



# EV Direction

**Ms. Piengjai Keawsuwan**  
**Nissan Motor (Thailand) Co., Ltd**

**CU-Energy Research Institute**  
**August 17, 2016**

# Agenda

- **The Changes**
- **ICE to EV Revolution**
- **EV in Thailand**



# The Changes



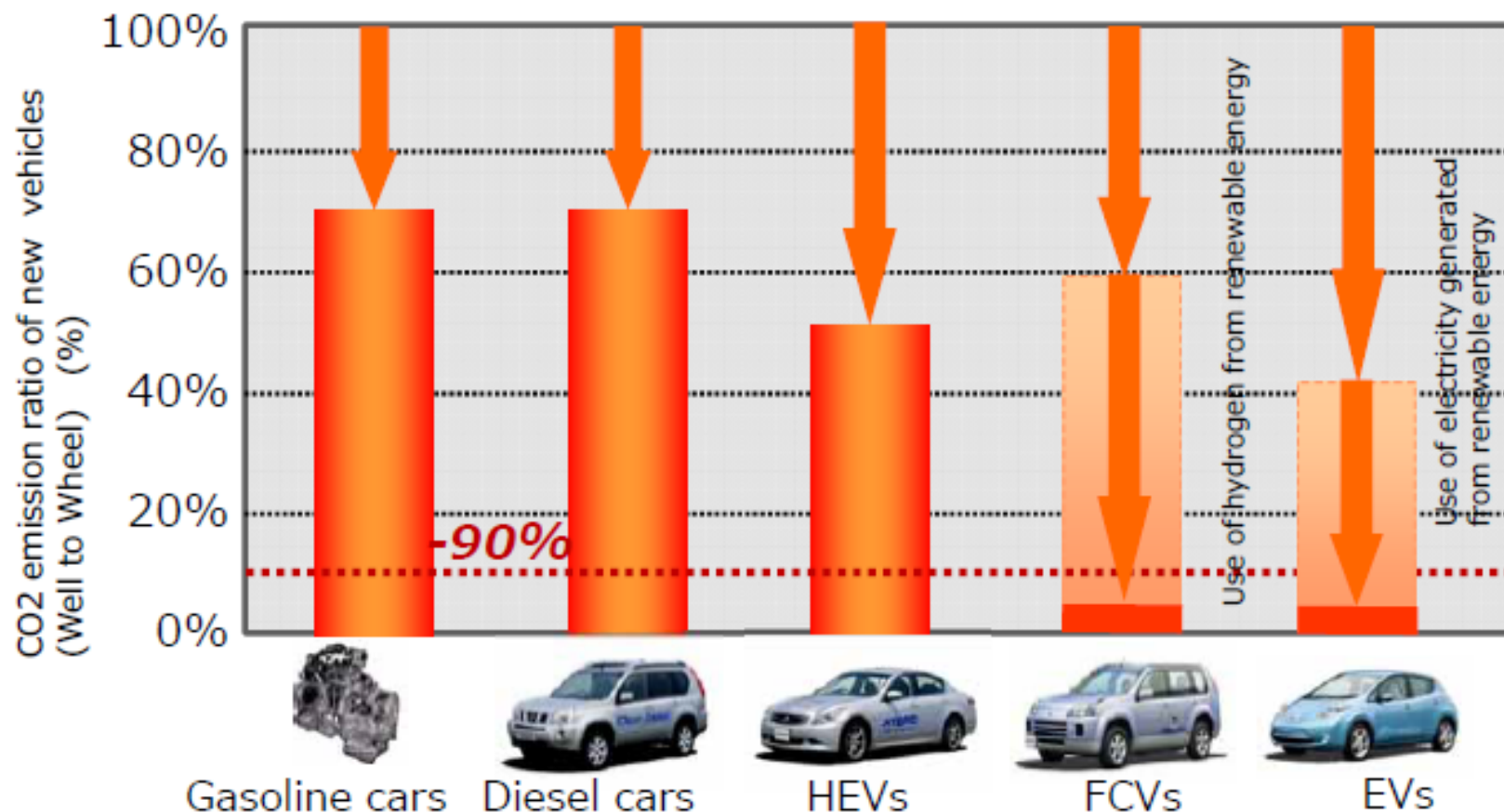
## **Mr. Tony Sebastian**

“Clean Disruption : Why Current Energy and Transportation Systems Will Be Obsolete by 2030”

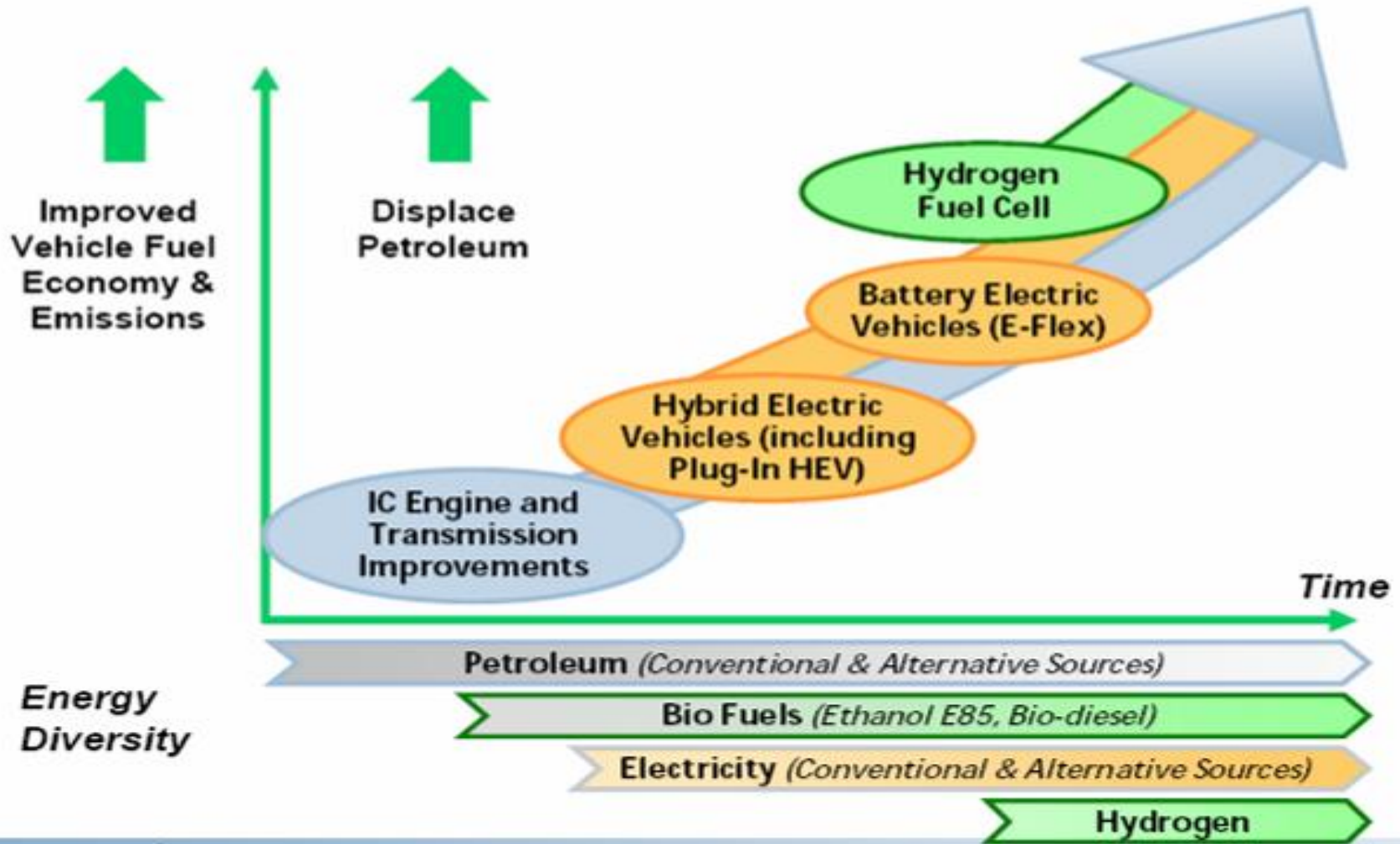
# Long-term targets for CO2 reduction

- IPCC requires 450ppm of CO2, which corresponds to 90% reduction of new vehicle's CO2 emission by 2050
- For stabilization of climate, increase of average temperature needs to remain within 2 degrees\*

\*Precondition of climate change panel

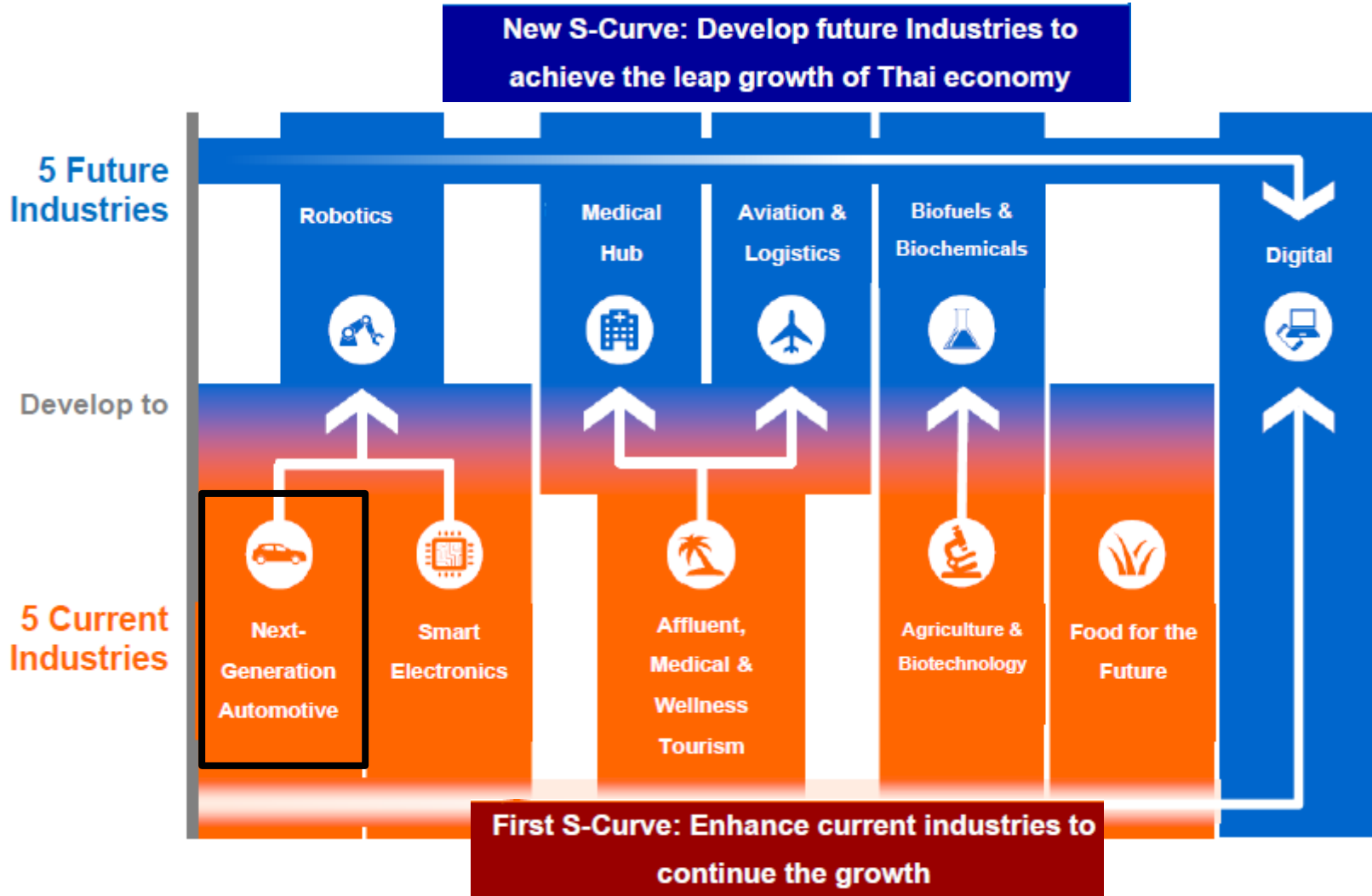


# Technology Direction for Vehicle



# Opportunity: EV in THI

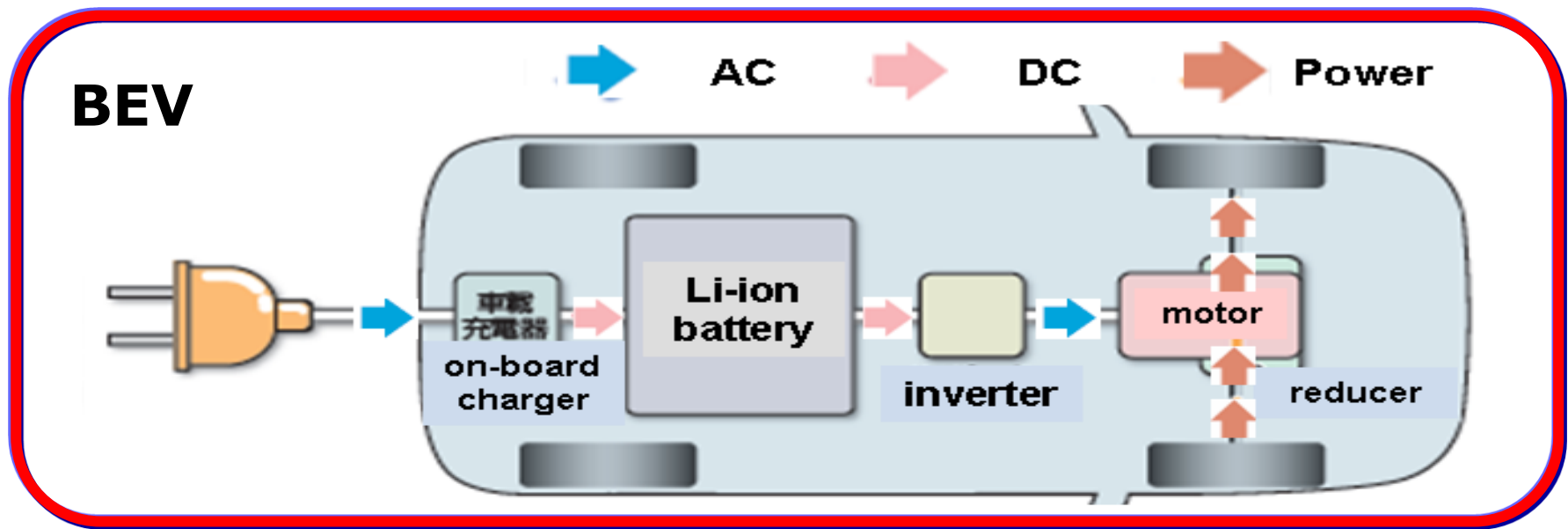
## 1. Thailand 4.0: Next Automotive Generation for New S-Curve



# ICE to EV Revolution

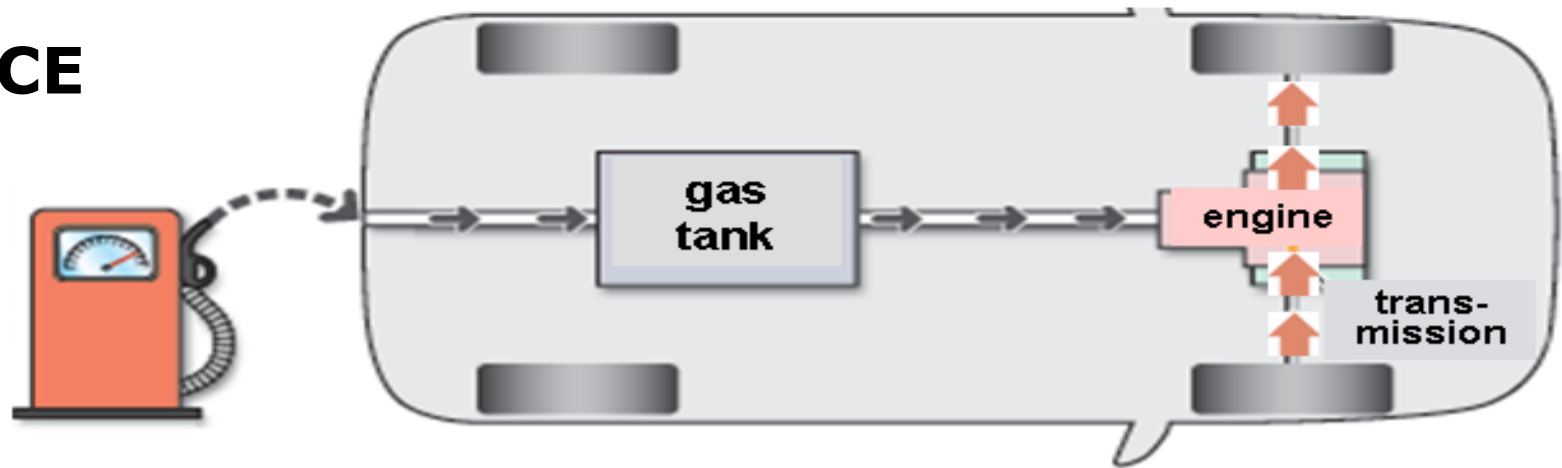


# e-Power Train diagram



gasoline → Power

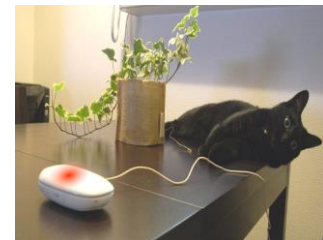
**ICE**



# EV significance



Outstanding Points	ICE	EV
Sustainable mobility	CO <sub>2</sub> > 0	CO <sub>2</sub> = 0
Energy Fee	*1.42 baht/km	**0.43 baht/km
Drive Feeling	Gear ratio acceleration	Smooth acceleration
Engine Noise	Noisy	Silent
Energy Charging	Gas station	Home (NC) / Gas station (QC)



\*E20 = 21.24 baht/L (PTT-16/08/16)  
Compared car = SYLPHY 1.8

\*\*TOU off-peak = 2.6369 baht/kWh  
FT = -0.3329 baht/kWh

# Charging Modes

There are two charging modes → **Quick** and **Normal**

## Quick Charge



Easy!



## Normal Charge

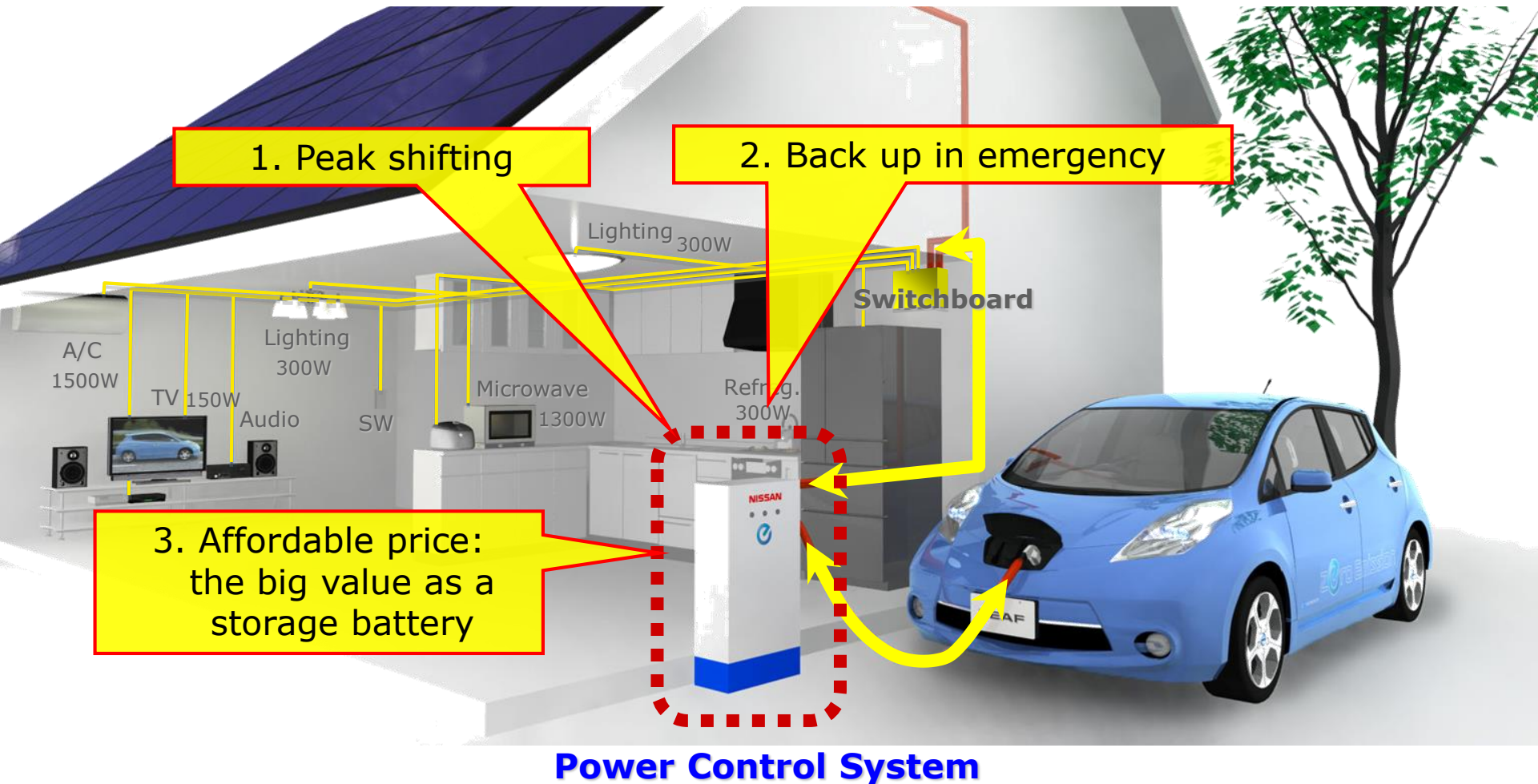


You can charge an EV like you recharge your mobile phone.



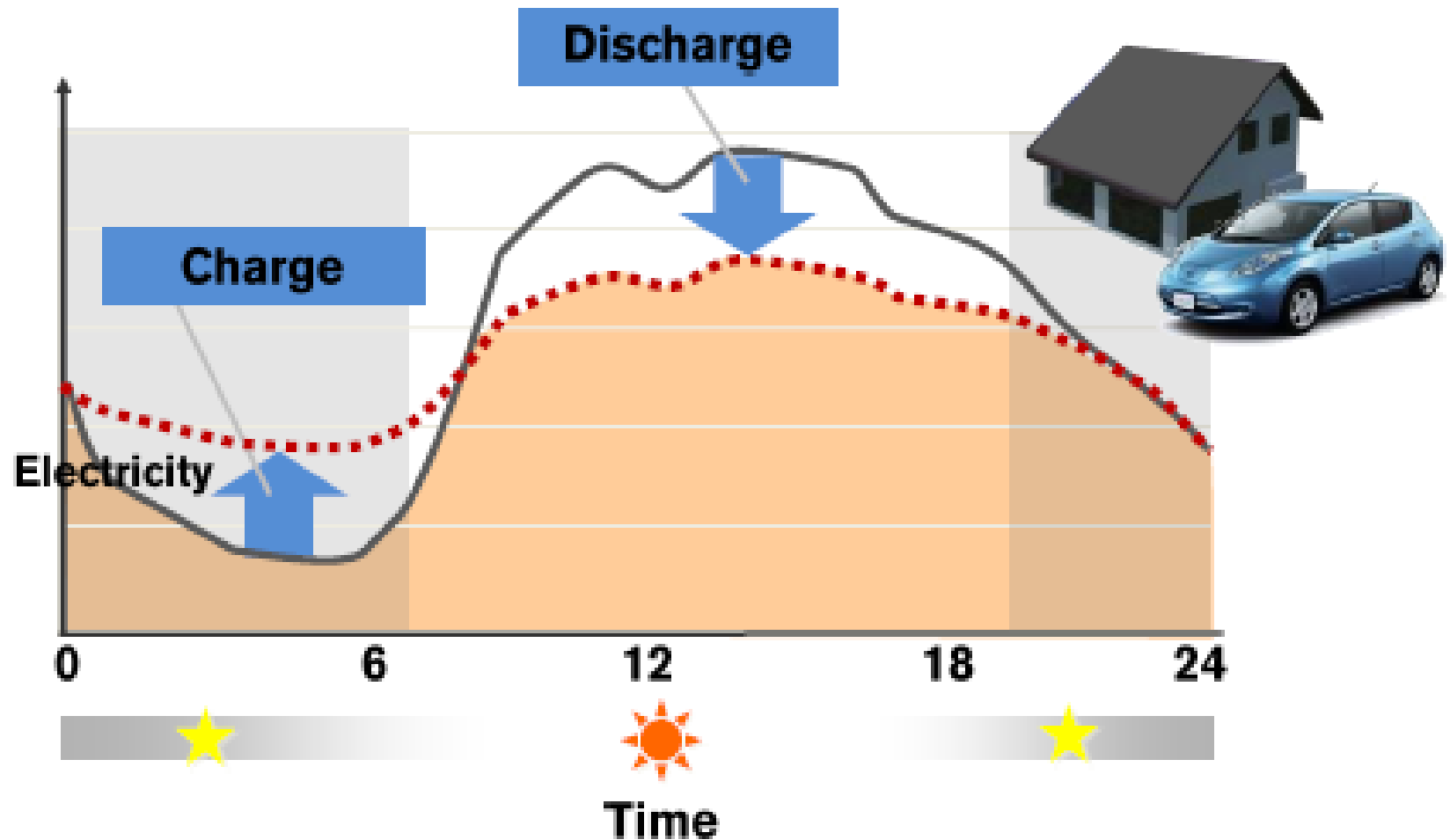
# V2G Technology

- Nissan LEAF to deliver a new value even at the garage
- Applying CHAdeMO protocol: a proven solution

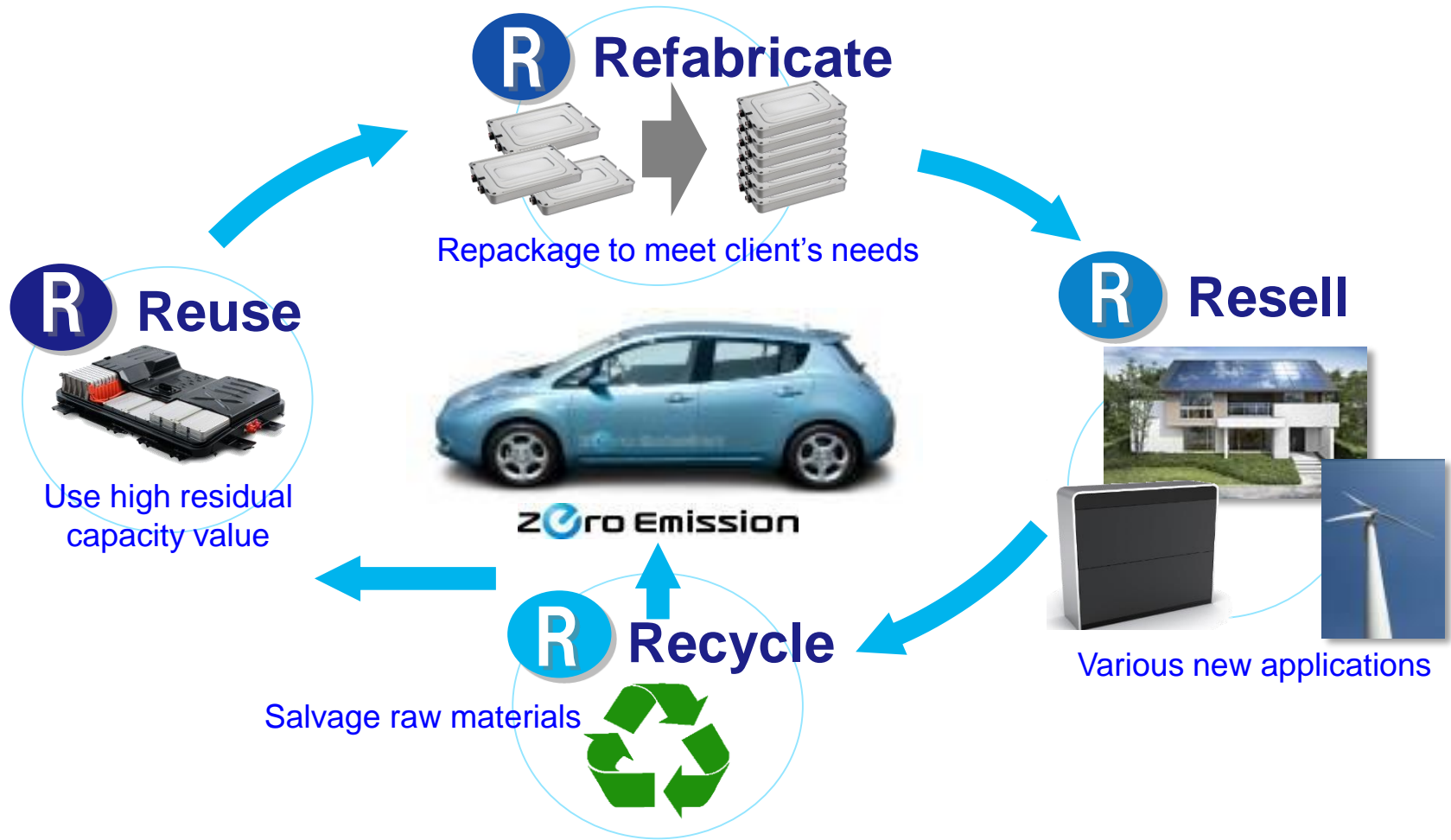


# Energy Management

- One of solution for the electric-load leveling.



# Battery Disposal Management



- Nissan has been studying 2nd Life non-automotive applications for used EV batteries since before the first LEAF was sold
- Through the re-use of batteries, usage of renewable energy can be maximized

# EV in Thailand

# 4 Pillars toward "EV in Thailand"

## EV in Thailand

### EV Awareness

- Government
- Investor

### EV Product

- EV Introduction
- Product capability
- Benefit to customers

### Infrastructure

- Standard of charger
- Standard of facility  
e.g. Plug & Socket

### Incentive

- Price
- No volume

**Knowledge and Information support**

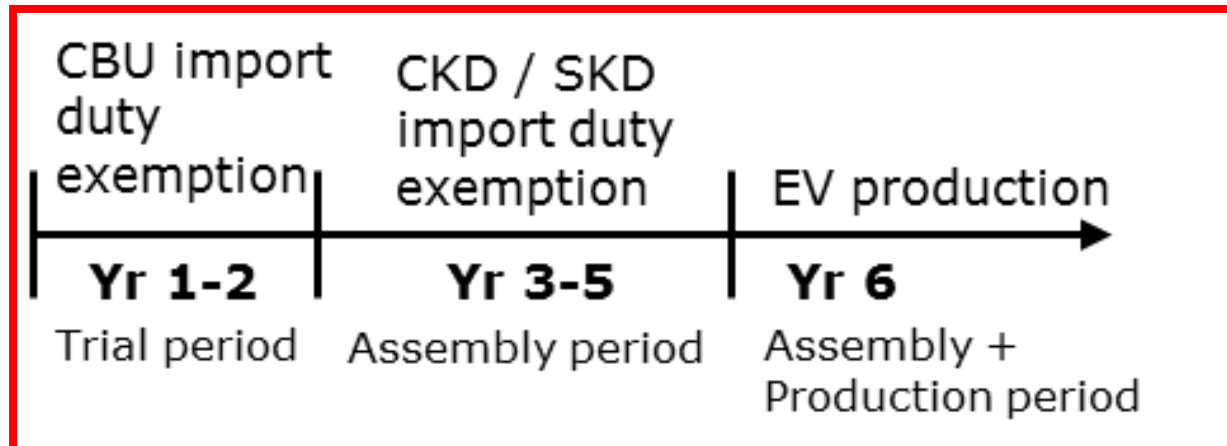


# Opportunity: EV in THI

## 2. EV Promotion Principle (August 2, 2016): Market demand creation

<b>BEV</b>	<ol style="list-style-type: none"><li>1. EV - passenger car</li><li>2. EV - small size passenger car</li><li>3. Electric bus</li></ol>
<b>Short term principle</b>	<ol style="list-style-type: none"><li>1. EV- Bus 200 units: BMTA (Bangkok Mass Transit Authority)</li><li>2. EV infrastructure standard and safety (Charger, wire harness, inlet-outlet , etc.)</li></ol>

## 3. EV Promotion plan by BOI (on process)



# Opportunity: EV in THI

## 4. Infrastructure readiness: Charging Station

➤ EPPO funding (for NC and QC): Managed by EVAT 100 stations within 3 years

➤ Quick charge station – Partner:

- MEA 7 + 3 stations

- PTT 4 stations (+2 stations within 2016, +14 stations within 2017)

- PEA 1 station (tentative 10 stations within 2016)

- EGAT 1 station

- NECTEC 1 station





**Thank you very much for your attention!**