

APEC EGNRET 39, Shanghai, China

Applying Distributed Energy in Japan

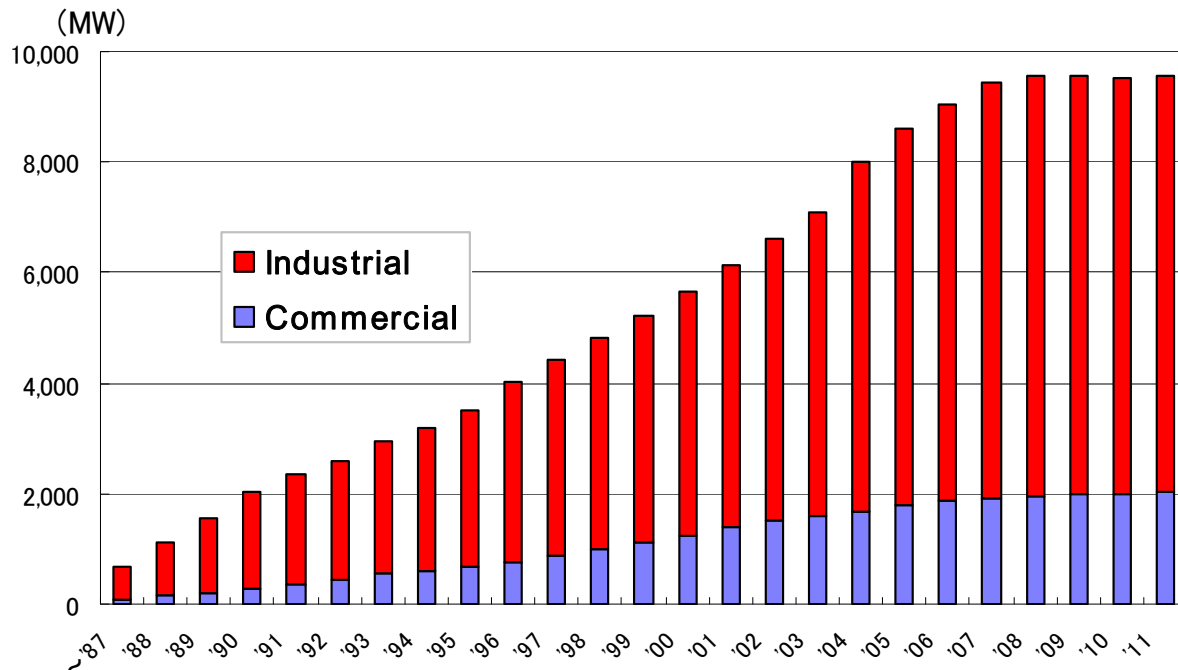
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CHP: Combined Heat and Power

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- 2011 Existing CHP: 9.5 GW (8,783 sites)
- Industrial users represent 79% of CHP capacity

Source : Advanced Cogeneration and Energy Utilization Center JAPAN (ACEJ)

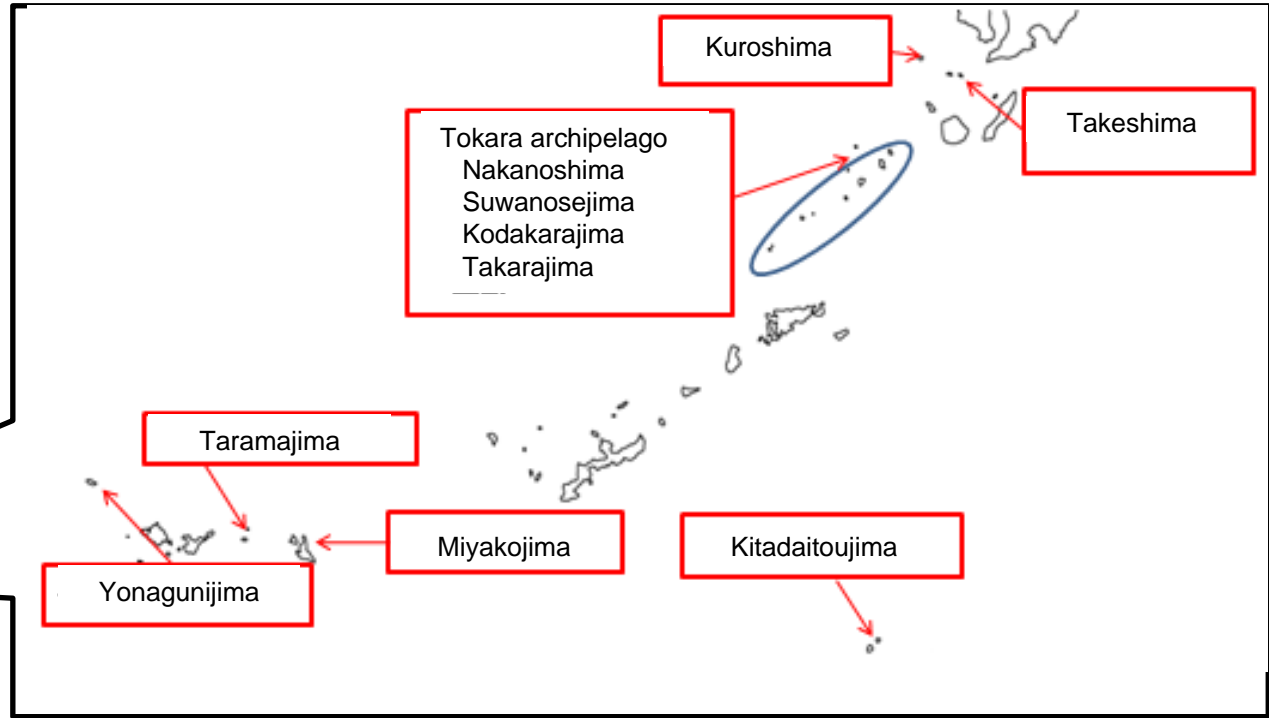
- Three scenarios with nuclear power at 0%, 15%, 20-25%, respectively
- CHP is set at 15% in Each scenario

	Nuclear	Renewables	Thermal	CHP	C02 Emissions Reduction
FY2010 (benchmark)	26%	10%	60%	3%	-0.3%
Option 1	0%	35%	50%	15%	-16%
Option 2	15%	30%	40%	15%	-23%
Option 3	20-25%	25-30%	35%	15%	-25%

Source: Energy and Environment Council (29th June, 2012)

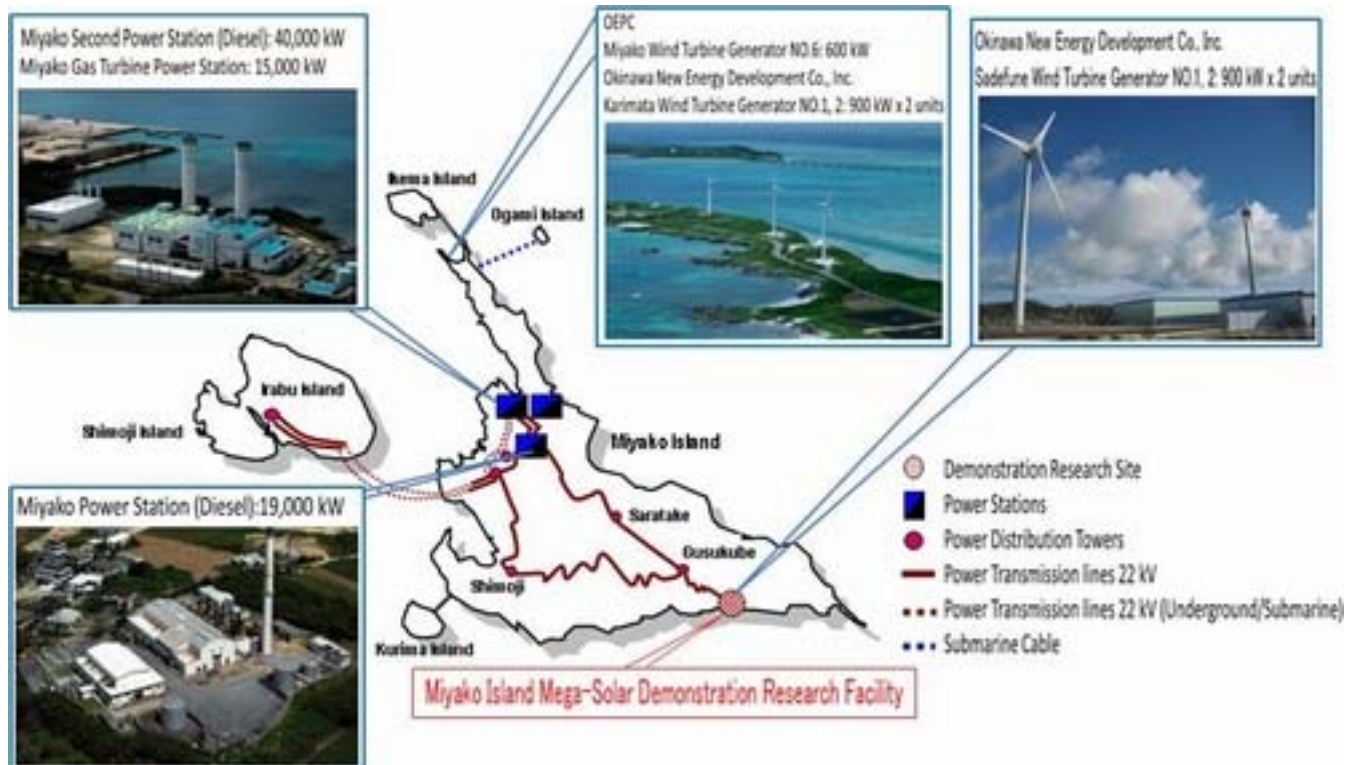
Micro grid Demonstration Projects

Micro grid Demonstration Projects for 10 Islands



Electric Company	Island Name	Peak Demand (kW)	PV(kW)	Wind(kW)	Existing RE Facility (kW)	PV ratio (%)
Kyushu Electric Power	Kuroshima	193	60	10	-	31
	Takeshima	83	7.5	-	-	9
	Nakanoshima	193	15	-	-	8
	Suwanosejima	78	10	-	-	13
	Kodakarajima	71	7.5	-	-	11
	Takarajima	125	10	-	-	8
Okinawa Electric Power	Miyakojima	50,000	4000	-	4,200 Wind	8
	Yonagunijima	2,160	150	-	1200 Wind	7
	Taramajima	1160	250	-	280 Wind	22
	Kitadaitoujima	860	100	-	40 PV	12

Micro grid Demonstration Projects (Miyakojima)

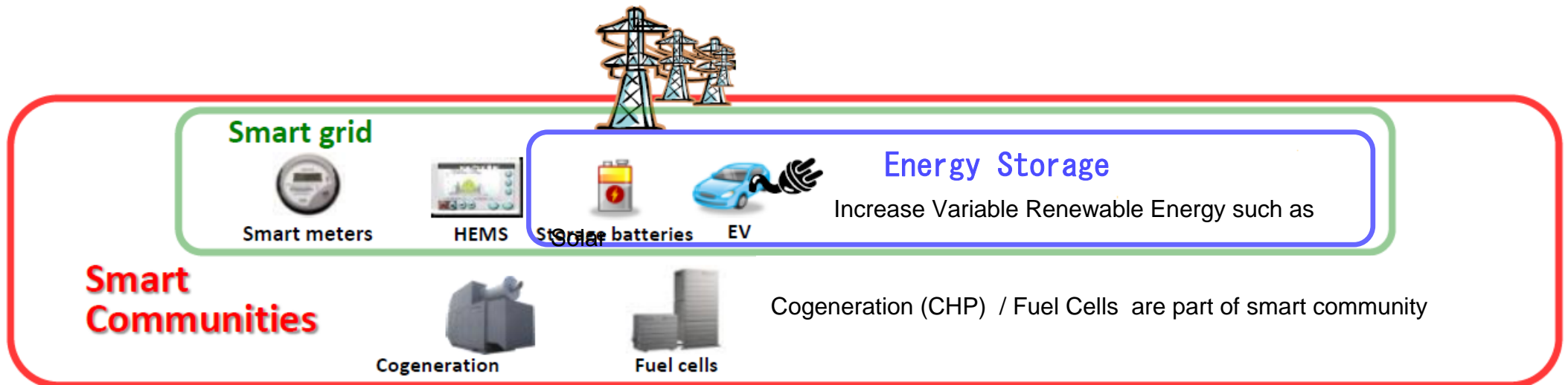


Distributed Energy and Smart Community in Japan

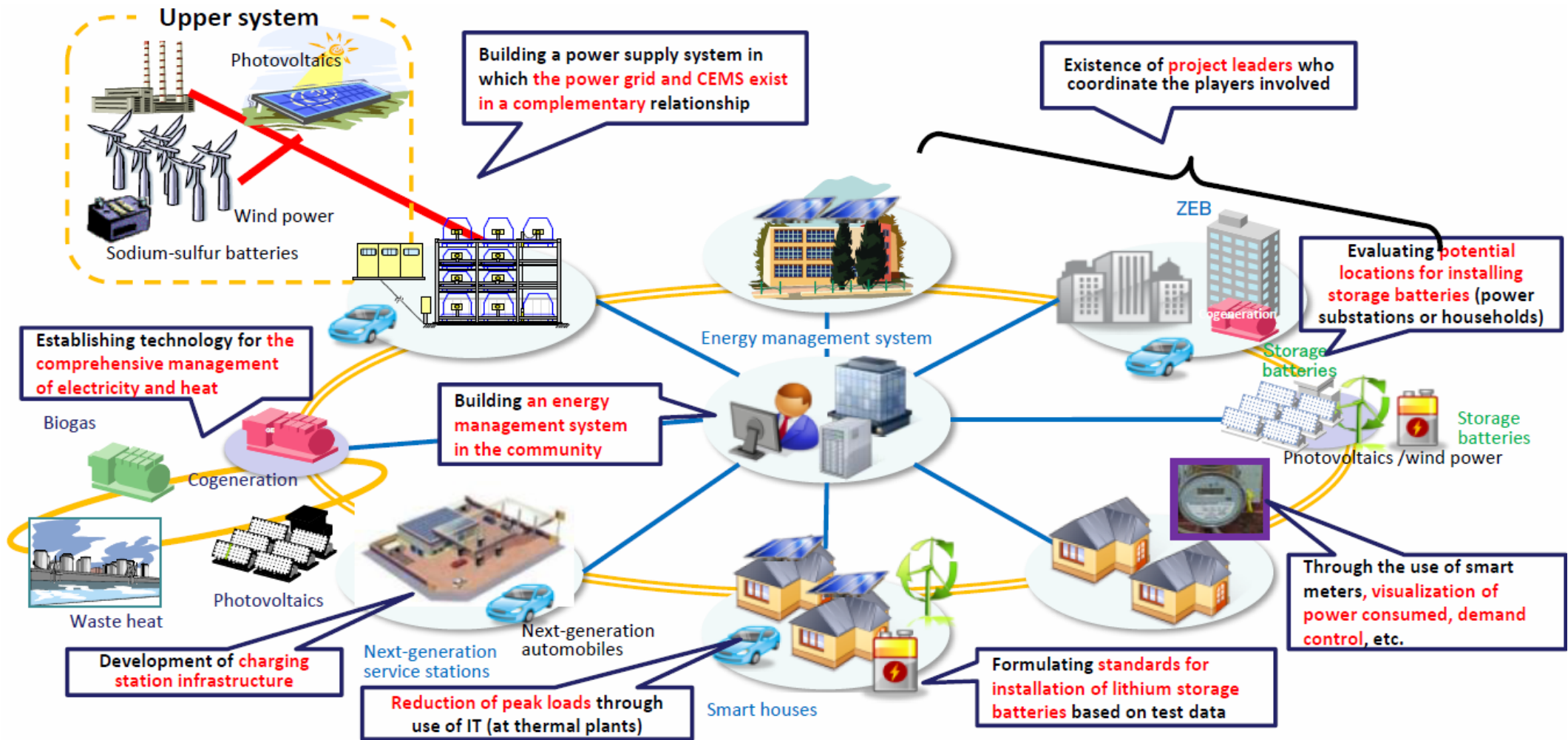
Distributed Energy and Smart Community in Japan

Concept of Smart Community includes Distributed Energy

- Cogeneration (CHP) / Fuel Cell are part of smart community
- Home use Fuel Cell are commercialized in Japan
- Energy Storage System enable to increase variable renewable energy
- Electric Vehicle can be utilized as a portable battery

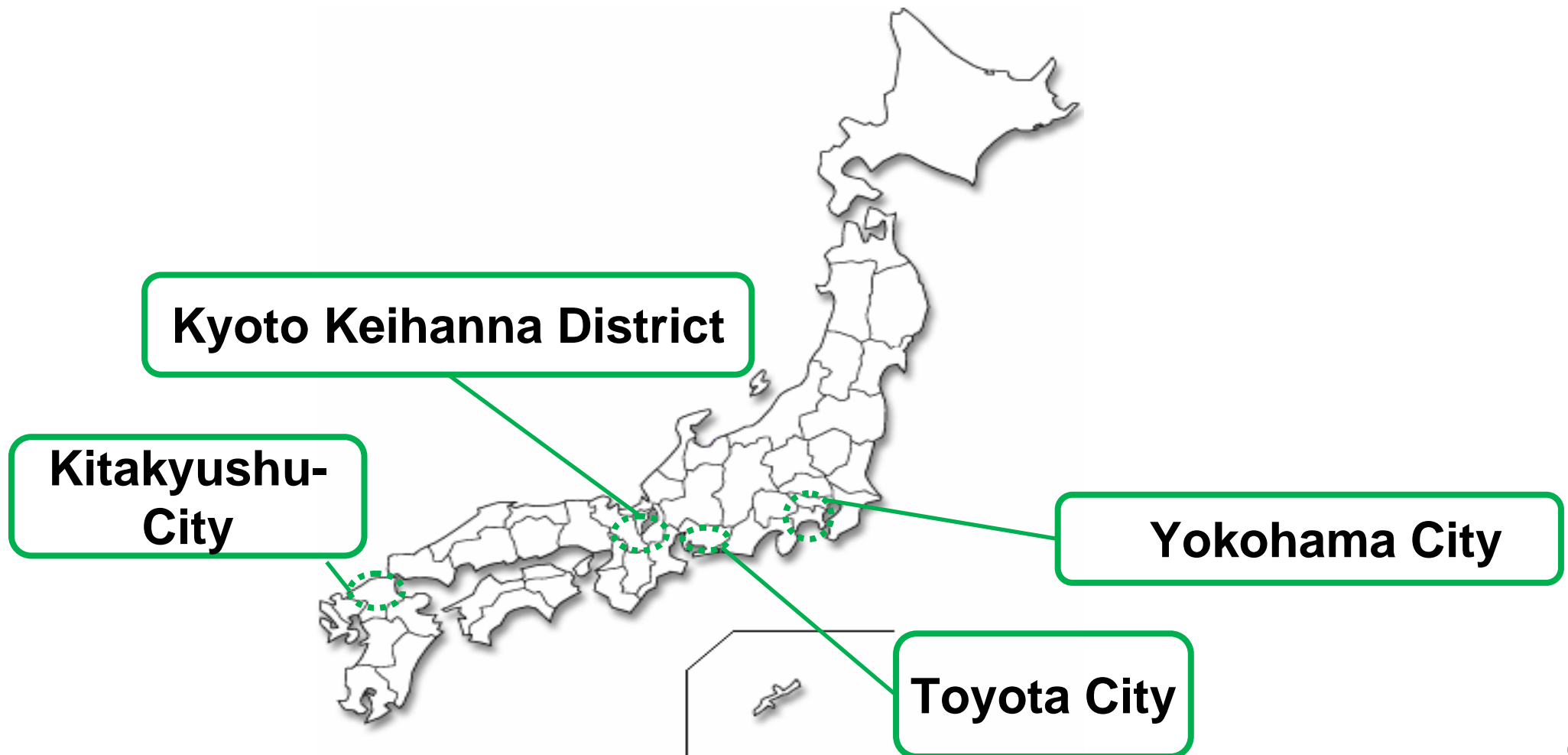


CEMS(Community Energy Management System)



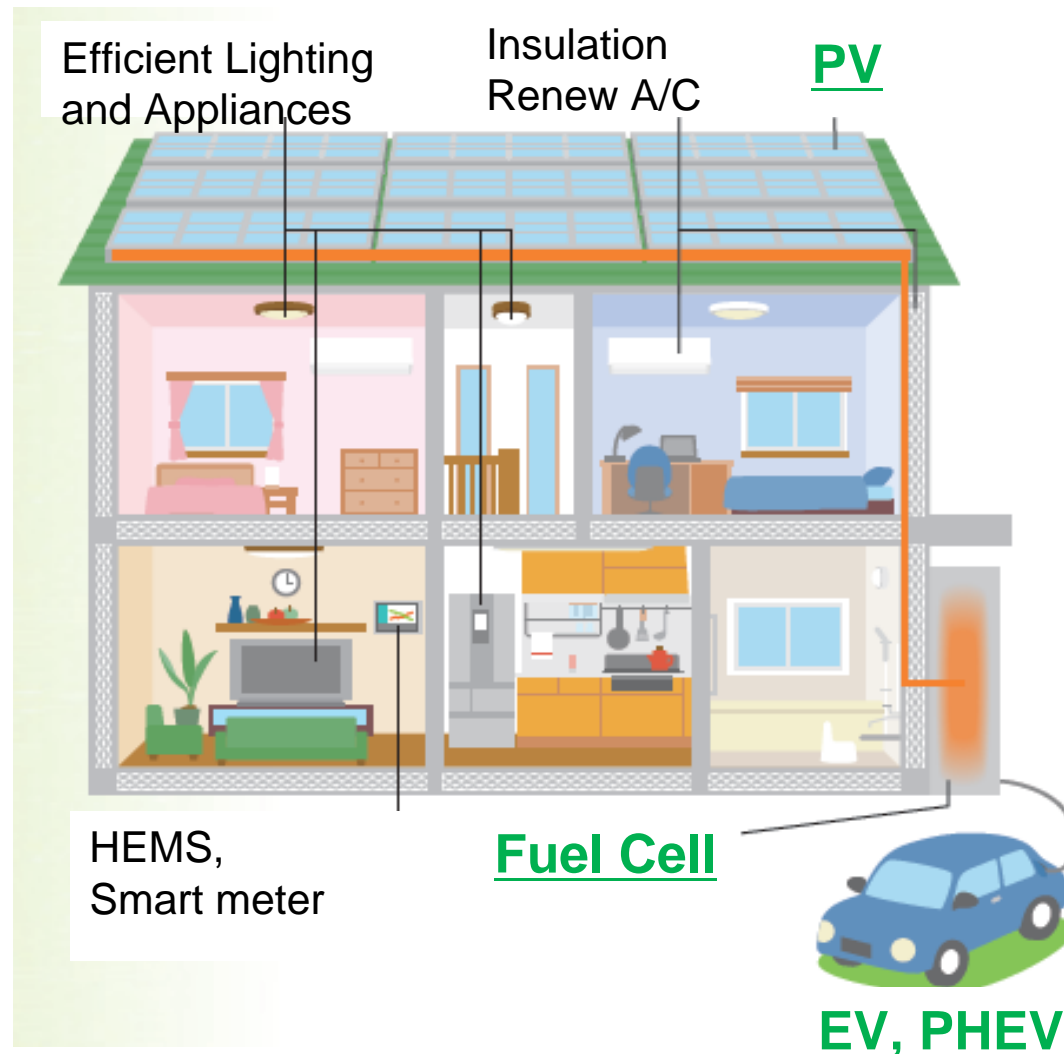
4 Flagship Smart Community Projects in Japan

On April 2010, 4 sites were selected to run large scale pilot projects on smart community (FY2010-FY2014)



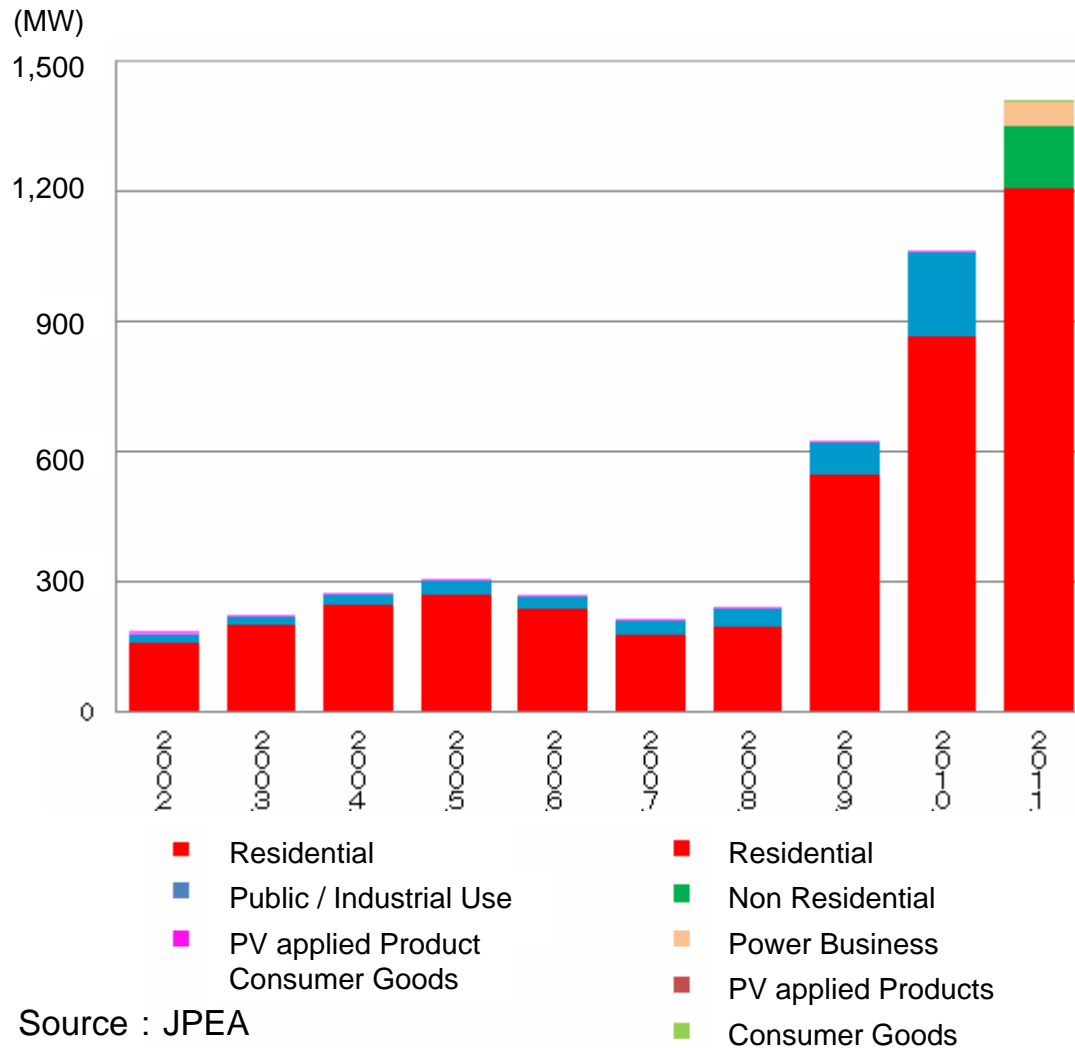
Smart House

- Smart House is a small unit of Distributed Energy
- PV, Fuel Cell and Battery (EV, PHEV)



PV

- Residential Use is the major part
- PV deployment is increasing after 2009
(Buy Back system for PV surplus electricity started on Nov. 2009)



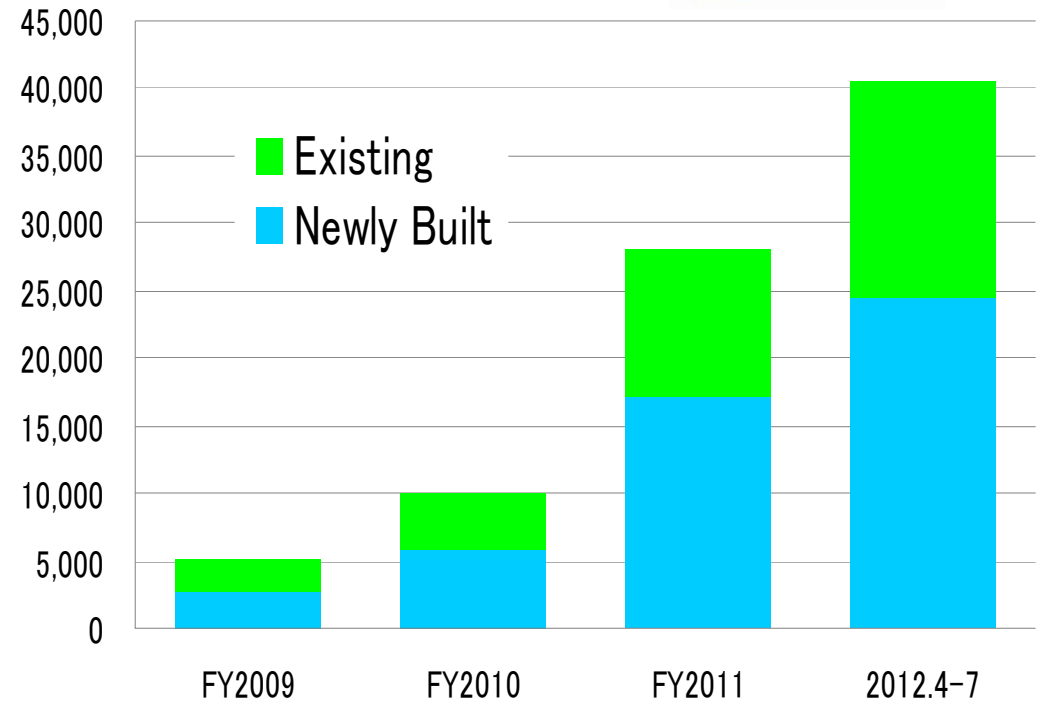
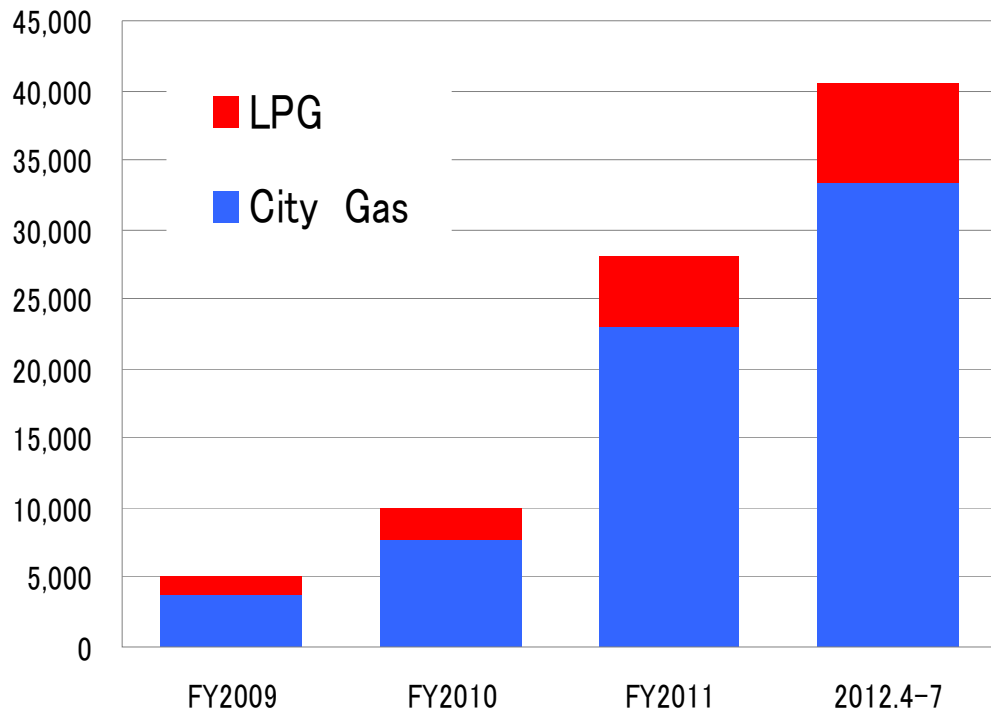
Source : JPEA

Ota City of Japan



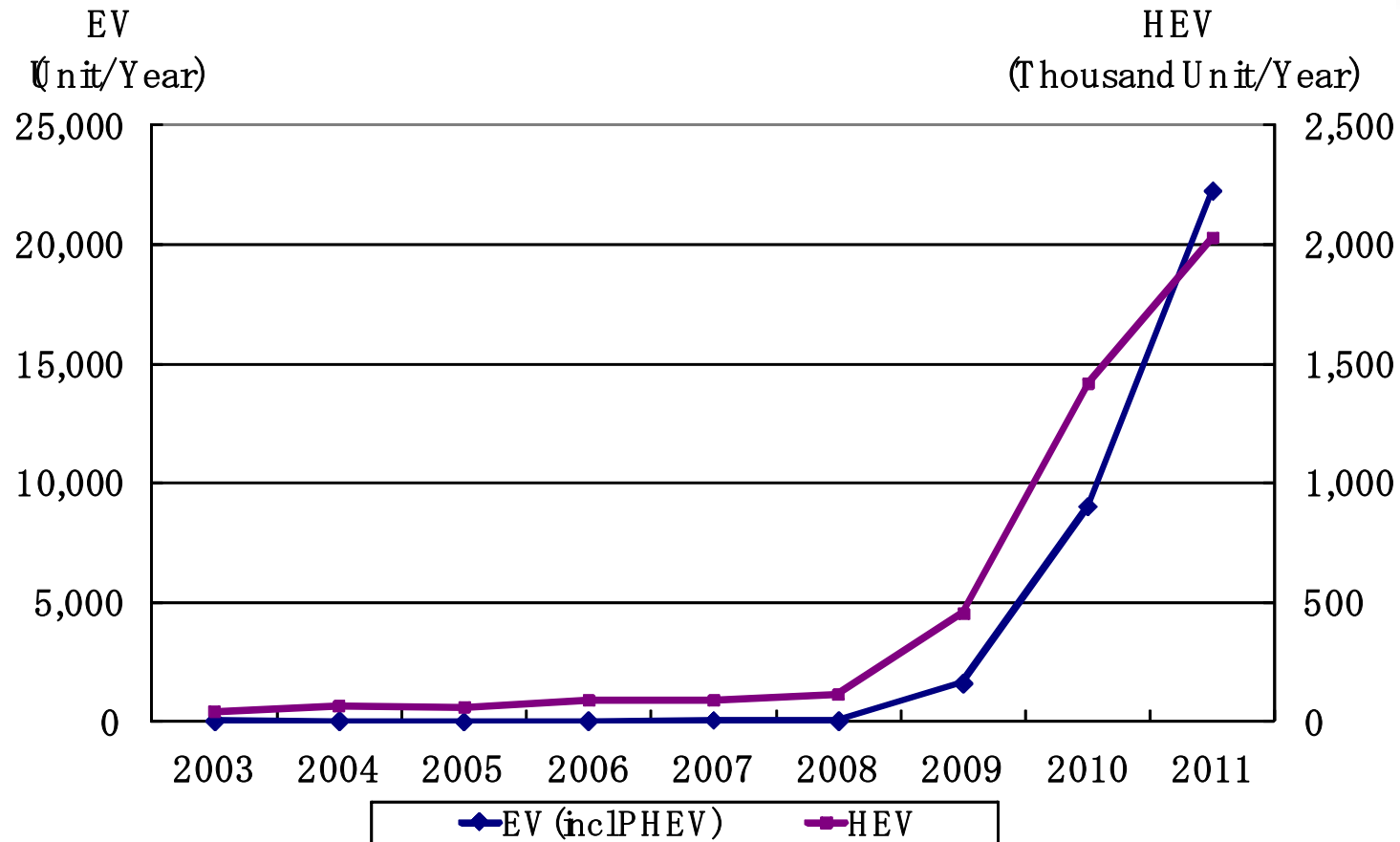
Fuel Cell

➤ **ENE-FARM, commercialized in 2009, has been accelerating the pace of deployment**



Source : ACEJ

Hybrid Vehicle and Electric Vehicle



Source : Next Generation Vehicle Promotion Center

**“Green Growth Strategy”
on “Rebirth of Japan”
(July 2012)**

Rebirth of Japan

- ◆ Japan currently faces a number of challenges: it is in the process of reconstructing areas affected by the earthquake, tsunami and nuclear accident, and is also addressing ongoing socio-demographic and economic challenges.
- ◆ Japan is seeking to meet these challenges head-on, to tackle them in an innovative and forward-thinking manner which will spur growth and allow the revitalization of the Japanese economy.
- ◆ Japan's immediate priority is reconstruction in the disaster-affected areas as well as a comprehensive review of its energy mix.
- ◆ Japan will prioritize four key policy areas in the coming three years: '**Green**', '**Life**', '**Agriculture**', and **SMEs**.
- ◆ In addition, Japan will implement **11 growth strategies** and **one initiative** to enhance its international relations, as well as **38 sets of priority policy actions** towards realizing a "**Country of Co-creation**." Japan will seek to leverage its position as a leader in innovation and technology to develop and share solutions with the world.



Green Growth Strategy

1. 'Green' parts and materials as driving force of Green growth

- ◆ Increase research and development for creating innovative 'Green' parts and materials
- ◆ Create synergies through joint technology development between parts / materials suppliers and assembling companies

2. Development of next-generation vehicles

- ◆ Improve battery performance and install charging stations
- ◆ Utilize next-generation vehicles, creating "power supplies that can move"
- ◆ Create ultra-compact mobility vehicles mainly for aged citizens



3. Widespread usage of storage batteries

- ◆ Accelerate innovation and cost reductions in order to expand various battery markets such as storage batteries in buildings and on cars
- ◆ Implement as emergency power sources during natural disasters or electricity stoppage

4. Development and use of marine and offshore resources

- ◆ Develop floating wind turbines
- ◆ Develop and use marine and offshore resources such as natural gas and algae for bio ethanol

5. Development of energy management systems (smart communities)

- ◆ Establish energy efficient cities / communities, utilizing energy supply-demand control technology and energy efficient buildings
- ◆ Export energy management systems

**Innovative Strategy for Energy
and the Environment
(Sep 2012)**

Innovative Strategy for Energy and the Environment(1)

Review of the path towards a society not dependent on nuclear power

- Review and constantly re-examine the path towards realization of a society not dependent on nuclear power in order to be sufficiently flexible and responsive to any unforeseen changes in the future

2. Realization of green energy revolution

- Compose the “Framework for Green Development Policy” by the end of this year.
- Electricity Saving: Reduce more than 110 TWh by FY 2030
- Energy Saving : Reduce more than 72 million kl by FY 2030
- Renewables : Develop more than 300 TWh by FY 2030

(all compared with FY2010)

3. For ensuring stable supply of energy

- Intensive use of thermal power generation
- Intensive use of heat such as the introduction of cogeneration systems of 150 TWh
- Technologies related to the next generation energy
- Stable and inexpensive securement and supply of fossil fuels

4. Bold implementation of reform of electric power system (Compose the Strategy for the “Reform of Electricity Power Systems (tentative)” by the end of this year)

5. Steady implementation of global warming countermeasures (Make the “Global Warming Action Plan” for the period from after 2013 by the end of this year)

- Disclose information in a detailed manner through a process that will sufficiently ensure transparency and review and constantly re-examine them

Innovative Strategy for Energy and the Environment(2)

Realization of green energy revolution

○ Path to the electricity & energy saving in FY 2030 (conservative growth case)

Electricity and energy saving	2010	2015	2020	2030
Power generation (TWh)	1,100	-25 (-2%)	-50 (-5%)	-110 (-10%)
Total final consumption (G Liter)	390	-16 (-4%)	-31 (-8%)	-72 (-19%)

% = compare to 2010

○ Path to the renewable energy use in 2030

Renewable energy	2010	2015	2020	2030
Power generation (TWh)	110	140 (1.4 times)	180 (1.7 times)	300 (3 times)
Capacity (GW)	31	48	70	132
Power generation (TWh) (excluding hydro)	25	50 (2 times)	80 (3 times)	190 (8 times)

X times compared to 2010

Framework for Green Development Policy (Nov 2012)

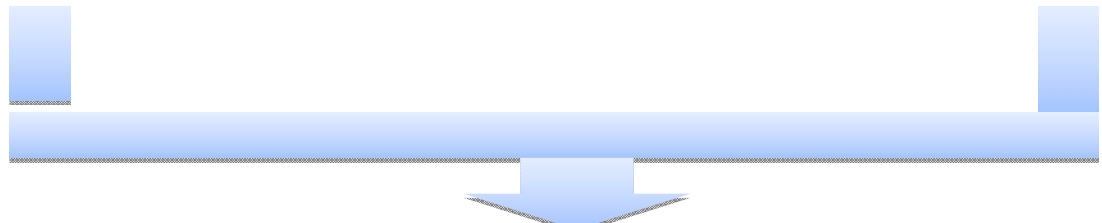
Overview of Framework for Green Development Policy

Innovative Strategy for Energy and the Environment(September 2012)

- Basic Policy is to maximize green energy, reduce dependence on nuclear power and restrain the use of fossil fuel
- Three pillars based on national discussions
 - Realization of a society not dependent on nuclear power
 - Realization of green energy revolution
 - Ensure stable supply of energy

“Green Growth Strategy” on “Rebirth of Japan”(July 2012)

- Green Policy as a part of growth strategy
- “Green” is positioned as one of the key policy areas
- Reduce dependence on nuclear power and replace it by renewable energy or energy saving

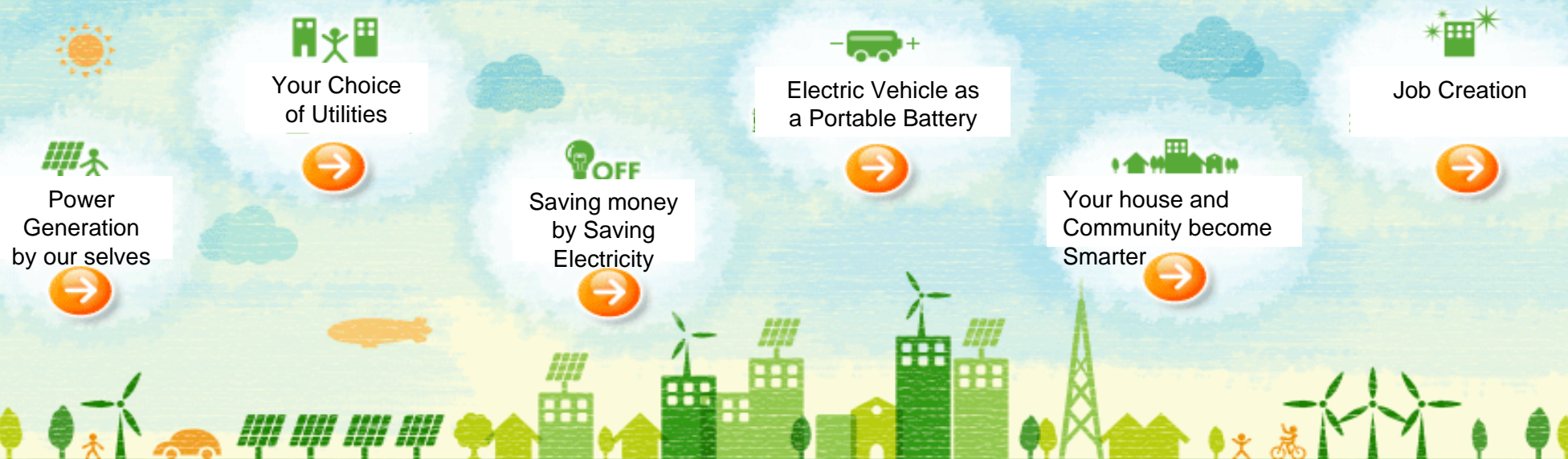


Framework for Green Development Policy
-Roadmap for expanding green energy usage-
(by around the end of this year)

Framework for Green Development Policy

1. 3E(Energy Security, Economical Efficiency, Environmental Adaptation) + S(Safety)
2. Green Growth by Energy Efficiency and Renewable Energy
3. Innovation in Life Style, Society and Industry Structure
4. Priority in 5 area
(Renewable Energy, Energy Efficiency, Smart Community, Battery, Material)
5. Policy Evaluation after 3 years

Green Energy Revolution



Priorities in Framework for Green Development Policy (1)

1 Renewable Energy

(Solar, Wind, Geothermal, Hydraulic, Biomass, Marine)

- 2012: Speed Up the Environmental Assessment Process
- 2015: Starting operation of floating type of offshore wind turbine in commercial scale
- 2020: Cost reduction of batteries as same level as Pumped Hydro
- 2020: 600 Biomass Town. Utilize biomass amount of 26 million carbon ton



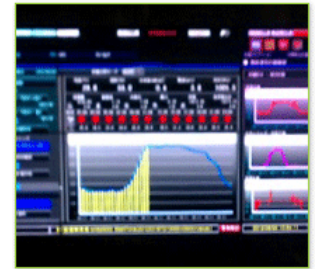
2. Energy Efficiency

(Building, Transportation, Industry, Co-Generation)

- 2015: Commercialize Fuel Cell Vehicle with 100 SS
 - 2020: Step by step mandate energy efficient standard for new house
 - 2020: Net Zero-emission House will be standard for new house
 - 2020: Two-fold EV Mileage, 2 million charger, 50 million rapid charger
 - 2030: HEMS for all houses
 - 2030: 5 times co-generation including Fuel Cell
- Fuel Cell for house use: 1.4 million in 2020, 5.3 million in 2030



Priorities in Framework for Green Development Policy (1)



3. Smart Community/Compact City, Promotion of Efficiency

- 2014: Complete 4 Smart Community Projects and expand nationwide after evaluation
- 2016: Deploy Smart meters for 80% of total demand of electricity
- 2020: Deploy Aggregate meter system for condominium in total of 1 million household

4. Battery

- 2020: Cost reduction of batteries as same level as Pumped Hydro



5. Material for Green Energy

- 2020: Strong Magnet without rare earth
- 2020: Metal alternative material for next generation vehicle
- 2030: 20% introduction of plastic material of petroleum free



Thank you for your attention !