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# Mitsubishi Plug-in Hybrid EV System

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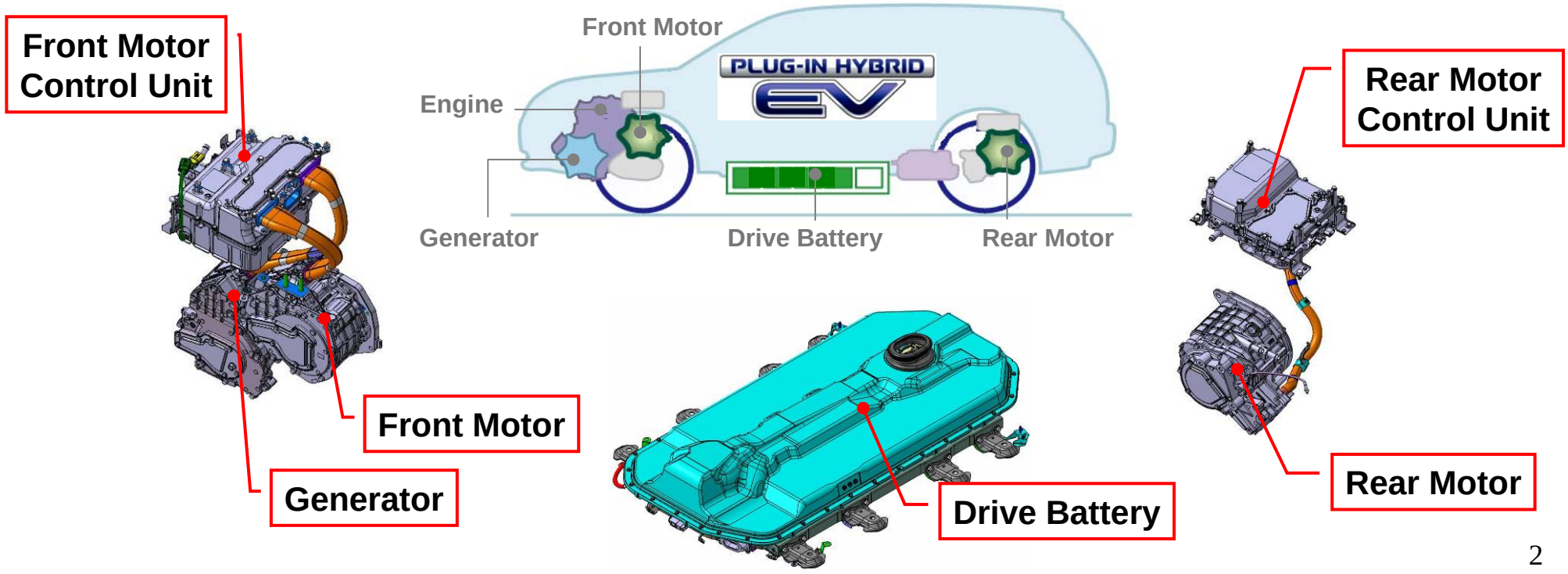
# Contents

# Features of the plug-in hybrid EV system

- Large-capacity drive battery and high power motor realize the enough cruising range and acceleration performance as an EV.
- An engine and a generator are equipped. It's possible to continue driving, even if a battery is discharged
- At high-speed driving, engine operates to improve fuel economy and motor assists the engine to accelerate smoothly



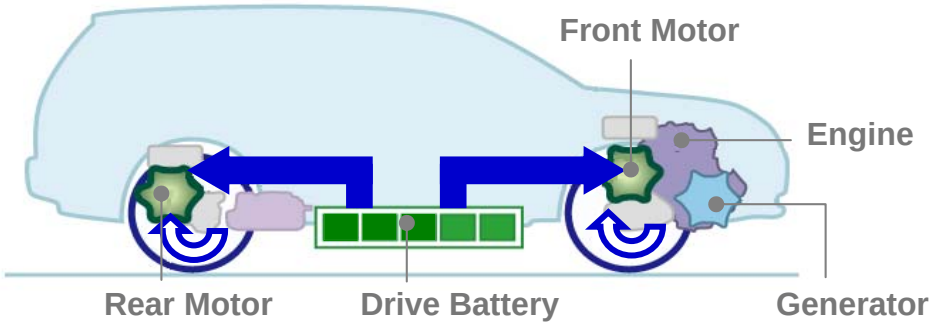
# Three operation modes of the plug-in hybrid EV system

➢ Optimum operation mode is selected automatically according to the situation.

**EV drive**

## EV

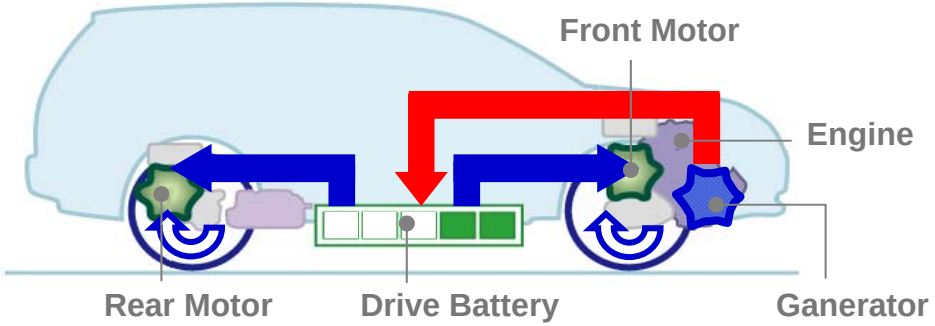
Only electric motor operates for propulsion.




**Hybrid drive**

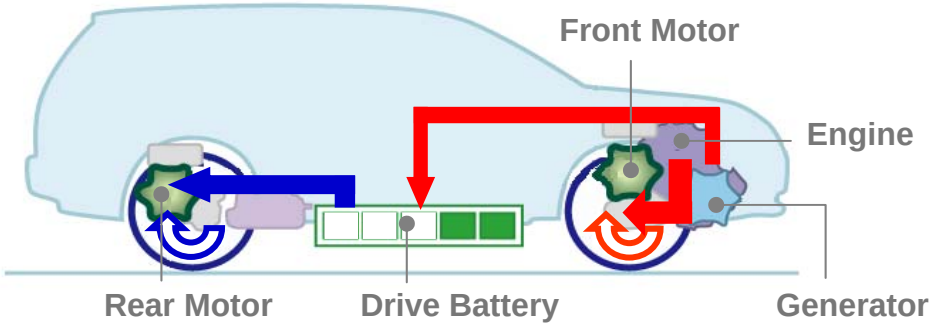
## Series

Electric motor operates for propulsion and engine generates electricity.



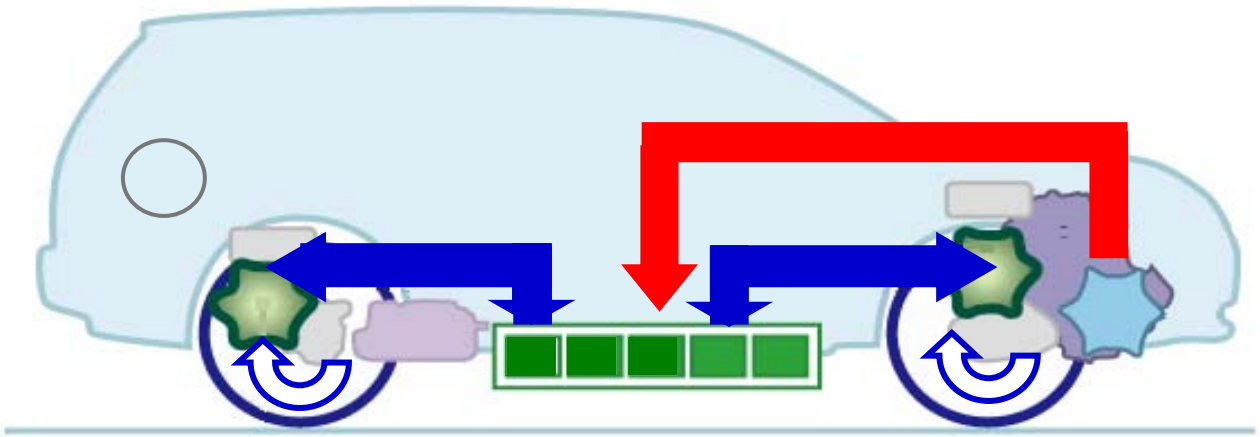

## parallel

Engine operates for propulsion and electric motor assists.



# Example of operation mode of the plug-in hybrid EV system

## Urban Drive




**Stopping**

Engine and motor are stopping

**Starting/Traveling**

Start and travel by motors

**Climbing**

Driven by motor and engine generates electricity

**Deceleration**

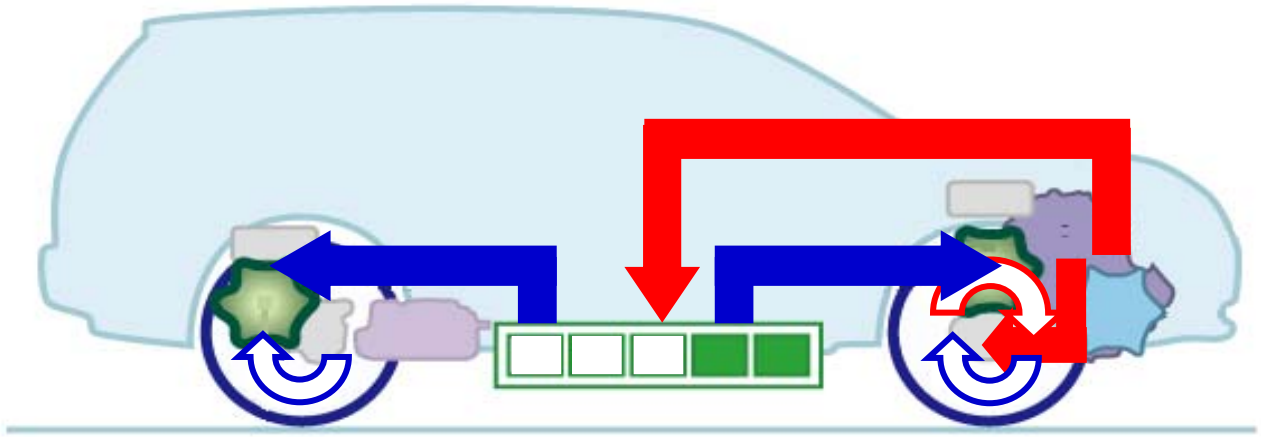
Kinetic energy is regenerated and battery is charged

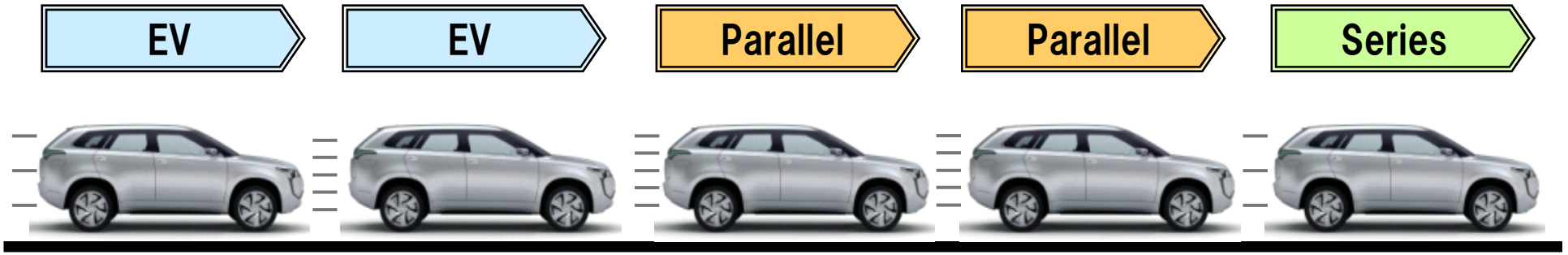
**Stopping**

Engine and motor are stopping

# Example of operation mode of the plug-in hybrid EV system

## Long Drive ( Urban - Country )






**Urban (High SOC)***

EV operation

**High speed (High SOC)**

Up to 120 km/h, EV operation can be performed

**High speed (Low SOC)**

Driven by engine while engine generates electricity

**Passing at high speed**

Driven by engine and motor assists

**Urban (Low SOC)**

Driven by motors while engine generates electricity

* SOC: state of charge

# Environmental performance of the plug-in hybrid EV system

- Better environmental performance is achieved by selecting three operation modes of a plug-in hybrid EV system according to the driving situation.

| | New OUTLANDER PHEV *1 | New OUTLANDER 2.4L 4WD *1 |
|---|---|---|
| EV driving Range (JC08 mode) | 55km or more | – |
| Overall driving range *2 (JC08 mode) | 880km or more | 860km or more |
| Combined FE *3 (JC08 mode) | 61km/Lor more | – |

*1: All numerical values are targets
*2: Total driving range of EV and HV
*3: Average fuel economy which is compounded fuel economy operated as EV and the fuel economy operated as HV, which is defined by MLIT

# Twin Motor 4WD System

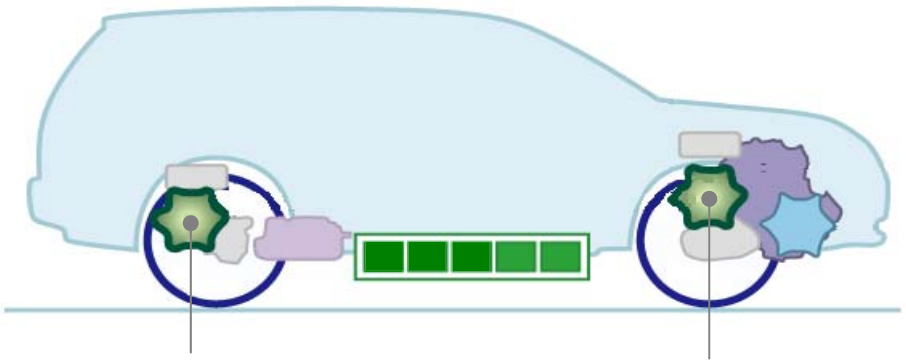
- Twin motor 4WD system which are equipped with high power front and high power rear motor is adopted.

**Quicker response at start**

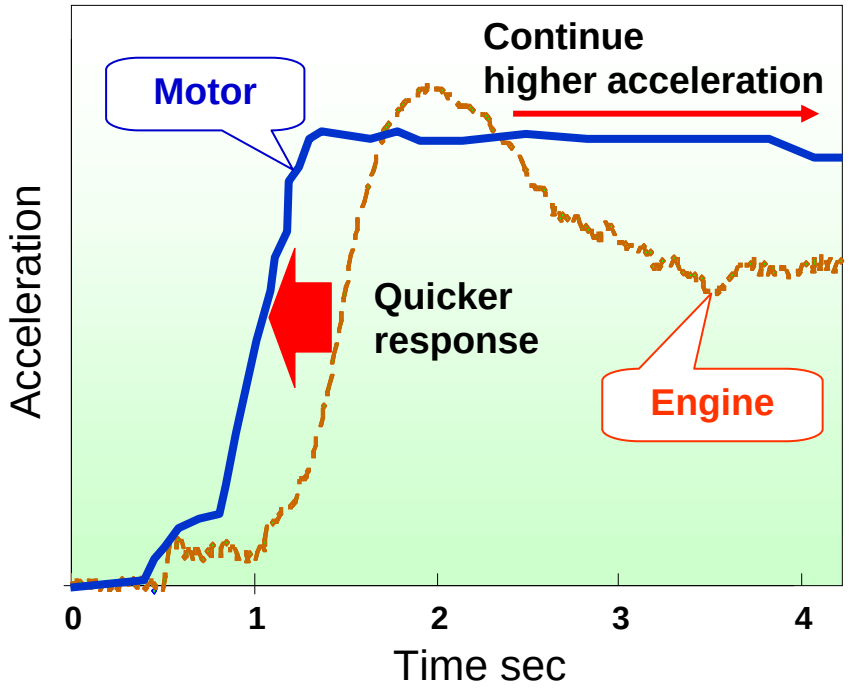
**Continue higher acceleration**

**Acceleration feeling electric motor realize**

**Twin Motor 4WD System**




**Accel. Feeling by motor**



# Twin Motor 4WD System ( S-AWC )

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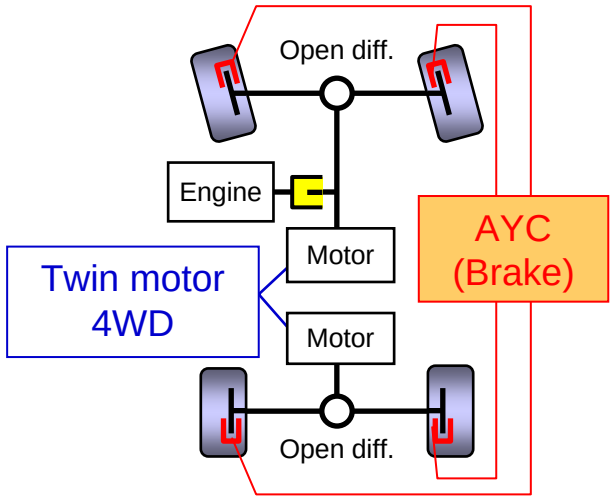
- To improve turning performance, traction and driving stability, twin motor 4WD distributes driving force of front and rear wheels, AYC system distributes driving force of left and right wheel.

**New OUTLANDER PHEV**




| | |
|---|---|
| Distribution of Fr. and Rr. | Twin Motor 4WD |
| Distribution of R and L | AYC (Active Yaw Control) |
| Controlling Mech. | Brake |

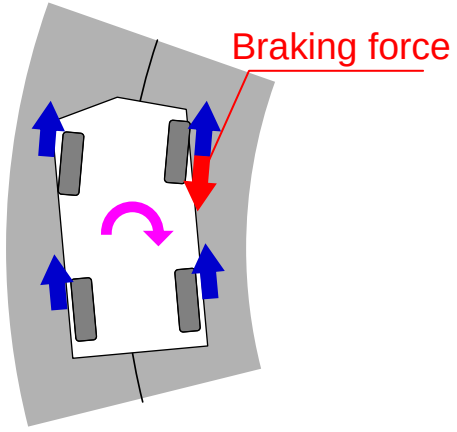
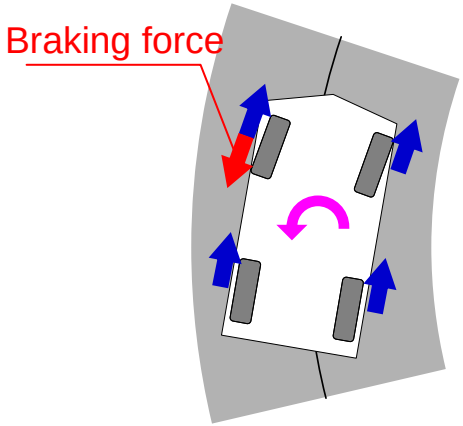
**Driving force distribution of Fr. & Rr. (Twin motor 4WD)**

**Normal control** Turning performance, high-speed stability

Detect lengthwise slip and side slip

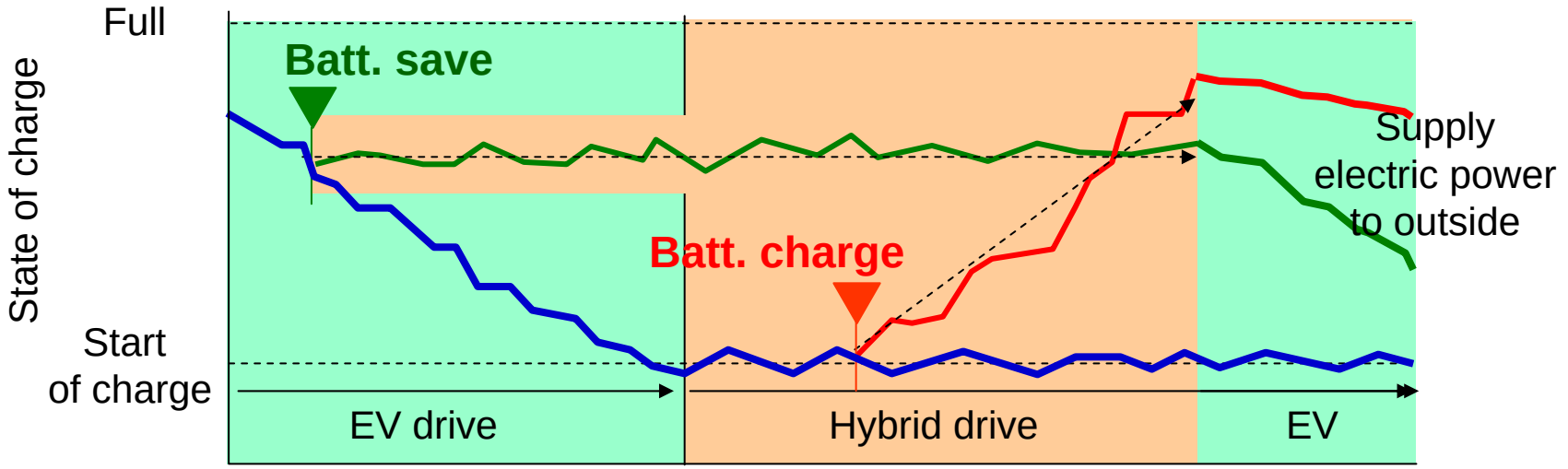
**Slip control** **Keep driving stability, traction**

**Driving force distribution of L & R (AYC: Braking control)**

| Braking inner wheel to suppress under-steer | Braking outer wheel to suppress over-steer |
|---|---|
|  |  |

# Utilization of large capacity battery ( mode SW )

- It's possible to save consumption of charged electric power at “battery save” mode. Driver can select EV drive or HV drive.
- At “battery charge” mode, engine operates and generates electricity and charges battery actively during traveling.

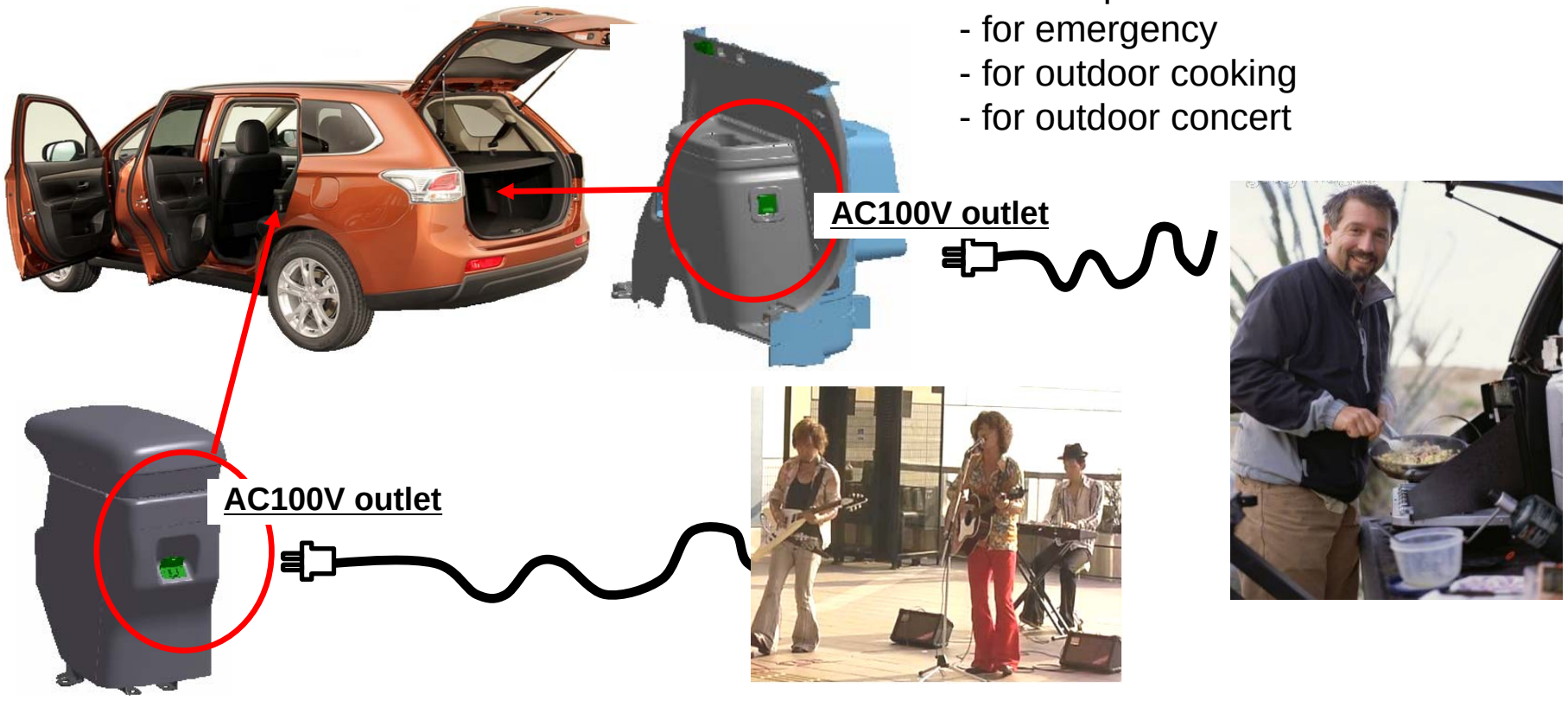


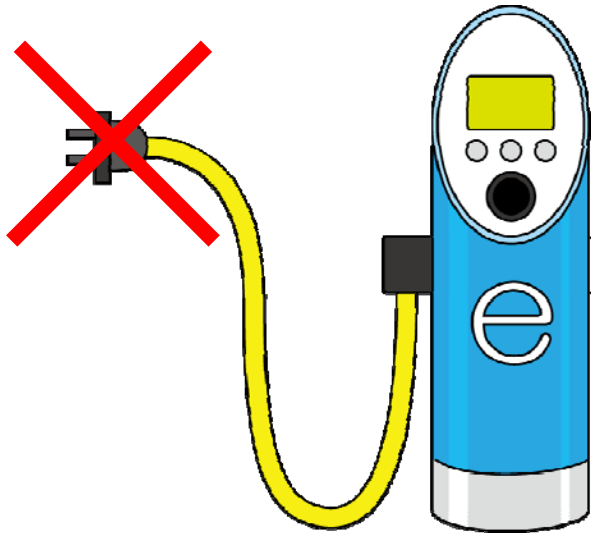

| Mode SW | | Operation |
|---|---|---|
| SAVE | Battery Save | Keep state of charge (Hybrid operation) |
| CHRG | Battery Charge | Engine starts & generate (Hybrid operation) |

# Utilization of large capacity battery (AC100V outlet)

- AC100V power supply outlet is equipped so that the electric power which is charged in large-capacity lithium ion battery can be utilized in various situations.
  - It's possible to supply the electric power for about 1 day at ordinary home by a full charge.
  - If the electric generation by engine is added, it's possible to supply the electric power for about 10 days.

<for example>
- for emergency
- for outdoor cooking
- for outdoor concert

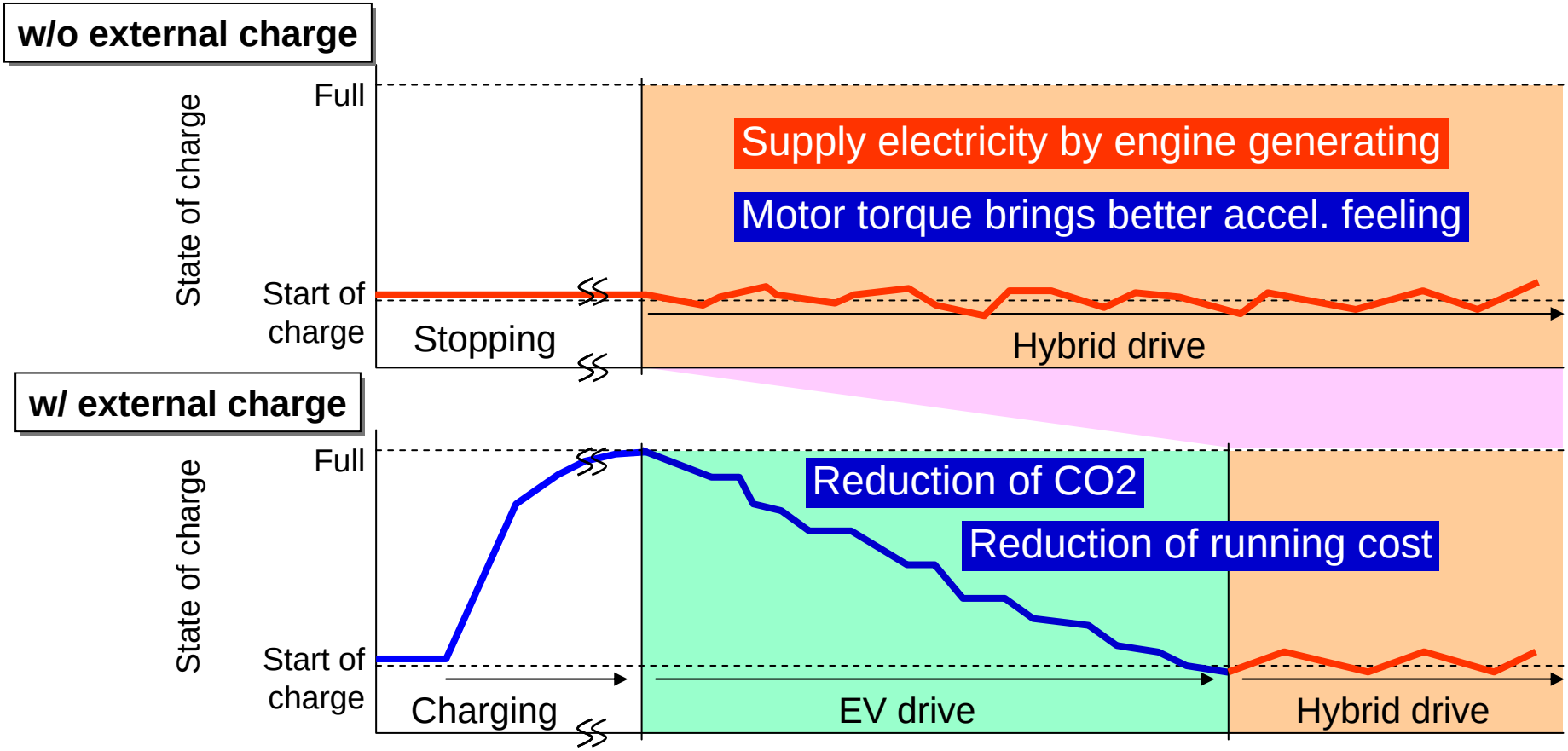




**When the charge equipment isn't available, how do you charge it?**

# Hybrid drive without external charging

- EV drive or HV drive is possible generating electricity by engine, if charging equipment is not available.
- As traction torque is mainly generated by motor, smooth drive feeling is almost equal to EV drive.
- External charge has potential of further reduction of $CO_2$ and running cost.



# PLUG-IN HYBRID EV

# Battery charge at home easily

自宅のコンセントや、外出先での充電が可能。
ガソリン代を節約することができます。

# EV as daily use

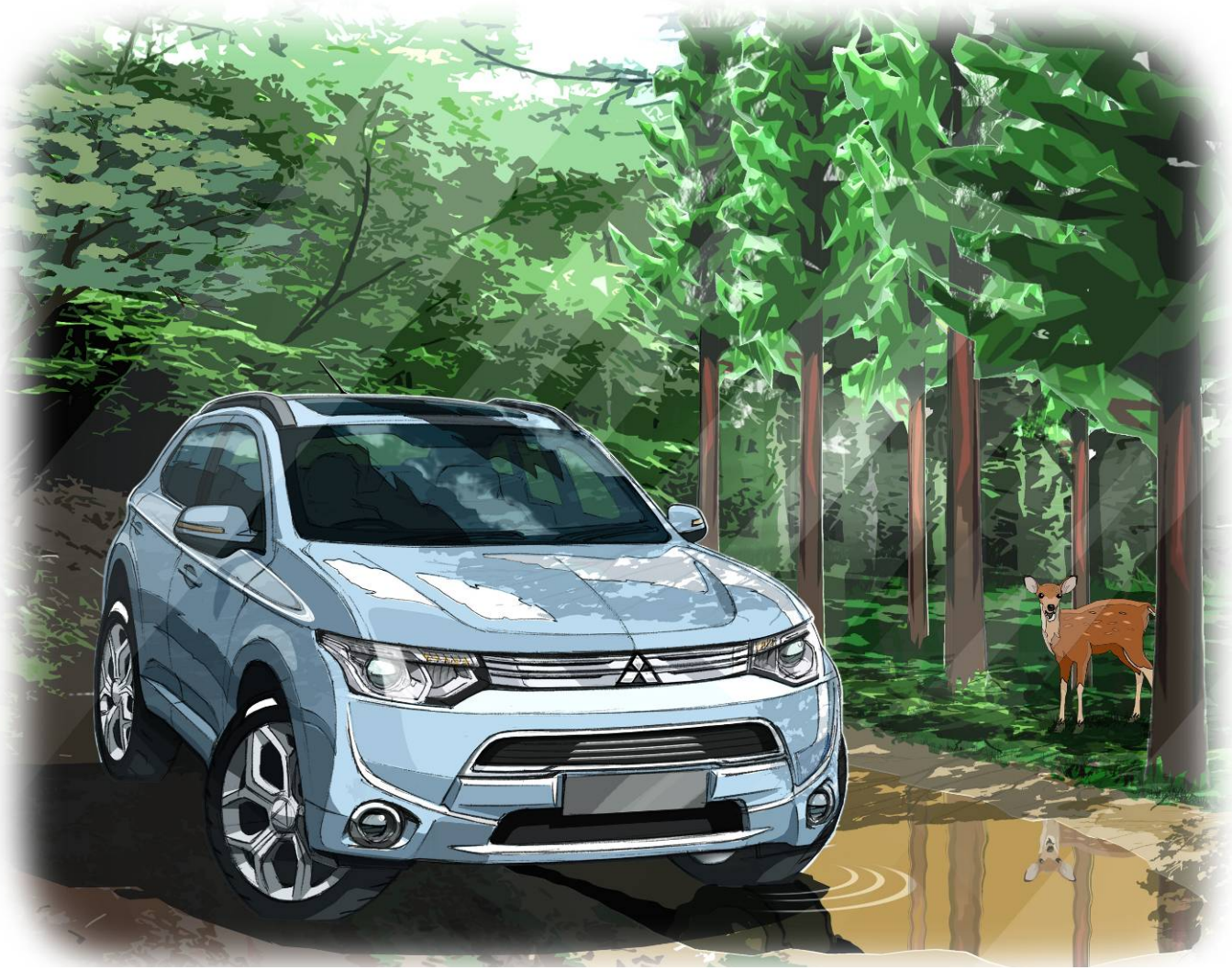
買い物や通勤など、日常での使用に十分なＥＶ走行距離を確保。
排出ガスゼロで、エコロジーかつエコノミーな毎日を過ごせます。

# As a HV for comfortable long range drive

長距離／高速走行では、エンジンを発電用や動力源として使用。
低燃費で、ツインモーター４WDによる力強い走りを存分に楽しめます。

# Enjoy beautiful nature with silent and clean EV

バッテリーセーブ／チャージモードで電気を残しておけば、
ドライブ先でもＥＶ走行が可能です。



# Convenient and comfortable outdoor life

大容量バッテリーをＡＣ電源として使用し、キャンプや趣味も楽しめます。

＊一部の機器は正常に動作しないことがあります。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