



Energy Challenges for Japan and Japan-Russia Energy Relation

The 5th Japan-Russia Dialogue on Energy & Environment in Niigata

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Ken Koyama, IEEJ, October 26th - 30th 2012

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Energy challenges for Japan after “March 11th”

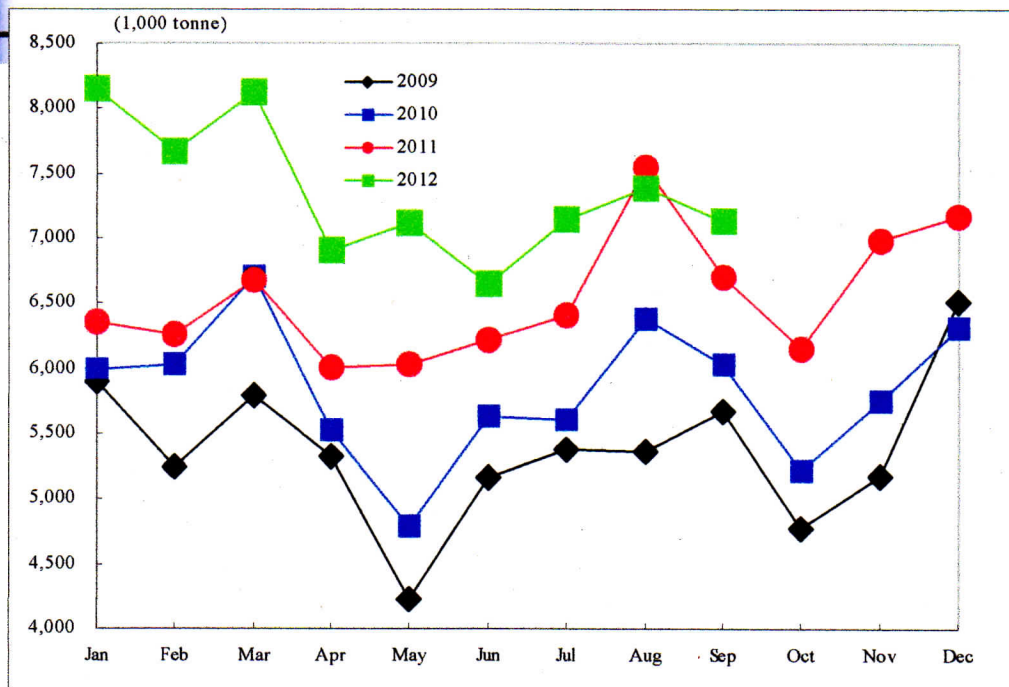
- **Top priority: stabilization of “Fukushima Daiichi”**
- **Restoration and reconstruction of damaged energy related facilities/infrastructure**
- **Power shortage: emerging serious problem**
 - To increase power supply capacity
 - To enhance energy (power) saving and efficiency improvement
 - To secure fuel procurement for increased fossil fuel power generation
- **Negative Impacts on Japanese economy (Increased outflows of National wealth, hollowing out of industry, etc.)**
- **Re-establish Mid and Long term energy policy/strategy**
- **Need to establish contingency planning**

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Increase in Japan's LNG import after 2011

- LNG imports in Japan increased substantially after April 2011



(Source) Trade Statistic, Ministry of Finance, Japan

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Current Situation on the 3Es and macro economy

Reduced nuclear power generation resulted in substantial increase in fossil fuels use and imports, which has serious implications on:

✓ Energy Security

→ Fossil fuel imports increase leads to lower energy self-sufficiency

(Down from 18% in FY 2010 to 7% in FY 2012 in TPES)

Higher import dependency, in particular on Middle East LNG

Power supply reserve margin remain low, while thermal power plants in full operation

✓ Environment

→ Increase in fossil fuel use leads to higher CO₂ emission (1.18 billion ton in FY 2012)

✓ Macro Economy

→ Fossil fuel imports increase leads to higher import bill for power generation fuels

(Up from 3.7 trillion yen in FY 2010 to 6.8 trillion yen in FY 2012)

Increased cost for power generation

(Up by 3.4 yen/kWh as compared to that in FY 2010)

Impacts on trade deficit

(Trade deficit in FY 2012 is estimated at 3.8 trillion yen)



Recent Development on Japan's New Energy Policy

- **September 14th, “Innovative Energy & Environment Strategy” published**
 - **Aim to establish a society which is not dependent on nuclear energy as soon as possible**
 - All available policy resource will be utilized to achieve zero-nuclear in the 2030s
 - In this process, nuclear power plant with safety permission from the authority can be utilized
 - The followings are important for consideration on nuclear policy
 - Nuclear fuel cycle
 - Maintenance and enhancement of skilled manpower and technology
 - International collaboration
 - Enhancement of policy measures towards the areas of nuclear plants site, etc.
 - Continuous Check & Review for the above mentioned policy
 - **Aim to materialize “Green Energy Revolution”**
 - **Enhance security of energy supply**
- **September 19th, a Cabinet Decision was made on new energy policy, referring to “Innovative Energy & Environment Strategy”**
- **General election to be held on December 16th**

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Emerging landscape with regard to energy security/sustainability

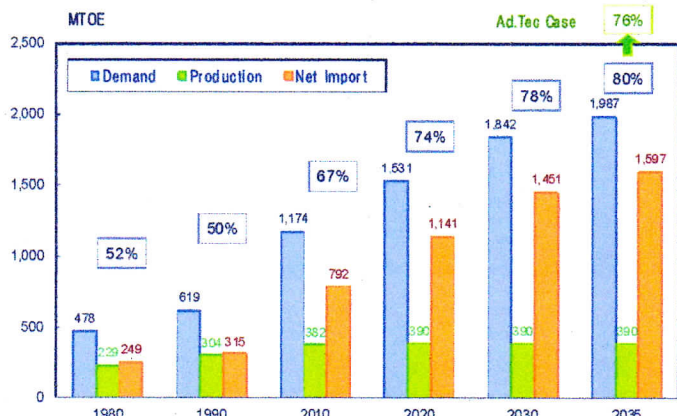
- **Historic volatility in global energy prices**
- **Growing energy demand in Asia and its implication to global energy security**
- **Emerging concerns for energy supply constraints**
 - Geopolitical risks, resource nationalism and issues of market power
 - Ongoing “MENA crisis”, “Iranian crisis”, etc.
 - Lack of timely investment in resource development
 - Importance of stability of energy transportation
- **Impacts of Unconventional Oil & Gas Development**
 - Impacts of US Shale Gas Revolution
 - Impacts of US Energy Independence
- **Environmental challenges for sustainability**
 - Climate change and global environmental problems
 - Local and regional environmental problems
- **Unprecedented impacts of “March 11th” (East Japan Great Earthquake and “Fukushima Daiichi accident”)**

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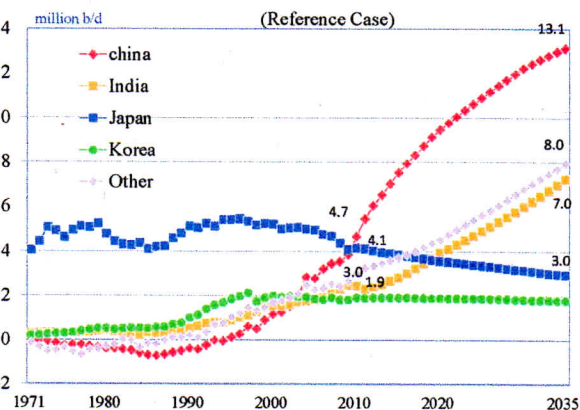


Asia's Rising Oil Import Dependence

Outlook of Oil Supply-Demand in Asia



Outlook of Oil Import in Asia



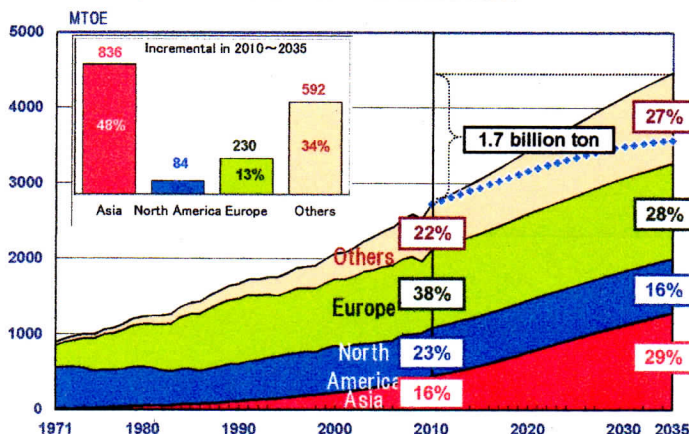
Oil import in China will increase to 13.1 million B/D in 2035, followed by India (7.0 million B/D) and other developing Asia, mainly ASEAN.

Source: IEEJ (Asia/World Energy Outlook 2012)

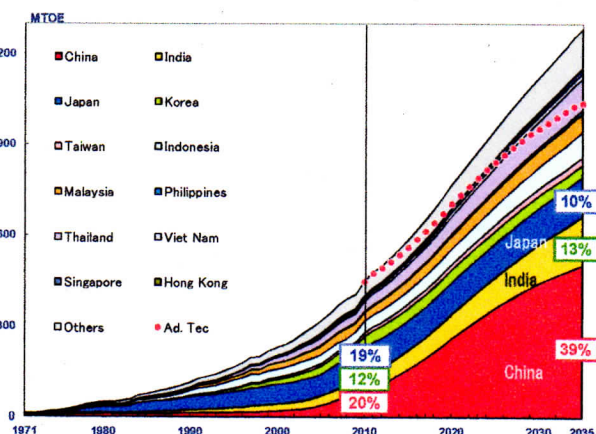
IEE Outlook for global and Asian gas demand

Gas demand in Asia (and in China) is key to global demand growth, which will affect global supply-demand balance

Global gas demand outlook (dotted line for Tech Advanced case)



Asia gas demand outlook (dotted line for Tech Advanced case)

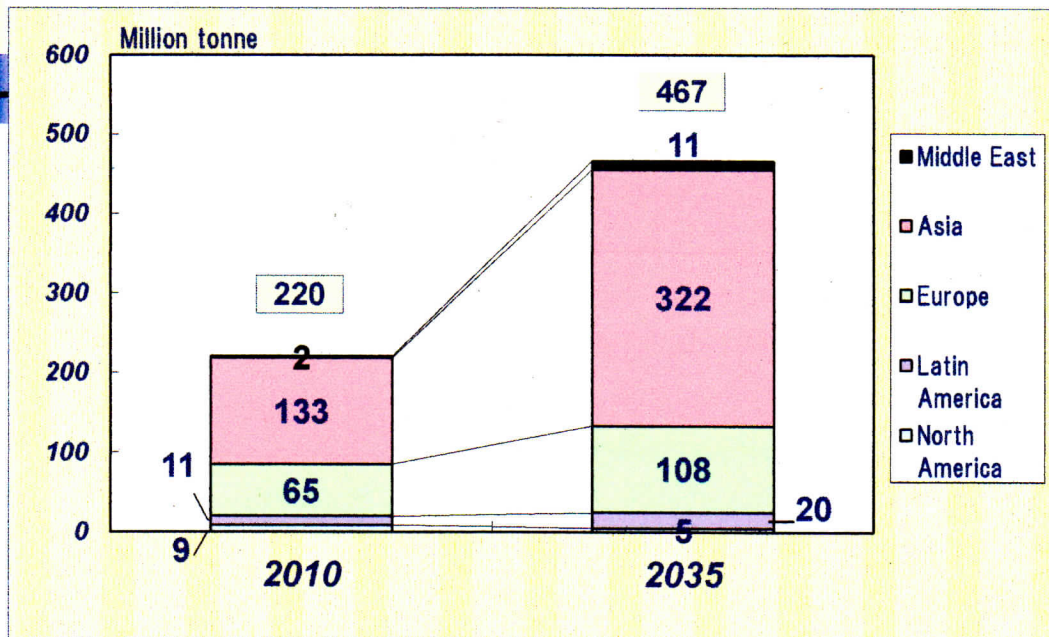


Source: IEEJ (Asia/World Energy Outlook 2012)



Outlook for World LNG Demand

(Reference case)



■ World LNG demand will expand from 220 million tons in 2010 to 467 million tons in 2035.

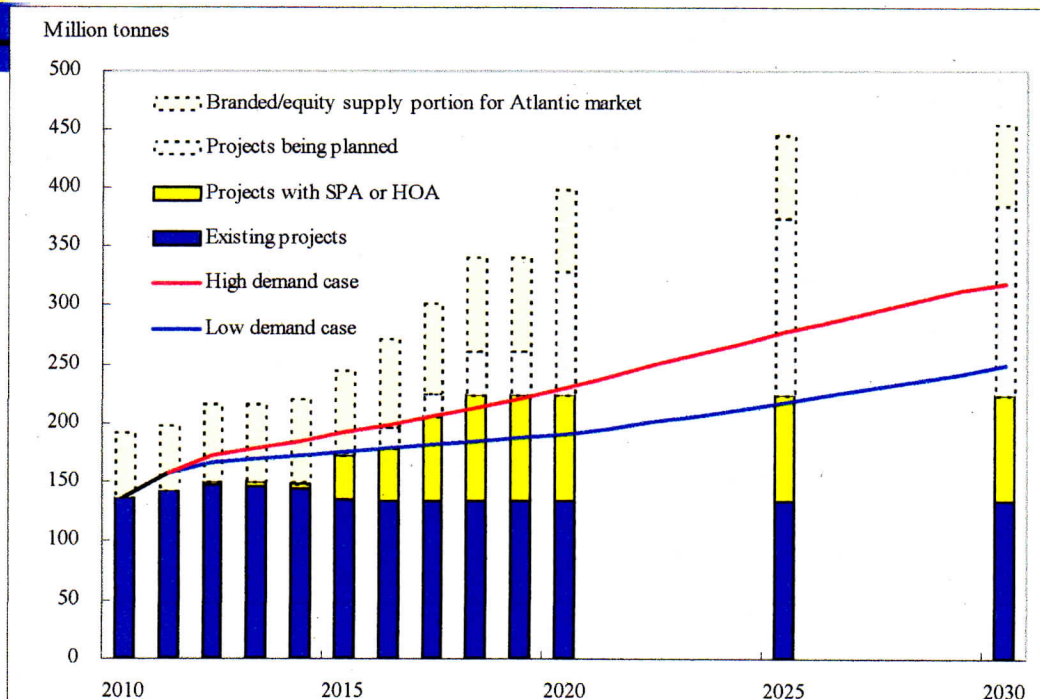
■ Asia's LNG demand will increase by 189 million tons, accounting for 80% of the world's LNG demand growth through 2035.

Source: IEEJ (Asia/World Energy Outlook 2012)



LNG S-D Outlook for Asia (and ME)

■ Supply capacity will be enough to meet growing LNG demand



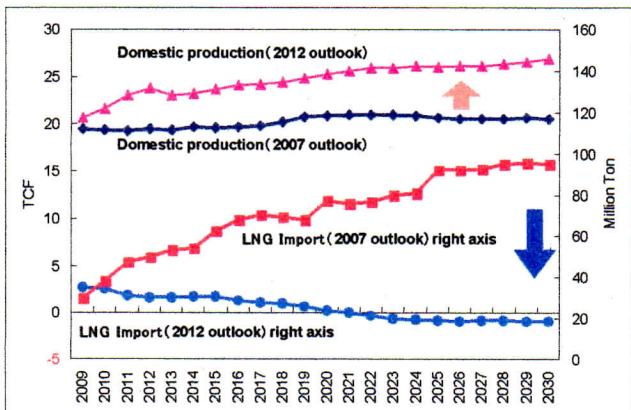
Source: IEEJ estimate



Impact and implication of US unconventional gas revolution

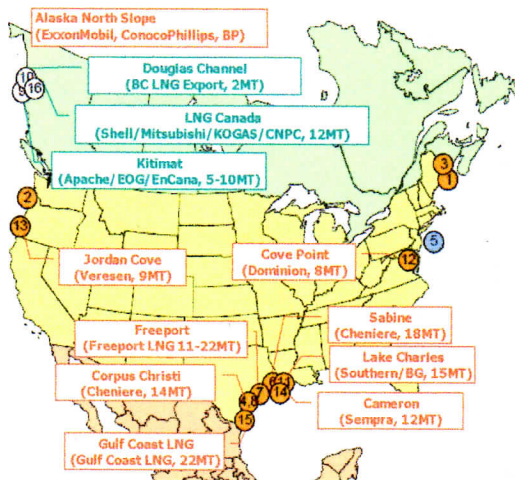
- Impacts
 - Lower US LNG demand impacts on global gas market
 - Emerging US LNG export potentials
 - Higher expectation for role of Gas in US, as important domestic energy source as well as low carbon/clean energy
 - Expectation for unconventional gas development outside US
- Challenges
 - Lower gas price and its impacts on gas development economics
 - Unconventional gas development and its impacts on environmental/pollution problem

Downward revision for US LNG demand by EIA



Source : prepared from "Annual Energy Outlook" (EIA)

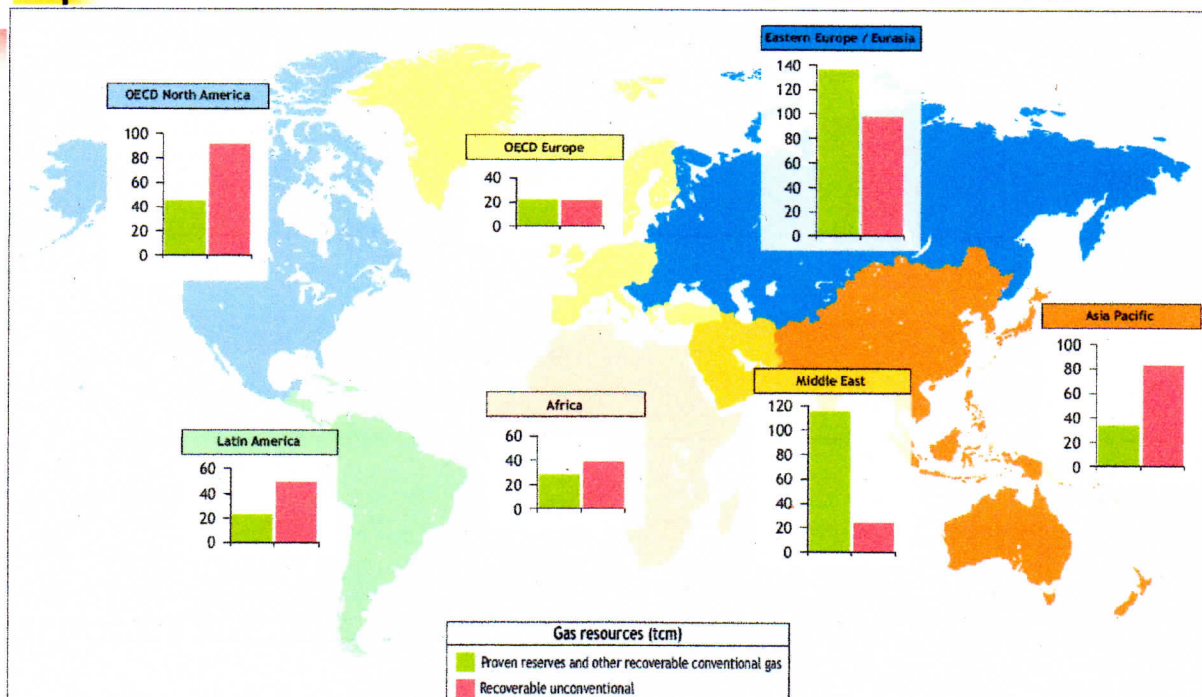
US LNG Export Projects



Source : EIA Homepage



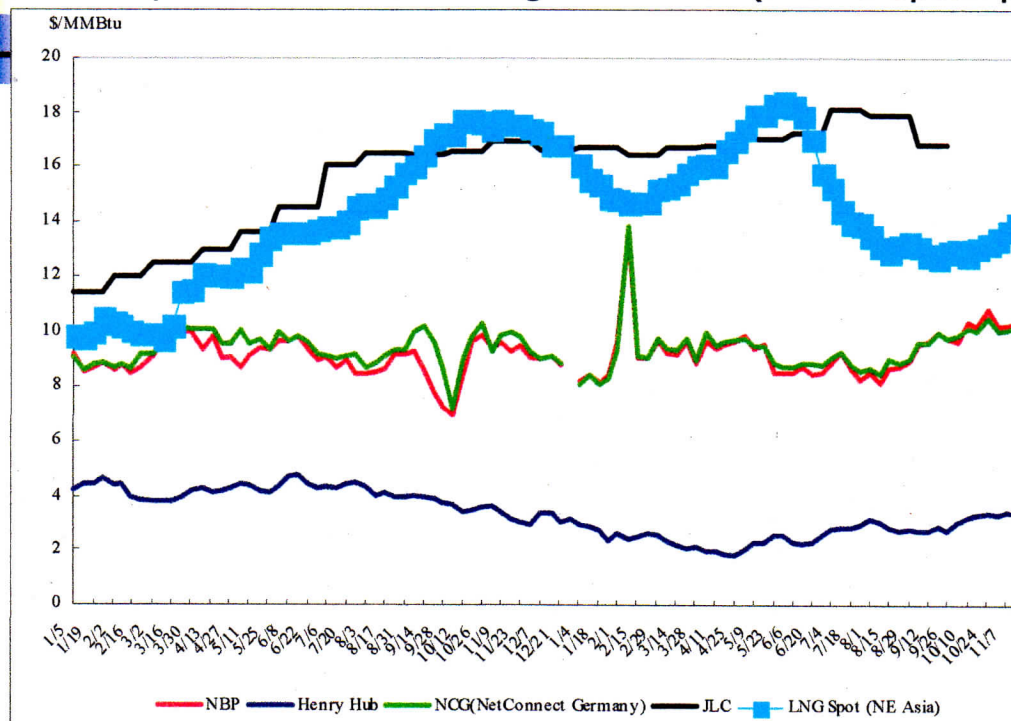
Conventional & Non-Conventional Gas Resources in the World





International Gas prices after 2011

- LNG price in Asia is much higher than US (and European prices)



(出所) World Gas Intelligence

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Russian Energy Resources and the World

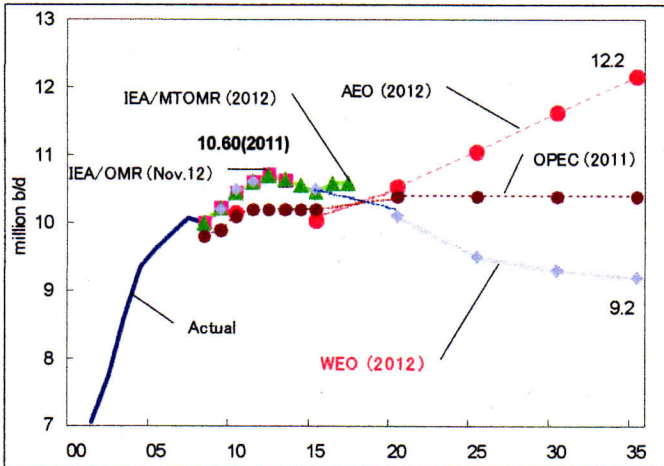
The importance to the world energy market

- Huge resource potential, possible to meet global energy demand growth in the future
- Production from existing major oil and gas fields showed stagnation/decline
- Importance of supply growth in new/frontier fields/areas
- Long term supply growth possible, but uncertainty remains
- Importance of “Demand security” in Europe and expectation for Asian market (Japan, China, Korea, etc.) as a new and growing market
- Initiatives for enhancing access to Asian market
 - APEC Summit in Vladivostok
 - Completion of ESPO PL
 - Vladivostok LNG
 - Eastern Gas Program
 - Oil & Gas Development plan in East Siberia and Sakhalin

Outlook for Russian oil production

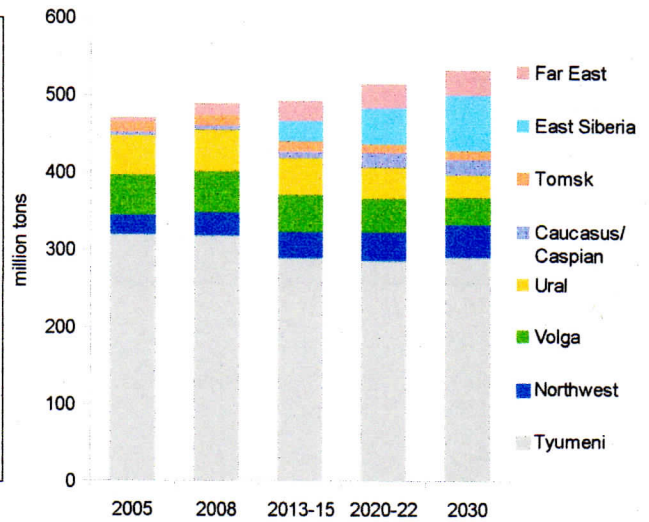
Uncertainty over long term prospects for oil production. Frontier development is a key

Russian oil production outlook by organization



(Source) prepared from EIA, IEA, OPEC data

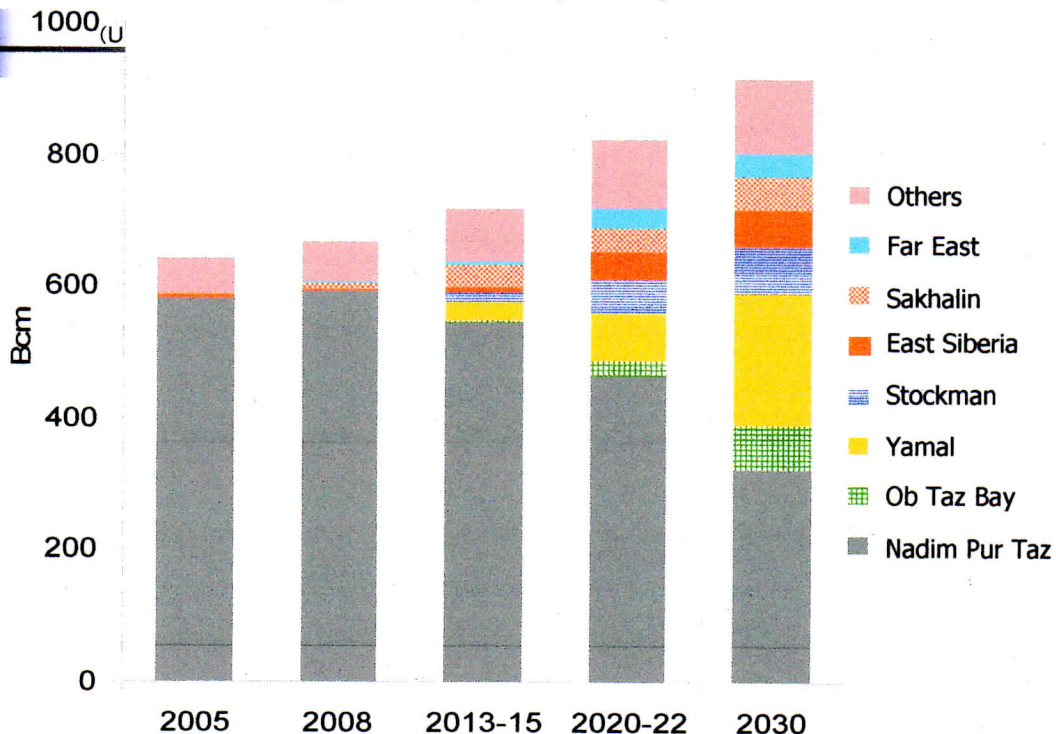
Russian government oil production outlook



(Source) prepared from "Russia's energy strategy 2030"

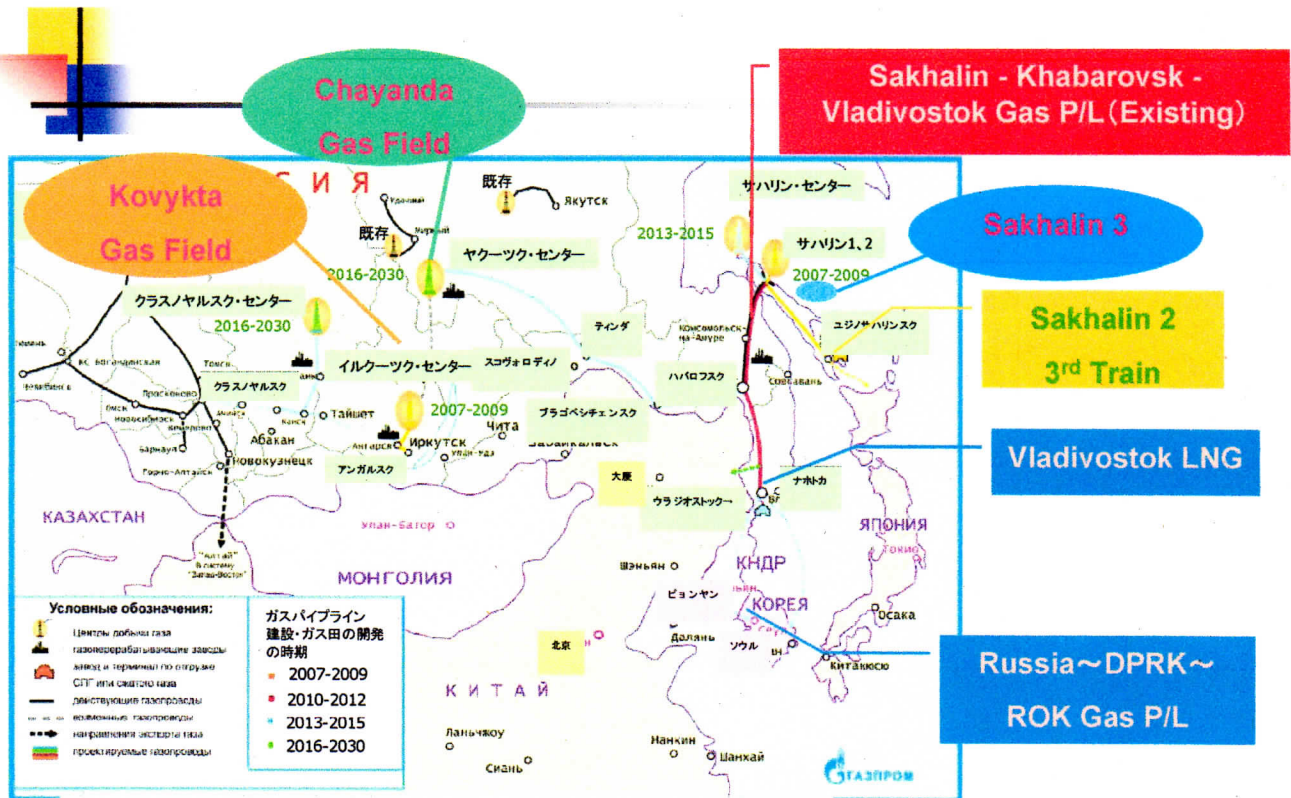
Outlook of Natural Gas production in Russia

Production of existing major fields continues to decline, but new fields/area production (Far East, etc.) is expected to rise



(Source) prepared from "Russia's energy strategy 2030"

Gas development PJs in East Siberia and Sakhalin



(Source) Prepared by IEEJ based on Eastern Gas Program of Gazprom

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Importance of cooperation between Japan (consumer) and Russia (producer)

Consumer and producer need each other because:

- Growing economic and energy relations
- Importance of both countries in global economy
- Japan (consumer) :
 - needs energy supply security, based on new reality after Fukushima
 - may provides a stable/reliable market
- Russia (producer) :
 - needs energy demand security, based on new reality in Europe and Asia
 - may provides stable/reliable supply
- Both sides need sustainable development, economic growth/diversification

Possible Areas for Energy Cooperation

- Complement “supply and demand security”
- Joint Efforts to Increase Energy Supply Capacity
- Promotion of Energy Conservation
- Cooperation in Alternative Energy Development (renewable energy, nuclear power, etc.)
- Cooperation in Environmental Protection
- Facilitate and Enhance Mutual Trust and Information Sharing through Improvement in Dialogue
- Etc.

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Summary

- Energy is essential to human existence, social and economic development and civil life for every country including Japan and Russia
- Emerging multiple and serious risks/threats to global energy security and sustainability
- Japan has to address serious energy challenges after Fukushima
- Russia, an important energy market players to fill the expected gap between energy supply-demand in Asia and World
- Japan and Russia, facing new/emerging political, economic and energy market realities, can complement each other
- Japan-Russia energy cooperation should be pursued in a way to promote mutual, regional and global benefits, taking into account the surrounding political, economic and energy market realities