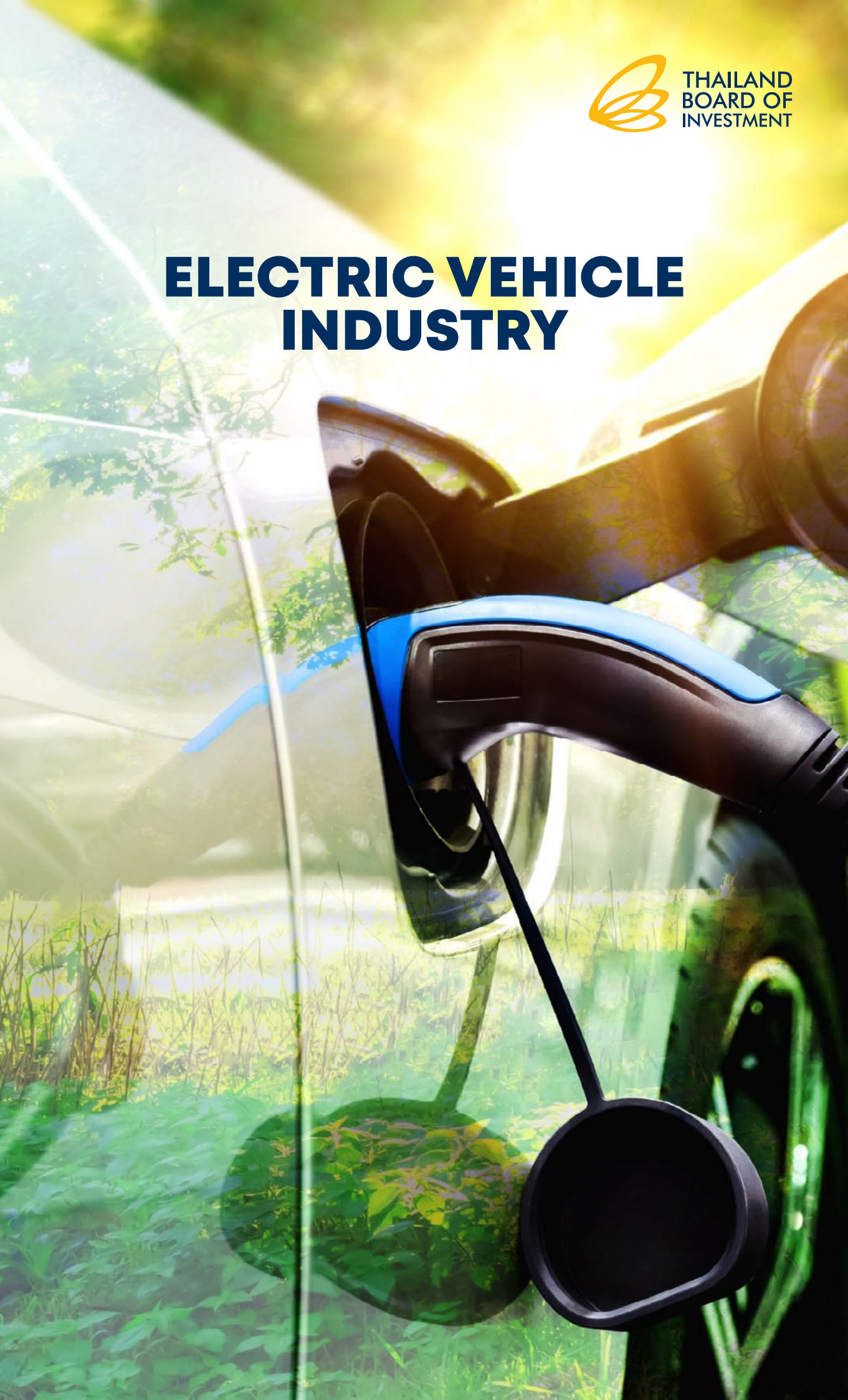


ELECTRIC VEHICLE INDUSTRY





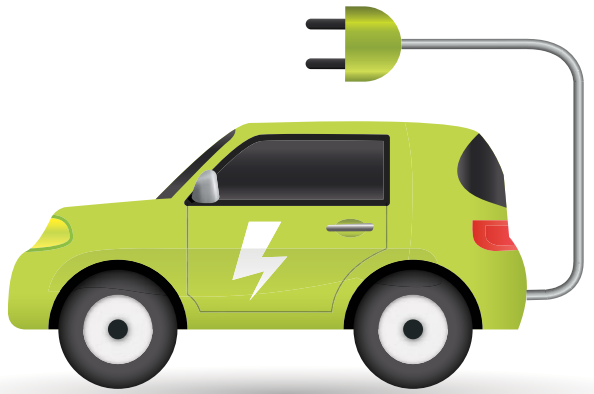
Why Thailand for the Electric Vehicle Industry?

Global & Local Demand

- According to the International Energy Agency (IEA), global sales of electric vehicle in 2019 is around 2.1 million units, which represents an increase of around 40% from 2018, which indicates a growing demand for electric vehicle worldwide. Similarly, the global accumulated EV unit grew on average by 60 percent during 2014 - 2019.
- For local demand, the stock of EVs in Thailand has been steadily increasing. More importantly, several well-known Thai companies have been actively investing in EV charging apparatus nationwide, which suggest a growing confidence in future demand surge.

Supply-Side Factor & Supportive Ecosystem

- As the 11th largest automotive producer in the World and the 1st in ASEAN, Thailand is prime to become the EV hub of ASEAN with its well-established value chain, offering the industry with top-notch quality product at a competitive cost.
- Thailand has robust and complete automotive supply chain of more than 1,700 companies in the upstream supporting industry, 1,820 auto parts suppliers (720 in tier 1 and 1,100 in Tier 2 & 3), and with over 35 automobile and motorcycle brand².
- Efforts to expand EV infrastructures such as charging stations by public and private sector institution indicates robust development of the EV ecosystem in Thailand.



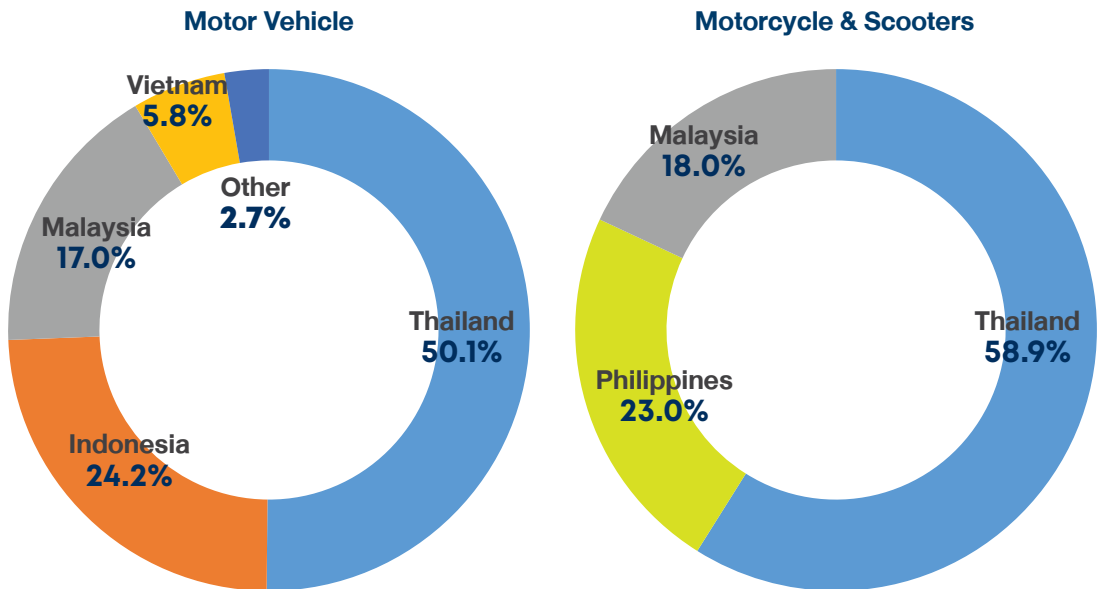
Government & BOI Support

- Government of Thailand offers extensive investment incentives through the Board of Investment (BOI) for almost every segment of electric vehicle market.
- These include exemption of corporate income for up to 8 years. Furthermore, the production of key electric vehicle parts (e.g., BMS, Motor, and DCU) is afforded additional years of CIT exemption on top of that for assembly. As always, the BOI investor facilitation services strive to ensure a smooth journey for all incoming companies.

Overview of the Thai Automotive Industry

Overview of Production Capacity

- Thailand is ASEAN's largest auto producer. Production in 2020 is 1,427,074 units, in which accounted for 50.1 percent of total production in all ASEAN countries. This is followed by Indonesia with 690,150 units or around 24.2 percent, and Malaysia with 485,186 units or around 17.0 percent.
- Similarly, Thailand is also the leader in motorcycle & scooters production with 1,615,319 units produced in 2020, accounting for 58.9 percent of production in ASEAN. This is followed by Philippines and Malaysia with 631,370 and 494,490 units, respectively.



Source: ASEAN Automotive Federation

Overview Situation of ASEAN Electric Vehicle Market

Besides production, Thailand is also the largest EV market in Southeast Asia, according to KPMG Singapore¹. In 2019, there are 153,184 units of newly registered EVs in Thailand, this is followed by Singapore with 45,367 units².

Country	Registered no. of EVs in 2019 (All Type)	Related Government Support Scheme
Thailand	153,184 units	<ul style="list-style-type: none"> ● Plan to produce 1.2 million EVs per year ● Aim to achieve 690 charging stations by 2036
Singapore ²	45,367 units	<ul style="list-style-type: none"> ● Plan to achieve 60,000 charging points in 2030 ● Plan to phase out Internal Combustion Engine (ICE) vehicles by 2040
Indonesia	15,024	<ul style="list-style-type: none"> ● Aim to exports 200,000 units of electric vehicles by 2025
Philippines*	7,000*	<ul style="list-style-type: none"> ● Estimated that EVs market in the country will grow 8-12% to reach 200,000 units by 2024
Malaysia ³	194	<ul style="list-style-type: none"> ● Plan to achieve 25% usage of renewable energy by 2025

Note: *Philippines estimated data as of 2018

Source: KPMG Singapore¹, Economic Research Institute for ASEAN and East Asia (ERIA) Research Project Report FY2021², Channel News Asia (CAN)³

In-depth Information of the Thai EV Market

- In terms of production, Thailand is the world's 11th largest automotive producer in 2020, a rank in which Thailand has been able to hold since 2018.
- As of 2020, total accumulated number of electric vehicle in Thailand is 186,271 units, in which passenger cars (HEV/PHEV) accounted for 93% of all EV in Thailand.

EV Types Type of Vehicle	Accumulated Electric Vehicle		New Registered Electric Vehicles*	
	HEV & PHEV	BEV	HEV & PHEV	BEV
Total	186,271	5,685	32,264	2,999
Passenger Cars	179,034	2,202	29,459	1,288
Motorcycle	7,236	3,128	2,804	1,591
Bus & Truck	1	120	1	2
Motor-tricycle	0	235	0	118

*New registered number of electric vehicles accumulated as of Dec 2020

Source: Organisation Internationale des Constructeurs d'Automobiles data as of June 2021, Electric Vehicle Association of Thailand (EVAT)²





Investment Opportunities

BEV, PHEV AND HEV

Various incentives & initiatives from both public and private sector on electric vehicle passenger cars alongside with various supporting industries makes BEV, PHEV and HEV a promising business opportunity. The example of both supply and demand side are as follow:

- Electric Vehicle Association of Thailand in associate with Thai' government to implement the coordinated plan to boost number PHEV and BEV to 1.2 million units along with 690 charging stations by 2035¹ to support electrical vehicle ecosystem.

- Growing demand for ride-sharing in ASEAN, from increasing number of users for both traditional taxi and transportation application, "CABB EV" launched EV taxi prototype all made by Thais manufacturer and ready to be serviced in 2022 and expected to manufacture 1,200 cars per year and export to overseas market².

Source: KPMG¹, Thai Residents²

Battery Electric Motorcycle

- On the other hand, for battery electric motorcycle industry, Thailand's government also establish solid incentive packages in parallel with Thais manufacturer's competitiveness over neighboring countries.

- According to World's Top Exports, Thailand as the World 5th motorcycle exporter with the total value of \$ 1.8 Billion (2019) with total production capacity of 3 million units per year¹, Thailand significantly equipped with a robust motorcycle supply chain ranging from supporting parts (tires, electronics parts) to production and assembly manufacturing capability.

- Motorcycle as one of the largest domestic manufacturing industry in Thailand with several manufacture plant (localization) that able to feed all ASEAN demand²

Source: World's Top Exports¹, Motorcycles Data (McD)²



Battery Electric Bus, Truck and Tricycle

- Battery Electric Bus, Truck and Tricycle potential growth are another example of electric vehicle business that able to attract interests from many Thailand's private companies.

- As part of Thai's government plan to promote electric vehicle industry with the achieving goals of 50% of new car production should be electric vehicle or 1.25 million units by 2030, Energy Absolute Plc. (Alternative energy focused conglomerate) plans to be a supplier of electric buses for state-run Bangkok Mass Transit Authority (BMTA) to replace current fleet of buses across Bangkok.

- For battery electric tricycle, Banpu Plc. (Energy conglomerate) is stepping in to this opportunity with plans to increase number of electric tricycle (Tuk-tuks) to 1,000 by end of 2021 achieving 5,000 units by 2025.

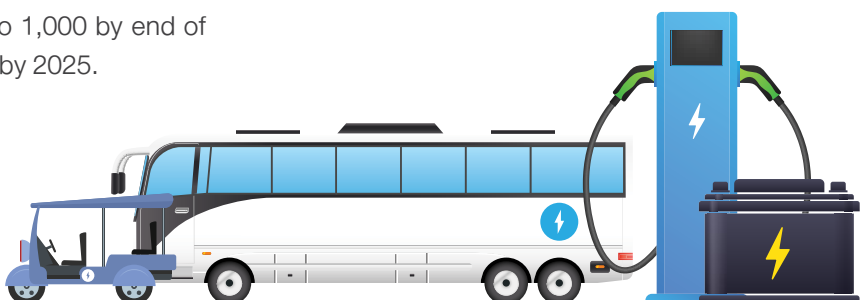
Source: Bangkok Post

Apart from potential possibilities on each specific type of vehicle, there are also some more supportive reasons for Thailand's electric vehicle industry horizon.

Lucrative Investment Incentives

- Electric vehicle, as one of the focusing industry that government of Thailand want to promote with an offering of enormous investment incentives via BOI channels with at least 3 years* of corporate income tax exemption for the manufacturer for almost every type of vehicle.

- Furthermore, as mentioned huge investment incentives policies is implementing with up to 8 years of corporate income tax exemption for Battery Electric Vehicle (BEV).





Private Support Research & Development on EV

- As for research and development requirement to drive and accelerate EV technology, many of Thailand's private companies is collaborating with government organization or research institution to implement EV's research & development projects.

- Ranging from supporting infrastructure perspective, PTT Plc. (Energy conglomerate) is conducting research and development on automotive, charging station, hydrogen and battery technology¹. Or in another aspect, Nissan automotive manufacturing company donates 5 first generation Nissan LEAF (cutting edge technology with 100% electric powered vehicle) to universities in Thailand. In order to provides academic automotive professionals alongside with first-hand understanding of electric automotive engineering and technology².

Source: PTT Thailand¹, Nissan Motor Corporation²

Expanding Regional Demand for Ev Vehicle

- Nissan as a well-known car manufacturer sees a potential in ASEAN's demand for EV's, by the agency of Frost & Sullivan Co. survey 3,000 people interviewed in six ASEAN countries (Philippines, Thailand, Indonesia, Malaysia, Vietnam, and Singapore), with the result of 66% of people in these countries expected that EV will dominate the vehicle markets in the near future.

Source: Nissan Motor Corporation





Expanding EV Charging Apparatus

- As of April 2021, total number of EV charging station in Thailand is 664 stations with the continuous growth rate.

- In parallel with Thai' government's EV roadmap, the expanding of EV infrastructure trend is significant. Incorporate with many private firms that willing to invest in this opportunity.

- For example, Energy Absolute Plc which aims to increase its number of EV charging outlets from 400 to 1,000 nationwide. And for the rest are operating by Thai's companies like PTT Oil and Retail, Electric Generating Authority of Thailand (EGAT) and Metropolitan Electricity Authority, the Provincial Electricity Authority to serve growing demand in the future¹.

Source: Bangkok Post¹

Private Sector and Development

- Many collaborative projects between Thai's research & development organization and private sector in both local & international level.

- PTT Plc. (Energy conglomerate) conduct research & development on automotive, charging station, hydrogen and battery technology. Furthermore in 2021 PTT Oil and Retail (PTTOR) (PTT Plc. subsidiary) collaborates with EVLOMO to implement charging network project across Thailand (With 2,290 fuel station currently) and will install more than 1,000 new fast chargers (every 50 km.) to accelerate EV adoption in Thailand.

- Nissan invested more than billions THB in electric vehicle business, alongside with a strategic plan to make Thailand the EV hub for EV export worldwide.

Government and BOI Support

Area of Focus

The government of Thailand offers supporting incentives for this EV sector via BOI channel. However, there are some areas of focus which provide extra incentive in electrical vehicle manufacturing industry in the following.

- Electric vehicles (BEV, PHEV and HEV)
- Battery Electric Motorcycle
- Battery Electric Tricycle
- Battery Electric Bus and Truck
- Key Parts for EV
- EV Charging Station

Related Research Institution

- **Thailand Automotive Institute:** Joint project with Korea Conformity Laboratories (KCL) from South Korea to establish EV battery testing center. The project aims to build a cooperative partnership on automotive research and development and electric vehicle batteries, for instance, organize trainings on knowledge development of experts and key stakeholders to be ready for operation in electrical vehicle (EV) battery testing center.

- **Electrical Vehicle Association of Thailand (EVAT):** In collaborate with 11 private companies in Thailand to research and develop electric charging consortium for electric vehicle in order to promoting the use of electric vehicle in Thailand and ASEAN.

- **Automotive and Tyre Testing, Research and Innovation Center (ATTRIC):** Construction of testing laboratory and installation of test equipment project. Main objective of this project is to provide knowledge and development of human resources in order to support the shifts towards EV industry.

- **Thammasat University & Kasetsart University:** Supporting study and research in electric vehicle technology in Thailand with various cooperative project alongside with Thailand public & private sectors. For example, Thammasat University and Electricity Generating Authority of Thailand (EGAT) collaboratively established "Smart City" a sustainable campus area with the use of EV car and charging station in the campus.



BOI Incentives

Table 1: BOI corporate income tax incentives for manufacturer of electric vehicle

Type of Activities	Incentives	
	Total Investment Capital of not less than 5,000 million baht	Total Investment Capital of less than 5,000 million baht
Manufacture of Battery Electric Vehicle (BEV), Plug-In Hybrid Electric Vehicle (PHEV) and Hybrid Electric Vehicle (HEV) *Must propose the plans in package covering at least the BEV manufacture project	<ul style="list-style-type: none"> ● HEV: no CIT exemption ● PHEV: 3-year CIT exemption ● BEV: 8-year CIT exemption +1 to 3-year exemption in case of R&D	<ul style="list-style-type: none"> ● HEV: no CIT exemption ● PHEV: 3-year CIT exemption ● BEV: 8-year CIT exemption +2-year exemption if manufacture starts in 2022. +1-year exemption per part if other key part is manufactured in addition to the basic criteria within 3 years +1-year exemption if actual manufacture is > 10,000 car/year in any year within 3 years +1 to 3-year exemption in case of R&D

Note: Exemption of import duties on machinery, exemption of import duties on raw materials used in production for export and non-tax incentives are applied for HEV, PHEV and BEV
 Source: Thailand Board of Investment

Table 2: BOI corporate income tax incentives for manufacturer of battery electric motorcycle, tricycle, bus and truck.

Type of Activities	Incentives
<p>Battery Electric Motorcycle</p>	<p>3-year CIT exemption</p> <ul style="list-style-type: none"> ● +1-year exemption if the manufacture starts in 2022. ● +1-year exemption if the battery manufacture starts from the module production process within 3 years as from the promotion certificate issuance date. ● +1-year exemption per part in case other key part (BMS, Motor, or DCU) is additionally manufactured within 3 years as from the promotion certificate issuance date. ● +1 to 3-year exemption in case of R&D <p>*No additional exemption in case situated in the industrial area or estate</p>
<p>Battery Electric Tricycle</p>	<p>3-Year CIT Exemption</p> <ul style="list-style-type: none"> ● +1-year exemption if battery manufacture starts from the module production process within 3 years as from the promotion certificate issuance date. ● +1-year exemption per part in case other key part (BMS Motor, or DCU) is additionally manufactured within 3 years as from the promotion certificate issuance date. ● +1 to 3-year exemption in case of R&D <p>*No additional exemption in case situated in the industrial area or estate</p>
<p>Battery Electric Bus and Truck</p>	<p>3-Year CIT Exemption</p> <ul style="list-style-type: none"> ● +1-year exemption if battery manufacture starts from the module production process within 3 years as from the promotion certificate issuance date. ● +1-year exemption per part in case other key part (BMS Motor, or DCU) is additionally manufactured within 3 years as from the promotion certificate issuance date. ● +1 to 3-year exemption in case of R&D <p>*No additional exemption in case situated in the industrial area or estate</p>

Source: Thailand Board of Investment



Table 3: BOI corporate income tax incentives for key parts of electric vehicle

Type of Activities	Incentives
<p>Battery</p>	<ul style="list-style-type: none"> ● Pack Assembly: 5-year CIT exemption ● Module Production: 8-year CIT exemption + incentive of 90% import duty reduction for raw and essential materials not available within the country for 2 years ● Cell Production: 8-year CIT exemption (no cap) + incentive of 90% import duty reduction for raw and essential materials not available within the country for 2 years
<p>Others Key Parts of EV</p> <ul style="list-style-type: none"> ● Traction Motor ● Air Conditioning System ● BMS ● DCU ● On-board Charger ● EV Charging Equipment ● DCDC Converter ● Inverter ● Portable EV Charger ● Electrical Circuit Breaker ● EV Smart Charging System ● Front / Rear Axle for EV Bus ● High Voltage Harness ● Reduction Gear ● Battery Cooling System ● Regenerative Braking System 	<ul style="list-style-type: none"> ● 8-years CIT exemption

Table 4: BOI corporate income tax incentives for EV charging station










Type of Activities	Incentives
<p>EV Charging Station</p>	<ul style="list-style-type: none"> ● 5-year CIT exemption <p>* Build at least 40 chargers (with at least 25% are quick type)</p>

Regulatory Process

The following illustration describes your investment journey in Thailand. The BOI stands ready to provide investment facilitation services to ensure that you can fully comply with any regulatory requirement.

Apply for BOI incentives	Submit the application for investment promotion from Board of Investment
Register your entity	Register your business at the Department of Business Development, Ministry of Commerce
Get the certificate of investment promotion	Obtain the certificate of investment incentive from the BOI

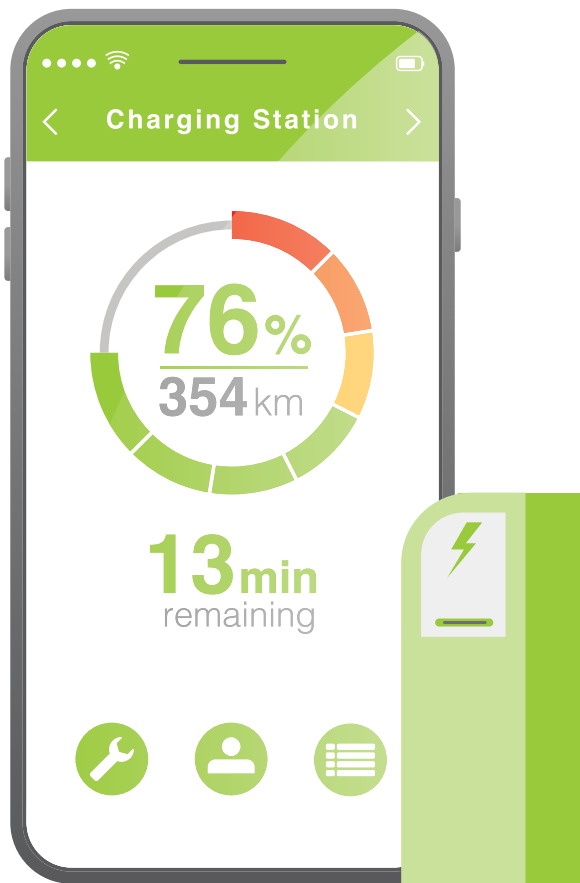
Operationalize your Site

Dealing with Construction Permits	 Building Permit and Occupancy Permit: apply at the Civil Works department of the area of your establishment <hr/>  Telephone: connect with the TOT Public Company Limited <hr/>  Water: apply at the Provincial or Metropolitan Waterworks Authority depending on your lo
Getting Electricity	 Connect with the Metropolitan Electricity Authority or the Provincial Electricity Authority depending on your location
Registering Property	 Submit your documents at the Land Office, Department of Lands.
Recruitment	 Understand Thai labor laws and business incentives for skill upgrading / training
Manufacturing License	 <ul style="list-style-type: none"> ● Authorization to Use Land ● Authorization for New Factory Construction or Rental Factory Renovations ● Authorization to begin factory
Import and Export License	 e-Custom system
Foreign Business License	 Obtain foreign business license if required

Per above illustration, apart from obtaining the BOI incentives and certificates, allow the BOI to assist you on the following processes.

Process	Details and Contact Point
<p>Dealing With Construction Permits</p>	<ul style="list-style-type: none"> ● Building Permit and Occupancy Permit: submit building permit application at the Civil Works department of the area you are building your establishment. ● Telephone: TOT Public Company Limited ● Water: connect with Provincial or Metropolitan Waterworks Authority depending on your location
<p>Getting Electricity</p>	<ul style="list-style-type: none"> ● Connect with the Metropolitan Electricity Authority or the Provincial Electricity Authority depending on your location
<p>Registering Property</p>	<ul style="list-style-type: none"> ● Submit your documents at the Land Office, Department of Lands. ● All corporate documents used in this process must be certified copies.
<p>Recruitment</p>	<ul style="list-style-type: none"> ● Key takeaways in understanding labor laws in Thailand: protections, hours and holiday, compensation, social security, cessation of operation, termination, and minimum wage ● Understand incentives for labor skill training
<p>Manufacturing License</p>	<ul style="list-style-type: none"> ● Apply for Authorization to Use Land, Authorization for New Factory Construction or Rental Factory Renovations, and Authorization to begin factory ● Connect with either the Industrial Estate Authority of Thailand (IEAT) or the Ministry of Industry (MOI) Provincial Offices (Dept. of Industrial Works) depending on the location of your establishment
<p>Import And Export License</p>	<ul style="list-style-type: none"> ● Use of e-Custom system for importing and exporting
<p>Foreign Business License/Certificate</p>	<ul style="list-style-type: none"> ● Obtain foreign business license if required per business type

Source: BOI OSOS Investment Center

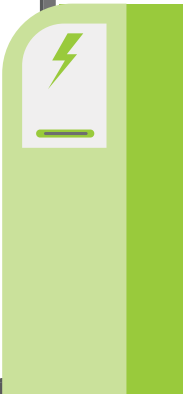


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