisons

Company	BBG code	Rec	Share Price (LCY)	Target price (LCY)	Upside (%)	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)
THAILAND															
B Grimm Power	BGRIM TB	BUY	39.25	58	48	3,057	31.8	35.5	25.8	10.2	13.4	3.5	3.4	13.1	11.5
Gulf Energy Deve	GULF TB	BUY	40.75	56	37	14,284	44.1	72.6	37.9	10.0	17.6	7.1	6.3	49.5	26.1
Global Power Syn	GPSC TB	BUY	74.5	100	34	6,276	16.3	25.2	21.2	8.0	9.3	2.0	1.9	16.2	15.7
Banpu Power	BPP TB	BUY	17.4	23	32	1,584	18.2	9.8	8.7	12.7	13.3	1.2	1.1	33.6	25.7
Electricity Gen	EGCO TB	BUY	171.5	245	43	2,697	26.2	6.9	5.3	12.3	14.5	0.8	0.7	13.6	9.9
Ratch Group	RATCH TB	BUY	44	60	36	1,906	13.4	8.3	7.4	12.2	15.7	1.0	0.9	11.0	11.4
Wha Utilities&Pow	WHAUP TB	HOLD	4.06	4.5	11	464	20.4	12.7	11.8	9.9	10.6	1.3	1.2	42.9	41.9
Bcpq	BCPG TB	BUY	12.8	17	33	1,107	(6.4)	14.2	14.5	10.8	9.8	1.5	1.4	17.5	17.4
Ck Power	BKP TB	BUY	5	6.6	32	1,214	97.0	17.9	12.8	9.1	11.9	1.6	1.5	10.1	11.7
Energy Absolute	EA TB	BUY	82.5	122	48	9,194	33.0	36.2	30.2	27.0	25.6	8.7	6.9	28.5	21.1
Gunkul Engineer	GUNKUL TB	BUY	4.8	5.4	13	1,274	41.4	16.4	13.7	20.2	22.0	3.2	2.9	14.0	12.5
Demco Pcl	DEMCO TB	BUY	3.78	5.9	56	82	64.6	15.3	13.0	3.8	4.4	0.6	0.6	(97.9)	(71.4)
Power Solution	PSTC TB	BUY	2.62	3.7	41	186	196.7	55.9	17.7	1.9	5.8	1.1	1.0	15.6	21.2
Sermang Power	SSP TB	BUY	12.8	20	56	388	19.5	14.3	11.4	18.7	18.2	2.2	2.0	10.1	8.5
Tpc Power	TPCH TB	BUY	11.4	14	23	137	30.8	20.3	9.5	7.5	15.1	1.5	1.4	12.7	8.3
Tpi Polene Power	TIIPP TB	BUY	4.18	5.7	36	1,049	(3.6)	7.5	7.7	15.7	14.8	1.2	1.1	6.5	6.5
Absolute Clean	ACE TB	BUY	3.62	5.2	44	1,101	31.0	19.5	17.0	15.1	16.5	2.8	2.8	15.5	12.2
Earth Tech	ETC TB	HOLD	3.28	2.1	(36)	220	nm	23.1	22.3	12.6	12.0	2.8	2.6	15.1	14.4
Thailand avg						46,219	25.6	39.0	25.3	14.0	16.9	4.9	4.2	28.5	19.1
HONGKONG															
Datang Intl Power	991 HK	n/a	1.43	n/a	NA	6,711	nm	nm	nm	nm	nm	nm	nm	nm	nm
Huadian Power	1071 HK	n/a	3.08	n/a	NA	6,584	(3.3)	12.7	5.5	1.5	10.6	0.4	0.4	12.5	8.9
Huaneng Power	902 HK	n/a	4.49	n/a	NA	17,827	(3.8)	12.5	8.7	1.7	6.9	0.7	0.6	11.5	9.3
China Power Inter	2380 HK	n/a	4.82	n/a	NA	6,695	14.3	26.6	16.8	5.0	7.4	1.2	1.1	12.6	10.4
China Resources	836 HK	n/a	25.30	n/a	NA	15,605	18.3	15.4	11.5	8.2	10.8	1.3	1.2	8.8	7.4
Clp Holdings Ltd	2 HK	n/a	75.10	n/a	NA	24,327	0.6	17.0	15.7	9.7	10.1	1.6	1.6	10.6	10.1
Power Assets	6 HK	n/a	47.20	n/a	NA	12,916	3.1	15.7	14.8	7.7	8.2	1.2	1.2	76.7	74.1
Hongkong avg						90,665	3.3	14.8	11.7	5.9	8.4	1.1	1.0	19.4	17.8
MALAYSIA															
Petronas Gas	PTG MK	n/a	16.46	n/a	NA	7,828	(0.7)	16.1	16.8	15.6	14.6	2.6	2.5	9.0	8.9
Tenaga Nasional	TNB MK	n/a	9.16	n/a	NA	12,601	8.7	10.9	11.0	8.6	8.3	0.9	0.9	6.4	6.3
Ytl Power Inte	YTLP MK	n/a	0.60	n/a	NA	1,190	97.0	11.1	13.8	3.6	2.7	0.4	0.4	10.3	10.5
Malaysia avg						21,619	4.5	3.1	3.2	2.6	2.4	0.4	0.3	1.8	1.8
CHINA															
China Datang	1798 HK	n/a	3.07	n/a	NA	2,863	26.3	11.3	9.2	7.4	7.7	1.4	0.9	9.5	8.2
China Gas	384 HK	n/a	14.68	n/a	NA	10,420	6.2	7.1	8.1	23.5	15.9	1.6	1.2	7.5	7.9
China Longyuan	916 HK	n/a	17.64	n/a	NA	18,176	20.2	18.9	16.5	10.6	11.2	2.0	1.8	10.3	9.2
Beijing Enterprises	392 HK	n/a	26.40	n/a	NA	4,272	14.0	4.0	3.8	9.4	9.5	0.4	0.3	6.6	5.5
Kunlun Energy	135 HK	n/a	7.57	n/a	NA	8,404	22.6	10.7	9.5	10.3	11.7	1.0	0.9	3.4	3.1
China avg						44,135	14.0	6.1	5.6	6.5	5.9	0.7	0.6	3.8	3.6
INDONESIA															
Perusahaan Gas	PGAS IJ	n/a	1,495.00	n/a	NA	2,512	nm	9.4	9.4	12.6	10.4	1.0	0.9	5.3	5.2
Indonesia avg						2,512	nm	0.3	0.3	0.3	0.3	0.0	0.0	0.1	0.1
SINGAPORE															
Sembcorp Indus	SCI SP	n/a	2.01	n/a	NA	2,566	11.8	12.9	9.0	8.0	10.5	1.0	0.9	9.4	8.8
Singapore avg						2,566	11.8	0.4	0.3	0.2	0.3	0.0	0.0	0.3	0.2
Utilities under coverage						46,219	25.6	39.0	25.3	14.0	16.9	4.9	4.2	28.5	19.1
Average (all)						207,716	21.2	16.8	12.2	7.4	8.9	1.7	1.6	15.8	13.0

Share price as of 9 December 2021

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	PAP	PCSGH	PDJ	PG	PHOL	PLANB
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	NWTO	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 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.

This report may not be reproduced, distributed or published by any person in any manner for any purpose without permission of FSSIA. Investment in securities has risks. Investors are advised to consider carefully before making investment decisions.

Company	Ticker	Price	Rating	Valuation & Risks
Energy Absolute	EA TB	THB 82.50	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.
PTT PCL	PTT TB	THB 37.50	BUY	Risks to our SoTP-based valuation are the oil price and potential earnings downside from government intervention.
Nex Point	NEX TB	THB 13.80	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 74.50	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.
PTT Global Chemical	PTTGC TB	THB 58.25	BUY	The key downside risks to our EV/EBITDA-based TP are the weaker-than-expected HDPE price and HDPE-naphtha margin.
IRPC PCL	IRPC TB	THB 3.84	BUY	Key risks to our positive view and EV/EBITDA-based target price are weaker-than-expected oil product demand growth and lower-than-expected PP-naphtha and SM-benzene margins.
Banpu	BANPU TB	THB 10.70	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 17.40	BUY	Downside risks to our SOTP valuation are the start-up delays of its new projects and government intervention in the electricity tariff.
PTT Oil and Retail Business	OR TB	THB 25.50	BUY	The downside risks to our SOTP-based TP include: 1) lower-than-expected demand for petroleum products; 2) a lower marketing margin; and 3) weaker-than-expected jet demand.
B.Grimm Power	BGRIM TB	THB 39.25	BUY	The downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand, 2) a lower crude price, and 3) unplanned shutdowns of its SPPs.
Gulf Energy Development	GULF TB	THB 40.75	BUY	The downside risks to our SoTP-based TP on GULF include 1) lower-than-expected demand for electricity in Thailand; 2) a lower crude price; and 3) delays in project commercial operation dates.
Electricity Generating	EGCO TB	THB 171.50	BUY	Downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand; 2) delays in project commencement or commercial operation dates (COD); and 3) government intervention in electricity tariff subsidies.
Ratch Group	RATCH TB	THB 44.00	BUY	The downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand; 2) lower crude price; and 3) delays in starting new projects.
WHA Utilities & Power	WHAUP TB	THB 4.06	HOLD	Downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand; and 2) lower crude prices. Upside risks are the higher than expected sales volumes of water and electricity for industrial users.
BCPG	BCPG TB	THB 12.80	BUY	The downside risks to our SoTP-based TP include: 1) lower-than-expected demand for electricity in Thailand, the Philippines and Indonesia; and 2) government intervention by way of electricity tariff subsidies.
CK Power	CKP TB	THB 5.00	BUY	The downside risks to our SoTP-based TP include lower-than-expected demand for electricity in Thailand and lower-than-expected water supply for hydro projects.
Gunkul Engineering	GUNKUL TB	THB 4.80	BUY	The downside risks to our SoTP-based TP on GUNKUL include 1) lower-than-expected demand for electricity in Thailand, 2) declining EPC backlogs, and 3) lower-than-expected utilisation rates for solar and wind farms.
Demco	DEMCO TB	THB 3.78	BUY	Downside risk includes delays in bidding for power transmission projects.
Power Solution Technologies	PSTC TB	THB 2.62	BUY	The downside risks to our SoTP-based TP on PSTC include 1) lower-than-expected demand for electricity in Thailand and delays of power plant project start-ups.
Sernsang Power Corp	SSP TB	THB 12.80	BUY	The downside risks to our SoTP-based TP for SSP include 1) a lower-than-expected demand for electricity in Thailand; 2) a lower crude price; and 3) project start-up delays.

TPC Power Holding	TPCH TB	THB 11.40	BUY	The downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand, 2) a lower crude price, and 3) higher costs of biomass feedstock.
TPI Polene Power	TPIPP TB	THB 4.18	BUY	Downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand; 2) lower crude price, and 3) unplanned shutdown of the company's power plants.
Absolute Clean Energy	ACE TB	THB 3.62	BUY	The downside risks to our SoTP-based TP include 1) lower-than-expected demand for electricity in Thailand, 2) a lower crude price, and 3) higher costs of biomass feedstock.
Earth Tech Environment	ETC TB	THB 3.28	HOLD	Downside risks to our SoTP-based TP include: 1) lower-than-expected demand for electricity in Thailand; 2) lower crude price; and 3) lower-than-expected industrial waste volumes. Upside risks are the faster and larger-than-expected new capacity won by ETC in 2021.

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 09-Dec-2021 unless otherwise stated.

RECOMMENDATION STRUCTURE

Stock ratings

Stock ratings are based on absolute upside or downside, which we define as (target price* - current price) / 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.