

# Natural Gas Vehicles May Provide Long Term Support For U.S. Natural Gas Prices

## The Growing Use Of Natural Gas As A Transportation Fuel May Ultimately Provide Upside For Natural Gas Leveraged E&Ps

- **Global Demand For Natural Gas As Transportation Fuel Is Set To Grow...** – As highlighted in Citi's June 4<sup>th</sup> [Citi GPS: ENERGY 2020: TRUCKS, TRAINS & AUTOMOBILES](#) note, the shift from oil to natural gas is underway in the US, where the shale gas revolution is providing an economic incentive to make the switch. One of the outcomes of the U.S. shale revolution is a push to substitute natural gas for oil in the fuel transportation market. Currently natural gas (compressed "CNG" and liquefied "LNG") has a low penetration rate in the domestic freight truck market, likely in the low single digits. However, by 2020, Citi expects this penetration to rise to ~25%.
- **...Which Is Ultimately Positive For The Natural Gas-Leveraged E&Ps** – Any incremental natural gas demand as a result of increased natural gas substitution for oil in the fuel transportation market would ultimately tighten the North America natural gas supply/demand balance, yielding further upside to natural gas prices. As a result, this would positively impact the bottom line of the more natural gas-leveraged E&P companies in our coverage group including **COG**, **CHK**, **ECA**, **RRC**, **SWN** and **UPL** (see Figures 5 and 6).
- **Meanwhile, U.S. Natural Gas Supply Is Projected To Decline Slightly This Year** – As outlined in our May 16<sup>th</sup> [note](#) on the E&P sector's U.S. natural gas activity, spending and production, the Citi E&P equity research team projects total U.S. natural gas supply will decline ~0.8 Bcf/d (~1%) this year with domestic natural gas production essentially flat year-over-year after adjusting for asset sales. But in 2014, the Citi E&P team projects total supply will be about flat with domestic production up ~0.2 Bcf/d.
- **Citi E&P Team's 2013 Natural Gas Price Forecast Is \$3.90/MMBtu...** – Following a much colder-than-normal April and May, we recently raised our full-year composite spot natural gas price forecast to \$3.90/MMBtu<sup>1</sup> from \$3.80/MMBtu (see our May 30<sup>th</sup> [note](#)). Following what turned out to be a normal winter, April was nearly 9% colder-than-normal April while temperatures in May also deviated sharply from normal. Thus, "shoulder" period (April-May) natural gas demand was ~60 Bcf above normal, which largely underscored the higher natural gas price outlook along with a corresponding and slightly higher outlook for CAPP coal prices.
- **...And The Outlook Is For Prices To Rise Through 2017** – The Citi E&P equity research team's 2014 natural gas price forecast is \$4.35/MMBtu and is underpinned by the view that some producers will begin to put rigs back to work in dry gas plays in a rising natural gas price environment. In 2015, the price forecast is \$4.75/MMBtu, for 2016 is \$5.10/MMBtu and in 2017 is \$5.25/MMBtu (see Figure 7).
- **Top Picks** – Among the gas-leveraged names, **COG** remains our top pick while **APC**, **CNQ**, **EOG**, **MRO**, **NBL**, **PXD**, **RRC** and **SWN** are also among our favorites.

(1) Citi's official natural gas price forecast is the Commodities Team's \$4.30/MMBtu Henry Hub projection. The forecasts differ based partly on varying supply and coal-to-gas switching assessments.

See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures.

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which 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 this report. Investors should consider this report as only a single factor in making their investment decision.

---

**Robert S Morris**

+1-212-816-3139

robert.s.morris@citi.com

**Rob Teahen**

rob.teahen@citi.com

**Chingiz Gadimov**

chingiz.gadimov@citi.com

**Bryan M Baritot**

bryan.baritot@citi.com

---

## Natural Gas For Oil Substitution Set To Increase In The Fuel Transportation Market

One of the effects of the US shale revolution is a push to substitute natural gas for oil in the fuel transportation market...

...And, while natural gas vehicles currently have a low penetration rate in the domestic freight truck market, by 2020 penetration could rise to ~25%.

However, due to financial and operational impediments, penetration is likely limited over the next five years, but could scale by 2020.

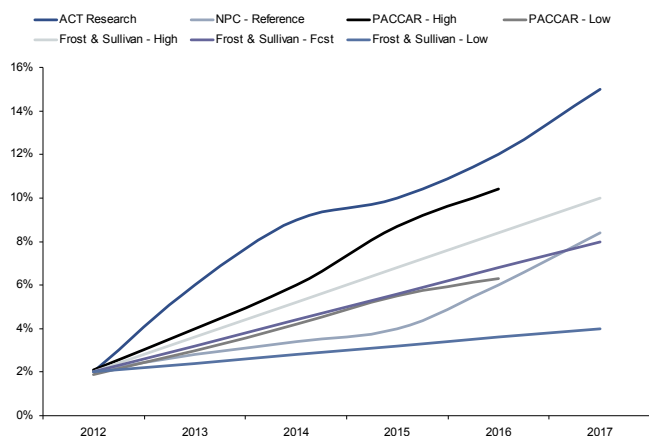
Current global demand in natural gas for transportation is estimated to be ~4.0 Bcf/d (~1% of global natural gas market) but could reach ~9-12 Bcf/d by 2020 (~3% of global natural gas market).

As highlighted in Citi's June 4<sup>th</sup> [Citi GPS: ENERGY 2020: TRUCKS, TRAINS & AUTOMOBILES](#) note, the shift from oil to natural gas is underway in the US, where the shale gas revolution is providing an economic incentive to make the switch. One of the effects of the US shale revolution is a push to substitute natural gas for oil in the fuel transportation market. Currently natural gas (compressed "CNG" and liquefied "LNG") has a low penetration rate in the domestic freight truck market, likely in the low single digits. However, by 2020, Citi expects penetration to rise to ~25%, which will begin to have a noticeable impact on the cost structure of trucking. We would note that adoption for some applications including buses and trucks is well underway (for example, ~80% of Waste Management's new truck purchases in 2012 were natural gas powered).

However, because of financial and operational impediments of implementing natural gas trucks, our view is that the uptake of the technology will be limited to regional adoption, particularly over the next 5 years. Most of the growth is expected to be relegated to large fleets that can leverage existing natural gas infrastructure, mainly refueling stations, while employing the tractors on short-haul dedicated freight lanes. Further, the pace of adoption will likely remain constrained by lack of infrastructure, and over the next five years, adoption rates are expected to be in the 5-15% range with much of this growth coming from dense freight corridors near major population centers while, ultimately, a large portion of the freight market could utilize LNG and penetration rates could top 40% (see Figures 1 and 2 below). Additionally, the pace of adoption is expected to resemble more of a hockey stick growth profile rather than smooth, upward trending linear growth due to the expectation that the willingness of carriers to adopt the technology depends on first developing greater supporting infrastructure, cheaper technology, or both.

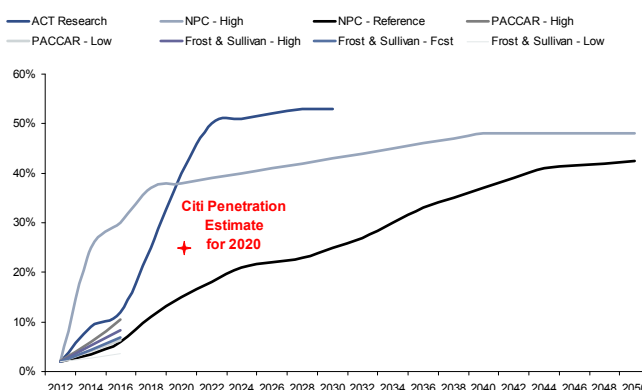
Globally, current demand in natural gas for transportation is estimated to be ~4.0 Bcf/d, up from ~3.0 Bcf/d in 2010 as reported by the IEA. But transportation comprises only ~1% of the global natural gas market with non-OECD countries making up much of the current natural gas demand for transportation. Looking ahead, we project natural gas demand for transportation will reach between 9-12 Bcf/d by 2020, putting transport demand at ~3% of global natural gas supply which is forecast to be ~375 Bcf/d.

Figure 1. Near-term Class 8 Natural Gas Penetration Forecasts



Source: Citi Research, Citi Commodities team

Figure 2. Long-term Class 8 Natural Gas Penetration Forecasts



Source: Citi Research, Citi Commodities team

Meanwhile, on the supply side, we project total U.S. natural gas supply will decline ~0.8 Bcf/d (~1%) this year...

Meanwhile, on the supply side, as highlighted in our May 16<sup>th</sup> [note](#) on the E&P sector's U.S. natural gas activity, spending and production, the Citi E&P equity research team projects total U.S. natural gas supply will decline ~0.8 Bcf/d (~1%) this year with natural gas production essentially flat year-over-year after adjusting for asset sales. But in 2014, the Citi E&P team projects total supply will be about flat year over year with domestic production up ~0.2 Bcf/d. See Figure 3 below for our 2013 U.S. natural gas production estimates for our E&P coverage group.

Figure 3. E&P Coverage Group U.S. Natural Gas Production (MMcf/d)

	Q1'12	Q2'12	Q3'12	Q4'12	2012	Q1'13	Q2'13	Q3'13	Q4'13	2013
Anadarko Petroleum (APC)	2,416	2,544	2,499	2,521	2,495	2,689	2,625	2,400	2,400	2,527
Apache Corporation (APA)	817	844	863	891	854	854	852	851	877	858
Canadian Natural Res. (CNQ)	-	-	-	-	-	-	-	-	-	-
Cabot Oil & Gas (COG)	620	651	682	813	692	947	956	1,033	1,157	1,024
Chesapeake Energy (CHK)	2,976	3,027	3,286	3,046	3,084	3,000	2,947	2,895	2,895	2,934
Cobalt International Energy (CIE)	-	-	-	-	-	-	-	-	-	-
Concho Resources (CXO)	178	172	208	213	193	198	213	228	244	221
Denbury Resources (DNR)	28	29	31	28	29	25	25	24	31	26
Devon Energy (DVN)	2,072	2,050	2,067	2,029	2,054	1,969	1,949	1,939	1,930	1,947
EnCana Corp. (ECA)	1,779	1,565	1,606	1,540	1,622	1,455	1,382	1,327	1,274	1,359
EOG Resources (EOG)	1,062	1,070	1,022	981	1,034	934	920	892	866	903
Goodrich Petroleum (GDP)	82	74	65	50	68	46	51	55	56	52
Kosmos Energy (KOS)	-	-	-	-	-	-	-	-	-	-
Magnum Hunter (MHR)	49	43	34	36	40	32	45	48	49	44
Marathon Oil (MRO)	344	319	366	404	358	340	316	324	333	328
Matador Resources (MTDR)	35	34	34	34	34	35	32	31	30	32
Newfield Exploration (NFX)	445	435	417	358	414	344	331	317	308	325
Noble Energy (NBL)	433	431	440	447	438	409	409	442	477	434
Pioneer Natural Resources (PXD)	369	373	376	395	378	384	383	375	367	377
Quicksilver Resources (KWK)	303	286	291	275	289	295	227	219	212	238
Range Resources (RRC)	512	575	623	655	592	689	715	760	810	744
Rosetta Resources (ROSE)	98	82	89	101	92	108	115	123	130	119
SandRidge Energy (SD)	173	241	295	312	256	304	281	276	271	283
Southwestern Energy (SWN)	1,466	1,508	1,568	1,628	1,547	1,639	1,699	1,772	1,857	1,742
Talisman Energy (TLM)	549	575	547	525	549	497	480	475	485	484
Ultra Petroleum (UPL)	732	693	665	635	681	641	623	615	606	621
Whiting Petroleum (WLL)	73	70	69	71	71	73	73	72	71	72
TOTAL	17,612	17,690	18,144	17,988	17,864	17,907	17,651	17,495	17,736	17,696
								Yr/Yr 2013-12		-1%
								Q4'13 - Q4'12		-1%

Source: Citi Research

Looking ahead, U.S. natural gas production is positioned to increase, driven in part by technological improvements, associated gas and uncompleted well backlogs

Looking ahead, natural gas production in the US could rise by more than 20 Bcf/d between 2012 and 2020 even if gas rig counts stay at a low level of ~400. Natural gas output may not necessarily fall despite a sharply lower gas drilling rig count. Three key areas will be supporting production growth despite low rig counts:

- **Technological improvements** – as mentioned in our May 23<sup>rd</sup> [E&P Sector – Still Sticking With The Winners](#) note, companies are increasingly focused on 'squeezing more' from existing plays via faster drilling times, pad drilling, longer laterals, tighter downspacing or better completion techniques.
- **Associated gas production** – natural gas production from oil and liquids-rich plays could make up a large portion of natural gas production growth. We estimate that oil production could grow by an average of 0.5 MMBbl/d every year until 2020.
- **Uncompleted Well backlog** – the backlog in drilled-but-uncompleted wells means that incremental output can be brought on line quickly.

Still, in spite of the natural gas supply growth, we believe that incremental upside in natural gas demand from the growing potential for gas substitution for oil in the fuel transportation market could apply upward pressure to natural gas prices going forward.

The Citi E&P equity research team's 2013 composite spot natural gas price forecast is \$3.90/MMBtu...

...And \$4.35/MMBtu in 2014, \$4.75/MMBtu in 2015, \$5.10/MMBtu in 2016 and \$5.25/MMBtu in 2017.

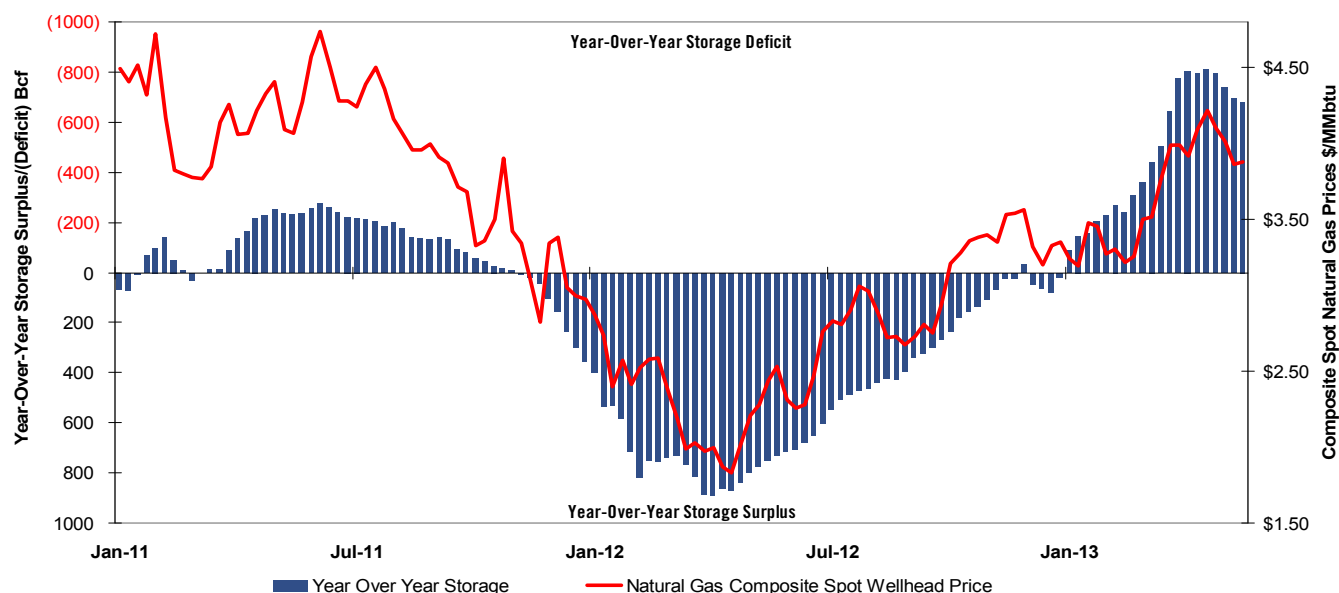
Interestingly, natural gas prices have quite often been closely correlated to the increase/decrease in the year-over-year storage surplus/deficit...

...While the year-over-year storage deficit has been declining recently due to lower coal-to-gas switching, and should continue to narrow as storage is once again refilled to "full" by the start of next winter.

Meanwhile, the Citi E&P equity research team recently raised its full-year composite spot natural gas price forecast to \$3.90/MMBtu from \$3.80/MMBtu (see our May 30<sup>th</sup> note: [E&P Stock Perspectives Per Underlying Commodity Price Drivers - Bumping '13 Natural Gas Price Outlook Following Much Colder-Than-Normal "Shoulder Season": Gas Levered E&Ps To Benefit](#)) following a much colder-than-normal April and May (note: Citi's official natural gas price forecast is the Commodities Team's \$4.30/MMBtu Henry Hub projection and the forecasts differ based partly on varying supply and coal-to-gas switching assessments). Weighted temperatures this past winter ended up matching the ten-year average after an extremely cold March, which was followed by a ~9% colder-than-normal April while temperatures in May also deviated sharply from normal. Thus, "shoulder" period (April-May) natural gas demand was ~60 Bcf above normal, which largely underscored our increased natural gas price outlook along with a corresponding and slightly higher outlook for CAPP coal prices. Next year, the Citi E&P team's natural gas price forecast of \$4.35/MMBtu is underpinned by the view that some producers will begin to put rigs back to work in dry gas plays in a rising natural gas price environment. The Citi E&P team's 2015 forecast is \$4.75/MMBtu, for 2016 is \$5.10/MMBtu and in 2017 is \$5.25/MMBtu (see Figure 7).

Further, as shown in Figure 4, composite spot natural gas price movements are often correlated to changes in the year-over-year storage surplus/deficit. As storage levels moved from a year-over-year deficit in late-2011 to a year-over-year surplus throughout 2012, composite spot natural gas prices steadily dropped and reached a low of ~\$1.90/MMBtu in April of last year, which corresponded to the largest year-over-year storage surplus (+888 Bcf) on record. Since this low point in April 2012, storage levels have normalized and throughout the first quarter were at an increasing year-over-year deficit, with the year-over-year deficit peaking at 807 Bcf in April. Similarly, composite spot natural gas prices more than doubled from April of last year to a 2013-high of ~\$4.22/MMBtu during April of this year. Since last month, however, the year-over-year storage deficit has narrowed due to lower natural gas demand in the power sector driven by lower levels of coal-to-gas switching compared to last year. This, in our opinion, should keep a lid on natural gas prices this summer apart from any intervention by Mother Nature.

Figure 4. Composite Spot Natural Gas Prices Versus Year-Over-Year Storage Surplus/Deficit

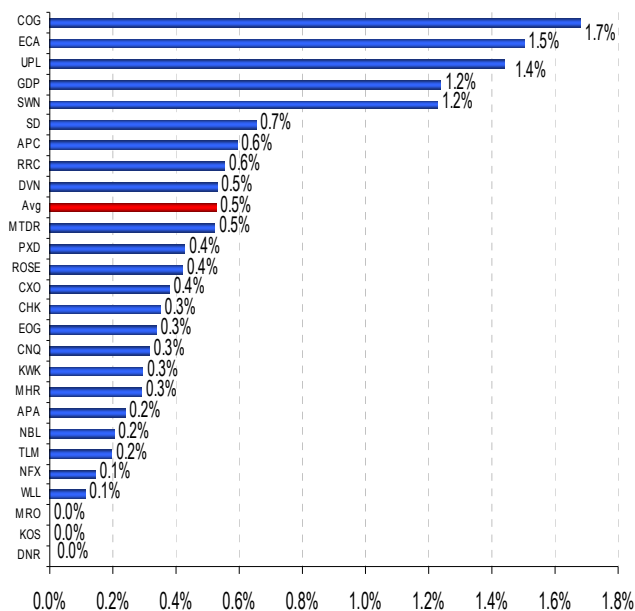


Source: Citi Research

Thus, any incremental natural gas demand would benefit the more natural gas leveraged companies in our coverage group including COG, CHK, ECA, RRC, SWN and UPL.

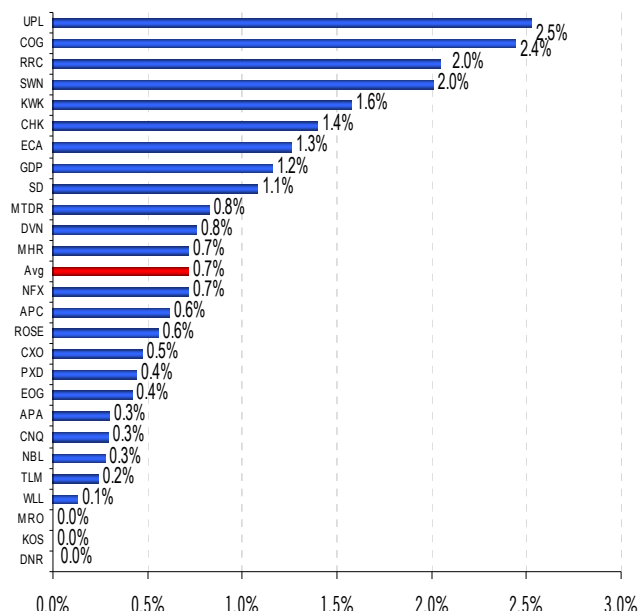
Thus, any incremental natural gas demand as a result of increased natural gas substitution for oil in the fuel transportation market could apply upward pressure on natural gas prices. As shown in Figures 5 and 6 below, any increase in natural gas prices would positively impact the bottom line of the more natural gas-leveraged E&P companies in our coverage group including *Cabot Oil & Gas*, *Chesapeake*, *Encana*, *Range Resources*, *Southwestern* and *Ultra Petroleum*.

Figure 5. 2013 CF Sensitivity per \$0.10/Mcf Change in Natural Gas Price Forecast



Source: Citi Research

Figure 6. 2014 CF Sensitivity per \$0.10/Mcf Change in Natural Gas Price Forecast



Source: Citi Research

Figure 7. Historical and Projected Commodity Prices

	Citi Research			Street Consensus*		
	WTI Oil (\$/Bbl.)	Brent Oil (\$/Bbl.)	Natural gas (\$/MMBtu)	WTI Oil (\$/Bbl.)	Brent Oil (\$/Bbl.)	Natural Gas (\$/MMBtu)
2005	\$56.44	\$54.36	\$8.35			
2006	\$66.11	\$65.52	\$6.42			
2007	\$72.35	\$73.17	\$6.64			
2008	\$99.69	\$98.07	\$8.36			
2009	\$61.77	\$61.76	\$3.78			
2010	\$79.39	\$80.00	\$4.33			
Q1	\$93.79	\$105.63	\$4.19			
Q2	\$102.28	\$116.99	\$4.30			
Q3	\$89.54	\$109.89	\$4.08			
Q4	\$94.06	\$109.03	\$3.27			
2011	<b>\$94.92</b>	<b>\$110.39</b>	<b>\$3.96</b>			
Q1	\$103.61	\$117.86	\$2.40			
Q2	\$93.98	\$108.12	\$2.25			
Q3	\$92.16	\$108.39	\$2.84			
Q4	\$88.17	\$110.13	\$3.37			
2012	<b>\$94.48</b>	<b>\$111.13</b>	<b>\$2.72</b>			
Q1	\$94.37	\$112.40	\$3.47			
Q2E	\$85.00	\$100.00	\$4.00	\$93.00	\$106.35	\$3.85
Q3E	\$90.00	\$105.00	\$3.95	\$95.00	\$110.00	\$3.80
Q4E	\$90.00	\$100.00	\$4.20	\$98.00	\$110.00	\$4.00
2013E**	<b>\$89.84</b>	<b>\$104.35</b>	<b>\$3.90</b>	<b>\$95.00</b>	<b>\$110.00</b>	<b>\$3.80</b>
2014E**	<b>\$83.00</b>	<b>\$93.00</b>	<b>\$4.35</b>	<b>\$98.50</b>	<b>\$109.50</b>	<b>\$4.20</b>
2015E**	<b>\$81.00</b>	<b>\$88.00</b>	<b>\$4.75</b>	<b>\$105.00</b>	<b>\$110.00</b>	<b>\$4.50</b>
2016E**	<b>\$80.00</b>	<b>\$85.00</b>	<b>\$5.10</b>	<b>\$105.00</b>	<b>\$110.00</b>	<b>\$4.74</b>
2017E+**	<b>\$81.00</b>	<b>\$85.00</b>	<b>\$5.25</b>	NA	NA	NA

\* Bloomberg Commodity Price consensus forecasts as of 05/01/13

\*\* Citi official natural gas price forecast is the Commodities Team's \$4.30/MMBtu Henry Hub projection

\*\* Our natural gas price forecast differs from Citi Commodities Team's forecast due to our lower outlook for U.S. power demand and higher coal-to-gas switching.

Crude oil: WTI Cushing spot wellhead price average.

Natural gas: 12 U.S. region spot wellhead price average.

Source: Citi Research

Figure 8. E&P Valuation Table

	Share Price	Citi	Target Price	EV/(DACF)			Price/	MEV/BOE	Reserve / Prod	Production Growth			% Prod N.Amer. Nat Gas	EBITDA/ Fixed Charges	Net Debt/Cap.		Reserve Replace Eff. <sup>(1)</sup>	
Company	6/3/2013	Rating		2012E 2013E 2014E			NAV			11/12E	12/13E	13/14E	2013	2013	2013E 2014E	2012		
Anadarko Petroleum (APC)	88.55	Buy	105.00	6.8x	6.0x	5.2x	87%	21.33	10.2	7.7%	6.6%	6.2%	54%	13.2x	29%	24%	1.3x	
Apache Corporation (APA)	84.57	Buy	95.00	4.5x	4.6x	4.6x	66%	16.10	11.0	4.1%	3.5%	6.4%	28%	44.7x	29%	29%	NA	
Cabot Oil & Gas (COG)	70.94	Buy	80.00	21.1x	12.8x	8.6x	189%	25.20	16.2	42.3%	44.9%	25.9%	95%	18.1x	26%	19%	2.8x	
Chesapeake Energy (CHK)	22.18	Neutral(H)	20.00	5.8x	5.8x	5.2x	59%	14.48	13.6	8.4%	(0.5%)	3.2%	73%	4.9x	44%	47%	NA	
Cobalt International Energy (CIE)	26.25	Buy(H)	38.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N/A	N/A	NA	
Concho Resources (CXO)	84.42	Buy	100.00	8.7x	7.9x	7.0x	153%	28.16	16.3	25.6%	16.1%	14.7%	39%	7.0x	51%	48%	1.8x	
Denbury Resources (DNR)	18.49	Neutral	18.00	5.9x	7.2x	7.2x	92%	21.99	19.3	9.2%	(1.2%)	14.4%	6%	19.3x	32%	32%	NA	
Devon Energy (DVN)	57.55	Neutral	55.00	5.8x	5.7x	5.7x	121%	9.74	12.5	3.7%	1.2%	4.7%	56%	11.9x	21%	21%	0.4x	
EOG Resources (EOG)	131.75	Buy	155.00	6.9x	6.1x	5.6x	114%	22.66	13.3	10.3%	7.6%	10.2%	32%	29.5x	29%	30%	NA	
Goodrich Petroleum (GDP)	12.81	Neutral	16.00	6.1x	7.6x	6.8x	NM	21.55	12.5	(21.7%)	(9.1%)	18.9%	67%	2.6x	93%	102%	NA	
Kosmos Energy (KOS)	10.43	Buy	15.00	11.9x	7.2x	7.1x	149%	80.81	NA	NA	51.4%	17.0%	0%	16.4x	48%	51%	NA	
Magnum Hunter (MHR)	3.58	Buy	5.00	8.7x	5.7x	5.9x	80%	30.40	27.6	140.6%	26.9%	15.9%	43%	2.0x	38%	42%	NA	
Marathon Oil (MRO)	35.46	Buy	42.00	8.9x	5.1x	5.1x	127%	16.33	13.6	19.1%	7.6%	5.7%	12%	33.3x	16%	16%	2.5x	
Matador Resources (MTDR)	9.96	Neutral (H)	10.00	6.6x	5.8x	5.7x	121%	35.86	8.3	27.9%	15.8%	22.2%	51%	17.5x	50%	55%	NA	
Newfield Exploration (NFX)	23.93	Neutral	25.00	4.8x	4.6x	5.4x	93%	11.79	13.3	(0.5%)	(17.8%)	(7.2%)	43%	7.6x	50%	51%	NA	
Noble Energy (NBL)	57.77	Buy	65.00	8.0x	6.7x	5.7x	50%	20.45	15.6	12.4%	16.9%	16.6%	26%	16.1x	32%	32%	0.6x	
Occidental Petroleum (OXY)*	94.27	Neutral	82.00	7.2x	7.7x	7.4x	117%	22.92	12.7	5.8%	3.1%	3.0%	59%	67.8x	9%	9%	1.5x	
Pioneer Natural Resources (PXD)	140.83	Buy	148.00	11.1x	9.3x	8.2x	111%	21.13	25.0	28.5%	13.9%	14.9%	35%	10.9x	32%	33%	1.1x	
Quicksilver Resources (KWK)	2.31	Neutral	2.00	6.4x	6.9x	7.1x	231%	9.94	18.5	(12.7%)	(18.5%)	(4.7%)	79%	1.6x	333%	283%	NA	
Range Resources (RRC)	74.62	Buy	95.00	16.6x	14.1x	10.7x	125%	14.12	28.0	35.9%	25.3%	22.5%	78%	6.4x	59%	58%	2.7x	
Rosetta Resources (ROSE)	47.28	Buy	55.00	7.9x	6.5x	5.8x	86%	17.03	16.0	34.6%	42.1%	26.0%	37%	20.6x	48%	48%	3.0x	
SandRidge Energy (SD)	5.10	Neutral	5.25	6.0x	5.8x	7.0x	102%	13.52	20.1	43.1%	(3.3%)	3.7%	53%	2.5x	55%	65%	0.7x	
Southwestern Energy (SWN)	38.07	Buy	46.00	9.5x	8.1x	6.8x	137%	22.41	11.8	12.7%	12.7%	10.5%	100%	20.6x	33%	28%	NA	
Ultra Petroleum (UPL)	23.15	Neutral	18.25	6.8x	9.2x	7.6x	204%	11.33	20.3	4.5%	(9.6%)	3.7%	97%	6.4x	124%	101%	NA	
Whiting Petroleum (WLL)	46.70	Buy	52.00	5.1x	4.7x	4.0x	65%	19.95	13.9	21.6%	13.7%	12.6%	12%	19.6x	39%	38%	1.5x	
U.S. Group Average (Ex Hi-Lo)				7.8x	6.9x	6.4x	114%	\$22.05	15.9	9.8%	5.8%	7.7%	49%	15.1x	44%	44%	1.7x	
Canadian Natural Res. (CNQ)	29.43	Buy	37.00	6.5x	6.1x	5.4x	83%	10.38	18.4	9.7%	5.3%	9.2%	27%	26.2x	31%	30%	1.3x	
EnCana Corp. (ECA)	18.90	Neutral	20.00	4.3x	6.1x	5.7x	154%	10.38	10.7	(8.6%)	1.4%	5.8%	90%	5.2x	50%	54%	NA	
Talisman Energy (TLM)	11.58	Neutral	12.50	5.0x	6.0x	5.6x	97%	18.04	8.0	0.1%	(9.1%)	1.4%	36%	10.3x	34%	37%	NA	
Canadian E&P Average				5.3x	6.1x	5.6x	111%	\$12.93	12.4	0.4%	1.9%	5.7%	51%	13.9x	38%	40%	1.3x	
US & Canadian Average (Ex Hi-Lo)				7.5x	6.8x	6.3x	114%	\$19.10	15.6	7.7%	5.1%	7.5%	49%	14.9x	44%	44%	1.6x	

Source: Citi Research



## Appendix A-1

### Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

### IMPORTANT DISCLOSURES

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Magnum Hunter Resources Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Quicksilver Resources Inc

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Devon Energy Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Anadarko Petroleum Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Occidental Petroleum Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Newfield Exploration Co

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Denbury Resources Inc

---

Citigroup Global Markets is acting as a joint book-running manager on the announced public offering of common stock of Pioneer Natural Resources Co.

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Pioneer Natural Resources Co.

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Talisman Energy Inc

---

Citigroup Global Markets Inc. is acting as a co-manager on the announced secondary offering of common shares of Rosetta Resources Inc.

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of SandRidge Energy Inc

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Range Resources Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Chesapeake Energy Corp

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of EOG Resources Inc

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Canadian Natural Resources Ltd

---

Citigroup Global Markets Inc. owns a position of 1 million USD or more in the debt securities of Apache Corp

---

Rob Teahen, Associate, holds a long position in the securities of Chesapeake Energy Corp.

---

Robert S Morris, Analyst, holds a long position in the securities of Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd.

---

Citigroup Global Markets Inc. or its affiliates beneficially owns 1% or more of any class of common equity securities of Cobalt International Energy. This position reflects information available as of the prior business day.

---

Within the past 12 months, Citigroup Global Markets Inc. or its affiliates has acted as manager or co-manager of an offering of securities of Kosmos Energy Ltd, Magnum Hunter Resources, Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Cobalt International Energy, Rosetta Resources, SandRidge Energy Inc, Range Resources Corp, Chesapeake Energy Corp, EOG Resources Inc, Apache Corp.

---

Citigroup Global Markets Inc. or its affiliates has received compensation for investment banking services provided within the past 12 months from Kosmos Energy Ltd, Noble Energy Inc, Magnum Hunter Resources, Southwestern Energy Co, Devon Energy Corp, Ultra Petroleum Corp., Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Cobalt International Energy, Talisman Energy Inc, Rosetta Resources, SandRidge Energy Inc, Range Resources Corp, Matador Resources Co, EnCana Corp, Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp.

---

Citigroup Global Markets Inc. or its affiliates expects to receive or intends to seek, within the next three months, compensation for investment banking services from Quicksilver Resources Inc, Anadarko Petroleum Corp, EnCana Corp.

---

Citigroup Global Markets Inc. or an affiliate received compensation for products and services other than investment banking services from Kosmos Energy Ltd, Noble Energy Inc, Magnum Hunter Resources, Quicksilver Resources Inc, Southwestern Energy Co, Devon Energy Corp, Ultra Petroleum Corp., Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Talisman Energy Inc, Rosetta Resources, SandRidge Energy Inc, Range Resources Corp, Matador Resources Co, EnCana Corp, Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp in the past 12 months.

---

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as investment banking client(s): Anadarko Petroleum Corp, Kosmos Energy Ltd, Noble Energy Inc, Magnum Hunter Resources, Quicksilver Resources Inc, Southwestern Energy Co, Devon Energy Corp, Ultra Petroleum Corp., Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Cobalt International Energy, Talisman Energy Inc, Rosetta Resources, SandRidge Energy Inc, Range Resources Corp, Matador Resources Co, EnCana Corp, Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp.

---

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, securities-related: Kosmos Energy Ltd, Cobalt International Energy, Pioneer Natural Resources Co., Noble Energy Inc, Magnum Hunter Resources, Quicksilver Resources Inc, Southwestern Energy Co, Devon Energy Corp, Ultra Petroleum Corp., Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Goodrich Petroleum Corp, Cabot Oil & Gas Corp, Marathon Oil Corp, Talisman Energy Inc, SandRidge Energy Inc, Range Resources Corp, EnCana Corp, Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp.

Citigroup Global Markets Inc. currently has, or had within the past 12 months, the following as clients, and the services provided were non-investment-banking, non-securities-related: Kosmos Energy Ltd, Noble Energy Inc, Magnum Hunter Resources, Quicksilver Resources Inc, Southwestern Energy Co, Devon Energy Corp, Ultra Petroleum Corp., Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Talisman Energy Inc, Rosetta Resources, SandRidge Energy Inc, Range Resources Corp, Matador Resources Co, EnCana Corp, Chesapeake Energy Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp.

Citigroup Global Markets Inc. or an affiliate received compensation in the past 12 months from Kosmos Energy Ltd, Cobalt International Energy, Pioneer Natural Resources Co..

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

The Firm is a market maker in the publicly traded equity securities of Rosetta Resources.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures). Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

#### **Citi Research Equity Ratings Distribution**

##### **Data current as of 31 Mar 2013**

Citi Research Global Fundamental Coverage

*% of companies in each rating category that are investment banking clients*

<b>12 Month Rating</b>			<b>Relative Rating</b>		
<b>Buy</b>	<b>Hold</b>	<b>Sell</b>	<b>Buy</b>	<b>Hold</b>	<b>Sell</b>
48%	39%	12%	7%	87%	7%
53%	49%	43%	65%	49%	51%

##### **Guide to Citi Research Fundamental Research Investment Ratings:**

Citi Research stock recommendations include an investment rating and an optional risk rating to highlight high risk stocks.

**Risk rating** takes into account both price volatility and fundamental criteria. Stocks will either have no risk rating or a High risk rating assigned.

**Investment Ratings:** Citi Research investment ratings are Buy, Neutral and Sell. Our ratings are a function of analyst expectations of expected total return ("ETR") and risk. ETR is the sum of the forecast price appreciation (or depreciation) plus the dividend yield for a stock within the next 12 months. The Investment rating definitions are: Buy (1) ETR of 15% or more or 25% or more for High risk stocks; and Sell (3) for negative ETR. Any covered stock not assigned a Buy or a Sell is a Neutral (2). For stocks rated Neutral (2), if an analyst believes that there are insufficient valuation drivers and/or investment catalysts to derive a positive or negative investment view, they may elect with the approval of Citi Research management not to assign a target price and, thus, not derive an ETR. Analysts may place covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and / or trading in the company's securities (e.g. trading suspension). As soon as practically possible, the analyst will publish a note re-establishing a rating and investment thesis. To satisfy regulatory requirements, we correspond Under Review and Neutral to Hold in our ratings distribution table for our 12-month fundamental rating system. However, we reiterate that we do not consider Under Review to be a recommendation.

**Relative three-month ratings:** Citi Research may also assign a three-month relative call (or rating) to a stock to highlight expected out-performance (most preferred) or under-performance (least preferred) versus the geographic and industry sector over a 3 month period. The relative call may highlight a specific near-term catalyst or event impacting the company or the market that is anticipated to have a short-term price impact on the equity securities of the company. Absent any specific catalyst the analyst(s) will indicate the most and least preferred stocks in the universe of stocks under consideration, explaining the basis for this short-term view. This three-month view may be different from and does not affect a stock's fundamental equity rating, which reflects a longer-term total absolute return expectation. For purposes of NASD/NYSE ratings-distribution-disclosure rules, most preferred calls correspond to a buy recommendation and least preferred calls correspond to a sell recommendation. Any stock not assigned to a most preferred or least preferred call is considered non-relative-rated (NRR). For purposes of NASD/NYSE ratings-distribution-disclosure rules we correspond NRR to Hold in our ratings distribution table for our 3-month relative rating system. However, we reiterate that we do not consider NRR to be a recommendation.

Prior to October 8, 2011, the firm's stock recommendation system included a risk rating and an investment rating. **Risk ratings**, which took into account both price volatility and fundamental criteria, were: Low (L), Medium (M), High (H), and Speculative (S). **Investment Ratings** of Buy, Hold and Sell were a function of the Citi Research expectation of total return (forecast price appreciation and dividend yield within the next 12 months) and risk rating. Additionally, analysts could have placed covered stocks "Under Review" in response to exceptional circumstances (e.g. lack of information critical to the analyst's thesis) affecting the company and/or trading in the company's securities (e.g. trading suspension). Stocks placed "Under Review" were monitored daily by management and as practically possible, the analyst published a note re-establishing a rating and investment thesis. For securities in developed markets (US, UK, Europe, Japan, and Australia/New Zealand), investment ratings were: Buy (1) (expected total return of 10% or more for Low-Risk stocks, 15% or more for Medium-Risk stocks, 20% or more for High-Risk stocks, and 35% or more for Speculative stocks); Hold (2) (0%-10% for Low-Risk stocks, 0%-15% for Medium-Risk stocks, 0%-20% for High-Risk stocks, and 0%-35% for Speculative stocks); and Sell (3) (negative total return). For securities in emerging markets (Asia Pacific, Emerging Europe/Middle East/Africa, and Latin America), investment ratings were: Buy (1) (expected total return of 15% or more for Low-Risk stocks, 20% or more for Medium-Risk stocks, 30% or more for High-Risk stocks, and 40% or more for Speculative stocks); Hold (2) (5%-15% for Low-Risk stocks, 10%-20% for Medium-Risk stocks, 15%-30% for High-Risk stocks, and 20%-40% for Speculative stocks); and Sell (3) (5% or less for Low-Risk stocks, 10% or less for Medium-Risk stocks, 15% or less for High-Risk stocks, and 20% or less for Speculative stocks).



Investment ratings are determined by the ranges described above at the time of initiation of coverage, a change in investment and/or risk rating, or a change in target price (subject to limited management discretion). At other times, the expected total returns may fall outside of these ranges because of market price movements and/or other short-term volatility or trading patterns. Such interim deviations from specified ranges will be permitted but will become subject to review by Research Management. Your decision to buy or sell a security should be based upon your personal investment objectives and should be made only after evaluating the stock's expected performance and risk.

---

#### **NON-US RESEARCH ANALYST DISCLOSURES**

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citigroup Global Markets Inc

Robert S Morris; Rob Teahen; Chingiz Gadimov; Bryan M Baritot; Faisal Khan, CFA

---

#### **OTHER DISCLOSURES**

Citigroup Global Markets Inc. and/or its affiliates has a significant financial interest in relation to Noble Energy Inc, Southwestern Energy Co, Devon Energy Corp, Anadarko Petroleum Corp, Concho Resources Inc, Occidental Petroleum Corp, Newfield Exploration Co., Pioneer Natural Resources Co., Marathon Oil Corp, Talisman Energy Inc, SandRidge Energy Inc, Range Resources Corp, EnCana Corp, EOG Resources Inc, Canadian Natural Resources Ltd, Apache Corp. (For an explanation of the determination of significant financial interest, please refer to the policy for managing conflicts of interest which can be found at [www.citiVelocity.com](http://www.citiVelocity.com).)

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

---

**Important Disclosures for Morgan Stanley Smith Barney LLC Customers:** Morgan Stanley & Co. LLC (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Research research report. Ask your Financial Advisor or use [smithbarney.com](http://smithbarney.com) to view any available Morgan Stanley research reports in addition to Citi Research research reports.

Important disclosure regarding the relationship between the companies that are the subject of this Citi Research research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Wealth Management disclosure website at [www.morganstanley.com/online/researchdisclosures](http://www.morganstanley.com/online/researchdisclosures).

For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to [www.morganstanley.com/researchdisclosures](http://www.morganstanley.com/researchdisclosures) and [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures).

This Citi Research research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of Citi Research. This could create a conflict of interest.

---

**The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by.** The Product is made available in **Australia** through Citi Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is

made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **France** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A. Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. <http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank

Singapore Ltd ("CSL") to selected Citigroup/Citigroup Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigroup/Citigroup Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Esiki Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E.**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority. Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at [https://www.citivelocity.com/cvr/eppublic/citi\\_research\\_disclosures](https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures).

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product. With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs) and other product that is made available through other distribution channels only to certain categories of clients to satisfy legal or regulatory requirements, Citi Research concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual Citi Research analysts may also opt to circulate research posted on such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. Citi Research simultaneously distributes product that is limited to QIBs only through email distribution.

The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with Citi and legal and regulatory constraints. Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes Citi estimates, data from company reports and feeds from Reuters and Datastream.

---

© 2013 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party. Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any

other MSCI intellectual property may not be reproduced, disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in anyway form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

---

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST

---