

Status of Distributed Generation, New & Renewable Energy in Korea

NOVEMBER, 2007

Korea Energy Management Corporation



Contents

I. KEMCO's Major Activities

II. DSM in Korea

III. Combined Heat & Power

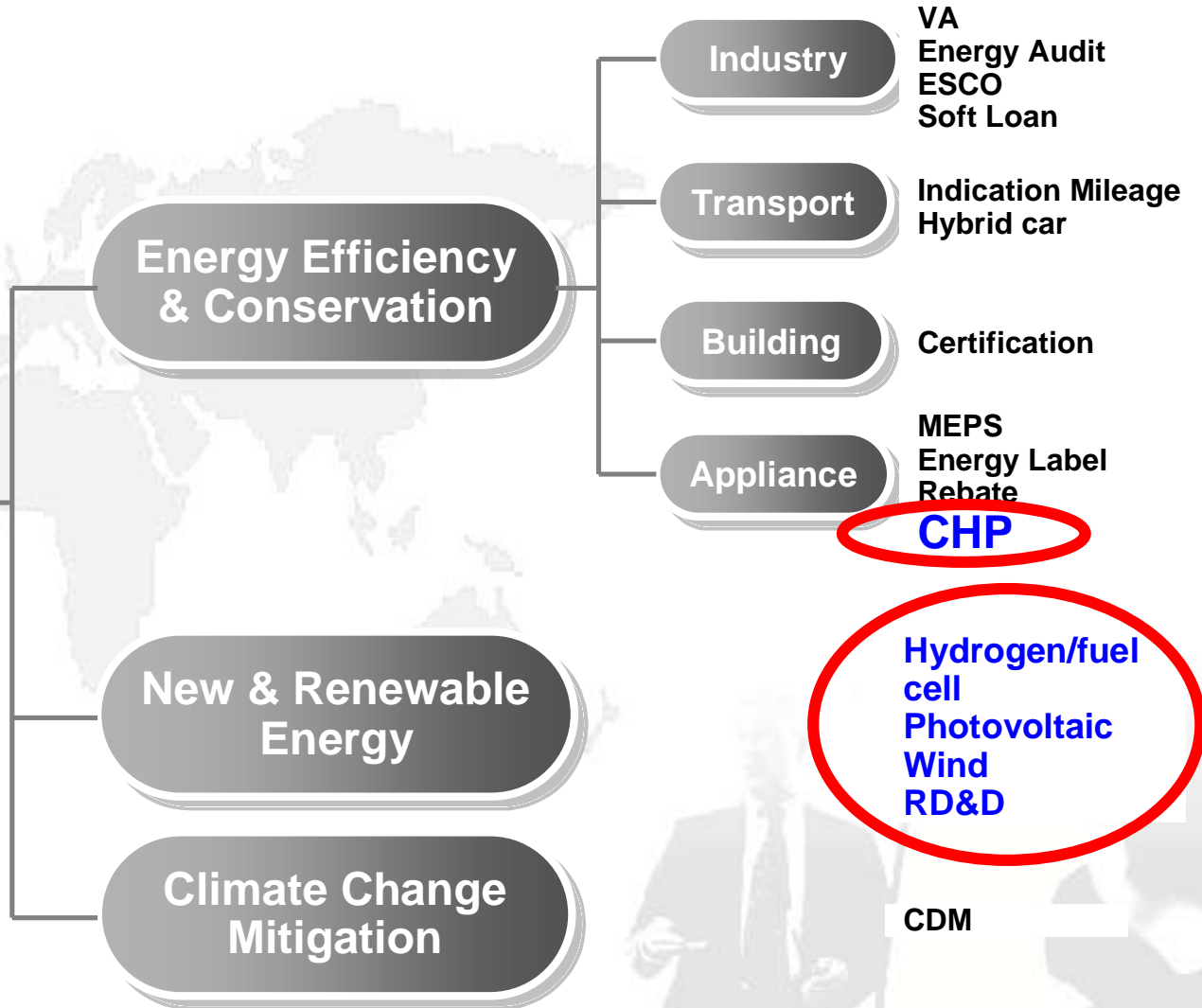
IV. New & Renewable Energy

I. KEMCO's Major Activities

MOCIE
(Korean Government)

KEMCO
(Under MOCIE)

15 Departments, 12 Branches
1 Affiliate (New & Renewable
Energy Center)





II. DSM in Korea

Demand Side Management

DSM of Energy

Energy Efficiency

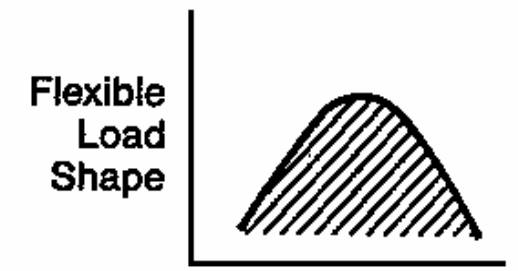
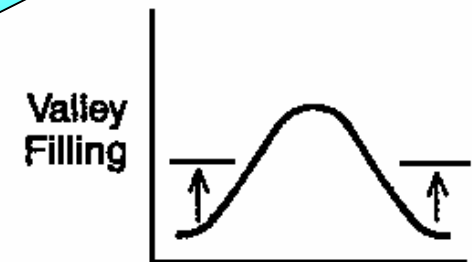
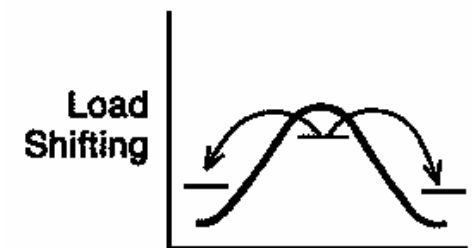
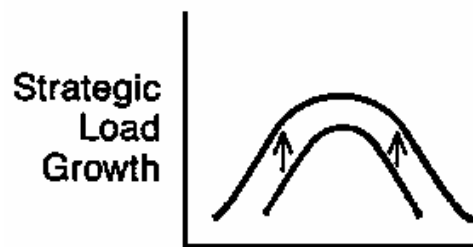
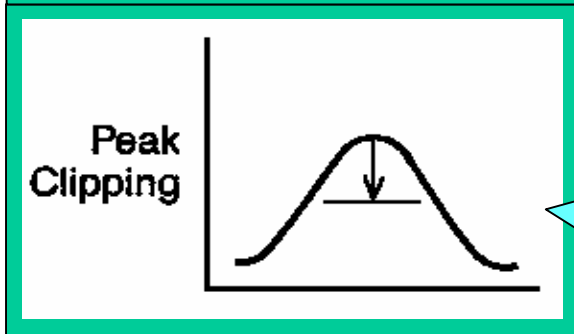
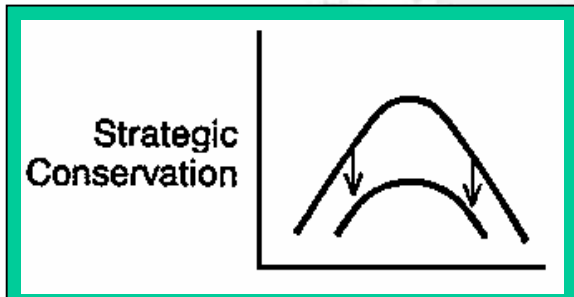
Retrofit or replacement of high efficiency end-uses

Load Management

Least-cost planning for energy
Supply and demand focused on load leveling

- Rate Policy (midnight power service, discounts for requested load adjustment)
- Energy Efficiency Standards and Certifications
- Financial Incentives (Rebates, loans, tax exemptions etc)
- Technical Audits (Consulting)
- Public Relations

Conventional DSM Categories

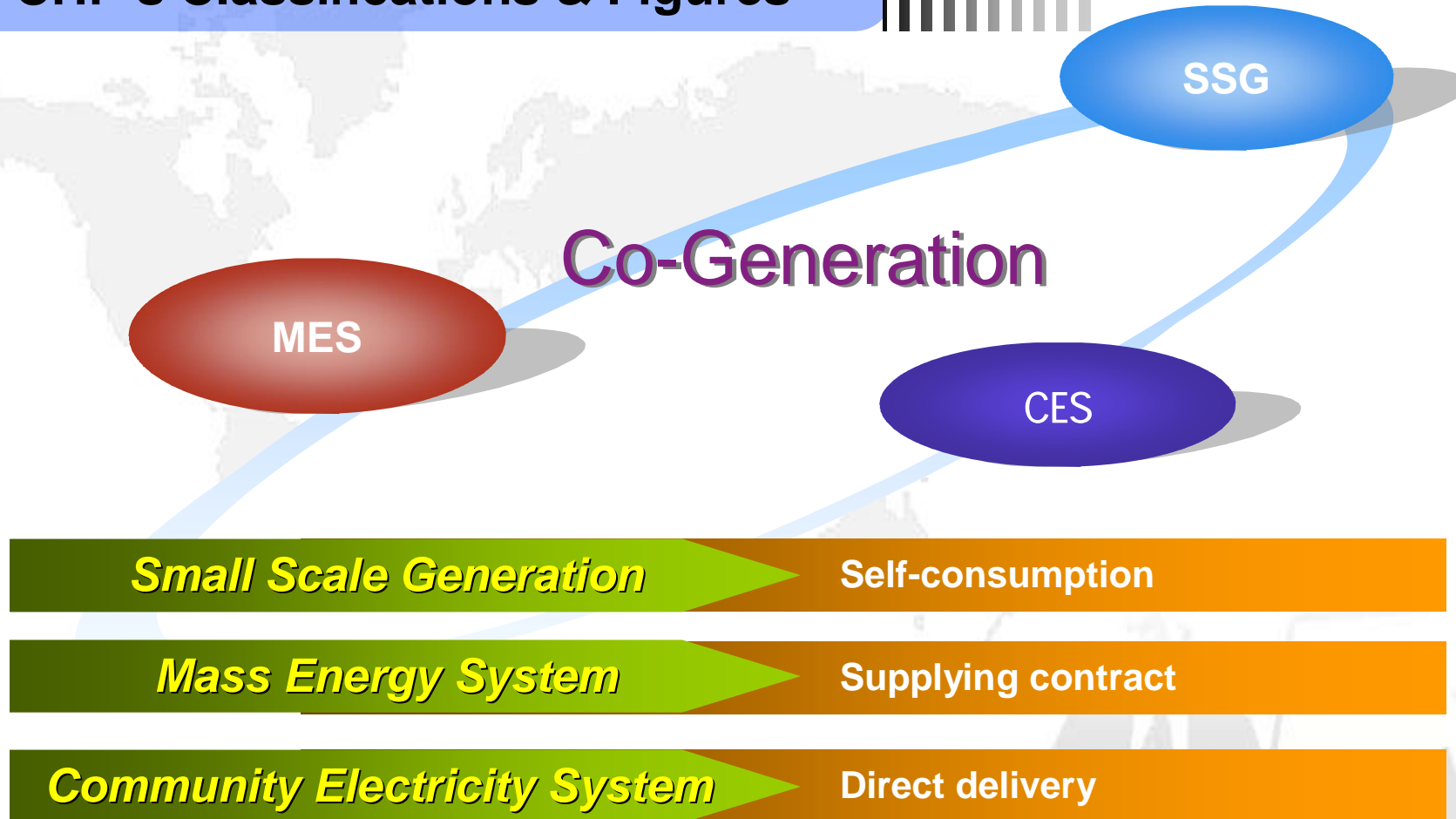


Load Reductions and Energy Supply Cost Savings (Installation, Operation)



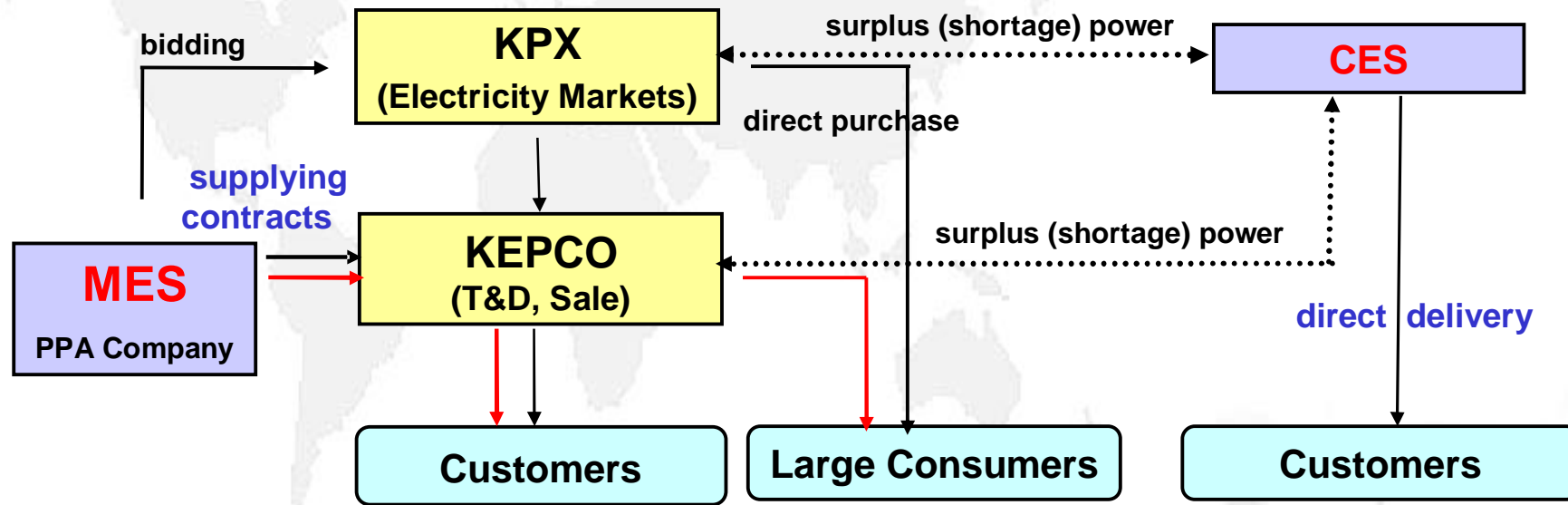
III. Combined Heat & Power

1. CHP's Classifications & Figures



•When a shortage of electric power occurs, Small Scale Generation is supplied with electric power from electric supply company.

Electricity Market Structure



※ PPA : Power Purchase Agreement
 MES&CES : Supplies heat and Power

→ Electricity Flow → Sale

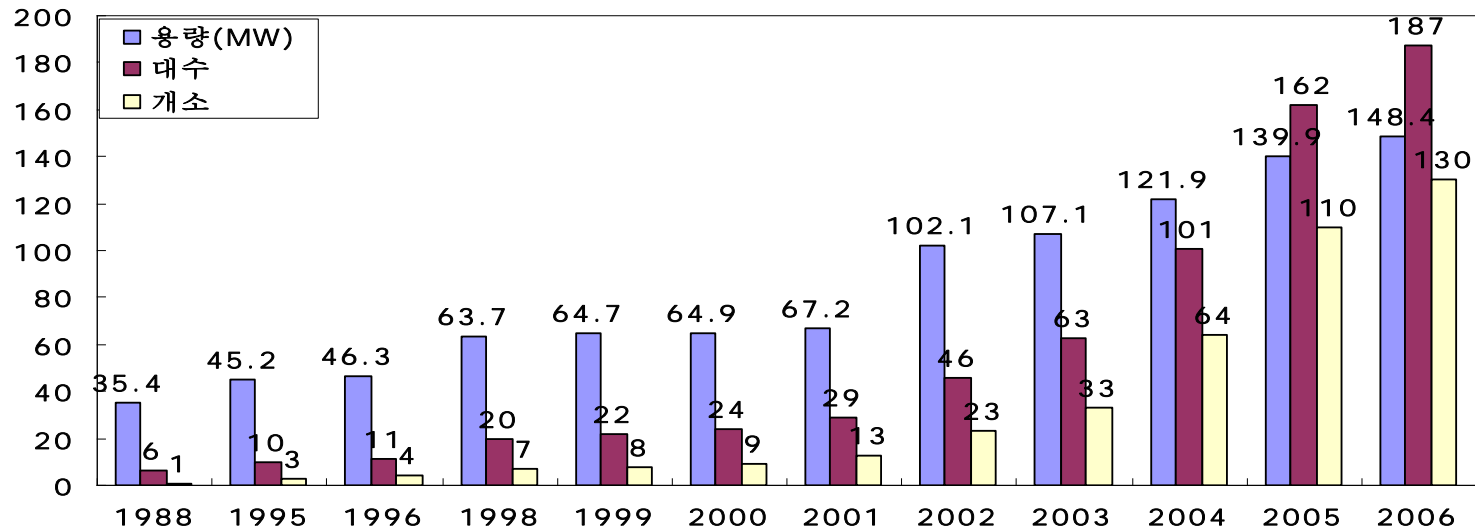
2. Small Scale Generation

Definition

- ❑ High efficiency integrated energy system which produce and utilize heating and electricity simultaneously by means of gas engines and gas turbines below 10,000kW in power generation capacity using LNG as a source of fuel.

Status

- ❑ 187(148MW) facilities are installed in 130 places in 2006. It takes up around **0.2%** of total power generation capacity nationwide.
- ❑ 46 (76.5MW) facilities are installed in office buildings, consisting of 52.8% among total power generation capacity of SSG.



	APT	Industry	Building & others	Total
Number of installed places	98	4	28	130
Number of facilities installed	135	6	46	187
Capacity of Facility	42	30	76	148
Rate(%)	28.4	20.0	51.6	100

3. Mass Energy System

Definition

- ❑ The Mass Energy system supplies both heat and electricity produced at large - scale power.
- ❑ Consumers are apartments, buildings, industries located in the area.

Status

- ❑ The distribution rate of district heating amounts to 11% of total households in the end of 2006. The MES is being supplied to the 15 industrial complexes.
 - District Heating: 11 companies, 26 places
 - Industrial Complex: 20 companies, 21 places

Difference

- ❑ Mass energy system companies can be defined as CES companies according to the Electricity Business Act.
MES and CES are equivalent in the facilities system (CHP)
- ❑ Mass energy system companies are the core of heating supply, and CES (Community Electricity System) companies are the core of electricity supply.

Power Generation facility & Capacity

- ❑ Power generation capacity of MES amounts to **4.9%** of the total national facility capacity, and the amount of power generated is **4.3%**.
- ❑ CES companies are going to business in 22 areas, and their power generation capacity take up **1.3%**.

4. CES (Community Electricity System)

- Supplies produced electricity directly to end- users in the specific district not through the electricity market (Electricity Business Act)
- Supplies electricity and heating (heating, cooling and speed heating) by building combined heat & power generation facilities around the high demand areas, and also sell power generation, distribution, and electricity.

Business Classification (Electricity Business Act)

Business		Minimum	Maximum
New & Renewable Energy		more than 60% of electricity demand in the specific supply area	Less than 35,000kW
MES	District Heating & Cooling		Less than 150,000kW
	Industrial complexes		250,000kW

Policies on Distribution of CHP

Mass Energy & CES

- ❑ Provide financial assistance within **80% of their necessary funds** (90 % to small and medium sized companies (public and non-profit organization))
- ❑ The loan interest rates are 3.50% to 4.75% which are about half of the current market (10% of Tax incentives are provided to the companies)

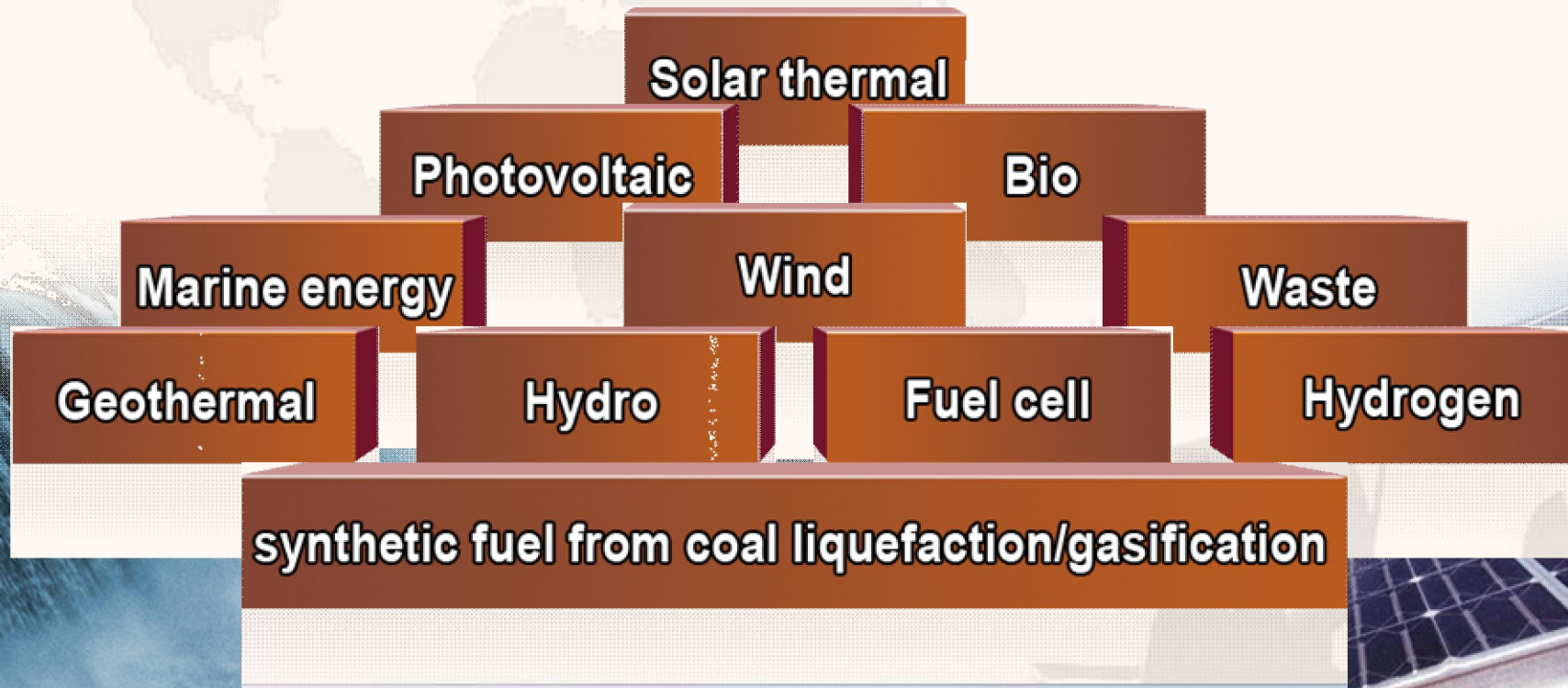
SSG

- ❑ **Is being distributed by ESCO and financial support is given at the fixed interest rate of 3%. (ESCO are retrieving as much as energy they saved in return for their investment)**
- ❑ **Rebate for Small Scale CHP(< 10MW)**
 - Installation rebates (30,000 won/kW)
 - Designing subsidy (5,000won/kW)

IV. New & Renewable Energy

1. Category of NRE

11 types are included in the promotion Act for NRE

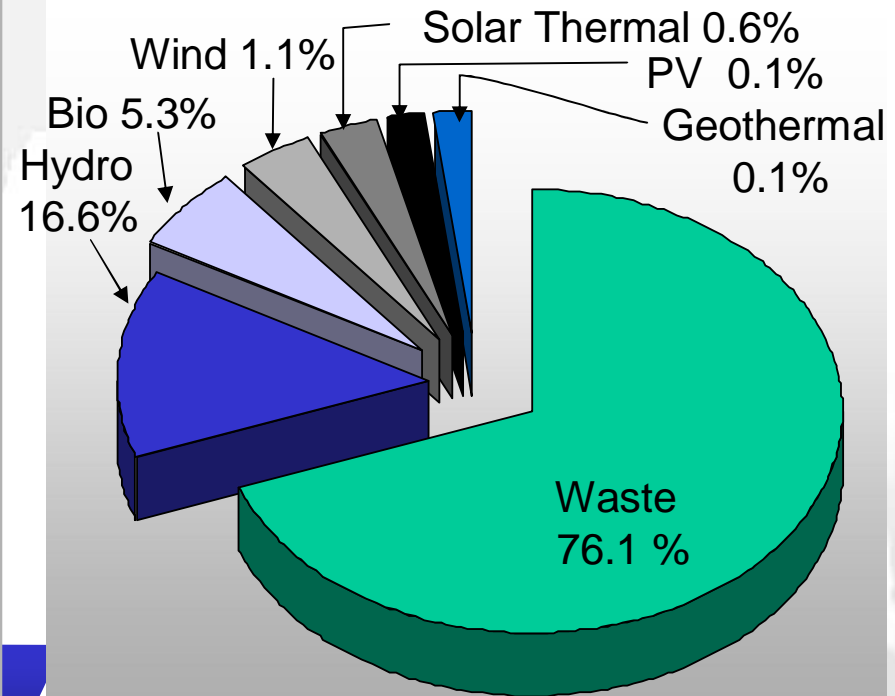


2. Achievement in NRE

NRE/Total Energy Consumption is 2.26% (2006)

- Targeting 5% of Total Energy Consumption by 2011

Resource	Amount (1000toe)	%
Waste	3,975	76.1
Hydro	867	16.6
Bio	274	5.3
Wind	60	1.1
Solar Thermal	33	0.6
PV	8	0.1
FC, Geothermal	8	0.13



3. NRE Power Generation

NRE Power occupies **1.02%** of total power generation

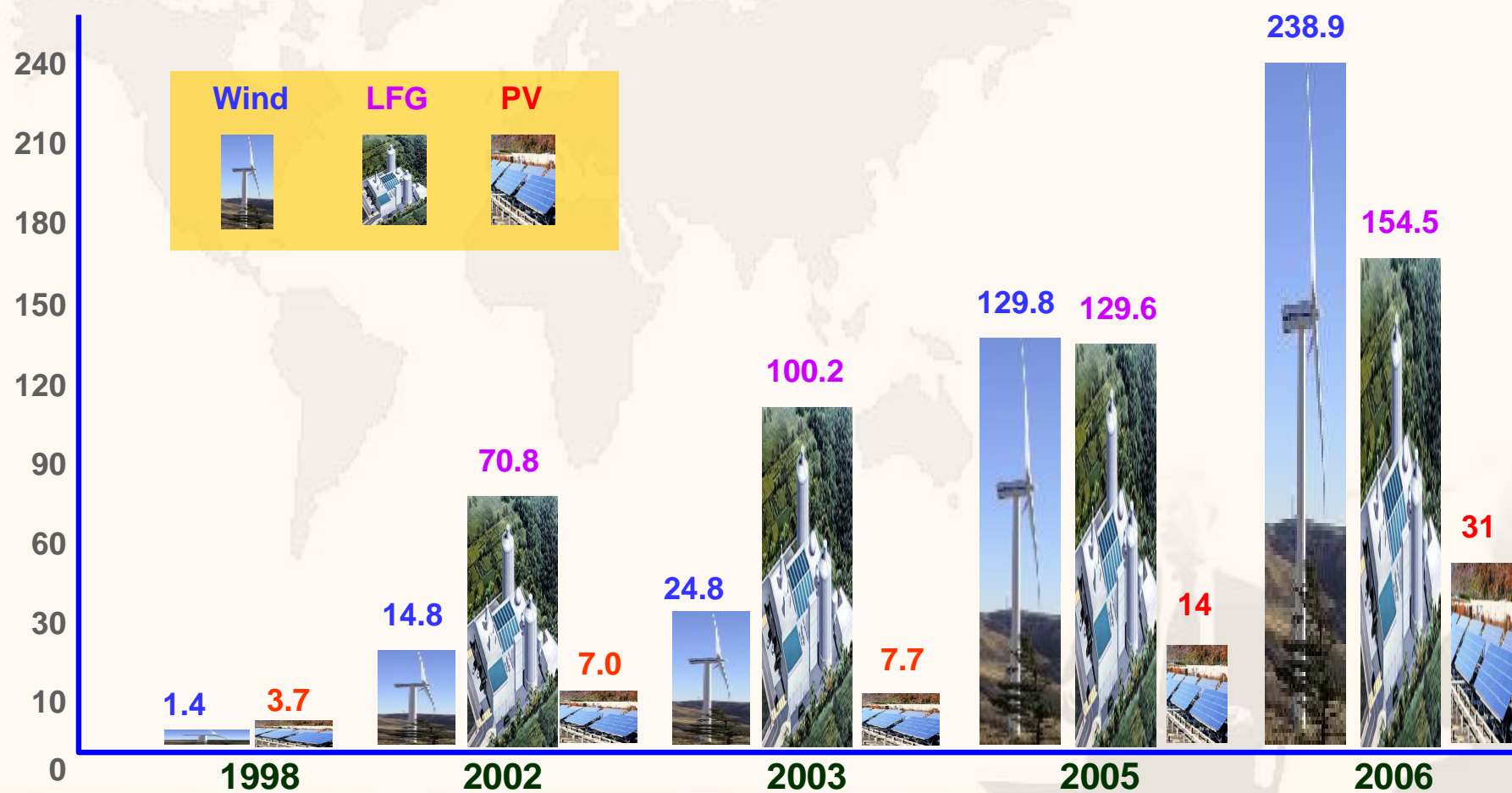
- The amount of NRE generation largely has been affected by hydro power generation

(Unit: GWh)

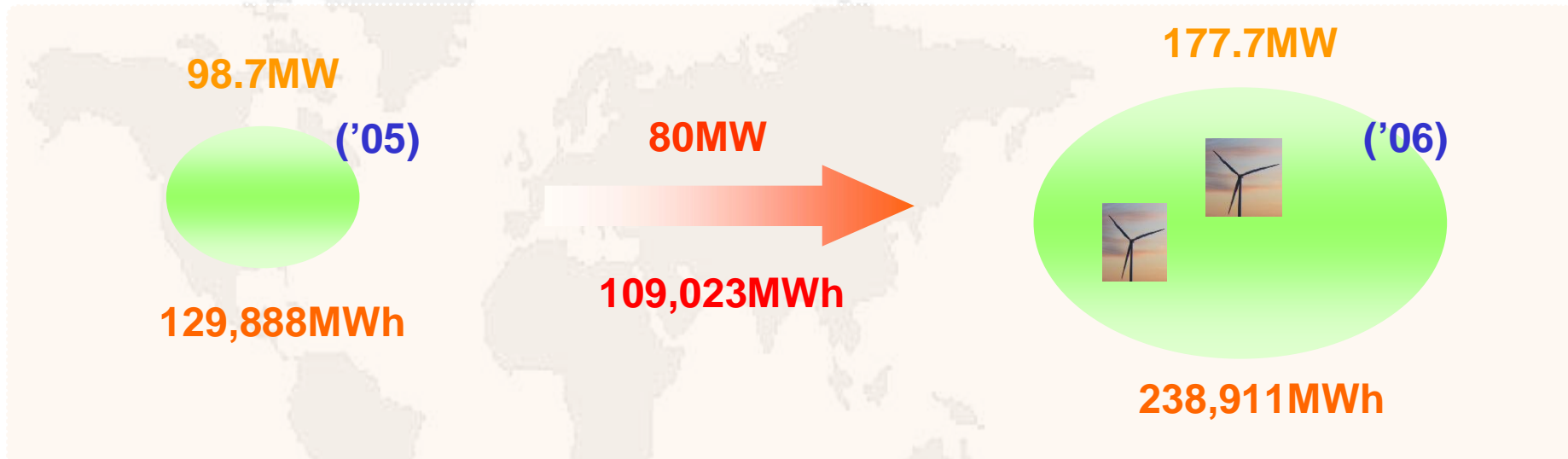
	1995	2000	2002	2006
Total Power Generation	184,660	266,400	306,474	381,180
NRE Power Generation	84.4	103.8	203.3	3,899.4
NRE ratio	0.05	0.04	0.07	1.02
- Commercial use	81.7	90.9	196.0	3,862.1
- Non Commercial use	2.7	12.9	7.3	37.3

Hydro(88.9%), Wind(6.1%) and LFG(3.3%) are playing major roles in NRE Power generation

(GWh)



4. Status of Wind Power



- **Sharp increase of Wind power is owing to Feed in Tariff (107.29 Won/kWh)**
 - Commercial Wind Farm('06): 117 Units in 12 Farms, Total Capacity175MW
 - * Daegwanryung(98MW) Youngduk(40MW) Hangwon(10MW) Hankyung(6MW)
- **Demonstration and evaluation : 750kW, 1.5MW wind power system**
- **Construction of off-shore wind farm in Jeju**

5. Deployment Target

5% of Total Energy Consumption by 2011

• Annual Target (%) •

Resources	2003	2006	2011
Waste	68.5	64.7	57.3
Hydro	27.6	23.6	12.3
Bio	3.0	8.3	7.8
Solar Thermal	0.7	0.7	2.4
Photovoltaic	0.1	0.4	2.5
Wind	0.1	2.1	9.7
Geothermal	-	0.2	8.0
Goal	2.1	2.5	5

6. R&D Policies

Research & Development

Large Project R&D

§ Hydrogen/Fuel cell, PV, Wind receive major support
Integration of the stages of development, demonstration, deployment

General R&D

§ 7 areas such as Solar thermal, biomass and waste energy focused on commercialization

Int. Collaboration

§ Multilateral: APP, IPHE, IEA/CERT, APEC etc
§ Bilateral: China, Germany, Japan, Mongolia etc

Achieve 70~90 % level of advanced countries' by 2011

PV, Hydrogen/fuel cell in the 3rd rank in the world

7. Deployment Policies

Loan & Tax Incentives

- The government provides **long-term, low-interest loans** for the consumers or manufacturers of NRE systems which have been completely commercialized
 - ∅ Loans are provided for **up to 90 %** of the total cost (**up to 80 % for large corporations, up to 50% for public institution**)
 - ∅ Total loans(~ 2006) : 619 billion won
- 10 percent of total investment in installation of NRE systems can be deducted from the income tax or corporate income tax

Thank you 

wglee@kemco.or.kr