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Electricity in Korea - Presentation

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Electricity in KOREA

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1. Before April 2001

- Korea Electric Power Corporation (KEPCO) – The State Monopolist in Generation, Transmission-Distribution, and Retail Sales since 1961.
- Private Shareholders owned 49% of KEPCO.
- A Couple of IPPs under long term PPAs < 5%.

2. Restructuring

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2.1 Restructuring in 2001

- One Nuclear-Hydro and 5 Thermal Gencos, KPX as the SO and MO, and KEPCO as the transmission-distribution-retailer. Competitive Wholesale Market.
But still remaining are
- **Divesting Distribution Sector to Create Regional Distco-Retailers, and**
- **Introducing Competitive Retail Market**

2.2 Electricity Commission

- Regulatory Agency reporting to the Minister of Energy (**Not Independent**)
- Approve electricity tariffs, oversee power quality and system security, and review the qualifications of industrial operators.
- **Takes charge of further restructuring.**
- **Old PPAs honored, All new IPPs are MPs.**
- **No restrictions on foreign ownership.**

2.3 Cost-Based Pool (CBP)

- Real-time demand and supply on merit order determines hourly Power Prices
- Dual pool structure – BLMP and SMP
- Capacity Payments (CP) – dual, too.
- Initially planned to be transitory until the full deregulation of retail tariffs.

2.4 Reform Stalled

- Union furiously objected reform.
- New government decided to stall divesting distribution sector in 2004.
- Retail tariffs had to stay under regulation as further reform delayed indefinitely.
- Political populism was reluctant to raise tariffs, despite soaring energy prices.

2.5 Unfolding Thereafter

- Rising wholesale prices aggravated KEPCO's financial status under fixed retail tariffs.
- Caps on BLMPs and SMPs. Other means to adjust the revenue sharing between KEPCO and Gencos.
- Nonetheless increasing deficit of KEPCO, and Public demand to fight inflation!

Unfolding -continued

- Installed capacity expanded from 55GW to 75GW during the past decade, driven mainly by 6 Gencos.
- All foreign investment in generation retreated.
- Prospect of privatizing Gencos is dim due to uncertainties created by reform put on hold, and unwillingness of government.

3. Retail Tariffs and Cross Subsidization

Table : Trends in average prices (KRW) per kWh.

| Year | Residential | Industrial | Agricultural | Total |
|-------------|--------------------|-------------------|---------------------|--------------|
| 2001 | 91.57 | 61.56 | 43.51 | 77.06 |
| 2002 | 87.01 | 59.02 | 42.37 | 73.88 |
| 2003 | 88.00 | 60.30 | 43.45 | 74.68 |
| 2004 | 90.94 | 60.23 | 41.95 | 74.58 |
| 2005 | 91.07 | 60.25 | 41.67 | 74.46 |
| 2006 | 93.70 | 61.92 | 42.96 | 76.43 |
| 2007 | 94.78 | 64.56 | 42.45 | 77.85 |
| 2008 | 97.58 | 66.24 | 42.38 | 78.76 |

Source: KEPCO statistics 2010.

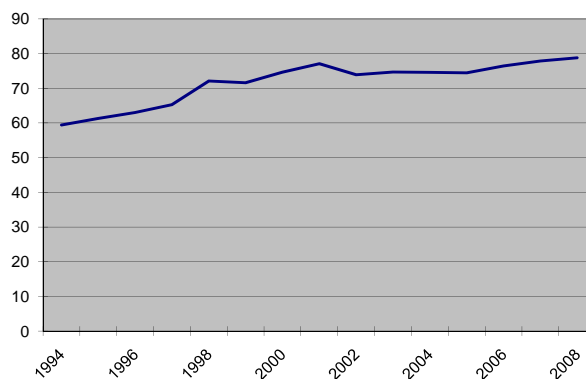
4. Statistical Features of Korea's Electricity Industry

- 4.1 Price Trends
- 4.2 Power Losses
- 4.3 Efficiency Gains?

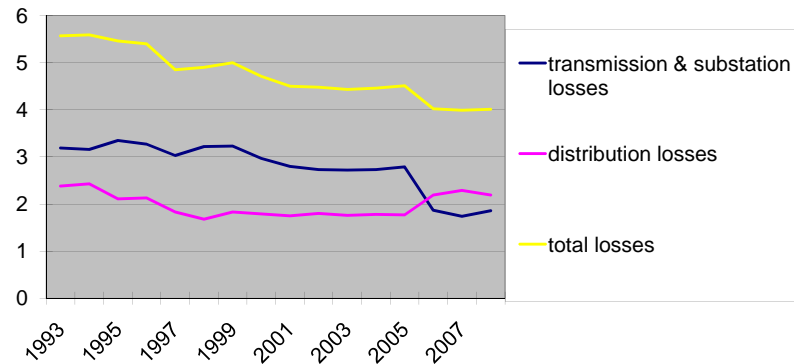
4.1 Price Trends

- KRW 78.76/kWh = USD0.066/kWh in 2008.
- In the same year, the price of the USA was USD0.0974/kWh.

Price Trends in KRW/kWh



4.2 Power losses (%)



4.3 Efficiency Gains?

- **Table 1: Trend of heat efficiency of generators (%), 1998–2004.**

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|-----------------|-------|-------|-------|-------|-------|-------|-------|
| Heat efficiency | 39.45 | 39.51 | 39.45 | 39.57 | 39.96 | 39.94 | 40.66 |

- **Table 2: Maintenance of frequency and voltage (%).**

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|
| Freq | 99.17 | 99.28 | 99.33 | 99.41 | 99.45 | 99.70 | 99.74 | 99.70 |
| Voltage | 99.35 | 99.57 | 99.79 | 99.84 | 99.88 | 99.94 | 99.96 | 99.96 |

5. Politics of Reform

- All reforms encounter socio-political resistances.
- The political leader must be clearly and fully convinced of its merits.
- When new president signals that he is not convinced of ongoing reform, then bureaucrats lose enthusiasm, KEPCO management objects publicly, Unions start systematic counter-campaign.

6. A New Setting

- Smart grid, Demand Response, and Competitive Market.
- Challenges from Telecommunication Giants.
- Too much consumption of Power – 497kWh/GDPUS\$1,000-, while Japan, USA and UK consume only 30-60% as much.