The role of EV · PHV for the realization of the smart community

Satoshi Inoue

METI, Japan

January 8, 2013

1. Background and Current situation

Automobile Industry in Japan

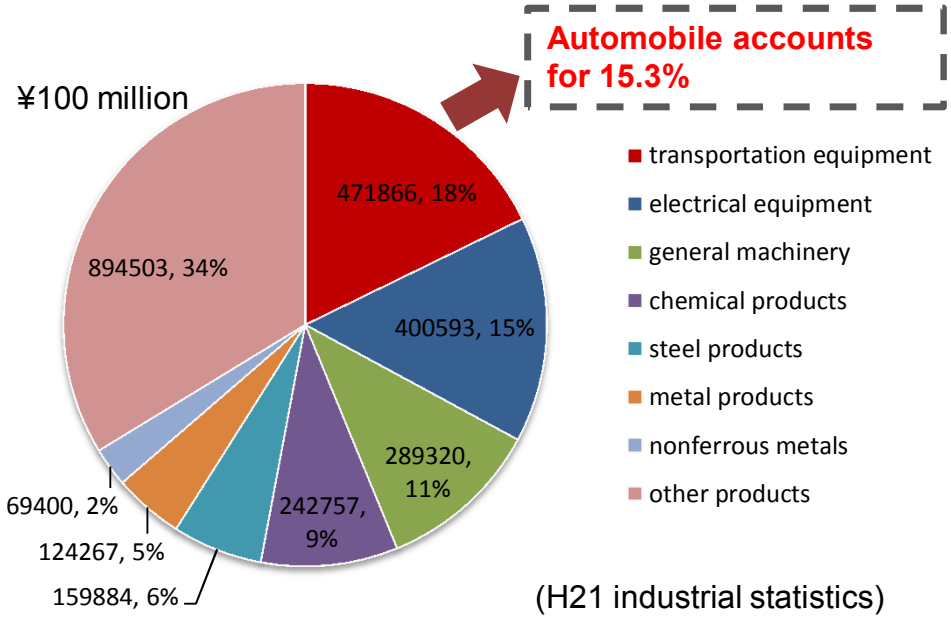
Shipments by the automobile industry accounts for 15% of the total for all industries. Its production volume amounted to 40 trillion yen. Automobile and related industries are producing 10% of the entire working population.

1.Shipment value (manufacturing)

15% of the total for all industries

◆Shipment value (all manufacturing)
265 trillion yen

◆Automobile Industry:
40 trillion yen



(H21 industrial statistics)

2. Employment

10 % of the entire working population

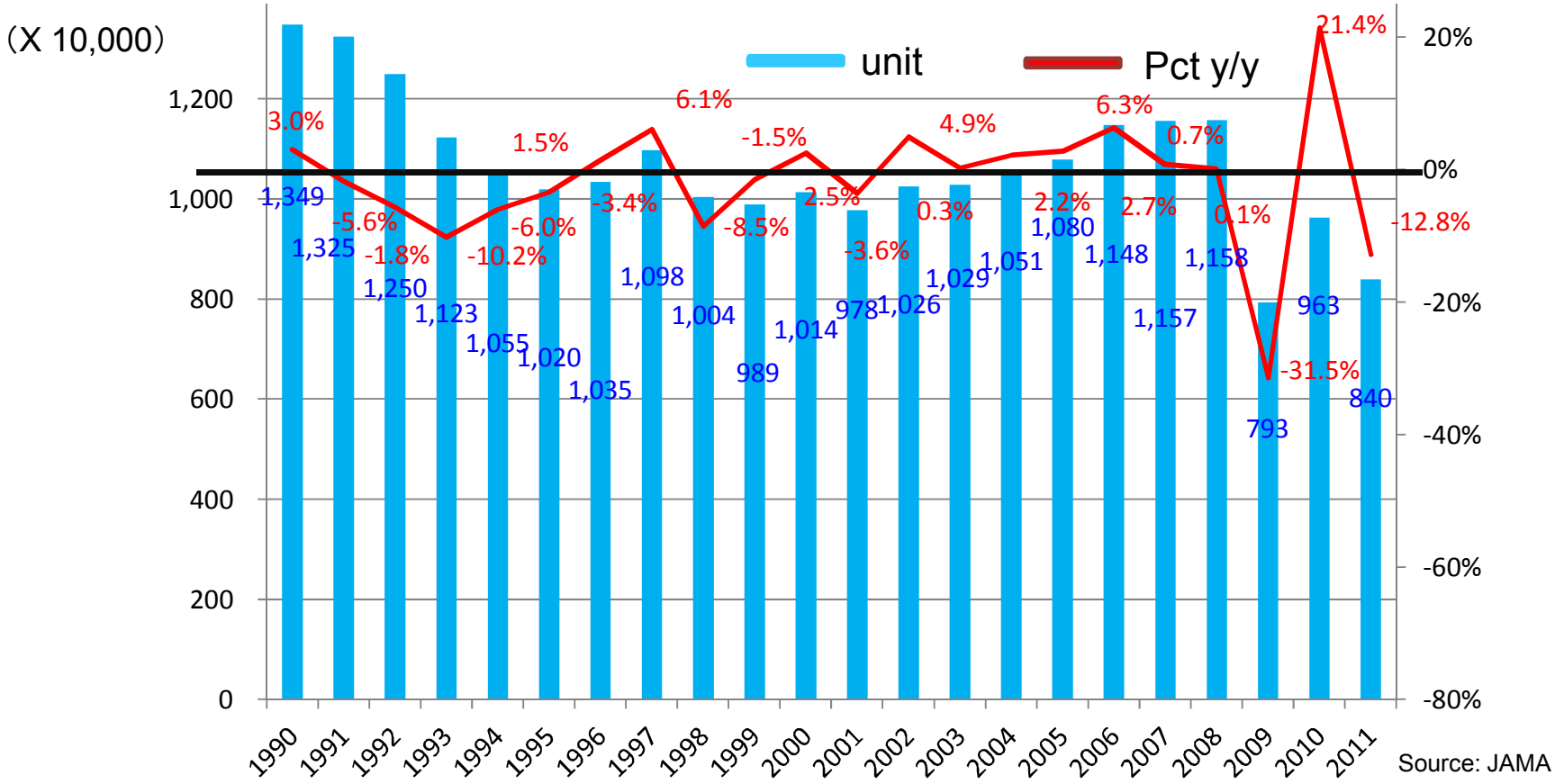
◆entire working population :
62.8 million

◆manufacturing: 10 million

◆automobile related: 5.32 million

Automobile domestic production

- Automobile domestic production level had been maintained over 10 – 11 million.
- After Lehman's fall in 2009, the production level in 2010 was below 10 million.
- In the situation of slumping trend of domestic market and prolonged strong yen, it is very hard to keep domestic production level.

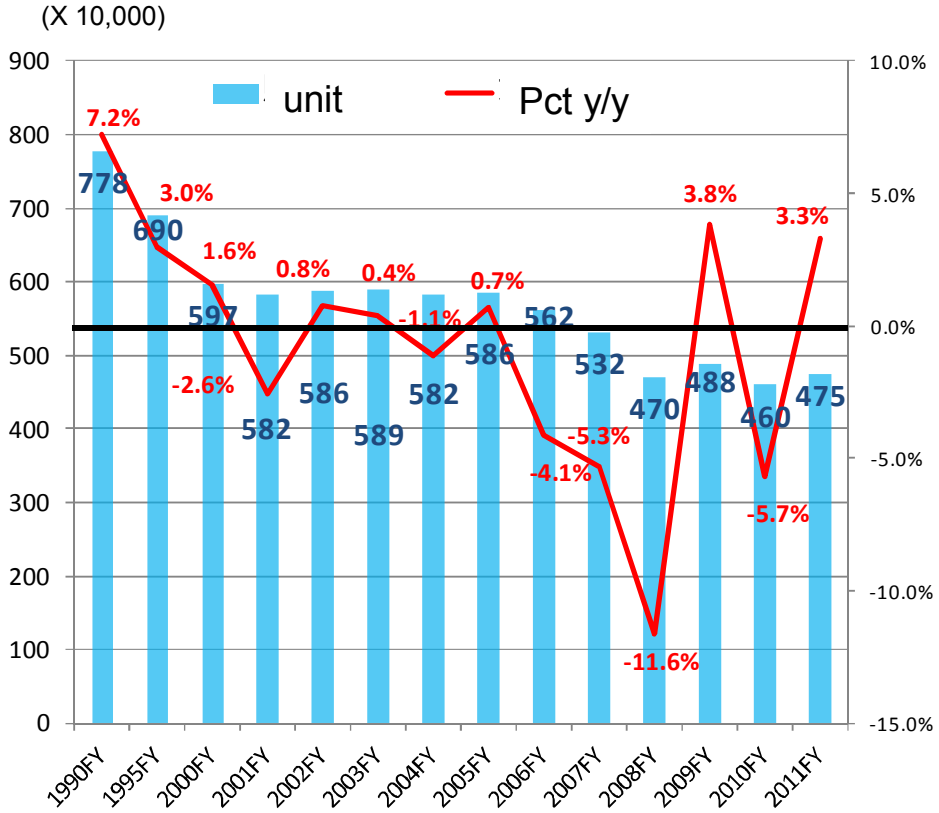


Source: JAMA

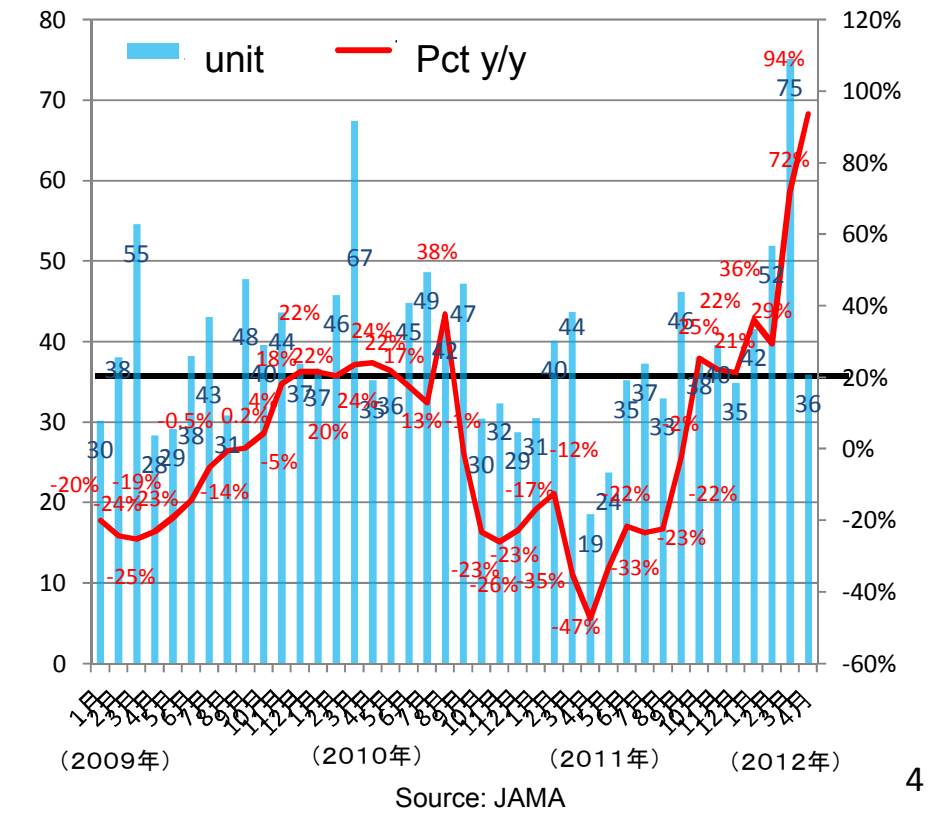
Automobile domestic sales

- domestic automobile sales have been on the decline. In 1990 domestic sales reached 8 million, meanwhile these days the sales level have been under 5 million.
- If domestic market continue to shrink, Japan will lose the attractiveness as production base.

Yearly new vehicle sales



Monthly new vehicle sales



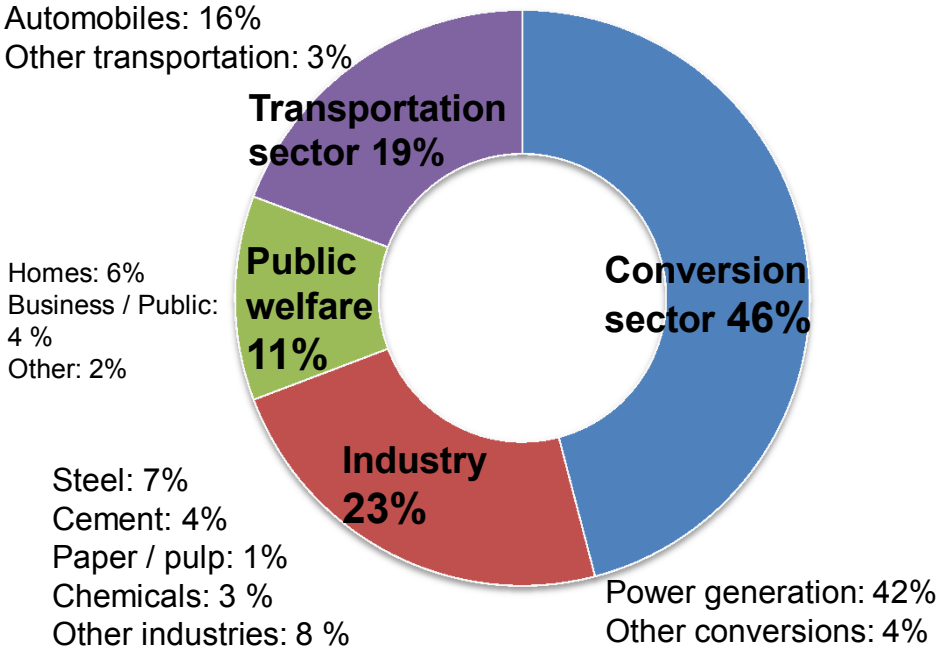
Source: JAMA

2. Basic strategy

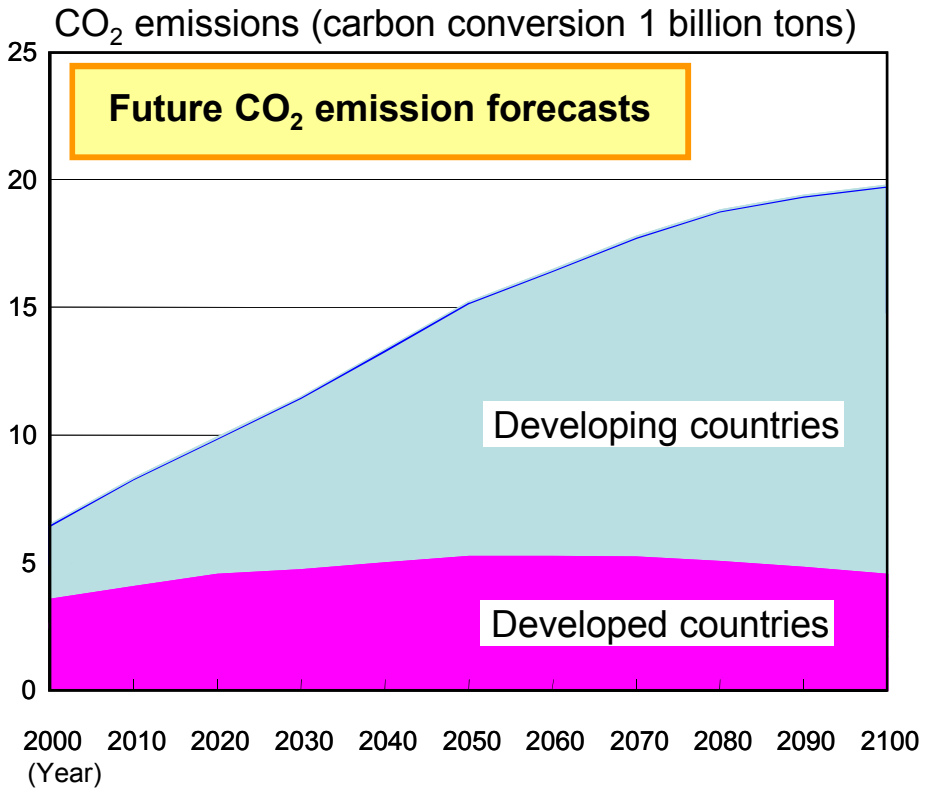
CO2 Emissions in the World and Future Forecasts

Global CO_2 emissions need drastic cutting. The transportation sector accounts for around 20% of CO_2 emissions and reduction efforts are needed from this sector as it is a major source of emissions. Developed countries should of course push ahead with reductions, but under the principle of differences in common responsibilities, there are growing global expectations that developing countries should also press ahead with efforts to reduce emissions.

Sector-wise percentages of CO_2 emissions (global basis) (2005)



[Source] Institute of Energy Economics, Japan based on IEA statistics



Source: Kainuma, et al., 2002: *Climate Policy Assessment*, Springer, p. 64

Next-Generation Vehicles

EV

Electric Vehicles

PHV

Plug-in Hybrid Vehicles

FCV

Fuel Cell Vehicles

HV

Hybrid Vehicles

CD

Clean Diesel vehicles

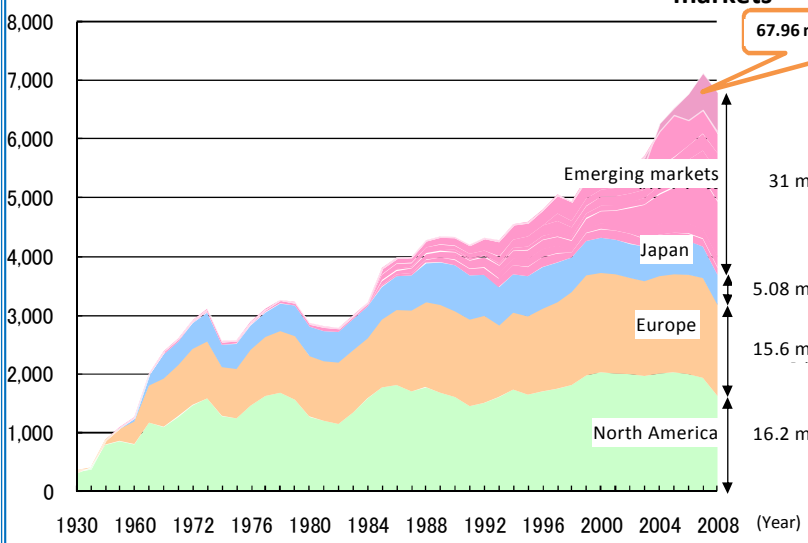
CNG

Compressed Natural Gas vehicles

Next-Generation Vehicle Plan 2010 (Outline)

Structural change in the auto market

- Rapid growth of emerging markets and trends toward green vehicles in developed markets



31 mil.

(2) Emerging markets
- Increase in the vehicle-buying population, along with economic development

Emergence of ultra-low-price vehicles

5.08 mil.

15.6 mil.

16.2 mil.

(1) Developed markets
- Mature, stable markets
- Diversifying users and social needs

Trends toward greater fuel efficiency Potential need to use different-power trains for different markets

External factors affecting the auto industry

Great changes in the competition environment
- Alliance based on environmental technology

Energy constraints
- High oil prices in the medium-to- long term

Global warming prevention
- Target of reducing GHG by 25% from the 1990 level by 2020

New industry
- Making EVs and batteries the growth driver

Six Plans

	Overall plan	Batteries	Rare metals	Infrastructure	Systems	International standards
Targets	next-gen. vehicle development and production	Secure battery R&D and technology	Secure rare metals and build resource recycling systems	Install 2 mil. normal chargers & 5,000 quick chargers	vehicles with systems (smart grid, etc.)	strategic international standardization
Action plan	• Set diffusion targets (for 2020/2030) - Next-generation vehicles account for up to 50% in 2020 - Advanced eco-friendly - vehicles (next-generation vehicles + eco-friendly conventional vehicles) account for up to 80% in 2020 • Diversify fuels • Higher-value-added parts • Promote the siting of low-carbon industries	• Improve performance of lithium-ion batteries • Develop post-lithium-ion batteries • Achieve economies of mass production by promoting EVs • Create an environment for secondary use of batteries	(Upstream) • Strategically secure rare metals (Middle course) • Develop batteries and motors free of rare metals (Downstream) • Establish battery recycling systems	• Build infrastructure intensively and systematically during the market preparation phase - Mainly in EV/PHV towns • Pave the way for full-scale diffusion - Compile EV/PHV town best practice handbook - Collaborate with the private sector (CHAdeMO Association)	• Create new business models in EV/PHV towns. • Verify systems through the Next-Generation Energy and Social System Demonstration program. • Promote international standardization and business development based on the verification results	• Establish international standards for battery performance and safety evaluation methods. • Establish international standards for charging connectors/systems. • Enhance public-private organization for standardization. • Develop human resources for standardization
		Battery R&D Target (set in 2006)	Resource Strategy Roadmap	Infrastructure Development Roadmap	International Standardization Roadmap	

Next-Generation Vehicle Plan 2010 (Diffusion Projections for 2020 and 2030; Government Targets)

Diffusion projections by type of vehicle (with private-sector efforts)

- Diffusion projections assuming private-sector efforts (scenario where auto makers make the utmost efforts to improve fuel efficiency and develop next-generation vehicles) were made.
- Next-generation vehicles will account for less than 20% of new vehicle sales in 2020 and 30-40% in 2030.

	2020	2030
Conventional vehicles	**80% or more**	**60 - 70%**
Next-generation vehicles	**Less than 20%**	**30 - 40%**
Hybrid vehicles	10 - 15%	20 - 30%
Electric vehicles Plug-in hybrid vehicles	5 - 10%	10 - 20%
Fuel-cell vehicles	Miniscule	1%
Clean diesel vehicles	Miniscule	- 5%

Diffusion targets by type of vehicle (government targets)

- The government has set diffusion targets to pursue for each type of vehicle for accelerating the spread of next-generation vehicles.
- Next-generation vehicles should account for up to 50% of new vehicle sales in 2020.
- To achieve this target, the government should provide effective incentives.

	2020	2030
Conventional vehicles	**50 - 80%**	**30 - 50%**
Next-generation vehicles	**20 - 50%**	**50 - 70%**
Hybrid vehicles	20 - 30%	30 - 40%
Electric vehicles Plug-in hybrid vehicles	15 - 20%	20 - 30%
Fuel-cell vehicles	- 1%	- 3%
Clean diesel vehicles	- 5%	5 - 10%

Necessity of advanced eco-friendly vehicles

Expected model changes	•Only 1-2 changes expected by 2020
Secure international competitiveness	•Continued dominance of conventional vehicles in international, especially emerging, markets.
Risk for auto makers	•High risk involved in focusing on specific technologies, due to variations in diffusion projections
Higher costs arising from the use of advanced technologies	•Even if green vehicles are available, whether to buy them depends on users.
Effects of eco-friendly-vehicles subsidies and tax breaks	• Apr. 2009: Eco-vehicles account for 42.5% (next-generation vehicles 5.7%) •Feb. 2010: Eco-vehicles account for 73.1% (next-generation vehicles 9.3%)

The government seeks to make advanced eco-friendly vehicles account for 80% of new vehicle sales in 2020, provided that effective policy support is offered.

Advanced eco-vehicles ("post-eco-vehicles")

Next-generation vehicles
HV, EV, PHV, FCV, CDV, CNG, etc.

+

Future conventional vehicles whose eco-friendly features are excellent in light of the technical standards of the time

Next-Generation Vehicle Plan 2010 (Roadmap)

Battery R&D Targets (set in 2006)

	2006	Improved battery (2010)	Advanced battery (2015)	Innovative battery (2030)
	Small EVs for power companies	Commuter EVs for limited use High-performance HVs	Commuter EVs for general use Fuel-cell vehicles Plug-in HVs	Full-fledged EVs
Performance	1	1	1.5-fold	7-fold
Cost	1	1/2	1/7	1/40
Development structure	Led by private sector	Led by private sector	Government-industry-academia collaboration	Universities & research institutes

(1) Development of advanced lithium-ion batteries (FY 2007-2011)

· Aim to improve the performance, and reduce the cost, of lithium-ion storage batteries as the power source of hybrid and electric vehicles.

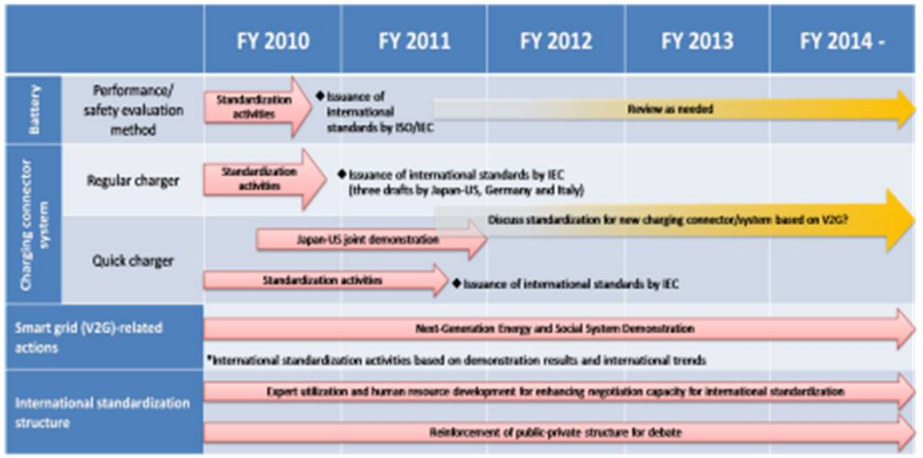
· FY 2010 budget: ¥2.48 billion (FY 2009 budget: ¥2.61 billion)

(2) Development of innovative batteries (post-lithium-ion batteries)(FY 2009-2015)

· Aim to elucidate the reaction mechanism of the storage battery through comprehensive joint studies by government, industry and academia ,and become the front-runner in post-lithium-ion battery development.

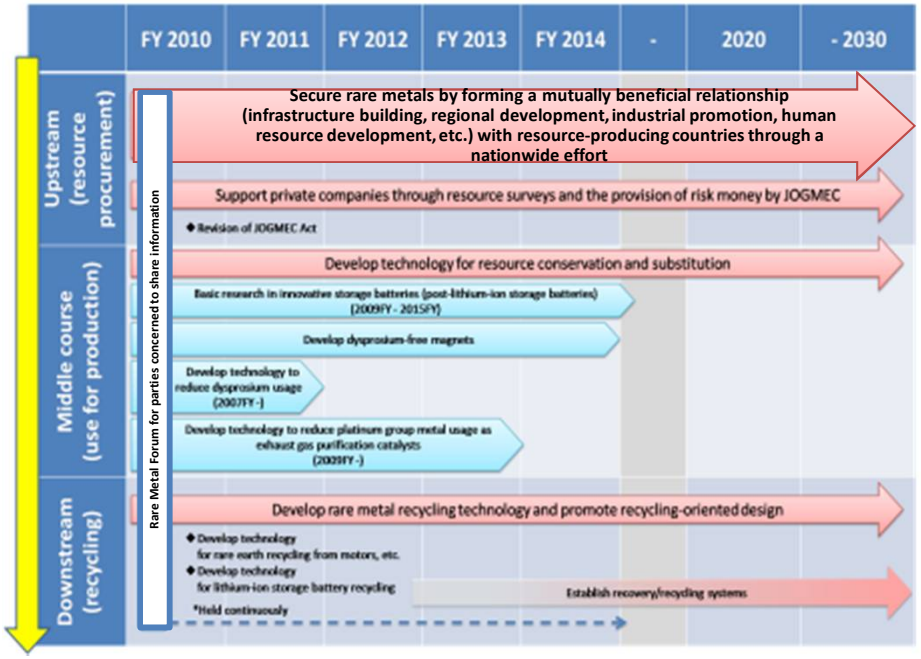
· FY 2010 budget: ¥3 billion (FY 2009 budget: ¥3 billion)

International Standardization Roadmap

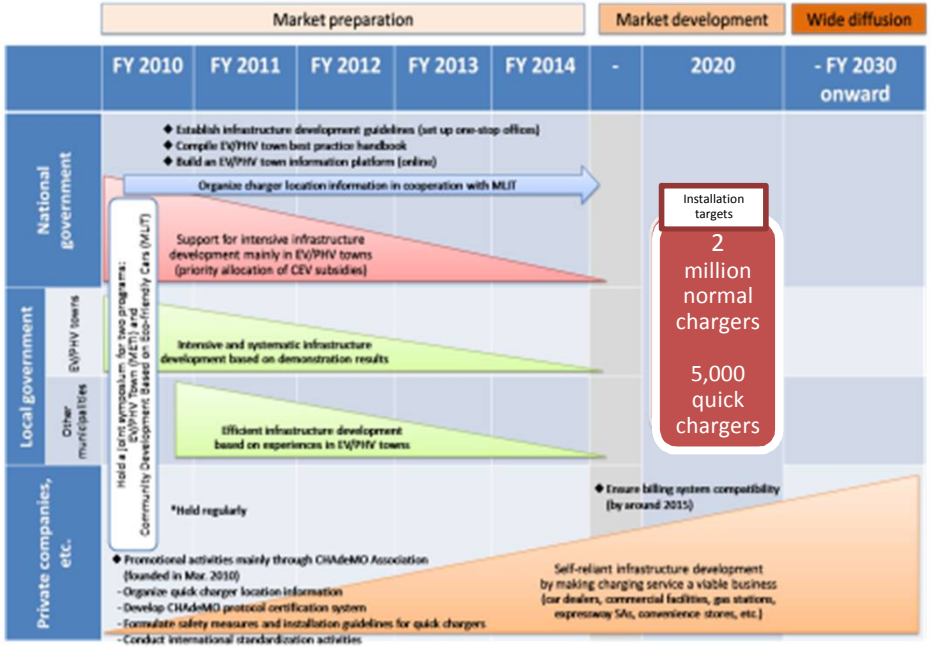


* Need for flexible actions according to international trends and technical development

Resource Strategy Roadmap



Infrastructure Development Roadmap



Outline of the Interim Report of the Strategy Study Group on the Automobiles contributing to the renaissance of Japan's economy

1. Show new roles and agendas of vehicles and automobile industry under new environment of Japanese society after the quake for the recovery of Japan's economy

2. Show lessons from interruption in the supply chain and show agendas towards resilient supply chain which are coincident with risk reduction and cost control

3. Show agendas for maintaining and vitalizing the domestic production damaged by much of impediments including electric shortage after the quake

Discussing in the Study Group, consisted of executives of the automobile industry, the materials and parts industries, academic experts, the public & private sector share of perception and agendas.

① Correspond with the new social challenges after the disaster including energy constraints

② Rebuild a resilient supply chain which are coincident with risk reduction and cost control

③ Revitalize Japan's auto market and domestic production

1. Coping with new social issues such as energy constraint in post-earthquake Japan

New role as coordinator off energy supply and demand for electric vehicles (EV), plug-in hybrid vehicles, and fuel cell vehicles due to the earthquake and energy constraints

1st Step

Securing power supply function

Realization of power supply function in case of emergency by equipping with AC converter

2nd Step

Establishment of decentralized, independent bases (enhancement of ability to cope with disaster)

Combination of next-generation automobiles and public facilities equipped with decentralized power sources such as solar power generation

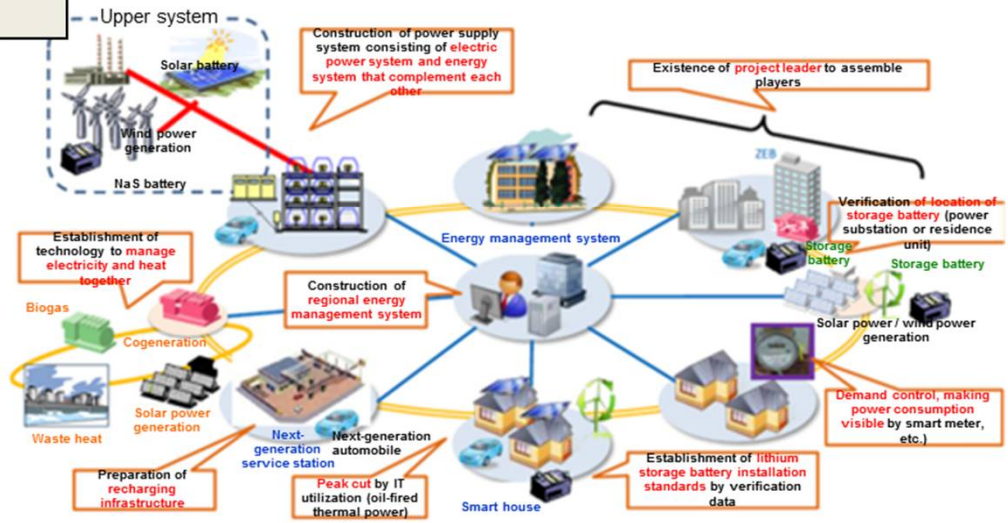
3rd Step

Linkage with smart grid

(Introduction of renewable energy, enhancement of supply coordination function)

New ranking of next-generation automobiles equipped with large capacity storage batteries for urban renewal with built-in, full-fledged smart grids

Coping with new social issues such as integration with smart grid



Proceed as follows to cope with new social issues in post-earthquake Japan:

Next-generation automobile strategy thorough investigation of 2010

- Active implementation of clean energy motor vehicle subsidy
- Consider extension of ecologically-friendly car tax break scheduled to end in April 2012

Government targets of next-generation automobile strategy

	2020	2030
Conventional vehicle	50 ~ 80%	30 ~ 50%
Next-generation motor vehicle	20 ~ 50%	50 ~ 70%
Hybrid automobile	20 ~ 30%	30 ~ 40%
EV Plug-in hybrid vehicle	15 ~ 20%	20 ~ 30%
Fuel cell automobile	~ 1%	~ 3%
Green diesel vehicle	~ 5%	5 ~ 10%

Popularization of next-generation automobiles and ecologically-friendly car required

Enhanced competitiveness of battery industry

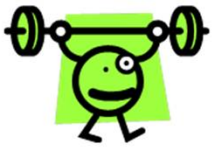
- Promotion of research and development of on-board lithium ion batteries for motor vehicles
- Fostering of a competitive on-board vehicle battery by standardization of specifications
- Training and education of personnel and investment of resources to enhance international standardization strategy
- Preparation of rules for reuse of lithium ion batteries

Winning over global completion

Exhibition of role of supply and demand adjustment function for electric power system

- Step 1: Secure power supply function
- Step 2: Prepare decentralized independent bases
- Step 3: Linkage with "smart grid"

Next-generation automobiles with storage battery function support electric power system



Support for diverse energy sources

- Preparation of hydrogen stations for introduction of fuel cell vehicles

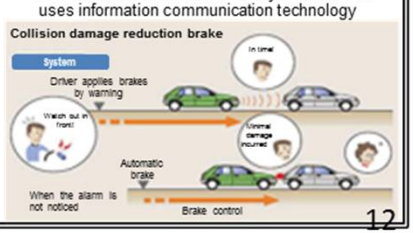
Preparation of infrastructure for FCV introduction around 2015

Coping with aging population and knowledge-oriented economy

- Development and popularization of secure mobility for elderly drivers
- Creation of new services by connecting motor vehicles by network, acceleration of studies of interface for it

Example of commercialized advanced safety vehicle technology

* Advanced safety vehicle (ASV): Automobile with advanced safety function that uses information communication technology



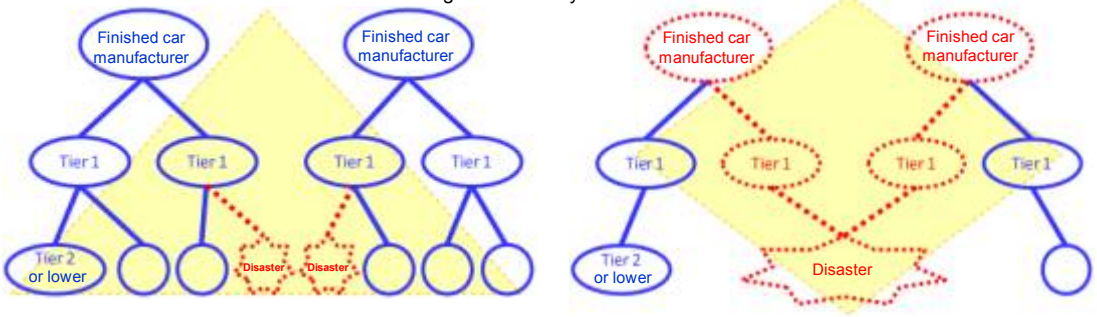
2. Reconstruction of robust supply chain and enhancement of competition in the parts and materials industry

Problem 1: Streamlining the entire supply chain invited centralization of core parts and materials.

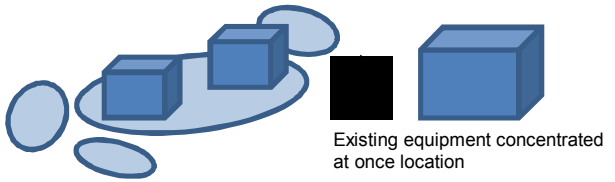
Problem 2: Excessive pursuit of unique specifications invited centralization of production bases and reduction of new investment.

Pyramid configuration → Diamond configuration

Subcontractor structure streamlined for higher efficiency and lower cost



Because specifications differ for each model and for each manufacturer, along with further centralizing suppliers in order to support small lot production while reducing cost, encouraged the centralized suppliers to centralize production bases and reduce new investment.



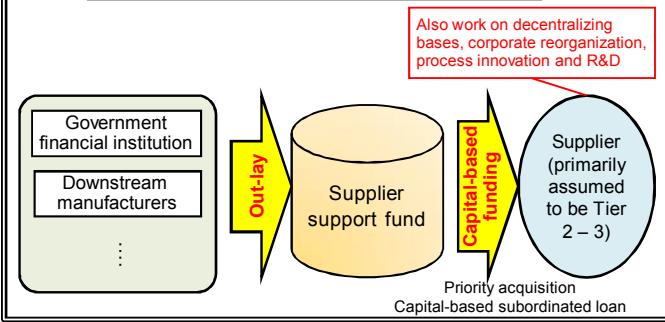
Existing equipment concentrated at once location

Proceed as follows to enhance ability to handle risk while not sacrificing ability to compete globally:

Enhancement of suppliers' economic infrastructure

- Observation of future recovery trends, end of support such as 2-step loans
- Importance of investing in decentralization of production bases
- Joint construction of capital-based funding for parts and materials manufacturers by government and private sector

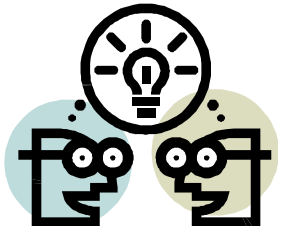
Scheme for providing suppliers with capital-based funding (example)



Balanced specifications, part organization and sharing

- Construction of platform to study specifications / part organization and sharing after confirming current state and preparing an opportunity for discussion that transcends industry segments by the automobile / parts and materials industries.

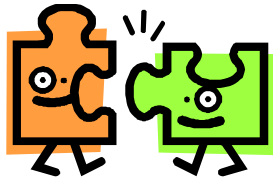
Review of specifications preconditioned upon enhanced competitiveness



Development and introduction of new parts and materials by linking upstream and downstream operations

- Promotion of research and development oriented toward introduction of new parts and materials such as carbon fibers and dysprosium-free magnets to mass-produced vehicles whereby upstream (parts/materials), middle-stream (production/machining) and downstream (completed parts) are combined into a single entity.

Improved ability to conduct research and development that can make attractive proposals for downstream manufacturers



3. Maintenance and enhancement of domestic production system

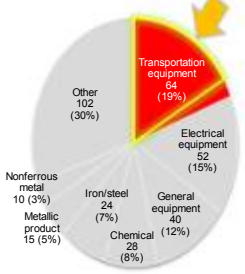
The automobile industry accounts for 20% of the shipment value of the nation's manufacturing industry and 10% of the working population. The production ripple effect of the industry is also significant. Maintaining the scale of production is important for maintaining employment.

Automobile industry accounts for **20%** of the shipment value of the manufacturing industry.

◆ Manufacturing industry shipment value: ¥336 trillion

Unit: Trillion yen

Of which automobiles account for ¥57 trillion (17%)



Industrial statistics for 2008

Automobile industry accounts for **10%** of the working population.

Working population	63.76 million
Automobile industry	5.15 million
Manufacturing sector	0.87 million
Usage	2.73 million
Related	0.31 million
Materials	0.23 million
Sales	1.01 million

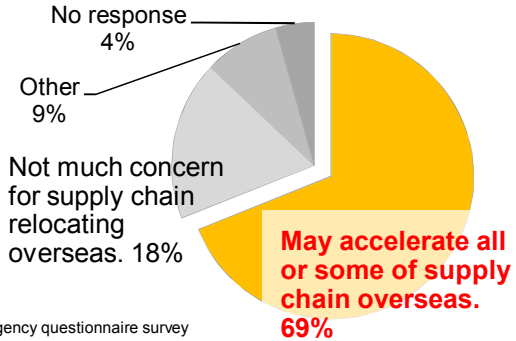
Maximum production ripple effect

Passenger vehicles	Iron/steel	Synthetic resin	Electronic/ electrical eqpt. for commercials	Total production avg.
3.02	2.68	2.27	2.26	1.92

Basic Inter-industry relations table, 2008

Accounts for 70% of "may accelerate relocation overseas" responses.

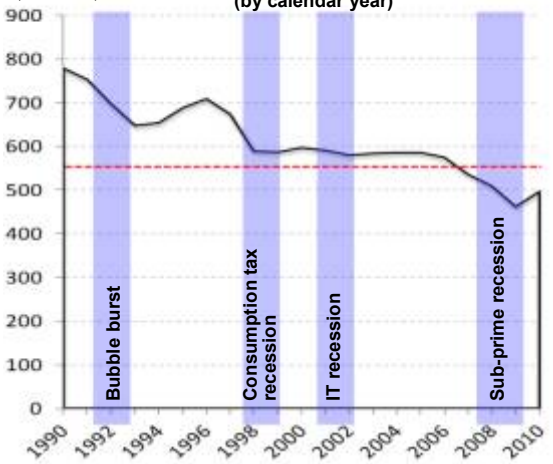
Question: Will the earthquake accelerate relocation of the supply chain overseas?



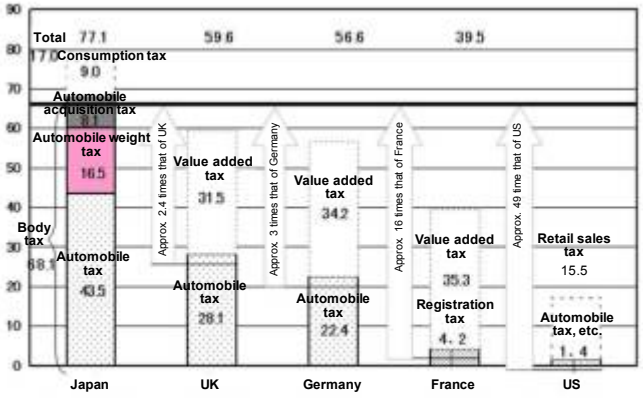
Emergency questionnaire survey concerning state of supply chain restoration or hollowing out following the Great East Japan Earthquake.

The domestic new automobile sales market has been shrinking year by year. If the trend continues, it will become more difficult to maintain domestic production and employment.

Transition of domestic new vehicle registrations (by calendar year)



Complicated and excessive tax burden at acquisition, retention and traveling stages. Factor behind stagnation of new vehicle sales.



Preconditions: (1) displacement: 1800 cc, (2) weight: less than 1.5 t (1320 kg), (3) JC08 fuel consumption: 13.4km/L (CO_2 emission: 173 g/km), (4) body price: ¥1.8 million, (5) Paris in the case of France; New York City in the case of US, (6) tax HP 8 for France, (7) 11 years of usage (avg. life), (8) exchange rate: 1 euro = ¥115, £1 = ¥137, $1 = ¥87 (avg. of April 2010 – March 2011)
*Special measures such as eco-car tax break in Japan not taken into account.

Proceed as follows to maintain domestic production and employment:

Revitalization of domestic market by reducing vehicle body tax

- Discontinuation of automobile acquisition tax
- Simplification and reduction of automobile weight tax and motor vehicle tax (light motor vehicle tax)
- Consider extension of ecologically-friendly car tax break scheduled to end in April 2012

Equal footing in terms of competition conditions

- Promotion of "Japanese domestic investment promotion program" to improve the working environment such as rising value of the yen, corporation tax, labor environment, environmental problems, EPA, etc.
- High-level economic cooperation based on "basic policy toward comprehensive economic cooperation"

Enhanced cost-competitiveness by production revolution

- Initiatives for reducing cost of domestic production

Example: Central automobile "horizontal line"
By lowering some vehicles bottom from the ceiling so they flow in the line horizontally, **equipment investment can be reduced by 40%; work time can be also be reduced and the line can be shortened** as well.

Japan‘s revival strategy （Cabinet decision）

- The highest priority, the recovery from the earthquake and Fukushima playback
- At an average of fiscal 2020, we aim to about 2% real growth rate and the nominal growth rate of about 3%
- Basic philosophy is "opening up the frontier, to the country of co-creation“
- Preferentially performed three areas Green (Energy and Environment), life (health), agriculture, forestry and fishery (6th industrialization). Actors SMEs
- Clarified growth strategies (11) and key initiatives (38)

Key Measures of green growth strategy

- Realization of the green material that will support green growth
- Win in the global market for next-generation vehicles
- Safely in the construction of society and the creation of new markets by promoting the introduction of emergency storage battery
- Strategic development and use of the ocean by the Green Innovation
- Overseas expansion and construction of smart communities to achieve local production for local consumption of energy

Win in the global market for next-generation vehicles

- Accelerated spread utilizing support the introduction of next-generation vehicles
- Promotion of technology development and infrastructure of next-generation vehicles
- Market creation of very small mobility
- Creation of a new function in fusion with information technology
- Development of international regulations and promotion of international standardization

Performance targets to be achieved by 2020

- ✓ Up to 50% the proportion of next-generation vehicles accounted for sales of new cars
- ✓ Normal charger → 2 million
- ✓ Quick charger → 5000

３．The role of EV・PHV for the realization of the smart community

（１）Background and Current situation

Competition to Create Smart Cities Around the World

■ Progress is being made on plans for competition to create smart cities around the world, including Japan.

■ The market for smart cities around the world is expected to reach 200 trillion yen in 2020, and 230 trillion yen in 2030. (Source: Results of estimations by Nikkei BP Clean Tech Institute)

Sino-Singapore Tianjin Eco-city (Tianjin)
Period: 2008 to 2020
Budget: 2.4 trillion yen
Participating companies: Keppel from Singapore, TEDA from Tianjin, Hitachi Ltd., etc.

Masdar City (Abu Dhabi)
Period: 2006 to 2020
Budget: 1.8 trillion yen
Participating companies: Siemens from Germany, GE from the US, Mitsubishi Heavy Industries, etc.

Zero energy building constructed in the Lyon urban development area **(ZEB)**.

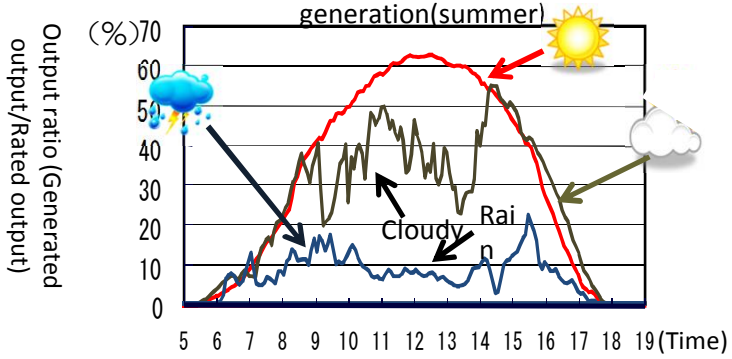
Nissan Motor is developing a system where energy can be supplied to households **(V2H)** from lithium ion batteries equipped in Leaf. This system has been publicized through "KANKANKYO," which are demonstration houses by Sekisui House. (August 2011)

Energy Situation and Smart Communities After the Disaster

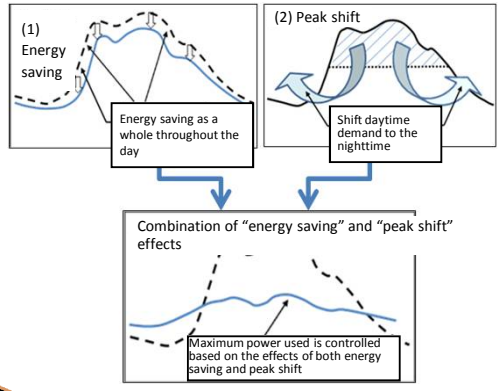
■ As output of renewable energy such as sunlight fluctuates greatly, issues such as insufficient wavelength adjusting power and an increase in voltage of the power network due to large influxes arise.
■ After the earthquake disaster, saving energy and cutting back during peak hours became an urgent issue for power networks, and ensuring supply of energy during disasters also became a challenge.
■ The solution to these kinds of problems is an efficient system for energy, including electricity, heat, and transportation, otherwise known as a “smart community.”

1. Due to large-scale induction of renewable energy, ensuring the quality of electricity, such as voltage and frequency, becomes a problem

◆Example of output fluctuation of solar power generation(summer)



2. After the disaster, saving energy and cutting back during peak periods became issues.

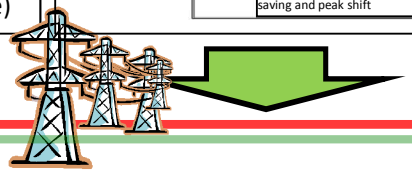


3. Sales of products that promote safety.

V2H
System where electricity can be supplied to residences from lithium ion batters equipped in Leaf

Capacity	Price
1kWh	¥870,000
2.5kWh	¥1,890,000

Yamada Denki
(Edison power)



Smart grids


Smart meters


HEMS


Secondary cell


EV

Efficient use of electricity based on IT technology and secondary cells

Smart communities


Co-generation


Fuel cells


Car sharing

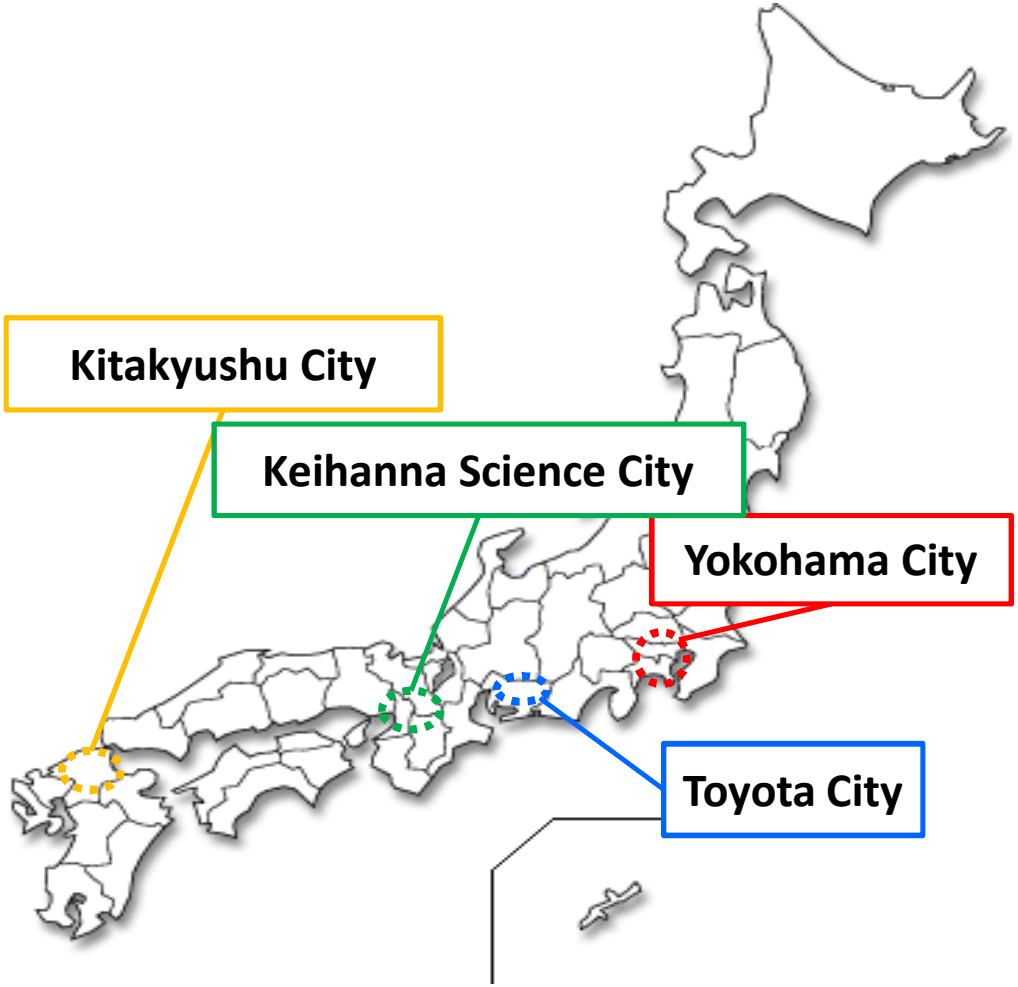
Efficient use of energy that includes electricity, heat, and transportation

3. The role of EV · PHV for the realization of the smart community

（2）Efforts in Japan

Demonstration of Smart Communities in Japan

■ Starting in FY2011, large-scale smart community demonstration projects have been ongoing in 4 regions across Japan that constitute representative examples of various patterns, based on participation by many residents, local governments, and corporations.



Yokohama City	Wide-area metropolis Introduction of an energy management system for an existing wide-area metropolis. As the sample number is high (4,000 households), demonstration using a variety of hypotheses is possible.
Toyota City	Separated housing Automatic control of home appliances in 67 homes. Secondary cells equipped in vehicles are used to supply energy to households. Approaches for drivers to alleviate congestion.
Keihanna	Housing development Demand response demonstration based on a point system is being implemented for general households (approximately 700 households) where PV or HEMS automatic control has not been introduced.
Kitakyushu City	Designated supply area In an area where power is supplied by Nippon Steel Corporation, a pricing system where the power price fluctuates for 2 hours afterwards in accordance with the state of supply and demand of energy for the day, applicable to 50 business establishments and 230 households, is being implemented.

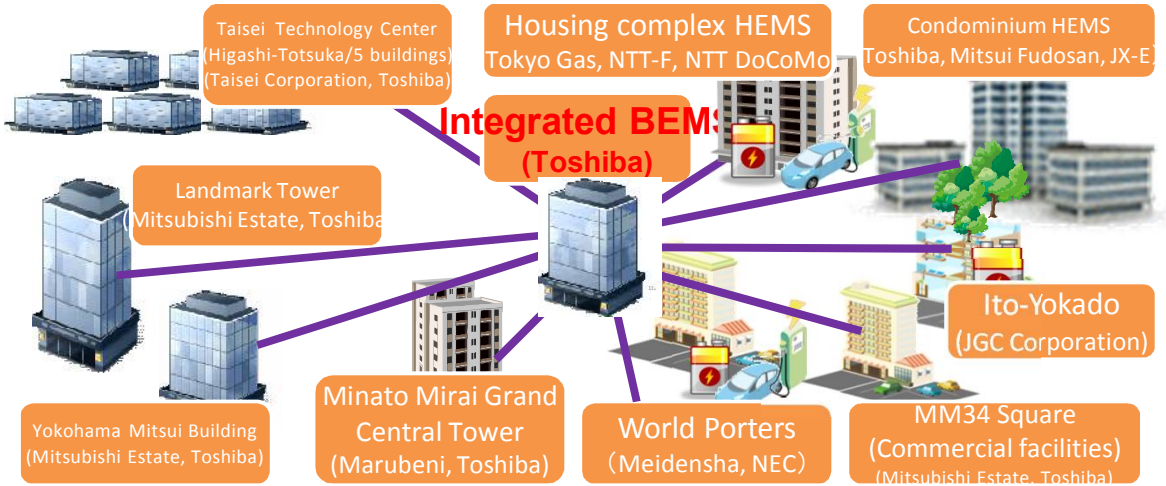
Demonstration in Yokohama City

MEMS

- Solar power generation, fuel cells, solar heat, EV, etc. have been introduced into housing complexes, and demonstration where interchange of power and heat within residential buildings is carried out was initiated in April of this year.
- Aim for a reduction of approximately 40% in energy usage through introduction of renewable energy and distributed energy, interchange of electrical heat/integrated control, and introduction of HEMS (Tokyo Gas company housing).
- Aim for a self-sufficiency rate of 80% or higher for electrical power energy (JX Nippon Oil & Energy company housing).

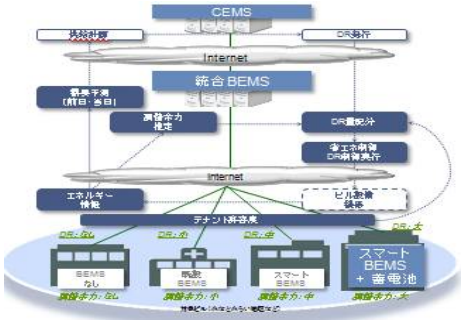
Integrated BEMS

- "Integrated BEMS" where multiple buildings are managed in an integrated manner was developed, and connection will be initiated sequentially this FY.
- Aim for approximately 10% more energy-saving than regular energy-saving buildings

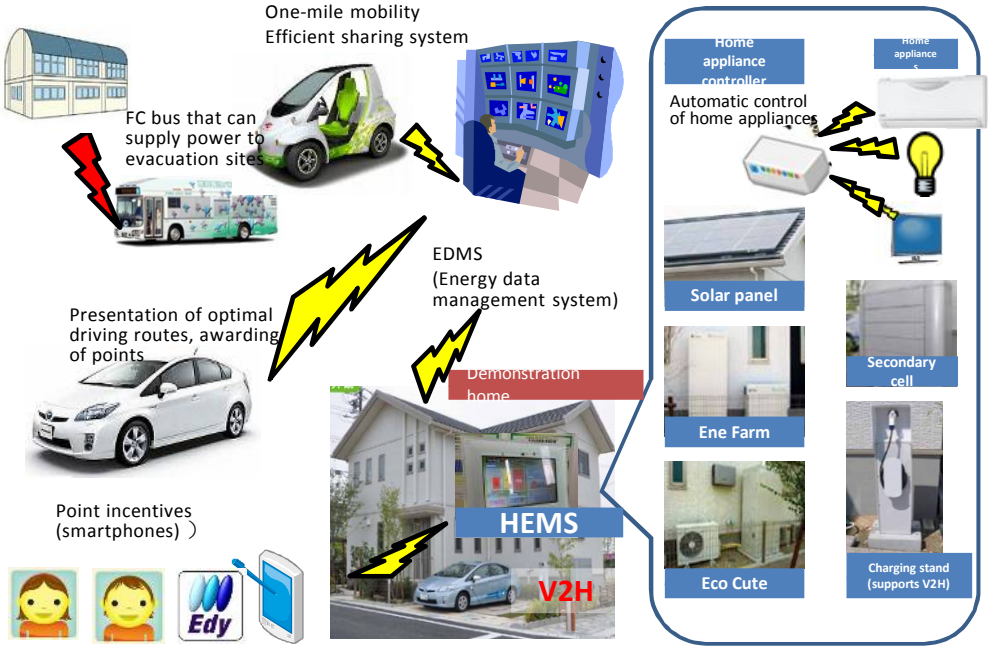


CEMS

- Launched starting in the summer of this year, connection to various customers planned on being implemented sequentially.
- Large-scale demand response demonstration targeting 4,000 households, etc. planned on being initiated next FY.
- Aim to control use of energy and a peak cut of approximately 20%.



Details of Demonstration in Toyota City



Participants

ハイブリッド・シティ とよた 環境モデル都市
TOYOTA
DENSO
DI Dream Incubator Inc.
中部電力
KDDI Designing The Future
TOYOTA HOME
SHARP
FUJITSU
SECOM
TOHO GAS

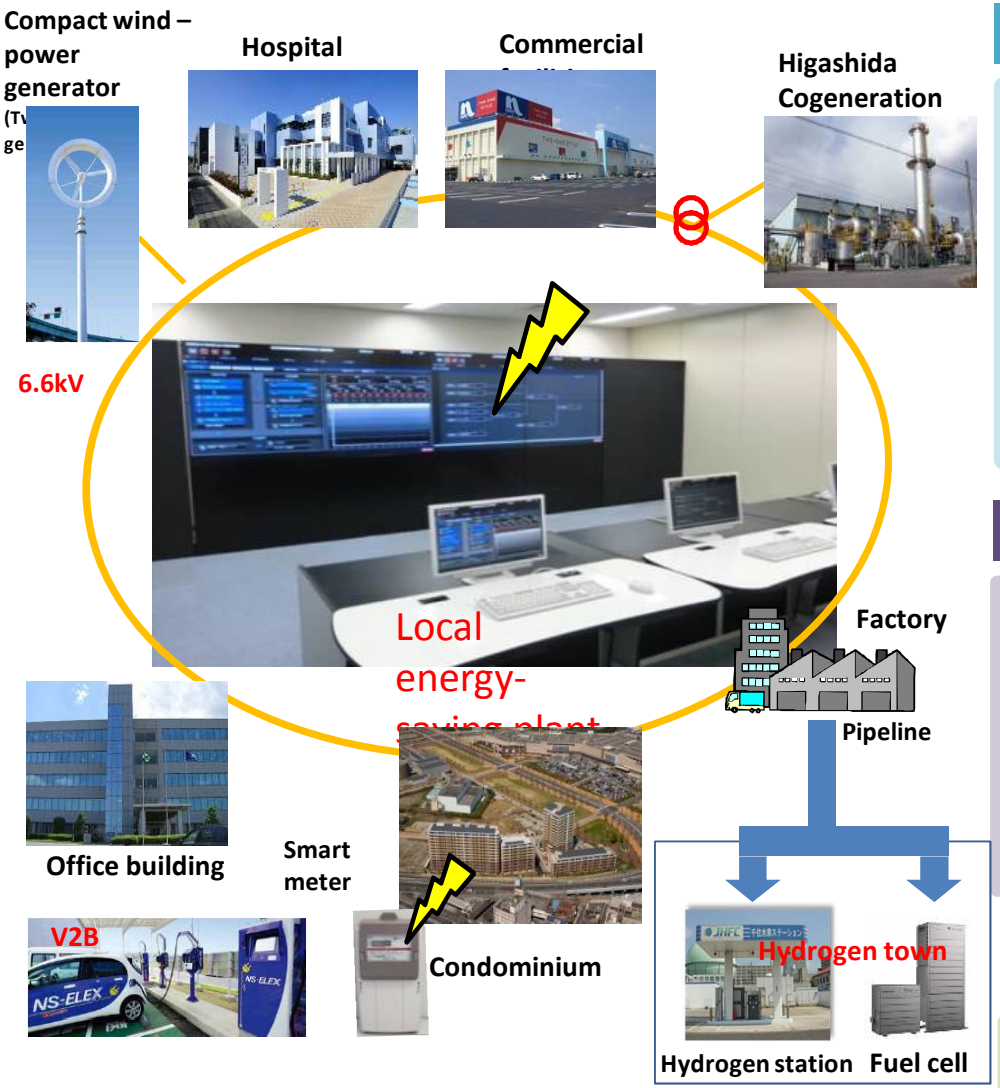
Energy management in smart houses

- 67 homes equipped with solar panels, household fuel cells, Eco Cute, secondary cells, plug-in hybrid vehicles, electric vehicles, etc. were constructed in the Higashiyama district of Toyota City. Currently, there are residents living in 55 homes.
- From the perspectives of local production for local consumption and cutting back during peak hours, pseudo-dynamic pricing is implemented by awarding Edy (electronic money) points through smartphones, etc. Also linked to EDMS (energy data management system), which manages energy for the entire region. Expanded to automatic control of home appliances (FY2012).
- Plug-in hybrid vehicles (PHV) and electric vehicles (EV) used as secondary cells (V2H) (Autumn 2012).

Transportation system

- The driving conditions of PHVs and EVs are managed through EDMS. An optimal driving route to the destination is presented for each vehicle in accordance with road conditions, and point incentives for resolving traffic are awarded.
- Demonstration of power supply from fuel cell buses to schools, etc. during disasters will be carried out (next FY).

Details of Demonstration in Kitakyushu



Local energy management

○ Nippon Steel Corporation possesses distribution lines, and has been implementing flexible electricity pricing menus since April 2012 for 230 households and 50 business establishments (office buildings, commercial facilities, hospitals, factories, etc.) in the Higashida district of Kitakyushu, which is a designated supply area where electricity is supplied from cogeneration equipment within factories.

Energy management for households and buildings

○ For business establishments, the world's first real-time pricing based on notifications 2 hours beforehand was implemented.

○ At a hospital that specializes in "dialysis" and uses high-temperature disinfected water, etc., heat utilization where the majority of demand for heat is covered by solar heat panels was demonstrated.

Use of hydrogen and fuel cells

○ By-product hydrogen that is generated in the production process at factories is sent to residential areas, etc. through pipelines and used by household fuel cells. In addition, they are filled into fuel cell vehicles at hydrogen stations.

○ Surplus electricity is stored as hydrogen, and adjustment of energy supply and demand is carried out by using fuel cells.

Participants

北九州市 新日本製鐵 富士電機 SEKISUI Iwatani IBM

Next-generation Energy Technology Demonstration Projects (Budget for FY2012: 2.78 billion yen)

■ Demonstration of smart communities that is rooted in the region, such as regarding utilization of local energy and establishment of highly advanced and versatile technology that complements demonstration in 4 areas (Yokohama City, Toyota City, Keihanna, Kitakyushu City), has been carried out.
7 projects were adopted in FY2011 and 1 project was adopted in FY2012.

1 Tottori City (Tottori City, Chuden Engineering Consultants, etc.) — Adopted in FY2011

"Energy interchange system model for factories and homes"

・A secondary cell is shared among 2 smart houses, a plant factory, and a confectionery factory. By sharing a secondary cell, costs for the community as a whole are lowered, and power interchange is also realized by control using CEMS. Demonstration was initiated in autumn of this year.

2 Fukuyama City (Tsuneishi Holdings, etc.) — Adopted in FY2011

"Coastal/disaster prevention type EMS model utilizing vessels"

・Construction of a system where electricity is supplied from the diesel power generator in vessels, used as an emergency power supply during emergencies, to an EV and power is supplied to customers via the EV.
・Construction of a model where power is supplied to EVs using solar power generation at a factory. For the future, a business model consisting of a package combined with loaning of an EV will be provided to employees as a benefit.

3 Minamata City (Fuji Electric, Taylors Kumamoto, etc.) — Adopted in FY2011

"EMS model for farms and fishing villages"

・The costs of cultivating Dekopon oranges will be reduced by introducing natural energy to greenhouse cultivation. At the same time, feeding and water quality monitoring will be automated by equipping rafts for oyster farming with solar power generation and secondary cells.
・In addition to starting Dekopon cultivation and oyster farming this summer, management will be carried out by constructing an EMS for farms and fishing villages.

4 Huis Ten Bosch in Sasebo City (Sojitz, etc.) — Adopted in FY2011

"Development of open source software for analyzing energy usage patterns"

・Information on the state of energy use in workplaces, etc. will be collecting using sensors, wastefulness will be analyzed based on the behavioral patterns of users, and software for proposing improvements will be constructed. In addition to initiating demonstration of developed software in December, an aim will be made to turn this into a business.

5 Hitachi City (Hitachi, Hino Motors, etc.) — Adopted in FY2011

"Model for optimal operation of EV bus batteries"

・Based on operational demonstration of EV buses, construction of bus charging and operation management system that controls the deterioration of secondary cells, which will serve as the core of commercialization of EV buses, will be constructed.
・Based on the results of demonstration, commercialization of EV buses and an added service for chargers is planned starting in FY2013.

6 Mie University (Mie University, Fuji Electric, etc.) — Adopted in FY2011

"DC power supply model"

・A system where DC power sources such as sunlight supply power to convenience stores in the university as DC will be demonstrated starting this winter.
・Demonstration of a desiccant-type air conditioning system where temperature and humidity are controlled separately.

7 Osaka City (Kawasaki Heavy Industries, Osaka Gas, etc.) — Adopted in FY2011

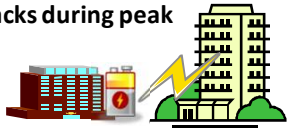
"Model for optimal use of waste disposal heat"

・Heat waste from waste incineration sites is transported to customers through vehicles with heat storage tanks, rather than using a pipeline. An optimal transport management system will be constructed.
・By November of this year, demonstration where heat transportation for buildings, factories, and hot-bath facilities is conducted will be initiated.

8 Kashiwa City (Mitsui Fudosan, Hitachi, etc.) — Adopted in FY2012

"Power interchange model for complex facilities"

・Through power interchange based on self-operated lines among shopping malls, offices, hotels, and housing complexes, cutbacks during peak hours and energy-saving are implemented.
・During disasters, power based on solar power generation and NAS cells in shopping malls are interchanged to shared areas in housing complexes (elevators, etc.).

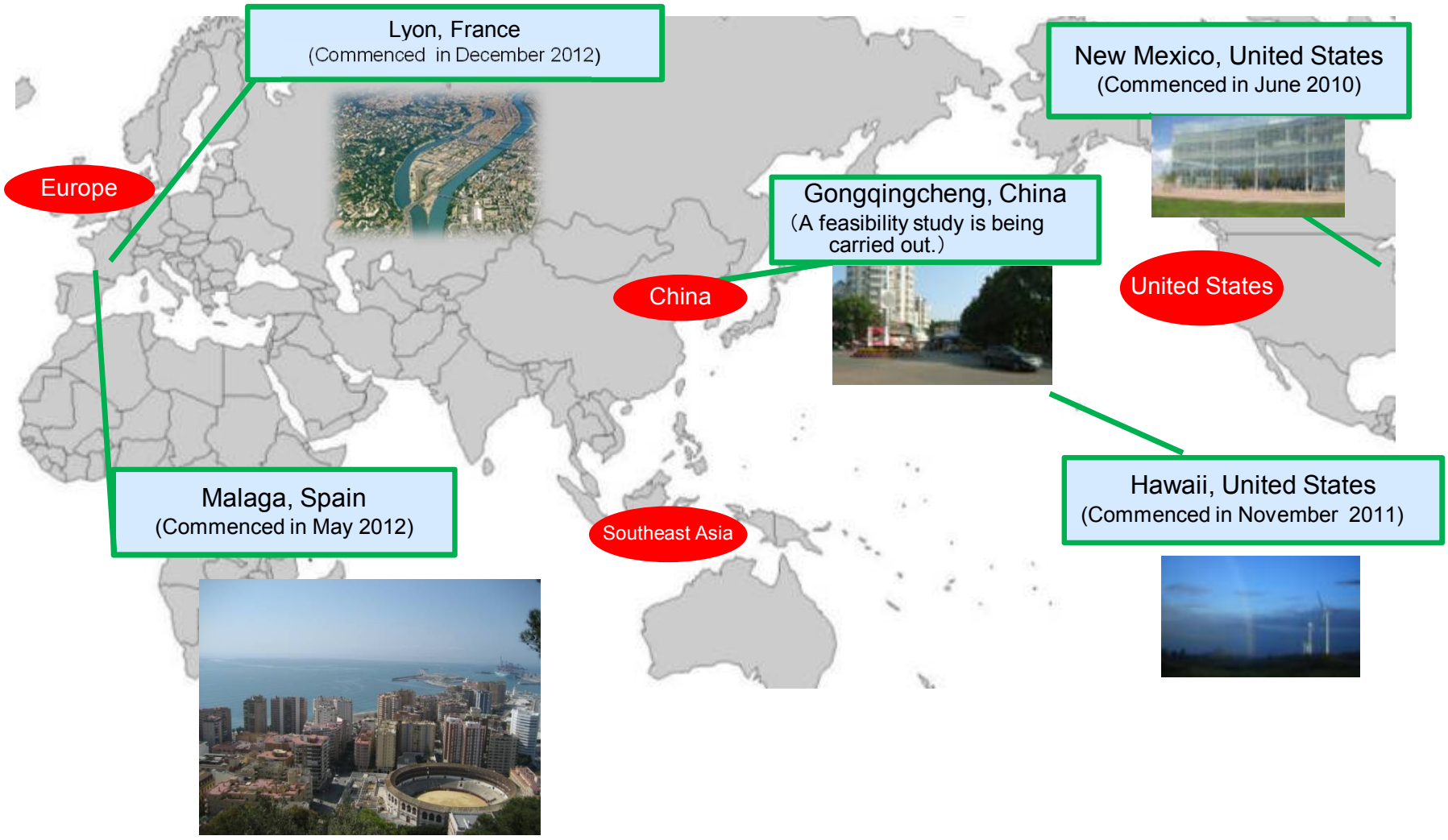


３．The role of EV・PHV for the realization of the smart community

（３）Efforts Overseas

NEDO International Smart Community Projects

NEDO is implementing Smart Community Projects in the world.



Project in the United States, New Mexico

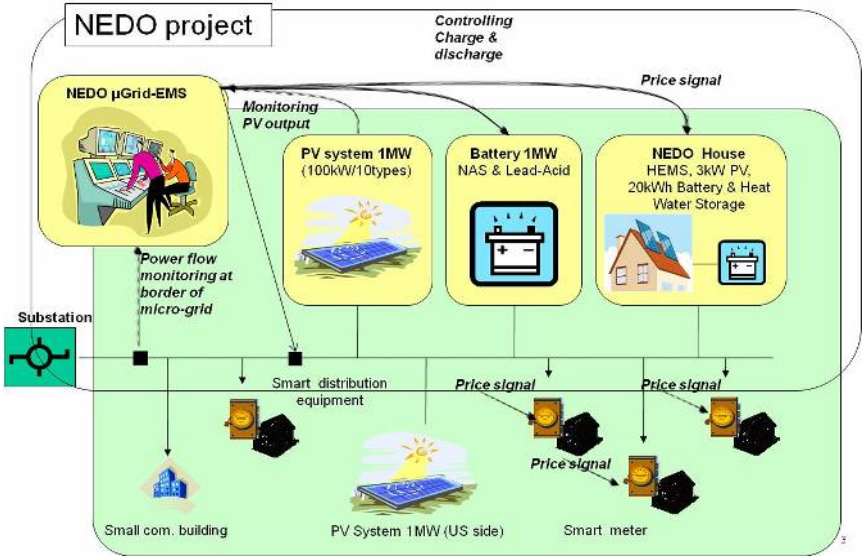
- Reliable power supply under high penetration of Photovoltaic by using CEMS, DER, NaS etc,.
- 2009-2013

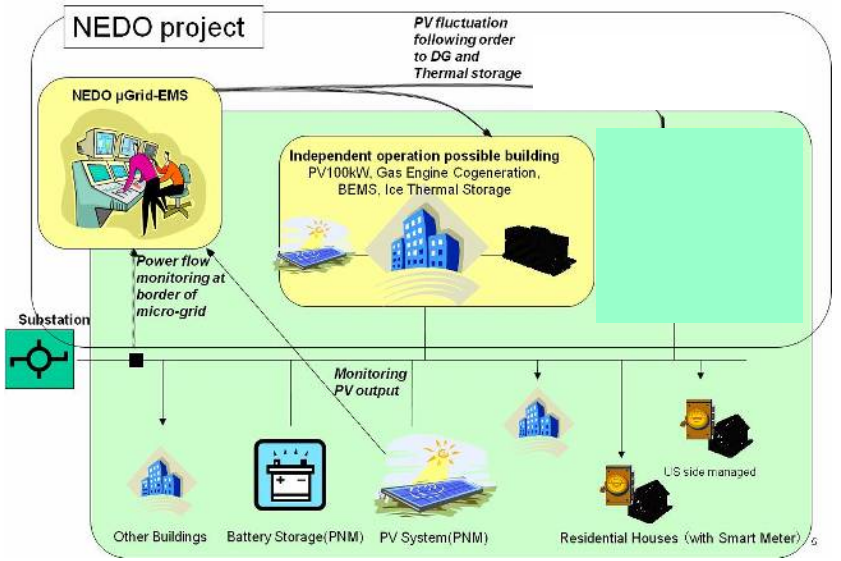
Partners; The State of New Mexico,
The County of Los Alamos, LANL, Mesa del Sol, PNM, UNM, SNL

Entrusted parties; Toshiba, Kyocera, Shimizu, Itochu, Cyber Defense, etc., 19 companies as total

[Los Alamos]
- Utility-Scale PV + NaS
- Schedule by Predicting PV generation
- Optimize by DR and NaS
- HEMS demo

[Albuquerque]
- Commercial building + DER with BEMS
- Absorb fluctuation from Utility Scale PV





Project in the United States, Hawaii

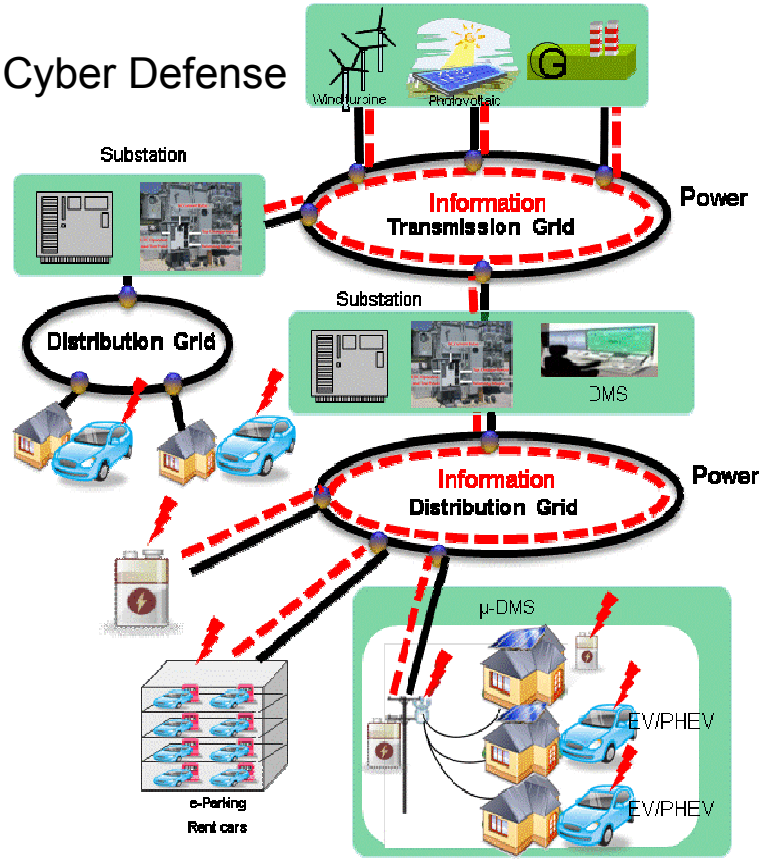
- Reliable power supply under high penetration of Wind Power by managing EV charging etc.,
- 2011-2015

Partners; The State of Hawaii,
HECO, MECO, HNEI, The County of Maui,
The Maui Economic Development Board etc.,

Entrusted parties; Hitachi, Mizuho Corporate Bank, Cyber Defense

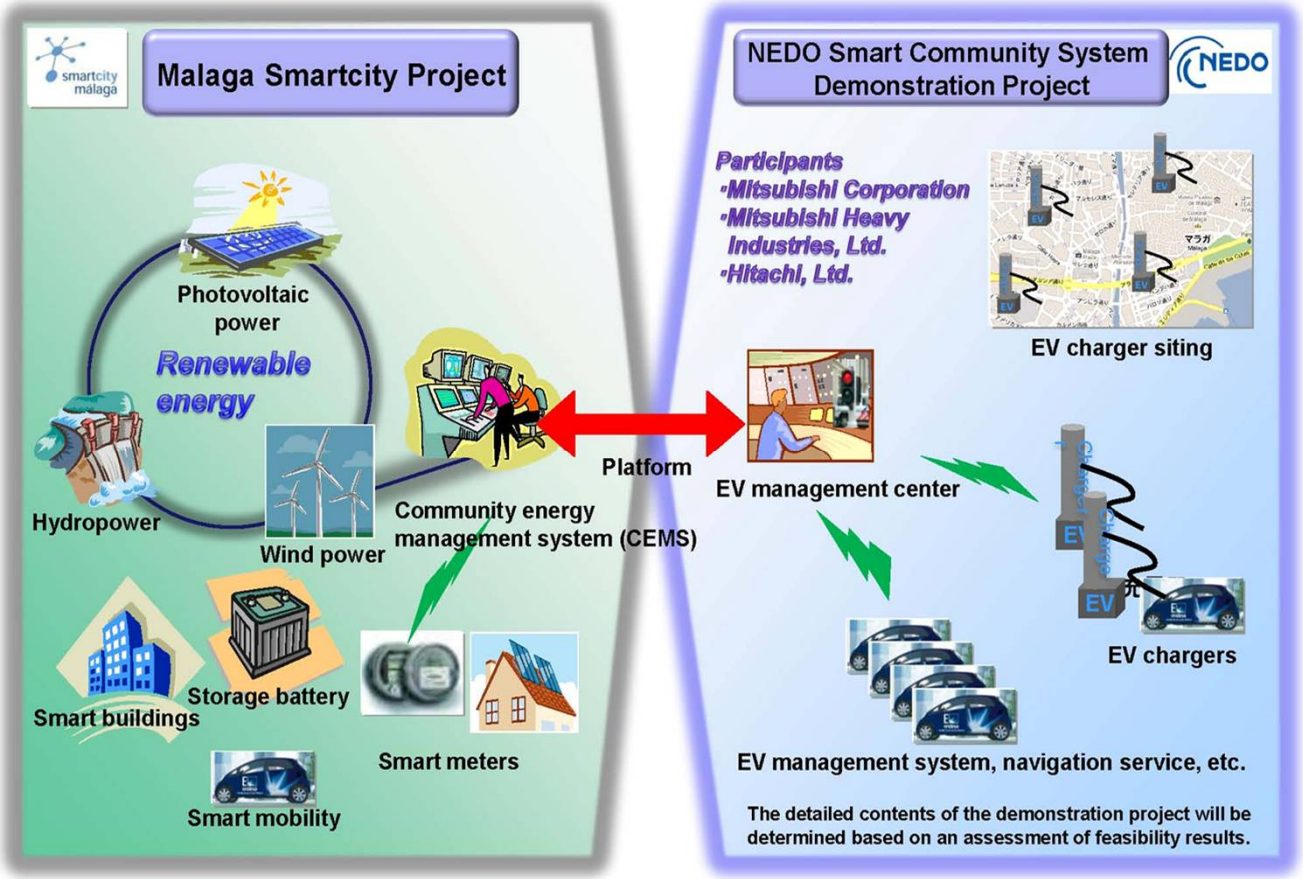
[Whole Maui island]
- Manage EV charge
  - Shift to midnight
  - Stop charging when unexpected down ramp occurs etc.,

[Kihei District]
- DLC thru μ-DMS
- Optimize usage of low Volt transformer
- Optimize PV generation by Smart PCS



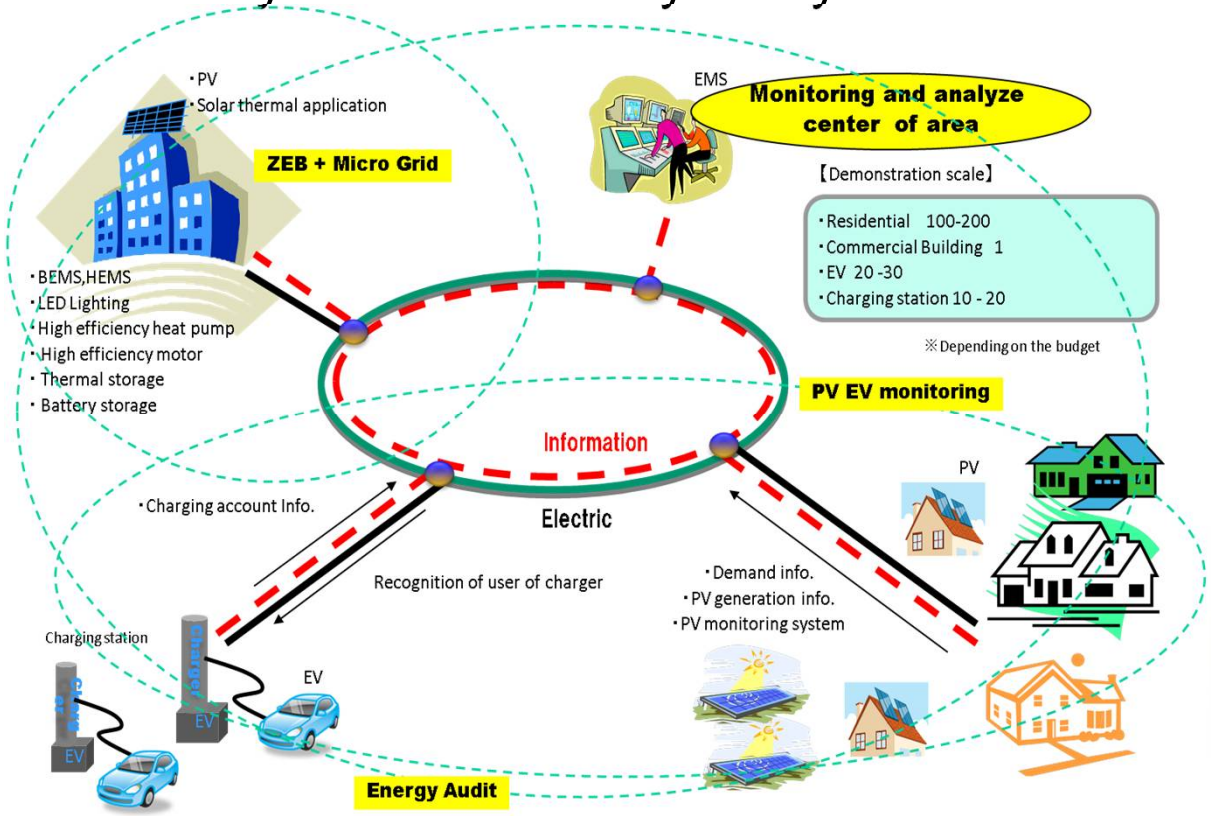
Project in Spain, Malaga

- Avoiding congestion of distribution line under high penetration of EV quick chargers by navigating EV users to optimal places
- 2011-2015
- Currently under Feasibility Study



Project in France, Lyon

- 3 Tasks are under consideration
  - Net Positive Energy Building demo
  - Energy use monitoring and management for PV and EVs
  - Energy audit program using AMI
- 2011-2015
- Currently under Feasibility Study

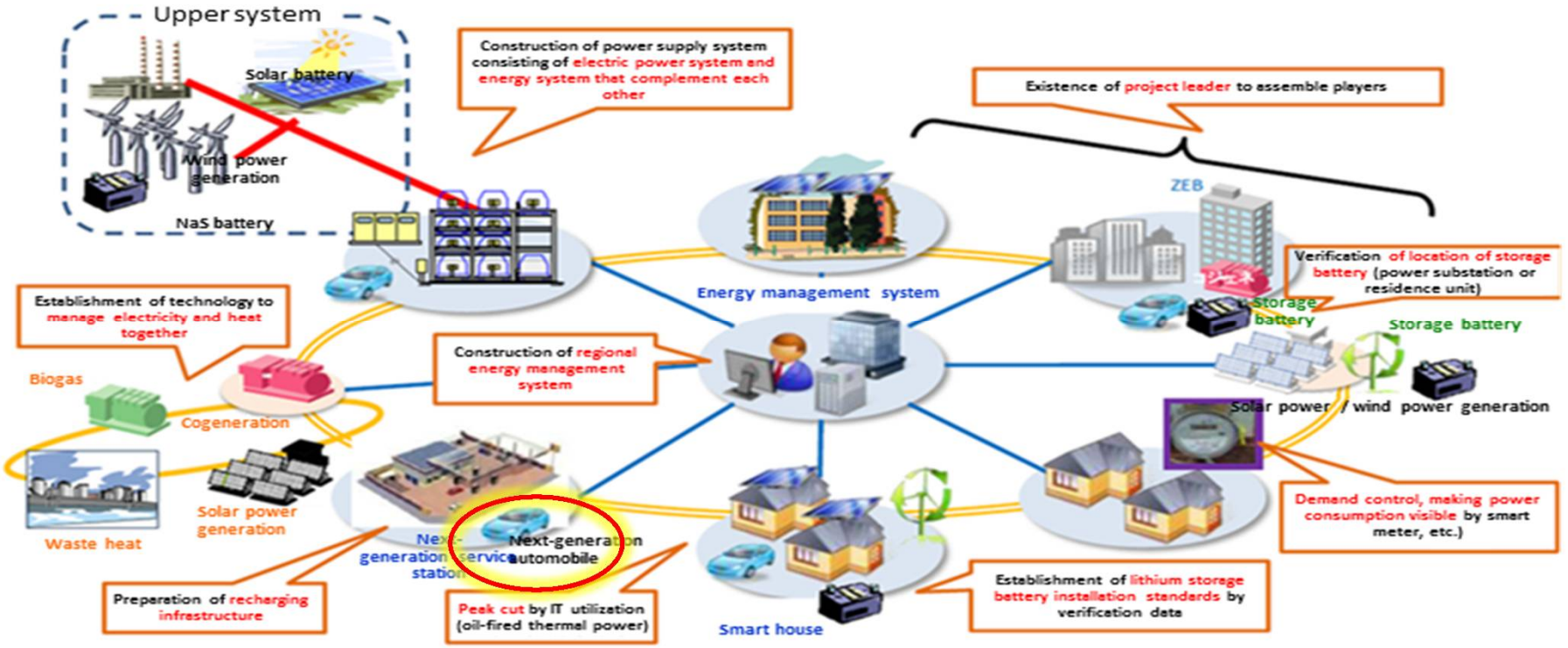


3. The role of EV · PHV for the realization of the smart community

（4）The role

Linkage with smart grid

- There is a possibility that the growing need for renewable energy and disaster response and an increase in the need for a flexible power supply control measures will accelerate the introduction of smart grids in the future.
- In terms of Load leveling of the residential and commercial sector and the efficient use of renewable energy distributed power, as part of the energy management system, the spread of the next generation car is equipped with a battery the need is growing.
- Establishing an interface to connect to the grid and Placing Power gateway and metering adapter is a necessary means to realize that.



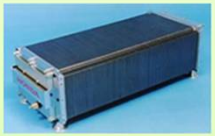
A new role of EV・FCV

➢ In the future, the growing importance of EV · PHEV · FCV from the perspective of load leveling energy management of the residential and commercial sector.

1st Step

Securing power supply function

EV → 100V・1500W



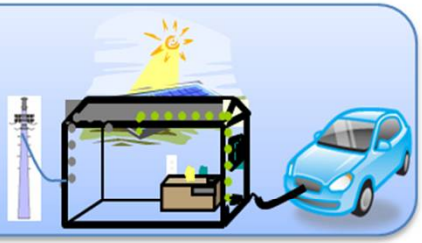
DC

Development as soon as possible to AC converter

FCV → 100V・20kW

2nd Step

Establishment of decentralized, independent bases (enhancement of ability to cope with disaster)



3rd Step

Linkage with smart grid

New ranking of next-generation automobiles equipped with large capacity storage batteries for urban renewal with built-in, full-fledged smart grids

Subsidy for EVSE Development

FY2012 Supplementary Budget US$1.14 billion.

(1 USD = 88.1 JPY equiv.)

Objective

Purpose

Government will make this subsidy in order to encourage development of charging stations for EV and PHEV, so as to promote expansion of EV market , which contribute to further economic growth of Japan.

In particular, by subsidizing a part of expenses for purchasing and installment, Government will support further development of EVSEs in areas below:

- Mid-route (gas station, convenience sore, roadside rest area.)
- Destination (shopping center, office building, amusement park)
- Residential (parking of condominium or apartment building)

Scheme

Methods and Criteria

In order to coordinate region-wide development, encourage efficient deployment and ensure availability to public, developments based on criteria below will be favored in terms of subsidy rates.

1. Development based on “Deployment Plans” made by municipalities or Highway Public Corporations: subsidized **2/3 of purchasing cost and installation cost.**
2. Development open to public but not based on “Deployment Plans”: subsidized **1/2 of purchasing cost and installation cost.**
3. Installation to parking of multi-unit buildings: subsidized **1/2 of purchasing cost and installation cost.**
4. Other deployment: subsidized **1/2 of purchasing cost.**