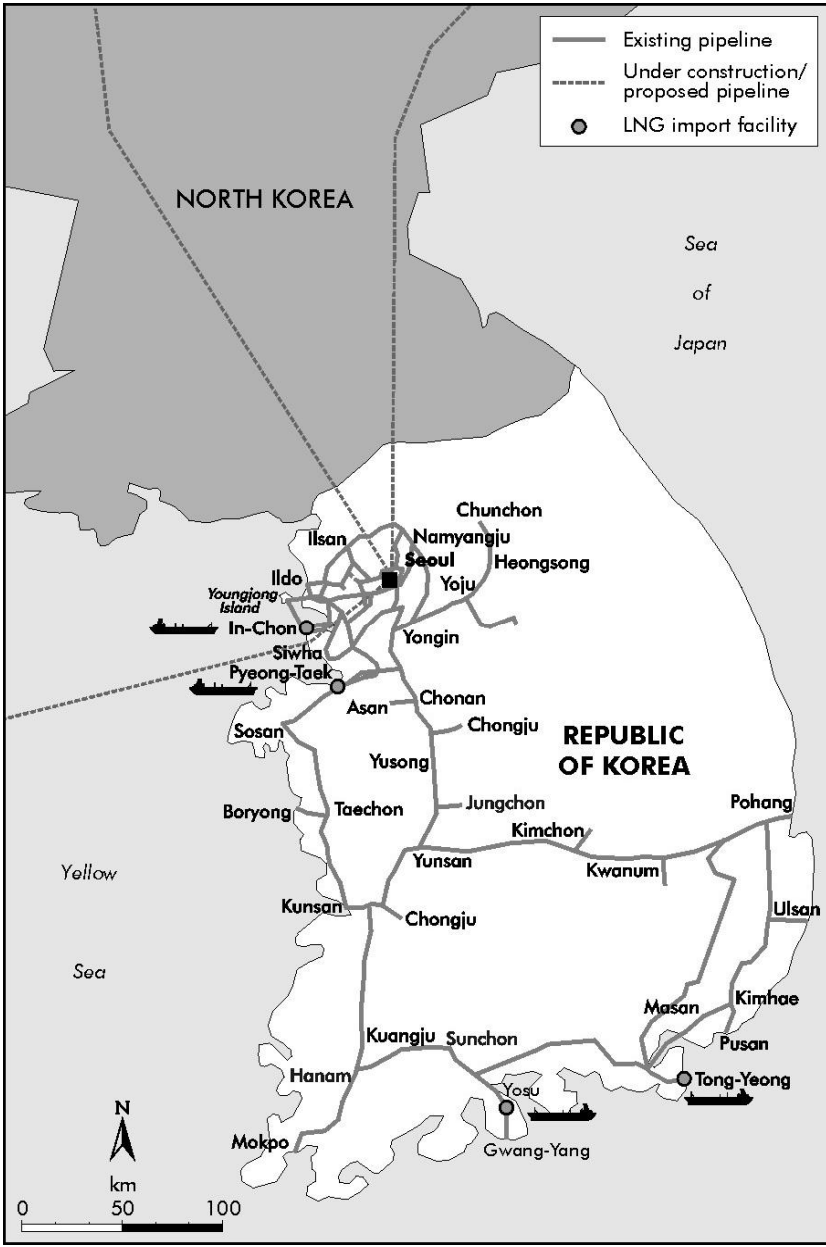
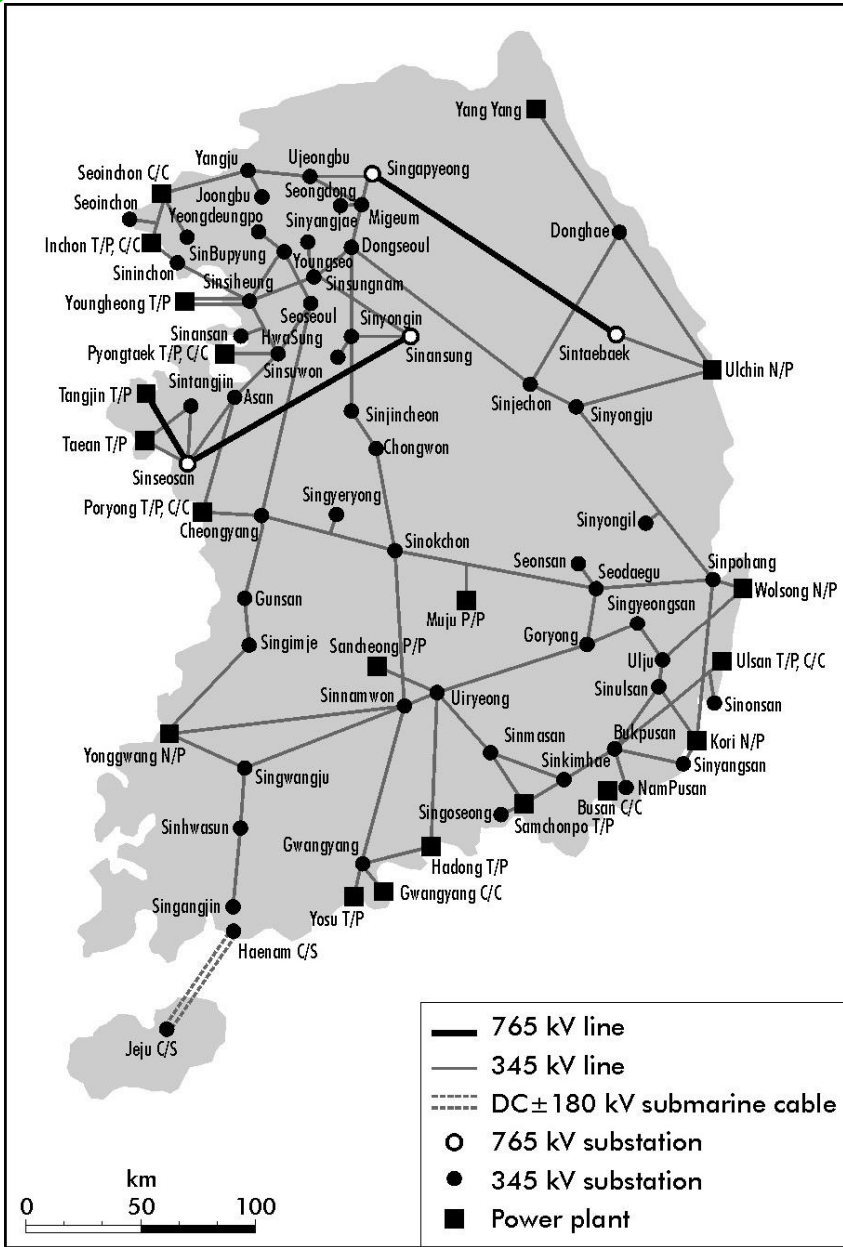


IEA DSM Task 17 Workshop
- ECN, Netherlands -

DER Status of Korea

July 2008





KOREA ENERGY MANAGEMENT CORPORATION

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

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