

Electric Vehicle Status & Promotion in Thailand

Yossapong Laonual, PhD

President

Electric Vehicle Association of Thailand (EVAT)

Global EV Association Network 2018 (GEAN)

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The 5th International Electric Vehicle Expo

Jeju, Korea

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EVAT Establishment



During the beginning of 2015, The Thai government had shown an attention to promote the electric vehicle (EV) technology and policy to support EV production, R&D and usage in Thailand.

This support motivated individuals from academia and private sector in Thailand to discuss and establish the Electric Vehicle Association of Thailand (EVAT) on September 14, 2015 at Knowledge Exchange (KX) building, which later had been officially registered on November 6, 2015. The present president, Dr. Yossapong Laonual, and committee were elected on June 24, 2016 and officially approved on August 23, 2016 for a two-year term.



**Present EVAT Committee
2016 – 2018**

EVAT Goals



EVAT promotes the usage of EV in Thailand which leads to a reduction of road pollution especially in the major cities. In addition, the EV deployment also improves the energy efficiency in transport sector. The EVAT support includes the industrial manufacturing, research and development on EV technologies in Thailand; this strengthens and increases the competitiveness of entrepreneurs in Thailand into the global market.

EVAT Membership



Corporate Member

103
Members

Individual Member

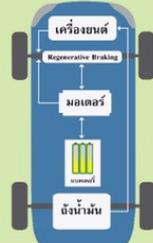
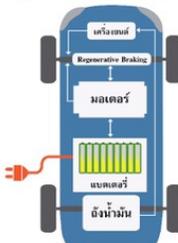
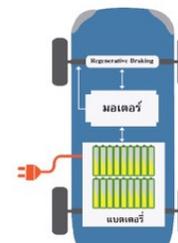
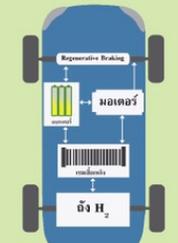
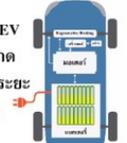
48
Members



EV Status Overview in Thailand

ยานยนต์ไฟฟ้า (Electric Vehicle)

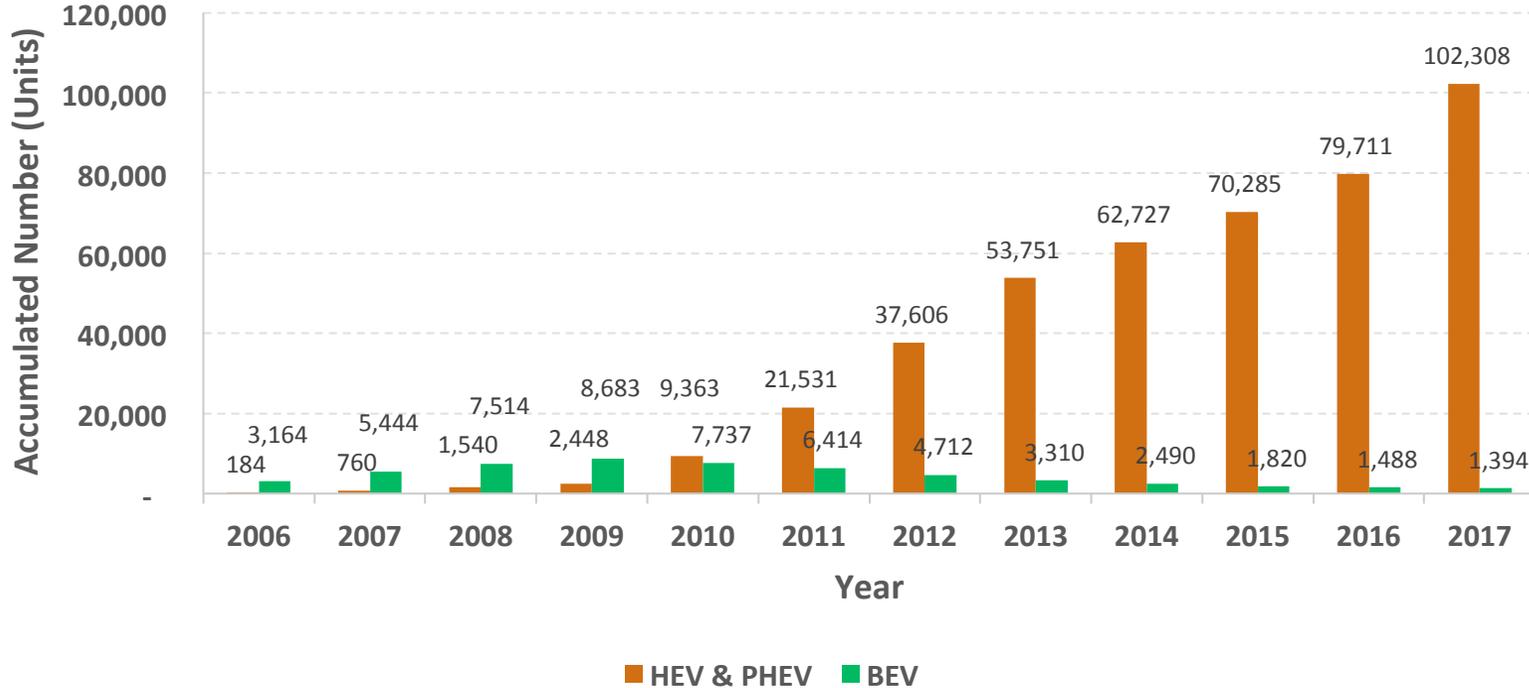
ยานยนต์ไฟฟ้า หมายถึง ยานยนต์ที่ขับเคลื่อนด้วยมอเตอร์ไฟฟ้าเพียงอย่างเดียว หรือ ยานยนต์ที่อาศัยเครื่องยนต์มาใช้ร่วมกับมอเตอร์ไฟฟ้าทั้งในส่วนของการขับเคลื่อนและผลิตพลังงานไฟฟ้าเก็บสะสมในแบตเตอรี่ หรือการอัดประจุไฟฟ้าจากภายนอกหรือการใช้เชื้อเพลิงไฮโดรเจนในการผลิตพลังงานไฟฟ้าจากเซลล์เชื้อเพลิง

HEV	ยานยนต์ไฟฟ้าปลั๊กอิน (Plug-in Electric Vehicle) ยานยนต์ไฟฟ้าที่มีการอัดประจุไฟฟ้าจากภายนอก		FCEV	
	PHEV	BEV		
<p style="text-align: center;">ยานยนต์ไฟฟ้าไฮบริด (Hybrid Electric Vehicle - HEV)</p>  <p style="text-align: center;">เป็นยานยนต์ที่มีการใช้เครื่องยนต์และมอเตอร์ไฟฟ้าขับเคลื่อนร่วมกัน ยังสามารถเปลี่ยนพลังงานที่สูญเสียจากการเบรกเป็นพลังงานไฟฟ้าเก็บในแบตเตอรี่ทำให้อัตราสิ้นเปลืองเชื้อเพลิงต่ำกว่าเครื่องยนต์</p>	<p style="text-align: center;">ยานยนต์ไฟฟ้าปลั๊กอินไฮบริด (Plug-in Hybrid Electric Vehicle - PHEV)</p>  <p style="text-align: center;">เป็นยานยนต์ที่พัฒนาต่อมาจากยานยนต์ไฟฟ้าชนิด HEV แต่สามารถอัดประจุไฟฟ้าจากภายนอกมาเก็บที่แบตเตอรี่ทำให้ยานยนต์ไฟฟ้าสามารถวิ่งด้วยพลังงานไฟฟ้าในระยะทางที่ไกลขึ้น รวมทั้งมีอัตราสิ้นเปลืองเชื้อเพลิงที่ต่ำกว่า HEV</p>	<p style="text-align: center;">ยานยนต์ไฟฟ้าแบตเตอรี่ (Battery Electric Vehicle - BEV)</p>  <p style="text-align: center;">เป็นยานยนต์ไฟฟ้าที่มีมอเตอร์ไฟฟ้าขับเคลื่อนเพียงอย่างเดียว (ไม่มีเครื่องยนต์) และใช้พลังงานไฟฟ้าที่อยู่ในแบตเตอรี่ซึ่งมาจากการอัดประจุไฟฟ้าจากภายนอกเท่านั้น โดยไม่มีการปล่อยมลพิษและ CO₂ จากยานยนต์โดยตรง</p>	<p style="text-align: center;">ยานยนต์ไฟฟ้าเซลล์เชื้อเพลิง (Fuel Cell Electric Vehicle - FCEV)</p>  <p style="text-align: center;">เป็นยานยนต์ไฟฟ้าที่มีมอเตอร์ไฟฟ้าขับเคลื่อนและใช้พลังงานไฟฟ้าที่ผลิตจากเซลล์เชื้อเพลิง (Fuel Cell) ซึ่งใช้เชื้อเพลิงไฮโดรเจนจากการเติมเชื้อเพลิงจากภายนอก โดยไม่มีการปล่อยมลพิษและ CO₂ จากยานยนต์โดยตรง มีเพียงการปล่อยน้ำเท่านั้น</p>	
<p style="text-align: center;">Hybrid Drive</p> <p style="text-align: center; font-size: small;">Electricity Generated in the Vehicle ไฟฟ้าที่ผลิตในรถ</p> <div style="display: flex; justify-content: space-around;"> <div style="background-color: #fff9c4; padding: 5px; border: 1px solid #ccc;">Gasoline/Diesel น้ำมันเบนซิน/ดีเซล</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="background-color: #fff9c4; padding: 5px; border: 1px solid #ccc;">Micro Hybrid</div> <div style="background-color: #e1bee7; padding: 5px; border: 1px solid #ccc;">Mild Hybrid</div> <div style="background-color: #ffe0b2; padding: 5px; border: 1px solid #ccc;">Full Hybrid</div> </div>	<p style="text-align: center;">ยานยนต์ไฟฟ้าแบตเตอรี่ขยายระยะ (Range Extender Battery Electric Vehicle)</p> <p style="text-align: center;">เป็นยานยนต์ BEV ที่เพิ่มเครื่องยนต์ขนาดเล็กเข้ามาเพื่อขยายระยะการใช้งานได้ไกลขึ้น</p> 		<p style="text-align: center;">สถานีอัดประจุไฟฟ้า (Charging Station)</p> 	<p style="text-align: center;">สถานีไฮโดรเจน (Hydrogen Station)</p> 

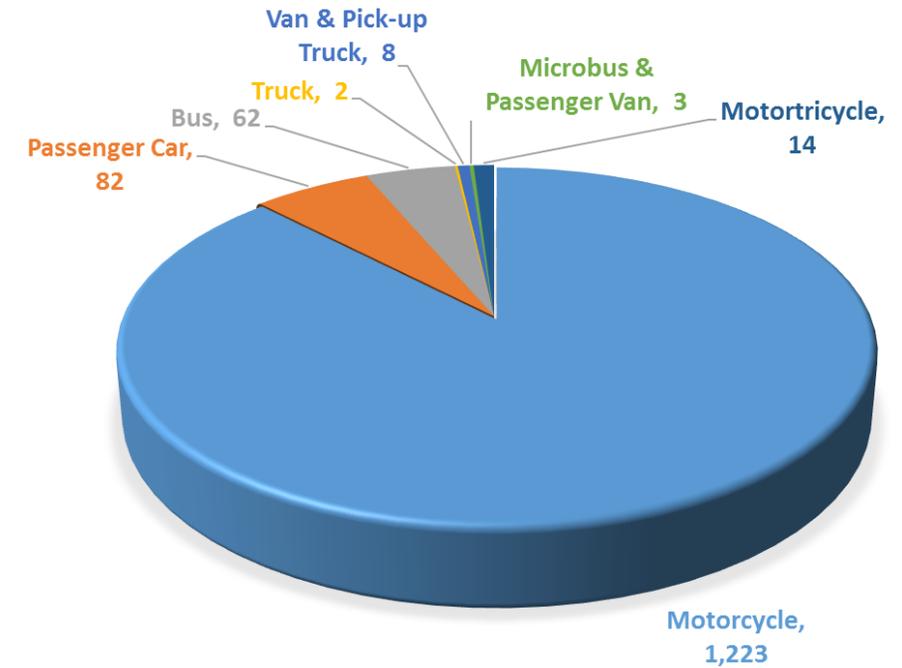
EV Status Overview in Thailand



Accumulated Number of EV Registration (as of 31st Dec 2017)

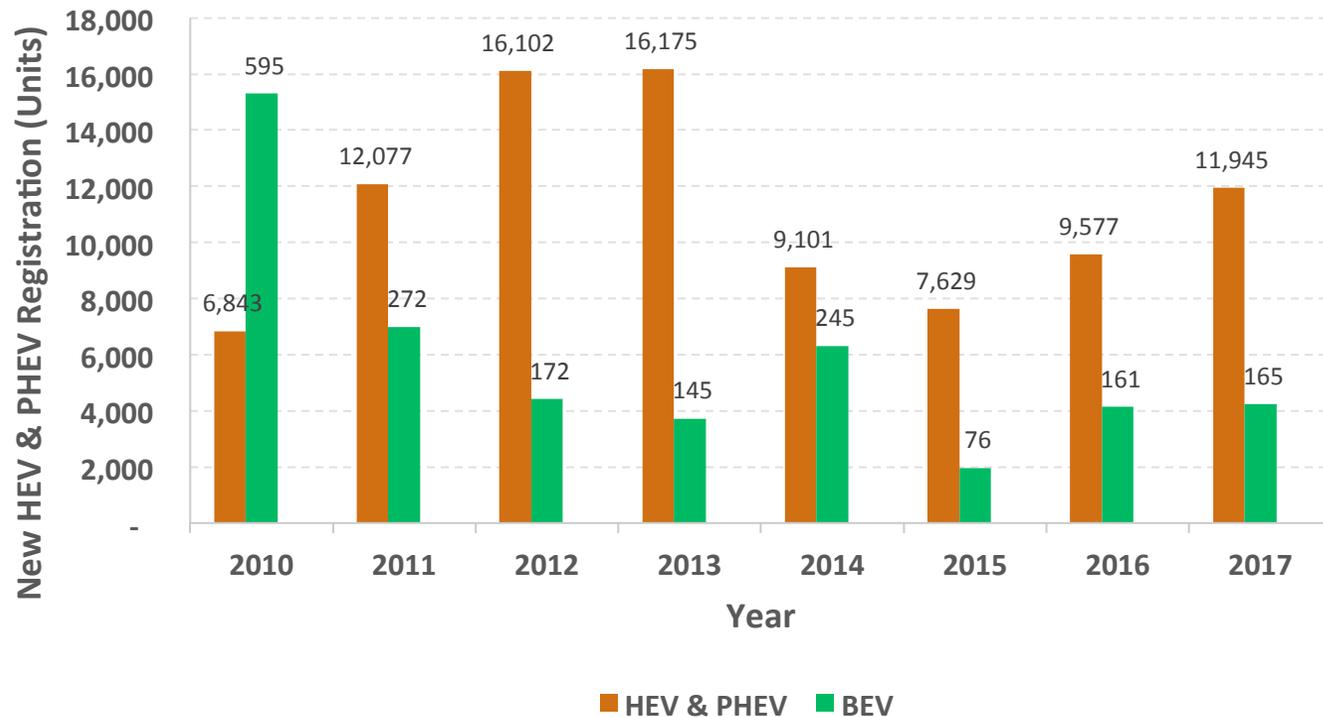


BEV Registration by Vehicle Types (as of 31st Dec 2017)

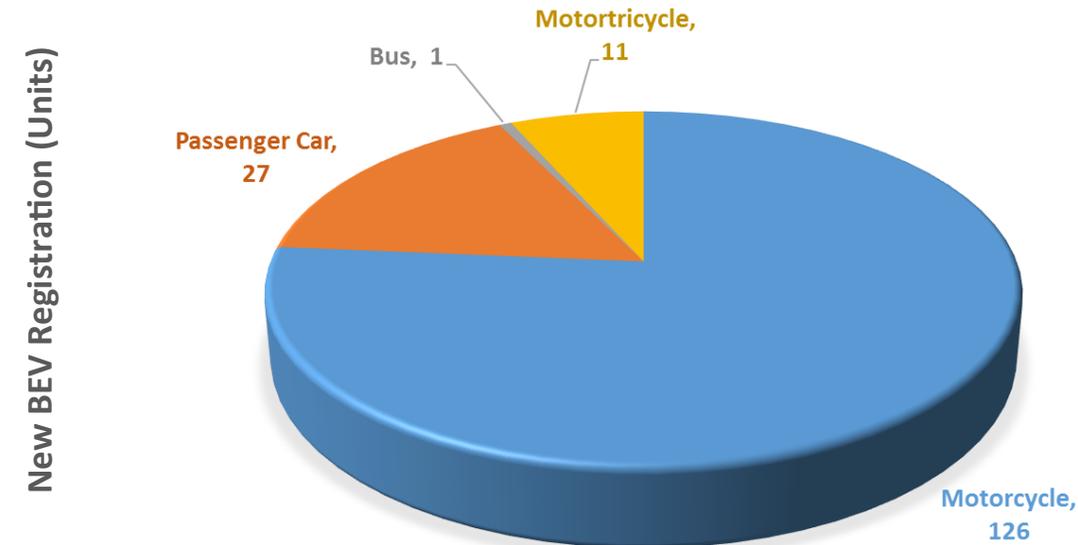


EV Status Overview in Thailand

Number of New EV Registration (as of 31st Dec 2017)



New BEV Registration by Vehicle Types (as of 31st Dec 2017)



EV Status Overview in Thailand

Plug-in Hybrid Electric Vehicles (PHEV)



BMW x5 xDrive40e



Volvo XC90 Drive-E



Mercedes Benz C350e



BMW 330e



Porsche Cayenne S E-Hybrid



Mercedes Benz S500

EV Status Overview in Thailand

Battery Electric Vehicles (BEV)



FOMM

Concept one

AWD Sport



BYD
e-6



Hyundai
ioniq electric



Kia
Soul EV



MINE

MPV EV

City EV



Nissan
LEAF



Tesla
Model X



VERA
V-1

EV Status Overview in Thailand

Public Charging Stations in Thailand



Paragon Department Store

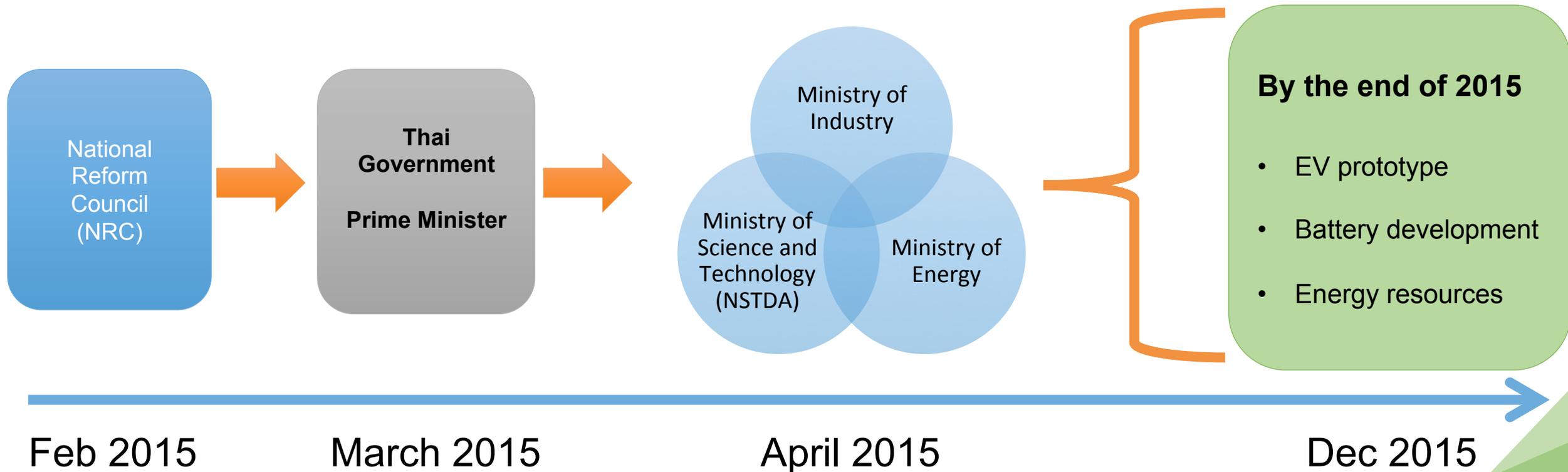


Pollution Control Department

Electric Vehicle Policy & Promotion in Thailand

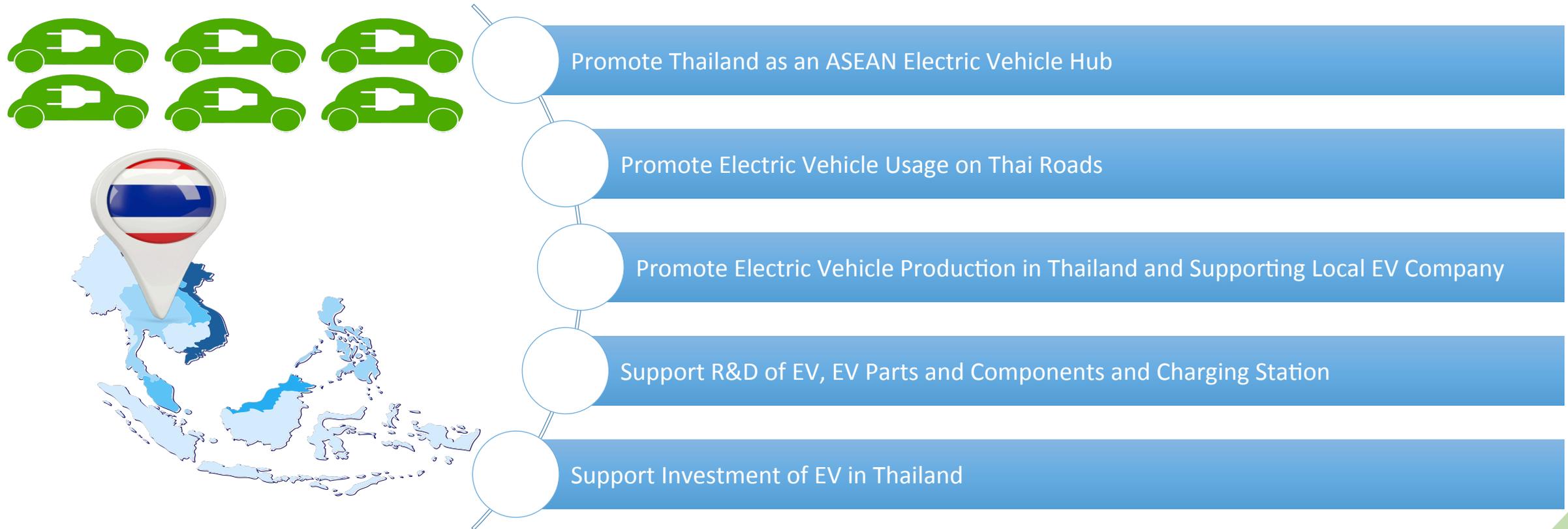
Development of EV Policy in Thailand

NRC proposed the National EV promotion project to Thai government.



Electric Vehicle Policy & Promotion in Thailand

NRC's EV Promotion Recommendations



Electric Vehicle Policy & Promotion in Thailand

COP21 in numbers

2°C global temperature rise that should not be breached

12 days for government leaders to seal a climate deal

40% target reduction in GHG emissions by 2030 below 1990 levels

178 countries which submitted INDCs

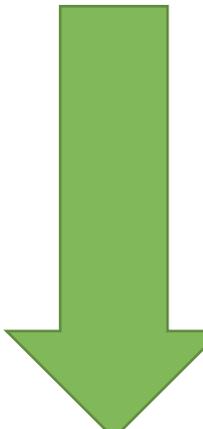
100 billion USD was promised each year to finance climate action

400 parts per million of CO₂ concentration has reached the atmosphere

2015 is the hottest year on record

2020 the Paris agreement comes into effect

Thai Prime Minister at COP21 Meeting



Reduce GHG emission
20 – 25%
in 2030

Electric Vehicle Policy & Promotion in Thailand



1

Foreign Direct Investment Support

- BOI EV Package (Import Tax & CIT exemption and Excise Tax reduction).
- Collaboration between Ministry of Foreign Affairs, Ministry of Commerce, Ministry of Finance and Ministry of Industry to discuss with China to set appropriate Import Tax for BEV under ASEAN-China FTA.

2

Domestic Market Stimulation

- Set the target that 20% of government budget for vehicle fleet to be used for BEV procurement.
- Urge Airport of Thailand Public Company Limited (AOT) to use more PHEV & BEV limousine.
- Industrial Estate Authority of Thailand & MoST to use BEV at EEC.
- EPPO to convert conventional taxi to BEV.
- The Fine Arts Department to use BEV at large national heritage sites

3

Infrastructure Preparation

- Ministry of Energy and Ministry of Transport to plan EV charging station location.
- TISI to proceed on the National Automotive and Tire Testing Facility and prepare human resources.

4

EV Standards

- TISI to proceed on standards of EV charging system, electromagnetic compatibility, battery for EV and DC meter for billing system.

5

End-of-life Management for EV Battery

- Department of Industrial Works to prepare EV battery end-of-life management plan.
- Pollution Control Department to enact Acts for EV battery end-of-life management.

6

Other Measures

- Thailand Automotive Institute to proceed on productivity improvement project focusing on human development to support next-generation automobile industry.

Electric Vehicle Policy & Promotion in Thailand

According to **Energy Blueprint**, in 2036

Target

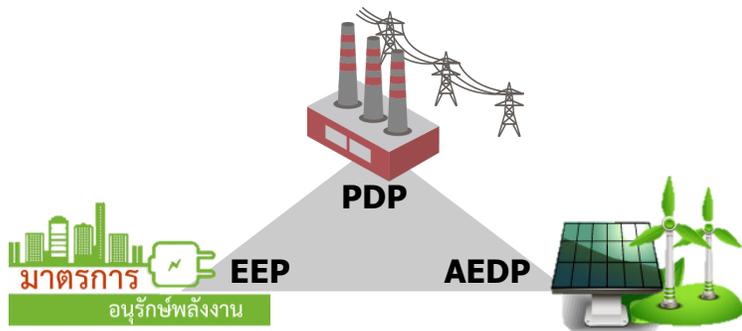
Reduce Energy intensity by 30%
Focusing on transportation sector which is
the highest energy consumption



1.2 Million EV (PHEV&BEV)



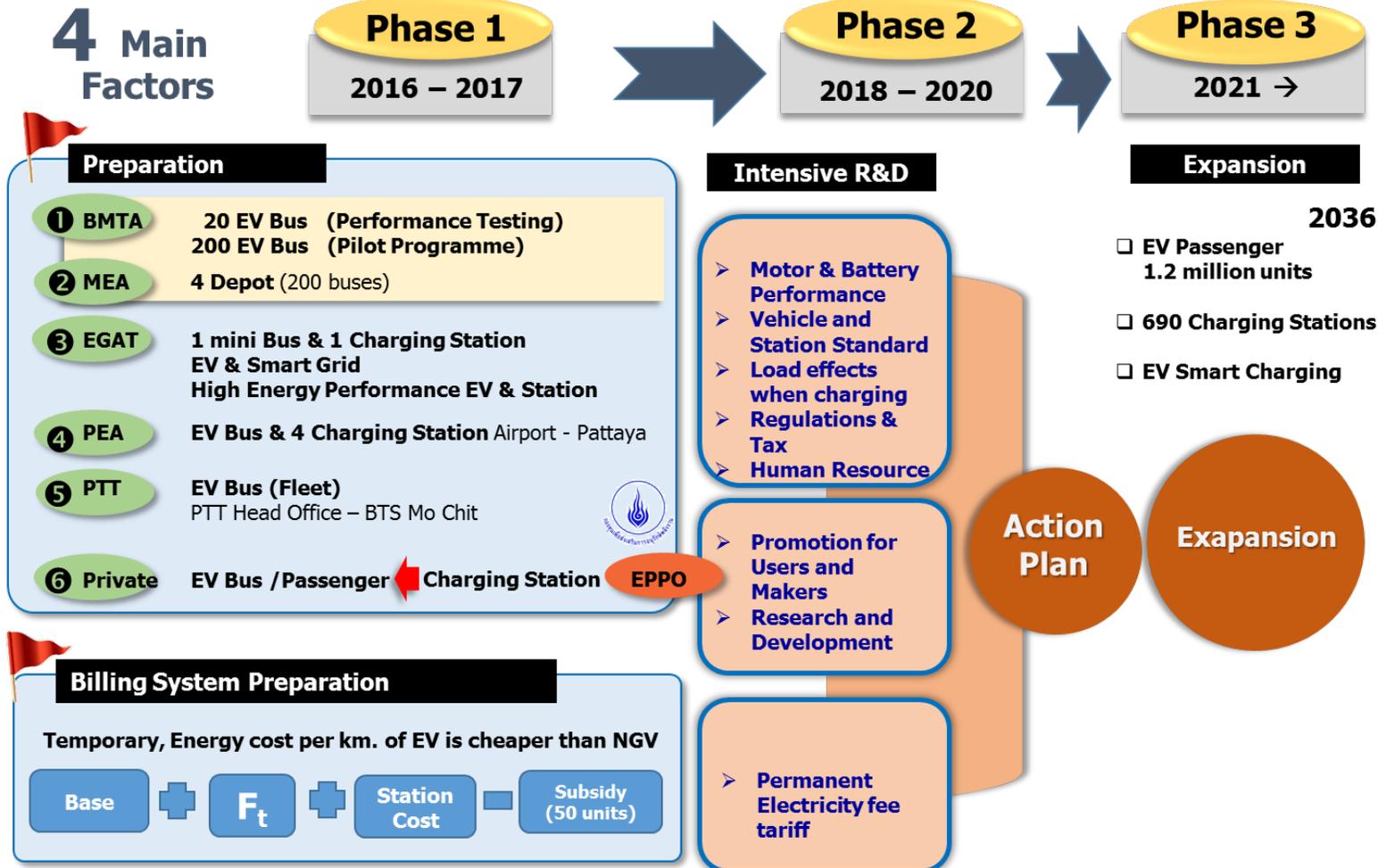
690 Charging stations



Energy demand deduction = **1,123 ktoe**
(transportation sector)

Electric Vehicle Policy & Promotion in Thailand

EV Action Plan (2016 – 2036)



Electric Vehicle Policy & Promotion in Thailand



Energy Policy and Planning Office
MINISTRY OF ENERGY



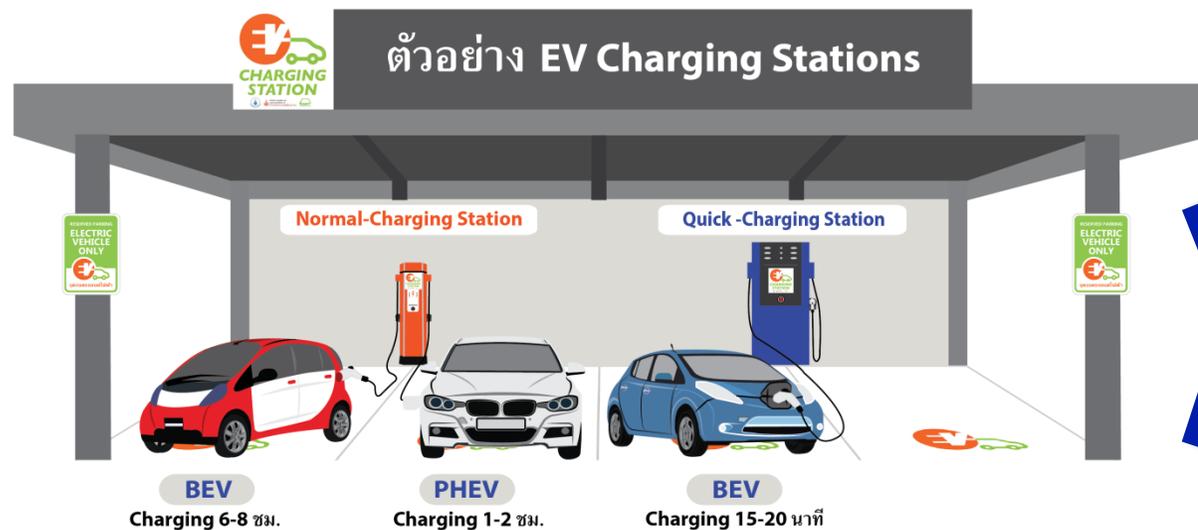
150 EV Charging Station Project Supported by EPPO

Objective

Targets

1. Hotel & Resort
2. Department Store
3. Offices
4. House estate/ Condo
5. Public service
6. Tourism service

Supporting Public & Private sectors to buy EV



Subsidy for Public sectors
Round 1-5 → 100%

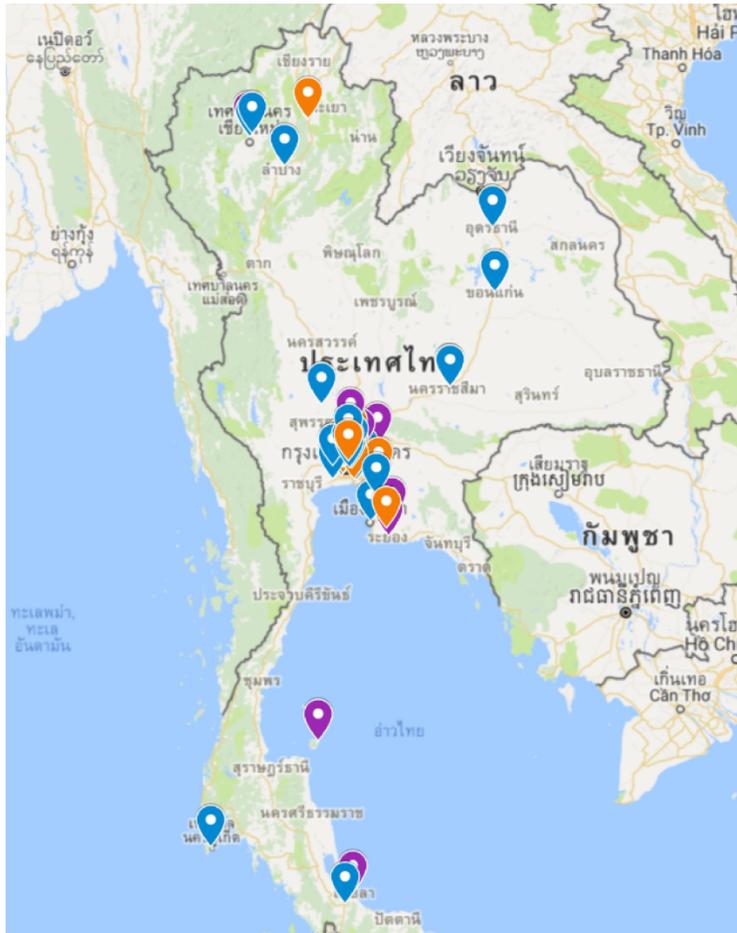
Subsidy for Private sectors
Round 1 → 70%
Round 2 → 50%
Round 3-5 → 30%

*หมายเหตุ เวลาในการอัดประจุไฟฟ้า(Charging) จะเพิ่มขึ้นอยู่กับปริมาณไฟฟ้าที่มีอยู่เดิม ขนาดของแบตเตอรี่และกำลังของตัวอัดประจุภายในรถยนต์ (on-board charger) ของรถยนต์แต่ละยี่ห้อ และรุ่น

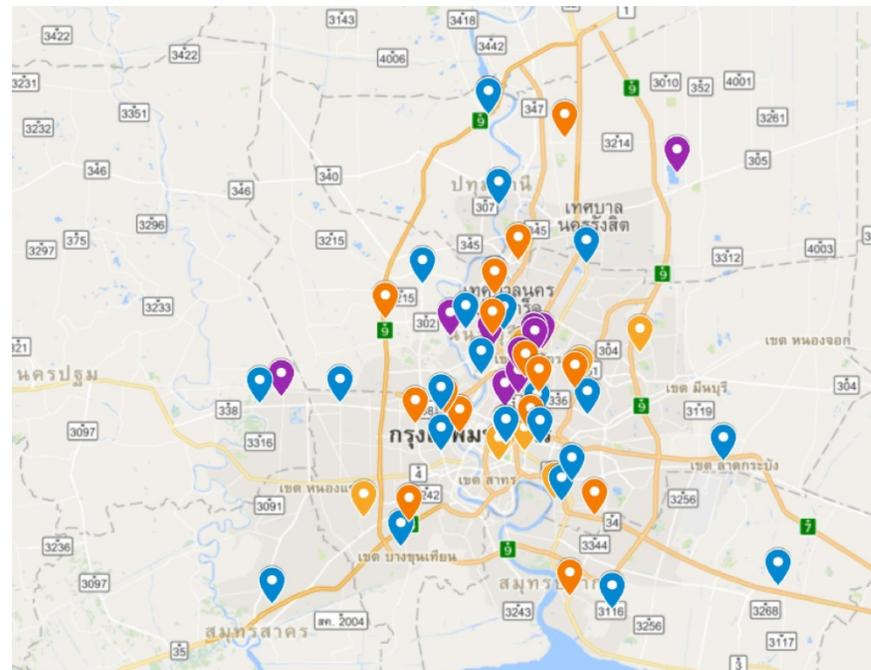
BEV : Battery Electric Vehicle **PHEV** : Plug-in Hybrid Electric Vehicle

Electric Vehicle Policy & Promotion in Thailand

Expected Locations of Installing EV Charging Stations by 2018 in Thailand & Bangkok



Greater Bangkok



-  Quick Charge & Normal Charge
-  Quick Charge
-  Normal Charge

Electric Vehicle Policy & Promotion in Thailand

EV Charging Consortium

EVAT signed with 17 organizations on 16 March 2018

Supported by Ministry of Energy and Energy Regulatory Commission

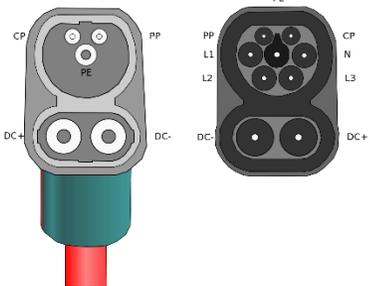


Electric Vehicle Policy & Promotion in Thailand



Thailand Industrial Standards Institute

Sockets and Inlets Standard

Vehicles	AC Charger	DC Charger	Vehicles																									
Electric Bus	<p>IEC 62196-2 Configuration Type 2</p>  <p>Type 2 Female Plug Pinout</p> <p>Type 2 Male Plug Pinout</p>	<p>IEC 62196-3 Configuration FF</p>  <p>Rated Current: Up to 200 A Rated Voltage: ≥ 500 V DC Communication Protocol: PLC</p>	Electric Bus																									
Electric Passenger Car	<p>Phase: Single / Three Rated Current: 70A (Single phase) / 63A (Three phase) Rated Voltage: 480 V Capacity: Up to 22 kW (Mode 2) Up to 43 kW (maximum)</p>	<table border="1"> <thead> <tr> <th></th> <th>System A CHAdeMO (Japan)</th> <th>System B GB/T (PRC)</th> <th colspan="2">System C</th> </tr> <tr> <th></th> <th></th> <th></th> <th>COMBO1 (US)</th> <th>COMBO2 (DE)</th> </tr> </thead> <tbody> <tr> <td>Connector</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Vehicle Inlet</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Communication Protocol</td> <td colspan="2">CAN</td> <td colspan="2">PLC</td> </tr> </tbody> </table>		System A CHAdeMO (Japan)	System B GB/T (PRC)	System C					COMBO1 (US)	COMBO2 (DE)	Connector					Vehicle Inlet					Communication Protocol	CAN		PLC		Electric Passenger Car
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Communication Protocol	CAN		PLC																									

Electric Vehicle Policy & Promotion in Thailand



Year	2017	2018	2019	2020	2021	Total
Target E-tuk Tuk	100	900	3,000	6,000	12,000	22,000

100 e-Tuk Tuk Promotion

Tuk Tuk

- ① **Commercial**
 - Old city Bangkok
 - Old city Chiang Mai
 - BTS-airport link
 - Tuk Tuk Tour e.g. Smiling Tuk Tuk
- ② **Personal**

New E-Tuk Tuk



Old Engine Tuk Tuk



Replacement
100 units
350,000 Baht

Converted
100 units
200,000 Baht

100 Units



Converted E-Tuk Tuk

Example of Current EV Projects in Thailand



EGAT

1. Pilot project: electric car, electric minibus and charging station

Compose of:

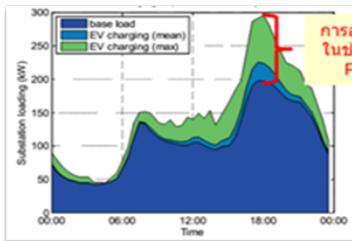
1. One Electric minibus (rent)
2. One Charging station



Service area: North Bangkok Power Plant

Progress: TOR drafting

2. Pilot project: load management of electric vehicle using smart grid technology



Progress : under technical study and TOR drafting

3. Project: development of standards and energy efficiency labeling (No.5) for the electric vehicle and charging station

Progress: under technical study for defining the suitable energy efficiency standard

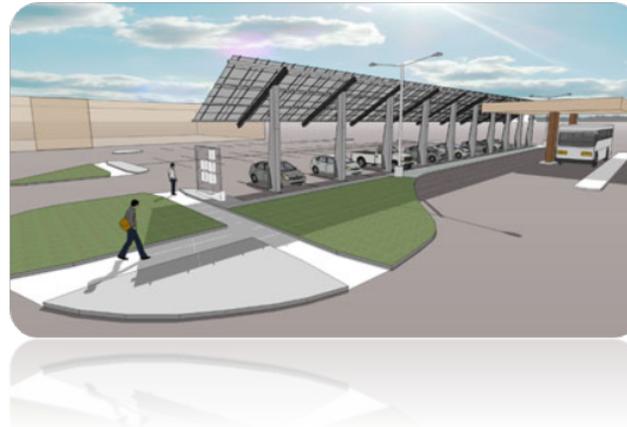


MEA

Project: establish of charging station (4 stations) for supporting the electric vehicle pilot project of Bangkok Mass Transit Authority

Progress :

- Designing and construction of charging station for supporting the electric vehicle pilot project of Bangkok Mass Transit Authority



PEA

Pilot Project: electric public bus and charging station (4 stations)

- Tourist transportation, Suvarnabhumi airport-Pattaya
- Progress : approved Budget, under the contract signed
- Planning to install charging station for 4 places as below



Example of Current EV Projects in Thailand

PTT

Pilot Project: electric van for personnel transportation between PTT head office and BTS station

- Progress : finding service company
- Electric van will be available on first quarter of 2017

Existing Van Operation

Proposed EV Bus Operation



BMTA

Project for procurement of electric bus (200 buses)



Chulalongkorn

Progress: Opening the Charging station for studying the Smart Grid & Smart Mobility



KMUTT

Project: **KMUTT Charge & Share : Electric Vehicle Charging and Car Sharing Zones**

Progress: Develop the project with partners and opening 2 charging stations at KMUTT BangMod campus & KX campus

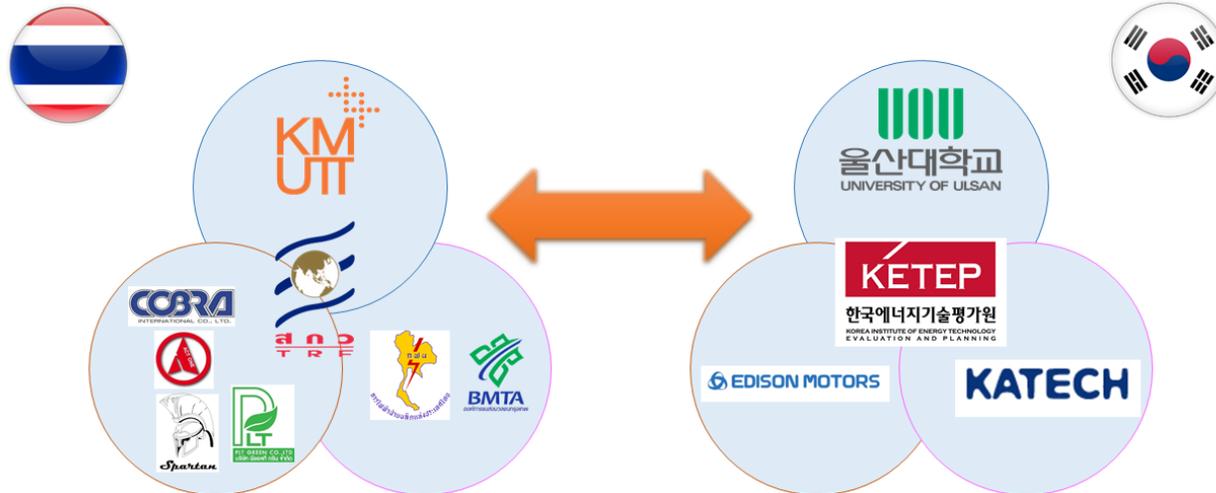


Korea-Thailand Collaboration Projects

Development and Promotion of Electric Bus in Thailand



- Collaboration on the study of operation of electric bus on Thai road condition.
- Collaboration with Korean government and bus manufacturer as well as Thai bus builder, material manufacturer and charger company.

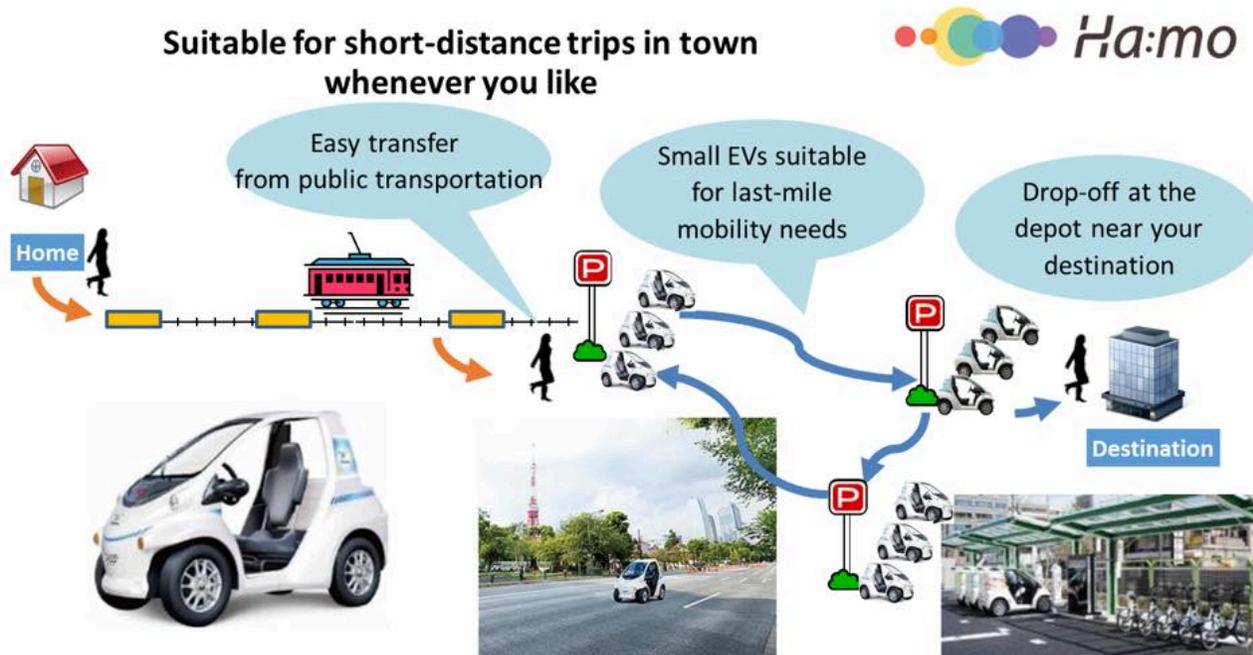


Project Period: June 2016 – May 2019

Toyota Motor Thailand Partners with Chulalongkorn

Ha:mo Car Sharing Service in Bangkok

What is Ha:mo ?



- Support short distance trip within the city, improved convenience effective use of land
 - Improve access and movement in the city
 - Reduce transportation problems
 - Complement public transportation for first/last mile.

Ha:mo is an ultra-compact EV sharing network which complements public transportation to enhance urban mobility.

Source: <http://newsroom.toyota.co.jp/en/detail/18045221>



Service from: Dec 2017

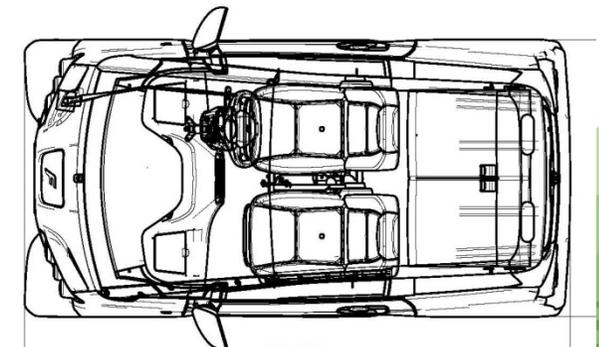
FOMM- The world's smallest class 4-seater EV



FOMM
First One Mile Mobility

 **GOOD DESIGN AWARD 2016**
SWAPPABLE BATTERY

“FOMM” stands for “First One Mile Mobility”.
Our vehicles are developed as “Mobility” of close-range such as from your home to a station, from a car sharing spot to your home, or from your home to the first one mile.
Then, we would like to propose you new style of moving.



ETRAN –Thai Taxi Electric Scooter



ETRAN PROM

electro-innovative scooter
for public use

Designed in Bangkok



Drivers of Etran Proms will be provided with a smart card that they can use to start the vehicle, swap batteries, receive maintenance, and pay the rental fee, which will start from Baht 3,500 a month.

The company aims to expand its service to cover the whole Bangkok area next year and to “go global” in 2019.

Haupcar is the first service provider of “carshare” mobility platform (including electric vehicle) in Thailand to enable individuals to travel seamlessly without the hassle that comes with car-ownership.



Access to variety of cars 24/7



Reduce parking congestion



Slow down car-ownership

iEVTech 2018



iEVTech 2018
3rd International Electric Vehicle Technology
Conference and Exhibition
6-9 June 2018
"E-Mobility: A Journey from Now and Beyond"
Bangkok International Trade & Exhibition Centre (BITEC), Thailand



In conjunction with



IEEE International Transportation Electrification Conference & EXPO Asia-Pacific

E-Mobility: A Journey from Now and Beyond
6th – 9th June 2018 at BITEC, Bangkok, Thailand

Organized by



Supported by



For more information
www.evat.or.th

Thank You & Happy Thai New Year



Electric Vehicle Association of Thailand (EVAT)
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