Green Transportation Policies and Examples from Japan
– an up to date view –
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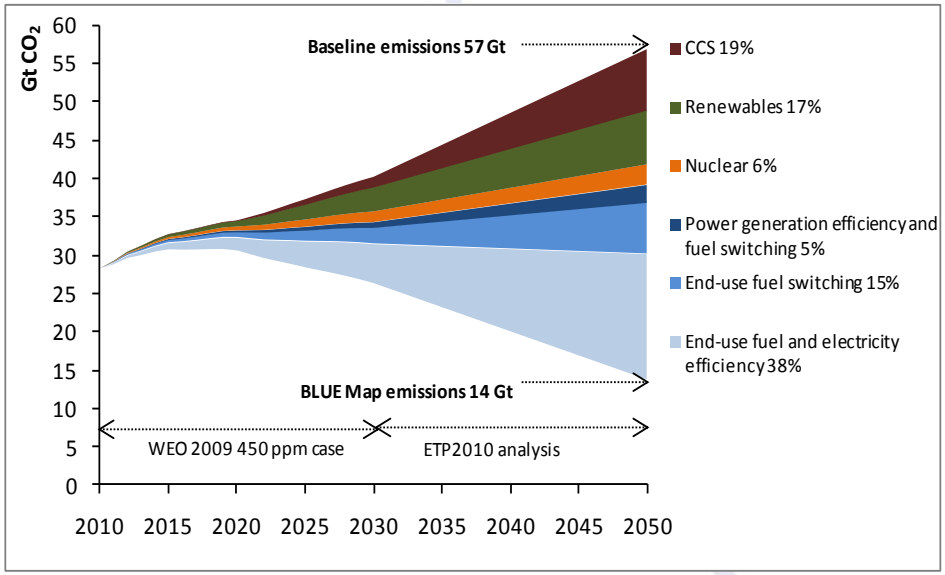
Agenda

- Introduction
- Transportation Sector and Reduction of CO2 (Overview)
- Potential of EVs and EV policy
- Potential of Hybrid Vehicles and PHVs
- Potential of Fuel Cell Vehicles
- NEDO International projects
    - Hawaii project
    - Malaga project

Energy is a Global Challenge

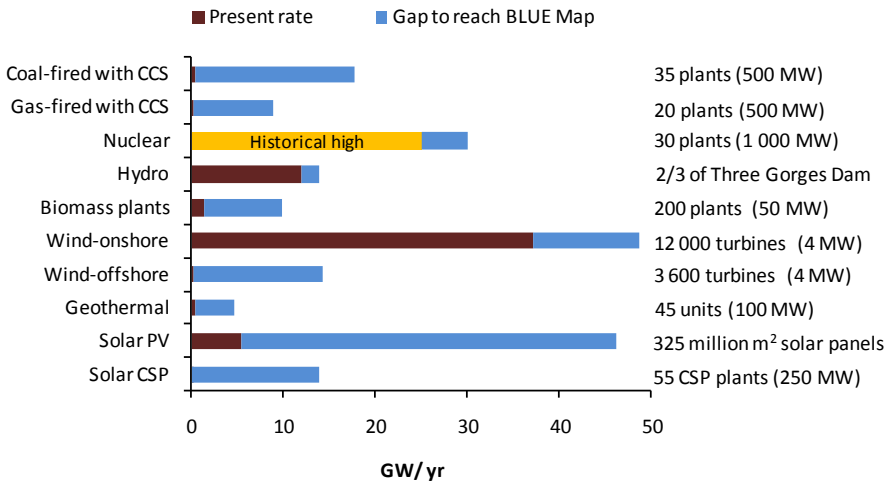


- Energy Efficiency and Renewable Energy contribute over half of CO2 reduction

(Source: IEA)

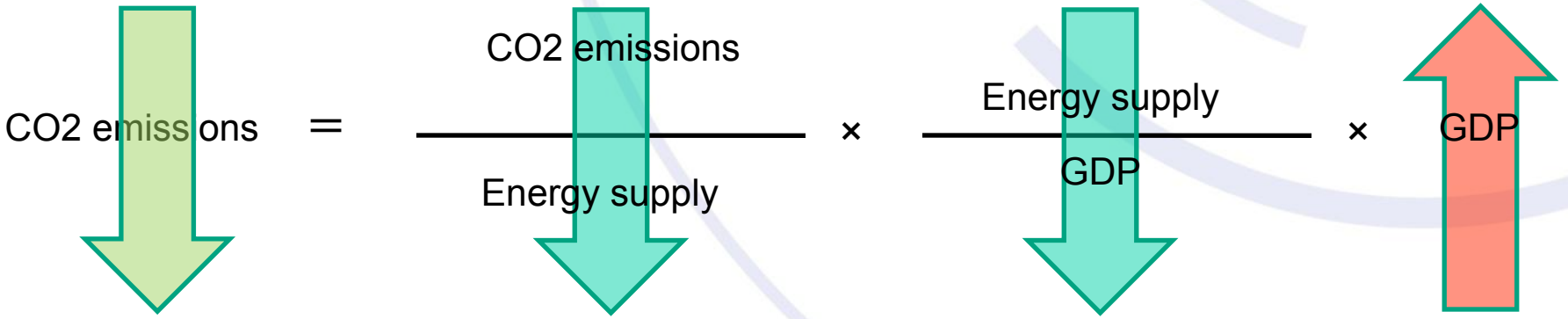
Need to accelerate investment into clean tech from current levels

Global Clean Energy Market
$53.6 bn (2004) to $260 bn(2011)
(Bloomberg New Energy Finance)



“Low-carbon Economy and Society”
Energy Conservation and New Energy

“Low-carbon economy and society” = Non-fossilization of energy supply × Energy Efficiency Improvement × Economic growth



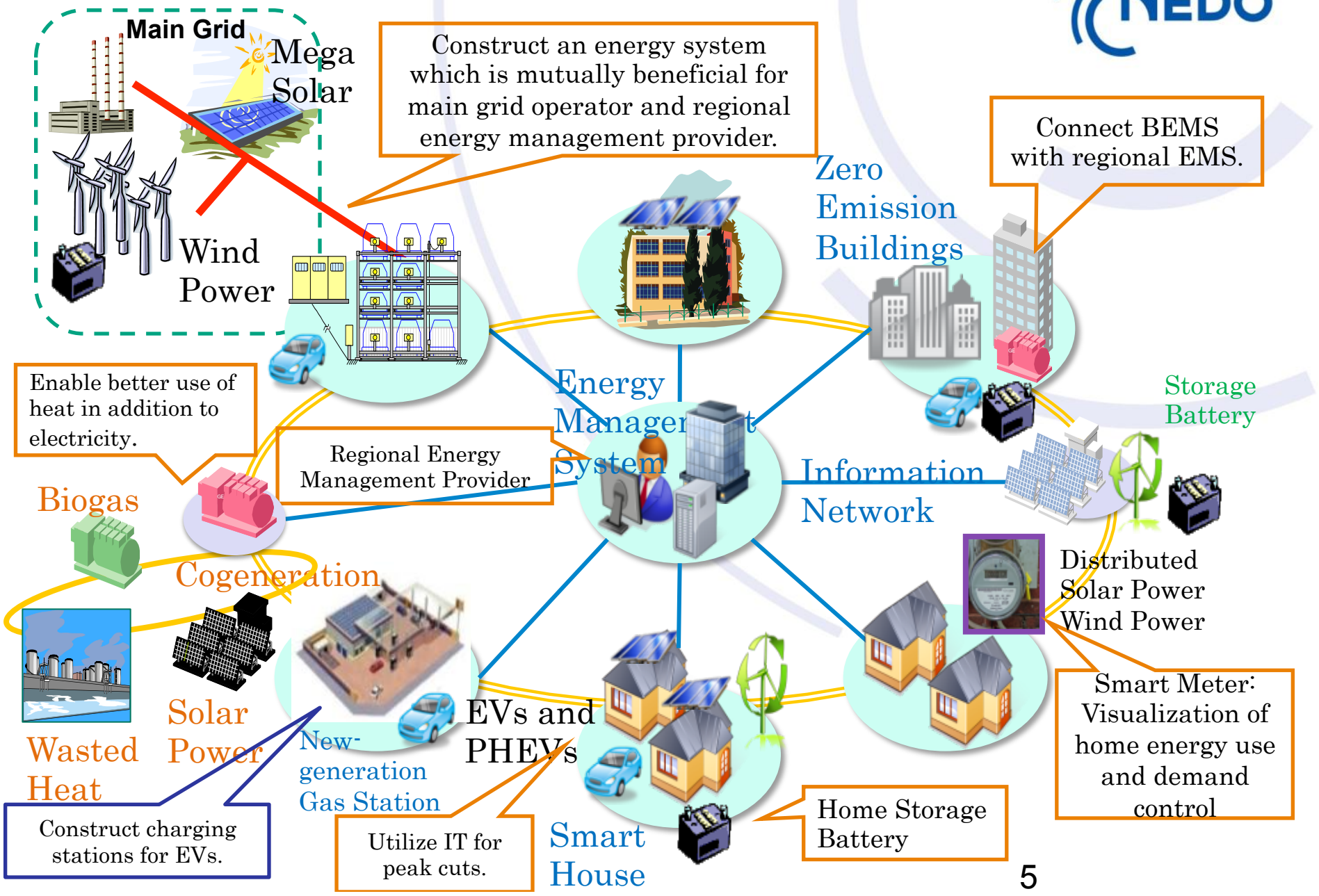
- ✓ Expansion of the introduction of new energy
- ✓ Promotion of nuclear energy
- ✓ Expanded utilization of biofuels

Others

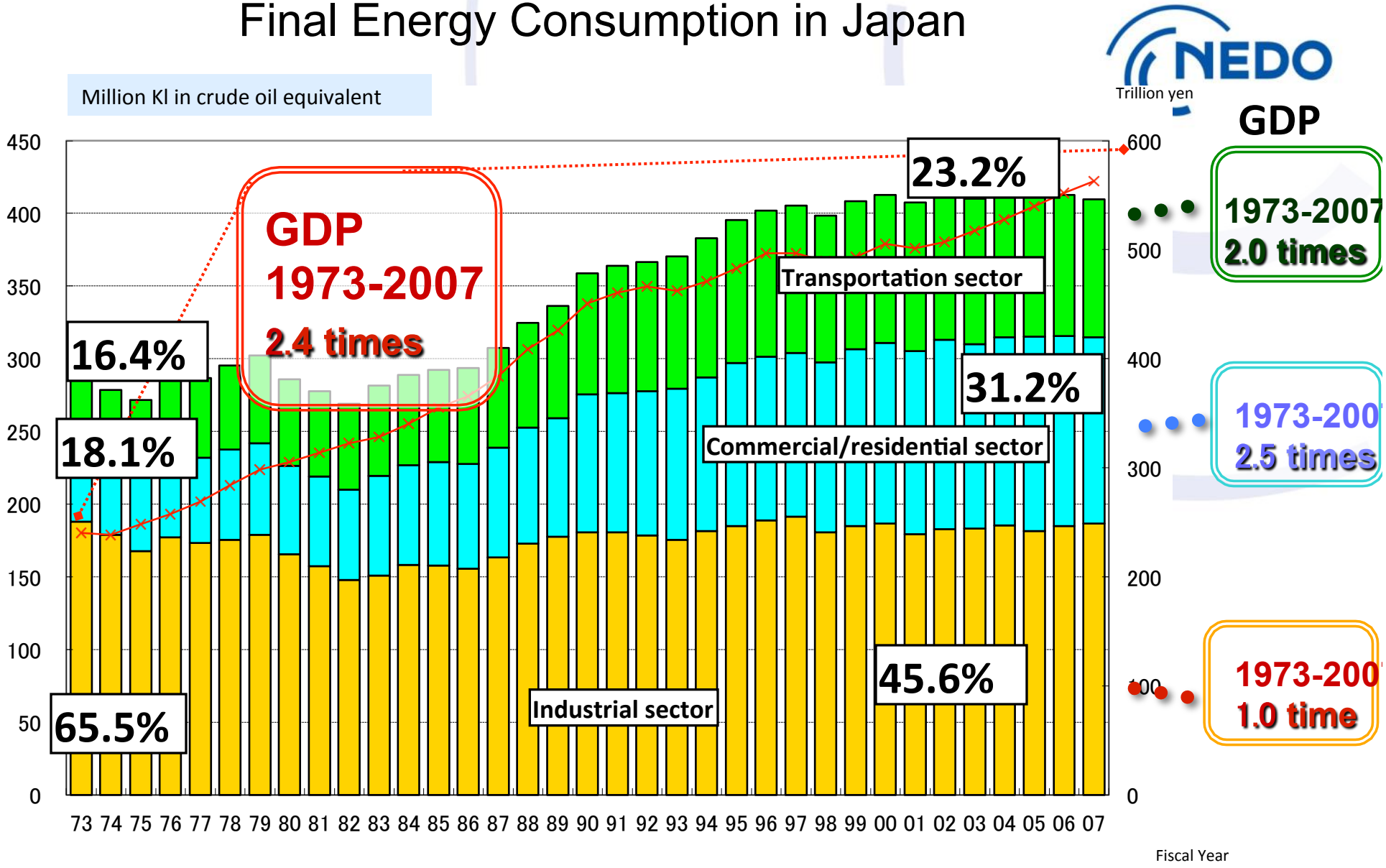
- ✓ Promotion of energy Efficiency
- ✓ Improvement of energy utilization intensity
- ✓ Improvement of fuel efficiency performance

Others

Concept of Smart Community



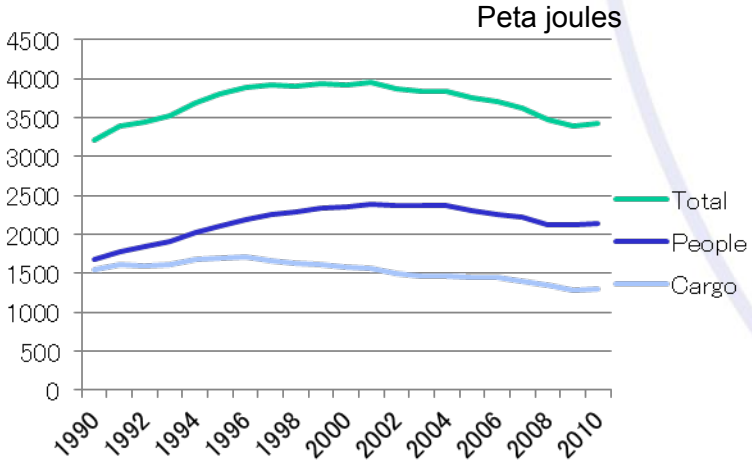
Final Energy Consumption in Japan



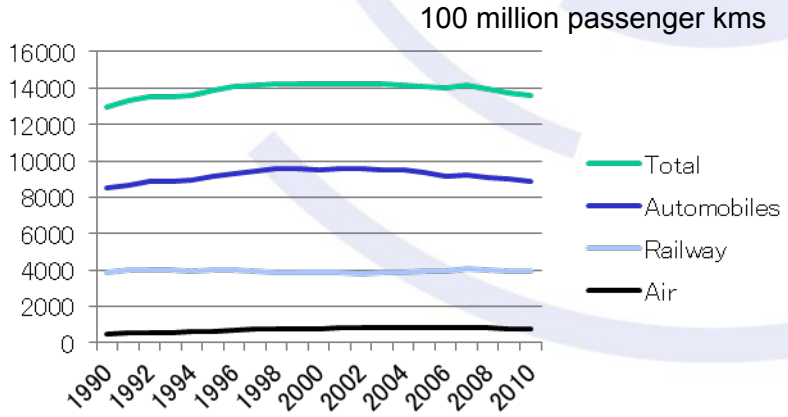
(Source) Total Energy Statistics, Annual Report on National Economy.
(Note) It must be noted that the values after 1990 were calculated differently from those of the years before that, because the calculation method for totaling the total energy statistics was changed in that year.

Closer look at Transport

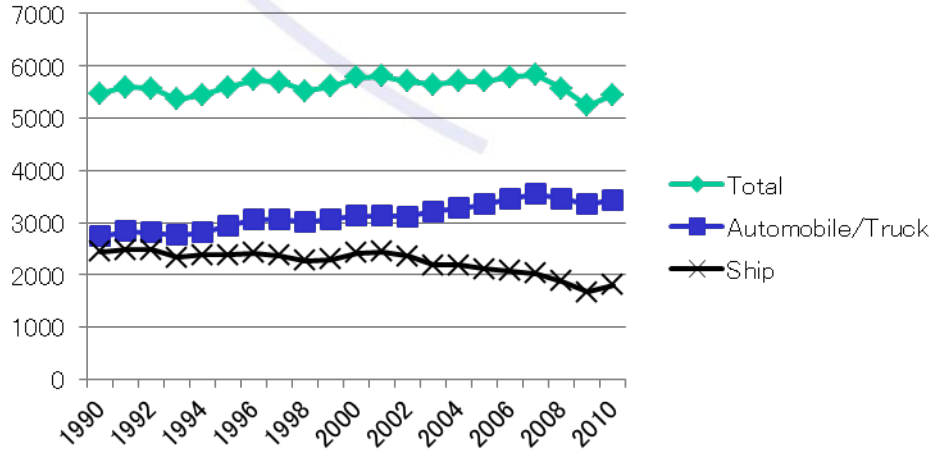
Transport energy use has stabilized.
Share of passenger transport has increased from 52% (1990) to 62% (2010).



In passenger transport, the share of automobiles (65-67%), railway (27-30%), and air (3-5%) is stable.



In cargo transport, share of automobile/truck has increased from 50% (1990) to 63% (2010).



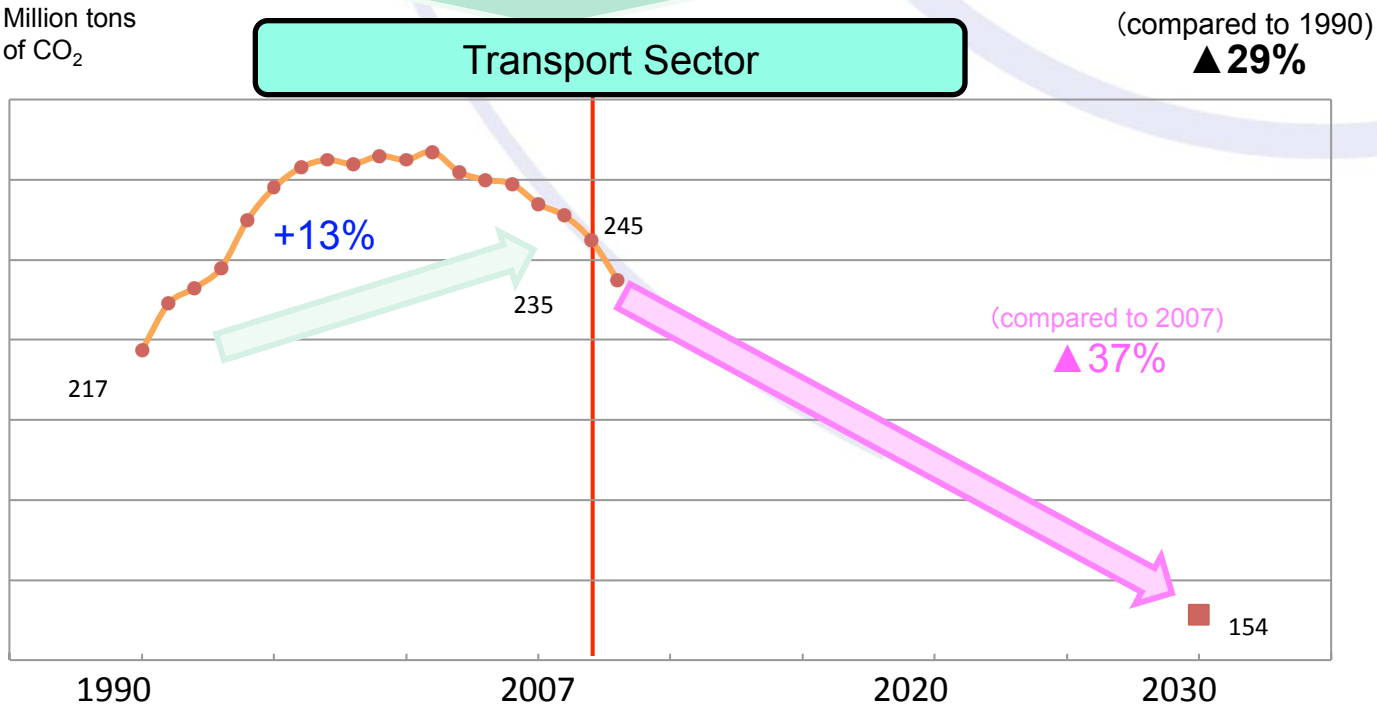
Transport Sector in 2030

Transportation sector

Major reduction measures	Status in 2030
○Diffusion and fuel efficiency improvement of next-generation automobiles	Seventy percent of new cars will be next-generation automobiles. * The current level is approx. 10% (estimated on 2009 actual data after eco-car subsidy implemented).
○ Biofuel	Introduction of transport fuel will be expanded to the maximum extent.
○ Modal shift	The share of railroad and coastal shipping will increase for mid- and long-distance transportation.

Major Preconditions
Transportation demand: 1307.2 billion men kilometers in 2007
–> 1303.6 billion men kilometers in 2030

Estimate



METI, Long Term Energy Plan

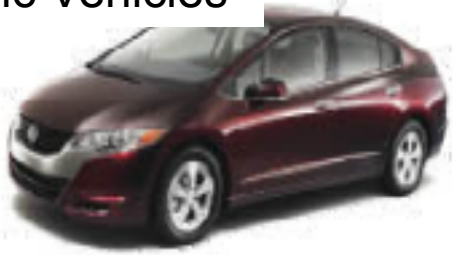
What are Next Generation Vehicles?

Bio Fuel Cars

Electric Vehicles

Hybrid Cars

Natural Gas Vehicles



Fuel Cell Vehicles

Plug-in Hybrids

Clean Diesel Vehicles

Hydrogen Vehicles

Hybrids:

As of end of 2010 1.4 million vehicles. Mainstay of Next Generation vehicles.

Can go down to 50% emissions compared to current vehicles

Challenges include cost and Improvement of batteries

Toyota Prius and numerous others

EV :

As of end 2011, 18000 vehicles. Large increase with the Nissan LEAF.

Can go down to 40% or down to 0% depending on power used

Need for charging infrastructure. Possiible range problems. Cost.

Nissan Leaf, Tesla, Mitsubishi iMiEV

Plug in Hybrid:

In short range can be used as EV and in long range maybe used as a hybrid.

Less need for charging infrastructure. No range problems.

Plug in Prius, Chevy Volt, Plug in Honda Fit

Fuel Cell Vehicles:

Great potential in reducing CO2 emissions. Most large vehicle manufacturers in development. 2015 is target date for commercialization.

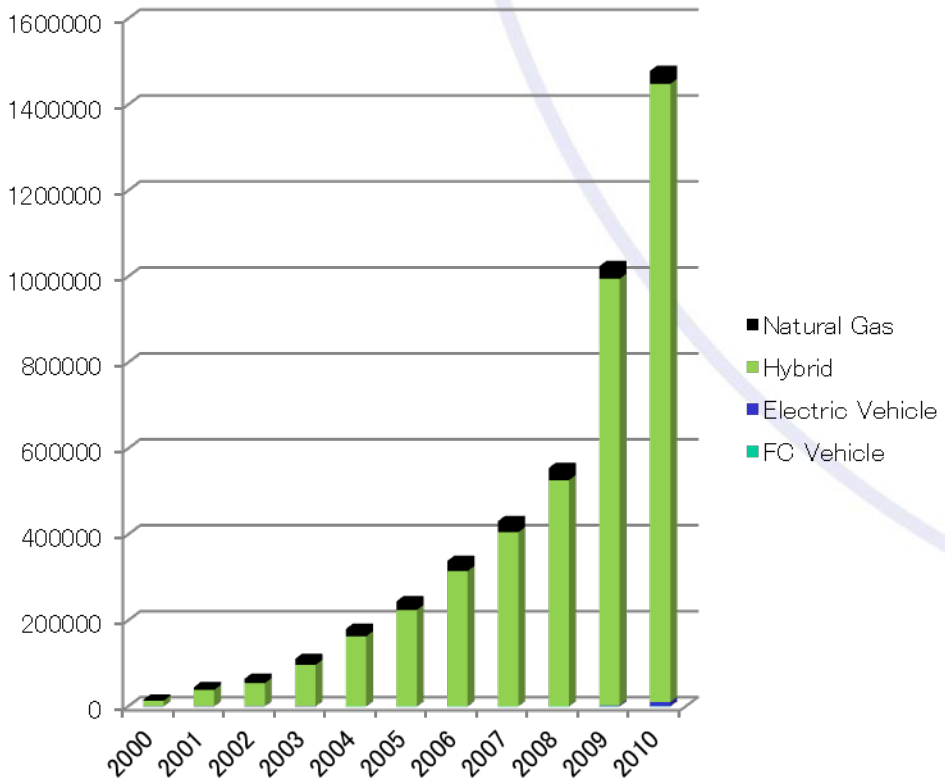
Need for infrastructure. Cost.

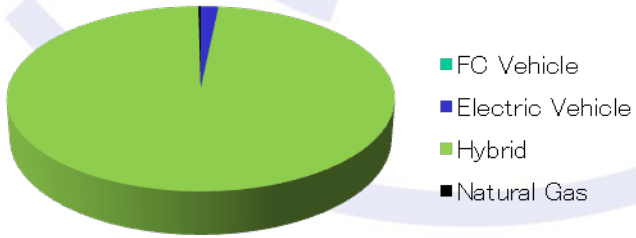
FCHV-adv (Toyota), FCX Clarity (Honda) etc.

Diffusion projections & Targets

		Projections (private-sector efforts)		Government Targets	
		2020	2030	2020	2030
Conventional Vehicles		80% >	60-70%	50-80%	30-50%
Next-Generation Vehicles		< 20%	30-40%	20-50%	50-70%
	HEV	10-15%	20-30%	20-30%	30-40%
	EV/PHEV	5-10%	10-20%	15-20%	20-30%
	FCV	Miniscule	1%	0-1%	0-3%
	CDV	Miniscule	0-5%	0-5%	5-10%

Number of Next Generation Vehicles have rapidly increased to 1.5 million cars but are still about 2% of the general fleet





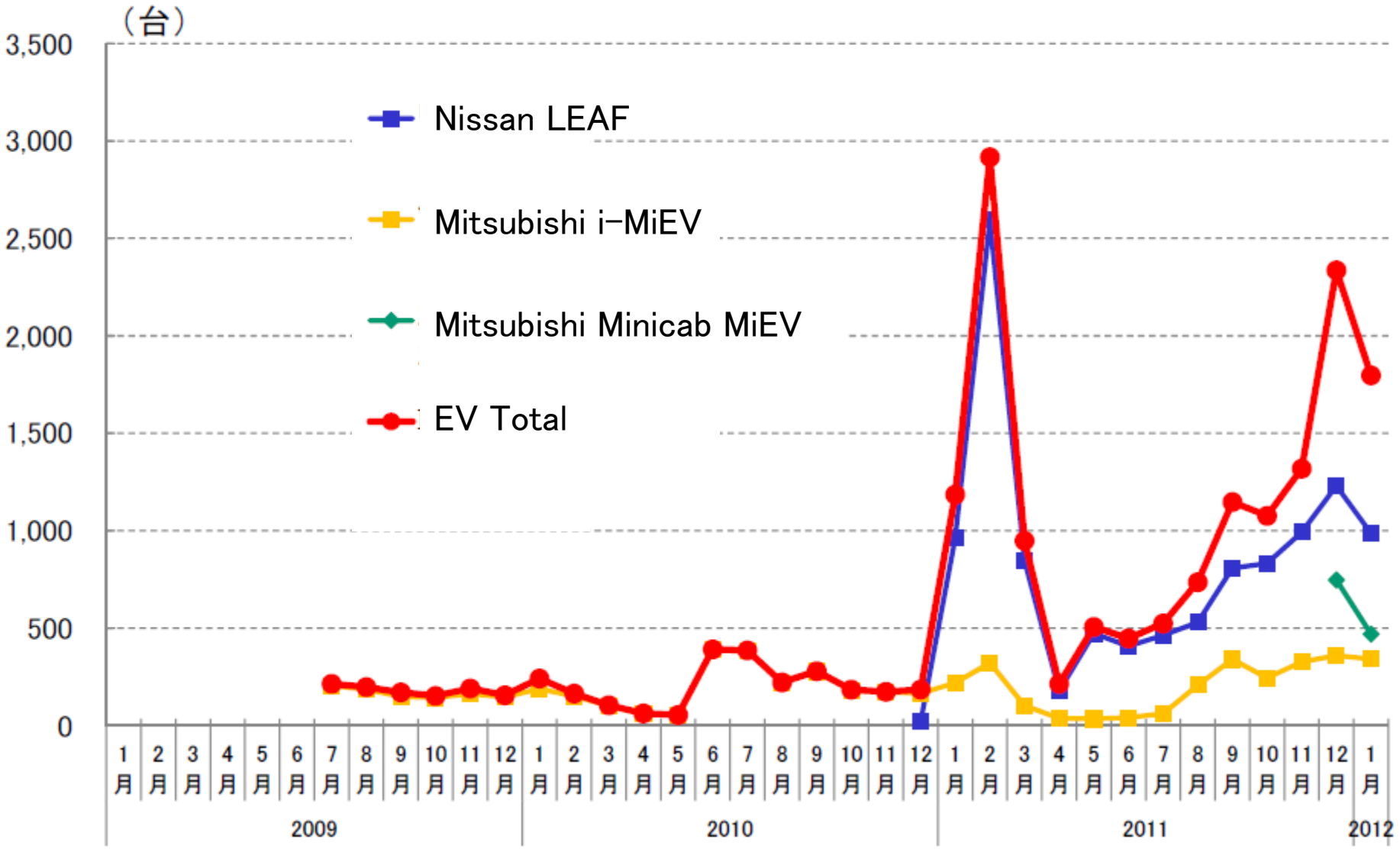
EVs have increased but were still only 1.6% of the next generation vehicle market in 2010

Japan Automobile Manufacturer's Association

Electric Vehicles

Expansion of Electric Vehicle

- EV sales reached over 1,000 monthly.



Monthly sales

Source: JAMA

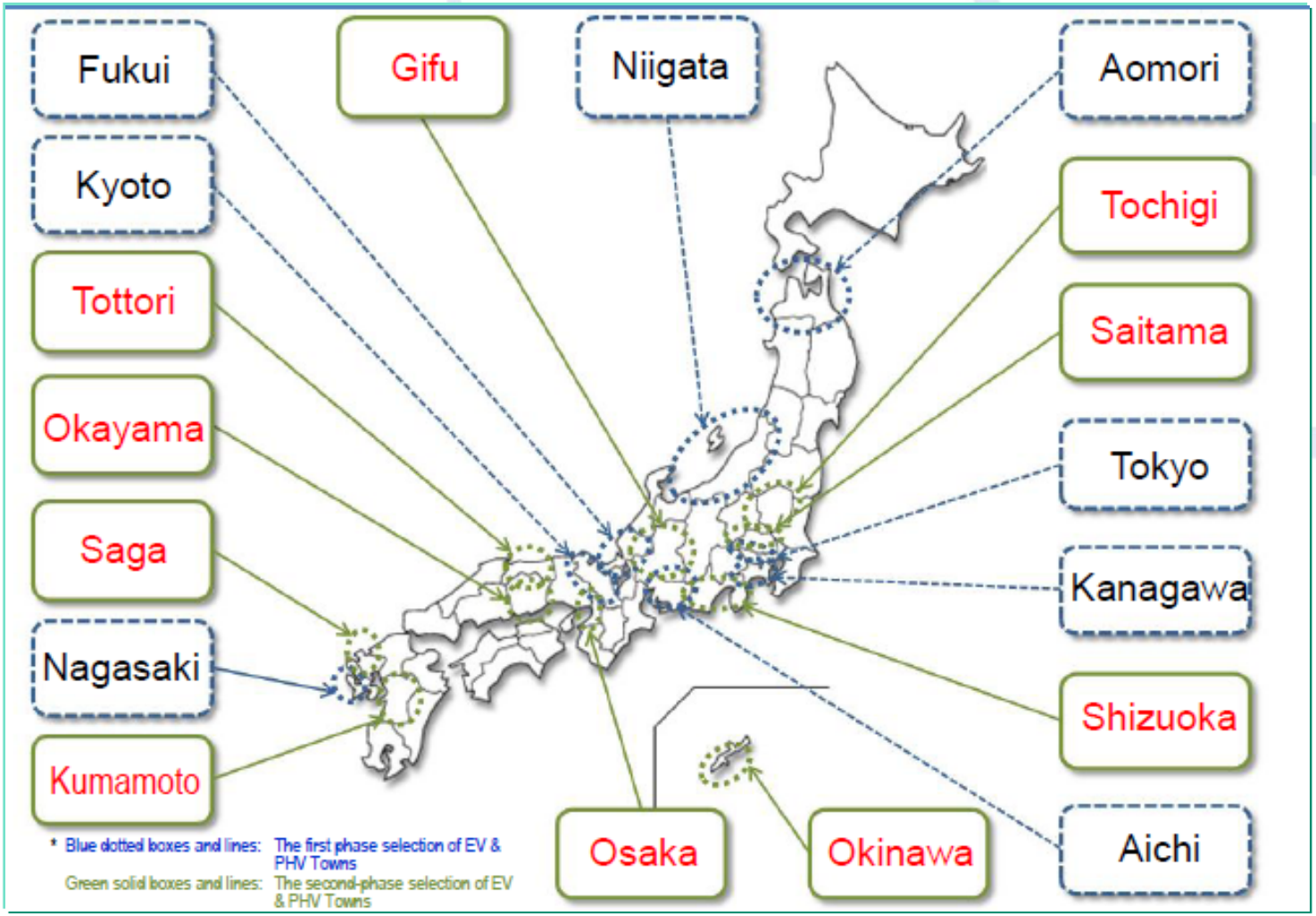
Basic direction towards diffusion of EV

Cost : creating initial demand and reducing cost by producing economies of scale

Performance: improving battery performance, promoting use of ITS（Intelligent Transport Systems）

Infrastructure: building infrastructure efficiently.

EV & PHV Towns


Fukui
Gifu
Niigata
Aomori
Kyoto
Tochigi
Tottori
Saitama
Okayama
Tokyo
Saga
Kanagawa
Nagasaki
Shizuoka
Kumamoto
Osaka
Okinawa
Aichi
* Blue dotted boxes and lines: The first phase selection of EV & PHV Towns
Green solid boxes and lines: The second-phase selection of EV & PHV Towns

The pioneering spirit of EV & PHV Towns

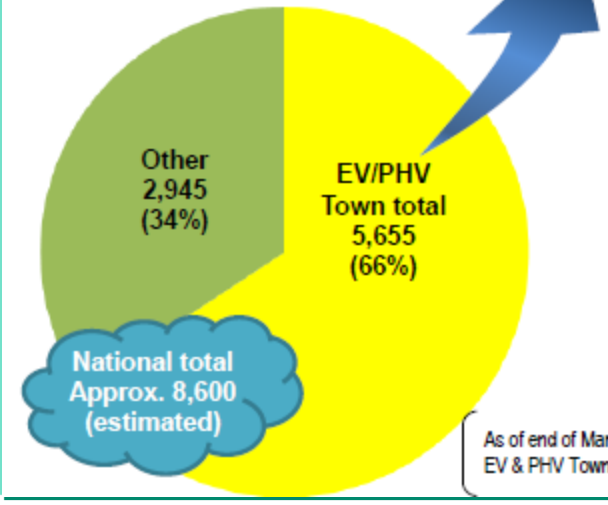
○ Because of their leading efforts to promote EV/PHV use, EV & PHV Towns are ahead of other local governments in terms of numbers of EV/PHV on the road in development of charging infrastructure.

Number of EV/PHV on the road by EV & PHV Town (vehicles)

Aichi	Aomori	Kanagawa	Kyoto	Tokyo	Nagasaki	Niigata	Fukui
579	80	1,210	197	1,030	200	168	63

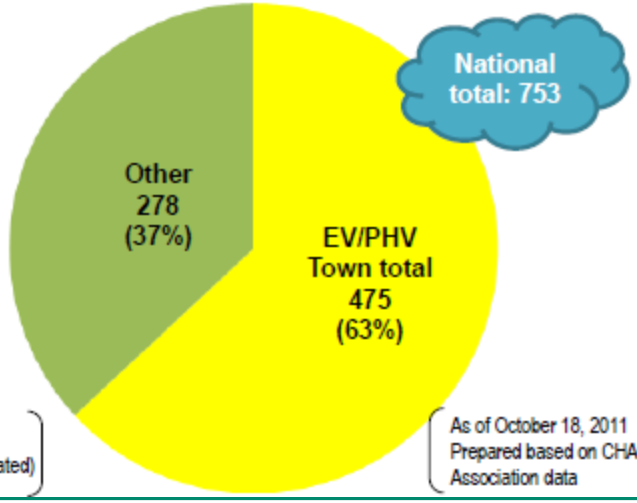
Osaka	Okayama	Okinawa	Gifu	Kumamoto	Saitama	Saga	Shizuoka	Tochigi	Tottori
491	269	300	168	81	307	40	262	146	64

No. of EV/PHV on the road



As of end of March 2011
EV & PHV Town data (partially estimated)

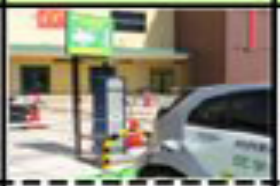
No. of quick chargers in use



As of October 18, 2011
Prepared based on CHAdeMO Association data

METI

Charging Infrastructure: Mix of private and public

Type of charging facility		Normal charging			Quick charge
		Outlet		Normal pole charger	
		100V	200V	200V	
					
Envisioned location (example)	Private	House, condominium/apartment building, office building, outside parking lot, etc.		Condominium/apartment building, office building, outside parking lot	– (Extremely limited)
	Public	Car dealers, convenience stores, hospitals, commercial facilities, pay-by-the-hour parking lots, etc.			"*Michi no Eki*" roadside stations, gas stations, expressway service areas, car dealers, commercial facilities, etc.
Charge time	Range: 160 km	Approx. 14 hours	Approx. 7 hours		Approx. 30 minutes
	Range: 80 km	Approx. 8 hours	Approx. 4 hours		Approx. 15 minutes
Sample price of chargers (not including installation cost)		Several thousand yen		Several hundred thousand yen	1 million yen or more

METI

<Classification by location of installation: Private charging>

	Location	Parking lot type		Charging type
Private charging	House	Standard ground-level		Normal charging
	Condominium/ apartment building	Standard ground level/drive-in		Normal charging
		Mechanical (two-level/multi-level)		Normal charging
	Office building	Standard ground level/drive-in		Normal charging
		Mechanical (elevator)		Normal charging
	Outside parking lot	Standard ground-level		Normal charging

EV tourism (Part 1): Kyoto EV/PHV Stories
(visiting Japan's ancient capital from a new perspective: "Kyoto Eco Tourism"

- A scheme that offers special gifts and services (commemorative items, etc.) to people who visit designated temples and shrines using eligible vehicles (EV and PHV taxis or rental cars). At the same time, taxi and rental car businesses donate a portion of their business earnings to the Kyoto Prefectural Foundation for Preserving and Conveying Cultural Heritage," which is a fund set up to preserve cultural assets within the prefecture using the "Furusato Nozei" tax system (tax payment for hometown).
- The scheme is not limited to Kyoto City. In FY2011, similar activities started in the Chutan/Tango region.

Source: METI Journal (March/April edition of 2010)

Many temples and shrines in and around Kyoto City provide special gifts and services.

Policy for the diffusion of EV

Budget in FY 2012

Battery	Development of advanced lithium-ion batteries	・US $ 26 million per year (JPN \ 2 billion) ・5-year project (FY 2012-2016)
Battery	Development of innovative (post-lithium-ion) batteries	・US $ 43 million per year (JPN \ 3.5 billion) ・7-year project (FY 2009-2015)
Infrastructure	Installation of infrastructure	・US$ 555 million (JPN \ 44.4 billion) ・1/2 of the charger price is subsidized
EV/PHV	Incentives for purchasing EV/PHV	・1/2 of the difference between the prices of EV/PHV and their base vehicle is subsidized

※ Assumption: US $1= \80