

Automobile Technology Presentation

April 16, 2014

Suzuki Motor Corporation

Product Development Policy

Top-Class Environmental Performance

Affordable Price

Car with Pleasure and Reliability

SUZUKI GREEN Technology



ALTO
ECO



WAGON R



Spacia



Wit
MR WAGON



HUSTLER

September
2012

March
2013

July

November

January
2014



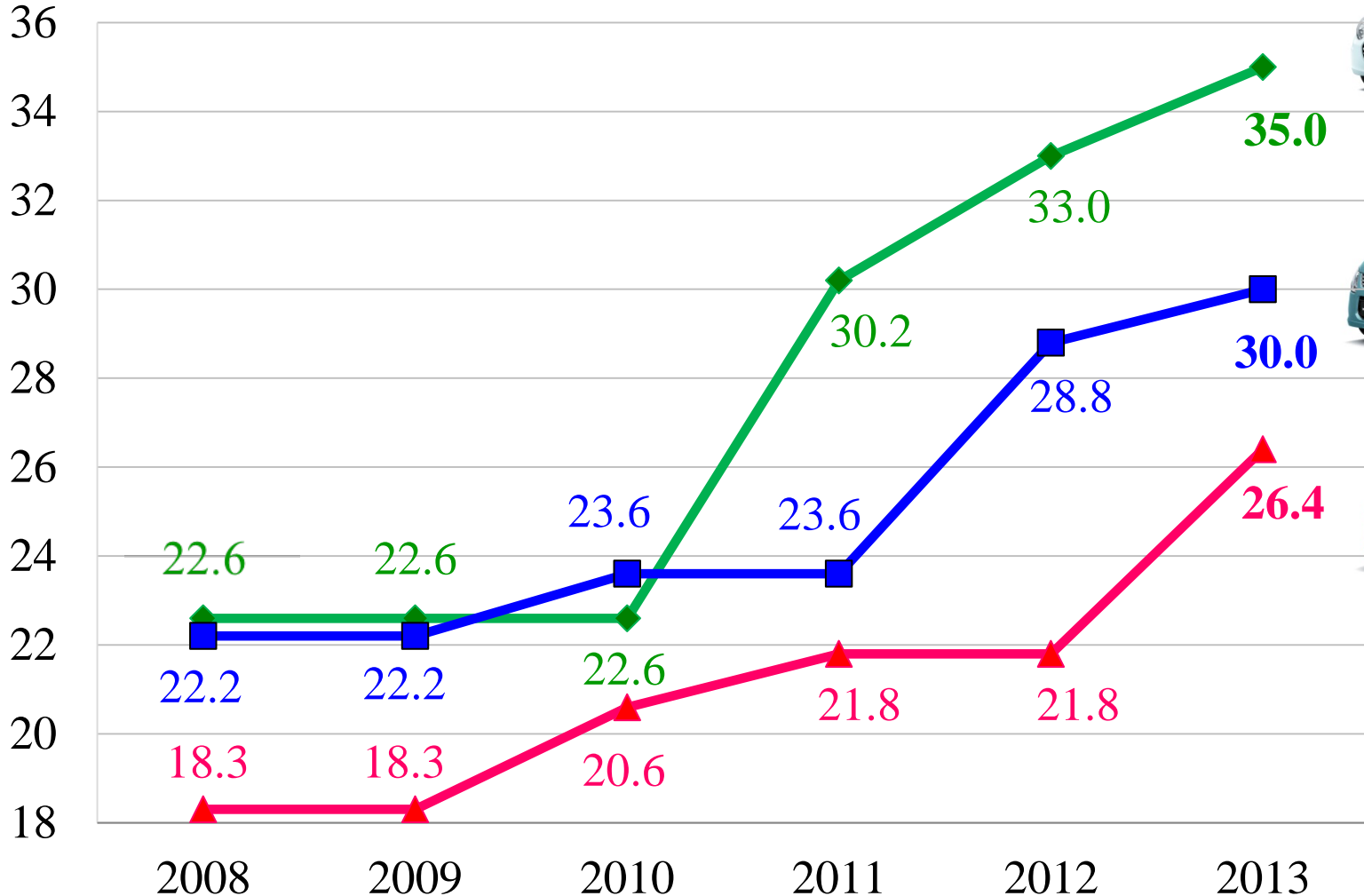
SWIFT



SOLIO

Change in Fuel Consumption

km/L[※]



ALTO
ECO



WAGON R



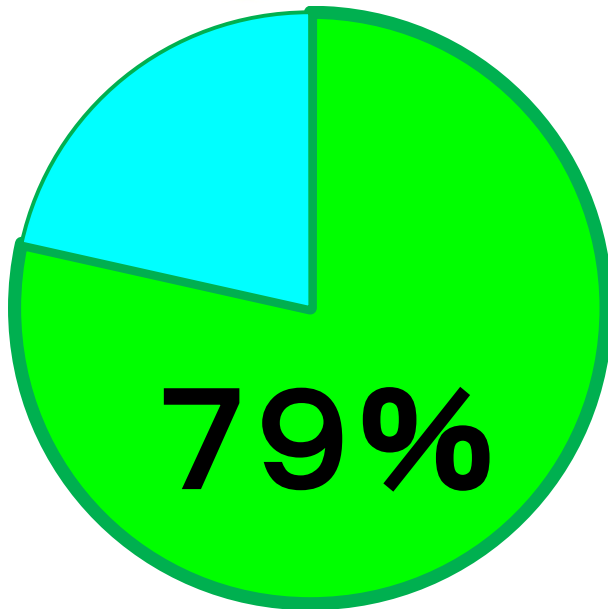
SWIFT

※ Measured in JC08 test cycle (verified by Japan's Ministry of Land, Infrastructure, Transport and Tourism). The fuel consumption rates are values obtained under a specific testing conditions. The rates vary according to the actual use conditions (weather, traffic, etc.) and driving situations (sudden starting, use of air conditioner, etc.). As of the end of March 2014. Rates before JC08 test cycle was applied are results of in-house calculation.

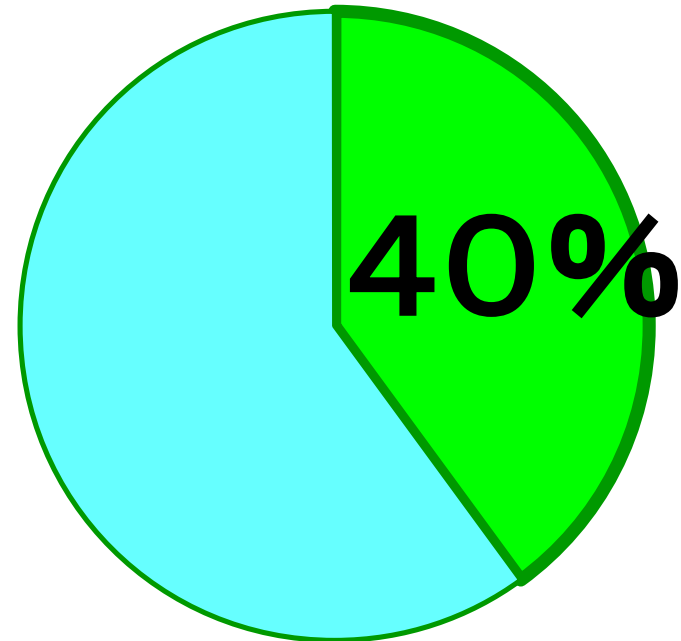
Equipment Rate (From Jan. to Mar. 2014)

Mini (passenger)

ene-CHARGE



Compact



Accumulated Sales of 520,000 Units

Auto Gear Shift



AUTO
GEAR SHIFT

India

Booking Situation of the Celerio

Booking of the Celerio
(MT+AGS)

Approx.
35,000 units
(From Feb. 6 to Mar. 31, 2014)

**Rate of units
equipped with AGS**

47%

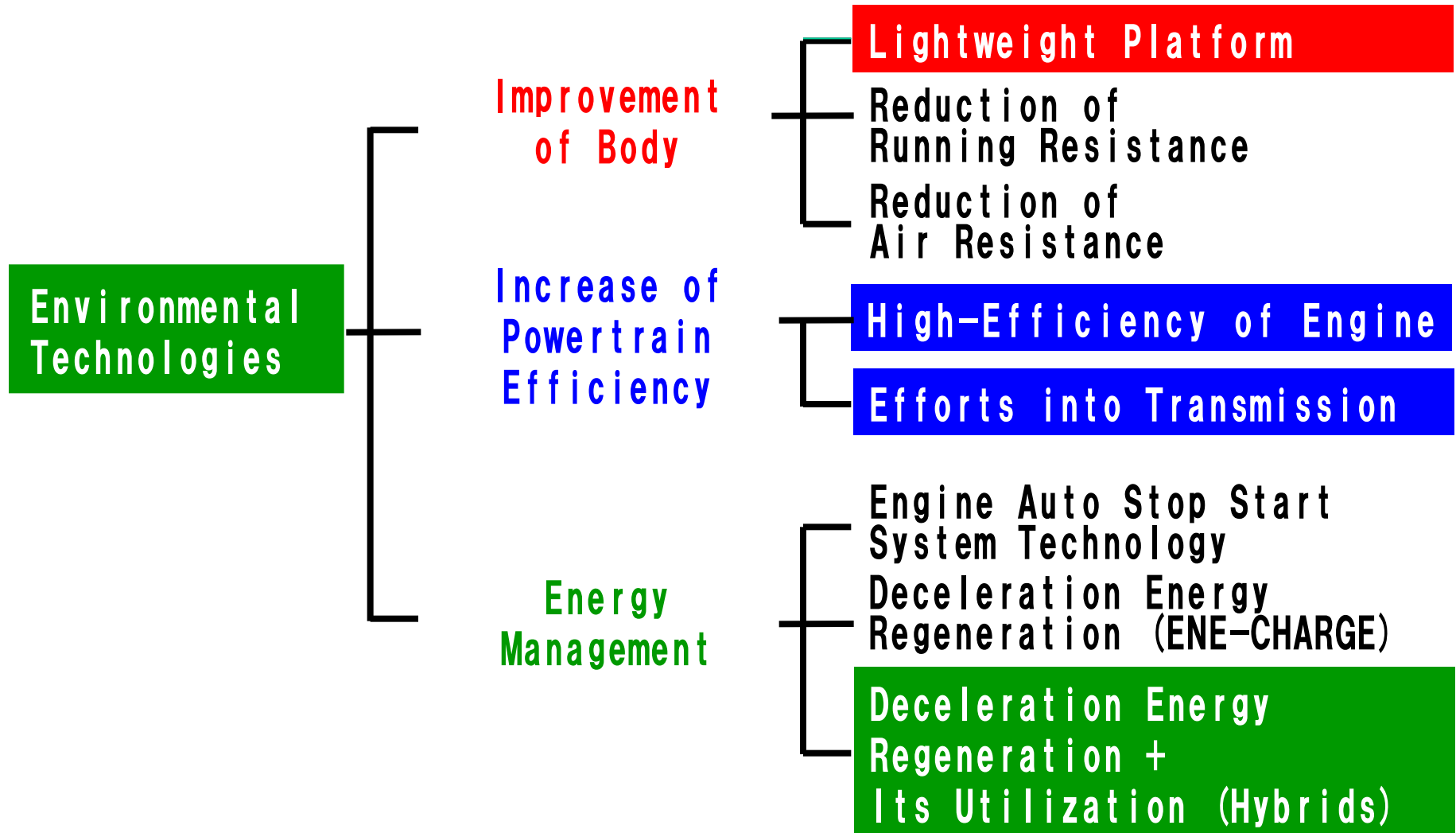


Auto Gear Shift



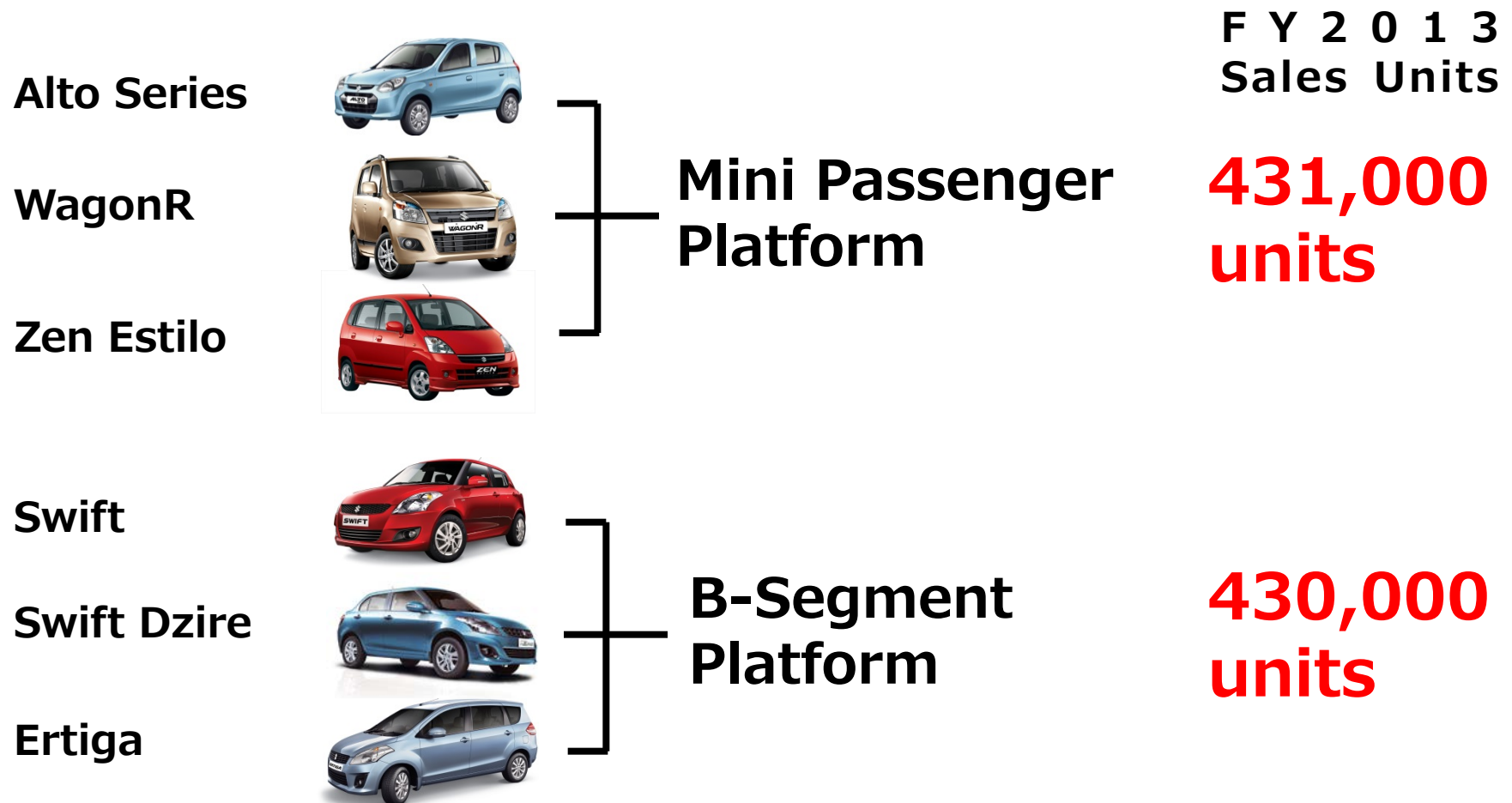
CELERIO

Future Efforts on Environmental Technologies

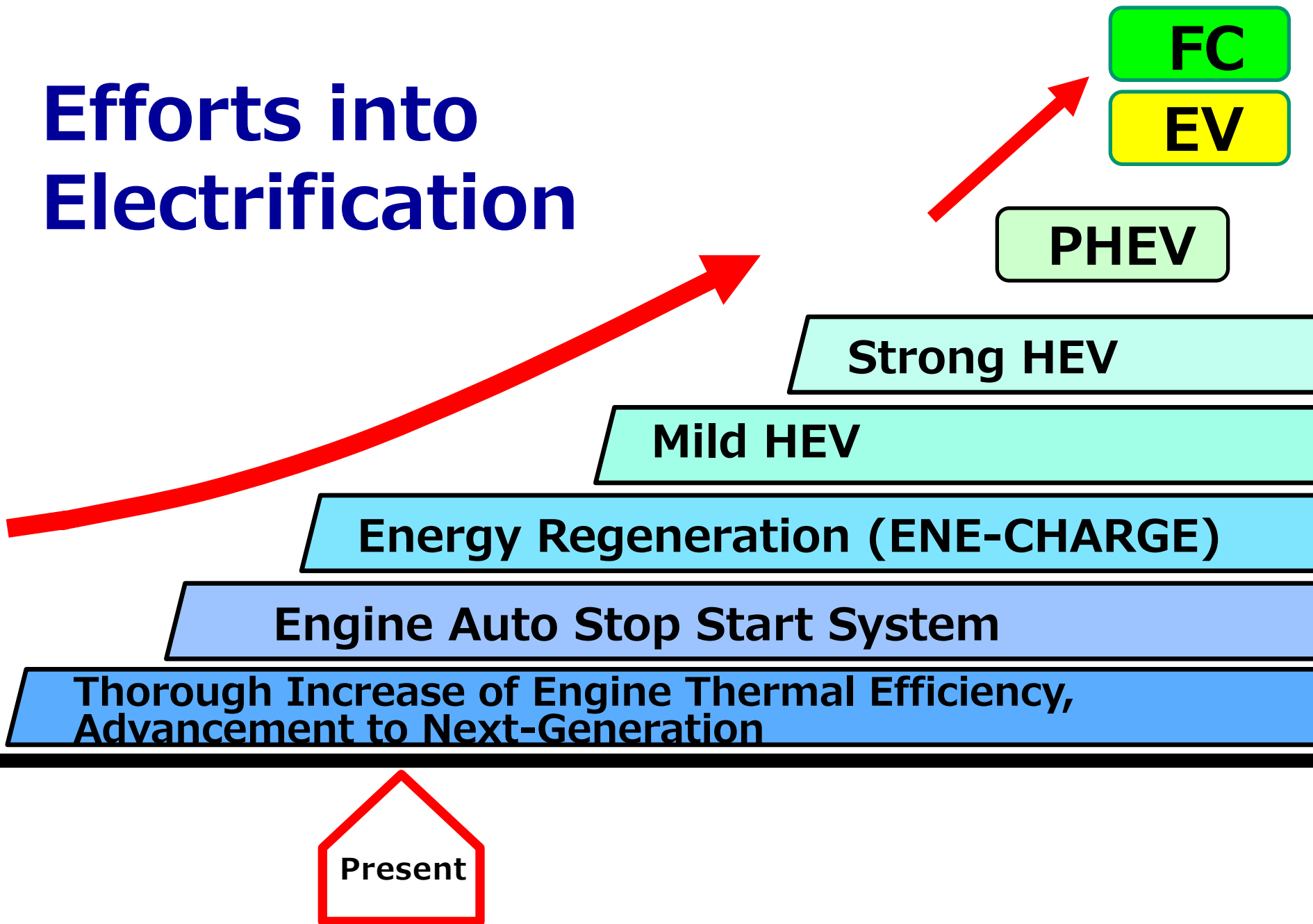


Integration of Platforms

Situation at Maruti Suzuki India



Efforts into Electrification



Next-Generation Lightweight Platform

Basic Concept of Platform

1 . Integration of Platform

Integrate into 3 types of Mini, A- and B-segments

2 . Modularization

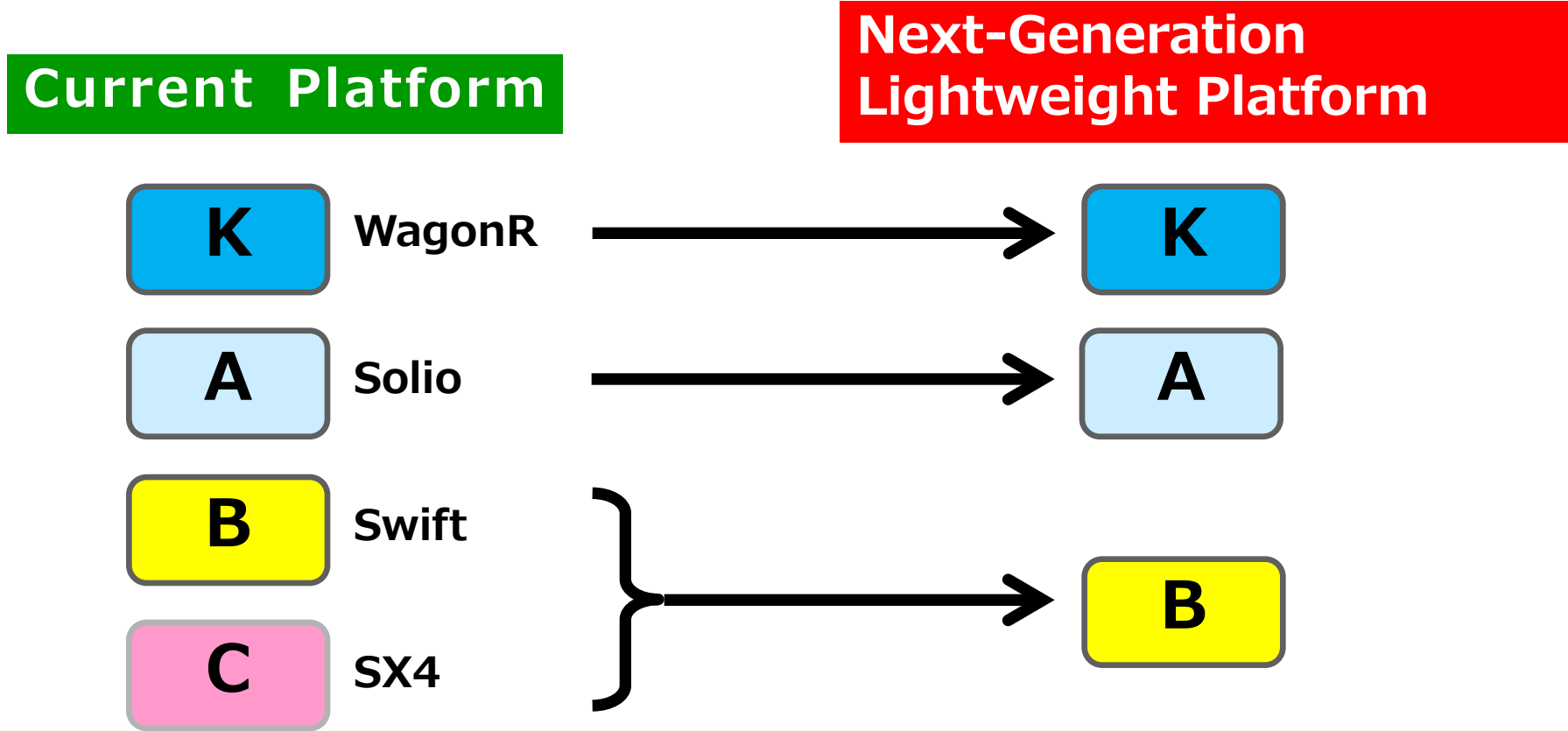
Modularize functional components, and increase development efficiency

3 . Weight Reduction

Reduce whole vehicle weight by up to 15%

Next-Generation Lightweight Platform

1. Integration of Platform

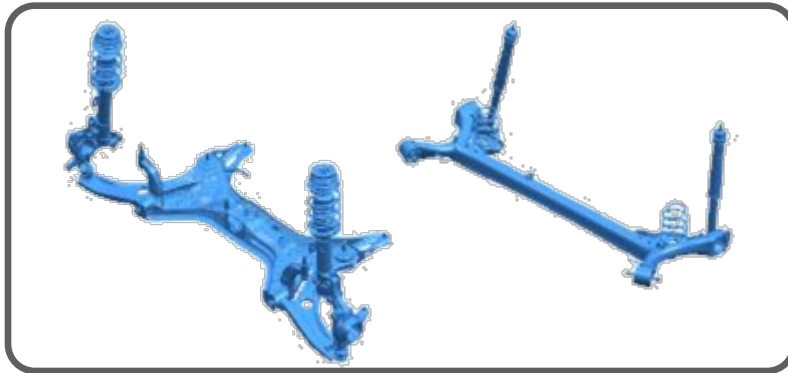


Integrate development of new platforms into three types:
Mini (K), A- and B-segments

Next-Generation Lightweight Platform

2. Modularization Strategy for modularization of functional components

Suspension



4 Types

Air-Conditioning System



2 Types

Front Seat Frame



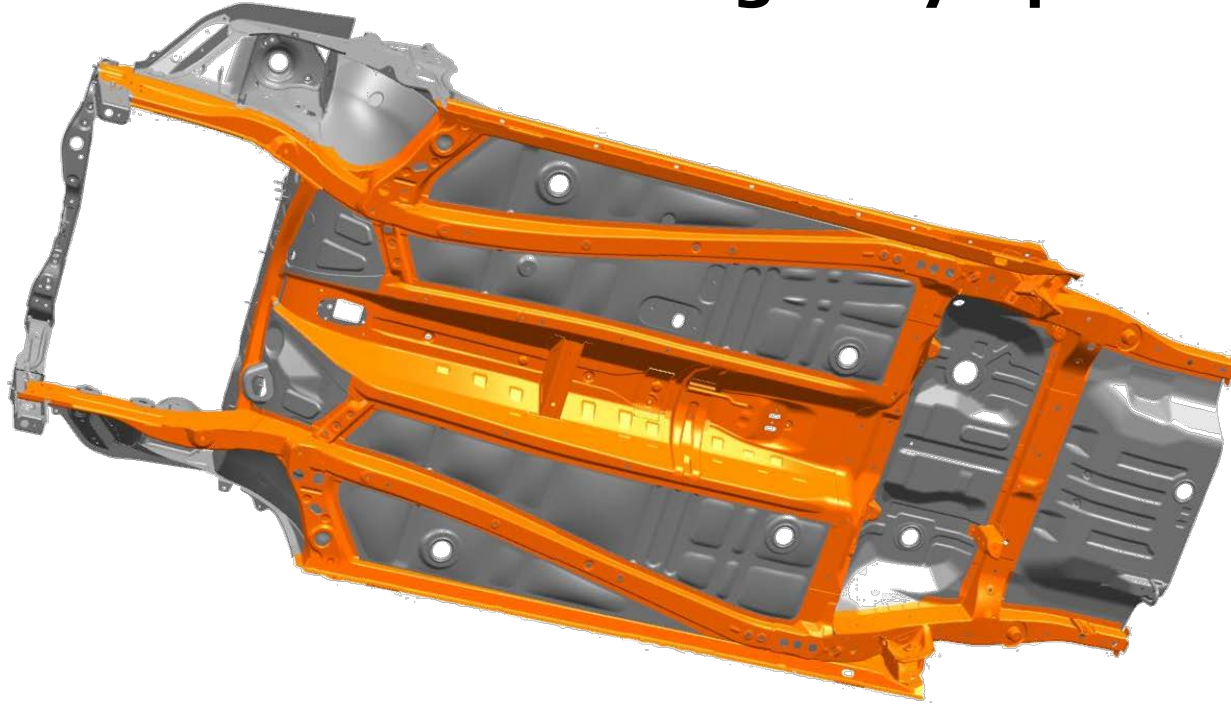
3 Types

Commoditize beyond segments

Next-Generation Lightweight Platform

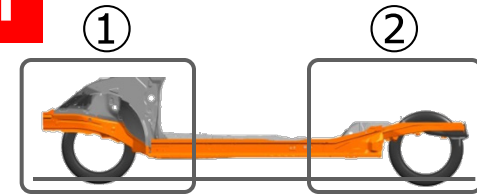
3. Weight Reduction

- Renovate the main structure and component layout
- Improve required performance (crash performance, rigidity and NVH)
- Reduce whole vehicle weight by up to 15%



Next-Generation Lightweight Platform

3. Weight Reduction

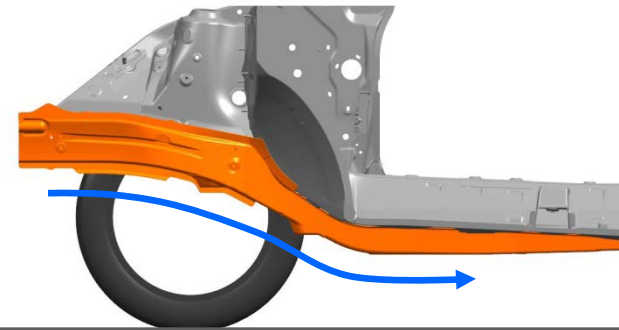
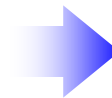
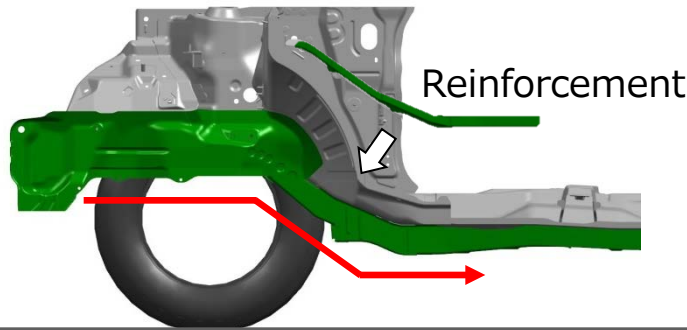


Concrete method for weight reduction (1) Disperse force with smooth shape

Current Platform

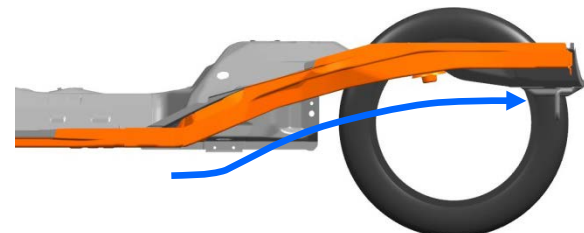
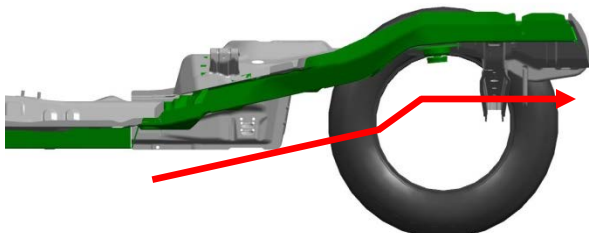
Next-Gen. Lightweight Platform

①



Abolition of reinforcement by the smooth shape

②



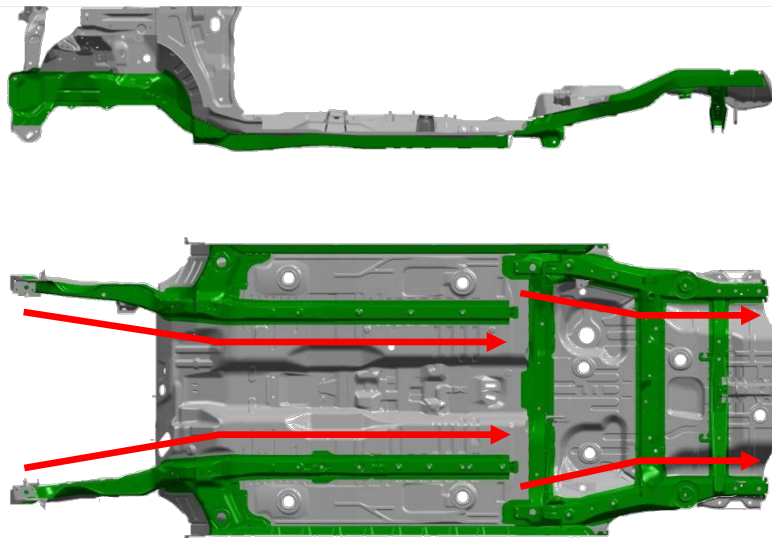
Reduction of sheet thickness by the smooth shape

Next-Generation Lightweight Platform

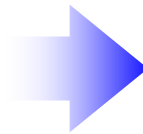
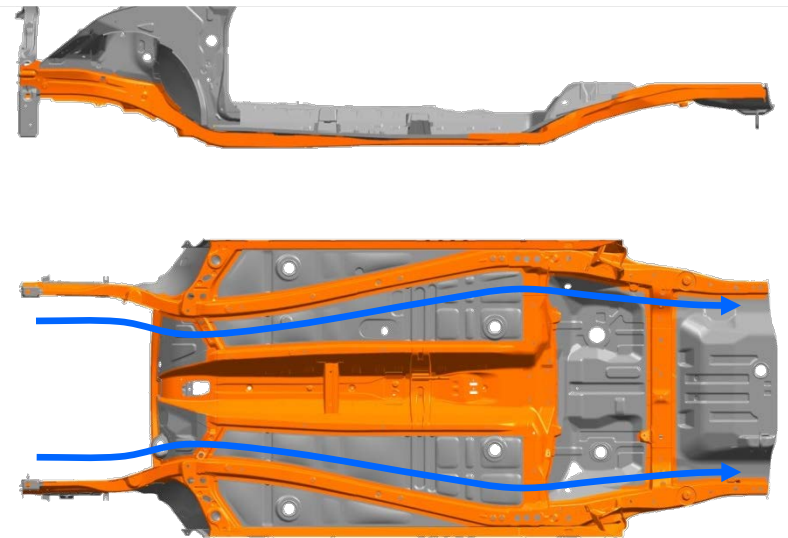
3. Weight Reduction

Concrete method for weight reduction (2)
Serial cross-section **Ensure body rigidity using less members by joining basic cross-section**

Current Platform



Next-Gen. Lightweight Platform



Next-Generation Lightweight Platform

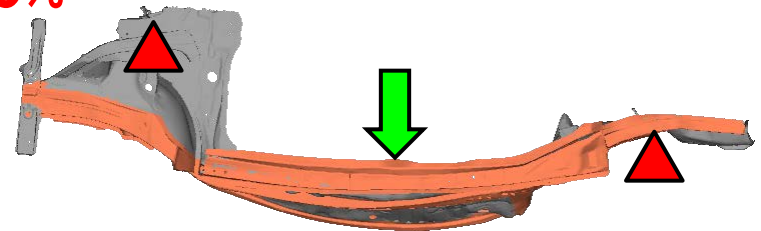
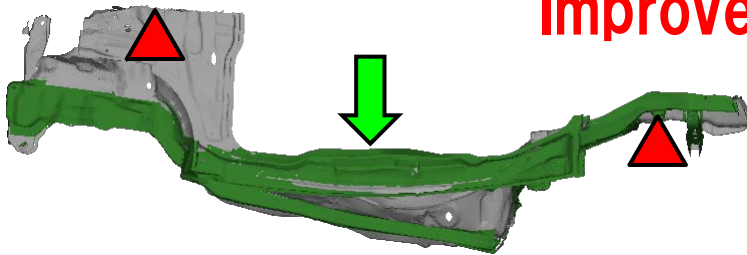
3. Weight Reduction

Body rigidity

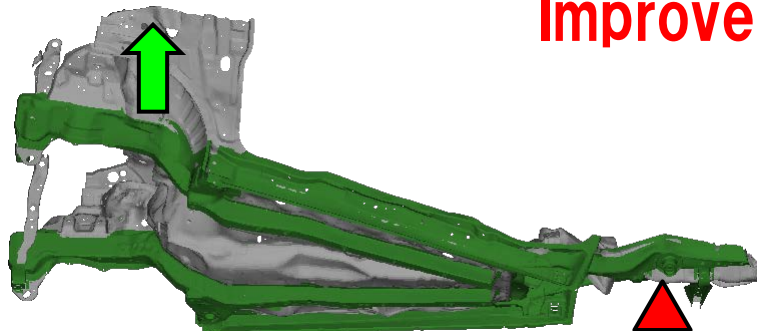
Current Platform

Next-Gen. Lightweight Platform

Bending Rigidity
Improved by 30%



Torsional Rigidity
Improved by 30%

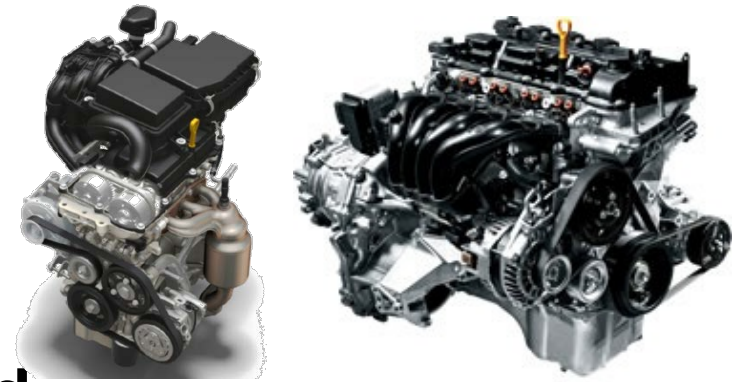


Development of Powertrain

Basic Concept of Engine

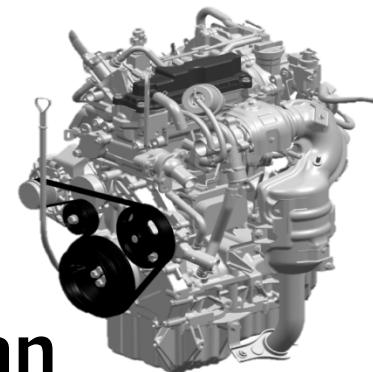
1. Gasoline Engine

- Challenge to 40% thermal efficiency
- Concentrate and consolidate engine development to Mini and under 1400cc engines



2. Diesel Engine

Development of in-house engines mainly for the Indian market



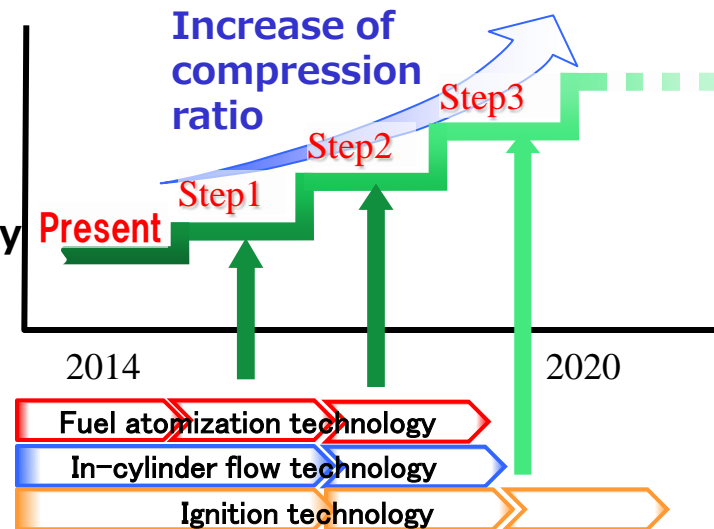
Development of Powertrain

1. Gasoline Engine

Achieve 40% average thermal efficiency by early 2020

- For Mini (660cc), continue improvements of Alto's 35km/L fuel efficiency technology
- For compact car, further brush up fuel efficiency technology of the DUALJET engine

Average thermal efficiency





● Increase of thermal efficiency by increasing compression ratio

Fuel atomization technology - atomized spray, increase of direct atomization rate, DUAJET atomization

In-cylinder flow technology - increase of tumble, control of disarray

Ignition technology - strengthening of ignition energy

● Reduction of loss - Cooled EGR, Low-friction

Development of Powertrain

1. Gasoline Engine

Concentrate and consolidate engine development to Mini and under 1400cc engines

- For Mini engines, integrate into R06A and continue its improvements
- For compact car engines, lineup naturally-aspirated, and direct-injection turbocharged engines by commoditizing the base engine

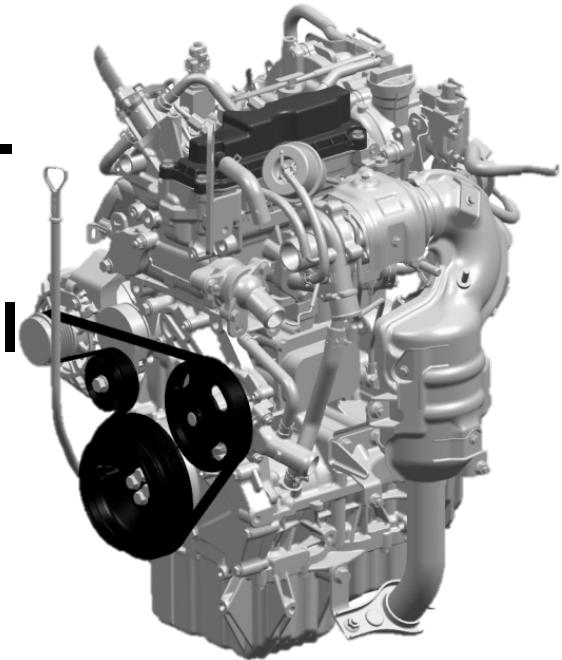


Development of Powertrain

2. Diesel Engine

Development of in-house engines mainly for the Indian market

- **Development of in-house two-cylinder engine**
Scheduled to be equipped on small cars for emerging market

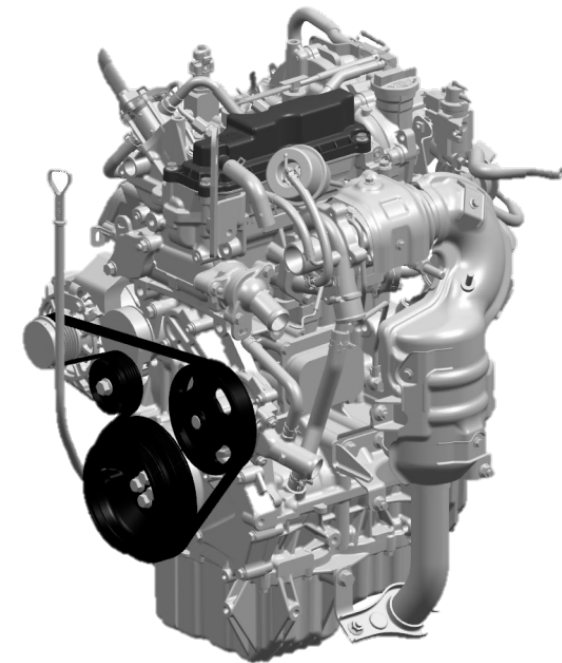


Development of Powertrain

2. Diesel Engine

【Engine Specification】

Arrangement and number of cylinders	In-line two-cylinder
Type of valve operation	DOHC
Number of valves	8
Displacement	793cc
Bore x Stroke	77 x 85mm



Development of Powertrain

Auto Gear Shift

Newly-developed Automated Manual Transmission (AMT) which equips an electro-hydraulic actuator that automatically operates clutch and gearshift, on the new five-speed manual transmission.



Development of Powertrain

Structure of Auto Gear Shift

Integrates the controller with the electro-hydraulic actuator unit.

Realizes reduction of wire harness and weight.



Controller

Electro-hydraulic actuator unit

New five-speed manual transmission

Development of Powertrain

Features of Auto Gear Shift

- ① **Enables easy driving without clutch pedal and gearshift operation**

Automatically operates clutch and gearshift with the electro-hydraulic actuator

- ② **Contributes to low fuel consumption with high transmission efficiency**

Because basic structure of AGS is manual transmission, thanks to its high transmission efficiency of gears, it achieves fuel efficiency equivalent to that of manual transmission

Development of Powertrain

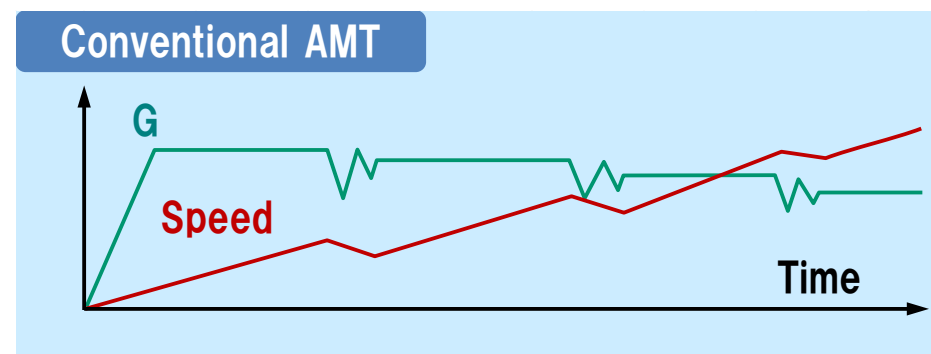
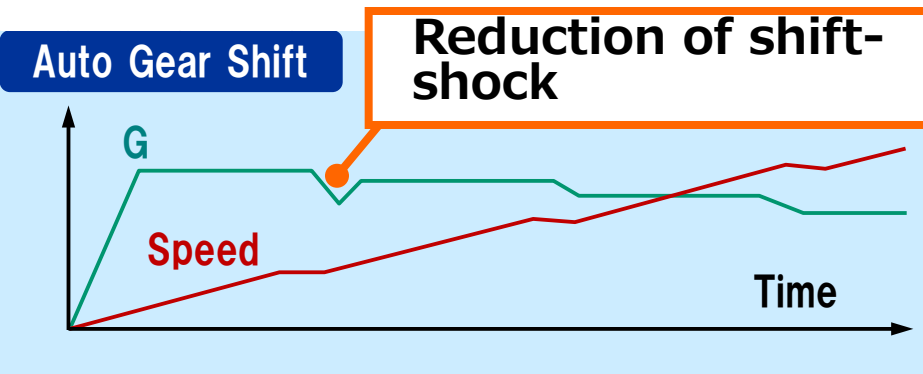
Features of Auto Gear Shift

③ Realizes smoothness like never before in the conventional AMT by contriving the controls

By optimally controlling the speed and timing of clutch, gearshift, and accelerator operation, it realizes smooth shifting of gears

④ Easy driving thanks to creep function

Enables easy driving for parking and during traffic congestion by setting creep function



Hybrid System

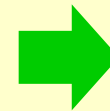
New system being developed by Suzuki

【 Idea 】

ISG Technology

ENE-CHARGE

Deceleration energy regeneration technology adopting lithium-ion battery



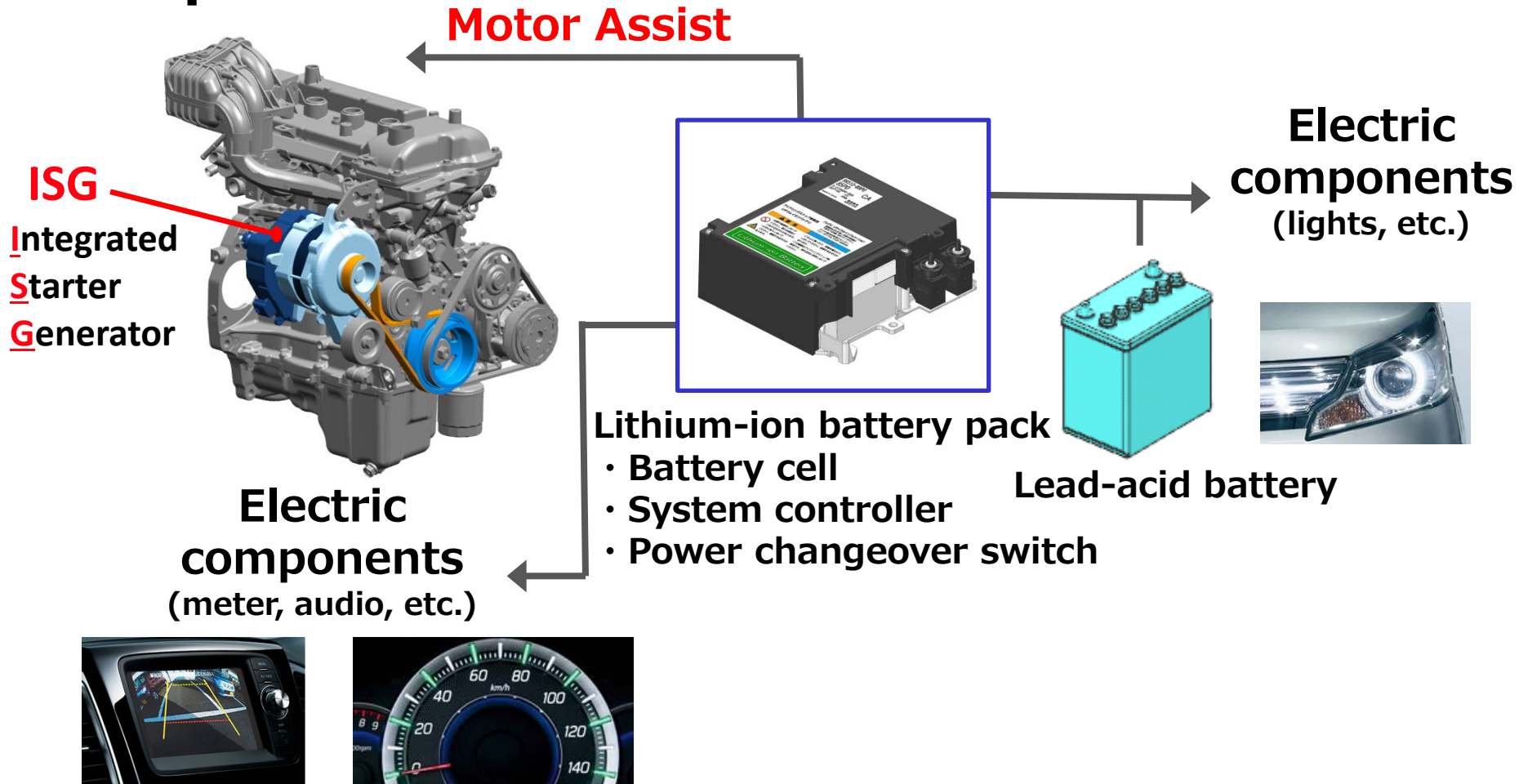
New system developed from ENE-CHARGE (lead-acid + LiB + **ISG**)

- High-efficiency, high-output regeneration
- Silent restart of engine thanks to belt drive
- Motor assist function

Hybrid System

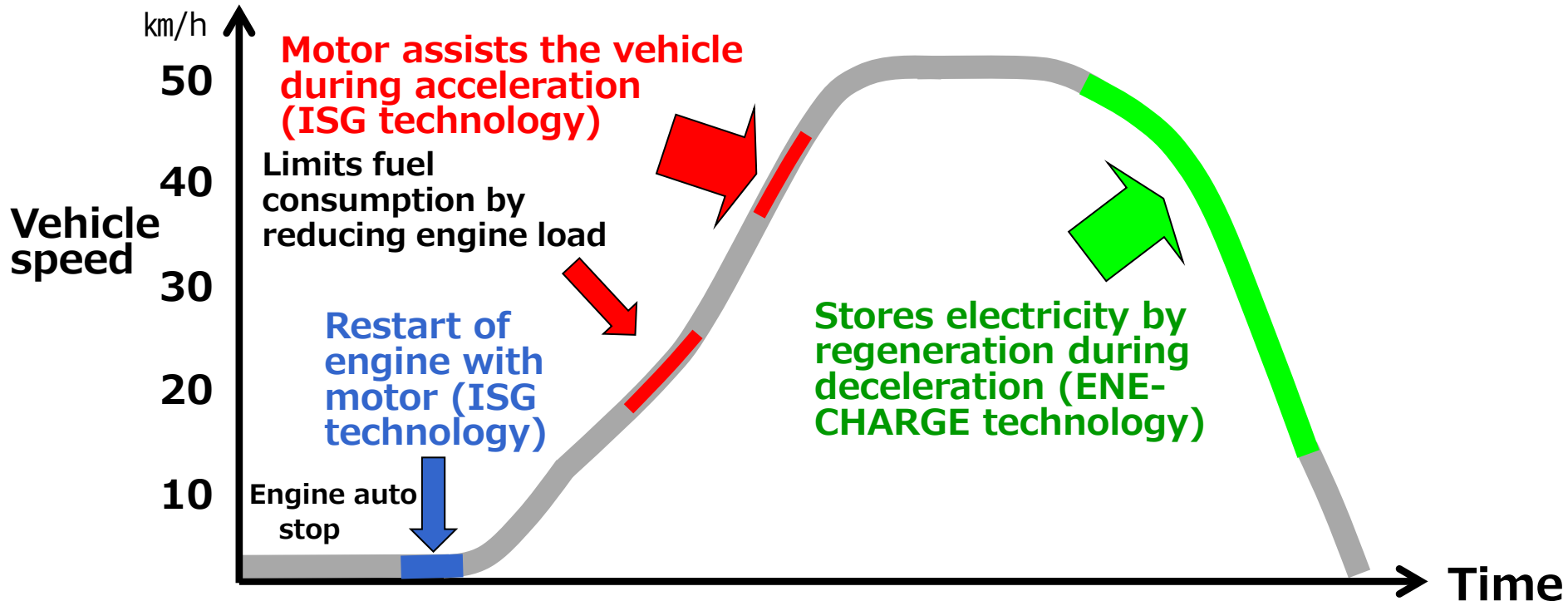
New system being developed by Suzuki

【Composition】



Hybrid System

【Mechanism】

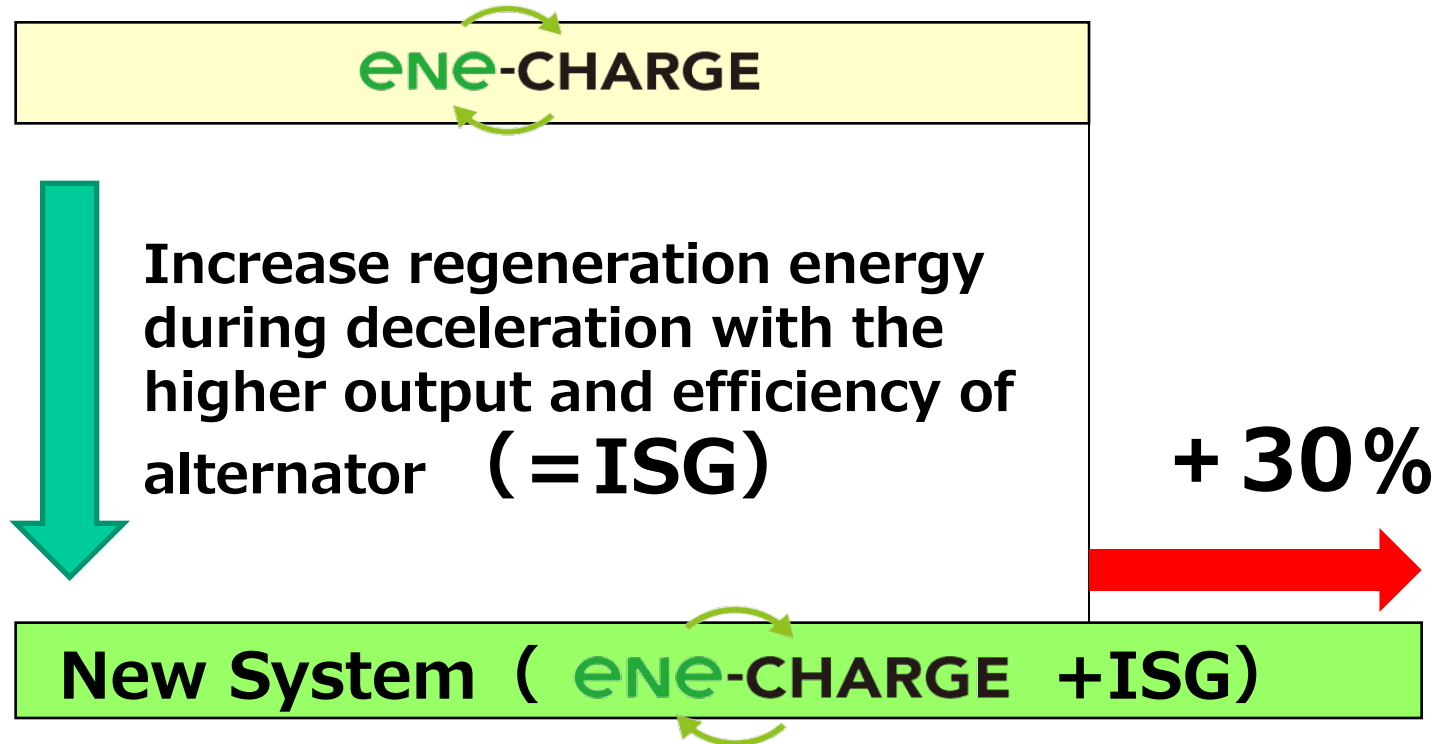


New system developed from ENE-CHARGE

- By increasing the amount of regeneration during deceleration, it has increased its usable electricity. By doing so, it has realized motor assist during acceleration.

Hybrid System

【Effect: Comparison of regeneration capacity】



Utilize increased regeneration energy for
motor assist