

2016 Deloitte Oil & Gas Conference

Oil, Gas, and Geopolitics: The Current Dynamics Impacting the Industry

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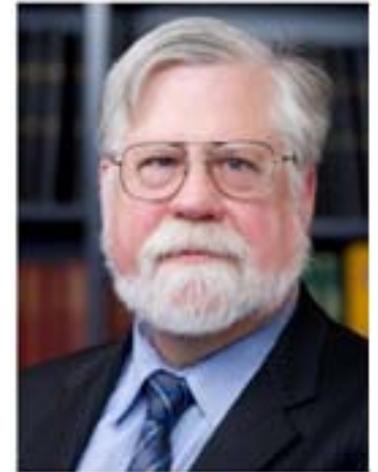
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Dr. David Knapp Biography

- ❑ Dr. David Knapp is Chief Energy Economist and Senior Editor for Global Oil Market Analysis at Energy Intelligence. He not only edits *Oil Market Intelligence*, but also writes regularly for several other EI publications, including *Petroleum Intelligence Weekly*, *Energy Compass*, *Oil Daily*, *Energy Intelligence Finance* and *International Oil Daily*.
- ❑ Before joining Energy Intelligence in late 2000, Dr. Knapp was a senior official with the International Energy Agency in Paris and served as Editor of the IEA's influential monthly *Oil Market Report* through much of the 1990s. He has analyzed energy markets for more than 45 years in the international, government, business and financial sectors as Energy Economist and Energy Team Leader for the Wall Street banking and investment firm of Brown Brothers Harriman & Co. throughout the 1980s, after starting his career at the Federal Energy Administration/Department of Energy and then Chase Manhattan Bank's Energy Economics Division in the 1970s.
- ❑ Dr. Knapp holds a Ph.D. in Economics from the University of California at Santa Barbara and is a member of numerous professional organizations in the energy area. He was a founder and currently serves as President of the Board of the New York Energy Forum. He is also a Senior Fellow of the US Association for Energy Economics and the current VP for Business and President-Elect of the IAEE. He has served on various USAEE committees, as well as being an appointed Advisor to five recent USAEE Presidents. He is a Charter Member and former council member of the parent IAEE, is a 2016 Distinguished Lecturer and reviewer for the organization's *Energy Journal*. Dr. Knapp holds the IAEE 2007 Award for Excellence in Written Journalism.



Outline

- How and why did the 2014-2017(?) oil price collapse happen?
- Have growing impacts from Climate Change Awareness changed Saudi thinking?
- What was the role, if any, of ongoing US natural gas surpluses? Where to next? Do geopolitics matter?
- How has the US shale surge and Opec/Saudi policy affected global oil balances?
- What do the expected balances mean for prices? What do prices mean for balances?

How and Why Did The 2014-17(?) ... Price Collapse Happen?

- ❑ The prime cause of the oil price collapse was **not Opec's Nov. 27 decision and its renewal earlier this month**, Opec's decision was a reaction to something else.
- ❑ The **birth of the "Shale Era" caused the price collapse**; changing the rules oil markets had lived by for decades -- and the roles of the main players.
- ❑ The Shale Era is more about **how geologists think about their job** than about the tools and information they have. Prices played **no** role and technology only contributed to the rapid rate of growth, not the fundamental events.
- ❑ **Source rock** as a target -- rather than being an academic afterthought -- brought about the US shale surge; not horizontal drilling, not multilateral wells, not hydraulic fracturing.
- ❑ The oil world is now confronted with a **new, huge, producible resource base** and has so far been able to produce it economically at prevailing prices and costs.
- ❑ Saudi Arabia couldn't change the resource or the knowledge base, so they have chosen to try to **change the economics**.

Shale was not Alone in Changing Energy Markets

- ❑ Besides the birth of the shale era, the other major change in oil market conditions has been the **rise in environmental awareness**.
- ❑ The **juxtaposition** of the **price decline** and the run-up to **COP21** in Paris last December had a profound effect on current and future oil market thinking, as the effects of increasingly likely environmental action could no longer be ignored.
- ❑ The long-term aspect of Saudi thinking and its “**low-price, market share**” **strategy** was affected by the coincidence of the price decline and the Paris Summit.
- ❑ Oil Minister Naimi’s “**Black Swan**” (or maybe now Khalid al-Falih’s “**Green Swan**”) of much lower future oil demand was largely motivated by visions of carbon taxes, cap & trade, renewable fuel standards and other mandatory anti-oil measures enacted by **environmentally committed consumer governments**.
- ❑ In the still unlikely event of the market for oil and oil products virtually disappearing in the next several decades, **Saudi Arabia** would be left with the **largest “stranded asset” in the history of the planet**.

What About Natural Gas and What About Geopolitics?

- ❑ Of the session title's three words -- **oil**, **gas** & **geopolitics** -- arguably **oil** matters most.
- ❑ To be fair, the shale revolution actually started with **natural gas** from the Barnett Shale.
- ❑ But gas was already on a road to surplus and "with abundance comes irrelevance."
- ❑ Similarly, **geopolitical impacts** paid the price of glut: Both these statements are true;
 - ❑ "Never has the Middle East had a higher degree of political risk."
 - ❑ "Middle East oil supply has never been higher."
- ❑ The second statement wins. **Geopolitics** will matter again when balances tighten.
- ❑ And **natural gas** regains relevance when it clearly becomes the global "bridge fuel."

Changing Roles for Key Oil Players: Who's Doing What & Why?

- ❑ Saudi Arabia is the center of it all; Mohammed bin Salman the political prime mover. Other Opec and non-Opec producers just whirl around the edges of the dance floor.
- ❑ Any accommodations on cooperation draws applause from **paper market price bulls**, cash-strapped producing companies and fiscally strained countries, and prices rise.
- ❑ But the mere **size of the cut** required to dry up both a still 1 million-2 million b/d surplus and begin attacking an accumulated stock overhang approaching a 500 million barrels, needs a 4.5 million b/d cut, the largest ever, to be done speedily enough.
- ❑ Unfortunately, if it were to work to drive up oil prices, success would likely turn into failure as **US shale production** quickly and effectively **returns**.
- ❑ But getting an agreement that meets Saudi **shared-burden criteria** is surely “no walk in the park.” Effectively bringing Iran, Iraq and even Libya into a pact is **no easy matter**. And if history is a guide, having Russia as a partner is no picnic either.
- ❑ The **alternative** of continuing to **leave the market to its own devices**, makes US **shale** producers and other non-Opec suppliers seeing involuntarily declines due to low prices are **part of the solution**; while **rising prices** make them **again part of the problem**, along with to likely unrestrained flows from Iran, Iraq and maybe even Libya. Only **Venezuela** lurks as a potentially “useful” involuntary cutter.

□ Focus on US Shales: The Main Agents of Change for Oil Markets

- US oil shale area production is reversing a multi-decade decline
- Eagle Ford and Bakken oil areas dominated, now it's Permian and SCOOP
- Marcellus and Utica dominate gas, following on Barnett and Haynesville
- The widespread Niobrara may prove the next frontier
- High-grading kept up momentum in sweet spots, at expense of future performance of main shales, ignoring marginal areas and secondary shales
- The longer the oil price experiment takes, the more difficult shale's return
- Financial factors will determine who stays and who goes; break-even costs don't matter as much as debt-equity ratios, debt service costs, values of reserve collateral in the game of "Shale Patch Economic Darwinism"
- Asset reallocation has been a victim of "slower for longer" with hopes of an oil price surge; sellers are plentiful, buyers just now beginning to appear

US Light, Tight Oil Surge Has Changed US and Global Oil Markets

The US shale liquids are dominated by North Dakota and Texas. Now US Gulf of Mexico is kicking in with a post-Macondo surge, despite lower prices.

2017 Quarterly US Oil Supply Details Compared to Prior Years									
(million b/d)	Q1	Q2	Q3	Q4	2017	Chg. vs. 2016	2016 Chg.	2015 Chg.	2014 Chg.
Texas	3,031	2,912	2,885	2,931	3,072	-1	+146	+711	+44
North Dakota	1,010	927	915	916	1,060	+2	+99	+228	+73
Gulf of Mexico	1,693	1,708	1,724	1,757	1,734	+91	+206	+82	+36
Colorado	309	299	298	300	341	+27	+83	+84	+2
New Mexico	424	424	427	425	354	-46	+63	+61	+12
Other PADD 2	681	694	703	701	692	+27	+47	+126	-0
Other PADD 4	329	324	320	314	345	-0	+14	+53	+4
Other PADD 3	91	89	86	85	92	-4	-1	-1	+12
PADD 1	32	32	31	29	29	-1	+1	+2	-8
Other PADD 5	1	1	1	1	1	-0	-0	-0	0
Louisiana	148	144	142	139	142	-15	-16	-8	+198
California	526	512	505	500	511	-34	-27	+14	+60
Alaska	520	486	458	522	496	-40	-8	-17	+32
Total US Crude	8,795	8,552	8,494	8,620	8,869	+6	+607	+1,335	+1,184
Total US NGLs	3,269	3,266	3,296	3,320	3,874	+285	+258	+408	0
Total US Other	1,400	1,378	1,364	1,347	1,381	+7	+24	-5	0
Total US Oil Production	13,464	13,196	13,154	13,288	14,125	+299	+890	+1,739	0

Source: Based on EI, Oil Market Intelligence, September 2016.

Supply-Demand Price Responses are Not the Whole Story

2016 Quarterly Oil Market Balances						
(million b/d)	Q1	Q2	Q3f	Q4f	2016f	Chg. vs. 2015
Demand	95.86	96.41	97.46	97.55	96.82	+1.38
OECD	46.66	45.95	46.97	46.86	46.61	+0.41
Non-OECD	49.19	50.46	50.49	50.69	50.21	+0.97
Supply	97.61	96.63	98.01	99.01	97.82	+1.25
Non-Opec	58.27	57.08	57.88	58.95	58.05	+0.10
Opec NGLs & Other	6.75	6.78	6.87	6.95	6.84	+0.14
Call on Opec Crude	30.84	32.55	32.71	31.65	32.03	+1.22
Opec Crude	32.60	32.77	33.26	33.11	32.94	+1.00
Implied Stock Chg.	+1.75	+0.23	+0.55	+1.46	+1.00	

Source: Based on EI, Oil Market Intelligence, September 2016.

2017 Quarterly Oil Market Balances						
(million b/d)	Q1	Q2	Q3	Q4	2017	Chg. vs. 2016
Demand	97.45	97.80	98.75	98.57	98.15	+1.33
OECD	47.15	46.26	47.31	47.10	46.96	+0.35
Non-OECD	50.30	51.54	51.44	51.47	51.19	+0.98
Supply	99.70	98.41	99.85	100.68	99.66	+1.84
Non-Opec	58.75	57.70	58.76	59.69	58.73	+0.68
Opec NGLs & Other	6.90	6.88	6.97	7.06	6.95	+0.12
Call on Opec Crude	31.80	33.22	33.02	31.82	32.55	+0.53
Opec Crude	34.05	33.83	34.11	33.94	33.98	+1.04
Implied Stock Chg.	+2.25	+0.61	+1.09	+2.11	+1.51	

Source: Based on EI, Oil Market Intelligence, September 2016.

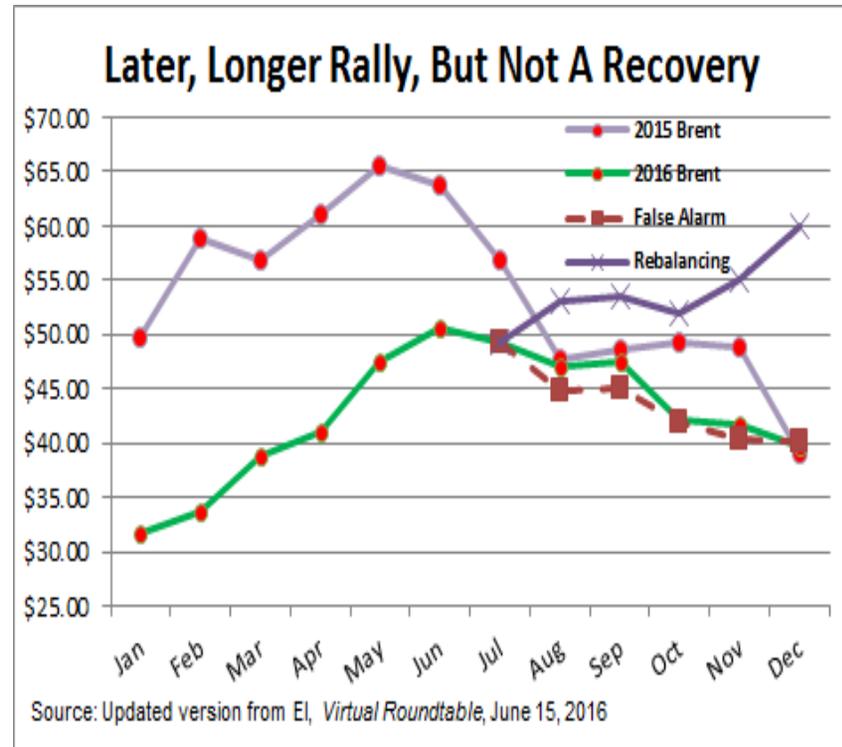
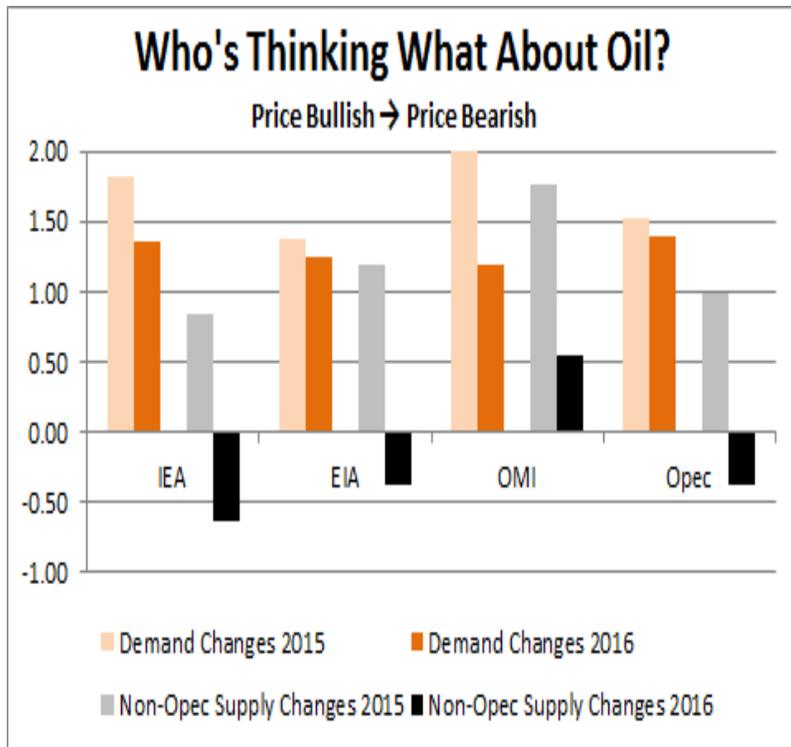
- Absent significant economic events, **2017 demand growth is slightly slower at 1.33 million b/d with non-Opec supply up 680,000 b/d vs. 2016 growth of 1.38 million b/d** and a nearly flat 10,000 b/d respectively. Inventories keep rising & prices wobble.
- **Opec NGL & Other** production slow to **120,000 b/d** from 2016's **140,000 b/d**. But **Opec crude adds about 1.04 million b/d** on top of **1 million b/d** expected this year.
- A key assumption is that Opec **financial pressures** from low oil price, on balance of payments, and government budgets, **don't spawn production-inhibiting upheavals**.
- **Iraqi growth**, depending on KRG, a sputtering **Libyan recovery** and a surge from post-sanctions **Iran** are responsible for much of the Opec near term crude increases.
- Demand responses will again be depressed by currency movements in favor of the dollar and further devolution of **subsidies**. Supply response depends on gov't **fiscal policies** and financial health of producing companies, plus related asset transfers.

US Shale is Not the Only, or even the Major, Supply in Play

Oil Supply Changes for Top Non-Opec Producers 2014-17								
'000 b/d					Changes			
	2014	2015	2016	2017	2014	2015	2016	2017
US	13,259	14,062	13,846	13,940	1,807	803	-215	93
Russia	11,315	11,510	11,694	11,552	188	194	184	-142
China	4,206	4,290	3,986	3,603	-8	84	-304	-383
Canada	4,249	4,320	4,439	4,826	258	71	118	387
Brazil	2,852	3,122	3,178	3,305	274	270	56	126
Mexico	2,801	2,599	2,478	2,283	-91	-202	-121	-195
Norway	1,882	1,944	2,061	2,082	52	63	116	22
Kazakhstan	1,623	1,596	1,667	1,952	-19	-27	71	285
UK	932	1,049	1,160	1,446	10	117	110	287
Oman	965	1,008	1,021	1,034	8	43	13	13
Colombia	989	1,007	952	923	-6	19	-55	-29
Azerbaijan	866	864	879	913	-26	-2	15	35
Malaysia	731	800	859	882	23	69	59	23
Egypt	672	688	694	688	2	16	6	-6
Argentina	563	551	522	540	-22	-12	-30	19
Other	6,371	6,209	6,254	6,369	26	-162	45	115
Total RPG	2,413	2,324	2,357	2,391	110	-89	32	34
Total Non-Opec	56,690	57,944	58,044	58,729	2,587	1,254	100	685
<i>Source: Based on EI, Oil Market Intelligence, September 2016.</i>								
<i>Top 15 non-Opec share</i>	<i>88.3%</i>	<i>88.8%</i>	<i>88.8%</i>	<i>88.7%</i>				

- **Russia's** surprise 2015 increase, was supposed to set the stage for a 2016 decline, but things went the other way. **China's drop** is real led by Daqing's final reckoning.
- Excluding China, **only four other** top 15 non-Opec producers are seen declining this year, mostly unrelated to price, same as 2015 and one less than in 2014.
- **Non-Opec growth** has been **dominated by the US** -- 70% of 2014 and still 64% of 2015; but **growth** could **swing** from an 800,000 b/d gain to a 2016 **215,000 b/d drop**.

An Interesting Range of Supply-Demand Opinions On Balances



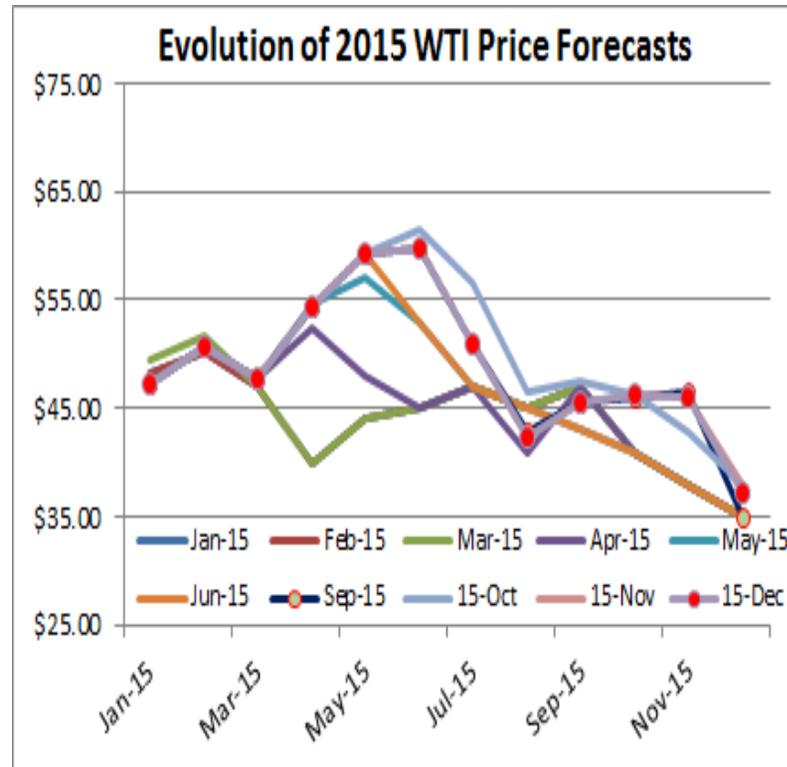
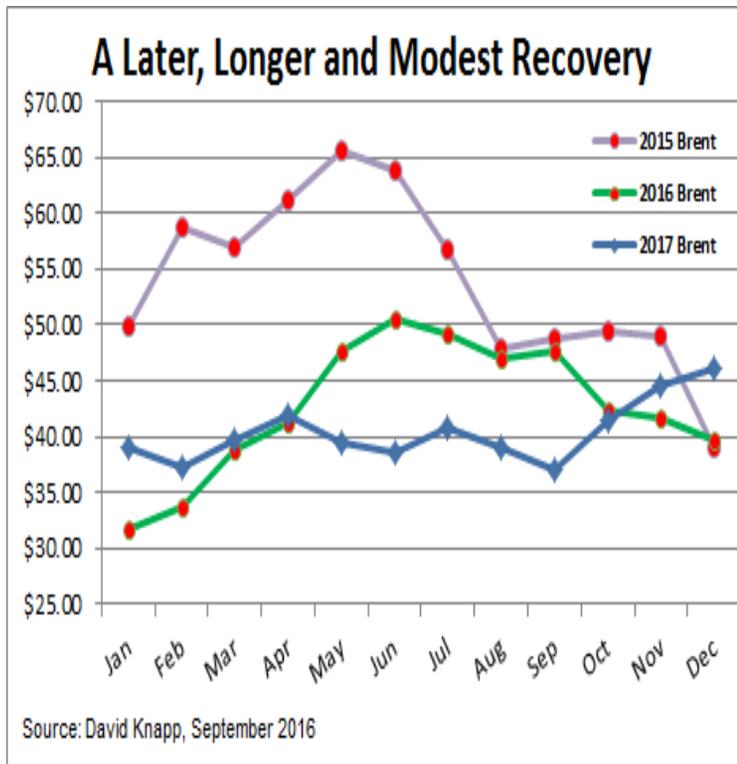
Sources: Energy Intelligence, Oil Market Intelligence, Sep.14'16; International Energy Agency, Oil Market Report, Sep.13'16; Opec Monthly Oil Market Report, Sep.12'16; US Energy Information Administration, Short Term Energy Outlook, Sep.79'16.

Oil Prices 2014-17 -- One Man's View (subject to major changes without notice)

- **Since the fundamentals continue to be choppy, this year due to inventory** rather than on and off optimism about S&D..
- **Much of the work was already done on prices during 2nd half of 2014 and 2015**, this year fundamentals catch up.
- **Brent has been more volatile than WTI**, since it is more global and geopolitics have a bigger Brent effect and WTI is more about better US shale supply logistics.
- **Last year's Jan-Feb, Q2 and Q3 prices bumps, were based the on financial side positioning and expectations**, ultimately merely delaying the supply adjustment process with hedge re-hedging.
- **This year** has already seen more of the same, this time is about **low-probability production cuts**.

Updated Outlook for 2016 Benchmark Crude Oil Prices								
	ICE Brent Front Month				WTI Front Month			
Month	2014	2015	2016	2017	2014	2015	2016	2017
Jan	\$108.12	\$47.71	\$31.75	\$39.00	\$94.86	\$47.33	\$31.58	\$39.45
Feb	\$108.91	\$58.10	\$33.64	\$37.25	\$100.68	\$50.72	\$30.62	\$37.00
Mar	\$107.48	\$55.89	\$38.90	\$39.75	\$100.51	\$47.85	\$36.55	\$39.00
Apr	\$107.66	\$59.64	\$41.14	\$42.00	\$102.03	\$54.38	\$39.02	\$41.00
May	\$109.52	\$64.06	\$47.58	\$39.50	\$101.85	\$59.37	\$46.80	\$40.00
Jun	\$111.80	\$61.47	\$50.54	\$38.50	\$105.11	\$59.83	\$49.51	\$38.00
Jul	\$106.86	\$56.55	\$47.62	\$40.75	\$102.39	\$50.93	\$45.79	\$39.00
Aug	\$101.61	\$46.51	\$46.99	\$39.00	\$96.08	\$42.89	\$44.80	\$37.00
Sep	\$97.34	\$47.61	\$47.60	\$37.00	\$93.03	\$45.47	\$45.24	\$36.00
Oct	\$87.46	\$48.42	\$42.25	\$41.50	\$84.34	\$46.29	\$39.75	\$40.00
Nov	\$79.00	\$48.93	\$41.70	\$44.50	\$75.81	\$45.97	\$39.35	\$42.00
Dec	\$62.33	\$39.07	\$39.75	\$46.00	\$59.29	\$37.33	\$38.00	\$44.00
Avg.	\$99.01	\$52.83	\$42.46	\$40.40	\$93.00	\$49.03	\$40.58	\$39.37
Part month; forecast. Source: David Knapp								

The Evolution of 2015-17 Prices Has Not Been Smooth



Source: Jan.'15 - New York Energy Forum, "2015 Oil Market Outlook"; Feb.'15 - CSIS, "Energy Market Impacts of Low Oil Prices"; Mar'15 - Saudi Aramco Energy Week, "Global Oil Markets in a New Lower Oil Price 'Shale Era'"; Apr'15 - CERI World Oil Conference, "Energy Market Impacts of Low Oil Prices"; May'15 - client presentations in London, Paris and Madrid, "Energy Market Impacts of Low Oil Prices"; Jun'15 - client presentations in Houston, "Shale Era Challenges Oil Market Traditional Structures"; Sep'15 - client presentations in Europe. Nov-Dec'15 Houston clients, China International Oil & Gas Trade Congress, Tokyo client presentations, Jan'16 – New York Energy Forum; Feb'16 CSIS, All by David Knapp.

Current Supply-Demand Response Only Half the Story

Medium-Term Oil Market Balances (Passive Saudi Arabia)								
(million b/d)	2014	2015	2016	2017	2018	2019	2020	Yrly Chg.
Demand	93.62	95.45	96.82	98.15	98.99	99.79	100.47	+1.0
OECD	45.81	46.21	46.61	46.96	46.52	46.04	45.53	-0.13
Non-OECD	47.81	49.24	50.21	51.19	52.46	53.75	54.93	+1.14
Supply	94.10	96.57	97.82	99.66	96.77	96.90	96.74	+0.03
Non-Opec	56.69	57.94	58.04	58.73	54.45	53.61	52.56	-1.08
Opec Non-Crude	6.57	6.69	6.84	6.95	7.14	7.34	7.47	+0.16
Opec Crude	30.83	31.94	32.94	33.98	35.18	35.95	36.71	+0.96
Implied Stock Chg.	0.47	1.13	0.99	1.51	-2.22	-2.89	-3.73	

Source: Based on EI, Oil Market Intelligence, September 2016

- For us, Saudi/Opec's strategy has always had a **longer-term** component: to assure **oil's role into the next decade and beyond**, likely with accelerated Saudi production rates.
- Arguably the bigger "success" for the **market share strategy** is delays and cancellations of the next tranche of **competing non-Opec** oil from **deepwater** and to a lesser extent the **Arctic**, **not** the immediate reversal of **US shale** area growth.
- A small **surplus** from 2014 doubled in 2015 is just under **1 million b/d this year**, growing to **1.51 million b/d in 2017**. That turns negative in 2018-20, given current trends of non-Opec project cancellations, assuming a lack of big Saudi capacity additions, even with more **Iran, Iraq and Libya**. **What if the Saudis merely push harder on existing fields?** Accumulated inventories, growing non-OECD Asian SPRs give protection, but **higher prices** toward the end of the decade are likely **without Saudi action**.

❑ No Oil Market is an Island

- The advent of paper markets brings with it asset allocation influences
- Physical market interactions have also become more intense
- Oil also lives in a world of inter-fuel and inter-factor competition
- Headline driven oil price movements are increasingly financial
- But classic geopolitics still can play a supporting (or depressing) role
- One great irony of the current oil market is Middle East geopolitics being more threatening than ever while oil production makes records

THANK YOU for your attention

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