Current Issues and Efficiency Enhancement Policy in the Korean Electricity Market

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Contents

1. National Reliability Organization
2. Market Efficiency Enhancement

National Reliability Organization

❖ **Discrepancy between demand and transmission systems due to the construction delay and investment depression against fast-growing peak demand**

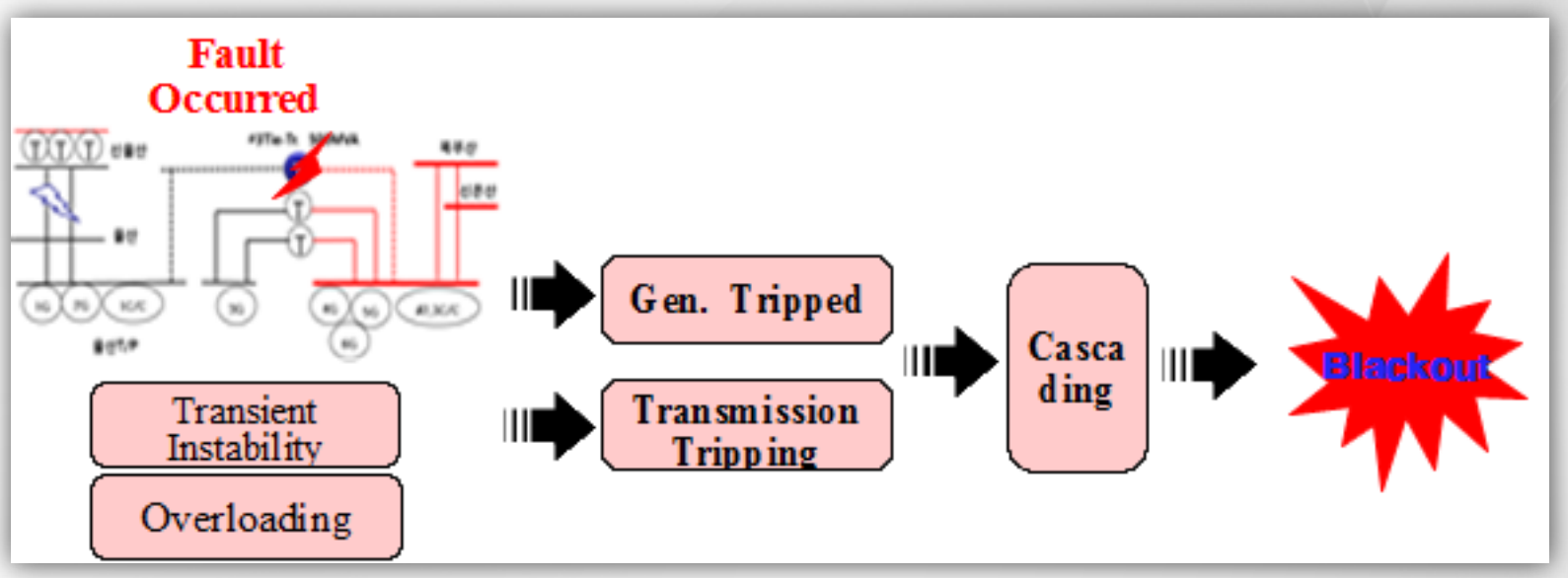
- In 2013, transmission system only increased 28% while peak demand increased 87% compared to 2000

	2000	2013	Increase Rate (%)
Peak Demand(MW)	41,000	76,520	86.6
Transmission(c-km)	24,855	31,816	28.0

National Reliability Organization

❖ **When fault occurred at transmission line connecting large-scale power plants, failure effect could spread nationwide**

→ Black Out possibility increases



National Reliability Organization

- **Operating condition in Seoul metropolitan area transmission system which has more than 42% of total demand is in very stressful state. If severe contingency occurs, wide area blackout likelihood rises.**
  - Without system reinforcement, applied are temporary problem solutions for current issue such as SPS(Special Protection System) installation and system separation, etc.

    → A large amount of load shedding will be inevitable when a severe fault occurs in this area

National Reliability Organization

❖ Problem in Reliability Management System

– Lack of consistency and unclear responsibilities with dispersed reliability management functions with KPX, KEPCO, GENCOs after deregulation

→ Limitations for prevention and action when accident occurred

– Players and referees are mixed without neutral supervisory agency, desiring profitability aspect rather than system security

Classification	System Operation Issues
Planning & Investment	(**Gen Co**) Concentrate on constructing large-scale generation plant regardless of current system conditions (**KEPCO**) Difficulty of transmission reinforcement for generated power delivery → system vulnerability worsened
System Operation	(**KPX**) Improvement demand for dispatching and equipment problems (**KEPCO, Gen CO**) Difficulty of accepting KPX demand having difference of position → cumulated problems and system instability

National Reliability Organization

❖ **To prevent Wide Area Black Out effectively**

- Establish a clear and detailed system reliability criteria
- Complying reliability criteria by power related organizations
- Conduct a strict supervision of management

Organization	Responsibility
MOTIE	Establish a system reliability criteria and supervision of management
KPX	Power system operations (Dispatch, Generation control, operational planning and Reserve management, etc.)
KEPCO/Gen Co	Transmission expansion planning, timely construction, operation and maintenance

National Reliability Organization

❖ **Duty and Responsibility**

- Establishment, revision and administration of system reliability criteria
- Monitoring compliance of reliability criteria
- Assessment of system reliability
  - Long-term reliability assessment

    : Comprehensive evaluation with Basic Plan for Electricity Supply and Demand, and System Planning
  - Short-term reliability assessment

    : Power supply and demand in summer and winter seasons(including DR), adequacy assessment of system operation plan

National Reliability Organization

❖ **Duty and Responsibility (Continued)**

- Real-time monitoring appropriate power system operations
- Power quality management and assessment
- Investigate power system fault occurrence
- Safety supervision of power system equipment
- Qualification management of dispatcher certifications
- Cyber security management

  (CIP, Critical Infrastructure Protection)
- Power system DB management

  (system monitoring, planning, Short circuit analysis, etc.)

Market Efficiency Enhancement

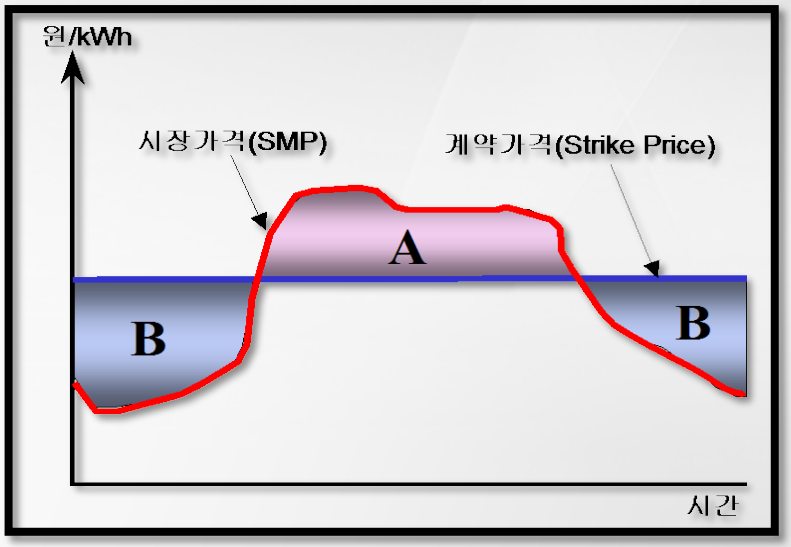
❖ **Vesting Contract Scheme**

- Government approval after price, quantity, and period contract between Gencos and selling company
- Stable trade with in advance contract with given price and quantity for arranged period, not with a market price having high variability

❖ **Contracted generation quantity is traded with a Strike price regardless of SMP**

A Case : SMP > Strike price
☞ Generation → pay the difference(A) to selling company

B Case : SMP < Strike price
☞ Selling → pay the difference(B) to generation company



Market Efficiency Enhancement

❖ **Expected Effects**

- **Suppress increasing factors of electricity price by stabilizing wholesale market price**
  - Electricity price increase will be inevitable with current market trade, because market price would be highly increased in case of difficult power supply and demand conditions

- **Contribute to stable power supply and demand by promoting Gencons continuous effort to supply generation according to the plan**
  - Gencos will try their best according to their generation plan, because if they fail to meet their contracted quantity, they will get a fine

Market Efficiency Enhancement

❖ **Institutionalization of Demand Response Market**

- Allow the demand response traded in power market while equally treated as conventional generation resources.
- Currently government fund compensates demand reduction quantity. Reinforce business sustainability utilizing power market mechanism
  - Demand response budget : (‘12) $2.5 million (’13) $7.1 million (‘14) $5.7 million
  - Demand response dealers aggregate and manage consumers for demand response quantity and can create benefits by participating in power market

Market Efficiency Enhancement

❖ **Expected Effects**

- Suppress increasing factors of electricity price by reducing power supply cost, resolve supply and demand instability
  - Replace additional construction of generation, transmission, and distribution equipment with a demand reduction. Reduce green house gas emission by minimizing power generations
  - Avoid constructing generation plant($59 million), Transmission systems($224 million), Distribution systems($138 million), Reduce green house gas emission($3 million)

    - Total $423 million economic benefits

Thank You!