

Energy Demand and Supply Outlook in APEC Northeast Asia Case

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Asia Pacific Energy
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Outline

- Rationale for the Revision of the APEC Outlook
- Preliminary Outlook Result for Northeast Asia
 - **Overview of Assumptions**
 - **Final Energy Demand**
 - **Oil**
 - **Coal**
 - **Electricity**
 - **Gas**
- Implications
- Challenges



Rational for the revision of the APEC Outlook

New Developments since 2002

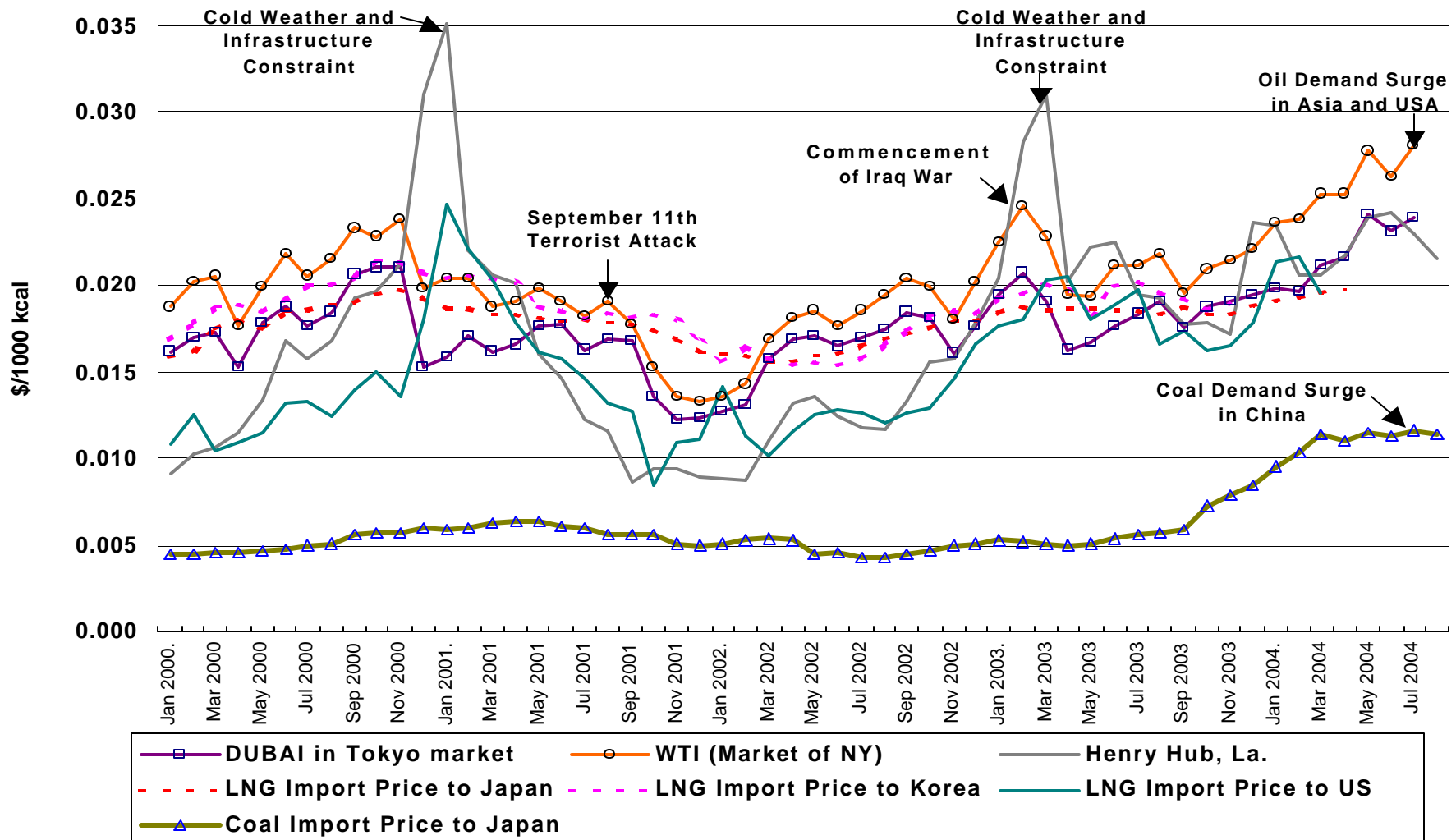
- High Energy Prices
 - Upward trend for coal, oil and natural gas prices
- Expanding Potential for LNG
 - Emergence of new importers such as USA, China, NZ, and Singapore
- Signs of Wider Application for New Technologies
 - Biofuel, Hybrid Vehicle, Wind, Photovoltaic
- Looming Concerns over Reserves

Factors Overlooked in the Previous Outlook

- Urbanisation as a Driver
- Water Supply as a Constraint



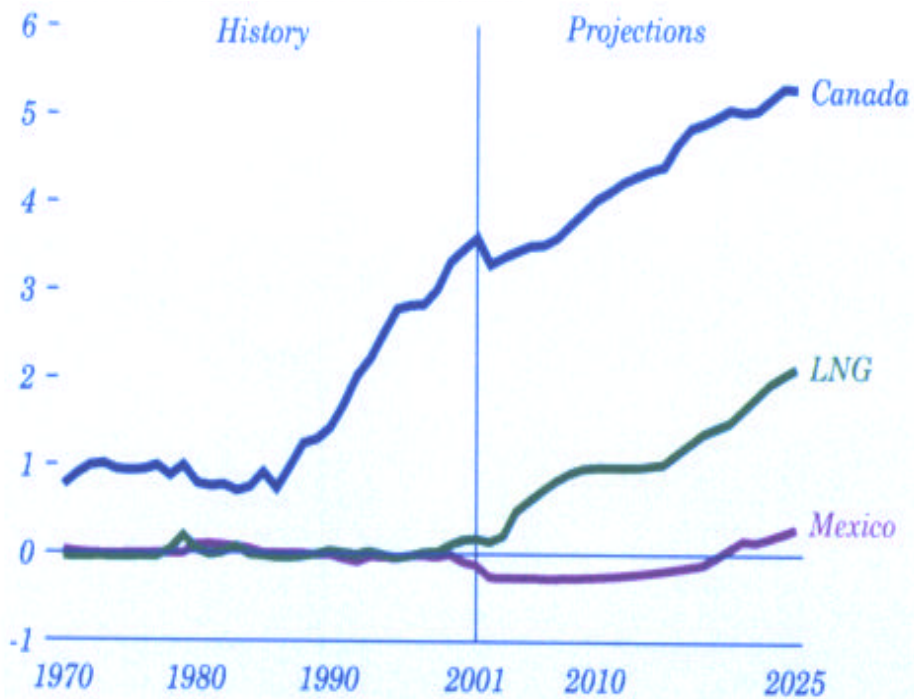
Energy Price Hike: Oil, Coal and Natural Gas: A Rule or an Exception?



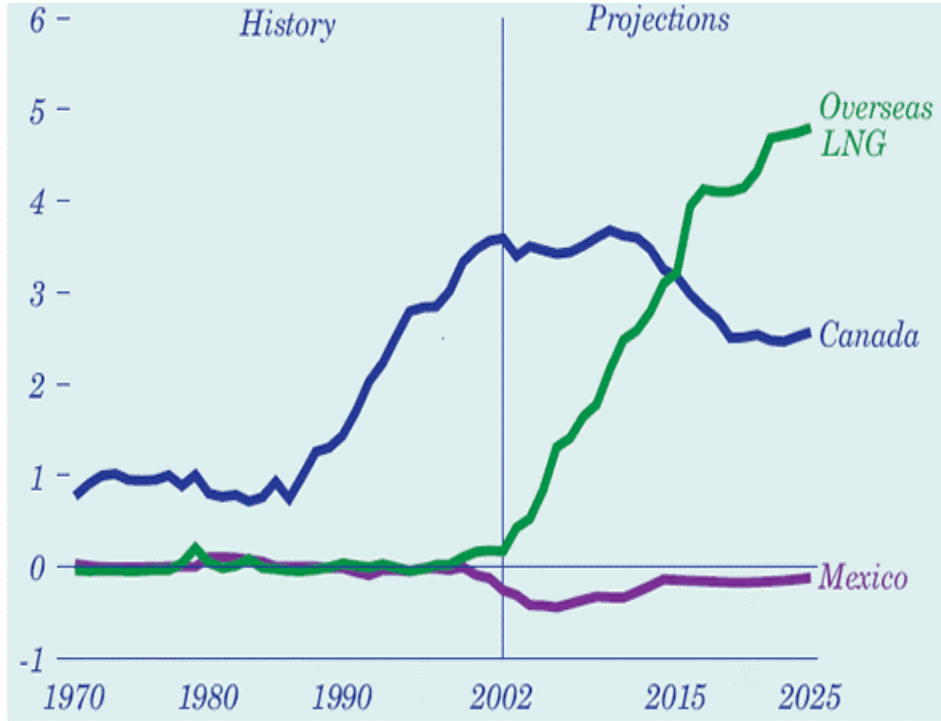


Expanding Potential for LNG: US Net Imports of Natural Gas, 1970-2025 (trillion cubic feet)

Annual Energy Outlook 2003



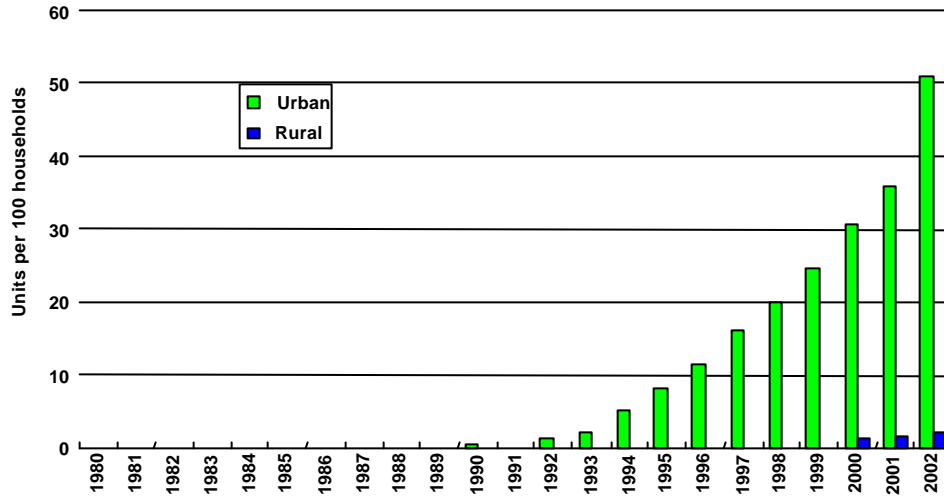
Annual Energy Outlook 2004



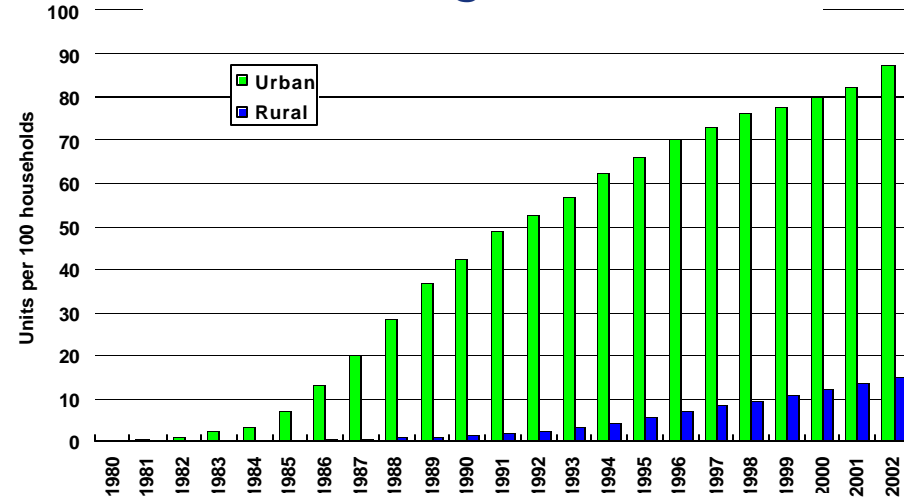


Number of Appliances in China: Urban and Rural

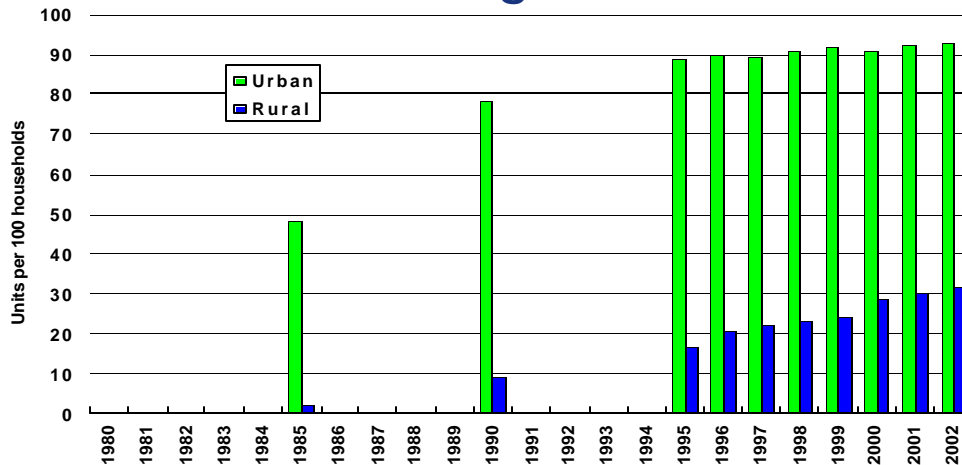
Air Conditioner



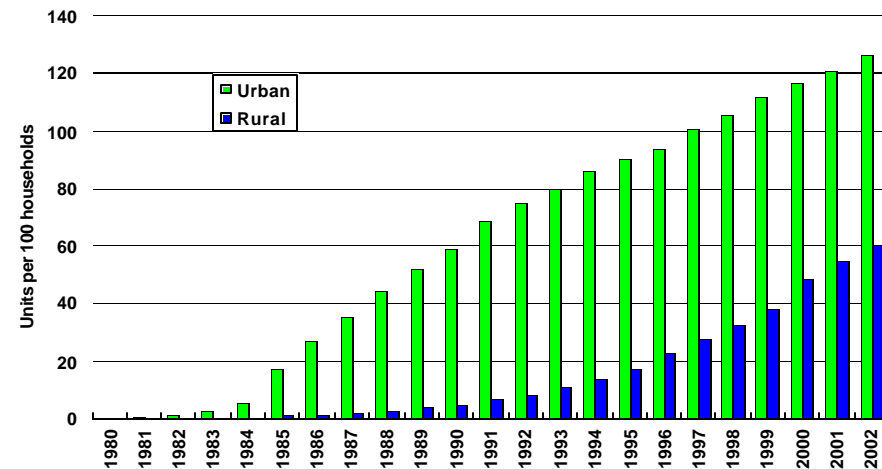
Refrigerator



Washing Machine



TV





Water Supply Constraint in China

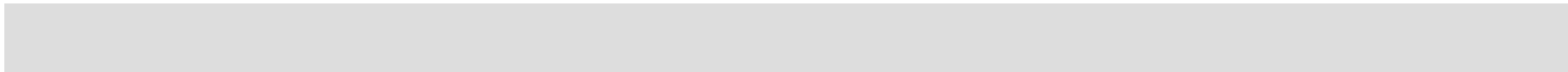
Unit: 100 million m³

	2000	Scenario 1			Scenario 2		
		2010	2030	2050	2010	2030	2050
Water Resources	566	580			580		
Usable Water Resources	380	380			380		
Total Water Demand	441	539	566	590	485	514	538
Agriculture	328	397	378	367	343	326	315
Industry	84	98	129	148	98	129	148
Household	29	44	59	75	44	59	75
Difference	-61	-159	-186	-210	-105	-134	-158

Source: Prof. Imura, Nagoya University



Preliminary Outlook Results for the Economies of Northeast Asia





Preliminary Outlook Result for the Northeast Asia

❖ Final Energy Demand

- Industry
 - Energy-Intensive Industries
 - Non-Energy Intensive Industries
 - Agriculture
- Residential
- Commercial
- Transport
 - Road
 - Marine
 - Air
 - Rail



An Overview of Assumptions

		China	HKC	Japan	Korea	Russia	CT
POP (Million)	2002	1,285	7	127	48	145	22
	2025	1,431	8	122	51	124	25
	% per year	0.5%	0.6%	-0.2%	0.3%	-0.7%	0.6%
GDP (Billion)	2002	5,494	197	3,275	662	1,658	441
	2025	23,920	491	4,678	1,586	4,183	1,044
	% per year	6.6%	4.1%	1.6%	3.9%	4.1%	3.8%
Income	2002	4,277	29,074	25,717	13,862	11,441	19,693
	2025	16,717	64,693	38,311	31,306	33,621	42,422
	% per year	6.1%	3.5%	1.7%	3.6%	4.8%	3.4%

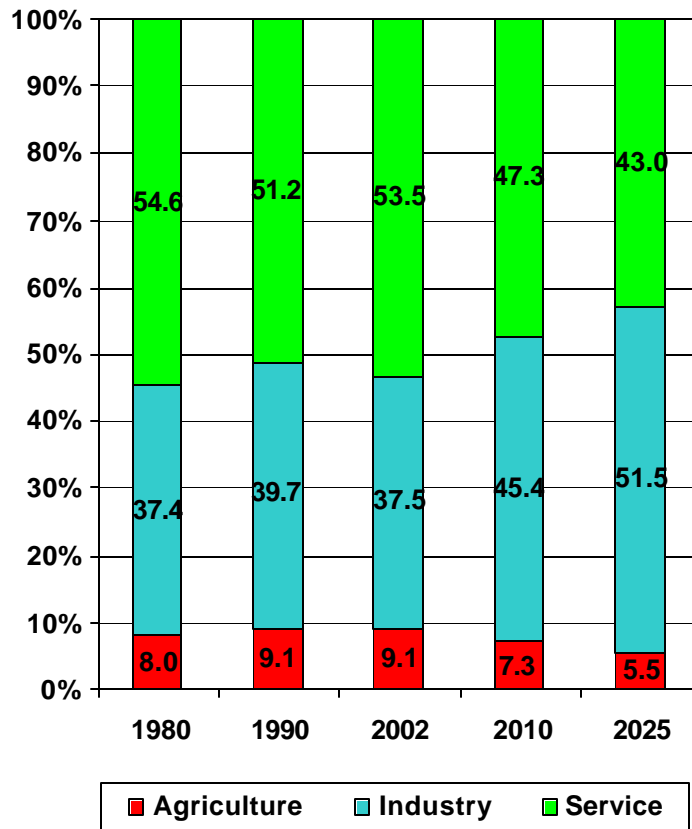
Note: Unit of GDP and Income are real 2000 US\$ PPP

Put US data to compare the trend.

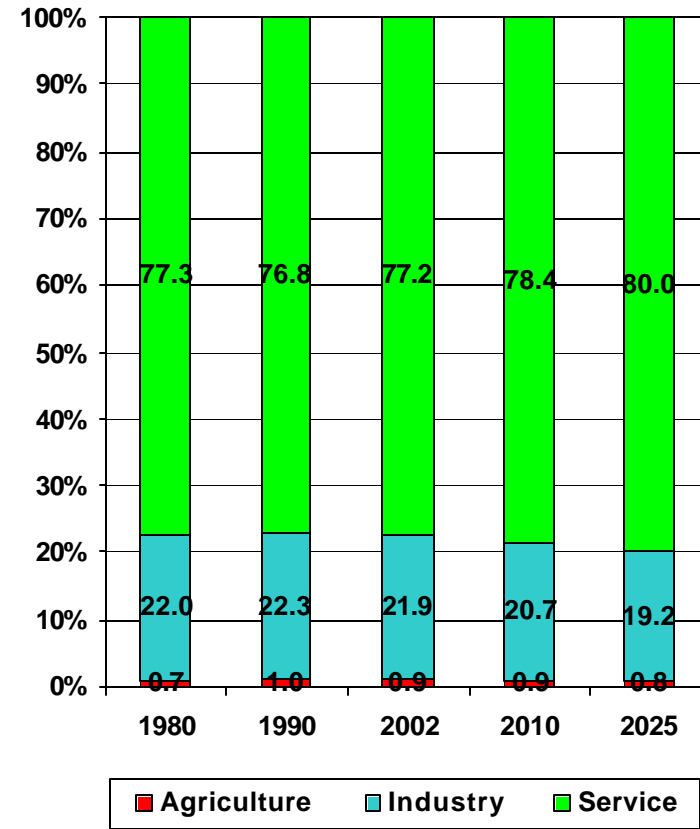


Industry Structure of Northeast Asia and USA

Northeast Asia



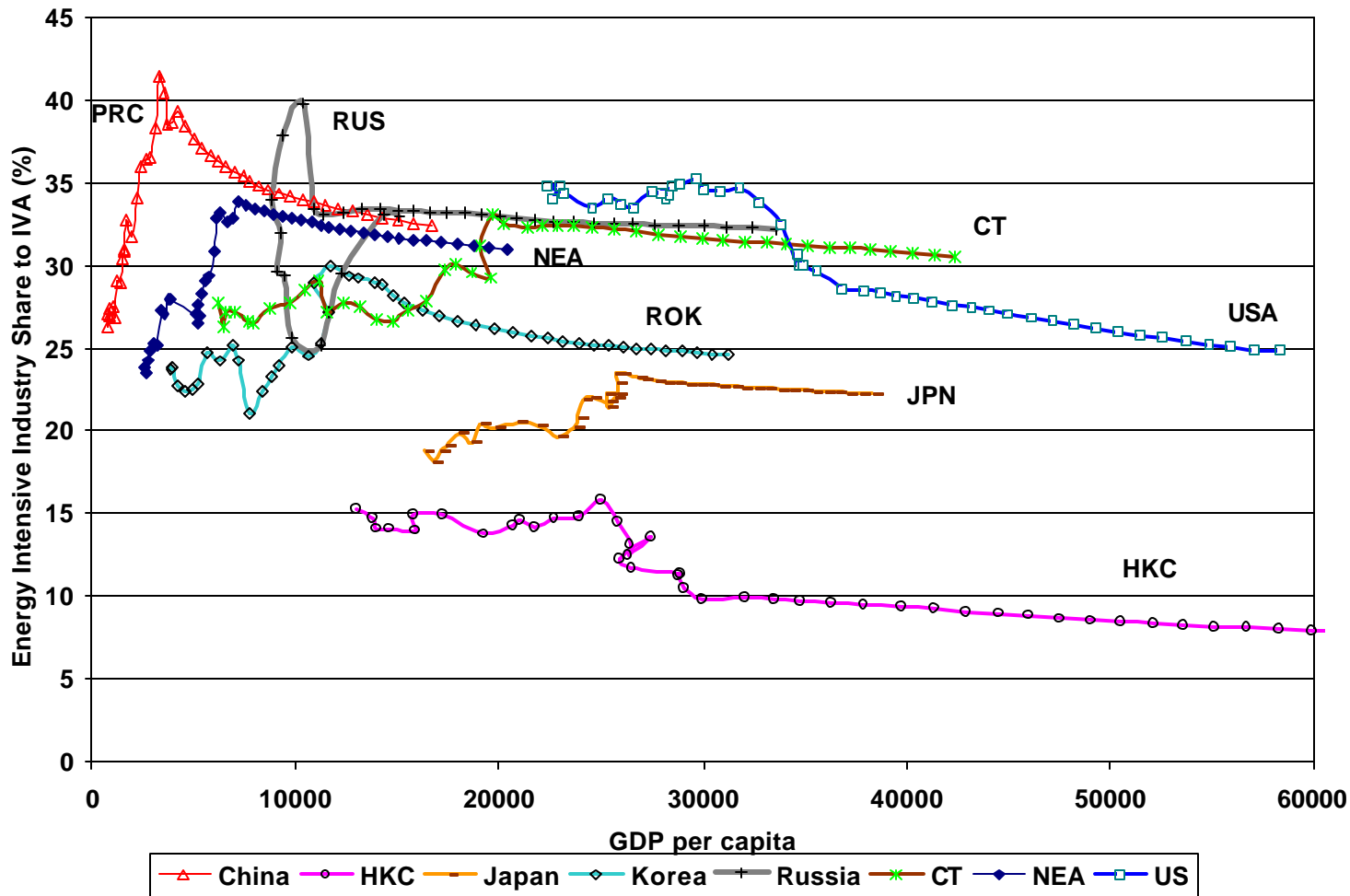
USA





Share of Energy Intensive Industry Value Added in Total Industrial Value Added

Declining share of energy intensive industries in total industrial value added.

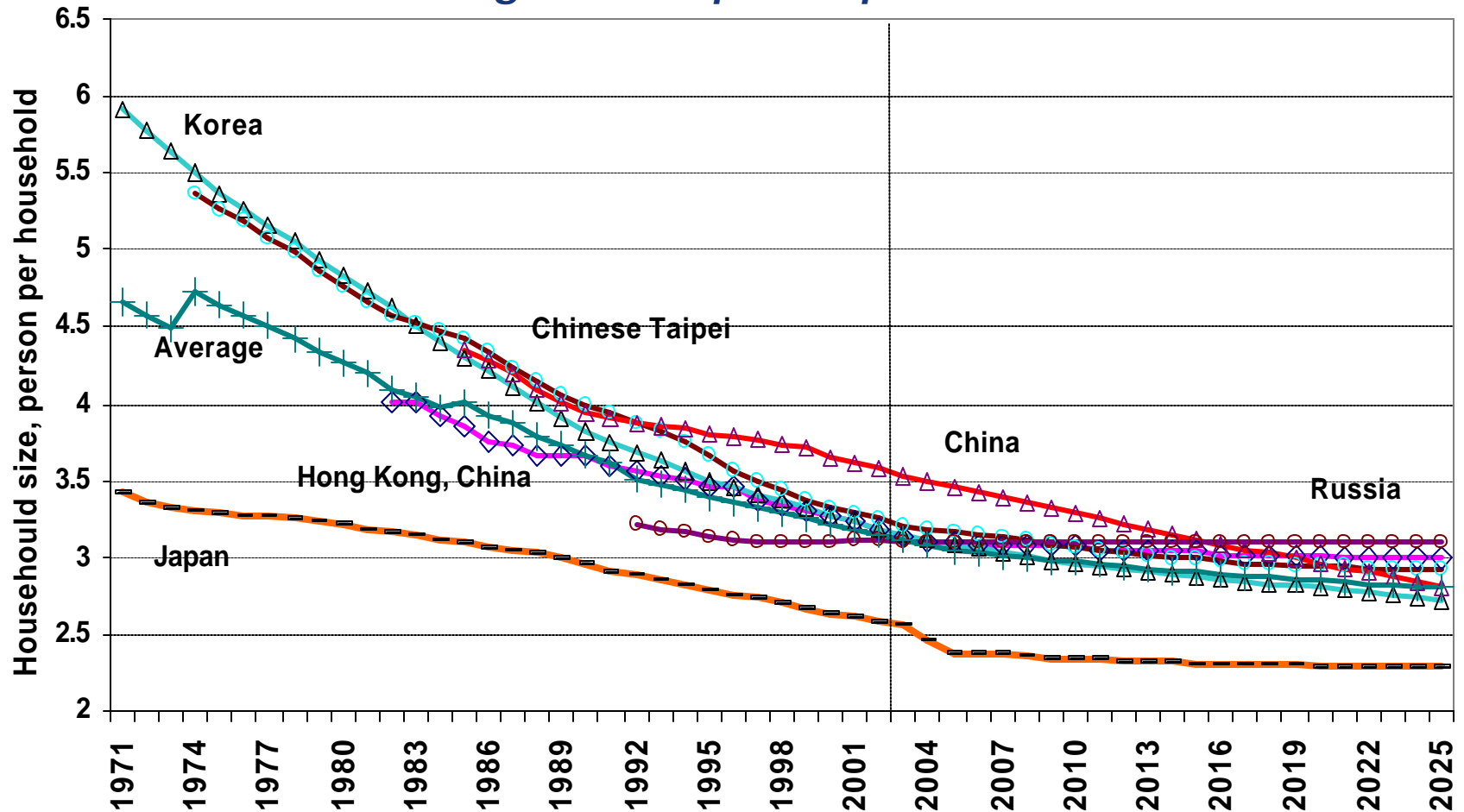


Source: Asia Pacific Energy Research Centre (2005)



Household Size

Declining trend for person per household.





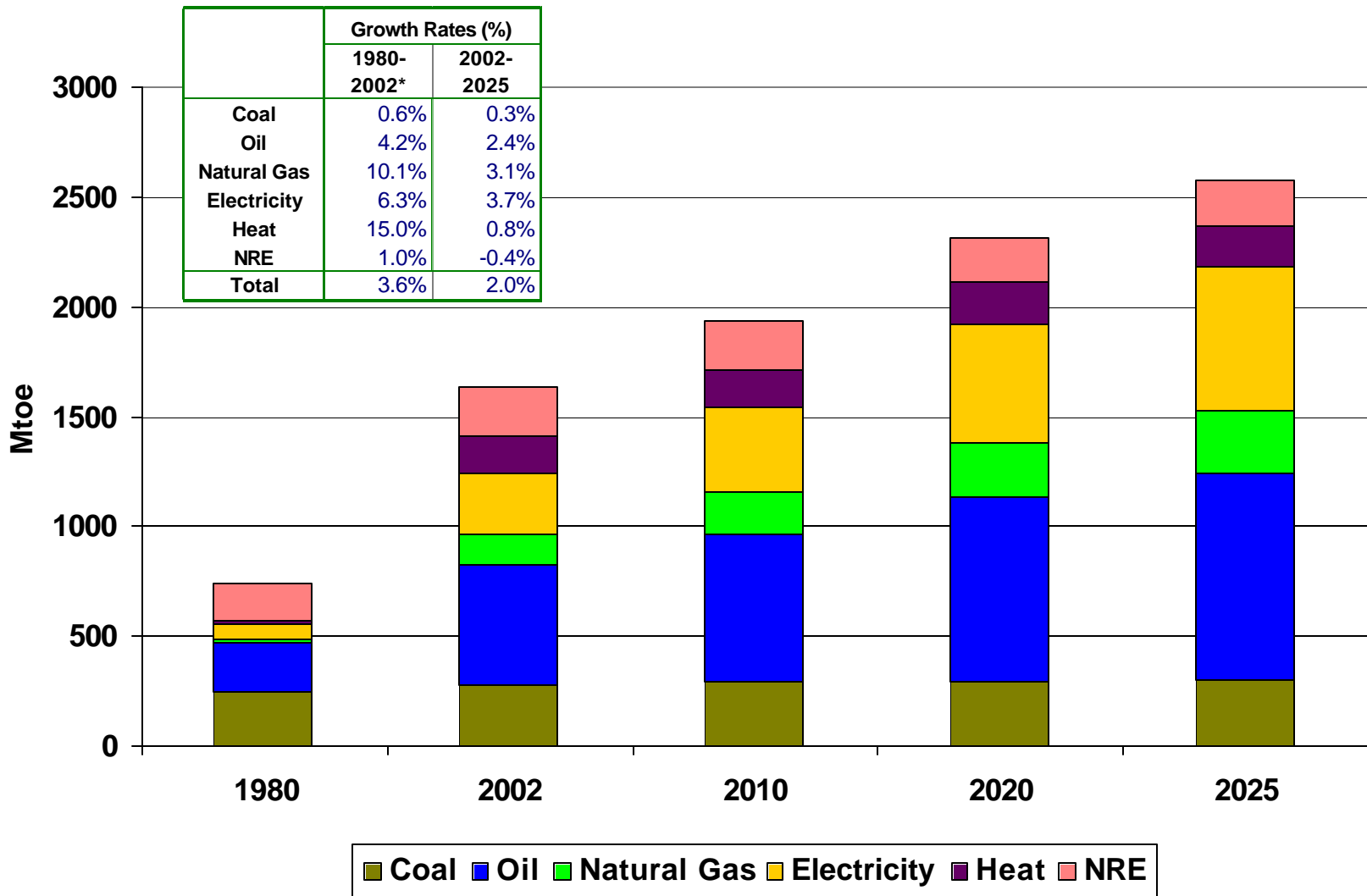
Outlook for Final Energy Demand of NEA

Final energy demand of Northeast Asian economies will grow at an annual rate of 2.0%. Industry sector will continue to take the largest share. Transport sector will grow by the fastest rate at 3.1% per year.

	Absolute Levels (Mtoe)					Annual Growth Rate		Share in FED	
	1980	2002	2010	2020	2025	1980-2002	2002-2025	2002	2025
Industry	348	760	919	1130	1256	2.5%	2.2%	47%	48%
Residential and Commercial	305	639	706	792	853	3.4%	1.3%	39%	37%
Transport	87	228	303	399	462	4.5%	3.1%	14%	16%
Total	740	1627	1928	2321	2571	3.6%	2.0%	100%	100%

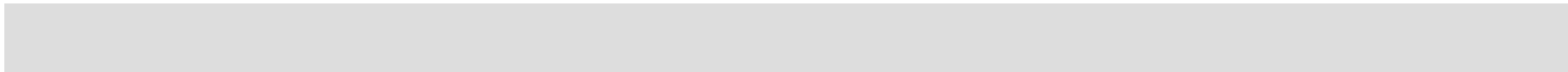


Outlook for Final Energy Demand of NEA





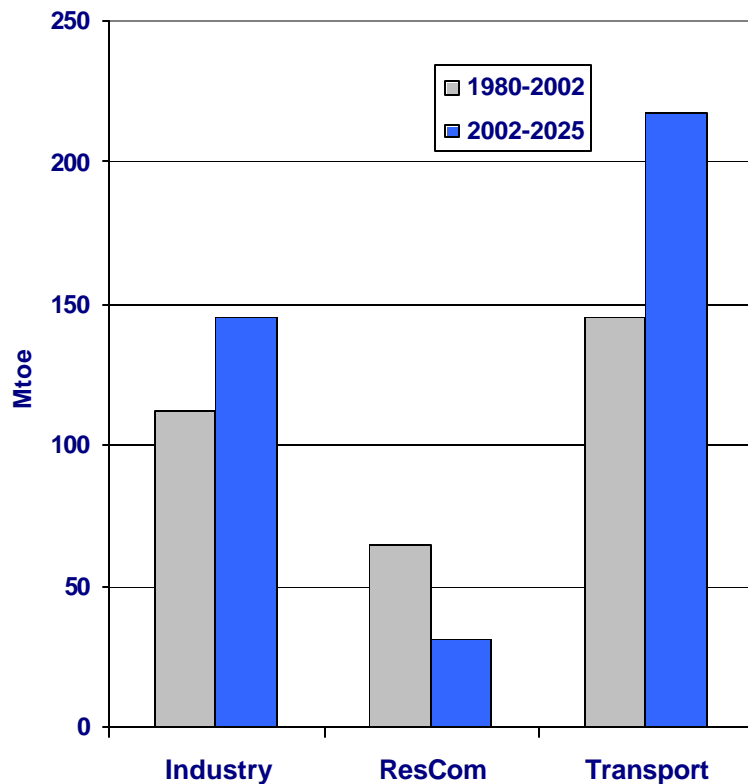
Oil Demand



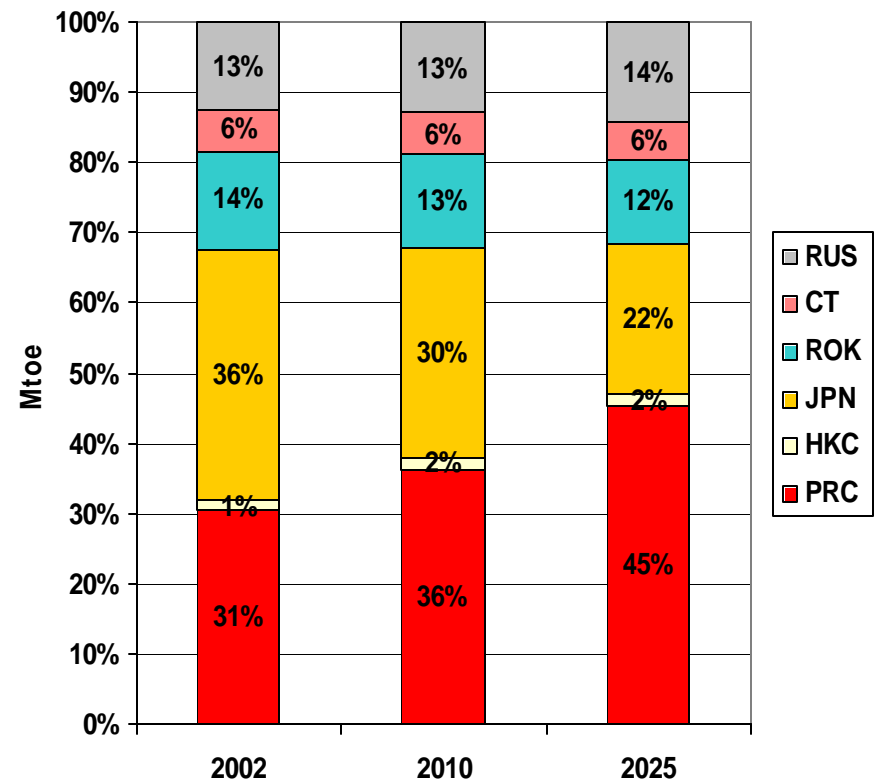


Outlook for Final Oil Demand in NEA

Sectoral contribution to the growth of Final Oil Demand (1980-2002 and 2002-2025)



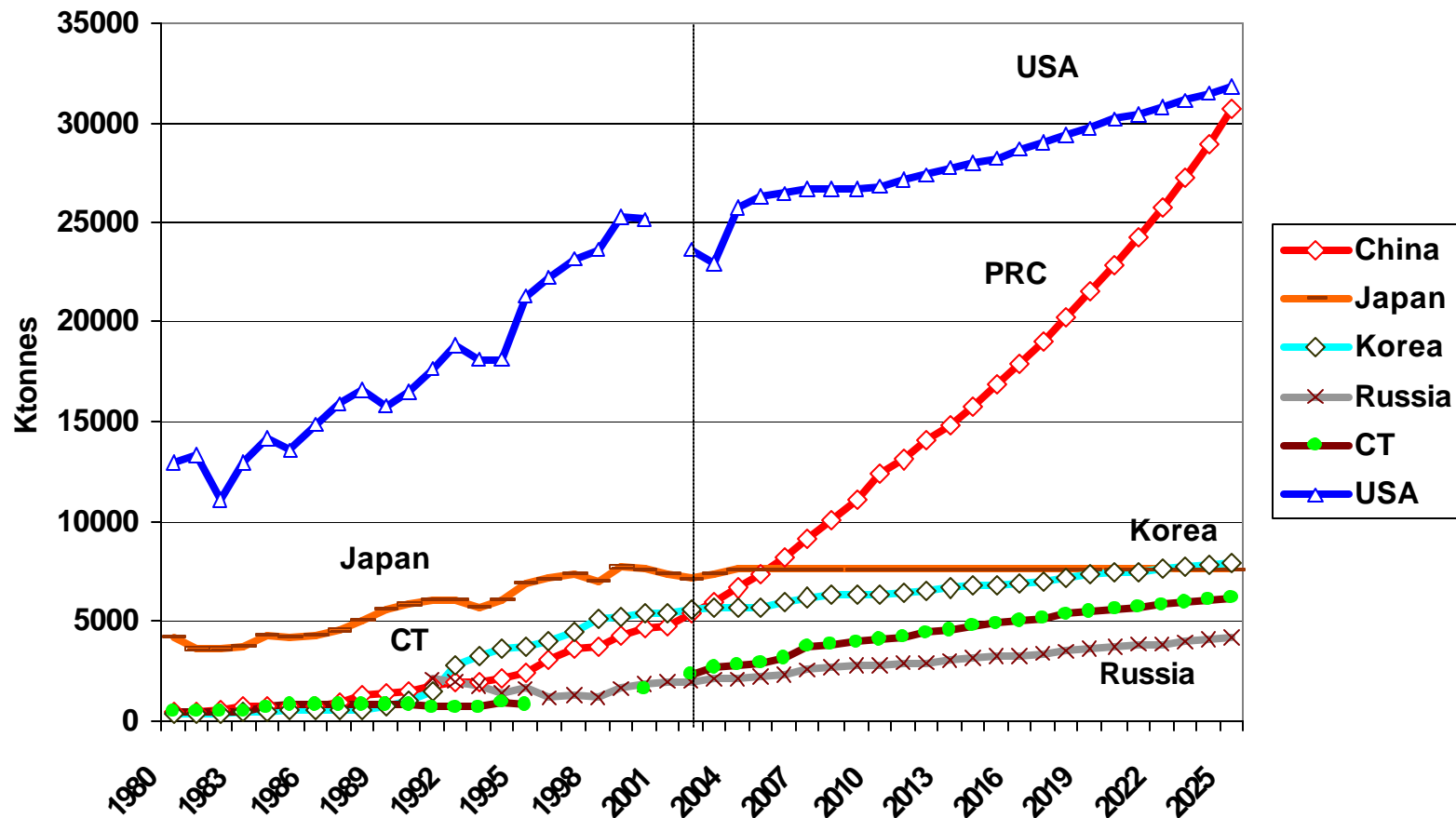
Share of Final Oil Demand by Economy (2002, 2010 and 2025)





Ethylene Production in NEA and USA

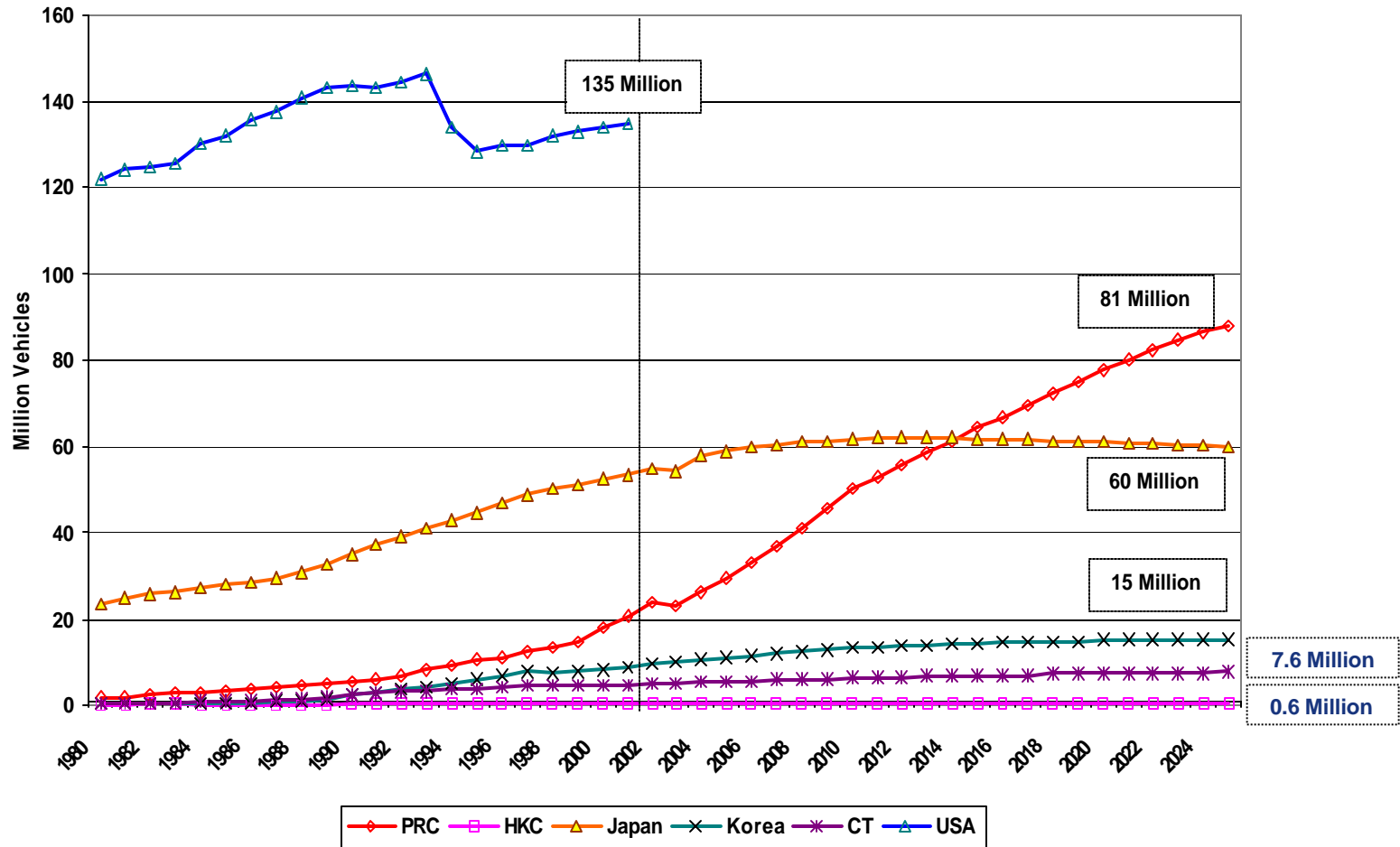
Substantial growth of ethylene production





Vehicle Stocks

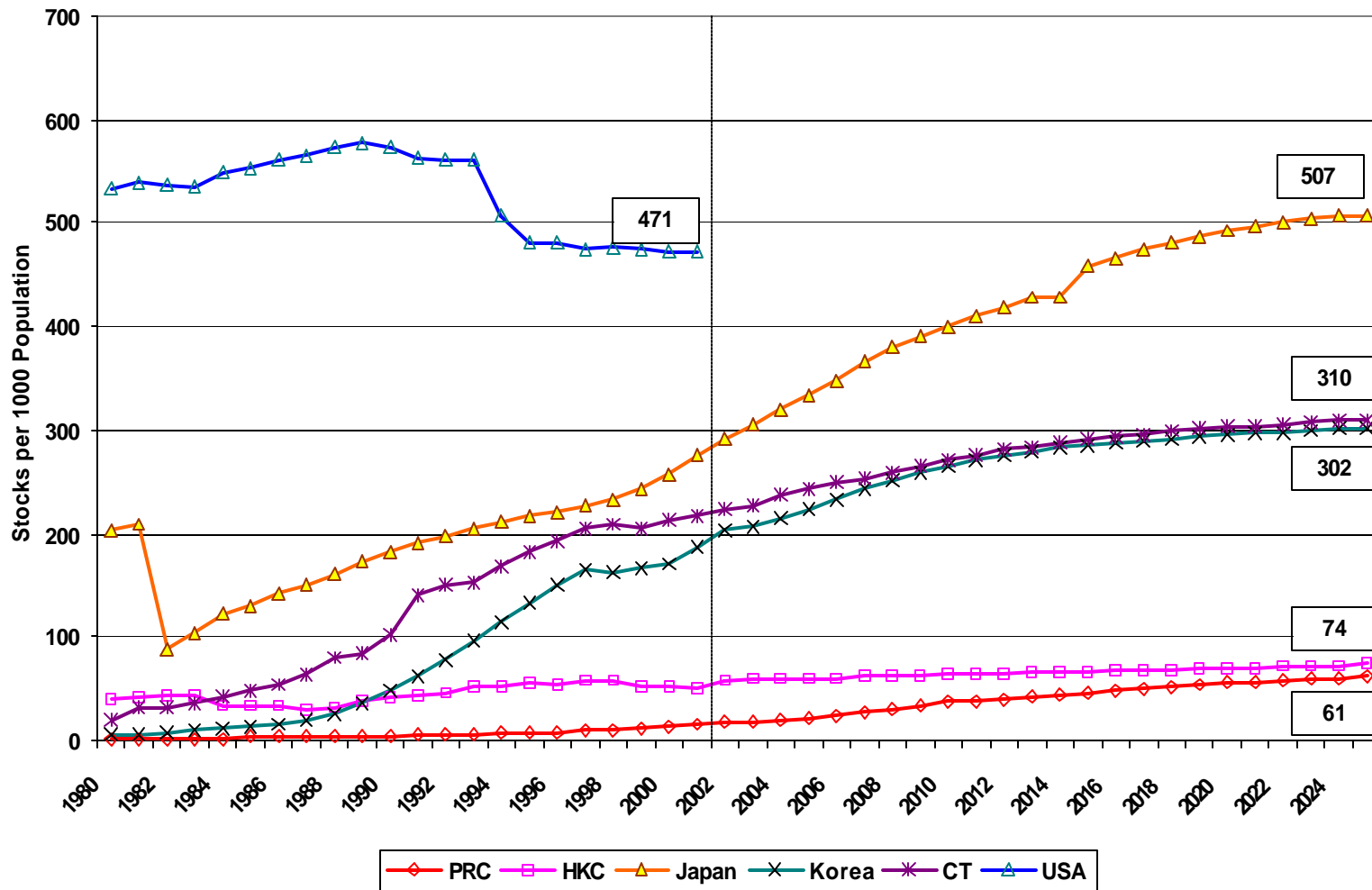
Increasing trend for vehicle stocks





Vehicle Stocks per 1000 Population

Still small vehicle ownership per 1000 population compared with USA

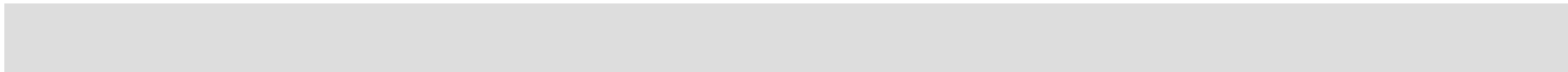


Outlook of Road Transport: Gasoline and Diesel

		Absolute Level (ktoe)					Annual growth rate		Per capita demand (toe/1000 person)		
		1980	1990	2002	2010	2025	1980-2002	2002-2025	1980	2002	2025
PRC	Gasoline	10,694	17,747	36,586	47,664	86,934	5.8%	3.8%	11	28	61
	Diesel	1,312	2,879	14,084	25,938	58,172	11.4%	6.4%	1	11	41
HKC	Gasoline	202	254	384	558	876	3.0%	3.7%	40	57	116
	Diesel	656	1,217	2,190	2,592	3,165	5.6%	1.6%	130	323	417
Japan	Gasoline	27,212	35,095	47,172	52,817	53,373	2.5%	0.5%	233	370	437
	Diesel	14,633	26,248	28,718	29,478	28,521	3.1%	-0.03%	125	225	234
Korea	Gasoline	854	2,955	8,006	11,176	12,806	10.7%	2.1%	22	168	253
	Diesel	0	6,664	13,401	19,618	24,875		2.7%		280	491
CT	Gasoline	1,425	4,183	7,715	9,224	10,699	8.0%	1.4%	81	344	435
	Diesel	1,340	2,107	3,464	3,575	4,356	4.4%	1.0%	76	155	177



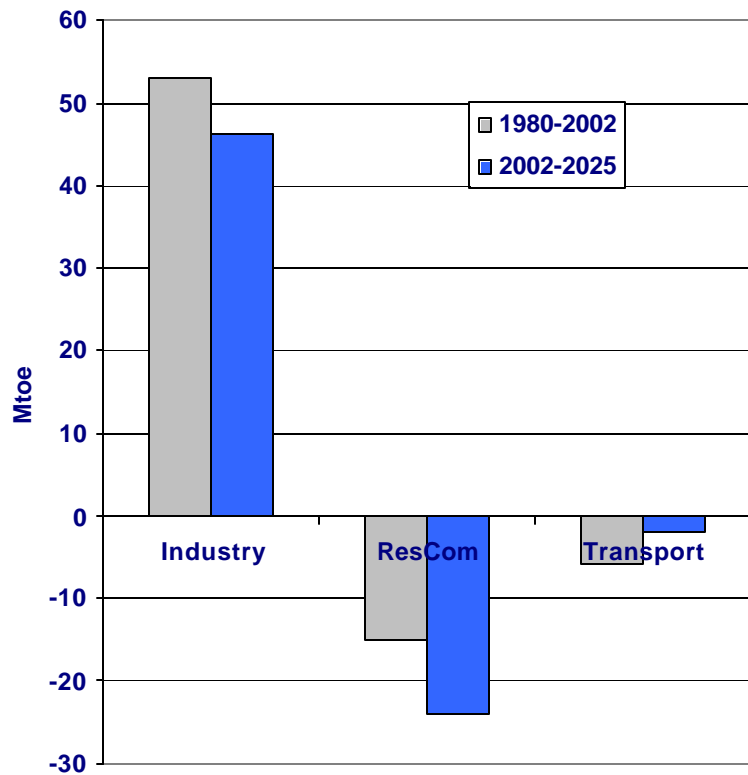
Coal Demand



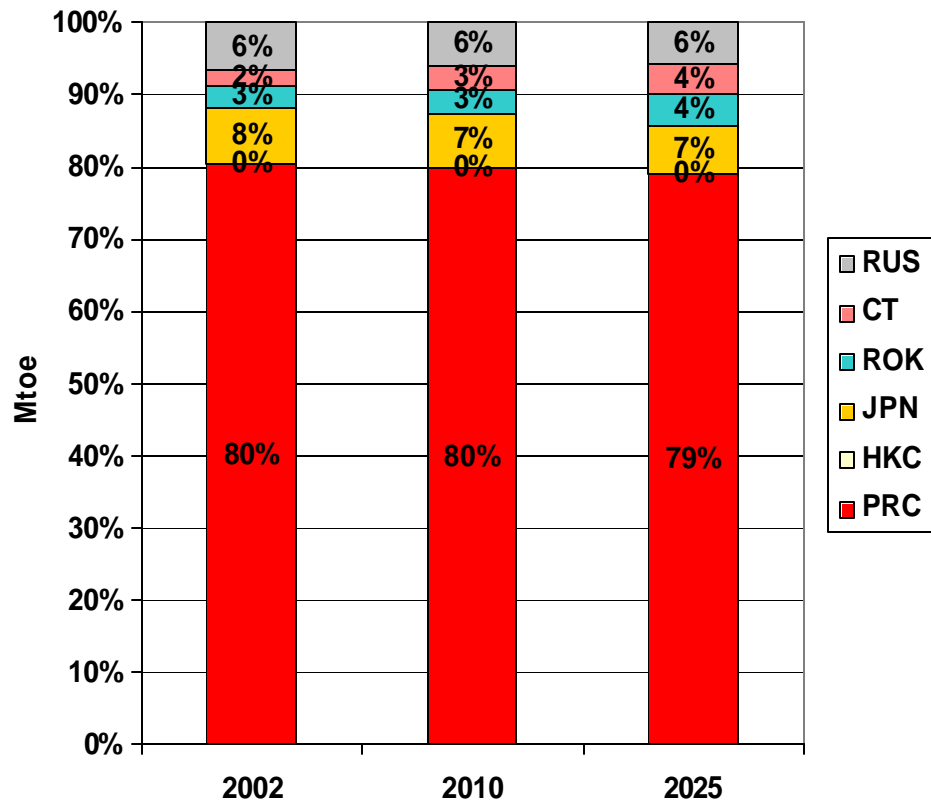


Outlook for Final Coal Demand in NEA

Sectoral contribution to the growth of Final Coal Demand (1980-2002 and 2002-2025)



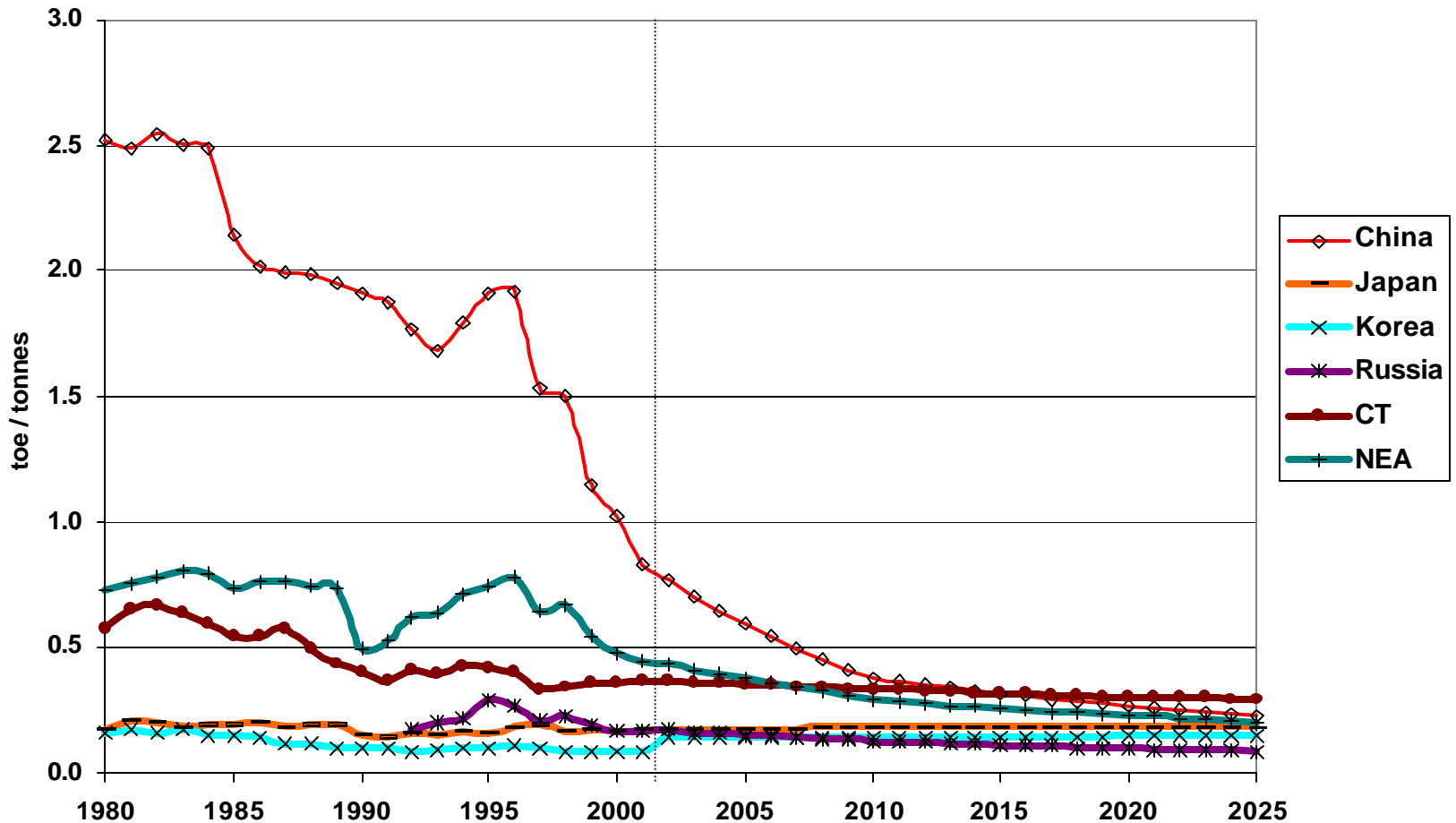
Share of Final Coal Demand by Economy (2002, 2010 and 2025)





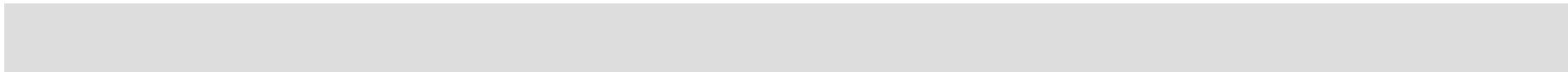
Coal Intensity in Crude Steel Production

Significant reduction in coal intensity of crude steel production





Electricity Demand

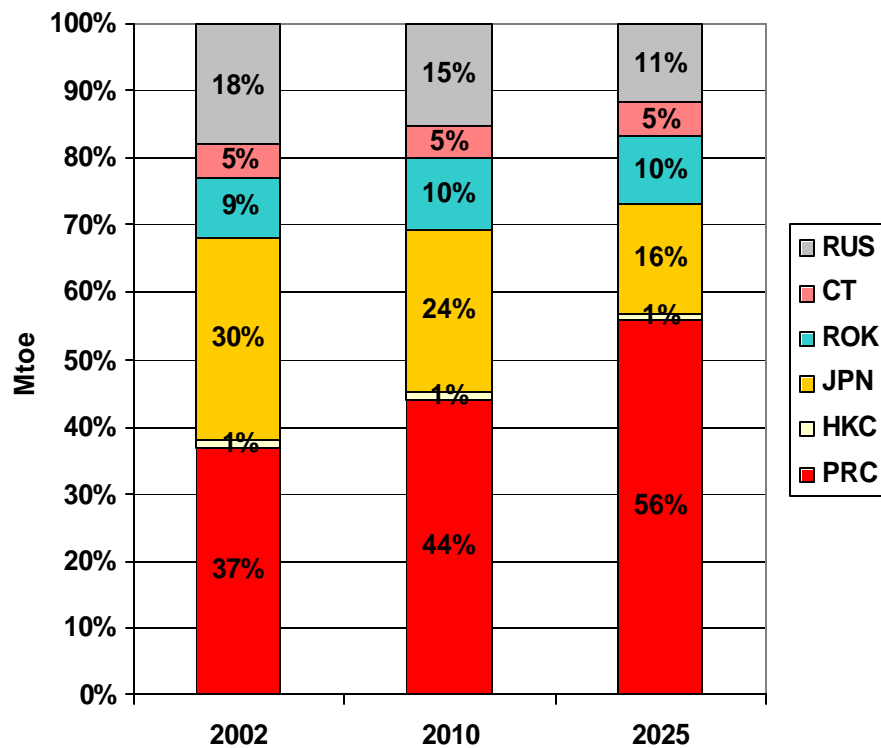
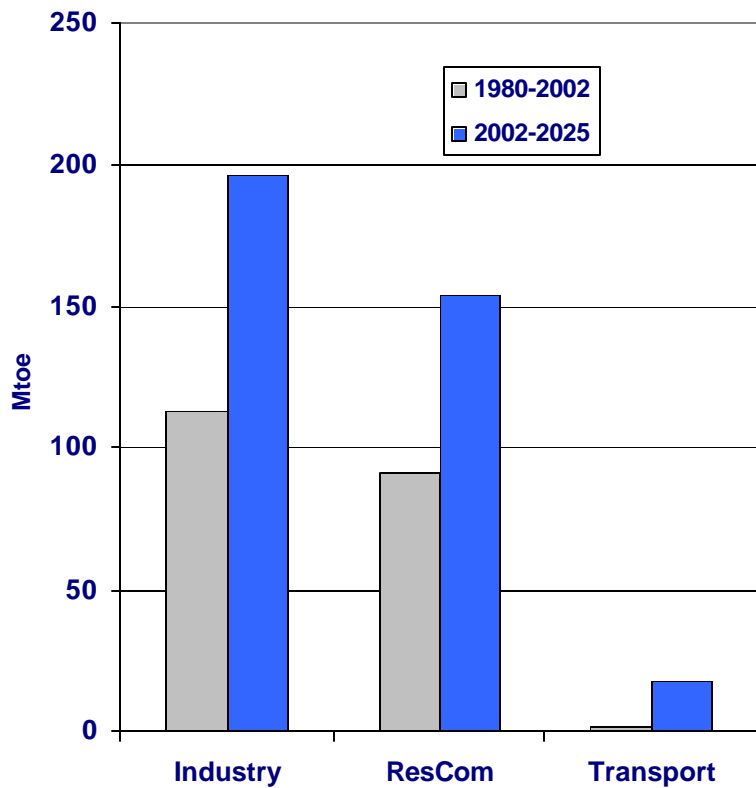




Outlook for Final Electricity Demand in NEA

Sectoral contribution to the growth of Final Electricity Demand (1980-2002 and 2002-2025)

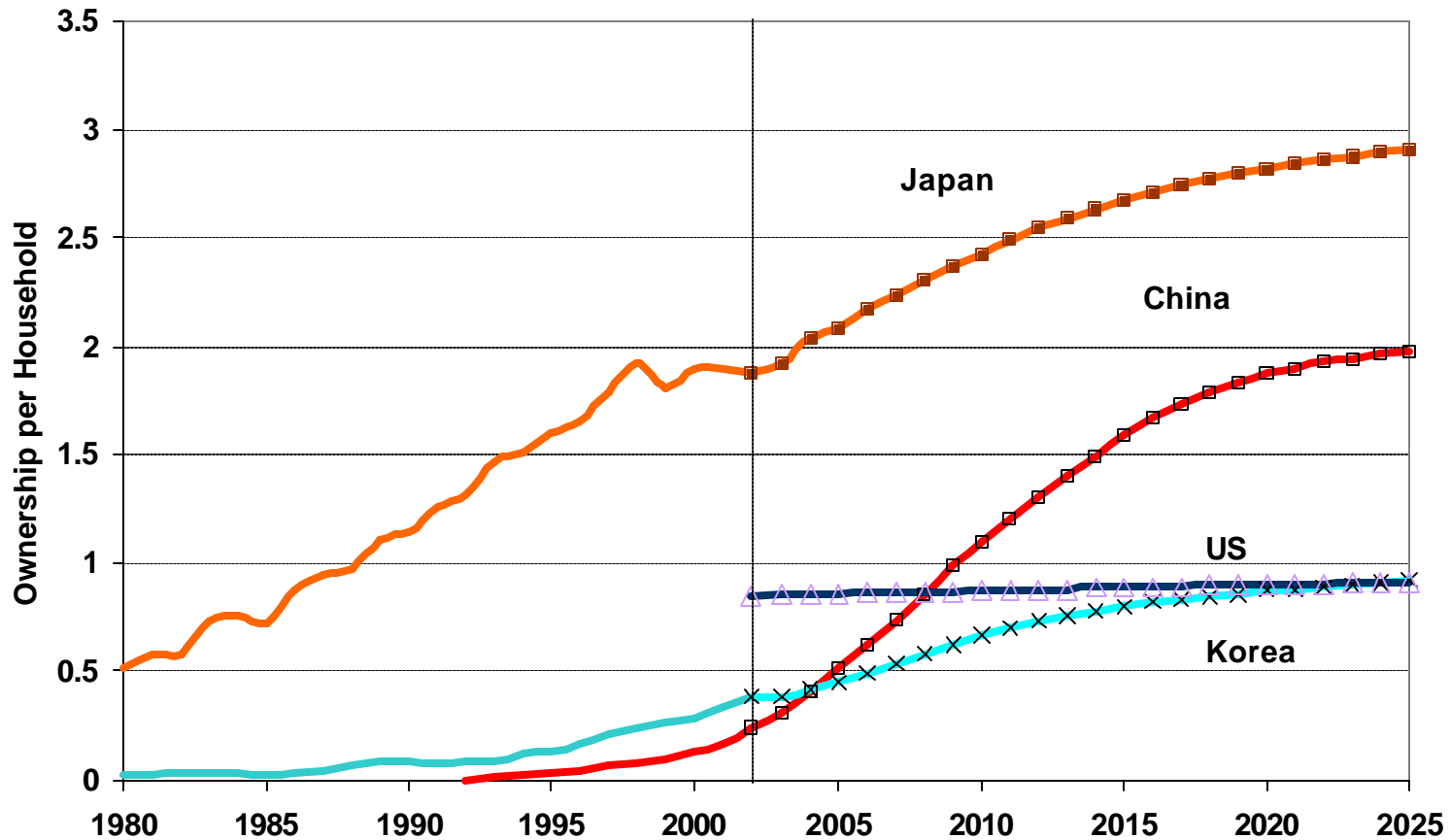
Share of Final Electricity Demand by Economy (2002, 2010 and 2025)





Diffusion Ratio of Air Conditioner in NEA and USA

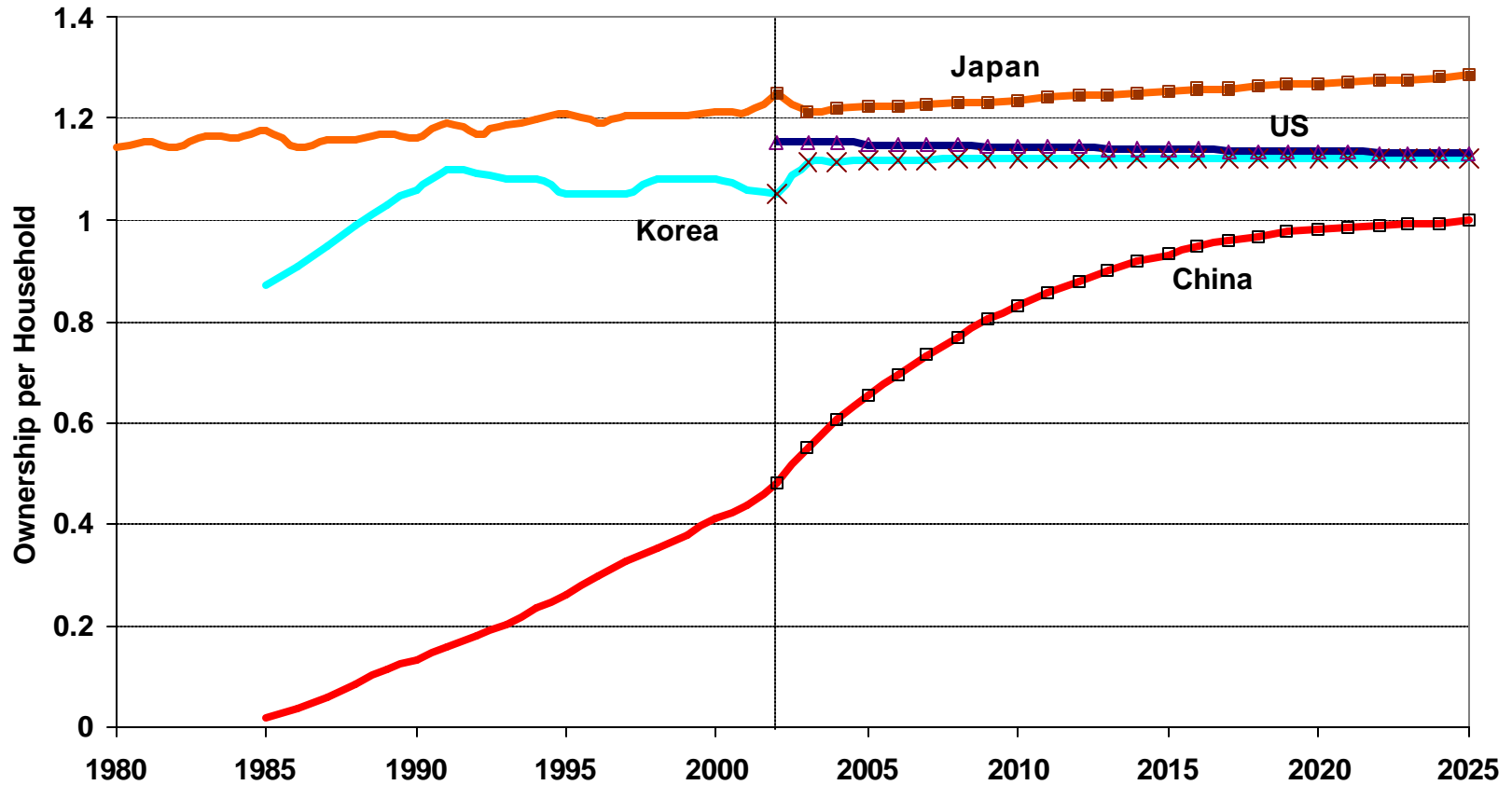
Fast trend for diffusion of air conditioner in Northeast Asia





Diffusion Ratio of Refrigerator in NEA and USA

Already high diffusion ratio of refrigerator in Northeast Asia





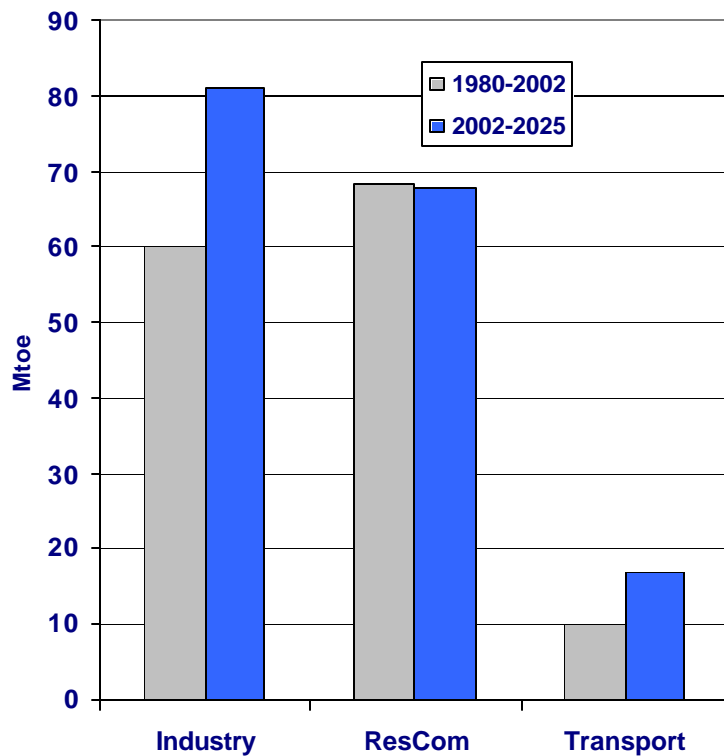
Gas Demand



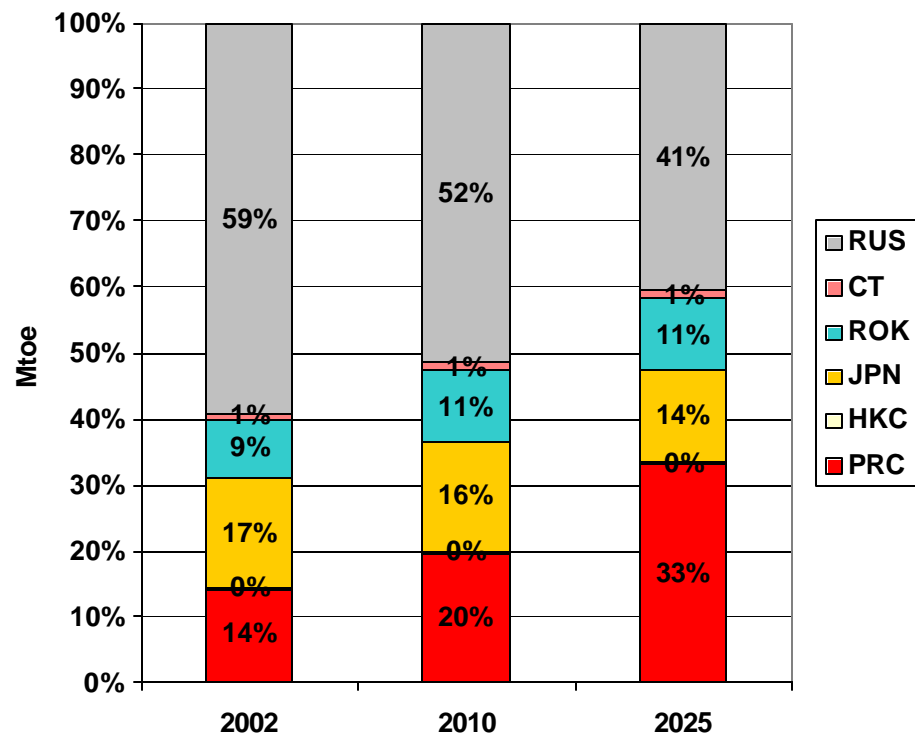


Outlook for Final Gas Demand in NEA

Sectoral contribution to the growth of Final Gas Demand (1980-2002 and 2002-2025)



Share of Final Gas Demand by Economy (2002 and 2025)





Comparison of the Outlook Result with the AEO2002

Outlook 2005: Annual Growth Rate (2002-2025)

	Coal	Oil	Gas	Elec
PRC	0.2%	4.4%	7.4%	5.9%
HKC		4.0%		3.1%
JPN	-0.2%	0.3%	2.4%	1.0%
ROK	1.6%	1.8%	4.3%	4.4%
CT	2.9%	2.6%	3.4%	4.3%
RUS	-0.2%	3.1%	1.5%	1.8%
Total	0.3%	2.6%	3.2%	3.9%

Outlook 2002: Annual Growth Rate (1999-2020)

	Coal	Oil	Gas	Elec
PRC	0.8%	4.7%	6.0%	5.3%
HKC		2.2%		1.8%
JPN	0.0%	0.5%	1.9%	1.3%
ROK	1.3%	2.7%	4.8%	4.5%
CT	1.5%	2.1%	3.7%	3.8%
RUS	3.1%	2.7%	2.6%	3.6%
Total	1.0%	2.7%	3.3%	3.8%



Summary of the Outlook Result

- ❖ Final energy demand of Northeast Asian economies will grow at an annual rate of 2.0%.
- ❖ Oil demand will grow at 2.4% per year.
 - Increase in vehicle stocks
 - Major expansion of ethylene production
- ❖ Coal demand will increase at the moderate rate at 0.3% per year.
 - Efficiency improvement in iron and steel industry
 - Decline in coal use for transport and residential sectors
- ❖ Gas demand will grow at 3.1% per year.
 - Environment as the major driver
- ❖ Electricity demand represents the fastest growth rate of 3.7% per year.
 - Industry structure change
 - High diffusion ratio of electric appliances