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# Japan's Experience on Smart Community

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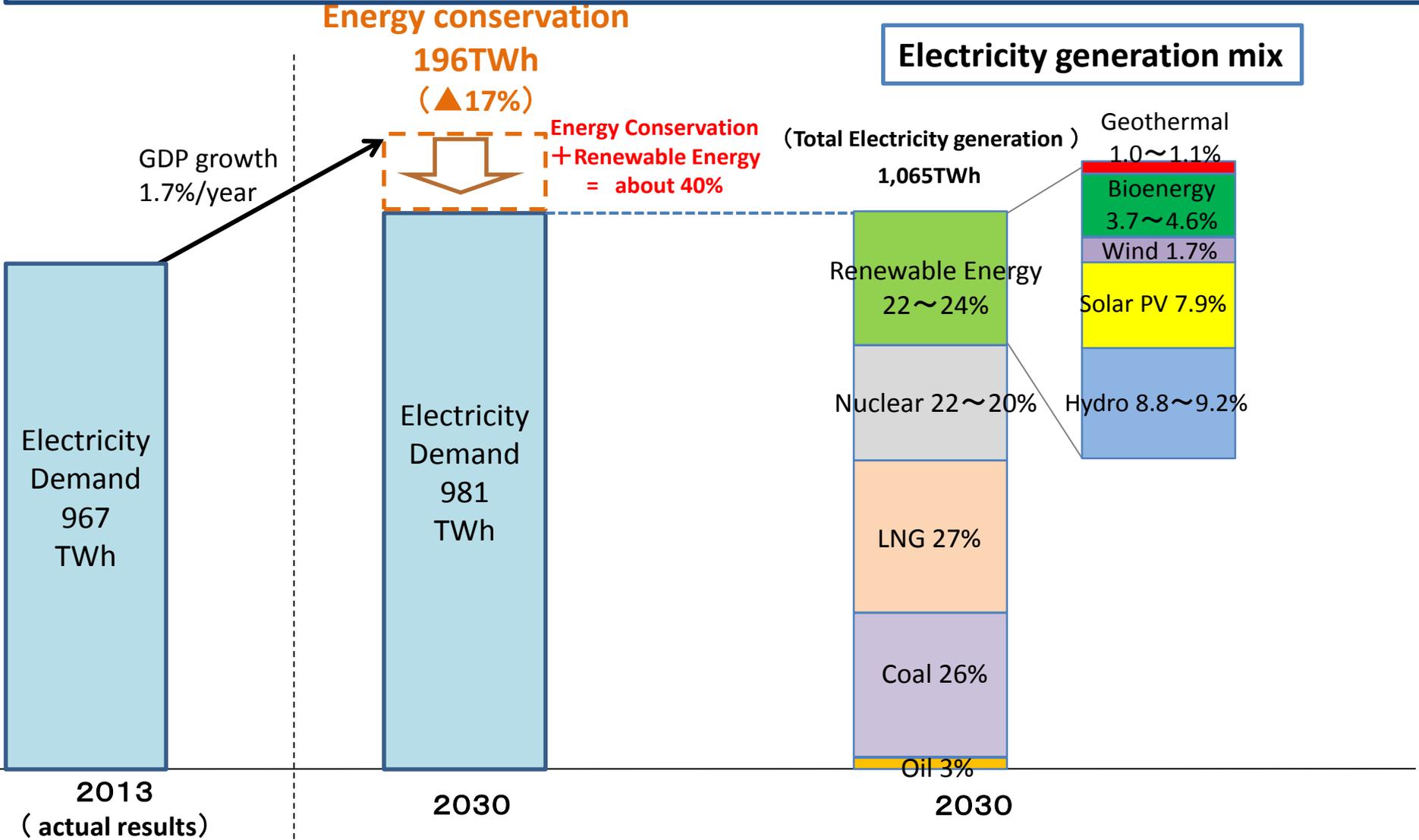
Ministry of Economy, Trade and Industry, Japan

# Japan's New Energy Mix (Preliminary)



## 【Direction】

- (1) To improve the self-sufficiency ratio to around 25% surpassing the level before the Earthquake.
- (2) To reduce the electricity costs lower than today.
- (3) To set a high-level GHG reduction goal compared with other developed countries to lead the world.

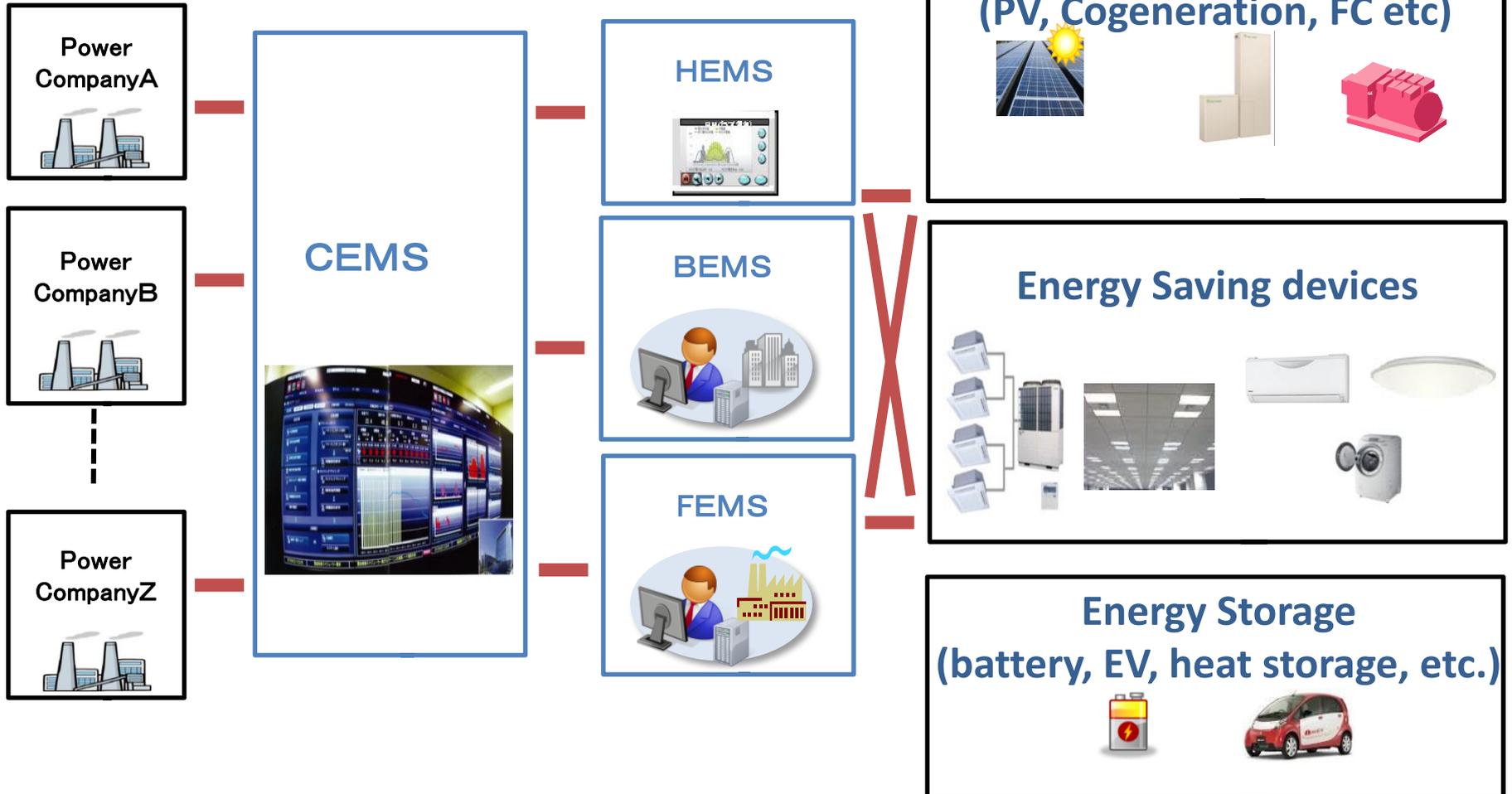


# Components of Smart Community



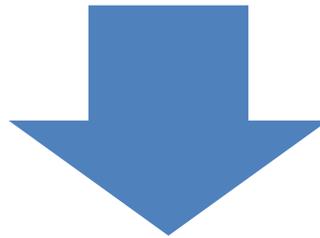
Optimization within/beyond community

Optimization in individual households, buildings and factories

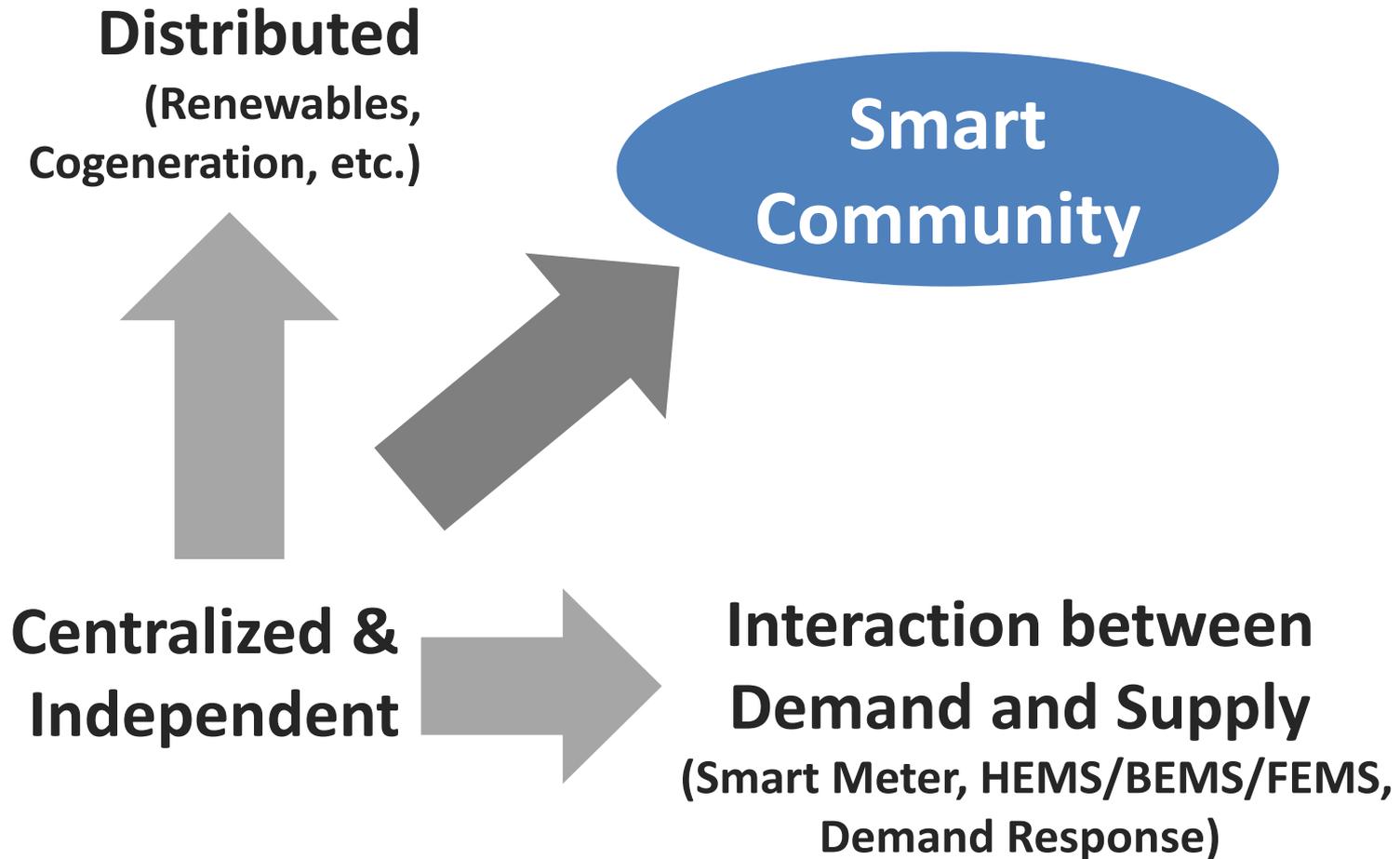




- More Renewables / Less diesel usage
- More distributed power source  
(reduce blackout risk, transmission loss)
- Energy saving / Higher energy efficiency
- Reduced peak demand
- Higher grid stability
- Less electricity theft



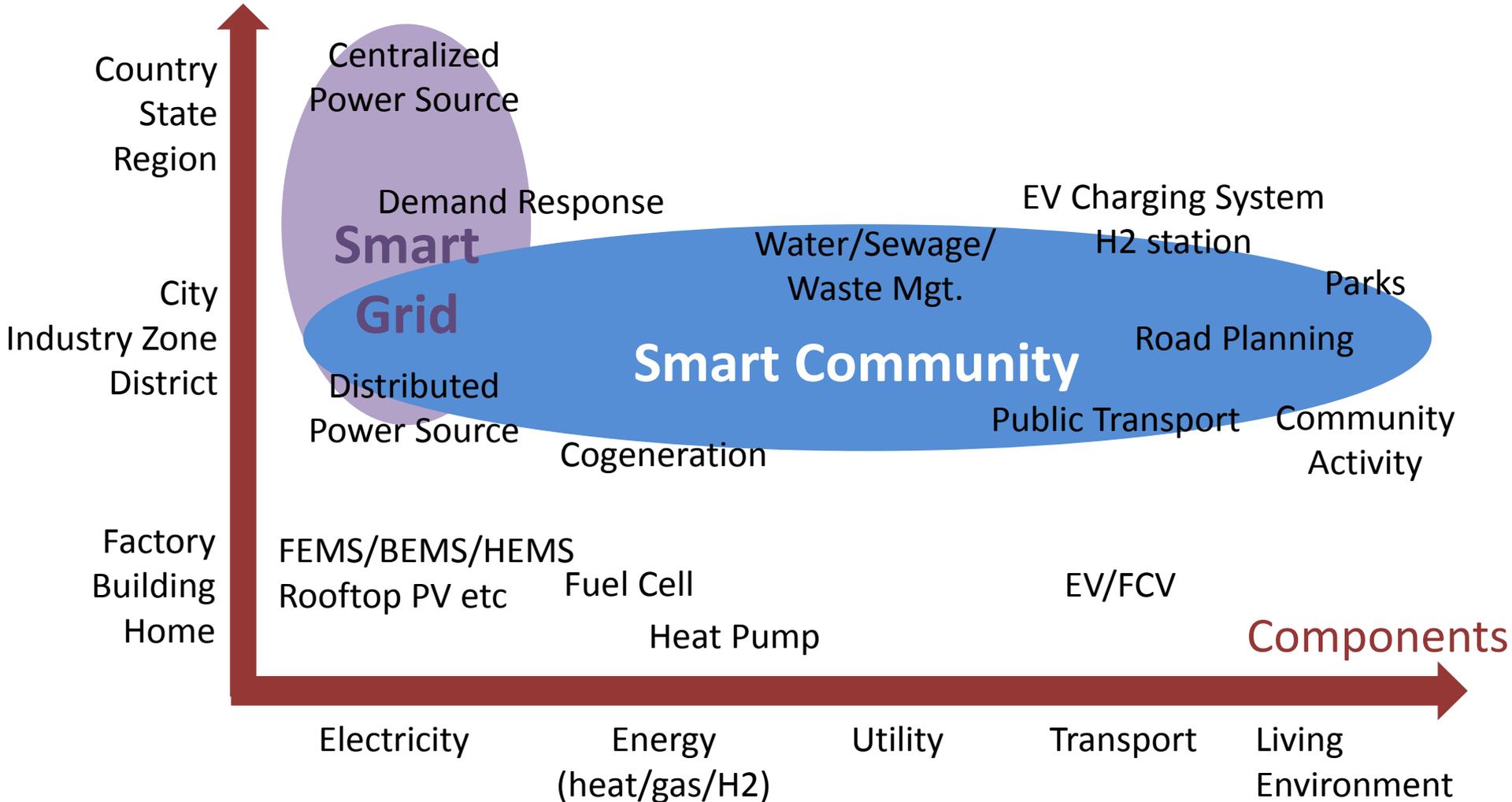
**Goals, priorities and solutions depend on the state of each country.**



# Smart Community and Smart Grid



geographical





**Housing complex**

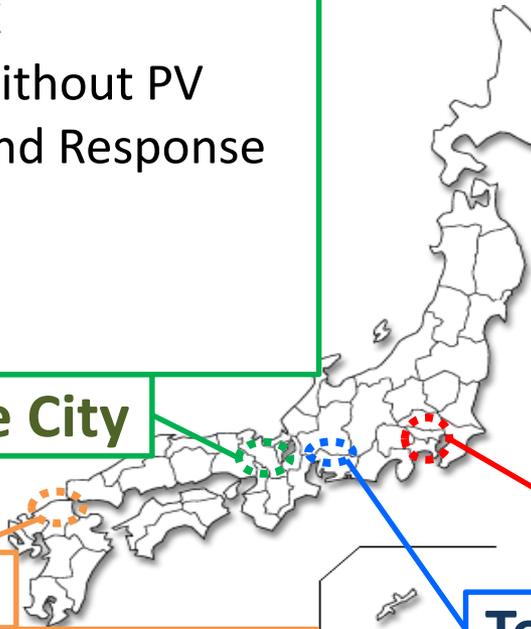
- 700 households without PV
- Large Scale Demand Response Test

**Keihanna Science City**

**Kitakyushu City**

**Independent supply area**

- Separated from EPCOs grid
- Power supplied by Nippon Steel & Sumitomo Metal Corporation.
- Real-Time Pricing



**Wide-area metropolis**

- 34 companies participated
- 4000 households with HEMS
- 10 large-scale buildings and BEMS
- Multiple storage batteries introduced with CEMS

**Yokohama City**

**Toyota City**

**Separate housing**

- 67 households
- Tested HEMS to optimize solar panels, household fuel cells , EV and storage batteries.
- Tested advanced EV car sharing system

# Image of Yokohama City

## MEMS

Isogo Tokyo Gas company housing



Solar panel



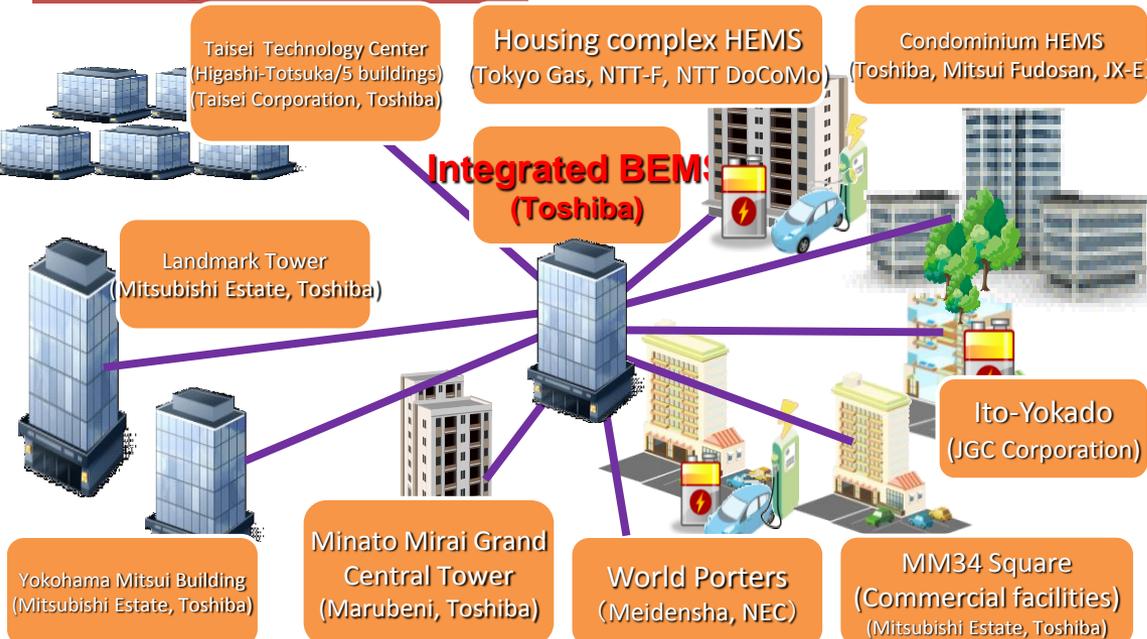
Fuel cell

JX Nippon Oil & Energy company housing



Fuel cell

## Integrated BEMS



## CEMS

- Large-scale demand response demonstration targeting 4,000 households, etc. was initiated in April of 2013.
- Aim to control use of energy and a peak cut of approximately 20%.

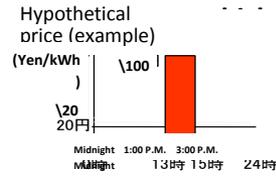


## Model Home Specifications (Exterior)





E-mail notification stating that the following day is a day on which the hypothetical pricing is applied

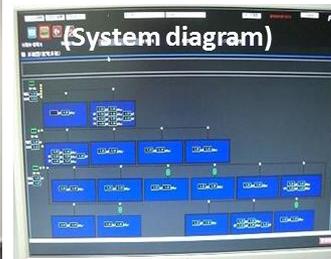


## Dynamic Pricing Demonstration in Kitakyushu

CEMS at the site

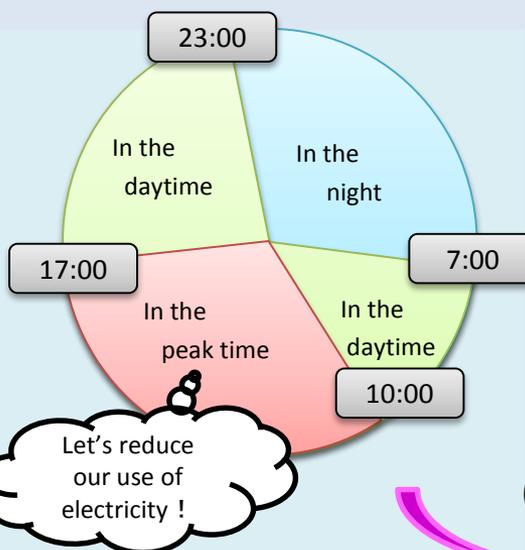


Examples of screens for CEMS

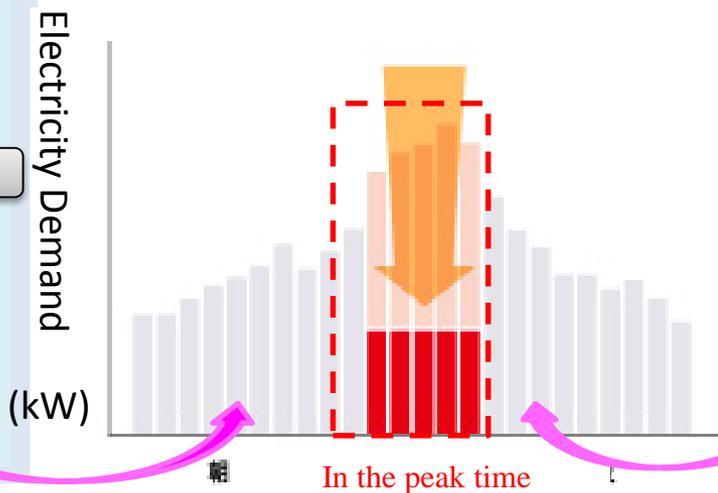


## 1. Price-based DR

- Demand reduction by flexible rate structure, set by retailers.
- Various types of pricing (TOU, CPP Real-time etc.)
- 4 demo projects used this type.
- Market reform will trigger this pricing scheme.

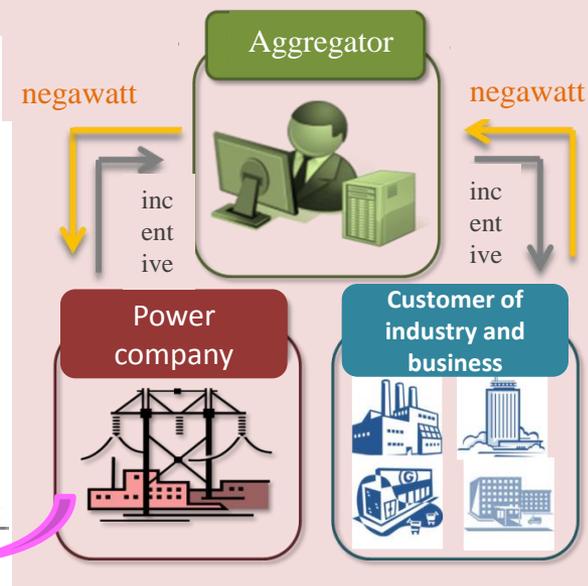


Control the power demand smartly by DR



## 2. Incentive-based DR (Negawatt trading)

- EPCO purchase demand reduction from DR aggregator.
- Ensures demand predictability for EPCO
- Last March, METI issued the guideline for Negawatt Trading.





## Demand Reduction by CPP [Kitakyushu]

CPP price	FY2012 Summer	FY2012 Winter	FY2013 Summer
50 yen/kWh	-18.1%	-19.3%	-20.2%
75 yen/kWh	-18.7%	-19.8%	-19.2%
100 yen/kWh	-21.7%	-18.1%	-18.8%
150yen/kwh	-22.2%	-21.1%	-19.2%

Basis price:17.55 yen/kWh

## Demand Reduction by CPP [Keihanna]

CPP price	FY2012 Summer	FY2012 Winter	FY2013 Summer
+40yen/kWh*	-15.0%	-20.1%	-21.1%
+60yen/kWh*	-17.2%	-18.3%	-20.7%
+90yen/kWh*	-18.4%	-20.2%	-21.2%

\*Additional price to the original rate



## Policy Measures

### 1) Electricity Market Reforms

(retail liberalization, unbundling T/D sector)

### 2) Introduction of Smart Meter to all Households by 2024

### 3) Rule-making e.g. Negawatt Trading Guidelines



**New business opportunities for distributed power generators, ancillary services, demand response aggregators, CEMS service etc.**



**By 2030**

**- 17% by Energy Saving**

**- 22% by Renewables**



Thank you for your kind attention