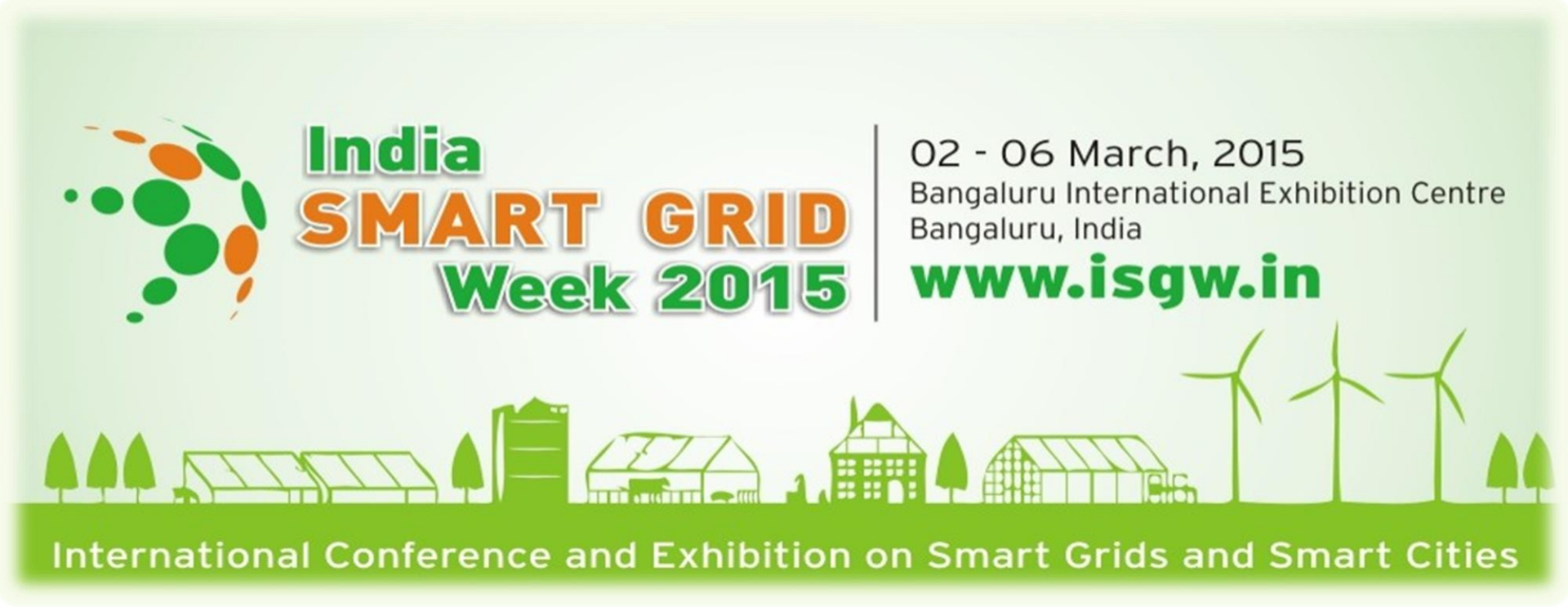

Case Study of Kitakyushu City, Japan

04.03.2015 | Plenary Session – 3 [9.30 – 11.00]: Smart Grid to Smart Cities and Smart Communities

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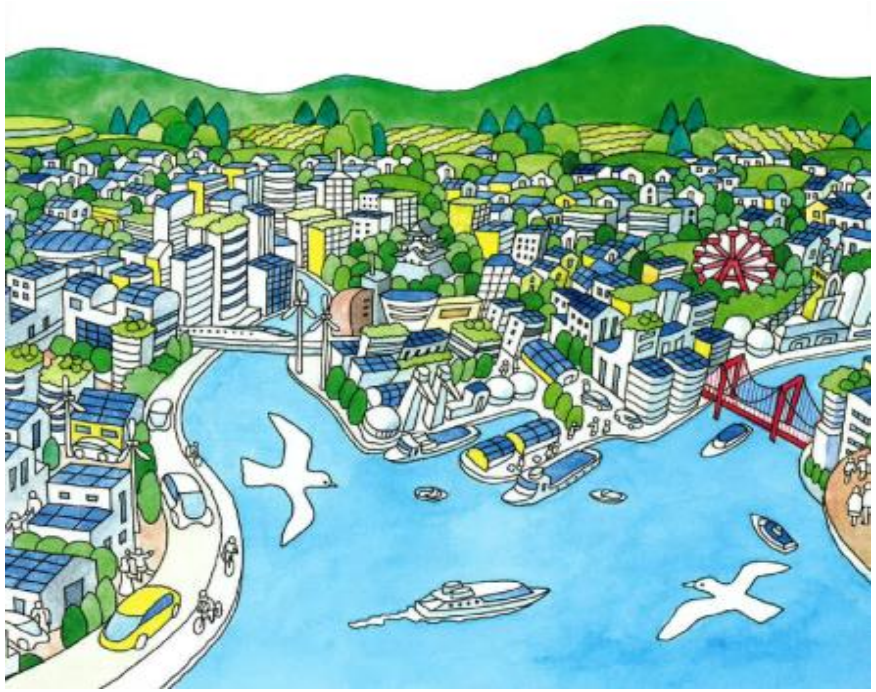
Organiser ISGF India Smart Grid Forum

Smart Community in Japan
Kitakyushu Demonstration Project and Beyond

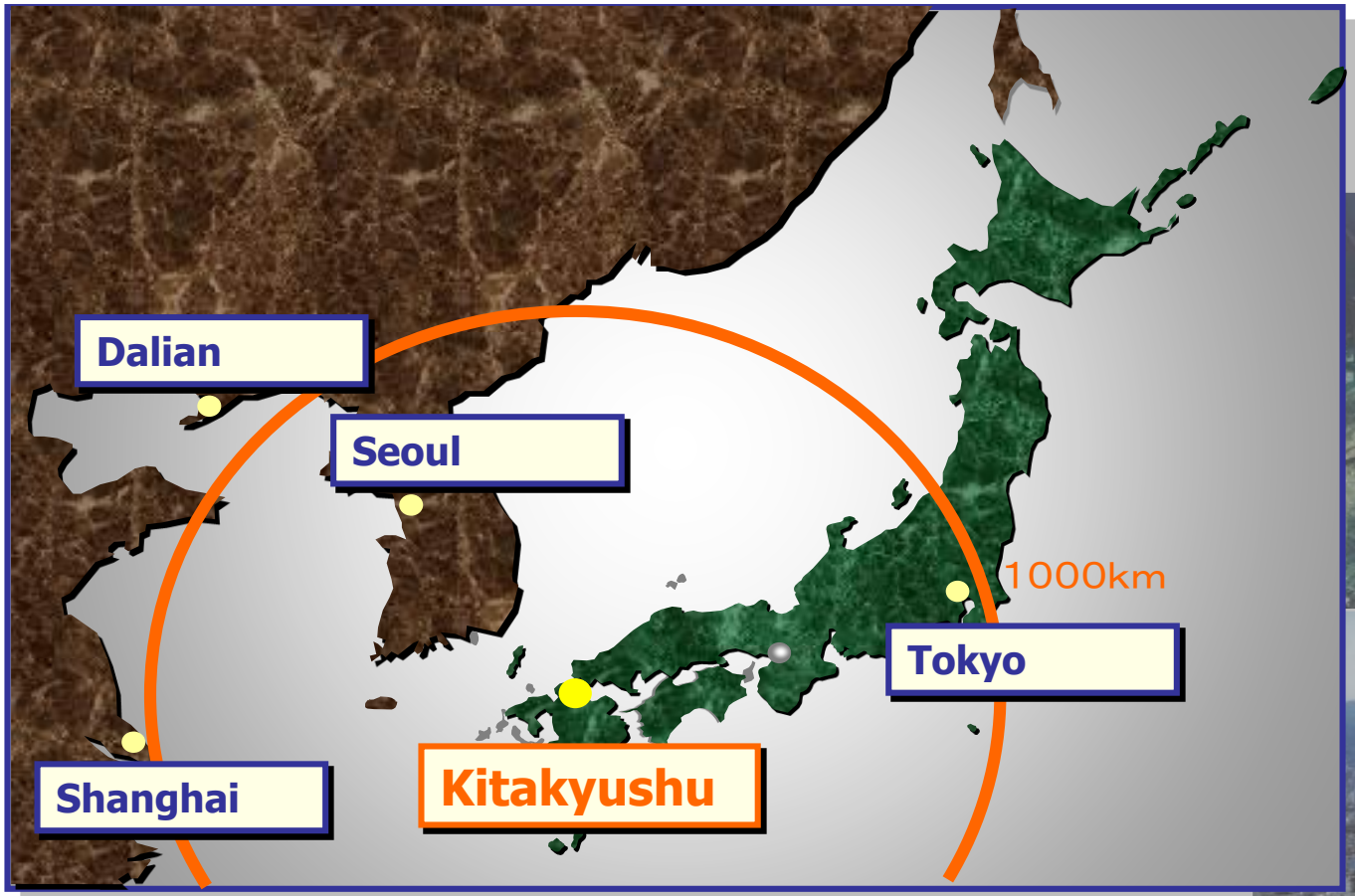


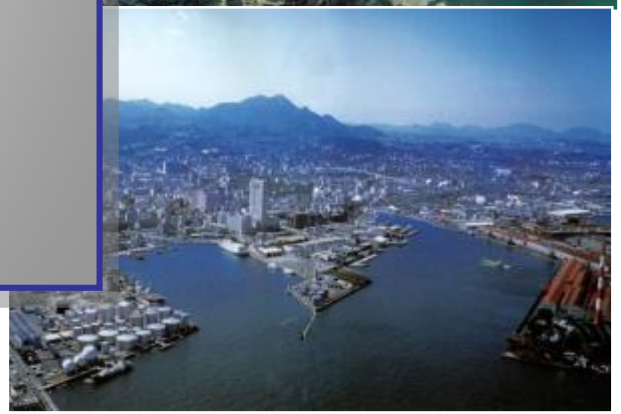
Today's Topics

1. About City of Kitakyushu
2. Smart Community Projects in Japan
3. Kitakyushu Smart Community Project
4. Community Energy Management System (CEMS)
5. Future Development

1. About City of Kitakyushu

Location of Kitakyushu

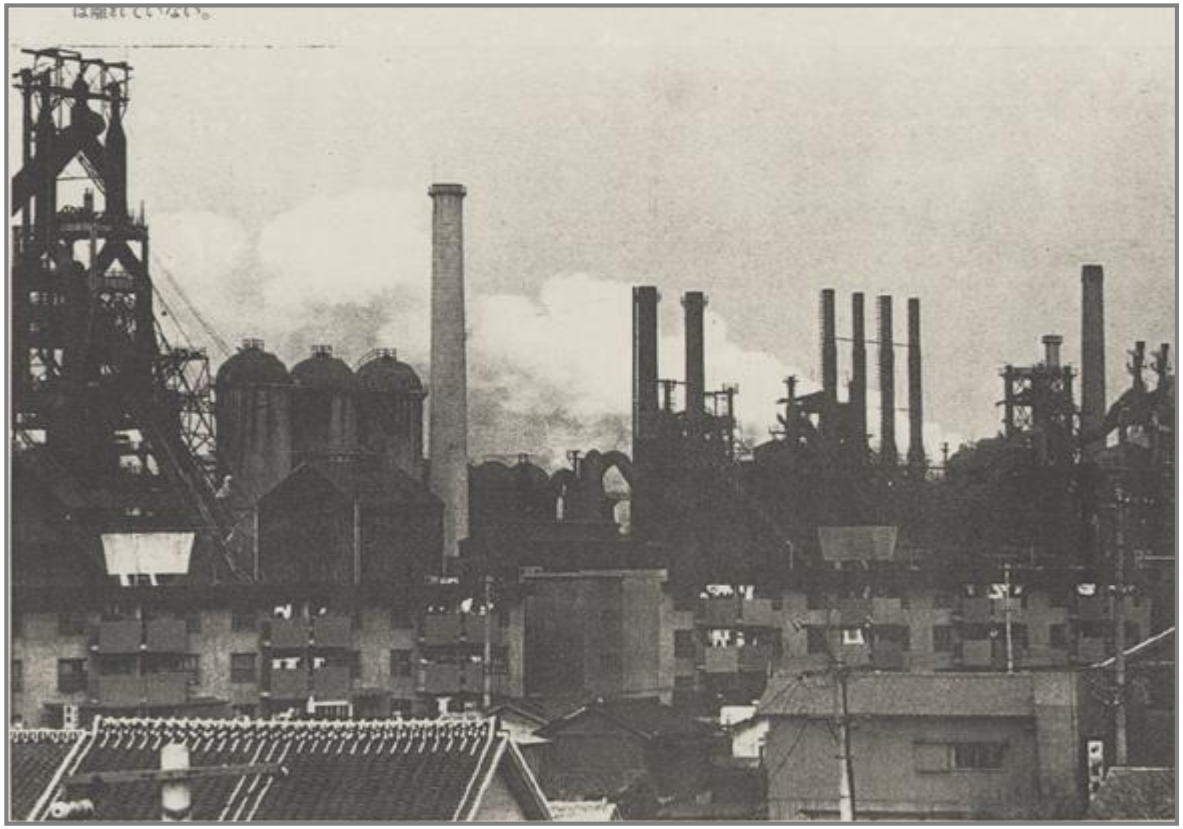




Population: 968,000 **Area: 490km^2**

Kitakyushu's Industries Led to Modernization in Japan

Yawata Steel Works began operation in 1901



Kitakyushu Industrial Area in 1950s

Overcoming
Severe Environmental Pollution

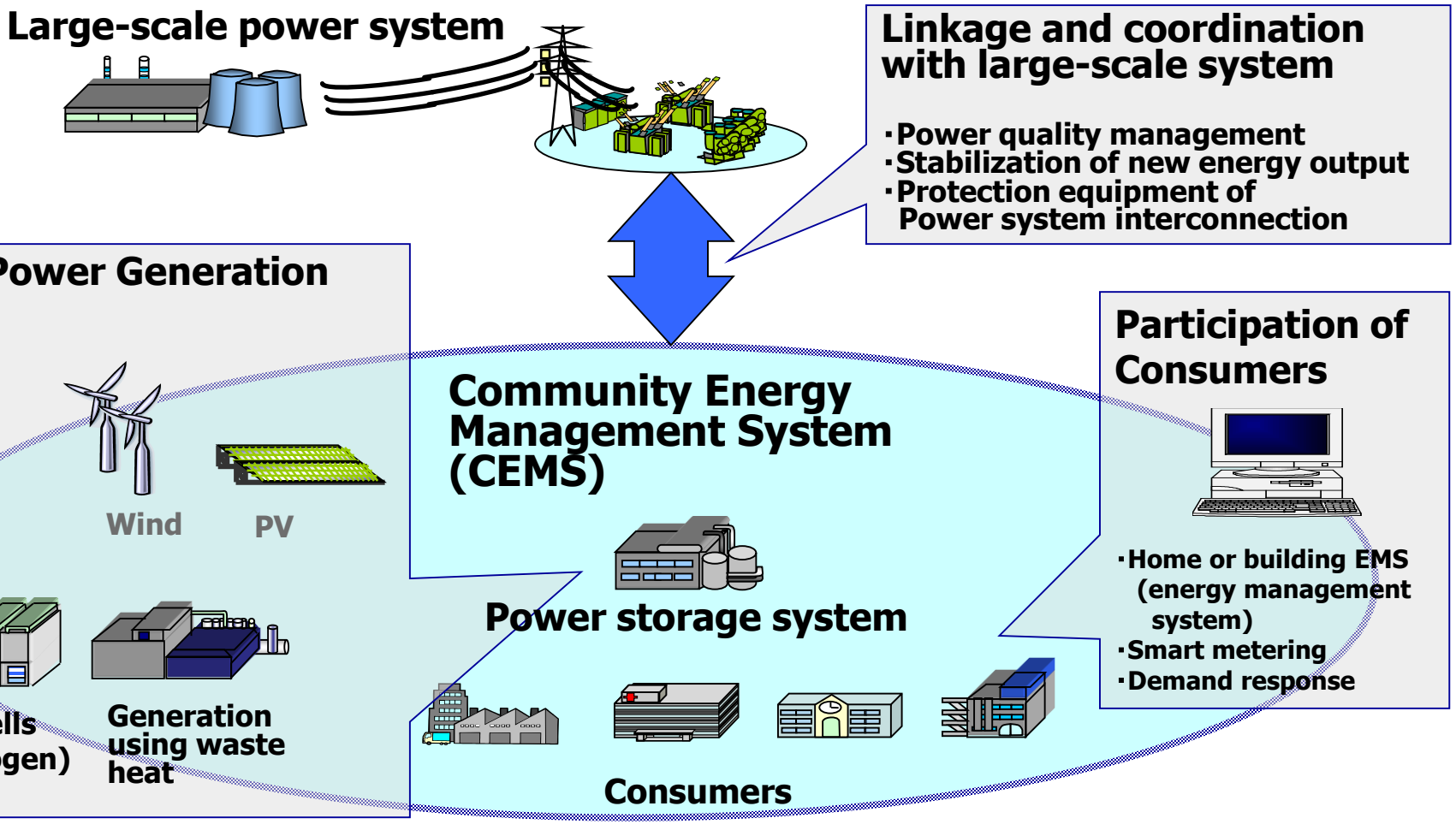
2. Smart Community Projects in Japan

Kitakyushu Smart Community Creation Project

1. Implementation body
   Kitakyushu Smart Community Council
   (Kitakyushu and about 70 companies / organizations)
2. Area of implementation
   Higashida district, Yahata-Higashi area
   (Approximately 1.2 km2)
3. Period of implementation
   FY2010 – FY2014
   (5 years)
4. Project scale
   38 projects
   15 billion yen
   (USD 150M)

3. Kitakyushu Smart Community Project

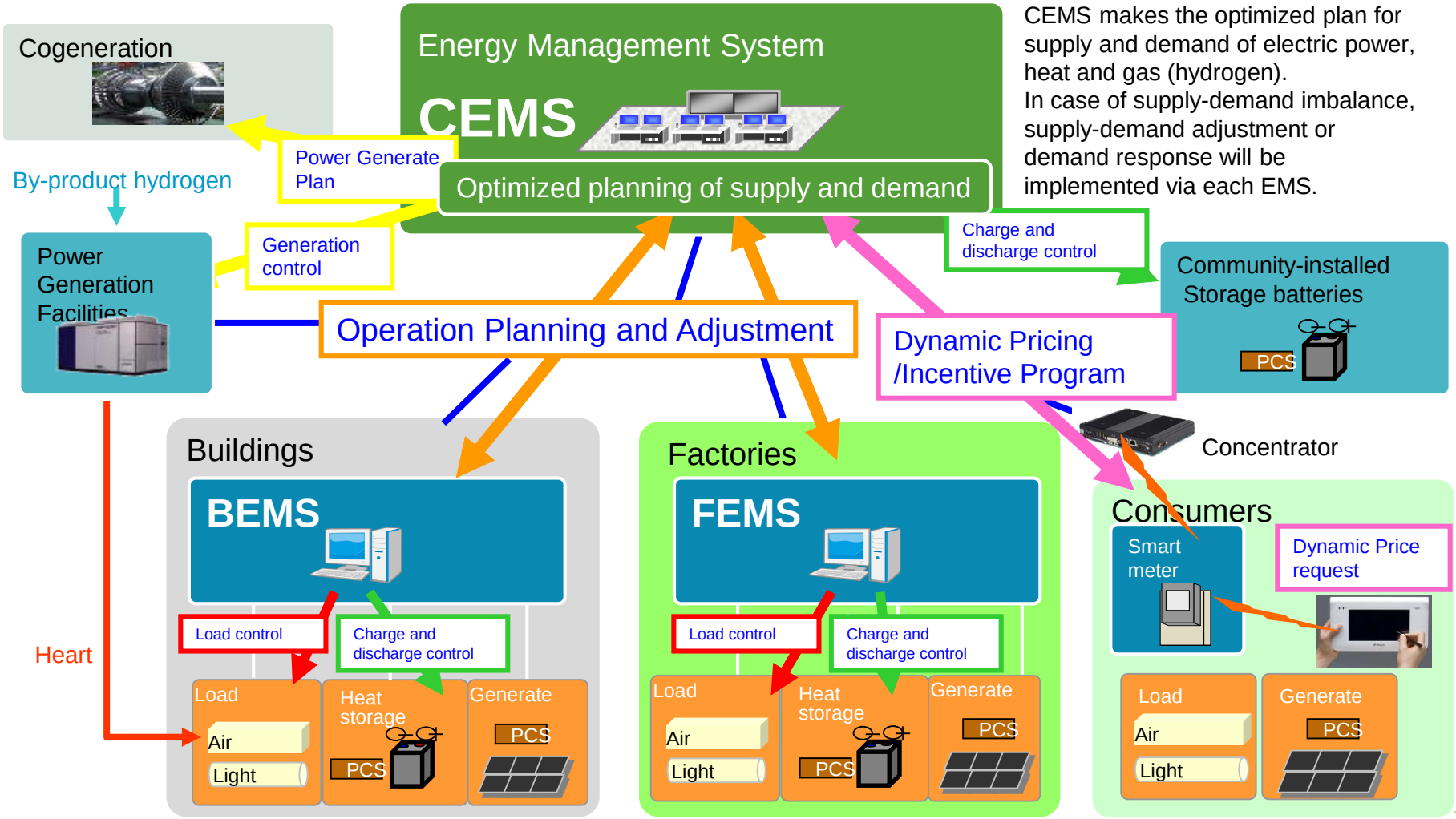
Features of Kitakyushu Smart Community Project



Features of Kitakyushu Smart Community Project

- Regional supply from the power source independent from large-scale power system **(New Asian city type smart grid)**
- Practical use of unused energy including **factory waste heat**
- Use of **hydrogen energy** (Kitakyushu Hydrogen Town)
- Regional **energy management system** that users take part in
- Verification of **smart metering** and **demand response**

Optimized Use of Local Energy and Demand Response



CEMS makes the optimized plan for supply and demand of electric power, heat and gas (hydrogen).
In case of supply-demand imbalance, supply-demand adjustment or demand response will be implemented via each EMS.

4. Community Energy Management System (CEMS)

CEMS (Community Energy Management System)

New energy systems (solar and wind power) are not stable.
Variation in electric power generated by the new energy systems cause the supply and demand imbalance.
Demand for new energy is increasing significantly. A reverse power flow poses the voltage rise problem.
CEMS plays a key role in solving these problems.

◆Key features

- **Prediction of power generated by new energy (PV and Wind Turbine Generator)**
- **Optimized planning and control of supply and demand, and frequency control by utilization of storage batteries.**
- **Demand response service for balancing the load**
- **Smart meters for consumers**

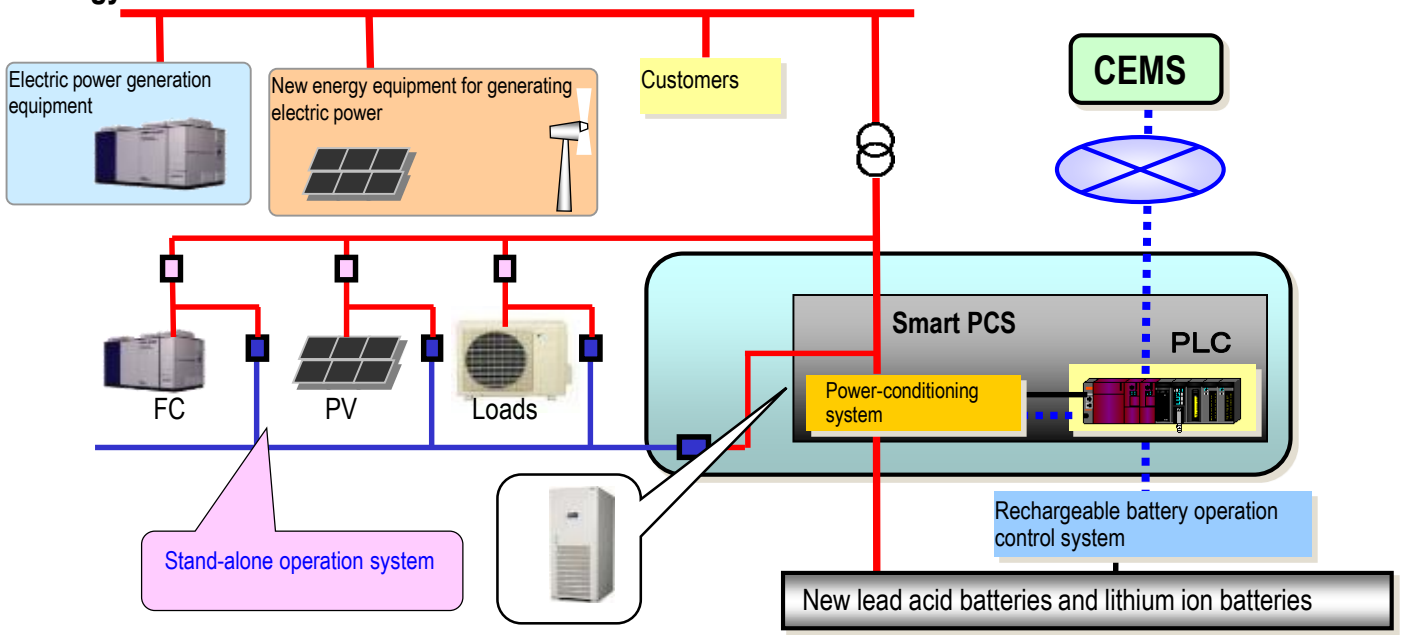
◆Extendibility

- **Multi-languages (Japanese, English and Chinese)**
- **Control several regions by a single system**
- **All in one package**

Community Installed Storage Battery

Role of smart PCS

Smart PCS plays a key role in controlling fluctuation of frequency and voltage caused by increased electric power generation by renewable energy



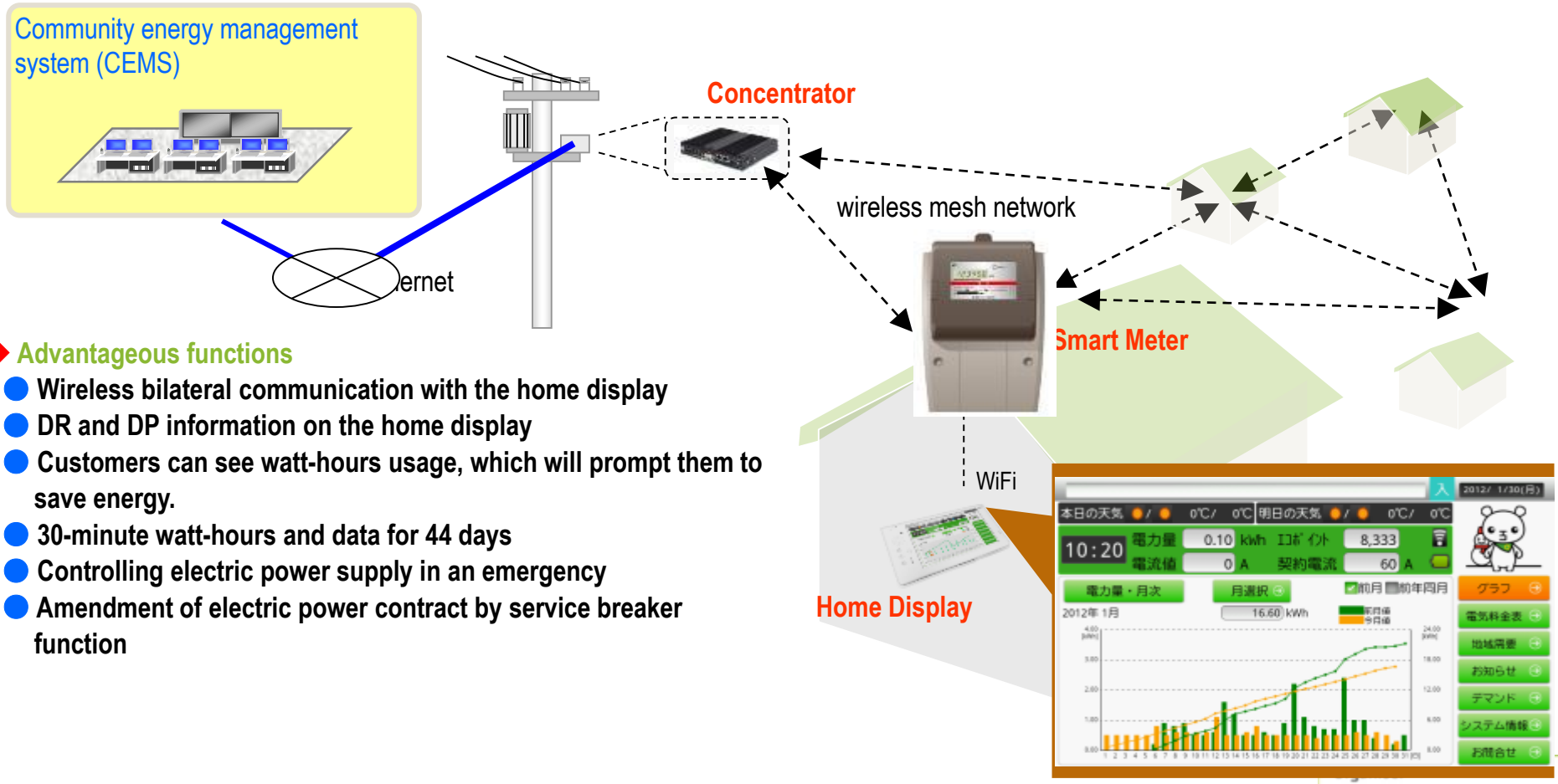
Advantageous functions

- Communicating with EMS, stabilizing loads by two-way communication and providing reserved capacity in an emergency
- Reducing instantaneous frequency variations by high-speed frequency control
- Governor-free function
- Controlling voltage by reactive power
- Stand-alone operation with variable frequency control

Smart Meters for Demand Response

Role of smart meter

With the smart meter, CEMS performs automated meter reading. In order to stabilize loads and balance supply and demand, the smart meter provides CEMS's request for demand response, and also shows watt-hour usage.



Advantageous functions

- Wireless bilateral communication with the home display
- DR and DP information on the home display
- Customers can see watt-hours usage, which will prompt them to save energy.
- 30-minute watt-hours and data for 44 days
- Controlling electric power supply in an emergency
- Amendment of electric power contract by service breaker function

7. Future Development

Future Development

STEP 1

●**Demonstration at Yahata Higashida**

STEP 2

●**Deployment in the Advanced Low-carbon Model Block (Jono district)**

STEP 3

●**Deployment in the entire municipal area**

● Promotion Council for the Low Carbon Cities

Established with the objective of deploying the great activities conducted by 13 environmental model cities in all of Japan and transmitting the information to the rest of the world, etc.

● Kitakyushu Asian Center for Low-carbon Society

Transfer of low-carbon technology to Asia

Deployed in packages as solutions with high added values

The know-how and results of the Kitakyushu Project


Smart grid
IT
Solar power generation

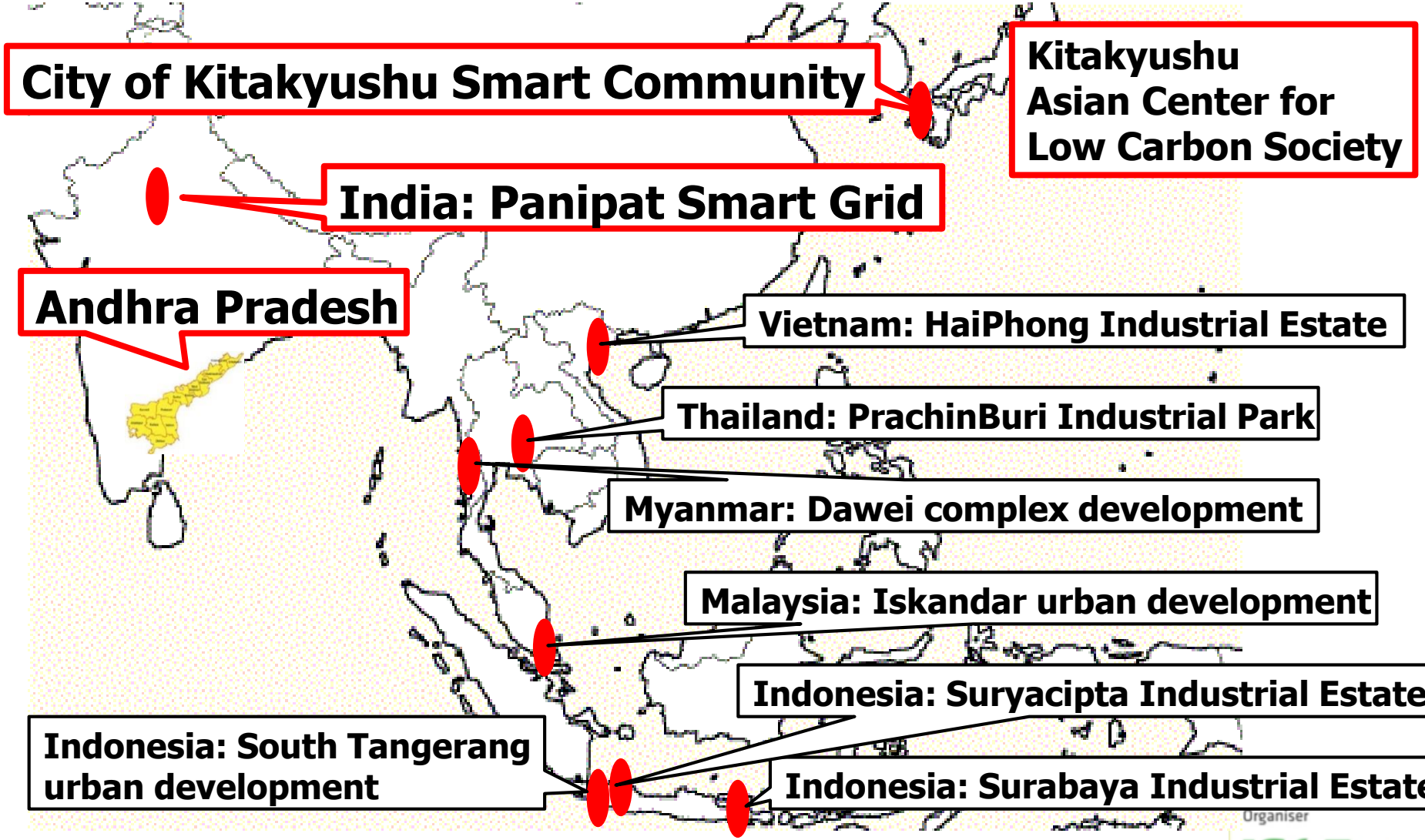
LED

EV (electric vehicle)
Hydrogen utilization technology
Green IT

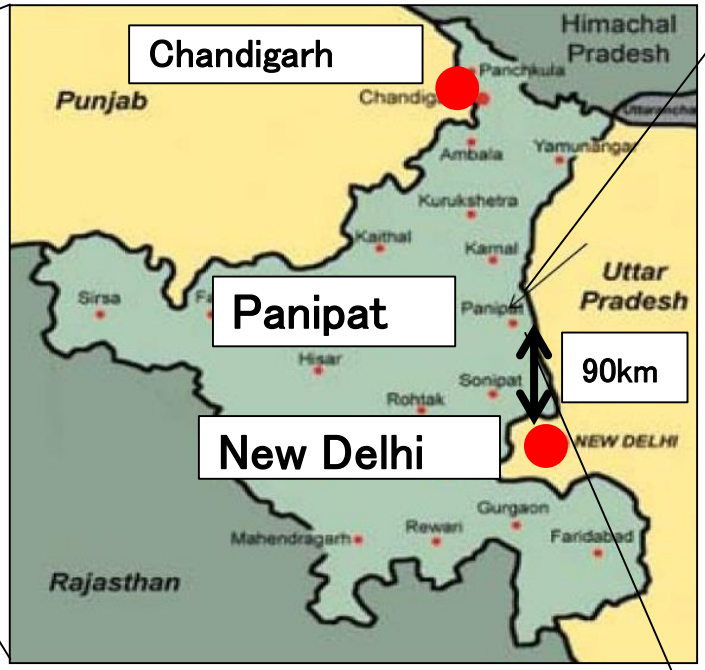
Power electronics

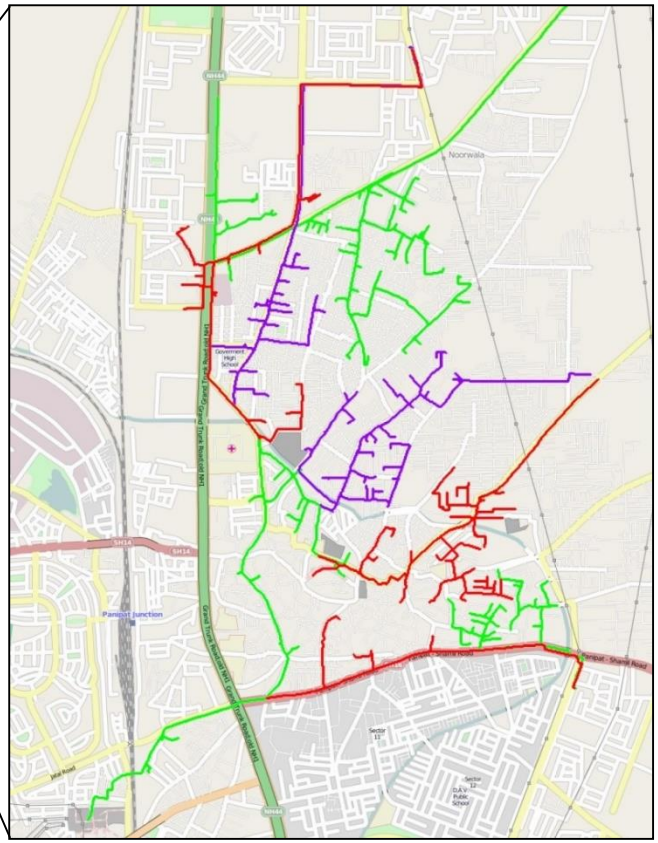
Organiser ISGF India Smart Grid Forum

Smart Grid Project with City of Kitakyushu



Panipat City, Haryana State, India

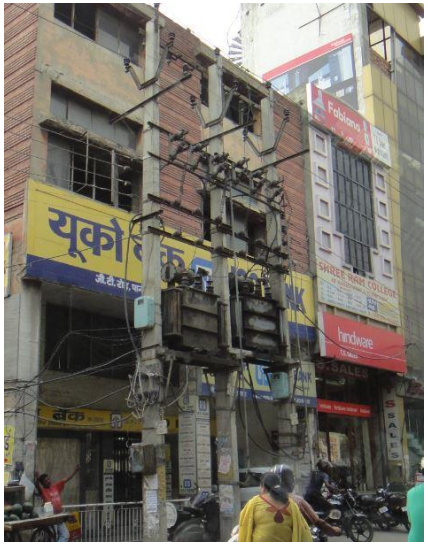


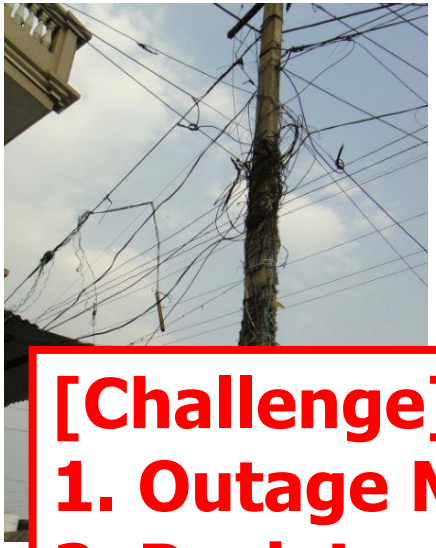


City Subdivision of Panipat
Peek Demand : 42MVA
Feeders : 8
DTs : 539
AT&C Losses : 23.15%
Consumers : 31,623

UHBVN
(Uttar Haryana Bijli Vitran Nigam)

Challenge of India Power Distribution Companies





[Challenge]
1. Outage Management
2. Peak Load Management
3. Smart Meters

Fuji Electric

Innovating Energy Technology

Thank You.