

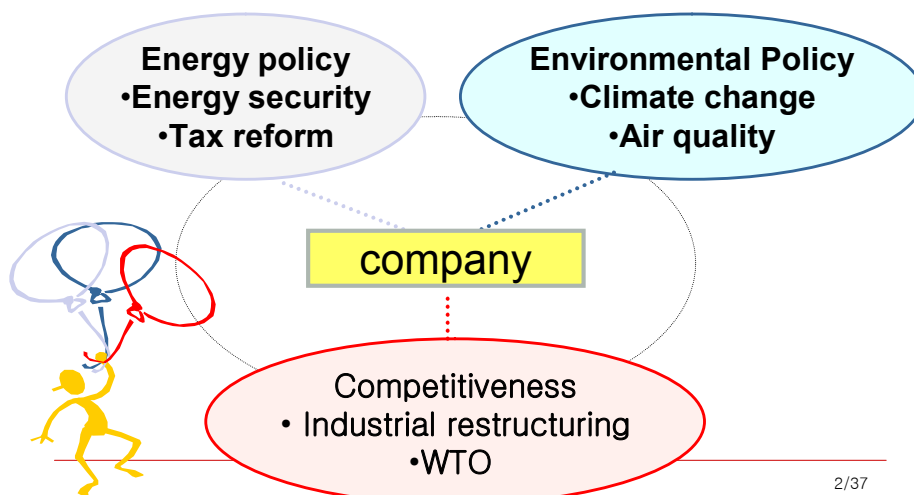
MAREKT BASED CLIMATE REGIME AND LOW CARBON SOCIETIES: Natural Gas Industry Perspective

Prepared for the APP-CFE TF Workshop

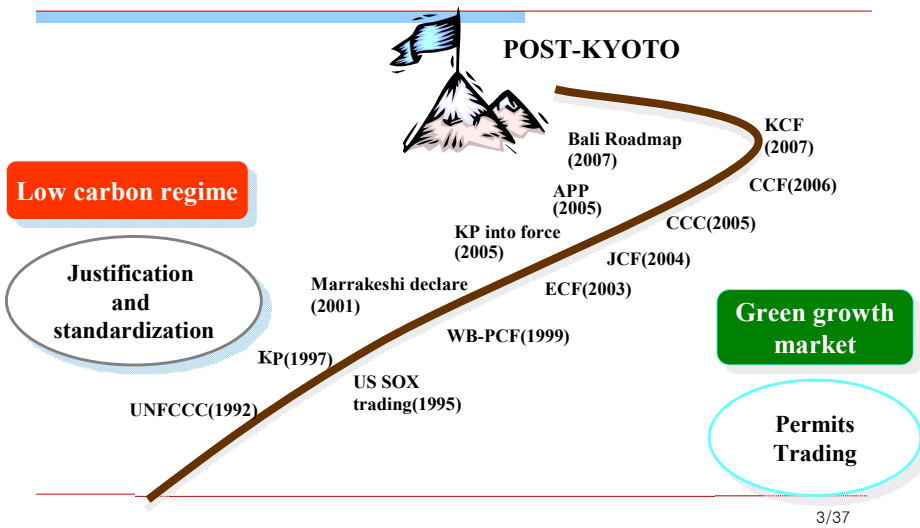
2009. 3. 31.

Hyo-Sun Kim
Senior Economist
Korea Gas Corporation

UNCERTAINTIES AND RISKS

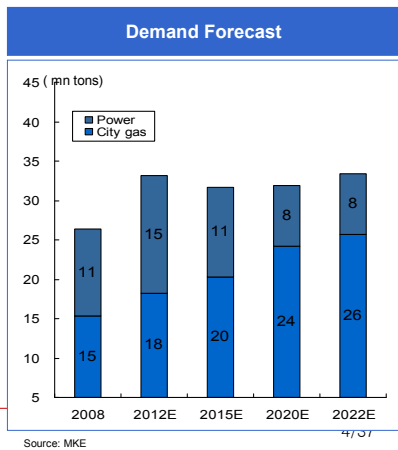
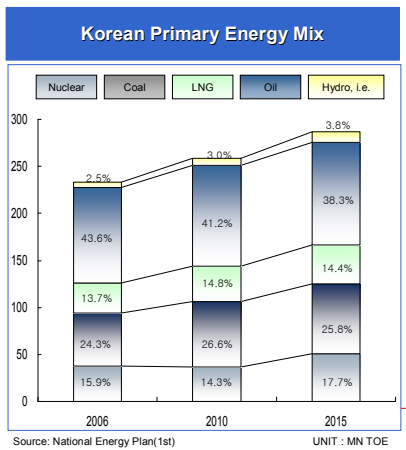


Toward Low Carbon, Green Growth



Core Biz - LNG Demand in Korean Energy Market

- LNG demand expected to increase at 5.9% of CAGR from 2008 to 2012, 2.7% to 2015
- LNG for power sector grows at 8.0% of CAGR from 2008 to 2012, 0.5% to 2015
- Nuclear and renewable energy sources influence on LNG demand growth



IMPACT OF POST-KYOTO: CGEM-CGE

Modeling

- Model : Dynamic Global CGE (2000~2050)
- countries
 - Annex I & Non Annex I
- industries
 - Energy sector : gas, oil, coal, petrochemical, electric
 - Energy users: manufacturing, energy-intensity industr
 - Backstop -technology : new energy
- data (GTAP 6)
 - 87 regions, 57 industries, 57 X 87 trade balance
 - energy data (by industry, by region)
- energy demand forecast by BP

SCENARIO	DEFINITION
SCN1	CARBON TAX BASED TARGET APPLIED TO ALL
SCN2	SEGREGATE CARBON MARKET(ANNEX I & NON-ANNEX I)
SCN3	SECTORAL APPROACH

countries		industries	
Code		Code	
KOR	Korea	S01	COAL
CHN	China	S02	OIL
USA	United States	S03	GAS
RUS	Russian Federation,	S04	PETC
	Rest of Former Soviet Union	S05	ELEC
EU	Austria, Belgium, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Bulgaria, Cyprus, Czech Republic, Hungary, Malta, Poland, Romania, Slovakia, Slovenia, Estonia, Latvia, Lithuania	S06	IRON
		S07	CEMT
		S08	SEMI
		S09	AUTO
		S10	PAPE
		S11	CHEM
JAC	Japan, Australia, Canada	S12	TRNS
OECD	Indonesia, Mexico, Venezuela, Rest of Middle East, Rest of North Africa	S13	AGRE
IND	India	S14	SEVS
ROW	All Other Regions	S15	OTHS

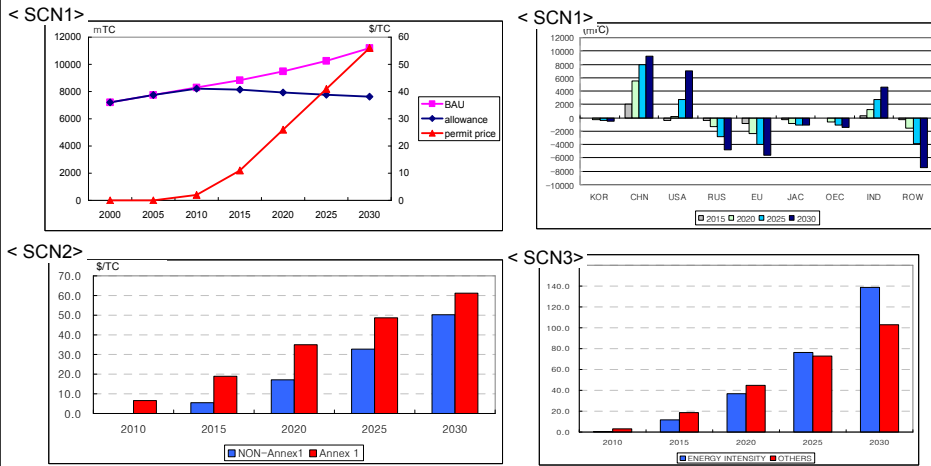
IMPACT OF POST-KYOTO: CGEM-CGE

Energy growth by region (BAU)

		2000	2005	2010	2015	2020	2025	2030	
coal	KOR	1.000	1.026	1.085	1.102	1.136	1.170	1.207	
	CHN	1.000	1.048	1.072	1.095	1.120	1.144	1.168	
	USA	1.000	1.047	1.086	1.128	1.160	1.192	1.227	
	RUS	1.000	0.995	0.985	0.954	0.923	0.895	0.866	
	EU	1.000	0.984	0.992	0.992	0.992	0.992	0.992	
	JAC	1.000	1.026	1.105	1.131	1.170	1.211	1.254	
	OECD	1.000	1.024	1.048	1.072	1.096	1.120	1.145	
	IND	1.000	1.149	1.293	1.386	1.499	1.622	1.755	
	ROW	1.000	1.104	1.226	1.393	1.529	1.685	1.869	
		KOR	1.000	1.063	1.125	1.200	1.283	1.372	1.468
oil	CHN	1.000	1.255	1.589	2.000	2.532	3.206	4.059	
	USA	1.000	1.080	1.162	1.214	1.253	1.295	1.337	
	RUS	1.000	1.158	1.359	1.536	1.713	1.910	2.129	
	EU	1.000	1.024	1.044	1.062	1.079	1.098	1.116	
	JAC	1.000	1.058	1.115	1.193	1.277	1.365	1.461	
	OECD	1.000	1.083	1.167	1.229	1.313	1.401	1.497	
	IND	1.000	1.254	1.492	1.794	2.159	2.599	3.128	
	ROW	1.000	1.183	1.367	1.565	1.798	2.066	2.375	
		KOR	1.000	1.137	1.255	1.295	1.393	1.498	1.612
	CHN	1.000	1.715	2.191	2.381	2.619	2.881	3.169	
gas	USA	1.000	1.091	1.198	1.272	1.340	1.411	1.486	
	RUS	1.000	1.140	1.283	1.400	1.537	1.687	1.852	
	EU	1.000	1.226	1.456	1.717	1.987	2.299	2.660	
	JAC	1.000	1.147	1.295	1.353	1.501	1.664	1.844	
	OECD	1.000	1.188	1.188	1.249	1.312	1.378	1.447	
	IND	1.000	1.542	2.250	3.042	4.000	5.260	6.918	
	ROW	1.000	1.539	2.140	2.860	3.736	4.887	6.400	

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Permit trading



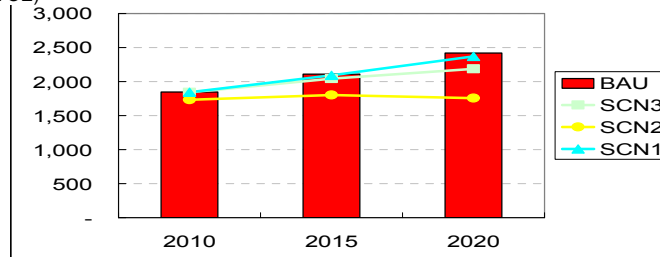
IMPACT OF POST-KYOTO: CGEM-CGE

Natural gas demand in global

(unit : % from BAU)

SCN1	KOR	CHN	USA	RUS	EU	JAC	OEC	IND	ROW
2010	-0.23	-0.23	-0.11	-0.27	-0.14	-0.1	-0.3	-0.31	-0.21
2015	-0.48	-1.03	-0.17	-2.04	-0.27	-0.2	-0.92	-1.47	-0.63
2020	-0.85	-2.22	-0.24	-5.58	-0.48	-0.36	-1.89	-3.3	-1.47

(unit : MTOE)



CONTRIBUTION OF NATURAL GAS TO LOW CARBON IN KOREA: PAST

year	Replacing coal		Replacing heavy oil	
	Reduction share	Reduction (1000TC)	Reduction share	Reduction (1000TC)
1986	0.06%	30	0.03%	17
1990	1.73%	1,276	0.98%	719
1995	3.19%	3,888	1.82%	2,193
2000	5.23%	7,986	3.02%	4,504
2001	5.56%	8,772	3.22%	4,947
2002	5.89%	9,748	3.41%	5,498
2003	6.06%	10,210	3.51%	5,758
2004	6.89%	11,964	4.01%	6,748
2005	7.19%	12,810	4.18%	7,224
2006	7.40%	13,506	4.31%	7,617

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Contribution of Gas Supply to Green Growth Economy

year	Replacing 100% of coal		Replacing 100% of B-C	
	Share of gas contribution to GHG reduction in overall	CO2 Reduction in overall (1000 tC)	Share of gas contribution to GHG reduction in overall	CO2 Reduction in overall (1000 tC)
2010	11.03%	20,519	8.67%	16,130
2015	13.62%	26,068	10.25%	19,628
2020	15.07%	30,312	11.06%	22,230
2025	14.30%	30,337	9.99%	21,198
2030	7.19%	16,202	2.48%	5,584

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