

Oil Services & Equipment

February 2018

Judson E. Bailey, CFA

Senior Analyst

jud.bailey@wellsfargo.com

713-319-1035

Coleman W. Sullivan, CFA

Senior Analyst

cole.sullivan@wellsfargo.com

713-319-1042

Nick Ohmstede

Associate Analyst

nicolas.ohmstede@wellsfargo.com

713-319-1257

Christopher Voie, CFA

Associate Analyst

christopher.voie@wellsfargo.com

713-319-1245

Blake Doerr

Associate Analyst

blake.doerr@wellsfargo.com

713-319-1247

Philip Dollar

Associate Analyst

philip.dollar@wellsfargo.com

713-654-5459

All estimates/forecasts are as of 02/15/2018, unless otherwise noted.

Please see page 25 for rating definitions, important disclosures and required analyst certifications.

Wells Fargo Securities, LLC does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of the report *and* investors should consider this report as only a single factor in making their investment decision.

Together we'll go far



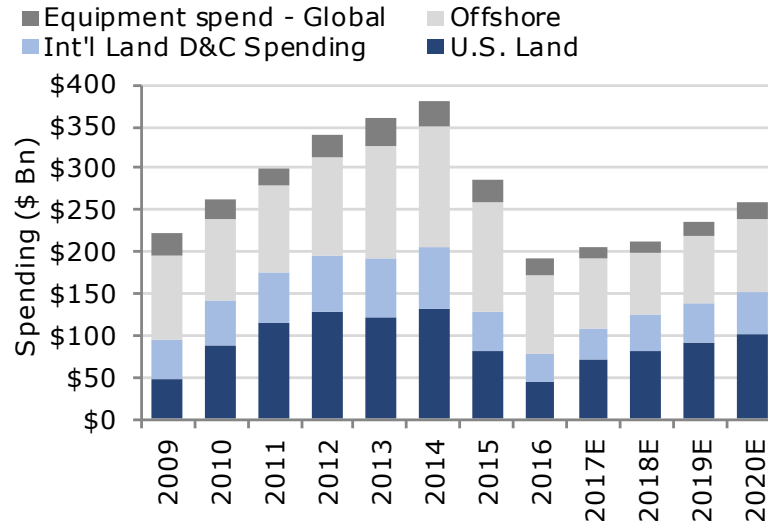
Oil Service Overview

- With WTI Near \$60, We See Upside Risk To Our Lower 48 Spending And Company Estimates (Which Are Based On Mid-\$50's WTI), With Select Bright Spots Internationally
- Remain Positive On OFS Sector In 2018 But See Stock Picking As Extremely Challenging As Valuations Discount "Peakish" Environment In NAM But Longer Term Growth Internationally & Offshore
- In Lower 48, Enablers Of Efficiency (Via Logistics/Scale/Technology) Likely To Gain Share And Better Returns As E&P Focus Shifts To Returns Versus Production Growth
- We Forecast A 5% Increase In Global Drilling & Completion Spending In 2018 Driven By A 14% Increase In U.S. Lower 48 Spending.
- Based On E&P Budget Announcements So Far, Our Bias Is That L48 Spending Could Increase Closer To 20% In 2018.
- We Forecast International Spending Down -1% In 2018 With Offshore D&C Spending Down -6% And International Land Spending +9%.
- Near To Medium-Term Offshore Outlook Remains Challenged But Massive Cost Deflation And Innovation Should Ultimately Lead To Some Recovery 2019-2020.

Macro Fundamentals Likely Support \$55-\$65 Oil Prices

- Following An Expected 11% Recovery In Global Spending In 2017 Led By The Lower 48, We Expect Modest (+5%) Global Spending Growth In 2018
 - Driven Primarily By A Higher 2017 Exit Rate In The Lower 48
- L48 We Expect +14% In 2018 Following +67% in 2017
- Offshore We Expect A 5-7% Decline In 2018 Following A 13-15% Decline in 2017
- International Land We Expect +9% In 2018 Following +10% in 2017

Global Drilling & Completion (D&C) Spending (\$Bn)



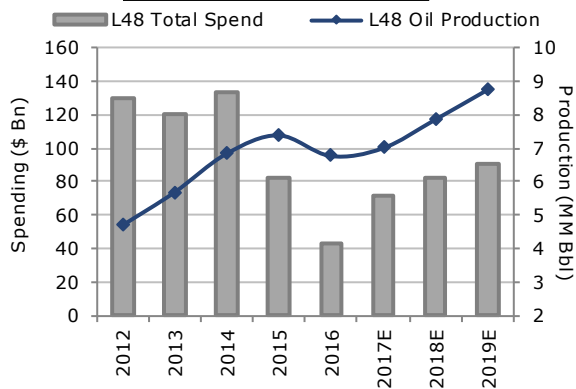
Source: Company filings, IHS, Wells Fargo Securities LLC estimates

Includes content supplied by IHS Global, ©. IHS Global Insights (2018). All Rights Reserved.

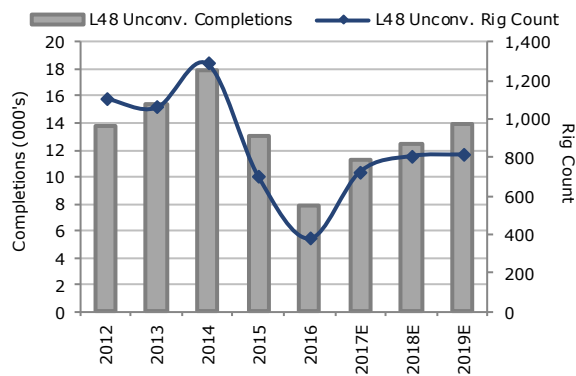
Well Productivity Starting To Normalize

- Significantly Lower D&C Spending Likely Required For L48 Production To Exceed Prior Highs
- Higher Stage Counts & Proppant Loadings Significantly Enhance Capital Efficiency, Lowering The Required Oil Price To Drive Spending & Production Growth
- Dislocation Between Expected Stages Counts (Higher vs 2014) And Rig Count (Lower)

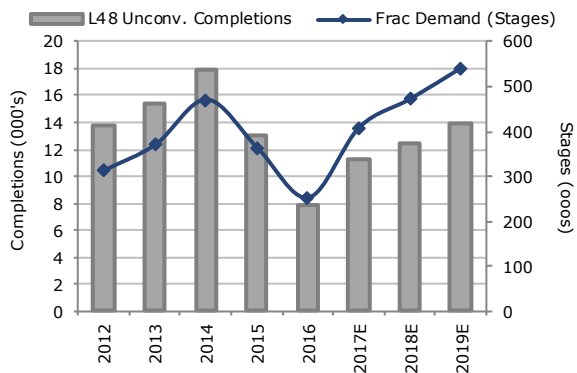
Lower 48 Total Spending and Oil Production



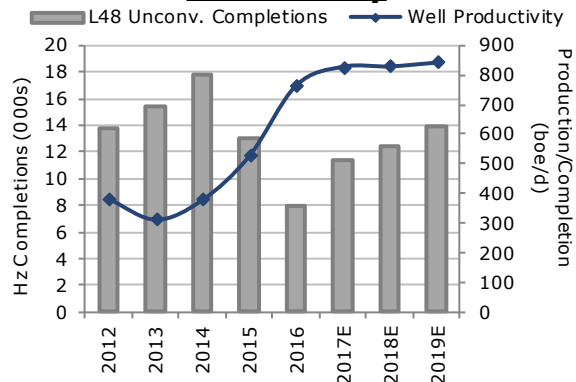
Lower 48 Hz Completions and Rig Count



Hz Completions and Stages



Hz Completions And Est. Well Productivity



Spending, Completion, & Rig Count Summary

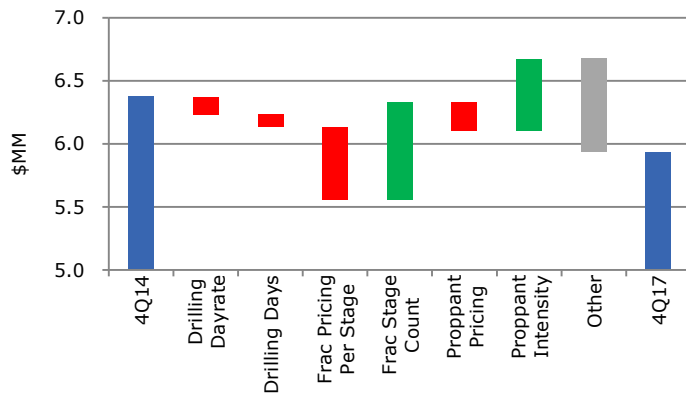
	2014	% Chg	2015	% Chg	2016	% Chg	2017E	% Chg	2018E	% Chg	2019E	% Chg
Drilling & Completion Spending (\$ MM)												
Majors	\$16,842	-15%	\$13,741	-18%	\$7,947	-42%	\$11,443	44%	\$14,184	24%	\$15,856	12%
Large Cap	\$57,949	10%	\$36,691	-37%	\$18,836	-49%	\$31,128	65%	\$33,126	6%	\$37,241	12%
Mid Cap	\$17,343	16%	\$10,523	-39%	\$5,872	-44%	\$10,896	86%	\$13,007	19%	\$14,319	10%
Private/Small Cap	\$41,230	20%	\$21,049	-49%	\$10,356	-51%	\$18,455	78%	\$21,732	18%	\$23,565	8%
U.S. Land D&C Spending (\$MM)	\$133,364	9.7%	\$82,004	-38.5%	\$43,010	-47.6%	\$71,923	67.2%	\$82,049	14.1%	\$90,982	10.9%
Well Completions												
Bakken	2,189	8%	1,515	-31%	731	-52%	1,011	38%	973	-4%	997	2%
Eagle Ford	3,724	13%	2,647	-29%	1,345	-49%	1,736	29%	1,639	-6%	1,680	2%
Utica	455	83%	440	-3%	269	-39%	251	-7%	247	-2%	249	1%
DJ Basin	1,397	53%	1,226	-12%	830	-32%	1,186	43%	1,242	5%	1,308	5%
Midland Basin	1,423	87%	1,314	-8%	1,310	0%	2,251	72%	2,928	30%	3,522	20%
Delaware Basin	1,181	52%	1,133	-4%	868	-23%	1,558	80%	2,104	35%	2,592	23%
Cana	456	33%	494	8%	510	3%	756	48%	897	19%	1,046	17%
Other Oil	<u>3,651</u>	<u>6%</u>	<u>1,860</u>	<u>-49%</u>	<u>730</u>	<u>-61%</u>	<u>756</u>	<u>4%</u>	<u>613</u>	<u>-19%</u>	<u>593</u>	<u>-3%</u>
Unconventional Oil	14,476	22%	10,629	-27%	6,593	-38%	9,506	44%	10,643	12%	11,987	13%
Haynesville	386	15%	267	-31%	184	-31%	256	39%	253	-1%	263	4%
Marcellus	1,504	-4%	1,318	-12%	798	-39%	1,147	44%	1,211	6%	1,278	6%
Other Gas	<u>1,487</u>	<u>-14%</u>	<u>860</u>	<u>-42%</u>	<u>342</u>	<u>-60%</u>	<u>410</u>	<u>20%</u>	<u>361</u>	<u>-12%</u>	<u>348</u>	<u>-4%</u>
Unconventional Gas	3,377	-7%	2,445	-28%	1,324	-46%	1,813	37%	1,825	1%	1,888	3%
Unconventional Wells	17,853	15.4%	13,074	-26.8%	7,917	-39.4%	11,319	43.0%	12,467	10.1%	13,875	11.3%
Permian	4,875	-16%	2,029	-58%	529	-74%	557	5%	499	-11%	526	6%
Oil	11,417	0%	4,992	-56%	2,153	-57%	2,510	17%	2,288	-9%	2,416	6%
Gas	<u>2,471</u>	<u>-11%</u>	<u>1,476</u>	<u>-40%</u>	<u>880</u>	<u>-40%</u>	<u>1,047</u>	<u>19%</u>	<u>982</u>	<u>-6%</u>	<u>895</u>	<u>-9%</u>
Conventional Wells	18,763	-6%	8,497	-55%	3,562	-58%	4,114	15%	3,769	-8%	3,838	2%
U.S. Land Well Completions	36,616	3.3%	21,571	-41.1%	11,479	-46.8%	15,433	34.4%	16,236	5.2%	17,713	9.1%
Cycle Time (Days)												
Unconventional	30.3	<u>5%</u>	22.4	<u>-26%</u>	19.9	<u>-11%</u>	26.9	<u>35%</u>	27.0	<u>0%</u>	24.5	<u>-9%</u>
Conventional	11.6	-2%	9.5	-18%	10.9	14%	13.6	25%	14.9	10%	14.7	-2%
Average Cycle Time	20.7	7.7%	17.3	-16.2%	17.1	-1.4%	23.4	36.6%	24.2	3.7%	22.4	-7.5%
Rig Count												
Unconventional Oil/Liquids	1,087	220	566	(520)	309	(258)	588	279	660	72	666	6
Unconventional Gas	201	10	133	(69)	67	(66)	138	71	143	6	145	1
Conventional Oil/Liquids	412	(51)	136	(276)	65	(72)	91	26	95	5	100	4
Conventional Gas	106	4	56	(50)	28	(29)	42	15	38	(4)	35	(4)
U.S. Land Avg Rig Count	1,806	182	891	(915)	468	(424)	859	391	937	78	945	8
Unconventional Rig Count	1,288	<u>22%</u>	699	<u>-46%</u>	375	<u>-46%</u>	726	<u>93%</u>	803	<u>11%</u>	811	<u>1%</u>
Unconventional Well Cost (\$MM)	\$6.1	11.3%	\$5.4	-11%	\$4.9	-10%	\$5.7	17%	\$6.0	5%	\$6.0	0%
Frac Demand (Stages)	470,728	27.1%	362,479	-23.0%	251,779	-30.5%	408,895	62.4%	472,095	15.5%	541,532	14.7%
Frac Capacity (Stages)	599,957	13.3%	589,653	-1.7%	543,465	-7.8%	657,583	21.0%	701,994	6.8%	720,216	2.6%
PP Supply (000 HP)	17,163	5.2%	17,356	1.1%	15,216	-12.3%	38,211	151.1%	42,448	11.1%	42,752	0.7%
Effective PP utilization %	78.5%		61.5%		46.3%		62.2%		67.3%		75.2%	

Source: IHS, Company filings, RigData, Wells Fargo Securities, LLC estimates

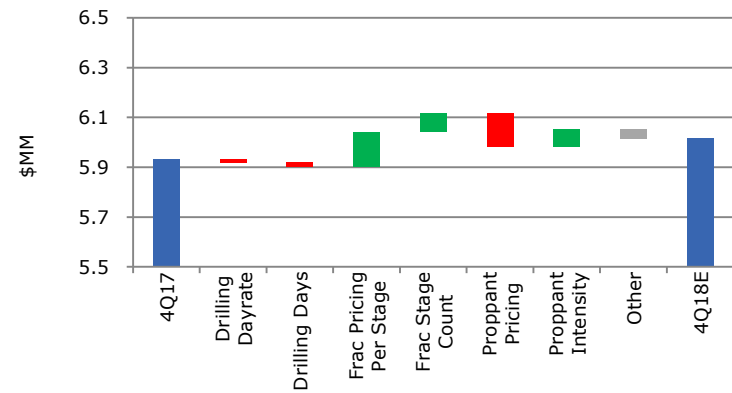
Service & Well Costs To Come Into Greater Focus

- Increases In Service Costs To Be Offset By Efficiencies And Pad Drilling
- We Forecast An Approximately 17% Increase In Average Horizontal Well Costs In 2017 And A 5% Increase In 2018

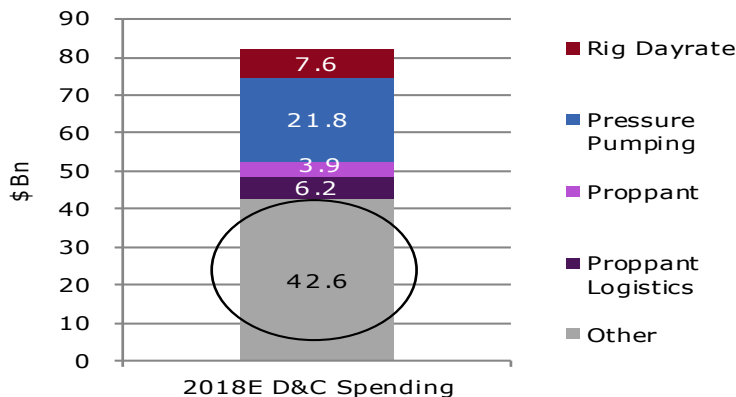
Change In Hz Well Cost – 4Q14 to 4Q17



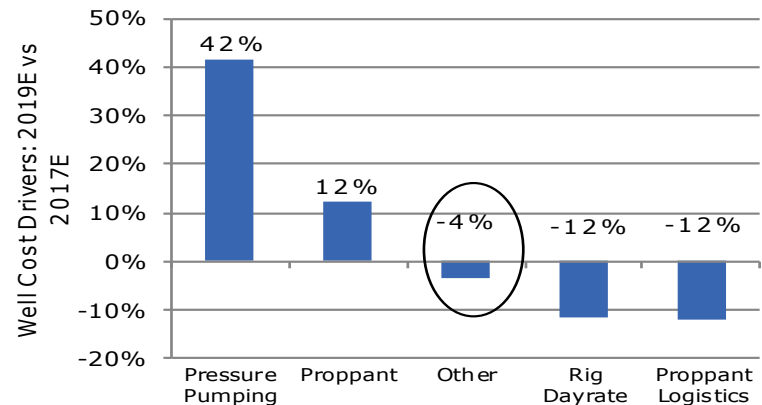
Change In Hz Well Cost – 4Q17 to 4Q18E



2018E D&C Spending Components



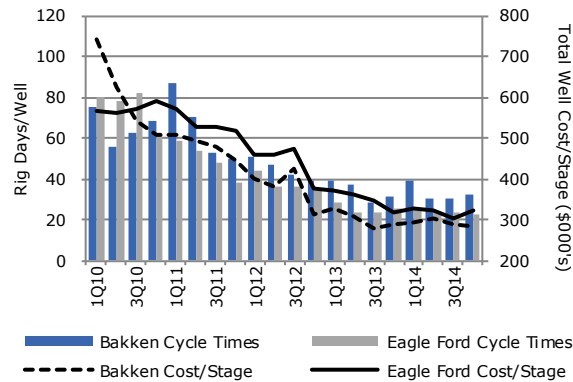
Well Cost: 2019E vs 2017E



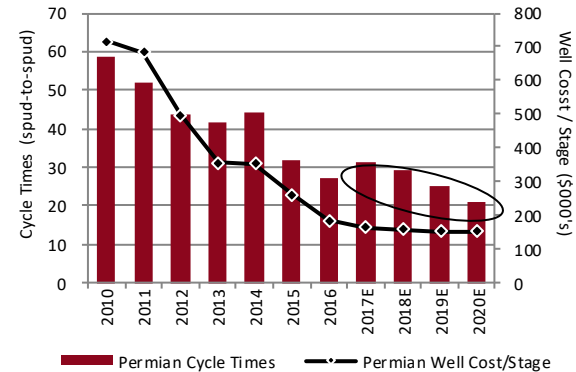
Efficiency Enablers To Gain Share In NAM

- Expect Service Cost Inflation To Be Offset By Efficiencies – Primarily In Permian Basin
- Well Costs Correlate With Cycle Times; Efficiencies Could Save ~\$1 MM/Well
- Returns-Focused E&Ps To Partner With Innovative/Efficient Services Companies

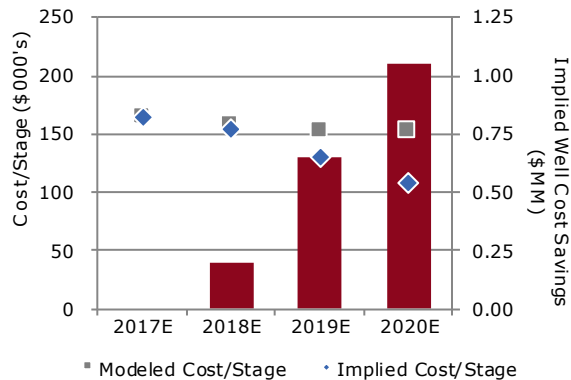
Bakken/Eagle Ford Efficiency ('10- '14)



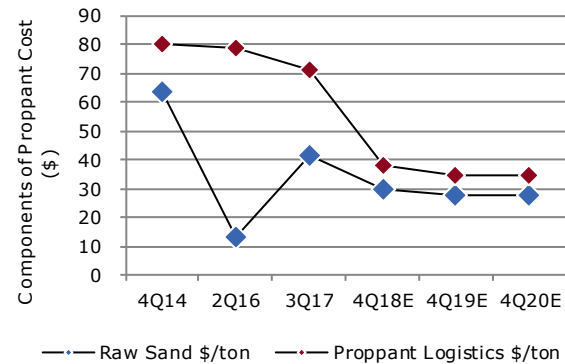
Permian vs. Bakken/Eagle Ford Efficiency



Permian Basin Proppant Cost

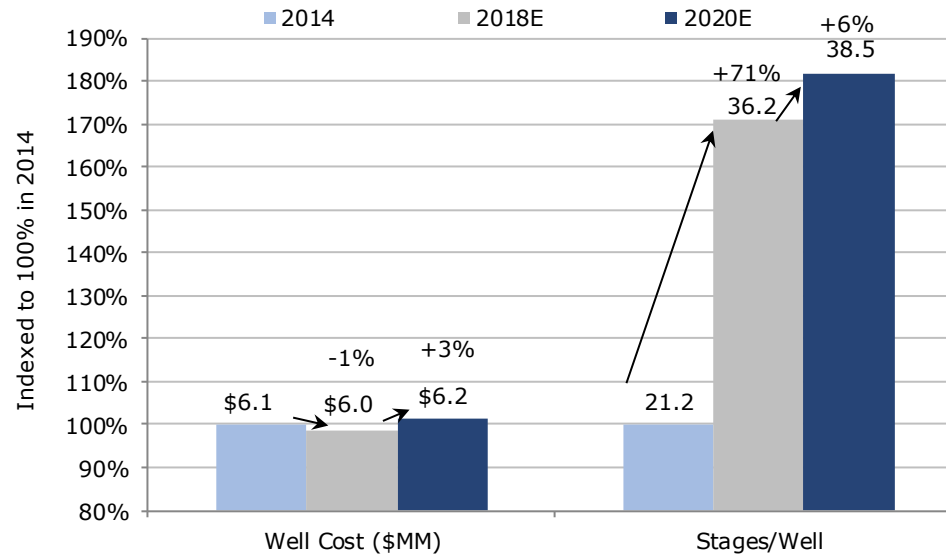


Permian Basin Proppant Cost



Doing More With Less

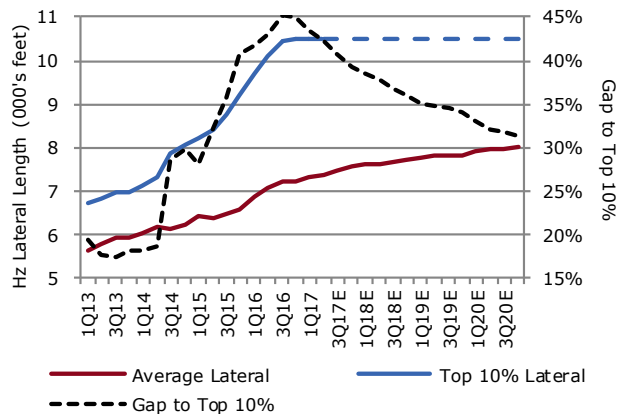
Estimated Horizontal Stage Count Vs Well Cost



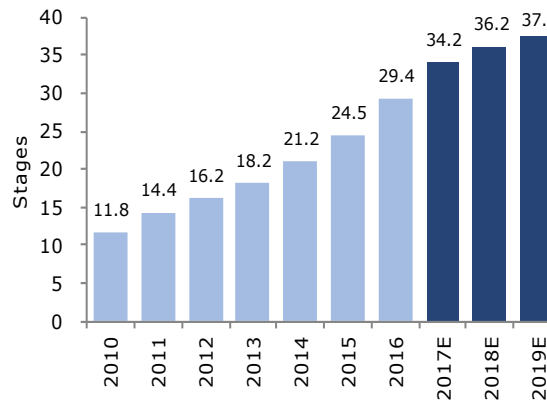
Longer Laterals Driving More Stages Per Well

- We Expect Lateral Lengths To Continue To Grow
 - Avg Hz Laterals Could Reach 8,000' By 2020 from 7,200' Currently As Top 10% Of Wells Plateau Around 10,000' And The Average Closes The Gap
- We Expect Stage Counts Per Well To Grow In Line With Lateral Lengths

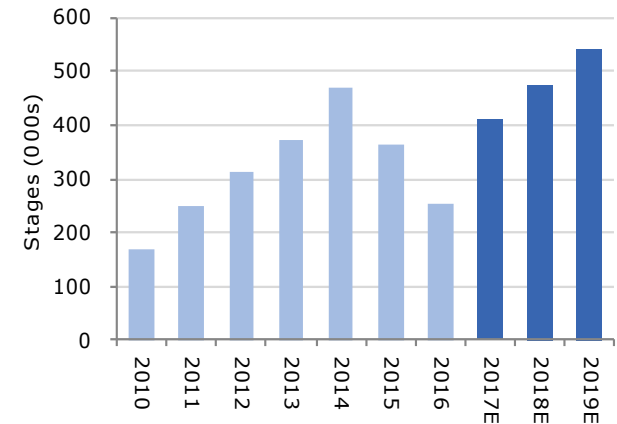
Avg Hz Lateral Length vs Top 10%



Stages Per Well



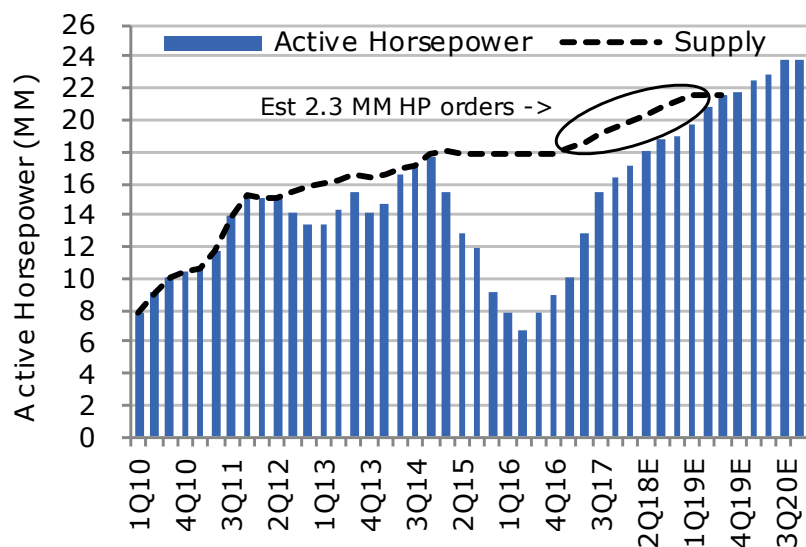
Frac Stage Demand



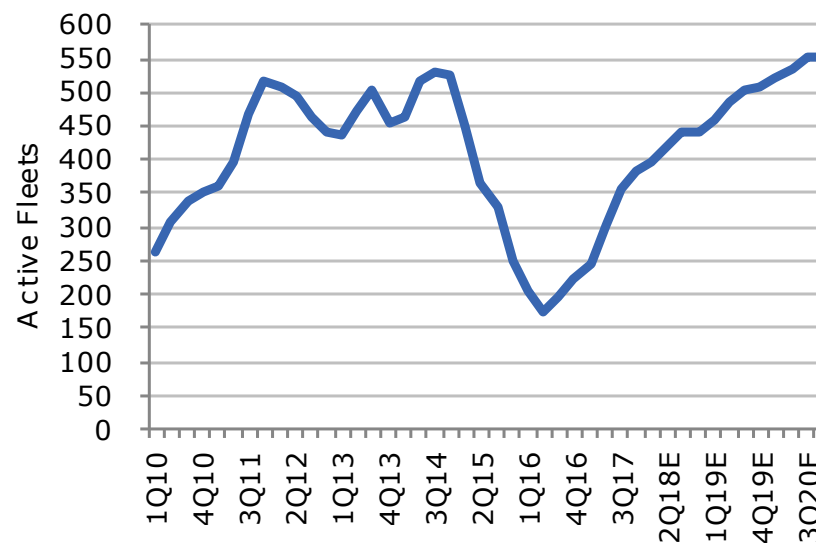
Frac Supply Demand Still Constructive Despite Capacity Additions

- Stage Count Forecast Suggests Continued Growth In Frac HP Demand
- Estimate About 2.3 MM HP On Order – Some Of Which Replaces Attrition
- Demand Growth On Track To Match Supply Growth (Starting From Undersupply)

Horsepower Supply & Demand

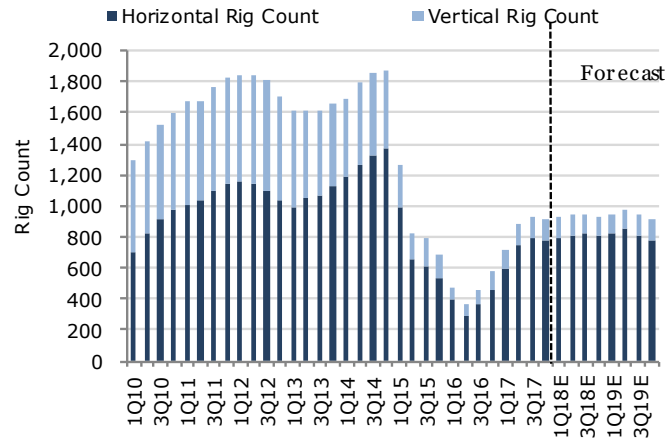


Frac Fleet Demand

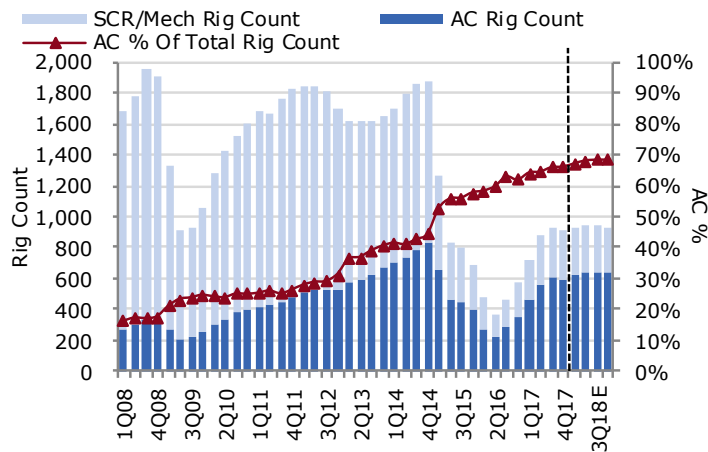


U.S. Land Rig Count Overview

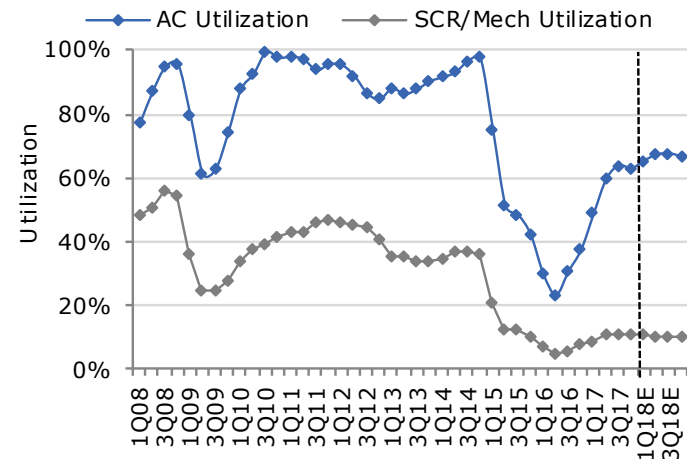
U.S. Land Rig Count



AC Rig Count Vs SCR/Mech

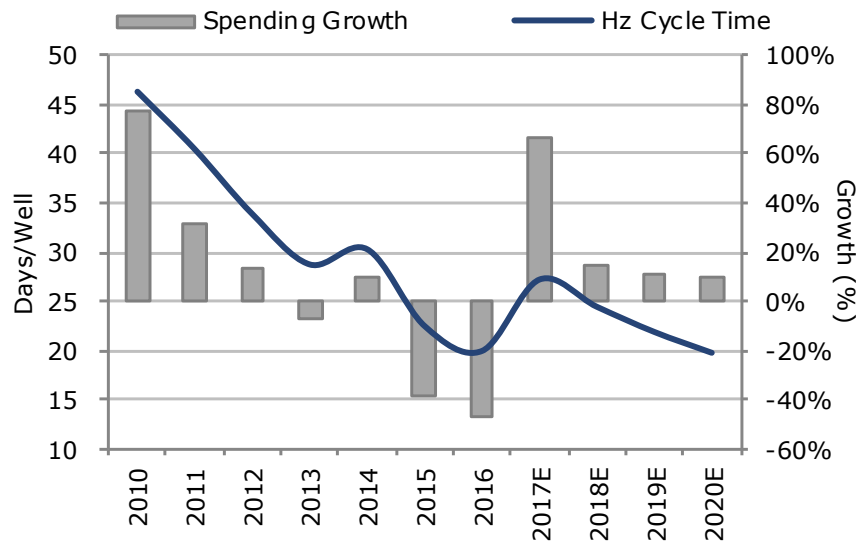


AC Rig Utilization/% Of Active Fleet

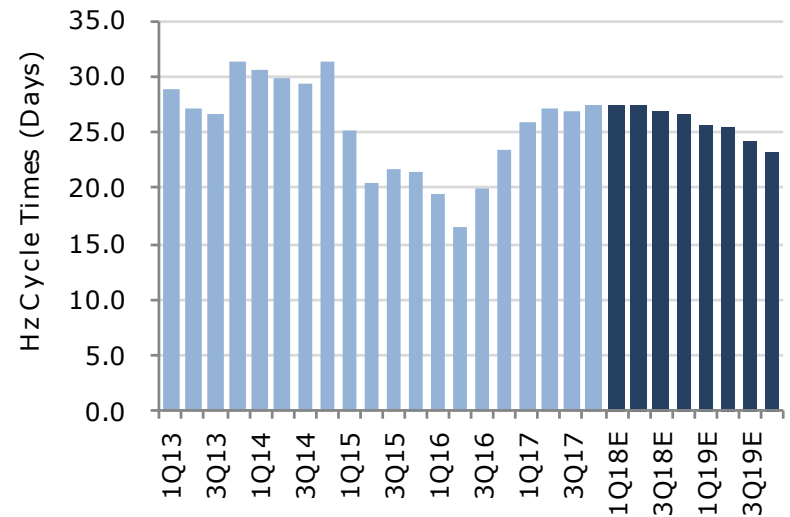


Efficiency Trends A Big Variable For Future Rig Demand

Spending Growth Vs Cycle Times

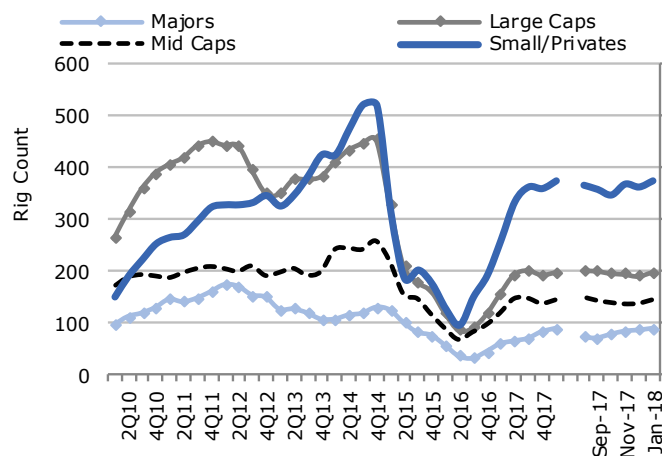


Horizontal Cycle Times

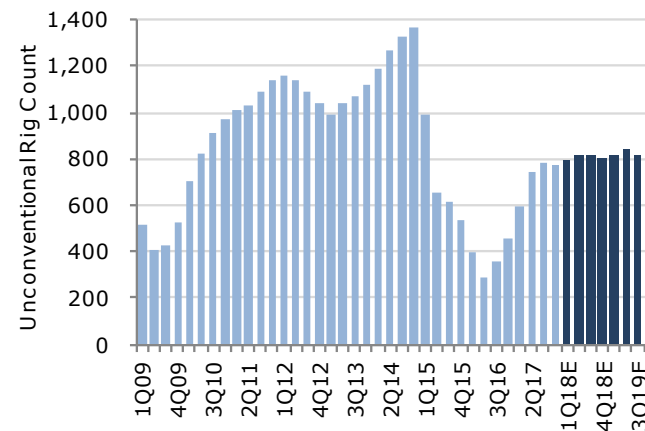


U.S. Land Rig Count Poised For Upside

Horizontal Rig Count By Operator



Horizontal Rig Count



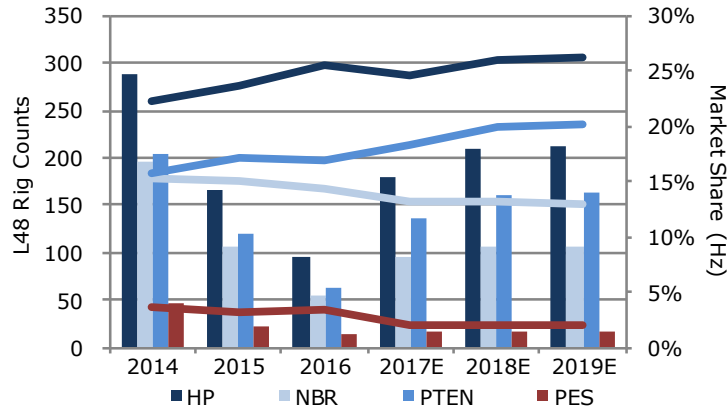
U.S. Land Rig Count Forecast

Rig Count	1Q17	2Q17	3Q17	4Q17	2018E	2019E	2020E
Bakken	36	44	47	47	47	48	51
Eagle Ford	59	83	72	67	66	64	66
Granite Wash	15	17	16	11	10	10	10
Cana	72	84	93	88	94	94	76
DJ Basin (Niobr.)	28	32	37	34	36	37	40
Utica	21	21	23	22	21	21	22
Mississippian	5	7	5	5	5	5	5
Permian Unconv.	228	283	312	318	355	365	348
Other	24	30	33	33	29	27	27
<i>Unconv.Oil/Liquids</i>	487	602	638	624	664	670	646
Barnett	1	4	3	3	3	3	3
Fayetteville	1	1	1	0	1	1	1
Woodford	7	9	10	9	8	8	8
Haynesville	40	51	54	55	53	55	57
Marcellus	34	44	44	44	46	49	53
Other	30	34	36	42	32	30	30
<i>Unconv.Gas</i>	113	141	147	153	143	145	151
Unconv. Rig Count	600	743	786	777	807	815	796
Permian Conv.	28	25	24	21	21	22	23
Conv. Oil (Non-Permian)	53	67	69	70	70	73	76
Conv. Gas	40	46	44	41	40	36	33
Conv. Rig Count	121	138	137	132	131	131	132
U.S. Land Rig Count	721	880	923	909	938	946	928

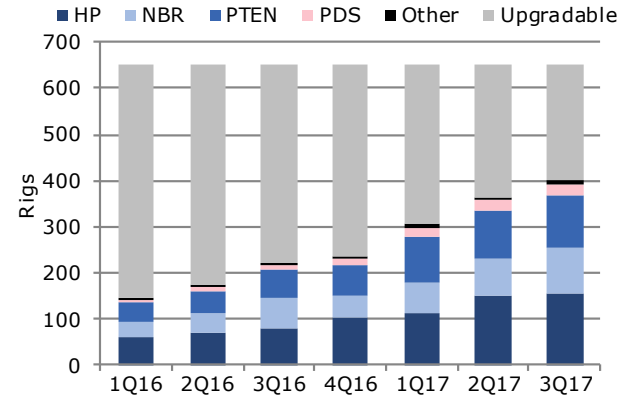
Source for all charts and table: RigData, Company filings, Wells Fargo Securities, LLC estimates

Land Rig Market Overview

Hz Rig Count & Market Share By Contractor

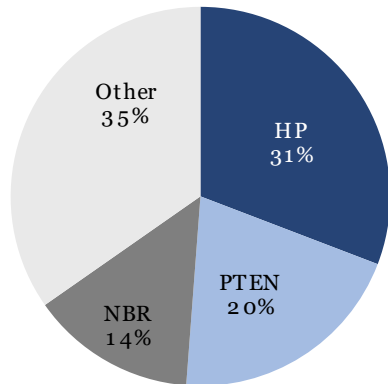


Super-Spec Rigs By Contractor & Total Upgradable Rigs



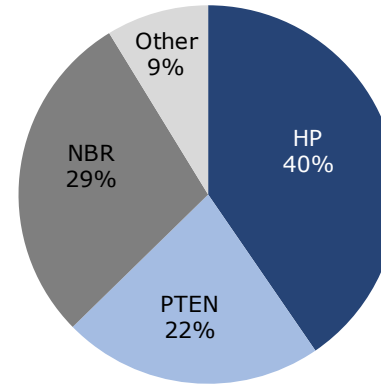
Note: PDS is not covered

AC Market Share - Working Rigs



As of February 2018

AC Rig Market Share - Idle Capacity

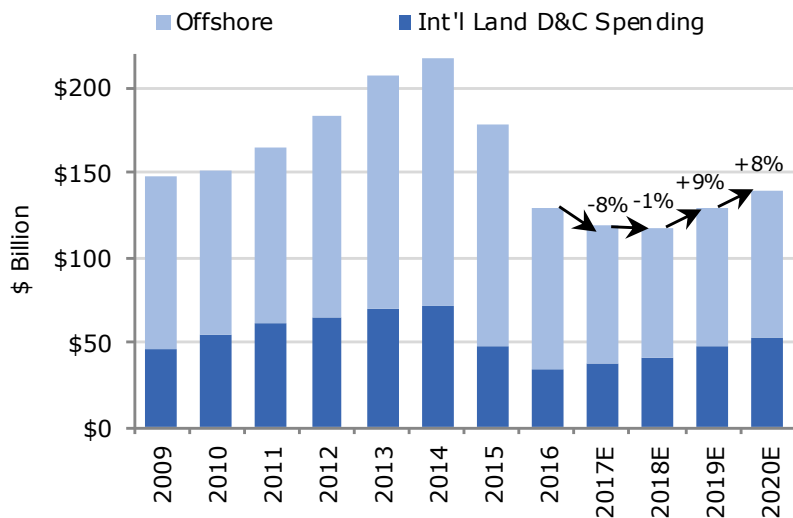


As of February 2018

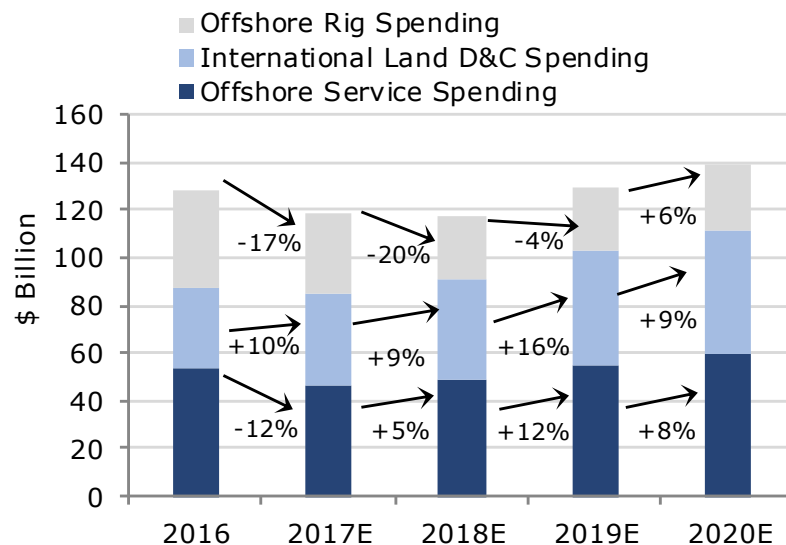
Int'l Spend Could Surprise To The Upside With \$60+ Brent Prices

- We Forecast International Spending To Decline 0-2% In 2018 With Land-Based Activity Registering Modest Increases Offset By Further Declines Offshore

International D&C Spending (\$Bn)

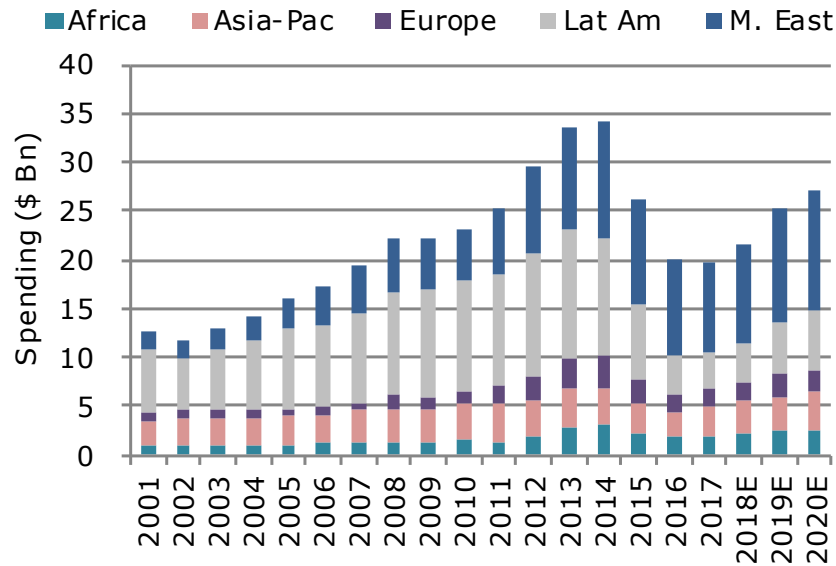


International D&C Spending Breakout

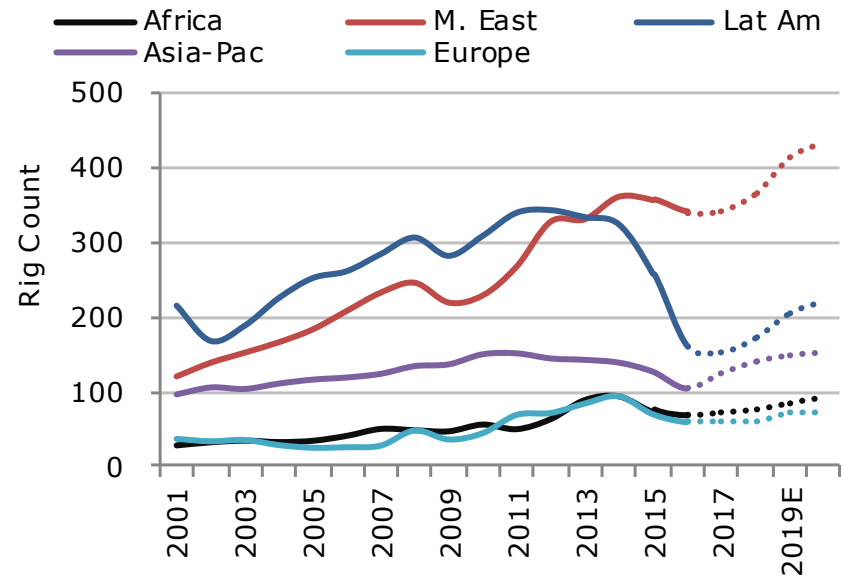


International Land Spending To Modestly Recover In 2018

International Rig Count



Select International Land Rig Counts

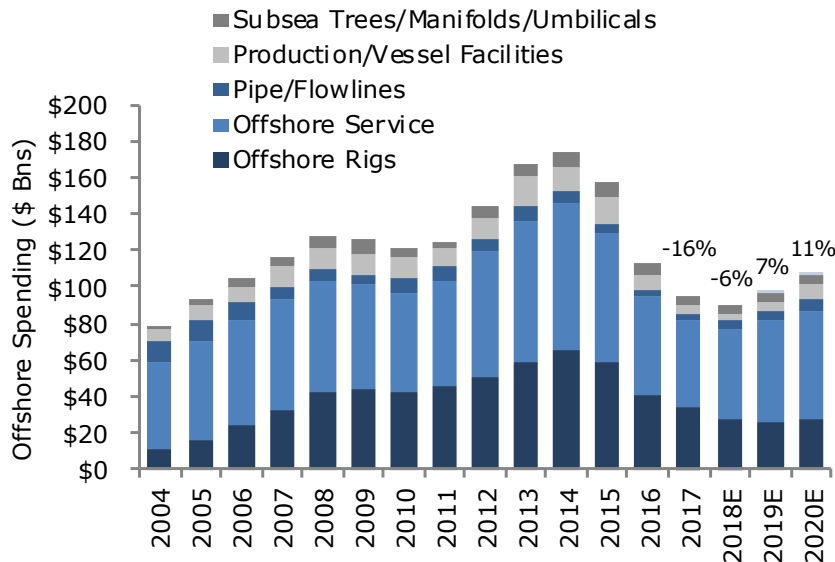


Source for all charts: Baker Hughes, Wells Fargo Securities LLC estimates

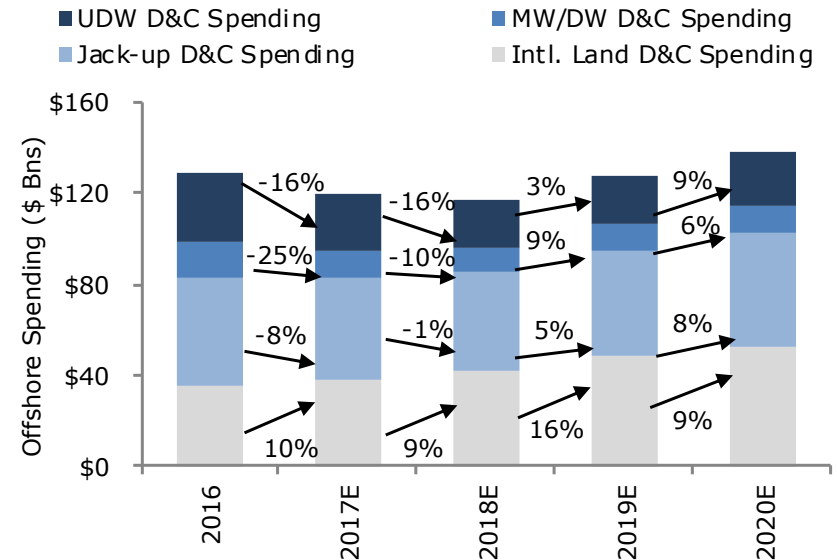
Offshore Spending Likely Set For Further Declines In 2018

- We Forecast A 6% Decline In Offshore Spending In 2018 Followed By A 7% Increase In 2019
- Re-Pricing Of Peak Contracts The Larger Driver Of Spending Reductions In 2018 Although Offset By Increases To Offshore Service Spending
- We Believe Jack-ups Troughed In 12/2016 And Floater Activity Will Trough In Mid-2018

Aggregate Offshore Spending Forecast



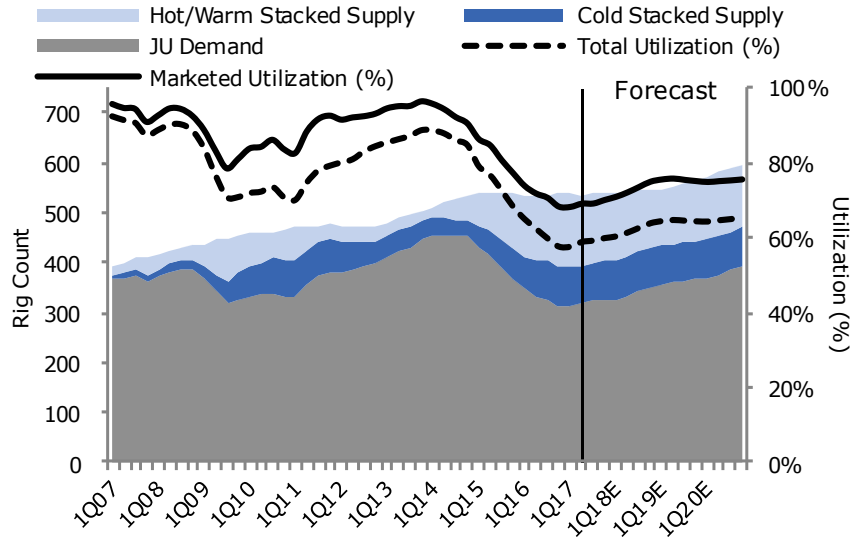
Breakdown of Est. Int'l & Offshore D&C Spending



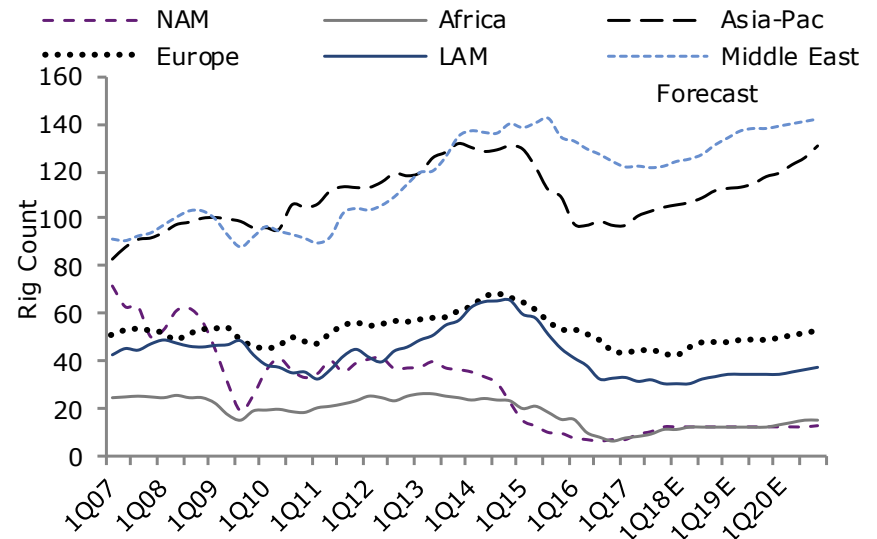
Jack-up Activity Starting To Increase

- Global Jack-up Demand Has Continued To Increase With Stronger Tender Activity
- Global Jack-up Count Troughed In 12/2016 And We Believe Will Trend Higher Over The Next Few Years With Total Utilization In The 60% Range And Effective Utilization In The Mid-70% Range
- Potential For Continued Demand Growth In The North Sea, Asia-Pacific, And Middle East Markets In 2018-2019
- We Estimate That Jack-up Attrition Of ~130 Rigs Is Likely Required Through 2020

Jack-up Supply/Demand Forecast



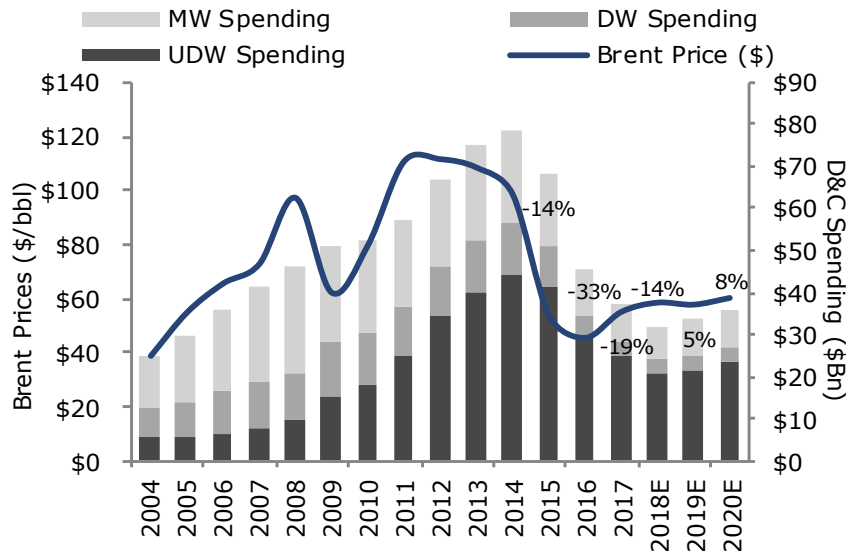
Regional Jack-up Demand



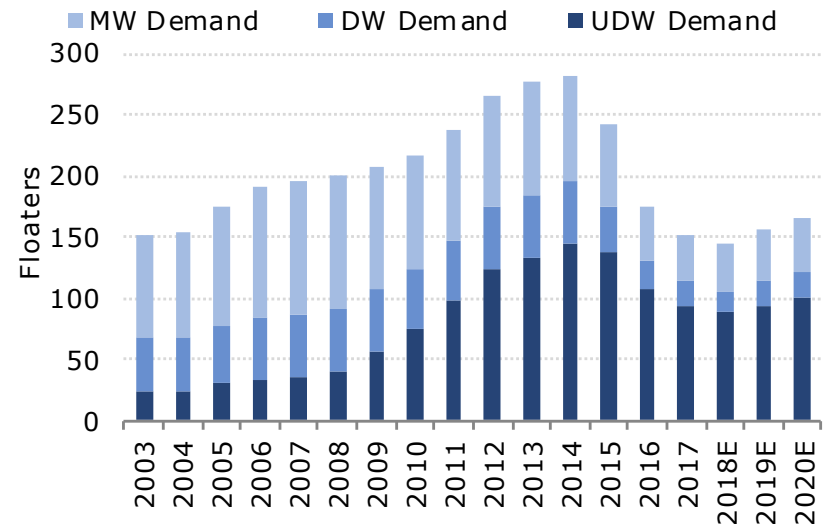
Floater Activity To Be Challenged Through 2018

- Floater-related D&C Spending Is Projected To Decline 10-15% In 2018 As Super Majors & National Oil Companies Continue To Right Size Their Budgets
- We Forecast The Contracted Global Floater Count To Trough In Mid-2018 At 144 Rigs And Stay Flat To Slightly Higher in 2018
- Our Base Case Assumption Is For Oil To Be In The \$55-\$65/bbl Range Which Should Drive Floater Demand Growth of 8% in 2019 and 6% in 2020

Floater D&C Spending vs. Brent



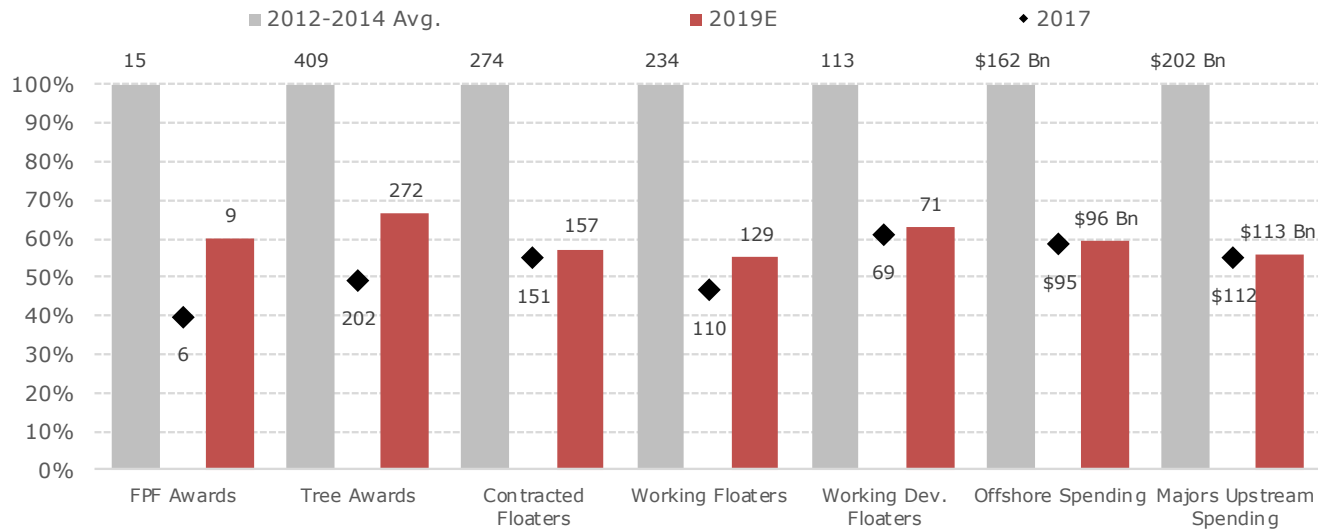
Floater Demand vs. Brent



Source for all charts: IHS, Wells Fargo Securities, LLC estimates

Offshore Spending Estimated to Settle Around 55-60% of Prior Highs

2019 Offshore Activity Forecast vs. 2012-2014 Averages



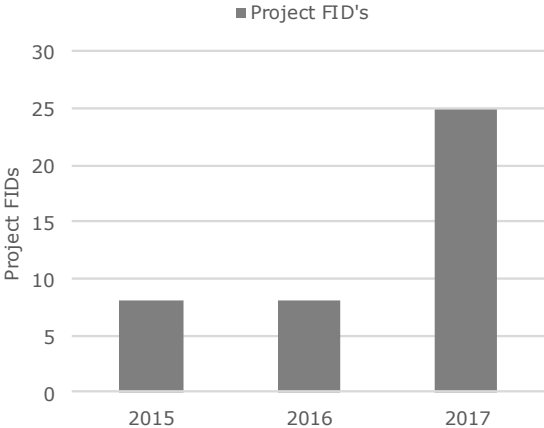
Average Project Savings

Project	Operator	Region	Original Cost (\$ Bn)	Cost Today or Cost Needed for FID (\$ Bn)	Project Savings
Mad Dog Phase 2	BP	US GOM	\$20.0	\$9.0	55%
Johan Castberg	Statoil	NS	12.4	5.9	53%
Zinia 2	Total	WAF	\$2.8	\$14	50%
Bonga Southwest	Shell	WAF	19.0	11.0	42%
Fortuna	Ophir	WAF	\$1.0	\$0.5	55%
Snorre	Statoil	NS	4.3	2.3	47%
Leviathan	Noble	ME	\$6.5	\$3.8	42%
Coral South FLNG	Eni	WAF	12.0	7.0	42%
Average Costs & Savings			\$78.1	\$40.8	48%

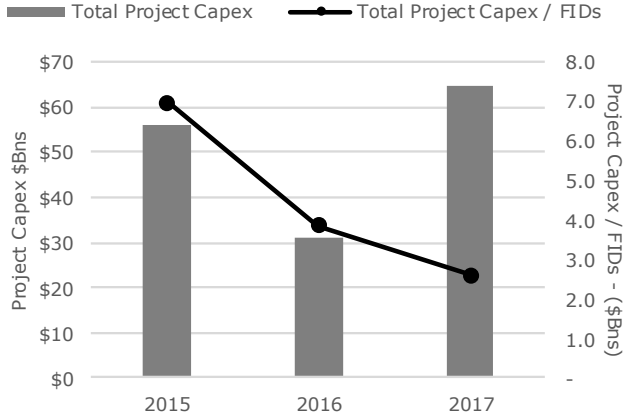
Source for all charts: IHS, Wood Mackenzie, Upstream Online, Wells Fargo Securities LLC estimates

Project FIDs and Cost Deflation On The Rise

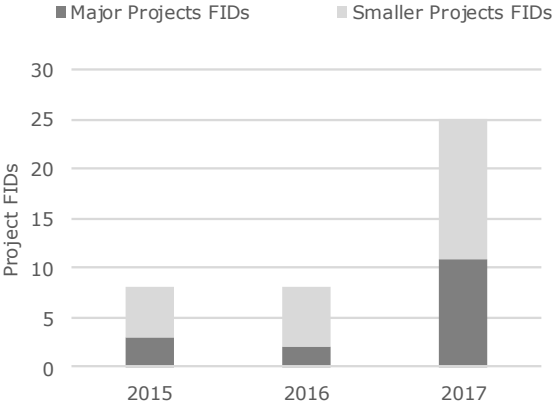
2015-2017 Total Project FIDs



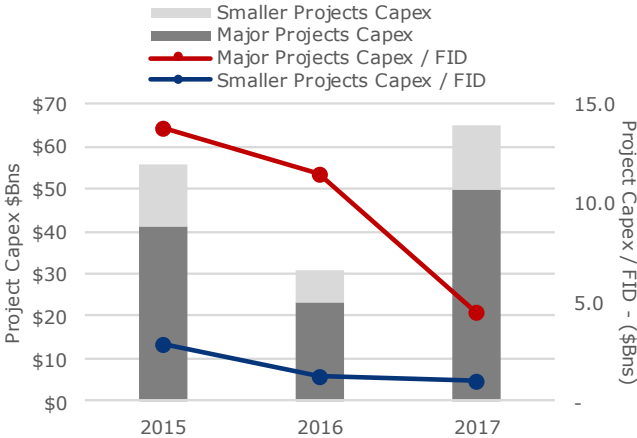
2015-2017 Total Project Capex vs. Ratio of Total Project FID Capex / FIDs



2015-2017 Project FIDs by Small vs. Major Projects



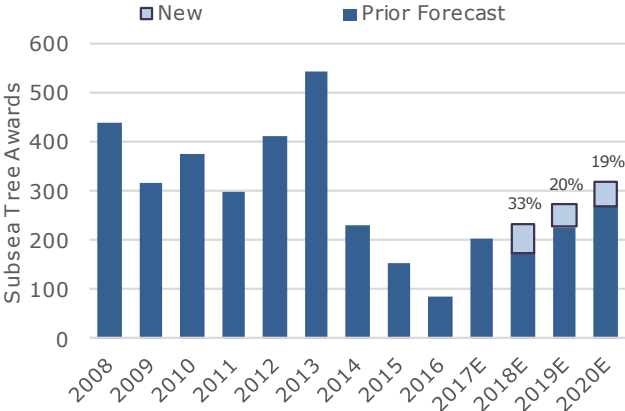
2015-2017 Project Capex vs. Ratio of Small & Major Project FID Capex / FIDs



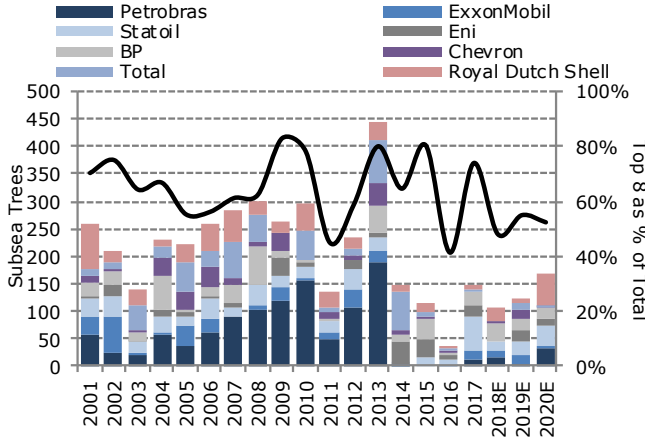
Source for all charts: Wood Mackenzie, Wells Fargo Securities, LLC estimates

SS Tree & FPF Award Expectations Increasing As Orders Begin To Normalize

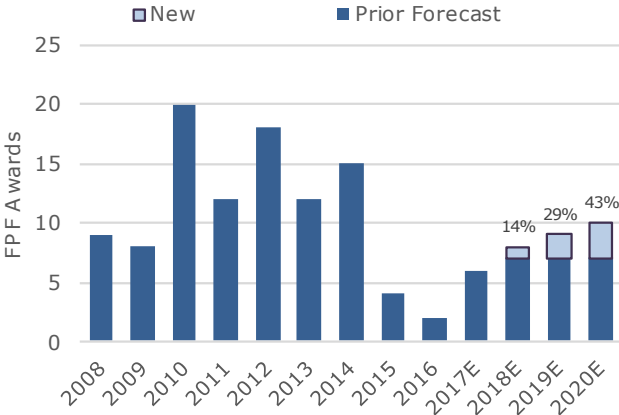
New vs. Prior Subsea Tree Award Forecast



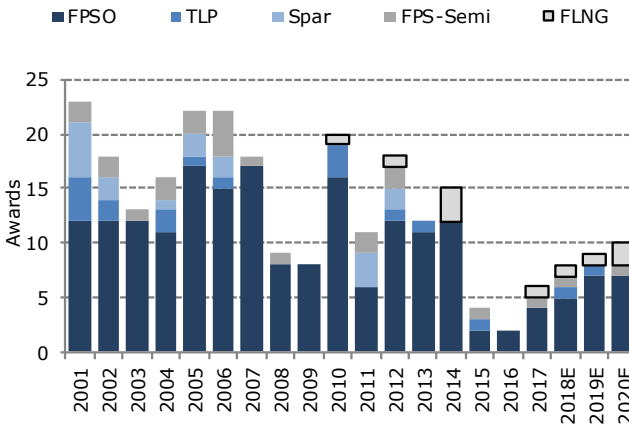
Annual Tree Awards by Top 8 Operators



New vs. Prior FPF Award Forecast



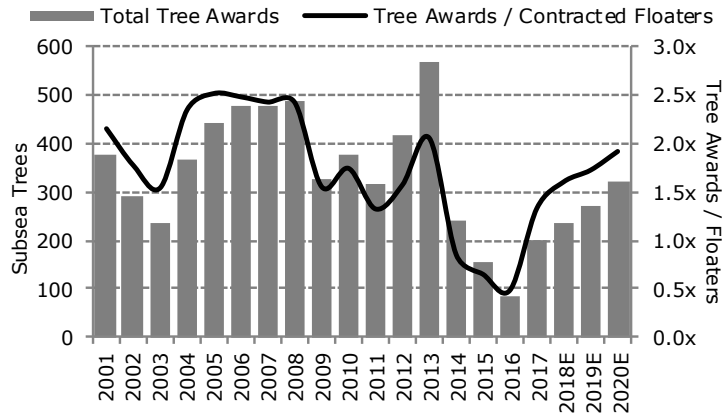
FPF Award Forecast by FPF Type



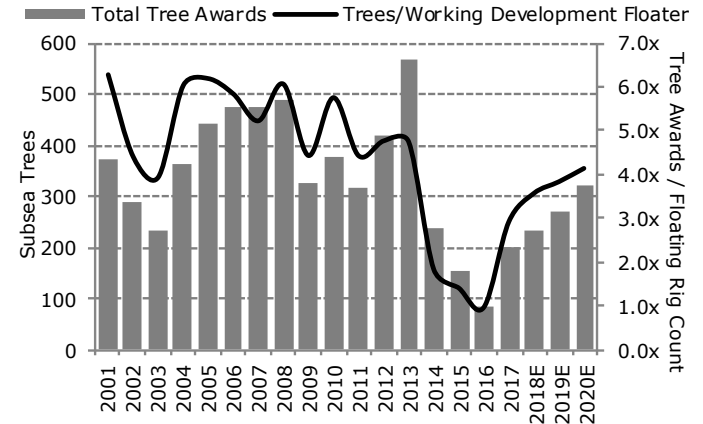
Source for all charts: Wood Mackenzie, Wells Fargo Securities, LLC estimates

Floater Count Suggests Upside To Tree Orders

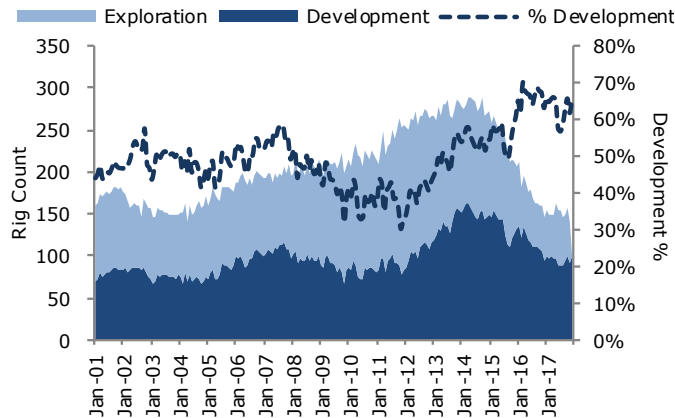
SS Tree Awards vs. Ratio of Tree Awards/Contracted Floaters



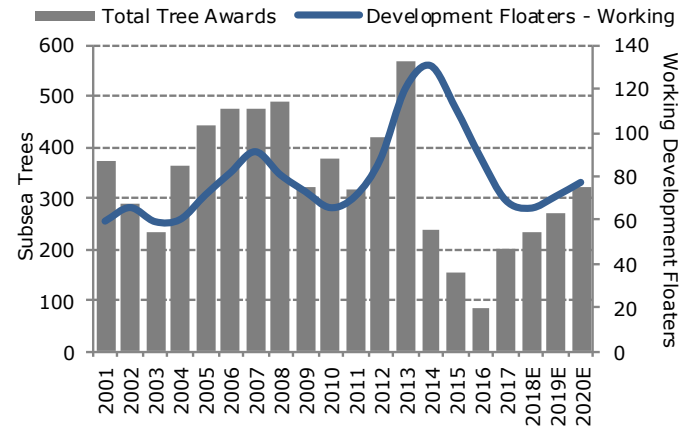
SS Tree Awards vs. Ratio of Tree Awards/Working Development Floaters



Working Exploration & Development Floaters vs. % Development



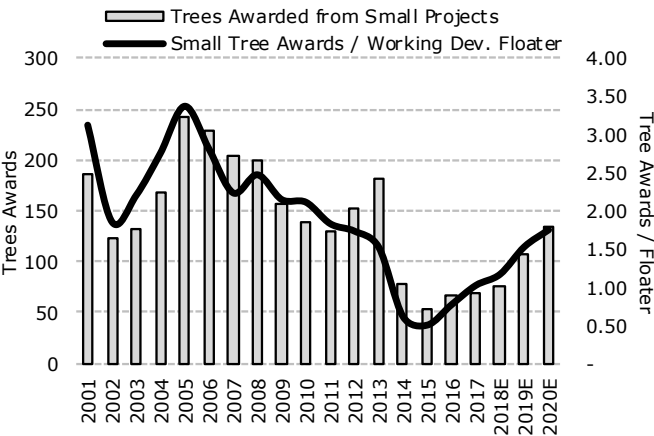
SS Tree Awards vs. Working Development Floaters



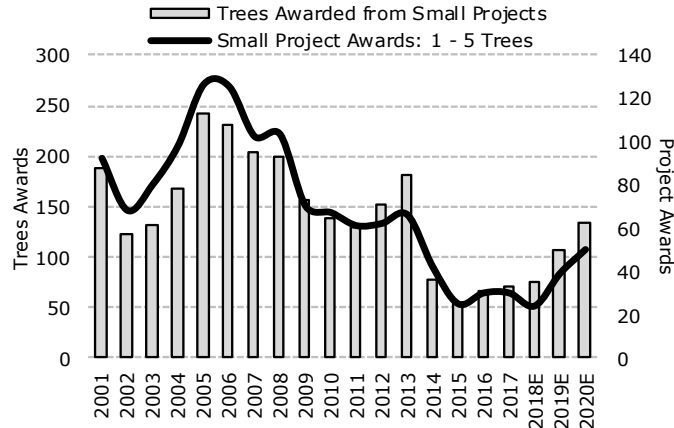
Source for all charts: Wood Mackenzie, IHS, Wells Fargo Securities, LLC estimates

Upside To Forecast Likely To Come From Small Awards

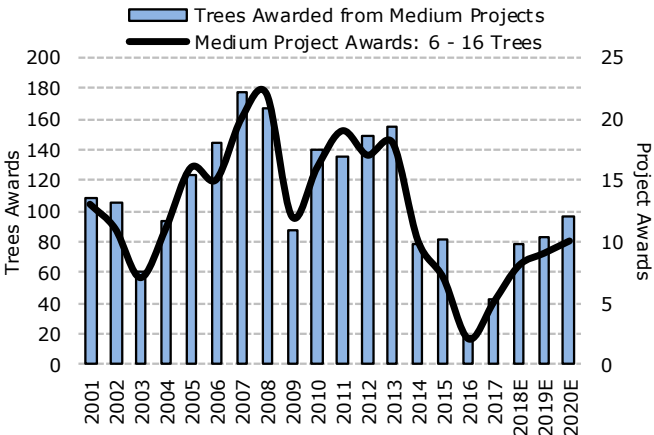
Small Tree Awards vs. Small Tree Awards / Working Development Floater



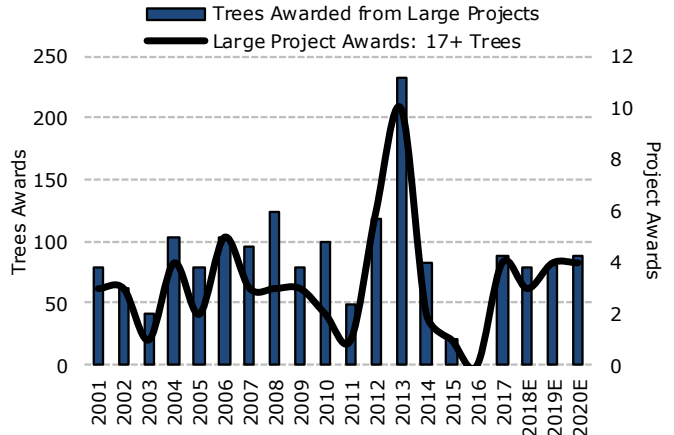
Small Tree Awards vs. Small Sized Project Awards



Trees Awarded from Medium Projects vs. Medium Sized Project Awards



Trees Awarded from Large Projects vs. Large Project Awards



Source for all charts: Wood Mackenzie, Wells Fargo Securities, LLC estimates

Required Disclosures

Additional Information Available Upon Request

I certify that:

- 1) All views expressed in this research report accurately reflect my personal views about any and all of the subject securities or issuers discussed; and
- 2) No part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by me in this research report.

Wells Fargo Securities, LLC does not compensate its research analysts based on specific investment banking transactions.

Wells Fargo Securities, LLC's research analysts receive compensation that is based upon and impacted by the overall profitability and revenue of the firm, which includes, but is not limited to investment banking revenue.

STOCK RATING

1=Outperform: The stock appears attractively valued, and we believe the stock's total return will exceed that of the market over the next 12 months. BUY

2=Market Perform: The stock appears appropriately valued, and we believe the stock's total return will be in line with the market over the next 12 months. HOLD

3=Underperform: The stock appears overvalued, and we believe the stock's total return will be below the market over the next 12 months. SELL

SECTOR RATING

O=Overweight: Industry expected to outperform the relevant broad market benchmark over the next 12 months.

M=Market Weight: Industry expected to perform in-line with the relevant broad market benchmark over the next 12 months.

U=Underweight: Industry expected to underperform the relevant broad market benchmark over the next 12 months.

VOLATILITY RATING

V=A stock is defined as volatile if the stock price has fluctuated by +/-20% or greater in at least 8 of the past 24 months or if the analyst expects significant volatility. All IPO stocks are automatically rated volatile within the first 24 months of trading.

As of: February 15, 2018

48% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Outperform.
banking services for 43% of its Equity Research Outperform-rated companies.

Wells Fargo Securities, LLC has provided investment

50% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Market Perform.
banking services for 29% of its Equity Research Market Perform-rated companies.

Wells Fargo Securities, LLC has provided investment

3% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Underperform.
banking services for 28% of its Equity Research Underperform-rated companies.

Wells Fargo Securities, LLC has provided investment

Required Disclosures

Important Disclosure for International Clients

EEA – The securities and related financial instruments described herein may not be eligible for sale in all jurisdictions or to certain categories of investors. For recipients in the EEA, this report is distributed by Wells Fargo Securities International Limited (“WFSIL”). WFSIL is a U.K. incorporated investment firm authorized and regulated by the Financial Conduct Authority. For the purposes of Section 21 of the UK Financial Services and Markets Act 2000 (“the Act”), the content of this report has been approved by WFSIL a regulated person under the Act. WFSIL does not deal with retail clients as defined in the Markets in Financial Instruments Directive 2007. The FCA rules made under the Financial Services and Markets Act 2000 for the protection of retail clients will therefore not apply, nor will the Financial Services Compensation Scheme be available. This report is not intended for, and should not be relied upon by, retail clients.

Australia – Wells Fargo Securities, LLC is exempt from the requirements to hold an Australian financial services license in respect of the financial services it provides to wholesale clients in Australia. Wells Fargo Securities, LLC is regulated under U.S. laws which differ from Australian laws. Any offer or documentation provided to Australian recipients by Wells Fargo Securities, LLC in the course of providing the financial services will be prepared in accordance with the laws of the United States and not Australian laws.

Canada – This report is distributed in Canada by Wells Fargo Securities Canada, Ltd., a registered investment dealer in Canada and member of the Investment Industry Regulatory Organization of Canada (IIROC) and Canadian Investor Protection Fund (CIPF).

Wells Fargo Securities, LLC’s research analysts may participate in company events such as site visits but are generally prohibited from accepting payment or reimbursement by the subject companies for associated expenses unless pre-authorized by members of Research Management.

Hong Kong – This report is issued and distributed in Hong Kong by Wells Fargo Securities Asia Limited (“WFSAL”), a Hong Kong incorporated investment firm licensed and regulated by the Securities and Futures Commission of Hong Kong (“the SFC”) to carry on types 1, 4, 6 and 9 regulated activities (as defined in the Securities and Futures Ordinance (Cap. 571 of The Laws of Hong Kong), “the SFO”). This report is not intended for, and should not be relied on by, any person other than professional investors (as defined in the SFO). Any securities and related financial instruments described herein are not intended for sale, nor will be sold, to any person other than professional investors (as defined in the SFO). The author or authors of this report is or are not licensed by the SFC. Professional investors who receive this report should direct any queries regarding its contents to Mark Jones at WFSAL (email: wfsalresearch@wellsfargo.com).

Japan – This report is distributed in Japan by Wells Fargo Securities (Japan) Co., Ltd, registered with the Kanto Local Finance Bureau to conduct broking and dealing of type 1 and type 2 financial instruments and agency or intermediary service for entry into investment advisory or discretionary investment contracts. This report is intended for distribution only to professional investors (Tokutei Toushika) and is not intended for, and should not be relied upon by, ordinary customers (Ippan Toushika).

The ratings stated on the document are not provided by rating agencies registered with the Financial Services Agency of Japan (JFSA) but by group companies of JFSA-registered rating agencies. These group companies may include Moody’s Investors Services Inc., Standard & Poor’s Rating Services and/or Fitch Ratings. Any decisions to invest in securities or transactions should be made after reviewing policies and methodologies used for assigning credit ratings and assumptions, significance and limitations of the credit ratings stated on the respective rating agencies’ websites.

About Wells Fargo Securities

Wells Fargo Securities is the trade name for the capital markets and investment banking services of Wells Fargo & Company and its subsidiaries, including but not limited to Wells Fargo Securities, LLC, a U.S. broker-dealer registered with the U.S. Securities and Exchange Commission and a member of NYSE, FINRA, NFA and SIPC, Wells Fargo Prime Services, LLC, a member of FINRA, NFA and SIPC, Wells Fargo Securities Canada, Ltd., a member of IIROC and CIPF, Wells Fargo Bank, N.A. and Wells Fargo Securities International Limited, authorized and regulated by the Financial Conduct Authority. This report is for your information only and is not an offer to sell, or a solicitation of an offer to buy, the securities or instruments named or described in this report. Interested parties are advised to contact the entity with which they deal, or the entity that provided this report to them, if they desire further information. The information in this report has been obtained or derived from sources believed by Wells Fargo Securities, LLC, to be reliable, but Wells Fargo Securities, LLC does not represent that this information is accurate or complete. Any opinions or estimates contained in this report represent the judgment of Wells Fargo Securities, LLC, at this time, and are subject to change without notice. All Wells Fargo Securities research reports published by its Global Research Department (“WFS Research”) are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Additional distribution may be done by sales personnel via email, fax or regular mail. Clients may also receive our research via third party vendors. Not all research content is redistributed to our clients or available to third-party aggregators, nor is WFS Research responsible for the redistribution of our research by third party aggregators. For research or other data available on a particular security, please contact your sales representative or go to <http://www.wellsfargoresearch.com>. For the purposes of the U.K. Financial Conduct Authority’s rules, this report constitutes impartial investment research. Each of Wells Fargo Securities, LLC and Wells Fargo Securities International Limited is a separate legal entity and distinct from affiliated banks. Copyright © 2018 Wells Fargo Securities, LLC