NEW & RENEWABLE ENERGY POLICY & INDUSTRY

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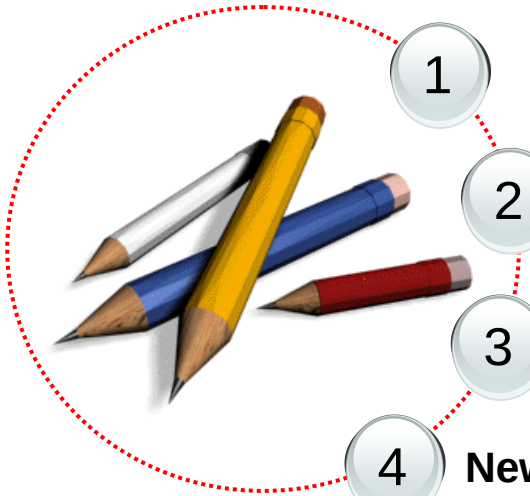
Energy Management Corporation
Byung Moon Kim



1 Energy Environment in Korea

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3 New & Renewable main tasks

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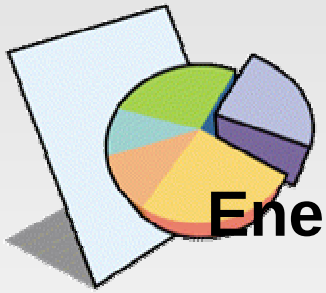
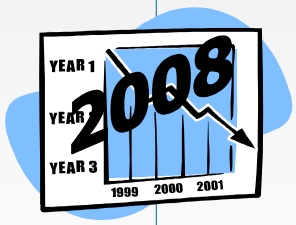


Energy Environment in Korea

Energy environment in Korea

Energy consumer	**11th biggest consumer in the world, consuming 240 Mtoe in 2008, with reliance on importing overseas sources reaching 97%**
Petroleum importer	**4th biggest in the world, importing 141.5 billion US dollars worth in 2008, accounting for 33% of all imports**
CO2 emission	**9th biggest emitter in the world, emitting 600 million tonnes in 2006**



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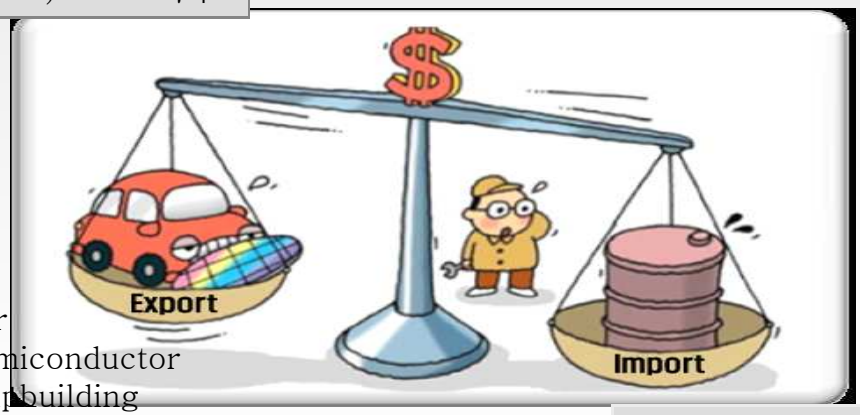

Car
Semiconductor
Shipbuilding

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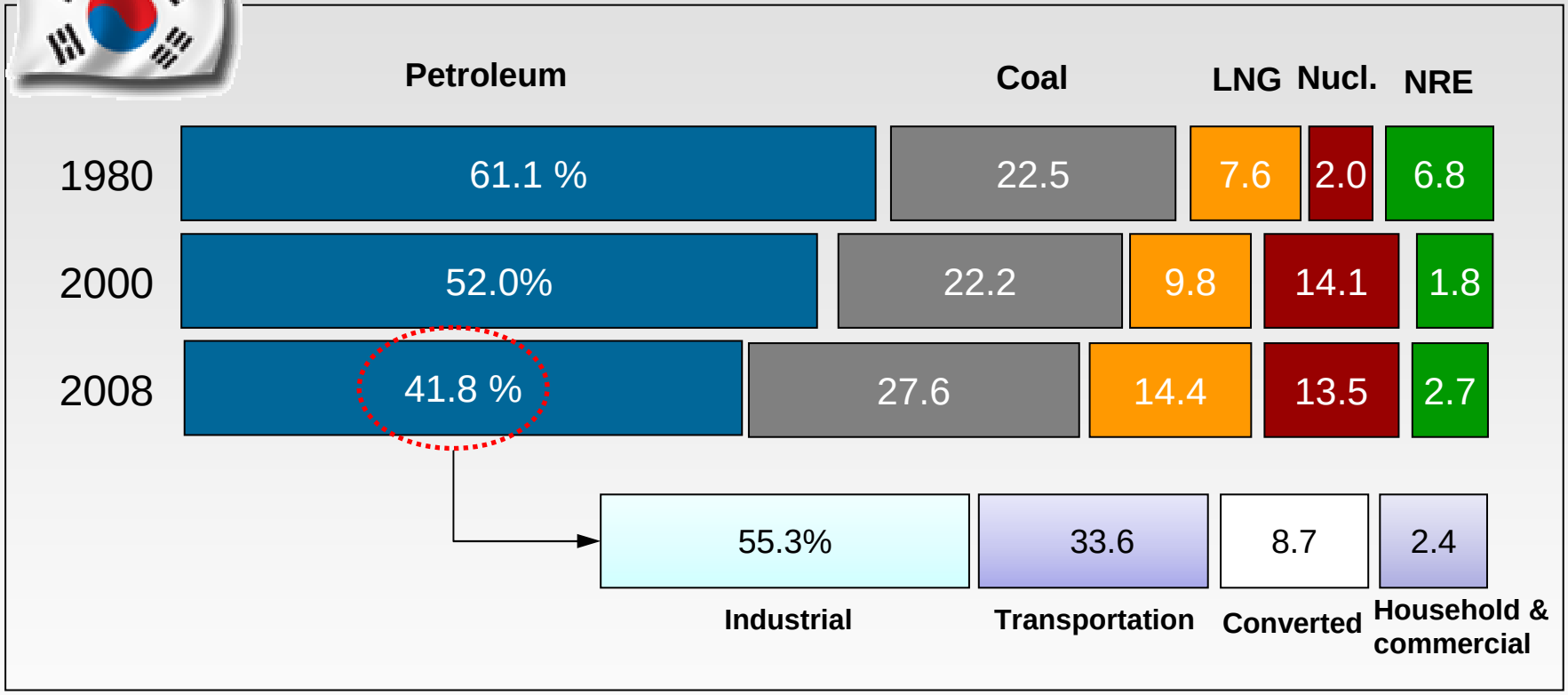
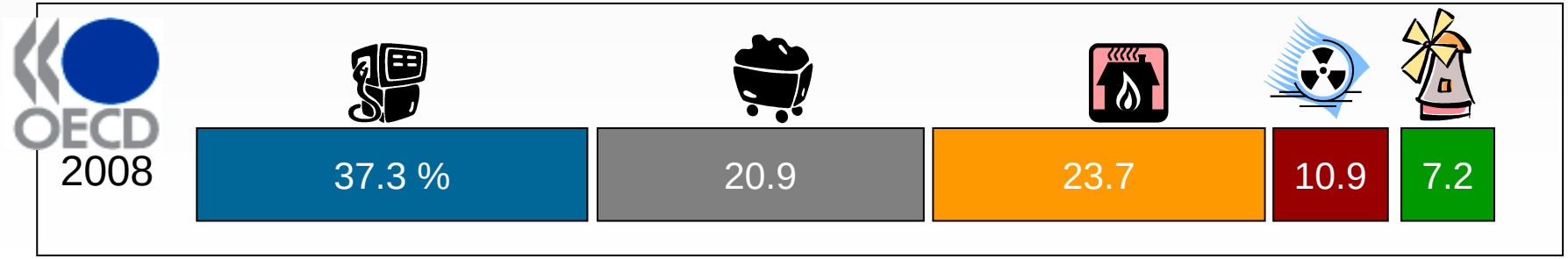
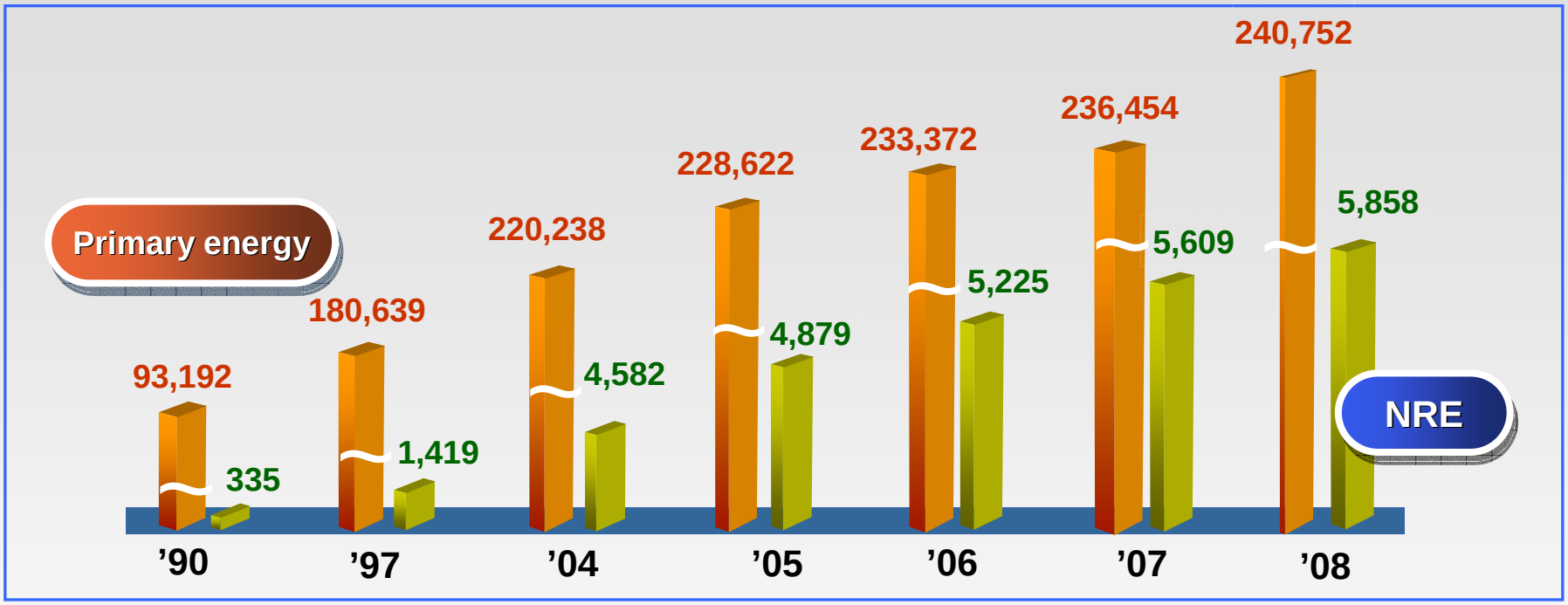
Source: KITA (Korea International Trade Association)

Domestic energy consumption





Growth rate in domestic NRE supply

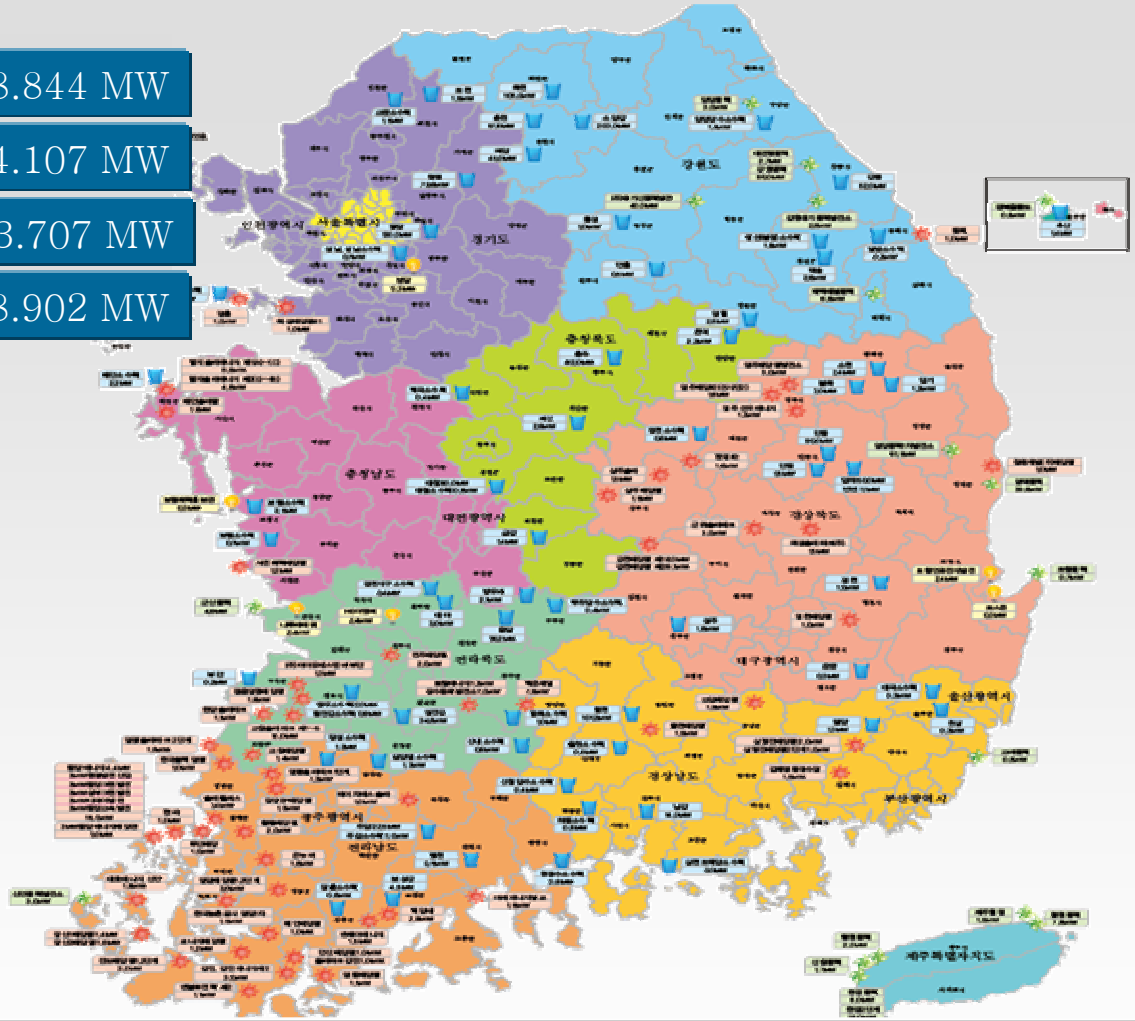


	'90	'97	'04	'05	'06	'07	'08
Primary energy	93,192	180,639	220,236	228,622	233,372	236,454	240,752
NRE	335.3	1,419.0	4,582.4	4879.2	5,225	5,609	5,858
Percentage	0.40	0.79	2.08	2.13	2.24	2.37	2.43

❖ in 1,000 toe, including macro-hydro power from '03

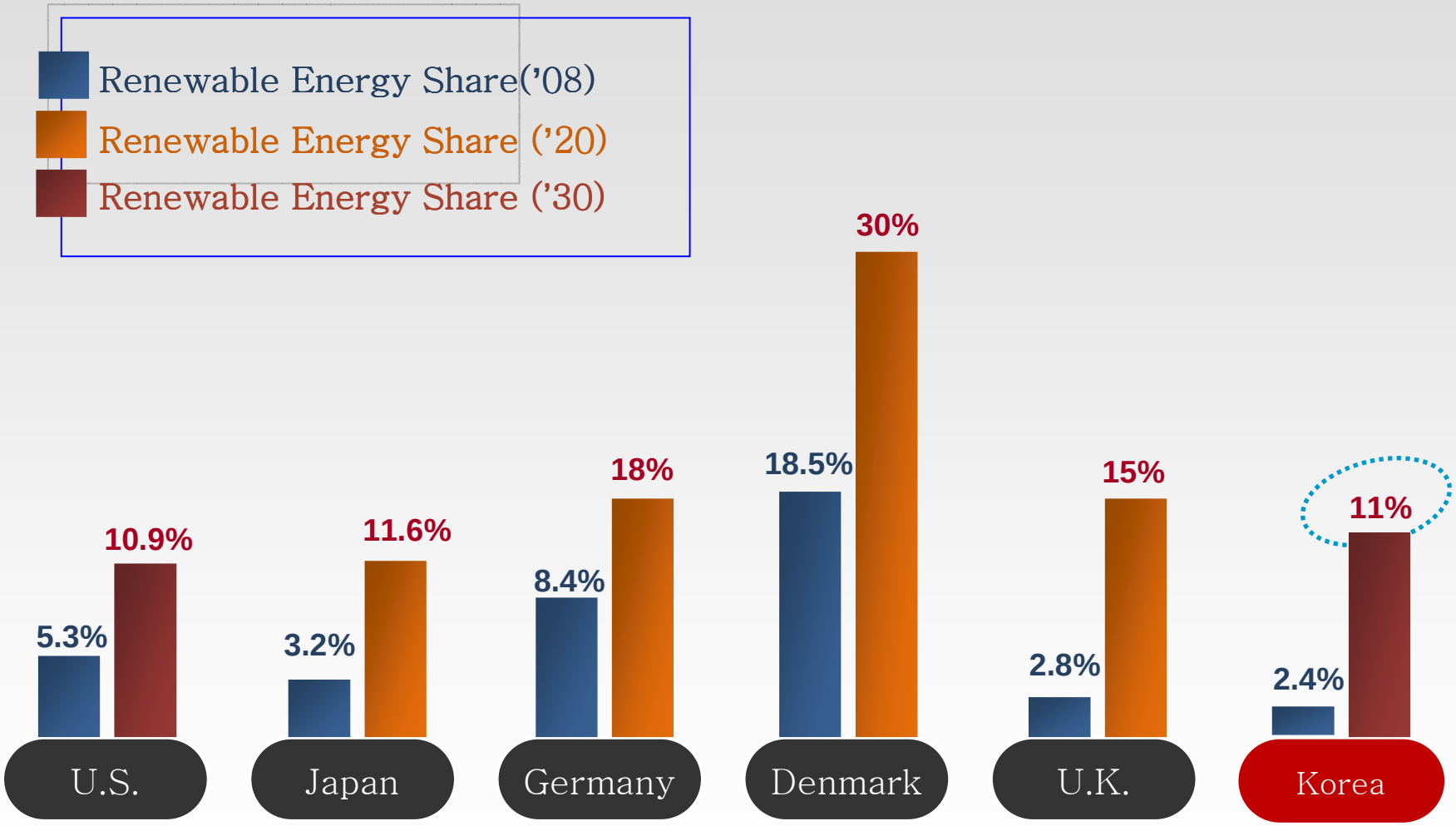
Power generation(2009)

Photovoltaic	368.844 MW
Wind	304.107 MW
Water	1.603.707 MW
Fuel cells	8.902 MW



	서울	부산	대구	인천	광주	대전	울산	경기	강원	충북	충남	전북	전남	경북	경남	제주
태양광	4.547	2.585	3.240	2.847	5.125	1.733	1.915	12.646	5.732	5.108	25.848	56.587	139.575	66.281	19.833	3.242
풍 력	0.101	0.753	0.007	0.002	0.001	0.200	0.002	0.024	154.073	0.008	0.073	7.908	3.310	102.748	0.793	34.178
수 력			0.139	3.000			0.550	203.285	502..970	509.394	7.592	69.703	32.334	154.375	120.425	
연료전지	0.293	0.003	0.008	0.002	0.253	0.008	0.002	0.271			0.307	4.800		2.950	0.005	

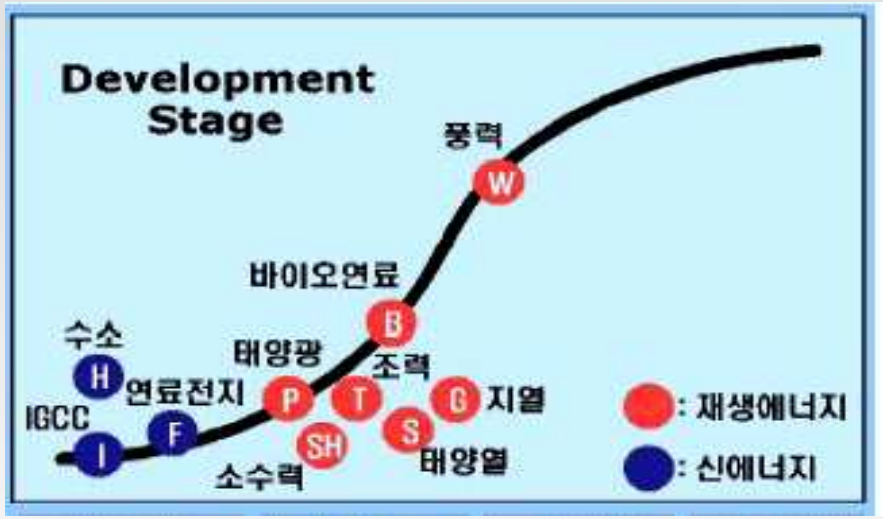
National deployment target



* Reference : : Energy Balance of OECD Countries('09), IEA

Domestic and international markets

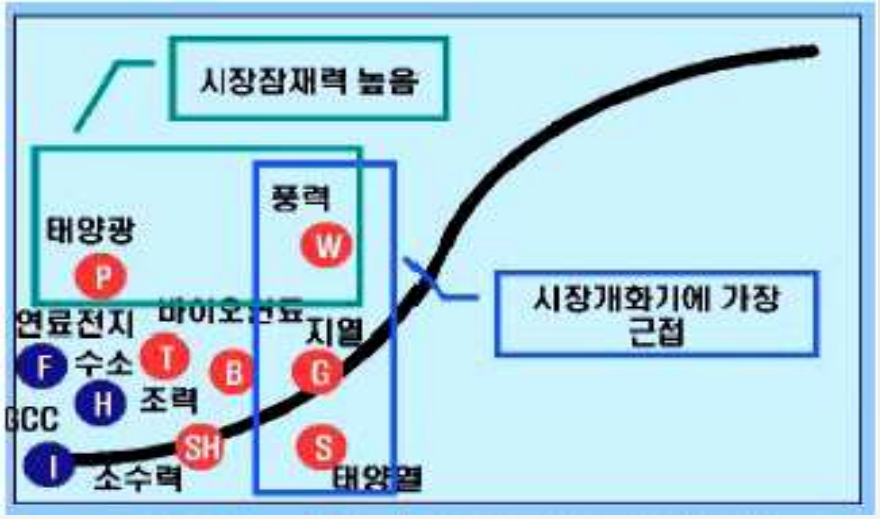
Global



Market preparation	Market development	Market growth	Market maturing

- Beginning to enter the market growth phase for wind power only
- Governments are offering incentives in the solar power field
- Technological immaturity for micro-hydro and tidal power
- For the hydrogen fuel cell and IGCC fields, most countries are in the research and development phase,
- and only a small group of products have exploited niche markets.

Korea



Market preparation	Market development	Market growth	Market maturing

- Market preparation phase in all fields
- Government policies to expand market for wind, solar and geothermal power
- Although the market potential is obvious for solar power, it solely relies on government support and has not entered into the market development phase.

Source: Samsung Economic Research Institute

New & Renewable Energy Policy

Relative legislation & strategy

Legal Framework on Low-Carbon, Green Growth

Legal Framework on Energy

New and Renewable Energy Act

- Effective : 2008~2030
- Target : Technology development and increase of RE use
- Details
  - Budget of 92.9bil US dollars
  - Draw and Implement a roadmap
  - 1 million green homes, RPS, RFS and Fund raising and institutional improvements
  - Industrial regulartories and promotion

Energy Use Rationalization Act

- Effective: 2008~2012
- Target : Management of national energy demand
- Details
  - National energy efficiency to be improved by 11.3% by '12
  - Create markets for high-efficiency products
  - Energy efficiency goal monitoring

Green Growth Strategies

Minimize use of resources

- Industrial structure reorganized for low energy consumption
- Efficient use of energy

New engine of growth

- Green technology R&D and investment
- Develop NRE industries

Minimize CO_2 emission

- Increase the use of NRE
- Develop cleaner energy sources

Legal framework on NRE

Promotion Act on Development, Use, Deployment of New and Renewable Energy

New energy

Conventional fossil fuels processed and used as cleaner sources
(fuel-cells, CTL, IGCC, Hydrogen)

Renewable energy

Transform natural resources such as sunlight, water, geothermal, rainwater, and biomass into usable energy sources
(PV, Solar-thermal, bio, wind, micro-hydro, geothermal, marine, waste)

Summary

Master Planning (Art. 5)

Plans for 10-year or longer terms, technological development, deployment goals, policy instrument, support program etc.

Mandatory Use (Art. 12)

When the federal or local government or a public organization constructs when expands or remodels a 3,000 m^2 or larger building, more than 5% of the total construction cost is required to invest in renewable energy facilities

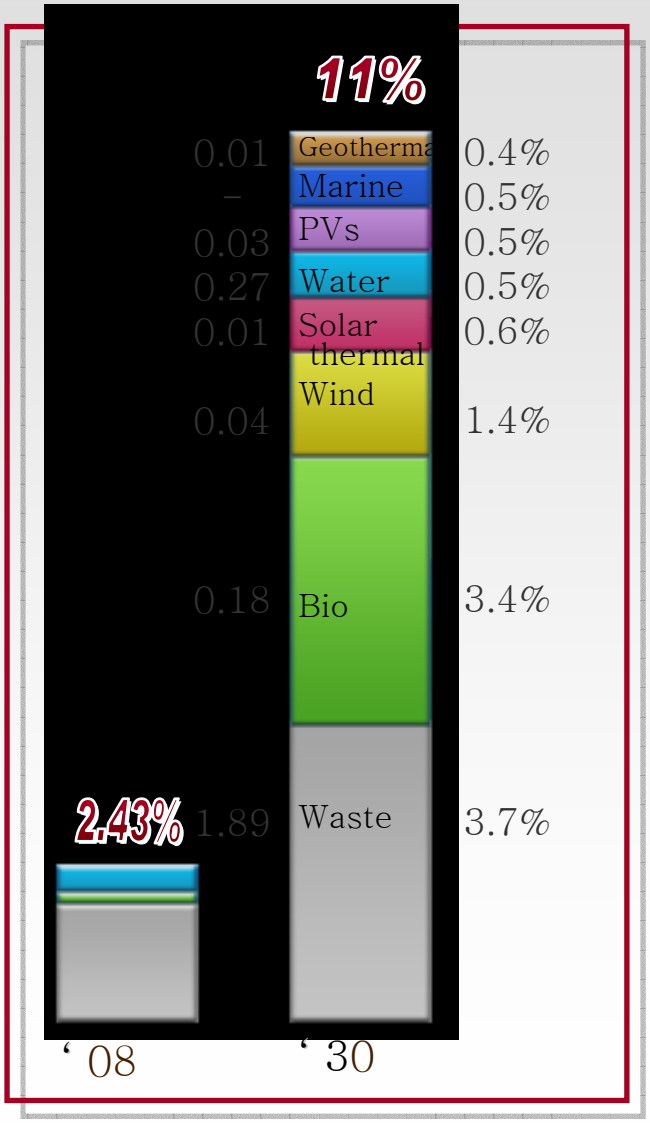
Miscellaneous

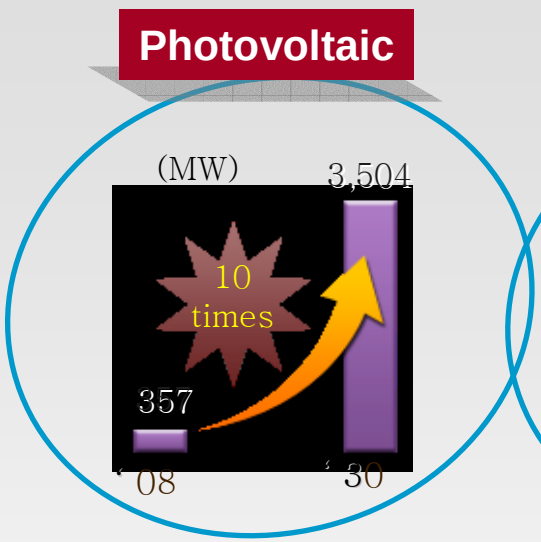
Equipment Certification (Art. 13), FIT System(Art. 17), Registration of Specialized Contractors (Art. 22), Statistics (Art. 25),Deployment projects (Art. 29), Training and Publicity (Art. 30), New and Renewable Energy Center (Art. 31)

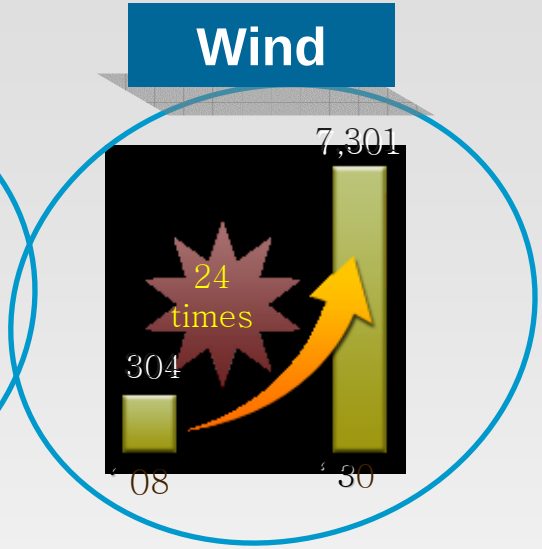
Categories of NRE

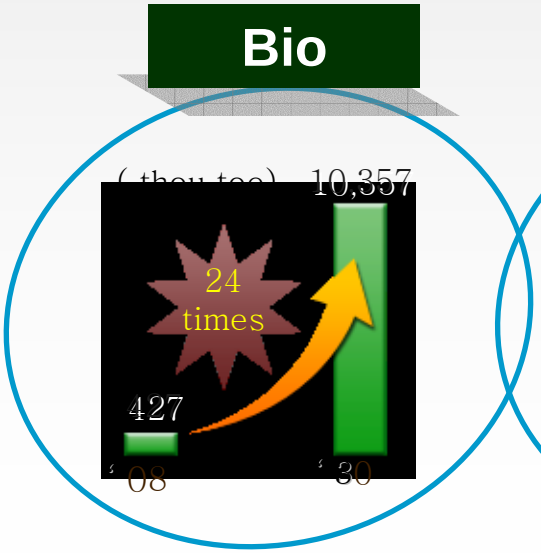
	IEA	EU	US	Japan	Korea
1. Solar	O	O	O	O	O
2. Wind	O	O	O	O	O
3. Water	O	O	O	O	O
4. Geothermal	O	O	O	O	O
5. Marine	O	O		O	O
6. Landfill gas	O	O	O		O
7. Biomass	O	O	O	O	O
8. Waste	O	O	O		O
9. Hydrogen					O
10. Fuel cells				Innovative energy	O
11. IGCC, CTL					O
Unutilized energy				O (river water, snow ice)	

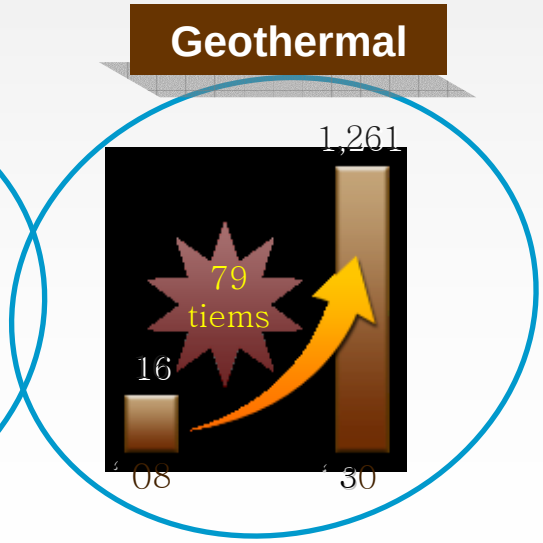
Long-term targets for NRE deployment



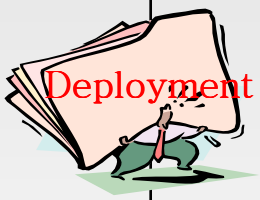


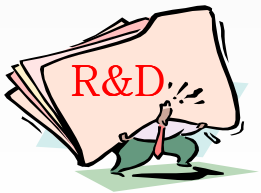






Investment volume





	2010	2015	2020	2030
Solar thermal	440	2,381	6,964	19,165
Hot water	440	1,697	4,699	16,168
Power Generation	-	685	2,265	2,996
Solar	8,644	5,546	6,975	9,567
Wind	3,073	4,061	3,686	3,174
Water	345	323	308	562
Bio	3,955	3,542	5,870	7,892
BIomass	2,489	910	3,177	4,748
BD	85	113	295	354
BE	253	107	101	160
Biogas	969	2,266	2,159	2,656
LFG	159	146	138	64
Geothermal	2,509	5,030	5,669	9,937
Marine	2,401	5,316	1,815	-
Waste	5,776	9,942	12,739	10,763
RDF	2,690	6,907	9,739	7,828
Combustable	3,086	3,036	3,000	2,936
Sub Total	27,143	36,142	44,028	61,151
R&D	6,000	9,000	6,500	3,700
Total	33,143	45,142	50,528	64,851

3rd national NRE plan

(Unit : 100mil won)

New & Renewable main tasks

NREC (New and Renewable Energy Center)

Statutory Ground

1987 : The Alternative Energy Development Act promulgated
2005 : The New and Renewable Energy Center was established,
an affiliate of Korea Energy Management Corporation (Article. 31)

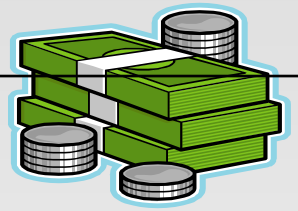
Function

- Certification
- Technical Support
- Human Resource Capacity Building

- Laws and Regulations
- Information and Statistics
- Stimulus Funding Management
- International Collaboration

- Deployment Programs (A Million Green Homes)
- F-I-T
- Mandatory Public Use
- Loan/Tax incentive

Budget of NREC



	2007	2008	2009	2010
Infrastructure	32	37	41	37
Subsidies Program	1,401	3,081	1,801	1,802
FIT	270	1,266	2,392	2,636
Loans	1,214	1,803	1,303	913
Total	2,917	6,187	5,537	5,388

(Unit : 100mil won)

Main activities

Deployment Support

General Subsidy

- (1994~), Factories, Individual Buildings, School etc
- Government50%+ Individual50%, 2010(14,000mil won)

Local Deployment

- (1996~), public buildings, social service facilities etc
- Government50%+ Local50%, 2010(70,000mil won)

1 Million Green Homes

- (2009~), residential house, aprtment house etc
- Government50%+ Individual50%, 2010(96,200mil won)

Loan/Tax

- 1980~ , Installation/Operation Loans (10,000mil won)
- '09(13,030 mil won), '10(9,130 mil won)
- Tax deduction for 20% of total investment and tariff (customs duties) cut by 50% in 7 areas (Solar thermal, PV, Wind, Hydrogen fuel cells, Bio, Marine) for 81 products

Main activities

Int'l Cooperation Activities

- **APP/REDGTF** (Asia Pacific Partnership on Clean Development and Climate)
- Collaborative projects in IPHE (International Partnership for the Hydrogen Economy)
- Collaborative projects in CERT/IEA (Committee on Energy Research and Technology)
- Activities of APEC/EGNRET (Expert Group on New and Renewable Energy Technology)
- Activities of IRENA (International Renewable Energy Agency)

Infrastructure building

- Facility Certificate Scheme(546 models in 25 items)
  - Designated as a state-recognized product certification organization (July. 2006) from KAS (Korea Accreditation System)
  - Designated as a national certification body for PV (Dec. 2008) from IEC (Int'l Electrotechnical Commission)

- Renewable Energy Service Companies(2005~), Exhibitions, An Integrated NRE Information Service System (Nov. 2010)
  - Number of RESCOs : 4,460 (Mar, 2010)

Main activities

Mandatory Use for Public Buildings

- (2004~) New and extended or remodeled buildings
- Buildings exceeds 3,000m^2
- Invest in NRE facilities more than 5% of total construction cost

- (2011~) New and extended or remodeled buildings
- Buildings exceeds 1,000m^2
- Invest in NRE facilities more than 5% of total energy load

Infrastructure

- (2012~) Renewable Fuel Standard : 2012(~3%), ~ 2020(~7%)

Certification for Green Buildings

- (2010~) Grants and other incentives for NRE facilities in Buildings
- Certain size or larger

FIT

- 2002~

RPS

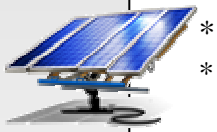
- Increase the regulatory quota
- 2012(2%)~2022(10%)

New & Renewable Energy Industry

Korea's main issues in NRE industry

Building NRE industrial infrastructure by increasing the government support and strengthening its market competitiveness

* R&D budget(100 Mil Won) : ('07)1,326→ ('08)2,088 →('09)2,195→('10)2,527



- The Participation of Semiconductor · Display conglomerates

  Poly silicon → Ingot · Wafer → Cell → Module → System : Value chain formation

* The Government's Support for PV industry (FIT, R&D etc) → Industrial Development
* Appropriate Si solar cell price and efficiency improvement,
  Investment in next solar cell (TF/DSSC etc.) & technology development
* Steady Increase in Material, Cell and Module Export : OCI(p-Si), Hyundai (Cell), S-Energy(module) etc.

- **Increasing market penetration in component and system areas, Investment in shipping and heavy industries and Development of large capacity generators**

* Major shipbuilding Co.'s participation('09) : Acquisition activities (STX, DSME, Samsung etc.)
* Export-oriented industrialization in Wind industry : Ontario Canada (2.5GW, KEPCO/Samsung), Pakistan (50MW, Hyundai), Eastern Europe (220MW) and Holland (50MW, STX Wind power) etc.

- **Facilitating Initial Industrialization with technological development and demonstration**

* Building : Complete in Monitoring program(210), Deployment promotion by 1 million Green homes plan
* Plant : Localization of technical know-how & Promotion of core technology development (POSCO power, Doosan Heavy Industries)
* Transport : 2nd phase pilot project (Application into 200 vehicles) to 2012 → Pilot Deployment (Hyundai Motor)

Status of domestic manufacturers

	2008	2009	2010(E)
Number of Companies	113 PV(45), Wind(20)	146 PV(61), Wind(24)	
Total Sales (1,000bil won)	3.1 PV(1.5), Wind(1.2)	4.0 PV(2.4), Wind(1.1)	8.1 PV(5.4), Wind(1.8)
Overseas Sales (1,000bil won)	2.3 (1.8bil USD) PV(1.1), Wind(1.3)	2.7(2bil USD) PV(1.7), Wind(0.94)	5.5(4.6bil USD) PV(4), Wind(1.5)
Employment (thou)	6.4 PV(3,620), Wind(1,783)	9.1 PV(5,587), Wind(2,301)	11.7 PV(7,572), Wind(2,668)
Investment volume (1,000bil won)	2.7 PV(2.2), Wind(0.4)	3 PV(2.3), Wind(0.5)	4 PV(2.6), Wind(1.1)

Domestic manufacturer's performance in 2009

	Number Of Companies	Total Sales (100mil won)	Domestic Sales (100mil won)	Overseas Sales (100mil won)	Employment
PV	61 (42%)	23,765 (59%)	6,761 (49%)	17,004 (64%)	5,587 (61%)
Wind	24 (16%)	10,340 (26%)	928 (7%)	9,412 (35%)	2,301 (25%)
Bio	32 (22%)	4,787 (12%)	4,597 (34%)	190 (1%)	545 (6%)
Solar thermal	13 (9%)	301 (1%)	300 (2%)	0.8	265 (3%)
Geo thermal	9 (6%)	293 (1%)	293 (2%)		185 (2%)
Fuel cell	7 (5%)	789 (2%)	789 (6%)		268 (3%)
	146	40,275	13,668	26,607	9,151

FIT (Feed in Tariffs)

2002 ~ 2009

Generation Capacity (kW)	852,237
Share in TPES(%)	0.3

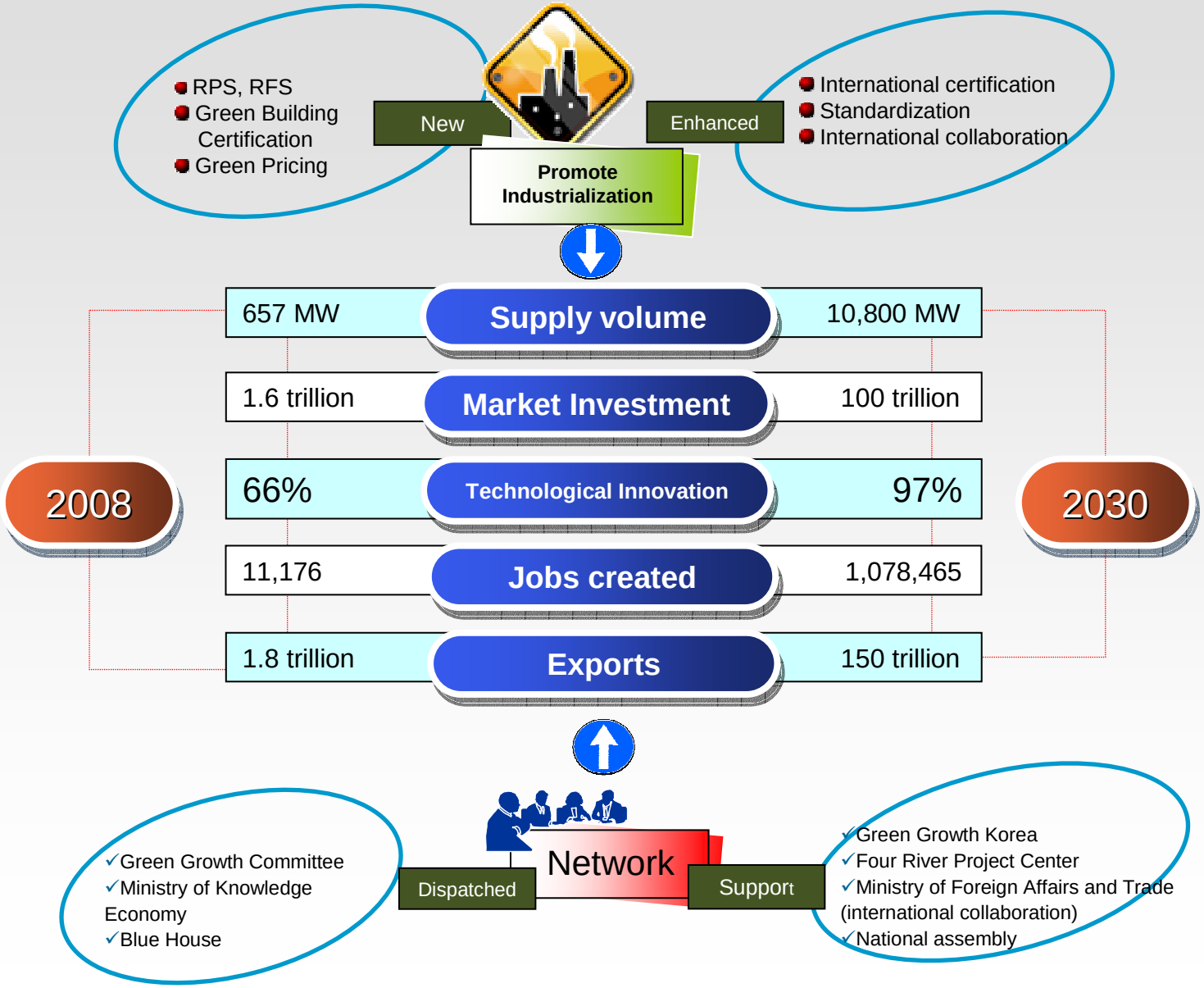
2.18

RPS (Renewable Portfolio Srandard)

2012

Generation Capacity (kW)	1,860,000
Share in TPES (%)	1.0

Prospect for industrial infrastructure



Korea Energy Management Corporation
New and Renewable Energy Center

Our future is in our hands and this is both a responsibility and obligation which we cannot afford to fail.