



# Survey of Microgrid R&D in Japan

**May 27, 2011**

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**New Energy and Industrial Technology  
Development Organization (NEDO)**

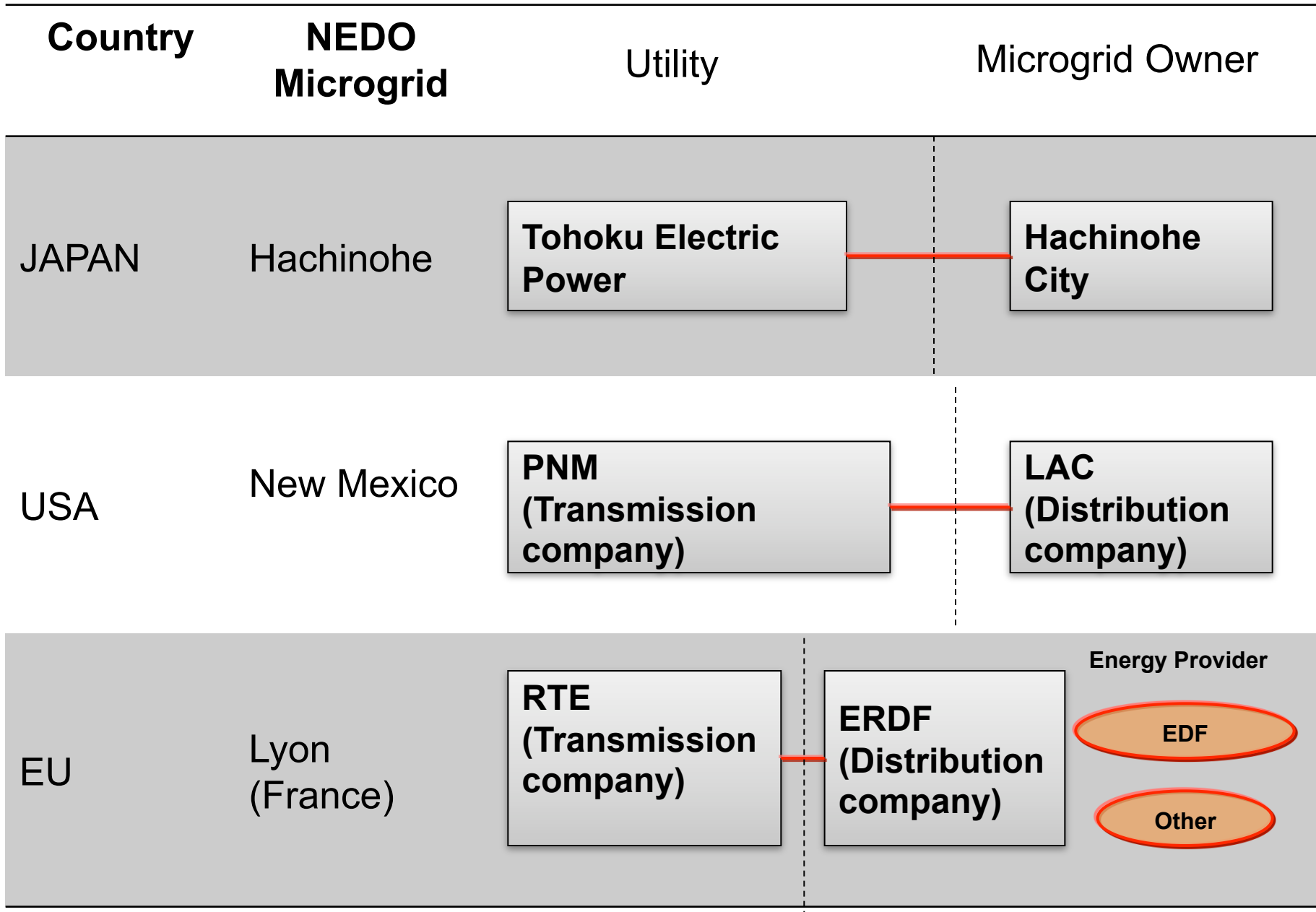
# Agenda

- 1. Types of Microgrid**
- 2. Specific Microgrid Activities**
  - ✓ **Hachinohe (Japan)**
  - ✓ **New Mexico (USA)**
  - ✓ **Lyon (France)**
- 3. Japan Smart Community Alliance**
- 4. Conclusion**

# Types of Microgrid

Country	Utility	NEDO Microgrid	Microgrid Owner
JAPAN	Mostly integrated	Hachinohe Aichi	Microgrid owner – Demand side
USA	Wholesale deregulated (Not completely deregulated on the distribution side)	New Mexico Hawaii	Microgrid owner – Distributed Company
EU	Fully deregulated (Both wholesale and retail)	Lyon (France) Malaga (Spain)	Microgrid EMS is separated into two different types (regulated utilities and competitive utilities)

# Specific Microgrid Activities

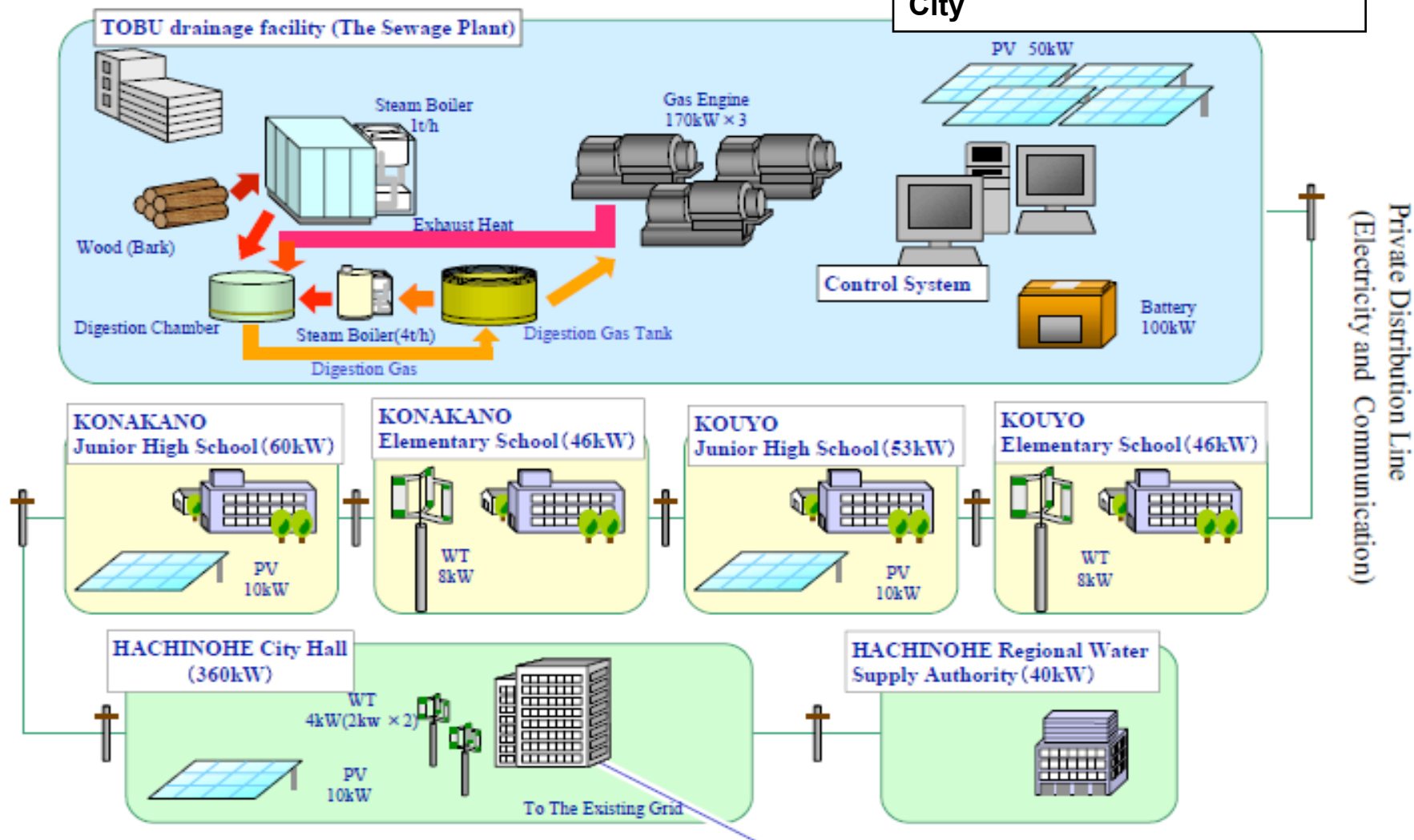


# Outline of Demonstration Project for Regional Power Grids Utilizing Various New Types of Energy (Hachinohe Project)



## Project Participants

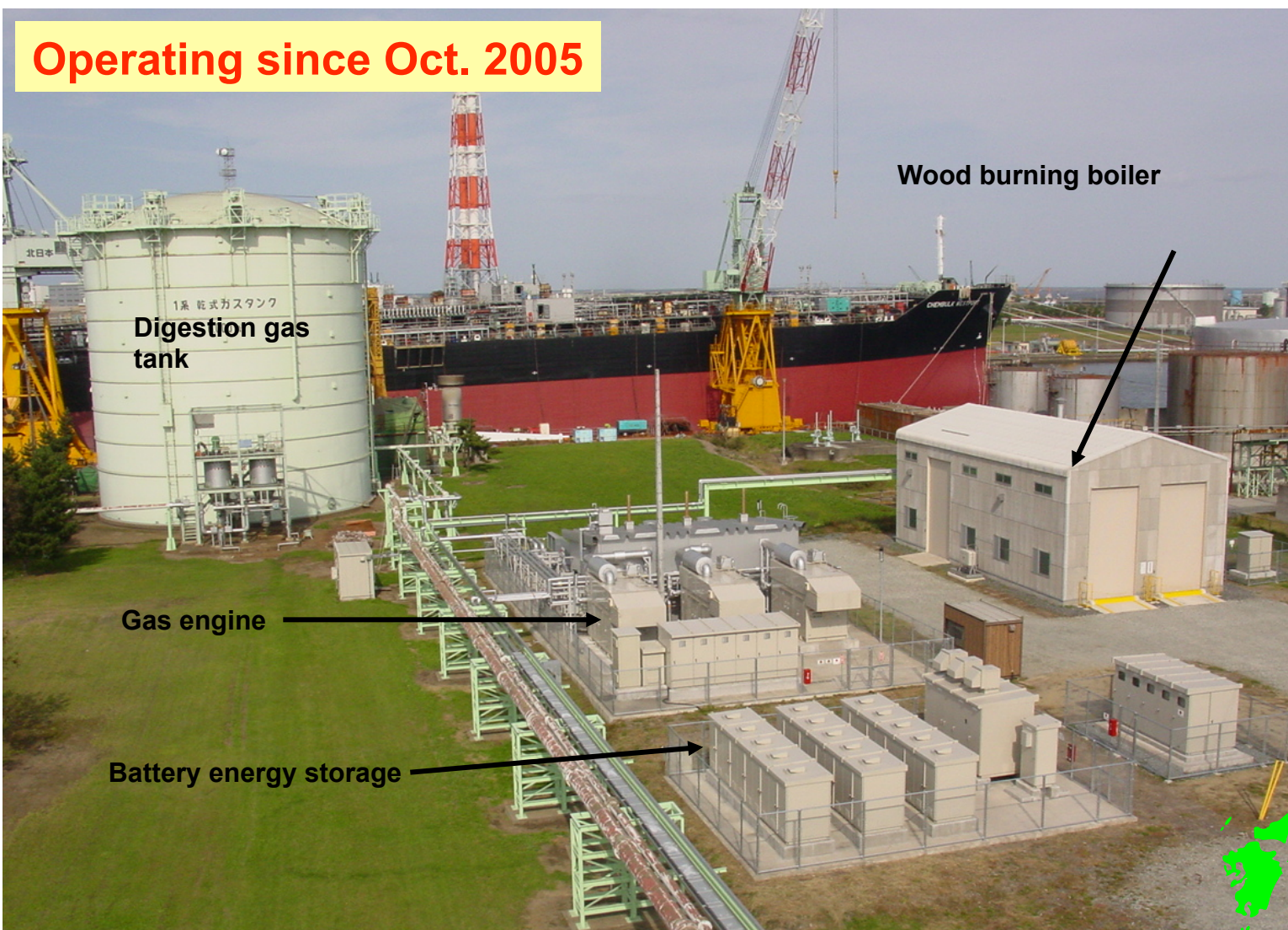
Mitsubishi Research Institute,  
Mitsubishi Electric, Hachinohe  
City



# Outline of Demonstration Project for Regional Power Grids Utilizing Various New Types of Energy (Hachinohe Project)

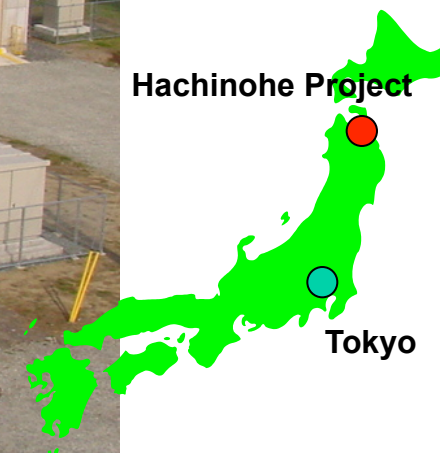


**Operating since Oct. 2005**



**Hachinohe Project**

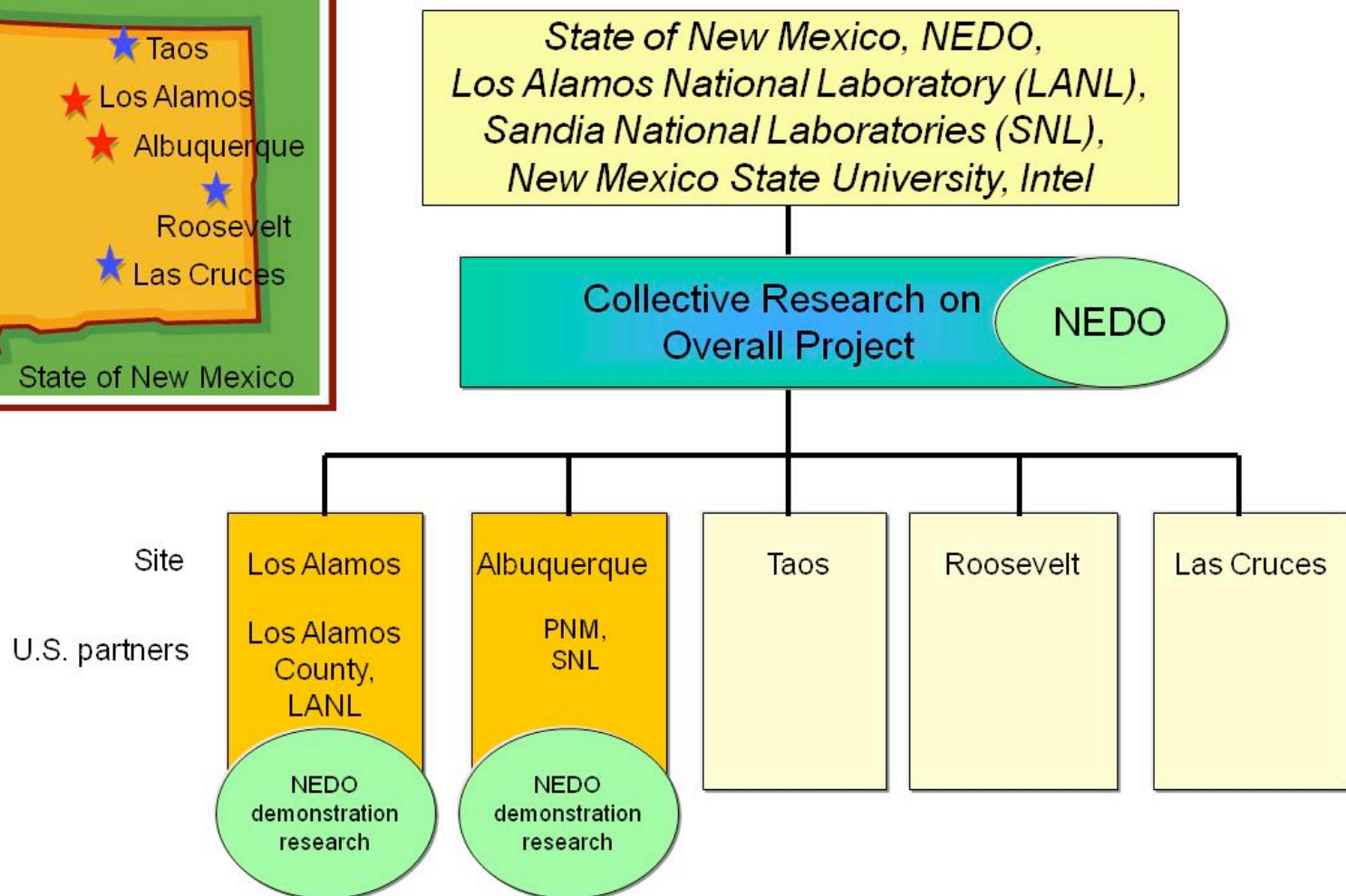
**Tokyo**





# Outline of Japan-New Mexico Smart Grid Demonstration

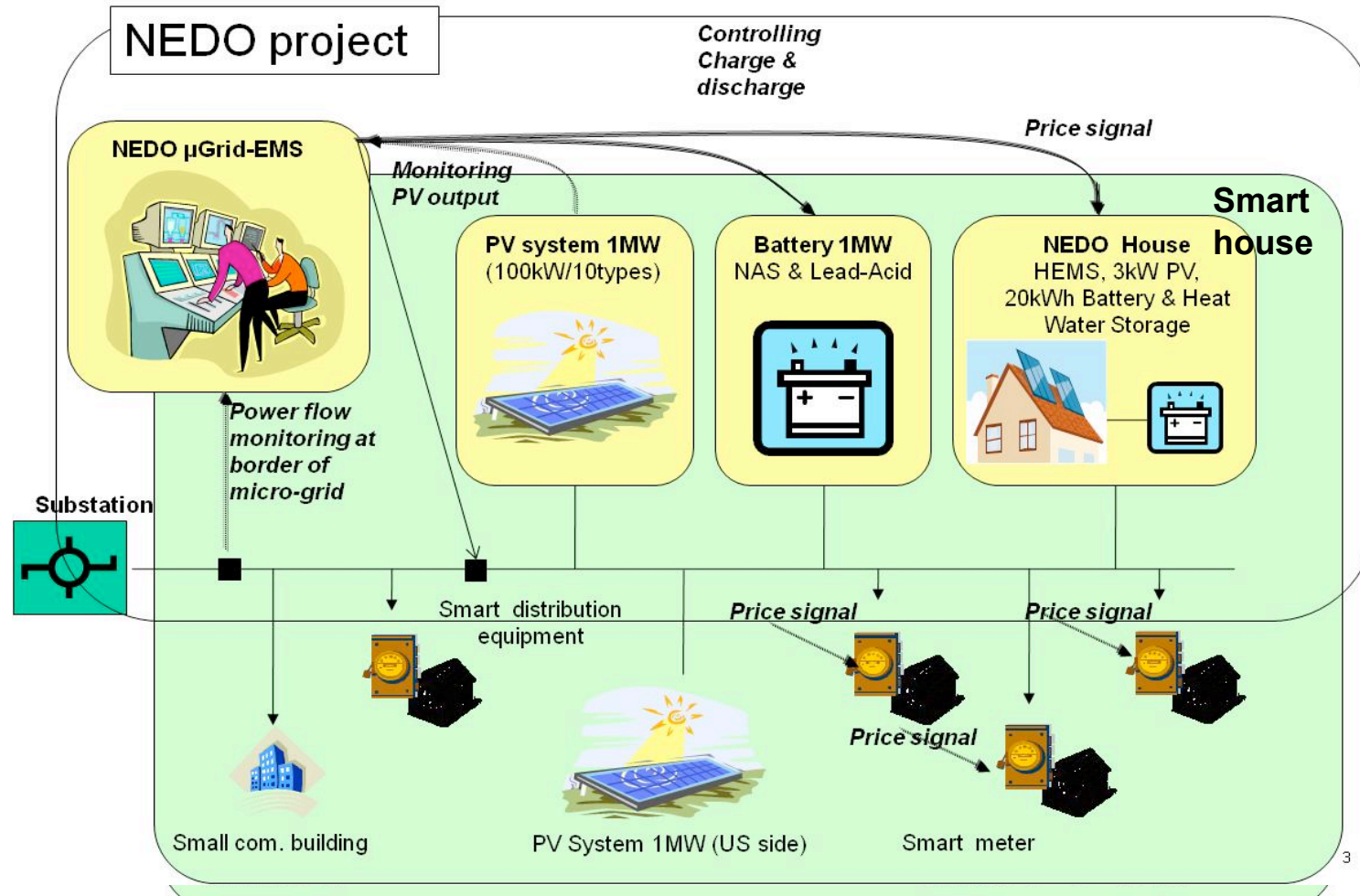
Research will be carried out at five sites in the State of New Mexico. NEDO will participate in research in Los Alamos and Albuquerque as well as collective research on the overall project.



# Microgrid Demonstration in Los Alamos



Demonstration of concentration power storage or home demand response



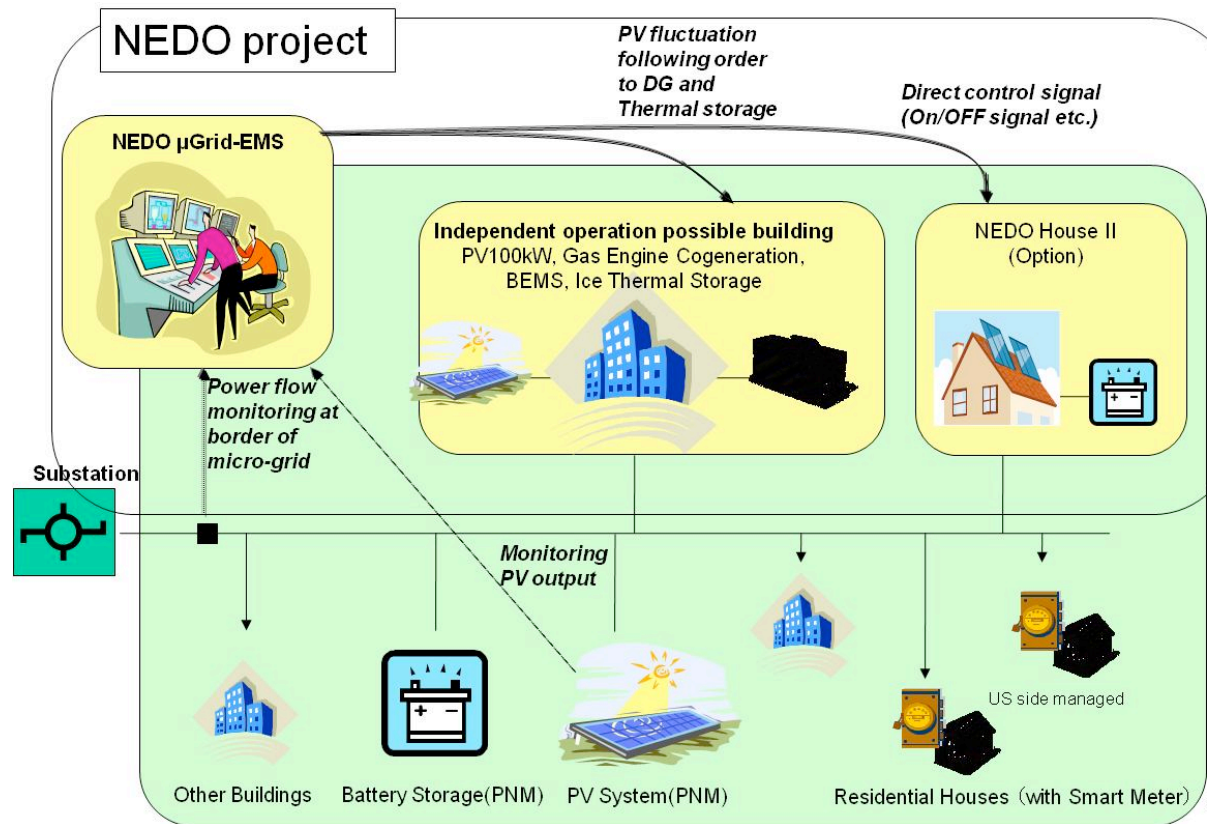
- ✓ Concentration PV generation and power storage cells of about 2 to 5 MW will be installed on distribution lines.
- ✓ Absorption experiments on PV output fluctuation will be conducted using various PV introduction efficiencies obtained by changing grid formation.
- ✓ A distribution network with high operability will be installed and demonstrated by introducing smart distribution equipment (distribution equipment with IT functions).



# Microgrid Demonstration in Commercial Areas in Albuquerque



## Demand response demonstration using facilities in industrial or commercial buildings



- ✓ This project is designed to demonstrate a highly reliable building power system that can continue operating by using power storage cells, gas engine cogeneration, fuel cells, a heat storage tank, solar cells, etc. when the grid connections to buildings are cut.
- ✓ The project demonstrates that output fluctuations of solar cells in a microgrid will be absorbed by using EMS in buildings and grids, and managing building facilities.

# Outline of NEDO-Lyon Project



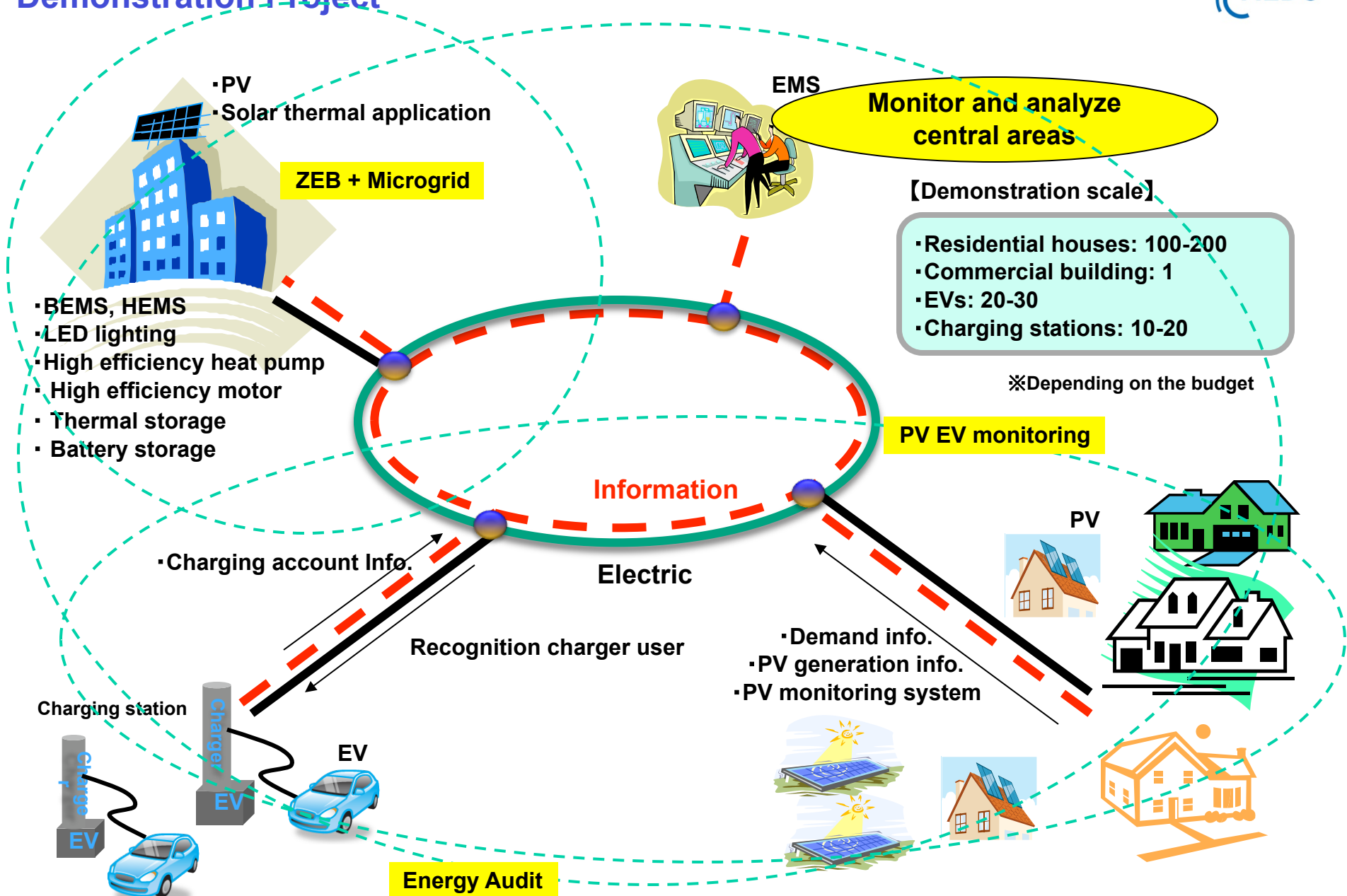
With the aim of taking the first step for the business deployment of Japanese companies in Europe, NEDO is holding discussions with Grand Lyon, the second largest city in France, to introduce Japanese leading-edge technologies for ZEB in France and to establish an EV charging infrastructure coinciding with the Lyon Confluence urban development project in Lyon.

Three main parts of the project:

- (1) Demonstration of Zero Emission Building technologies at P-plot building
- (2) Energy use monitoring and management for PV and EVs
- (3) Energy audit program using AMI



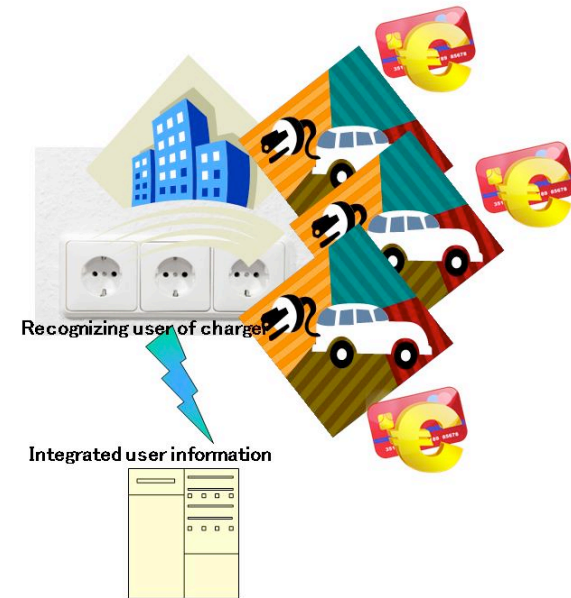
# Zero Emission Building, Electric Vehicle Charging Management System Demonstration Project



# Development and Demonstration of Information Systems

- EV charging system includes:

- Billing management system
- Charger authentication
- Car sharing service



- PV remote management system includes:

- Generation monitoring
- Synchronization of PV generation and EV charging
- Fault detection



# Japan Smart Community Alliance



- The “Japan Smart Community Alliance” JSCA, a public-private organization, consists of a broad range of Japanese organizations, companies, etc. JSCA held its inaugural meeting on April 6, 2010.
- JSCA carries out various work for the development of roadmaps or dissemination of information to achieve international standardization and strengthen collaboration among a wide range of relevant people and organizations.



**Members: 599 (As of April 28, 2011 )**

**Established: April, 2010**

**JSCA includes members from electric power, gas, automobile, information and communications, electric machinery, construction and trading industries as well as the public sector and academia.**



# Japan Smart Community Alliance



## Japan Smart Community Alliance

**President**: Toshiba

**Board**: Hitachi, ITOCHU, JGC, Mitsubishi Electric, Panasonic, TEPCO, Tokyo Gas, Toyota

**Secretariat**: NEDO

### International Strategy Working Group

This working group will identify domestic and global smart grid trends and JSCA will then share such information with international organizations. It will also study and develop strategies to support Japanese companies in their international deployment activities.

### International Standardization Working Group

With the aim of achieving international smart grid standardization, this working group will facilitate practical activities in different areas. It will also develop strategies for future activities and work to achieve international standardization by identifying global trends in smart grid standardization, especially in Europe and the United States. Collaborative activities with organizations in Europe and the United States will also be carried out.

### Roadmap Working Group

This working group will prepare a roadmap for smart grid technology development. In addition, it will promote technology development as part of a social system by developing a scenario for a next-generation society in which smart grid-related technologies have been disseminated. This is expected to generate a synergetic effect between technology development and dissemination.

### Smart House Working Group

With a view to early commercialization of smart house technologies, this working group will review an information infrastructure (platform) that will enable visualization and monitoring of home energy use evaluation as a basic consumer service.

## Conclusion



- **NEDO has been conducting demonstration projects for various different types of microgrids in Japan and abroad.**
- **NEDO's key projects are related to: ① a microgrid for vertically-integrated areas in Japan; ② a microgrid for distributed utility in the U.S. where whole sale market is deregulated; and ③ a microgrid for several electricity entities in Europe where electric market has been fully deregulated.**
- **The function and logic in EMS installed in microgrid will depend greatly on regional regulations and industrial structure, thus making EMS standardization is not easy.**
- **We think that areas for improving the compatibility of the various elements of a microgrid, such as protocols for power storage inverters, should be standardized.**
- **NEDO is planning to compile domestic microgrid-related projects as use cases for submission to EPRI in order to share Japan's expertise with international standardization activity .**

**Thank you for your attention.**

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