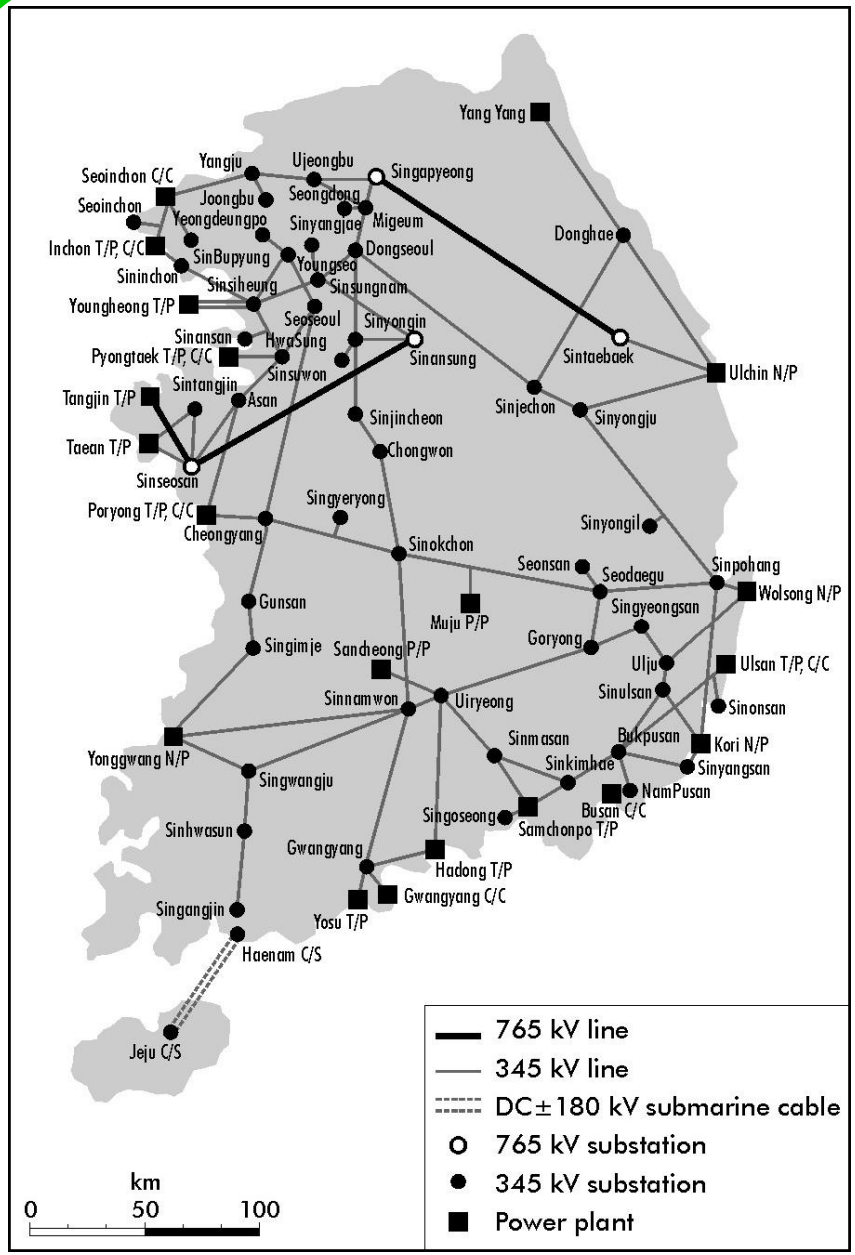
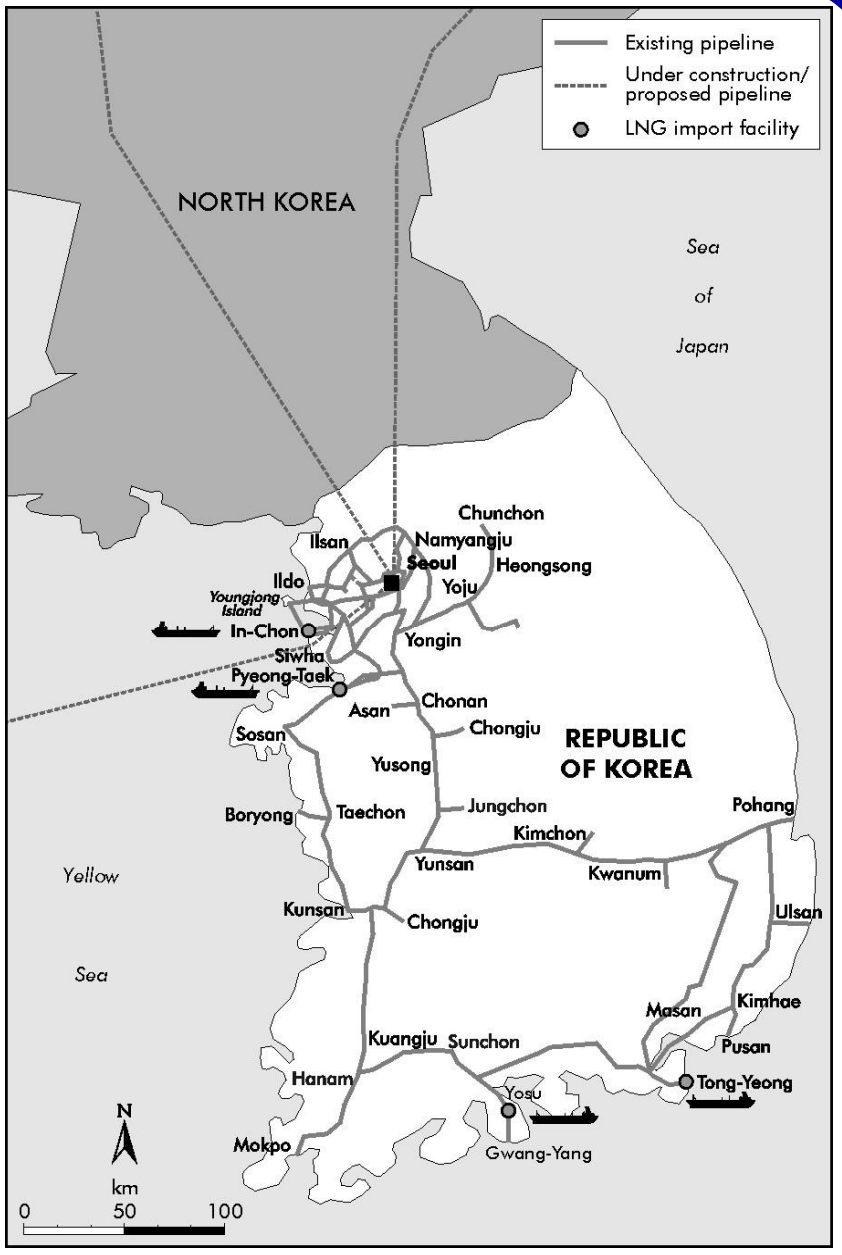
IEA DSM Task 17 Workshop
- ECN, Netherlands -

DER Status of Korea

July 2008

에너지管理公團
KOREA ENERGY MANAGEMENT CORPORATION





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DER Overview in Korea

- CHP for district heating and industrial cogeneration
  - (2006, 4.0GW) district heating 1.3GW, industrial cogen 2.2GW, small cogen 0.5GW
    - 4.9% of total gen capacity(70.4GW) and 4.3% of total generation(404.7TWh)
  - Recently CHP has deployed in the forms of local community energy systems (21 sites under construction).
- Renewables
  - (2006) 5.3 million toe(2.2% of TPES), 3.9TWh(1.0% of total electricity generation)
  - Long-term targets of renewables is set up to 5.6% of Total Primary Energy Supply in 2012 and to 9.0% of TPES in 2030 by the National Energy Fundamental Plan.
- DSM/DR
  - DSM goals of electricity, together with load management and energy efficiency, are reduce about 14% of peak demand on the basis of BAU scenario in 2020. (energy efficiency takes up 4% of peak demand reduction)
    - Reserve margin targets of power systems: 10% in long-term perspectives and 6% reserves(near 4GW levels) in normal operations

Market Access of DER

- Mandatory market pools for electricity transactions
  - Generators above 200kW which want sales should register to KPX
  - Only KEPCO purchases all the electricity from the pool
  - DG/renewables is treated as the one of market participation entities.
- Compensate the market participated renewables with feed-in tariffs
  - The government compensates eligible renewable generators for any shortfall between the pool price and feed-in tariffs.
    - Renewable standard prices(KRW/kWh, 2007): PV(700), Fuel Cell(283), Wind(107), Small Hydro(95)

(As of 2006)	CHP		Renewables*	
	MW	GWh	MW	GWh
Current Resources	3,455	17,244	550**	616
Market Access	892	2,597	428	511
(Ratio)	26%	15%	78%	83%

Source: KEMCO, KPX (* Hydro power is excluded, ** provisional data)

Grid Concerns focused on CHP

- Interconnection of DER (including renewables)

Capacity	100kW	above 100kW	above 3MW
Interconnection	220V, 380V (DL)	22.9kV (DL)	154kV (Substation)

- Cogeneration Efficiency: 57%~92%
  - Typical Industrial Cogen Efficiency: Textiles(74.7%), Petrochemical(57.7%), Paper&Pulp(83.4%), Non-Metal(59.0%)
- No electricity market incentives for CHP
  - But, installation subsidy (35 USD/kW) and wholesale gas price reduction (below 5% in summer) can be supported from KOGAS

* CHP facilities can be eligible for the government low interest loans.

DER Business Model in Korea

- CHP
  - Community Energy System (permission of zonal electricity business)
- Renewables
  - Feed-in-Tariffs, Renewable ESCO, RPA for the energy suppliers
  - RPS is planned
- Energy Efficiency
  - ESCO, DSM investment of energy suppliers
  - EERS (or White Certificates) is planned

DER Expansion Plan

- Focus on the Nuclear, CHP and renewables
  - Renewables are gradually increasing but not satisfactory
    - Renewable Generation(GWh): 350('04) → 404('05) → 511('06) → 830('07)

< Registered Generation Capacity to the Korean Electricity Markets (unit: GW, as of 2008) >

	Hydro*	Coal	Oil	LNG	Nuclear	CHP	Renewables	Sum
Capacity	5.5	20.5	5.4	17.9	17.7	0.9	0.4	68.3
Share(%)	8.0	30.0	7.9	26.3	25.9	1.3	0.5	100

* Hydro(5,492MW): Large(1,528MW), Small(64.0MW), Pumped Storage(3,900MW)

< 2020 Generation Capacity Outlook (unit: GW) >

	Hydro	Coal	Oil	LNG	Nuclear	CHP	Renewables	Sum
Capacity	6.3	26.4	2.3	26.2	27.3	3.8	2.0	94.3
Share(%)	6.7	28.0	2.5	27.7	29.0	4.0	2.1	100

* Source: the 3rd basic plan for Electric Power Supply and Demand (2006~2020)

Need of DER Integration

- Why integrate the resources?
  - (Objectives) Obtain better information, Promote better efficiency
  - For the diverse DERs of lower carbon or carbon free energy supply
    - CHP, renewables, energy efficiency … Most of them are small sized & widespread
- How can we integrate?
  - (Directions) Proper signals on the energy price and quality
    - Providing desirable competition between various DERs
  - Information exchange between DERs on the status of supply and demand
  - Mutual energy transfer or delivery if necessary
  - Smart grid implementation can be used as a groundwork


감사합니다
Contact:
Seungchan Chang
Phone: +82-31-260-4452
E-mail: schang@kemco.or.kr
에너지管理公團
KOREA ENERGY MANAGEMENT CORPORATION