



Asia-Pacific
Economic Cooperation

Asia Pacific Energy
Research Centre



South Korea's Energy Strategies and Prospects

Asian Energy Security and Implications for the U.S.
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Outline of Presentation

- Energy Demand and Supply of Korea
 - Drivers for Energy Demand
 - Outlook of Total Primary Energy Demand
 - Crude Oil Supply Sources
 - Energy Seasonality
- Energy Efficiency Improvement
- Importance of Nuclear Power Generation
- KEDO
- Regional Cooperation
 - Pipeline Gas Projects
 - Power Interconnection Projects
- Summary of Korea's Energy Situation and Prospects
- Implications to the U.S.



Characteristics of Energy Demand and Supply, and Energy Policy in Korea

◆ Demand

- Strong demand for industry, transport and residential and commercial sectors
- Seasonal differences in peak demand
 - Peak demand for electricity falls on summer, while that of gas comes in winter.

◆ Supply

- Very few domestic energy sources
 - High import dependency (Oil: the world 4th importer, LNG & Coal: 2nd)
 - Short-term orientation
 - Economics first rather than security (high reliance on Saudi)

◆ Policy

- Populous policy
 - No full privatization of KEPCO and KOGAS is insight.
 - Strong opposition from labor union



Key Energy Indicators of Korea

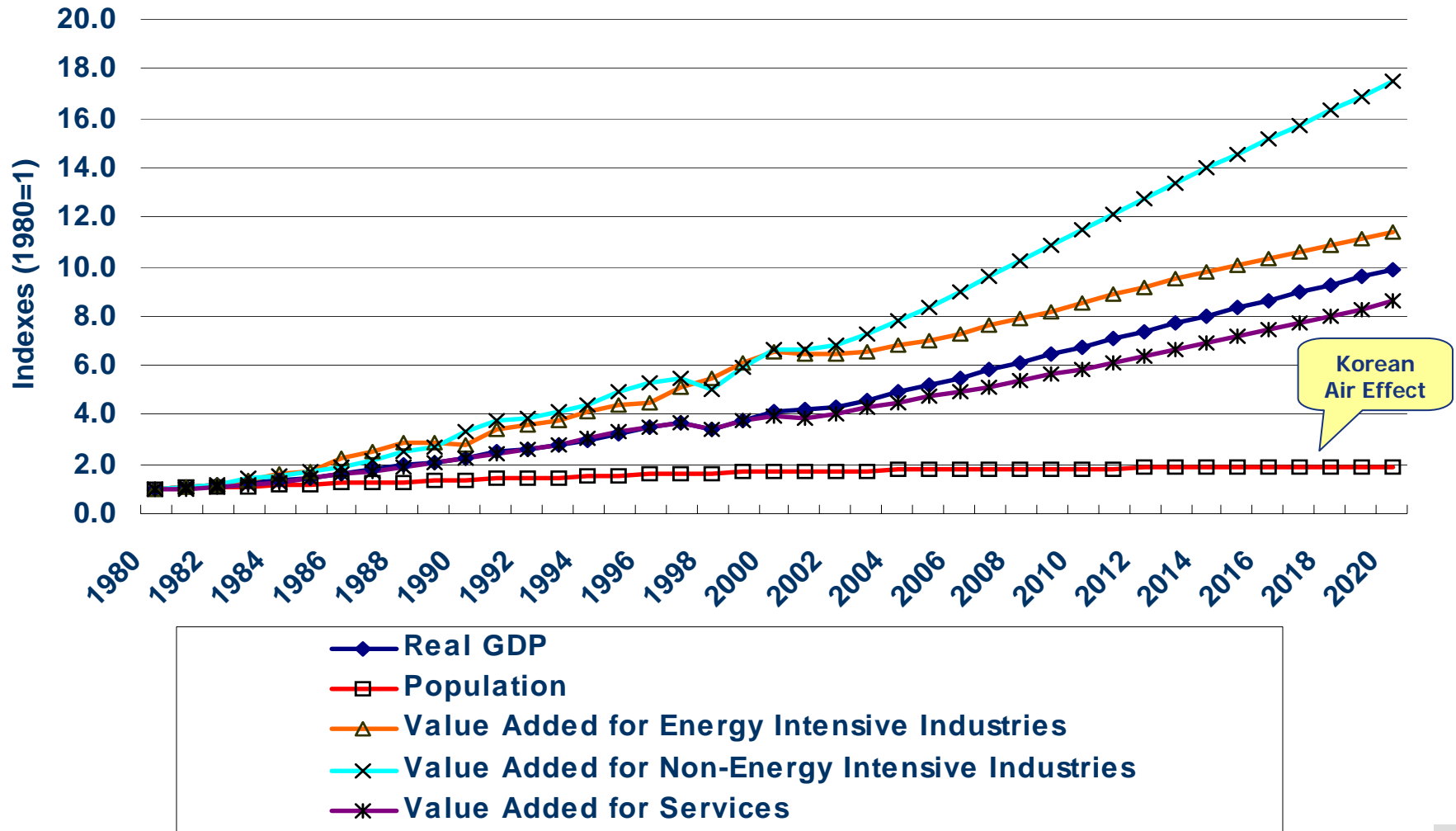
- The world's 10th largest energy consumer
- Little indigenous energy resources ⇒ dependence on overseas 97%
(Oil: the world 4th importer, LNG & Coal: 2nd)
- Put influence on global energy supply market and cargo prices

	Unit	1980	1990	2002	Annual Growth Rate	
					1980-1990	1990-2002
Real GDP (1995 Prices)	Billion USD	149	342	680	8.7%	5.9%
Population	Million	38	43	48	1.2%	0.9%
Total Primary Energy Demand	Mtoe	41.4	92.7	203.5	8.4%	6.8%
Oil Dependence	Share in Total	65%	54%	50%		
Energy Intensity	toe/million USD	278	271	299	-0.2%	0.8%
Energy per capita	toe/person	1.1	2.2	4.2	7.1%	5.8%



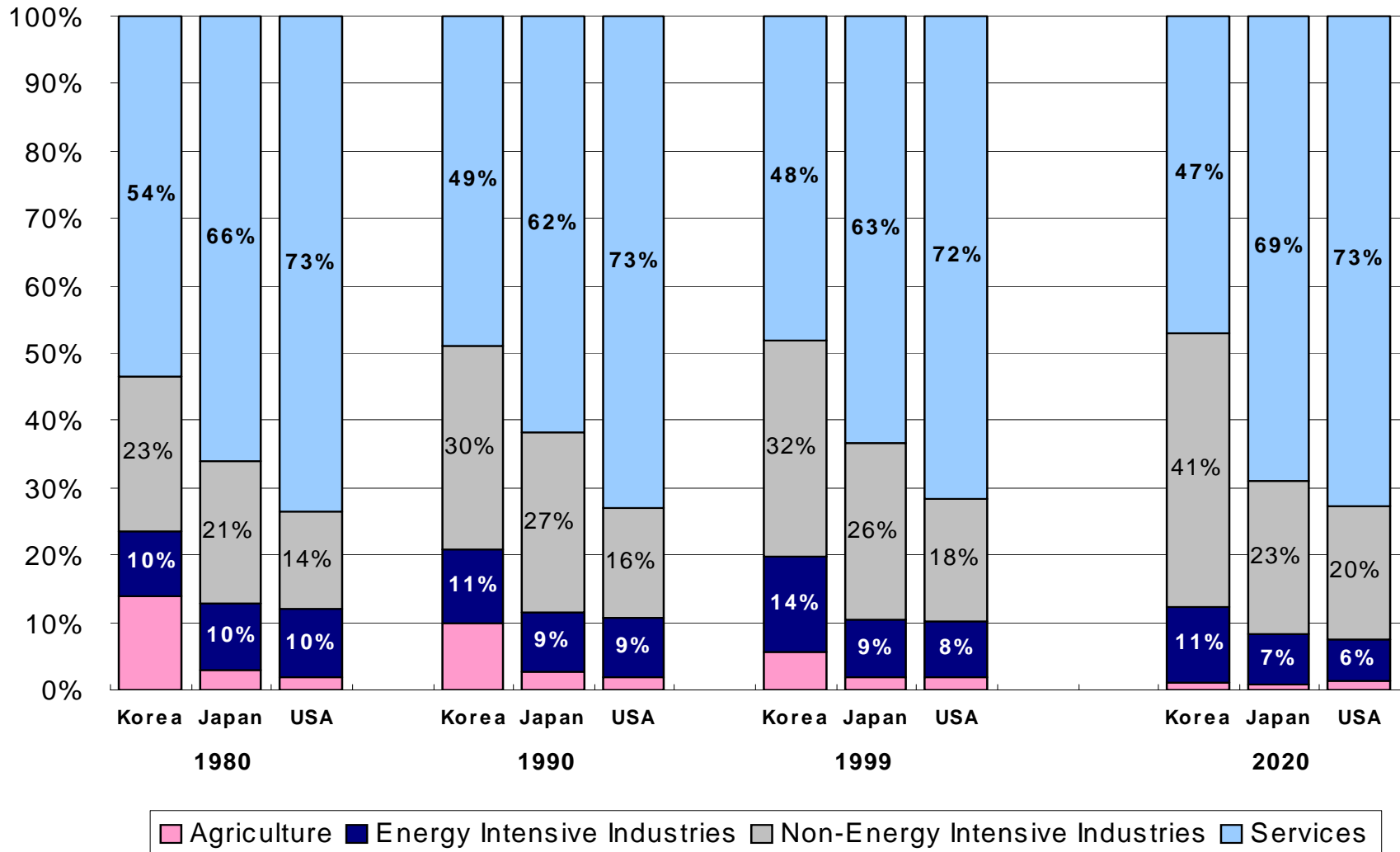
Drivers for Energy Demand (1999-2020): Indexes of Macro Variables

Strong growth for non-energy intensive industries and energy intensive industries

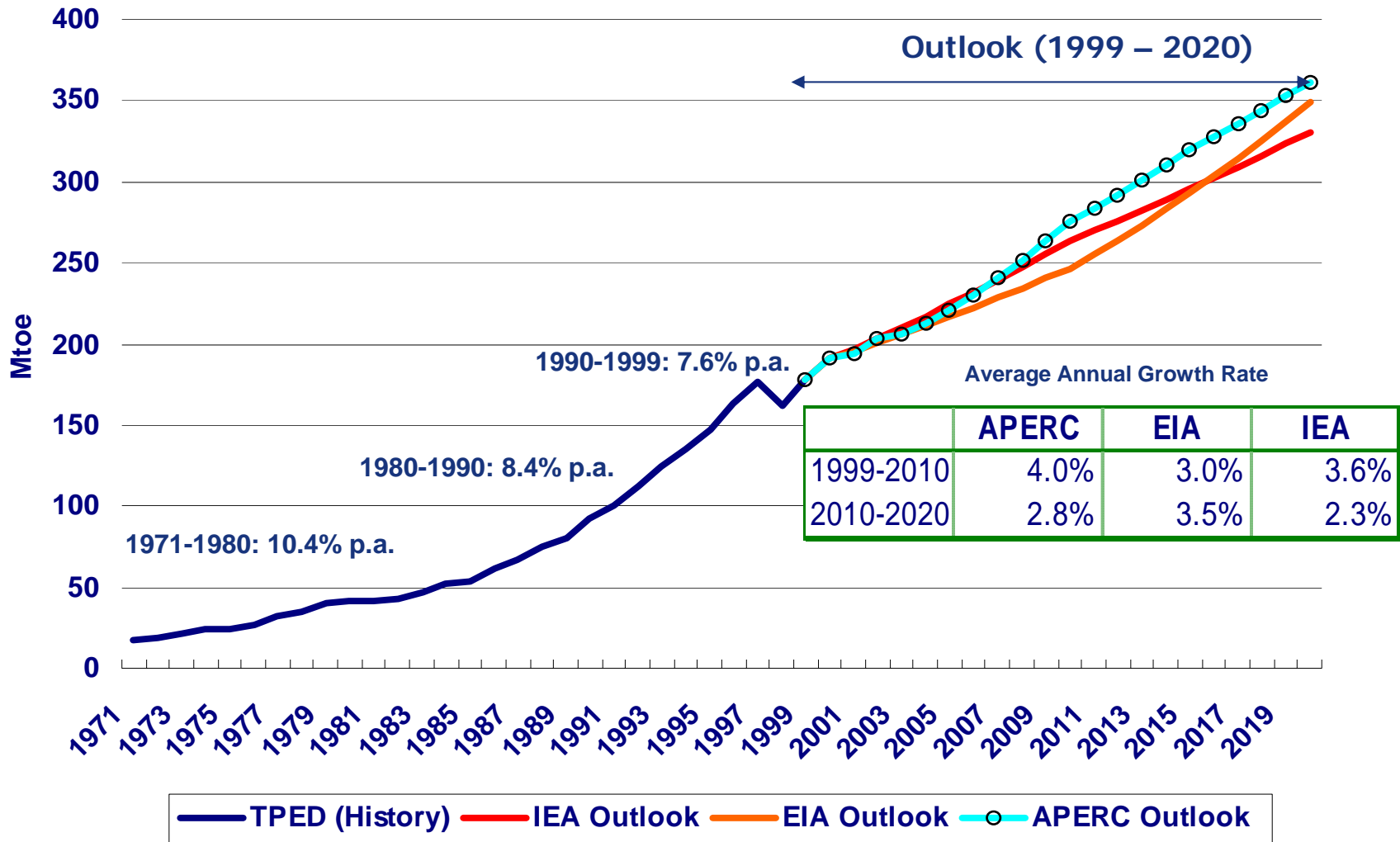




Industry Structure: Share of Value Added for Industries



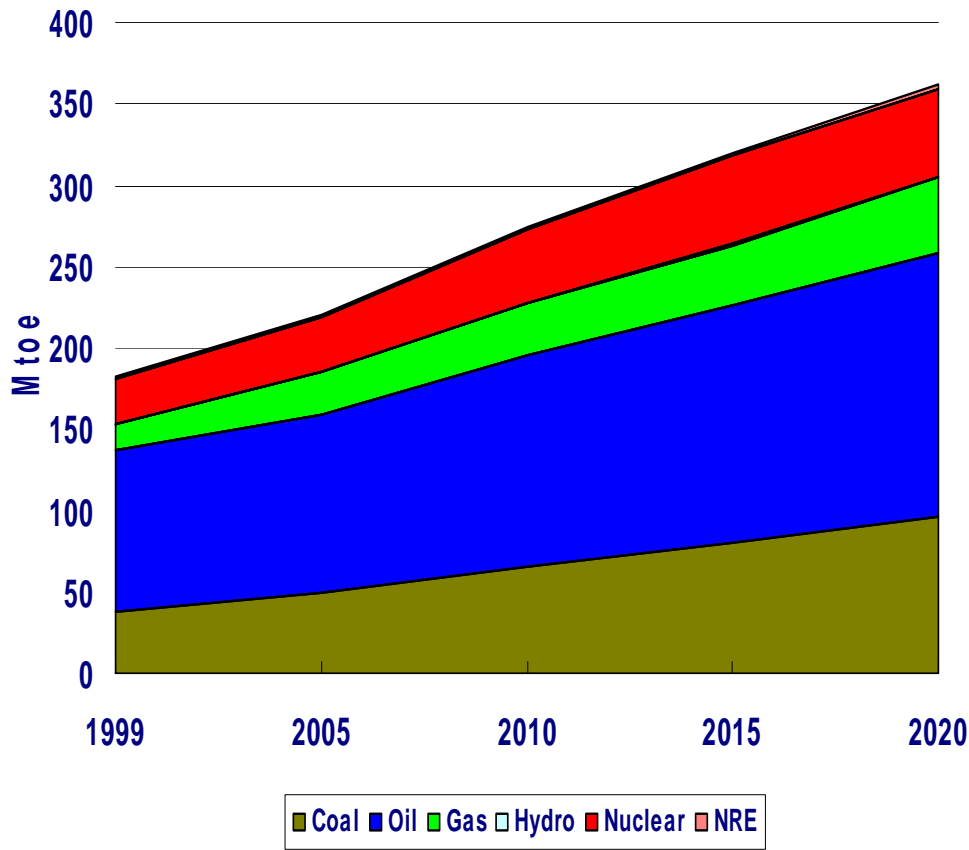
Total Primary Energy Demand of Korea



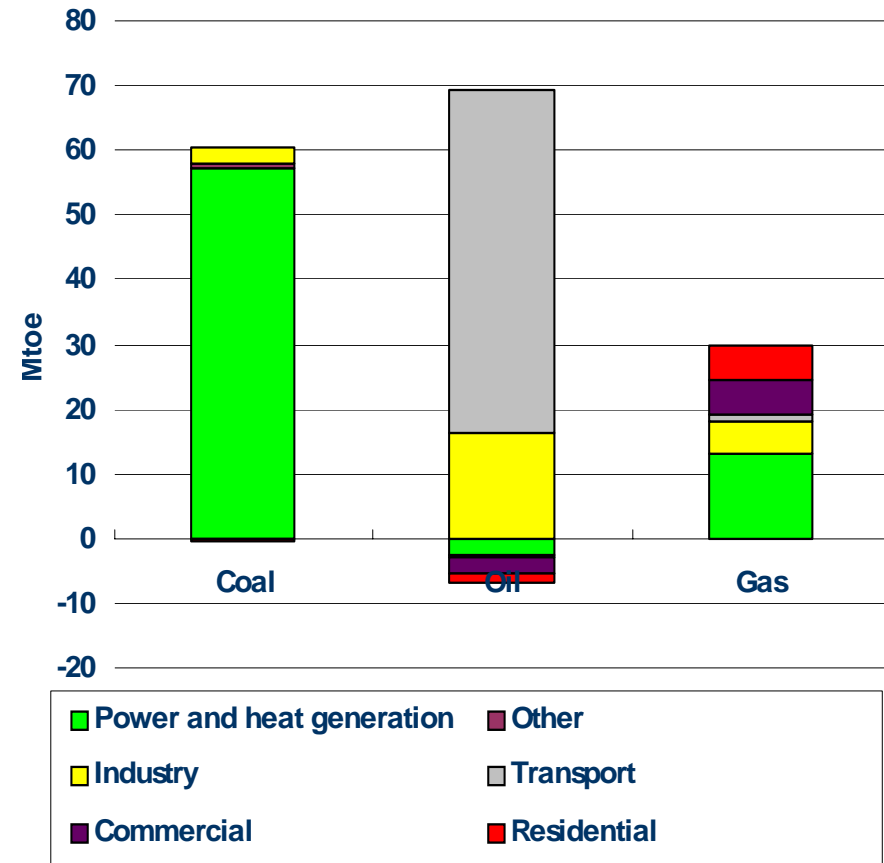


Outlook of Total Primary Energy Demand

TPED by Fuel Type

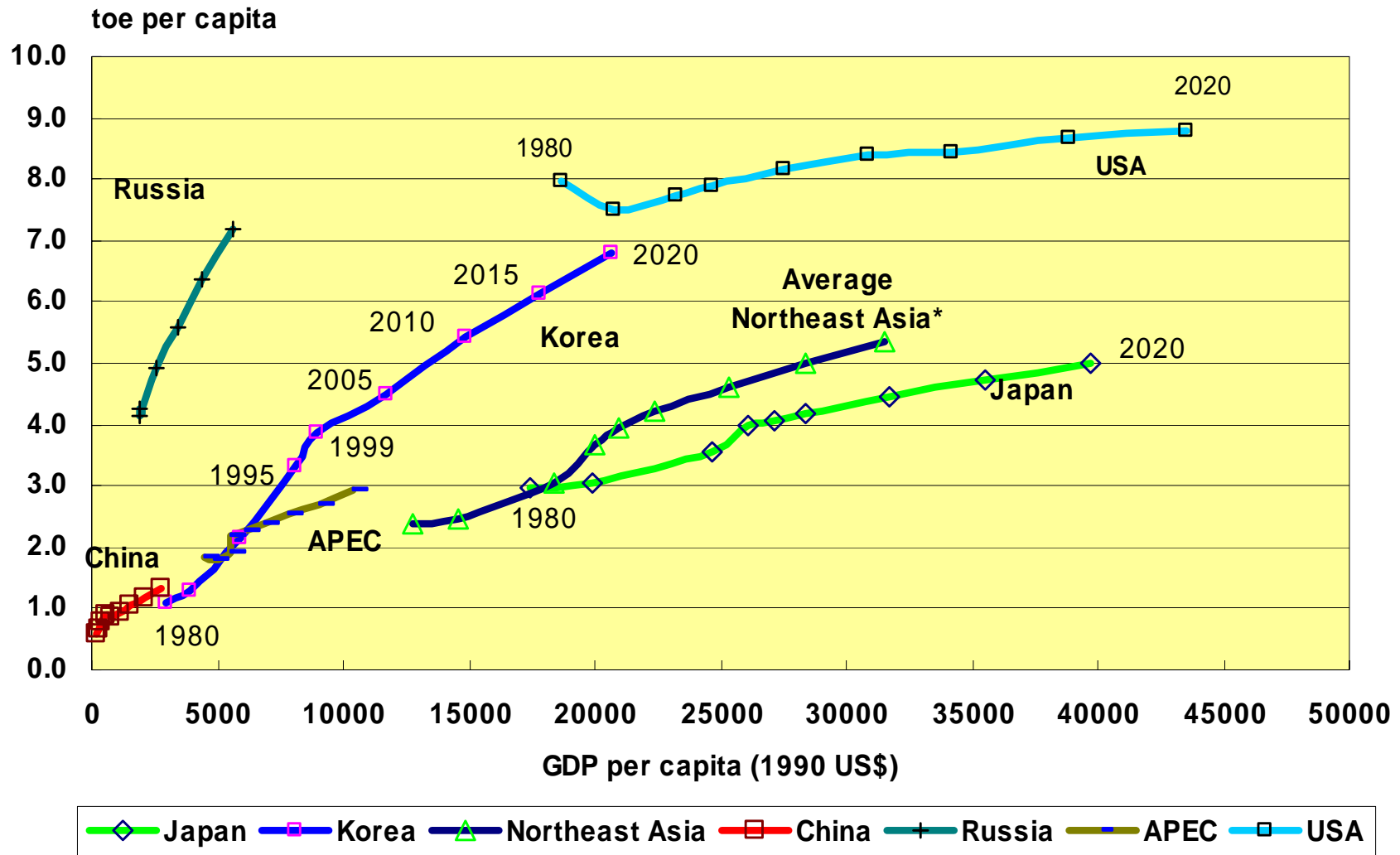


Growth by Fuel Type and Sector



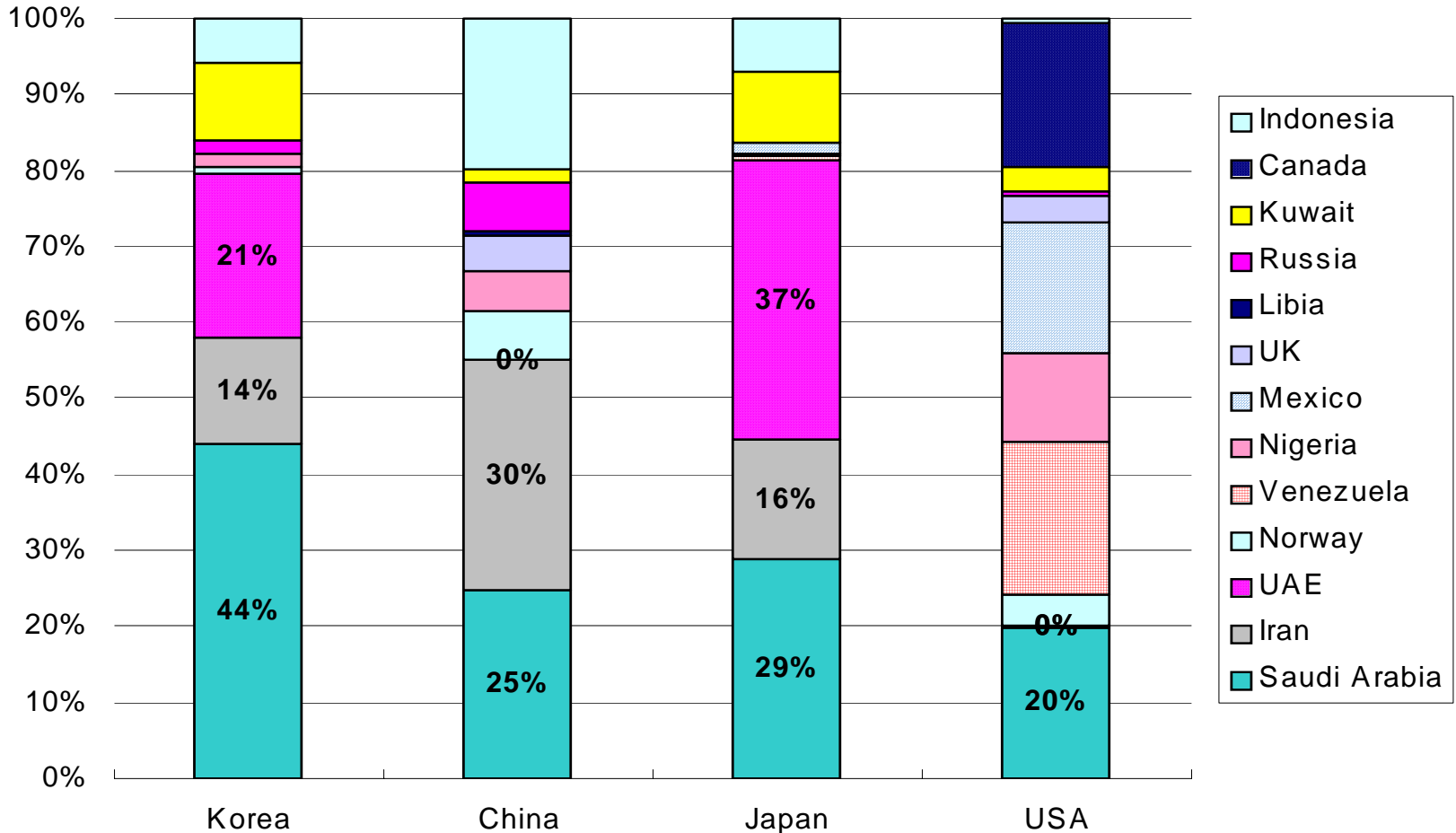


Income and Energy Demand (1980-2020)



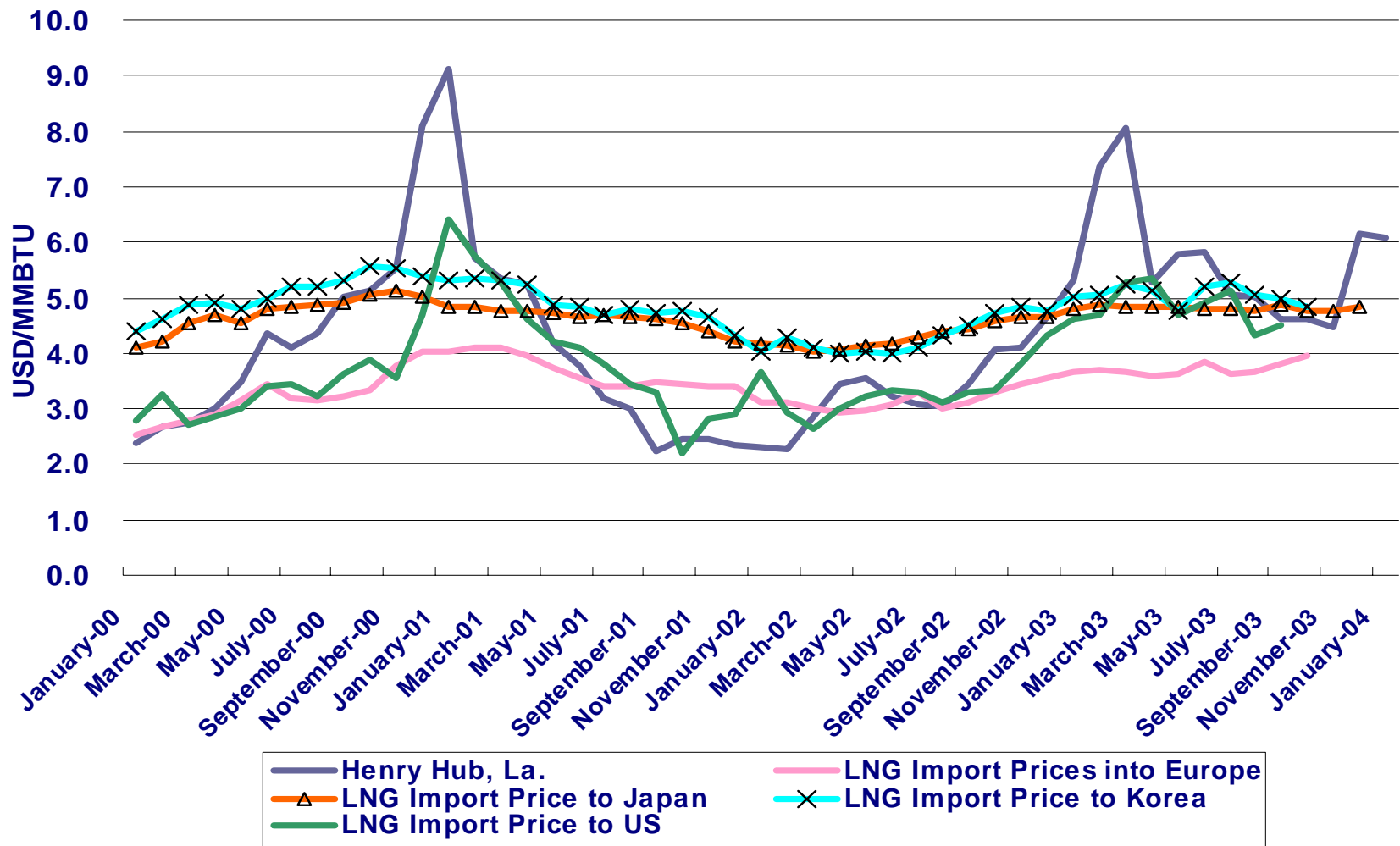
Crude Import Dependences on the Middle East

High reliance on the Middle East





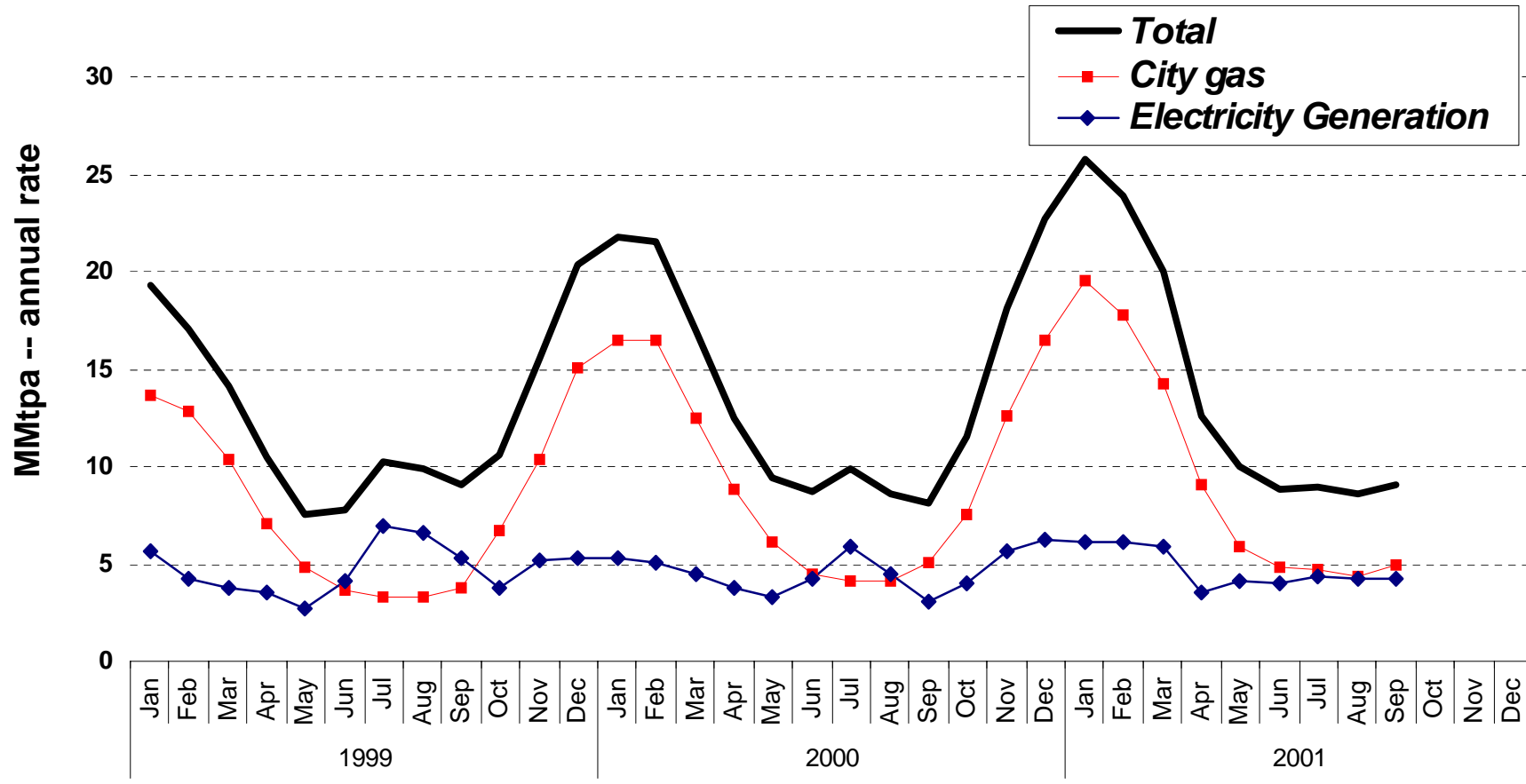
Energy Price Trends: Natural Gas





Korea's Energy Seasonality

South Korea: LNG Seasonality

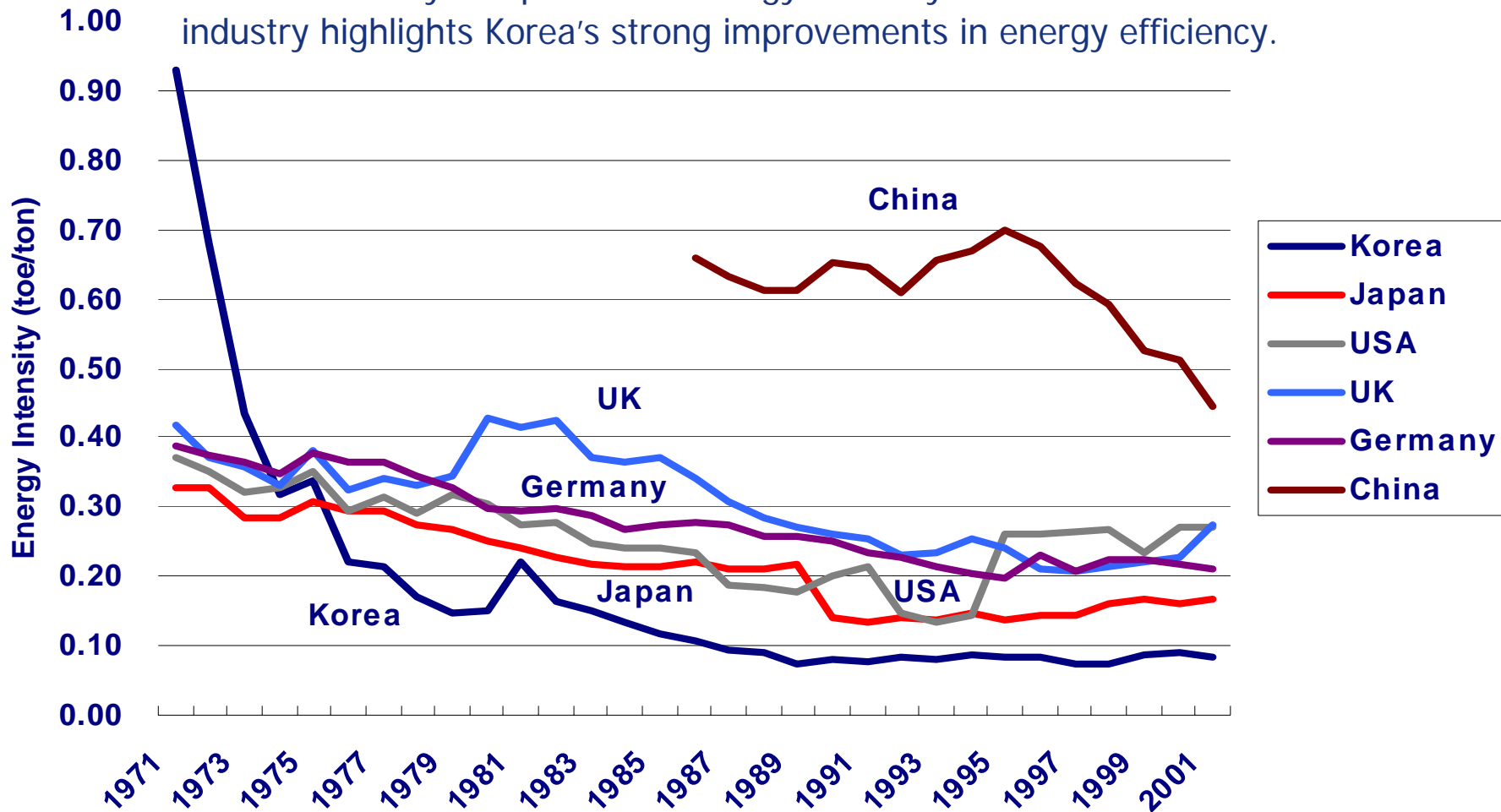


Source: David Nissen (2002), "Flexibility in LNG Trade", A Paper Presented at APERC Annual Conference in 2002



Efforts to Improve Energy Efficiency

Inter-country comparison of energy intensity for iron and steel industry highlights Korea's strong improvements in energy efficiency.





Nuclear Power Generation

- ◆ **Role of nuclear as to enhance energy security**
 - In 2002, Nuclear accounted for 15% of TPED, and 36% of total electricity generation output.

- ◆ **Onsite storage will be full by 2008**

- ◆ **To secure new repository site,**
 - Government awaits for the application from local provinces
 - Bu-An prefecture is likely to apply for the new site
 - However ...



Governor of Bu-An Prefecture





KEDO (Korean Peninsula Energy Development Organization) Project

◆ Objective

- KEDO was established in 1995 to implement the agreed framework between the United States and North Korea, under which North Korea will freeze and dismantle its existing nuclear program. In exchange, KEDO agrees to offer alternative energy sources:
 - Construction of 2 nuclear power units (1000MW*2, LWR) that follows international safety standards
 - Supply heavy fuel oil (500,000 ton) for heating and power plant by the time the 1st nuclear unit starts operation

◆ Participating Countries

- Executive members (EU, Japan, Korea and US) and 9 countries.

◆ Current Status

- Due to the North Korea's **violation to the agreed framework**, KEDO has been suspending;
 - heavy fuel oil supply, and
 - construction of nuclear power plant.



Regional Cooperation

◆ Inter-governmental cooperation

- The APEC Energy Working Group on “Energy Security Initiative”
- The ASEAN + 3 “Osaka Initiative” and “Manila Declaration”

◆ Private sector cooperation

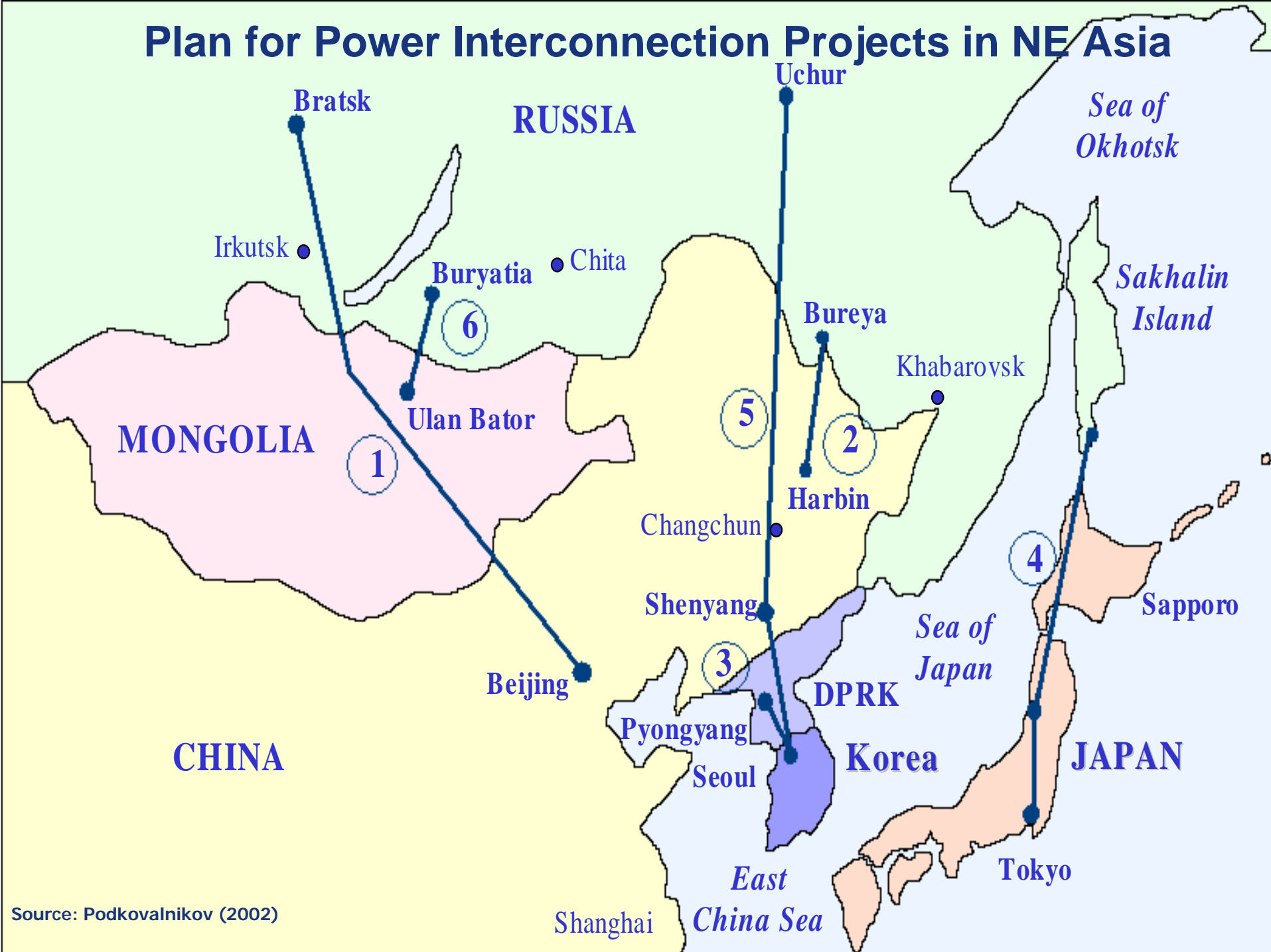
- Korea East and West Power Corp and Tohoku Electric Power Corp. (Dec. 2002)
 - Cooperation on Coal Procurement
- Korea Gas Corporation and Tohoku Electric Corp (May 2003)
 - Emergency Preparedness for LNG Supply Disruption
 - LNG tanker swap

Plan for Gas Projects in NE Asia



Source: Korea Gas Corporation

Plan for Power Interconnection Projects in NE Asia



Source: Podkovaalnikov (2002)



Summary of Korea's Energy Situation

- ◆ **Conventional fuel will maintain dominant share.**
 - Share by energy type (2020): Coal 20%, Oil 49%, Natural Gas: 12%, Nuclear: 15% and NRE 1%
- ◆ **Robust energy demand growth is expected.**
 - Transportation sector to lead oil demand, and power sector to lead coal and natural gas demand.
- ◆ **Nuclear expansion – hurdles lying ahead**
 - Government plans to install additional 9 units by 2015, but hurdles are lying ahead. → repository issue and difficulty for siting
- ◆ **Kyoto Protocol**
 - Ratified Kyoto Protocol in November 2002
- ◆ **Potential for regional cooperation**
 - Still lingering regional rivalry: “Nationalism”
 - Financing projects for North Korea



Implications for the U.S.

US has and will have vital interests in energy markets for Korea and Northeast Asia.

◆ **Trade volume with Northeast Asia is on the rise.**

- China, Japan and Korea are among the top 10 trading partners with US.

◆ **Russian Far East: West Coast Connector**

- Potential for LNG and oil from Sakhalin II to USA

◆ **Exposure of US firms to Northeast Asia offers greater business opportunity.**

- Funding sources from US-lead private banks, export credit agencies, international lending institutions could be extended to projects in Northeast Asia.
- US firms could generate value added in this growing market.



For your refreshment ...





Korea's population growth is stabilized.

