Power System Reform after 3.11
– toward decentralized–open system –

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Paradigm Shift of Power System

- Centralized–Close System -
  
  Large-scale Centralized Power Sources
  
  Vertical Integration
  
  Long-distant Transmission
  
  Regional Monopoly

- Decentralized–Open System -
  
  Smart Grid
  
  Power Market
  
  TSO

Centrally sourced power sources and market centralization versus decentralized, distributed sources and open competition.
March, 2011 : Rolling Blackout

"Planned" Rolling Blackout in TEPCO's Area

(# of households affected : K) (Average temperature : °C)

- March 14: 113
- March 15: 5,000
- March 16: 10,900
- March 17: 18,200
- March 18: 13,680

14.1
10.9
7.5
4.6
6.1
Drop-out of Large-scale Generators

– TEPCO’s Power Source Mix –

Operational Suspension
- Fukushima 1st & 2nd
- Hitachinaka
- Hirono
- Kashima

Generation Capacity
- Oil
- LNG
- Nuclear
- Hydro
- Renewables

Source: Tepco’s Website
Limited Inter-regional Grid

- 9 Utilities and Inter-regional Grid -

Area
Peak Load in 2010

Kansai 30,950MW
Chugoku 12,010MW
Kyushu 17,500MW
Shikoku 5,970MW
Chubu 27,090MW
Hokuriku 5,730MW
Hokkaido 5,790MW
Tohoku 15,570MW
Tokyo 59,990MW

60Hz  50Hz

DC line
AC line

600MW
1,000MW
300MW
1,400MW
2,400MW
6,310MW
5,570MW
16,600MW
5,570MW
Summer, 2011: “Demand Restriction”

- Peak Demand in TEPCO’s Business Area -

Annual Peak Cut: -17.9%

Average Peak Cut: -20.7%

(Max. Temperature: -1.7°C)

Source: TEPCO’s website
“Less Smart” DR

– Actions by Large-size Users to Cut Peak Demand –

1. Power-saving at Offices
   - thin out electric lights, change to LED bulbs
   - set air-conditioners at 28°C

2. Change of Work Style
   - wear “cool-biz” light clothing
   - take longer holidays, work on weekends

3. Production Adjustment
   - operate factories on weekends or at nights
   - produce in advance, accumulate inventory
   - shift production to western or outside Japan

4. In-house Power Generation
   - introduce & operate co-generation, PV
   - utilize NAS battery

Expenditure/Burden
- capital investment
- psychological burden
- labor cost
- inventory cost
- profit loss
- coordination cost
- additional investment
  - a few billion yen at maximum

Source: METI
Summer, 2012 : Smarter DR?

Peak Demand in KEPCO’s Business Area

Annual Peak Cut : -11.5%

Average Peak Cut : -11.8%

(Max. Temperature : -0.6°C)

Source : TEPCO’s website
Agenda for System Reform

“Basic Policy” by Power System Reform Committee

Full Market Liberalization

- liberalize households market: more choices for all users
- DR services: rebate program, dynamic pricing, negawatt trading

Unbundling of Transmission Grid

- operational unbundling or legal unbundling
- establish wide-area system operator/coordinator

Reregulation for more Competition

- abolish wholesale generator regulation
- vitalize power market: compulsory tendering
- market monitoring by independent regulator
Vision toward Decentralized–open System

Nuclear
Generator–driven
Planned Economy
Supplier–driven
Centralized–close System

Decentralized–open System
Renewables
Network–driven
Market Economy
Consumer–driven
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