

Current Profile of Transport Electrification in ASEAN Countries

To be presented at

**Transition to Soot-free Heavy-duty Vehicles and Fuels Workshop:
Accelerating Adoption of Euro VI and Electric Vehicles Technology in the heavy-duty transport sector**

Organized by icct and CCAC



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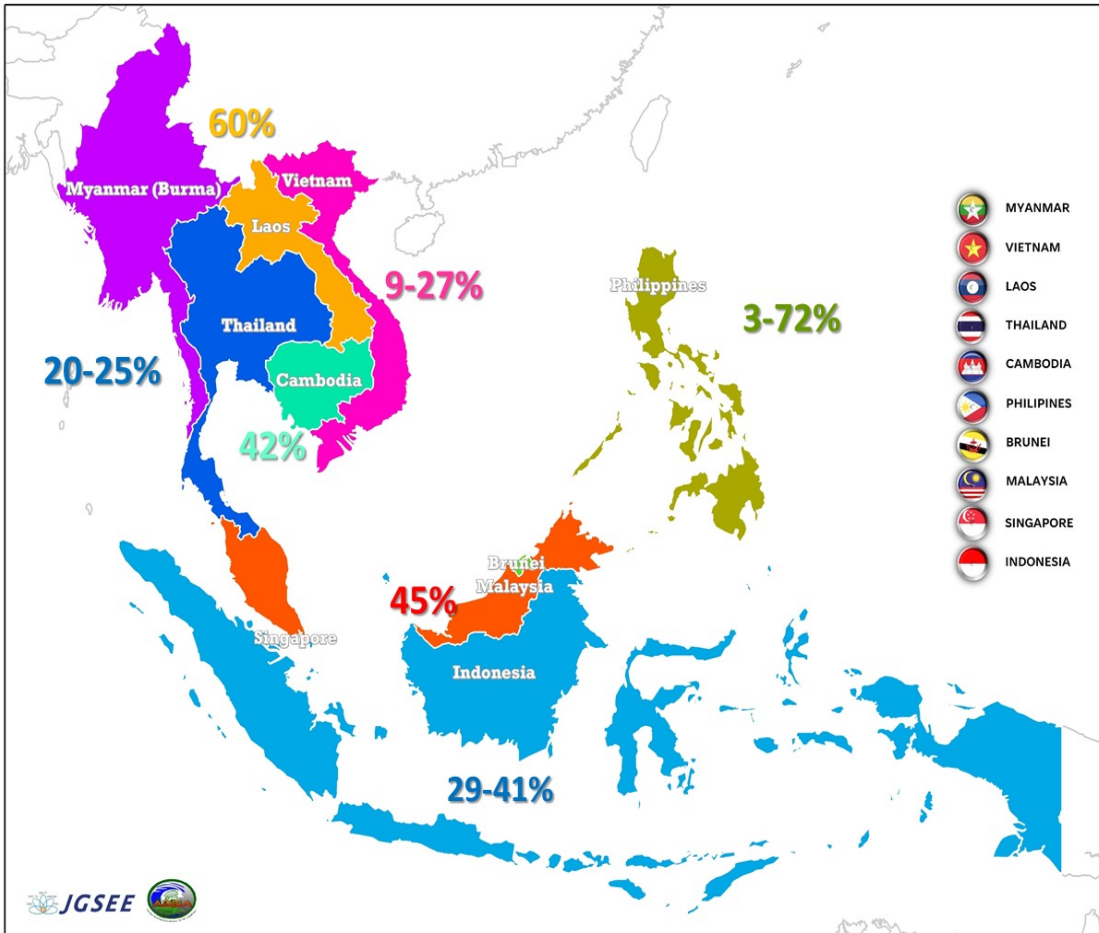
The Joint Graduated School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi (KMUTT)

Need of Transport Electrification in ASEAN countries: Achieve the Carbon Neutrality and Net Zero GHGs Emission Targets

● Data obtained, see detail of each item on tabular format in excel file.
(sheet ' review ASEAN updated July 2022)

Status Review Summary

Item	Vietnam	Thailand	Laos	Brunei	Cambodia	Indonesia	Malaysia	Myanmar	Philippines	Singapore
1. Policy	●	●	●	●	●	●	●		●	
2.1 Target : vehicle number perspective	●	●	●	●	●	●	●		●	●
2.2 Target : Infrastructure number perspective	●	●	●			●	●		●	
2.3 Target : Technology development perspective	No in ASEAN countries, available only in countries such as Japan, USA, EU, China.									
3.1 Economic Instrument: EV production side.	●	●				●	●		●	
3.2 Economic Instrument: EV domestic usage side.	●	●				●	●		●	
3.3 Economic Instrument: Infrastructure.	●	●				●	●		●	
4.1 Current Market (domestic usage)	●	●				●	●		●	
4.2 Current Market (service)	●	●				●	●		●	
4.3 Current EV business	●	●				●	●		●	
5. Existing/ transfer technology	●	●				●	●		●	
6. Plan (Using EV plan) / Opportunity	●	●				●	●		●	●
7. Challenge	●	●				●	●		●	
8. Other related	●	●				●	●		●	



Climate Policy and GHG Emission Reduction Commitments in ASEAN Countries (as presented in the NDC)

Country	Commitments	Ref.
Thailand	<ul style="list-style-type: none"> 20-25% of GHG emission mitigation (or equal to 111 MtCO_{2eq} reduction) by 2030. Emission mitigation measures include an environmentally sustainable transport system plan which promotes an electrification of transport and technical support for battery charging technologies 	1
Vietnam	<ul style="list-style-type: none"> 9-27% of GHG emission mitigation (or equal to 83-250 MtCO_{2eq} reduction) by 2030. Mitigation measure in transport sector introduces a shifting from conventional fuels to biofuel, natural gas and electricity 	2
Indonesia	<ul style="list-style-type: none"> 29-41% of GHG emission mitigation by 2030 Mitigation measure in transport sector is to support implementation of biofuel (B20 and B30) and compressed natural gas 	3
Philippines	<ul style="list-style-type: none"> 3-72% of GHG emission mitigation by 2030 No mention of mitigation measures in the transport sector 	4
Malaysia	<ul style="list-style-type: none"> Carbon intensity reduction by 45% in 2030 No mention of mitigation measures in the transport sector 	5

Policies Contributing to Transport Electrification in ASEAN Countries (Central Government)

Country	EV policy	Ref.
Thailand	<ul style="list-style-type: none"> ▪ 30 @ 30 policy (30% of domestic production to be zero emission vehicle by 2030) formulated by the NEVPC 	6
Vietnam	<ul style="list-style-type: none"> ▪ Action plan of climate change adaptation and green growth strategy (2016-2020) promoted the use of renewable and clean energy in transport ▪ Action program for transition to green energy and mitigation of carbon emissions and methane emission from transportation 	7
Indonesia	<ul style="list-style-type: none"> ▪ Roadmap on Low Carbon Emission Vehicle 	8
Philippines	<ul style="list-style-type: none"> ▪ Electric Vehicle Roadmap ▪ EV manufacturing roadmap ▪ Public Utility Vehicle (PUV) Modernization Program Supporting Laws and Regulations Incentives on Manufacturing ▪ Charging Infrastructure Development ▪ A ZERO-TARIFF policy for electric vehicle (EV) imports 	9-11
Malaysia	<ul style="list-style-type: none"> ▪ National Automotive Policy (NAP); National Green Technology Master Plan (2017-2030); NKEA Electrical and Electronics (EPP 18). 	12-14

Current EV Production and Use Targets in ASEAN Countries

Country	EV production and use targets	Ref.
Thailand	<ul style="list-style-type: none"> ▪ By year 2025, 30% of vehicle use and 10% of vehicle production ▪ By year 2030, 50% of vehicle use and 30% of vehicle production ▪ By year 2035, 100% of vehicle use and 50% of vehicle production 	6
Vietnam	<ul style="list-style-type: none"> ▪ For 2022-2030, focus on promoting the production, assembly, import of EV ▪ By 2040, step-by-step limit and stop the production, assembly, and import of vehicles using fossil fuels for domestic use ▪ By 2050, 100% of road motorized vehicle will be powered by electric and green energy ▪ Having EV uptake targets for electric buses and electric taxis in urban areas 	15
Indonesia	<ul style="list-style-type: none"> ▪ By year 2025, 20% of vehicle production to be EV or hybrid ▪ By year 2030, Stock target 2 M for PC electrified and 3 M for MC electrified ▪ By year 2035, Under Low Carbon Emission Vehicle Program (LCEV) <ul style="list-style-type: none"> ○ For 4-wheeler: Production 4,000,000 = Domestic usage 2,500,000 and Export 1,500,000 ○ For Motorcycle: Production 10,750,000 = Domestic usage 9,000,000 and Export 1,750,000 	16
Philippines	<ul style="list-style-type: none"> ▪ The roadmap targets to achieve 21% EVs of total vehicles in the country by 2030 with focus on public transportation, and 50% by 2040. ▪ The Electric Vehicle Association of the Philippines (EVAP) has revised its growth target for e-vehicle adoption in the country from 300,000 units by 2030 to 1.0 million units in anticipation of incentives for the sector, clearer regulations, and growing awareness on the benefits of using EVs. 	17
Malaysia	<ul style="list-style-type: none"> ▪ The government is targeting that by 2030, 15% of the total industry volume will be EVs. 	18

Policies Contributing to Transport Electrification in ASEAN Countries – Infrastructure Targets/Roadmap

Country	Charging station targets	Ref.
Thailand	<ul style="list-style-type: none"> ▪ The 30@30 policy sets a target: <ul style="list-style-type: none"> - 12,000 charging points by end of 2030 - 1,450 battery swap stations by end of 2030 	6
Vietnam	<ul style="list-style-type: none"> ▪ In 2021, VinFast has planned 2,000 charging stations with more than 40,000 charging posts across country for car and electric motorbike. ▪ VinFast aims to establish 150,000 charging ports nationwide in coming years 	19
Indonesia	<ul style="list-style-type: none"> ▪ Charging stations expected to grow from 180 to 7,146 stations by 2030. 	20
Philippines	<ul style="list-style-type: none"> ▪ 2,000 charging stations by end of 2030 	21
Malaysia	<ul style="list-style-type: none"> ▪ 125,000 charging stations by end of 2030 	22

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Manufacturers

Country	Incentives to Manufacturers	Ref.
Thailand	<ul style="list-style-type: none"> ▪ Exemption of Cooperate Income Tax for: <ul style="list-style-type: none"> ○ PHEV + BEVs: 3-years, ○ MC + 3 WH + Bus + Truck: 3-years ○ Electric power ship (vessel < 500 gross tonnage): 8-years ○ EV parts as high voltage harness, reduction gear, battery cooling system and regenerative braking system: 8-years ▪ 90% Reduction of import duties for essential materials unavailable locally for EV battery production for 2 years ▪ Investment incentive package for an investments project located in the Eastern Economic Corridor (EEC) ▪ Exemption of custom duties fee for: (1) passenger car (2) bus less than 10 seats (3) BEV pick up, which are assembled or produced in the duty-free zone, effective until 31 December 2025 	24
Vietnam	<ul style="list-style-type: none"> ▪ Reduction of import tax to be 0 % for raw material unavailable, components that has not been domestically made for local manufacturing and assembling automobile industry 	21

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Manufacturers

Country	Incentives to Manufacturers	Ref.
Indonesia	<ul style="list-style-type: none"> ▪ In 2021, Indonesia plans to roll out new regulations that offers tax breaks for hybrid EVs. ▪ Battery-powered EVs continue to be exempt from luxury tax, the plug-in hybrid EV will see an increase to 5% from 0%. ▪ Full and mild hybrid types will be taxed at a rate of 6% to 12%, from a previous range of 2% to 12%. ▪ The government will also provide tax holiday incentives for up to 10 years if EV manufacturers make at least an IDR 5 trillion (USD 346.2 million) investment. 	25
Philippines	<ul style="list-style-type: none"> ▪ The importation of completely built EVs shall generally be entitled to incentives under the TRAIN Act (R.A. No. 10963). ▪ The importation of completely built charging stations shall be exempt from the payment of duties for eight years from the effectivity of Electric Vehicle Industry Development Act (EVIDA). ▪ The utilization of battery EVs and hybrid-EVs shall be entitled to a discount of 30% and 15%, respectively, from the payment of the motor vehicle user's charge, vehicle registration and inspection fee for eight years from the effectivity of EVIDA. 	26

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Manufacturers

Country	Incentives to Manufacturers	Ref.
Malaysia	<ul style="list-style-type: none">▪ 100% import duty and excise duty exemption for completely built-up (CBU) EVs from 1 January 2022 to 31 December 2023▪ 100% import duty exemption on components for locally assembled EVs from 1 January 2022 to 31 December 2025▪ 100% excise duty and sales tax exemption for completely knocked-down (CKD) EVs from 1 January 2022 to 31 December 2025	27

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Consumers

Country	Incentives to Consumers	Ref.
<p>Thailand</p>	<p>Passenger cars (with SRP ≤ THB 2 million or THB 2-7 million)</p> <ul style="list-style-type: none"> ▪ Excise tax reduction from 8% to 2% ▪ Excise subsidy THB 70,000 unit or THB 150,000/unit ▪ Excise tax reduction of 1% <p>Motorcycles (with SRP ≤ THB 150,000)</p> <ul style="list-style-type: none"> ▪ Excise tax reduction of 1% ▪ Excise subsidy THB 18,000/unit <p>Pick-ups (with SRP ≤ THB 2,000,000)</p> <ul style="list-style-type: none"> ▪ Excise tax reduction from 10% to 0% ▪ Excise subsidy THB 150,000/unit 	<p>24</p>
<p>Vietnam</p>	<p>Special consumption tax (SCT)</p> <ul style="list-style-type: none"> ▪ 40-150% of selling price for gasoline and diesel vehicles while 3-15% for passenger cars under 9 seats ▪ Exempt registration fee for EV within 5 years starting from 2022, after this period the registration fee shall be paid at a rate equal to 50% of the fee for petrol and diesel cars with the same number of seats over the next two years. (meanwhile, the registration fee for passenger vehicles powered by gasoline and diesel is 10%) 	<p>28</p>
<p>Indonesia</p>	<p>Vehicle tax tariff is based on engine capacity and exhaust emission rate but for PHEV, BEV, FCEV = 0% – 15% (imported EV)</p>	<p>29</p>

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Consumers

Country	Incentives to Consumers	Ref.
Philippines	<ul style="list-style-type: none"> ▪ Excise tax exemptions: EVs will be entitled to tax incentives — under the Tax Reform for Acceleration and Inclusion (TRAIN) law. This means hybrids get 50% off applicable excise taxes, while full battery EVs get a 100% excise tax exemptions. ▪ The law provides that EV owners will be exempt from road congestion measures. ▪ Registration perks: EVs will be given “priority registration and renewal” with the Land Transportation Office (LTO) under the new law. ▪ Registration Fee Discounts: Under the law, a 30% discount for motor vehicle users charge (MVUC) will be given for full EVs; and 15% off for hybrids. ▪ A special EV license plate: EVs will be issued a special type of license plate under the EV Industry Development Act. Though details on this bit are scant, this could boost EV usage. ▪ Dedicated parking slots: As the EV Industry Development Act finally kicks in, both public and private establishments are mandated to dedicate a portion of available parking spaces for EV use. In a building — or mall — with 20 parking slots, the law mandates at least 5% must be set aside for EVs. 	9

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Consumers

Country	Incentives to Consumers	Ref.
Malaysia	<ul style="list-style-type: none"><li data-bbox="517 432 2186 621">▪ Owners are exempted from road tax and can claim a personal tax exemption of up to 2,500 ringgit (US\$571) for costs relating to EV charging hardware and services, including the purchase, installation, rental, and subscription fees of EV charging facilities, until the end of 2023.<li data-bbox="517 649 2109 739">▪ The tax incentives are effective as, except for the road tax exemption for owners, which came into force on February 15, 2022.	27

Policies Contributing to Transport Electrification in ASEAN Countries – Incentives to Household/Public

Country	Incentives to Household/Public	Ref.
Thailand	<ul style="list-style-type: none"> ▪ Offers 'low priority rate' for EV charging station business. (Electrical cost 2.6269 baht/unit + service cost 312.24 bath/month) supported by Electricity Generating Authority of Thailand (EGAT) valid until 2023 or new re-structure electricity price launched. ▪ Free installation home charging supported by private company ▪ Free of home box-charge and electrical meter installations supported by Metropolitan Electricity Authority (MEA) and Provincial Electricity Authority (PEA) 	30
Vietnam	<ul style="list-style-type: none"> ▪ Not available 	
Indonesia	<ul style="list-style-type: none"> ▪ Free upgrade of installed power capacity for households that use electric cars ▪ 75% discount for households that use electric motorcycles 	29
Philippines	<ul style="list-style-type: none"> ▪ Not available 	
Malaysia	<ul style="list-style-type: none"> ▪ Not available 	

Barriers/Challenges to the Transport Electrification in ASEAN Countries

Country	Challenge and Barrier	Ref.
Thailand	<ul style="list-style-type: none"> ▪ Supply side: Lack of raw material, High competition from China, and Transformation of ICE-pick up manufacturer to be EV pick up manufacturer. ▪ Demand side: Expensive compare to ICE vehicle price. 	24
Vietnam	<ul style="list-style-type: none"> ▪ High EV prices compared to ICE vehicles ▪ lack of charging infrastructures ▪ Lack of EV-regulated regulations (e.g. FC standards, EV production mandate) ▪ Lack of supportive policies ▪ Lack of public awareness on EV benefits 	15
Indonesia	<ul style="list-style-type: none"> ▪ High tax imposed on EV, High EV price and infrastructure cost 	31
Philippines	<ul style="list-style-type: none"> ▪ Market barriers: Lack of enabling national laws, High acquisition costs, Underdeveloped domestic EV industry, Limited charging infrastructure, Lack of awareness of the social, environmental, and economic benefits of EVs among Philippine consumers and public transport, and Lack of plans for social integration ▪ Motivational incentives for consumers: Charging stations in the vicinity of housing and work (56.2%), Tax rebates and subsidies on electric car purchase (47.4%), Special insurance plans for electric cars (32.4%), Priority or special lanes for electric cars (30%), Free or subsidized parking spots for electric cars (26.6%), and Road tax or toll subsidies (16.8%) 	21, 32
Malaysia	<ul style="list-style-type: none"> ▪ Lifetime and costing of EV battery affecting the depreciation value ▪ Low number of charging stations and charging area infrastructures ▪ Lack of marketing promotion, awareness programs, and market study ▪ Lack of knowledge on EV maintenance, service center, and workshop 	31

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT Analysis	Ref.
Thailand	SWOT analysis topic “EV manufacture in Thailand”	
	<p>1. Strength/ Opportunities:</p> <ul style="list-style-type: none"> - As, Thailand is a hub of vehicle – parts manufacture, so, strong possibility to be as a hub for EV – parts manufacture. - As vehicle manufacturers are located at the same area/zone, in which feasibility for setting EV manufacture cluster. - Various governmental incentive policies which support EV manufacture investment <p>2. Weak/ Threat:</p> <ul style="list-style-type: none"> - Limitation of budget on EV research - Lack of infrastructure that facilitate further development. - High competition on price from ASEAN and non-ASEAN countries 	

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT Analysis	Ref.
Vietnam	SWOT analysis topic “EV development in Viet Nam”	
	<p>1. Strengths</p> <ul style="list-style-type: none"> - Viet Nam has a high and increasing share of renewable energy - Transport-related GHG emissions and pollution reduction - Easy home charging - Energy efficiency and travel cost savings - Reduction of pressure on non-renewable resources <p>2. Weaknesses</p> <ul style="list-style-type: none"> - Lack of supporting policies in EV production, investment in charging infrastructure, and EV uptake - High prices of EVs and their batteries - Lack of charging infrastructure - Lack of EV-related regulations <p>3. Opportunities</p> <ul style="list-style-type: none"> - Viet Nam signed and approved the Paris Agreement - Increased environmental awareness of consumers - Suitable national grid - Potential market, especially with electric cars (with low car ownership rate – around 35 cars/1000 inhabitants) - Having potential production capacity for E2Ws (more than 1 million vehicle annually) <p>4. Threats</p> <ul style="list-style-type: none"> - Clean energy issues - Waste battery recall and disposal issues - Suspicion of EVs 	

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT Analysis	Ref.
Indonesia	SWOT analysis topic “Indonesian EV and Battery Industry”	33
	<p>1. Strengths</p> <ul style="list-style-type: none"> - Abundant and diverse mining resources of battery materials - High population (Large market) - High productive age population (human resources) - Already active and established in ICE vehicle production <p>2. Weaknesses</p> <ul style="list-style-type: none"> - Presently does not possess the technology/knowledge for Battery production - Low market WTP - Low market awareness/preference of low-carbon lifestyle - Low percentage of RE in the national energy mix <p>3. Opportunities</p> <ul style="list-style-type: none"> - Collaboration with internationally well-established battery industry through investment schemes - Regional market and partnership opportunities - To reduce crude oil dependency and enable growth of RE <p>4. Threats</p> <ul style="list-style-type: none"> - Uncertain outcome of the on-going lawsuit against the nickel Ore-export ban at the WTO - Competing technologies (hydrogen fuel cell or cheaper non-nickel batteries) 	

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT 4	Ref.
Indonesia	SWOT analysis topic “Indonesia’s position in global EV market”	34
	<p>1. Strengths</p> <ul style="list-style-type: none"> - The most populous country in ASEAN, growing economy → High potential market. - The largest automotive market and second largest (after Thailand) production base in ASEAN. - One of the world’s largest nickel reserves. - Moderate electric price. <p>2. Weaknesses</p> <ul style="list-style-type: none"> - Domination of Japanese automakers, who currently remain reluctant to invest in EV. - Domestic price sensitive market. <p>3. Opportunities</p> <ul style="list-style-type: none"> - EV is still at an early stage of development, so the opportunity to grab the investment demand is still open. - Increase of automotive global trading due to earlier implementation of free trade across region/countries. <p>4. Threats</p> <ul style="list-style-type: none"> - EV may become the global standard earlier than current prediction. - Earlier implementation of environment policies such as LCA may also be required. - Declining demand of vehicles due to faster spread of other new technologies such as Telework (WFH) and Mobility services. 	

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT 5	Ref.
Philippines	SWOT analysis topic EV industry	35
	<p>1. Strengths</p> <ul style="list-style-type: none"> - Emerging industry to give essential advantages such as: <ul style="list-style-type: none"> • Savings on costly oil imports • Reduction in pollution (smoke-emission free) • Ensuring answer to global warming threats <ul style="list-style-type: none"> ○ Green Option taking the lead by 2017 ○ Ushering new and innovative technologies • Regenerative braking system • No oil, transmission fluids, filters and belts - Transformational gains for the local industry is lucrative <ul style="list-style-type: none"> • Immediate big investments are coming in to start the EV industry <p>2. Weaknesses</p> <ul style="list-style-type: none"> ▪ Technological failures • Need to develop battery technology for EV to become sustainable • Lack of available rapid charging technology <ul style="list-style-type: none"> ○ Safety Issues ○ Lack of Standards and Regulations ○ Limited manufacturing capability ○ Limited driving range (short distances only) 	

Barriers/Challenges of the Transport Electrification in ASEAN Countries – Results from SWOT Analysis

Country	Results from SWOT Analysis	Ref.
Philippines	SWOT analysis topic EV industry	35
	<p>3. Opportunities</p> <ul style="list-style-type: none"> ▪ Major foreign companies in EV manufacturing looking for partners in the PH. ▪ PH aims to be a regional manufacturing hub for Philippine EV ▪ Boost PH Tourism potential ▪ Results to sufficiency in present transportation system ▪ Results to creation of Solar-Powered charging stations nationwide ▪ US\$ 500M E-Trike program bringing PHP 20 B to industry • Major EV partners will set shops • Save 561T barrels of imported oil • Reduction of 260T tons of CO₂ per year ▪ US auto industry to produce 1M EVs by 2015 <p>4. Threats</p> <ul style="list-style-type: none"> ▪ Restrictive social acceptance ▪ Crucial market transformation with greater need to stage education campaign and training on maintenance requirements ▪ Lag of technological advancement in the local scene. 	

Thank You – ขอบคุณค่ะ (Khob Khun Kha)

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