NEDO's Activities

Innovation for a Sustainable Future

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New Energy and Industrial Technology Development Organization (NEDO)
Japan

1. What's NEDO

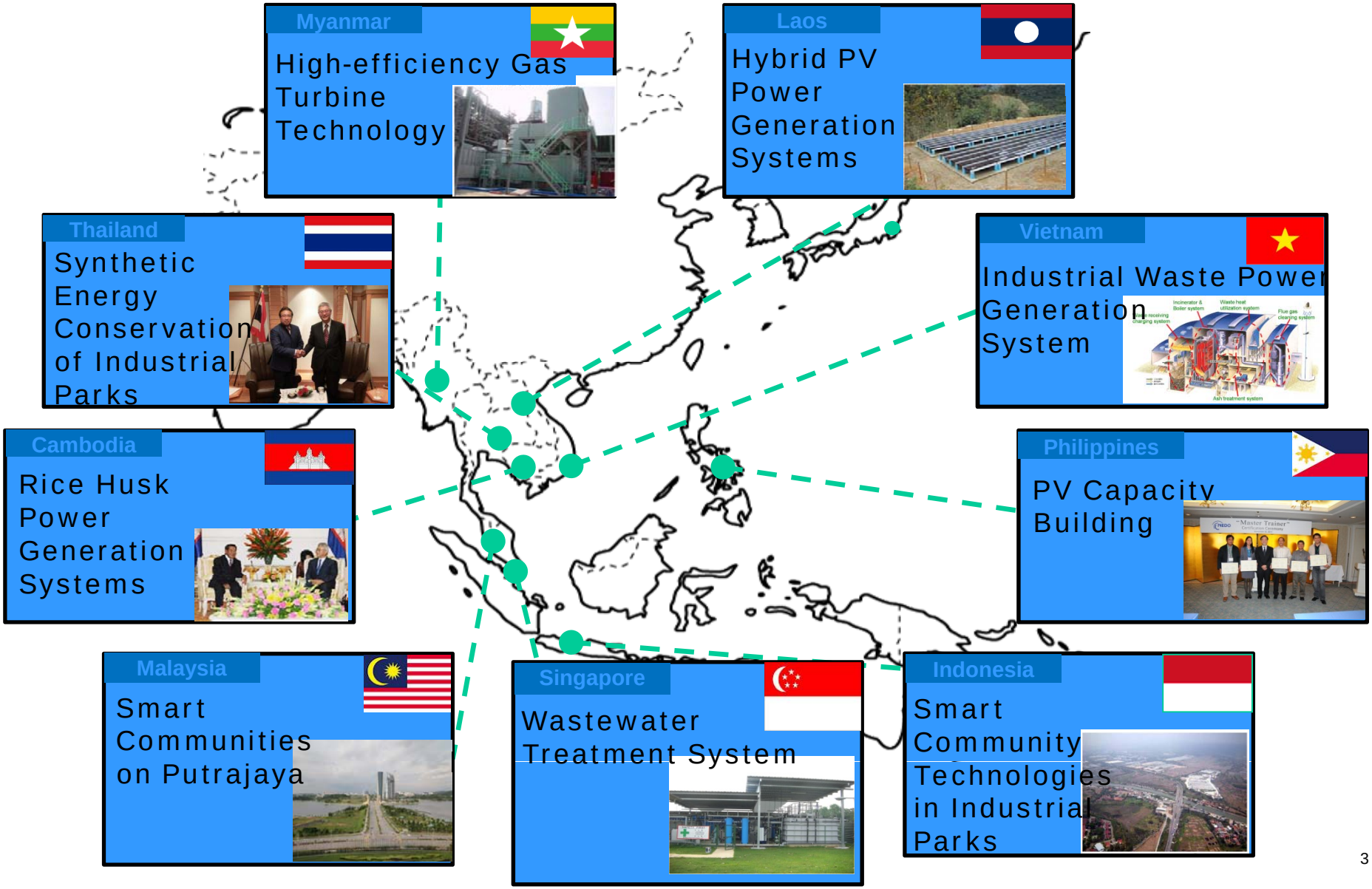
NEDO's Mission

Coordination with policymaking authorities

Combining efforts of Industry and academia

- **Addressing energy and global environmental issues**
  - **International Collaborative Demonstration Project**
- **Enhancement of Japan's industrial technologies**

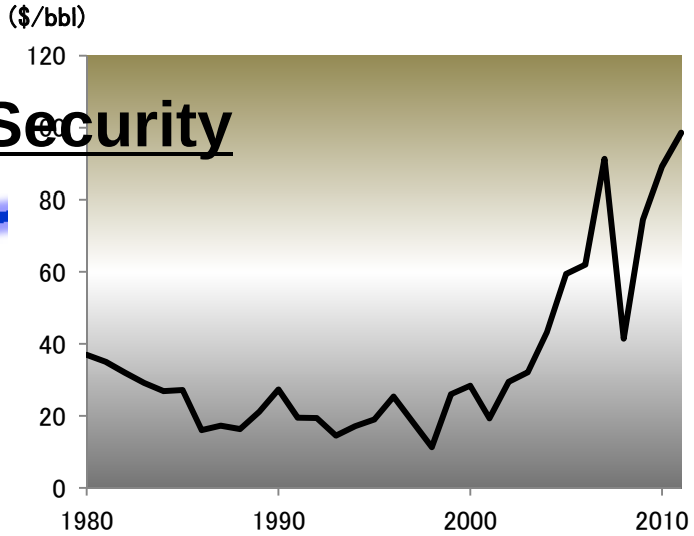
Examples of NEDO's Projects in ASEAN



2. Global Background

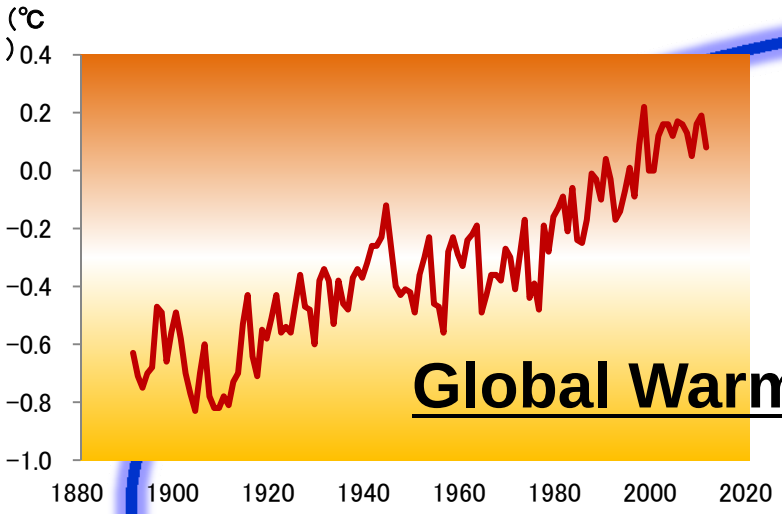
Energy and Environmental Issues

Energy Security



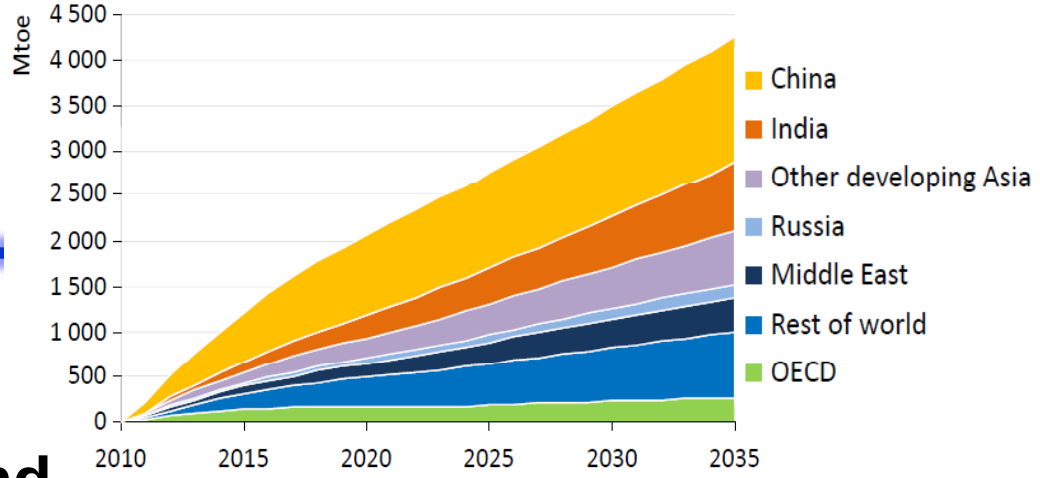
Soaring oil price (WTI)

Global Warming



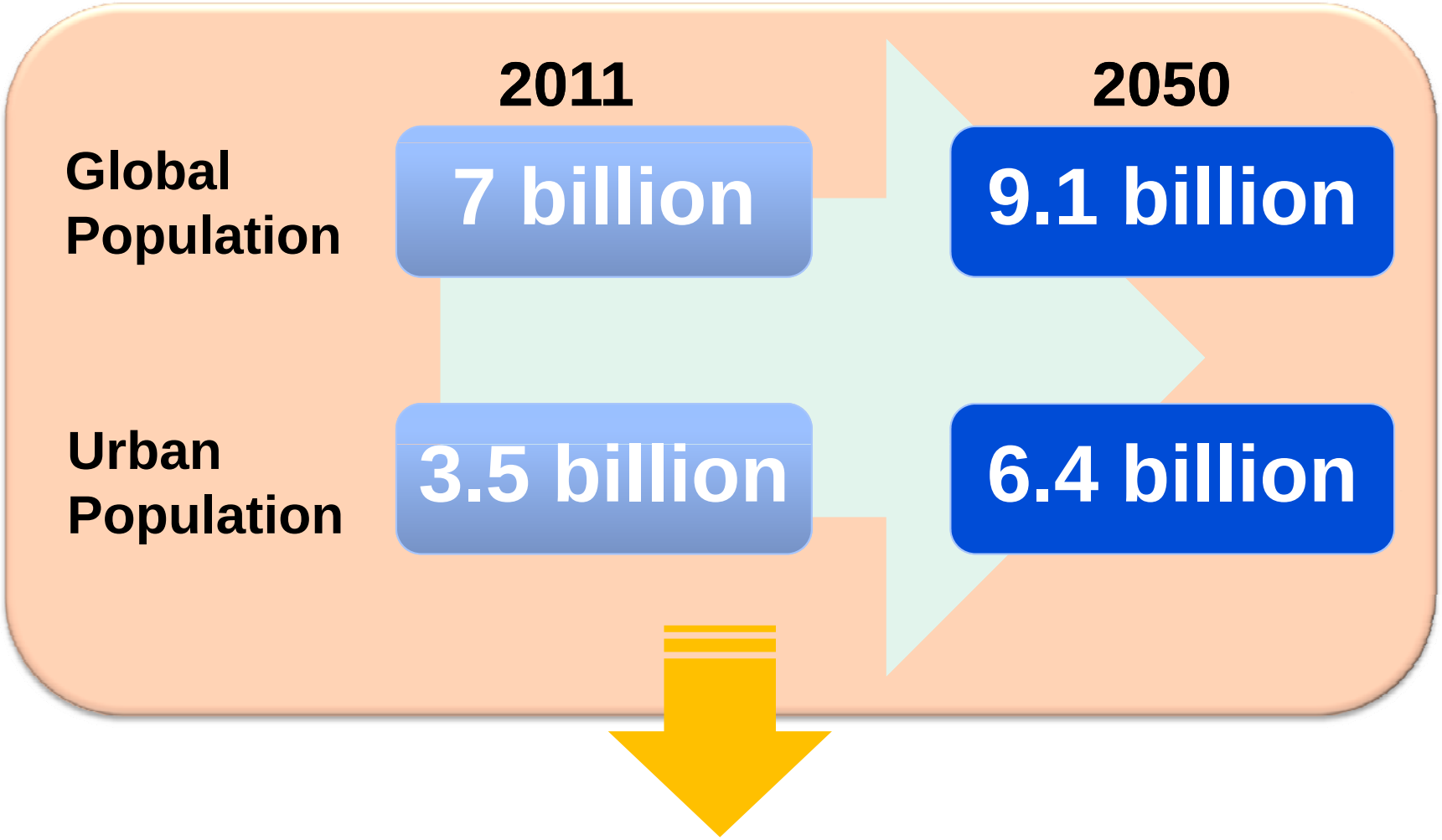
Changes in average global surface temperature

Increasing Energy Demand



Global primary energy demand

Population Growth and Cities' Over-Burden

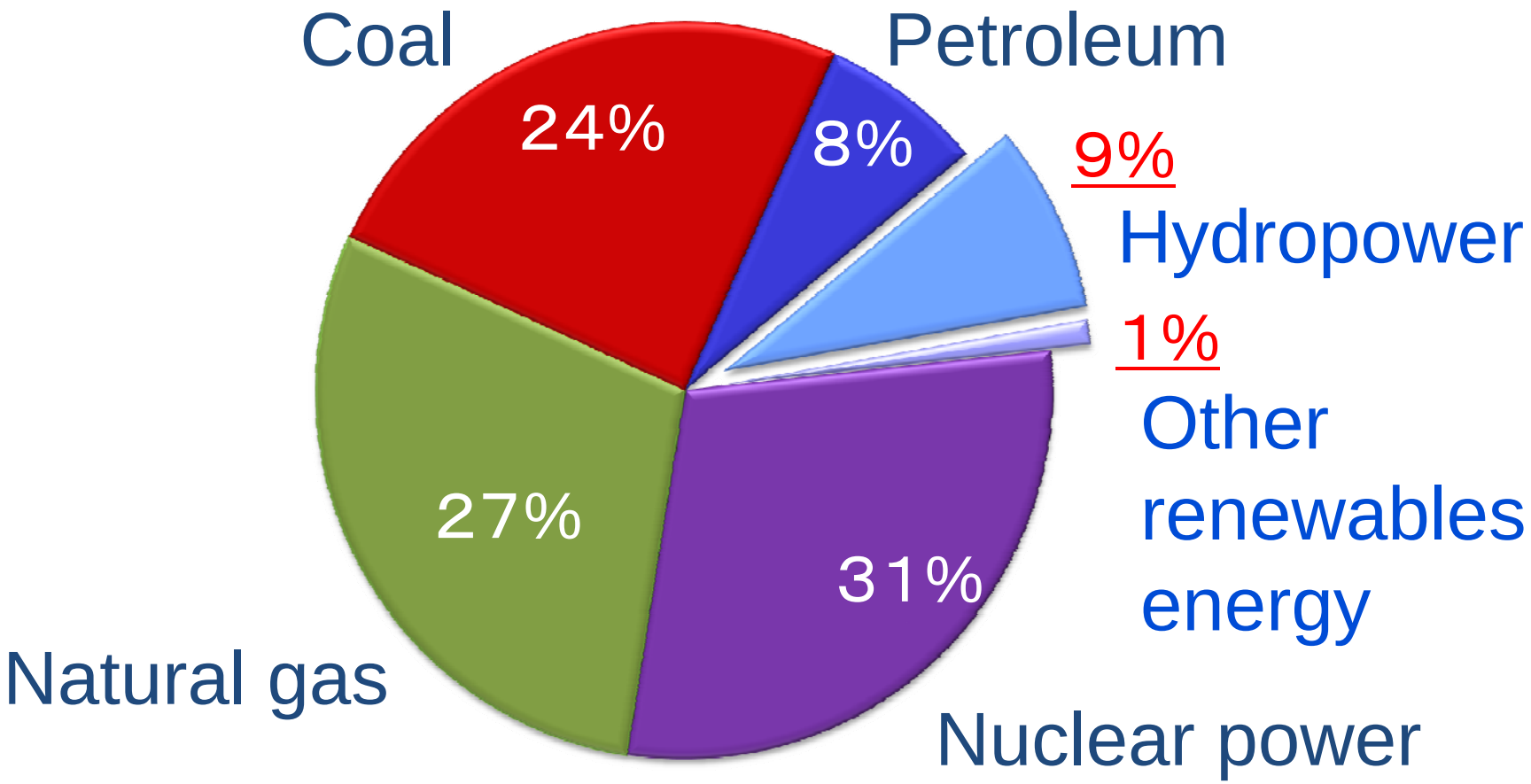


- Rising urban energy demand
- Traffic congestion
- Air pollution
- Waste issues
- Aging societies

3. Japan's Situation of Energy

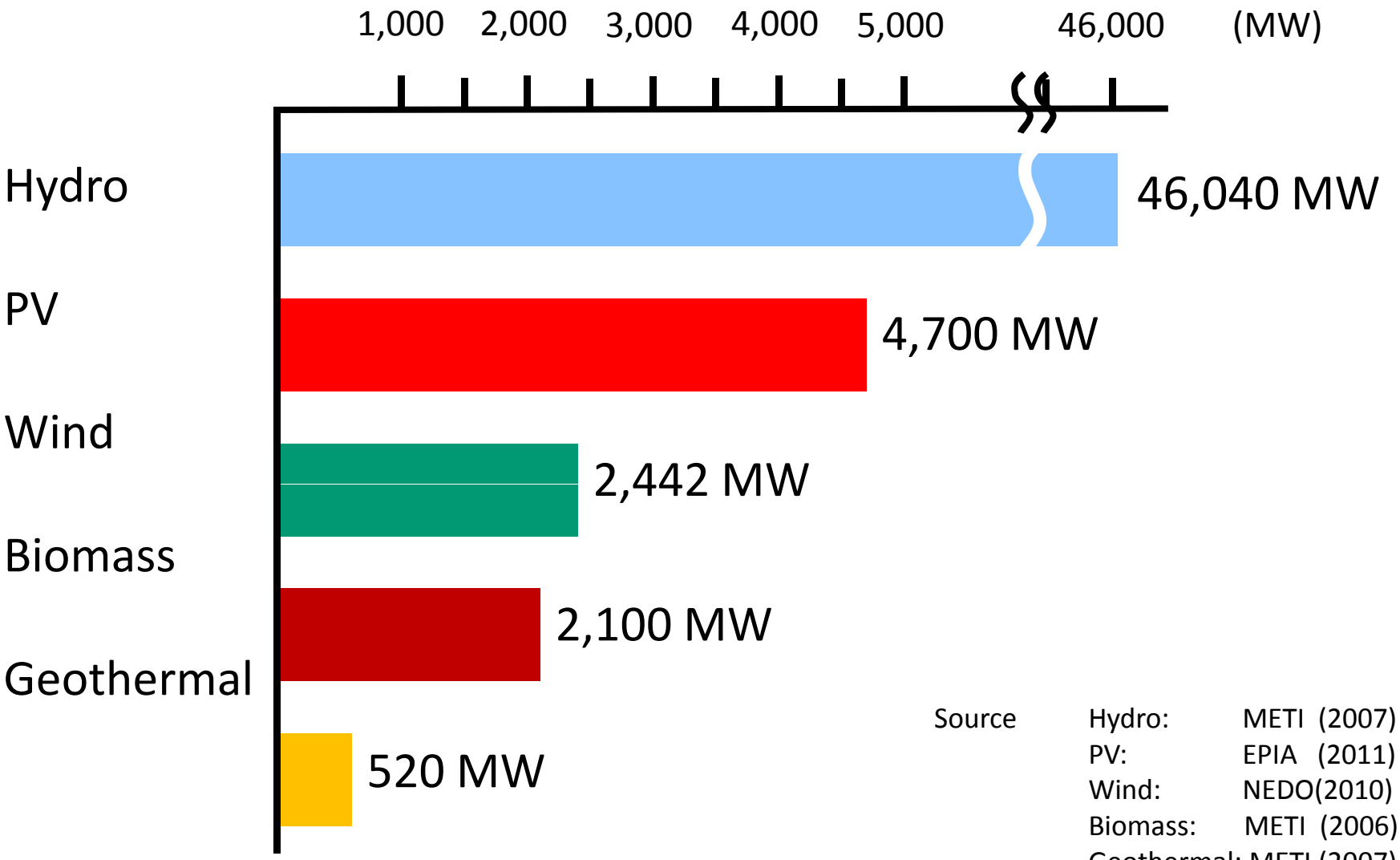
Electricity Supply

Composition of annual energy generated in Japan (FY2010)



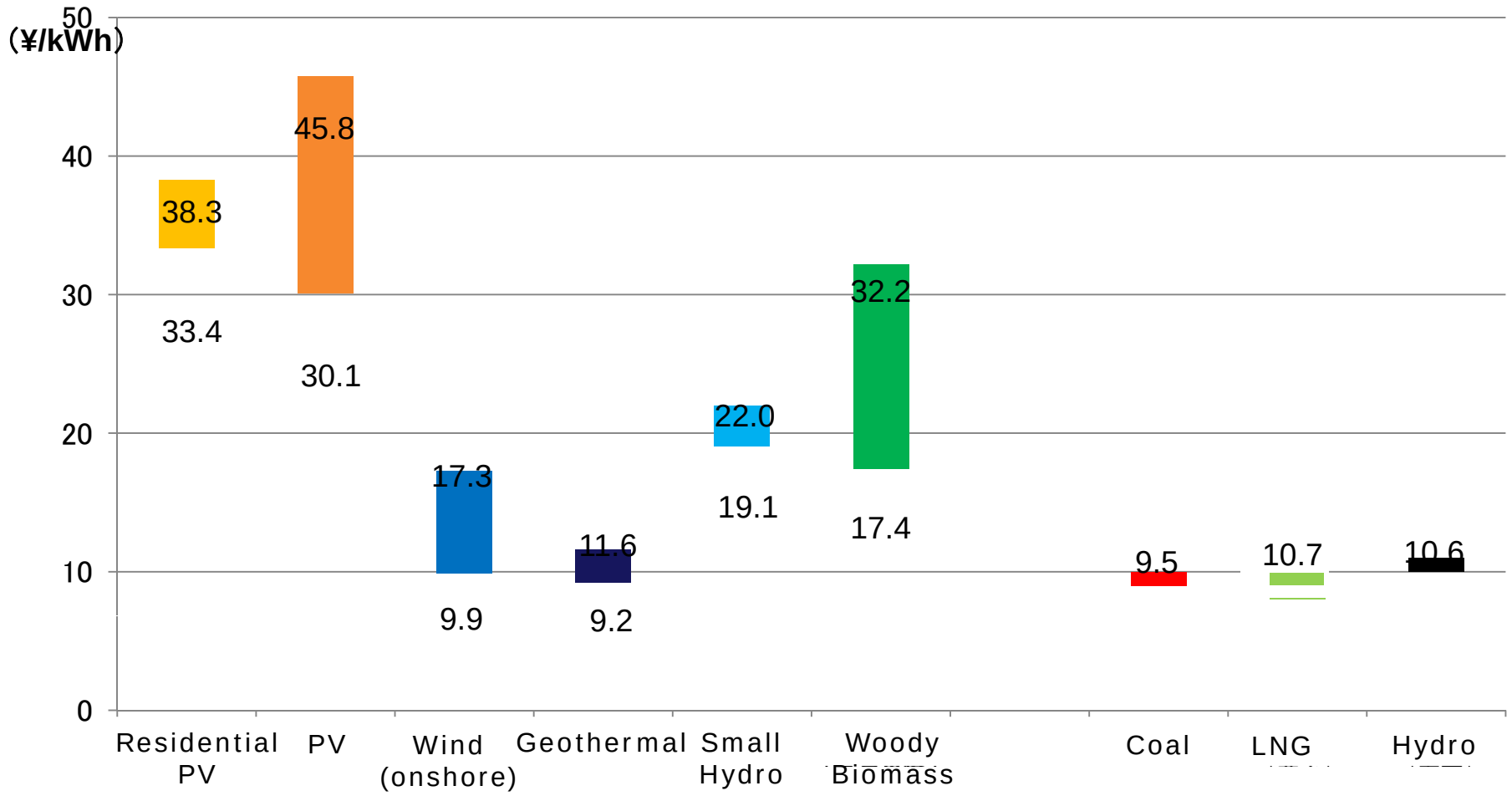
Source: METI

Renewable Power Generation Capacity



Source
Hydro: METI (2007)
PV: EPIA (2011)
Wind: NEDO(2010)
Biomass: METI (2006)
Geothermal: METI (2007)

Power Generation Cost



Source : National Policy Unit

4. After March 11 2011

”Basic Energy Plan” (under discussion)

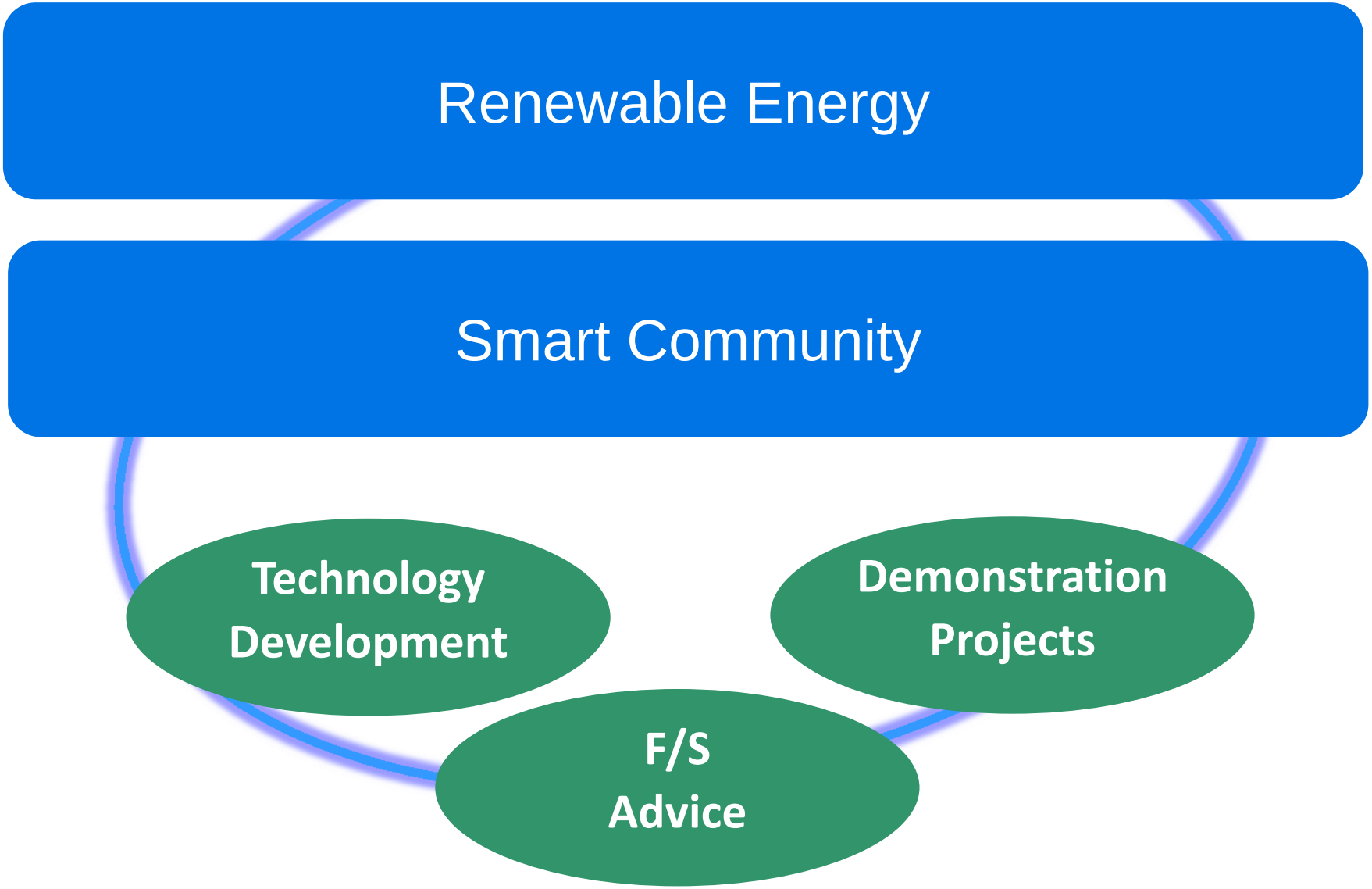
Desired Energy Mix

- Fundamental reinforcement of energy and electricity conservation
- Accelerated development and use of renewable energies
- Effective utilization of fossil fuels
- Reduced dependency on nuclear power

Direction of Energy Policy Reform

- Realizing the world’s most advanced energy-saving society:
  Reform of the demand structure
- Realizing a distributed next-generation energy system:
  Reform of the supply structure
- Need for technical innovation to support the energy mix conversion and reform of the energy supply-demand structure

Accelerating NEDO's Actions



5. Renewable Energy

NEDO's Activities in Renewable Energy

Solar PV

Concentrating Solar Power (CSP)

Wind

Ocean

Biomass

Progress of PV R&D in Japan

2009 Roadmap “PV2030+”

2004 Roadmap “PV2030”

2000 Thin-film Si PV cells (¥140/W), CIS PV cells

“New Sunshine Project” completed

Low cost mc-Si PV cells production technology (Efficiency = 17.2%, ¥189/W)

“New Sunshine Project” started 1993

Residential PV system technologies, basic grid connection equipment

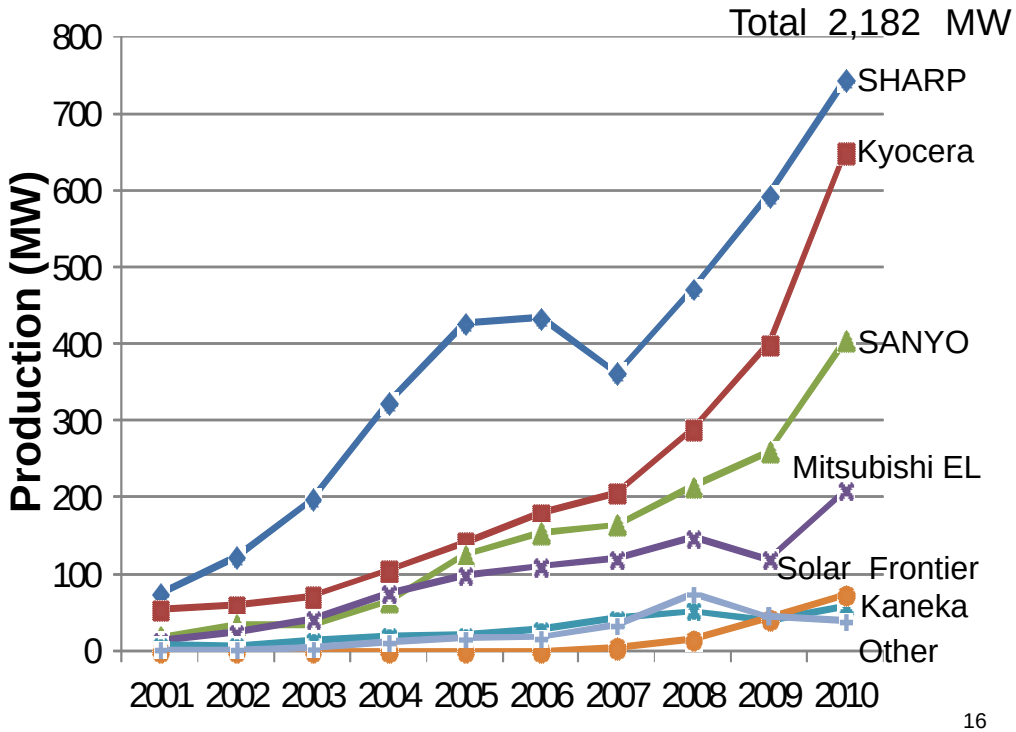
Manufacturing technologies for mc-Si PV cells

1980 Establishment of NEDO

“Oil crisis”

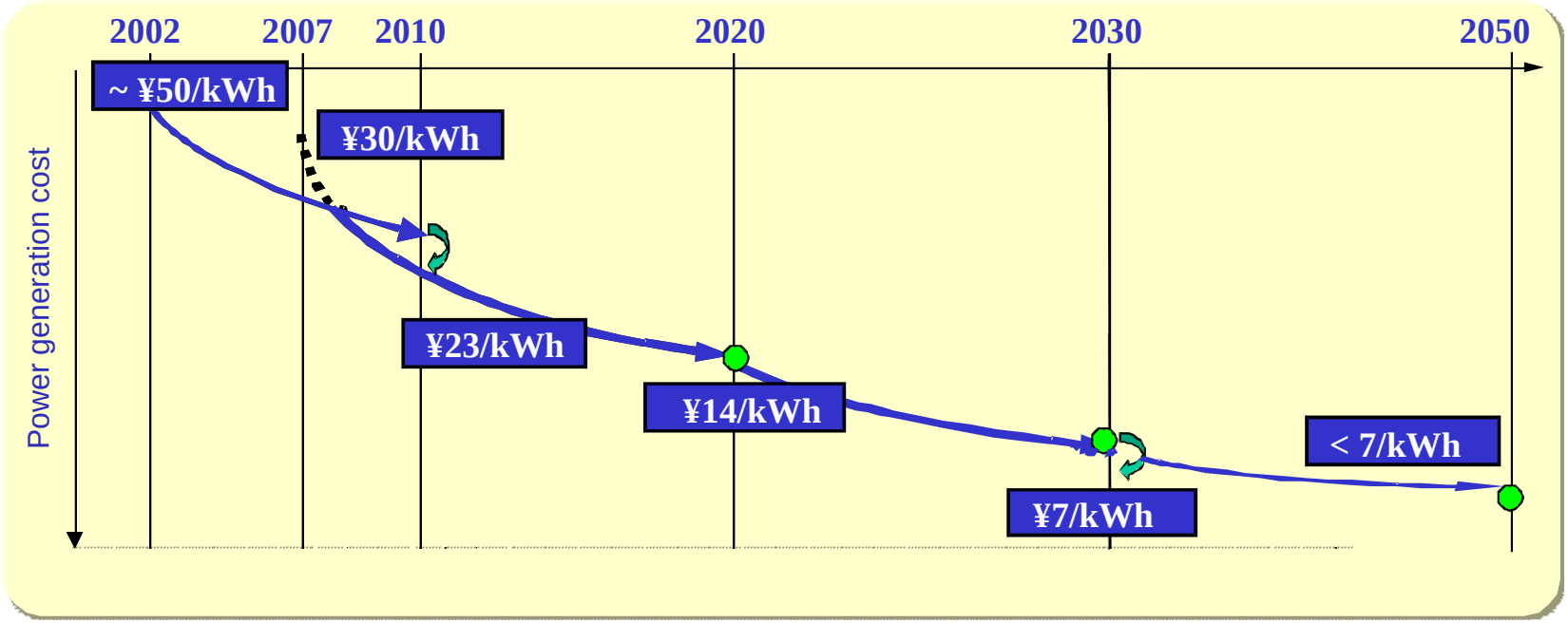
1974 “Sunshine Project” started

PV cell production (Japan)



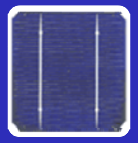
Source : PVNews April 2009, May 2010, May 2011

NEDO's "PV Roadmap (PV 2030+)"

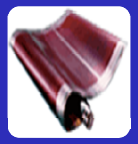


Target year	2010 -	2020	2030	2050
PV Power generation cost	Equal to household residential electric rates (¥23/kWh)	Equal to commercial electric rates (¥14/kWh)	Equal to average power generation costs (¥7/kWh)	Used as general power source (< ¥7/kWh)

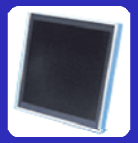
High Performance PV R&D Projects



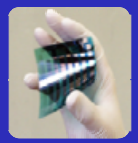
Wafer-based Si solar cell



Thin-film Si solar cell



CIS solar cell

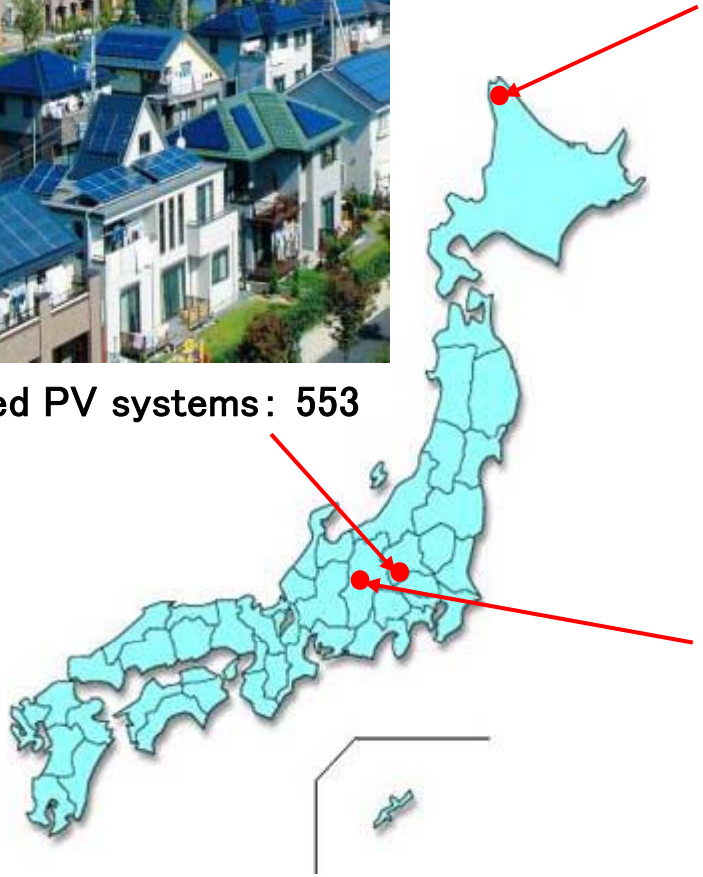


Dye-sensitized and organic thin-film solar cell

Demonstration PV (+ Grid System) Projects

Clustered PV Power Generation Systems in Ota City (FY2002 - FY2007)

Number of installed PV systems: 553



Mega-solar Project (FY2006 - FY2010)

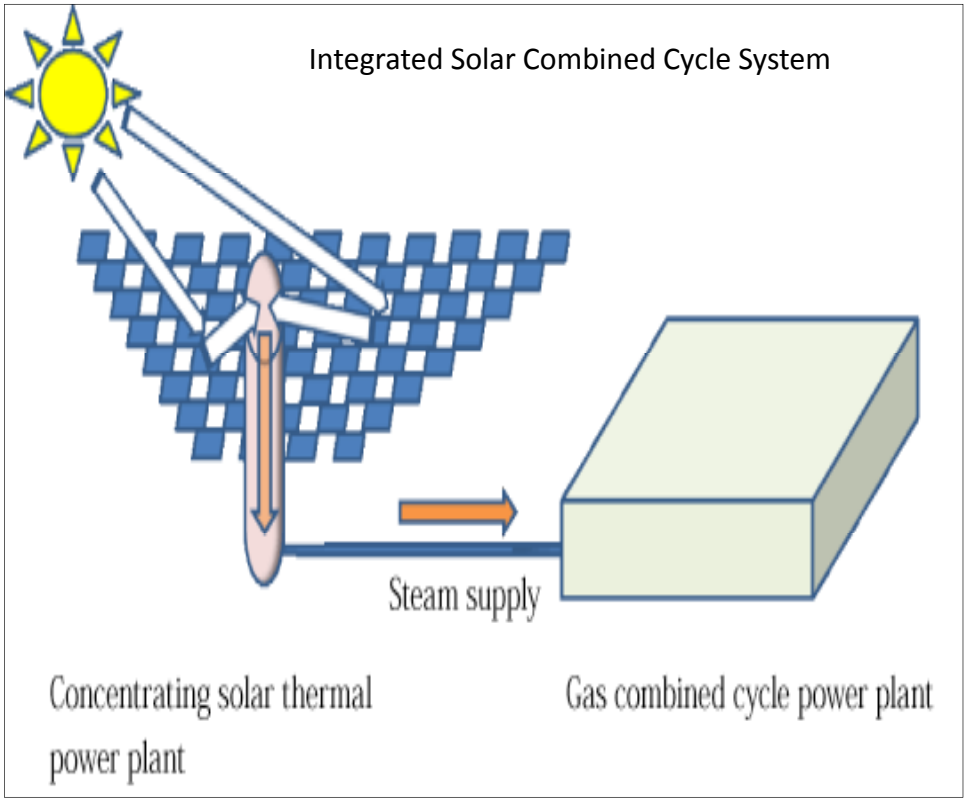
Wakkanai Site
5 MW (Most PV cells are crystal type)

Hokuto Site
2 MW (26 types of PV cells)

Concentrating Solar Power (CSP)

CSP Demonstration in Japan (FY1974 - FY1984)

Joint CSP Project with Tunisia (F/S Now in Progress)



Wind Power Stabilization Demonstration

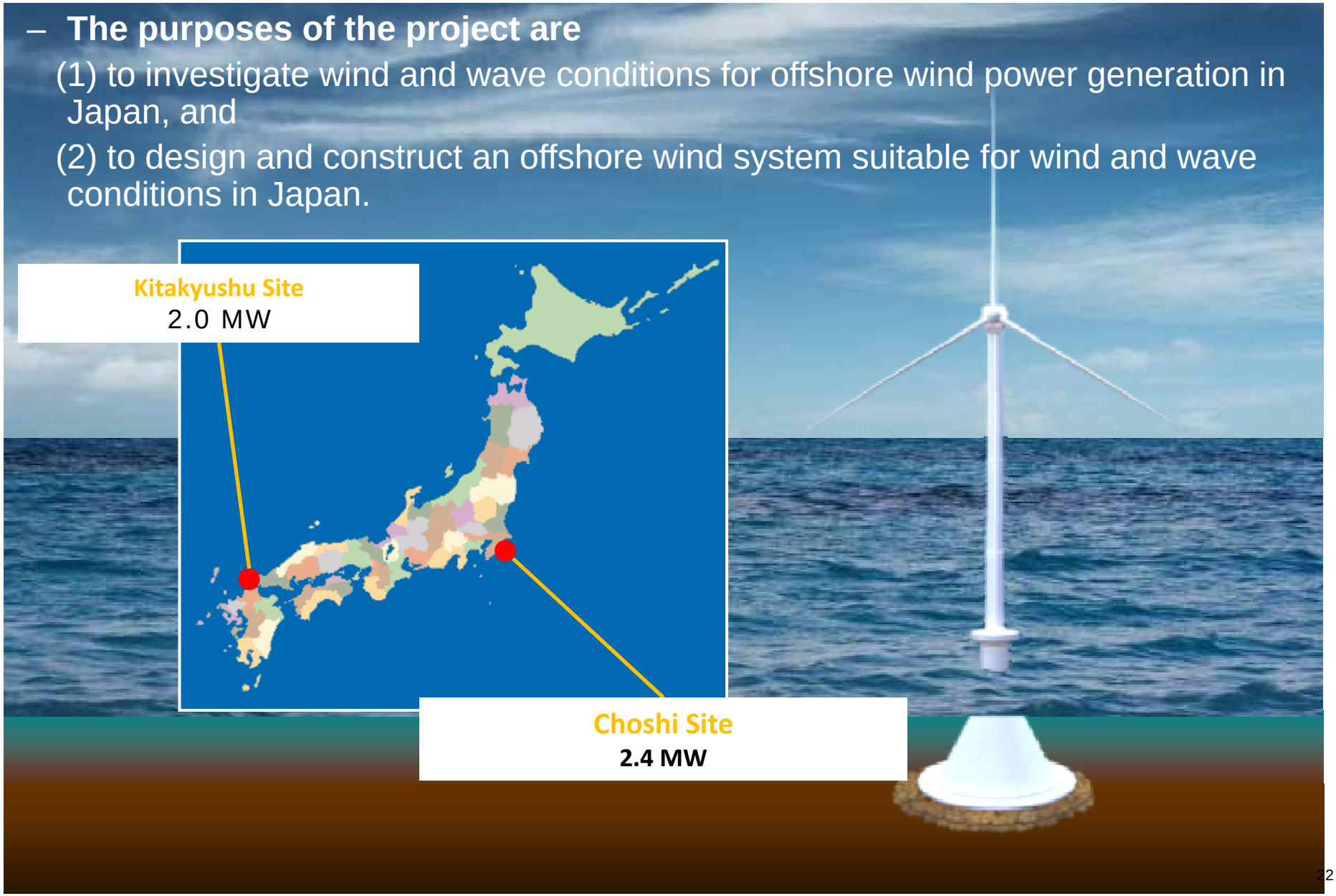
- FY2003 – FY2007
- Development of battery and control technologies to stabilize output from wind farm
- Development of simulation technologies

Off-Shore Wind Demonstration

– **The purposes of the project are**

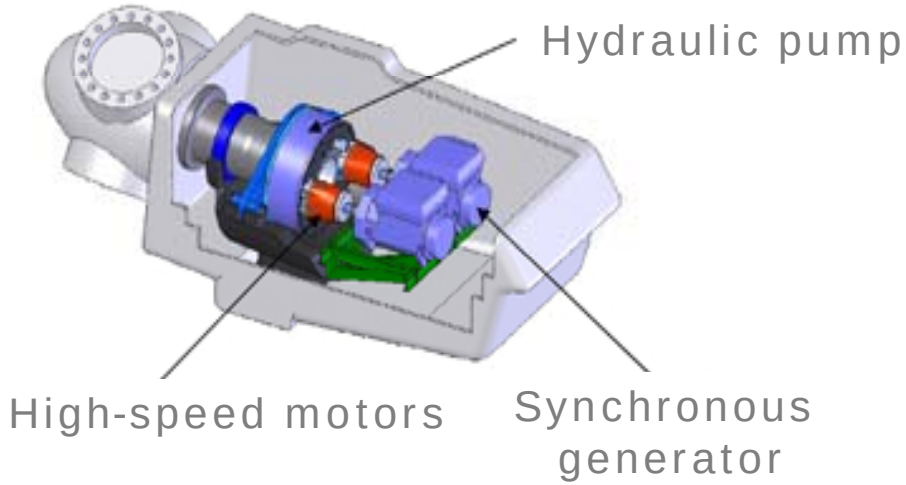
(1) to investigate wind and wave conditions for offshore wind power generation in Japan, and

(2) to design and construct an offshore wind system suitable for wind and wave conditions in Japan.



Large Class Wind Turbine

- High quality electrical output
- Highly reliable and robustly driven system
- Lower maintenance costs



The New-type Hydraulic transmission system

The Image of 7 MW-class Wind Turbine (Rotor diameter : Over 165 m)

Ocean Energy Technology

- Ocean Wave Power

- Tidal Current Power

Cellulosic Bioethanol Production System

Plantation / Collection

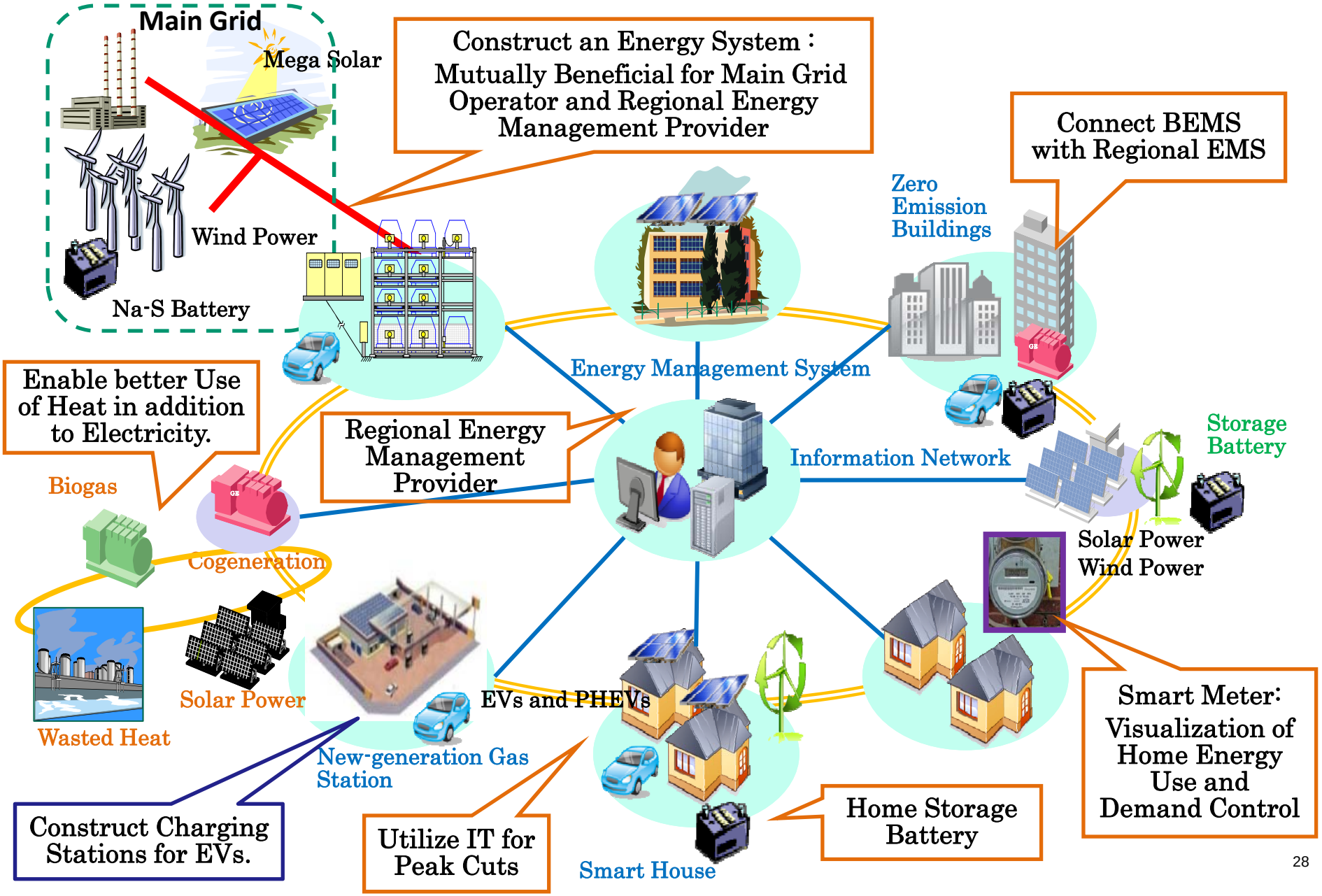
Ethanol Production (Target: ¥40/L)

Bioethanol Pilot Plant Demonstration

NEDO's demonstration plant at Oji Paper Co.'s Kure plant in Hiroshima Prefecture

6. Smart Community

"Smart Community"



NEDO's Smart Community Roadmap

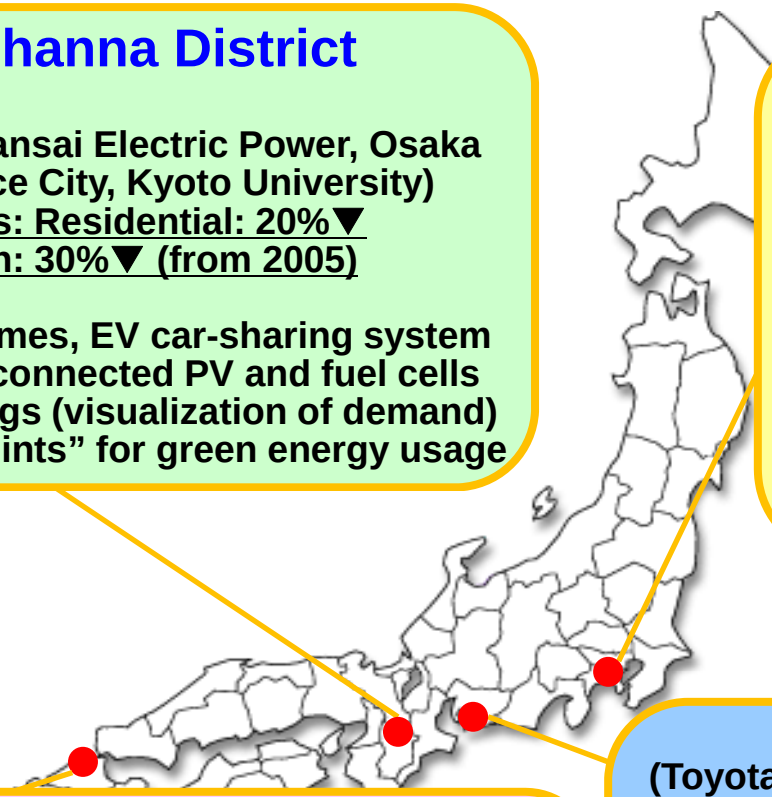
	Today - Year 2020	2020 - 2030	2030 -
Relation between regional EMS and entire grid	■ Solar panel prices will decrease significantly due to large-scale introduction of panels to houses as well as commercial buildings. ■ Measures to maintain the quality of electricity during the large-scale introduction of PV will be carried out mainly for the grid side. Storage cells will be installed at substations. ■ As regional EMS are further demonstrated, technology and know-how will be accumulated. ■ The cost of storage cells will go down due to technology development and demonstration.	■ Due to a decline in PV prices, more PV systems will be installed at houses. ■ Regional EMS, which contribute to effective use of RE generated at houses, will become more important. ■ Regional EMS will be realized as storage cells become cheaper and are further disseminated. ■ Distribution and transmission networks that enable two-way communication between demand side and grid side will be actively established.	■ Cost competitiveness of RE will improve as fossil fuel prices increase by more than double. Use of RE will be prioritized and nuclear power will be used as a base. ■ EMS that can provide an optimized balance in terms of economy and security between regional EMS and grid will be established. ■ EMS that creates demand by charging EVs at the time of excessive RE, and supplies energy to grid at high demand, will be used.
Houses	■ Remote reading using smart meters will start. ■ HEMS will be disseminated. Some houses will install home servers. Demand response demonstration will start. ■ Demonstration of EVs will start.	■ HEMS and regional EMS will be integrated. All power generated at houses will be used optimally. ■ Various services using home servers will be disseminated. ■ EVs will be used for power storage.	■ A fully-automated HEMS will be realized.
Buildings	■ ZEB introduction will start.	■ ZEB will be realized at new public buildings.	■ ZEB will lead to a greatly reduced level of emissions for all new buildings as a group.

Demonstration Projects in Japan

Kyoto Keihanna District

(Kyoto Prefecture, Kansai Electric Power, Osaka Gas Kansai Science City, Kyoto University)
CO2 emissions: Residential: 20%▼
Transportation: 30%▼ (from 2005)

- Install PV at 1,000 homes, EV car-sharing system
- Management of grid connected PV and fuel cells in houses and buildings (visualization of demand)
- Grant "Kyoto eco-points" for green energy usage



Yokohama City

(Yokohama City, Toshiba, Panasonic, Meidensha, Nissan, Accenture, others)
CO2 emissions:
30%▼ by 2025 (from 2004)

- Energy management system that integrates HEMS, BEMS and EVs
- PV (27,000 kW)
- Use of heat and unused energy
- 4,000 smart houses, 2,000 EVs

Kitakyushu City

(Kitakyushu City, Fuji Electric Systems, GE, IBM, Nippon Steel)
CO2 emissions: 50%▼ (from 2005)

- Real-time management at 70 companies and 200 houses
- Energy management using HEMS and BEMS
- Energy system that coordinates demand side management with overall power system

Toyota City

(Toyota City. Toyota Motor, Chubu Electric Power, Toho Gas, Toshiba, Mitsubishi Heavy Industries, Denso, Sharp, Fujitsu, Dream Incubator, etc.)
CO2 emissions: Residential 20%▼
Transportation: 40%▼

- Use of heat and unused energy in addition to electricity
- Demand response at more than 70 homes 3,100 EV, V to H and V to G

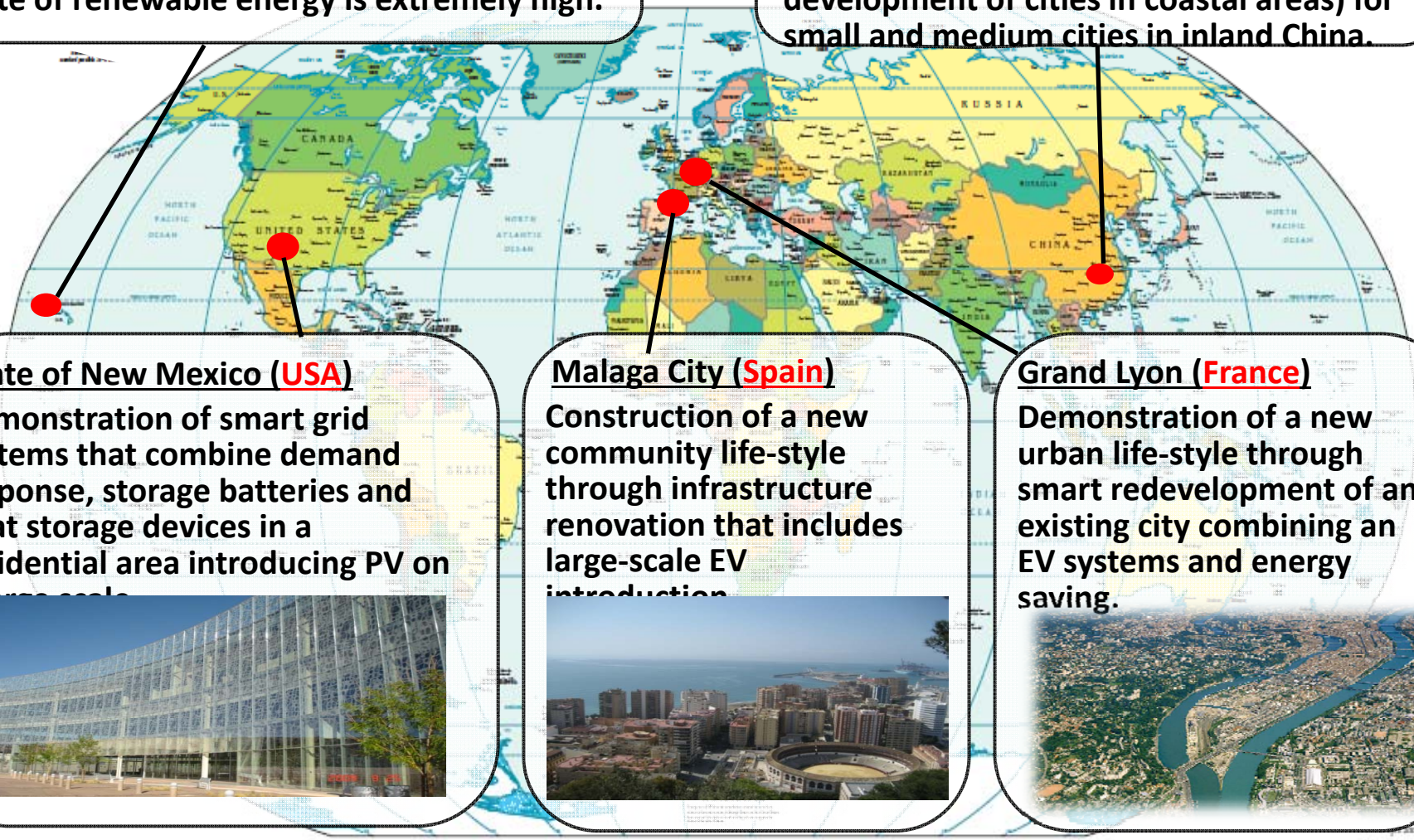
NEDO's Global Projects

Maui Island, State of Hawaii (USA)

Construction of a low-carbon model city for remote islands using an EV charging control system on the Maui, where the introduction rate of renewable energy is extremely high.

Gongqingcheng City, Jiangxi Province (China)

Exhibition of a new model (to avoid urban growth problems that occurred during the development of cities in coastal areas) for small and medium cities in inland China.



State of New Mexico (USA)

Demonstration of smart grid systems that combine demand response, storage batteries and heat storage devices in a residential area introducing PV on a large scale

Malaga City (Spain)

Construction of a new community life-style through infrastructure renovation that includes large-scale EV introduction

Grand Lyon (France)

Demonstration of a new urban life-style through smart redevelopment of an existing city combining an EV systems and energy saving.

http://www.nedo.go.jp/english

Thank you very much for your kind attention!