



Strategic Advisors in Global Energy

### COMBINED VALUE OF PFC ENERGY 50 FALLS 46%

- The combined market capitalization of the 50 largest energy companies fell 46% from \$5.2 trillion a year ago to \$2.8 trillion, the worst decline in the list's history and substantially more than the 12% and 7% declines seen in 2001 and 2002. This year's PFC Energy 50 companies have the same combined value as the list published three years ago.
- The lost value reflects a combination of falling global equity markets (S&P 500 down 38.5%) and lower oil prices (WTI price declined 59% to a level not seen since 2004).

### THE HIGHER THEY FLY, THE HARDER THEY FALL

- Last year's big gainers, the traded National Oil Companies (NOCs), experienced the largest declines, losing 64% of their combined market capitalization, compared with average Integrated Oil Company (IOC) losses of 35%.
- The Alternative Energy Top 15, which in 2007 posted an average 145% share price increase, also suffered substantial value losses. The companies on this year's Alternative Energy Top 15 declined an average 61%.
- Within the NOC group, value losses ranged from Ecopetrol's 11% to Gazprom's 74%, the largest decline on the list.
- Most of the value remains outside public markets. Major resource holding companies like Saudi Aramco, National Iranian Oil Company and PDVSA have also lost substantial value.

### FLIGHT TO QUALITY

- Least hit by the downturn were the six SuperMajors, which posted a combined value decline of 30%. Within this group, ExxonMobil (market cap down 21%) and Chevron (-24%) proved the most resilient. Stock repurchases further limited their share price declines to 15% and 21%, respectively.
- ExxonMobil reclaimed its long-standing leadership of the PFC Energy 50 from PetroChina, which lost 64% of its value to end below \$260 billion. At the start of the year, markets valued PetroChina 41% higher than ExxonMobil; at year end, ExxonMobil's market capitalization was 56% above PetroChina's.
- IOCs as a group performed slightly less well than SuperMajors, posting a 35% value decline. Cepsa (-10%) showed the strongest IOC performance; weakest came from the Russian companies Lukoil (-63%) and Surgutneftegaz (-56%).

### COUNTRY WINNERS AND LOSERS

- Russian and Chinese companies fared badly. The combined value of the list's four Russian companies fell 69%; the three Chinese companies declined 63%.
- Japanese companies benefited from largely short energy positions and a strengthening currency. Tokyo Gas was the only PFC Energy 50 firm to post a share price gain for the year. Japanese power companies also performed well on the PFC Energy 100—available at [www.pfcenergy50.com](http://www.pfcenergy50.com).

### SERVICE SECTOR REDISCOVERS GRAVITY

- Value declines were large in oilfield services, a sector heavily favored by equity markets in 2007 and early 2008. Led by Transocean, which shed 67% of its value and fell furthest in rank (from #25 to #45), the group lost 58% of its combined market value over the year. Two service companies—Baker Hughes and National Oilwell Varco—were too small at year end to return to the list.
- One of the surprising features of last year's PFC Energy 50 was the exceptionally high earnings multiples that service sector stocks enjoyed relative to energy producers. This gap largely evaporated in 2008. Schlumberger and ExxonMobil began the year with P/E ratios of 25 and 14, respectively; at year end both companies were valued at nine times earnings.

### REVERSALS OF FORTUNE

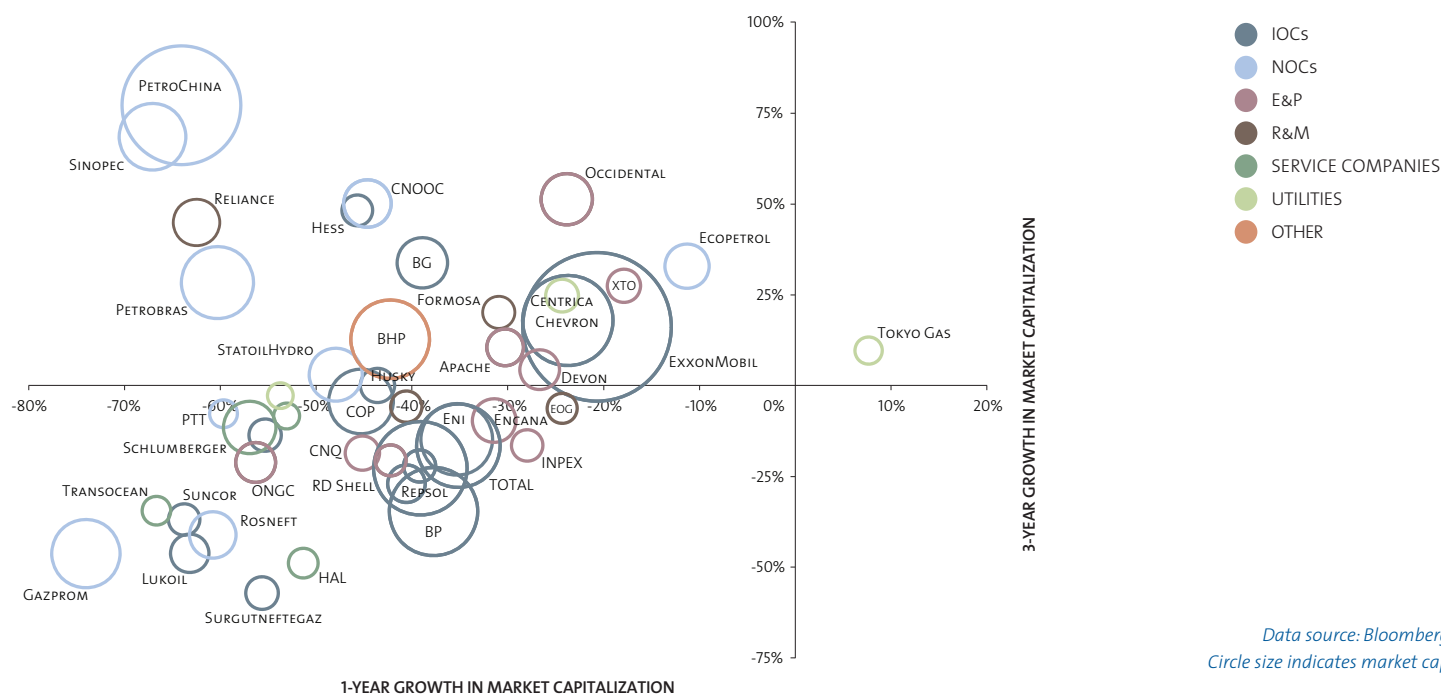
- Outside the service sector, E&P companies rode the biggest rollercoaster, posting strong value gains in the first half before being hit by both the falling oil price and collapsing equity markets. Apache, Canadian Natural Resources, Devon, EOG, Encana, Woodside and XTO rose 30-50% in the first six months but lost 40-60% in the second half.
- Explore the 2009 PFC Energy 50 trends in greater detail with new interactive graphics at [www.pfcenergy50.com](http://www.pfcenergy50.com).

**PFC ENERGY 50**

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Primary Business	HQ Country	Ticker/Exch
1	2	<b>EXXONMOBIL</b>	406.1	-15%	Integrated IOC	US	XOM US
2	1	<b>PETROCHINA</b>	259.7	-65%	Integrated NOC	China	601857 CH
3	4	<b>ROYAL DUTCH SHELL</b>	161.1	-38%	Integrated IOC	Netherlands	RDSA NA
4	10	<b>CHEVRON</b>	150.3	-21%	Integrated IOC	US	CVX US
5	7	<b>BP</b>	143.6	-37%	Integrated IOC	UK	BP/ LN
6	8	<b>TOTAL</b>	128.7	-34%	Integrated IOC	France	FP FP
7	9	<b>BHP BILLITON</b>	113.4	-39%	Diversified Minerals	Australia	BHP AU
8	22	<b>GDF SUEZ</b>	108.1	-16%	Utility	France	GSZ FP
9	6	<b>PETROBRAS</b>	96.8	-60%	Integrated NOC	Brazil	PETR3 BZ
10	11	<b>ENI</b>	93.6	-36%	Integrated IOC	Italy	ENI IM
11	3	<b>GAZPROM</b>	83.0	-74%	Integrated NOC	Russia	GSPBEX RU
12	5	<b>SINOPEC</b>	82.1	-68%	Integrated NOC	China	600028 CH
13	12	<b>CONOCOPHILLIPS</b>	77.2	-41%	Integrated IOC	US	COP US
14	16	<b>STATOILHYDRO</b>	52.2	-47%	Integrated NOC	Norway	STL NO
15	13	<b>SCHLUMBERGER</b>	50.6	-57%	Oilfield Services	US	SLB US
16	21	<b>OCCIDENTAL</b>	48.6	-22%	E&P	US	OXY US
17	17	<b>BG</b>	46.8	-39%	Integrated IOC	UK	BG/ LN
18	18	<b>CNOOC</b>	41.7	-45%	E&P	Hong Kong	883 HK
19	14	<b>RELIANCE</b>	39.9	-65%	R&M	India	RIL IN
20	15	<b>ROSNEFT</b>	39.7	-61%	Integrated NOC	Russia	ROSN RU
21	33	<b>ECOPETROL</b>	36.1	-11%	Integrated NOC	Colombia	ECOPETL CB
22	23	<b>ENCANA</b>	35.1	-31%	E&P	Canada	ECA CN
23	20	<b>ONGC</b>	29.3	-56%	E&P	India	ONGC IN
24	29	<b>DEVON</b>	29.0	-26%	E&P	US	DVN US
25	19	<b>LUKOIL</b>	27.2	-63%	Integrated IOC	Russia	LKOH RU
26	27	<b>REPSOL YPF</b>	25.7	-41%	Integrated IOC	Spain	REP SM
27	42	<b>CEPSA</b>	25.2	-9%	Integrated IOC	Spain	CEP SM
28	34	<b>APACHE</b>	24.9	-31%	E&P	US	APA US
29	30	<b>CANADIAN NAT'L RESOURCES</b>	21.7	-45%	E&P	Canada	CNQ CN
30	32	<b>HUSKY ENERGY</b>	21.5	-44%	Integrated IOC	Canada	HSE CN
31	-	<b>XTO ENERGY</b>	20.3	-31%	E&P	US	XTO US
32	47	<b>CENTRICA</b>	19.8	-39%	Utility	UK	CNA LN
33	26	<b>SURGUTNEFTEGAZ</b>	19.6	-56%	Integrated IOC	Russia	SNGS RU
34	28	<b>MARATHON</b>	19.3	-55%	Integrated IOC	US	MRO US
35	43	<b>FORMOSA PETROCHEMICAL</b>	19.1	-31%	R&M	Taiwan	6505 TT
36	39	<b>SASOL</b>	18.9	-40%	Integrated IOC	South Africa	SOL SJ
37	24	<b>SUNCOR</b>	18.2	-64%	Integrated IOC	Canada	SU CN
38	50	<b>INPEX</b>	18.1	-28%	E&P	Japan	1605 JP
39	41	<b>WOODSIDE</b>	18.1	-41%	E&P	Australia	WPL AU
40	36	<b>IBERDROLA RENOVABLES</b>	18.0	-48%	Alternatives	Spain	IBR SM
41	40	<b>ANADARKO</b>	17.7	-41%	E&P	US	APC US
42	38	<b>HESS</b>	17.5	-47%	Integrated IOC	US	HES US
43	-	<b>EOG RESOURCES</b>	16.6	-25%	E&P	US	EOG US
44	37	<b>HALLIBURTON</b>	16.2	-52%	Oilfield Services	US	HAL US
45	25	<b>TRANSOCEAN</b>	15.1	-67%	Drilling & Seismic	US	RIG US
46	35	<b>PTT</b>	14.2	-60%	Integrated NOC	Thailand	PTT TB
47	-	<b>TOKYO GAS</b>	13.6	9%	Utility	Japan	9531 JP
48	44	<b>TENARIS</b>	12.4	-53%	Equipment & EPCI	Luxembourg	TS US
49	45	<b>GAS NATURAL</b>	12.1	-54%	Utility	Spain	GAS SM
50	-	<b>FIRST SOLAR</b>	11.2	-48%	Alternatives	US	FSLR US

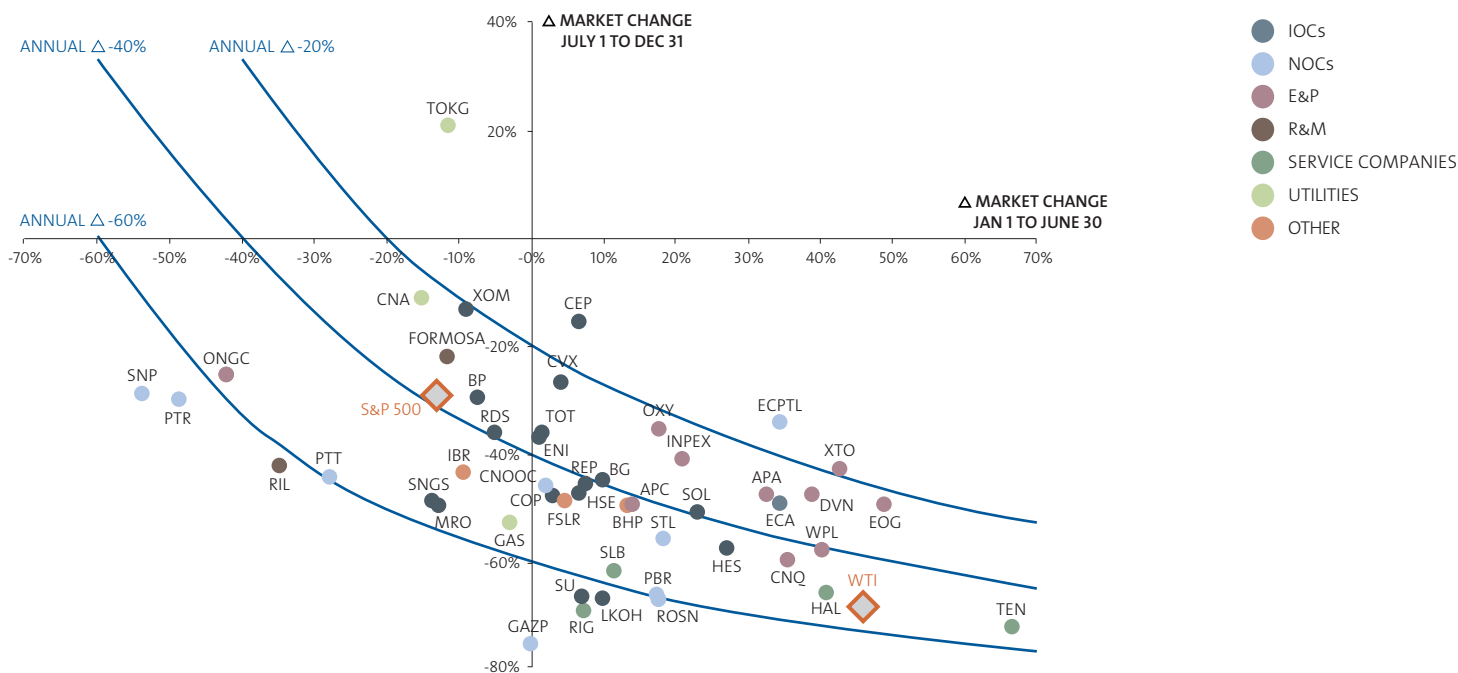
Source: Bloomberg, PFC Energy estimates as of 12/31/2008  
Share price growth based on primary exchange tickers

## 1-YEAR AND 3-YEAR CHANGES IN MARKET CAPITALIZATION



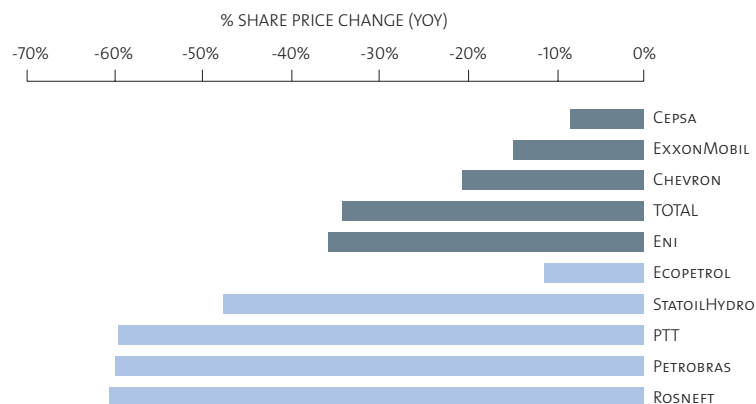
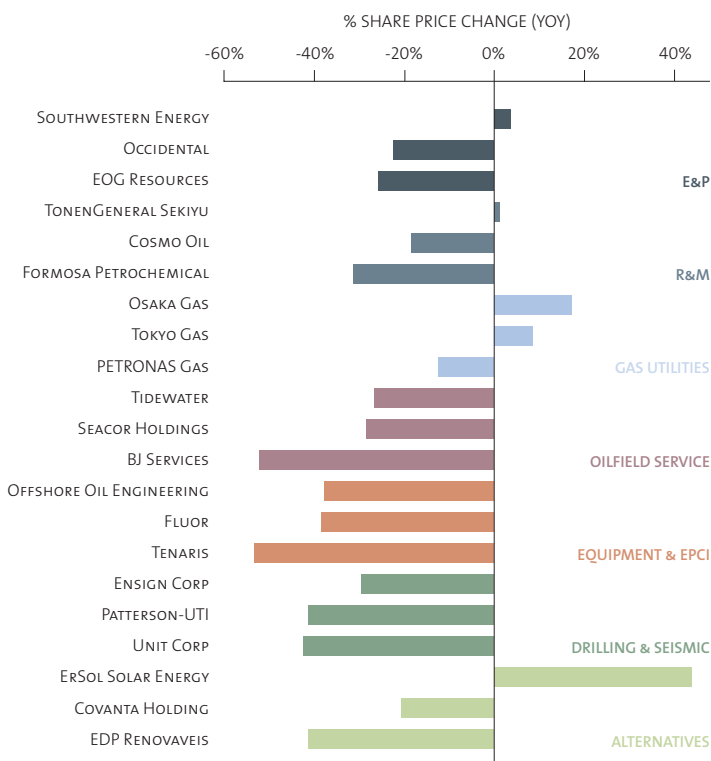
In the last three years, the market caps of the PFC Energy 50 companies have been more volatile than at any time in the history of this ranking. Over the full period, the values of the Chinese companies PetroChina and Sinopec gained more than 50%, despite 60% declines in 2008. Other companies posting strong long-term growth were Reliance, CNOOC, Hess and Occidental. The worst performance, declines of 30% or more, came from the Russian companies, two service companies, Transocean and Halliburton, and IOCs Suncor and BP. Among SuperMajors, only Chevron and ExxonMobil increased their market cap over the three-year period. Please visit the PFC Energy 50 website at [www.pfcenergy50.com](http://www.pfcenergy50.com) for additional information and analysis.

## 2008: A ROLLERCOASTER YEAR



For many PFC Energy 50 companies, 2008 was a rollercoaster ride, with gains in the first half being more than offset by losses in the second. Others lost value at varying rates all year. The chart shows how market capitalizations moved in the year's first six months (horizontal axis) vs. the second half (vertical axis). Companies in the bottom right quadrant, predominantly E&P and service companies, gained value in the first half and lost it in the second. Companies in the bottom left quadrant, including refiners and many integrated IOCs and NOCs, lost value all year. Moving from top right to bottom left, companies increasingly lost value. Companies along the contours achieved the same result by year end—but by different routes. Proximity to the WTI and S&P 500 index points shows how closely company performance correlated with oil prices or market movements. Only one PFC Energy 50 company attained the top right quadrant, and it is off the chart: GdF substantially increased its market cap by completing its long-planned merger with Suez. Please visit the PFC Energy 50 website at [www.pfcenergy50.com](http://www.pfcenergy50.com) for additional information and analysis.

## SEGMENT SHARE PRICE PERFORMANCE



Only one of the PFC Energy 50 companies, Tokyo Gas (+9%) achieved a share price increase in 2008. In a year in which no segment could be said to have performed well, most "best performers" posted losses. Among integrated companies, many NOCs saw their shares decline 60% or more. IOCs fared slightly better, with performance more closely matching broad equity markets. Four of the smaller companies featured in the segment Top 15s posted positive performance: E&P company Southwestern Energy (+4%), refiner TonenGeneral Sekiyu (+1%), utility Osaka Gas (+17%) and the #15 Alternatives company ErSol Solar Energy, which achieved the largest overall gain of 43%.

Data source: Bloomberg, PFC Energy estimates, as of 12/31/08

## TOP 15 EXPLORATION & PRODUCTION

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	3	<b>OCCIDENTAL</b>	48.6	-22%	6	6%	US	OXY US
2	1	<b>CNOOC</b>	41.7	-45%	6	7%	HONG KONG	883 HK
3	4	<b>ENCANA</b>	35.1	-31%	6	35%	CANADA	ECA CN
4	2	<b>ONGC</b>	29.3	-56%	7	1%	INDIA	ONGC IN
5	5	<b>DEVON</b>	29.0	-26%	6	16%	US	DVN US
6	8	<b>BHP BILLITON</b>	*	-39%	8	25%	AUSTRALIA	BHP AU
7	7	<b>APACHE</b>	24.9	-31%	5	18%	US	APA US
8	6	<b>CANADIAN NAT'L RESOURCES</b>	21.7	-45%	7	41%	CANADA	CNQ CN
9	12	<b>XTO ENERGY</b>	20.3	-31%	9	42%	US	XTO US
10	11	<b>INPEX</b>	18.1	-28%	8	10%	JAPAN	1605 JP
11	10	<b>WOODSIDE</b>	18.1	-41%	15	26%	AUSTRALIA	WPL AU
12	9	<b>ANADARKO</b>	17.7	-41%	8	37%	US	APC US
13	14	<b>EOG RESOURCES</b>	16.6	-25%	7	18%	US	EOG US
14	-	<b>TALISMAN</b>	10.2	-46%	5	28%	CANADA	TLM CN
15	-	<b>SOUTHWESTERN ENERGY</b>	9.9	4%	20	25%	US	SWN US

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

• Share price growth based on primary exchange tickers

• P/E based on earnings from continuing operations for the 12 months ended 9/30/2008

• Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet

\* BHP Billiton is a diversified minerals company; its oil and gas E&P activities, which account for 20-25% of the company's total, had an estimated value in the range of \$25-28 billion. BHP Billiton's total market capitalization was \$113.4 billion.

## TOP 15 REFINING & MARKETING

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>RELIANCE</b>	39.9	-65%	9	36%	INDIA	RIL IN
2	3	<b>FORMOSA PETROCHEMICAL</b>	19.1	-31%	9	38%	TAIWAN	6505 TT
3	2	<b>VALERO</b>	11.2	-69%	4	25%	US	VLO US
4	4	<b>INDIAN OIL</b>	10.4	-57%	6	46%	INDIA	IOCL IN
5	6	<b>NIPPON OIL</b>	7.2	-39%	8	57%	JAPAN	5001 JP
6	-	<b>TONENGENERAL SEKIYU</b>	5.6	1%	82	34%	JAPAN	5012 JP
7	5	<b>SK ENERGY</b>	5.5	-70%	21	50%	KOREA	096770 KS
8	8	<b>S-OIL</b>	5.5	-44%	9	32%	KOREA	010950 KS
9	12	<b>SUNOCO</b>	5.1	-40%	9	34%	US	SUN US
10	10	<b>NESTE OIL</b>	3.8	-58%	6	36%	FINLAND	NESTV FH
11	11	<b>PKN ORLEN</b>	3.7	-59%	4	32%	POLAND	PKN PW
12	13	<b>TUPRAS</b>	2.6	-64%	3	15%	TURKEY	TUPRS TI
13	-	<b>COSMO OIL</b>	2.6	-19%	5	56%	JAPAN	5007 JP
14	-	<b>IDEMITSU KOSAN</b>	2.5	-40%	23	65%	JAPAN	5019 JP
15	14	<b>TESORO</b>	1.8	-72%	27	32%	US	TSO US

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

- Share price growth based on primary exchange tickers
- P/E based on earnings from continuing operations for the 12 months ended 9/30/2008
- Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet

## TOP 15 GAS UTILITIES

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>GDF SUEZ</b>	108.1	-16%	13	23%	FRANCE	GSZ FP
2	3	<b>CENTRICA</b>	19.8	-39%	5	28%	UK	CNA LN
3	6	<b>TOKYO GAS</b>	13.6	9%	58	44%	JAPAN	9531 JP
4	2	<b>GAS NATURAL</b>	12.1	-54%	8	48%	SPAIN	GAS SM
5	5	<b>SEMPRA</b>	10.4	-31%	10	44%	US	SRE US
6	4	<b>HONG KONG AND CHINA GAS</b>	10.1	-46%	12	22%	HONG KONG	3 HK
7	8	<b>OSAKA GAS</b>	9.8	17%	60	44%	JAPAN	9532 JP
8	-	<b>PGNIG</b>	7.2	-42%	30	1%	POLAND	PGN PW
9	-	<b>QUESTAR</b>	5.7	-40%	9	39%	US	STR US
10	11	<b>PETRONAS GAS</b>	5.6	-12%	18	5%	MALAYSIA	PTG MK
11	7	<b>GAIL</b>	5.4	-54%	9	22%	INDIA	GAIL IN
12	10	<b>ENAGAS</b>	5.2	-25%	14	64%	SPAIN	ENG SM
13	-	<b>EQUITABLE RESOURCES</b>	4.4	-37%	15	42%	US	EQT US
14	12	<b>CANADIAN UTILITIES</b>	4.2	-29%	14	50%	CANADA	CU CN
15	9	<b>PERUSAHAAN GAS</b>	3.8	-48%	30	45%	INDONESIA	PGAS IJ

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

- Share price growth based on primary exchange tickers
- P/E based on earnings from continuing operations for the 12 months ended 9/30/2008
- Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet
- Excludes gas utilities that are components of diversified companies whose major business is electric power

## TOP 15 OILFIELD SERVICES

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>SCHLUMBERGER</b>	50.6	-57%	9	24%	US	SLB US
2	2	<b>HALLIBURTON</b>	16.2	-52%	6	27%	US	HAL US
3	3	<b>BAKER HUGHES</b>	9.9	-60%	6	19%	US	BHI US
4	4	<b>WEATHERFORD</b>	7.4	-68%	5	40%	US	WFT US
5	5	<b>CHINA OILFIELD SERVICES</b>	6.4	-63%	9	11%	CHINA	601808 CH
6	6	<b>SMITH INTERNATIONAL</b>	5.0	-69%	6	33%	US	SII US
7	7	<b>BJ SERVICES</b>	3.4	-52%	6	14%	US	BJS US
8	-	<b>TIDEWATER</b>	2.1	-27%	6	14%	US	TDW US
9	8	<b>SBM OFFSHORE</b>	1.9	-59%	9	52%	NETHERLANDS	SBMO NA
10	10	<b>OCEANEERING INTERNATIONAL</b>	1.6	-57%	8	24%	US	OII US
11	11	<b>BOURBON</b>	1.4	-61%	6	52%	FRANCE	GBB FP
12	12	<b>CORE LABORATORIES</b>	1.4	-52%	11	70%	NETHERLANDS	CLB US
13	15	<b>SEACOR HOLDINGS</b>	1.3	-28%	10	38%	US	CKH US
14	13	<b>SUPERIOR ENERGY</b>	1.2	-54%	4	37%	US	SPN US
15	9	<b>PROSAFE</b>	0.9	-64%	6	88%	NORWAY	PRS NO

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

- Share price growth based on primary exchange tickers
- P/E based on earnings from continuing operations for the 12 months ended 9/30/2008
- Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet
- Oilfield Services companies have operations that are primarily tied to oil and gas company operating expenses

## TOP 15 EQUIPMENT & EPCI

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>TENARIS</b>	12.4	-53%	7	26%	LUXEMBOURG	TS US
2	2	<b>NATIONAL OILWELL VARCO</b>	10.2	-67%	5	11%	US	NOV US
3	6	<b>FLUOR</b>	8.1	-38%	13	5%	US	FLR US
4	3	<b>SAIPEM</b>	7.3	-59%	6	60%	ITALY	SPM IM
5	15	<b>OFFSHORE OIL ENGINEERING</b>	4.8	-37%	27	26%	CHINA	600583 CH
6	4	<b>KEPPEL</b>	4.8	-65%	6	24%	SINGAPORE	KEP SP
7	8	<b>CAMERON INTERNATIONAL</b>	4.5	-57%	8	38%	US	CAM US
8	10	<b>TECHNIP</b>	3.3	-62%	10	23%	FRANCE	TEC FP
9	7	<b>FOSTER WHEELER</b>	3.1	-70%	7	19%	US	FWLT US
10	11	<b>FMC TECHNOLOGIES</b>	3.0	-56%	8	30%	US	FTI US
11	12	<b>SEMBORP</b>	2.9	-60%	7	23%	SINGAPORE	SCI SP
12	-	<b>KBR</b>	2.5	-61%	10	0%	US	KBR US
13	-	<b>AMEC</b>	2.4	-57%	12	0%	UK	AMEC LN
14	9	<b>WORLEY PARSONS</b>	2.3	-78%	10	33%	AUSTRALIA	WOR AU
15	5	<b>MCDERMOTT INTERNATIONAL</b>	2.3	-83%	4	1%	US	MDR US

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

- Share price growth based on primary exchange tickers
- P/E based on earnings from continuing operations for the 12 months ended 9/30/2008
- Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet
- Equipment & EPCI companies have operations that are primarily tied to oil and gas company capital spending
- Excludes major equipment and services suppliers that are components of diversified equipment and engineering companies, such as GE and ABB

## TOP 15 DRILLING & SEISMIC

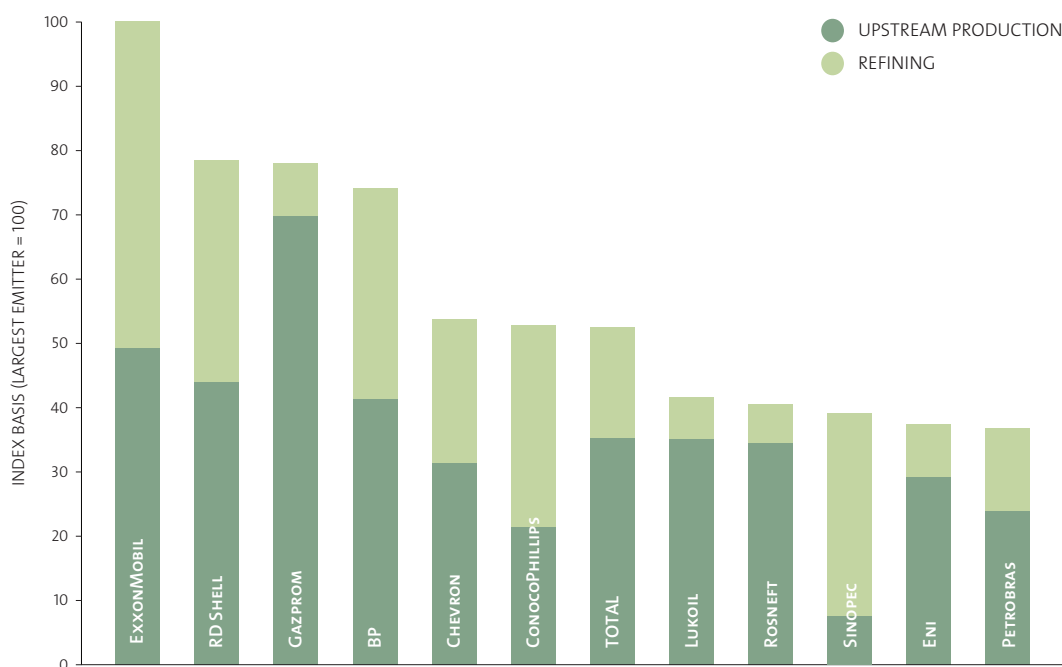
2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>TRANSOCEAN</b>	15.1	-67%	3	48%	US	RIG US
2	2	<b>DIAMOND OFFSHORE</b>	8.2	-56%	7	13%	US	DO US
3	3	<b>NOBLE CORP</b>	5.8	-60%	4	13%	US	NE US
4	5	<b>ENSCO INTERNATIONAL</b>	4.0	-52%	4	6%	US	ESV US
5	7	<b>NABORS INDUSTRIES</b>	3.4	-56%	4	46%	US	NBR US
6	4	<b>SEADRILL</b>	3.2	-67%	4	64%	NORWAY	SDRL NO
7	8	<b>PRIDE INTERNATIONAL</b>	2.8	-53%	5	15%	US	PDE US
8	13	<b>HELMERICH &amp; PAYNE</b>	2.4	-43%	5	18%	US	HP US
9	6	<b>CGG</b>	2.2	-74%	5	34%	FRANCE	GA FP
10	9	<b>FUGRO</b>	2.2	-63%	7	43%	NETHERLANDS	FUR NA
11	12	<b>ROWAN COMPANIES</b>	1.8	-60%	4	14%	US	RDC US
12	-	<b>PATTERSON-UTI</b>	1.8	-41%	5	0%	US	PTEN US
13	14	<b>FRED. OLSEN ENERGY</b>	1.8	-50%	7	63%	NORWAY	FOE NO
14	-	<b>ENSIGN CORP</b>	1.7	-29%	8	9%	CANADA	ESI CN
15	-	<b>UNIT CORP</b>	1.3	-42%	4	8%	US	UNT US

Source: Bloomberg, PFC Energy estimates as of 12/31/2008

- Share price growth based on primary exchange tickers
- P/E based on earnings from continuing operations for the 12 months ended 9/30/2008
- Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet
- Drilling & Seismic companies have operations that are primarily tied to oil and gas exploration spending

## WHICH PFC ENERGY 50 COMPANIES EMIT THE MOST GREENHOUSE GASES?

Companies, consumers and governments are increasingly concerned about the greenhouse gas emissions that contribute to global climate change. The emissions intensity of energy operations varies considerably depending on the nature of the resources being extracted or processed and the technologies employed. The chart shows the Top 12 upstream and downstream emitters among PFC Energy 50 companies. Emissions were estimated based on the PFC Energy Carbon Strategy Service's modeling of 30 leading companies. Note that emissions from LNG and other midstream operations are not included. Adding Gazprom's significant midstream emissions would make it the largest emitter among PFC Energy 50 companies.



Source: Company data, PFC Energy estimates

- Emissions from upstream production operations include carbon dioxide and methane from energy combustion as well as flaring and venting.
- Emissions from refining operations include carbon dioxide from energy combustion, flaring, and process vents.
- All emissions are based on 2007 production and output in equity share terms, including subsidiaries, before royalties and taxes.
- This comparison excludes large untraded NOCs, many of which have substantial upstream and downstream emissions.

## TOP 15 ALTERNATIVE ENERGY

2008 Rank	2007 Rank	Company Name	Market Cap (\$US billion)	% Share Price Change (YoY)	Est P/E	Debt/Capital	HQ Country	Ticker/Exch
1	1	<b>IBERDROLA RENOVABLES</b>	18.0	-48%	28	12%	SPAIN	IBR SM
2	3	<b>FIRST SOLAR</b>	11.2	-48%	41	11%	US	FSLR US
3	-	<b>VESTAS WIND SYSTEMS</b>	10.6	-47%	21	6%	DENMARK	VWS DC
4	-	<b>EDP RENOVAVEIS</b>	6.1	*-41%	N/A	57%	SPAIN	EDPR PL
5	2	<b>RENEWABLE ENERGY</b>	4.5	-82%	14	29%	NORWAY	REC NO
6	-	<b>GAMESA</b>	4.4	-62%	11	32%	SPAIN	GAM SM
7	4	<b>Q-CELLS</b>	4.0	-75%	15	18%	GERMANY	QCE GR
8	-	<b>XINJIANG GOLDWIND SCI &amp; TECH</b>	3.7	-62%	34	38%	CHINA	002202 CH
9	9	<b>COVANTA HOLDING</b>	3.4	-21%	19	65%	US	CVA US
10	6	<b>SUNPOWER</b>	2.9	-72%	43	30%	US	SPWRA US
11	8	<b>EDF ENERGIES NOUVELLES</b>	2.7	-46%	32	66%	FRANCE	EEN FP
12	7	<b>SOLARWORLD</b>	2.4	-65%	12	47%	GERMANY	SWV GR
13	-	<b>SUZLON ENERGY</b>	1.9	-87%	9	31%	INDIA	SUEL IN
14	5	<b>SUNTECH POWER HOLDINGS</b>	1.8	-86%	17	61%	CHINA	STP US
15	-	<b>ERSOL SOLAR ENERGY</b>	1.6	43%	40	1%	GERMANY	ES6 GR

Source: Bloomberg, PFC Energy estimates as of 12/31/2008; \*since 06/08 IPO

• Except where noted, share price growth based on primary exchange tickers

• P/E based on earnings from continuing operations for the 12 months ended 9/30/2008, except 12 months ended 6/30/08 for Xinjiang Goldwind, EdFEN, SolarWorld

• Debt/Capital is ratio between total debt and total capital based on most recent published balance sheet

• Other PFC Energy 100 companies own substantial shares in Iberdrola Renovables, EDP Renovaveis and EdF Energies Nouvelles

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www.pfcenergy.com  
pfcenergy50@pfcenergy.com

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