

# Bernstein Energy & Power Blast: Equal and Opposite... If Solar Wins, Who Loses?

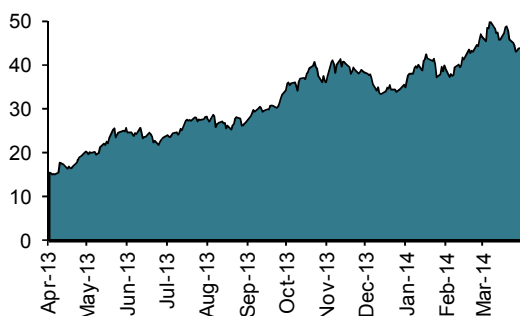
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## Equal and Opposite... If Solar Wins, Who Loses?

By Michael W. Parker and Flora Chang

A year ago, the ragtag rabble of renegades that comprised (and invested in) the TAN Index had been given up for dead. Solar was yesterday's technology... and, as technologies go, it wasn't even that good yesterday. At the same time, the investment case for solar was simple and monolithic: not dead *yet*. Solar had become cheap enough that the combination of US, Chinese and Japanese demand restrained further module price declines and created margin expansion as costs kept falling. Many solar companies fought their way out of the death spiral over the course of 2013. The TAN Index has tripled over the last year (**Exhibit 1**).

Exhibit 1  
TAN Index April 1, 2013 - Present



Source: Bloomberg

Now that the sector is off the Death Watch – the conventional wisdom goes – destinies within the solar industry will diverge. If one part of the supply chain is going to continue to benefit, then some other part of the solar sector has to lose. We are not so sure.

## You Say Downstream... I Say Upstream

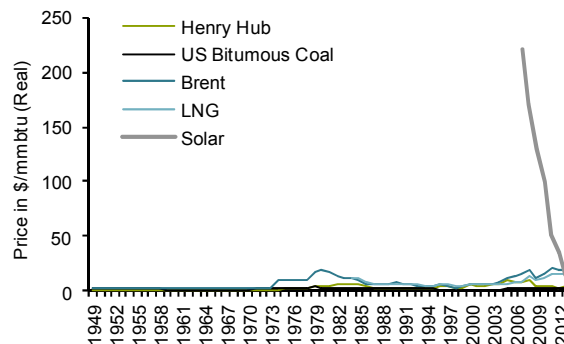
In one scenario, it is assumed that the upstream (polysilicon producers) and the mid-stream (module manufacturers) will continue to bumble along but their lack of capital discipline will flood the market with too much poly and too many modules on a regular enough basis resulting in continuing pricing and margin pressure. The downstream (project developers) will capture value as input prices keep on falling and subsidies in the US and elsewhere persist.

In an alternate scenario, since solar is now cheap enough that there is demand in unsubsidized markets in Asia and elsewhere, module prices won't fall any further. Demand simply absorbs all of the new supply of both modules and polysilicon. After all, it's a \$5 trillion energy market that solar is tapping into. The solar market will eventually break solar subsidies in the US, in China and in Japan through sheer volume (just like it has in every other market in the world that has ever offered solar subsidies). Developers will face rising competitive intensity as solar hits the mainstream and well-established distribution channels (like Big Box retailers or cable companies) start offering solar. Downstream returns will collapse. Polysilicon – the hardest part of the supply chain to expand – will capture all the value as the rest of the industry competes margin away in the quest for poly.

## Door No. 3: Solar Wins... The Global Energy Market Loses

There is a third scenario. The fact is that solar is now cheap enough that it competes with oil, kerosene, diesel and LNG in developing markets and yet is still small enough that it cannot disturb pricing for energy in any market. Solar can simply get bigger and bigger. Global energy loses, but those losses are too small to notice.

Exhibit 2  
Welcome to the Terrordome... \$/MMBTU by Energy Type

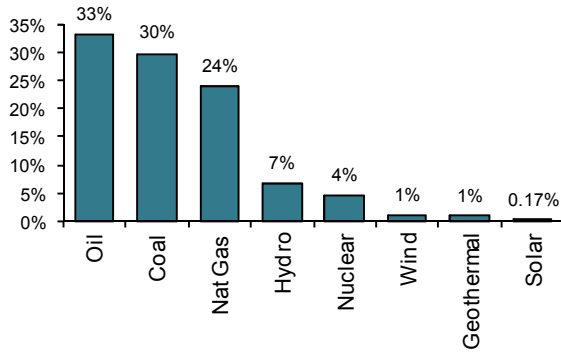


Source: EIA, CIA, World Bank, Bernstein analysis

**Exhibit 2** is the chart the solar industry has been working towards for 60 years. Solar is now – in the right conditions – cheaper than oil and Asian LNG on an MMBTU basis. Yes, we are using utility-scale solar costs in developing markets with lots of sun. But that describes the growth markets for global energy today. For these markets solar is just cheap, clean, convenient, reliable energy. And

since it is a technology, it will get even cheaper over time. Fossil fuel extraction costs will keep rising. There is a massive global market for cheap energy and that market is oblivious to policy changes at the NDRC, MITI, the EU or the CPUC. If **Exhibit 2** creates consternation among energy investors, **Exhibit 3** should make them feel better.... at least for a while.

Exhibit 3  
2012 Global Energy Supply by Type

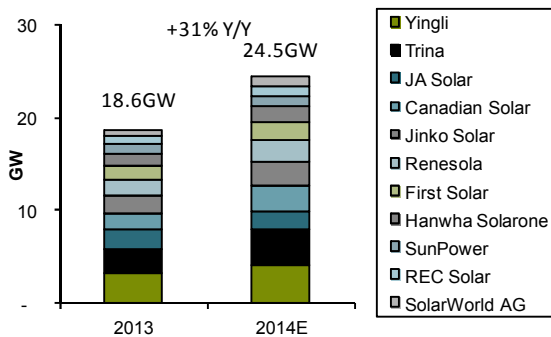


Source: BP Energy Survey, Bernstein analysis

Solar is tiny in the context of global energy. It accounted for 0.17% of global energy supply in 2012. Therefore, the equal and opposite effect of solar adoption is too small to matter to the rest of the energy sector. Both upstream and downstream solar prosper. Poly and module producers can make money selling solar panels at prices so cheap that even those living in the most wretched conditions can buy them (call it the Rajasthan Price... [video here](#)).

Developers make money by paying the Rajasthan Price for the panels and flooding them into any market still offering subsidies or tax benefits and elsewhere in the developed world by pricing under retail power prices for distributed solar and wholesale power prices for utility-scale solar. In short, the developers get to arbitrage the difference between the Rajasthan Price for the panel and the California Price for the electricity.

Exhibit 4  
Module Production from Tier 1 Manufacturers 2013-2014E



Source: Company reports, Bernstein estimates and analysis

If you think that all sounds too good to be true, you are right. If someone is winning, someone is losing. Solar's success comes at the cost of (i) taxpayers and power consumers in subsidized markets that don't yet have solar panels on their roofs and (ii) kerosene and diesel demand in off-grid markets. There is no easy way to short the cohort renting apartments in California's Central

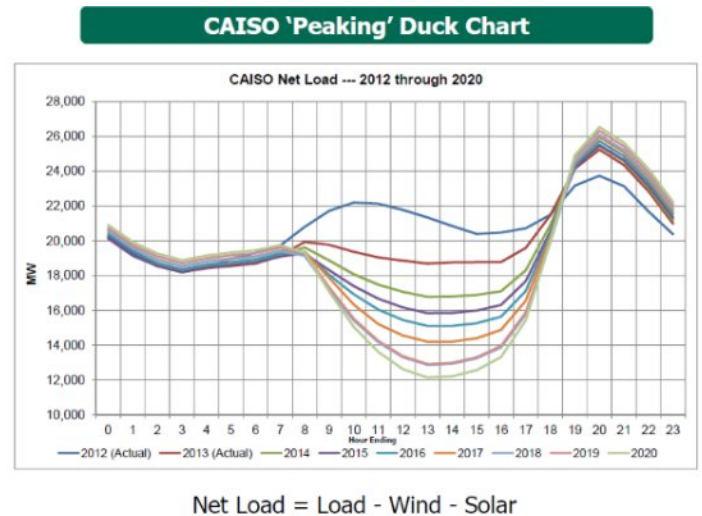
Valley, but they are the losers here. And while off-grid solar reduces demand for diesel and kerosene, it is currently a tiny fraction of global demand and certainly too small to measure.

But if \$0.60/W is a price floor for the panels, every part of the solar supply chain will simply get bigger and bigger. Module and polysilicon manufacturers can make money undercutting the Rajasthani villagers' willingness to pay for energy. Developers can make money exploiting the delta between that price and the developed market electricity price. On cue, the module manufacturers are ramping up production (**Exhibit 4**). But the simple implication is that eventually solar will become so large that there will be consequences elsewhere. In fact, there already are. Ultimately, the losers are: every participant in the energy sector globally, including solar investors. The only question is sequence. We detail the order and the potentially affected industries below.

1. Generation Utilities

Solar – by virtue of the fact that it generates electricity during the day – reduces peak power demand from non-renewable sources as adoption increases. Instead of high-cost (and high-priced) gas-fired peaking power plants being engaged in the middle of the afternoon when all of the air-conditioners are operating and all of the factories are running, solar addresses that load. California – like Germany and Australia – is already seeing this effect (**Exhibit 5**).

Exhibit 5  
Solar's Effect on On-Grid Power Demand



Source: Edison International

CAISO Peaking Duck sounds like a delicious Asian-Latino inspired poultry dish. Instead, it is the future of merchant power markets globally. The top, blue line (the duck's back) represents 24-hour demand for electricity in California in 2012. Daytime demand for power from sources other than wind and solar in 2012 peaked around midday. As more solar capacity is installed, that peak is lower in 2013 (the red line) and the forecast is that by 2020, that demand profile will resemble the green line (the duck's belly). Daytime power demand collapses.

For companies selling electricity into merchant or competitive markets like California, this is a disaster. Demand during what was one of the most profitable times of the day disappears. With it, the need for part of the merchant fleet disappears too for all but the

dinner hour. And that is the issue competitive generators face globally in this 2020-scenario: how to live off demand of two hours a day.

## 2. Distribution Utilities

Roof-top solar reduces the amount of electricity a building (whether residential, commercial or industrial) buys from its distribution utility. For distribution utilities – natural monopolies that have high fixed costs and recover those costs by charging per kilowatt/hour – the loss of volume risks deflating returns.

For regulated distribution businesses, there is a stabilizer embedded in the business model: increase power prices to make up for the loss of volume. However, that power price increase simply increases incentives for power consumers to install roof-top solar. The response of simply raising prices per KWh is therefore unsustainable. The options for distribution utilities become increasingly less attractive. First, refuse to accept power into the grid that has been generated from roof-top solar systems (or pay a reduced rate for that electricity). These steps are being adopted or proposed in Hawaii and California currently. This merely creates economic incentives for homes and businesses to start thinking about domestic energy storage solutions. Second, charge a connection fee to reflect the true value of the service (the *ability* to buy electricity whenever it is required, rather than the electricity itself). This step is being adopted in Arizona and California. But this step cements the attractiveness of battery storage to time-shift the power. Third, admit defeat and become a roof-top solar developer. We cannot think of a fourth option.

Hugh and I hosted a conference in New York last week discussing the implications of distributed solar on US utilities. The real surprise for me was that – for the utility executives who spoke – the issue of *whether* solar is going to ramp in the US was not raised. Instead, the discussion from utilities themselves went directly to the issue of *how* to reach an accommodation with this rapidly expanding and disruptive technology. The link to our note on the conference is [here](#). Two things stand out. First, this is a live issue in one of the largest power markets in the world, with solar at 0.17% of global energy. Second, trends that start in California tend to travel well.

## 3. The Global Energy Market

All of the above eats away – at the margin – at oil and gas demand. The adoption of solar in off-grid areas in developing markets means less kerosene and diesel demand. The adoption of solar in the Middle East means less oil demand. The adoption of solar in China and developed Asia means less LNG demand. Distributed solar in the US, Europe and Australia means less natural gas demand. However, given how small solar is in comparison to total energy demand, the idea that oil and gas is the "loser" in this formulation is laughable... in 2014.

That obvious limit to the risk that solar places on the global energy market in 2014 is one of the most attractive aspects of the solar industry for equity investors, in our view. Solar is now cheaper than fossil fuels (at least oil and LNG in Asia). It can displace these fuels at the margin but the quantities involved are so small that the impact on oil and gas pricing is immaterial. As solar costs fall, the price that end markets will pay for solar energy is set by oil and remains unchanged. The solar industry (upstream and

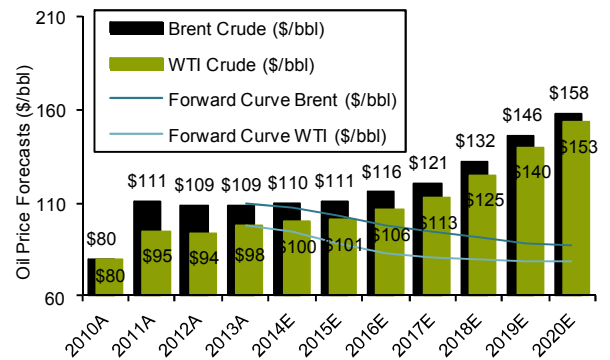
downstream) collects all of the value created by improvements in the technology.

The behavior from here seems clear: the solar industry will expand. Retaliatory steps from distribution utilities will increase the market for cost-effective battery storage. This becomes – initially – a secondary market for battery technologies being developed for the auto sector. A failed battery technology in the auto sector (too hot, too heavy, too rigid a form factor) might well be perfect for the home energy storage market... with an addressable end market of 2 billion backyards.

And for some years, that will be the extent of the effect. We have previously calculated how large the solar sector would need to be in order to become a material share of incremental energy supply each year and therefore begin to displace high-cost oil and gas supply and start to depress prices. We estimate that the solar industry would need to be an order of magnitude larger than it is today to have this kind of impact. At the point where solar is displacing a material share of incremental oil and gas supply, global energy deflation would become inevitable: technology (with a falling cost structure) would be driving prices in the energy space. But even on an aggressive view, this could take the better part of a decade.

Our Oil and Gas team forecasts oil prices rising to \$150 per barrel by 2020 (**Exhibit 6**). That is quite consistent with the scenario I am setting out here given how small solar is currently and the decade it would need to ramp before impacting global energy prices. Response from oil and gas investors and from solar investors is the same: *good news, solar is too small to matter*.

Exhibit 6  
Oil Price Forecasts – SCB and the Forward Curve



Source: Bernstein Global Oil and Gas analysts' estimates and analysis, Bloomberg

Of course, the risk is that I am being too conservative. It may be that oil and gas producers sitting on large reserves will not wait for deflating energy prices a decade from now before changing behavior. Rather, the *expectation* of energy deflation may be enough. If the downward sloping forward curve is ever accepted as permanent, rational behavior from energy producers will guarantee it is so. Sitting on oil and gas reserves for the benefit of generations yet to come ceases to be a rational strategy if that reserve represents a depreciating rather than an appreciating asset. This is the hidden flaw with the "*equal and opposite/ too small to matter*" formulation. Ultimately what may kill the solar sector – and every other part of the energy market – for equity investors is not renewable technology and battery storage turning into behemoths, but the realization of that future as inevitable.



**This Week's Reports**(available on FirstCall/ [bernsteinresearch.com](http://bernsteinresearch.com))**Asian Coal & Power:**

[Chinese Renewable Energy Operators: Into the Storm... Utilization is Rising and That's Still What Matters. Outperform.](#) (3-April-2014)

Since the start of the year, the wind stocks have been hammered (down 20-25% while H-shares as a whole are down ~7%). The weakness has come from poor wind generation combined with impairments and higher-than-expected 2H13 operating expenses. Utilization rose in 2013 and – based on transmission line completions – we expect it will rise again this year. Adjusting for elevated operating costs and revised capacity expansion, the stocks still look cheap. We are reducing target prices for Datang Renewable (TP reduced from \$2 to \$1.50) and Longyuan (TP reduced from \$14 to \$9.50). Huaneng Renewables is our top pick (TP maintained at \$6). The difference: Huaneng is growing installed capacity aggressively.

**Asia-Pacific Oil & Gas**

[Bernstein Global LNG: Re-Start of The LNG Growth Cycle. Our Outlook for Global LNG in 2014 and Beyond](#) (3-April-2014)

Global LNG demand declined to 230mtpa in 2013 due to minimal new capacity additions and disruption to output from existing plants. Global LNG demand is set to accelerate in 2014 as Aus LNG projects start up, heralding the start of a new growth cycle. Asia remains the driver of global LNG demand and we do not expect nuclear re-start in Japan to have a significant impact on 2014 demand. While N.A. export volumes and pricing remain a major controversy, we expect export volumes of 50mtpa by 2020 at most. We remain positive on long-term LNG demand and pricing given the relative tightness of markets through to the end of the decade. Our top picks among E&Ps exposed to global LNG are OSH, INPEX, BG, WPL and TOT, which we rate as Outperform.

[China Oil and Gas: SOE Reform and the Shift from Quantity to Quality. Repositioning After Full Year Results](#) (1-April-2014)

We remain neutral on the China oil and gas sector and see more downside risk to earnings for 2014. Rising costs, flat oil prices and weak economic growth continue to act as headwinds for the sector in 2014. Upstream growth should accelerate over 2014-15 but will not translate into meaningful EPS growth given the rising production costs. Conversely, in downstream, we expect slower growth but higher margins in refining as new fuel standards are rolled out. Restructuring is the big opportunity and we are seeing the shift from quantity to quality with capex cuts. Our top pick is SNP (TP: HKD8.0). We rate PTR, CEO, Kunlun and COSL as market-perform. For CEO and COSL we lower TP to HKD14 and HKD20 respectively.

**North American E&Ps**

[Best of Bernstein: Southwestern - A Solid Way to Play Rising Gas Price](#) (2-April-2014)

SWN has recently gained attention as a low-cost gas name with assets outside of the congested Marcellus. We undertake an NAV analysis and conclude that a 7.5x CF multiple can be supported; thus, we raise our TP to \$57 and raise SWN to our top pick. We estimate SWN's leading position in the Fayetteville to be worth \$11.9 B, and estimate their NE Marcellus position to be worth \$7.6 B. Additionally, we note that SWN has a high-quality management team with a straightforward, consistent strategy. Risks to our outlook include a decline in gas price, declining well results in the Fayetteville and Marcellus, and potentially overblown investor disdain of the company's new venture strategy. We rate SWN Outperform.

[Encana - Boldly Stays the Oily Growth Course...But at the Wrong Time?](#) (1-April-2014)

ECA has had a strong run in the last three months, which we primarily attribute to cold weather and increased gas price, rather than investor confidence in their shift-to-liquids strategy. On Mar 31, they sold their dry gas Jonah asset to TPG. This sale provides a strong indicator that they will be staying the course. Although they received a comparable price to prior deals, they could have gotten more. The forward strip is higher than during previous deals and their wells outperformed others. Overall, we think this deal was a negative for ECA. It removes one of their proven, better gassy assets likely profitable in the low \$4's and presumably redeploys the money into the Montney and their other four, generally unproven liquids positions.

[Bernstein Energy 1Q14 Survey: Investors Maintain Bright View of Oil Price, While More Divided on Gas](#) (27-March-2014)

Gas price outlook rose, including 2-yr expectations 9% ahead of strip. However, responses indicated increased uncertainty on long term gas, and sentiment improvement for gas E&Ps was slight. Integrated Services saw the greatest improvement in sentiment. Respondents expect WTI price of \$100/bbl and \$4.77/mcf HH price two years out, more optimistic than strip for both commodities. We expect a WTI price of \$106/bbl in 2016, but expect that gas prices will fall towards \$4.50/mcf in 2015. Within E&Ps, we continue to like EOG, COG, SWN, APA, APC, and TLM and within Services we like HAL, BHI, SLB, CAM, and NBR (all O).

[Bernstein E&Ps: Apache - Double Digit Production Growth Trumps Global Project Delivery Concerns](#) (25-March-2014)

Apache has long lagged peers but we see 2014 as a defining year. We believe that if they can 1) grow production at a faster than guided rate this year and 2) sell down their Kitimat LNG stake they should trade at a higher multiple. We believe the 5-8% production growth 2014 guidance is conservative; we independently modeled their US onshore assets and think that overall portfolio growth of 10% should be achievable which should increase their multiple to 4-5x (vs 3.4x today). Our major

assumptions are that APA will be able to sell down a significant stake of their 50% ownership in Kitimat this year, and execute projects on time in 2014. We continue to rate outperform but continue to closely monitor LNG developments.

## U.S. Oil Services

### [U.S. Oil Services: Pumping Efficiency Gains - Is the Headwind Moderating? How Will It Impact Pricing Recovery?](#) (27-March-2014)

Similar to land rig efficiency gains, pumping efficiency gains appear to be moderating. We believe that this is due to a moderating ramp in 24hr operations, deceleration in multi-well pad penetration, and diminishing learning curve & technology effects. We estimate that pumping efficiency gains will moderate further in 2014 and 2015. Assuming the E&Ps lift budgets to reflect prevailing commodity prices, then pricing power should swing back to the pumpers in about 12 months. We believe pumping pricing upside presents the most attractive investment theme within Oil Services & Equipment space, and the resumption of pricing power would drive positive revisions & further upside for the pumpers. We rate HAL, BHI & NBR outperform.

### [Bernstein Energy: Why Is US Onshore So Good & the Offshore So Bad? Explaining the Current Dynamics in Energy Capex](#) (26-March-2014)

Energy investors today are hearing conflicting messages from the E&Ps and IOCs, which is leaving investors in Oil Services confused. The E&Ps are raising budgets to drive growth while the IOCs are trimming capex. Who is right? We argue both are acting rationally. E&P CF is rising given production growth, which is being recycled. The IOCs are trimming capex following cost inflation into flat oil prices. This should last until N. American oil production growth decelerates to... ..meet only a minority of global demand growth, which we forecast in 2016. Thus Oil Services exposed to N. America (esp. pumping) should be preferred (HAL & BHI). Within IOCs, we favor TOT, STO and SNP on capex discipline.

## U.S. Utilities

### [Bernstein Innovative Energy Technologies Conference: The Key Points and Killer Charts](#) (1-April-2014)

On Tuesday, March 25, Bernstein hosted an Innovative Energy Technologies conference with Ted Craver (CEO of Edison International), David Crane (CEO of NRG Energy) and Tom Werner (CEO of SunPower) presenting, along with various other utility executives. This note focuses on one of the key controversies of the conference: are U.S. electric utilities poised to join land-line telcos of a decade ago, with their regulated networks circumvented by a new and more nimble technology? The threat this time: solar. We rate EIX, PCG and GCL Poly Outperform.

### [EIX: SONGS Settlement Eliminates Shareholders' Potential Downside While Preserving Upside from Recoveries](#) (28-March-2014)

Edison International's core regulated subsidiary, Southern California Edison (SCE) has entered into an agreement with the Division of Ratepayer Advocates of the California Public Utilities Commission (CPUC) and TURN to settle the SONGS investigation. While the settlement is expected to result in an incremental impairment charge of \$155 million (\$0.31 per share), taken in its entirety the settlement is a highly satisfactory one, permitting SCE recovery of the bulk of its investment in SONGS. The settlement also allows recovery of purchased power costs incurred by SCE to replace the output of SONGS. The uncertainty regarding the SONGS investigation has thus been removed in a way that avoids the largest downside risks.

## European Oil & Gas

### [Bernstein Energy: Twelve Steps to Russian Gas Independence in Europe: Is The Cure Worse Than The Disease?](#) (2-Apr-2014).

Ukrainian tension, Russian sanctions and concerns over Europe's gas supply raise a recurring question: How reliant is Europe on Russian gas? I.e., how easily could Europe replace the c163Bcm of gas supply from Russia that met 31% of demand last year? The answer: To wean Europe off Gazprom gas would require \$215Bn of up-front capex, \$40Bn of additional annual energy costs, a 5-year effort, 10,000+ lost jobs, 300MT additional CO2 emissions per year & mandatory monthly cold showers. Not very palatable. Of all the measures, drawing down gas stocks and paying higher gas & LNG prices seem most attractive. Hence gas- and LNG-names (TOTAL, Statoil, BG) remain the best way to play Russian tension, although we also doubt Gazprom supply will be cut. Outperform.

### [Bernstein Energy: What Will It Take To Lift European Refining Out of the Doldrums? The Majors' Capital Discipline Is A Start](#) (1-Apr-2014).

European refining has truly been in the doldrums. Slack capacity is 1.3Mbpd higher than pre-2008 due to 1.4Mbpd lower demand, 0.9Mbpd additional imports, while only 1Mbpd of capacity has closed. In this note we ask why rationalisation has been so elusive? We find half-a-dozen key barriers to closure: Uncertainty from increased volatility, the size of the problem, the temptation to "cling on" for others to close instead, \$10M/kbpd closure costs, cutting is easier than closing and reinvestment is tempting. Most importantly, the Majors' improved returns-focus will help them to overcome all of these barriers. TOTAL, Eni, Exxon & Shell have intimated that they are most committed to improving downstream returns, with each closure worth c1%/share price upside.

## Upcoming Events

No upcoming event.

## Changes to Ratings / Target Prices/ Earnings Estimates

Please refer to Exhibit 7

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**Commodity Price Information**

<b>4/3/2014</b>	<b>Spot Price</b>	<b>Last Week</b>	<b>Last Month</b>
Natural Gas	4.35	4.39	6.86
WTI Crude Oil	100	101	105
<b>SCB</b>			
<b>Estimates</b>	<b>2013A</b>	<b>2014E</b>	<b>2015E</b>
Natural Gas	4.09	4.00	4.30
WTI Crude Oil	98	100	101

Source: Bloomberg, Bernstein estimates

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**Risks**

Risks to energy and commodity stocks include economic conditions and commodity price swings. If the global, US or Chinese economies turn down significantly, global demand growth for commodities could decelerate, putting pressure on prices and thus on the cash flow of producers. Economic swings also affect refiners and utilities. Utility stocks could be further impacted by swings in demand for electric power. If demand drops, utilities could suffer.



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### Valuation Methodology

We value **Asia-Pacific large cap oil and gas companies** (PetroChina, Sinopec, CNOOC, PTTEP and ONGC) by identifying the forward price to book multiples they should trade at based on returns on equity, long term earnings growth expectations, dividend payout ratio and cost of equity. Our starting point is that  $Fwd\ P/B = (ROE \times PO) / (K_e - g)$ , which ROE is our estimates of ROE for 2014, PO is the dividend payout ratio,  $K_e$  is the cost of equity, and  $g$  is the long term growth rates. For **Australian E&Ps** (Santos, Oil Search and Woodside), we believe an NAV approach is appropriate given a significant portion of their values are attached to future LNG projects. In calculating the NAV, we have assumed a long term oil price of \$100 (real). We value **Reliance and COSL** using a sum of the parts methodology.

Our target prices for the **European Integrated Oils** are calculated by applying our estimates for 2013 cashflow per share (CFPS) to a forward price-to-cashflow (P/CF) multiple. This P/CF multiple is generated through the relationship, and historically strong correlation, between 12 month forward P/CF multiples and Return on Average Capital Employed (ROACE) within the Integrated Oils group. Our calculation utilizes this relationship and an estimated long term, through the cycle ROACE to generate the target P/CF multiple. The price calculations for the Integrations are summarized below. We use \$110/bbl Brent and \$4.25/mcf for US gas in 2013. We use DCF valuations to determine our price targets for the **Russian Energy stocks** incorporating WACC rates ranging from 12-15% and terminal growth rates ranging from 0.5% to 3%. For BG, Galp & Repsol and the **European E&Ps** we use an NAV approach. In calculating the NAV, we have assumed a long term oil price of \$90.

Our target price methodology for the **Oil Services** is based upon P/E multiples applied to our 2015 EPS estimates. Our P/E multiples are determined by the relationship between relative P/E multiples and returns relative to the market for each Service stock.

For the **Equipment** providers, our P/E multiples are derived from our crude price forecasts and individual company backlog forecasts, and their historical influence on each stock's multiple. We apply these multiples to our 2015 EPS estimates to arrive at our target prices for each Equipment stock.

Our valuation methodology for the **Offshore Drillers** combines an EV/EBITDA based approach and Net Asset Value. Our EV/EBITDA based target prices utilize 2015 forecasted EBITDA, as long duration contracts cause the group to trade on forecasted cash generation further into the future. We apply a modeled group EV/EBITDA multiple, utilizing the year over year change in crude prices and the ratio of newbuild orders to working rigs. Next, we adjust the company specific multiple based upon fleet complexity, operational quality and dividends. Our NAV incorporates both recent rig orders and transactions, and utilizes our rig complexity index to benchmark the global fleet. Given robust contract backlogs and rising rig rates, we also add the discounted free cash flow that each Driller will generate in 2013 and 2014 to account for the potential growth in assets. Finally, we apply a 50/50 weighting to our EV/EBITDA and NAV target prices, respectively, to calculate our published target price for each Driller.

Our **Land Driller** target price methodology combines two approaches. First, we calculate an appropriate EV/EBITDA multiple based upon a prediction model incorporating the year-over-year change in commodity prices, weighted by the US active rig count split and the Land Driller reinvestment rate. The model inputs are leading indicators for changes in land rig supply and demand. Second, we calculate the NAV including asset additions. Finally, we take a simple average of the two methodologies.

We value companies within our **Asian Utilities** coverage based on a combination of DCF, price-to-forward year earnings multiple and dividend yield. Our valuation for Huaneng is based on a P/FE multiple on our 2015E EPS. Our valuation for HNP (the NYSE-listed ADR) multiplies of Hong Kong valuation by 40 (the number of H-Shares each ADR represents) and divides by the current HKD exchange rate. Our valuation for China Resources Power is based on an average of a P/FE multiple on our 2015 EPS and a P/B multiple. We value Datang based on a price-to-forward year earnings multiple. Our valuation for Datang reflects a P/FE multiple on our 2015E EPS. We value China Shenhua based on a price-to-forward year earnings multiple at our 2015E EPS. Our valuations of Yanzhou Coal Mining and China Coal Energy are based on the average of price-to-forward earnings at our 2015E EPS and price to book multiple using average price to book of global coal peers. Our valuation for Hong Kong



and China Gas is based on our Sum of the Parts method. Our valuation for ENN is a combination of twelve-month target price based on a 2015 P/FE multiple and a sum-of-the-parts DCF analysis.

Our valuation for CLP is driven primarily driven primarily from a SoTP analysis of the companies' different segments. We believe that it is dividend yield that primarily drives the stock price. Our valuation for Power Assets Holdings is derived primarily from a SoTP valuation of the company's business units as we value the Hong Kong business on a dividend yield basis and the non-Hong Kong businesses are valued on a combined of P/B and P/E multiples. We value China Longyuan, Datang Renewable and Huaneng Renewables based on a forward P/E ratio. We value GCL Poly on a combination of a 12M P/FE multiple, back-tested against our DCF valuation.

For the **US Utilities**, our target prices reflects the results of three alternative valuation methodologies: (i) a multiple-based valuation calculated by applying the median valuation multiples of a group of comparable companies to our estimates of a utility's future earnings, dividends and EBITDA; (ii) a discounted cash flow model over the forecast period of 2011-2015, and a terminal value in 2016, discounted back to present value at the weighted average cost of capital; and (iii) a discounted dividend model over the forecast period of 2011-2015, and a terminal value in 2016, discounted back to present value at the cost of equity.

Our valuation framework for **North American E&P oil & gas** stocks is based on the strong correlation of P/CF multiple and the recycle ratio (cash flow per barrel divided by F&D costs). The recycle ratio-implied target multiples are supplemented by company-specific catalysts, which are valued independently under a full-life cycle NPV methodology and applied in the form of incremental (positive or negative) change. We adjust our target multiples to include the effects of growth, capitalization, capital efficiency, and risk.

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## Risks

Risks to energy and commodity stocks include economic conditions and commodity price swings. If the global, US or Chinese economies turn down significantly, global demand growth for commodities could decelerate, putting pressure on prices and thus on the cash flow of producers. Economic swings also affect refiners and utilities. Utility stocks could be further impacted by swings in demand for electric power. If demand drops, utilities could suffer.

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### 12-Month Rating History as of 04/03/2014

#### Ticker Rating Changes

1088.HK	U (RC)	12/14/11		
1171.HK	U (RC)	12/14/11		
135.HK	M (RC)	03/27/14	M (DC)	01/28/13
1798.HK	O (RC)	09/12/13	M (RC)	05/22/12
1898.HK	U (RC)	06/13/12		
2.HK	U (RC)	01/12/12		
2688.HK	U (RC)	09/17/12		
2883.HK	M (RC)	01/08/13		
3.HK	U (IC)	06/23/10		
386.HK	O (RC)	01/21/14	M (RC)	03/28/13
6.HK	M (IC)	06/23/10		
836.HK	M (RC)	03/07/13		
857.HK	M (RC)	11/01/13	O (RC)	07/08/13
883.HK	M (RC)	01/21/14	O (RC)	12/01/11
902.HK	O (RC)	09/12/13	M (RC)	03/07/13
916.HK	O (RC)	01/31/13		
958.HK	O (RC)	01/31/13		
991.HK	M (RC)	03/03/11		
AEP	M (IC)	01/15/03		
APA	O (IC)	05/13/11		
APC	O (RC)	06/28/12		
BG/LN	O (IC)	01/22/09		
BHI	O (RC)	10/01/09		
CEO	M (RC)	01/21/14	O (RC)	12/01/11
CHK	M (RC)	06/13/12		

CNE.LN M (RC) 01/29/13  
 D M (RC) 09/04/07  
 DO M (RC) 07/26/10  
 DUK M (RC) 08/05/04  
 DVN M (IC) 05/13/11  
 ECA M (IC) 05/13/11  
 ECA.CN M (IC) 05/13/11  
 EIX O (RC) 06/14/13 M (RC) 12/03/12  
 EOG O (RC) 11/02/11  
 ESV M (RC) 09/13/13 O (RC) 06/28/12  
 EXC M (RC) 02/05/10  
 FE M (RC) 10/27/10  
 GALP.PL O (RC) 05/26/10  
 HAL O (RC) 06/28/12  
 HNP O (RC) 09/12/13 M (RC) 03/07/13  
 LKOD.LI M (RC) 06/28/12  
 NBL M (RC) 01/08/13  
 NBR O (RC) 09/07/07  
 NE M (RC) 09/13/13 O (RC) 03/01/11  
 NVTK.LI M (RC) 10/16/13 O (RC) 06/28/12  
 OGZD.LI O (RC) 07/16/09  
 ONGC.IN M (RC) 11/17/09  
 OSH.AU O (IC) 06/29/09  
 PCG O (RC) 03/27/13  
 PMO.LN O (RC) 06/28/12  
 PTEN M (RC) 10/03/11  
 PTR M (RC) 11/01/13 O (RC) 07/08/13 M (RC) 04/20/11  
 RDC M (RC) 02/19/09  
 RIG M (RC) 09/13/13 O (RC) 02/19/09  
 RIL.IN O (RC) 05/27/13 M (RC) 07/11/12  
 ROSN.LI M (RC) 01/29/13  
 SGGD.LI M (RC) 06/28/12  
 SLB O (RC) 08/11/11  
 SNP O (RC) 01/21/14 M (RC) 03/28/13  
 STL.NO O (RC) 12/03/13 M (RC) 06/28/12  
 STO O (RC) 12/03/13 M (RC) 06/28/12  
 STO.AU M (RC) 04/20/11  
 TLM O (RC) 06/28/12  
 TLM.CN O (RC) 06/28/12  
 TLW.LN O (IC) 01/22/09  
 WFT M (RC) 06/28/12  
 WPL.AU O (RC) 01/08/13

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Rating Guide: O - Outperform, M - Market-Perform, U - Underperform, N - Not Rated  
 Rating Actions: IC - Initiated Coverage, DC - Dropped Coverage, RC - Rating Change

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