Distributed Power Value-Added Service
by Ennet

November 7, 2013
Ennet
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   2-2 Power Supply and Demand Adjustment

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About Ennet

Ennet Creates New Value in Energy

Company: Ennet Corporation

ENNET = ENERGY + NETWORK
【integration of ENERGY and NETWORK】

Established: July 7, 2000
Capital: 6.3 billion yen
Sales: 163.2 billion yen (FY 2012)
Funded by: NTT Facilities, Inc. (40%)
Tokyo Gas Co., Ltd. (30%)
Osaka Gas Co., Ltd. (30%)
Ennet’s Major Supply Sources

- **Tokyo Gas Bay Power Plant** 99,000 kW
- **Esquare Power Plant** 96,000 kW
- **Tokyo Gas Oogishima Power Plant** 810,000 kW
- **Osaka Gas Senboku Natural Gas Power Plant** 1,100,000 kW
- **Tokyo Gas Kawasaki Natural Gas Power Plant** 800,000 kW
- **Ennet Ibaraki Power Plant** 21,000 kW
- **Ennet Maizuru Power Plant** 35,000 kW

Use large-scale power plants owned by gas companies who fund Ennet, nationwide power plants, and supply from wholesale power suppliers.

The numbers show the total capacity of each power plant.
Ennet’s Renewable Energy

Additionally sourced from:
- hydropower plants owned by corporations
- waste power plants owned by local governments

Ennet Power by Source:
- Liquid Natural Gas (LNG)
- Renewal energy (about 10%)
- Others
- About 2/3 clean power sources

Hirogawa Myojinsan Wind Farm (Osaka Gas)
16 turbines/16,000 kW

Sodegaura Wind Farm (Tokyo Gas)
1,990 kW

Miyazaki Solar Way Power Plant (Miyazaki Solar Way)
1,000 kW

Biomass Power Plant (Eco Energy Japan)
1,250 kW

Matsukawa Hydropower Plant (managed by Nagano prefecture)
1,200 kW
9 regions in Japan

Approx. 15,000 customers

Market entry in April 2013

Approx. 600

Approx. 450

Approx. 2,300

Approx. 400

Approx. 350

Approx. 9,000

Approx. 1,700

Approx. 200

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National Diet Building, embassies, government-owned hospitals, prisons, detention centers, parks, etc.

Non-government: 60%

office buildings, hospitals, schools, railroads, factories, supermarkets, movie theaters, hotels, stadiums, etc.

Government: 40%

Apartment buildings: approx. 200 (approx. 20,000 families)
Ennet Ranks Number 10 in Power Sales
Ahead of Okinawa Electric Power Co.

Ennet’s Power Sales

(FY 2010)

Power Sold approx. 10,000,000,000 kWh

Power sold (unit: 100,000,000 kWh)

Tokyo: 2,934
Kansai: 1,511
Chubu: 1,309
Kyushu: 875
Tohoku: 827
Chugoku: 624
Hokkaido: 323
Hokuriku: 295
Shikoku: 291
Ennet: 98
Okinawa: 75
Even 10 years after the electricity market deregulation, new power companies’ share is limited to only 2%.
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Shift in Attitudes of a Consumer of Electricity

Shift in attitudes of a consumer of electricity

Before March 11
Energy consumption relying on large-scale power sources

1. Energy saving
2. Economy
3. CO² reduction

After March 11
Discussion on what a consumer can do

1. Power saving
2. Business Continuity Plan (BCP)
   (power source security improvement)
3. Distributed energy
4. Renewable energy development

Additionally,

Power demand and supply policy set by the Ministry of Economy, Trade and Industry. For example, “Distributed power deployment” is effective for power consumption control and power demand peak shaving.

March 11, 2011
The Great East Japan Earthquake and Tsunami
It is vital for a consumer of electricity to be prepared for “tight power supply” and “power outage when a disaster strikes” in order to ensure continuity of business activities.

- **[Tight power supply]**
  - Ensure power supply
  - Avoid planned power outage and large-scale power outage

- **[Power outage at the time of a disaster]**
  - Unplanned power loss
  - Power self-sufficiency

For independent power generation, power saving, power security, energy saving, and CO\textsuperscript{2} reduction

Distributed power development is effective
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Ennet Offers a New Service Menu

Suppliers

Win

- Optimize supply & demand balance
- Economize facilities
- Reduce supply & demand risk

A variety of fees and service menus

IT

Optimization by cooperation

IT

Consumers’ power consumption data

Consumers

Win

- Visualize usage (generate ideas)
- Power saving (cost reduction)
- Service selection (power and others)

Public

Win

- minimize costs
- avoid power outage risk

Sample new services

1. Demand response service for apartment buildings (EnneVision) offering jointly with NTT Facilities
2. Demand response service for businesses (EnneSmart)
3. Demand response service using CGS offering jointly with Osaka Gas
4. Negawatt power aggregation service offering jointly with NTT Facilities
5. Smart community (local power generation and consumption model)
Service to provide incentives to customers who increase cogeneration output and reduce risk of service interruptions.

Demand Response Service Using Computer Graphic Systems (CGS)

<Before demand response implementation>

<After demand response implementation>

Incentive

Negawatt power

Aggregate customers’ negawatt power

Incentive

Negawatt power

Cogeneration output increase

Customers

Cooperate in demand response

Avoid cost increase due to supply and demand imbalance

Power supply by Ennet

Output increase

Negawatt power

Demand response

information

kW

cogeneration

Power supply by Ennet

Response needed

time
Operations during Power Shortage

- Reduce supply equal to negawatt power
- Power shortage information Request for power saving
- Avoid operating less efficient power generation, expensive spot purchase, and imbalance pricing
- Receive incentive for negawatt power provided

Win-Win-Win business model for everybody
プロの仕事は、信頼の絆

* The graph shows 2 times of 30-minute power.
Miyako, Iwate Prefecture

- **Area:** 1,260 km²
  The largest city in Iwate Prefecture, the 2nd largest city in Tohoku, and the 8th largest city in Japan.
- **Rich natural resources**
  Rich in forest, river, and ocean resources. Forests occupy 90% of the area and are particularly rich in forest resources.
- **Population:** approx. 58,800
- **Elderly people:** 30.2% of population
Miyako Smart Community (Local Power Generation and Consumption Model)

**Local power sources**
- Biomass
- Solar power
- Small-scale hydropower

**Power grids**
- (transmission)

**Local new power generation**
- Community Energy Management System (CEMS)

**Local users**
- Public facilities
- Seafood processing

**Benefits to power suppliers**
- ensure stable supply (local demand)
- use the fixed rate buyback system
- local government’s support (subsidies)

**Benefits of local new power generation**
- electric power local generation and consumption
- create local employment
- dividend distribution to local shareholders

**Benefits to consumers**
- lower electric bill
- lower power consumption
- negawatt power sales revenue from demand response
Miyako Smart Community – Community Energy Management System (CEMS)

Users PPS

Community Energy Management System

Power generation data
Weather data

Demand data
Weather data

Power generation simulation

Demand simulation

<functions>
• adjust and control supply and demand balance
• DR service as aggregator
• efficient business operation

Power trade

BEMS server

HEMS server

Charge/settle

Network

Power grids

Ennet

Mega solar

Mega solar

Biomass

Biomass

Small-scale hydropower

Consumers

Public buildings

Consumers Ice plants

Consumers Commercial buildings

Consumers Homes

Japan Electric Power Exchange (JEPX)

Tohoku Electric Power Co.

legends
Data flow
Power flow

legends
Data flow
Power flow
Thank you for your participation

For more information on the Web
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