



# Korea, Republic of



KEPCO was a vertically integrated electricity company monopolizing the entire process ranging from the purchase of fuel to power generation, transmission and distribution. In April 2001, generation sector was separated from KEPCO spinning off six generation subsidiaries (Korea Hydro and Nuclear Power, Korea Southeast Power, Korea Midland Power, Korea Western Power, Korea Southern Power, Korea East-West Power: hereinafter referred to as "Gencos").

Also, Korea Power Exchange (KPX) was founded for power trading, allowing Independent Power Producers (IPPs) to compete in the power market. All generators and retailers can only trade through the market. However, new and renewable energy generators below generation capacity of 200kW can trade outside the market.

Currently, KEPCO purchases the electricity generated by the 6 Gencos and 89 IPPs through the KPX on a daily basis and sells it to end-use customers. KEPCO is also in charge of building and operating the transmission and distribution networks. Large-scale customers with power receiving capacity of more than 30,000kW can purchase the electricity directly through the electric power exchange market bypassing KEPCO. But there has been no case of direct purchase yet. Competition was also introduced into the sales sector by allowing CES (Community Energy Suppliers)



Photo: Bloomberg

to produce electricity and directly sell it to customers in their licensed area (surplus or shortage power can be traded through KEPCO or KPX).

Based on a special committee's evaluation conducted in 2004, the Government decided not to further proceed with the original plan of restructuring. Therefore, the power networks will be operated by KEPCO and competition in retail sales will not be introduced until the change of the current government policy. Instead, to raise management efficiency by

## PROFILE

Capital	Seoul	Installed Capacity	68,268MW
Area	99,720 km <sup>2</sup>	Population Electrified	100%
Population	49,269 million	Main Voltages (kV)	765, 345, 154,
GDP	\$957 billion		66, 22
Currency	Won	Natural Resources	coal, hydropower potential

## Growth Patterns

### Peak Demand

(Unit: %, MW)

Item	2004	2005	2006	2007
Load Factor	76.2	76.2	73.8	73.9
Peak Demand	51,264	54,631	58,994	62,285
Peak Availability	57,528	60,818	65,183	66,778
Capacity R/R	12.2	11.3	10.5	7.

### Installed Generating Capacity

(Unit: MW)

Fuel Type	2004	2005	2006	2007
Hydro	3,829	3,829	5,485	5,492
Anthracite	1,125	1,125	1,125	1,125
Bituminous	16,340	16,840	17,340	19,340
Oil	6,048	6,091	6,172	6,808
LNG	15,746	16,447	17,436	17,436
Nuclear	16,716	17,716	17,716	17,716
Alternative Energy	158	210	240	351
PTotal	59,961	62,258	65,514	68,268

### Power Generation

(Unit: GWh)

Fuel Type	2004	2005	2006	2007
Hydro	5,861	5,861	5,189	5,042
Thermal	205,222	212,267	226,703	254,316
Nuclear	130,715	146,779	148,749	142,937
Alternative Energy	350	404	511	829
Total	342,148	362,639	381,181	403,125

## Future Projection

(Unit: MW)

Fuel Type	2008	2010	2012	2014
Hydro	5,429	5,429	6,289	6,289
Thermal	47,510	49,411	53,418	55,933
Nuclear	17,716	18,716	21,716	24,516
Other	4,555	4,853	5,480	5,480
Total	75,310	78,409	86,903	92,218

**Installed Capacity of Power Generation**

(As of Dec.31, 2006) (Unit :MW)

Where,

[1]= Korea South-East Power Co.

[2]= Korea Mid-land Power Co.

[3]=Korea Western Power Co.

[4]= Korea Southern Power Co.

[5]= Korea East-West Power Co.

[6]= Korea Hydro &amp; Nuclear Power Co

\* Total Capacity 68,268.2MW: KEPCO & Gencos  
60,268.7MW + IPPs 7,999.5MW  
(Table in the following page)

Fuel Type	Korea south - East Power	Korea Mid - Land Power co.	Korea Western Power Co.	Korea Southern Power Co.	Korea East - West Power Co.	Korea Hydro & Nuclear Power Co.
Nuclear	-	-	-	-	-	Gori(3,137) Wolsong (2,779) Yeonggwang (5,900) Ulljin(5,900)
Bituminous Coal	Samchonpo (3,240) Yeonghung (1,600)	Boryeong (3,000)	Taean (3,000)	Hadong (3,000)	Dangjin (3,000) Honam (500)	-
Anthracite Coal	Yeongdong (325)	Seochon (400)	-	-	Donghae (400)	-
Oil	Yeosu(528.6)	Jeju(215)	Pyeongtaek (1,400)	Yeongnam (400) Namjeju(100) Hallim C/C (105)	Ulsan-1 (600) Ulsan-2 (1,200)	-
Gas	Bundang C/C(900)	Boryeong C/C(1,800) Inchon(1,150) Seoul(387.5)	Seinchon C/C(1,800) Pyeongtaek C/C(480)	Sinchon C/C(1,800) Busan(1,800)	Ulsan-3 (1,200) Ilsan C/C (900)	-
Hydro	Muju P/S(600)	Yangyang P/S(1,000)	Samnangjin P/S(600) Cheongsong P/S(600)	Cheongpyong P/S(400)	Sanchung P/S(700)	Hydro(534.5)
Total	7,198.3	8,500.4	8,882.1	7,766.0	9,501.4	18,251.5

## Tariffs

### Average Electricity Prices

Unit : Won/kWh

Type	Residential	Industrial	Agricultural	Commercial	Total
2007	94.78	64.56	42.45	77.20	77.85
2006	93.70	61.92	42.96	77.48	76.43
2005	91.07	60.25	41.67	89.00	74.46
2004	90.94	60.23	43.95	96.85	74.58

promoting internal competition, 8 district offices out of 15 were restructured into 9 SBUs (Independent Strategic Business Unit) in September 2006. Independent accounting and Performance evaluation of SBUs became the basic frame for the new system.

Remaining 7 district offices maintain its original status and function as affiliates of Marketing & Service Division. Further transition will be reviewed after performance assessment of trial operation for 2 years.

### Electricity Export and Import

Korea imports 97% of nation's primary energy needs and it does not trade power with neighboring countries due to geo-political

conditions. Under "Sunshine Policy" of the South Korean government, KEPCO started power supply to the Gaeseong Industrial Complex in North Korea from 2004 for the first time since Korea had been divided.

### Procedure of Rates Revision

- KEPCO (Korea Electric Power Corporation) submits recommendations for revisions of rates to the MKE (Ministry Of Knowledge Economy) after Board of Directors' approval
- Reviewed by ERCPEC (Electric Rates and Consumer Protection Expert Committee)
- Reviewed by MOSF (Ministry Of Strategy and Finance)

## Transmission and Distribution

### Transmission Facilities (2007 year-end)

(Unit: c-km, MVA)

Facilities	Line (C-KM)		Substation		Transformer Capacity (MVA)
	Overhead	Underground	Manned	Unmanned	
765kV	755	-	4	-	23,114
345kV	8,063	221	56	-	95,279
154kV	17,656	2,261	97	455	109,268
66kV	335	3	2	4	454
180KV	30	202	-	4	134
Total	26,839	2,687	159	463	228,249
2006					

**Distribution Facilities(At year 2007-end)**

(Unit : c-km)

Facilities	Line-length (C-km)	Transformers (1,000 units)	Supports (1,000 units)
2007	401,485	7,895	7,608
2006	393,304	7,608	7,412
2005	385,510	7,412	7,261

**Long Term Construction Plan**

(Unit : c-km)

Voltage	2010	2015	2020	2020
765kV	1,005	1,005	1,005	1,005
345kV	9,772	9,772	9,787	9,787
154kV	22,790	25,147	27,085	27,085
Total	2,921	35,924	37,877	37,877

- Reviewed by KEC (Korean Electricity Committee)
- Authorisation of tariff revisions by MKE

**Market Price**

The market price is composed of the System Marginal Price (SMP) and Capacity Payment (CP). Capacity payment is to reimburse the fixed cost to a generating unit that has declared its availability during the day, while SMP compensates for the variable cost, fuel cost, of a generating unit that produces electricity.

Price cap is imposed on the base load generating units such as coal and nuclear power.

**Method of Determining System Marginal Price**

The system marginal price (SMP) refers to the cost of the most expensive generating unit included in the Price Setting Schedule (PSS).

PSS is set up by a computer program that can minimize the total production cost of generating units including the startup cost and

incremental fuel cost.

**Market Price Setting Procedure**

KPX forecasts the demand for the trading day and receives offers for available capacity from generation companies one day ahead. It then determines the market price by running a Price Setting Schedule (PSS). In the PSS, the SMP values for each trading hour are calculated to meet the forecasted demand each hour. Congestions in grid or generation constraints such as fuel limitation and district heat supply are not considered in this procedure. Thus, establishing an efficient Operation Schedule that determines the unit commitment (merit order) and output level of generating units is essential in minimizing the total production cost while meeting the demand.

**Environmental Management**

As part of an effort to pursue sustainable management, KEPCO has established environment-friendly policies in all sectors of

electric power business. In particular, KEPCO is actively developing renewable energy as an alternative to conventional energy using fossil fuel which causes environmental pollution. Motivated by obtaining the ISO14001 (Environmental Management System) Certificate in power transmission, transformation, and distribution, KEPCO is expanding the Environmental Management System throughout the entire company.

Integrated desulfurization and sewage treatment facilities are operated in power plants; and KEPCO is using satellite data analysis to minimize environmental impacts in locating new power plants.

### **Renewable Energy**

Development and expansion of renewable energy sources are very important for the

sustainable growth of KEPCO. The "Agreement on the Development and Supply of Renewable Energy" was signed between the Government and KEPCO group in July 2005. In 2007, the investment amount recorded 200 billion won. KEPCO has supplied 332MW capacity of power generation facilities to renewable energy projects including solar and wind power generation, hydro-power, and fuel cells. In 2008, the investment amount is expected to reach 460 billion won.

Through active development of Wind Power Generation projects in China, KEPCO is anticipating to achieve Certified Emission Reduction (CER) equivalent to 180,000 tons of carbon emission right. The CDM (Clean Development Mechanism) project for the reduction of the SF<sub>6</sub> gas is on the way for registration in the UN by the end of 2009.