US/Japan Forum
On
Foreign Investment in Energy Infrastructure of China

Northeast Asia Energy Partnership toward Sustainable Development

April 11, 2005
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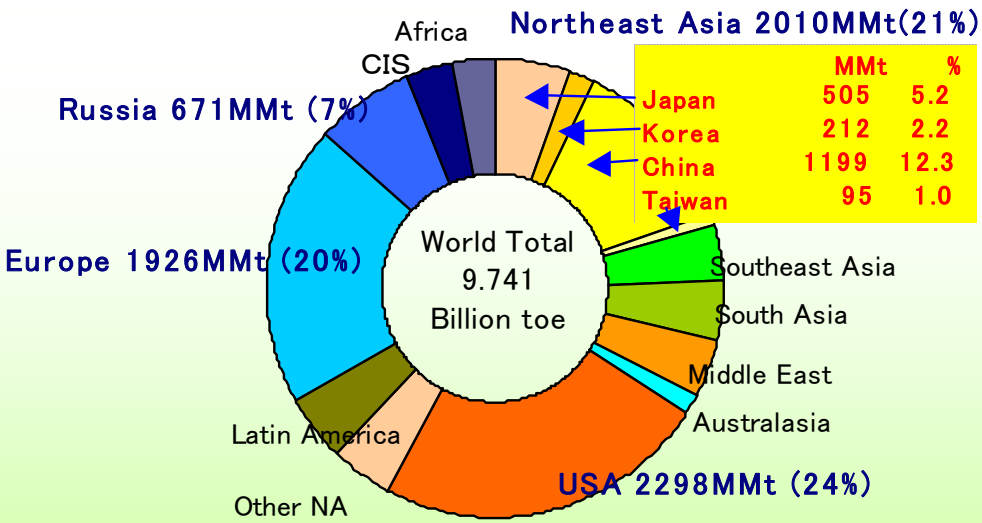
Contents

1.1 Asia in the World

1. Northeast Asia is one of the three major energy market of the world together with North America and Europe.

2. Asian energy consumption is expanding rapidly driven by the fast growth of China.

→ Securing stable energy supply is an important policy objective of Asia.



Source: BP Statistical Review of the World Energy 2004

World Energy consumption (2003)

Energy Total

	Oil Equiv. Btoe	Growth %
China	1.20	+13.6
Other Asia	2.00	+ 2.1
US, Europe, Others	8.54	+1.4
World	9.74	+2.9

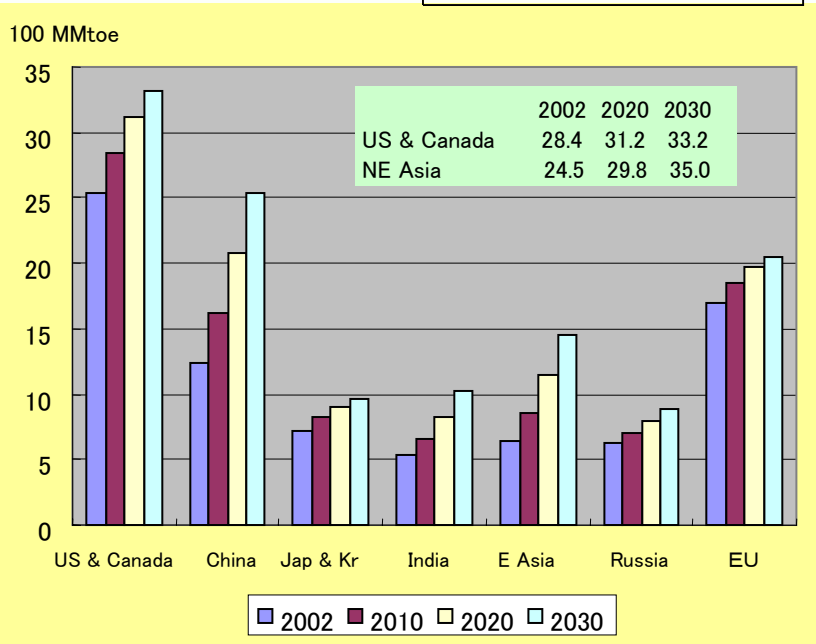
Oil	MMt	%
China	276	+11.5
Other Asia	729	+1.7
US, Europe, Others	2633	+1.3
World	3636	+2.1

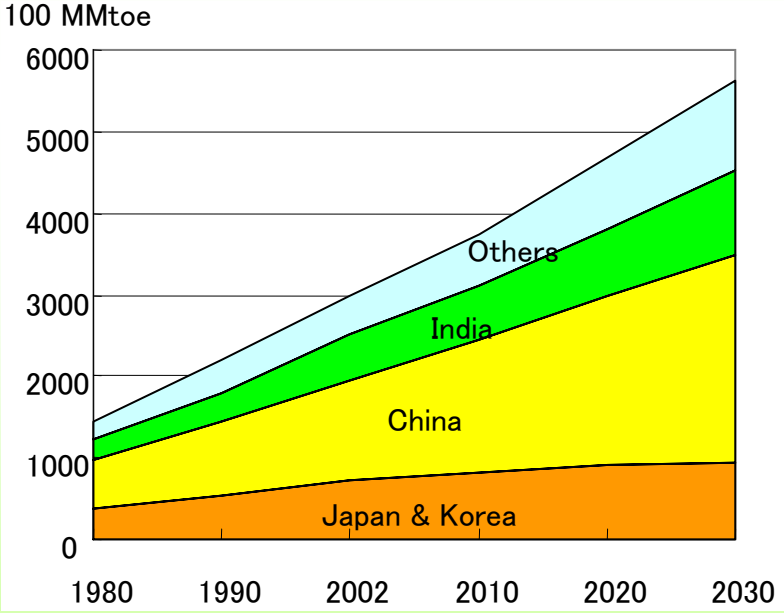
1.2 Energy Outlook of Asia

IEA World Energy Outlook 2004

1. Northeast Asia, one of the three major energy market of the world, will exceed north America.
2. In Asia, China's energy consumption will grow rapidly while those of Japan and Korea remain moderate.

	1980	2002	2020	2030
Jap & Kr	27.1%	24.2%	19.4%	17.0%
China	41.9%	41.6%	44.2%	45.1%
India	17.0%	18.0%	17.7%	18.2%
Others	14.1%	16.2%	18.8%	19.7%
Total	100.0%	100.0%	100.0%	100.0%

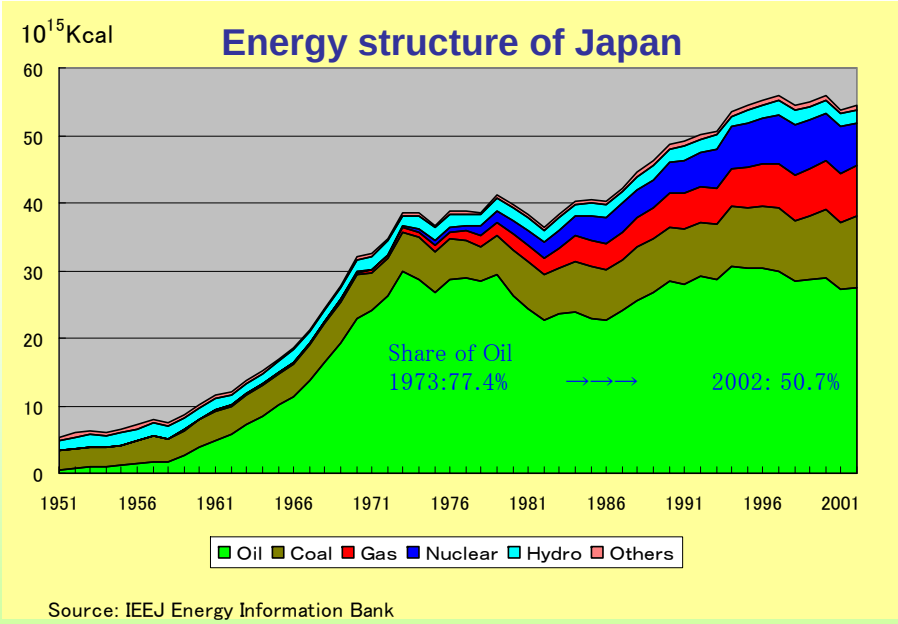


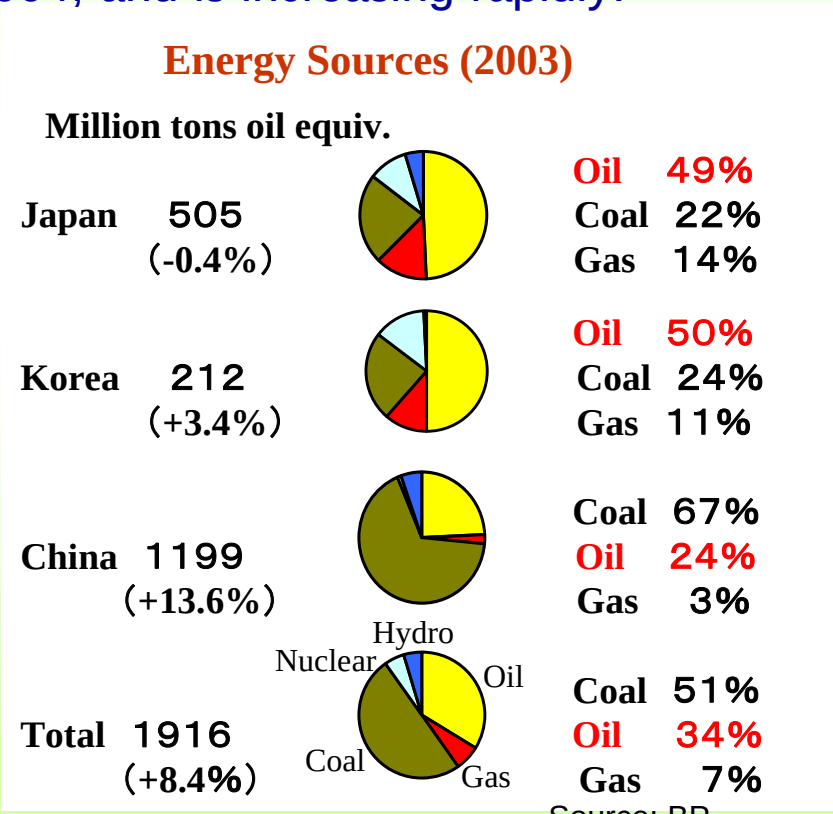


Source：IEA World Energy Outlook 2004

1.3 Energy Structure of Northeast Asia

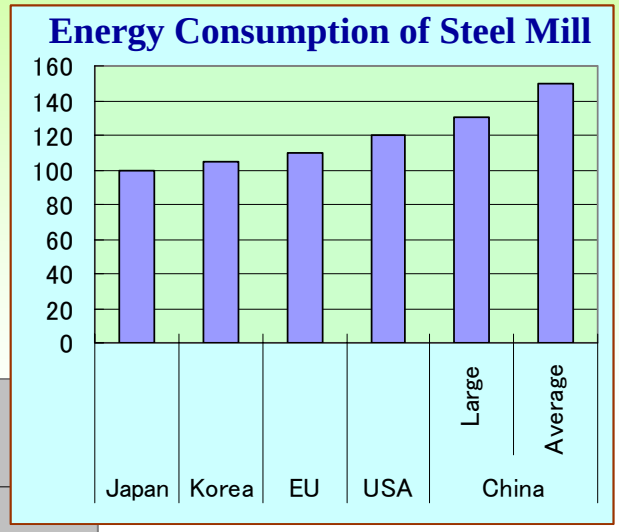
1. Japan & Korea: Heavily depend on import.
   Oil and Gas are the major energy sources. Coal is also imported.
2. China : 90% self sufficient, while oil is partly imported.
   Coal is the major energy source, with serious environmental problems.
3. China's oil import exceeded Korea's in 2004, and is increasing rapidly.
4. During the oil crisis of 1970s, Japan decreased oil use for power & industry. This cannot be expected for China.



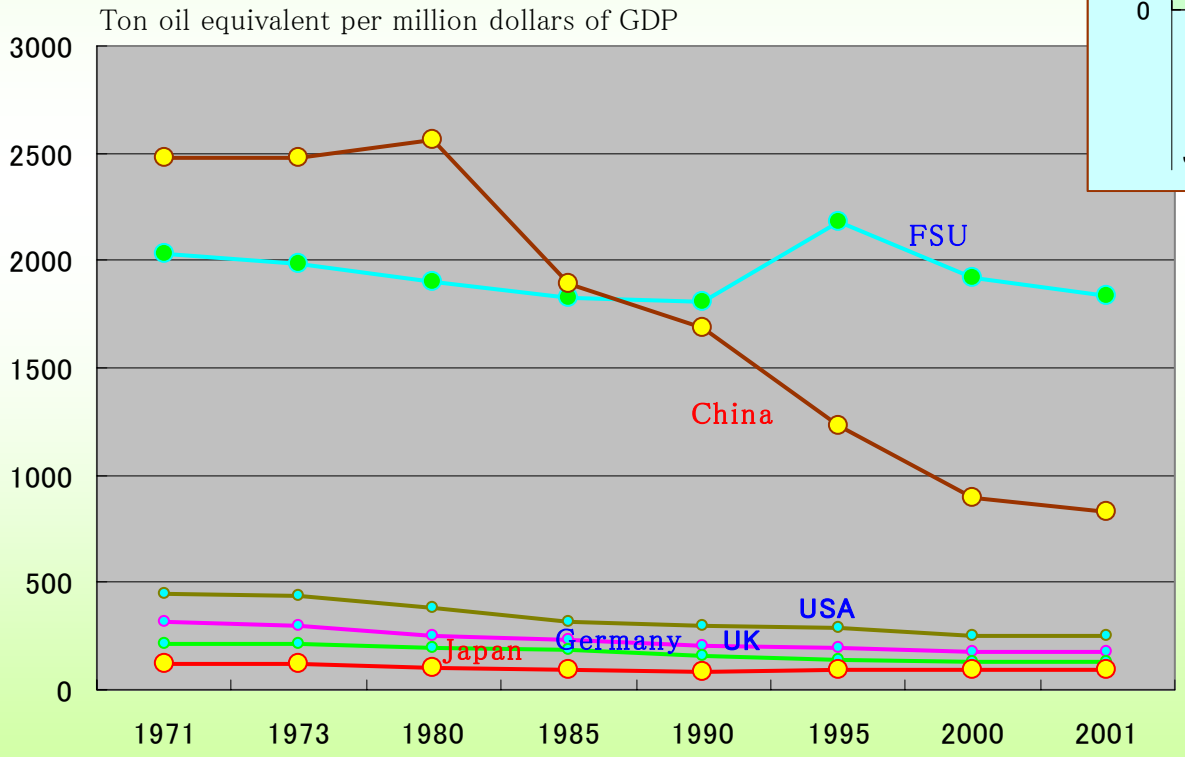


1.4 Energy Efficiency

1. China's energy efficiency has improved rapidly.
2. But, it is still 3 times higher than US and 9 times higher than Japan.



Source: Japan Steel Association

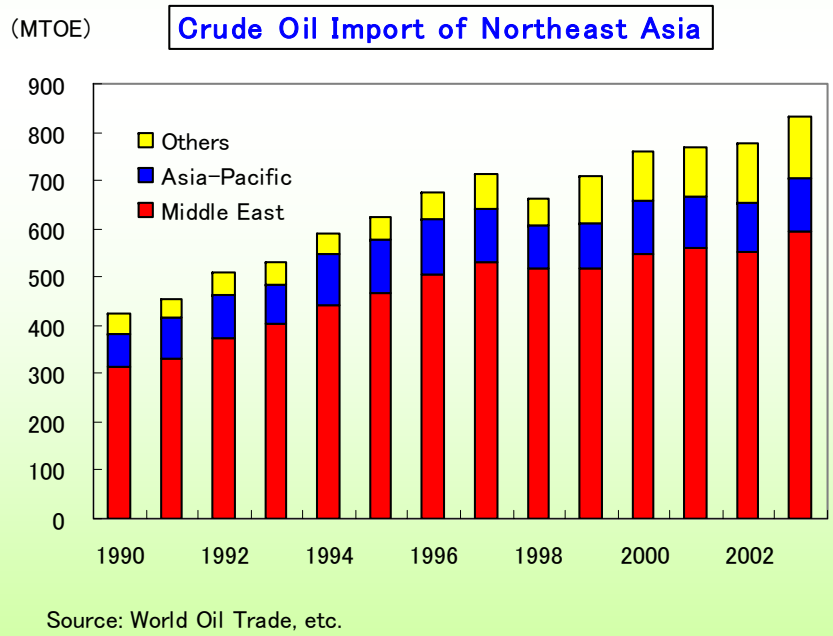


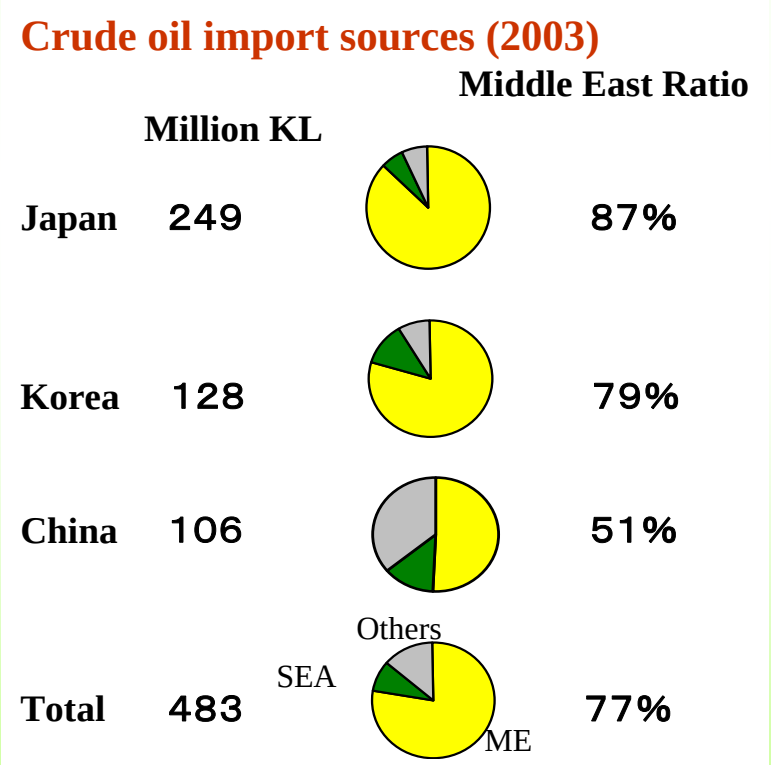
Source:IEA/IMF

1.5 Increasing dependence on the Middle East

1. Northeast Asia depends 3/4 of oil import on the Middle East.
2. To accommodate large increase in oil import, Middle East dependence will go up further.

(Note) In 2004, China's import of the Middle East crude decreased its share to 45.4% from 50.9% in 2003 due to sharp increase of lighter crude import from the Atlantic basin (+66%), while import of the Middle East crude increased by 20% in quantity.

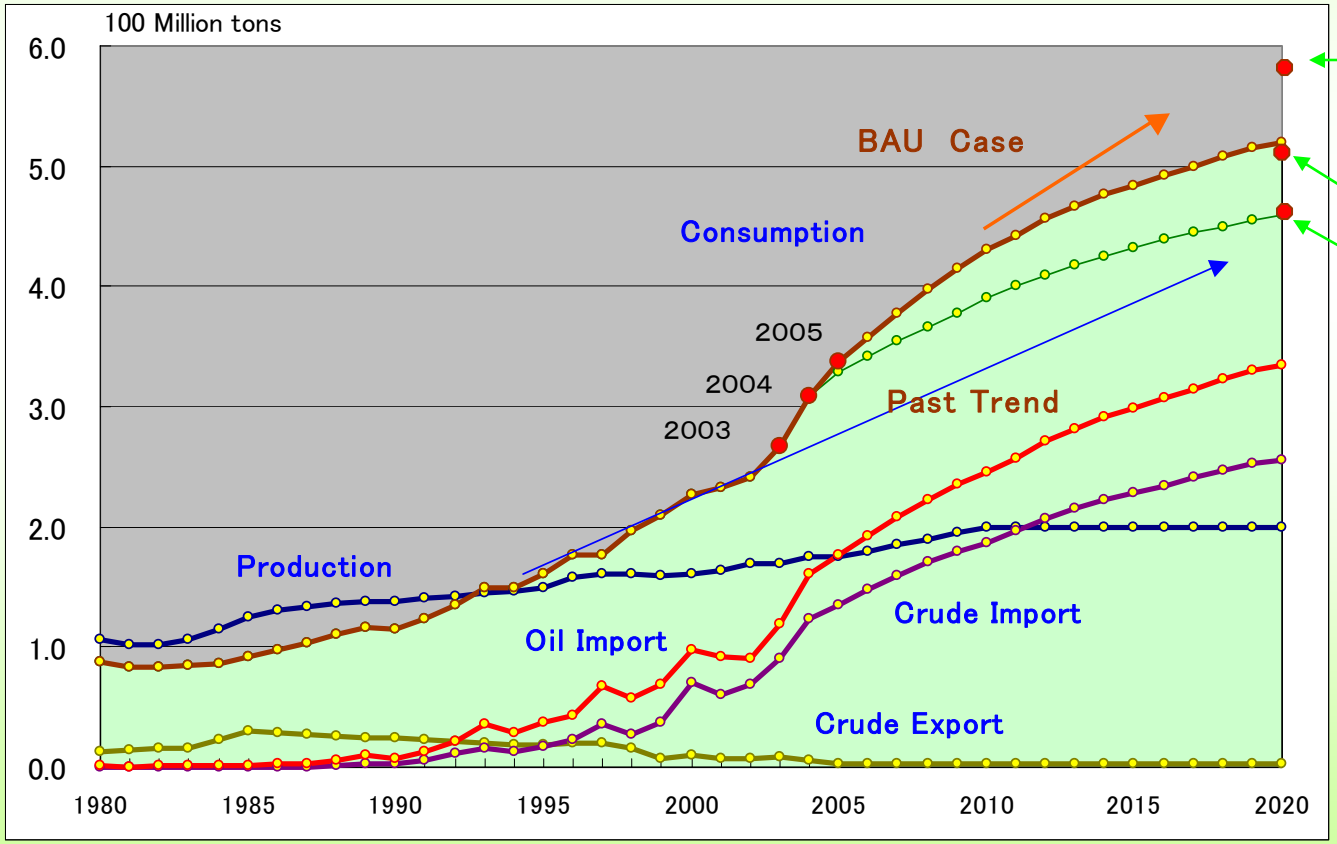




Source: National statistics

1.6 Petroleum Outlook of China

1 . China's oil demand will continue rapid growth.
2 . Existing large fields are depleting. China's oil production will be leveling off despite the intensive exploration efforts.
3 . Thus, substantial increase of oil import is unavoidable.



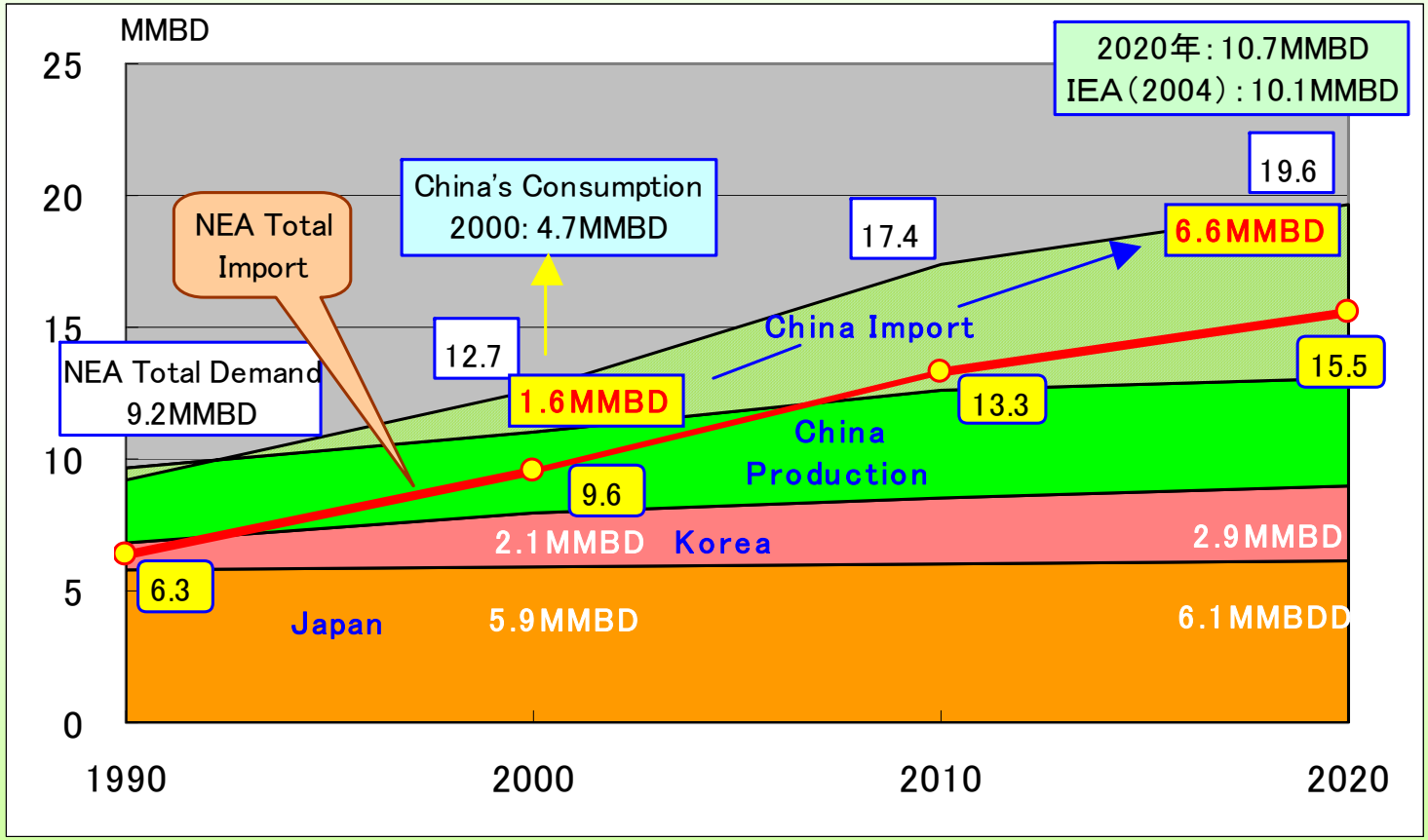
BAU Case
(IEEJ)
590MMT

IEA Scenarios 2004

	2020 MMt	2030 MMt
Reference	503	636
Alternative	464	559

1.7 Petroleum Outlook of Northeast Asia

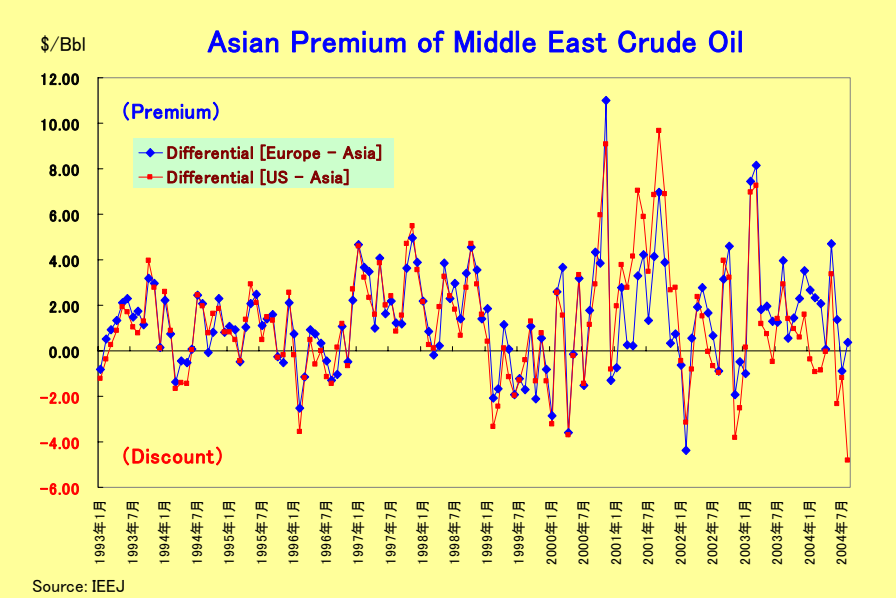
Oil import of Northeast Asia will increase by more than 5 MMBD by 2020, driving the Middle East dependence upward further.

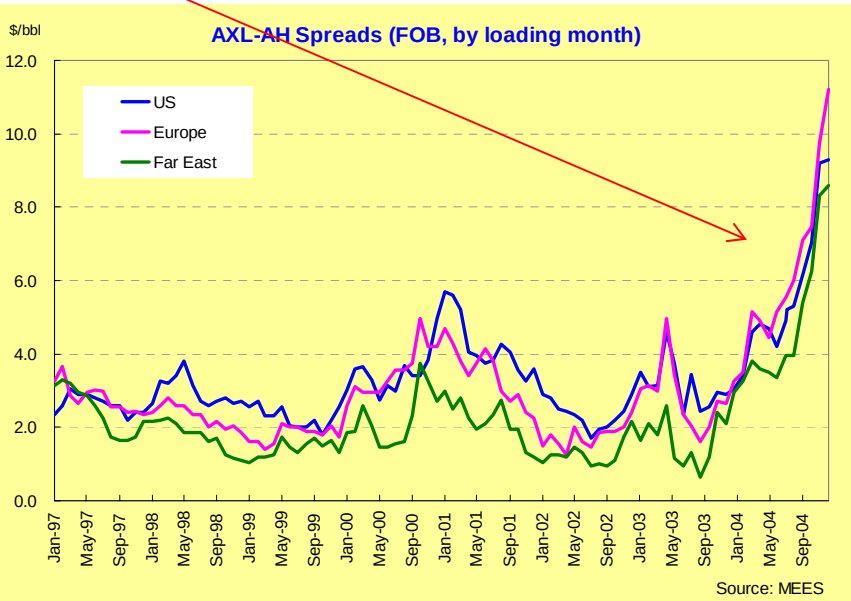


1.8 Oil Price and Asian Market

1. Asian Premium: ME crudes are priced $1/Bbl higher for Asia
   a. Middle East is the only reliable source as mega-suppliers
   b. Upward price pressure will continue as China and India keep increase import
   c. Effective cure is to develop new supply sources
2. Expanding Light-Heavy Spread
   a. Major demand increase for lighter products
   b. US and China competing for lighter crude oils in the Atlantic basin
   c. Lack of downstream investment for upgrading

China's Crude Import	2002	2003	2004
Middle East	49.6%	50.9%	45.4%
SEA	15.4%	13.2%	10.3%
Africa & Others	35.0%	35.9%	44.3%
Total (MMt)	69.41	91.13	122.82





1.9 Summary: Facts and Concerns

1. Facts

a. Northeast Asia is already a world-class energy market ranking with the United States and Europe.
b. Northeast Asia is growing fast to be the world largest energy market in 2020s.
c. Huge incremental demand for oil and gas have to be imported, as region's indigenous production will be leveling off.
d. Interdependence of Northeast Asian economies is progressing fast.

2. Issues and Concerns

a. Northeast Asia needs to secure stable and sufficient supply of energy to realize sustainable development.

Oil & Gas Import

x Increase of Middle East dependence is inevitable
x Oil price for Asia is not stable with Asian premium of the Middle East crude
x Congestion and piracy in Malacca straight

Introduction of Nuclear and Renewable Energies is an effective option

b. China's energy efficiency is low
c. China's environment pollution is serious

2.1 Regional Energy Cooperation

To solve energy issues facing Northeast Asia,
concerted efforts as a region is essential!

1. Securing imported energy requires international cooperation
   a. Emergency response
   b. Security of international transportation route
   c. Initiative to implement international projects:
      new energy sources, infrastructure and market

2. Development of technology and socio-economic system is essential to cope with increasing demand and environmental issues
   a. Rational use of energy and energy conservation
   b. Standardization of energy technologies
   c. Technology transfer and joint development of new technologies

3. Aspects to be considered in designing cooperation
   a. Issues of short term or long term?
   b. Characteristics of each energy source
   c. Feature of a project as business model

Role of government initiative is essential!

2.2 Short term and Long term

Energy issues should be addressed separately for short term and long term

1. Short term turbulence?

Caused by extreme weather or unexpected disruption?

Then, cures are to eliminate anxieties and speculations + quick response

a. Recognizing position : Quick and accurate information and statistics

b. Reinforcing supply flexibility and preparedness :

Stock Piling + Emergency Response Program

2. Long term mismatch ?

Caused by

a. Demand movement in the market difficult to control or predict

* Abrupt market enthusiasm : car, air conditioner, etc.
* Untransparent policy ; laws, guidance and enforcement especially on pricing control and environment protection

b. Long lead time required for supply capacity increase

* Mismatch in market accumulates for years while symptoms are not noticed nor properly taken care of

Cures are to reinforce the supply base developing new energy projects, which are huge and time-consuming, by proper navigation and initiative.

2.3 Characteristics of Energy Sources

1. To cope with short term turbulence, oil should be given a priority because of its superior flexibility for exchange.

	Transportation Method	Exchange Method	Current Capacity	Supplemental Supply
Coal	Ship	Cargo / Ship Exchange	OK	Currently Small
Oil	Ship	Cargo / Ship Exchange	Limited	Easy
Gas	Ship for LNG	Cargo / Ship Exchange	Limited	Possible
	Pipeline	Diverting allocation	None	Very Limited
Hydro Power Nuclear Renewables	High voltage Transmission Line	Diverting allocation	None	Very Limited
		Exchange of PNG and power will be limited by the capacity of supply source, trunk and branch lines.		

2. In the long run, energy base should be reinforced to accommodate increasing demand. Gigantic projects calls for international collaboration.
   - x Oil and gas exploration and development, Nuclear, Renewable Energies
   - x Pipelines, refining capacity, city gas network, etc.,
   - x Harmony with environment is important

2.4 Projects as Business Model

1. Characteristics of sectors as Business Model, oil and gas for example

Upstream	**Adventurous with high risk high return**	**Commercial business type**
Pipeline	**Stable if resource and market are assured**	**Utility type**
Market	**Unpredictable and long lead time**	**Commercial/utility mixture**

2. Project value for implementation

a. Commercially viable ... qualifying commercial criteria and in a pretty size

b. Economically feasible ... cost recovery is OK but not commercial, or too large in size for private sector

c. Socially required ... social benefit is large but not measurable

3. If not commercially viable (b and c), Social Benefit at the market is the key

For example, resource base of east Russian natural gas is huge, then,

a. Economics may be justified if transportation cost were reasonably low.

b. Pipeline economics can be politically adjusted if substantial social benefit exists.

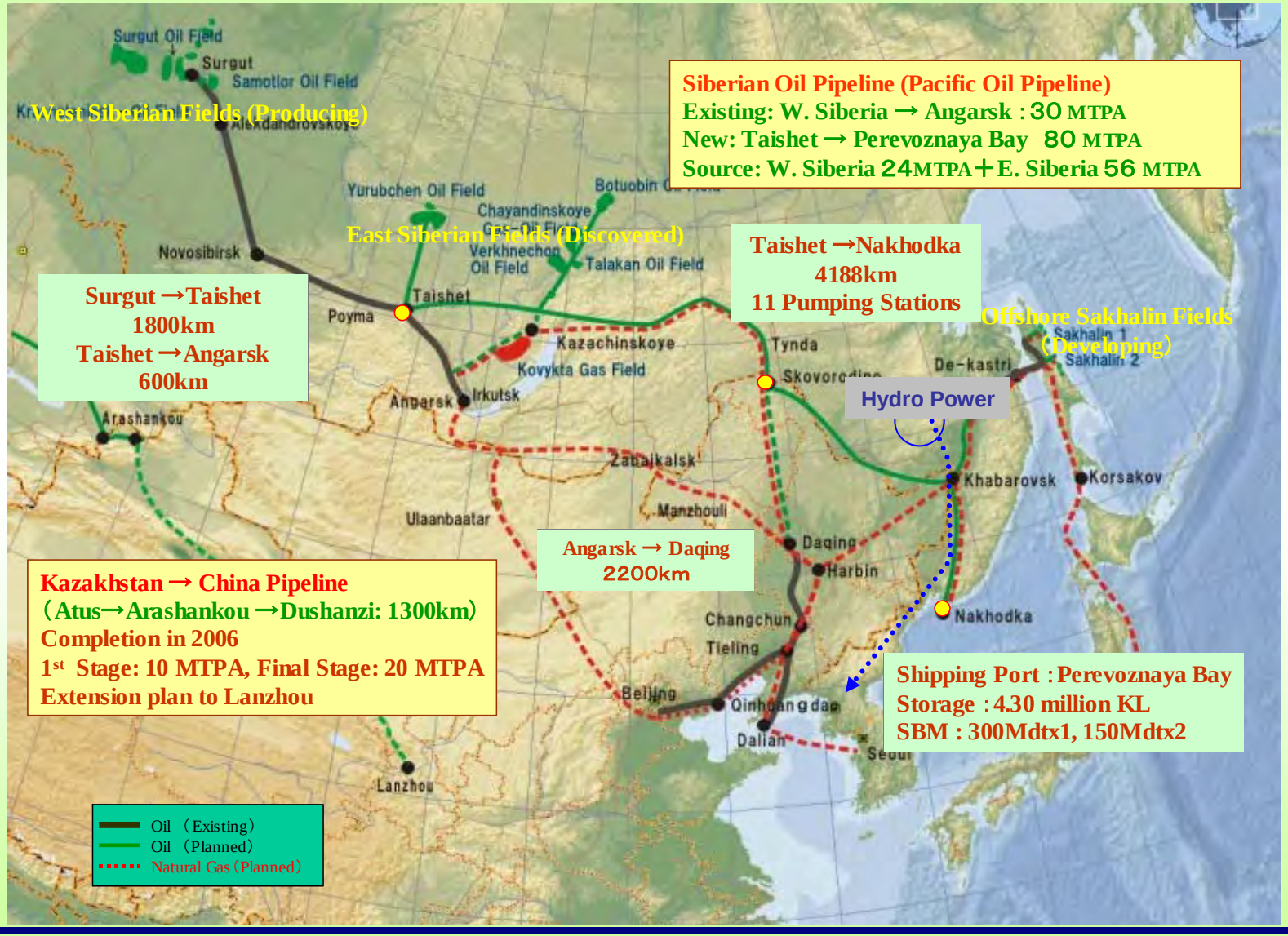
c. Social benefit should be defined as political consensus.

3.1 Potential Energy Projects

1. Upstream resources located in frontier areas of eastern Russia
   Coal, Crude Oil, Natural Gas and Hydro Power
2. Transportation Infrastructure :
   Railway, Long Distance Pipelines and HV Transmission Lines
3. Market : growing Chinese market needs investments
   Refinery, Power plants, Gas delivery network, Clean Coal Technology, ESCO
4. Renewable Energies/ Environment Improvement
   Mostly not commercially viable but socially required

	Upstream	Transportation	Market
Coal	Rich resource Abundant low quality coal	Railway and shipping port congestion	Japan & Korea : Available China : Heavy use causing serious pollution
Oil	Potentially rich, but yet to be confirmed	Pipeline is huge but relatively cheap	Readily available
Natural Gas	Rich potential	Pipeline is a huge project and costly	Japan & Korea : Maturing China : Yet to develop
Hydro Power	Rich potential	Transmission is very costly	Japan & Korea : Matured China : Main market is remote

3.2 Potential Energy Flow from Eastern Russia



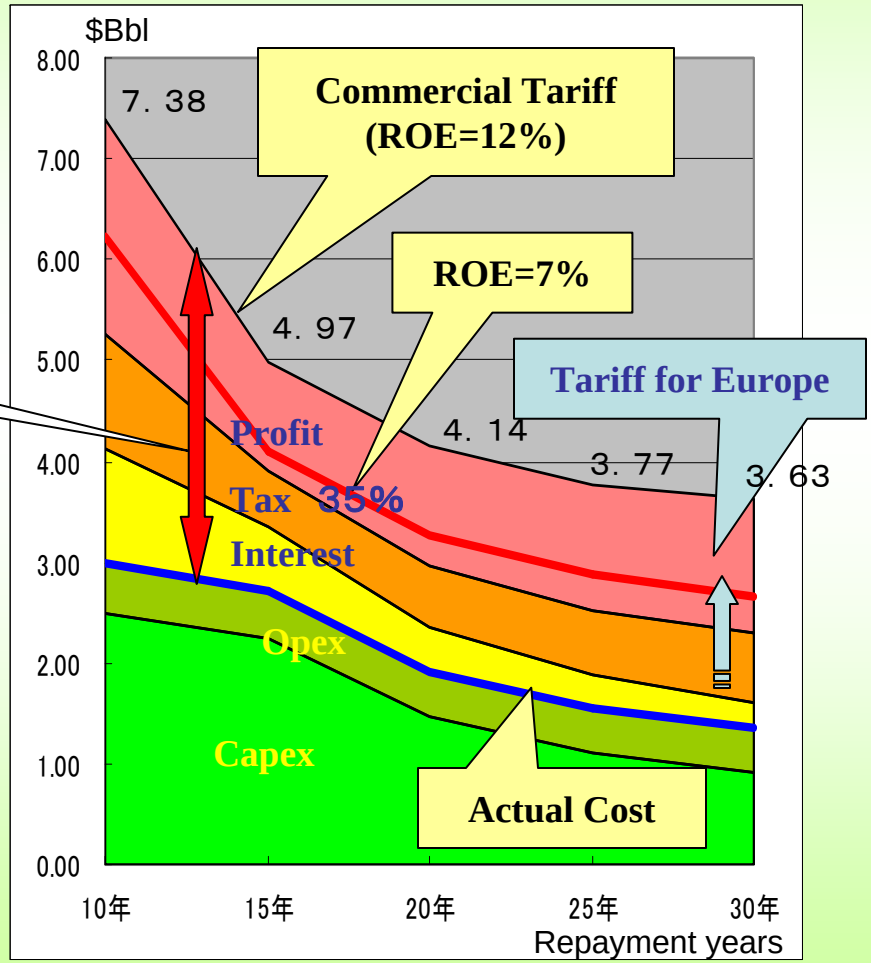
3.3 Pipeline Economics and Role of Government

1. Commercial Pipeline Tariff
   a. Economics heavily depends on loan repayment period
   b. Commercial project requires financial service fee of 1.5 – 3 times of (Capex+Opex)
   c. Price risk barrier for commerciality is 2.5- 4 times of the actual cost ($1.5-3/Bbl)

2. Government Initiative
   a. Only government can provide super long term credit for investment fund
   b. If viewed as public work, project threshold can be lowered to the actual cost
   c. Government can provide subsidy to lower project threshold further

3. Tax income for the government can be defined by the FOB price of crude
   a. Government can realize potential tariff by tendering, or
   b. recover the tax income from upstream

$12 billion Investment on oil pipeline for 1.6MMBD capacity



3.4 Oil Pipeline and Gas Pipeline

Length : ４０００ｋｍ
Investment : $１２B

Project Period	Pipeline Tariff ROE=12% (A)	Actual Cost (B)	Market Price (C)	B/A	A/C	B/C
Oil (1.6MMBD)	$/Bbl	$/Bbl	$/Bbl	%	%	%
15 years	4.97	2.70	CIF 50.0	54	10	5
25 years	3.77	1.55		41	8	3
Natural Gas (30 Bcm/y)	$/MMBTU	$/MMBTU	$/MMBTU	%	%	%
15 years	2.37	1.20	At City Gate 6.00	51	40	20
25 years	1.79	0.69		39	30	12

Oil Pipeline

- x Commercial Tariff is about 10% of the market price — **OK**
- x Substantially lower than rail transport (about $10/bbl) — **OK**
- x Crude oil contract term is shorter and flexible with sufficient market — **OK**
- x Project size is too large for the private sector — **?**

Natural Gas Pipeline

- x Commercial Tariff is 30 to 40% of the market price — **?**
- x Existing market of LNG is tightly guarded by long term contracts — **?**
- x PNG is inferior to LNG in market development — **?**
- x Project size is too large for the private sector — **?**

Government initiative is essential to realize natural gas pipeline, which will bring substantial social benefit to the region.

4.1 Areas of Regional Energy Cooperation

1. Preparedness for short term turbulence: being formulated
   a. Quick Information and Emergency Response
      x Joint Oil Data Initiative (JODI): 94 countries of the world participate to cover the over 90% of the world oil demand/supply data monthly
      x Real-Time Emergency Information Sharing System (RTEISS) : information exchange among APEC member countries
   b. Oil stock piling
      x Japan:173days, Korea:67days, China:Started with the first target of 20days
   c. Security of transportation route
      x Security of choke points on sea lane: ex. Malacca Straight

2. Long term regional cooperation program: yet to be discussed
   For the sustainable development, long term cooperation is important.
   a. Enhancing energy supply base: reserves, pipelines and infrastructure
   b. Rationalizing energy use
   c. Improving environment
   To implement these, regional dialogue for cooperation is necessary
      x Regional Energy Master Plan
      x Priority approach according to overall regional benefit

4.2 Agenda for Regional Approach

1. Reinforcing region's energy supply base
   a. Security of Oil Supply
   b. Utilization of Russian resources
      x Upstream exploration and development
      x Oil and gas trunk pipeline (from production-hub to market-hub)
   c. Settlement of international issues
      x Rules for transit
      x Joint development of resources in areas of international dispute

2. Rationalizing region's energy use
   a. Energy conservation and rational use
   b. Construction and modernization of gas and power delivery net
   c. Joint development of technology and socio-economic systems

3. Implementation program should be aligned with priorities on each item in view of urgency, possibility and lead time.

4. Role of government sector should be clearly identified
   a. International coordination on sovereign issues
   b. Initiative implementing not-readily commercial but socially beneficial projects
   c. Domestic laws, regulatory framework and supporting system

4.3 Oil

Oil is an international commodity and requires concerted efforts of the region.

1. Actions for Government Sector
   a. Emergency Response Plan and Oil Stock Piling
   b. Security of Sea lanes
   c. Initiative on Siberian and other oil pipelines
   d. Upstream E & P: Licensing framework and supporting system
   e. Downstream: Rules and regulations on licensing and market activities

2. Actions for Private Sector
   a. Oil purchase: Russian oil ex-Nakhodka will be a new momentum
      x Establishing a new Asian price marker
      x Greater bargaining power by joint purchase
      x Optimizing cargo/fleet operation
   b. Joint development of technology, product and market
      x Modernization of refineries and delivery network
   c. Large scale joint project: upstream, pipeline, etc.

4.4 Coal

1. Coal is and continues to be the major energy source of China.
2. Coal is causing substantial environmental problem in China.

Stable supply and rational use of coal in China will have considerable impact on the region's energy plan. However, industry policy, environmental policy and market reality is not clear and transparent. Major issues and areas for cooperation will be:

a. Development of coal mines
  x Modernization of coal mines
  x Rational exploration and development plan
b. Upgrading of transportation system
  x Roles of rail, road and ship transportation
c. Rational use of coal
  x Clean Coal Technology
d. Joint technology development
  x Efficient clean coal technology
  x Gasification and hybrid use for CCGT

4.5 Natural Gas

1. Natural gas will be one of the region's preferable option to ease future energy supply and environmental issues.
2. Huge natural gas reserves have been identified in eastern Russia. However, interior gas needs trunk pipeline which is costly.

Areas and agendum for regional cooperation to widely utilize natural gas will be:

a. Developing Russian resources and constructing regional trunk pipeline
   - x Regulatory framework and governmental support
   - x Cooperation of upstream, transit and consuming countries
   - x Rules for pipeline transit

b. Regional natural gas market development plan
   - x Energy and environment policy plus institutional supporting system

c. Natural gas utilization (Technology transfer/Joint Development)
   - x LNG, CHP, CCGT and other technologies

d. Financial arrangement
   - x Institutional finance (WB, ADB, JBIC, etc)
   - x Benefits and contribution of each countries

4.6 Electric Power

Electric power demand expanding rapidly, power shortage is reported elsewhere in China causing substantial impact on industry activity and human life. The government is trying to expand supply as fast as possible. Areas and agenda for regional cooperation will be:

1. Medium term objectives
   a. Modernization and upgrading of power stations
   b. Optimization of transmission/linkage system management
   c. Demand side management
   d. Financial arrangement

2. Long term agenda
   a. Nuclear power station and nuclear cycle
   b. Power supply from Russia (long term objective)
   c. Joint technology development

4.7 Energy Conservation and Renewable Energies

1. Energy conservation or rational use of energy is very important factor to realize energy structure toward sustainable society.
2. Energy conservation and renewable energies are preferable options to improve environment and global warming.
3. Renewable energies are not readily commercial, but with substantial social benefits. China created “Renewable Energy Act” to be put in force in 2006.

Areas and agenda for regional cooperation will be:

1. Technology exchange and joint development
   a. Energy conservation technologies and business systems like ESCO
   b. Clean power linkage to major network
   c. Base technology development for PV and fuel cell
2. Implementation of CDM projects
   a. Establishment of regional cooperation policy on CDM
   b. Rules and regulatory framework
3. Global warming
   x Energy policy need to be aligned to realize regional joint efforts

5. Conclusion ...

Approaches toward Regional Cooperation

1. Global actions are being implemented on preparedness against emergency
   a. Joint Oil Data Initiative (JODI)
   b. Real –Time Emergency Information Sharing System (RTEISS)
   c. Oil stock piling is being built up.

2. However, Northeast Asia has not started dialogue on issues and agendas specific to the region. Region's energy demand and import expanding rapidly,regional dialogue is important and urgent.
   a. Establishing regional action plan for emergency
   b. Reinforcing energy supply base
      x Introduction of Russian resources to Northeast Asia
      x Solution to territorial disputes
   c. Promoting energy conservation, rational use and CDM
   d. Security issues relating to promotion of nuclear power

3. As a first approach,Regional Energy Plan should be discussed to give a basis to identify benefits of and priority in the regional cooperation.

...and Recommendations

Northeast Asia Energy Partnership: from aid to collaboration

1. Implementing body
   a. Northeast Asia Energy Initiative at government level
   b. Northeast Asia Energy Forum for private sector players

2. As the first approach, non-binding dialogue should be called on to identify priority agendas.
   a. Joint study on regional energy outlook
   b. Areas of collaboration
   c. Evaluation of potential joint projects

3. After moderating process, organization for regional energy partnership shall be established.

Government initiative is essential to implement!

謝　謝　大　家 **Thank You**

