

'The 418th Forum on Research Work

Global and domestic petroleum market outlook for 2015

December 19, 2014

Yoshikazu KOBAYASHI

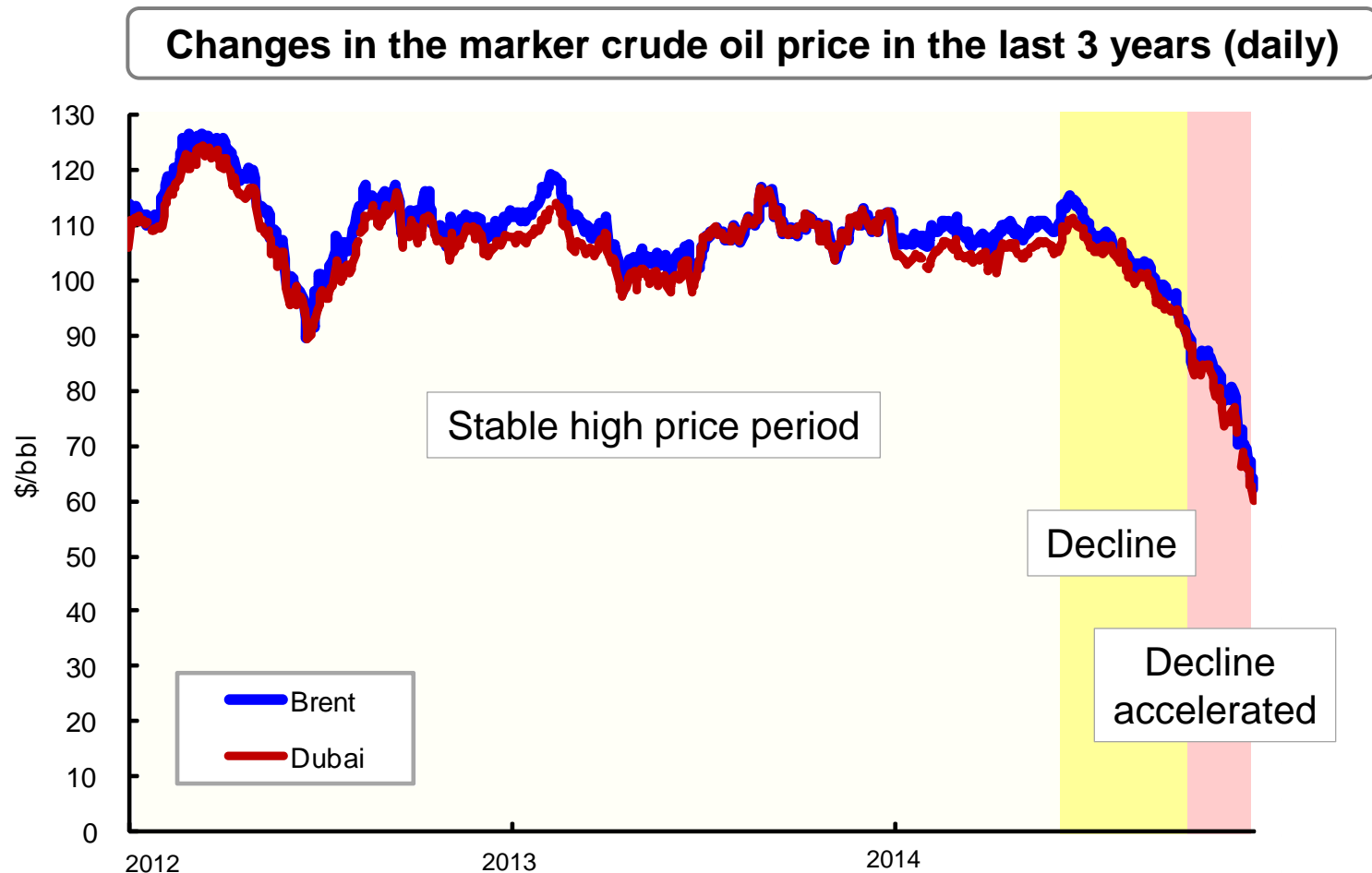
The Institute of Energy Economics, Japan (IEEJ)
Oil Group, Fossil Fuels & Electric Power Industry Unit

Key points in today's report

- ❑ The current crude oil market is in the process of finding a new equilibrium, with anticipated unstable price fluctuations.**
- ❑ Notable points are non-OPEC supply and the OPEC production policy (Saudi Arabia) in the lower oil prices environment. Supply-demand fundamentals are of interest more than ever.**
- ❑ As the domestic oil industry faces rapid declines in demand, it is vital to have good adaptability regarding the changing business environment resulting from the shale revolution and lower oil prices.**

2014 international crude oil market

- Stable high prices maintained to the summer.
- Turned to a completely downward trend since summer.
- Downward trend accelerated after the Nov 27 OPEC Conference decision.



Source) Various references

International crude oil market seeks a new equilibrium.

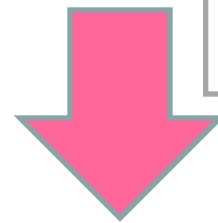
□ Factors that contributed to the stable high-price range to this summer

- Increased demand for oil from emerging countries
- Intermittently occurring geopolitical risk events
- OPEC's preference for higher prices



□ Factors that contributed to tipping the pre-summer balance point

- Sluggish global demand growth
- Increased production from oil-producing countries with higher geopolitical risks
- OPEC's tolerance for lower oil prices
- Supply growth from non-OPEC including the US

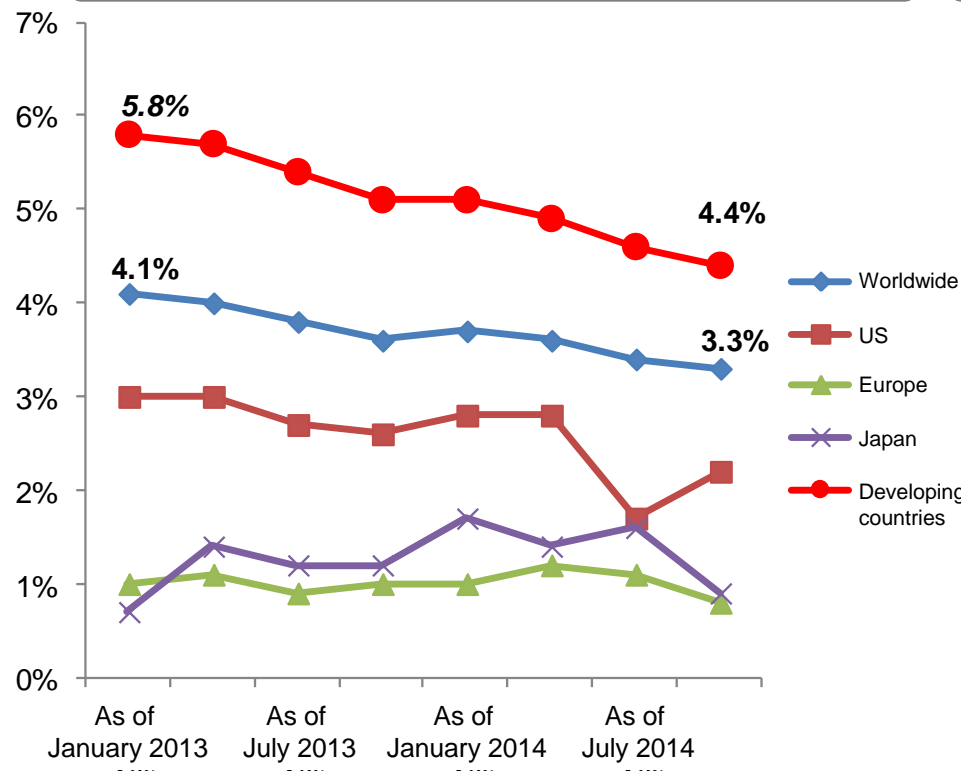


Crude oil market seeks a new equilibrium

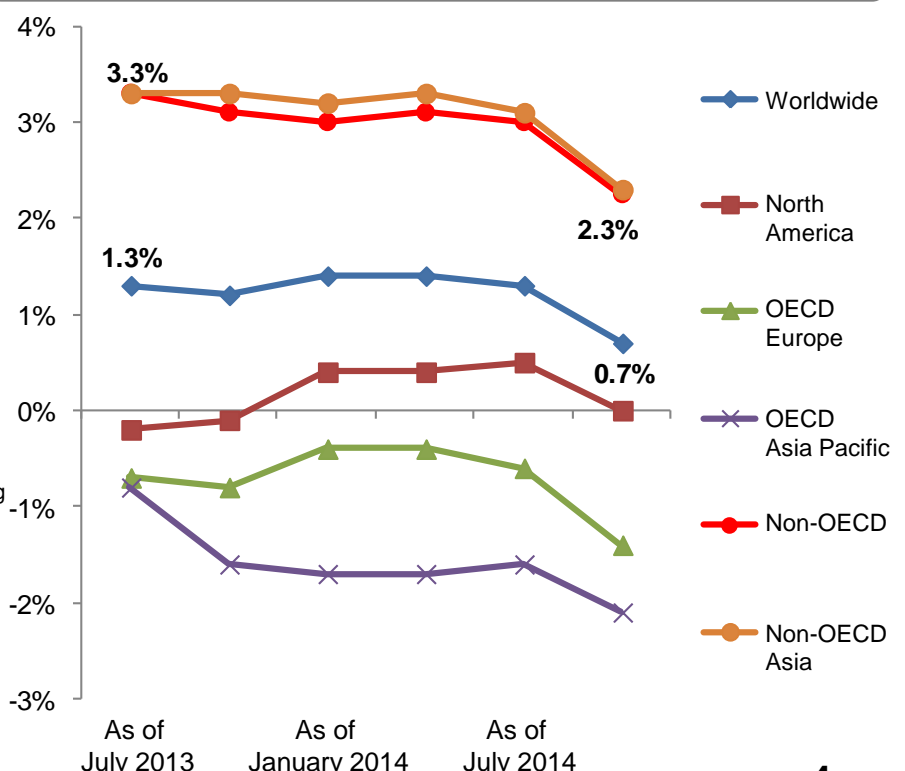
Deceleration of economic growth and demand for oil

- 2014 growth rate recorded at well below the initial prediction.
 - IMF made significant downward revisions of the 2014 growth rate of the world economy during the two years.
- 2014 demand for oil similarly was below the initial prediction.
 - Rapid deceleration in the pace of growth regarding the demand for non-OECD oil that had driven the global demand increase.
 - Demand in advanced countries also dipped sharply. Higher inventory since summer (reference material) contributed to declining oil prices

Changes in 2014 GDP growth rate forecasts



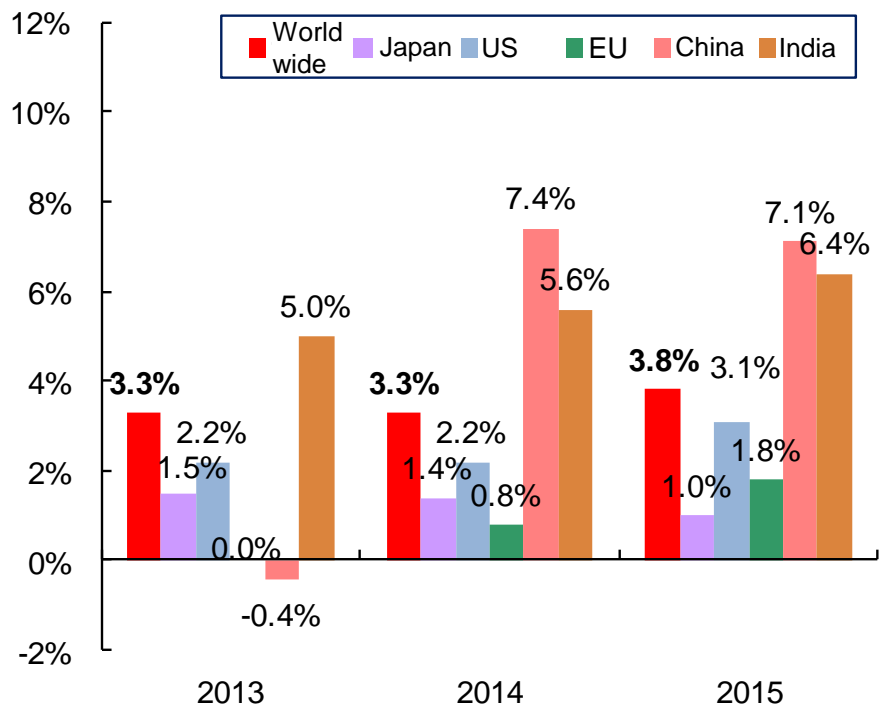
Changes in IEA 2014 demand increase projection



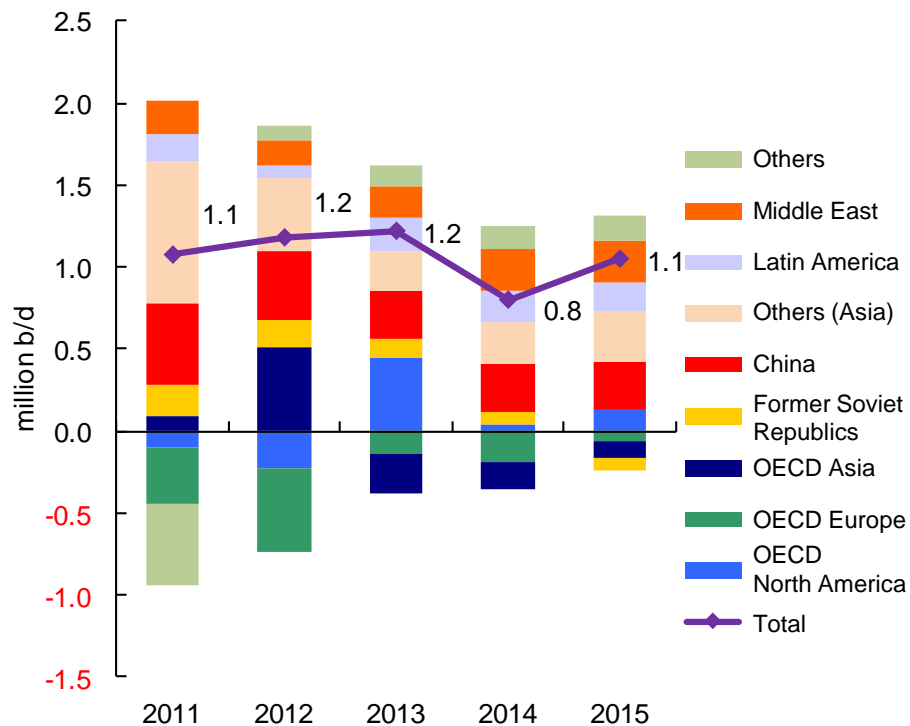
Economic growth outlook and global demand for oil in 2015

- Global growth rate on track for recovery during 2015.
 - To date, no significant downward revision has been made.
- Global demand for oil also heads for recovery next year.
 - Global demand increase continues to be led by Asia and the Middle East.

World's GDP growth rate figures and outlook



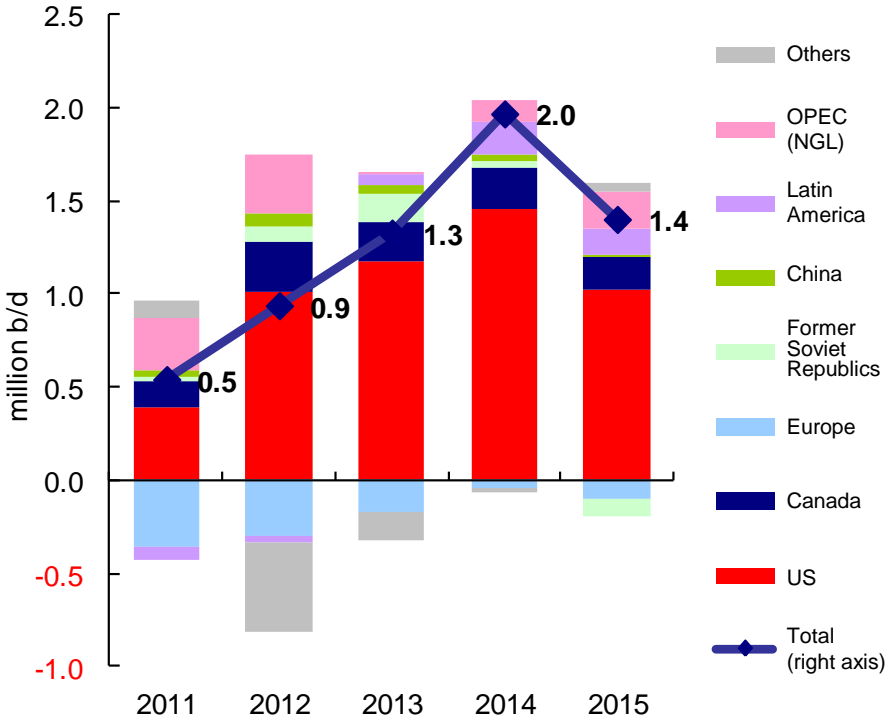
Changes and outlook of demand for oil in the world (year-on-year)



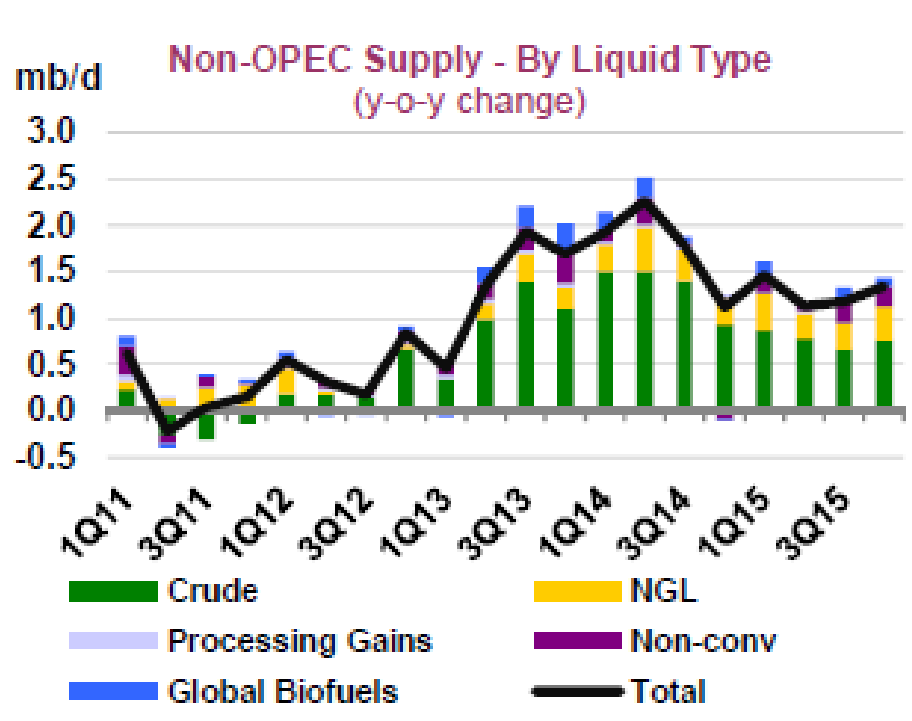
Increased supply from non-OPEC sources

- US production continues to increase every year.
 - Last year's increase was considered to be the peak; recorded higher growth again this year.
- Non-OPEC supply, especially from North America, expected to continue next year

Changes in non-OPEC supply amount by region (year-on-year)



Changes in non-OPEC supply amount by oil type (year-on-year)



Note) Including OPEC NGL Source) Estimated based on IEA and OPEC

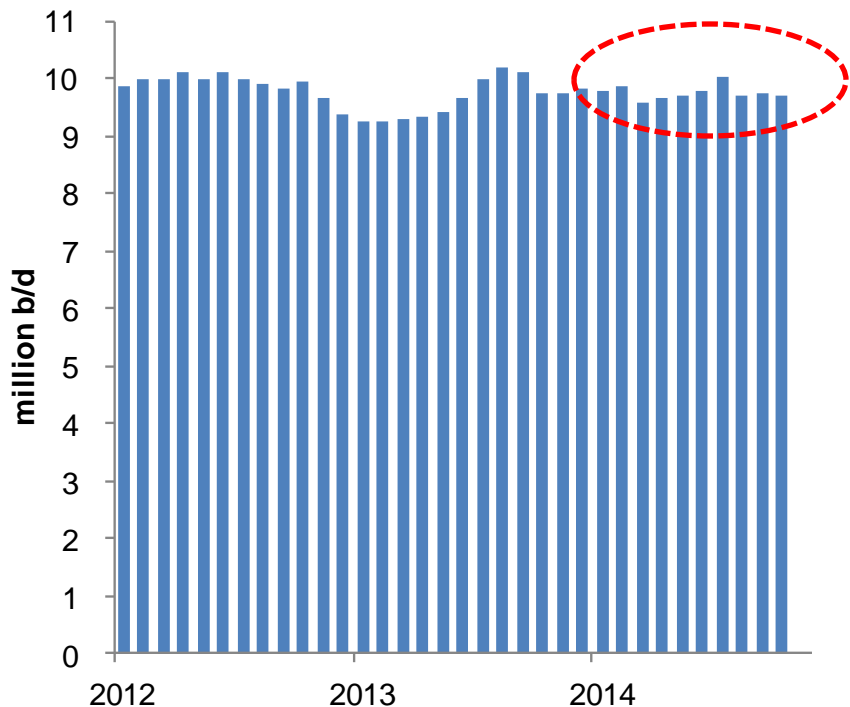
Oil price decline and shale oil

- The oil price level around \$80/bbl, which initially was considered to be the average supply cost of shale oil, did not show significant impact on actual production.
 - “4% of all shale oil oilfields become unprofitable at a crude oil price of \$80/bbl or lower” (IEA)
 - “80% of shale oil oilfields remain economically viable even at \$70/bbl for WTI” (Leading consulting company)
- To the contrary, the latest oil price drop prompted oil companies to revise their capital expenditures and production plans downwards for 2015.
 - ConocoPhillips reduced 20% of its 2015 capital expenditure to \$13.5 billion.
 - Apache cut a \$5.4 billion capital expenditure for US onshore oilfield development for 2015 to \$4 billion.
 - Continental Resources revised its fiscal 2015 production forecast downward by 3%. 12% lower capital expenditure to \$4.6 billion.
 - Devon maintained the same capital expenditure plan, yet revised its production increase projection to a 20 to 25% increase, from the 35% increase from the previous year in 2014.
- Lower oil prices also affect high cost supply beyond shale oil.
 - IEA analyzes the break-even price for supply over a total of 2.6 million B/D at \$80/bbl or higher, for non-OPEC high-cost oilfields in Canada, China, Southeast Asia, and Russia.
- **While the effect of lower oil prices due to over supply is not expected to become apparent in the short-term, in the time being, the market will try to find a level where general non-OPEC supply clearly starts to slow down.**

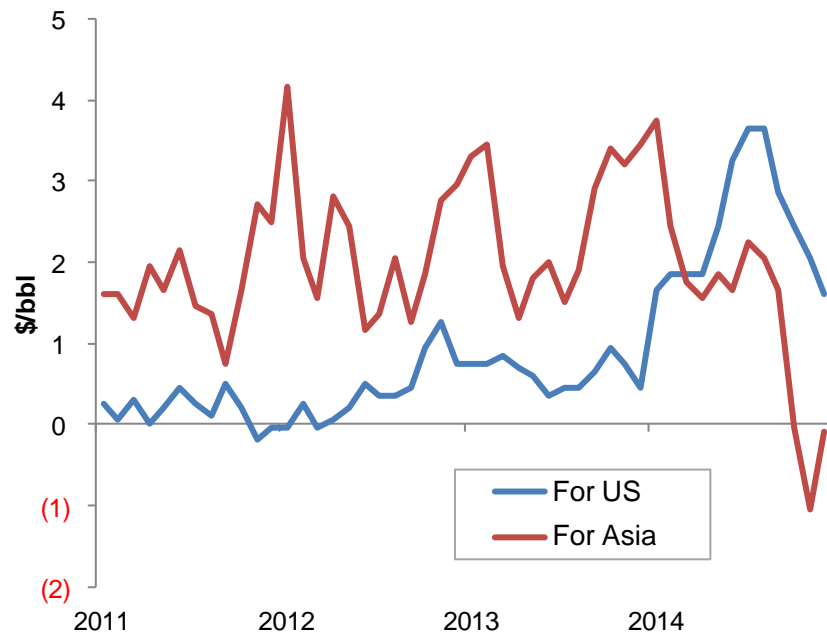
Production trend in Saudi Arabia

- No production decrease even following the lower oil prices that have been present since the summer; prefers to strongly maintain shares in the Asian market.
 - Lowers adjustments in view of maintained shares in Asia, higher adjustments for the US.
- At the November OPEC Conference, led the decision to maintain production, essentially tolerating a decline in oil prices.
 - Abundant foreign exchange reserve (\$739 billion as of 2013) provides robust financial capacity even with lower oil prices.

Production change in Saudi Arabia



Arab Light adjustments for Asia and US



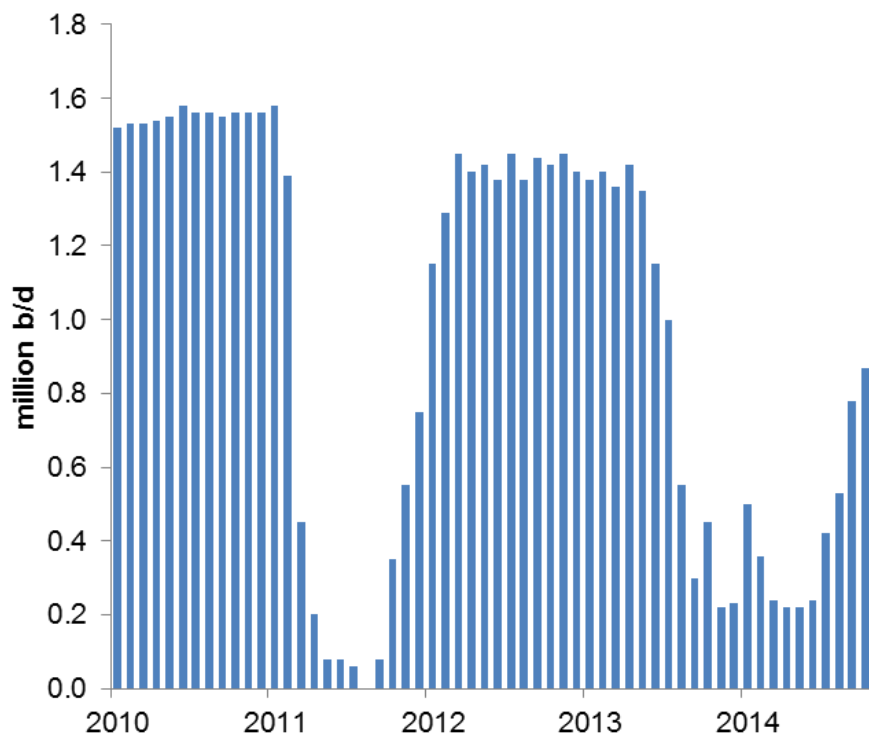
Shale oil and Saudi Arabia's production policy

- Crude oil from Saudi Arabia is not in direct competition with shale oil as they have different quality.
 - Shale oil production increased to 0.82 million B/D to 4.07 million B/D (EIA estimate) during 2010 and 2014, Saudi Arabia's US exports rose from 1.08 million B/D to 1.25 million B/D (Jan. to Sep. figures)
- Sluggish shale oil production resulting from lower oil prices would provide Saudi Arabia the following advantages:
 - Maintains a strong presence by taking back the “primary player” role in the global oil market from the US.
 - (as a result of the above) Continues to participate in security affairs by the US in the Middle East region.
 - Deters production increases by other oil-producing countries.
 - Monitors the economic viability of shale oil production
 - Checks global expansion of the shale revolution and long-term stagnation of oil prices
 - Secures export profitability for new refineries in the country.
- At the same time, in the medium-term, it is expected to shift to higher oil prices due to the following factors:
 - Rising government spending due to population growth and increasing social expenditures after the “Arab Spring.”
 - Lower exportable oil volume due to larger domestic energy demand and increased production by other oil-producing nations.
- **In the past cases of a sharp decline in oil prices, OPEC's decisions led by Saudi Arabia played a vital role in reversing the market. Closely observing Saudi Arabia's movement is vital to identify a change in the international crude oil market orientation in the future.**

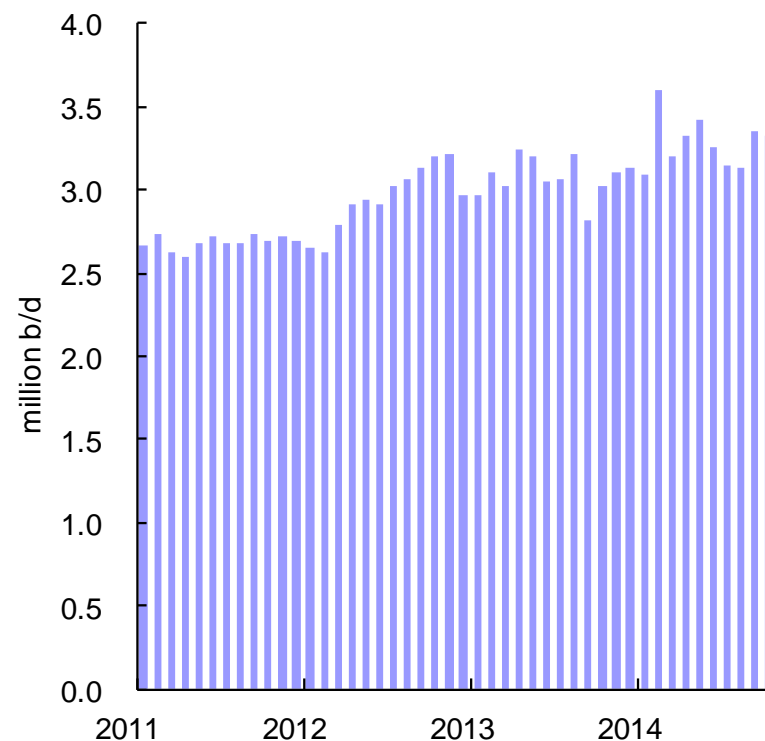
Increased production from Libya and Iraq

- The second half of 2014 saw lower oil prices partially due to increased production by the two countries, both of which have high geopolitical risks.
 - Production in Libya recovered quickly after an agreement was reached in the summer between the local forces in the eastern region and the central government.
 - Iraq also maintains good production from the southern part of the country despite activities by the Islamic State in the northern part, which produces nearly no exports. Gradual increase in exports.

Crude oil production by Libya



Crude oil production by Iraq



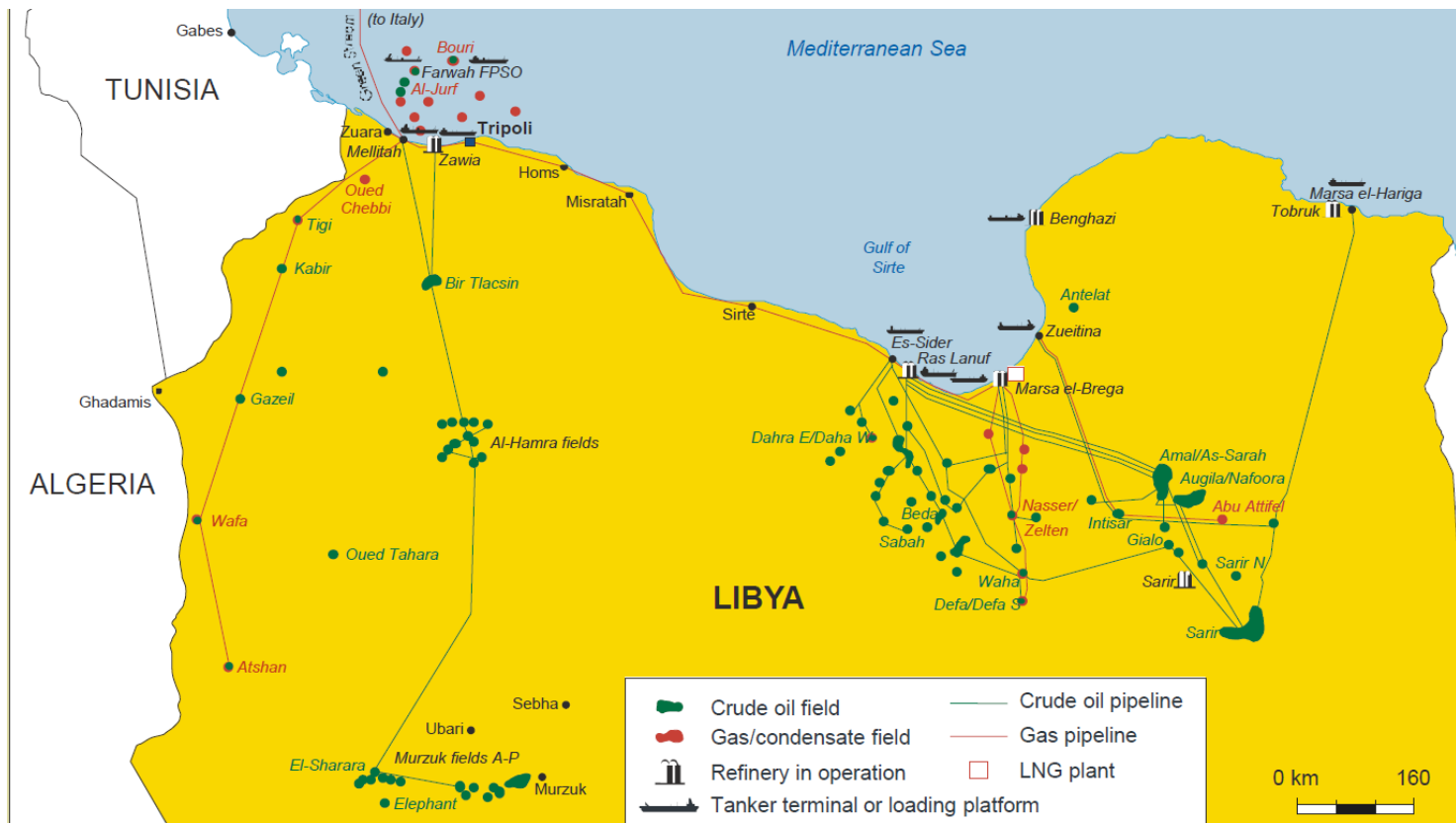
Source) IEA

Source) IEA

Libyan crude oil production causes a direct impact

- Political conflicts between the central government in the west and the oilfield-rich east still continue. Possible supply re-interruption.
 - No political force to govern the entire country in a united manner.
- Some oilfields still produce unstable production.

Oil related assets and infrastructure in Libya

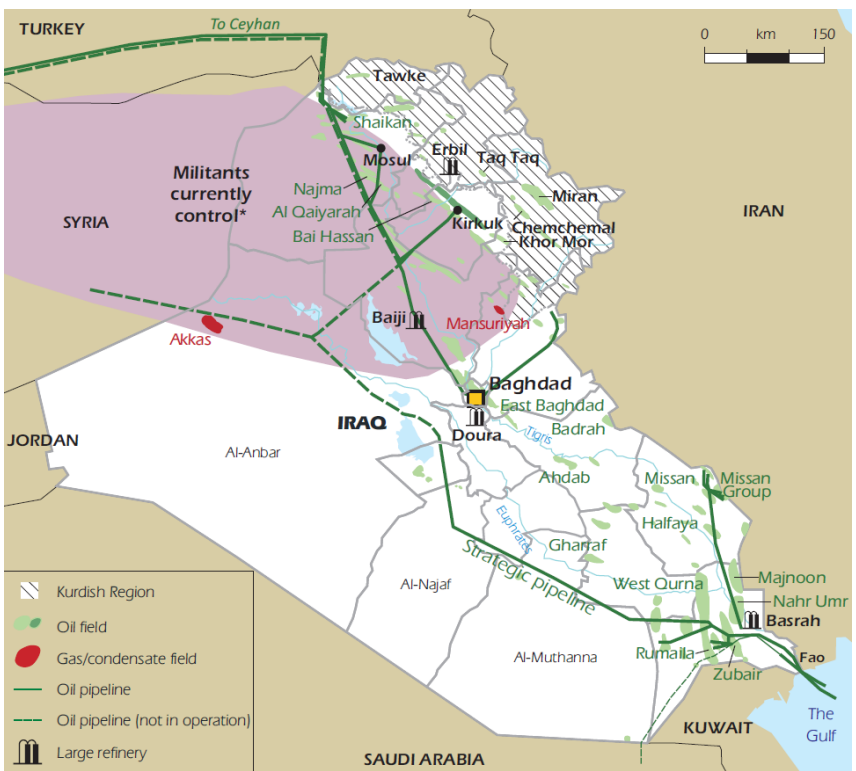


Source) IEA

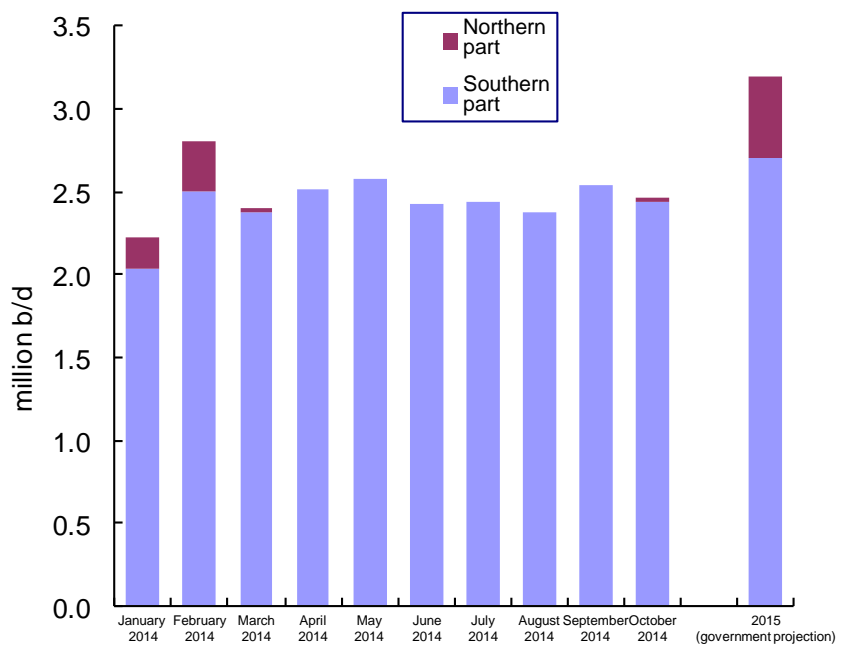
Situations in Iraq are the “wild card” in 2015

- Situations in Iraq could produce either upward or downward force with respect to crude oil pricing.
 - The largest geopolitical risk factors continue to be the effects from the Islamic State.
 - An agreement was reached between the central government and the Kurdistan region regional government in December of this year. If the problems regarding infrastructure restriction and the quality issues in the south are solved, exports may further increase in the future.

Libyan oil related infrastructure map



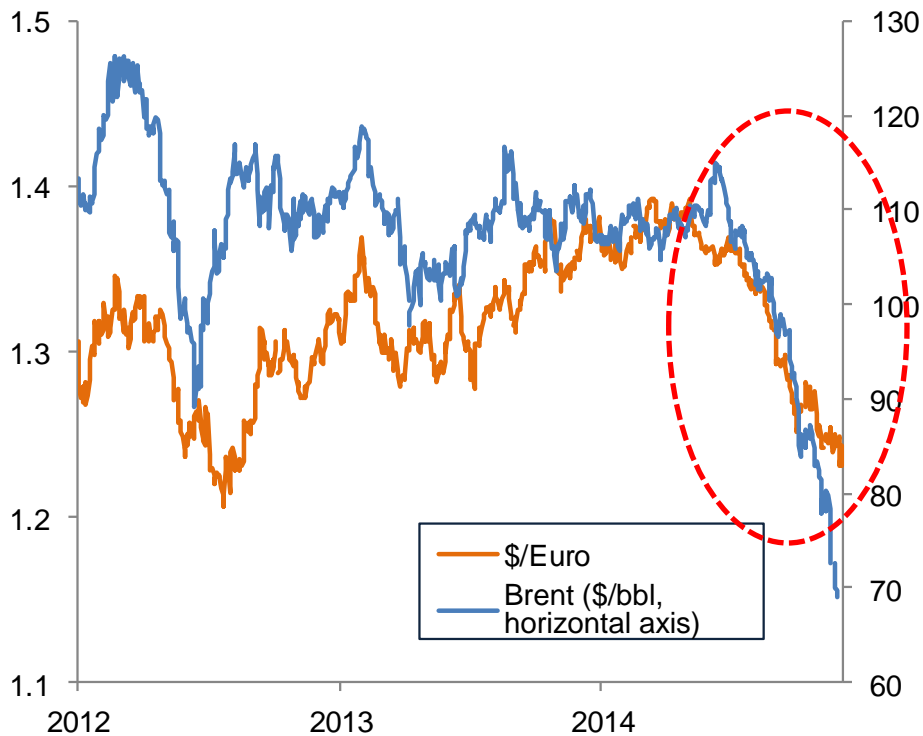
Crude oil export figures and government outlook in Iraq



US policy of quantitative monetary easing ends

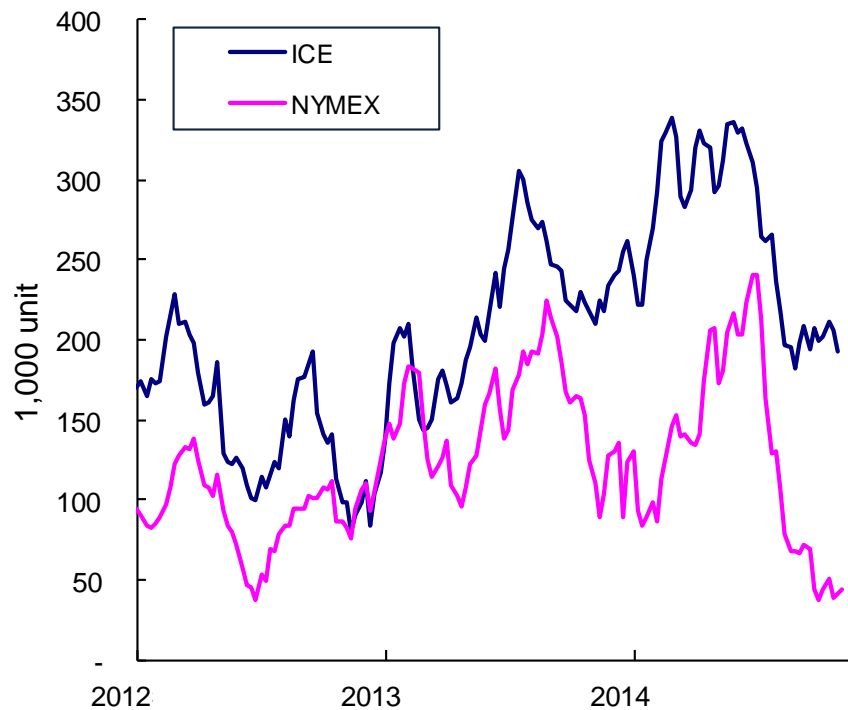
- The US Federal Reserve announced the end of the quantitative easing program in October 2014.
- The appreciating US dollar encourages selling in crude oil futures markets.
- Funds flow into robust stock markets, lower interests shown in the commodities markets in general.
 - Fewer money managers are holding long positions.

Exchange rate and Brent price



Source) FRB, ICE

Changes in money managers and their long positions

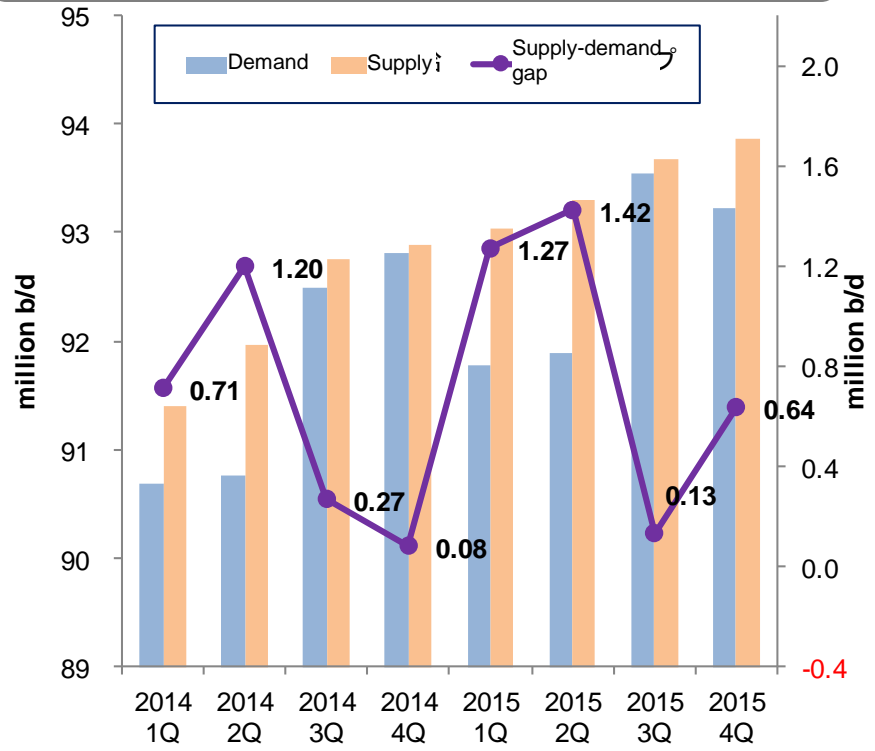


Source) CFTC, ICE **13**

Future supply-demand balance

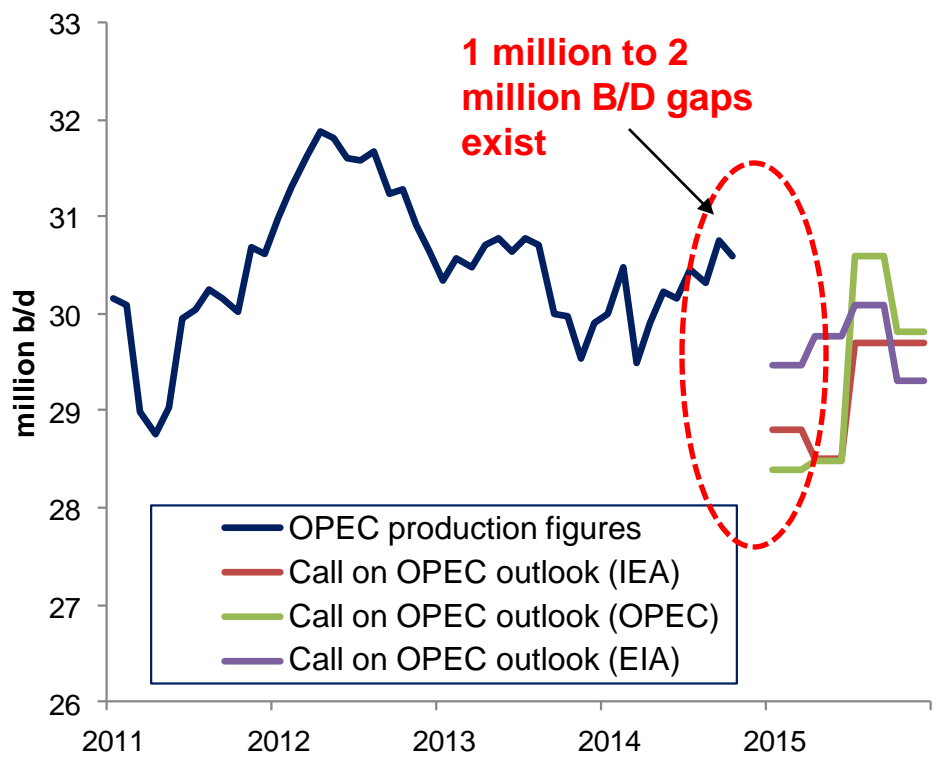
- Assuming the maintenance of the production level (30 million B/D) decided at the November OPEC Conference, the supply balance over next year will continue to ease.
 - Over the entire period, supply will exceed demand.
 - If OPEC does not reduce its production by 1 million B/D or more at the beginning of next year, the supply-demand ratio will not be balanced.

Crude oil supply-demand balance in the world (by quarter)



Source) Estimated based on IEA, EIA, OPEC outlook

OPEC production and Call on OPEC outlook by organizations



Source) IEA, EIA, OPEC

International crude oil price outlook

- The 2015 full-year crude oil price outlook is as follows:

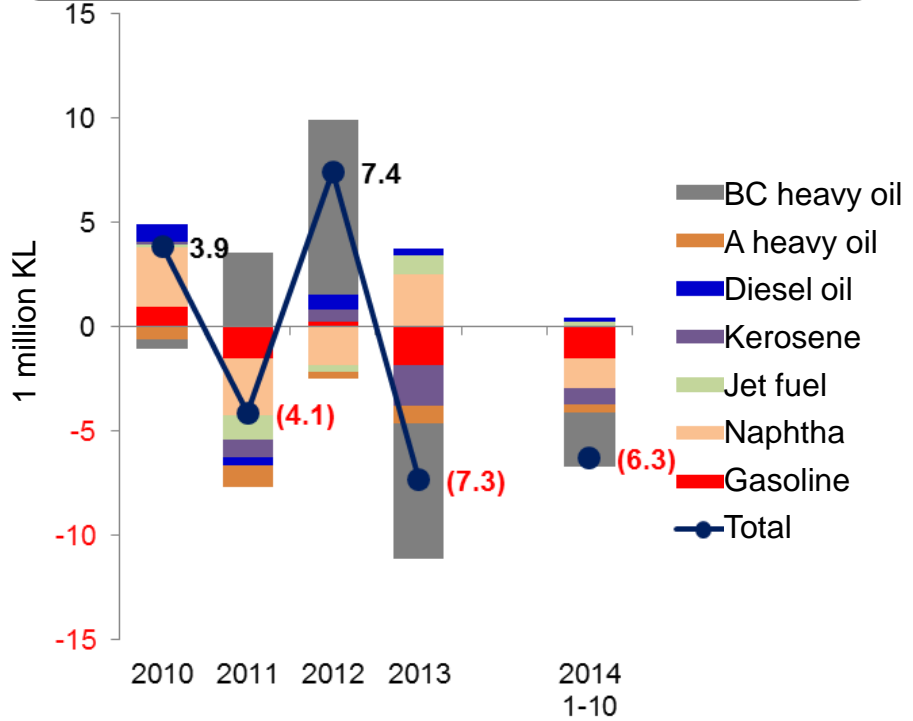
Crude oil index	2015 full-year average
Brent	\$65 ± \$10
Dubai	\$63 ± \$10
WTI	\$60 ± \$10

- Assumptions regarding the oil price projection
 - The basic supply-demand balance will remain moderate through the first half of the next year, as long as there are no incidents such as reduced OPEC production by Saudi Arabia or serious geopolitical unrest.
 - The effect of declining prices on lower production by non-OPEC sources will gradually become apparent in the latter part of 2015 and later.
 - The price gap among various oil types will continue at the current rate.
 - A maximum of ±\$20/bbl variations between high and low oil price scenarios (reference material)

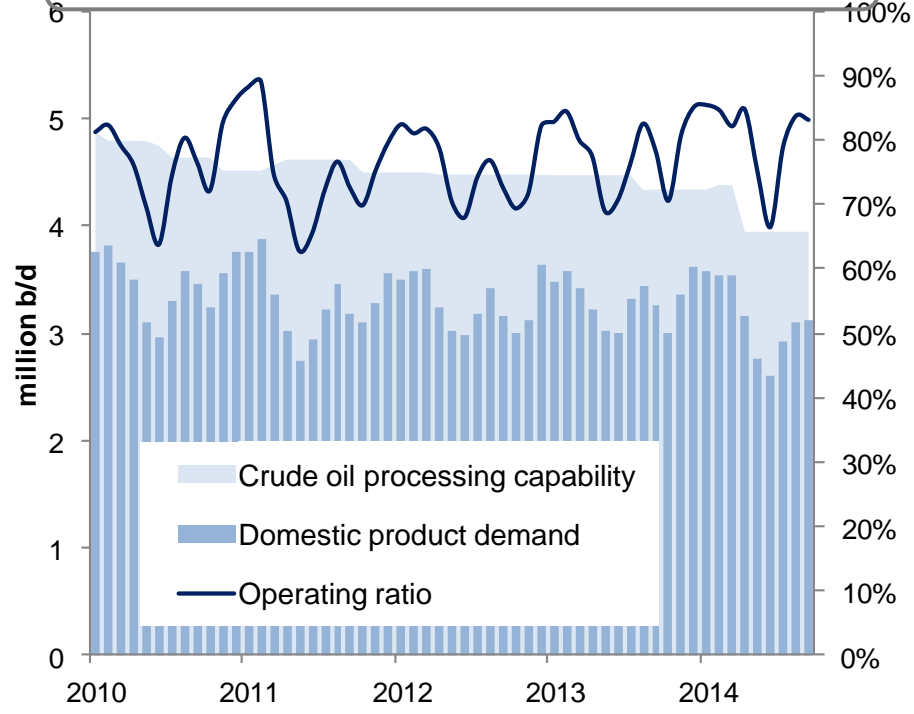
Rapid domestic product demand weakening

- Pre-summer factors of high oil prices, weather, temperature, etc., will sharply weaken domestic product demand.
 - Yen depreciation, higher retail prices due to the increase in sales tax and a special tax for global warming countermeasures causes consumers to be reluctant to make purchases
- Governmental measures to enhance the energy supply-demand structure are reducing domestic crude oil processing capability, along with accelerating decline in domestic demand. No improvement in refinery operating ratios
 - Gasoline margins are also moving at low a level. Major future challenges are setting fair, transparent invoice prices

Product demand change within Japan (year-on-year)



Crude oil processing capacity change and domestic demand



The shale revolution and the domestic oil industry

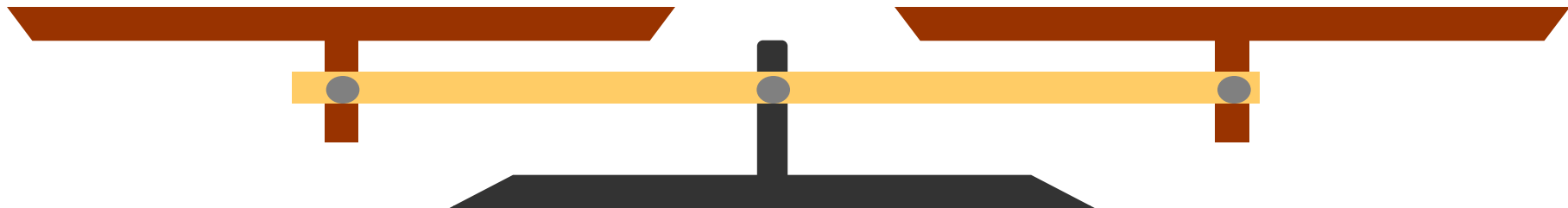
- The shale revolution can potentially impact the domestic oil industry in various ways.

Merit

- ✓ New oil resources and long-term supply cost reduction
- ✓ (in the shorter term) Oil price control from excess supply over the world
- ✓ Condensate import (crude oil in the future) from the US
- ✓ Diversified supply source for Asian markets from reduced US crude oil imports
- ✓ Creation of new petroleum related investment opportunities

Demerit

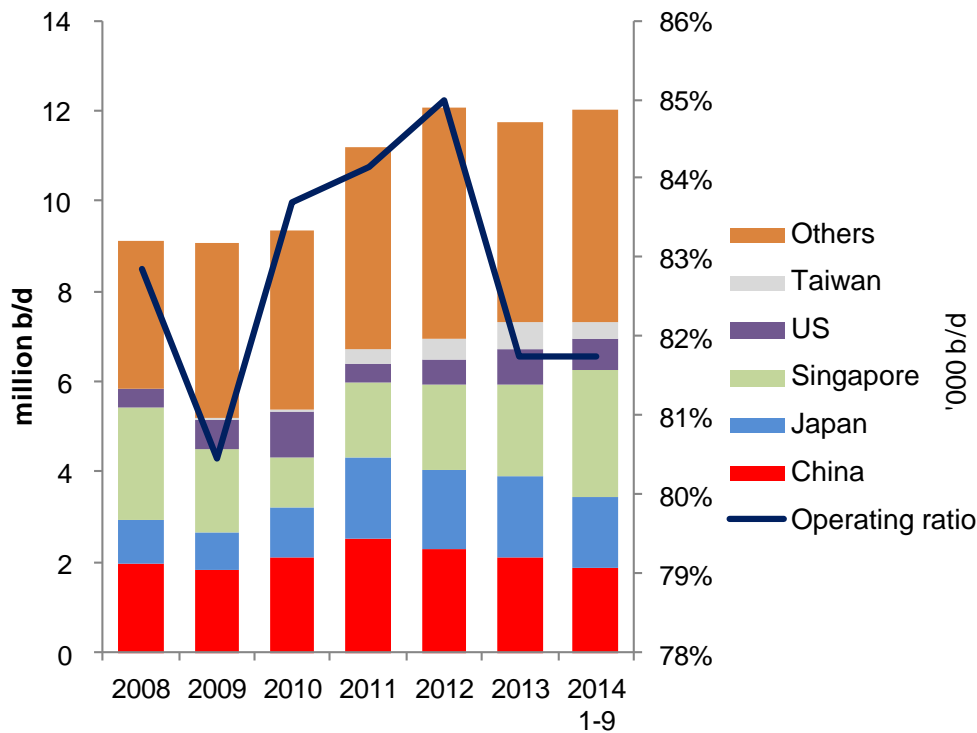
- ✓ Expanded US product exports to ease the oil product supply-demand balance and refinery margins globally
- ✓ Same factor reduces the potential product export market in South America and Europe
- ✓ Petroleum refining, petrochemical sectors to weaken relative competitiveness



Easing product supply-demand balance in Asian markets

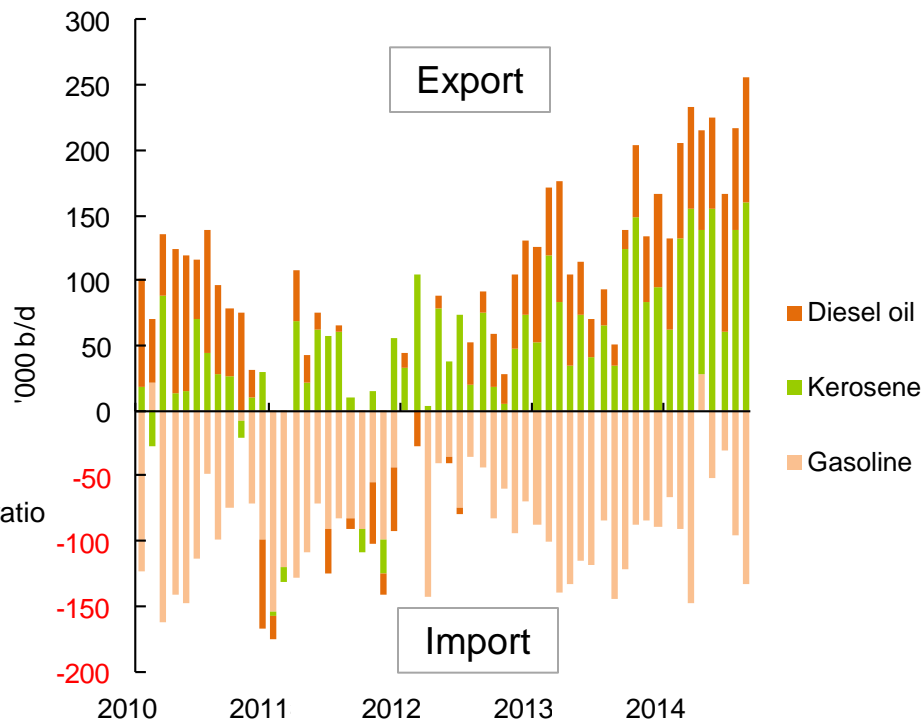
- Difficult conditions continue in the Asian product export markets
 - Increased US exports force export refineries in Korea and India to reduce their exporting markets in Europe and South America
 - Increased product exports from China and newly operating export refineries in the Middle East accelerate the shifting of the product supply-demand balance.

Product exports from South Korea



Source) KNOC

Export and import balance for the 3 main Chinese oil products

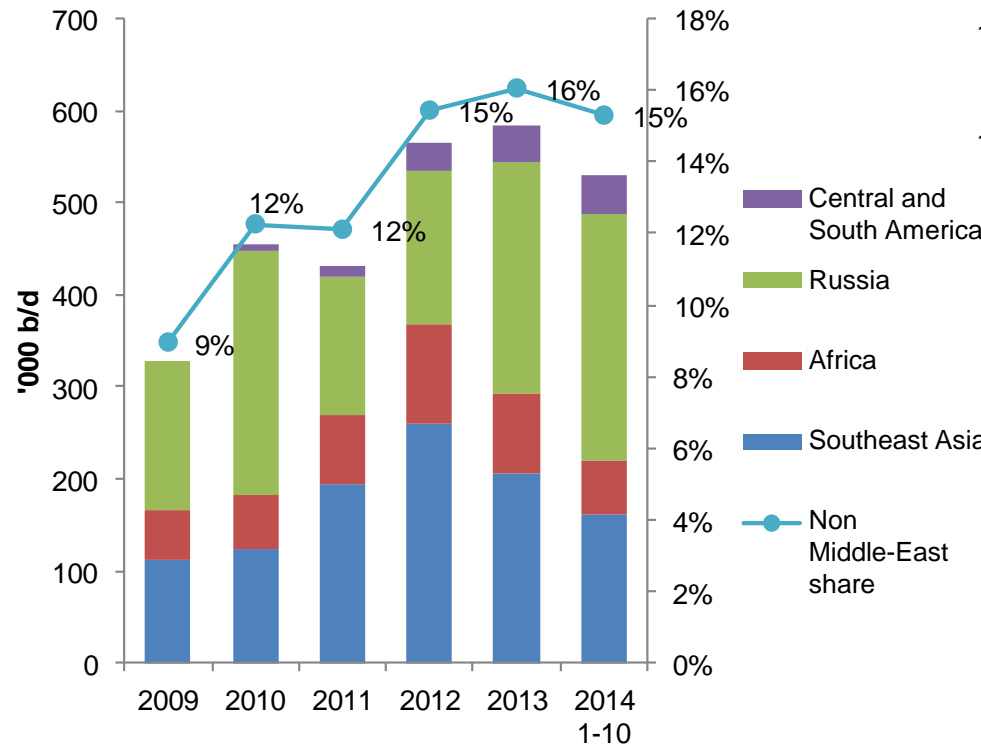


Source) JODI

Diversifying supply sources

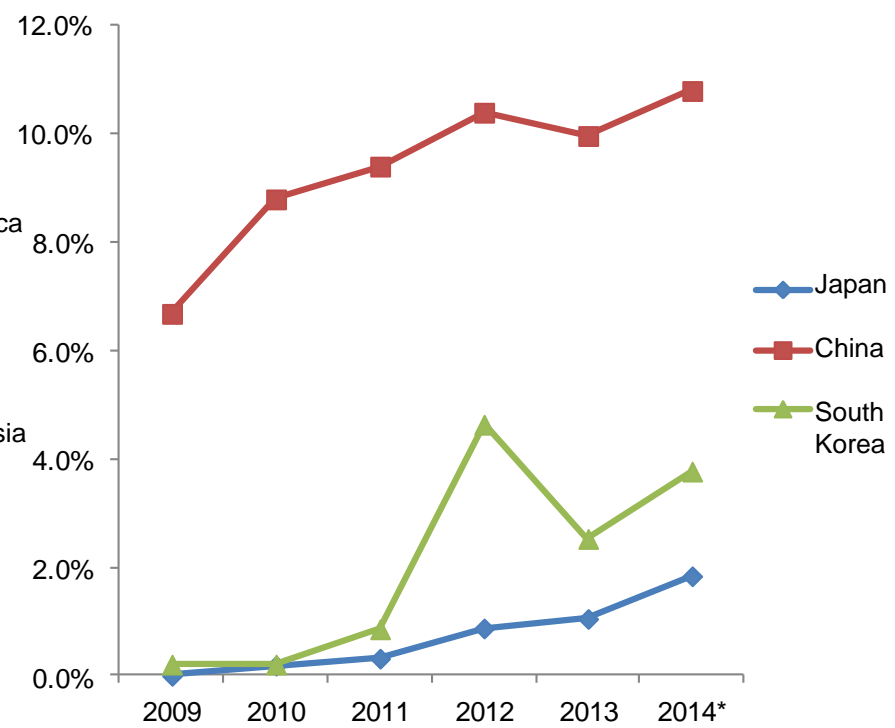
- Declining crude oil import volume eases Japan's dependency on oil from the Middle East
 - Crude oil from Russia is the largest non Middle-East crude oil supply (especially ESPO crude oil).
 - Rising crude oil import share from South America can be seen over the entire northeast Asia region.
- The shale revolution and slower oil demand in Europe prompted diverse crude oil types to flow into the Asian markets.

Non Middle-East crude oil imports to Japan



Source) Agency for Natural Resources and Energy

Changes in South American crude oil import share in Japan/China/Korea



* 2014 figures are for Jan. to Oct. for Japan, Jan. to Sep. for China/Korea

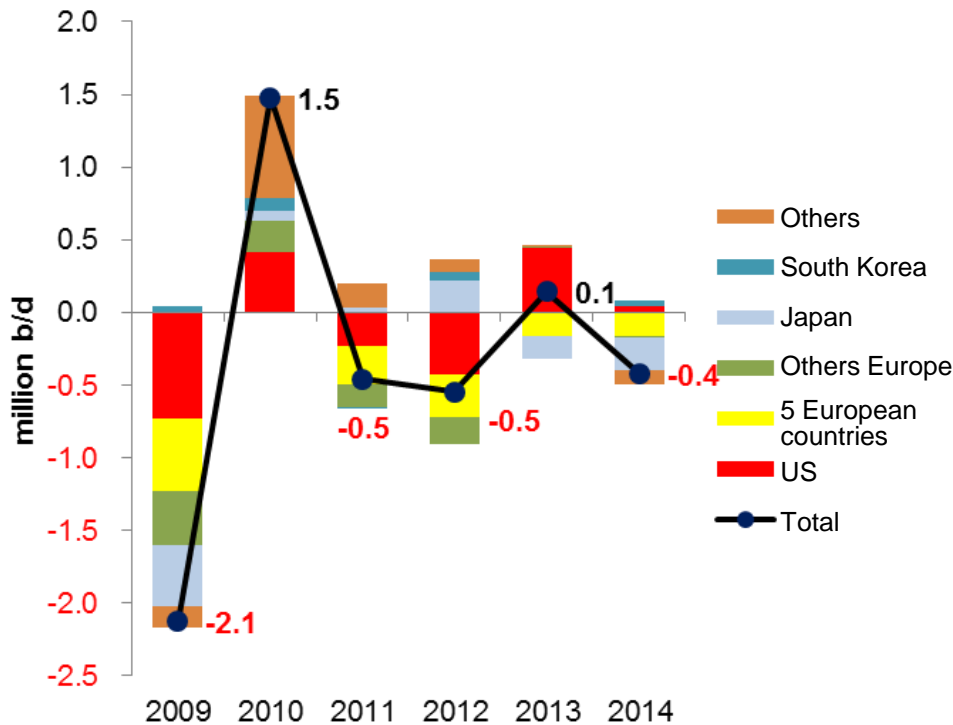
Source) Agency for Natural Resources and Energy; China OGP, KNOC

Reference material

Sharp decline in OECD demand as well

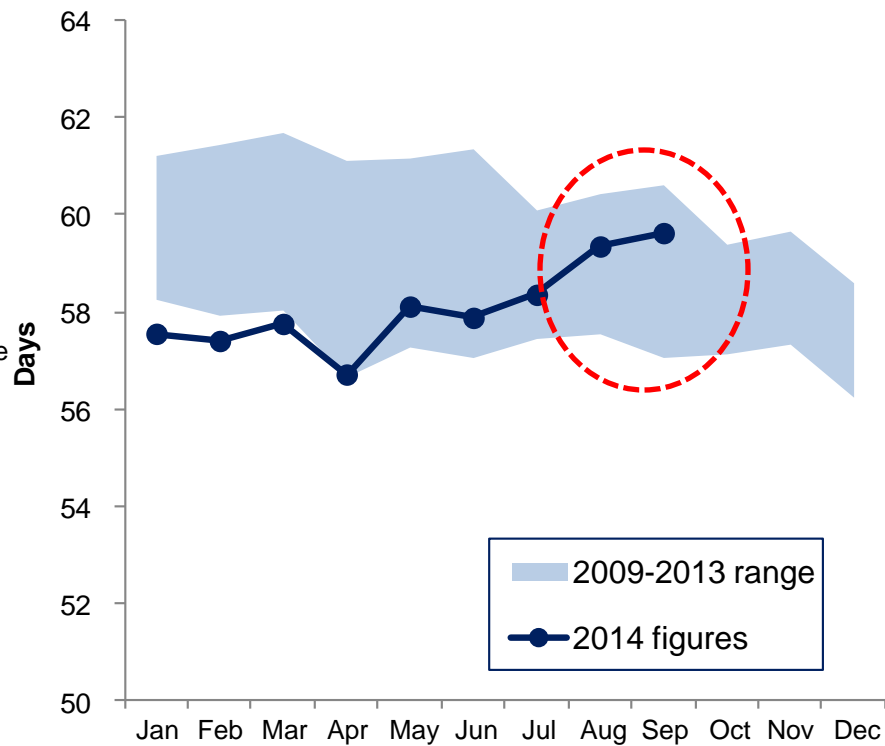
- OECD's demand declined at a pace higher than initially predicted, which also greatly contributed to the shift in the supply-demand ratio
 - Demand in Europe has consistently declined for the past 4 years. Japan also saw a drastic, more-than-expected drop in demand this year
- Higher inventory since summer contributed to a decline in oil prices

**Demand change by region
(compared with the previous year)**



Source) estimated based on IEA and OPEC

OECD inventory duration change



Source) IEA

Comparison with sharp crude oil price drops in the past

- In comparison, the current drop is similar to the 1980s' case
- Production cut by OPEC played a big role for price recovery in all of the past cases

	1986	1998	2008	2014
Drop rate*	-74%	-34%	-77%	?
Decline factor	<ul style="list-style-type: none"> • Higher oil prices after the oil shock decreased demand • Same factor contributed to non-OPEC supply increase • Heated competition for shares within OPEC • Saudi Arabia's net back pricing eases the supply-demand ratio 	<ul style="list-style-type: none"> • Demand declines in emerging nations due to economic crisis in Asia • Excess production within OPEC • Expanded production capacity by OPEC eases the supply-demand ratio 	<ul style="list-style-type: none"> • The Lehman Shock causes a sharp drop in global demand • Expanded production capability, such as in Saudi Arabia 	<ul style="list-style-type: none"> • Expanded non-OPEC supply • OPEC production maintained • Global demand slows • Increased production by OPEC (especially Libya)
Factors for upward trend	<ul style="list-style-type: none"> • Demand increased in advanced countries such as the US • OPEC's coordinated production cut • Sluggish production in non-OPEC regions due to lower oil prices 	<ul style="list-style-type: none"> • OPEC's production cut • Demand recovery in emerging countries 	<ul style="list-style-type: none"> • OPEC (Saudi Arabia) production cut • Demand recovery in emerging countries (especially in China) 	?

* Drop ratio from the peak oil price to the lowest price within a 6-month period

High price and low price scenarios

- Future price fluctuation scenario will switch between the following two patterns.

	High price scenario	Low price scenario
Supply-demand factors	<ul style="list-style-type: none"> ✓ Price drop slows the production growth in North America, as well as the supply due to early suspension of high-cost oilfields globally. ✓ Lower prices bring back growth pace of oil demand 	<ul style="list-style-type: none"> ✓ Impact on high-cost oilfields such as shale is limited, thanks to technological advancement and material cost reduction. ✓ Demand recovery due to lower prices will not become apparent in the short term.
Risk factors	<ul style="list-style-type: none"> ✓ Prominent activities of the Islamic State in Iraq and Syria result in partial suspension of crude oil exports from Iraq ✓ Crude oil exports stop again due to reasons such as conflicts between the eastern force and the central government in Libya. Light crude oil supply becomes scares. ✓ Some type of attacks on petroleum related facilities even in oil producing countries in the Persian Gulf. 	<ul style="list-style-type: none"> ✓ Production and export increase from south Iraq, freed from infrastructure limitations. ✓ Gradual recovery of production capability in Libya will further ease the light crude oil supply-demand balance. ✓ Gradual increase of supply from Iran.
Financial factors	<ul style="list-style-type: none"> ✓ Above mentioned risk events move investments to a futures market 	<ul style="list-style-type: none"> ✓ Robust US economy and stronger dollar nurture the perception of overvalue in crude oil futures, marking a selling signal. ✓ Investments continue to flow out to stock markets.
Crude oil price	Brent: \$75/bbl Dubai: \$73/bbl WTI: \$70/bbl	Brent: \$55/bbl Dubai: \$53/bbl WTI: \$60/bbl