MEA’s Supports for Electrification of Public Transport in Thailand
Area of Thailand: 513,000 sq.km

- Nonthaburi: 622.3 sq.km
- Bangkok: 1,565.2 sq.km
- Samutprakan: 1,004.1 sq.km

Total: 3,191.6 sq.km (0.64% of Country Area)
POWER CONSUMPTION

The proportion of electricity consumption

- PEA: 139,634 GWh (73%)
- MEA: 49,598 GWh (26%)
- Direct customer: 1,236 GWh (1%)

Electricity consumption compared to previous year: -2.18%

Total 190,468 GWh

* January - December
EV policy and strategies in Thailand

Visions: Thailand will become the global production and supplier hub for electric vehicles automotive parts.

Goal at 2035: Thailand towards 100% Zero Emission Vehicle (ZEV) Sale by 2035

30@30 Target at 2030

- **Fast Charging**
  - 12,000 Outlets
  - Usage Target: 440,000 units
  - Production Target: 725,000 units

- **Usage Target**
  - 33,000 units

- **Production Target**
  - 34,000 units

- **Swapping Station**
  - 1,450 Stations
  - Usage Target: 650,000 units
  - Production Target: 675,000 units

Policy Direction to National Energy Plan

1. RE >50%
2. EV 30@30
3. EE >30%
4. 4D1E

Carbon Neutrality 2065 - 2070
**Government Policy Response**

**MEA EV Charging Platform**

**MEA EV Smart Charging**
Ref. Open Smart Charging Protocol (OSCP)

**EVAT Charging Consortium**

**MEA EV Roaming**
Ref. Open Charge Point Interface (OCPI)

**Action Targets 2022**

- **Location Module**
  - Location detail
  - Charge-point detail
  - Status

- **MEAT EV Charging Consortium**

- **MEA EV Application**

- **MEA Wallet & Payment**

**DC Charger**
50 – 120 kW

**AC Charger**
7.2 – 44 kW

Ref. Open Charge Point Protocol (OCPP1.5, OCPP1.6)

**MEA Call Center**

**EV Station Management**

**Tariffs Module**

**Pilot Project (CPO)**

**Energy time-shift**

**Demand response**

**Real-time Charging Control**

**EV Charging Network**

**MEAT EV Charging Consortium**

**MEA EV Roaming**
Ref. Open Charge Point Interface (OCPI)
Government Policy Response
MEA EV Smart Charging Project

Why? MEA Smart Charging
- Real time monitoring
- Real time Charging Power Management
- Adaptive Load Charging
- Power Demand Management

First smart charging station @MEA Ploenchit station (2017)
Government Policy Response

MEA

EV Smart Charging Project
**Government Policy Response**

**EV Charging Station**
- 97 Stations
- Total Installation Power: 16,200 kW

**E-Bus Charging Station**
- 2 Stations
- Total Installation Power: 5,100 kW

**E-Truck Charging Station**
- 1 Station
- Total Installation Power: 800 kW

**E-Ferry Charging Station**
- 2 Stations
- Total Installation Power: 4,500 kW

**MEA EV Low Priority**
**EV Special Tariff: Low Priority Rate**
- Equal off-peak tariff for 24 hrs.
  - No Demand Charge
  - 2.6369 Baht/kWh (exclude Ft and VAT)

**Conditions:**
1. Public EV charging station only.
2. Connected directly to MEA’s grid.
3. MEA can control EV Charging remotely. (MEA Smart Charging)
Government Policy Response

**MEA EV Low Priority**

**EV Special Tariff : Low Priority Rate**

- Equal off-peak tariff for 24 hrs.
  - No Demand Charge
  - 2.6369 Baht/kWh (exclude Ft and VAT)

**Conditions:**
1. Public EV charging station only.
2. Connected directly to MEA’s grid.
3. MEA can control EV Charging remotely. (MEA Smart Charging)

**Options:**

A. The CPO can manage the charging station and exchanges data with the MEA through the MEA OSCP API.

B. The MEA manages the stations.
MEA Power System Planning for EV

How MEA controls EV Charging
Option A: CPO shall manage the electricity consumption of the charging station not greater than the available capacity provided by MEA every 15 minutes.

Available capacity (kW)

Power supply limitation – Non-charging station load

Power supply limitation is determined by:
- 90% of distribution transformer capacity for voltage level 230/400 V
- 7.7 MW or 370 A per feeder for voltage level 12 kV
- 15.4 MW or 370 A per feeder for voltage level 24 kV

How it work:
- MEA will provide the available capacity at least 10 minutes before the operation start.
- CPO shall provide the electricity consumption data (kWh) of the charging station and each charging point every 15 minutes.
- If the charging station cannot communicate to MEA including not provide the electricity consumption data more than 96 times in each billing cycle, the charging station is defined as violating low priority load management.
MEA Power System Planning for EV

Peak demand included EV and Solar PV

Peak shift from noon to night

30@30 Policy
MEA Power System Planning for EV

Power System Planning

System Expansion
- Distribution Transformer
- Modular Substation

Demand Side Management
- EV Smart Charging
- Distributed Energy Resources Management System (DERMS)
MEA Power System Planning for EV

Power System Expansion to support EV

Demand (MW)

<table>
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<th>Year</th>
<th>Level (MW)</th>
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<tbody>
<tr>
<td>2022-2027</td>
<td>1,066</td>
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<tr>
<td>2028-2032</td>
<td>4,195</td>
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<tr>
<td>2033-2037</td>
<td>6,477</td>
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New substation (MVA)

<table>
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<tr>
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<th>Level (MVA)</th>
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<tbody>
<tr>
<td>2022-2027</td>
<td>820</td>
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<tr>
<td>2028-2032</td>
<td>7,020</td>
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<td>2033-2037</td>
<td>7,560</td>
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</table>

New distribution transformer (MVA)

<table>
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<tr>
<th>Year</th>
<th>Level (MVA)</th>
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<tbody>
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<td>2022-2027</td>
<td>1,025</td>
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<td>2028-2032</td>
<td>4,210</td>
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<td>2033-2037</td>
<td>6,495</td>
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</tbody>
</table>

30@30 policy without DERMS
With DERMS