

Energy Security in North Asia

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CEO & Chairman

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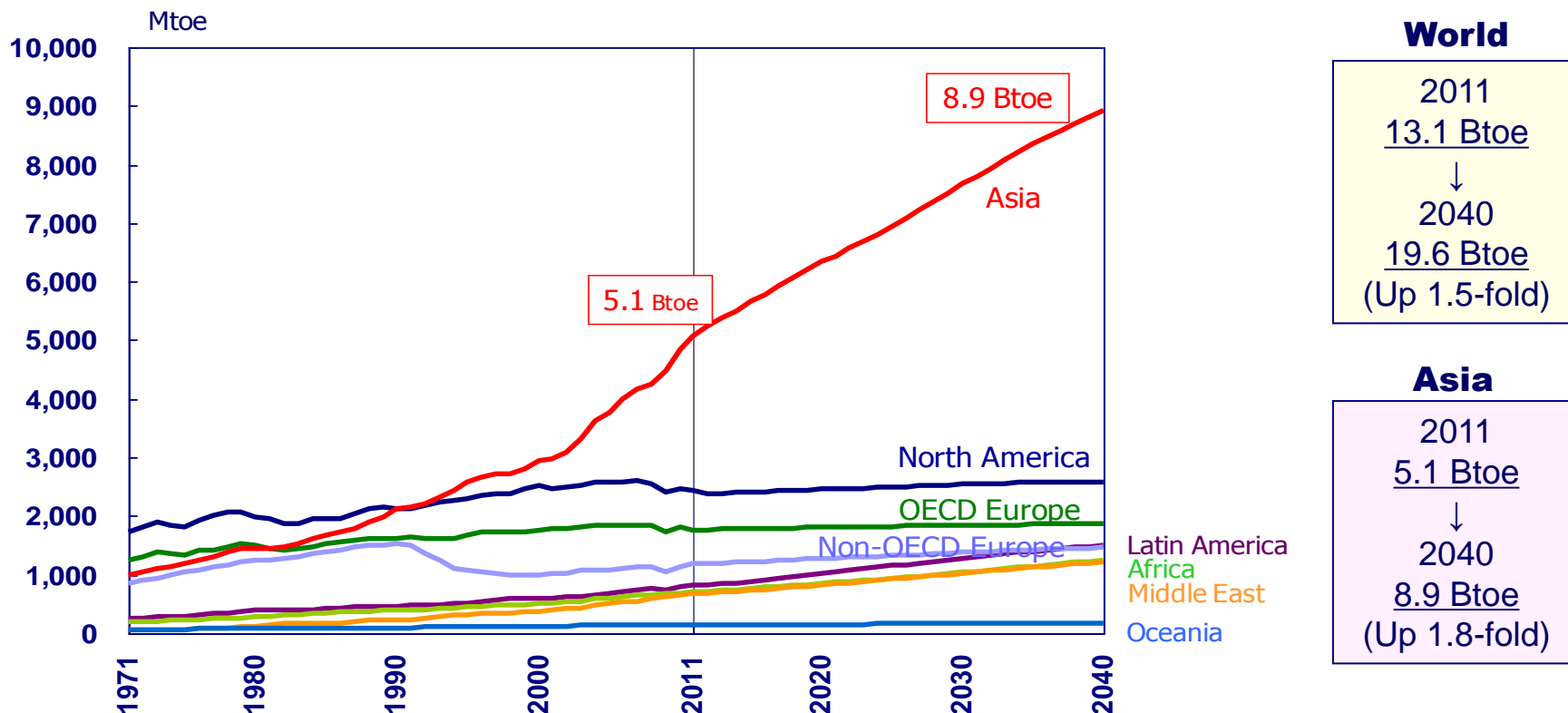


- 1. Asia: A Center of Growth and Energy Consumption**
- 2. Recent Uncertainties in the Global Energy Landscape**
- 3. How to ensure energy security under those uncertainties
: Four cooperative agenda for North East Asia**
- 4. Conclusions**

- 1. Asia: A Center of Growth and Energy Consumption**
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1. Asia : Center of growth and energy consumption

1-(1) World Energy Supply and Demand Outlook (by Region)



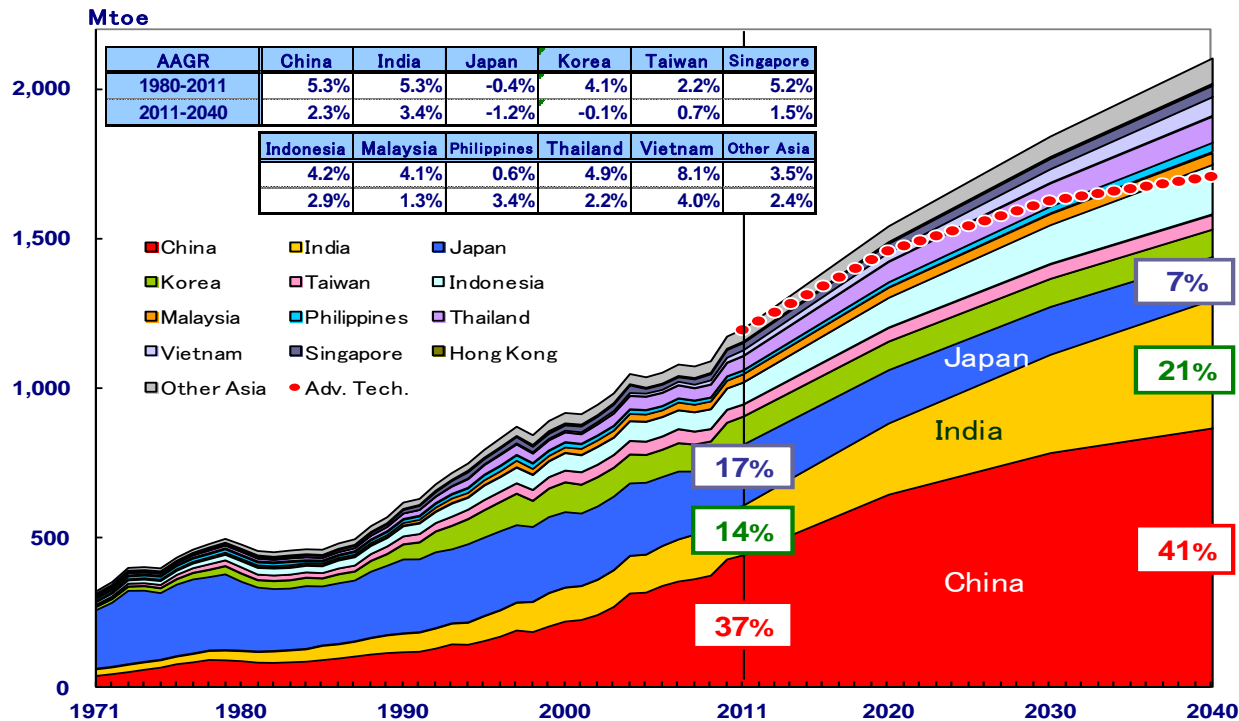
- Under steady economic growth assumptions, **Asian energy consumption in 2040 will increase 1.8-fold** from the present level (from 5.1 billion tons in 2011 to 8.9 billion tons in 2040). Non-OECD countries will account for about 90% of global energy consumption growth between 2011 and 2040.

Source: IEEJ "Asia / World Energy Outlook 2013"

1. Asia : Center of growth and energy consumption

1-(2) Primary Energy Demand by country (Asia)

Reference
Adv. Tech.



0.39 bil.toe
(19%)
Reduction

2011
1.20 bil.toe (24.5 mbd)

↓

2040

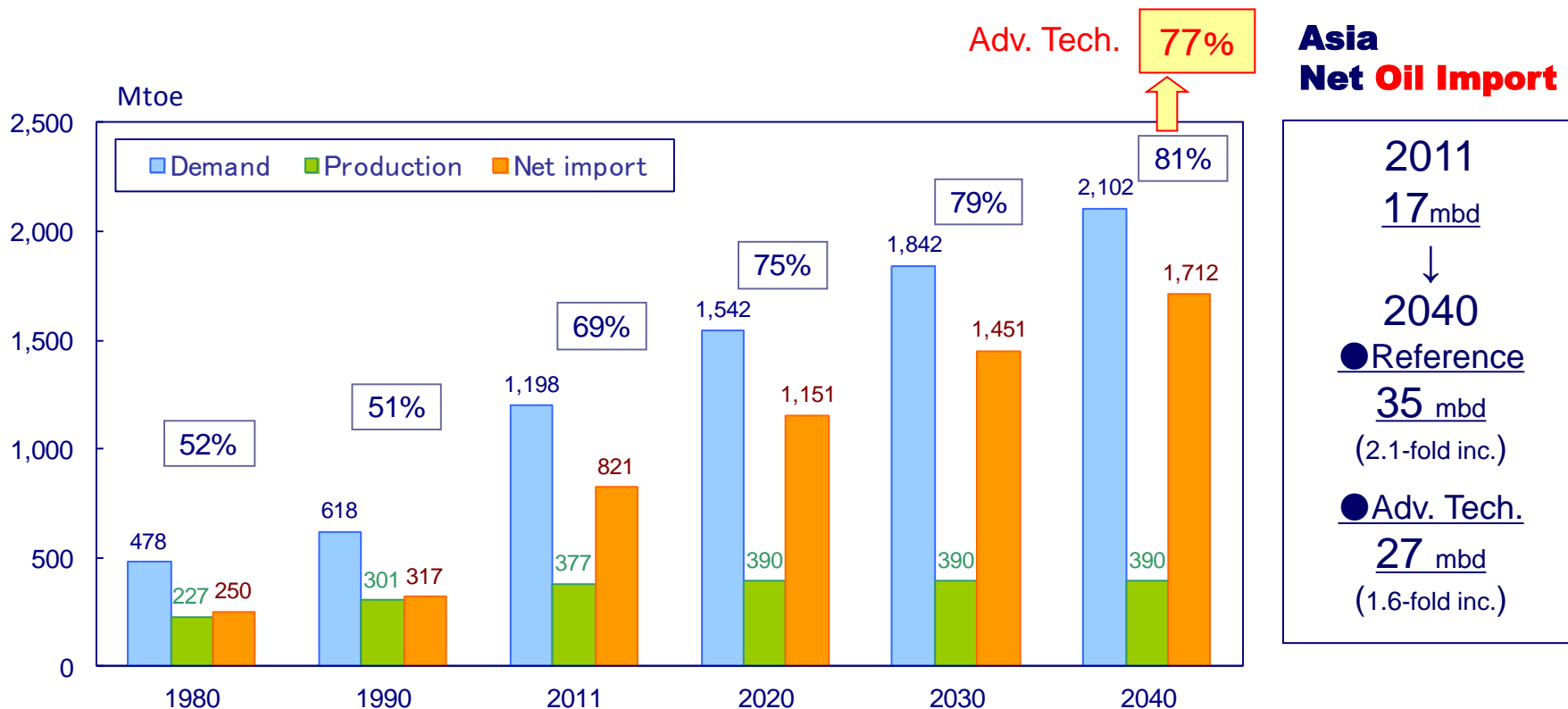
- Reference
2.10 bil.toe (43.0 mbd)
- Adv. Tech.
1.71 bil.toe (35.1 mbd)

- Though the vehicles' fuel efficiency may be improved, and clean energy vehicles may expand, oil demand in Asia will expand from 24.5 million B/D in 2011 to 43.0 million B/D in 2040, due mainly to its escalating vehicle ownership. The share of China and India together in Asian oil demand will grow from 51% in 2011 to 62% in 2040.
- Even in the Adv. Tech. Scenario, projected oil demand saving will be equal to 19% of the Reference Scenario in 2040.

Source: IEEJ "Asia / World Energy Outlook 2013"

1. Asia : Center of growth and energy consumption

1-(3) Energy independence is increasingly weakened in Asia



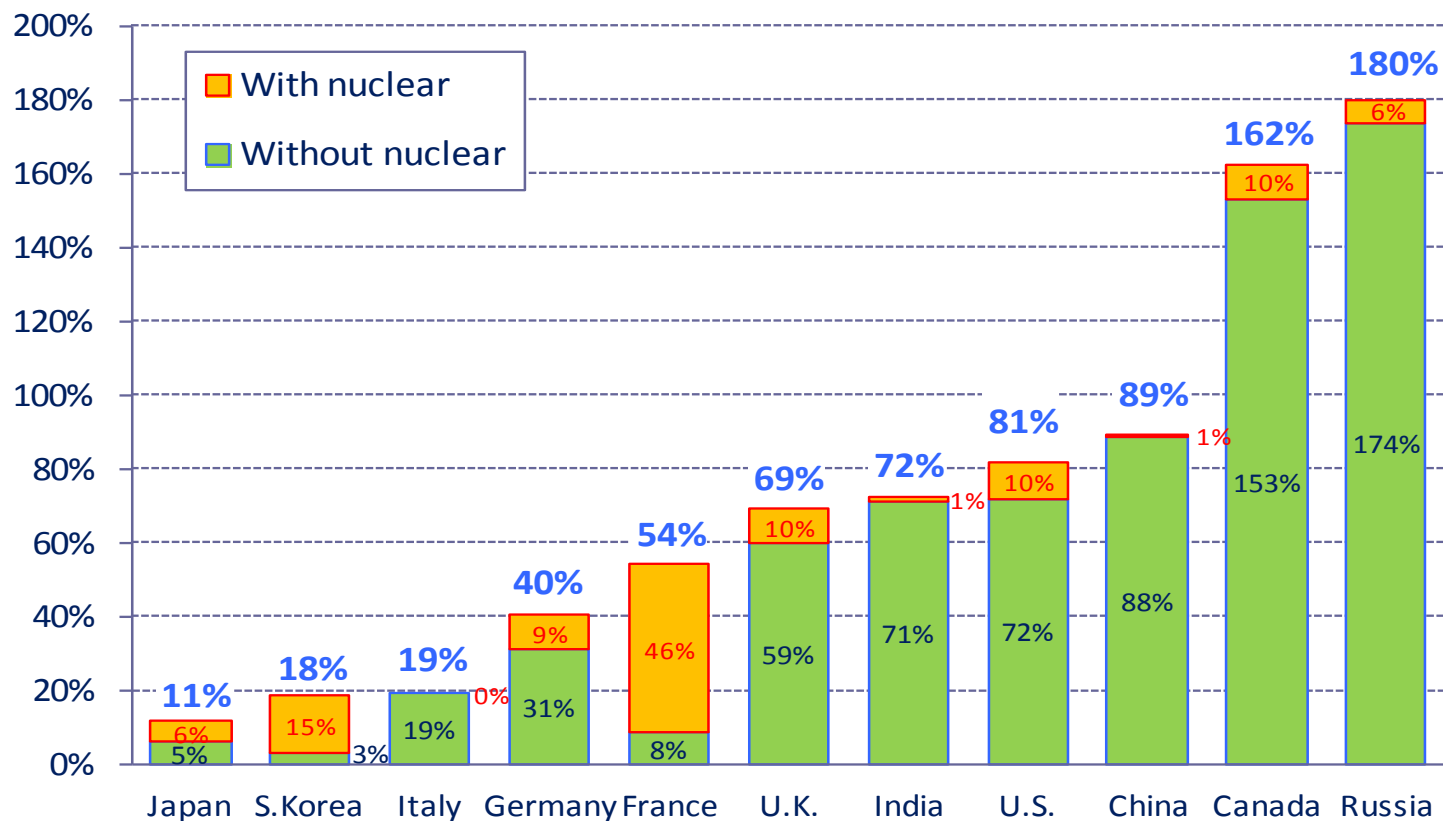
- Net oil import in Asia will expand from 17 mb/d (720 Mtoe) in 2011 to 35 mb/d (1,712 Mtoe) in 2040.
- Oil production in Asia (such as China, India, Indonesia and Malaysia) will marginally increase, not keeping pace with the steady increase in oil demand. Therefore, net oil import ratio will reach 81% in the Reference Scenario, and 77% in the Adv. Tech. Scenario by 2040 (compared with 69% in 2011).

Source: IEEJ "Asia / World Energy Outlook 2013"

1. Asia : Center of growth and energy consumption

1-(4) Very low self-sufficiency in Korea and Japan

Self sufficiency rate (2011)

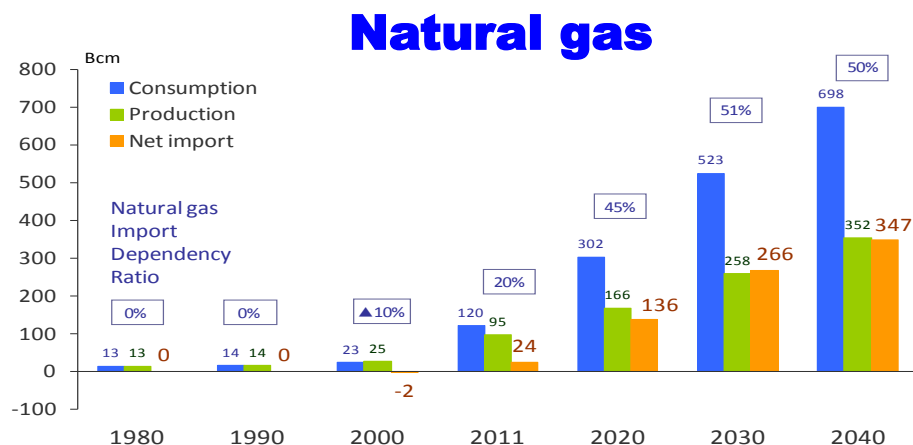
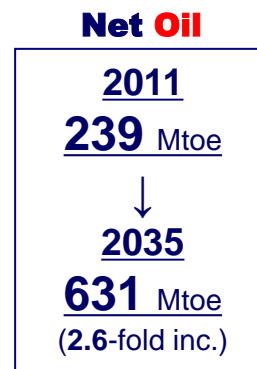
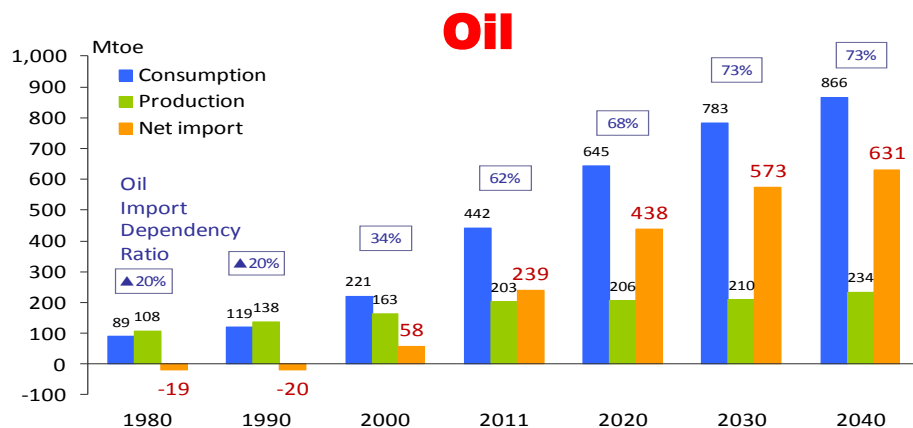


Source: IEA "Energy Balances of OECD countries"

1. Asia : Center of growth and energy consumption

1-(5) Energy Vulnerability is increasing in China

China's supply and demand outlook on Oil and Natural gas



- Increasing dependence on energy imports = Increasingly recognized as a vulnerability (esp. by China)
- Full-scale countermeasures include developing domestic energy, diversifying supply sources, independently conducting overseas development and strengthening companies as players.
- However, these actions may increase the hoarding of and competition for resources, destabilizing the international markets.

1. Asia: A Center of Growth and Energy Consumption

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2. Recent Uncertainties in the Global Energy Landscape

2-(1) Uncertainty in M.E. has deepened as Arab Spring spread.

Uncertainty over Middle East Peace issues

Iraqi situations after the war

Tensions on Iran Nuclear development

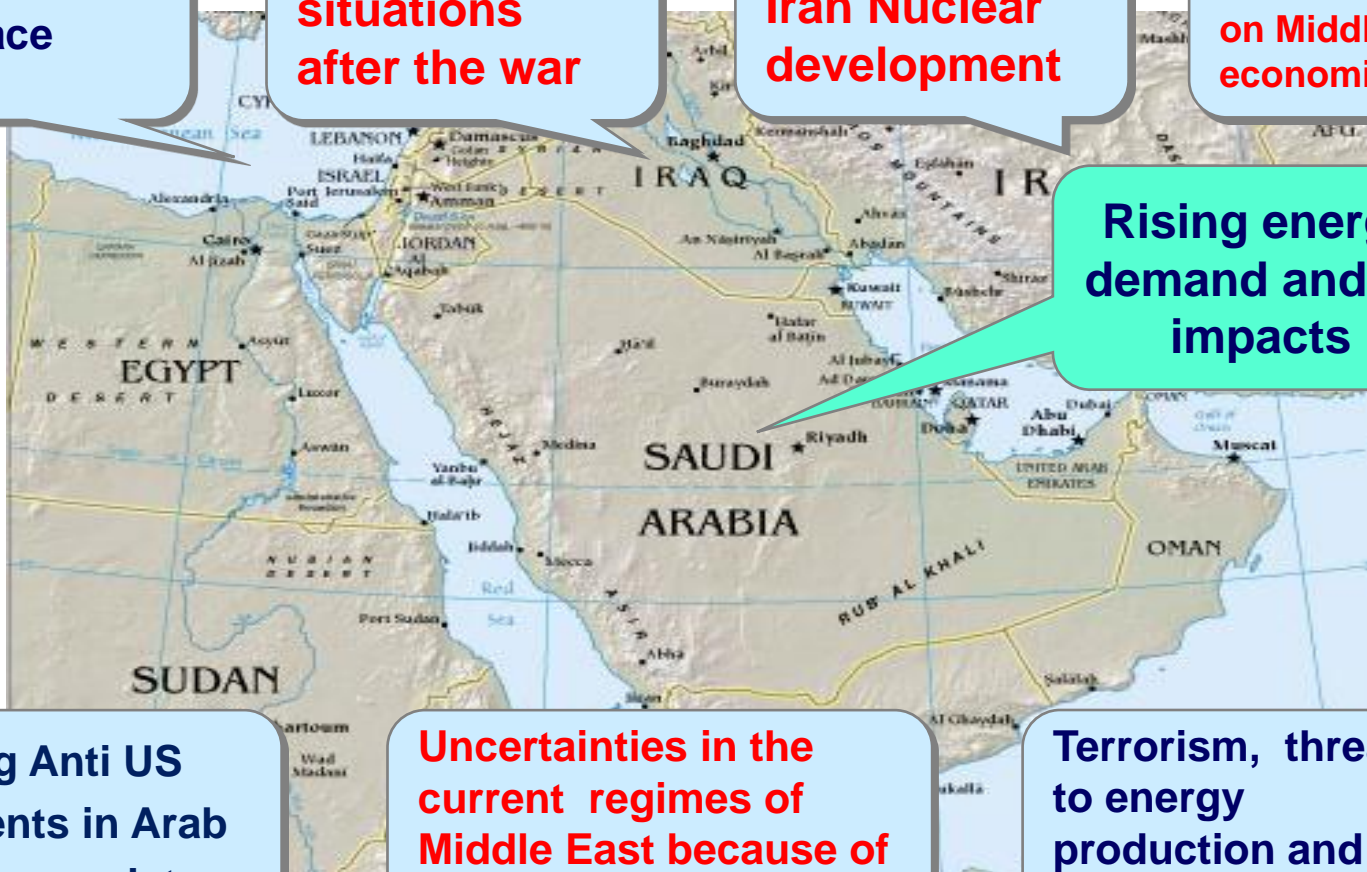
Shale Revolution and its impact on Middle East economics

Rising energy demand and its impacts

Growing Anti US sentiments in Arab and Islam society

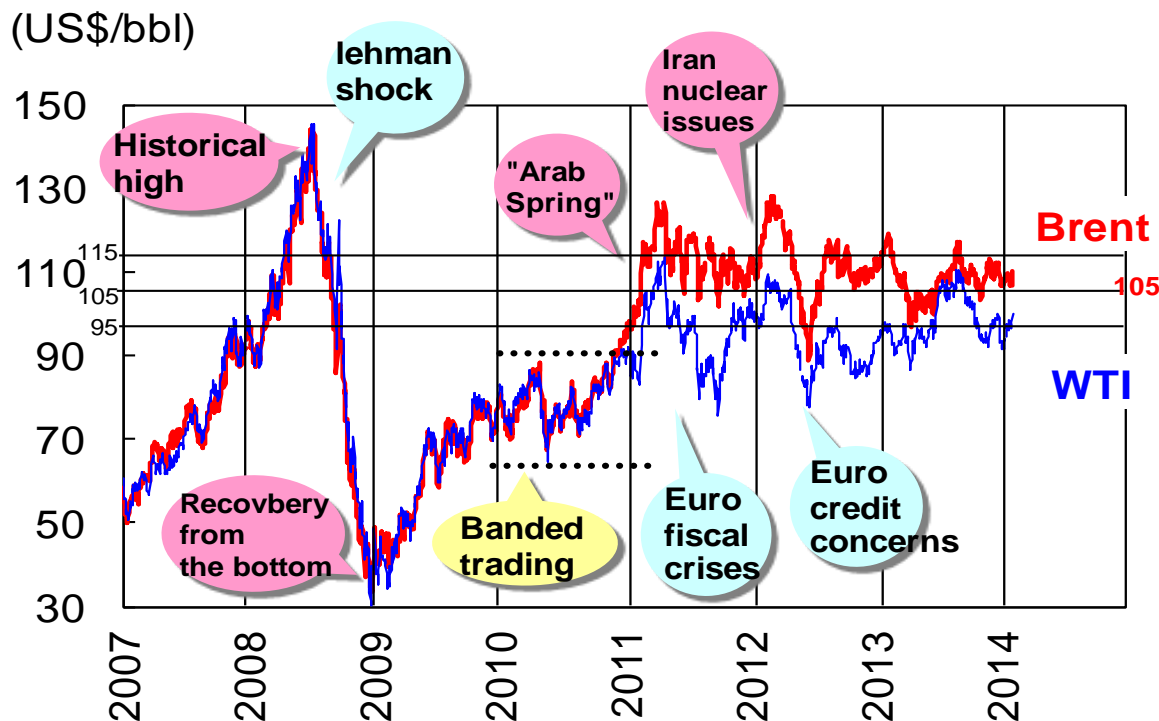
Uncertainties in the current regimes of Middle East because of "Arab Spring"

Terrorism, threats to energy production and exports



2. Recent Uncertainties in the Global Energy Landscape

2-(2) Oil Prices hovering at high level



Source: EIA/DOE

- In 2013, oil prices remained high (more than \$100/bbl) for the third consecutive year since 2011.
- Average Brent crude oil price is forecasted at \$105/B (\pm \$10/B) for 2014.

- Average Brent crude oil is \$109/bbl (WTI \$98/bbl)
- The price has remained at a historically very high level since 2011.
- In November 2013, provisional agreement was reached on Iran's nuclear development. However, its impact on oil prices is limited due to persistent geopolitical concerns over Syria and Iraq.
- In the US, WTI prices have dropped since the summer of 2013 due to the easing demand for oil caused by increasing production of shale oil. The difference with the Brent price is now greater than \$10/bbl.

2. Recent Uncertainties in the Global Energy Landscape

2-(3) Shale revolution ①

The surge in unconventional oil & gas has huge implication.



Remaining technically recoverable **Oil resources** by type and region

(billion barrels)	Conventional		Unconventional			total
	Crude oil	NGLs	Extra heavy oil and bitumen	Kerogen oil	Light tight oil	
OECD Americas	253	57	809	1000	70	2188
OECD Europe	59	31	3	4	18	116
E.Europe/Eurasia	352	81	552	20	14	1019
Asia	100	37	3	16	63	219
Middle East	982	142	14	30	4	1172
Africa	255	52	2	0	33	341
Latin America	245	32	498	3	37	815
World	2245	433	1880	1073	240	5871

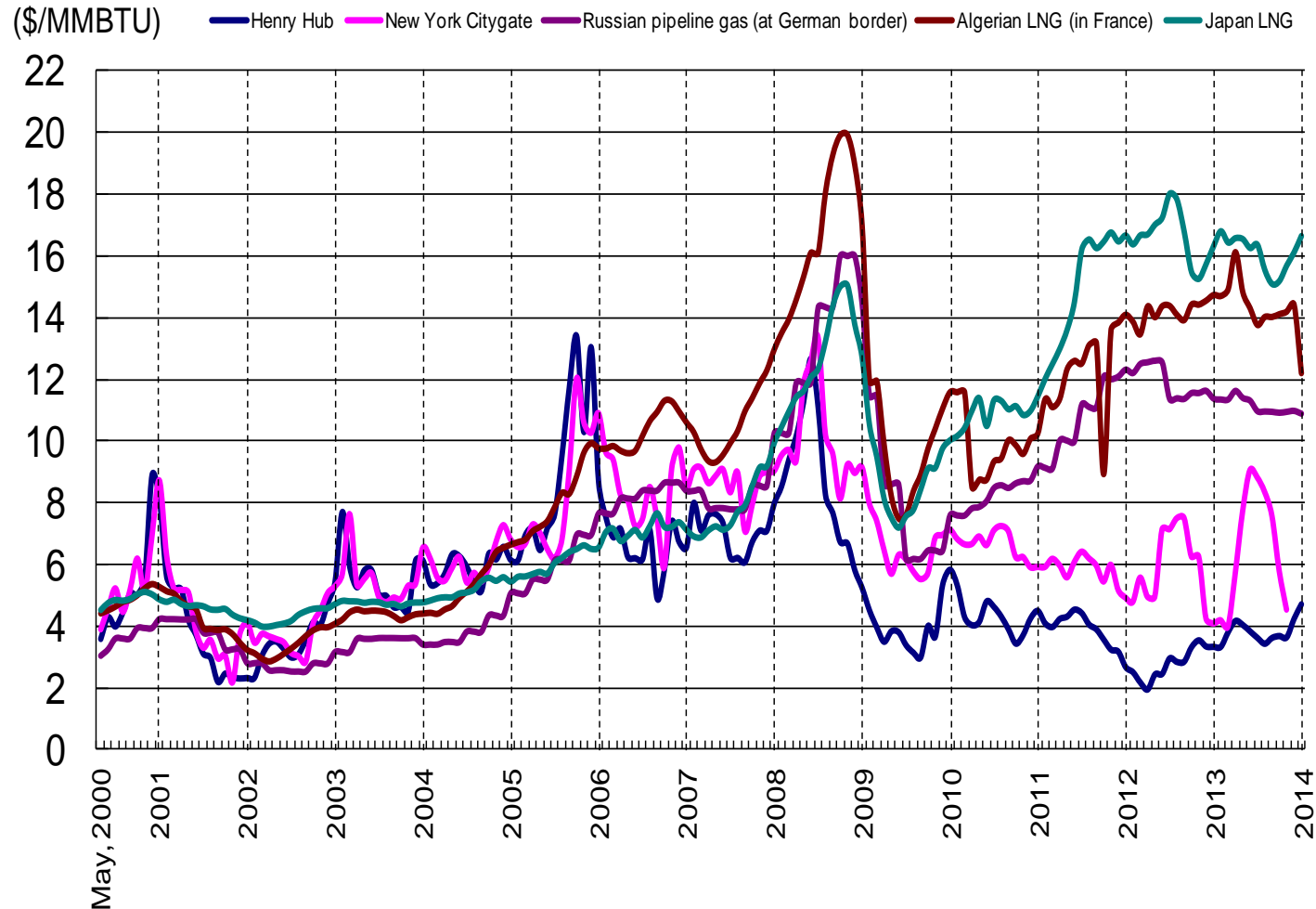
Remaining technically recoverable **Natural gas resources** by type and region

(tcm = trillion cubic meters)	Conventional	Unconventional			total
		Tight gas	Shale gas	Coalbed methane	
E.Europe/Eurasia	144	11	12	20	187
Middle East	125	9	4		137
Asia-Pacific	43	21	57	16	137
OECD Americas	47	11	47	9	114
Africa	49	10	30	0	88
Latin America	32	15	33		80
OECD Europe	24	4	16	2	46
World	462	81	200	47	790

Source:
IEA
"World
Energy
Outlook
2012"

2. Recent Uncertainties in the Global Energy Landscape

2-(3) Shale revolution ② : Asian premium



Japan LNG

France LNG
from Algeria

German border:
Pipeline gas from
Russia

US: NY City Gate
(Pipeline gas)

US:
Henry hub
(Pipeline gas)

Sources: Japan's customs clearance statistics and Energy Intelligence Data from the US Department of Energy

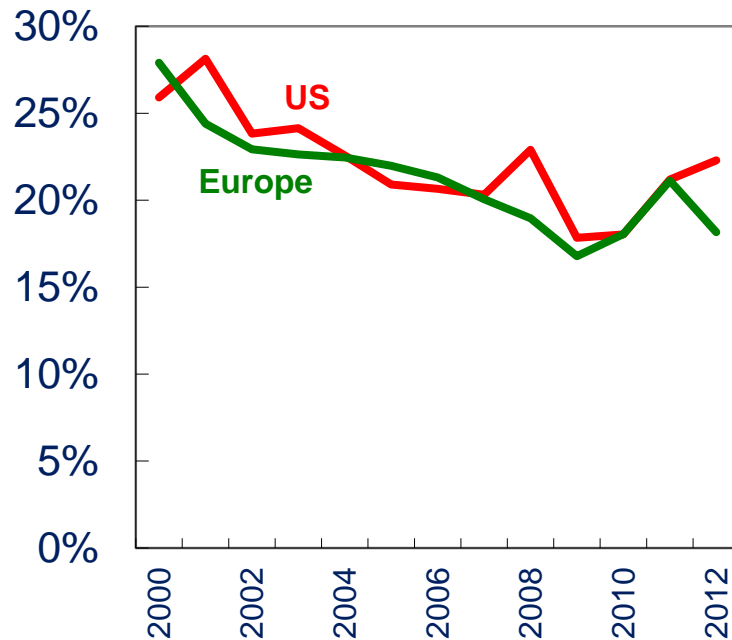
2. Recent Uncertainties in the Global Energy Landscape

2-(3) Shale revolution ③

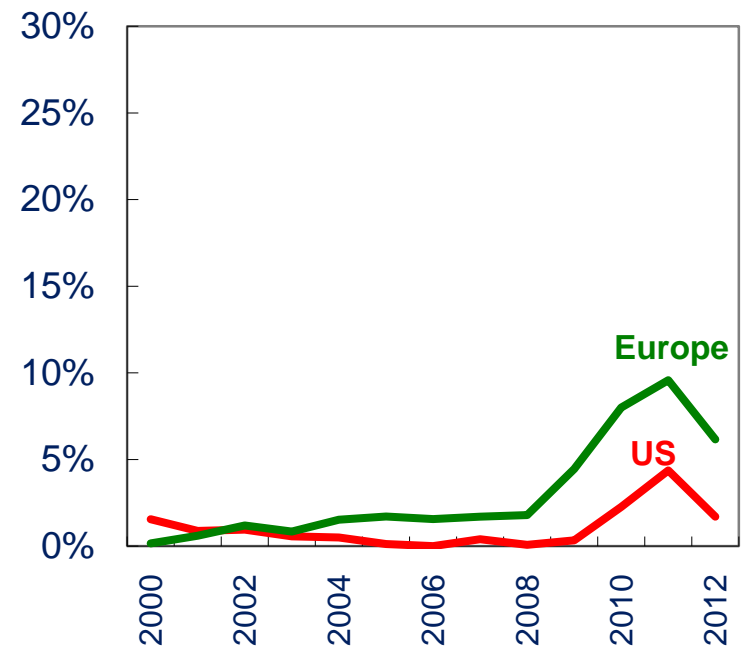
: Implications of US Energy Independence



Dependence of Oil import on the Middle East



Dependence of Natural gas import on the Middle East



- **Oil:** US dependence on the Middle East continues to decline, while imports from Canada and Central and South America are increasing. European dependence on the Middle East also continues to decline, while imports from former USSR countries are increasing.
- **Natural gas:** Dependence on the Middle East is slightly increasing due to reinforced LNG export capacity in the Middle East.

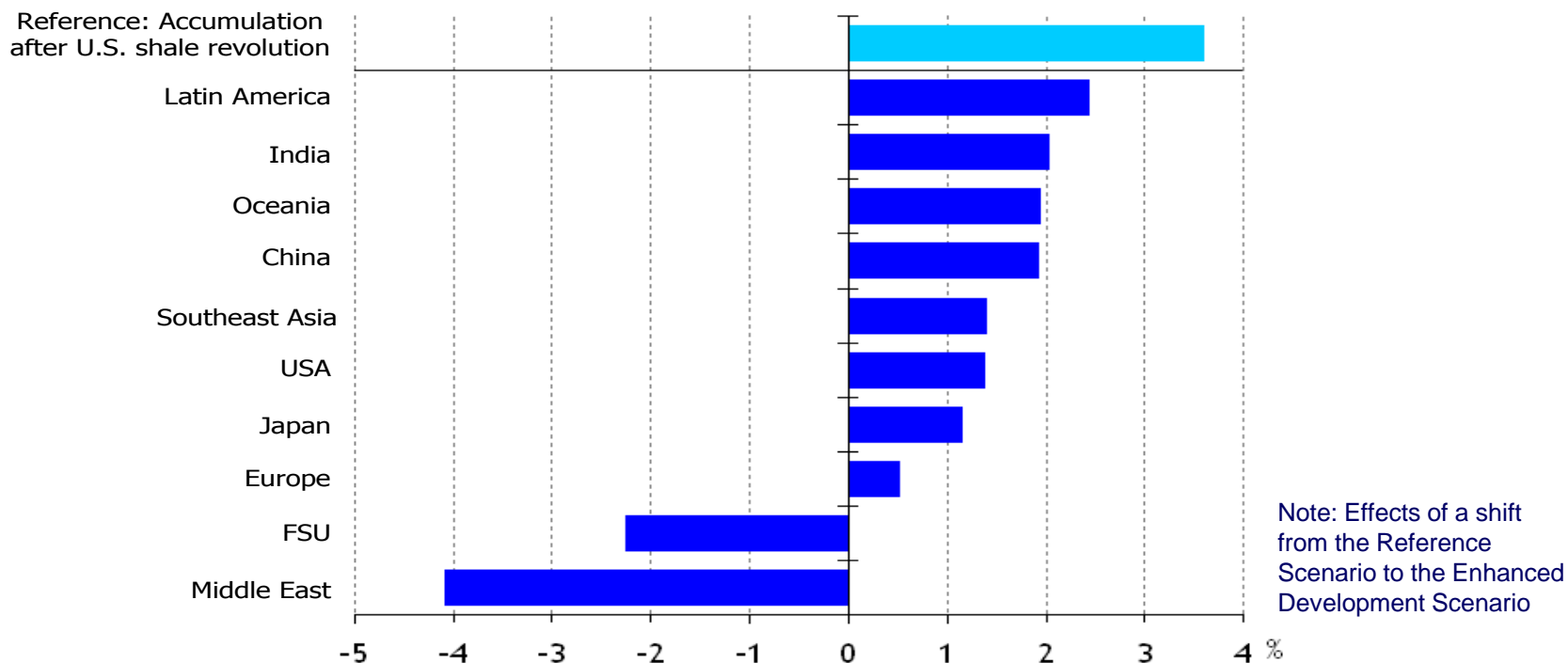
2. Recent Uncertainties in the Global Energy Landscape

2-(3) Shale revolution ④

: Possible Impact on Real GDP



Enhanced Development Scenario : Changes in 2040 from the Reference Scenario



- As oil & gas industries expands, net energy import value drops and energy price falls, most national economies benefit. The degree of benefits depends on output growth, industrial structure, oil and natural gas industries' portion of the economy, energy supply and demand structure, external demand changes in trading partners, etc.
- Traditional energy producing countries will face downward pressures on their GDP due to a combination of demand loss and price drops.

2. Recent Uncertainties in the Global Energy Landscape

2-(4) Serious concerns with Nuclear Energy

The trust on nuclear safety was seriously damaged because of Fukushima nuclear accident.

<Global shift in opinion on nuclear energy after Fukushima>

	Before 3.11.2011		After	
	Pro	Con	Pro	Con
(1) Japan	52%	28	39	47
(2) U.S.A	53	37	47	44
(3) France	66	33	58	41
(4) Germany	34	64	26	72
(5) Russia	63	32	52	27
(6) S.Korea	65	10	64	24
(7) China	83	16	70	30

Source: Gallup International (April 19,2011)

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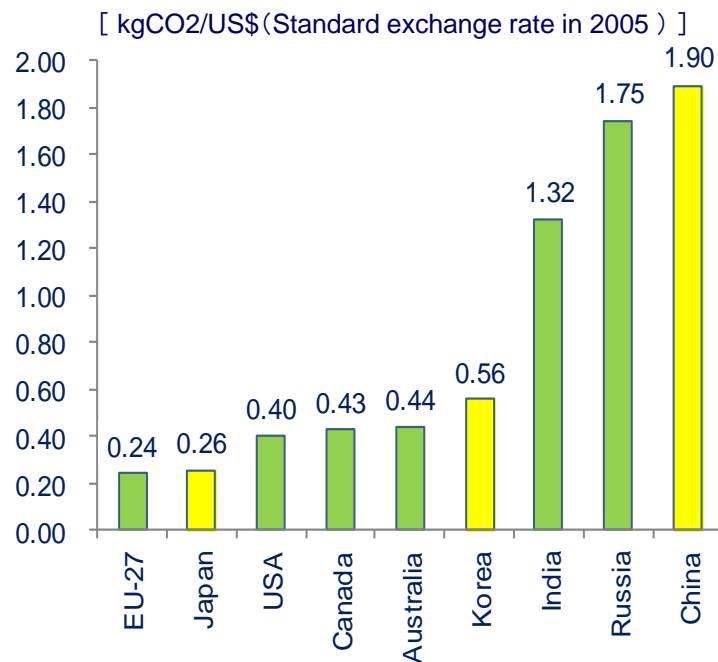
3. How to ensure energy security under those uncertainties

3-(1) Energy conservation is beneficial for all importing countries.

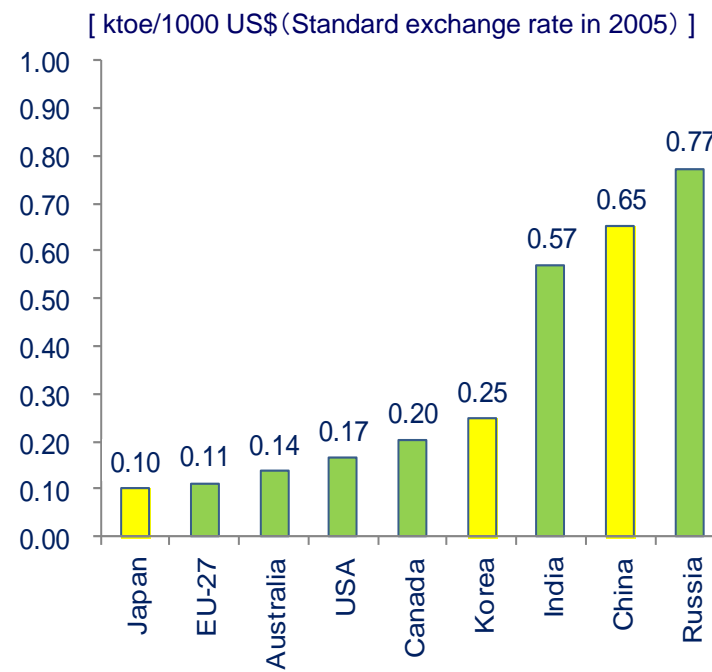


Energy conservation would increase energy independence and contribute to combat Climate Change

**CO2 emissions per GDP (2011)
(Carbon Intensity)**



**Primary energy supply per GDP (2011)
(Energy Intensity)**



3. How to ensure energy security under those uncertainties

<Example of cooperation> : It is important to continue to hold Energy and Environmental Forum for China and Japan

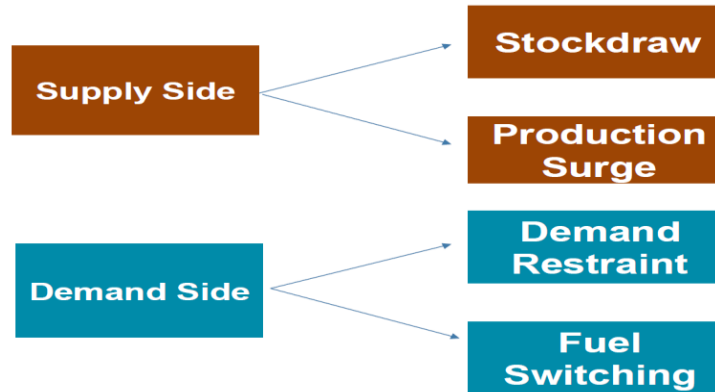


- The above mentioned forum has been held with **about 1000 business people and Government officials for seven years** since 2006, in China, either in Tokyo or in Beijing, alternately. The forum has been hosted by Ministers of METI and NDRC (National Development and Reform Commission). The last meeting was held in Tokyo.
- Various issues have been discussed such as **policies, technology transfer, and experiences with respect to energy conservation and introduction of low and zero carbon.** A large number of projects have been agreed.
- **Trends of cooperative projects :**
(1) 5 projects → (2) 10 → (3) 19 → (4) 42 → (5) 44 → (6) 51 → (7) 47 (Total 218 projects)
- Unfortunately the meeting was not held last year(2013).

3. How to ensure energy security under those uncertainties

3-(2) Emergency Response Arrangement

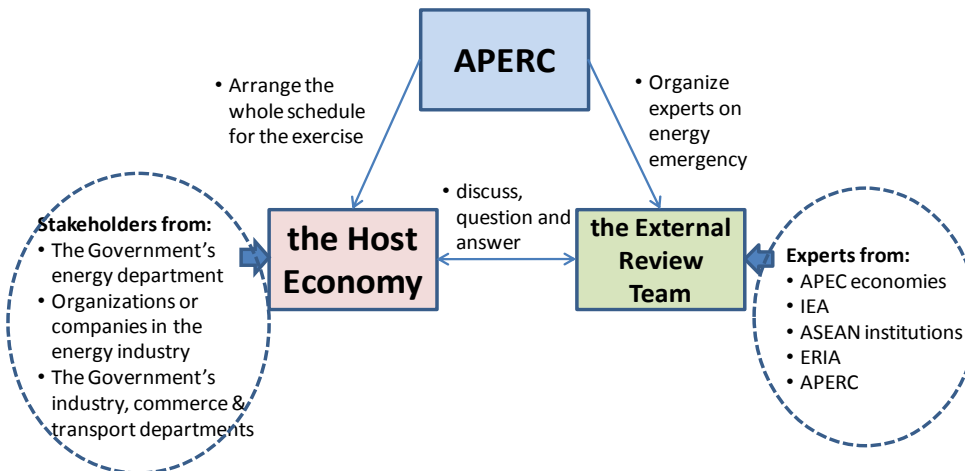
(IEA) Emergency Response Measures



Source: IEA "IEA Emergency Response System" New Delhi, 30 May 2012

(APEC) APEC Oil & Natural gas Security Exercises

METHODOLOGY FOR THE EXERCISE



- Upon the instruction from APEC Energy Ministers Meeting (EMM) in St. Petersburg on June 2012, APERC has worked on activities to improve the response to oil and gas emergency situations in the APEC region, including two emergency response exercises in Thailand (jointly with other ASEAN APEC economies) on September 2013 and in Indonesia on October 2013.
- The result of these activities will be reported to the forthcoming APEC EMM in Beijing on September 2014.

3. How to ensure energy security under those uncertainties

3-(3) Joint efforts are essential to eliminate Asian premium



(1) Goals

1. Relaxing supply and demand of natural gas in Asia
2. Increasing liquidity in Asia LNG market
3. Developing a benchmark LNG price in Asia

(2) Possible cooperation

2-1) Cooperation by private sectors

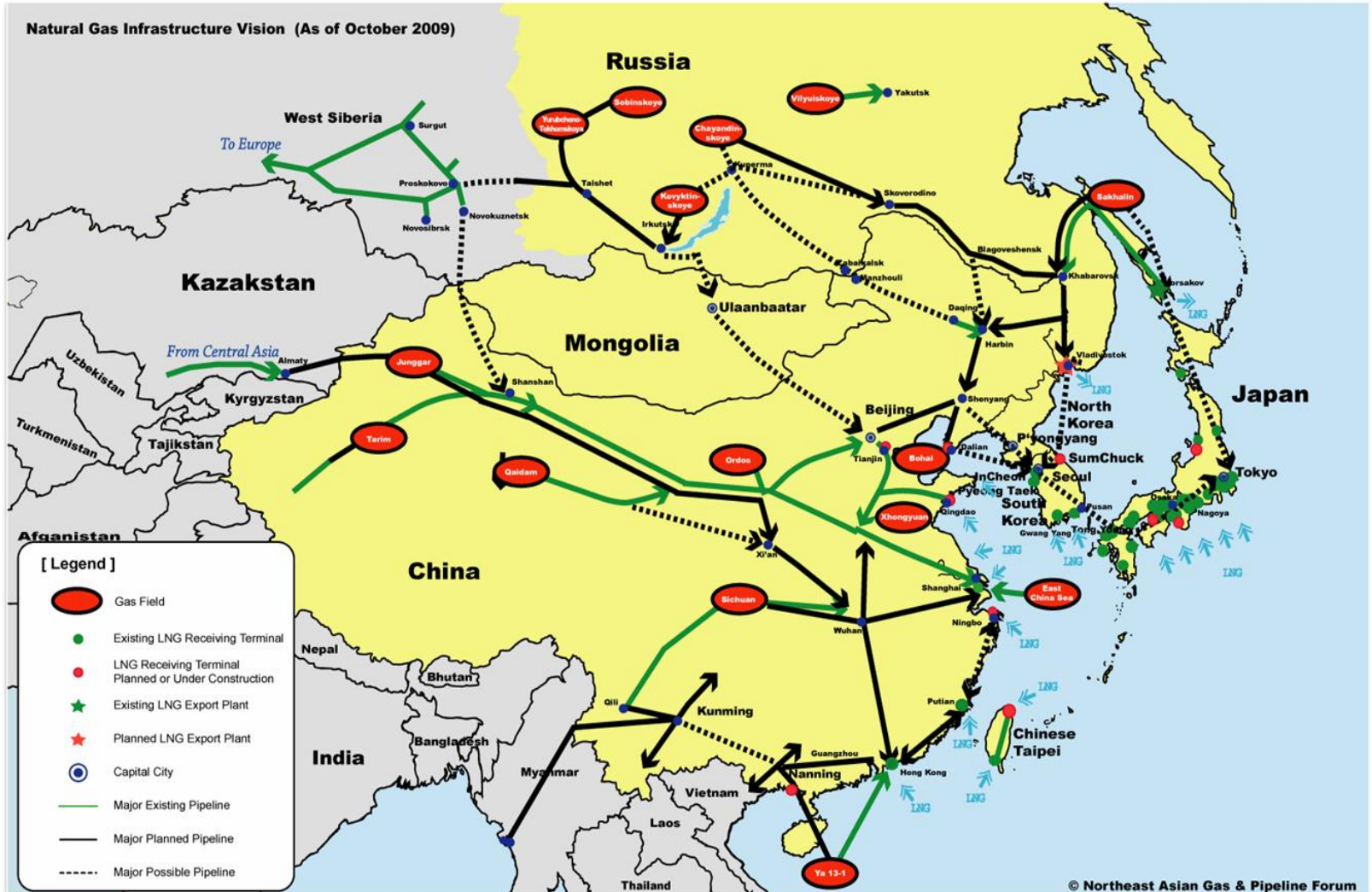
- a. LNG swap
- b. Joint purchase and development for diversification of supply sources (incl. pipeline gas) and pricings (e.g. Henry Hub, Hybrids, Spot LNG)

2-2) Cooperation by Governments

- c. Diplomatic and financial supports for upstream gas project
- d. Prohibiting destination clause of LNG contract
- e. Ensuring free flow of goods, personals and money through EPA
- f. Deciding energy mix, which will improve price negotiation capability

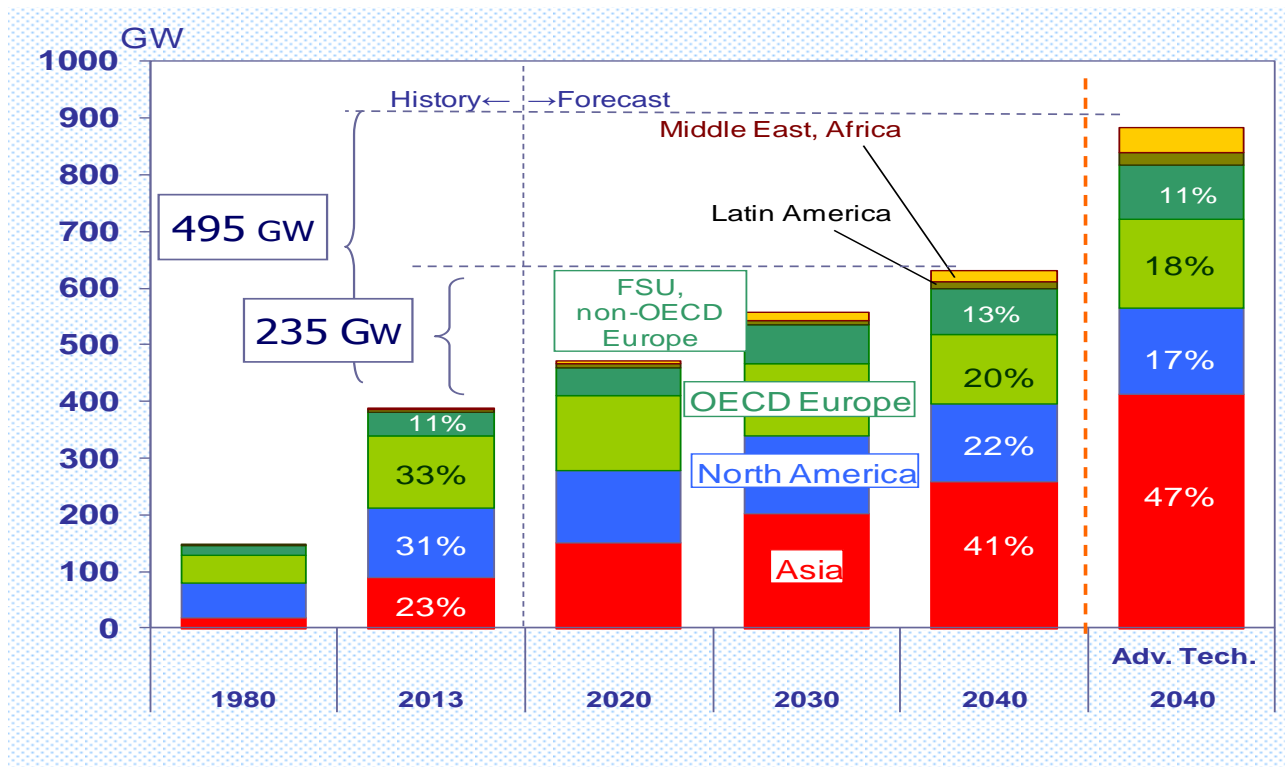
3. How to ensure energy security under those uncertainties

<Reference> Possible Gas pipeline network in North east Asia

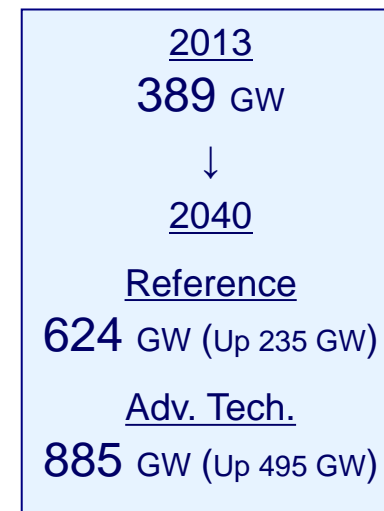


3. How to ensure energy security under those uncertainties

3-(4) Nuclear Power could expand safely based on lessons from Fukushima



World



- Global nuclear power generation capacity in 2040 will grow by 235 GW in the Reference Scenario and by 495 GW in the Advanced Technology Scenario. Asia will lead the growth and account for nearly half of the global capacity in 2040 in the Advanced Technology Scenario.

Source: IEEJ "Asia / World Energy Outlook 2013"

3. How to ensure energy security under those uncertainties

<Example of cooperation>: Formation of cooperative framework for nuclear safety



(1) Elements to be considered

- a. **Types of cooperation** : those among gov. (either promoting agencies or regulators) and /or operators
- b. **Nature of cooperation** : EU like cooperation (Non-binding but virtually effective)

(2) Points of cooperation

- a. Establishing meaningful **regulatory frame**
- b. **Accident preparedness** or crisis management
- c. **Risk communication**
- d. Enhancement of **nuclear security** and coping with terrorism
- e. **nuclear cycle**
- f. **liability scheme**
- g. **human resource development**

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4. Conclusion

1. Asia is **a center of growth**, but this means that Asia is **a center of energy consumption**
2. Energy landscape surrounding North Asia is full of **uncertainty**
3. **Energy security in North Asia is getting more vulnerable** unless regional cooperation is promoted to cope with recent uncertainty
4. At least four **cooperation** can be listed to be promoted;
 - 1) Energy conservation => **more energy independence**
 - 2) Emergency Response arrangement
 => **helping each other among countries with similar characteristics**
 - 3) Elimination of Asian premium for LNG trade
 => **cheaper and cleaner fuel**
 - 4) Ensuring nuclear safety => **safer North Asia**

Thank you for your attention !!

