

PROSPECTS OF ENERGY EFFICIENCY IN ASEAN AND ASIA - ASIA/WORLD ENERGY OUTLOOK 2013

A series of five orange circles of varying sizes arranged in a descending staircase pattern from left to right, positioned to the left of the event details text.

**Think Tank Roundtable A
Singapore International Energy Week
31st October 2013, Singapore**

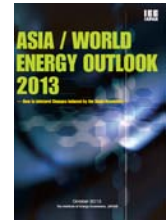
**The Institute of Energy Economics, Japan
Yukari Yamashita**

Asia/World Energy Outlook 2013

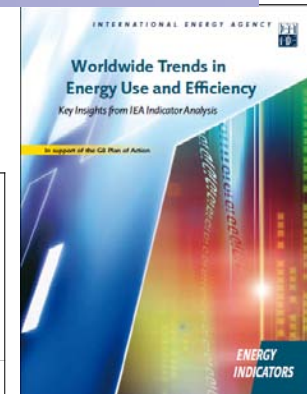
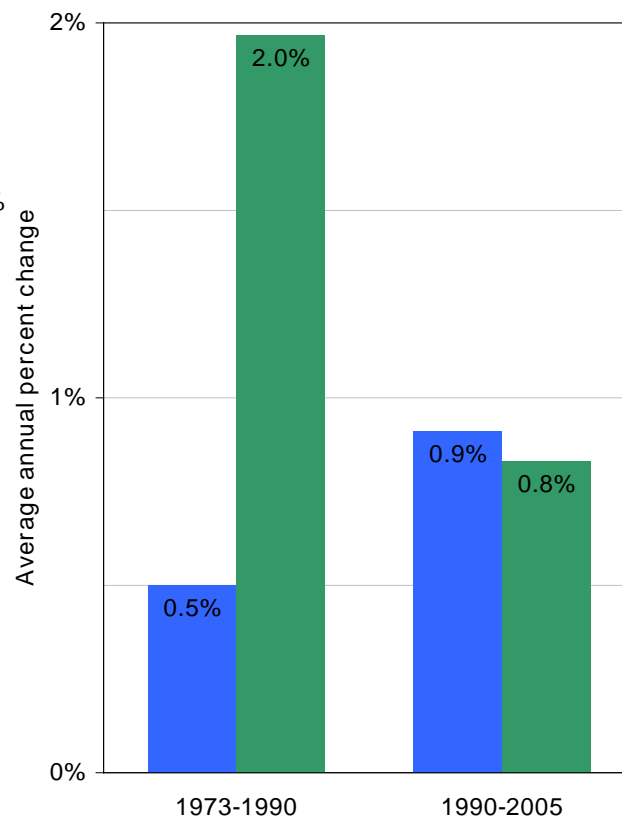
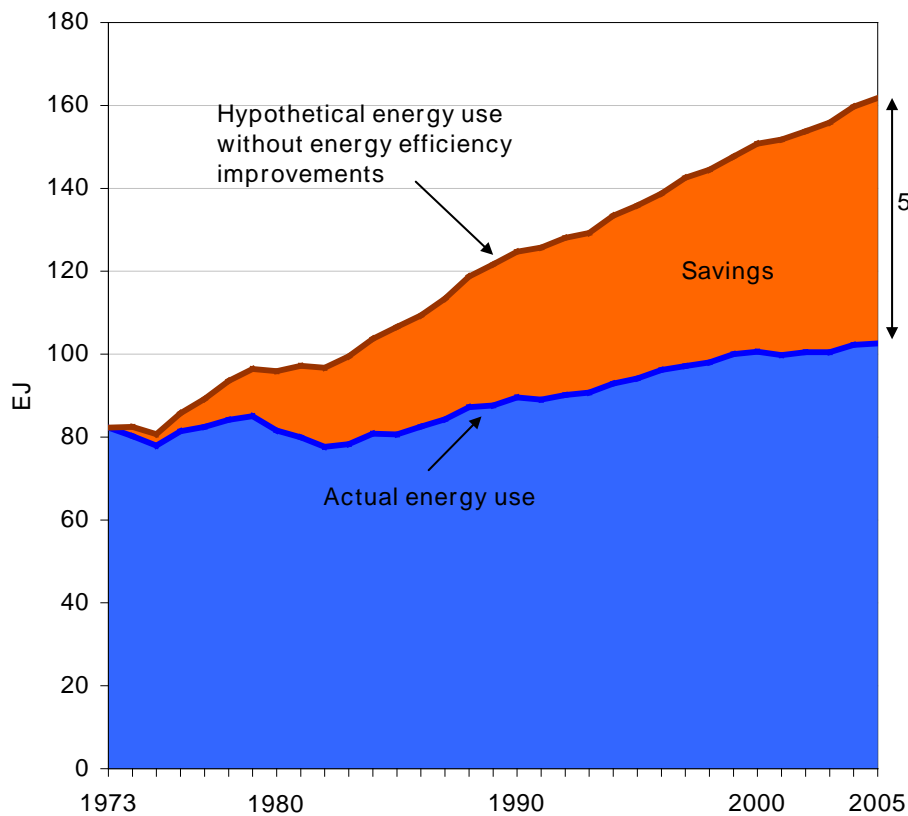
— How to Interpret Changes Induced by Shale Revolution —

Introduction

- Why Energy Efficiency matters?
- Results from IEEJ's Asia/ World Energy Outlook 2013
- What are Expected of Energy Efficiency?
- Way forward



OECD avoided 60% of energy increase by Energy Saving (2005 estimates, IEA Report to G8 Summit in Toyako)



■ Actual energy use ■ Energy savings due to energy efficiency improvements ■ Energy efficiency improvements

IEA, "Worldwide Trends in Energy Use and Efficiency" (2008)



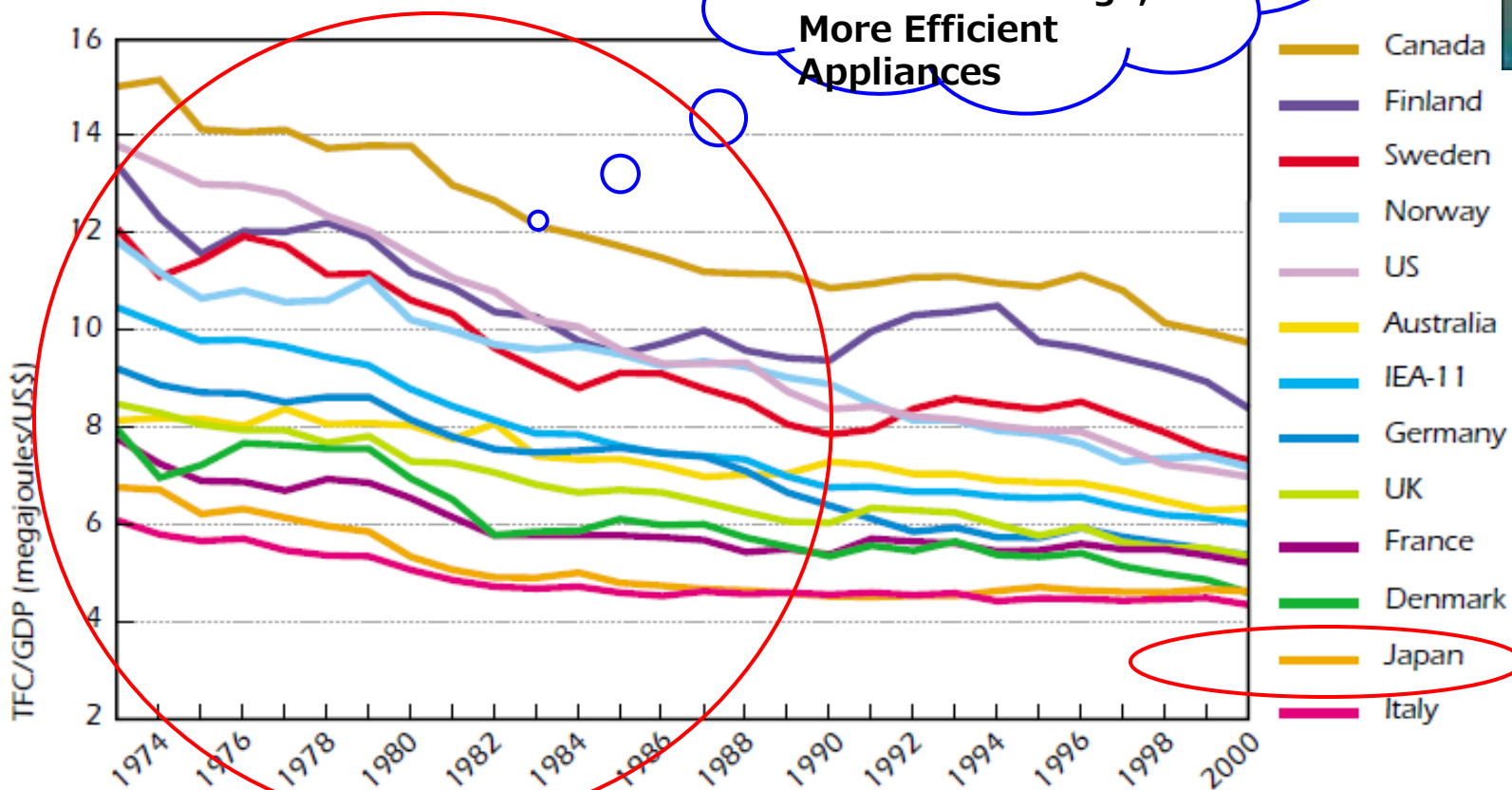
Energy Saving of OECD Countries Slowed Down in late 1980's



2004

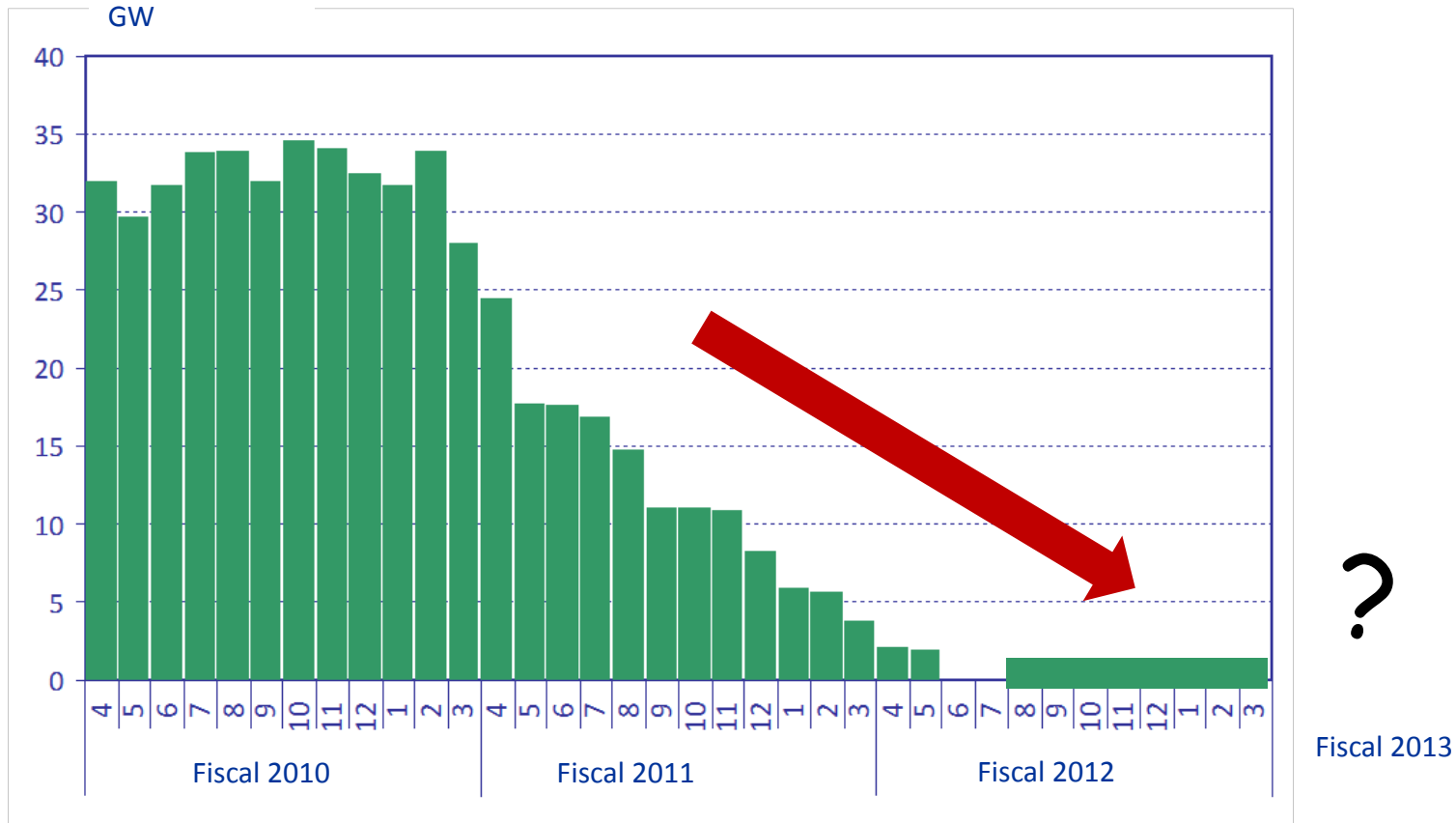
Figure 3-8

TFC per Unit of GDP

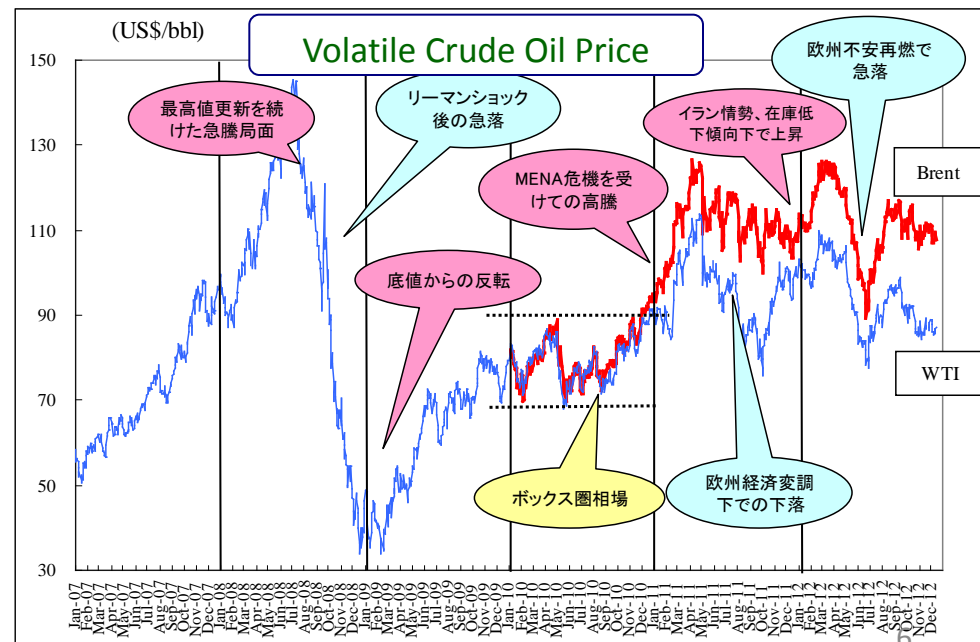
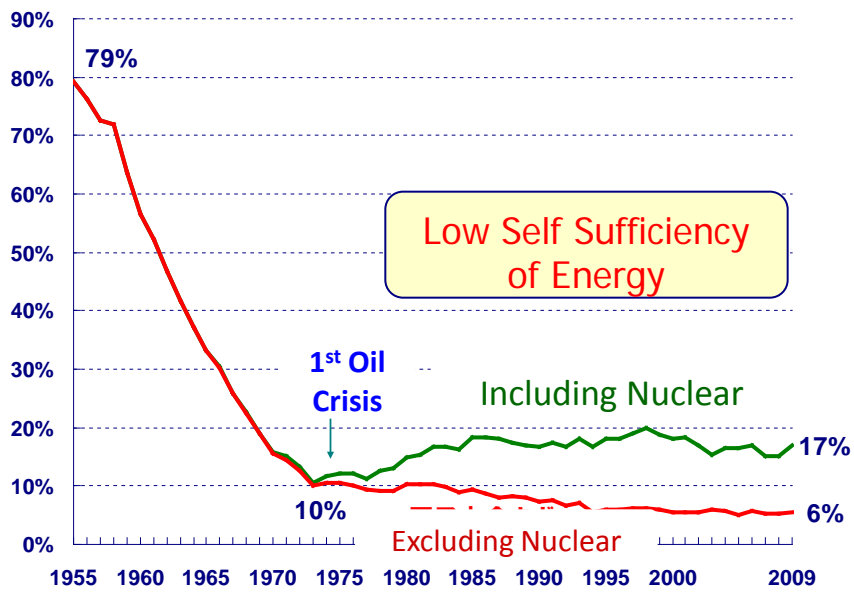
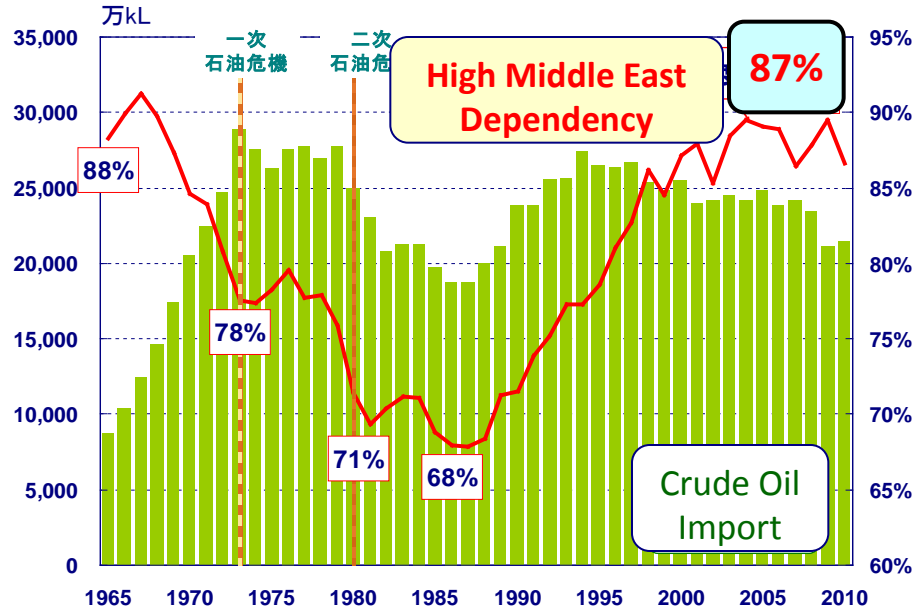
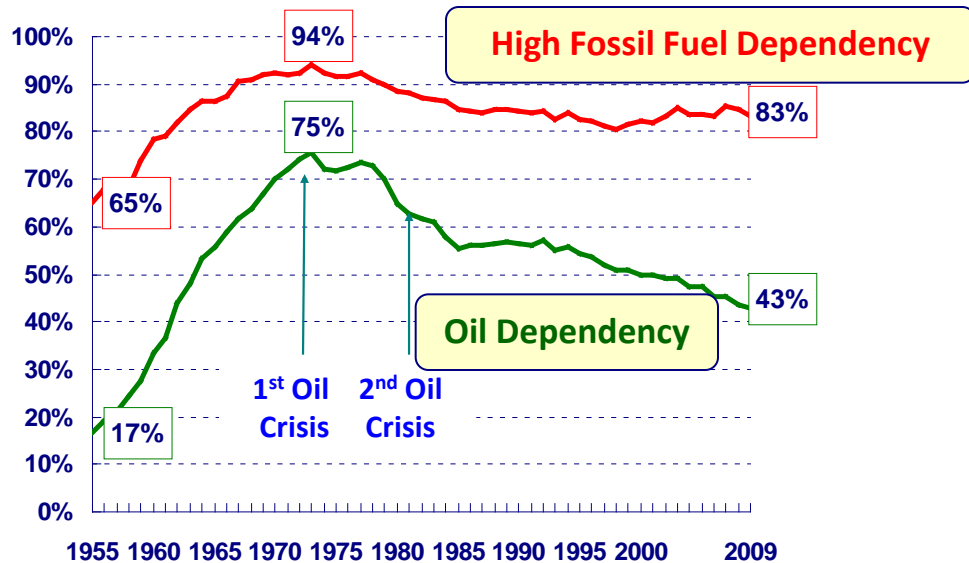


EE improvement in Energy-Intensive Industries, Structural Change, More Efficient Appliances

Nuclear Plants' Restart in FY2013 still Unknown

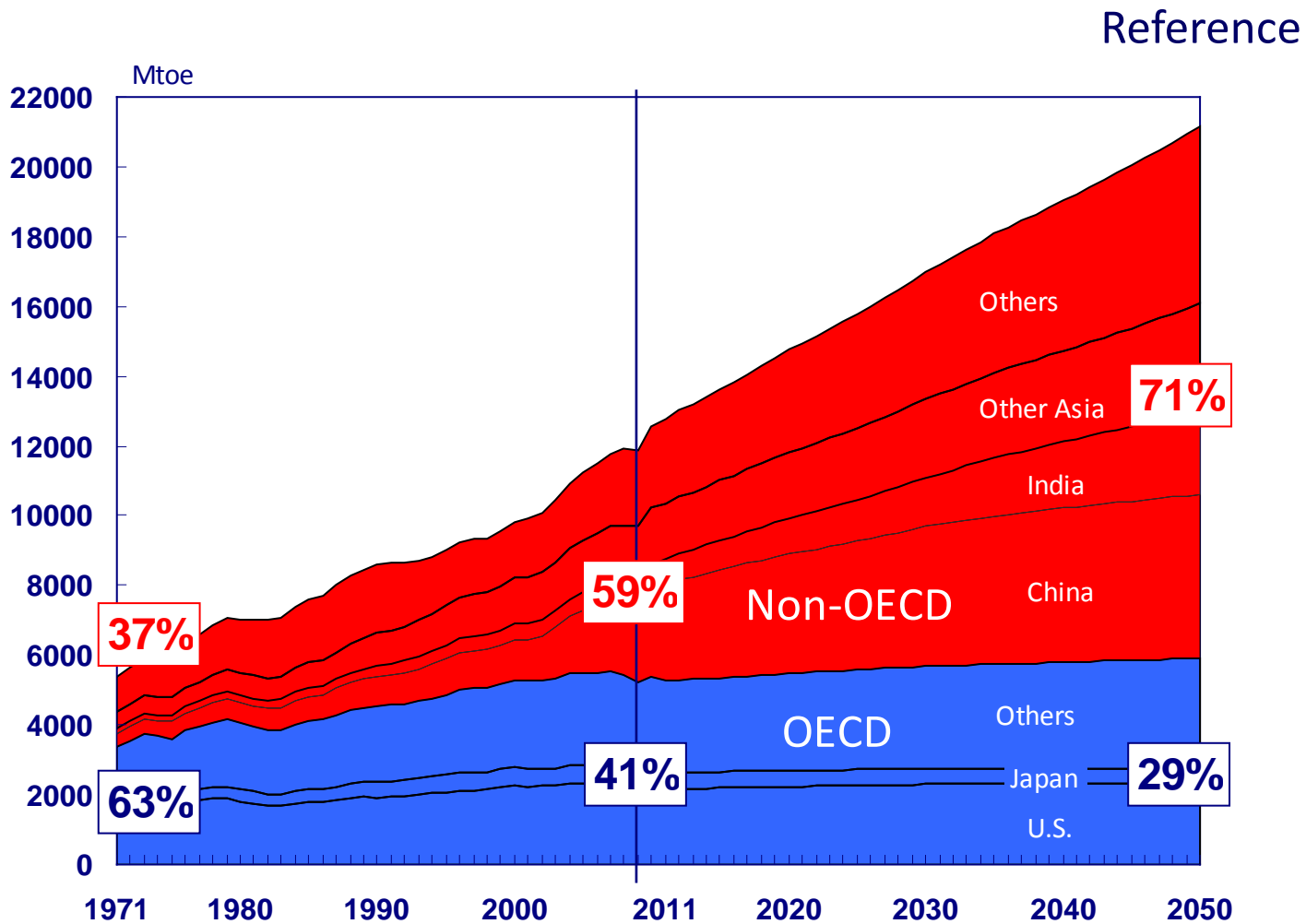


Weakness of Japan's Energy Security



Source) IEEJ "EDMC Handbook of Energy & Economic Statistics", IEA, etc.

World Energy Demand Will Grow



Source: IEEJ (Asia/World Energy Outlook 2013)

“Energy Mix” Debate in Japan : Relevance to ROW

1) Comprehensive Perspective

- No Perfect Energy exists for Japan without domestic energy resource
- 3E+S : Energy Security + Efficiency + Environment + Safety
 - More Efficient Energy Use
 - Cleaner Use of Fossil Fuels + Safer Nuclear Energy Technology
 - Lower Cost Renewable Energy
- Increasing use of electricity requires:
 - ➔ Well-balanced Mix of 4 power gen technologies
in addition to enhanced energy efficiency is essential.
“Nuclear” : “Renewable” : “Thermal Power” : “Cogeneration”

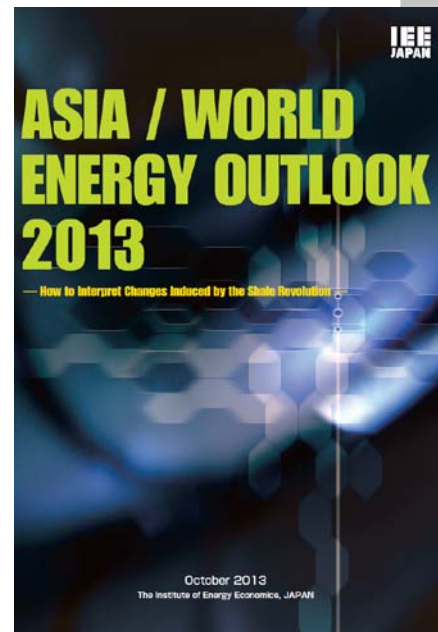
2) Long-term Perspective

3) International Perspective

➔ Japan's Energy Mix Debate has a relevance to the Rest of the World

Some Results from Asia/World Energy Outlook 2013

— How to Interpret Changes Induced by Shale Revolution —



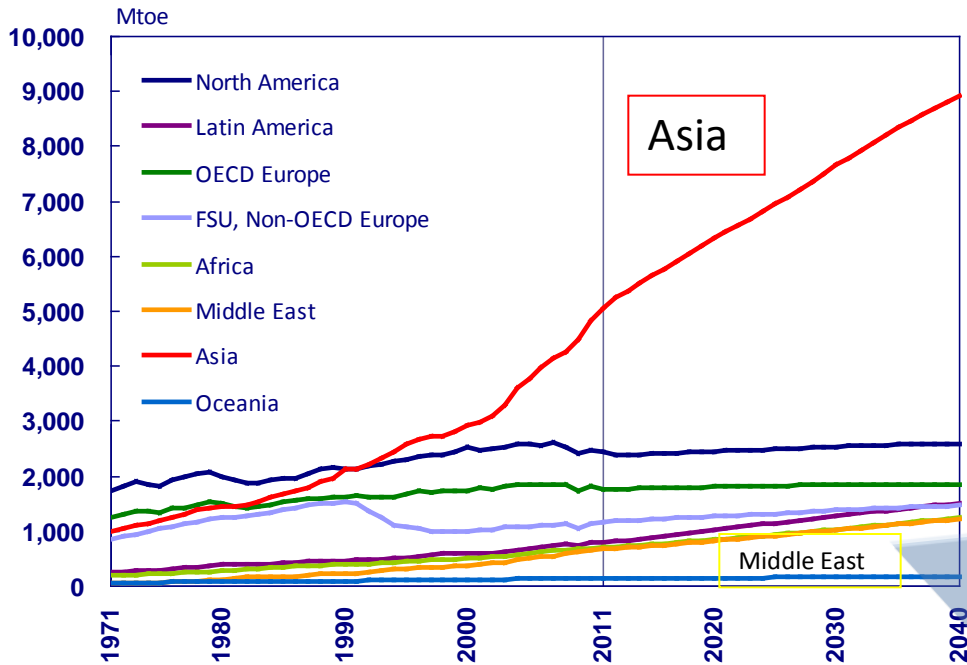
English version will also become available soon!

1: Energy Demand in Asia Will Continue to Grow

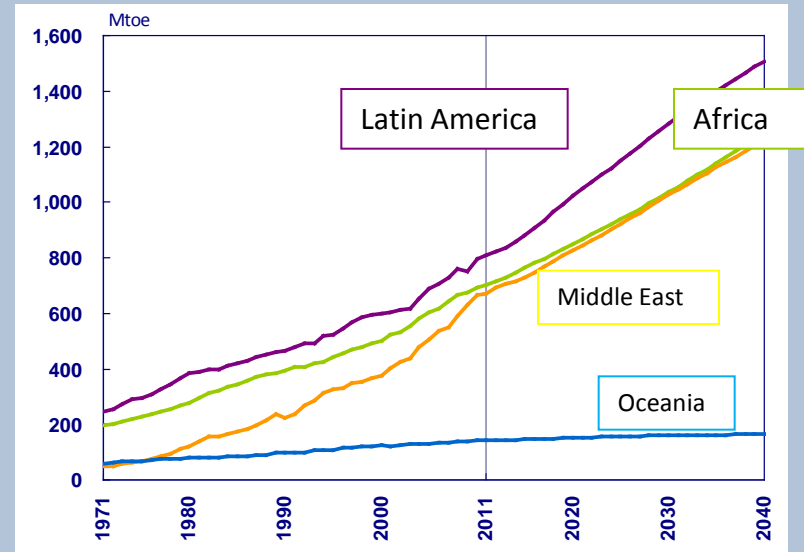
Reference



Outlook for Energy Demand by Region



So is the case for the other regions!



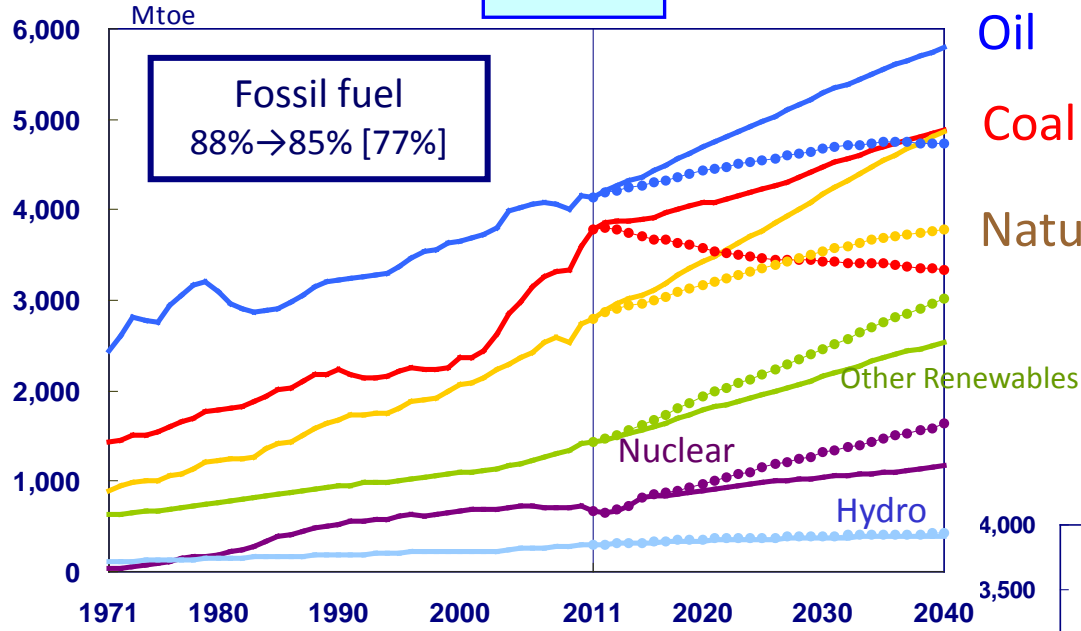
Source: IEEJ (Asia/World Energy Outlook 2013)

2: Fossil Fuels (Oil, Coal, Gas) Will Remain Key Energy

Reference
Adv. Tech.

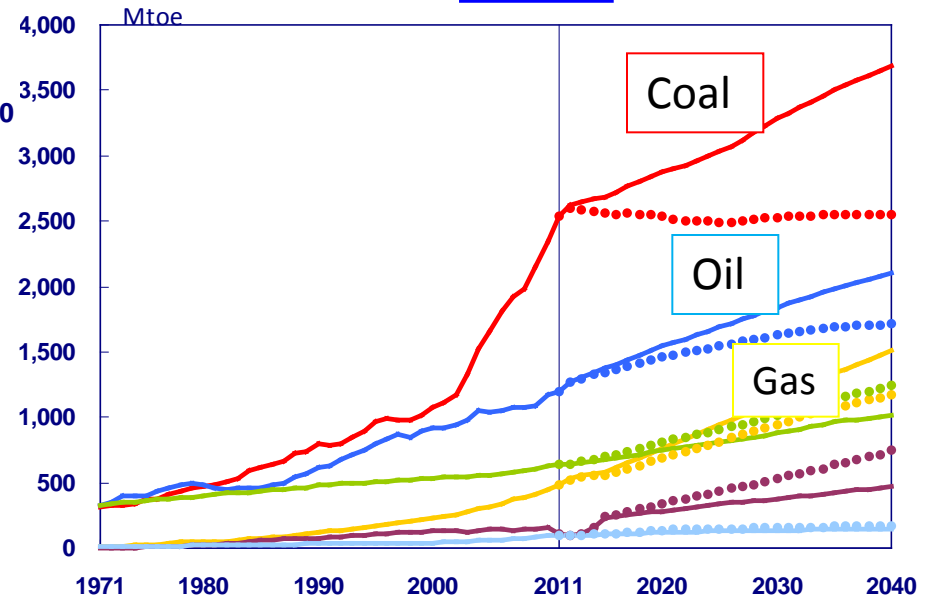


World



Energy Demand Outlook by Source

Asia



Source: IEEJ (Asia/World Energy Outlook 2013)

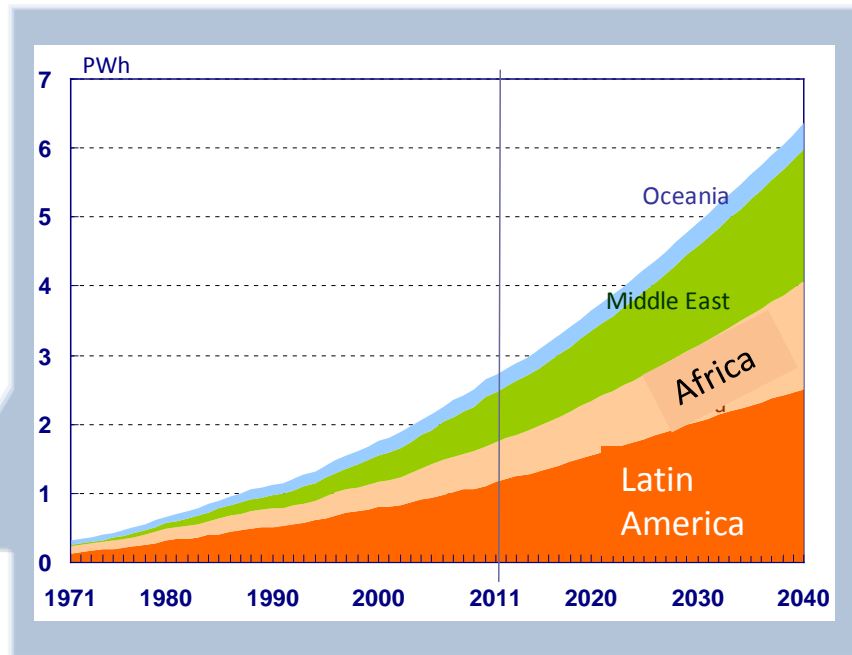
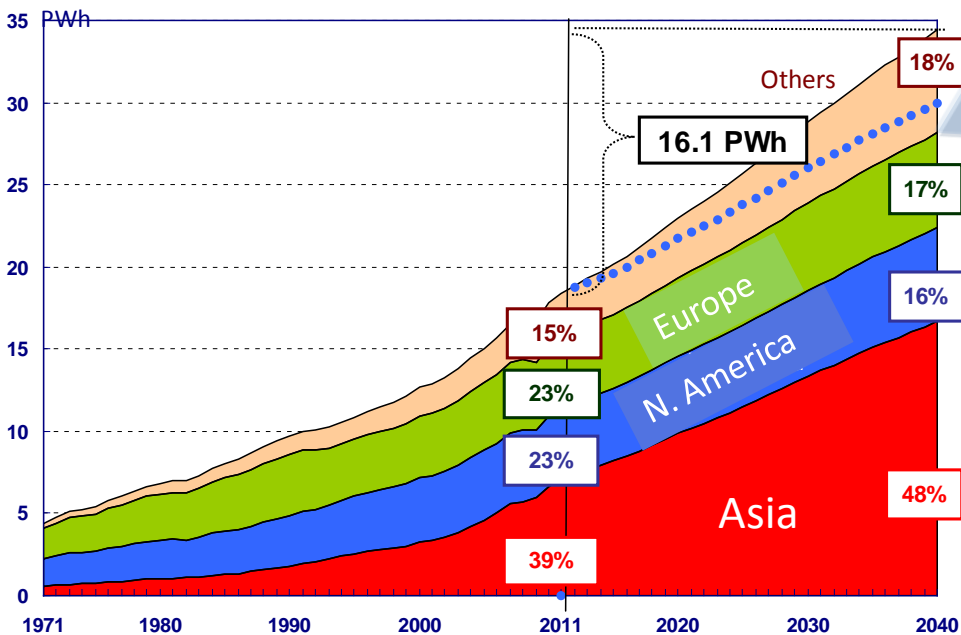
3: Robust Increase of Electricity

Reference



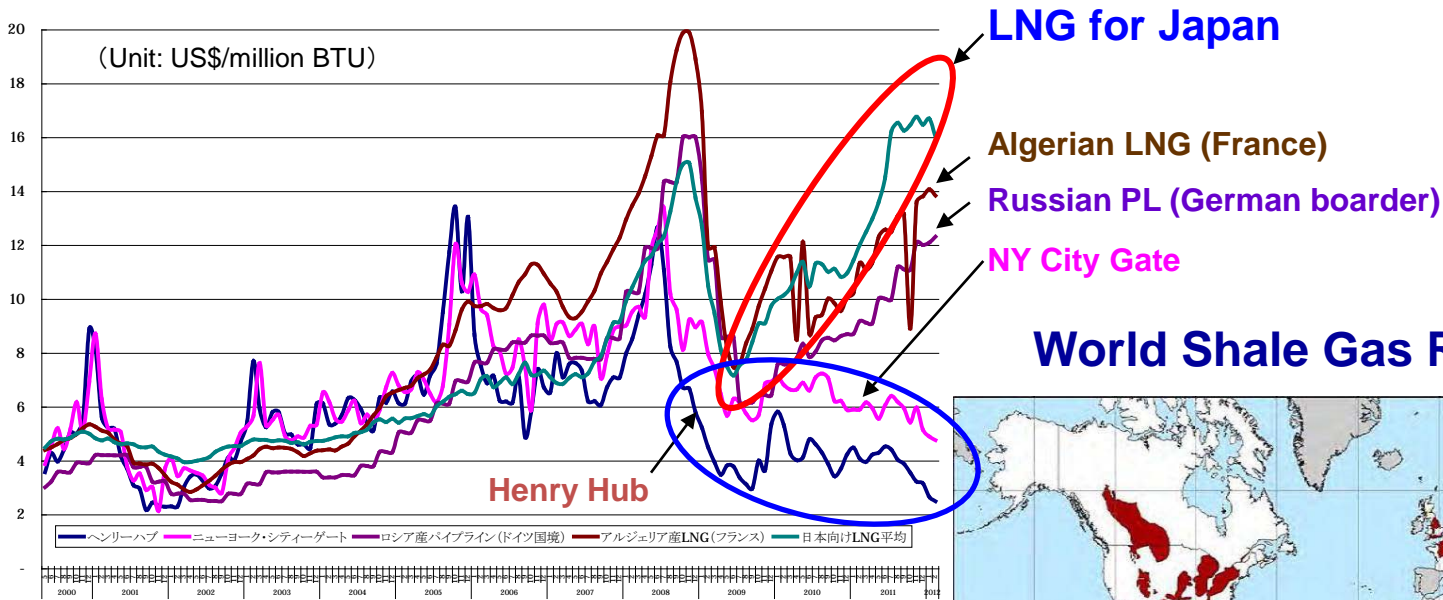
Outlook for Electricity Demand by Region

Outlook for Electricity Demand (ROW)



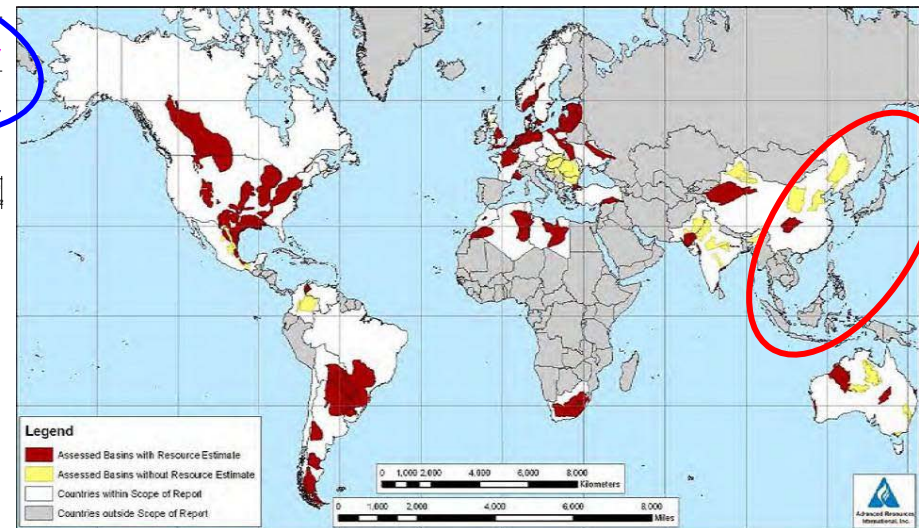
4: Facing Higher Gas Prices

Comparison of Regional Natural Gas Prices



(Source) Compiled from Trade Statistics (Japan), US/DOE, Energy Intelligence data

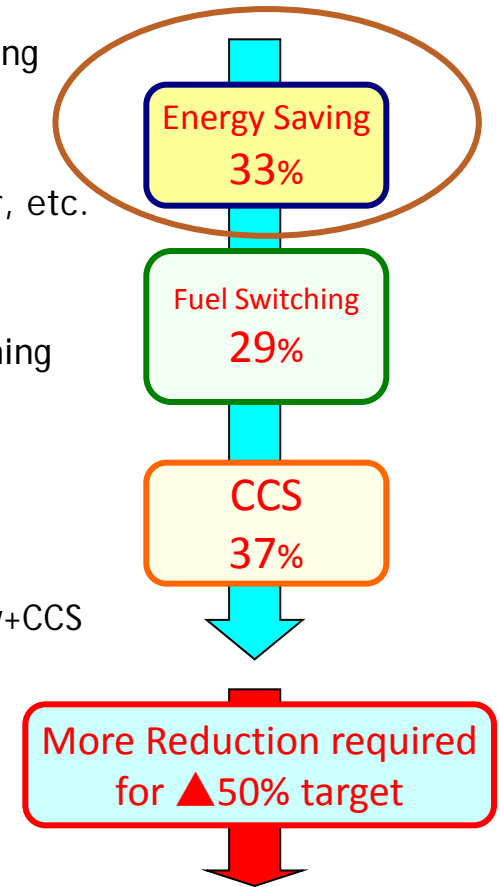
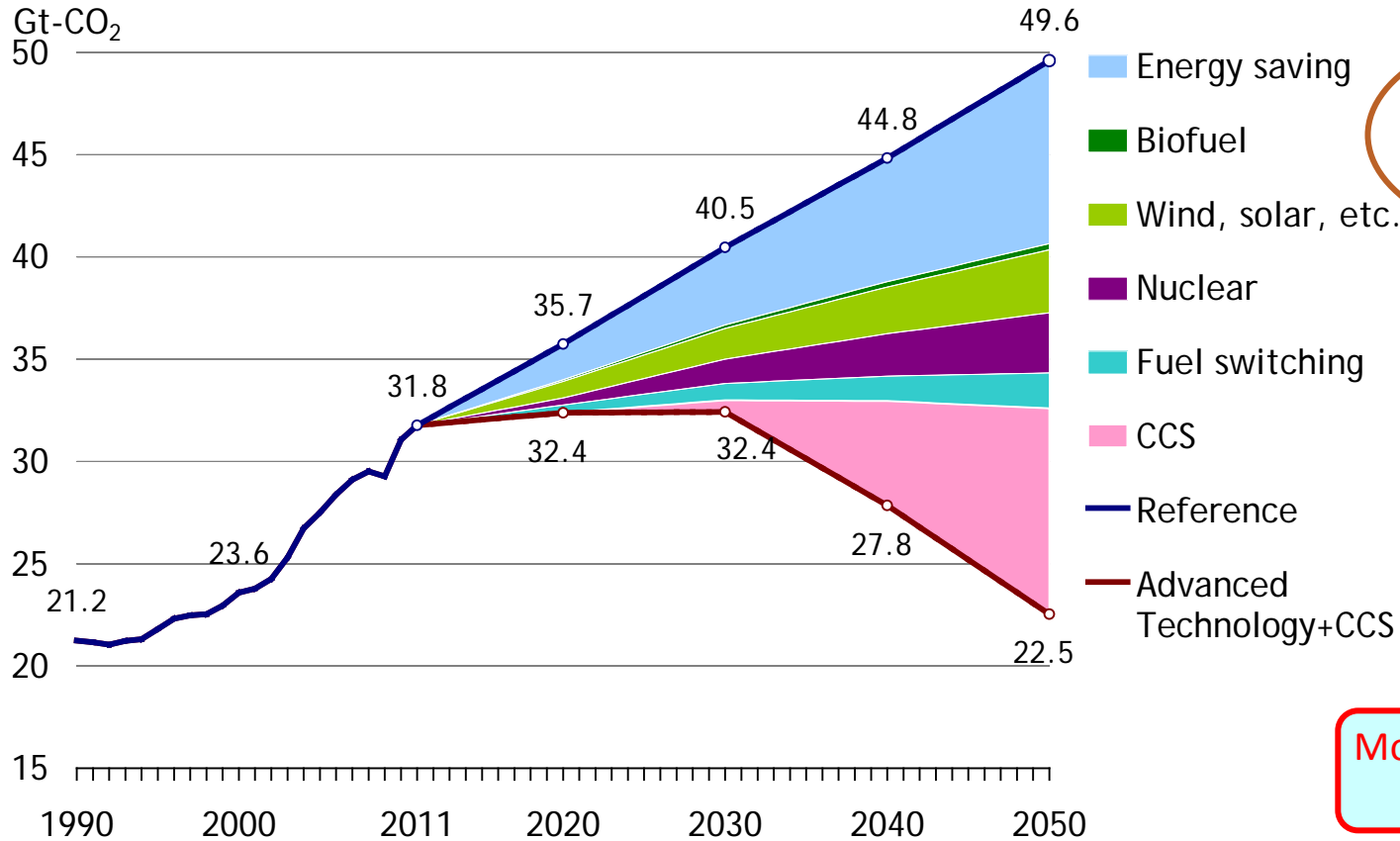
World Shale Gas Resources



(Source) US/DOE study, World Shale Gas Resources: An Initial Assessment of 14 Regions Outside the United States, APRIL 2011, prepared by Advanced Resources International (ARI) for the United States' Energy Information Administration (EIA).

CO2 Emissions Reduction by Technology (World)

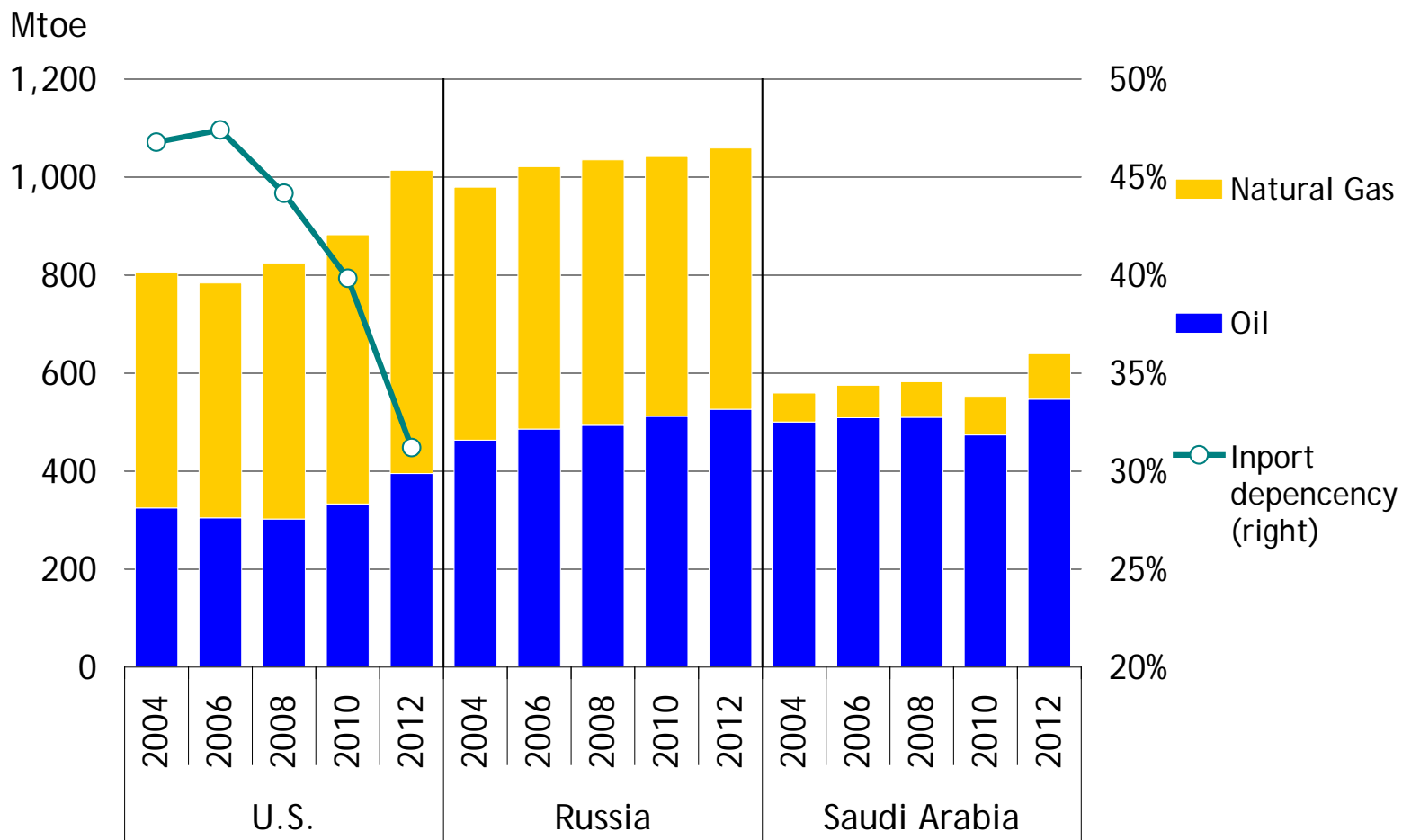
Reference
Tech. Adv.



■ For 50% reduction of global CO2 emission, additional long-term measures are necessary and development of innovative technology is essential.

2. What about Shale Gas Revolution?

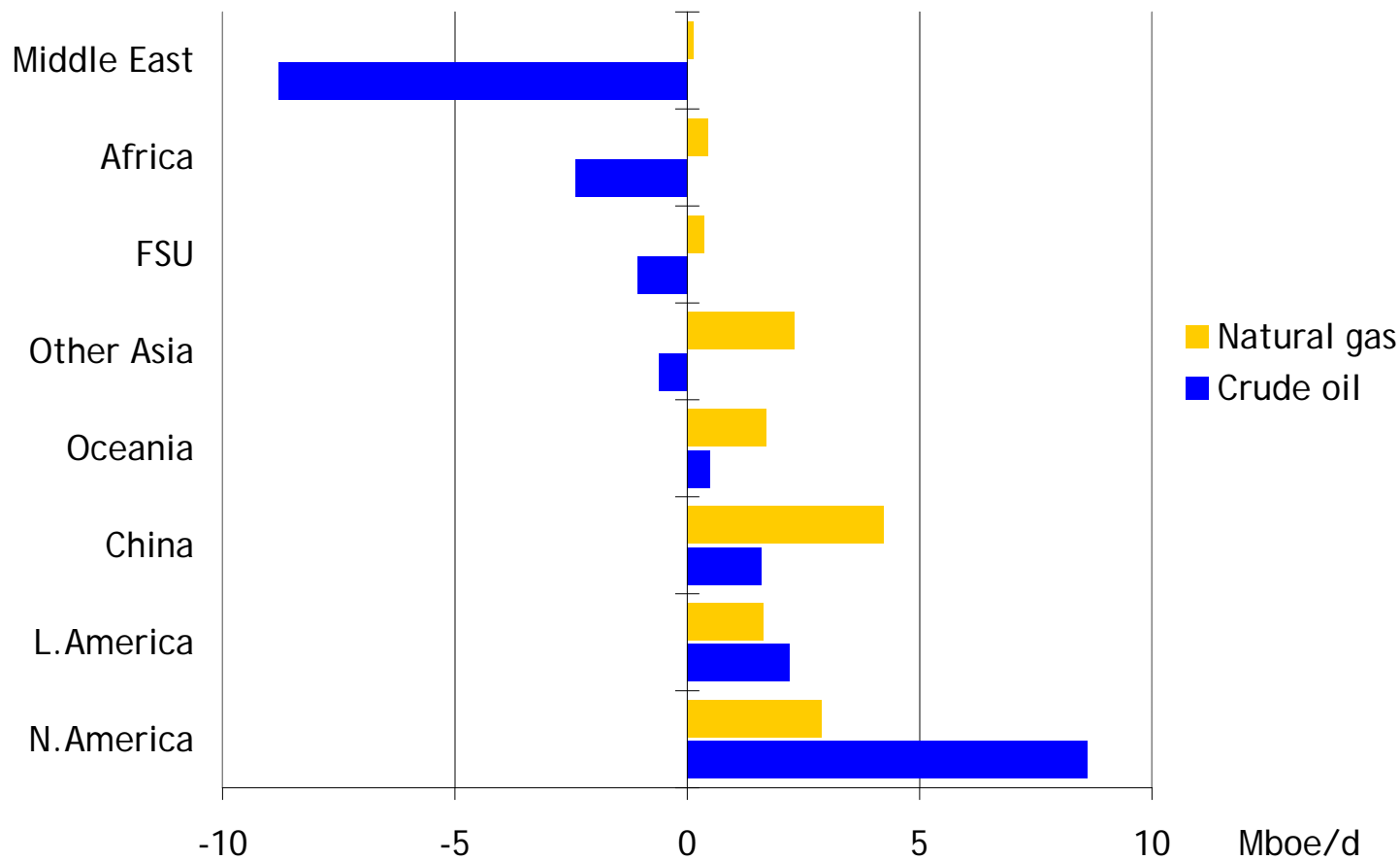
Production Trends of Big 3 for Oil & Gas



BP "Statistical Review of World Energy 2013"

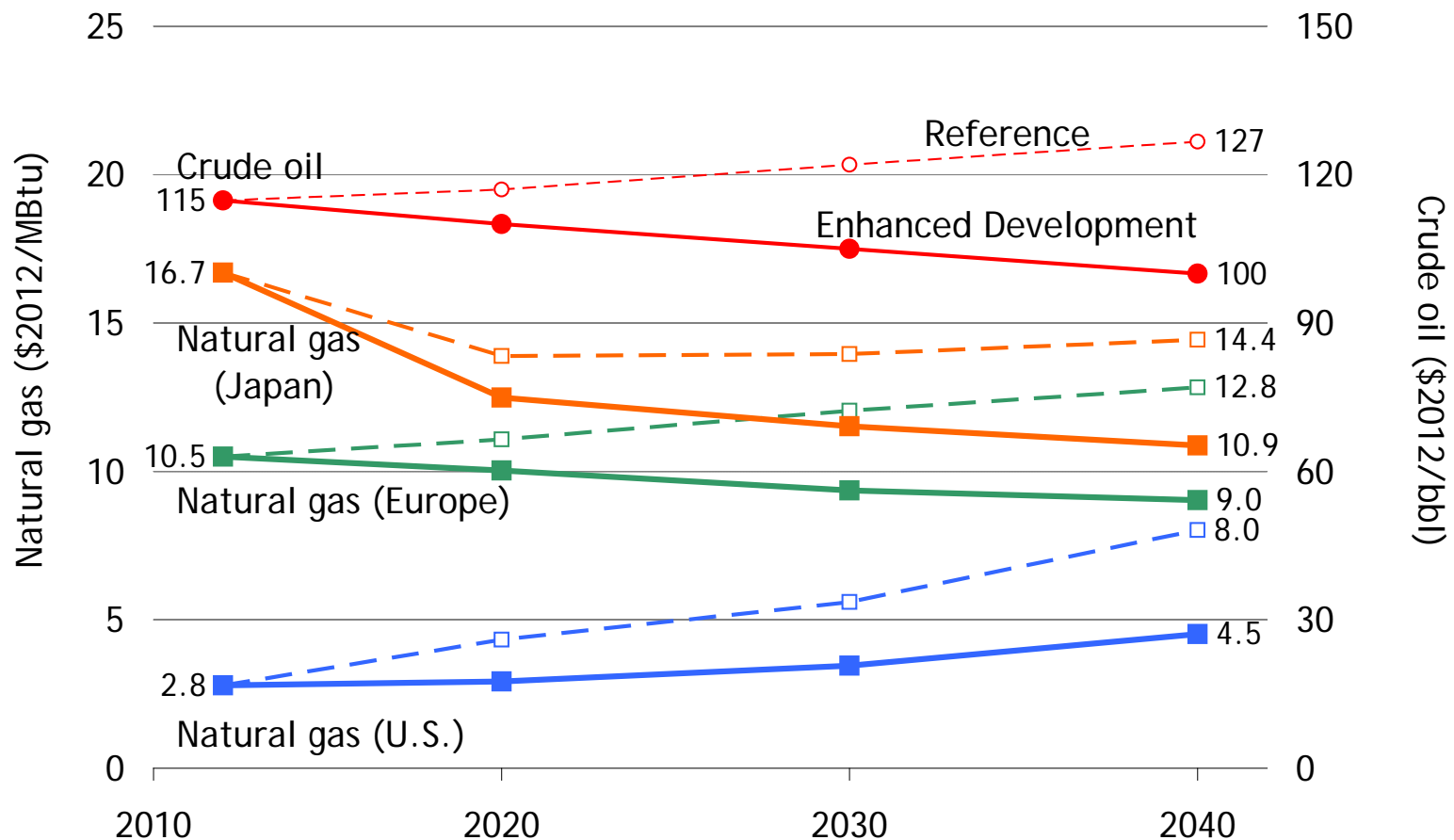
Shale Revolution Will Change Supply Picture for Oil and Gas

2040 Production (Enhanced Unconventional Resource Case vs Reference Case)



Crude oil and natural gas prices (2010-40)

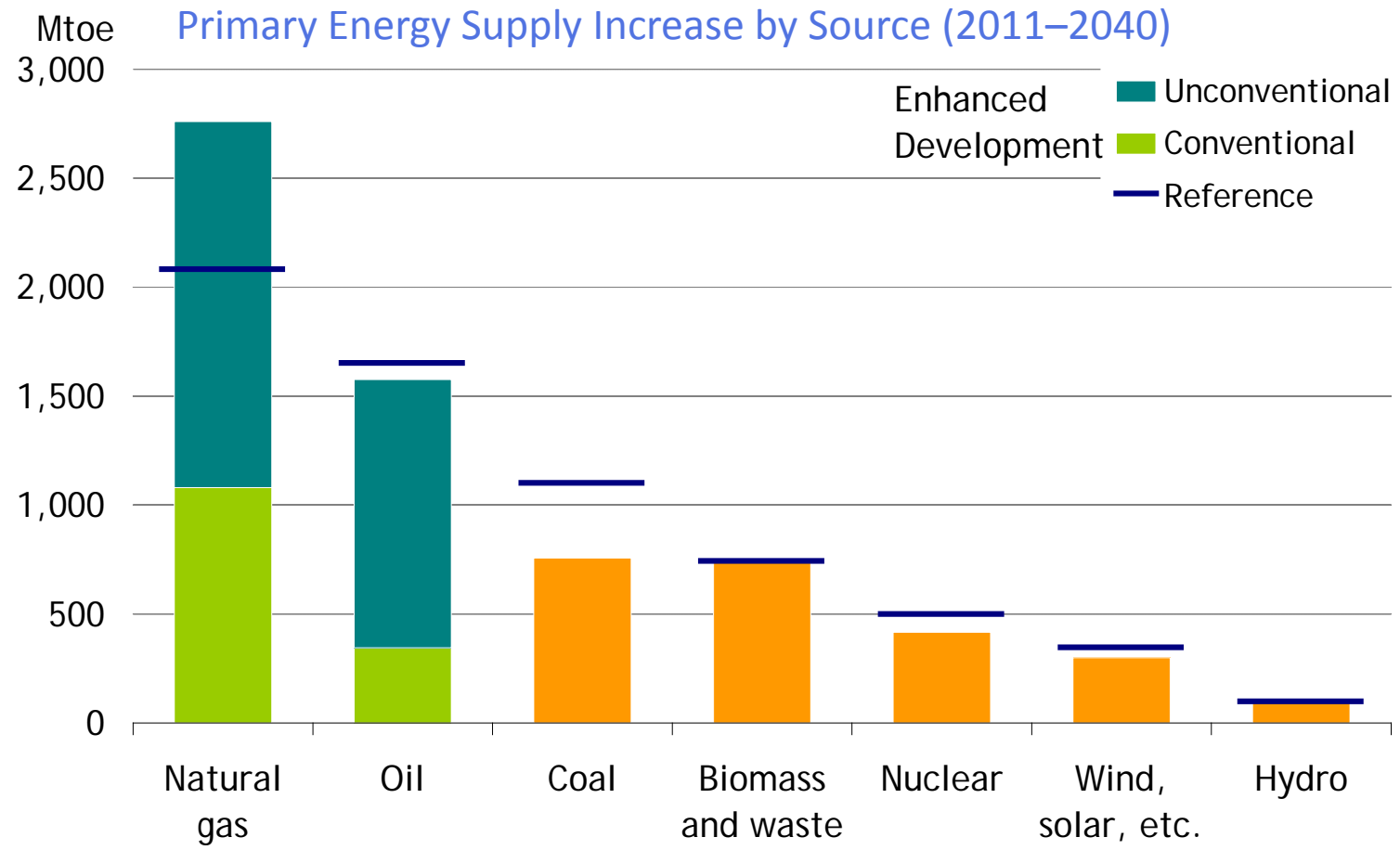
Enhanced Development Case vs. Reference Case



What Can be Expected

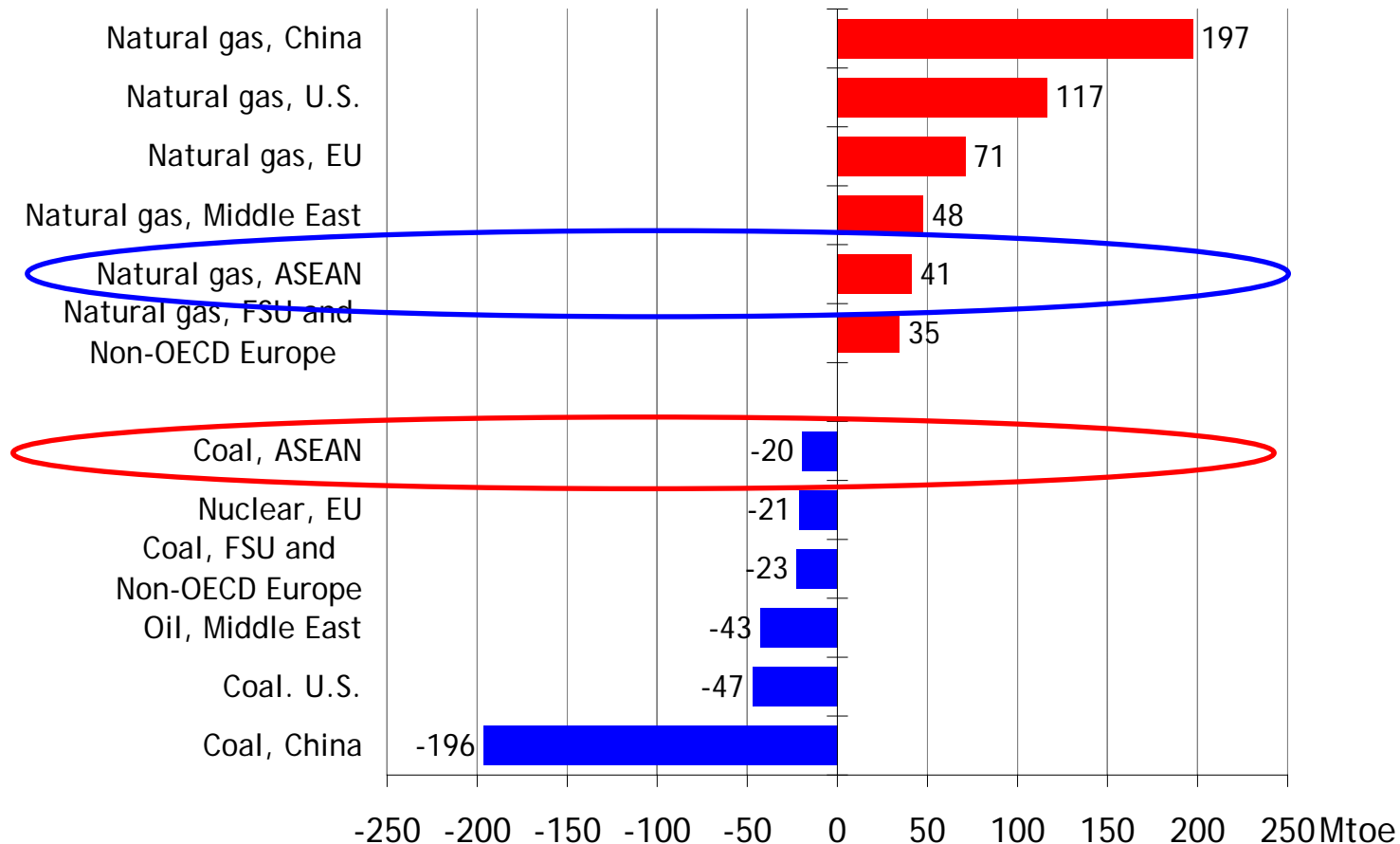
IF Things Go Well for Unconventional Resources?

IEEJ: 2013年12月掲載 禁無断転載



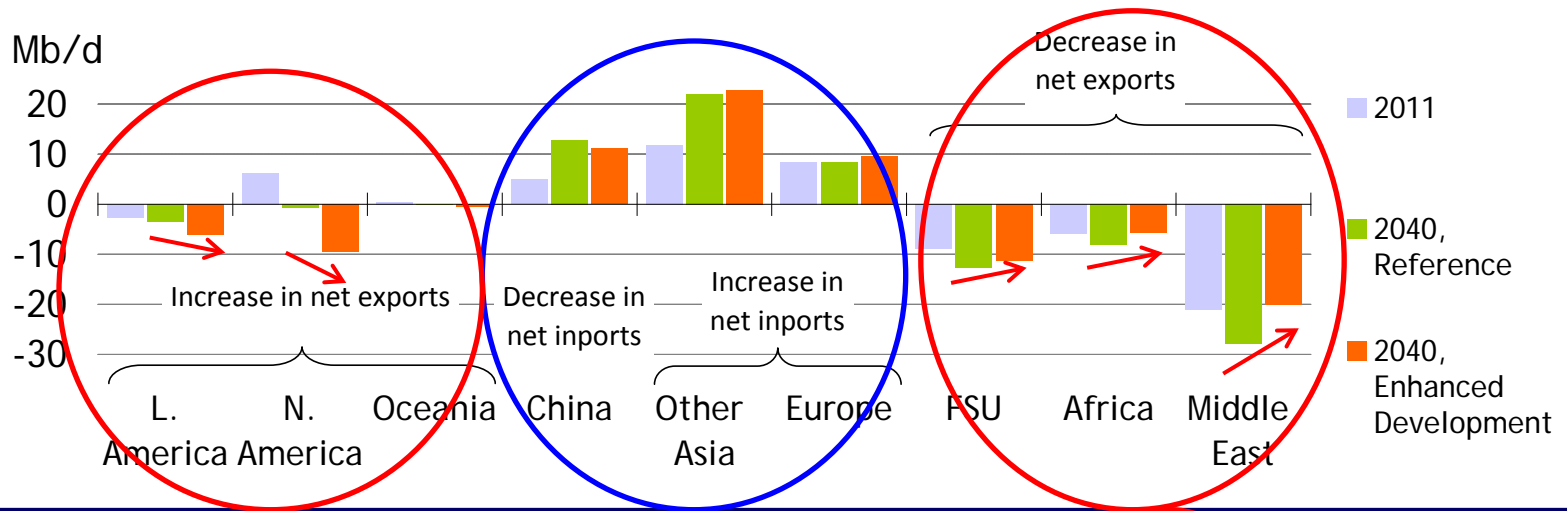
Gas will replace Coal, Oil and Others

Primary Energy Consumption Difference in 2040
(Enhanced Unconventional Resource Case vs Reference Case)

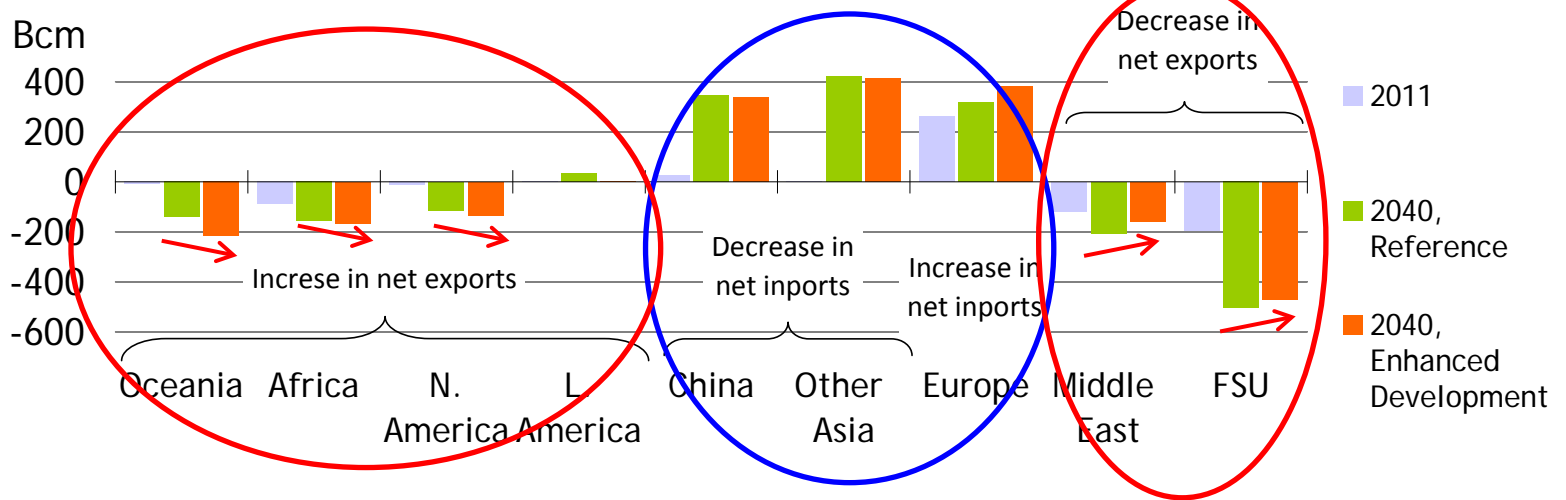


Oil and Gas Supply Picture will Change

Oil

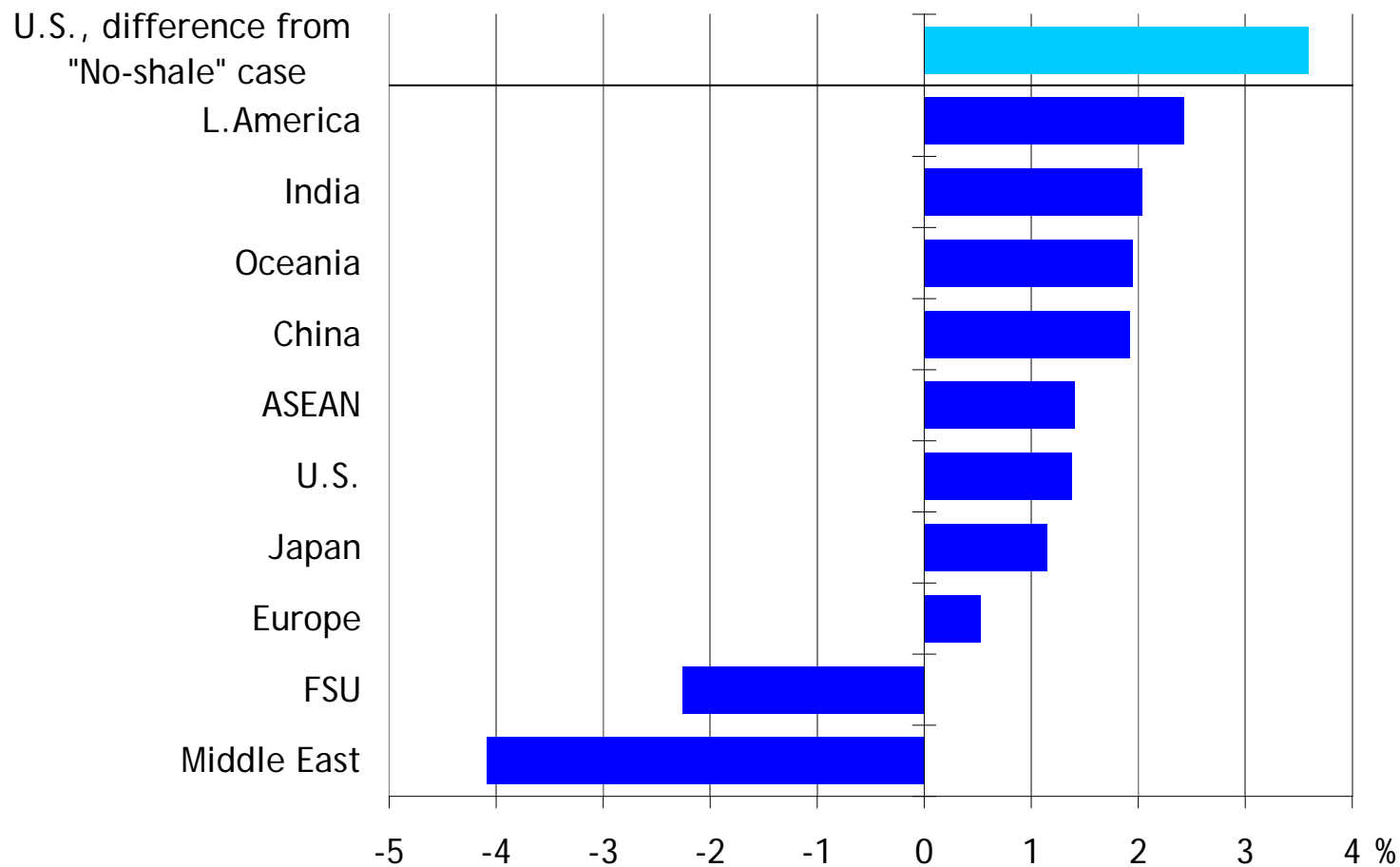


Natural gas



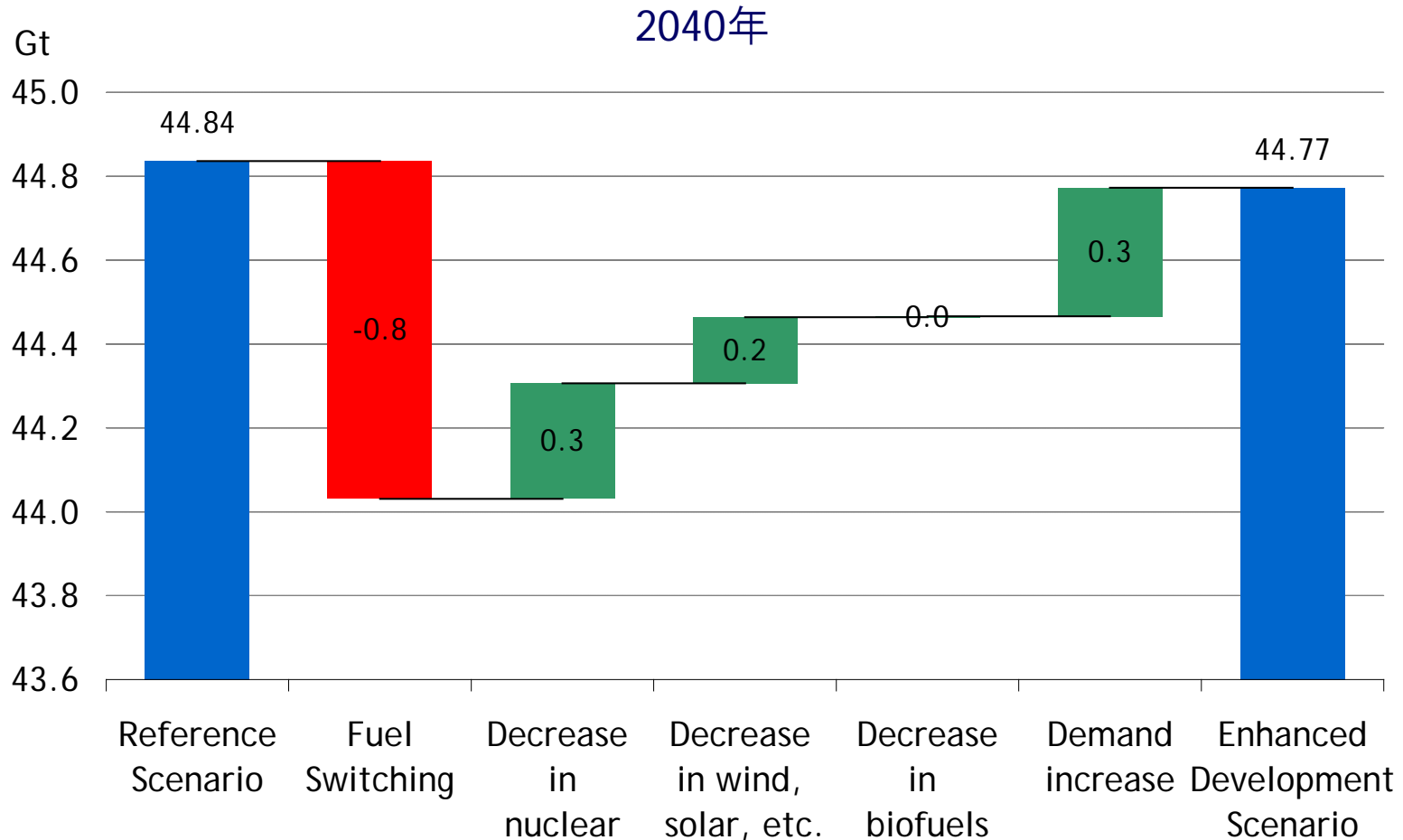
Importers Will Benefit From Lower Prices

GDP Gains in 2040 from "Reference Case"

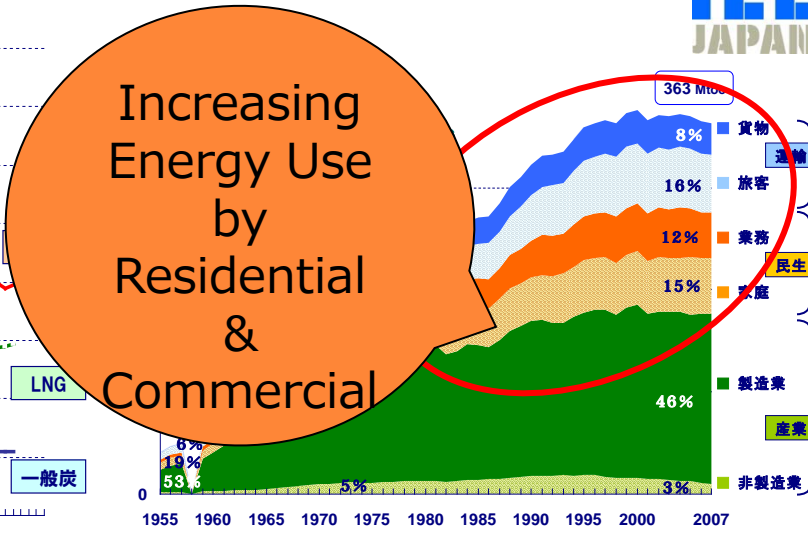
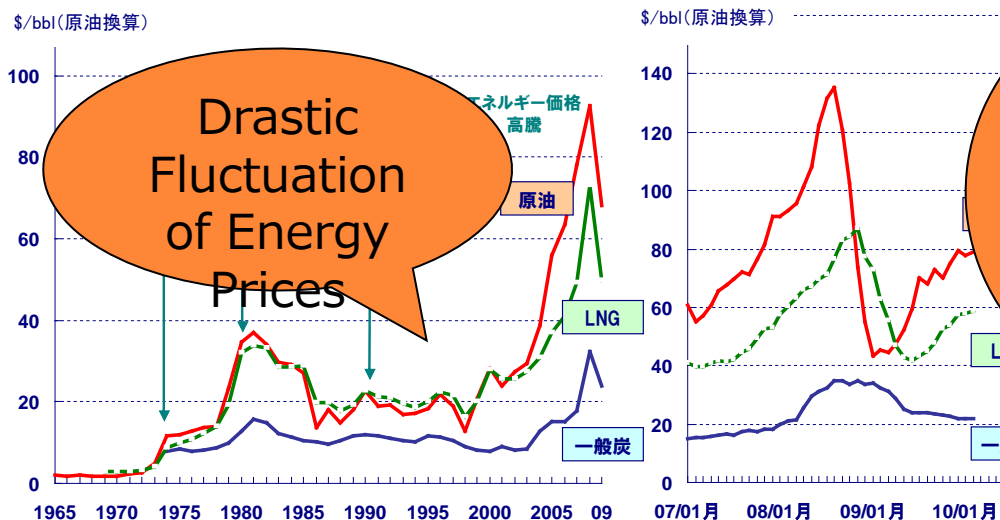


注: レファレンスケースから開発促進ケースへの移行による影響分

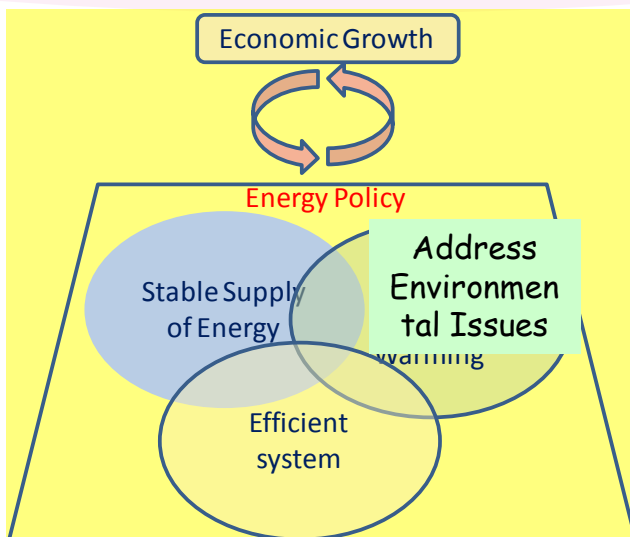
CO₂ Emission from Energy Use will not Change



- 2040年の排出はレファレンスケース比で世界0.1%減とほぼ変わらず。石炭代替効果が効くアジアは1.1%減と若干減少。
- 天然ガスへのシフト(燃料転換)が排出減に寄与する一方で、エネルギー価格の低下による省エネルギー、原子力、再生可能エネルギーの停滞が排出増に寄与。



Energy Efficiency Remains Key to Energy Policy



2. What are Expected of Energy Efficiency and Conservation (EE&G)?

New Challenges for Japan

- New EE **technology R&D** for new **social infrastructure** and **systems**
- Development of EE policies and tools and information/
best practice sharing, technology transfer and **international collaboration.**
- **EE achievement as a system**
 - **Smart Grid**, Smart Energy Network, Zero Energy Building (ZEB), EE and renewable energy technology imbedded **building materials**, **motor system**, electric vehicles, fuel cell vehicles and power/hydrogen SS infrastructure, eco-town/city...
- Importance of **Inter-Ministry** collaboration, **Public-Private Partnership**, foundation of **Consortium of industries** and collaboration among them

Challenges Common with ROW

- **Increase** in **power usage** to be addressed by ITC
⇒ HEMS, BEMS, Energy Management, Smart Meters
- **Combined usage** of both **EE** and **non-fossil energy** to achieve **Zero Emission** options (e.g. ZEB)
- Active employment of **reuse, recycle, natural light & heat (passive E)**
- **Integrated policy challenges** to be addressed
 - Environment (air, water) issues, EE, energy poverty & aging society (in both developed & developing countries), **sustainable growth** • and creation of new employment.

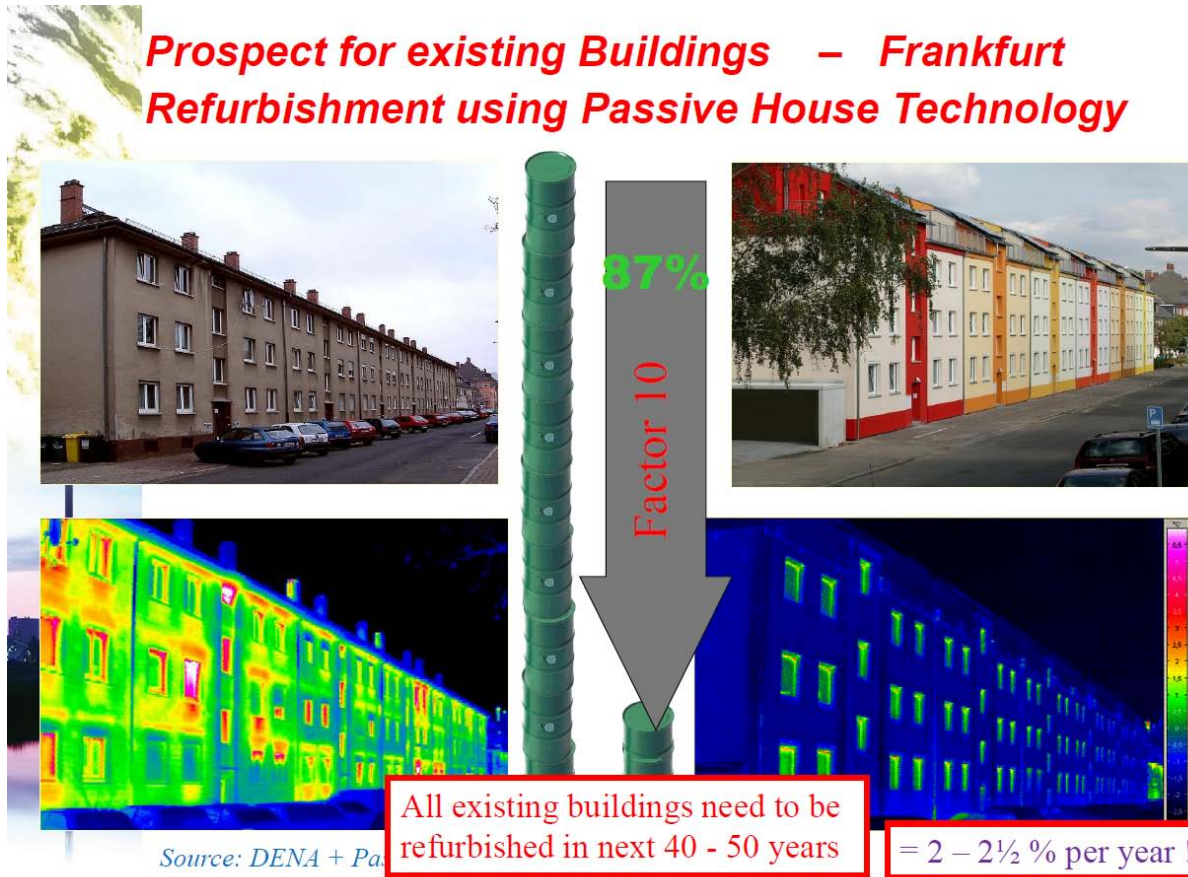
The Latest Change in Japan's EE Act (2013 May)

- Inclusion of building materials (insulation & windows) into “Top Runner Program” → Wider coverage
- “Peak Shift” as additional means to appeal in annual reports on energy efficiency improvement and conservation.
 - Introduction of Electricity peak demand cut/shift

Detailed rules for regulation are currently under discussion

Building EE Improvement: Passive House, Zero Energy Building

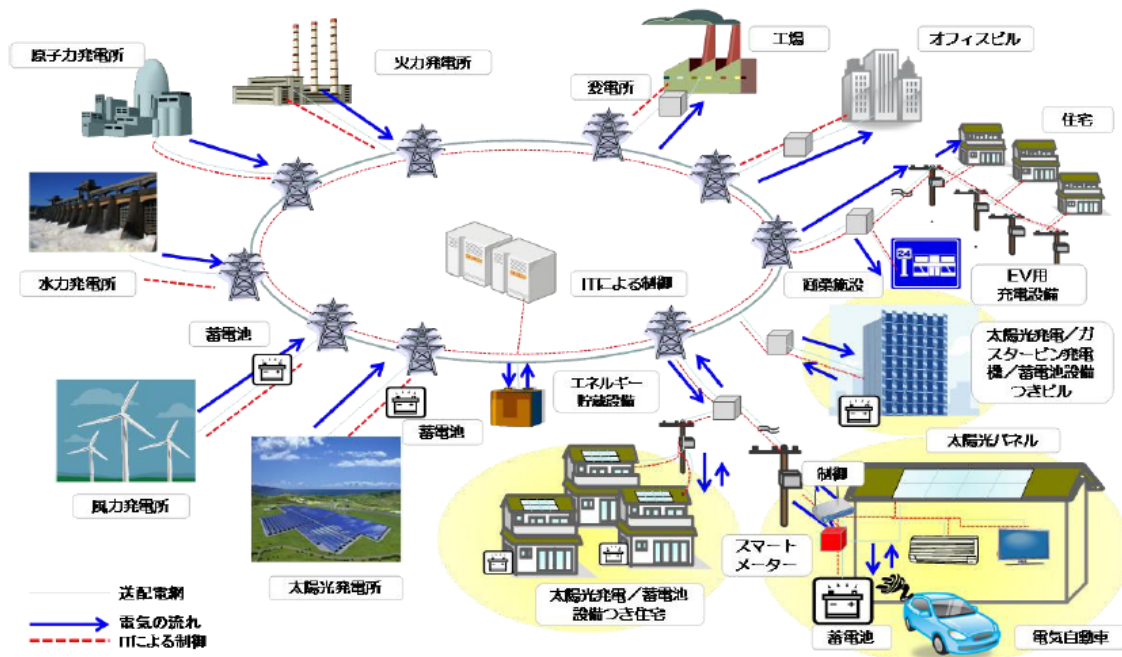
Refurbishment dramatically increased insulation to save heat usage in Frankfurt



Source: DENA + Pa

© OECD/IEA, 2008

Next Generation Energy Use : Embodied into a Social System and Infrastructure (Smart Grid +)



- Cross-cutting collaboration across industries and Ministries is required for strategic actions.
- Maximum utilization of renewable energy will be integrated.
- IT driven energy savings based on data and information.

Common Advantage of Energy Efficiency (1)

➤ Readily available **cost effective** measures are **applicable widely**.

- **Governments** are facing budget **deficit** with many complex social/economic **issues** while **industries** are facing increasing **regulations/ higher costs/ lack** of skilled labor, etc.

⇒ **Autonomous EE improvement** benefits both.

- **Resource-rich** countries are also striving **to save energy** to retain their national resources. (e.g. Saudi Arabia, Russia, Brunei, South Africa and many others)

Common Advantage of Energy Efficiency (2)

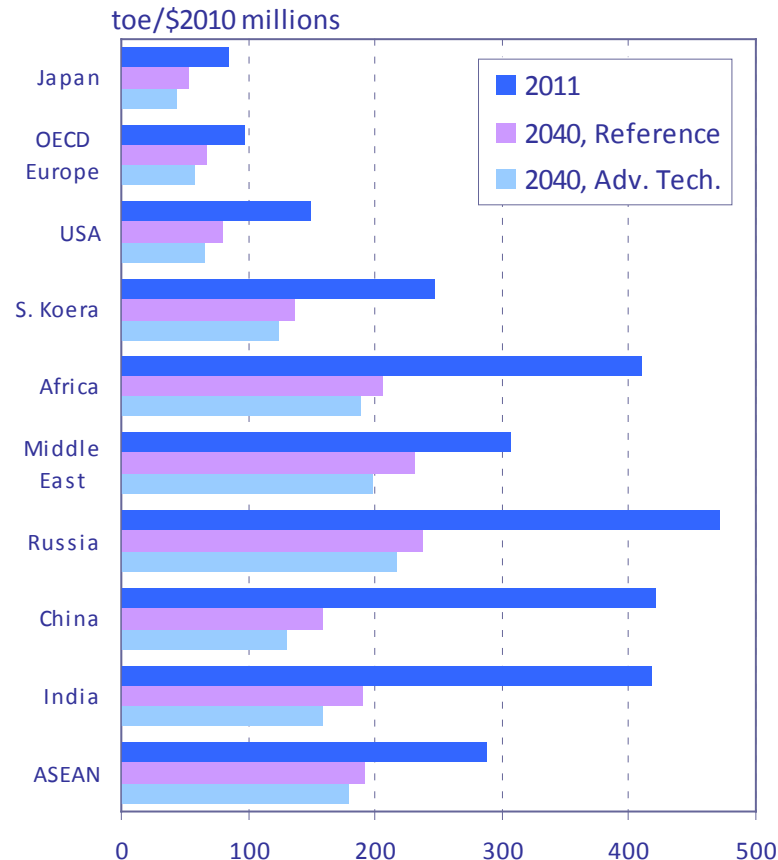
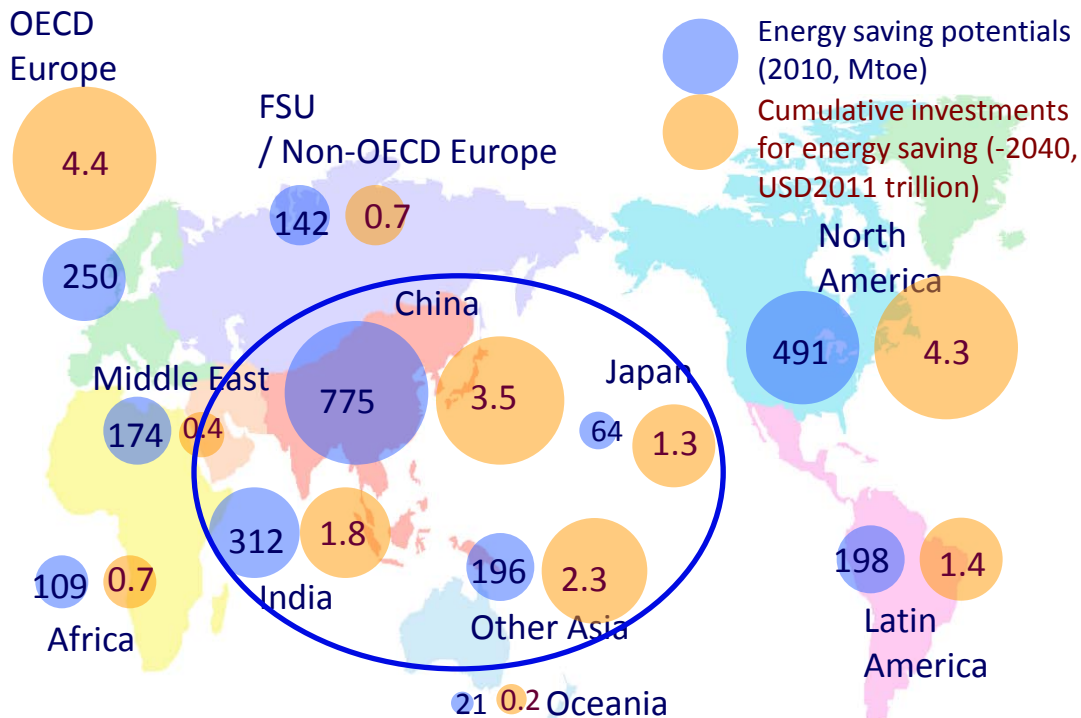
- Energy shift from coal → oil → gas → electricity.
 - Power generation needs to become more efficient while saving electricity usage and “peak shift “ is effective to make the power intensive society affordable.

- Generating own power using renewable alone will not make houses/ buildings “net-zero energy/ emission” to realize Low Carbon Society. Energy efficiency improvement is essential.

Energy Saving Potential is Big for Growing Asia

Energy saving potentials and cumulative investments by region

Primary energy consumption per unit of GDP



※ Difference between the Reference and Advanced Technology Scenarios

※ 省エネポテンシャルは、2040年における技術進展ケースとファレンスケースの一次エネルギー消費量の差。投資額は、2040年までの両ケースにおける省エネ投資の差額。

Conclusion

Energy Efficiency & Conservation is a “powerful tool”.

- ❖ The recent experience of power shortage in greater Tokyo Area proved that individual companies and factories could **move fast** and **adjust** daily operation with **flexibility** based on well **informed** knowledge of **daily EM**.
- ❖ More **targeted policy making** is required as potential for EE improvement gets exhausted. → SMEs & “peak cut”

Targeting sectors with priorities is a “Key”.

- ❖ To **exhaust** the most of **EE&C potential** in the country **with speed** and **volume**.
- ❖ To aim at co-benefits from the **EE&C policies and measures**
→ job creation, new green industries, technological innovation, smart***.

Collaboration among the Ministries & industries across the country and cooperation in the world is “essential”.

- ❖ **Wider collaboration** is required **across** the **country** and **beyond** industrial **boundaries** to further utilize EE potential.
- ❖ Sharing **best practices** **domestically** and **internationally** can **speed up** and **strengthen** the efforts **globally**.

Thank you very much for your attention!

For more advanced analyses, please contact IEEJ at report@tky.ieej.or.jp