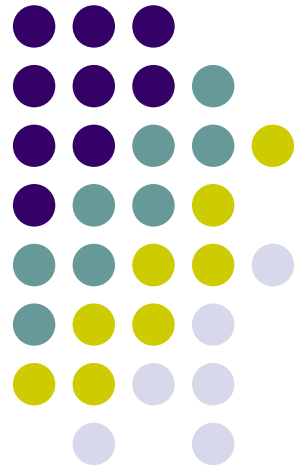
The Current Status and Prospect of Distributed Generation in Korea

Korea Institute of Energy Research

2007. 4



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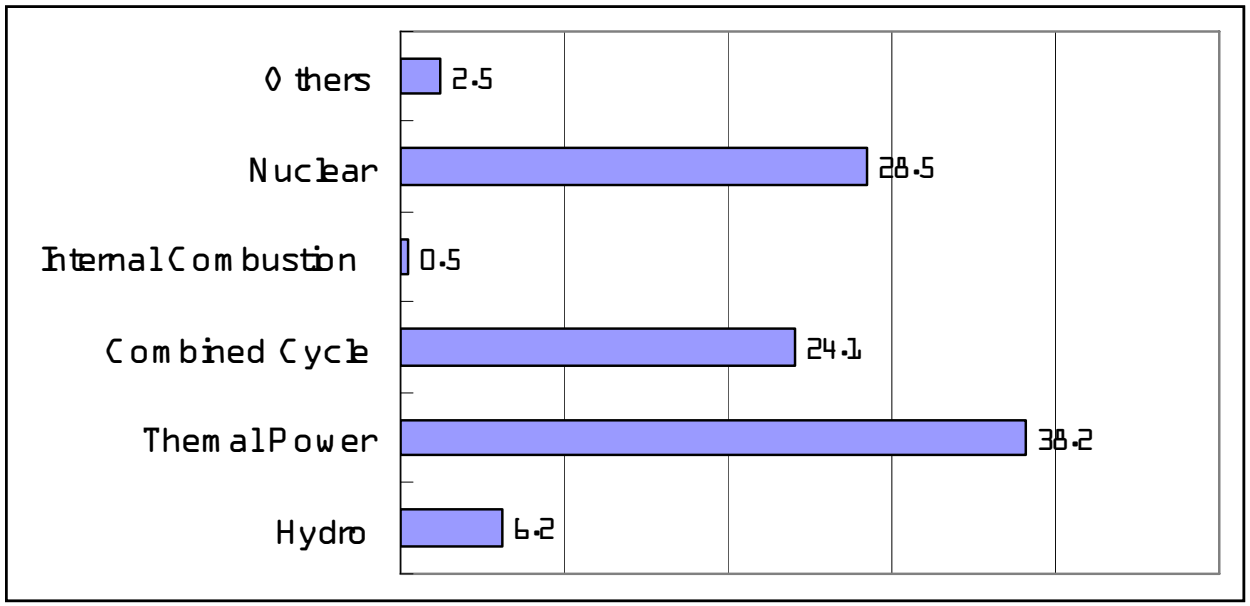
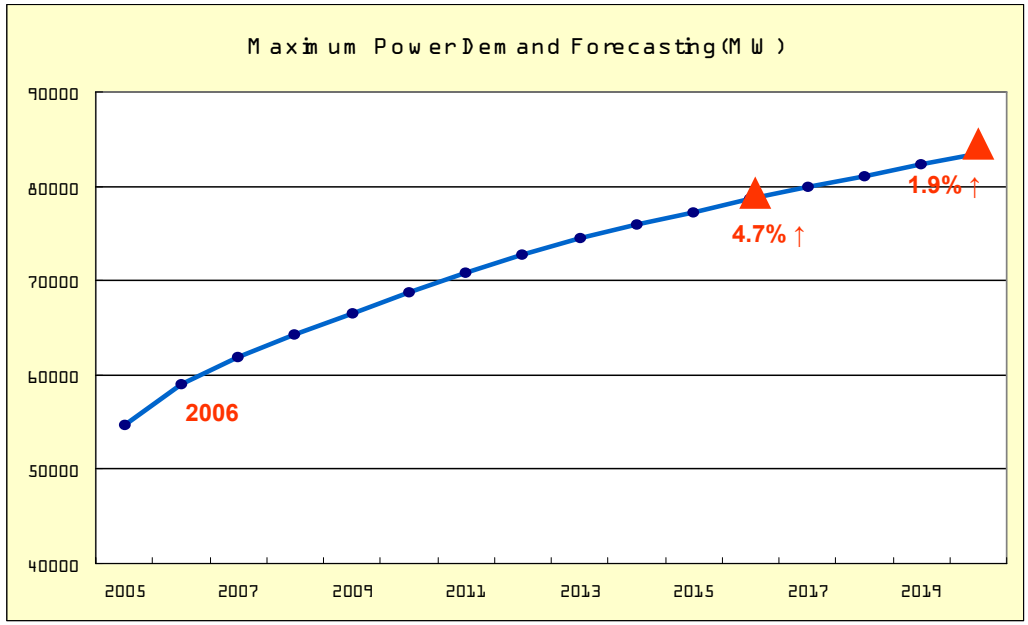
Background

- **Current status of electric power installation in Korea**



- **Regional emotion as the construction of power plant**
- **International environment regulation, high oil prices**
- **High dependence rate to overseas energy resource**

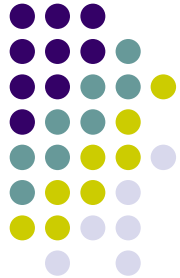


[Long-term Power Forecasting in Korea]

- An continuous upward tendency in domestic electricity supply- demand
- To need the installation cost down plan at central electric power supply system

To solve the problems above,
Increasing the interest of DG in Koera

Status of Distributed Generation in Korea



- New & Renewable Energy (NRE) Area

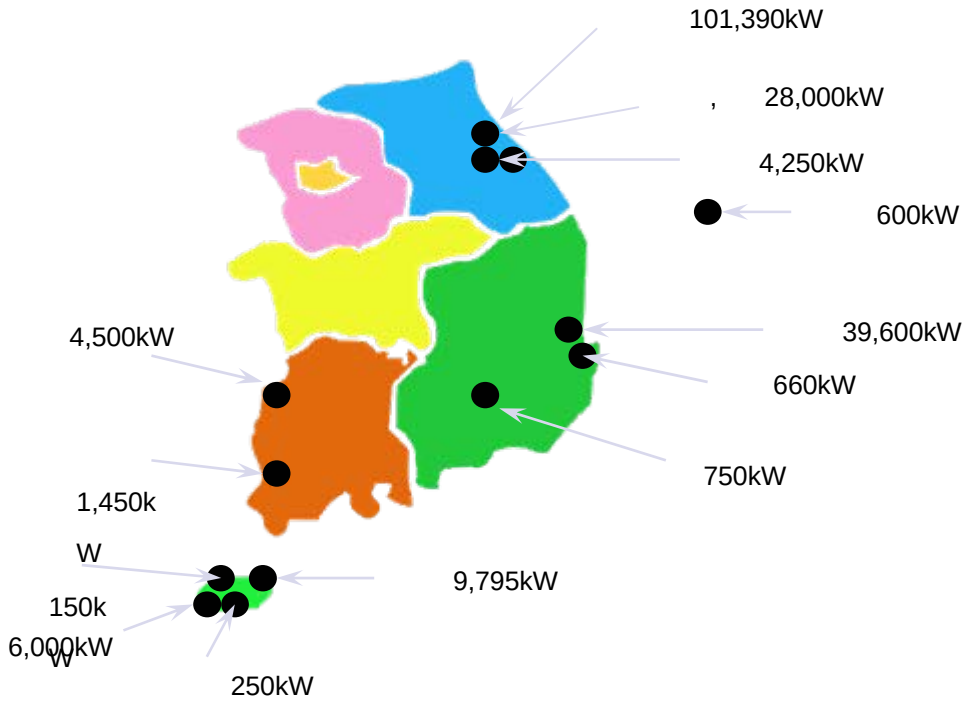
  Photovoltaic & Wind power are two generation area of the most progressive area in NRE sources.

  - **Photovoltaic (PV) System**
    - **Total installation status(~2005) : 13,594 kW**
    - **Power generation 14,399 MWh/year**
    - **Estimated installation capacity until 2006 : 31,000 kW**
    - **Installation goals of 1.3GW by 2012**
      - Residential homes (3 kWp): 100,000 (‘12) 300 MWp
      - Public buildings (10 kWp): 40,000 (‘12) 400 MWp
      - Commercial buildings (20 kWp): 30,000 (‘12) 600 MWp

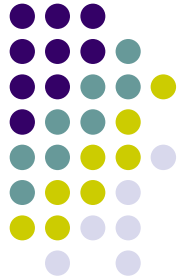
- **Establish the PV demonstration site**
  - ✓ **Construction of SOONCHON PV demonstration site**
    - **- Capacity : 1 MW**
    - **- Budget : about 10 billion won**
    - **- Period : 2004. 11 ~ 2007. 10**
  - ✓ **PV Plant construction plan**
    - **- Concentrated arrangement Type 1,200 kW**
    - **- Dispersed arrangement Type 1,200 kW**
- **Construction Plan of Power Corporation for Power Plant**
  - ✓ **2,000 kW PV Plant (2007. 12)**
  - ✓ **1,200 kW PV & Wind hybrid generation plant (2007. 12)**
  - ✓ **Total 6,000 kW construction in JEONNAM (2009. 06)**
  - ✓ **KWANGJU 2~3 MW PV Plant (2008.06)**
  - ✓ **Establish to unused site of existing plant (over 600 kW)**
- **Residential PV system will be increased because of 100,000 solar roof program. (Support budget in 2007: 41 billion won)**

Wind power System

- **Installation Status : 197,395 kW**
- **Power generation per year : 129,888,000 kWh**



- **Installation objective of 2,237,000 kW by year**
  - 750kW ~ 2,000 kW level (~ 2007)
  - 2.0MW ~ 3,000 kW level (2008 ~ 2012)
  - Over 3,000 kW level (2013 ~ 2018)



- **Development of demonstration complex for Off-Shore wind energy**
  - ✓ **Scale : 4,000 kW (2,000 kW x 2)**
  - ✓ **Period : 2006~2009**
- **Construction of demonstration complex for On-Shore wind energy (2008. 11)**
- **Establishment plan for wind farm**
  - ✓ **To be expected total 2,237,000 kW wind farm until 2013**
  - ✓ **Currently be progressing 130,000 kW wind farm among them**

Fuel Cell area

Currently, MCFC type of the fuel cell is operating for grid-connection.

- **Total installation capacity for generation : 790 kW**
- **For demonstration 750 kW (for residential 40 kW)**
- **Power generation per year : 2,103,000 kWh**
- **Establishment Fuel Cell plant**
  - ✓ Total 110 MW capacity by 2011
  - ✓ Budget : 225 billion won (Construction cost 65 billion won)
- **Recently to fix the buyback rate**

Co-generation area

The highest energy efficiency among the distributed generations.

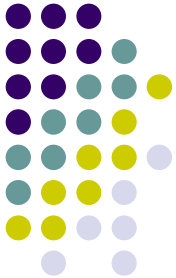
- **Total installation capacity : 6,718,990 kW**
  - ✓ Small co-generation 138,700 kW
  - ✓ District heating co-generation 1,332,196 kW
  - ✓ Industrial complex co-generation 2,071,430 kW
  - ✓ Independent co-generation 3,176,664 kW
- **To be verified the effect of energy saving (about 20%)**
- **In case of small co-generation, the gas engine has the highest energy and economical efficiency in Korea**
- **To be supplied the 300 kW level gas engine co-generation system centering around the apartment complex**

Financial Assistances

- **In order to attract public attention and promote the credibility of R&D activity in NRE**
  - ✓ **Loans**
  - ✓ **Tex-intensive**
  - ✓ **Feed-in-Tariff**
  - ✓ **Demonstration & Dissemination Program**
- **Preferential buy-back rate from energy resources**

	Tariff (won/kWh)	Conditions applied
PV	677.38	> 3kW
	711.25	< 3kW
Wind	107.66	> 10 kW
Fuel Cell	234.53	Using Bio Gas
	282.54	others
Co-generation	Apply the general electric rate	

Organizations



MOCIE
(Ministry of Commerce, Industry and Energy)

KEMCO
(Korea Energy Management Corporation)

ETEP
(Electric Power Industry Technology & Evaluation Planning)

- Industry
- University
- Research

KIEE
Korean Institute of Electrical Engineering

- Society for A sector "Power Engineering"
- Special community
- "Distributed Generation Power system Association"

Conclusions

- Korea is needed the countermeasures about the several expected problems because of high dependence on energy import and long-term electric power demand forecasting.
- Especially, Korea is inevitable the construction of large scale power plant as increasing the electric power demand, but expects the many problem as installation cost and reaction of local residents.
- To solve the problems, in Korea, increased the interest of distributed generation (DG) which is installed near the consumer as well as supplied the electric power
- Korea already is installed the DG that is corresponded to 2.5% of total electric power generation, and in the near future the number of DG will be increased.
- Also, the DG is expected to the high dissemination because of existence of many assistance systems about DG in Korea

- **The DG in Korea will constantly grow through the development of research in each DG area and demonstration complex which is constructed in the future and for that, Korea needs the formation of total network for unifying the industry-university-research.**