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*Creating New Lifestyles
using Advanced Mobility Measures*

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Serious Issues associated with mobility

< Environment >

Global warming



Air pollution



< Energy >

Oil dependence



Renewables



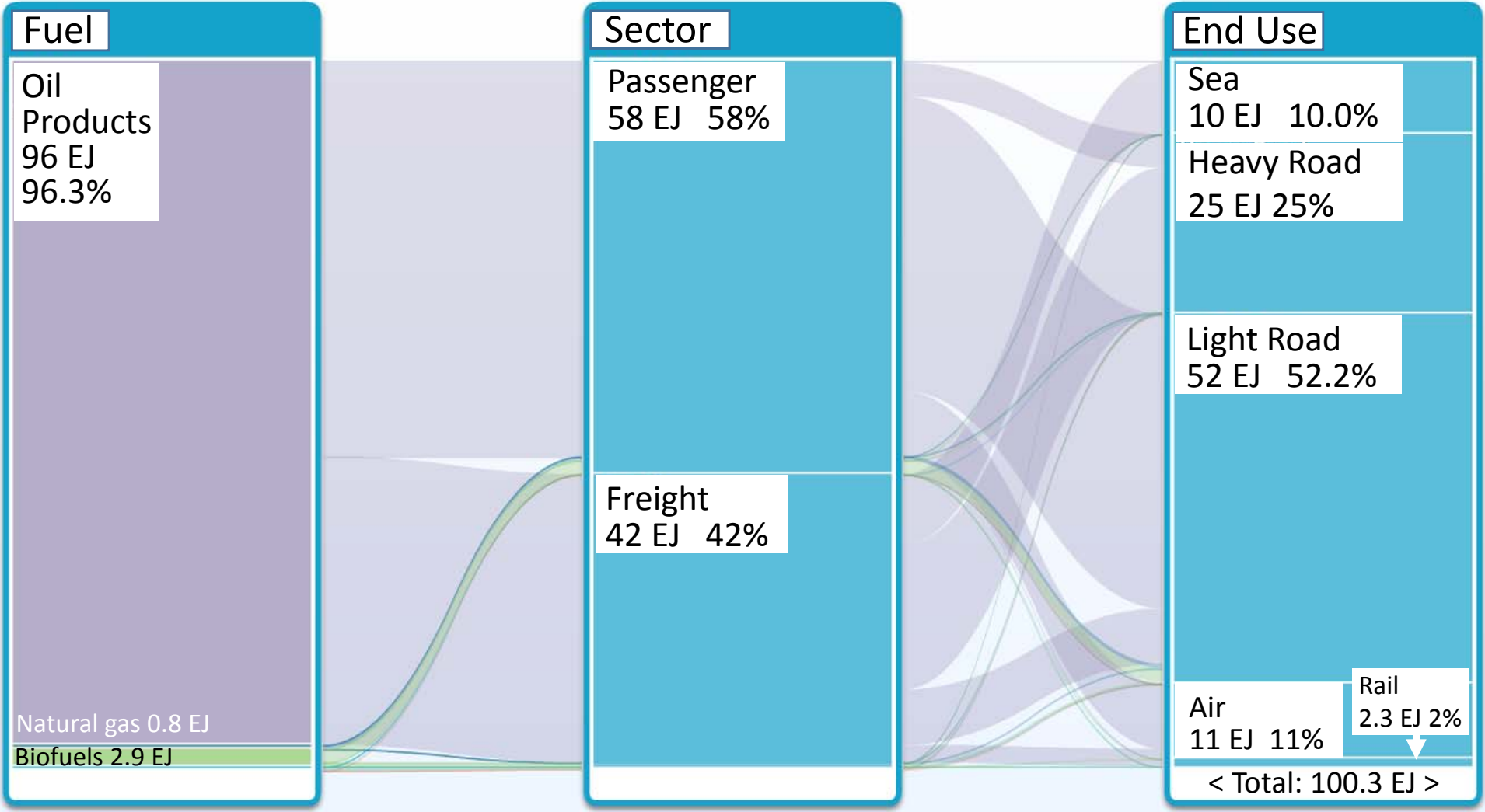
< Traffic Congestion >



< Traffic Accidents >



End Use in the Global Transportation Sector in 2012 (Energy Technology Perspectives 2015, IEA)



Three important measures to resolve or mitigate vehicle-related environmental and energy issues

1

Reducing exhaust gas emissions and improving fuel economy in conventional gasoline and diesel vehicles and hybrids in meeting related short- and mid-term regulations and standards

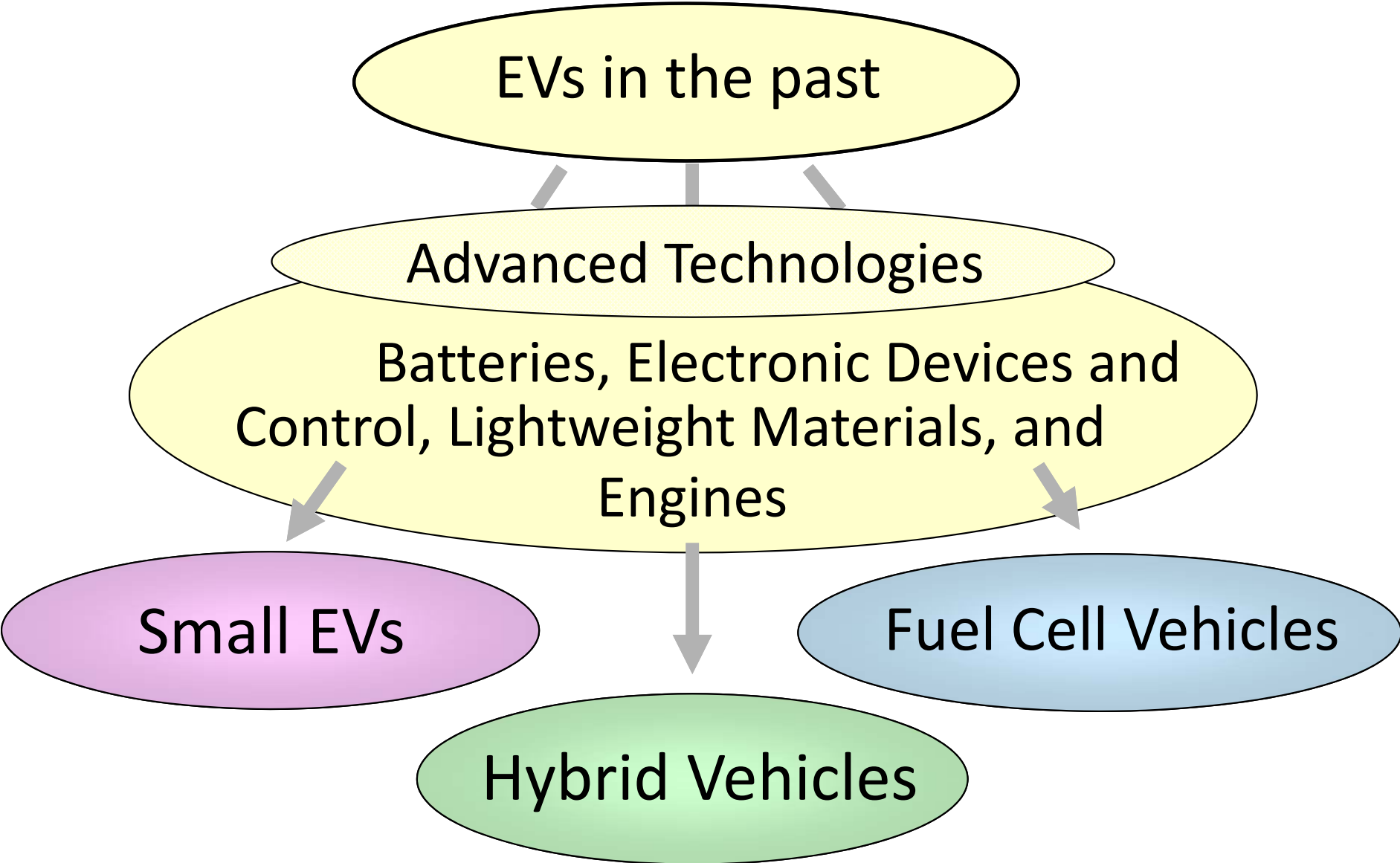
2

Developing and disseminating alternative power systems, fuels and energy, including EVs , plug-in hybrid, FCVs, renewable fuels and energy, etc.

3

Changing the way we use the automobile assisted by ITS, ICT and IT, thereby reducing traffic along with enhancing modal shift using mass transit, freight efficiency, eco-driving, car sharing and city/road planning

Variations of Electrified Vehicles



Low-speed EVs for single to two passengers



<Nissan's New Mobility CONCEPT>

- L2,340 × W1,190 × H1,450mm
- Vehicle weight: 470 kg
- Max. speed: 80 km/h
- Range: 100km



<Honda's Micro-commuter>

- L2,500 × W1,250 × H1,445mm
- Maximum speed: 80 km/h
- Range: 60 km
- Recharging time: shorter than 3 hours
- Battery unit: Li-ion, Max. power: 15 kW



<Toyota's i-Road>

- L2,350 × W850H × H1,445mm
- Vehicle weight: 300 kg
- Range: 50 km, Max. speed: 45 km/h
- Motor system: 2 kW × 2 units

Electrified Means for Personal Mobility



Toyota launched FCV "Mirai" in Nov., 2014

■ "Mirai" is the world-first mass production fuel cell passenger car sold worldwide.

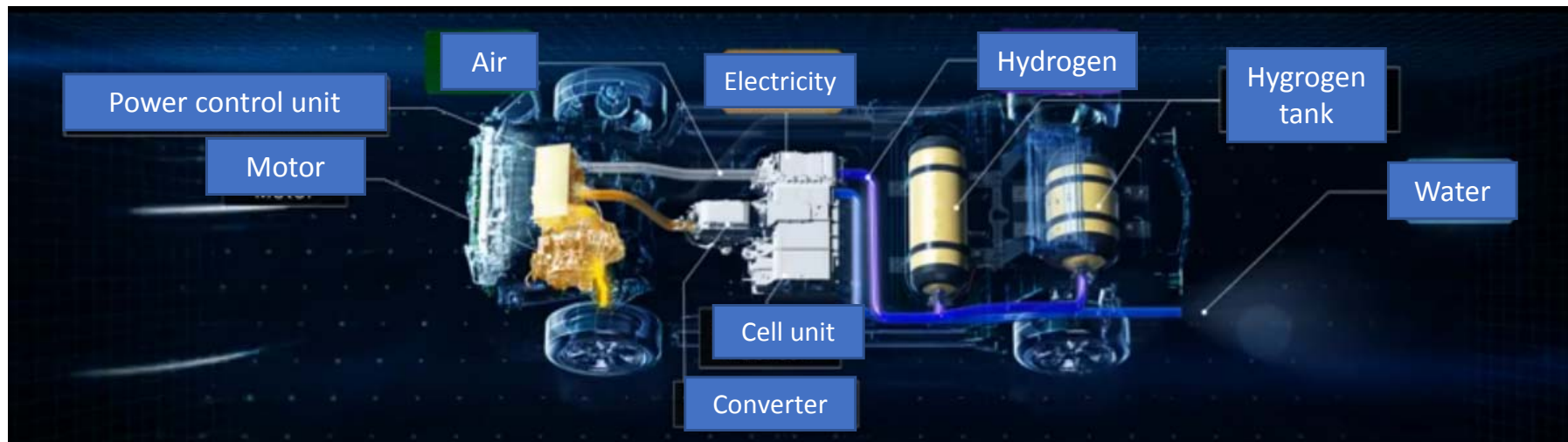
■ Specifications

- 70MPa (2 tanks) ▪ Range: 700 km ▪ Max. speed: 170km/h
- Power density: 3kW/L (100kW) ▪ Cold startability: -30°C
- Vehicle efficiency: 65%

■ Almost all related patents will be opened.

■ Price. 7.23 Million yen (Tax incentive: 2 million yen)

■ Annual production schedule: 700-1,000 in 2014-15, 2,000 in 2016 and 3,000 in 2017



Options for Decarbonizing Electricity and Hydrogen

Renewables



Solar



Wind



Geothermal

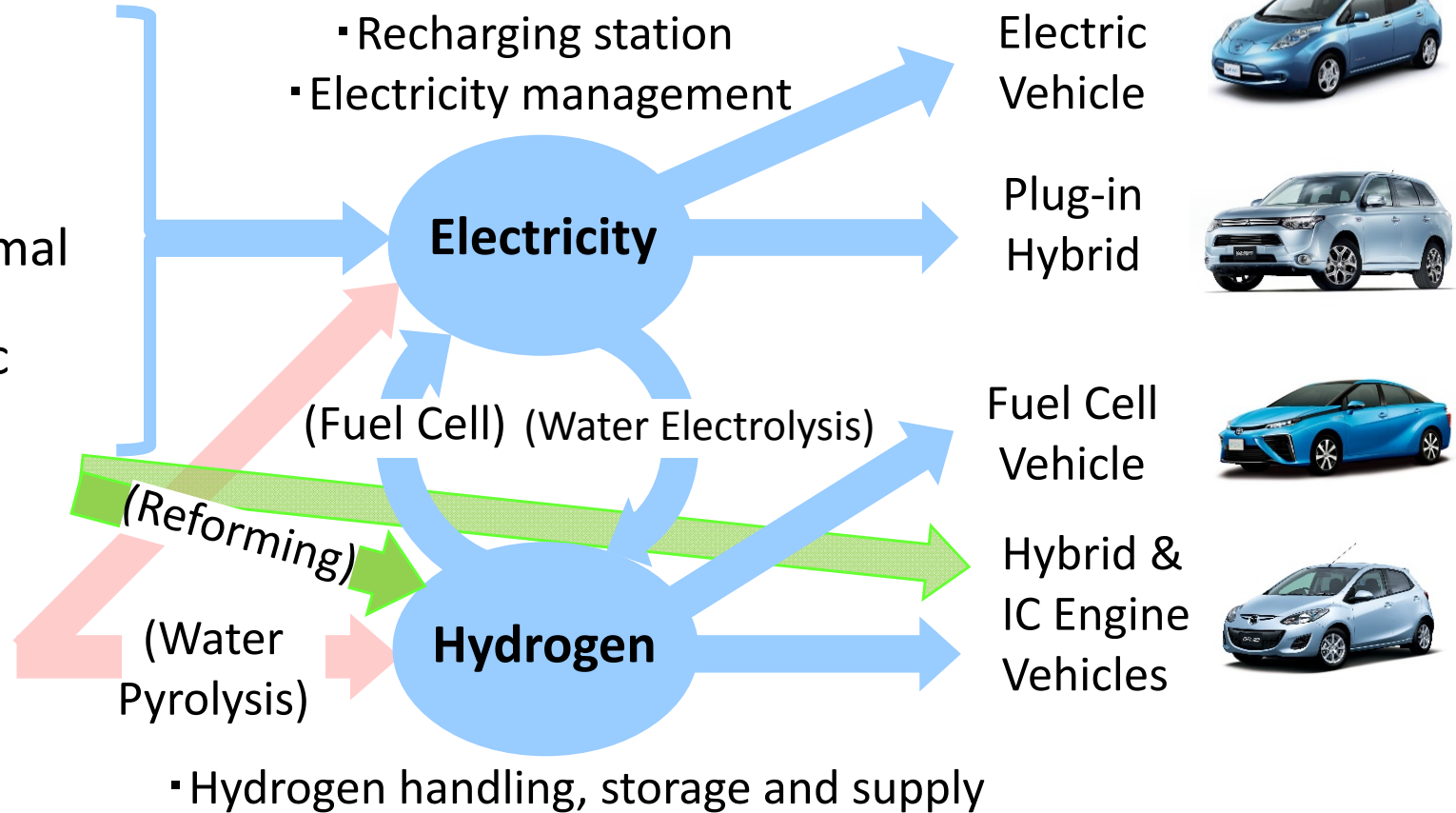


Hydraulic



Biomass

Nuclear Power



- ☆ Hydrogen is produced mainly from fossil fuels such as oil and natural gas.
- ☆ Carbon-free hydrogen must be commercialized by 2040 taking into production, transportation, storage and supply processes.
- ☆ Overall LCA and cost evaluation should be made on these fuels and energy.

Roles of Intelligent Transport Systems

Drivers, cars and roads are connected using advanced ICTs to achieve safe, eco-friendly and convenient mobility (ITS Japan)



Car Navigation



ETC



Safe Driving Assistance



Traffic Management



Road Management



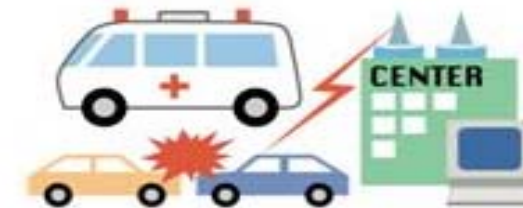
Mass Transit Management



Commercial Vehicle Management



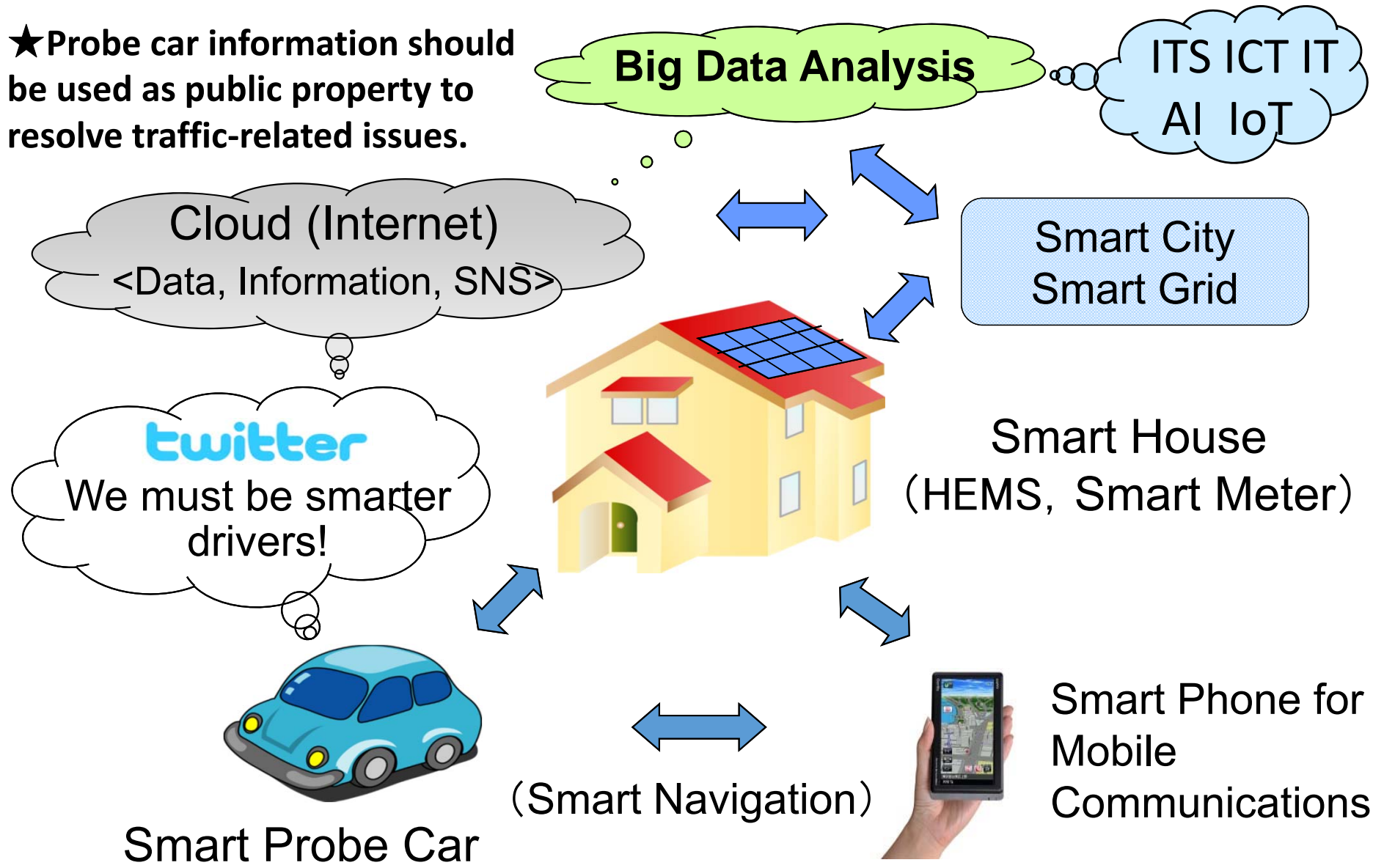
Pedestrian Assistance



Ambulance Vehicle Management

Eco-friendly Smart Mobility and Housing

★ Probe car information should be used as public property to resolve traffic-related issues.



Autonomous Drive and Mobility Sharing



Google Car



Robot Taxi (DeNA, ZMP)



Car Sharing (Daimler)

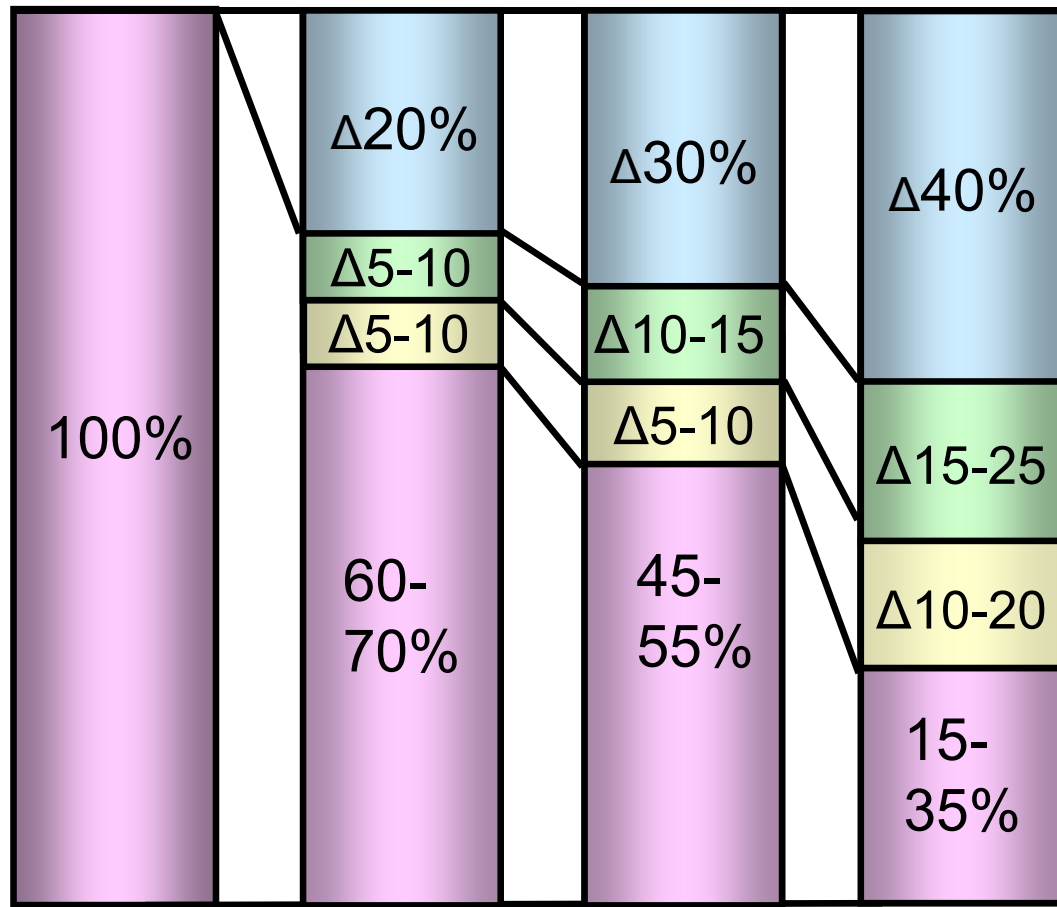


Autonomous Ride Sharing
(Uber and Volvo)

Projected Long-term Reduction in Motor Vehicle CO₂ Emission in Japan

Reference Δ30-40% Δ45-55% Δ65-85%

【 Measures 】



<Fuel Economy Improvements>
Efficient power systems, Hybridization, Vehicle weight reduction

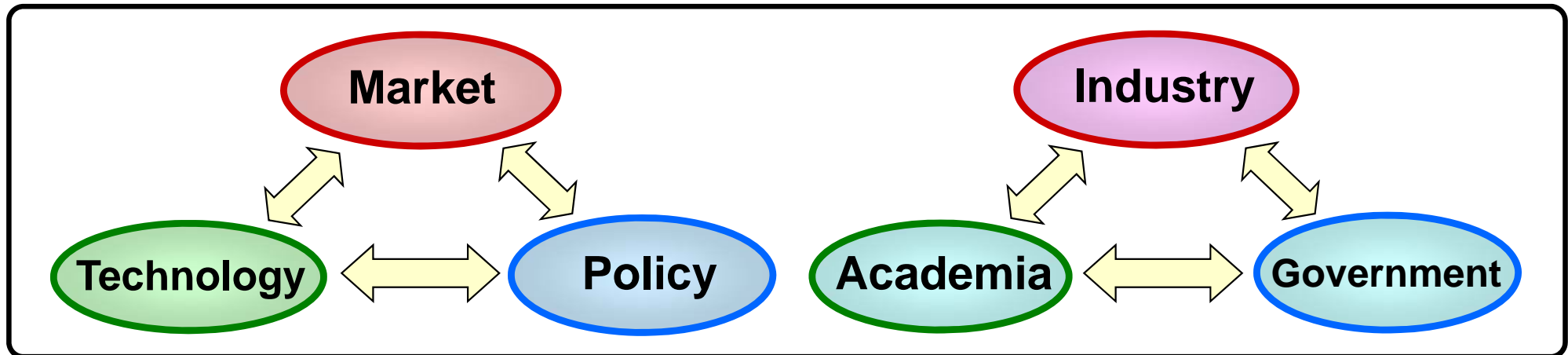
<Use of Low Carbon Fuels and Energy>
Electricity, H₂, Biofuels, CCS

<Improvements in Vehicle Use>
ITS, ICT, Modal shift, Change in car lifestyle

2010 2020 2030 2050

(By Y. Daisho)

Issues for Developing and Disseminating Next Generation vehicles



- Social actions for sustainable mobility in terms of environmental protection, energy security, economy, convenience, safety, comfort and resiliency to disasters.
- Continued governmental support and collaboration between industry, academia and government for developing advanced mobility technologies
- Strengthening global competitiveness for transportation-related technologies
- Developing and disseminating technologies related to renewable fuels and energy such as electricity, hydrogen, bio-fuels etc.
- Creating new environmentally friendly mobility lifestyles
- Developing technologies related to ITS, IT and ICT for us to drive conveniently, efficiently and safely.
- Technological and policy contributions to motorizing economies