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GDF SUEZ

Low Oil Prices Could Transform Electricity Markets

A special feature by renowned energy expert Andrew Weissman



The changes that are occurring in the U.S. and global oil markets could constitute a potential paradigm shift with far-reaching implications for electricity markets. There is a considerable possibility that U.S. oil prices will remain substantially below current levels for many years – perhaps even permanently.

If this occurs, it could significantly reduce electricity prices on the coldest days of the year; costs might even be capped at or below \$150/MWh. This could dramatically reduce electricity users' exposure to price spikes and prevent futures contracts from spiking to the levels seen over the past two years.

This reduction in near-term price risks, however, could also deter construction of new generation during a period when the retirement of older coal- and gas-fired power plants is likely to accelerate. This could lay the groundwork for serious problems in regions in which available generation drops enough to fall short of higher market needs in the future.

The Price Trajectory of Oil

The recent plunge in U.S. and global oil prices is rooted in two factors: spectacular growth in production of light sweet crude from U.S. tight oil formations and a simultaneous sharp contraction in growth in global demand – which totaled just 600,000 barrels per day last year (the lowest growth rate since the Great Recession).

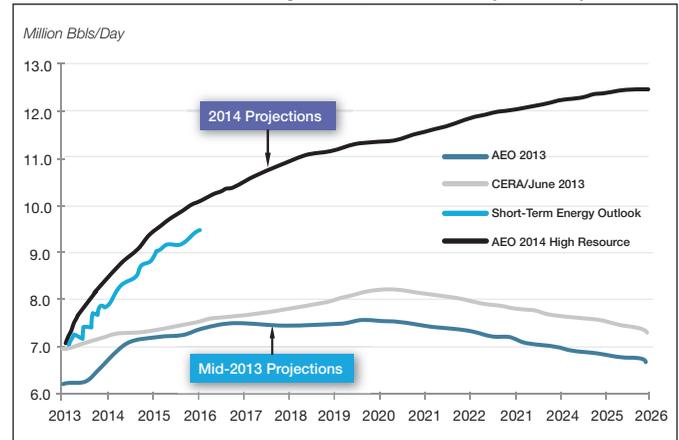
In December of 2014, U.S. production reached 9.125 million barrels/day – nearly 1.5 million barrels/day above IHS-CERA's mid-2013 projection for 2014, and 600,000 barrels/day higher than CERA's projection for 2020 (six years from now). EIA's 2013 projections were even further off the mark.

This startling growth is a direct result of applying to tight oil formations the same development techniques that have powered the shale gas revolution, i.e., horizontal drilling and hydraulic fracturing.

However, an enormous supply glut has emerged in the global market as a result.

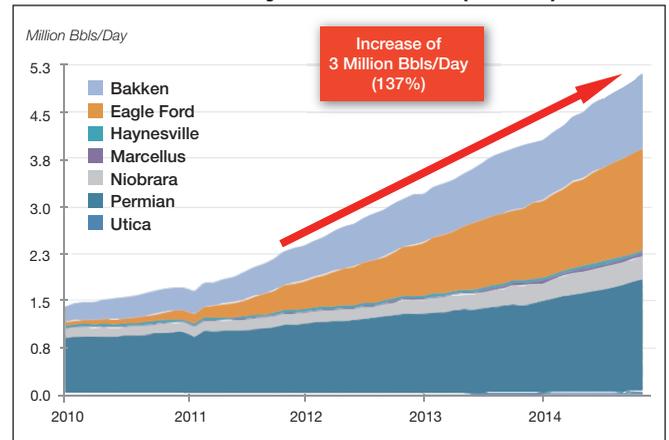
As crude prices have plummeted, refiners have begun to rapidly build inventories of gasoline and other finished products – storing crude as finished products in the hope that prices will soon rebound. Last year, this buildup in inventories helped mask the growing supply

U.S. Crude Oil Production Projections, 2013-2026 (MMbbl/d)



Source: EBW AnalyticsGroup, IHS CERA, EIA

U.S. Shale Oil Production by Basin, 2010-2014 (MMbbl/d)



Source: EBW AnalyticsGroup, EIA

excess. However, with global production far exceeding market needs and with little need or justification for continuing to add oil to storage, NYMEX crude is likely to re-test 2009 support levels below \$40/barrel.

While the global economy remains weak, the plunge in oil prices could help increase global demand in 2015. Global demand has the potential to grow by 1 million barrels/day, year over year, during the second half of the year if the economic downturn in Russia and other oil-producing countries is not too steep, and if Europe, China, and Japan are able to avoid recessions.

If this occurs, prices for Brent and other grades of crude traded globally could start to firm up by the third or fourth quarter of this year, possibly returning to late 2014 levels. If the global market rebounds later in 2015, however, prices for NYMEX crude could remain in the \$50-\$60/barrel range for a prolonged period – and potentially settle out even lower in the longer term.

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Domestic Production Considerations

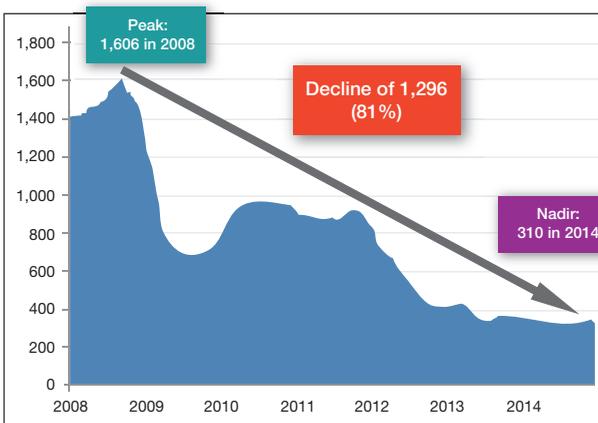
Under the most extreme scenarios, U.S. production is likely to grow by at least 600,000 to 700,000 barrels/day, year over year, in 2015. Even if the rate were suddenly frozen at 9.125 million barrels/day on January 1 of this year (which is inconceivable), on an annual average basis total U.S. production would be nearly 675,000 barrels/day more in 2015 than in 2014 — that is more than the total net increase in global demand last year.

The more likely scenario is that U.S. production will continue to grow rapidly during the first six to nine months of 2015 and slow down only gradually later in the year.

During the last few weeks of 2014, many U.S. producers announced significant cuts in CAPEX budgets for 2015 — in some instances by 20 percent or more. Further reductions in CAPEX budgets are likely in the first quarter of this year.

It would be a mistake, however, to assume that these CAPEX reductions will quickly bring growth in production to a halt — or even slow down the growth rate appreciably. Factors like the lag time before spending cuts affect drilling, high grading of reserves to maximize yields, and expected declines in oilfield service costs could instead create the need for a potentially much longer adjustment period.

U.S. Natural Gas Rig Count, 2008-2014



Source: EBW AnalyticsGroup, Baker Hughes

At least to a degree, the rebalancing of the oil market could parallel what the natural gas market experienced after prices crashed earlier in the decade. While many market observers initially

thought that a 10-15 percent reduction in the rig count for natural gas wells would be sufficient to stabilize production, the rig count instead has fallen by more than 80 percent. Yet, despite this steep decline, U.S. natural gas production has continued to increase every year — with the growth rate accelerating sharply in 2014.

Growth in Lower 48 Natural Gas Production, February 2014-November 2014 (Bcf/d)



Source: EBW AnalyticsGroup, EIA

While there are significant differences between drilling for oil and drilling for natural gas, a reduction of 60 percent or more in oil-directed drilling may be required before total U.S. production stabilizes.

Finally, at the same time global prices are plummeting, U.S. refineries may soon reach a critical inflexion point at which they can no longer increase utilization of domestic crude.

Imports of light sweet crude have already been reduced to near-zero levels. And U.S. refineries may have reached (or at least be very close to reaching) the “refinery wall” — or the point at which as a practical matter, given forced outages and the need for seasonal maintenance, it is no longer possible to significantly increase refinery utilization.

Further, at a time when nearly every refinery in the world has access to abundant quantities of low-cost crude, Saudi Arabia is bringing online massive amounts of new, ultra-efficient refining capacity, and China and India also have built more new capacity than they need. Essentially, a commercial limit could be reached before the physical limits on our ability to increase crude inputs at U.S. refineries are fully tested.

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Implications on Electricity Prices

This radical shift in oil prices has far-reaching implications for winter-month prices in electricity markets — particularly in the northeast but potentially more broadly. The 2013-2014 winter season starkly revealed the potential for severe winter price spikes in New England, New York, PJM, and MISO. ERCOT was less affected, but that region is still vulnerable.

It would be a mistake to view last winter's price spikes as a one-off event due solely to very cold weather. Instead, the high frequency of scarcity pricing last winter revealed vulnerabilities in the grid that have been building over a period of several years.

The situation can only get worse as the use of natural gas for space heating continues to increase, as older, less efficient generating units are retired, as aging nuclear plants are shut down, and as new gas-fired generation is added. The frequency of scarcity pricing therefore could increase even when winter weather conditions are much milder than they were in 2013-2014.

Although there is no one-size-fits-all solution to the problem, the 50 percent decline in oil prices that has occurred since last winter significantly increases the attractiveness of relying on oil as a backup fuel when natural gas prices spike.

However, oil is not a panacea.

Many — if not all — of the following measures would still be required to effectively address the scarcity issues, even in a low-oil-price environment: (i) building new natural gas pipelines to decrease the frequency of constrained supply; (ii) instituting capacity performance requirements to improve generation availability when cold weather occurs; (iii) improving maintenance; (iv) contracting for firm transportation rights at gas-fired plants; (v) adding dual-fuel capability at combined cycle units and peaking units that currently burn only

natural gas; (vi) increasing the amount of oil stored at dual-fuel facilities; and (vii) in New England, utilizing LNG as a supplemental source of natural gas.

It's important to note that the availability of dual-fuel generation capability does not eliminate exposure to price spikes. Additionally, taking full advantage of this option will require an investment in facilities for holding oil in storage and for adding dual-fuel capability to generating units that were designed to burn either oil or gas but are not currently oil capable.

However, on a total cost basis, it could be significantly more cost-effective than some alternatives being considered. Just as significantly, it also could dramatically reduce the market clearing price in future capacity auctions. This, of course, can be a two-edged sword if the effect reduces the incentive to construct new generation needed in the longer term.

The paradigm shift in the oil market poses an important challenge to regulators. Considerable thought will be required to design cost recovery mechanisms that properly incentivize use of the dual-fuel capability option, but at the same time ensure that sufficient new generation is added to meet market needs during a period when massive retirements will soon be occurring.

Additional analysis of these issues can be found at <http://ebwanalytics.com/library/>.

Andrew Weissman (Andy) has provided strategic advice to leading firms in the energy sector for more than 30 years, playing a key role in developing innovative business structures for major energy transactions, and transforming energy and environmental policy at the state and federal level. Andy is Senior Energy Advisor to Haynes and Boone, LLP, and the guiding force behind EBW AnalyticsGroup, an energy market research and analysis advisory service. Andy is a graduate of Harvard Law School.

As a licensed provider of retail electricity and related services to industrial and commercial customers in the United States, GDF SUEZ Energy Resources NA is a business unit of GDF SUEZ Energy North America and a part of the GDF SUEZ Group of companies.

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