

## Advanced Technology Briefing 2009

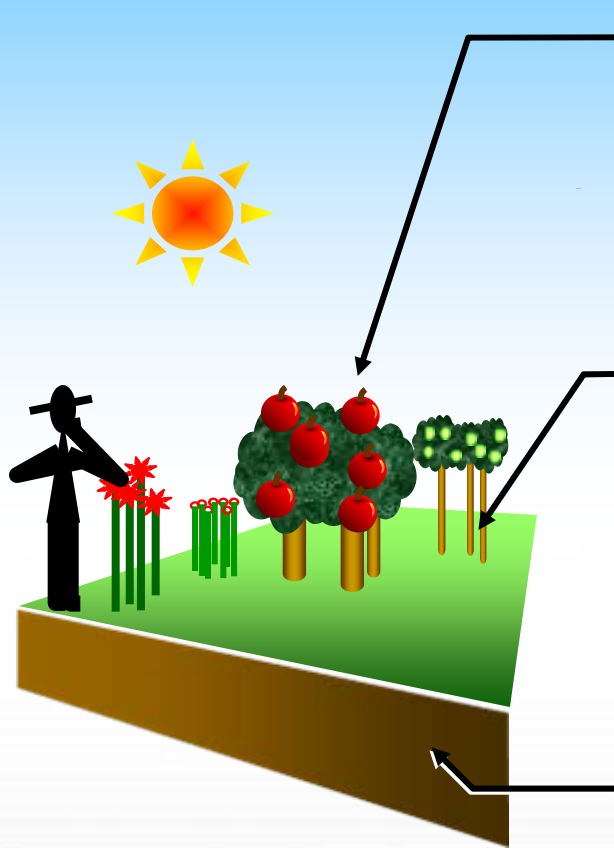


NISSAN MOTOR CO., LTD.

# **AGENDA**

- 1. Orchard Concept**
- 2. Environmental Technologies**
- 3. Technologies for new Fuga**

# Orchard Concept



## **I . Harvest Plan**

- Performance & functions which exceed customer expectations
- Timing of release

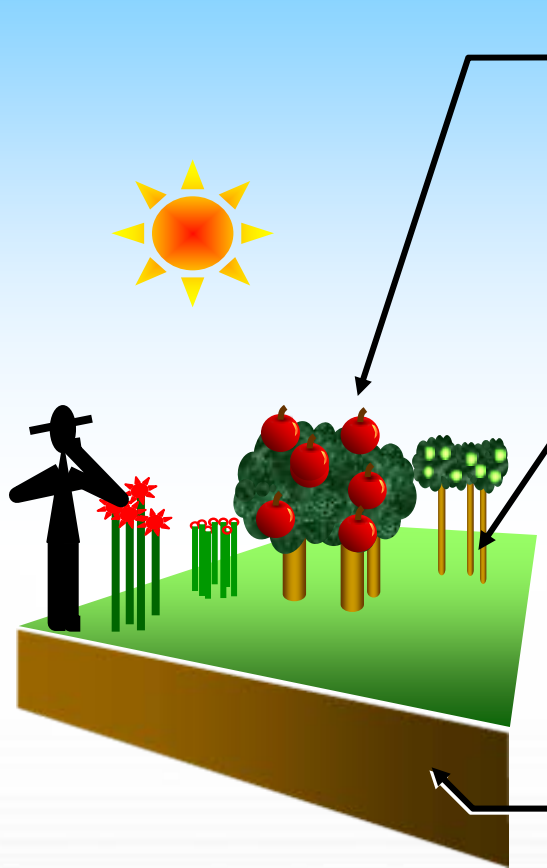
## **II . Seeding & Growth**

- To specify technologies to be developed for Harvest
- To formulate development schemes  
Organizational Structure, Partnership,  
Continuous improvements after introduction

## **III. Soil Enrichment**

- To cultivate continuously R&D competencies for Harvest Plan and Seeding & Growth
- To promote foundational research for future Harvest Plans

# Orchard Concept: Purpose of Advanced Technology Briefing



## I. Harvest Plan

To introduce technologies for commercial distribution within the next 2-3 years

■ 採用時期

## II. Seeding & Growth

■ Harvest に向け重点開発する要素技術の特定

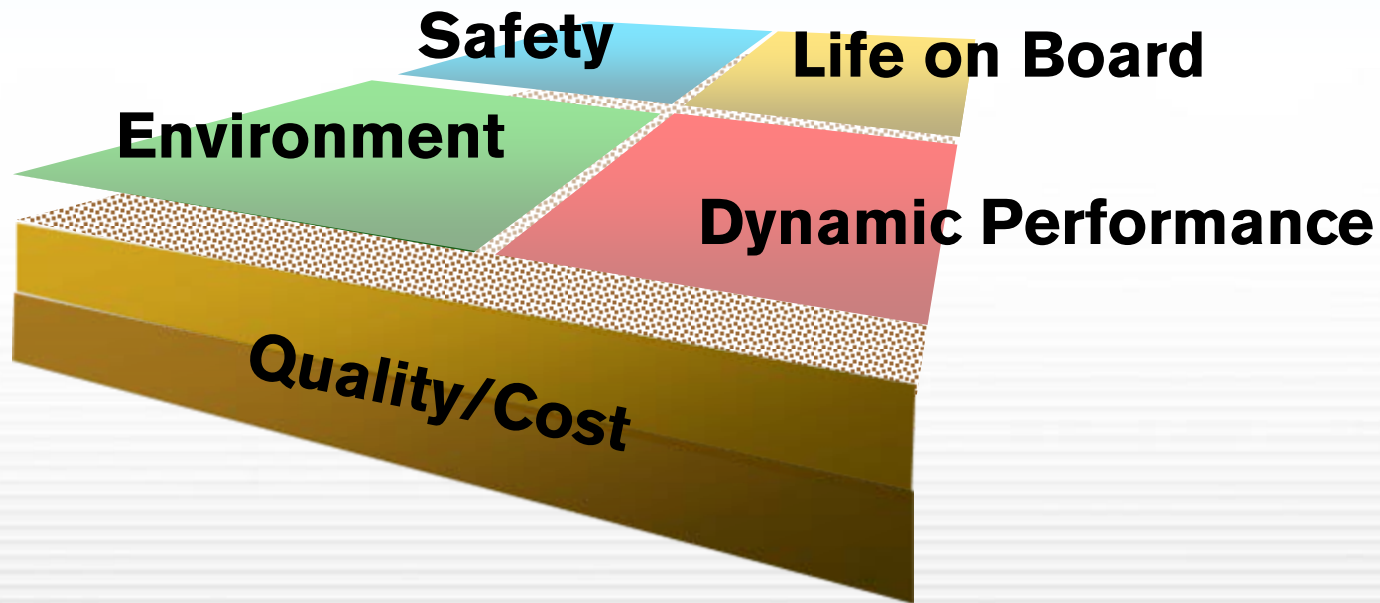
To introduce fundamental technologies which support product commercialization, and the realization of Nissan's mid- and long-term vision

■ Harvest, Seeding & Growth のために、継続的に保有するコンピテンシー(基盤技術)の醸成

■ 将来の Harvest に向けた基礎研究の推進

# Nissan's Four Strategic Technology Fields

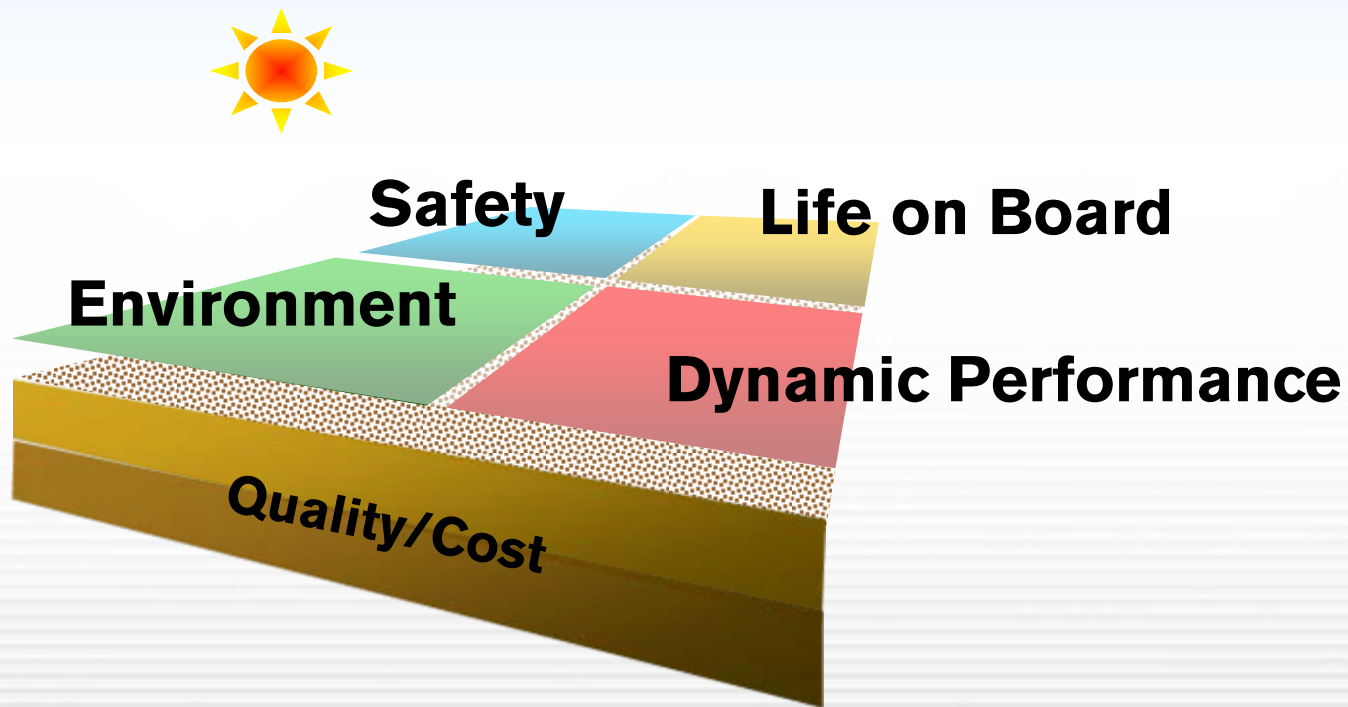
For each field, technology development will be based on a defined target (Vision 2015) and detailed roadmap



# Nissan's Four Strategic Technology Fields

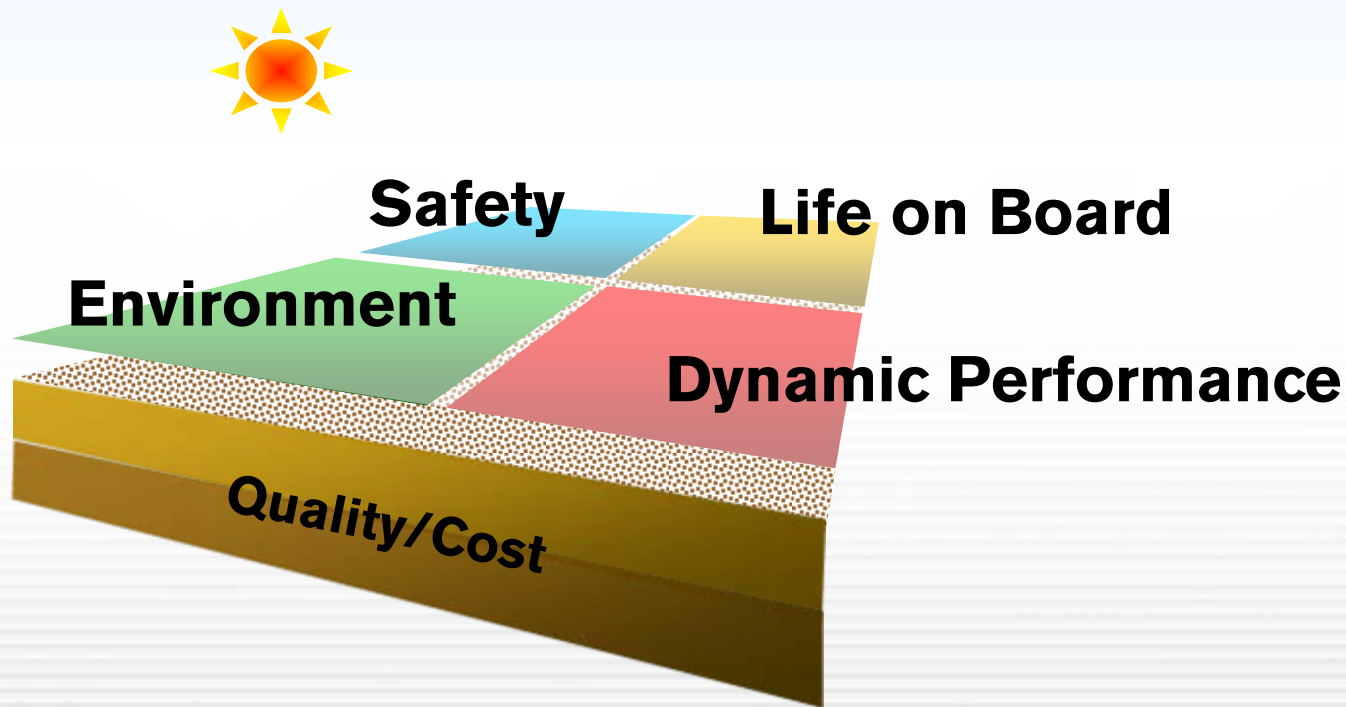
Nissan's Core Technology Values:

***Trusted Driving Pleasure***



# Featured Technologies

- EV
- Fuel efficient powertrain
- Technologies for new Fuga



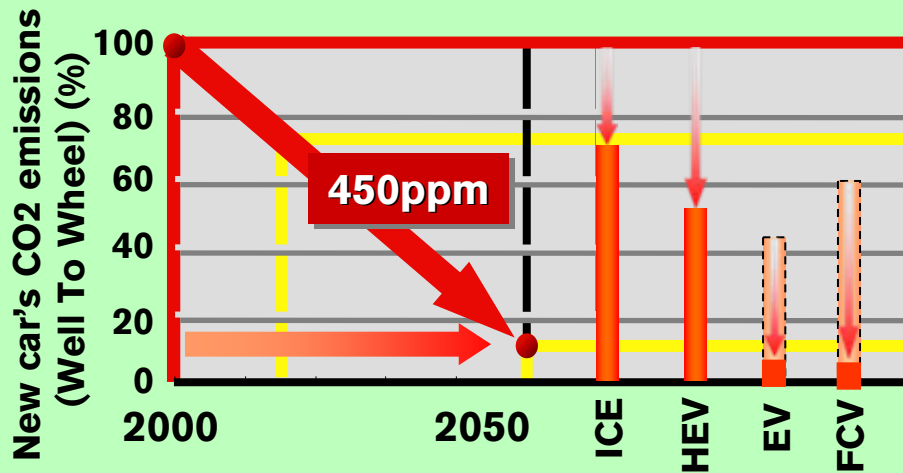
## **2. Environmental Technologies**

# Nissan Green Program 2010

## CO2 Reduction

Long-term target: -90%

Evolution of engine technologies including HEV, and expanding Zero-emission vehicles



## Cleaner Emissions

Atmosphere-level emission

Expanding SU-LEVs



Cube (SU-LEV)

## Recycling resources

Recycling rate: over 95%

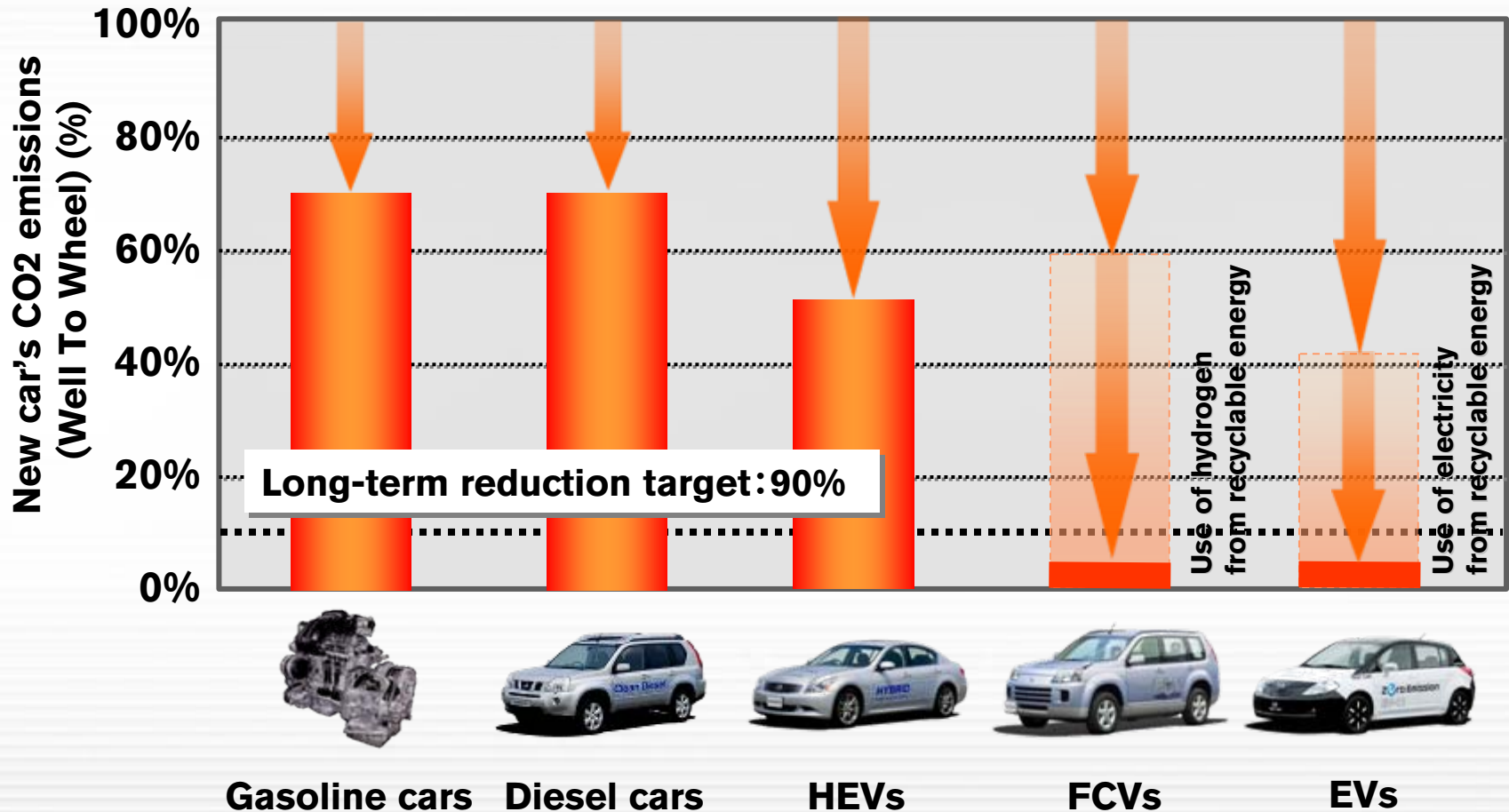
Resource recovery rate: 100%



Environmental conscious vehicle design

# Environment : Electric powertrain for CO2 reduction

- Ultimate goal is Zero-emission vehicles



Gasoline cars

Diesel cars

HEVs

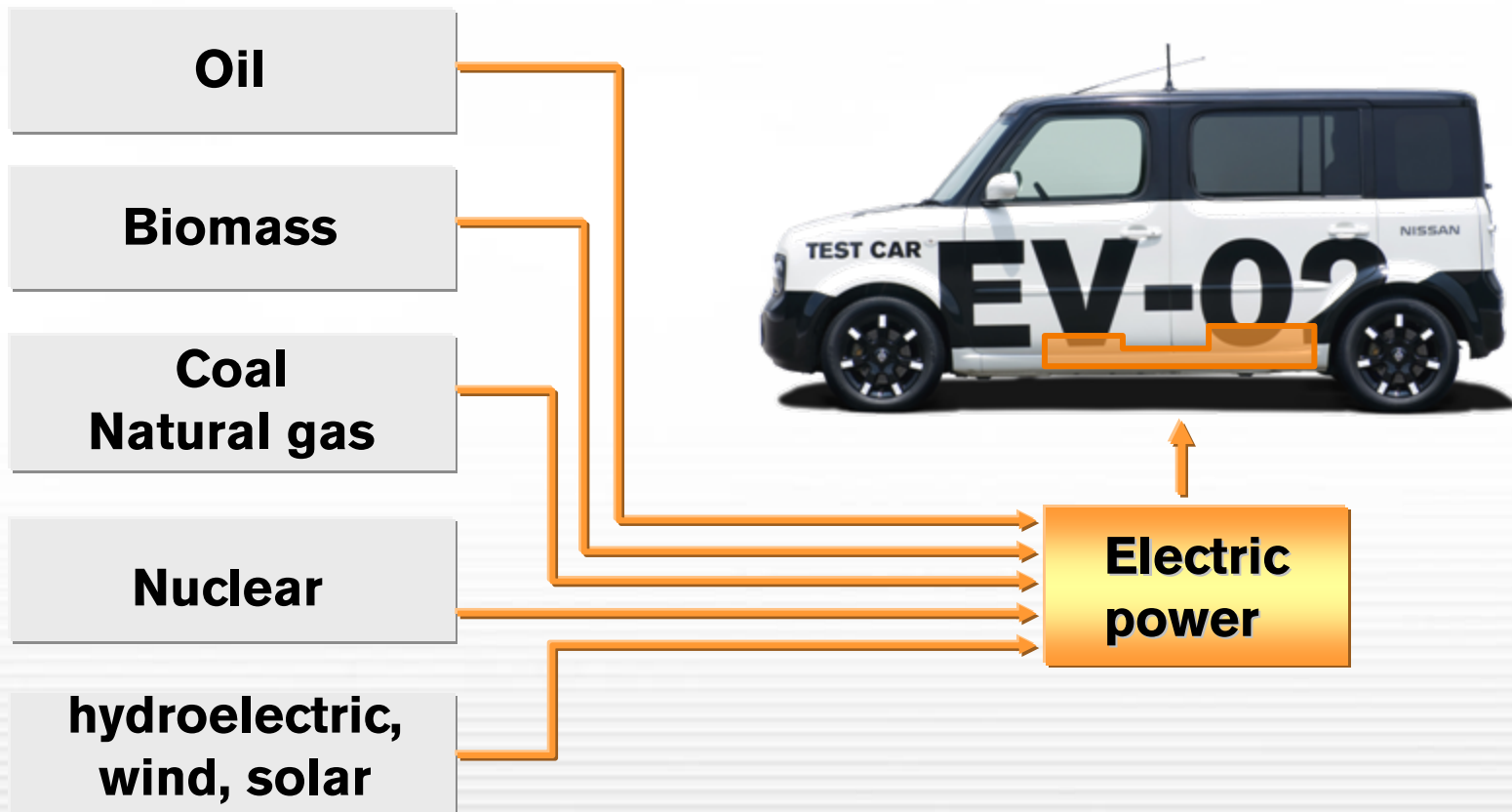
FCVs

EVs

Zero-emission vehicles

# Energy : Use of electricity for powertrain

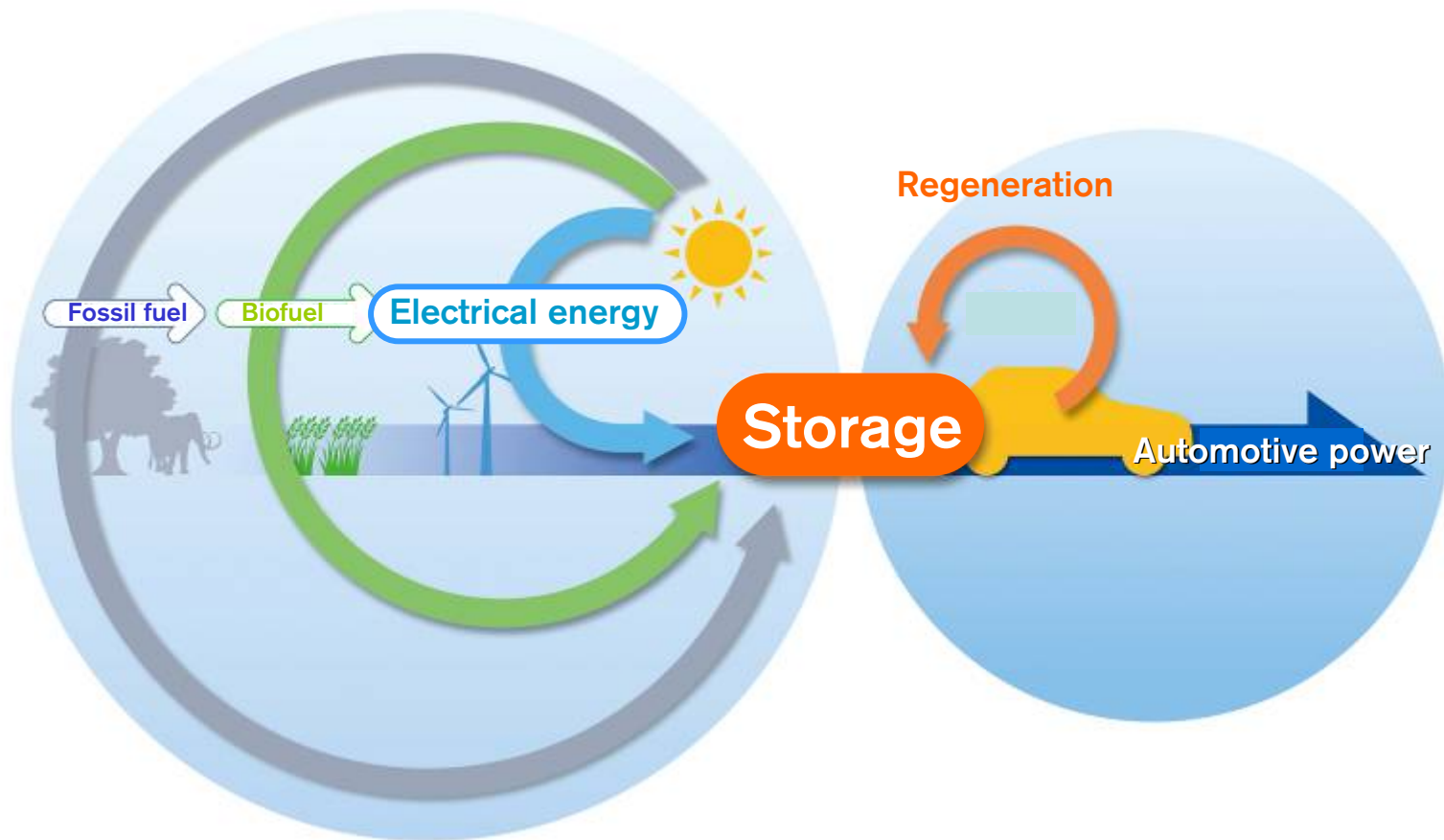
- Electric energy can be generated from various sources.
- Priority of electric energy is high, from security perspective as well.



# Technology development perspective on electric powertrain

## ■ Three challenges for R&D:

"Production and supply of energy," "Storage of energy,"  
and "Effective usage of energy for vehicle"



## **2-1. Electric Vehicles**

# EV Launch Plans

- To launch Nissan original EV for US and Japan in FY10
- Expand globally in 2012



<b>Size</b>	<b>Compact car class</b>	<b>Ample cabin space</b>
<b>Seating</b>	<b>4-5</b>	
<b>Battery</b>	<b>Laminated compact Li-ion battery</b>	
<b>Motor</b>	<b>High-response AC synchronous motor</b>	<b>Stimulating acceleration</b>
<b>Cruising Range</b>	<b>160km (US-LA4 mode)</b>	<b>Cruising range sufficient for daily use</b>
<b>Major features</b>	<b>Dedicated IT system</b>	<b>Charging support gives secure feel</b>

**Detailed specifications to be introduced on the individual presentaton**

# Various values provided by EVs

## ICE



Gasoline cost  
6,000yen/mth

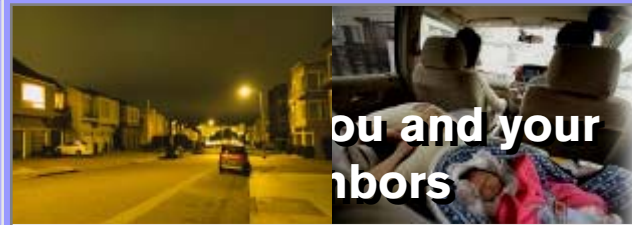
(20km/L, 1,000km/mth driving)



## EV



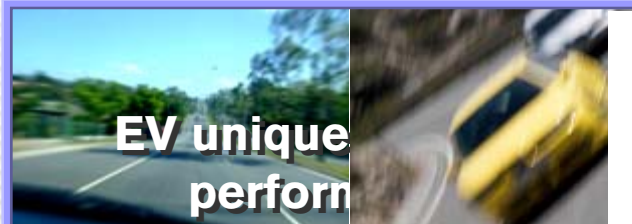
Sustainable  
mobility society



Electricity cost  
1,200yen/mth

(Charge using nighttime electricity  
, 1,000km/mth driving)

Equivalent of  
100km/L  
gasoline cost



Stimulating  
acceleration  
Smooth start

# Today's demonstration : EV experience

■ Experience the performance of 2010 EV as well as the EV lifestyle

at home  
Normal charging



Demonstration

New EV unique  
dynamic performance

Stimulating acceleration  
Overwhelming quietness  
Smooth start



Test drive

away from home  
Quick / non-contact  
charging



Demonstration

## EV always supported by IT

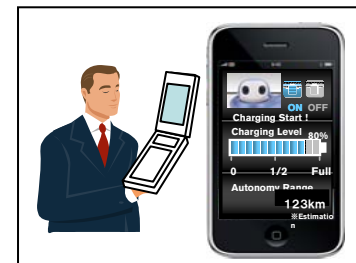


Demonstration

Cruising range



Charging stations



Cellphone alert  
when charging completed

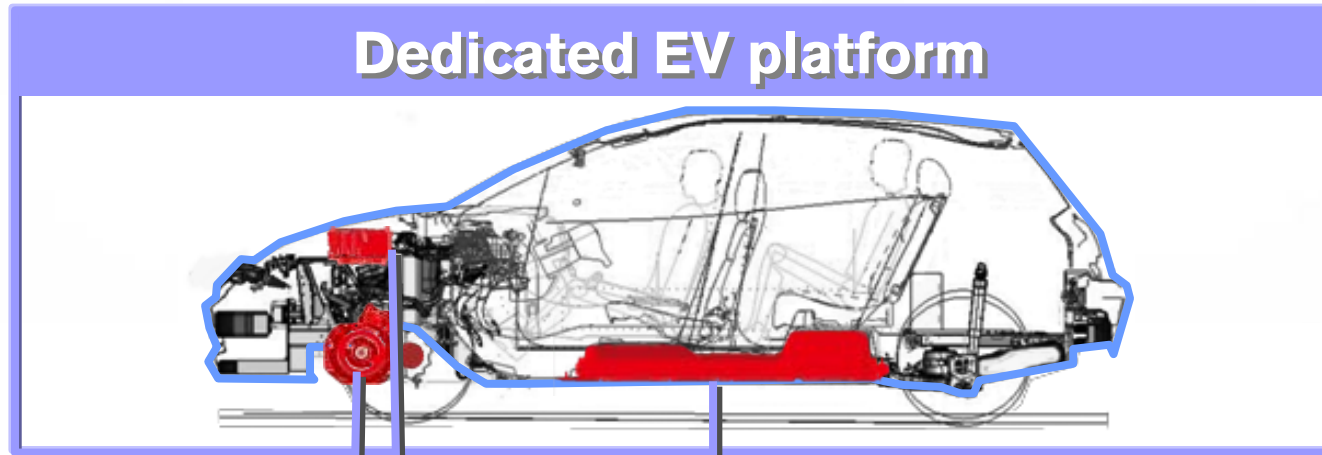
# Today's demonstration : EV technologies

## ■ Newly developed dedicated EV platform

- High performance compact powertrain concentrated in front
- Compact Li-ion batteries installed under floor
- High rigidity chassis using Battery / Inverter Frame



- Ample cabin space
- Quiet and agile driving



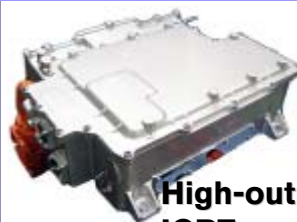
Display

### Motor



High-response synchronous : 80kW

### Inverter



High-output IGBT

### Battery pack



Laminated high energy density : 24kWh

# EV is a mobile device moving freely on the electricity network

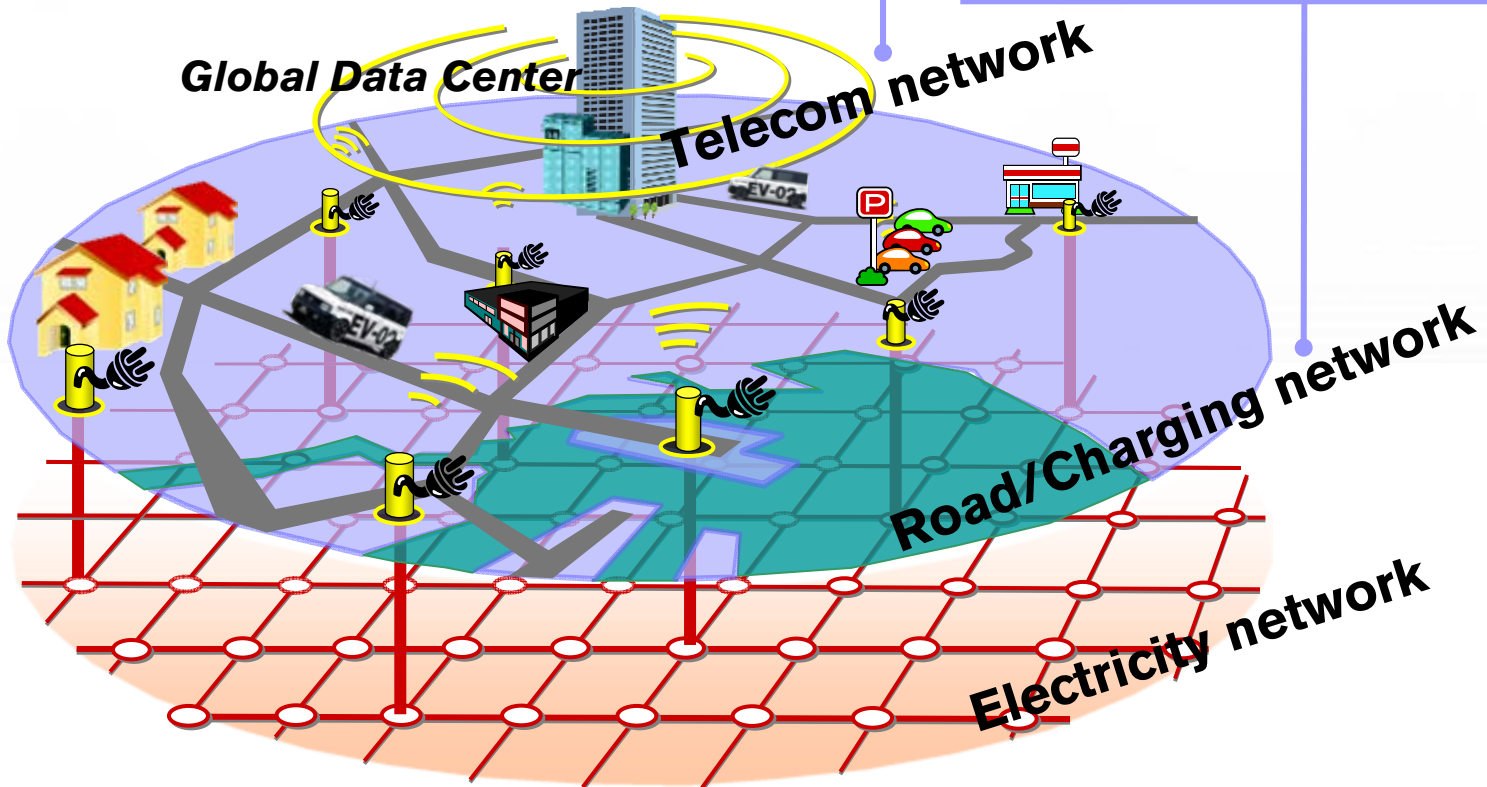
- EV runs through the "road/charging network" and "telecom network" on the "electricity network" available

## Charging supported by IT

- SOC can be checked anytime
- Cruising range can be checked anytime
- Charging stand can be checked anytime

## Can be charged anywhere, at or away from home

- Normal charging: home, office, parking lots
- Quick charging: mini-marts, service stations, shopping malls, parking lot



## **2-2. Fuel-efficient Power Train**

# Featured Technologies

## Next-generation XTRONIC CVT

**Smaller, lighter,  
more efficient**

- Transmission range equivalent to a 7AT achieving fuel efficiency and quick acceleration
- Auxiliary transmission reduces size and weight

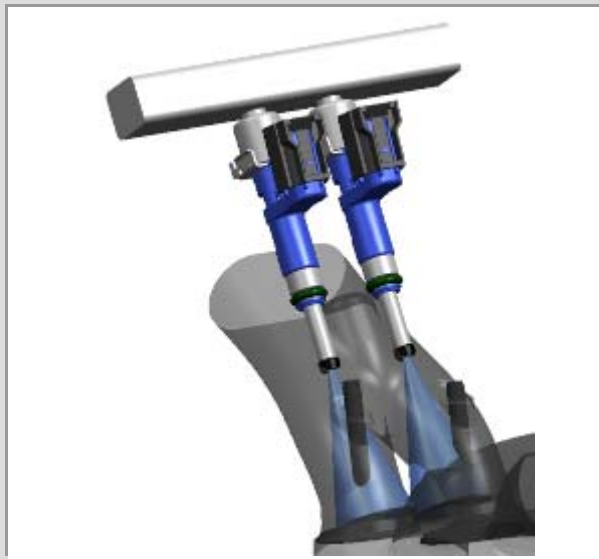


**Test drive**

## Next-generation combustion system (Dual injector system)

**High fuel efficiency  
and cleaner exhaust**

- Improved 4% fuel efficiency on more complete combustion
- Reduce rare-metal content in catalyst to 1/4



**Display**

## Clean Diesel AT

**AT added to the lineup**

- Designed to meet "post new-long-term restrictions" and scheduled for sale in spring 2010


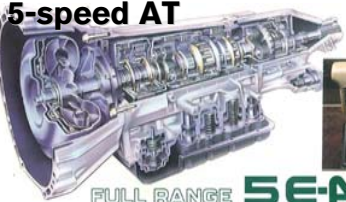
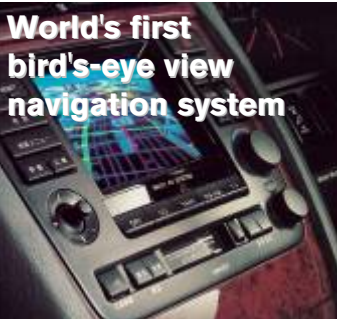




**Test drive**

### **3. Advanced Technologies on the new Fuga**

# Premium sedan starting-point of featuring advanced technologies

- Predecessors of premium sedan has always been the first to feature the advanced technologies
- Next generation Fuga will have 12 new technologies

<p><b>Japan's first car with turbocharger</b></p> 	<p><b>World's first electronically controlled 5-speed AT</b></p>  <p>FULL RANGE 5E-AT</p>	<p><b>World's first bird's-eye view navigation system</b></p> 	<p><b>World's first ICC with low-speed tracking</b></p> 	<p><b>World's first Distance Control Assist (Intelligent Pedal)</b></p> 
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8 new technologies



**Japan's first electronically controlled V6 turbo**



PLASMA-VG20TURBO (ジェットターボ)

**World's first Multi-AV system with optical fiber gyro**



**8 new technologies**

**World's first XTROID-CVT**



**Nissan's first AutoCompasslink**



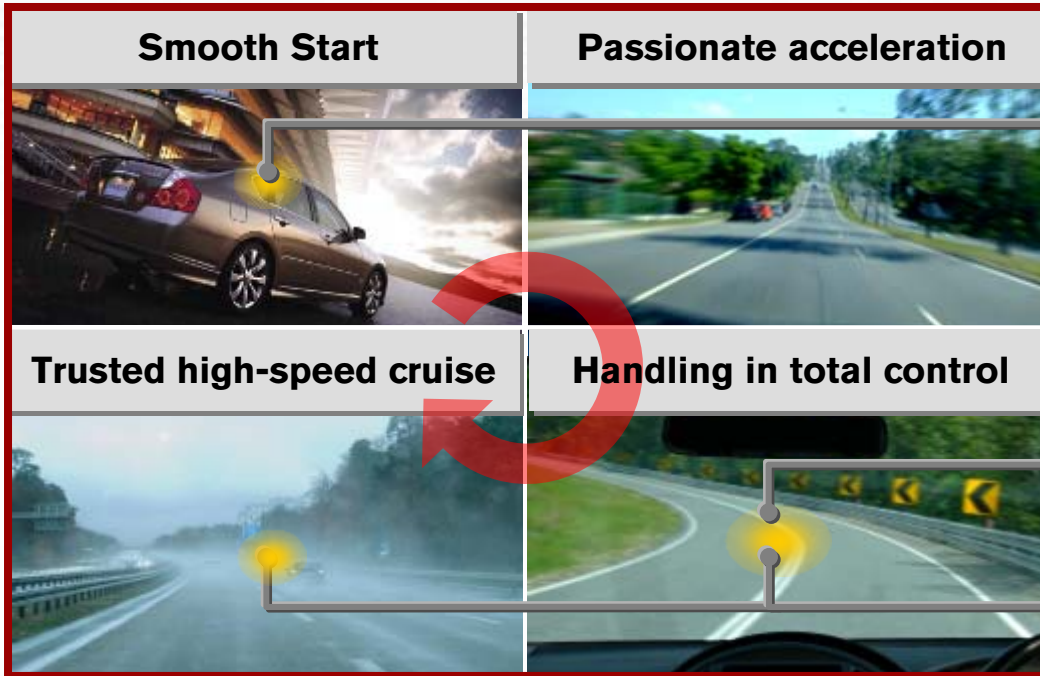
**12 new technologies**

↓

**6 will be introduced today**

# Featured Technology : Safety and Dynamic Performance

- Synchronized control of navigation and chassis offers security and fun



**Rear-seat comfort concept**

**Active Stability Assist**

**Four-wheel active steering**

**DP:4 core values**



**Navigation-cooperative  
Distance Control Assist**

## Navigation-cooperative Distance Control Assist (World's first)

**Reducing driver's stress  
when driving on curves**

- 1-Receiving information on curves from the navigation system
- 2-Support operation of acceleration pedal and braking when approaching the curve

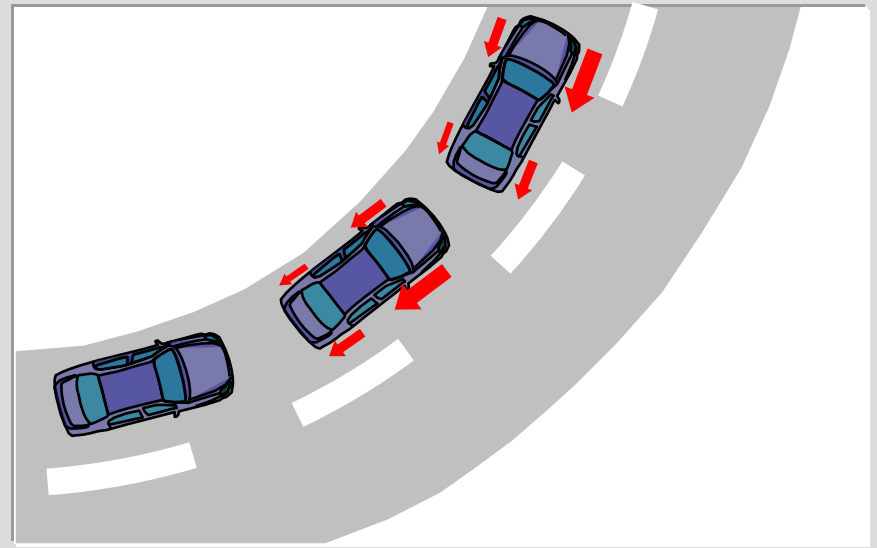


**Test drive**

## Active Stability Assist (World's first)

**Cornering with secure  
and smooth feel**

**Controlling four wheel brakes and engine  
torque, according to vehicle behaviour  
during cornering**

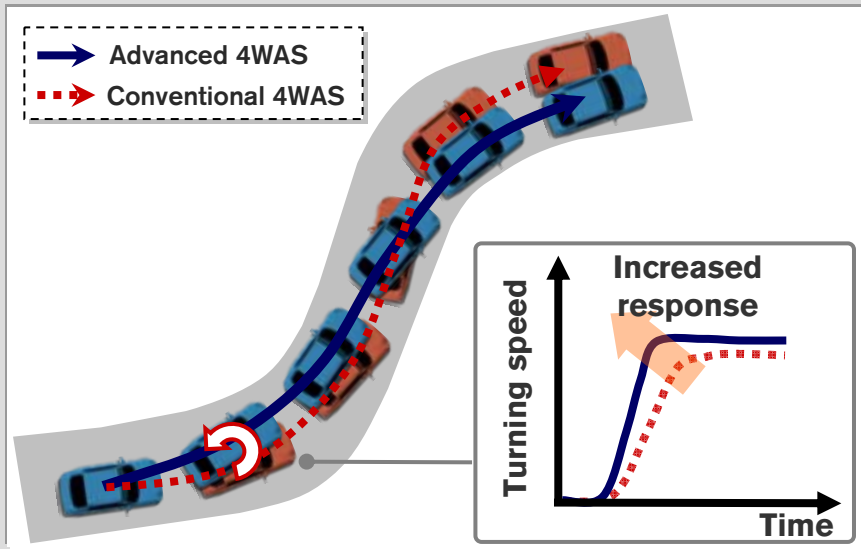


**Test drive**

## Evolution of 4-Wheel Active Steering

**In-command driving  
for anyone, anytime**

**Smooth driving with fewer operations by  
increasing steering response**

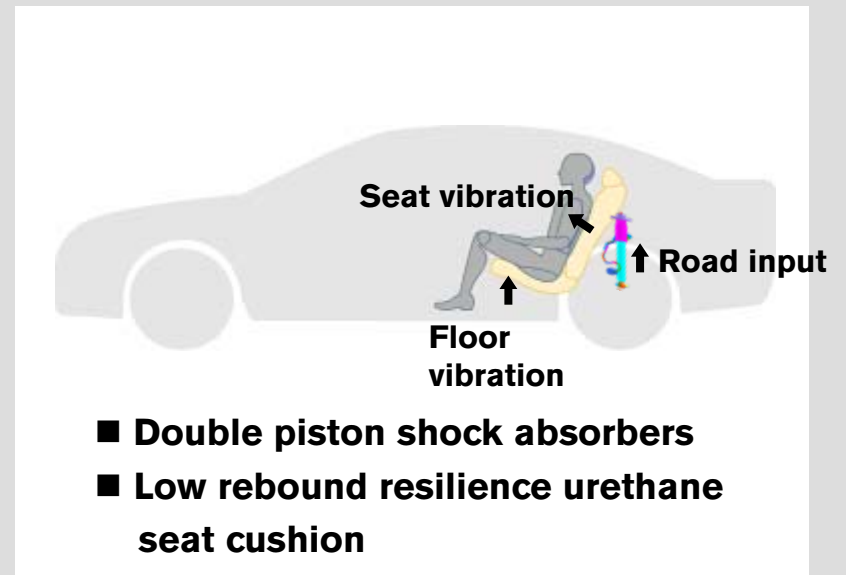


**Test drive**

## Rear-seat comfort concept

**Able to "read/write/sleep" comfortably**

**Developed 2 technology items restricting  
unpleasant motion of vehicle and  
passenger, for rear-seat comfort**



**Test drive**

# Featured Technologies : Life on Board

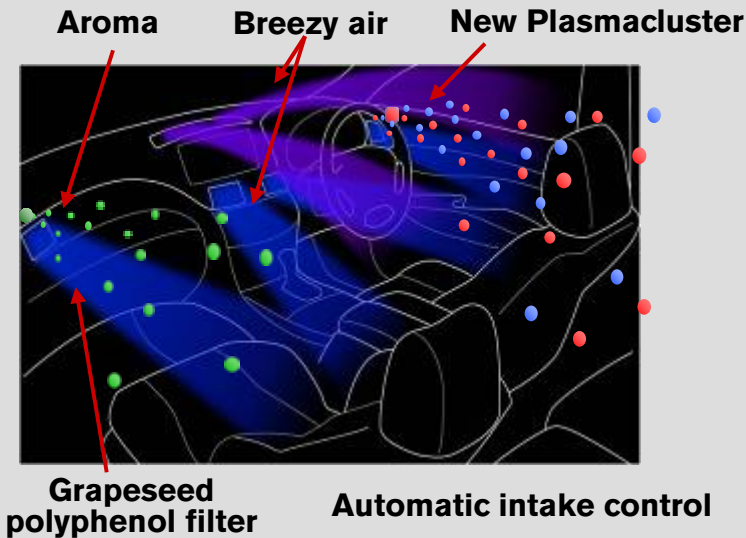
- **Offering comfort cabin and premium interior finish supported by thoroughly measured and analyzed human senses**



## Forest Air (World's first)

**Air-conditioning system recreating forest atmosphere**

Offering refreshing air by integrated control of "breezy air," "aroma," "temperature," and "humidity"



**Actual experience**

## Premium touch interior concept

**Comfortable feel you wouldn't want to put your hands off**

Analyzed human "senses" and designed every material which will be touched by the passenger to be comfortable



**Actual experience**

# Today's Featured Technologies: Summary

## EV

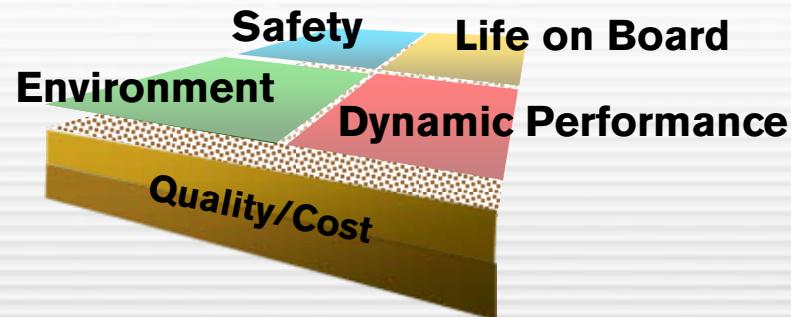
- **EV TEST Car**
- **EV platform**  
(Battery, Motor, Inverter)
- **EV-IT support**
- **Quick charging**
- **Non-contact charging**
- **EV lifestyle diorama**

## Fuel-efficient Power Train

- **Next-generation XTRONIC CVT**
- **Dual injector system**
- **Clean Diesel AT**

## Advanced Technologies on the new Fuga

- **Navigation-cooperative DCA**
- **Active Stability Assist**
- **4WAS**
- **Rear-seat comfort concept**
- **Forest Air**
- **Premium touch interior concept**
- **CARWINGS navigation system**



**END**