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The Energy Transition and the Future for Retail Fueling Stations

“The Mobility Mash-Up”

Background

In music, a mash-up is a blend of two or more styles that are mashed together to create something new. The retailing of fuels to drivers is starting to experience its own mash-up, as the long dominant internal combustion engine (ICE) will start to see increased competition from plug-in electric vehicles (PEVs), and in the process lead to the creation a new refueling landscape. In the process, the energy industry will start to reveal how it is reshaping itself.

Long held at arm’s length and serving their own discrete markets, the oil industry, the electric utility industry and the equipment providers are now starting to experience convergence—what many are calling the *energy transition*.

With new catalysts provided by the equipment providers such as the electric vehicle manufacturers, value will start to leak from the oil industry into utilities with liquid demand replaced by that for electrons. The oil industry is now starting to consider how to respond. In addition, the three industries are starting to realize that the future may lie in collaboration as well as competition.

The most visible manifestation of this transition is in the retailing of transport fuels at fuel stations, often the forgotten part of the industry. For too long, fuel stations were seen purely as the location for disposing of the output of the oil supply chain, sitting at the end of a very long pipe that starts at the wellhead. However, changes are afoot and the retail fuel station business potentially faces an existential threat in the next 10–20 years, facilitated by technology development and a supportive electric utility industry. The oil industry as a whole is waking up to this threat.

The question to ask is not whether the threat is real, but what to do if and when it does arrive. This article looks at the challenges faced by the oil industry and charts how players will potentially respond, and how the market may play out.

In the last 15 years, the retail fuels industry has experienced substantial change globally. History indicates that the industry moves through a number of stages of development, starting as fully regulated markets with fixed prices and limited competition and ultimately arriving at a highly competitive market environment, with oversupply and aggressive price competition. Those that have flourished understand the rules of the game and have learned what it takes to survive and ultimately beat the competition.

In most situations, this route to survival has come down to aggressive cost management, margin enhancement, and a fixation on driving site volume throughput achieved through a near religious focus on four factors. These factors are: the site operating platform, operational excellence and efficiency, customer offers from the fuel to the shops, and management of the real estate portfolio.

However, there is a looming cloud that threatens even the most successful, and for once, the traditional solutions may not be enough. The mash-up demands an innovative response.

The New Threat— Creeping Electrification

One of the Darwinian laws of retail fuels has been that the number of cars on the road will continue to increase year-on-year. Despite the occasional wild fluctuations in fuel prices, the assumption has been that more cars will lead to a continued rise in overall fuel consumption over the long term.

The more mature markets of Northern Europe and the United States have seen this assumption challenged in recent years due to significant improvements in engine

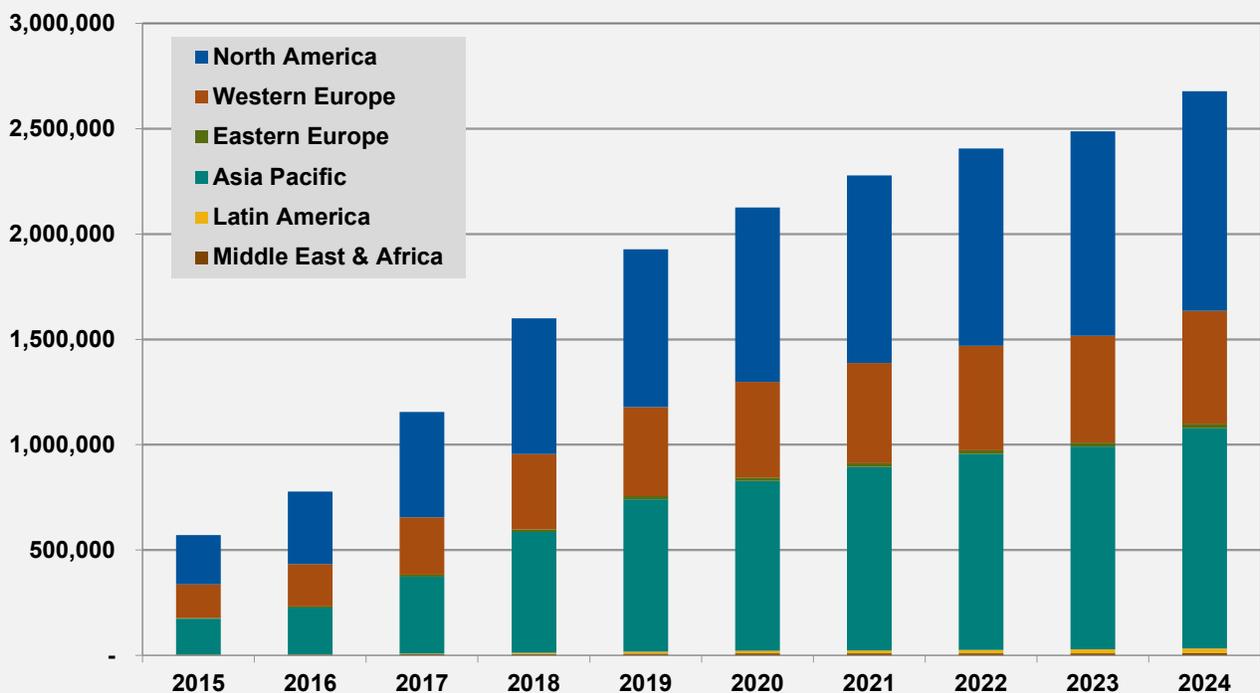
efficiency. Given the relatively slim retail margins in these markets, there has been a shake-up. A number of the traditional players, including the supermajors, are selling out of the markets where they lack a strong market position and new players are entering, including non-European national oil companies and domestic investors.

Despite these moderate market adjustments, the assumption has remained that the fundamentals of the market will prevail and the strongest will survive. If a few inefficient players exit the market, then that is the law of the jungle, and potentially helps the remaining players.

However, with the creeping emergence of PEVs in the market in small numbers, there is a tangible emerging threat to the growth drivers of the retail fuels market that cannot be ignored. Whether this is called a manageable market adjustment or an existential threat comes down to an individual's prediction of the speed of adoption and eventual penetration of these vehicles.

However, in both cases, it will be important for those involved in the retail fuels value chain to deeply understand the threat and work out how they can continue to extract value when it does arrive. Some of those that cannot see a route to value will start to make choices and may start to exit early.

FIGURE 1: LIGHT DUTY PEV SALES BY REGION, WORLD MARKETS 2015-2024



Source: Navigant Research

The purpose of this article is not to assess the economic or environmental case for PEVs — that is comprehensively handled elsewhere. What is already known is that vehicle emissions and fuel economy regulations are being enacted in leading markets such as Europe and the United States. This is starting to drive the penetration of lower emission and fuel efficient vehicles, including electrified vehicles, and players across the value chain are responding.

PEVs includes both pure battery (BEVs) which use energy stored from the grid exclusively and plug-in hybrid electric vehicles (PHEVs) which use energy stored from the grid plus have an ICE to extend the range of the vehicle.

Navigant Research anticipates the growth in PEVs to rise from over 570,000 sold globally in 2015 to 2.7 million sold in 2024. This growth will not be equal across all regions. Leading markets will be those with stronger efficiency and tailpipe regulations and incentives to support vehicles and charging equipment: Western Europe; the United States, especially California; Japan and China.

While these numbers look inconsequential in global terms, what matters is not the absolute numbers, but what is happening at the micro level—where the emergence of these vehicles *is* starting to have an impact.

What is clear from the research and the current market activity is that because of the infrastructure needs and drivers' performance demands, PEVs are emerging in very specific locations. That is, they are predominantly emerging around urban locations and are starting to become a concentrated threat to the retail forecourt industry.

Mash or Be Mashed

In truth, no one knows how the market will play out and what the prognosis for the retail fuels industry will be. The answers will be determined by the behavior of the key factors, as well as the ultimate level and spread of penetration of the vehicles.

However, what can be charted is how the first few moves will potentially play out. In doing so, an understanding can be developed of some of the approaches the industry could take to live with this threat, both at the micro retail site level and more broadly at the strategic level.

An unlikely source of insight comes from looking at how the industry responded, or in many cases, did not respond, to the threat from the supermarkets when they first entered the retail fuels market. What the industry learned the hard way is that the longer one waits to respond, the more painful the experience is.

On the Front Line

One way to view the future is to look at the way the developments may play out. More a live, scenario-based video game than a fixed movie script, it is informative to think about the potential successive moves.

Realization and response: If overall local market retail fuels volume starts to contract, it is likely that there will eventually be increased price competition as competitors fight for lower volume.

The smart players have learned (to their cost) the impact of sitting on their hands and allowing site volume throughput (the measure of how many liters of fuel a site pumps in a day, month, or year) to be eaten by a competitor (in this case, the market).

The supermajors paid a heavy price in France for not responding to the entry of the supermarkets, as did the traditional players in the US when the non-traditional players entered the market. Ask any seasoned industry expert from the supermajors whether they would have behaved differently in these markets had they known what they know now, and they will likely to give you an enlightening answer.

In the short term, market players know that this increased price competition will drive down margins and deliver significantly lower short-term return on capital, but they have learned that eventually the market *tends* to correct itself. What they know is that if they do not protect their throughput in the short term through price competition, it is very difficult to recover it in the medium term. In the case where there is even less market volume, this will be doubly more difficult.

Emerging market corrections: Up to this point, national players will have had to swallow the local margin compression. However, eventually there will be the realization that this local market condition is structural and not temporary. The market will start to correct itself as players realize that the current margin situation cannot prevail.

Market corrections may come in many forms and will be very much down to the mind-set of the individual players and local and national government:

- » **Find an alternative use:** Players will be looking at the prognosis for their individual portfolio of retail sites. One of the emerging dynamics, especially in more mature markets, has been the concept of *highest invest use* (HIU). Simply, what use of the real estate that the retail site occupies will deliver the highest return?

Fundamentally, whoever owns the real estate (be it a real estate landlord, the dealer/wholesaler, or the oil company), they will likely be asking this question. As leases come up for renewal, landlords will look at their portfolio and will be actively looking for alternative uses. As commercial property prices have continued to rise in places such as Hong Kong and Singapore, the market has seen the contraction in the number of urban refueling sites as the location is converted to residential or commercial use.

- » **Cut your losses:** Where there are limited alternative options and margins remain unacceptable despite extensive self-help in terms of cost reduction, margin enhancement, and volume retention, the only alternative case may be to close the site. An interesting motivation here may be the learning that “it is hardest to be the last to leave, so leave early.” In mature markets, players have learned that the retail site belongs to the community and closing the last site results in a strong level of local resistance and threat to brand reputation.
- » **Market adjustments:** Regardless of how the market adjusts through network rationalization, learnings from the market are that this always lags volume contractions, primarily due to the timing of landlord contracts. Therefore, there may come a realization point where leading competitors decide that due to the permanence of the market adjustment, they will test the market through price increases to recover margins. This will test the price inelasticity in the market, as customers consider the inconvenience of alternative suburban and highway sites.

- » **Government-mandated presence:** The role that local or national governments will play is less clear, and there are limited learnings. If there is a significant run on site closures, public backlash may emerge on the inconvenience of having to travel further to refuel. Governments in some markets may mandate players with a certain national presence to provide a minimum number of urban locations (as a cost of doing business), regardless of the economics of the site. This will need to be factored into the overall fuel mix and all will ultimately end up paying a contribution.

How these scenarios play out will be a function of the local market. While the prognosis is not predetermined, it can be gamed. Using established war gaming techniques allows a player to start to understand how the market could evolve, and how they should respond, to achieve the optimal outcome for their business.

The Strategic Question—Learning to Thrive in the Mash-Up

Managing the challenge to the core retail fuels business can only ever be one part of the solution—a defensive move. It is only about protecting the remaining value after the electric utility industry continues to take its bite out of the oil industry’s pie.

To thrive, the oil industry needs to think about more aggressive, proactive moves across the divide into the utility sector. Remember, this is a world of energy transition, and in transitions, the rules are often rewritten.

So what are some of the ways the industry is learning to respond?

Embrace the threat: Almost all supermajors and some local and regional players have dabbled with the concept of meeting the needs of PEV recharging onsite. This is the logical step, and one that initially feels the most comfortable. Embrace the threat, bring it into the fold, and learn how to make it pay its way. This has usually been in the form of providing recharging facilities or battery swaps onsite. However, the cruel truth is that the economics rarely add up.

Delivering a sufficient return on the occupied real estate through margin from the electronics and non-fuel shop purchases is brutally difficult. Remember, each square foot of an urban retail site has to sweat its value to compete with the alternative HIU. The reality is that electric cars stay longer and deliver significantly lower returns per visit.

Doing what you know best: Ultimately, oil companies know about motorists in a way that most electric utilities can only but dream. The opportunity for oil companies is to think about the challenges individual customers face in managing the operational challenge of recharging, be that at home or on the move—and, importantly, about how they pay for the electrons.

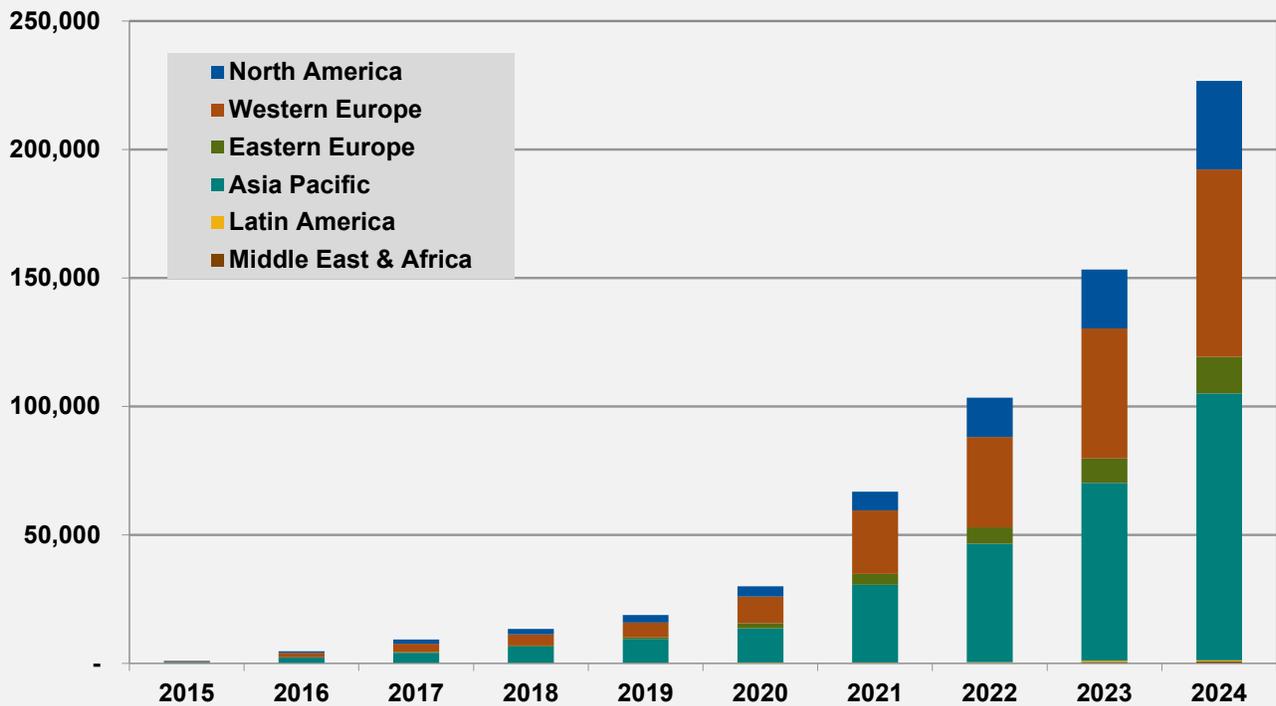
In the business-to-business (B2B) world, while PEVs potentially offer an economic and sustainability benefit, they present significant operational challenges for which most fleet managers are unprepared. Rarely will a B2B

customer transition a complete fleet to PEVs, and oil companies with sizeable B2B customer franchises have the potential to help their customers manage a portfolio of *energy for mobility* needs.

Promoting Alternatives: For more than 15 years fuel cell vehicles (FCVs) have been cited as a potentially significant alternative to PEVs, although development has been slow due to technology and infrastructure costs. Sustained investment for the development of FCVs, especially by the vehicle manufacturers and selective oil industry players, has led for the first time to the emergence of commercial market opportunities.

FCVs will have a slower adoption rate than PEVs, as commercial FCVs are only just coming to market in very small numbers. However, Navigant Research predicts expects that FCVs will reach annual sales of just over 200,000 by 2024.

FIGURE 2: TRANSPORTATION FORECAST LIGHT DUTY FUEL CELL VEHICLES



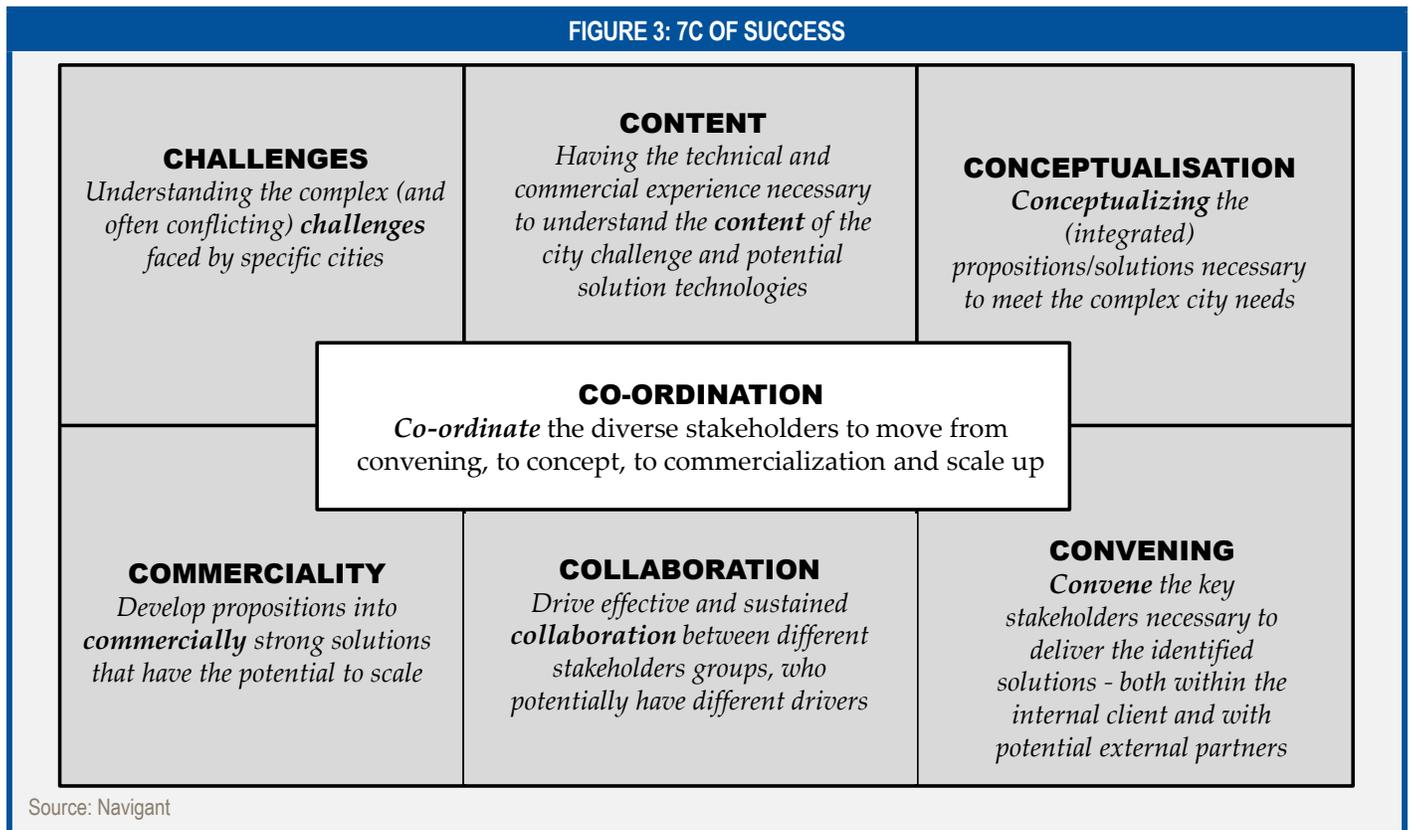
Source: Navigant Research

While the attractiveness of FCVs for the oil industry is that the refuelling model is similar to that for ICEs, with hydrogen refuelling facilities on retail fueling stations, it will not create sufficient replacement value, therefore should only be considered one element of a strategic response plan.

Going large: Ultimately, utilities have learned that value can be enhanced through aggregation and/or integration — be that aggregating customers or customer demand or integrating services. The oil industry needs to think about how and where it can leverage the concepts of aggregation and integration in this mobility mash-up.

Going together: Those who are experimenting in this space are learning the importance of partnerships. If one looks closely enough, one will see increasing partnerships between oil companies, electric utilities, and equipment providers. Disruption to each of their industries and the realization that they need to more deeply understand the other are forcing players across the three to work together for mutual benefit. However, this is tough. They are learning the importance of embracing seven success factors (see chart below), specifically;—framing the *challenge* and sufficiently understanding its *content*, *conceptualizing* complex solutions, *convening* the key players, *collaborating* in developing the solutions, *commercializing* the outcome, and *coordinating* development and delivery.

FIGURE 3: 7C OF SUCCESS



Fallout

While the focus has been on the retailing, it is worth reflecting on the impact further up the supply chain. PEVs will reduce overall liquid fuel demand and will ultimately affect the refining industry. This is an industry that has experienced a torrid time during the last 5 years in a number of geographies, including Europe. The recent upsurge in margins due to the lower oil prices can only be a temporary respite. The industry will need to understand how and where it is most at threat from PEVs in the medium term, and Europe and California are likely to be at the front of the rank.

Refiners need to be able to model the impact in their supply envelopes, understand the prognosis, and prepare accordingly. This will be different for the downstream integrated players compared to the merchant refiners.

Conclusion

The reality is that for most markets, PEVs will not be a material threat to retail fuels for at least 5–10 years. However, at some point, they almost certainly will be a threat. What history has taught the incumbent industry players is that, too often, they underestimate the speed at which the threat will emerge. If they do not have a solution when the threat arrives, it will be too late.

What retailers need to understand is how to respond defensively and to actively explore the opportunities presented by this transition. Retailers should not ask when the transition will arrive; instead, they should ask how to continue making money when it does arrive.

How Can Navigant Help?

Navigant's team of energy and mobility experts use their in-depth knowledge and experience in helping clients understand the issues and develop complex new business solutions, often working with multiple stakeholders to create win-win outcomes.

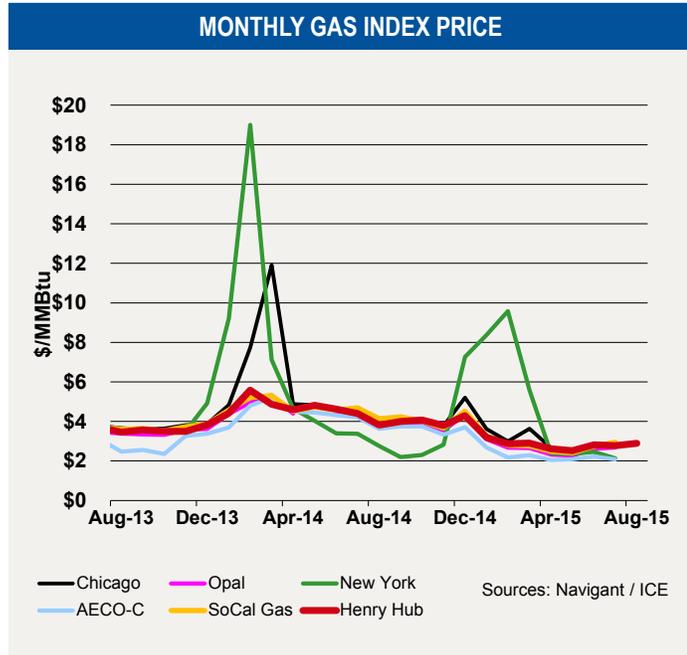
— *Nick Allen*

About the Author »

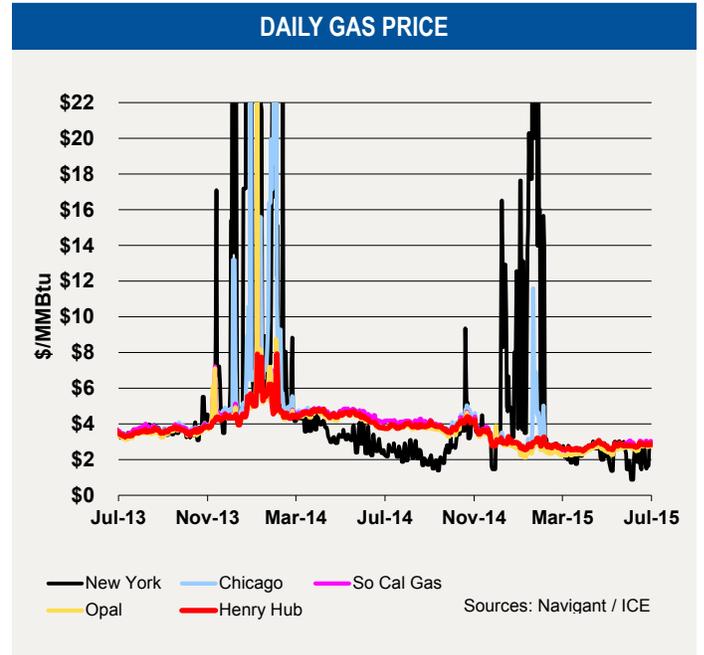
Nick Allen is a Director in Navigant's Energy Practice.

The opinions expressed in these article are those of the authors and do not necessarily represent the views of Navigant Consulting, Inc.

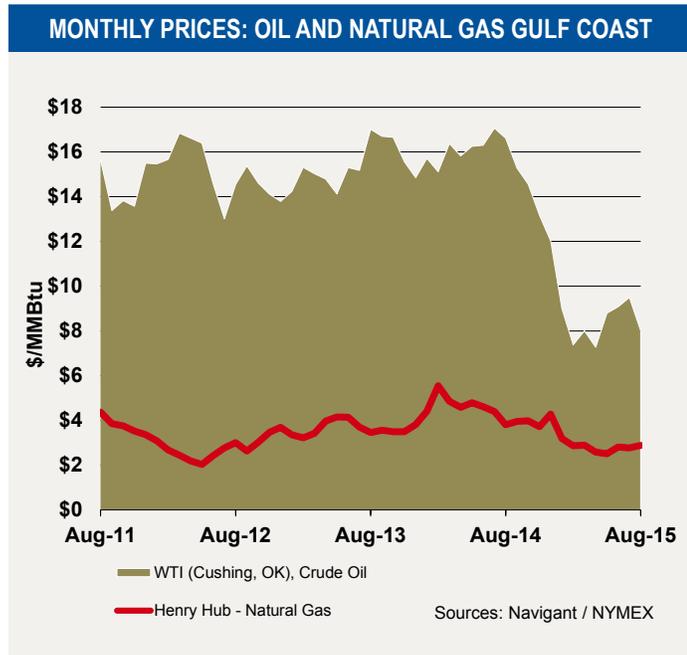
Natural Gas Market Charts



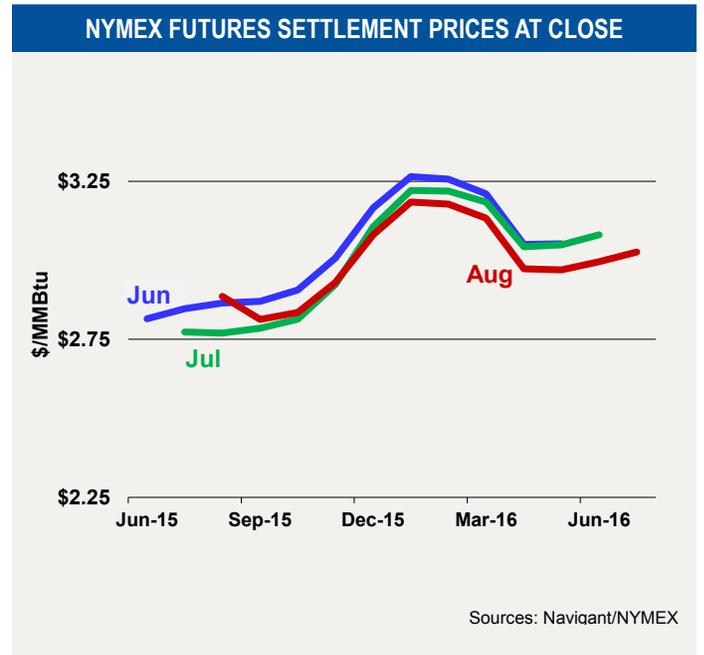
Monthly index gas prices increased 4% last month, with Henry Hub at \$2.89/MMBtu for August versus \$2.77/MMBtu for July. The August 2015 price was below the August 2014 price of \$3.81/MMBtu by \$0.92/MMBtu.



The daily spot prices ended July up 2% versus the end of June, with Henry Hub at \$2.85/MMBtu versus \$2.80/MMBtu.



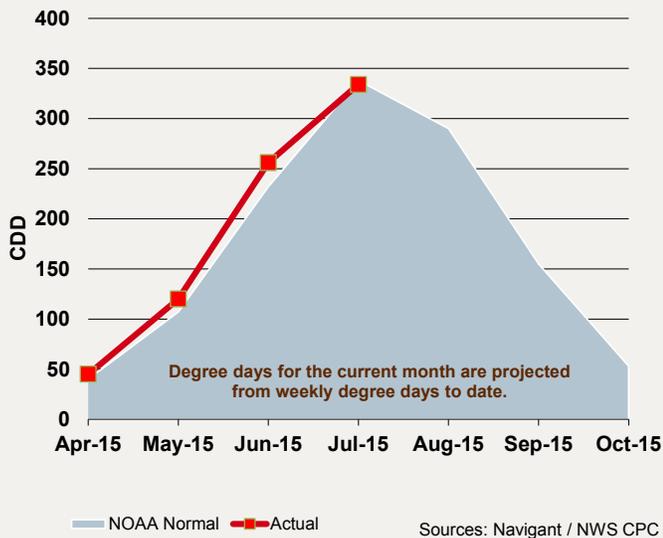
The most recent gas/oil price ratio decreased to 2.8 times, with Henry Hub natural gas price at \$2.89 versus WTI crude oil price at \$8.01. The ratio one year prior was 4.4 times.



The average 12-month strip price was unchanged at \$3.00/Mmbtu, for the strip starting August 2015.

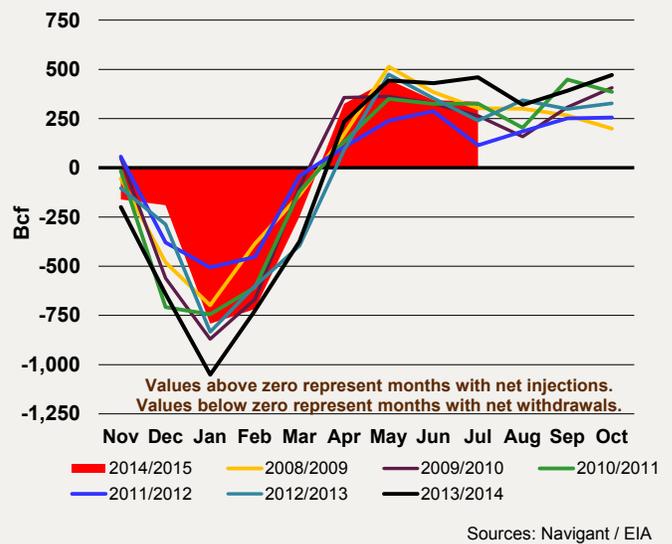
Natural Gas Market Charts

U.S. POPULATION-WEIGHTED CDD



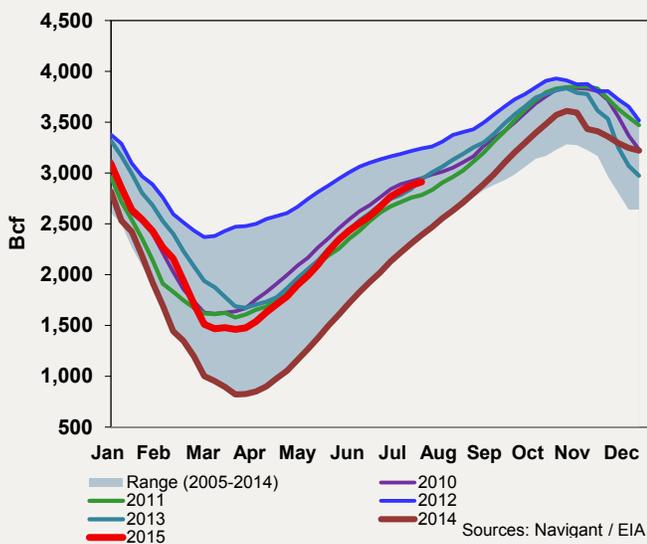
Normal weather in July brought seasonal cooling degree days down to 5% above normal.

MONTHLY U.S. STORAGE ACTIVITY



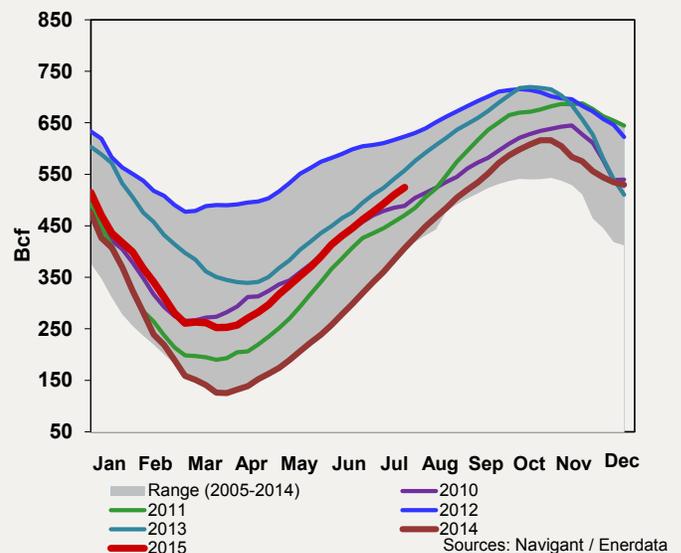
U.S. storage injections in July were above normal at 335 Bcf versus 282 Bcf, greater than eight of the prior ten years at this time.

U.S. GAS STORAGE



U.S. storage inventories increased in July to 2,912 Bcf, 4% above the average of the prior ten years at this time.

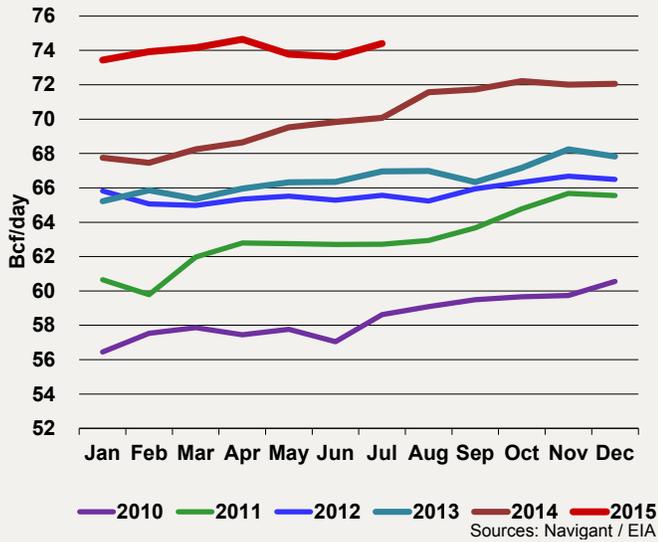
CANADA GAS STORAGE



Canadian storage inventories increased in July to 524 Bcf, about 7% above the 488 Bcf average for the last ten years at this time.

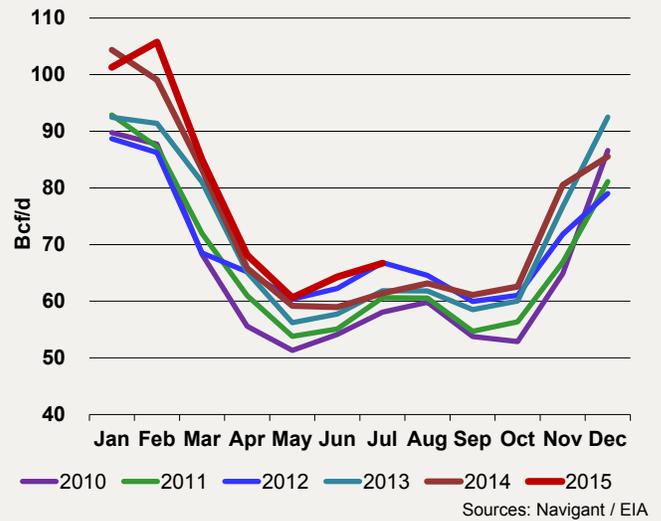
Natural Gas Market Charts

U.S. DRY GAS PRODUCTION



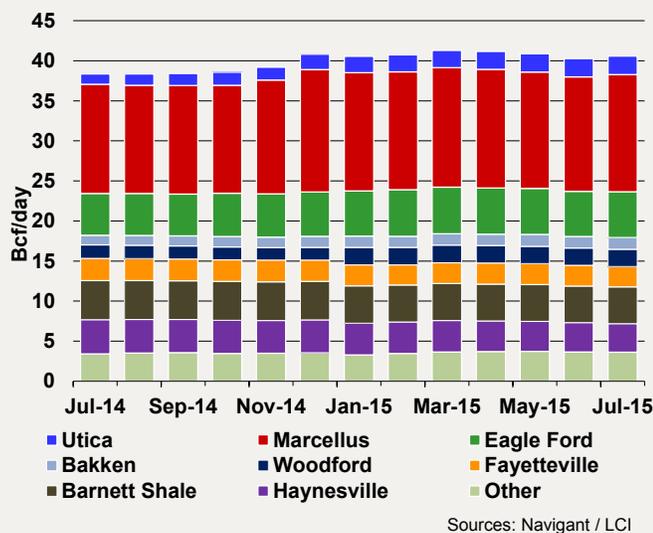
U.S. dry gas production rebounded back to levels above 74 Bcf/d.

U.S. MONTHLY NATURAL GAS DEMAND



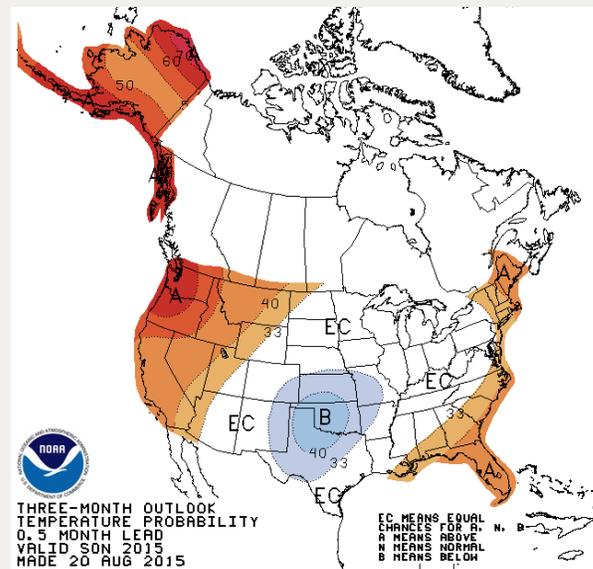
U.S. gas demand continued near all-time high levels, with demand for the month of July at 67 Bcf, just under the prior high for the month in 2012.

U.S. WELLHEAD SHALE GAS PRODUCTION



U.S. shale gas production continued strong with its eighth straight month above 40 Bcf/d.

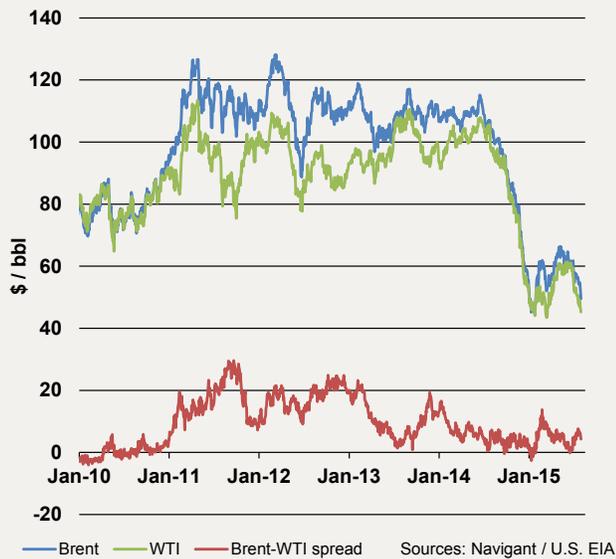
U.S. TEMPERATURE OUTLOOK



The temperature outlook is for above normal temperatures for the U.S. eastern seaboard, eastern Gulf Coast, and the U.S. west of the Rockies. Below normal temperatures are favored for south central portions of the Great Plains and Mississippi Valley.

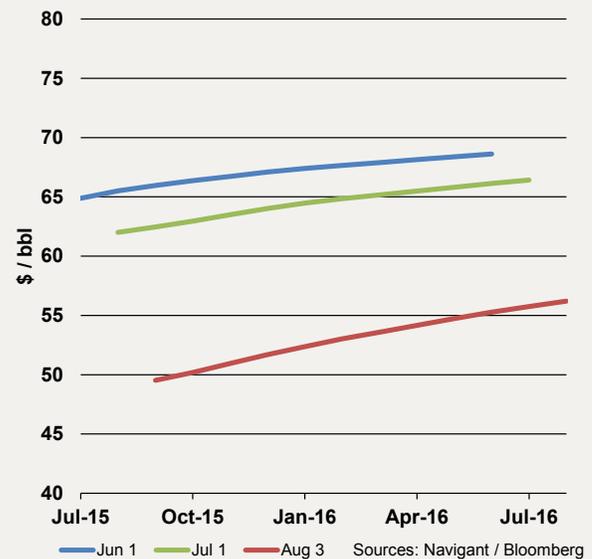
Oil Market Charts

SPOT CRUDE PRICES



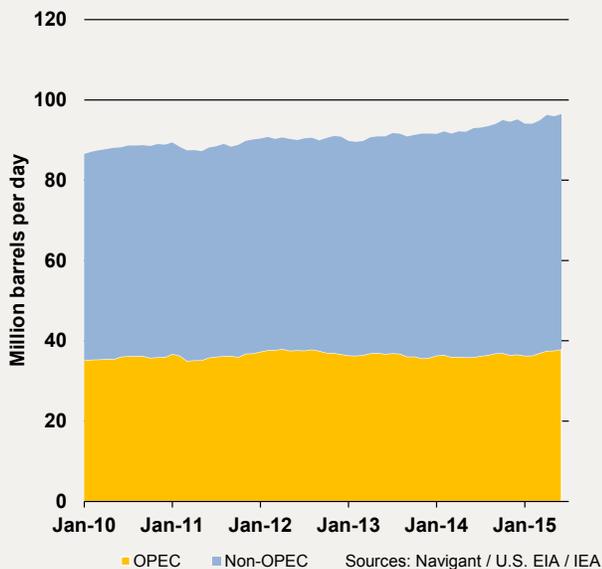
After three years of relative stability in the \$90-110/bbl range, crude prices plunged 60% from June 2014 levels. Prices averaged \$57/bbl (Brent) and \$51/bbl (WTI) in July 2015.

ICE BRENT FUTURES CURVE



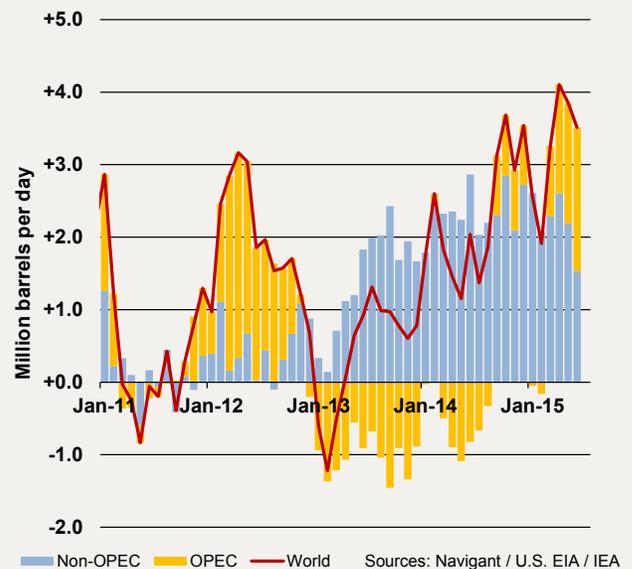
The average 12-month strip price at the beginning of August was \$53/bbl, a 18% fall from the previous month.

OPEC & NON-OPEC OIL PRODUCTION



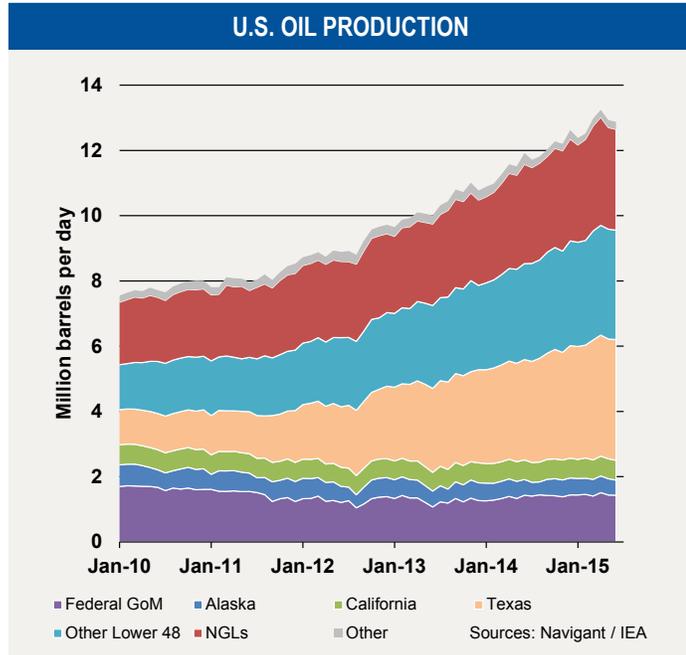
Global oil production increased from 93 million barrels per day a year ago to an estimated 96.5 million barrels per day in June 2015, of which 39% was supplied by OPEC.

YEAR-ON-YEAR CHANGE IN OIL PRODUCTION

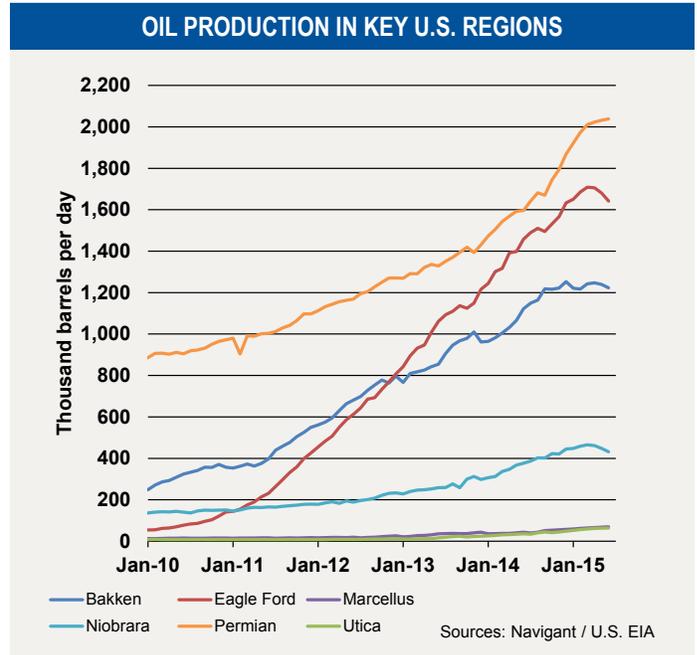


Oil production growth in recent years has been led by non-OPEC countries, particularly the U.S.

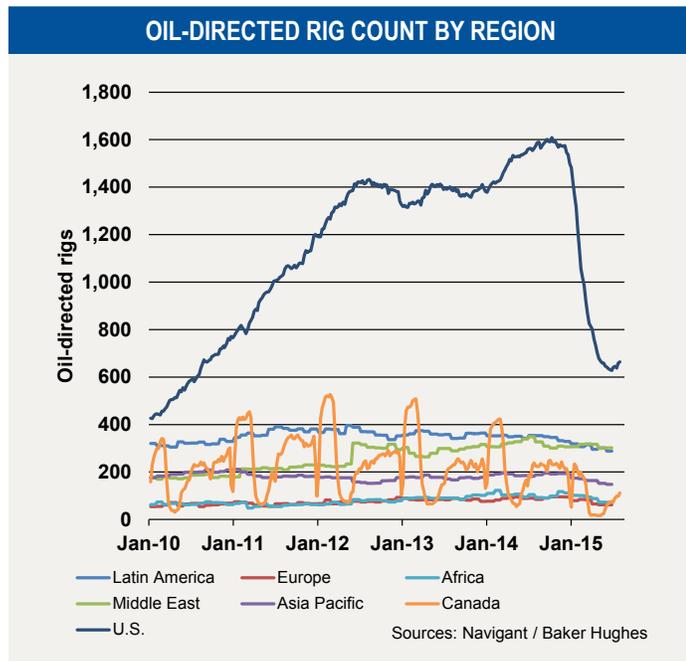
Oil Market Charts



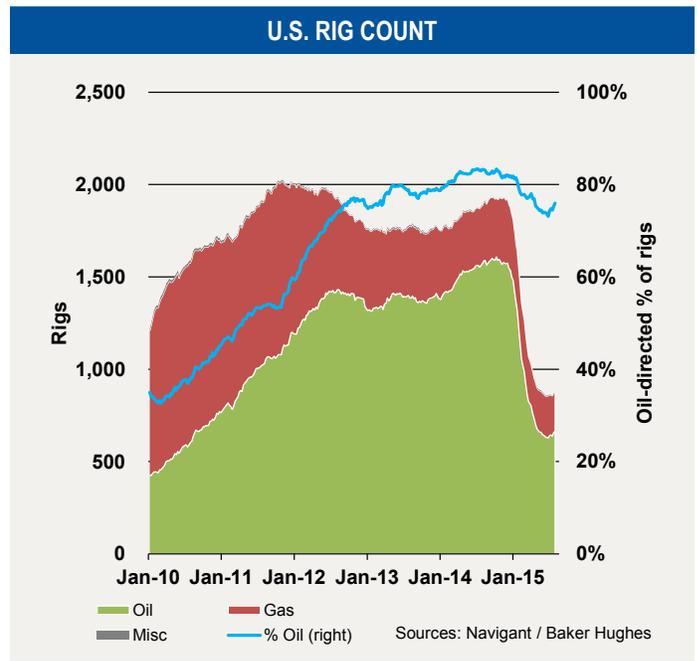
In the United States, oil production climbed by 8% over the year to an estimated 12.9 million barrels per day in 2015. However, production has fallen since April.



In June 2015, oil production reached an estimated 2.04 million barrels per day in the Permian (+28% YoY) but production continued to dip in Eagle Ford, Bakken and Niobrara.

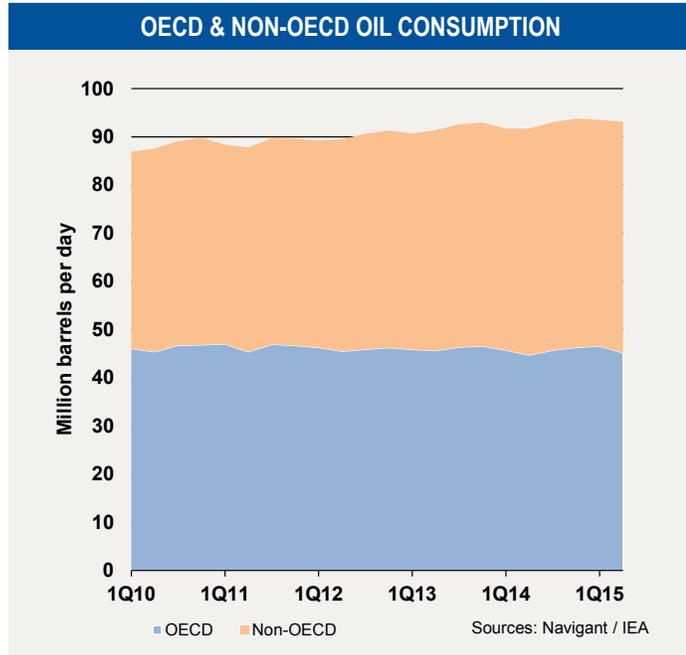


Rig counts collapsed in response to lower crude prices. However, the U.S. oil rig count may have found a bottom in June 2015.

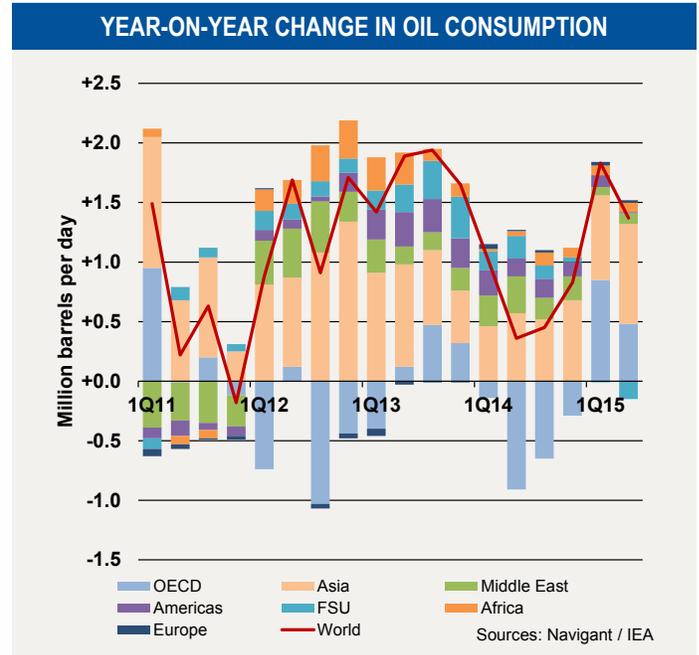


76% of U.S. rigs were oil-directed at the end of July.

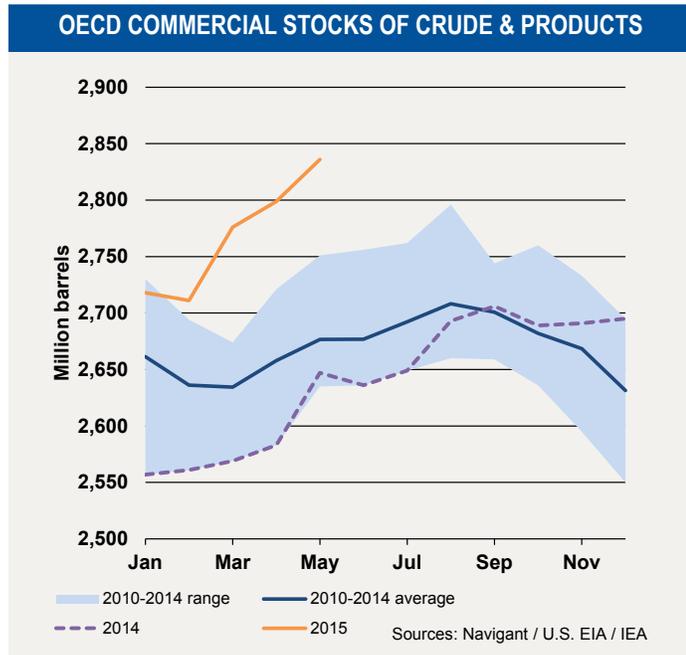
Oil Market Charts



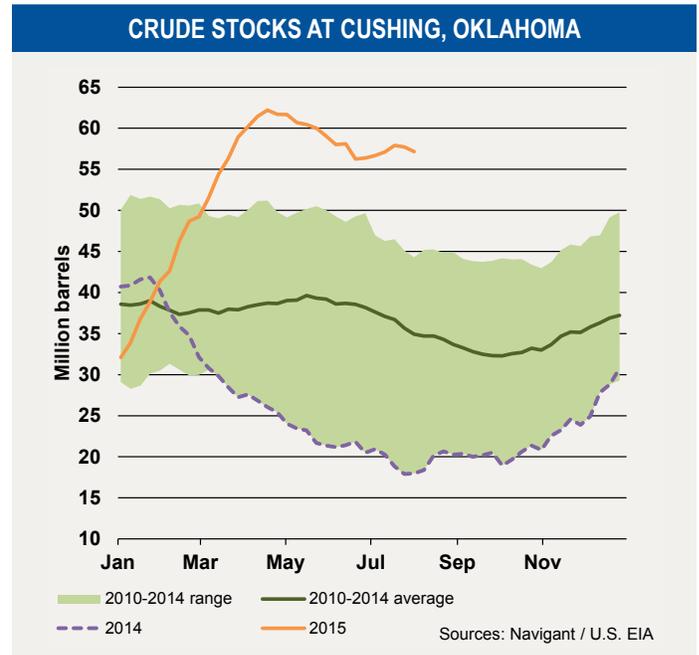
Global oil consumption increased from 91.8 million barrels per day in Q2 2014 to an estimated 93.1 million barrels per day in Q2 2015, of which 49% was consumed by OECD countries.



Oil demand growth in recent years has been led by non-OECD countries, particularly in Asia (e.g. China).



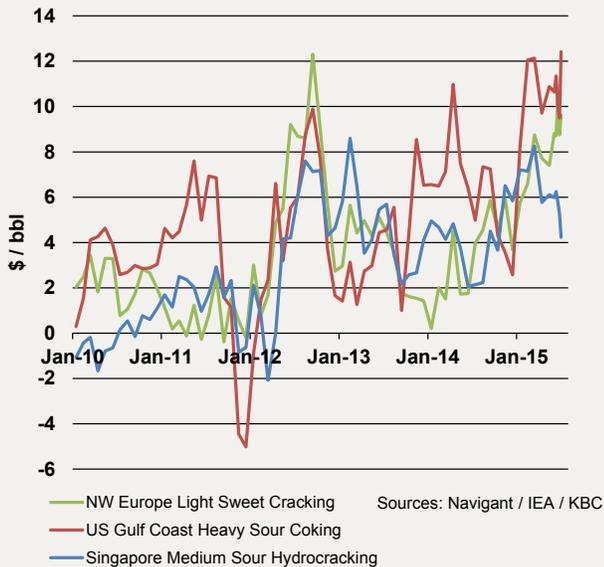
OECD commercial inventories reached an estimated 2,836 million barrels of crude and products in May 2015, remaining well above the five-year range.



Crude inventories at the Cushing hub (the delivery point of the WTI contract) totalled 57.2 million barrels at the start of August, remaining 64% above the five-year average.

Oil Market Charts

INDICATOR REFINING MARGINS



At the start of July 2015, indicative refining margins were \$9.62/bbl for NWE light sweet cracking, \$12.42/bbl for USGC heavy sour coking and \$4.23/bbl for Singapore medium sour hydrocracking.

EU CARBON ALLOWANCE PRICES



EU carbon allowances have recovered to €7.90/tonne since the lows of April 2013.

U.S. ETHANOL RIN PRICES



U.S. ethanol RINs nearly halved in value in May when the EPA announced proposals to cut quotas.

U.S. BIODIESEL RIN PRICES



U.S. biodiesel RINs began August at 63 cents/gallon for the 2014 vintage and 67 cents/gallon for the 2015 vintage.

Legislative and Regulatory Highlights



Northwest

FERC Staff Releases Favorable Draft Environmental Impact Statement for the Oregon LNG Terminal and Pipeline Project

On August 5, FERC staff released a Draft Environmental Impact Statement for the facilities proposed by Oregon LNG and Oregon Pipeline, finding that most adverse environmental impacts of the projects would not have significant effects if the projects are approved with proposed and recommended mitigation measures. Also included in the Draft EIS is the related Washington Pipeline Expansion project proposed by Williams Partners' Northwest Pipeline. A public comment period will continue until October 6, 2014.

Northeast

Utica Shale Resources Estimated at 782 Tcf in New Study

On July 1, the Utica Shale Appalachian Basin Exploration Consortium issued its final report examining the Utica Shale resource. Its Geologic Playbook for Utica Shale estimated the mean technically recoverable resources for the play at 782 Tcf, an increase of over 600 percent beyond the 111 Tcf estimate provided by the U.S. Energy Information Administration in 2013. This latest estimate places the Utica beyond Marcellus shale play resource estimates, and represents almost 30 years of total U.S. natural gas consumption at 2014 levels.

Positive FID Reached for Tennessee Gas Pipeline's Northeast Energy Direct Project

On July 16, the board of Kinder Morgan authorized Tennessee Gas Pipeline Company to proceed with its proposed Northeast Energy Direct project. The project will provide a path from the Wright, New York inter-connection point to the Dracut, Massachusetts receipt point, providing natural gas supplies to New England gas utilities and electric generators. TGP expects to file an application with FERC in October 2015, contemplating operations on the 1.3 Bcfd pipeline segment starting November 2018.



Southeast

Shell Announces Sale of Interest in Elba Island LNG Export Project to Kinder Morgan

On July 15, Royal Dutch Shell announced that Shell will sell its 49 percent interest in the Elba Liquefaction Company to its joint venture partner Kinder Morgan. Kinder Morgan's additional investment in the Elba Island export project will be \$630 million, bringing its total investment in the liquefaction additions at the site to \$2.1 billion. Subject to regulatory approvals, construction could begin in Q4 2015, with initial production expected in late 2017. Total capacity is expected to be 2.5 million tons per year of LNG, or about 350 MMcfd of natural gas.

Gulf

Cheniere Announces LNG Sales Agreement for Sabine Pass LNG Project

On August 11, Cheniere Energy announced that its subsidiary Cheniere Marketing International entered into an LNG sales agreement with France's EDF for 26 cargoes of LNG from Cheniere's Sabine Pass project. The cargoes will be delivered to the Dunkerque import terminal in France, with prices linked to the Dutch Title Transfer Index. The 26 cargoes are in addition to 42 cargoes from Sabine Pass previously sold for delivery in the 2016-2018 timeframe, with pricing linked to Henry Hub plus a fixed fee.



British Columbia

NEB Approves LNG Export Application by Orca LNG

On July 27, the National Energy Board issued a Letter Decision approving the application of Orca LNG Inc. to export natural gas in the form of LNG totaling 31,800 Bcf over the course of a 25-year term. The approved export point will be the proposed Orca LNG project near Prince Rupert, British Columbia. The NEB determined that the quantity of gas to be exported is surplus to Canadian needs.