Energy Policy
and Planning Office
MINISTRY OF ENERGY

Policy and Promotion of Electric Vehicles in Thailand

Dr. Twarath Sutabutr
Director General, Energy Policy and Planning Office (EPPO)
Ministry of Energy

April 18th, 2017 @ The Engineer Institute of Thailand under H.M. The King's Patronage

[13:30 – 15:30]

Energy Policy and Planning Office
MINISTRY OF ENERGY

Agenda

Energy policy

Thailand 4.0
Energy 4.0
TIEB

Implementation

Years 2010-2015
Electric vehicles
- R & D
- Prototype

Infrastructure

Progress

Years 2016-2017
Pilot project
- Electric bus, Tuk-Tuk
- Charging station

Energy Policy
and Planning Office
MINISTRY OF ENERGY

Agenda

Energy policy

Thailand 4.0
Energy 4.0
TIEB

Implementation

Years 2010-2015
Electric vehicles
- R & D
- Prototype

Infrastructure

Progress

Years 2016-2017
Pilot project
- Electric bus, Tuk-Tuk
- Charging station

Thailand 4.0

Food, Agriculture Biotechnology	Public Health and Medical Technology	Smart Devices, Robotics& Mechatronics	Digital, IoT & Embedded Technology	Creative, Culture & High Value Services

10 Target Industries

First S-Curve

- Next – Generation Automotive
- Affluent, Medical and Wellness Tourism
- Smart Electronics
- Agriculture and Biotechnolgy
- Food for the Future

New S-Curve

- Robotics
- Aviation and Logistics
- Medical Hub
- Biofuels and Biochemicals
- Digital

Energy 4.0

- Electric vehicle (EV)
- Energy storage (ES)
- Small power producer (SPP)
- Smart City (SC) Smart Grid (SG)

Thailand Integrated Energy Blueprint (TIEB)

- PDP power plan
- EEP Energy efficiency
- AEDP Alternative energy
- GAS
- OIL

Energy Policy and Planning Office
MINISTRY OF ENERGY

Energy policy

At the end of Energy Blueprint on 2036

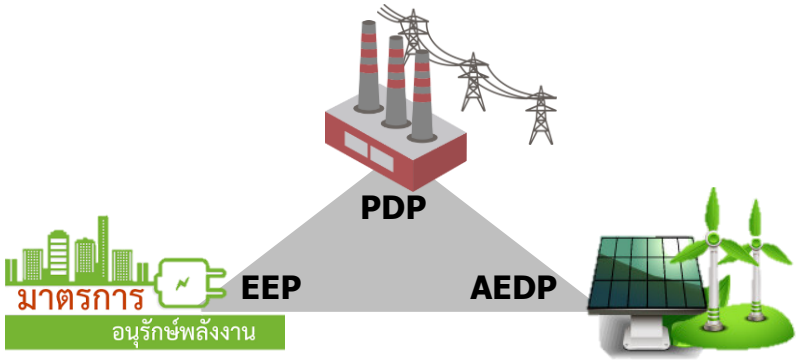
Target

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)

Energy Policy and Planning Office
MINISTRY OF ENERGY

Agenda

Energy policy

Thailand 4.0
Energy 4.0
TIEB

Implementation

Years 2010-2015
Electric vehicles
- R & D
- Prototype

Infrastructure

Progress

Years 2016-2017
Pilot project
- Electric bus, Tuk-Tuk
- Charging station

Energy Policy and Planning Office
MINISTRY OF ENERGY

EV Promotion in the Past

2010	2011	2012	2013	2014	2015

Pilot

EV & Charging Station

PTT
2 EV car
4 Charging Station

MEA
16 EV car
10 Charging Station
- Bangkean, Bangyai, Samsen etc.

Suranaree U.
PEA
1 EV Bus [43 ที่นั่ง]

Silpakorn U.
Y2016
1 EV Bus [18 ที่นั่ง]
1 Mobile Charging
- Chulalongkorn U.

Y 2010-2015
- Total 13 Projects
- 9 Project supported by Energy Conservation Promotion Fund

R&D

Silpakorn U.
Motorcycle Master Plan

KMITL
Motorcycle Performance Test

Ramkhamhaeng U.
Charging Station [FS]

EPPO
ปี 58
Infrastructure

KMUTNB
EV Bus-Long Transit [FS]
150 km from Bangkok

Thammasat U.
EV Promotion

Prototype

PEA **NSTDA**
Y2016
Pilot EV
Motorcycle & EV development Technology

Chulalongkorn U.
Smart Grid

PEA
Motor for EV Motorcycle

Energy Policy and Planning Office
MINISTRY OF ENERGY

EV Promotion in the Past

EGAT-NSTDA

1. Pilot Electric vehicle, Y2010-2016


2. EV Technology development and their effect in Thailand, Y2012-2013

3. Promotion of small EV Production and Utilization, Y2014-2016

MEA

- 16 EV car
- 10 Charging Station in MEA area
- Billing System Development

Energy Policy and Planning Office
MINISTRY OF ENERGY

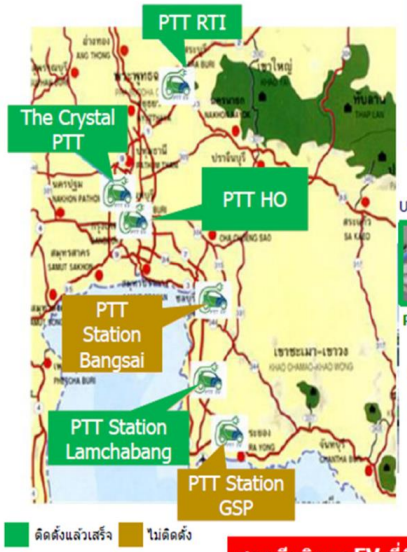
EV Promotion in the Past

PEA

- Development of environmentally-friendly EV and installation of charging station
- Development of small EV
- Research and development of motor and driving


PTT

- Pilot Charging Station



สถานีบริการ EV ที่มีอยู่ 4 สถานี เพียงพอต่อการดำเนินการตามมติ PTTGMC

Energy Policy and Planning Office
MINISTRY OF ENERGY

Agenda

Energy policy

Thailand 4.0
Energy 4.0
TIEB

Implementation

Years 2010-2015
Electric vehicles
- R & D
- Prototype

Infrastructure

Progress

Years 2016-2017
Pilot project
- Electric bus, Tuk-Tuk
- Charging station

Energy Policy and Planning Office
MINISTRY OF ENERGY

EV Action Plan

4 Actions

Phase 1 Y2016-2017 → **Phase 2** Y2018-2020 → **Phase 3** Y2021 →2036

Prepare

1. **BMTA** 20 EV Bus (Test drive)
   200 EV Bus (Pilot project)
2. **MEA** 4 Charging Station (BMTA - 200 Bus)
3. **EGAT** 1 mini Bus & 1 Charging Station
   EV & Smart Grid
   High Energy Performance EV & Station
4. **PEA** EV Bus & 4 Charging Station
5. **PTT** EV Bus (personnel transportation)
   (PTT head office – BTS Mo-chit)
6. **Private** EV Bus /Passenger → Charging Station

EPPO

Electricity rate

(Draft) Cost of energy consumption per kilometer for EV

Demand Charge เฉลี่ย + Energy Charge + ค่า Ft − เงินอุดหนุนค่าไฟฟรี (50 หน่วย)

Research

- Battery/Motor capacity
- Car/Charging station standard
- Charging system effect
- Law, Tax, Permission
- Personnel
- User/Producer promotion
- Research and development
- Electricity rate structure

Action Plan

Extend

Y2036

- ❑ 1.2 Million PEV Passenger
- ❑ 690 Charging Stations
- ❑ EV Smart Charging
- ❑ Vehicle to Grid; V2G

Energy Policy and Planning Office
MINISTRY OF ENERGY

EV Charging station Promotion

Objective

To supporting the government agency, state enterprise and private sector install 150 charging station

27 April 2016
Energy Conservation Promotion Fund
76,047,500 Bath

14 June 2016
"Start"
Sign Agreement

Oct 2016
Recruit round 1

Dec 2016
Recruit round 2

1-20 Feb 2017
Recruit round 3

Proposal → EVAT → Consider → Committee → Result / Contract / Follow

Electric Vehicle Association of Thailand

Expected Results

- Increase PEV usage
- Decrease oil usage
- Decrease CO_2
- Technical knowledge of Charging Station (include Economic, Public and Environment)

Charging station Owner	Type	Round 1	Round 2	Round 3	Total	Round 4	Round 5	Total
Supporting ratio →		100%	100%	100%		100%	100%	
Government Agency	Quick	3 1,900,000 บาท	3 1,900,000 บาท	4 1,900,000 บาท	10	2 1,900,000 บาท	3 1,900,000 บาท	5
	Normal	3 100,000 บาท	3 100,000 บาท	4 100,000 บาท	10			
State enterprise	Quick	3 1,000,000 บาท	3 1,000,000 บาท	4 1,000,000 บาท	10			
	Normal	3 100,000 บาท	3 100,000 บาท	4 100,000 บาท	10			
Supporting ratio →		70%	50%	30%		30%	20%	
Private sector	Quick	10 700,000 บาท	10 500,000 บาท	10 300,000 บาท	30	20 300,000 บาท	25 200,000 บาท	45
	Normal	10 70,000 บาท	10 50,000 บาท	10 30,000 บาท	30			
Total Charging station		32	32	36	100	22	28	50

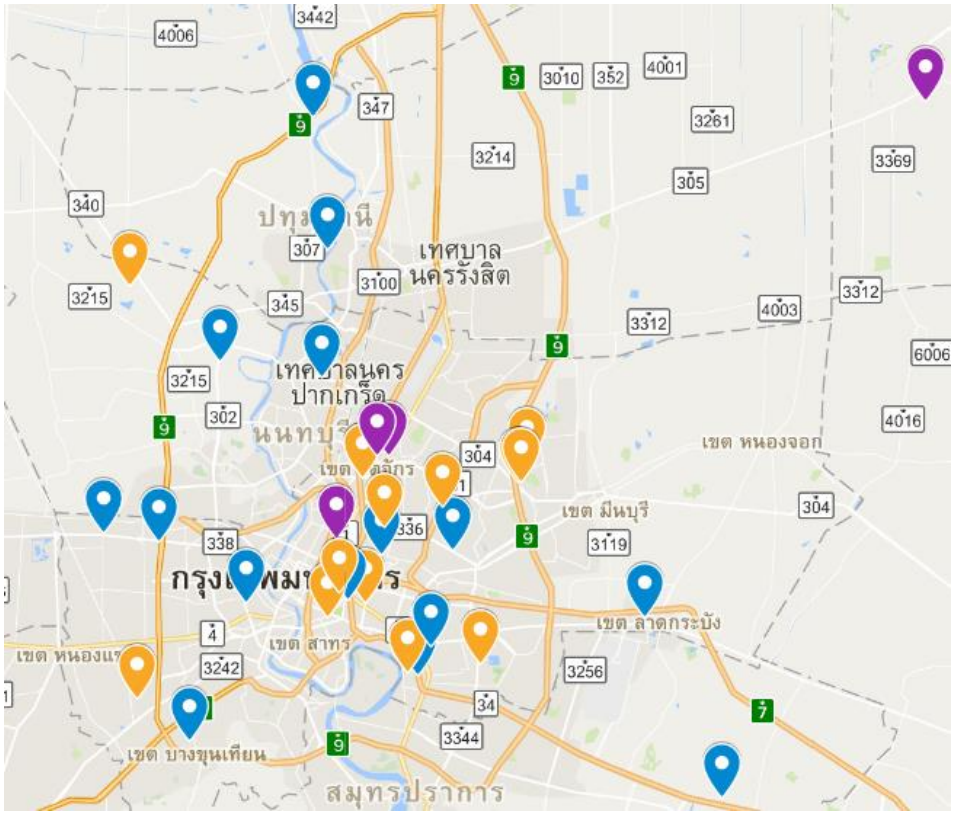
① ② 14 Sep 2016

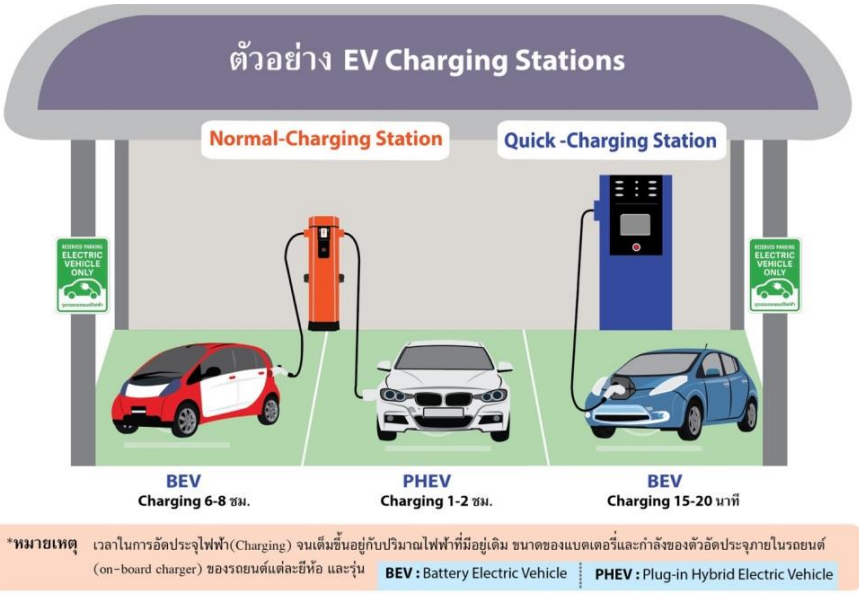
34,938,000 Bath

Energy Policy and Planning Office
MINISTRY OF ENERGY

EV Charging station Promotion

Result from **Round 1 & 2 & 3**
Expected to install **91 charging** outlets
(**46 Normal** & **45 Quick** Charging outlets)





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

Energy Policy and Planning Office
MINISTRY OF ENERGY

E-Tuk Tuk Promotion

24 Sep 2016
Energy Conservation Promotion Fund
69,938,000 Bath

27 Oct 2016
"Start"
KMUTT Sign Agreement

26 Nov 2016
Inception Report

① รย 4: Private Tuk-Tuk (1,641 Car)

② รย 8: Public Tuk-Tuk (20,395 Car)

22,036 Car

Limited Registration

Low cost Tuk-Tuk Project
814 car
Joined 284 car

EV Tuk-Tuk could be registration
If power ≥ 4 kW, Max. Velocity ≥ 45 km/hr

Producer/Expoter EV Tuk-Tuk

- ❑ Clean Fuel Energy Enterprise (C-FEE)
- ❑ TukTuk Factory (TTF)/Thai GreenView
- ❑ RMA

manufacture **400** car/year

Promotion for changing old Tuk-Tuk to Electric Tuk-Tuk

Year	① 2017	② 2018	③ 2019	④ 2020	⑤ 2021	total 5 year
Target (Car)	100	900	3,000	6,000	12,000	22,000

รย 4 → **20** Car

รย 8 → **80** Car

Old Tuk-Tuk **100** Car

① Changing price 100,000 Bath/car

② Buying price 300,000 Bath/car

③ Student Competition 100,000 Bath/car

New e-Tuk Tuk **100** Car

Modified e-Tuk Tuk **100** Car

Energy Policy and Planning Office
MINISTRY OF ENERGY

Progress - EV Promotion

EGAT

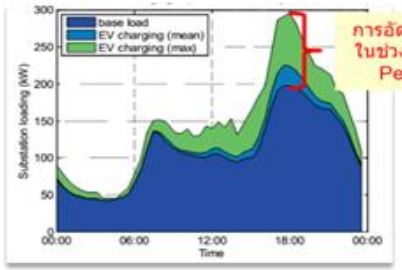
1. Pilot project: electric car, electric minibus and charging station

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

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

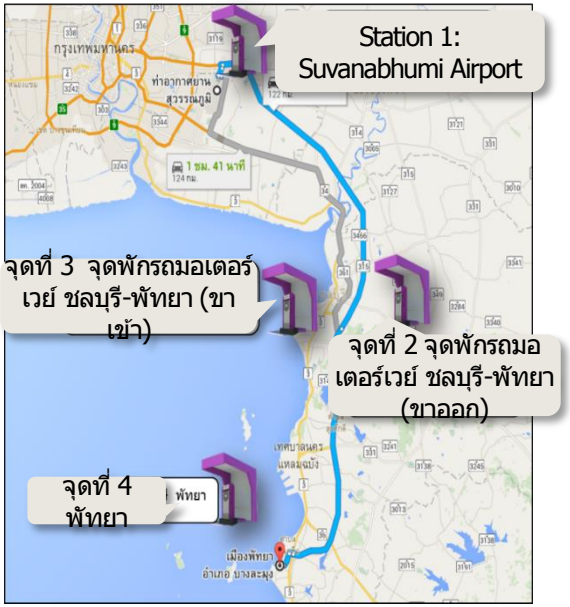
Energy Policy and Planning Office
MINISTRY OF ENERGY

Progress - EV Promotion

PEA

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

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



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

MBTA

Project for procurement of electric bus (200 buses)

Energy Policy and Planning Office
MINISTRY OF ENERGY

Progress - EV Promotion

Land Transport

Progress: Drafting announced in order to define the electrical power of motor, small EV and two wheels EV could be registration

BOI

Progress: Preparing a promotion package for supporting the manufacture of electric vehicles in Thailand, e.g.

- Promote the development of HEV and PHEV
- Promote the investment of BEV

xEV manufacture

Charging station development

Battery management

Energy Policy and Planning Office
MINISTRY OF ENERGY

Progress - EV Promotion

Thailand Industrial Standards Institute

Progress: Preparation of EV standard

Using AC/Combo/CHAdeMO type charging system

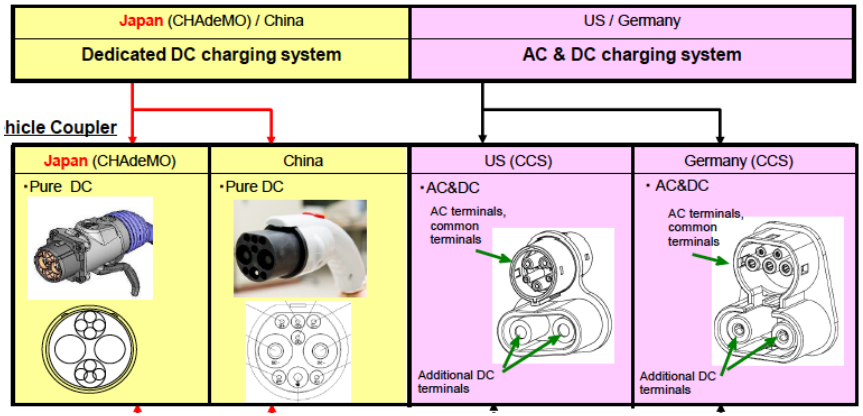
Electric car:

- AC charge - Type II
- DC charge - open for all standard

Public bus:

- AC charge - Type II
- DC charge – Configuration FF

DC Charging Standard



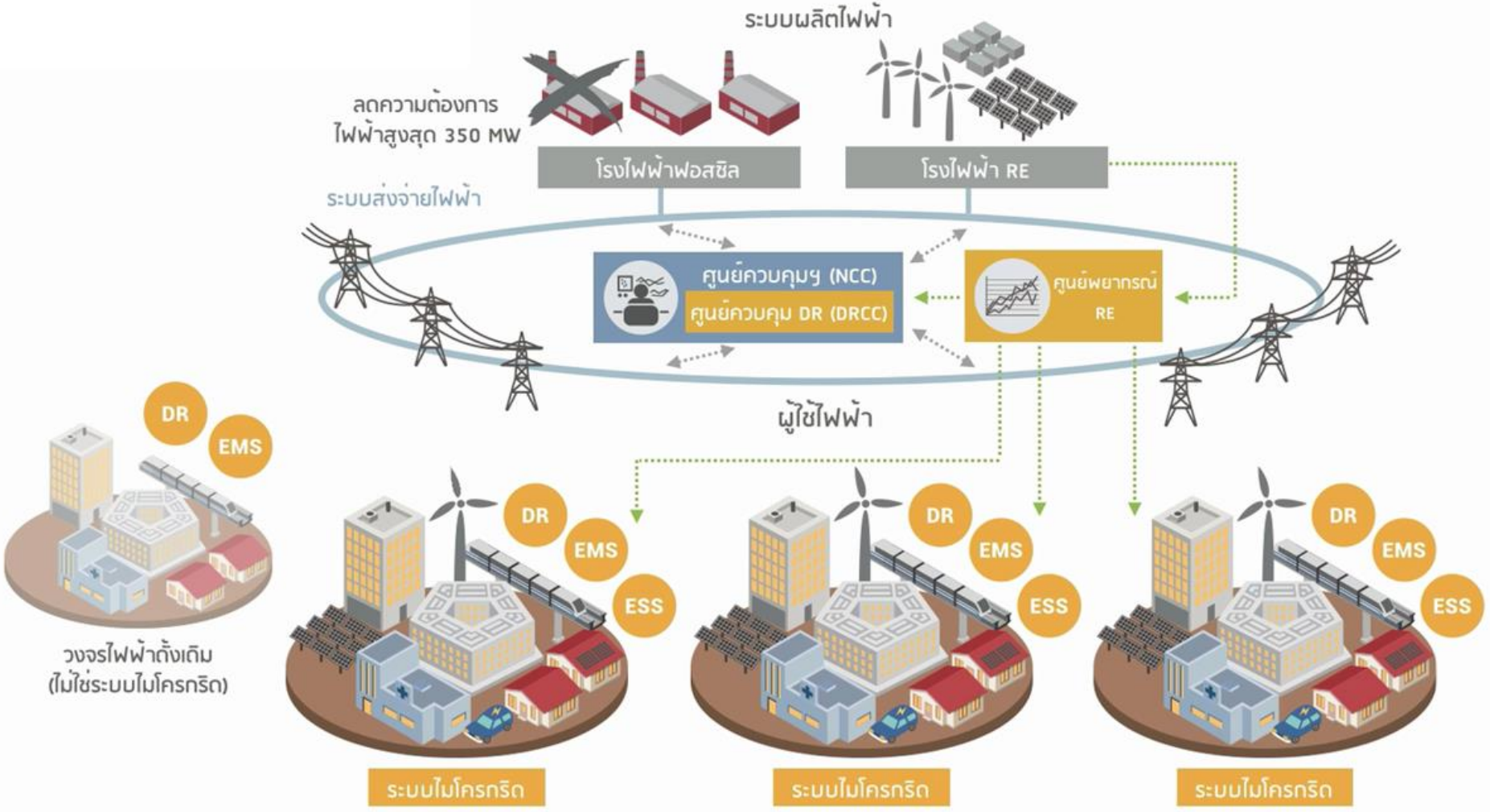
AC Charging Standard

	IEC 62196-2	
	Type1	Type2
Proposer	Japan	Germany
Phase	Single	Single/Three
Rated Current	32 A (single phase) 80 A(single, US only)	70 A (single phase) /63 A (three phase)
Rated Voltage	250 V (300 V: US only)	250 V (single phase) /480 V(three phase)
Number of Contacts	5	7
Scope	Vehicle coupler	Vehicle coupler Plug & Socket-outlet
Compatibility	SAE J1772	–
Connector Design	 Φ43.8	 Φ56.0
Locking	Option	Yes
Shutter	No	Option

Photo Source: Takahiko Miki, JARI, Summary of Standardization Activity – EV Battery Charging, EVTeC & APE Japan 2014.

Energy Policy
and Planning Office
MINISTRY OF ENERGY

Infrastructure : Smart grid



Re : Renewable Energy
DR : Demand Response
NCC : National Control Center
ESS : Energy Storage
EMS : Energy Management System
DRCC : Demand Response Control Center

Thank you for your kind attention

like us on facebook

EPPO Thailand

Energy Policy and Planning Office
MINISTRY OF ENERGY