Operations of electric mobility services in Bangkok: Experience and lesson learned from the private sector

Energy Absolute (EA) Public Company Limited
EA Business

**Bio-diesel**
- B100 & Glycerin
  - 800,000 liters/day
- Bio-PCM & green diesel
  - 130 tons/day

**Renewable Energy**
- Wind and Solar PV in operation
  - Solar 278 MW
  - Wind 386 MW
- New projects
  - Wind Power
  - Waste-to-Energy
  - Hydropower

**Battery & Energy Storage**
- Amita (Thailand)
  - Battery Factory
  - 1 GWh/year
  - COD since Dec 2021
  - Plant expansion is ongoing

**Electric Vehicle (EV)**
- Electric Vehicle (EV)
  - MINE Smart Ferry in operation since Q4-2020
  - MINE Bus & Truck in operation since Q1-2022

**EV Charging Station**
- EA Anywhere charging stations
EV Ecosystem with Ultra Fast Charge Solution

Reliable charging network

Partnership with EV manufacturers & local suppliers

One-stop after-sales service

Battery R&D and production

International standard EV

E-Ferry
MINE Smart Ferry

E-Truck
MINE Truck

E-Bus
MINE Bus
MINE Smart Ferry

Thailand’s First Electric River Mass Transit

- Operation includes 3 routes in Chao Phraya river since 2020
- Max. 250 passengers
- Current fleet: 23 ferries (+15 under construction)
- Common ticket, cashless payment
MINE Electric Bus

Public bus services Bangkok Metropolitan Region
- Downstream integration of EA ecosystem
- Operation ramp-up in 2022
- Total of up to 37 routes
- Max. 1,250 electric MINE buses

Single network, single fare
- Supported by new and existing charging infrastructures
- Compatible with patented 15-min ultra-fast charging technology
- Platform connection with other public transit (road, rail, river) and feeder system
High-Capacity Charging Challenges

High-capacity charging
- Crucial for feasibility of commercial EV
- Reduced battery durability

Impact on electricity distribution grid
- High peak and intermittent demand
- Requires load prioritization and energy management
- Coordination with fleet management

Multiple socket charging

Largest DC charging station in ASEAN
High-Capacity Charging Opportunities

Low-priority tariff scheme
- Unique tariff scheme for EV charging station
- Off-peak rate
- Demand charge exemption
- Affordable pricing passed on to customers

Grid service
- Vehicle-to-grid and demand response opportunities

Second-life deployment
- Replaced battery can be redeployed as energy storage system (ESS) to support renewable or grid modernization projects
Potential Growth for EV Market: Thailand ZEV Plan

Supportive regulatory framework

- Thailand 4.0 launched, which targeted environmental protection as 1 of 4 goals
- Thailand to become the “EV Hub in ASEAN”

2022

- 1,447 charging stations to be installed across Thailand
- 300+ stations to be installed in EEC(3)

2025

- All vehicles used by government agencies and public fleets to be ZEVs
- 30% of new vehicles produced to be ZEVs

2030

- All new vehicles produced to be ZEVs

2035

- 100% of all new vehicles produced to be ZEVs

Forecasted EV demand in Thailand

- Passenger cars
- Trucks and buses

CHARGING STATION
Forecasting number of charger (Accum.)

- 2022: 31k
- 2023: 402k
- 2024: 2,050k
- 2025: 6,400k

- 2022: 160k
- 2023: 430k
- 2024: 1,447k
- 2025: 4,020k

2025

- 2,460
- 13,450

2030

- 40,500

2035

Source: State policies EV Committee
Thailand Government Policy shift the EV Demand

Benefits from Thai EV incentive package

- Reduce the electricity cost for the EV Charger and ease the regulation on getting extra electricity for private EV charging station & batteries
- EV units
- Reduction in customs duty and excise tax for battery EVs, including passenger cars and other EVs such as motorcycles with the local production requirement
- THB150k subsidy per unit for completely knocked down (1) pickups with a battery size of over 30 kWh E-pickup
- Support the Local EV Assembly by enforcing the Local EV Production in the future EV assembly

2022

2025

EA is well-positioned to capture the upcoming exponentially growing EV market and its value chain

Source: Thailand National Electric Vehicle Policy Committee.
(1) Refers to units delivered in parts and assembled at the destination, (2) Zero Emission Vehicle, (3) Eastern Economic Corridor.

BATTERY DEMAND

GWh

20
38
100

2025
2030
2035
Challenges

Expansion in growing markets

- Impacts on grid – with large EV populations
- Affordable charging fee - Low priority tariff scheme with growing demands
- Public transport – difficulties on fleet management
- Zero emission – green electricity supply

Ecosystem

- Ecosystem across EV value chain – local assembly and production
- Policy support for EV adoption including subsidies and tax incentives