
MUSINGS FROM THE OIL PATCH

July 14, 2015

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Note: *Musings from the Oil Patch* reflects an eclectic collection of stories and analyses dealing with issues and developments within the energy industry that I feel have potentially significant implications for executives operating and planning for the future. The newsletter is published every two weeks, but periodically events and travel may alter that schedule. As always, I welcome your comments and observations. Allen Brooks

EIA's New Oil Output Forecasts Raise Questions About Data

The latest weekly domestic oil production data and monthly revisions leave us confused

Analysts have been actively monitoring the weekly data on domestic oil production seeking a signal that output is falling and oil prices should begin rising. The problem is that the weekly data is essentially an estimate made by the Energy Information Administration (EIA) based on some sampling data. As we have written before, the weekly estimates are subject to greater volatility that we prefer to smooth out by using the EIA's 4-week average volume figures. That average gives us what we believe is a better sense of direction. Another source of data is to monitor the monthly revisions to the annual energy forecasts each month for confirmation of the weekly data. The latest weekly domestic oil production data and monthly revisions leave us confused.

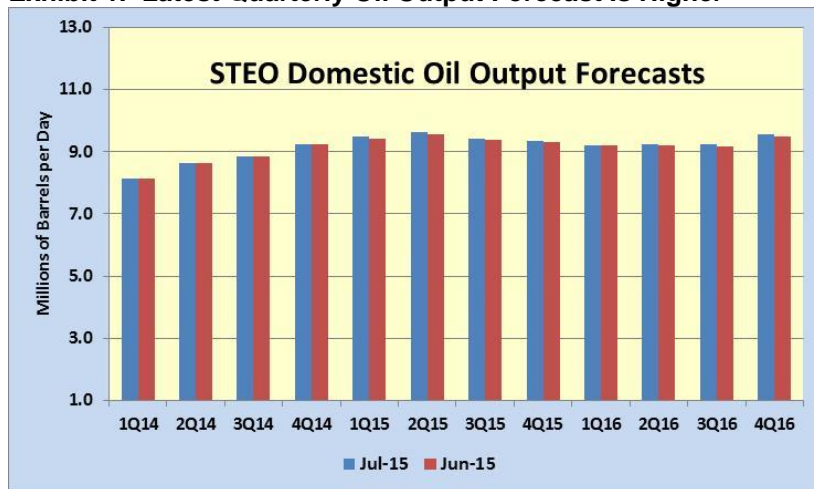
The latest revision to the EIA's Short Term Energy Outlook (STEO) published July 7th highlighted the following change in the agency's oil production forecast:

"U.S. crude oil production declined by 50,000 barrels per day (b/d) in May"

"EIA estimates total U.S. crude oil production declined by 50,000 barrels per day (b/d) in May compared with April. Production is expected to generally continue falling through early 2016 before growth resumes. Projected U.S. crude oil production averages 9.5 million b/d in 2015 and 9.3 million b/d in 2016."

Along with the new STEO, the EIA issues a set of tables comparing all the data series in the latest forecast with the estimates from the prior month's STEO, in this case the June 9, 2015, report. The STEO forecasts are quarterly estimates for the three-year period 2014-2016. The report also shows the average estimate for each year and the year-to-year changes. In Exhibit 1 on the next page, we show the quarterly oil production forecasts presented in the July report and the prior monthly report for comparison purposes. What

Exhibit 1. Latest Quarterly Oil Output Forecast Is Higher



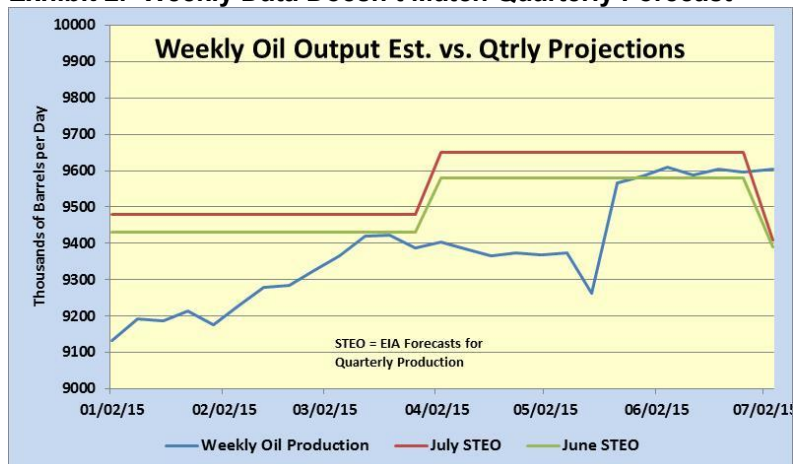
Source: EIA, PPHB

So while the EIA believes production is and will continue to fall, it appears it had already built that pattern into its forecasts

we found surprising was that despite the EIA’s commentary about the estimated 50,000 b/d output drop in May and the comment about continued declines “through early 2016,” every quarterly output estimate is now higher than before. So while the EIA believes production is and will continue to fall, it appears it had already built that pattern into its forecasts. Now, however, production volumes are higher than the EIA assumed they would reach, which explains why every quarterly estimate has been revised higher, although the 2016 quarterly estimates remain below the 2015 estimates.

from the start of May to the end of that month, weekly oil production is estimated to have grown by 217,000 barrels a day, not fallen

What becomes interesting is comparing the EIA’s weekly domestic oil production estimates against the agency’s quarterly forecasts. Exhibit 2 on the next page shows the weekly oil production estimates reported by the EIA every Wednesday, when it issues its estimate of changes to the volume of crude oil and refined products in storage, against the quarterly forecasts from the June and July STEOs. The highlighted data point from the July STEO about May’s production falling 50,000 barrels per day from April’s output doesn’t appear to be supported by the weekly production data. One does see a slight downward trend in the weekly data through April but then in one week in May output fell by 112,000 barrels per day. The problem is that the following week production jumped by 304,000 barrels per day. As a result, from the start of May to the end of that month, weekly oil production is estimated to have grown by 217,000 barrels a day, not fallen. Between the beginning of April and the beginning of May, weekly oil output declined by 31,000 b/d. The EIA’s highlighted conclusion suggests that the May weekly data was wrong as the weekly series suggests an increase versus April rather than the EIA’s claim of a 50,000 b/d decline.

Exhibit 2. Weekly Data Doesn't Match Quarterly Forecast

Source: EIA, PPHB

This should be a warning about relying too heavily on weekly data, derived from sampling and estimating, for drawing conclusions

We also have a problem with the EIA's highlighted conclusion and the latest STEO quarterly production estimates. If we assume that the weekly oil production estimates are accurate, they get you nowhere close to the July STEO second quarter production estimate. The weekly estimates will also not even meet the June STEO estimate. It appears to us that there are data problems that need rectifying. This should be a warning about relying too heavily on weekly data, derived from sampling and estimating, for drawing conclusions. Nuanced conclusions are safer even though they may appear to be wishy-washy, especially when the industry is near, at, or past tipping points.

Wind Power Allows Rhode Island To Lead Nation Once Again

As the first state to declare its independence from Britain, Rhode Island is about to become home to the nation's first offshore wind farm

The smallest state in the nation has been a leader in a number of areas throughout its history and that of America, and it is poised to lead once again. As the first state to declare its independence from Britain, Rhode Island is about to become home to the nation's first offshore wind farm. On the weekend of June 26-27, the first two foundations for the five offshore wind turbines ultimately to be installed at the Deepwater Wind project located three miles southeast of Block Island were loaded on a barge for the trip from Houma, Louisiana to Rhode Island. Along with the foundations the barge carries the piles to anchor them to the ocean floor and the deck section for the first foundation.

Deepwater Wind turned to the oil industry for its expertise in developing offshore oil and gas fields in the Gulf of Mexico

In order for wind turbines to be built, Deepwater Wind turned to the oil industry for its expertise in developing offshore oil and gas fields in the Gulf of Mexico. Deepwater Wind plans to install five platforms that will have the wind turbines mounted on them containing blades that will reach a total of 589 feet above the water. Each jacket stands 110 feet tall and will be positioned in roughly 80 feet of water.

Exhibit 3. First Structures For Block Island Wind Farm

Source: *Block Island Times*

That means the turbine blades at their peak will stand 499 feet from the floor of the deck

The decks to be installed atop the jackets will add an additional 60 feet of height, meaning the base of the turbine will be 90 feet above the surface of the water. That means the turbine blades at their peak will stand 499 feet from the floor of the deck. In some ways the use of domestic oilfield technology was a surprise since the offshore wind industry has been in existence in Europe for nearly two decades, so one would have assumed it has developed cheap, efficient technology for installing offshore wind turbines. Maybe U.S. waters are more challenging than those of Europe.

The original plan for the development of wind energy in Rhode Island...called for the state to become the construction center for East Coast wind farms

The original plan for the development of wind energy in Rhode Island, as envisioned by former Republican Governor Donald Carcieri, called for the state to become the construction center for East Coast wind farms. At that time projects were sprouting all along the coast and engineering professors suggested installing thousands of wind turbines all along the East Coast. Creating that industry was perceived as a solution for Rhode Island's lagging economy and lack of jobs. Deepwater Wind's CEO Jeff Grybowski, previously Gov. Carcieri's chief of staff, recently highlighted that the Block Island project would create 330 construction jobs in Rhode Island during 2015 and 2016 until the turbines are scheduled to start up. Interestingly, there was no mention by the media covering this project that these construction jobs are similar to the 40,000 "temporary" construction jobs of the Keystone XL pipeline that President Barack Obama disparaged.

The construction plan is for the first barge to make the 1,800-mile trip from South Louisiana to Rhode Island in about 15 days. This means installation of the first jacket, which involves driving steel

National Grid...needs to install a 20-mile power cable from the island to the mainland to deliver any excess power

piles into the ocean floor to anchor the jacket, will begin in late July or early August. Once the jacket is in place, a crane barge will lift the deck onto it. Next year, when the wind turbines arrive from Europe, they will be lifted onto the deck. Before the wind turbines go live, National Grid (NNG-NYSE), the local utility who is purchasing Block Island's excess wind-generated electricity, needs to install a 20-mile power cable from the island to the mainland to deliver any excess power.

We suspect the wind industry is not happy about the author's use of the term "windmills" to describe these highly sophisticated offshore wind turbines

There was an interesting article about the Block Island wind farm in *The Wall Street Journal* that discussed the economics of the project. In citing the political battles over the approval for the two prominent offshore wind farms in New England – Cape Wind offshore Massachusetts and Deepwater Wind off Rhode Island – the author wrote: "Objections to offshore windmills include noise, the blight on pristine views and the above-market costs to consumers." We suspect the wind industry is not happy about the author's use of the term "windmills" to describe these highly sophisticated offshore wind turbines. The author cited the cost issue of the Deepwater Wind project, writing "...it approved a deal later that year [2010] after lawmakers amended a regulatory law to be more favorable." That description minimizes the damage done to the regulation of electricity by the Rhode Island Assembly.

The law was amended to make buying Deepwater Wind's power the ONLY option available for the state's utilities

The background is that the state had enacted a clean energy mandate for Rhode Island's electric utilities, of which there is one primary and one minor provider. After signing a power purchase agreement (PPA) with Deepwater Wind, National Grid, the primary electric utility, filed for approval of the PPA's terms under the state's public utility rules. The PPA required the initial electricity to be bought at 24.5 cents per kilowatt-hour (kWh), a substantial premium to the current cost of electricity in the state that currently average somewhere about 14-15 cents/kWh. The initial purchase price is programmed to escalate at 3.5% per year during the 20-year life of the agreement. The Rhode Island Public Utility Commission rejected the PPA on the basis of it being too expensive. That rejection forced the state Assembly to go into a special session to amend the PUC law. The law was amended to make buying Deepwater Wind's power the ONLY option available for the state's utilities. Clean wind power had to be purchased from domestically-produced projects. The PUC amendment was written in response to National Grid presenting alternative clean energy contracts from wind projects from states outside of Rhode Island. Those contracts had power costs much lower than Deepwater Wind's price. In addition, those alternative contracts did not contain mandatory annual price escalators. Unfortunately, the alternative clean energy contracts were not allowed since they didn't meet the "domestically-produced" requirement. In our view, the regulatory law was amended to be more than just "favorable," but that is what happens when economics meet politically-correct agendas.

It is estimated that wind power will reduce Block Islanders' electricity bills by 30%

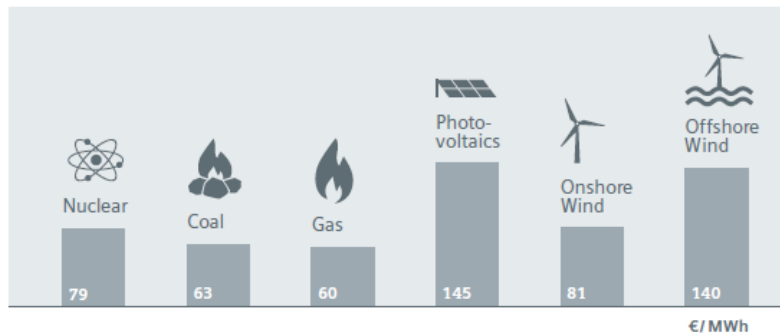
The shorter lifetime means that wind turbines must be replaced after 15-16 years of use, an investment that reduces wind investment returns

The Deepwater Wind project will provide less costly power to the Block Island residents who currently depend on electricity generated by diesel-powered generators. It is estimated that wind power will reduce Block Islanders' electricity bills by 30%. Those savings are partially funded by the increased electricity costs assessed on the entirety of the 490,000 power customers in the state. That additional cost is regardless of your electricity source. That means that even if you purchase power from a non-National Grid supplier, regardless of where the power comes from, you must pay the Block Island surcharge.

As we have written before, a representative of Deepwater Wind, speaking at the annual meeting of the National Ocean Industries Association (NOIA) this spring, acknowledged that without the wind investment tax credit, the cost of wind power is \$170 per megawatt-hour (MWh) versus the cost of electricity from natural gas at \$40/MWh. A report produced by Siemens AG (SIEGY-OTC), the German industrial company that is a leader in clean energy technology and especially in building wind turbines, looked at the cost of offshore wind power. The report contained a table showing the cost-differential for power generating by various fuels in England based on levelized cost of energy (LCOE) calculations. While the cost figures are in euros and are for the United Kingdom in 2013, the cost relationship between electricity from offshore wind versus natural gas are similar to those cited at the NOIA conference. (See Exhibit 4.) Remember that natural gas in the UK represents a blend of North Sea gas and liquefied natural gas (LNG), which is considerably more expensive. As a result, the blended natural gas cost to fuel power plants is more expensive than in the United States. It is also important to remember that in the LCOE cost calculation, the fact that wind turbines have an operating lifetime of less than half that of a fossil fuel plant is not reflected. The shorter lifetime means that wind turbines must be replaced after 15-16 years of use, an investment that reduces wind investment returns. Maybe that is why U.S. offshore wind power PPAs mandate annual price escalations even though the cost of their fuel (wind) is free.

Exhibit 4. 2013 UK Levelized Cost Of Energy By Fuel

LCOE 2013

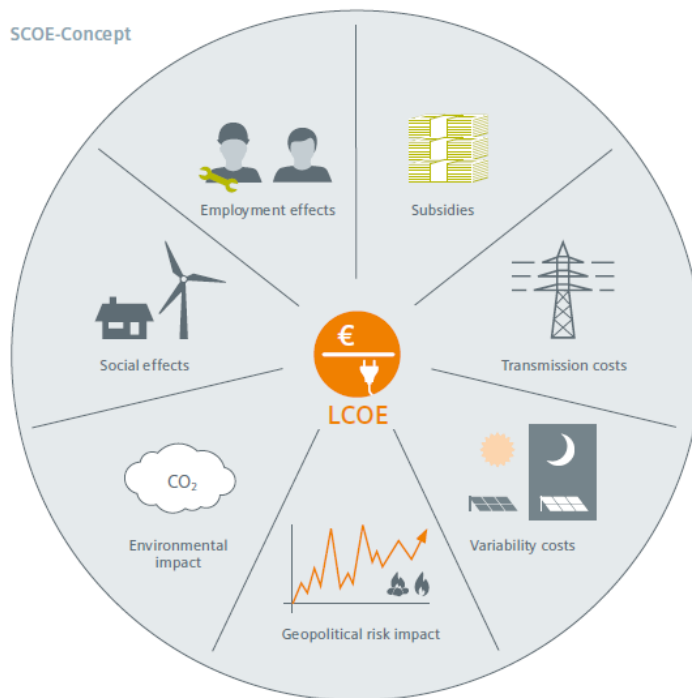


Source: Siemens

Society’s Cost of Electricity is perceived to be a more representative measure of the cost of electricity fuels when one adjusts for the “actual economic costs of individual primary energy sources.”

The Siemens’ report asks whether LCOE, which represents only the direct system costs in terms of the expected lifetime of a power plant, is the appropriate measure. LCOE is calculated as the ratio of the lifetime sum of discounted capital and operating costs, including fuel, divided by the lifetime sum of discounted electricity output. Siemens believes LCOE is not the correct way to measure the true cost of fuels, so it has invented a new measurement – Society’s Cost of Electricity (SCOE). SCOE is perceived to be a more representative measure of the cost of electricity fuels when one adjusts for the “actual economic costs of individual primary energy sources.” The new measurement system considers additional factors and produces a new “real cost/benefit ratio” of energy fuels.

Exhibit 5. Siemens’ Social Cost Of Energy Matrix



SCOE: total of LCOE and all cost factors relevant to society as a whole

Source: Siemens

The company claims that renewable subsidies receive extensive attention but those for fossil fuels are overlooked

In developing the SCOE measure, it is interesting to see some of the calculations and determinations of Siemens. The company explained its calculations for each of the items cited in Exhibit 5. The company claims that renewable subsidies receive extensive attention but those for fossil fuels are overlooked. These costs are not included in the LCOE calculation. Grid stability is a transmission cost and is assessed at 2€/MWh for offshore and onshore wind and 6.6€/MWh for photovoltaic solar power. Renewables also have a problem with variability, which equates to a charge of 13-15€/MWh. Geopolitical risk is where fossil fuels are impacted with a 5.4€/MWh

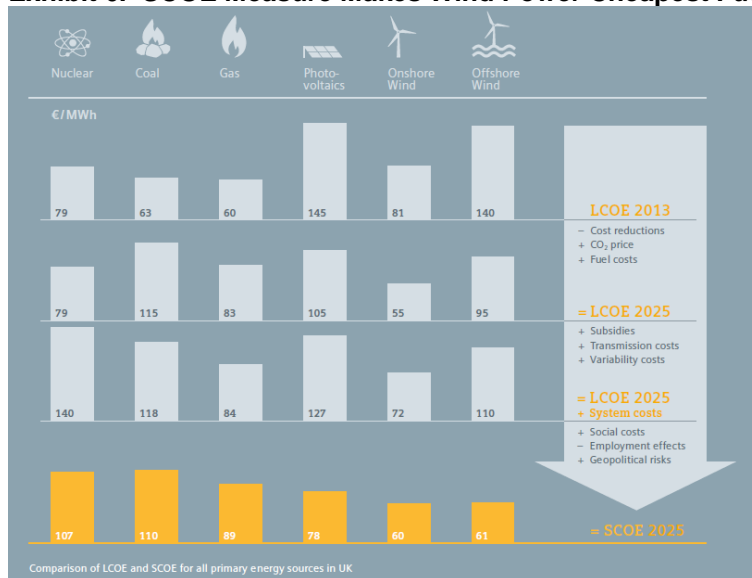
Siemens assumed a cost of 81€/ton for the lifetime cost of power plants

Therefore, offshore wind would benefit by 50€/MWh

for natural gas and 1.7€/MWh for coal. Siemens suggests this charge is conservative when viewed against the lifetime of fossil fuel power plants that have 30 year lives. Renewables gain a clear advantage on environmental costs. The LCOE does include a factor for the cost of CO₂ emissions but at 10€/ton. Siemens assumed a cost of 81€/ton for the lifetime cost of power plants. This equates to a charge of 45€/MWh for a coal plant. In determining the social cost of fuels, or the impact on property values for those located close to power plants, it was assumed to be a moderate charge. This cost was estimated at 5€/MWh for onshore wind, for example.

The last consideration was the employment impact of fuels. According to the most recent UK government Offshore Wind Industrial Strategy Report, the UK economy would add 30,000 jobs and benefit by Euro 8 billion by 2020 from its expanded use of onshore and offshore wind power. In determining the true social cost, Siemens calculated the gross employment benefit at 21€/MWh for natural gas and 71€/MWh for offshore wind. In assessing the impact in the SCOE measure, Siemens assessed the positive difference relative to the lowest benefit, which was for natural gas at 21€/MWh. Therefore, offshore wind would benefit by 50€/MWh. After all these calculations are done, voilà, offshore wind becomes the lowest-cost fuel based on the SCOE measure.

Exhibit 6. SCOE Measure Makes Wind Power Cheapest Fuel



Source: Siemens

The fact that onshore wind and offshore wind have the lowest costs based on the SCOE measure isn't a complete surprise

Because Siemens is a leading provider of wind turbines, the fact that onshore wind and offshore wind have the lowest costs based on the SCOE measure isn't a complete surprise. What would be a surprise is if their SCOE rankings came out higher. A recent column on *Power Line* highlighted a recent story in Britain's *Sunday Telegraph* dealing with the "unraveling of green energy policies." According to

“Every household in the country is forced to pay an estimated £170 (\$261) a year by the end of the decade to support the renewable electricity schemes”

the column, “Officials admitted that so-called ‘green’ energy schemes will require a staggering £9 (\$13.8) billion a year in subsidies—paid for by customers—by 2020. This is £1.5 (\$2.3) billion more than the maximum limit ministers had originally planned.”

The article went on to cite what this rapid increase in energy subsidies will mean to the average household. “The mounting costs will mean every household in the country is forced to pay an estimated £170 (\$261) a year by the end of the decade to support the renewable electricity schemes that were promoted by the coalition [the former ruling government].”

The problem is to be addressed by the new government. According to the *Sunday Telegraph*, “George Osborn, the Chancellor, believes the figures demonstrate the need to rein in the cost of policies to tackle climate change. As a first step, he will use this week’s [last week’s] summer Budget to announce that he is abandoning targets set under the coalition to increase the level of environmental taxes in a move he hopes will save customers and businesses billions of pounds.”

Several European countries are aggressively rolling back their wind and solar power subsidies because they have become too expensive and are failing to produce the desired economic results

By 2020, maybe Rhode Island will be able to determine whether Deepwater Wind’s Block Island project was a worthwhile investment. Based on the outcomes in numerous leading wind power countries, the financial outcomes have been less than satisfactory. In fact, several European countries are aggressively rolling back their wind and solar power subsidies because they have become too expensive and are failing to produce the desired economic results. Hopefully, Rhode Island’s financial results will prove more successful as 490,000 households are footing the bill and few will be happy if the experiment proves as flawed as those in Europe.

Crude Oil Has Been Down So Long It Looks Like Up

June was a difficult month for investors in almost every asset class. Overall, commodities were about the only positive performing investment class last month, although crude oil declined. If you held only cash during June, at least you didn’t lose money, except to inflation.

On longer term measures – one and three year time periods – crude oil was the worst performing asset class followed closely by commodities, in general

Year-to-date, crude oil has been the best performing asset class, but that is because the latter part of 2014 was such a disaster that there was barely anywhere to go but up. On longer term measures – one and three year time periods – crude oil was the worst performing asset class followed closely by commodities, in general. It is interesting that U.S. stocks and bond indices performed well over both of those time periods. On the three year measure, U.S. financial assets were joined by almost all the other financial asset classes.

Exhibit 7. Investment Returns Signal Sea-change In Markets

| TOTAL RETURNS (%) | | | | |
|---|-------|------|-------|-------------------|
| Through June 30, 2015. Asset classes ranked by 1 month % total return | | | | |
| Asset Class (index) | 1 mo. | YTD | 1 yr | 3 yr [■] |
| Commodities (Bloomberg-UBS Commodity) | 1.7 | -1.6 | -23.7 | -8.8 |
| Foreign Devlp'd Mkt Bonds (Citi WGBI exUS) | 0.0 | -5.8 | -13.5 | -3.9 |
| Cash (3-month T-bill) | 0.0 | 0.0 | 0.0 | 0.0 |
| Foreign Gov't Inflation-Linked Bonds (DB Global Gov't ex-US Inflation Linked Bond) | -0.1 | -4.1 | -10.8 | 0.4 |
| Foreign High Yield Bonds (Markit Global exUS HY) | -0.2 | -6.1 | -17.1 | 4.3 |
| Foreign Corp Bonds (Citi Non-\$ Corp) | -0.3 | -7.8 | -14.7 | 1.7 |
| TIPS (Barclays Treasury TIPS) | -1.0 | 0.3 | -1.7 | -0.8 |
| U.S. Bonds (Barclays US Aggregate Bond) | -1.1 | -0.1 | 1.8 | 1.8 |
| Emerging Market Bonds (Citigroup ESBI-C) | -1.1 | -4.7 | -13.9 | -2.9 |
| U.S. Stocks (Russell 3000) | -1.7 | 1.9 | 7.3 | 17.7 |
| US High Yield Bonds (iBoxx High Yield) | -1.8 | 1.6 | -1.2 | 5.7 |
| Emerging Market Stocks (MSCI EM) | -2.6 | 3.0 | -5.1 | 3.7 |
| Foreign Developed Mkt Stocks (MSCI EAFE) | -2.8 | 5.5 | -4.2 | 12.0 |
| Foreign REITs (S&P Global exUS REIT) | -3.6 | 3.4 | -0.3 | 10.5 |
| US REITs (MSCI REIT) | -4.6 | -6.2 | 3.9 | 8.7 |
| Global Market Index† | -1.6 | 1.1 | -0.5 | 8.5 |
| Global Market Index-Fund †† | -1.8 | 1.2 | -0.5 | 6.1 |
| Global Market Index-Rebalanced * | -1.6 | 0.9 | -1.0 | 8.9 |
| S&P 500 | -1.9 | 1.2 | 7.4 | 17.3 |
| 60/40 U.S. stock/bond (rebalanced) + | -1.6 | 0.7 | 5.2 | 11.3 |
| Crude Oil (West Texas Intermediate spot price) | -1.4 | 11.1 | -43.6 | -11.2 |
| Gold (spot price) | -1.5 | -1.0 | -11.7 | -9.8 |
| US Dollar Index (spot price) | -1.4 | 5.8 | 19.7 | 5.4 |

■ annualized
 † GMI is a passive, unmanaged, market-value weighted index of all the major global asset classes (excluding cash). Initial allocation based on 12/31/97 market values.
 †† Investable version of GMI, comprised of representative ETFs
 * Rebalanced version of GMI that's rebalanced to 12/31/97 weights every Dec. 31
 + Initially weighted 60% S&P 500 and 40% Barclays US Aggregate Bond, rebalanced to 60/40 every Dec. 31.

Source: CapitalSpectator.com

Source: Barry Ritholtz

In this case it would appear that the performance results suggest a sea-change has occurred for commodities and physical assets compared to financial assets

While snapshots of asset class performance measurements can often be misinterpreted, in this case it would appear that the performance results suggest a sea-change has occurred for commodities and physical assets compared to financial assets. Part of that sea-change reflects the impact of U.S. and global financial regulators instituting easy money policies in an attempt to stimulate their economies and help drive economic recoveries that will benefit the citizens and lift government revenues. This performance is leading many policy makers and politicians into debates over growing income inequality that is becoming more evident in many

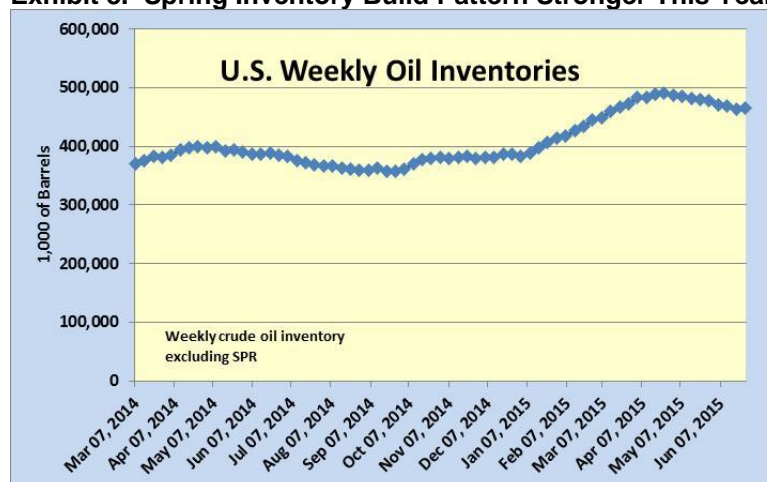
countries around the world. These debates will grow as we move toward the next political election cycles around the world.

What Do Record European Oil Storage Volumes Signal?

Weekly changes in U.S. crude oil storage volumes often move oil prices higher or lower as the change supposedly signals to investors and speculators what may be happening to both domestic oil production and the nation's oil consumption

Weekly changes in U.S. crude oil storage volumes often move oil prices higher or lower as the change supposedly signals to investors and speculators what may be happening to both domestic oil production and the nation's oil consumption. For the first four months of 2015, crude oil inventories grew steadily as shale oil production continued growing despite the sharp decline in active drilling rigs. What we know about the pattern of oil inventories is that they normally increase during that part of the year as refineries shut down for seasonal maintenance and reconfiguration, causing them to cease buying oil as it is not needed then. Once refineries return to service, they resume purchasing oil in order. In the spring the refineries shift from producing heating oil to making gasoline for the summer driving season. Refiners work quickly to build gasoline inventories during April and May in advance of the driving season that starts Memorial Day weekend in late May and peaks on the Fourth of July.

Exhibit 8. Spring Inventory Build Pattern Stronger This Year



Source: EIA, PPHB

As inventories built rapidly, analysts began worrying that the shrinking surplus of oil storage capacity might force E&P companies to cut back their output

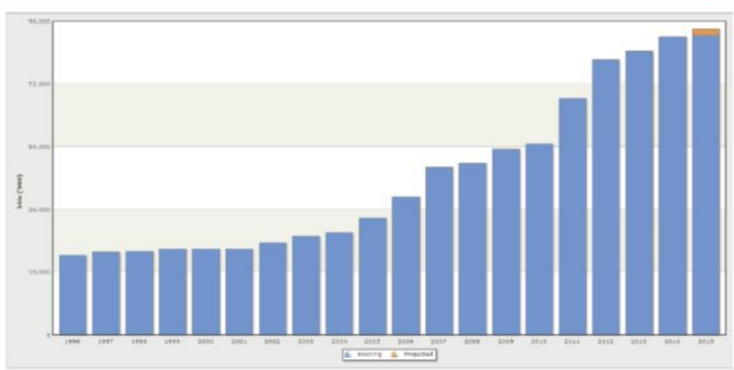
The seasonal inventory pattern can be seen in Exhibit 8 with the rise in early 2014 and the subsequent fall as we moved into the summer. This year, however, the magnitude of the seasonal increase in weekly inventories shocked analysts (Exhibit 8). As inventories built rapidly, analysts began worrying that the shrinking surplus of oil storage capacity might force exploration and production (E&P) companies to cut back their output. Consultant Glenscape, which attempts to determine the volume of oil in storage at important inventory centers around the nation, pointed out how high utilization was at the storage tanks in Cushing, Oklahoma, the focal point of

As overall storage capacity rose during the spring, storage costs soared and the economics of putting additional oil into storage were altered

the crude oil storage business. Glenscape flies helicopters and small planes over the storage tank sites and utilizes laser devices to measure the height of the floating tops of storage tanks in order to calculate the percentage of their capacity in use. As overall storage capacity rose during the spring, storage costs soared and the economics of putting additional oil into storage were altered, forcing the owners of the oil to either seek different storage locations – the Gulf Coast, for example – or decide not to put their output into storage. The latter decision put downward pressure on oil prices as supply overwhelmed demand.

Over time, oil storage capacity at Cushing has grown. It is even expanding in 2015, as reported by Brian Busch, Director of Oil Markets at Genscape in a June presentation in Calgary on Cushing storage capacity and oil market activity.

Exhibit 9. Cushing Crude Oil Storage Growth History
Historical Crude Storage Capacity at Cushing Oklahoma



Source: Genscape

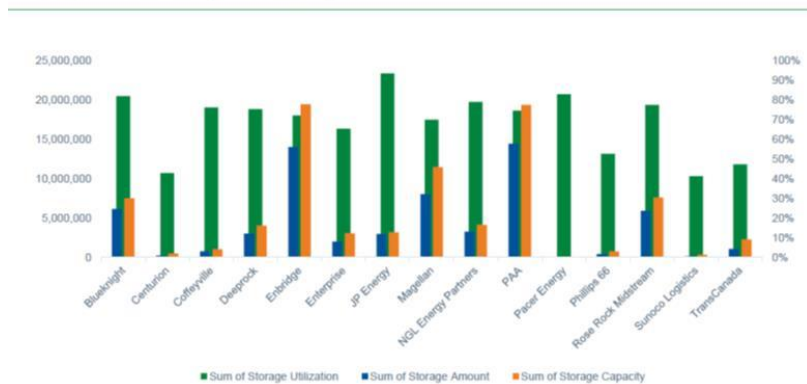
The least utilized terminals appear to be those with the smallest capacity

As equally important as storage capacity is the utilization of the various storage terminals in the Cushing market. As shown in Exhibit 9, while utilization at all of the terminals was quite high in early June, it was highest at those terminals with the greatest capacity. The least utilized terminals appear to be those with the smallest capacity, possibly highlighting the difficulty those facilities have in accepting storage volumes that meet customer needs.

Starting with the first week in May, the oil industry began drawing down crude oil inventories that had reached an 80-year high

Starting with the first week in May, the oil industry began drawing down crude oil inventories that had reached an 80-year high. For the next eight weeks, the Energy Information Administration (EIA) reported that crude oil inventories fell each week. The string of weekly inventory declines ended with the last week of June. The volume of weekly oil inventory changes varied depending on issues such as weather conditions along the Gulf Coast that often prevented ships from delivering import cargoes, consumption changes, and domestic production levels.

Exhibit 10. Storage Terminal Utilization At Cushing High
Cushing Utilization by Terminal Operator

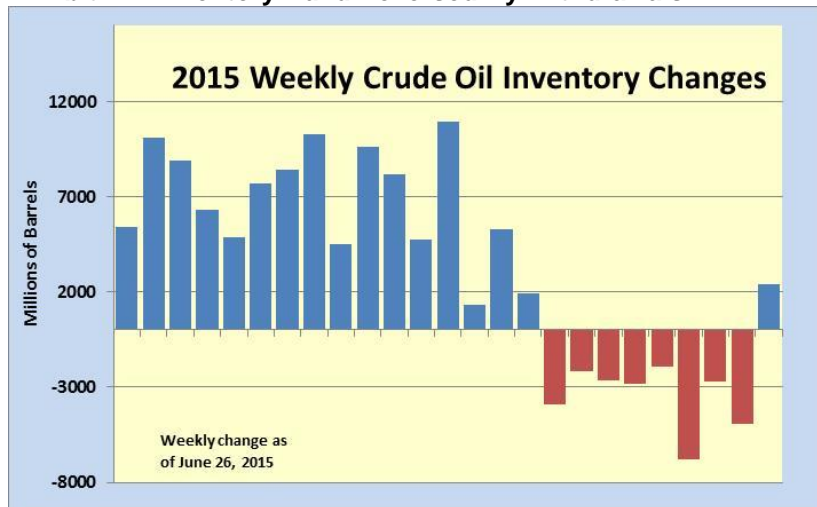


Source: Genscape

Now we have to question whether gasoline demand growth falling short of refiner expectations signals an issue for them or reflects the global challenge from weak oil demand

Although gasoline demand has increased, it appears it has not grown as much as refiners expected, especially as large profit margins encouraged them to boost their output to record levels. Now we have to question whether gasoline demand growth falling short of refiner expectations signals an issue for them or reflects the global challenge from weak oil demand. In order to answer that question, we turned to the global inventory data

Exhibit 11. Inventory Build Reversed By Withdrawals



Source: EIA, PPHB

OECD Asia Oceania inventories actually have trended lower since the start of 2015

compiled by the International Energy Agency (IEA). The most recent report of the Agency suggests that global crude oil inventories were rising through April, driven by the significant increase in United States inventories and a sharp rise in inventories held in OECD Europe. OECD Asia Oceania inventories actually have trended lower since the start of 2015, offsetting inventory builds in the other regions.

Exhibit 12. Inventory Builds In U.S. And Europe; Not Asia

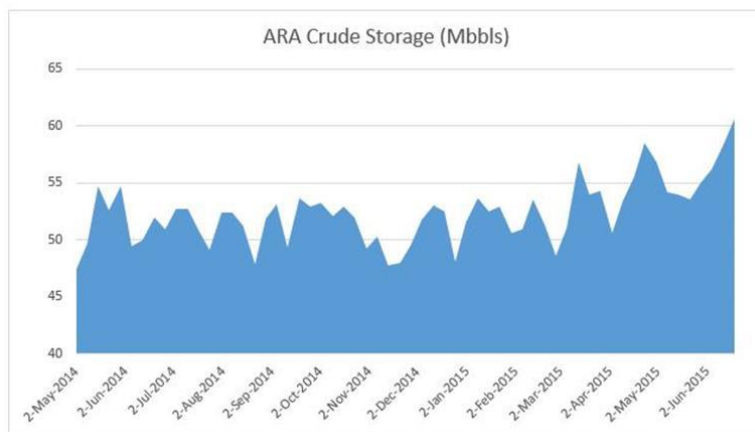


Source: IEA

Through June, total crude oil inventories in the Dutch oil storage center at Rotterdam rose to a record-high

A recent report by Genscape showed that through June, total crude oil inventories in the Dutch oil storage center at Rotterdam (ARA) rose to a record-high of 60.62 million barrels as of June 19, 2015. Genscape reported that during the previous 11 weeks, crude oil inventories at ARA rose seven times, growing by 10.06 million barrels since April 3, 2015, a roughly 20% increase.

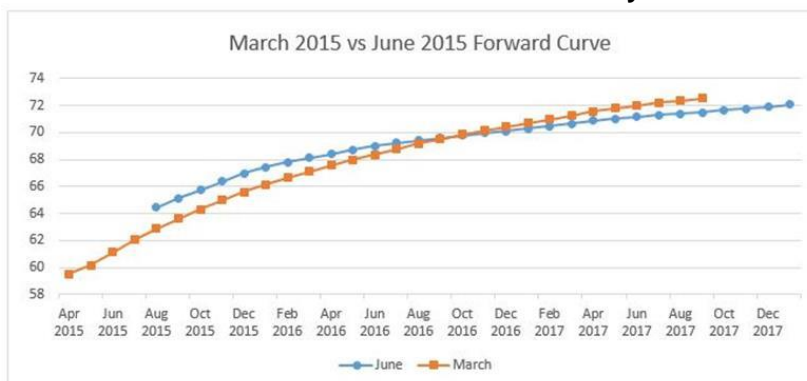
Exhibit 13. European Crude Oil Inventories Hit Record High



Source: Genscape

The fact that a significant volume of oil was added to storage during the steep contango earlier this year will become an incentive to put that oil into the market to cash in on the profits

According to the Genscape analysis, the primary driving force behind the rise in ARA inventories was the contango curve for Brent oil prices. Their analysts suggest that many of the stored barrels were put there when the contango was the steepest. The curve, although flatter now, still provides sufficient incentive for adding more barrels into storage. However, the fact that a significant volume of oil was added to storage during the steep contango earlier this year will become an incentive to put that oil into the market to cash in on the profits. That additional oil will add to the current surplus that is holding back global oil prices.

Exhibit 14. Brent Price Curve Influences Inventory Build

Source: Genscape

The record levels of U.S. and European oil inventories suggest that demand growth this year has not been quite as strong as people had been assuming

The record levels of U.S. and European oil inventories suggest that demand growth this year has not been quite as strong as people had been assuming, coupled with surging production growth. It appears that demand growth within the developed economies, although higher, has only increased marginally, while consumption growth was healthier in Asia. That conclusion is supported by the decline in OECD Asia Oceania inventories this year versus the rise in inventories in other regions.

The release of these record U.S. and European inventories would send oil prices lower

At some point, hopefully soon, oil supply growth will slow leading to a better match with higher consumption levels. Until then, global oil inventories overhang the market and act to hold back sustainable oil price increases. The release of these record U.S. and European inventories would send oil prices lower. Crude oil buyers and speculators will closely watch what happens to these inventories as their movement will influence the direction of oil prices.

Signs Of Problems For Energy Private Equity Funds

Normally when so many dollars are seeking investment opportunities, future returns shrink and losses often become the norm rather than outsized profits

We have commented in the past on what we believe to be a major problem for the energy business, which is the large pool of private equity funds seeking investment opportunities. That money may merely extend the current difficult environment for the business. Our view is that much of this money will wind up supporting weak companies that should be eliminated or consolidated in order to help reduce industry capacity and accelerate the recovery that is necessary in order for the industry to return to profitability. This does not mean that all energy-focused private equity funds are poor investments or that all their investments will fail, but normally when so many dollars are seeking investment opportunities, future returns shrink and losses often become the norm rather than outsized profits. A recent story in *The Wall Street Journal* discussing the travails of First Reserve's two recent multi-billion dollar private equity energy funds highlight this conundrum.

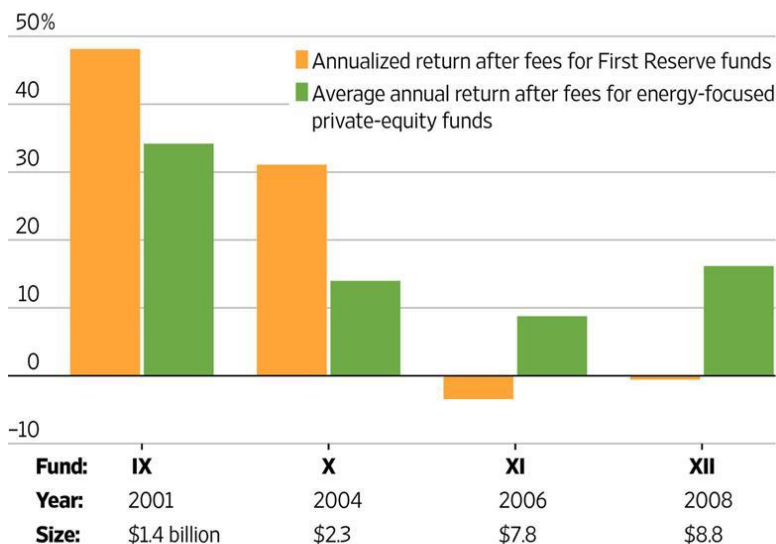
Often there were solid businesses underlying the debt debris, but many times the good and bad were both destroyed

First Reserve may be the oldest energy-dedicated private equity fund having been founded in 1983 by John Hill, an Energy Department undersecretary in the Ford administration, and William Macaulay, an investment banker with Oppenheimer & Company. (In full disclosure, we know Mr. Macaulay and our prior employers did business with First Reserve.) These two gentlemen were early in seeking energy industry investment opportunities, starting during the industry’s first significant bust – the mid-1980s, oil-price-induced collapse. For those who experienced that period, many energy companies were victims of overleveraged balance sheets that were unsupportable when asset values collapsed in response to the dramatic oil price decline orchestrated by Saudi Arabia and the subsequent drop in activity. Often there were solid businesses underlying the debt debris, but many times the good and bad were both destroyed. During the mid- to late-1980s, by working with the banks to restructure loans and through judicious use of the U.S. bankruptcy courts, balance sheets of companies in the energy business were restructured.

Exhibit 15. First Reserve Billion Dollar Funds Struggling

Out of Gas

First Reserve’s early funds generated big profits, but its later and larger investment pools have underperformed peers.



Sources: Washington State Investment Board (First Reserve performance); Cambridge Associates LLC (average performance) THE WALL STREET JOURNAL.
 Source: *The Wall Street Journal*

The returns of both of funds are currently negative

The *WSJ* article focused on the two large private equity funds raised by First Reserve – a \$7.8 billion fund in 2006 and an \$8.8 billion fund in 2008. As shown by the article’s accompanying chart (Exhibit 15), the returns of both of funds are currently negative. As the article pointed out, if the funds don’t generate positive returns by the time

The large positive returns generated by these alternative investment funds help pension funds and endowments achieve their investment return targets

He and his team were coming off a highly successful \$4.4 billion fund-raising effort that needed only six-months, but Blackstone was having a difficult time finding attractive investment opportunities

They are hoping their judgement of the investment potential for specific deals will prove better than the views of their private equity competitors

they are liquidated, they will join select company – only five \$1+ billion private equity funds have ever lost money for their investors according to Cambridge Associates LLC. Previous First Reserve billion dollar funds earned very attractive returns. That record explains why investors seek opportunities to invest funds raised by successful private equity firms such as First Reserve. The positive investment record in recent years of most alternative investment funds – private equity, real estate, hedge funds and venture capital – has enabled them to carve out a meaningful position within large pension and endowment funds. The large positive returns generated by these alternative investment funds help pension funds and endowments achieve their investment return targets. Moreover, these funds' returns are often counter-cyclical to the returns generated by overall equity and debt markets, making them attractive from a portfolio diversification perspective.

Several months ago we attended two meetings dealing with energy private equity investing, which we subsequently wrote about. The observations from these meetings are related to the problems highlighted in the article on First Reserve. One of our meetings was a presentation by Michael Ryder, managing director at Blackstone Private Equity Group (BK-NYSE) and head of his firm's energy investing effort. He and his team were coming off a highly successful \$4.4 billion fund-raising effort that needed only six-months, but Blackstone was having a difficult time finding attractive investment opportunities. The new Blackstone energy fund, along with existing buyout funds raised previously, had positioned the firm then with a pool of over \$8 billion in uncommitted funds.

The second meeting involved presentations by four energy-focused private equity managers discussing the state of the energy business and the experiences they had gained in managing businesses during a challenging industry period. Some of the interesting points these managers made dealt with what they are looking for in order to deploy their uncommitted funds. They said they were looking for "good businesses that were improperly capitalized." They also suggested that they were not interested in "bad managements and bad business models." In other words, these managers want solid companies with outstanding growth profiles that have been overlooked by other investors. What that really means is that they are hoping their judgement of the investment potential for specific deals will prove better than the views of their private equity competitors. If they are right, then time will reward them with outsized investment returns.

While there really was nothing unique in the observations they shared about the investment process or the desirable criteria, the scary fact was (is) the volume of private equity money seeking a home in the energy industry. According to Mr. Ryder, energy private equity investing as a percentage of total energy sector merger and acquisition activity had climbed from under 2% in 2000 to over 20%

To hold to its original investment philosophy, First Reserve would have had to make many more investments in each fund stretching the human resources of its investment team

in 2014. During the first quarter of 2015, the energy private equity funds were investing at that slightly greater than 20% rate until the announcement of the \$70 billion BG Group (BG-NYSE) and Royal Dutch Shell (RDS.A-NYSE) deal. We have not yet seen updated figures so we don't know how the current state of the industry may have changed in the second quarter.

As the First Reserve article pointed out, the increased size of the investment pools forced the group to abandon its proven strategy of making smaller investments in smaller enterprises. First Reserve was forced to increase the size of its investments, meaning it needed to invest in larger deals. This investment shift is an economy of scale issue. To hold to its original investment philosophy, First Reserve would have had to make many more investments in each fund stretching the human resources of its investment team. It would have also potentially diluted the potential investment returns anticipated when putting the fund together, although given the performance of those funds a broader pool of investments might have provided them with better results. At the same time it was being forced to alter its investment strategy, First Reserve may also have been a victim of the "feeding frenzy" among energy private equity funds and non-energy new entrant private equity funds that could have inflated deal valuations. That feeding frenzy may have been the biggest problem if one believes that since the financial crisis in 2008-2009, the energy industry has been in a long-term downturn, just as happened during the 1980's. We remain concerned about the magnitude of private equity money seeking investment opportunities in the energy business. We concluded our prior article on energy private equity funds with the following observations, which we still believe are correct.

"The uniformity of thinking among private equity players is a bit scary"

"The uniformity of thinking among private equity players is a bit scary. Group-thought is usually not a successful strategy. The volume of public capital is not only surprising, but discouraging if one believes the industry needs to experience pain before a true recovery can begin. Lastly, in looking at the presenters and the audience, there were very few present that experienced the 1980's forced re-structuring of the energy business following the bullish experience of the 1970's. In our discussions that day, we encountered another old-timer who referenced the 1980's downturn starting in 1982, three years before when most who look at the industry's history think it began. We were there then, and this guy had it exactly right. This industry is headed for significant change." In our view, the industry's changes are just now beginning to emerge.

Global Economic Growth Lowered Once Again

Last Thursday, the International Monetary Fund (IMF) released its latest World Economic Outlook (WEO) report, and once again it reduced its expectation for global economic growth in 2015. The

The IMF's chief economist, Olivier Blanchard, said that the agency's revision was primarily due to the poor first quarter performance of North America, meaning primarily the negative growth posted in the quarter by the United States' economy

He said "we are about where we expected to be now"

"The unexpected weakness in North America, which accounts for the lion's share of the growth forecast revision in advanced economies, is likely to prove a temporary setback"

"Oil prices have rebounded more than expected in the second quarter of 2015, reflecting higher demand and expectations that oil production growth in the United States will slow faster than previously forecast"

revision to the 2015 forecast brings the agency's new growth estimate down to only a 3.3% gain this year rather than April's 3.5% growth estimate. The IMF kept its 2016 growth forecast of 3.8% in place. In an interview with a CNBC anchor that morning, the IMF's chief economist, Olivier Blanchard, said that the agency's revision was primarily due to the poor first quarter performance of North America, meaning primarily the negative growth posted in the quarter by the United States' economy. We found somewhat confusing the explanation of the 2015 growth projection revision as outlined in the online interview and subsequently in an online article published on CNBC's web site. The confusion over what is truly driving the revisions to the IMF's projections left us wondering whether we would be seeing further revisions in the future.

As an example of what left us confused, we noted that the basic conclusion of the new report is that the revised forecast anticipates "a more gradual pickup than was forecast in the April 2015 WEO" among the advanced economies. On the other hand, the current growth rate for emerging markets is forecasted to be below that of earlier projections. In other words, the growth revision is heavily impacted by the anticipated results from the second quarter which was recently completed, but what was focused on by Mr. Blanchard was that the damage to their forecast was due to the first quarter data as he said "we are about where we expected to be now."

To highlight that point, the report stated: "The unexpected weakness in North America, which accounts for the lion's share of the growth forecast revision in advanced economies, is likely to prove a temporary setback." Yet, the IMF tied its lowered growth projection in emerging markets and developing economies to revised outlooks for commodities and other considerations. "The slowdown reflects the dampening impact of lower commodity prices and tighter external financial conditions—particularly in Latin America and oil exporters, the [economic] rebalancing in China, and structural bottlenecks, as well as economic distress related to geopolitical factors—particularly in the Commonwealth of Independent States and some countries in the Middle East and North Africa." So is the revision due to the past or the future?

What was particularly interesting was the IMF's view about oil prices. "Oil prices have rebounded more than expected in the second quarter of 2015, reflecting higher demand and expectations that oil production growth in the United States will slow faster than previously forecast," said the IMF. That suggests that with falling U.S. oil output and rising global demand, oil prices should continue to ramp higher. Instead, the IMF report stated, "Nevertheless, the average annual oil price expected for 2015—US\$59 a barrel—is in line with the oil price assumption in the April 2015 WEO, with a somewhat smaller increase forecast for 2016 and beyond..." So if the price target for 2015 is essentially the same, the earlier jump in oil prices due to rising demand would signal that the

What the IMF is saying about the oil market is that the higher price having been achieved earlier than anticipated is contributing to slower growth for developed economies in the second quarter

IMF expects oil demand in future quarters to weaken or we should have a higher price target. The comment about a smaller price increase expected for 2016 suggests that demand will be slightly weaker, but what is happening to the IMF's expectations for U.S. oil production?

Greece is even less significant when considered against global GDP as it represents less than one-half of one percent

Maybe what the IMF is saying about the oil market is that the higher price having been achieved earlier than anticipated is contributing to slower growth for developed economies in the second quarter but then will have a smaller impact on growth in future quarters and years. As the IMF report pointed out, "The underlying drivers for a gradual acceleration in economic activity in advanced economies—easy financial conditions, more neutral fiscal policy in the euro area, lower fuel prices, and improving confidence and labor market conditions—remain intact."

The IMF is now expecting that China's economy will grow by 6.3% in 2016 and 6% in 2017

The major concerns for global growth seem to be the Greece situation and a slowing China. While Greece is and has been the focal point of investor attention and global bankers recently, the IMF pointed out that Greece accounts for less than 2% of the Eurozone's gross domestic production (GDP). Greece is even less significant when considered against global GDP as it represents less than one-half of one percent. On the other hand, the slowing of the Chinese economy, especially given the issue the government is having with its financial markets, is undercutting the country's growth rate. The fact is that as of July 9th, the Chinese stock markets have lost about a third of its value since early June and the government has stepped in to stop the trading in many of the companies' shares and has banned company CEOs and directors from selling for up to six months. These moves have unsettled global stock markets.

A recent article in the *Economist* highlighted the problem of an aging population being confronted by Japan

Mr. Blanchard made the point that the IMF had retained its 6.8% growth forecast for China's economy in 2015, although it did so with "greater uncertainty." The IMF is now expecting that China's economy will grow by 6.3% in 2016 and 6% in 2017, neither of which is robust by past standards. We wonder what will happen to these future forecasts if it becomes apparent to the IMF that China's 2015 growth rate has slowed further.

One of the key determinants of global economic growth, especially for advanced economies, is demographics, a topic we have written about numerous times in the past. A recent article in the *Economist* highlighted the problem of an aging population being confronted by Japan. While this is a long term issue, a shrinking and greying economy will negatively impact the country's growth and its demand for energy, including oil.

The Japanese economy is projected to total about \$4.21 trillion in 2015 based on nominal GDP, making it the third largest economy in the world. On a purchase price parity basis, the Japanese economy is ranked fourth in the world at an estimated \$4.70 trillion. Although

Japan remains the second largest developed economy in the world

One of the things the cabinet is considering is a proposal for repopulating rural areas of the country as a way to reduce the cost of looking after this aging population in major cities

China passed Japan's economy on a nominal basis in 2010; Japan remains the second largest developed economy in the world. Therefore, what happens in Japan is important for what happens to global economic growth and energy markets. Remember that Japan is the third largest automobile manufacturing country and it has the world's largest electronics goods industry.

The *Economist* article points out that by 2060, Japan's population is projected to fall from 127 million now to 87 million. Almost 40% of that future population will be 65 years old or older. To deal with this emerging economic and social issue, the Japanese government has created a new cabinet position for "overcoming population decline and revitalizing local economies." One of the things the cabinet is considering is a proposal for repopulating rural areas of the country as a way to reduce the cost of looking after this aging population in major cities.

Exhibit 16. Japan First Country To Confront Aging Issue



Economist.com
 Source: *Economist*

That would put Tokyo's aged population at 5.7 million, straining the services for caring for this population segment

The Japan Policy Council says that over the next decade, the population of those over 75-year-olds in greater Tokyo will grow by 1.75 million. That would put Tokyo's aged population at 5.7 million, straining the services for caring for this population segment. The government is considering the impact of this aging trend on both

The ageing may threaten hundreds of Japanese villages with extinction

the country's rural and urban populations. The aging may threaten hundreds of Japanese villages with extinction. On the other hand, the growth of the aged population in large cities may draw health care workers from rural areas further accelerating the depopulation of rural areas while adding to the population problems of the cities. Therefore, the government is considering a strategy of building rest homes in rural areas and moving many of the aged from cities to these new locations.

After having created the world's longest life expectancy due to the country's wealth and its excellent health care, Japan must now find a solution to its aging population

While these plans are not well-developed, there are several hurdles to be overcome. First, how much will it cost and who will finance it? Second, how do you deal with older people unwilling to move? They usually prefer staying closer to friends and relatives. A German scholar, Florian Coulmas was interviewed by the *Economist* and noted that Tokyo is at the forefront of dealing with this demographic challenge. After having created the world's longest life expectancy due to the country's wealth and its excellent health care, Japan must now find a solution to its aging population. What does this challenge mean for the Japanese economy? Japan's economy has been boosted by its population's high savings rate, which is likely to be reversed in the near term. Older people mean a less productive labor force, less economic stimulus and reduced energy needs. These challenges will force the government to have to consider restructuring its economy, which will place downward pressure on its growth rate. That means less energy will be consumed.

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