Energy Complex Upended

- High oil prices and cheap credit fuelled ramp in energy exploration and production (E&P)
  - Shale in the US
  - Large Liquefied Natural Gas (LNG) projects in Asia, Australia, and Africa
- OPEC cracks
  - Members have competing interests
  - Politics pressuring economics
- Tensions rise as budgets are under pressure
  - Higher breakeven costs for government promises
  - Social stability at risk

Energy Has Repriced Over The Last Year

Source: Bloomberg
US Shale Revolution

- Shale revolution was a game changer
  - Crude oil production in the US rose by 55% between 2009 and 2014
  - Net crude imports fell by 20% between 2009 and 2014
  - The US is the world’s largest oil and gas producer
- Production of unconventional wells has high initial production followed by steep decline rates
  - Wells can see production declines by 70% in year 1, 50% in year 2, and 30% in year 3
  - Creates need to invest continually in order to maintain production levels
- As global supply of oil has outgrown demand, oil price has plunged

Source: EIA, Bloomberg
A Gusher Of E&Ps

• Shale E&P in the US is an unconsolidated sector with little control over production and pricing
  – Largely funded by low Fed rates
• Short term management compensation plans are tied to production growth
  – Return on capital metrics are rare
  – Well participation agreements are common
• Public valuations are tied to production growth
  – Investors relied on NAV and EV/EBITDA, both of which are heavily dependent on production growth
• Most E&Ps need to spend 120% of cash flow to grow production with prices between $50-60/bbl

Source: Morgan Stanley, BMO
E&Ps Reduced Costs In An Unanticipated Fashion

• High cost US oil was expected to cut production to balance the market
• Rather than cutting production, E&Ps optimized cost per barrel and lowered 2015 costs by 30-50%
  — Squeezed service providers
  — Retreated to core areas
  — Focused on drilling efficiency
• US production is expected to grow 6% in 2015 despite a 59% drop in the US rig count since September 2014
• Production expected to decline 4% in 2016 at the current strip

Source: EIA, Baker Hughes, Bloomberg
E&P Accounting Allows Flexibility

• Widespread use of full-cost accounting
  — While drilling and completion is always capitalized, businesses vary in how aggressive they are in capitalizing costs
  — Drilling and completion, exploration, unsuccessful drilling/exploration efforts, gathering and transport, G&A and interest expenses can all be capitalized
  — Allows E&Ps to defer depreciation of capitalized costs associated with unproven reserves
  — Flatters EBITDA and leverage ratios
• Due to the variation in capitalization policies across businesses, it is important to know how aggressive the policy is when evaluating cash costs and margins
  — It is equally important to watch out for changes in policy
• GAAP reserve testing and PV-10 methodology in a deflationary price environment can lead to overstated reserves and valuations
  — Assumed selling price for all reserves is based on a trailing twelve month average (1st day of each month)
  — Cost structure used in reserve tests reflect current cost environment
E&Ps Squeezed

• US oil and gas supply currently cannot tap global demand
  – Despite price declines, production continues
  – Federal approvals for exporting limited quantities of US oil and petroleum products are beginning
  – E&P company executives are lobbying Congress to lift the export ban on crude

• High yield producers are challenged to fund capex in a low price oil environment
  – Equity issuance decreased to $1.8B in 3Q15 from $7.4B in 1Q15
  – Debt issuance decreased to $4.0B in 3Q15 from $12.8B in 1Q15
  – Small and medium-sized E&P company liquidity is dependent on reserve-based credit facilities and borrowing bases are expected to drop as much as 15% in October 2015
  – The weakest companies are starting to collapse under the weight of debt, as 8 bankruptcies have been announced in YTD15 vs. 3 bankruptcies between 2012 and 2014

E&P Historical Cash Flow And Debt

<table>
<thead>
<tr>
<th></th>
<th>DVN</th>
<th>EOG</th>
<th>CHK</th>
<th>CLR</th>
<th>PXD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Cash Flows 2010 - 1H 2015, ($M)</td>
<td>30,364</td>
<td>30,260</td>
<td>23,065</td>
<td>10,189</td>
<td>9,596</td>
</tr>
<tr>
<td>Operating cash flow</td>
<td>(39,130)</td>
<td>(38,008)</td>
<td>(35,150)</td>
<td>(16,979)</td>
<td>(14,197)</td>
</tr>
<tr>
<td>Capex</td>
<td>(8,766)</td>
<td>(7,748)</td>
<td>(12,085)</td>
<td>(6,790)</td>
<td>(4,601)</td>
</tr>
<tr>
<td>Dividends and repurchases</td>
<td>(5,314)</td>
<td>(1,475)</td>
<td>(1,208)</td>
<td>(55)</td>
<td>(260)</td>
</tr>
<tr>
<td>FCF post distributions</td>
<td>(14,080)</td>
<td>(9,223)</td>
<td>(13,293)</td>
<td>(6,845)</td>
<td>(4,862)</td>
</tr>
<tr>
<td>Proven reserve growth 2010 - 2014</td>
<td>0.2%</td>
<td>6.8%</td>
<td>0.8%</td>
<td>39.3%</td>
<td>(2.3%)</td>
</tr>
<tr>
<td>Incremental debt and equity 2010 - 1H 2015</td>
<td>4,627</td>
<td>5,159</td>
<td>2,850</td>
<td>7,104</td>
<td>2,713</td>
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<tr>
<td>Total debt</td>
<td>12,045</td>
<td>6,400</td>
<td>11,544</td>
<td>6,990</td>
<td>2,672</td>
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<tr>
<td>2015E EBITDA</td>
<td>4,975</td>
<td>3,918</td>
<td>2,415</td>
<td>1,942</td>
<td>1,703</td>
</tr>
<tr>
<td>2015E EBITDA less 10% of net business assets</td>
<td>510</td>
<td>988</td>
<td>(701)</td>
<td>625</td>
<td>470</td>
</tr>
<tr>
<td>Economic return on capital</td>
<td>1.1%</td>
<td>3.4%</td>
<td>(2.2%)</td>
<td>4.7%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

Source: Company filings, Bloomberg

Economic Return on Capital as: (2015E EBITDA less 10% of YE14 Net Business Assets) / YE14 Net Business Assets
Liquidity Analysis Might Come Back In Vogue

- Traditional signs of balance sheet stress paint a dire picture
  - Current and quick ratios routinely below 1.0x
- Low cash on balance sheets matters
  - Investors no longer interested in funding capex in excess of cash flow
- High yield energy market is stretched and issuers are becoming increasingly constrained by covenants
  - Traditional source of E&P capital
  - Energy spreads are 480 bps wider than average high yield spreads
  - Unused revolver capacity key to current ratio covenant compliance
- Energy bulls cite revolver capacity and distant financing maturities as reason to ignore depleted balance sheets

<table>
<thead>
<tr>
<th>1H15 E&amp;P Liquidity and Leverage ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>As of 2Q15</strong></td>
</tr>
<tr>
<td>CFG</td>
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<tr>
<td>UPL</td>
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<tr>
<td>CRZO</td>
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<td>ERF</td>
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<td>RRC</td>
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<td>WLL</td>
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<td>APA</td>
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<tr>
<td>EQT</td>
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<tr>
<td>EEC</td>
</tr>
</tbody>
</table>

Source: S&P Capital IQ, Bloomberg

Shading: current and quick ratios less than 1.0x, net debt / 2016 EBITDA greater than 3.0x and cash less than $100m
Is Bank Liquidity A Mirage?

- Banks of all sizes are increasingly vocal about their concerns with the energy sector
  - Significant YTD reserve building, with negative credit migration expected to continue
  - Emphasizing active engagement with borrowers and increased regulatory scrutiny
- Seemingly benign revolver redeterminations are accompanied by less publicized covenant adjustments
  - A major Wall Street bank modified 72 out of 74 loans in its oil and gas book \(^1\)
- Even “best-in-class” E&Ps are reluctant to tap revolvers
  - Despite $2.3B of revolver availability, CXO decided to issue $794M of equity
- Return to growth cannot happen without cheap equity and debt, neither of which exist today

High Yield Issuers Are Increasingly More Reliant On Equity ($B)


* 2015E based on annualized YTD October 15, 2015 issuances
Big Oil Is Pumping Negative Cash Flow

- Cash flow after distributions is negative
  - Distributions support stock price
  - Growing debt funding the gap
  - Buybacks starting to be curtailed
- Paying more for less
  - Big 5\(^1\) production has declined 12% to 5,502mboe in 2014 from 6,235mboe in 2010
  - Costs per barrel increased 82% to $29.6/bbl in 2014 from $16.2/bbl in 2010
- Replacing less reserves at a higher cost
  - Costs per organic barrel addition is up almost 4x to $35.1/bbl in 2014 from $9.5/bbl in 2009
  - Reserve replacement ratio was 76% in 2014, the lowest level since 2007

### IOC Historical Cash Flow And Debt

<table>
<thead>
<tr>
<th>Total Cash Flows 2009 - 1H15 ($B)</th>
<th>BP</th>
<th>Chevron</th>
<th>RDS</th>
<th>Total</th>
<th>Exxon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating cashflow</td>
<td>130.0</td>
<td>210.8</td>
<td>232.0</td>
<td>161.8</td>
<td>296.6</td>
</tr>
<tr>
<td>Capex</td>
<td>(89.2)</td>
<td>(185.5)</td>
<td>(196.8)</td>
<td>(156.2)</td>
<td>(204.1)</td>
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<tr>
<td>Free cashflow</td>
<td>40.8</td>
<td>25.3</td>
<td>35.2</td>
<td>5.6</td>
<td>92.6</td>
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<tr>
<td>Dividends and buybacks</td>
<td>(26.9)</td>
<td>(54.5)</td>
<td>(69.3)</td>
<td>(44.0)</td>
<td>(174.3)</td>
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<tr>
<td>FCF post distributions</td>
<td>13.9</td>
<td>(29.1)</td>
<td>(34.1)</td>
<td>(38.4)</td>
<td>(81.7)</td>
</tr>
<tr>
<td>Total reserves CAGR, 2009-2014</td>
<td>(0.8%)</td>
<td>(0.2%)</td>
<td>(1.3%)</td>
<td>1.4%</td>
<td>1.6%</td>
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<tr>
<td>Incremental debt 2009-2Q15</td>
<td>18.0</td>
<td>21.6</td>
<td>17.9</td>
<td>30.0</td>
<td>24.2</td>
</tr>
<tr>
<td>Total debt 2Q15</td>
<td>52.1</td>
<td>31.8</td>
<td>52.9</td>
<td>56.5</td>
<td>33.8</td>
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<tr>
<td>Total debt 2009</td>
<td>34.0</td>
<td>10.2</td>
<td>35.0</td>
<td>26.4</td>
<td>9.6</td>
</tr>
<tr>
<td>ROIC LTM 2Q15</td>
<td>3.5%</td>
<td>7.7%</td>
<td>13.5%</td>
<td>3.7%</td>
<td>12.1%</td>
</tr>
<tr>
<td>ROIC 2009</td>
<td>15.4%</td>
<td>14.7%</td>
<td>19.3%</td>
<td>18.0%</td>
<td>21.6%</td>
</tr>
<tr>
<td>ROIC 2009-2Q15</td>
<td>(52.7%)</td>
<td>(1.1%)</td>
<td>(0.6%)</td>
<td>(13.0%)</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

Note: BP LTM 2Q15 EBIT excludes Gulf of Mexico related losses

Source: Company filings

1) Big 5 includes BP, Chevron, Royal Dutch Shell, Total, ExxonMobil

ROIC calculated as: EBIT / Net Business Assets
ROIIC calculated as: (LTM 2Q15 EBIT – 2009 EBIT) / (2Q15 NBA – 2009 NBA)
More LNG Projects Coming Online

- Global LNG supply/demand balance now unfavorable for producers
  - Global capacity to increase to 400Mt in 2018 from 290Mt in 2013
  - Bulls argue insufficient supply constrained demand after the past 3 years of stagnant growth
- Major projects coming online
  - Australia has $180B invested in top 6 projects bringing 53Mtpa online over the next two years
  - US LNG exports to begin in 4Q15
  - ExxonMobil and Total ramping production in Papua New Guinea
- North American proposed projects
  - US has 22 proposed projects with capacity of 270Mtpa, equivalent to 94% of global capacity in 2014
  - British Columbia has 19 LNG projects proposed

LNG Market Deteriorating

- Japan Korea Marker benchmark currently below $7/mmBtu, down 55% in the last year
  - Project economics dependent on double-digit LNG prices
  - Prices have lag effect from crude and are projected to drop further
  - Shift towards spot pricing will be more favorable to buyers who once relied on long-term contracts
- Buyers asking for lower prices on long-term “fixed price” contracts
- Japanese LNG demand will decline
  - Full nuclear restart may take 30Mtpa of demand out of Japan by 2030
  - Japan accounts for 37% of global demand

Are LNG Contracts Indestructible?

- Most contracts are not publicly disclosed
- Petronet breaks contract with Qatar
  - It is cheaper purchase spot cargoes and pay $1.4B upfront fee than pay for the agreed-upon volume and price
  - Contract was in year 11 out of 25
  - Only willing to take 70% of agreed-upon volumes, when the minimum was 90%
- Shell CEO says long-term LNG contracts have pricing formulas reviewed every 3 to 6 years
  - 85 to 90% of Shell’s LNG contracts are long-term (2 or more years)
  - Growing concern that Chinese regulators may ask for changes in LNG contracts or asset sales to approve BG takeover
- Japanese buyers showing unwillingness to take test batches of LNG from new projects in Australia
- Qatar, the largest supplier of LNG, no longer opposed to making changes to existing contracts

“We are moving into a buyers’ market and people will go the way that offers better options”

-Prabhat Singh, Petronet LNG CEO
  October 5, 2015

“There is no doubt that different contract arrangements are being experimented with as buyers look to manage price risk”

-Robert Franklin, ExxonMobil Gas & Power Marketing President
  September 16, 2015

Source: Company Filings, BG Group, Shell CEO Comments at Barclays CEO Energy Conference, September 8, 2015, Reuters, Egypt Independent, Bloomberg, Barclays
Royal Dutch Shell
Shell’s $70B Bet On LNG And Brazil

- Shell pays 50% premium to acquire BG Group, a restructuring story focused on LNG and Brazil
  - Bull oil case of $110/bbl, base case of $90/bbl
  - Pro-forma a more levered entity with $68B of net debt and declining cash flow
- An expensive solution to aid struggling legacy upstream portfolio
  - Shell proved reserve replacement ratio of 26% in 2014, the lowest of the Big 5 since 2010
  - Production rates declined 11% to 2.7Mboe/d in 2Q15 from 3.1Mboe/d in 2Q14
- Pro-forma LNG capacity of 70Mtpa by 2020, equivalent to 17% of estimated global trade
- Major LNG projects in Australia dependent on strong Asian demand

### Shell And BG Pro-Forma ($M)

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Cash</td>
<td>21,607</td>
<td>5,295</td>
<td>26,902</td>
<td>20,288</td>
<td>5,295</td>
<td>25,583</td>
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<tr>
<td>Total debt</td>
<td>45,540</td>
<td>17,507</td>
<td>63,047</td>
<td>78,225</td>
<td>14,961</td>
<td>93,186</td>
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<tr>
<td>Net debt</td>
<td>23,933</td>
<td>12,212</td>
<td>36,145</td>
<td>57,937</td>
<td>9,666</td>
<td>67,603</td>
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<tr>
<td>CFFO</td>
<td>45,044</td>
<td>7,397</td>
<td>52,441</td>
<td>30,573</td>
<td>6,234</td>
<td>36,807</td>
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<tr>
<td>Capex</td>
<td>31,854</td>
<td>8,510</td>
<td>40,364</td>
<td>28,789</td>
<td>6,243</td>
<td>35,032</td>
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<tr>
<td>FCF</td>
<td>13,190</td>
<td>(1,113)</td>
<td>12,077</td>
<td>1,784</td>
<td>(9)</td>
<td>1,775</td>
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<tr>
<td>EBITDA</td>
<td>51,888</td>
<td>8,846</td>
<td>60,734</td>
<td>38,705</td>
<td>6,013</td>
<td>44,718</td>
</tr>
<tr>
<td>Capex</td>
<td>31,854</td>
<td>8,510</td>
<td>40,364</td>
<td>28,789</td>
<td>6,243</td>
<td>35,032</td>
</tr>
<tr>
<td>EBITDA-Capex</td>
<td>20,034</td>
<td>336</td>
<td>20,370</td>
<td>9,916</td>
<td>(230)</td>
<td>9,686</td>
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<tr>
<td>Production (kboe/d)</td>
<td>3,166</td>
<td>606</td>
<td>3,772</td>
<td>2,961</td>
<td>667</td>
<td>3,628</td>
</tr>
</tbody>
</table>

Assumption: 2015 Total debt assumes deal closes in 2015

The Dream Of The Combined Shell And BG

- Greater production
  - Total production expected to increase 15% by 2020 to 4.3Mboe/d
  - Brazil deep water production expected to account for nearly all growth in oil production
- Growing cash flows
  - CFFO to increase to $53B in 2020 from $43B once the deal closes in 2016
  - $2.5B in synergies by 2018
- Higher distributions
  - Annual dividends raised to $15B from $12B in combined pro-forma 2014
  - $25B in buybacks between 2017-2020 driven by oil price recovery
- $30B in asset sales between 2016 and 2018 to offset incremental debt

### 2020E Financials For The Big 5 ($B)

<table>
<thead>
<tr>
<th></th>
<th>BP</th>
<th>Chevron</th>
<th>RDS/BG</th>
<th>Total</th>
<th>Exxon</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBITDA</td>
<td>32.4</td>
<td>35.4</td>
<td>52.8</td>
<td>53.9</td>
<td>52.7</td>
</tr>
<tr>
<td>Capex</td>
<td>(19.4)</td>
<td>(23.8)</td>
<td>(35.6)</td>
<td>(21.1)</td>
<td>(25.3)</td>
</tr>
<tr>
<td>EBITDA - Capex</td>
<td>13.0</td>
<td>11.6</td>
<td>17.2</td>
<td>32.8</td>
<td>27.4</td>
</tr>
<tr>
<td>Total Enterprise Value</td>
<td>123.1</td>
<td>169.3</td>
<td>253.2</td>
<td>143.3</td>
<td>345.6</td>
</tr>
<tr>
<td>TEV/EBITDA</td>
<td>3.8x</td>
<td>4.8x</td>
<td>4.8x</td>
<td>2.7x</td>
<td>6.6x</td>
</tr>
<tr>
<td>TEV/(EBITDA - Capex)</td>
<td>9.5x</td>
<td>14.6x</td>
<td>14.7x</td>
<td>4.4x</td>
<td>12.6x</td>
</tr>
</tbody>
</table>

Sources: Company filings, Goldman Sachs, Bernstein, Bloomberg
Shell’s Brazil: Risk Masquerading As Opportunity

- Shell production growth dependent on Brazil
  - Shell estimates Brazil will account for 20% of total production by 2020 up from less than 10% currently
  - Nearly all of BG’s oil-related growth projects are in partnership with Petrobras
- The price of corruption
  - Shell CEO confident Brazilian pre-salt assets will be profitable despite risk of delays
  - Timing of floating production, storage, and offloading (FPSO) vessel delivery uncertain
- The Eike Batista Experience
  - Are all the reserves there?
  - The promise of production does not always materialize

“The headlines about Petrobras are not pretty, but we are talking about something long term here”

-Shell CEO Ben van Beurden
April 8, 2015

Source: Royal Dutch Shell – BG Group Analyst Conference Call, April 8, 2015
Cheniere Energy
Cheniere’s Dream

• Annual EBITDA of $4.1B from 9 trains
  — Baseline cash flows are guaranteed on 20-year “take or pay” contracts
  — Cash flows from liquefaction fees will easily cover construction costs and pay off debt
  — Uncontracted volumes will find buyers who will pay liquefaction fees of $3.50/mmBtu
  — Buyers are responsible for shipping to end users, so demand is locked in
  — 100% utilization rate at all times

• LNG capacity from Sabine Pass and Corpus Christi will total 40Mtpa
  — Equivalent to 10% of the global market by 2020

• No commodity pricing risk gives Cheniere an unique position in the LNG market
  — Other producers are responsible for producing gas that feeds into LNG projects, thus there are minimal capex requirements once the projects are online
  — Sales agreements are indexed to 115% of Henry Hub, which is cheap relative to gas prices elsewhere
  — Liquefaction costs only $1/mmBtu but fees range between $2.25-3.50/mmBtu

• Activist involvement will manage cost base more efficiently
  — Icahn raises stake to 12% from 8% and granted two seats on the board

• Cost to build LNG facilities are at a fraction of Australian projects

• First US exporter of LNG beginning in 4Q15

Source: Company filings, Goldman Sachs, Raymond James
Cheniere Reality

- Annual EBITDA of $1.7B from 7 trains generated by contracted volumes
  - Stock is trading at 16x 2020 EV/EBITDA generated from contracted volumes
  - Does not factor in possible delays to LNG train buildout, which is common across the industry
  - Difficulty finding buyers willing to commit to long-term contracts
- 87% of commissioned capacity is on “take or pay” contracts which represent less than half of Cheniere’s dream EBITDA
- 13% of capacity is uncontracted and will struggle to breakeven regardless of destination
  - Filings do not show sensitivities to Asian LNG prices below $8/mmBtu
  - Management assumes gross margins of $4-7/mmBtu on uncontracted volumes, which implies a premium to spot prices
  - Global LNG markets will remain oversupplied when spare capacity is available for marketing
- Liquefaction terminals have an average utilization rate of 88%
- Cheniere is a complex holding company structure with multiple operating joint ventures
- Most of the LNG trains have not been completed and still need funding
  - All 7 trains will cost $29B, but less than half of all construction is complete
  - Construction of Corpus Christi trains 1 and 2 will cost $12B
- Operating level financing has caveats
  - Class B shares of Cheniere Energy Partners (CQP) increase by 3.5% compounded each quarter
- Management unsure if first LNG cargo will meet 4Q15 target

Source: Company filings, BG Group, Bloomberg, Barclays
Residential Solar Market Is Uneconomical

- Government largess, not economics, drive residential rooftop systems
  - Net metering allows residential systems to sell electricity to utilities at retail rates
  - IRS rules encourage rooftop solar via 30% investment tax credit (ITC) and accelerated depreciation
  - Residential rooftop systems are more than twice as expensive per watt as utility scale solar projects
- Of 6GWs total US solar photovoltaic installations in 2014, 1.2GWs were residential rooftop systems, most of them in California
- SolarCity and others finance systems to households lacking sufficient income and upfront capital to take advantage of the arbitrage

SolarCity Is Really A Financing Scheme

- SolarCity perceived as a solar company with the Elon Musk Effect
- SolarCity does not scale as smaller competitors claim similar installation costs
- Competition is increasing and lease rates are declining faster than costs
- Solar leases becomes a liability when selling a home
  - New homeowner must take over the lease, otherwise the seller must prepay the remaining payments
- Recent changes undermine the business model
  - Net metering under pressure in many states, with Hawaii as the first to eliminate the program
  - 30% ITC expires in 2016
  - California electricity rate reform lowers savings for homeowners, as existing leases could be underwater, undermining securitizations
SolarCity Math

- Returns on invested capital based on lease revenues are below 8%
- Claims >30% margins on its leasing business, but requires outside capital to build new systems
- 2Q15 LTM FCF of $(1.9B) including new systems
- Uses 6% discount rate to calculate the net present value of 20-year residential leases
  - Assumes that 90% of customers will renew the contract for another 10 years

Source: Company filings
Thank You To Grant’s Fall 2015 Conference
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