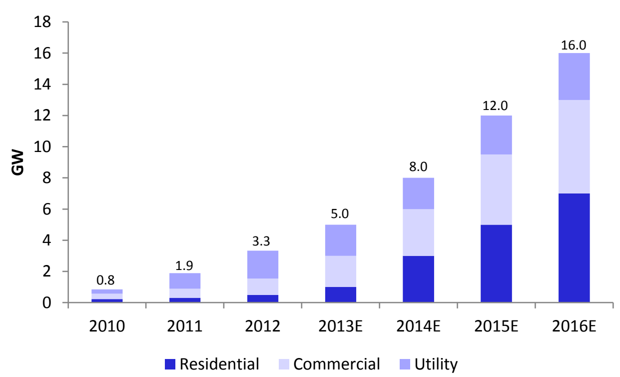
Industry Overview: US Residential Solar

1) Grid parity in 10+ states currently

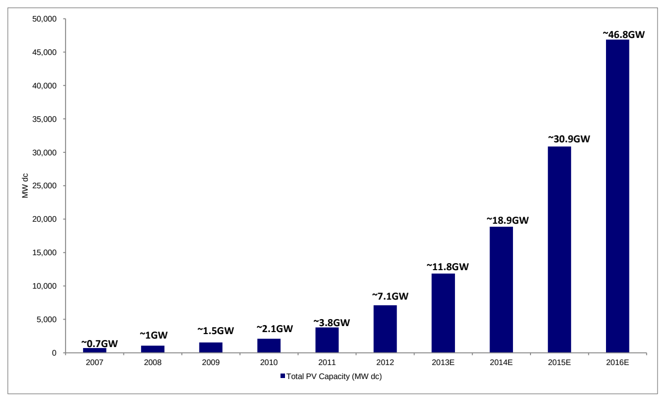
We believe solar is currently competitive in more than 10 states in the U.S without additional state subsidies. Solar LCOE in these states ranges from 11-15 c/kWh and compares to retail electricity price of 11-37 c/kWh in these markets. These grid parity states currently have a cumulative installed capacity of ~6GW as of 2012. However, considering the improved economics of solar in these markets along with other growth enablers such as solar leasing, availability of low cost financing, we expect installed capacity growth of ~400-500% over the next 3-4 years.

Figure 28: US Total PV Installations



Source: Deutsche Bank, SEIA

Figure 29: Total PV Capacity



Source: Deutsche Bank

2) Potential for further cost reductions and solar growth in additional states over the next 18 months

Assuming solar system prices decline from sub \$3/W currently to sub \$2.50/W over the next 12-18 months, solar LCOE in existing grid parity states could decrease further to 9-14 c/kWh driving further acceleration in solar shipments in these markets. At these system price levels, solar has the potential to reach grid parity in 12 additional states as LCOE approaches 11-14 c/kWh in these states.

Figure 30: States Currently at Grid Parity

Grid Parity at $3.00 ($2.10 w/ ITC)	LCOE ($/KWh)	Average Cost of Electricity ($/KWh)
Arizona	$0.11	$0.11
California	$0.12	$0.16
Connecticut	$0.15	$0.17
Hawaii	$0.12	$0.37
Nevada	$0.10	$0.12
New Hampshire	$0.15	$0.16
New Jersey	$0.15	$0.16
New Mexico	$0.11	$0.11
New York	$0.15	$0.18
Vermont	$0.16	$0.17

Source: Deutsche Bank

Figure 31: Additional States Poised to Reach Grid Parity

Grid Parity at $2.50 ($1.75 w/ ITC)	LCOE ($/KWh)	Average Cost of Electricity ($/KWh)
Colorado	$0.10	$0.12
Delaware	$0.12	$0.13
Washington, DC	$0.12	$0.12
Florida	$0.11	$0.11
Kansas	$0.11	$0.11
Maryland	$0.12	$0.13
Massachusetts	$0.13	$0.15
Michigan	$0.14	$0.14
Pennsylvania	$0.13	$0.13
Rhode Island	$0.13	$0.15
South Carolina	$0.11	$0.12
Wisconsin	$0.13	$0.13

Source: Deutsche Bank

3) Lower financing costs could provide additional growth kicker

We believe the broader acceptance of yieldco type structures has lowered solar financing costs by ~200-300 bps in addition to providing significant amount of liquidity within the solar sector. Every 100 bps reduction in financing costs results in 1 c/kWh reduction of LCOE, in our view. We believe solar LCOE could potentially decrease from 10-16 c/kWh to 8-14 c/kWh as a result of wider acceptance of yieldco type structures. Wider availability of financing options could provide project developers some cushion in a rising interest rate environment.

Figure 32: Shift in LCOE for 100bps Reduction

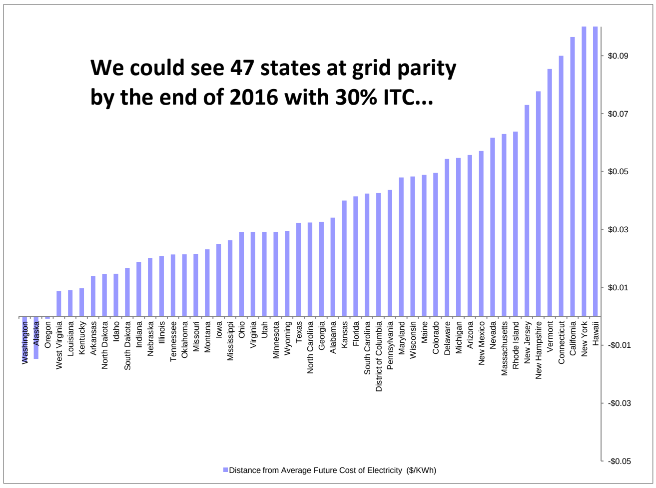
Cost of Debt / Discount Rate	Average LCOE ($2.10 w/ITC)	Reduction per 100bps
7.50%	$0.15	
6.50%	$0.14	$0.008
5.50%	$0.13	$0.008
4.50%	$0.12	$0.008
3.50%	$0.12	$0.008
2.50%	$0.11	$0.007

Source: Deutsche Bank
Note: Average of all 50 states and DC for current net system LCOE (with ITC)

4) ITC expiration could act as another catalyst

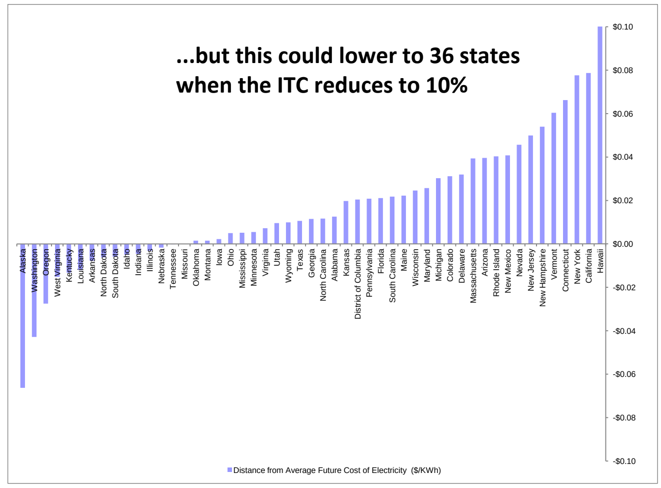
Current forms of federal investment tax credits are set to expire in 2016. Without any ITC, solar LCOE increases from 10-16 c/kWh to 15-21c/kWh and only 1 state (Hawaii) screening at grid parity states vs ~10 states currently. In a 2017+ 10% ITC environment, solar would be at grid parity in ~36 states (vs ~47 states with 30% ITC), assuming system prices and financing costs decline although the economics for solar would not be as attractive. Consequently, we expect to see a big rush of new installations ahead of the 2016 ITC expiration.

Figure 33: 2016 Grid Parity With ~30% ITC



Source: Deutsche Bank, EIA
Note: Both Graphs above show LCOE minus average electricity price in States

Figure 34: Grid Parity When ITC Steps Down to 10%



Source: Deutsche Bank, EIA

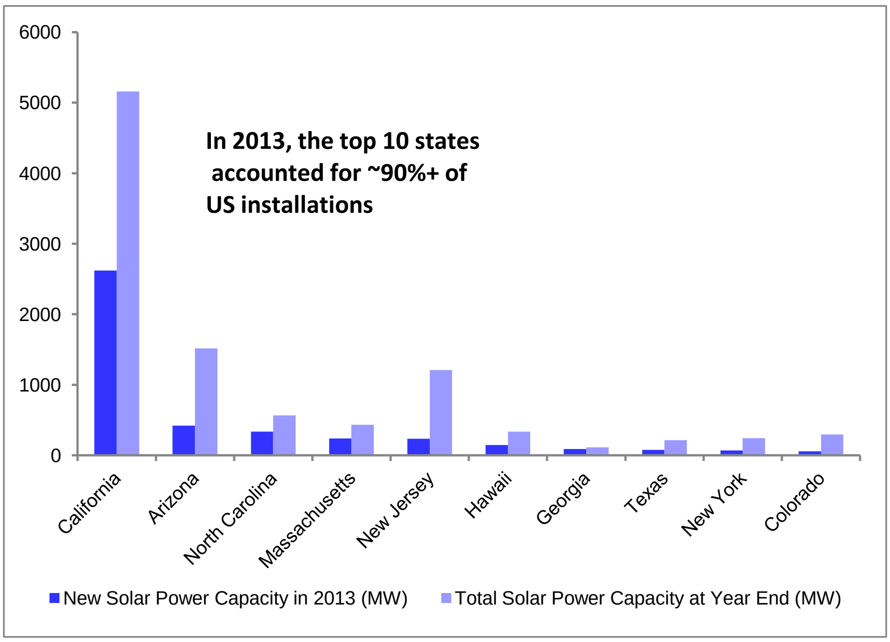
5) Leasing model could become mainstream

We believe the availability of residential leasing option would also act as a significant growth catalyst for the sector considering the fact that solar leasing companies are highly profitable and have strong incentive to maximize the number of leasing customers ahead of ITC expiration in 2016.

Background

The US market has over 16GW of installed capacity and nearly 5GW of solar capacity was added in 2013. While the data shows a focus on utility scale installations, distributed generation (both residential and commercial) has also been gaining ground recently. We estimate that ~800MW of residential systems were installed in 2013 and expect this number to reach 5GW as solar securitization increases and more states continue to reach grid parity. We believe regions within 10+ states are at grid parity already, while more states will follow suit as cost per watt continues to decline fueled by BoS cost reductions, making solar more competitive with rising electricity rates over the long term.

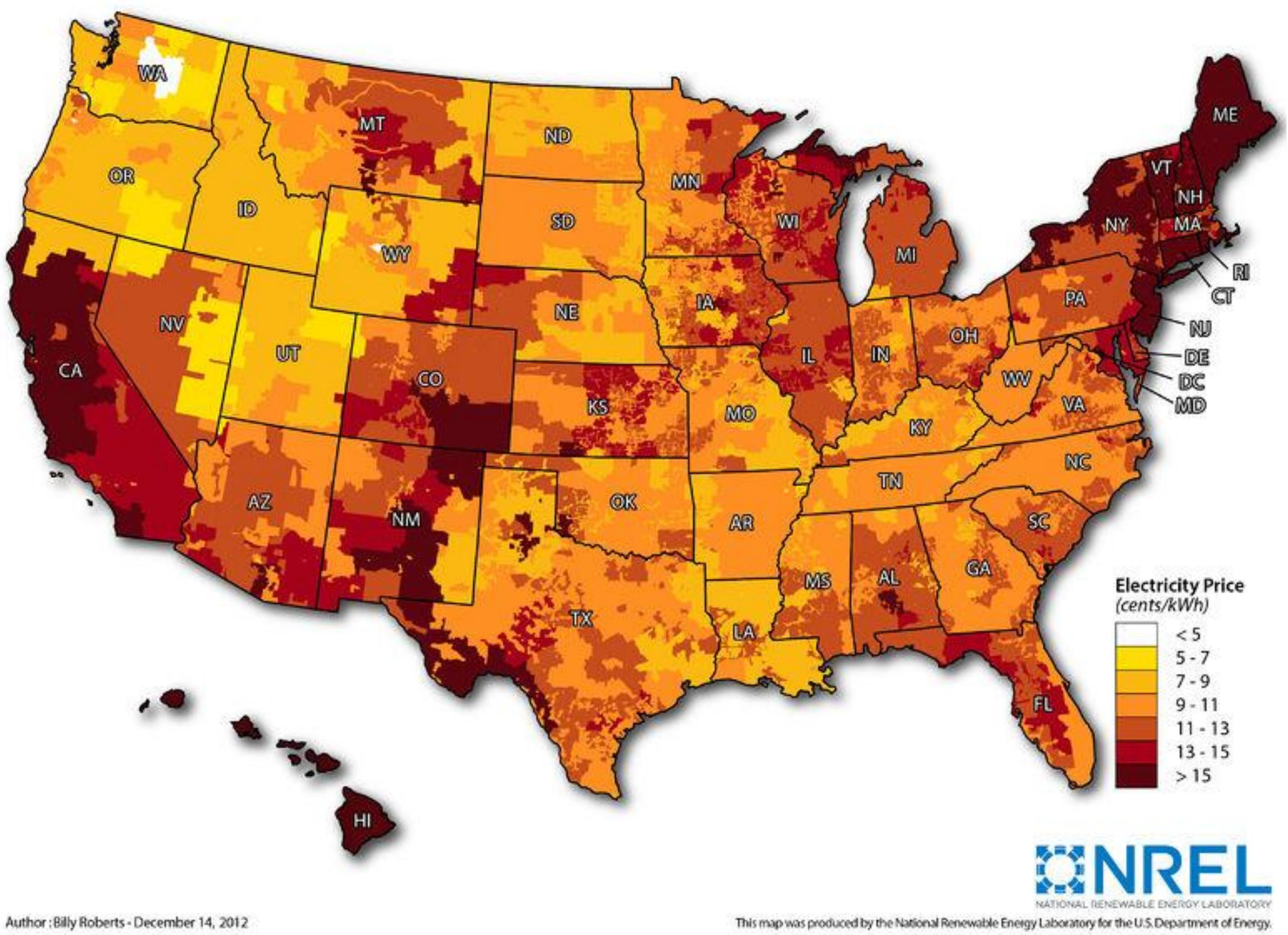
Figure 35: Total State Capacity/Installs



Source: Deutsche Bank

State Economics

Figure 36: Dispersion of Electricity Prices in the US



Source: National Renewable Energy Laboratory

As shown above, the electricity price within any given state is often highly variable (we estimate many states are +/- 3 cents from the mean), while the vast number of rate structures can provide for further complications (fixed or variable pricing, time of use, demand response, volume pricing, etc). We have compiled the average state electric prices on a monthly basis and used the LTM average for our model.

Figure 37: Most Expensive Electricity (Residential)

		12 Month Average Electricity Price		
Rank	State	Residential ($/W)	Commercial ($/W)	Industrial ($/W)
1	Hawaii	$0.37	$0.35	$0.31
2	New York	$0.18	$0.15	$0.07
3	Alaska	$0.18	$0.15	$0.16
4	Vermont	$0.17	$0.14	$0.10
5	Connecticut	$0.17	$0.15	$0.13
6	New Hampshire	$0.16	$0.13	$0.12
7	California	$0.16	$0.14	$0.11
8	New Jersey	$0.16	$0.13	$0.11
9	Rhode Island	$0.15	$0.12	$0.11
10	Massachusetts	$0.15	$0.14	$0.13
11	Maine	$0.15	$0.12	$0.08
12	Michigan	$0.14	$0.11	$0.08
13	Delaware	$0.13	$0.10	$0.09
14	Wisconsin	$0.13	$0.11	$0.07
15	Maryland	$0.13	$0.10	$0.08
16	Pennsylvania	$0.13	$0.09	$0.07
17	District of Columbia	$0.12	$0.12	$0.06
18	Nevada	$0.12	$0.09	$0.06
19	Ohio	$0.12	$0.09	$0.06
20	South Carolina	$0.12	$0.10	$0.06
21	Minnesota	$0.12	$0.09	$0.07
22	Colorado	$0.12	$0.10	$0.07
23	Florida	$0.11	$0.10	$0.08
24	New Mexico	$0.11	$0.09	$0.06
25	Kansas	$0.11	$0.09	$0.07

Source: Deutsche Bank, EIA

Figure 38: Least Expensive Electricity (Residential)

		12 Month Average Electricity Price		
Rank	State	Residential ($/kWh)	Commercial ($/W)	Industrial ($/W)
26	Arizona	$0.11	$0.10	$0.07
27	Alabama	$0.11	$0.11	$0.06
28	Texas	$0.11	$0.08	$0.06
29	Georgia	$0.11	$0.10	$0.06
30	Virginia	$0.11	$0.08	$0.07
31	Illinois	$0.11	$0.08	$0.06
32	Iowa	$0.11	$0.08	$0.05
33	North Carolina	$0.11	$0.09	$0.06
34	Indiana	$0.11	$0.09	$0.06
35	Mississippi	$0.10	$0.10	$0.06
36	Montana	$0.10	$0.09	$0.05
37	Missouri	$0.10	$0.08	$0.06
38	Tennessee	$0.10	$0.10	$0.07
39	Nebraska	$0.10	$0.08	$0.07
40	South Dakota	$0.10	$0.08	$0.07
41	Wyoming	$0.10	$0.08	$0.06
42	Utah	$0.10	$0.08	$0.06
43	Oregon	$0.10	$0.08	$0.06
44	West Virginia	$0.10	$0.08	$0.06
45	Kentucky	$0.09	$0.09	$0.05
46	Oklahoma	$0.09	$0.07	$0.05
47	Arkansas	$0.09	$0.08	$0.06
48	North Dakota	$0.09	$0.08	$0.07
49	Idaho	$0.09	$0.07	$0.05
50	Louisiana	$0.09	$0.08	$0.05
51	Washington	$0.09	$0.08	$0.04

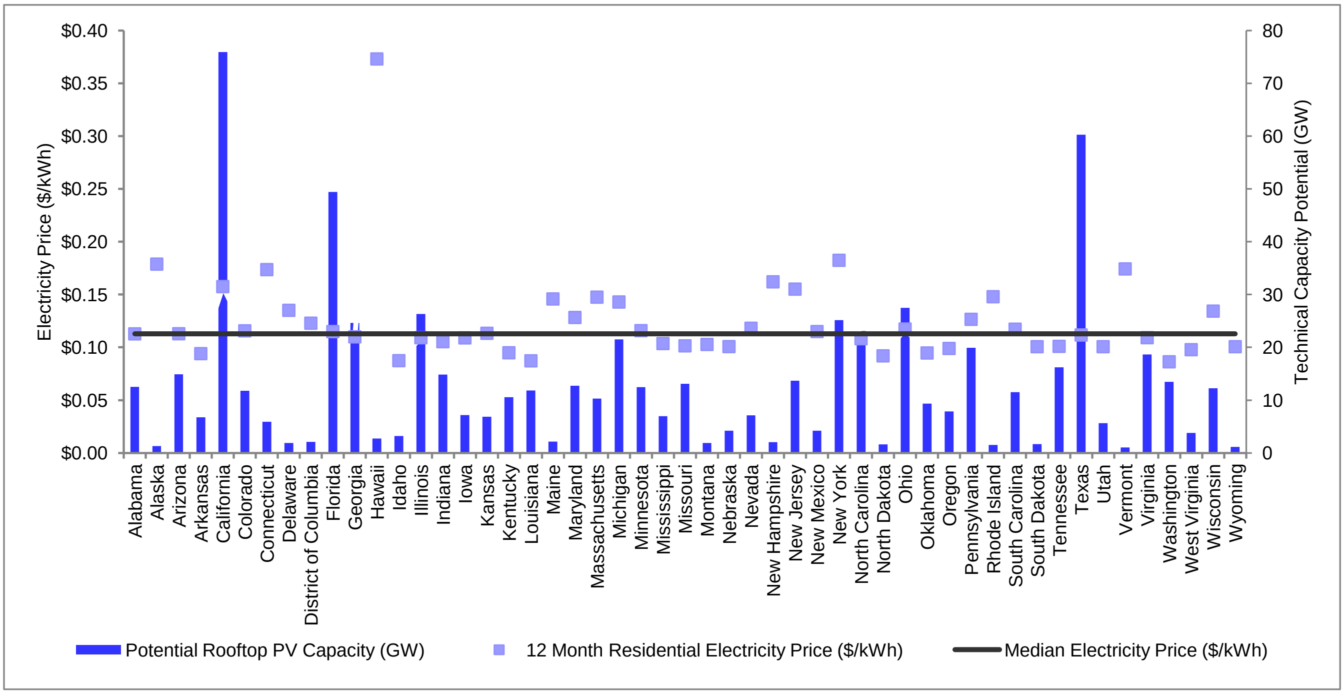
Source: Deutsche Bank, EIA

In the absence of outside incentives, utility electricity prices are the main form of competition a residential/commercial solar project must face. We believe the top 10-15 states provide the most compelling possibilities for unaided cost parity, particularly as fossil fuel based generation has been in relative oversupply and this environment begins to shift. For example, there are ~55GW of coal fired plant retirements planned through 2016 due in large part to the finalization of the Mercury and Air Toxics Standards (MATS) by the EPA. There will be incremental capacity additions to maintain adequate capacity in the electricity market, but the addition of large power plants increases the rate base of regulated utilities, which often allows them to raise rates on consumers over time. As higher electricity prices make solar more competitive, we view this as a positive

Theoretical Potential

In a 2012 paper (*U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis*) the US National Renewable Energy Laboratory (NREL) conducted a study on the technical potential for various renewable energy technologies. Using data from the EIA, McGraw-Hill, and Denholm and Margolis, NREL concluded that ~664GW of potential capacity could be realized by the rooftop market alone, versus <1% penetration currently.

Figure 39: Technical Rooftop Capacity Vs Electricity Price



Source: Deutsche Bank, NREL, EIA, McGraw Hill, Denholm and Margolis,

From their analysis, we see that ~51% (343GW) of the technical potential lies in states with electricity prices above the median electricity price ($0.1128/kWh) while, ~19% of the potential (~128GW) lies in states with residential electricity prices already above $0.15/kwh – primarily California (~76GW), New York (~25GW), New Jersey(13.7GW), and Connecticut(5.9GW).

Grid Parity Increasing

We believe that the US is rapidly approaching grid parity in various regions where high electricity prices and the declining cost of solar has made investments increasingly attractive. By default our model takes into account the gross lifetime cost of the system and the lifetime electricity production, but we have assumed ITC inclusion (effectively 30% less system cost) in our LCOE analysis.

Below, we show the states which we believe have likely reached grid parity, depending on the region, electricity price, and type of consumption. Hawaii and California are consistently the top two markets due to high insolation (a measure of the sun's radiation) and high electricity prices, but different pricing schemes for types of electricity within state markets causes divergences thereafter.

Figure 40: States At or Near Grid Parity

	Type of Electricity		
Rank	Residential	Commercial	Industrial
1	Hawaii	Hawaii	Hawaii
2	California	California	California
3	New York	New York	Massachusetts
4	Connecticut	Connecticut	Connecticut
5	Nevada	Massachusetts	New Hampshire
6	Vermont	Arizona	Rhode Island
7	New Mexico	Vermont	New Jersey
8	Arizona	New Mexico	Arizona
9	New Hampshire	New Hampshire	Nevada
10	New Jersey	Nevada	New Mexico

Source: Deutsche Bank, EIA

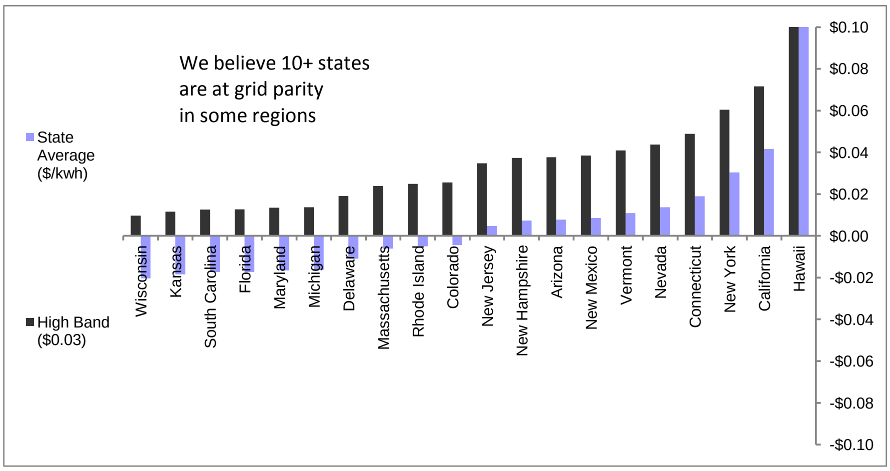
While Hawaii is an outlier due to drastically higher electricity prices, The next ten states closest to grid parity reinforce our view that high electricity prices provide the most compelling argument in favor of PV self generation. There is often a direct correlation between population centers and high electricity prices (more resources required to generate/transmit electricity equates to a higher rate base) which implies upside bias to our estimates as customer awareness increases and the financial viability of solar passes further into mainstream decision making.

Furthermore, we have conducted a similar analysis for Commercial and Industrial sectors with and with the ITC. While we assumed $2.10/w ($3/w ex ITC) for residential, we have used $1.75/w ($2.50/w ex ITC) and $1.58/w ($2.25/w ex ITC) for commercial and industrial systems (given economies of scale). Our analysis shows that despite lower electricity prices to compete with compared to residential prices, the commercial market appears particularly attractive and should continue to be a solid growth driver for the US market. The residential market retains the most markets at grid parity in the current ITC environment.

Based on our analysis we believe 10+ States in the US are at grid parity in certain regions (depending on the local electricity price). Our base case model uses the 12 month rolling average electricity price for each state. However, given notable volatility in electricity prices within states, we have also tested our assumptions compared to a high band (+$0.03) above average. Our analysis shows that 20-30% of US States appear to be at or near to grid parity. Industrial electricity prices are the most difficult to compete with (as they are lowest) but are likely biased to the upside if our analysis considered other incentives in the LCOE calculation.

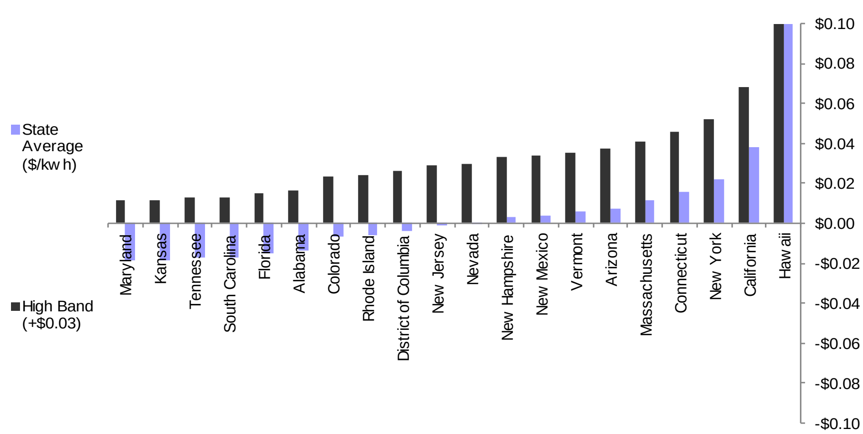
Key States – Distance from Grid Parity

Figure 41: Residential Parity @ $2.10 Net Cost (w/ ITC. $3.00/w Gross)



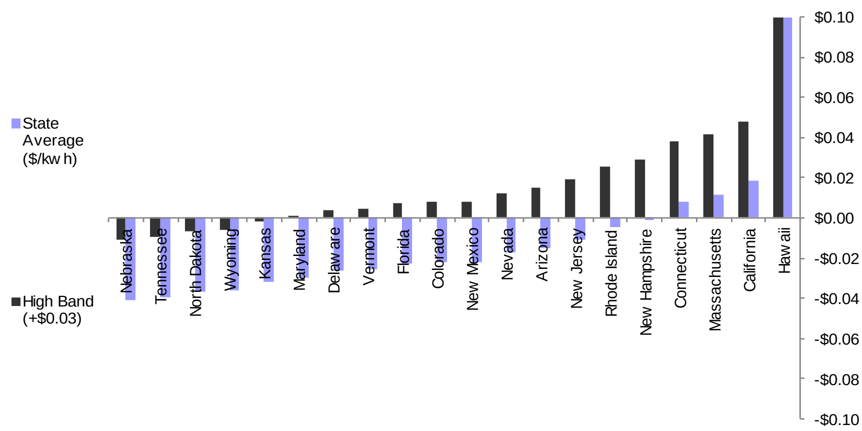
Source: Deutsche Bank, EIA
Note: These three successive graphs show LCOE minus electricity price (average and +3 cents)

Figure 42: Commercial Parity @ $1.75/w Net Cost (w/ITC. $2.50/w Gross)



Source: Deutsche Bank, EIA

Figure 43: Industrial Parity @ $1.58/w Net Cost (w/ ITC. $2.25/w Gross)



Source: Deutsche Bank, EIA

Model Overview

Inputs and Variables

For our US analysis we have considered medium to large DC systems using a traditional string inverter (replaced after 10 years). We assume a 0.70% production decrease every year, a 90% DC to AC efficiency conversion, and 364 days of electricity production. A yearly power price escalator (2%) is used to account for general inflation or rising fuel costs, and several switches (tax credit, FiT, SREC market, depreciation) are available in the model.

The costs of the system are broken into financing and the solar array itself. Module prices ($0.70/watt) are added to the inverter ($0.45), labor ($0.50/w), and other costs ($1.35) to arrive at a total gross cost per watt ($3.00) for residential systems. Commercial/Industrial systems are assumed to have economies of scale that allow for a 50-75 c/w reduction. Furthermore, debt levels are initially based on a spread (5%) to the local risk free rate (2.5%) and flowed through the model over a chosen payment period (20 years). This is also used as the discount rate. Operation and maintenance is considered an ongoing cost as a percentage (0.5%) of total system cost and is escalated (1%) annually. Lastly, the electricity production is assumed to be taxed if the system produces a net profit.

Methodology

Our base case assumes straight line 6 year depreciation, the federal 30% ITC, and $100 SREC's in existing markets are the only favorable policies in place. This implicitly assumes that a third party financier is used so we have used a cost per watt on the lower end of the likely range today for a residential system ($3/w gross). While in reality there will be variations in the $2.50-$4/w range for residential systems with variations between states, we have used a single cost/watt for simplicity.

Electricity production from the sample solar array was estimated using a point average insolation level from NREL's Solar Prospector (we have used levels for each State's most populous city) multiplied by the system size, the production days (364), and the conversion loss factor (90%). We use the total system cost, the yearly operation & maintenance, inverter replacement costs, and debt payments to arrive at total cost for a year. We apply a discount rate equal to the total financing cost in order to arrive at a discounted total costs and production. LCOE is calculated as gross total lifetime costs divided by total lifetime electricity production (both are discounted at the cost of debt). Our model spans a 20 year lifespan although we note that this may be conservative as most panels are expected to last 5-10 years longer.

Furthermore, we have modeled out the cash flows of each system to arrive at unlevered IRR's ranging from 0 to 47%. Our model assumes that the electricity is either self used (representing an avoided cost) or sold back into the grid at the prevailing electricity price. The Solar Energy Industries Association (SEIA) reports that 43 of the 50 states + DC currently have some form of net metering in place. Despite some recent challenges to policies, we believe that net metering policies are likely to stay in place for the foreseeable future. The table below represents an unlevered system.

Figure 44: LCOE and IRR in USA's Most Populous Cities (100% equity, ITC, SRECs in Select Markets)

City, State	Insolation (kWh/m2/day)	Cost of Electricity - $/kWh (12 month State average)	LCOE ($2.10/w Cost with ITC)	IRR
Honolulu, Hawaii	5.97	$0.37	$0.16	47.11%
Newark, New Jersey	4.67	$0.16	$0.21	15.11%
Los Angeles, California	6.06	$0.16	$0.16	13.68%
Boston, Massachusetts	4.57	$0.15	$0.21	13.32%
Wilmington, Delaware	4.81	$0.13	$0.20	12.97%
Baltimore, Maryland	4.85	$0.13	$0.20	12.14%
Washington, District of Columbia	4.87	$0.12	$0.20	11.39%
Philadelphia, Pennsylvania	4.72	$0.13	$0.21	11.08%
New York, New York	4.62	$0.18	$0.21	10.83%
Charlotte, North Carolina	5.19	$0.11	$0.19	10.73%
Las Vegas, Nevada	6.73	$0.12	$0.15	9.59%
Virginia Beach, Virginia	4.93	$0.11	$0.20	9.45%
Bridgeport, Connecticut	4.54	$0.17	$0.21	9.42%
Albuquerque, New Mexico	6.60	$0.11	$0.15	8.65%
Phoenix, Arizona	6.68	$0.11	$0.15	8.53%
Burlington, Vermont	4.30	$0.17	$0.23	8.42%
Columbus, Ohio	4.48	$0.12	$0.22	8.25%
Manchester, New Hampshire	4.54	$0.16	$0.21	8.06%
Providence, Rhode Island	4.59	$0.15	$0.21	6.57%
Denver, Colorado	5.85	$0.12	$0.17	6.50%
Louisville, Kentucky	4.70	$0.09	$0.21	5.77%
Detroit, Michigan	4.41	$0.14	$0.22	5.26%
Charleston, West Virginia	4.50	$0.10	$0.22	5.24%
Columbia, South Carolina	5.22	$0.12	$0.19	4.75%
Jacksonville, Florida	5.31	$0.11	$0.18	4.71%
Milwaukee, Wisconsin	4.54	$0.13	$0.21	4.70%
Wichita, Kansas	5.33	$0.11	$0.18	4.54%
Portland, Maine	4.04	$0.15	$0.24	4.13%
Birmingham, Alabama	5.00	$0.11	$0.20	3.42%
Atlanta, Georgia	5.09	$0.11	$0.19	3.30%
Cheyenne, Wyoming	5.53	$0.10	$0.18	3.21%
Salt Lake City, Utah	5.51	$0.10	$0.18	3.15%
Houston, Texas	4.96	$0.11	$0.20	3.14%
Jackson, Mississippi	5.11	$0.10	$0.19	2.43%
Minneapolis, Minnesota	4.56	$0.12	$0.21	2.40%
Des Moines, Iowa	4.72	$0.11	$0.21	1.99%
Oklahoma City, Oklahoma	5.41	$0.09	$0.18	1.93%
Billings, Montana	4.98	$0.10	$0.20	1.91%
Kansas City, Missouri	4.97	$0.10	$0.20	1.69%
Memphis, Tennessee	4.99	$0.10	$0.20	1.68%
Omaha, Nebraska	4.93	$0.10	$0.20	1.47%
Chicago, Illinois	4.50	$0.11	$0.22	1.30%
Indianapolis, Indiana	4.60	$0.11	$0.21	1.11%
Boise, Idaho	5.48	$0.09	$0.18	0.94%
Sioux Falls, South Dakota	4.75	$0.10	$0.21	0.91%
Fargo, North Dakota	5.16	$0.09	$0.19	0.80%
Little Rock, Arkansas	4.98	$0.09	$0.20	0.61%
Anchorage, Alaska	2.09	$0.18	$0.34	-
New Orleans, Louisiana	5.12	$0.09	$0.14	-
Portland, Oregon	4.04	$0.10	$0.17	-
Seattle, Washington	3.98	$0.09	$0.18	-

Source: Deutsche Bank, NREL, EIA
Note: Includes 30% ITC for all states and $100 SREC's for 6 years in markets in Delaware, Washington DC, Kentucky, Maryland, Massachusetts,New Jersey, North Carolina, Ohio, Pennsylvania, Virginia, and West Virginia

SREC Markets

State renewable energy certificates (SRECs) have helped to push New Jersey into one of the top solar markets in the country, and several other states have followed suit. While California does not currently utilize SREC markets the same way that other states do, we believe these market based instruments can be an effective means to increase ROI and enhance solar adoption rates.

Overview – Active Markets

New Jersey, Maryland, Delaware, Massachusetts, Ohio, Pennsylvania, North Carolina and Washington DC all employ active SREC markets currently. Indiana, Kentucky, West Virginia, and North Carolina also have marginal SREC markets because they have territory located within the PJM Regional Transmission Organization, which allows them to trade into active SREC markets like Ohio and Pennsylvania. Furthermore, California allows tradable renewable energy credits (TRECs) which are considerably different from SRECs and less likely to directly benefit distributed generation.

What is an SREC?

SREC's have been implemented to provide a partially market based incentive for solar capacity additions, particularly for distributed generation. 1 SREC is created for every 1 MWh of electricity generated from a solar installation. Using a Newark, NJ example, a 5kw system would generate ~6-8 SREC's per year. At current average wholesale prices, a residential system could generate incremental yearly income of ~$1,000-$1,500 per year.

SREC markets are primarily based on supply and demand, although the demand is essentially state mandated. The specifics vary across states, but there is generally a target renewable portfolio standard (RPS) with a specific carve out for solar generation over the next 10+ years as either a percentage of total electricity use or total GWh generated from solar. For example, the requirements for NJ are shown below, which have changed from absolute generation targets to % generation targets as shown.

Figure 45: New Jersey RPS Solar Mandate

Energy Year	Old Solar Carve-Out	New Solar Carve Out		Energy Year	OldSolar Carve-Out	New Solar Carve Out
EY 2011	306 GWh	306 GWh		EY 2020	2,164 GWh	3.38%
EY 2012	442 GWh	442 GWh		EY 2021	2,518 GWh	3.47%
EY 2013	596 GWh	596 GWh		EY 2022	2,928 GWh	3.56%
EY 2014	772 GWh	2.05%		EY 2023	3,433 GWh	3.65%
EY 2015	965 GWh	2.45%		EY 2024	3,989 GWh	3.74%
EY 2016	1,150 GWh	2.75%		EY 2025	4,610 GWh	3.83%
EY 2017	1,357 GWh	3.00%		EY 2026+	5,316 GWh	3.92%
EY 2018	1,591 GWh	3.20%		EY 2027	5,316 GWh	4.01%
EY 2019	1,858 GWh	3.29%		EY 2028 +	5,316 GWh	4.10%

*Note: Energy Year Begins June 1st of the prior calendar year in NJ

Source: NJ State Legislature Bills, DSIRE
Note: "Old Solar Carve Out" refers to A.B. 3520, while "New Solar Carve Out" refers to S.B. 1925

Eligibility and SACP

SREC's are generally designed to increase distributed generation market penetration and focus specifically on smaller system sizes more suited to residential or commercial scale. In some states, residential systems (<10-20kw) can use estimated generation for SREC credits but this is starting to change.

Solar Alternative Compliance Payments (SACPs) are effectively a price ceiling for SREC's, as they are the price a utility would pay if it cannot purchase SRECs for a lower price. The existence of this mechanism encourages market development but we believe it is unlikely that longer-term prices will rise above a certain discount to these levels, given the attractive economics from SRECs and relatively high prices for SACPs (~$300-400).

SRECs in Perspective

One of the most obvious benefits of an SREC is a notable reduction in the payback time for a solar system. Given that 1 SREC is created for 1MWh, each $100 in SREC prices is effectively equal to 10 cents per kwh. The average US retail electricity price is only 12 cents per kwh, so we can see that the economics improve with a functioning SREC market which is not dramatically in oversupply. This has happened before (NJ specifically has been in relative oversupply recently) which can cause a precipitous decline in SREC prices and hurt the economics of legacy projects. However, state legislatures which choose to implement RPS with a solar carve out may be more likely than others to revise as needed.

SRECs in our Model

States with high insolation levels showed the greatest improvement in IRRs because they produced the most SRECs.

Figure 46: Theoretical $100 SREC Project IRR

City, State	Insolation (kWh/m2/day)	Cost of Electricity - $/kWh (12 month State average)	Base IRR (No SRECs)	$100 SREC IRR	Change
Birmingham, Alabama	5.00	$0.11	3.37%	10.45%	7.08%
Anchorage, Alaska	2.09	$0.18			0.00%
Phoenix, Arizona	6.68	$0.11	8.48%	20.43%	11.95%
Little Rock, Arkansas	4.98	$0.09	0.53%	7.06%	6.53%
Los Angeles, California	6.06	$0.16	13.57%	25.65%	12.08%
Denver, Colorado	5.85	$0.12	6.44%	15.94%	9.49%
Bridgeport, Connecticut	4.54	$0.17	9.39%	16.88%	7.49%
Wilmington, Delaware	4.81	$0.14	5.80%	12.97%	7.17%
Washington, District of Columbia	4.87	$0.12	4.37%	11.39%	7.02%
Jacksonville, Florida	5.31	$0.12	4.75%	12.61%	7.87%
Atlanta, Georgia	5.09	$0.11	3.23%	10.48%	7.25%
Honolulu, Hawaii	5.97	$0.37	47.20%	65.75%	18.56%
Boise, Idaho	5.48	$0.09	0.86%	8.31%	7.45%
Chicago, Illinois	4.50	$0.11	1.43%	7.08%	5.65%
Indianapolis, Indiana	4.60	$0.10	1.02%	7.02%	6.00%
Des Moines, Iowa	4.72	$0.11	1.99%	8.26%	6.27%
Wichita, Kansas	5.33	$0.11	4.44%	12.44%	8.00%
Louisville, Kentucky	4.70	$0.09		5.77%	5.77%
New Orleans, Louisiana	5.12	$0.09		6.49%	6.49%
Portland, Maine	4.04	$0.15	4.14%	9.64%	5.49%
Baltimore, Maryland	4.85	$0.13	5.06%	12.14%	7.08%
Boston, Massachusetts	4.57	$0.15	6.42%	13.32%	6.90%
Detroit, Michigan	4.41	$0.14	5.19%	11.61%	6.42%
Minneapolis, Minnesota	4.56	$0.12	2.31%	8.47%	6.16%
Jackson, Mississippi	5.11	$0.10	2.31%	9.46%	7.16%
Kansas City, Missouri	4.97	$0.10	1.59%	8.33%	6.74%
Billings, Montana	4.98	$0.10	1.88%	8.61%	6.73%
Omaha, Nebraska	4.93	$0.10	1.40%	7.99%	6.59%
Las Vegas, Nevada	6.73	$0.12	9.61%	21.94%	12.34%
Manchester, New Hampshire	4.54	$0.16	8.02%	15.22%	7.20%
Newark, New Jersey	4.67	$0.16	7.80%	15.11%	7.31%
Albuquerque, New Mexico	6.60	$0.11	8.61%	20.40%	11.78%
New York, New York	4.62	$0.18	10.71%	18.76%	8.05%
Charlotte, North Carolina	5.19	$0.11	3.30%	10.73%	7.42%
Fargo, North Dakota	5.16	$0.09	0.79%	7.58%	6.80%
Columbus, Ohio	4.48	$0.12	2.26%	8.25%	5.99%
Oklahoma City, Oklahoma	5.41	$0.09	1.80%	9.39%	7.59%
Portland, Oregon	4.04	$0.10		3.04%	3.04%
Philadelphia, Pennsylvania	4.72	$0.13	4.37%	11.08%	6.71%
Providence, Rhode Island	4.59	$0.15	6.53%	13.51%	6.98%
Columbia, South Carolina	5.22	$0.12	4.61%	12.49%	7.88%
Sioux Falls, South Dakota	4.75	$0.10	0.88%	7.02%	6.14%
Memphis, Tennessee	4.99	$0.10	1.64%	8.34%	6.71%
Houston, Texas	4.96	$0.11	3.08%	10.05%	6.97%
Salt Lake City, Utah	5.51	$0.10	3.06%	11.07%	8.01%
Burlington, Vermont	4.30	$0.17	8.30%	15.18%	6.89%
Virginia Beach, Virginia	4.93	$0.11	2.72%	9.45%	6.73%
Seattle, Washington	3.98	$0.09		0.71%	0.71%
Charleston, West Virginia	4.50	$0.10		5.24%	5.24%
Milwaukee, Wisconsin	4.54	$0.13	4.65%	11.17%	6.52%
Cheyenne, Wyoming	5.53	$0.10	3.19%	11.18%	7.99%

Source: Deutsche Bank, NREL

Effect of Leverage on Model

We conducted a basic scenario analysis and lowered the equity contribution from 100% to 50% in 10% increments using the same assumptions in previous iterations ($3/w gross cost, 6 Year $100 SRECs, 30% ITC, etc). We use a 7.5% cost of debt and 20 year payment term. Although some markets cannot sustain their own projects, we see returns increasing notably across the most important markets as leverage is added.

Figure 47: Debt on our Model

City, State	IRR (100% equity)	IRR (90% Equity)	IRR (80% Equity)	IRR (70% Equity)	IRR (60% Equity)	IRR (50% Equity)
Birmingham, Alabama	3.42%	2.69%	1.67%	0.15%	-	-
Anchorage, Alaska	-	-	-	-	-	-
Phoenix, Arizona	8.53%	8.72%	8.97%	9.38%	10.09%	11.74%
Little Rock, Arkansas	0.61%	-	-	-	-	-
Los Angeles, California	13.68%	14.80%	16.43%	19.08%	23.89%	34.23%
Denver, Colorado	6.50%	6.32%	6.08%	5.70%	5.06%	3.77%
Bridgeport, Connecticut	9.42%	9.76%	10.25%	11.00%	12.37%	15.50%
Wilmington, Delaware	12.97%	14.28%	16.41%	20.12%	26.61%	52.27%
Washington, District of Colun	11.39%	12.33%	13.89%	16.88%	21.74%	42.11%
Jacksonville, Florida	4.71%	4.22%	3.53%	2.49%	0.79%	-
Atlanta, Georgia	3.30%	2.56%	1.51%	-	-	-
Honolulu, Hawaii	47.11%	55.89%	71.09%	104.46%	243.33%	-
Boise, Idaho	0.94%	-	-	-	-	-
Chicago, Illinois	1.30%	0.18%	-	-	-	-
Indianapolis, Indiana	1.11%	-	-	-	-	-
Des Moines, Iowa	1.99%	1.01%	-	-	-	-
Wichita, Kansas	4.54%	4.02%	3.28%	2.18%	0.37%	-
Louisville, Kentucky	5.77%	5.33%	4.57%	3.01%	-	-
New Orleans, Louisiana	-	-	-	-	-	-
Portland, Maine	4.13%	3.54%	2.70%	1.44%	-	-
Baltimore, Maryland	12.14%	13.26%	15.10%	18.54%	24.12%	47.04%
Boston, Massachusetts	13.32%	14.68%	16.90%	20.69%	27.33%	52.97%
Detroit, Michigan	5.26%	4.87%	4.32%	3.48%	2.09%	-
Minneapolis, Minnesota	2.40%	1.49%	0.20%	-	-	-
Jackson, Mississippi	2.43%	1.53%	0.25%	-	-	-
Kansas City, Missouri	1.69%	0.65%	-	-	-	-
Billings, Montana	1.91%	0.91%	-	-	-	-
Omaha, Nebraska	1.47%	0.37%	-	-	-	-
Las Vegas, Nevada	9.59%	9.95%	10.48%	11.30%	12.79%	16.16%
Manchester, New Hampshire	8.06%	8.16%	8.30%	8.51%	8.89%	9.74%
Newark, New Jersey	15.11%	16.91%	19.80%	24.10%	32.87%	66.19%
Albuquerque, New Mexico	8.65%	8.85%	9.14%	9.59%	10.39%	12.24%
New York, New York	10.83%	11.42%	12.27%	13.61%	16.11%	21.23%
Charlotte, North Carolina	10.73%	11.53%	12.88%	15.55%	19.92%	39.78%
Fargo, North Dakota	0.80%	-	-	-	-	-
Columbus, Ohio	8.25%	8.43%	8.73%	9.31%	10.53%	8.96%
Oklahoma City, Oklahoma	1.93%	0.93%	-	-	-	-
Portland, Oregon	-	-	-	-	-	-
Philadelphia, Pennsylvania	11.08%	11.94%	13.35%	16.06%	20.57%	39.00%
Providence, Rhode Island	6.57%	6.41%	6.18%	5.82%	5.22%	4.02%
Columbia, South Carolina	4.75%	4.27%	3.59%	2.56%	0.87%	-
Sioux Falls, South Dakota	0.91%	-	-	-	-	-
Memphis, Tennessee	1.68%	0.63%	-	-	-	-
Houston, Texas	3.14%	2.37%	1.27%	-	-	-
Salt Lake City, Utah	3.15%	2.38%	1.29%	-	-	-
Burlington, Vermont	8.42%	8.58%	8.81%	9.16%	9.79%	11.23%
Virginia Beach, Virginia	9.45%	9.93%	10.74%	12.34%	15.15%	28.04%
Seattle, Washington	-	-	-	-	-	-
Charleston, West Virginia	5.24%	4.67%	3.69%	1.72%	-	-
Milwaukee, Wisconsin	4.70%	4.21%	3.51%	2.47%	0.75%	-
Cheyenne, Wyoming	3.21%	2.45%	1.37%	-	-	-

Source: Deutsche Bank estimates

Management

Greg Butterfield (CEO) - Gregory S. Butterfield is Vivint Solar's CEO and President since Sep 2013. He also became a member of the company's board in Mar 2014. Prior to joining Vivint Solar, Mr. Butterfield was a managing partner at SageCreek Partners (from 2008 to 2013). He has also served as a director for RES Software, Needle Inc., Omniture Inc., Utah Valley University and Utah's Technology Council. Mr. Butterfield was also the group president of Symantec Corporation, and CEO of Altiris Inc. He holds a bachelor of science degree in business administration and finance from Brigham Young University.

Dana C. Russell (CFO) - Dana C. Russell is Vivint Solar's CFO and Executive Vice President since Nov 2013. Prior to joining Vivint Solar, he was the CFO of Allegiance, Inc (Jan-Nov 2013). From May 2011 – Dec 2012, Mr. Russell was an independent contractor and provided financial services and business consulting to various organizations. He was the CFO of Novell, Inc. (from June 2006 to April 2011). He holds a master's degree in accounting from Weber State University and a CPA license in the State of Utah.

L. Chance Allred (Vice President of Sales) - L. Chance Allred is Vivint Solar's Vice President of Sales since Mar 2012. Prior to joining Vivint Solar, Mr. Allred served as a founding partner and vice president of sales for Platinum Protection (from Sep 2006 to Mar 2012). From Mar 2000 - Oct 2006, he served in various positions for Vivint, Inc. (a home automation and security company and Vivint Solar's sister company). He holds a bachelor's degree. in marketing from Southern Utah University.

Paul S. Dickson (Vice President of Operations): Paul S. Dickson is Vivint Solar's Vice President of Operations since Nov 2013. Prior to this, he served as the company's Vice President of Financing (from May 2011 to Nov 2013). Before joining Vivint Solar, he was the director of smart grid and energy management for Vivint, Inc. from Dec 2010 to May 2011. Mr. Dickson also co-founded and served as the president and CEO of Meter Solutions Pros, which was acquired by Vivint, Inc. Mr. Dickson holds a Bachelor of Arts degree from Brigham Young University.

Dwain A. Kinghorn (Chief Strategy and Innovations Officer) - Dwain A. Kinghorn has been Vivint Solar's Chief Strategy and Innovations Officer since Mar 2014. Prior to joinig Vivint Solar, he served as a partner for SageCreek Partners (from July 2008 to Mar 2014). From Apr 2007 to July 2008, Mr. Kinghorn served as a vice president for Symantec Corporation; and from Oct 2000 to Apr 2007, he was the chief technology officer for Altiris, Inc. He has also served as the CEO of Computing Edge (from May 1994 to Sep 2000). He holds a degree in electrical and computer engineering from Brigham Young University.

Appendix 1

Important Disclosures

Additional information available upon request

Disclosure checklist

Company	Ticker	Recent price*	Disclosure
Vivint Solar	VSLR.N	13.07 (USD) 23 Oct 14	1,7,8

*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors . Data is sourced from Deutsche Bank and subject companies.

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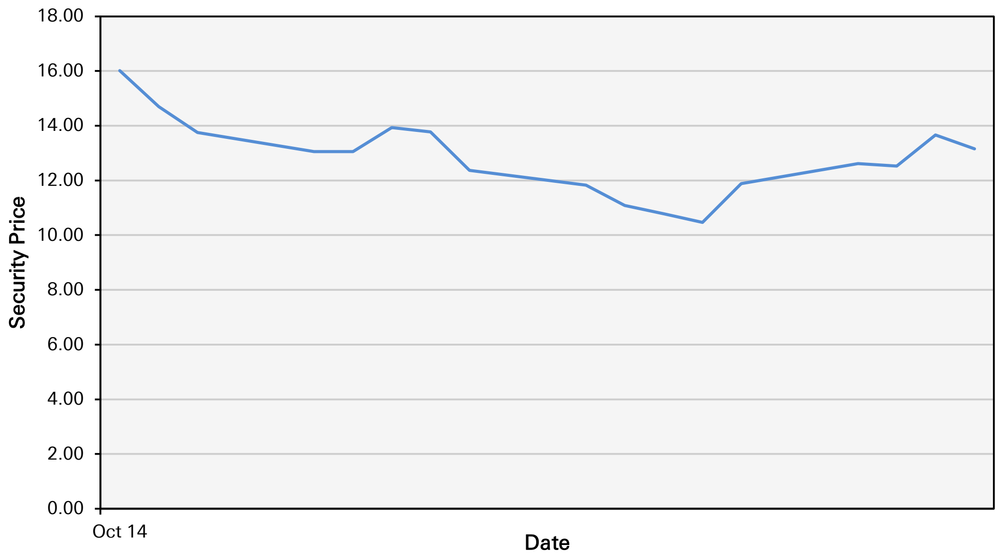
Historical recommendations and target price: Vivint Solar (VSLR.N)

(as of 10/23/2014)



Previous Recommendations

Strong Buy
Buy
Market Perform
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Not Rated
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Buy
Hold
Sell
Not Rated
Suspended Rating

*New Recommendation Structure as of September 9,2002

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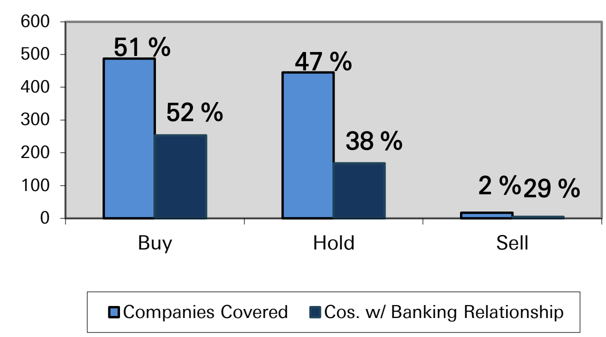
Sell: Expected total return (including dividends) of -10% or worse over a 12-month period

Equity rating dispersion and banking relationships



North American Universe

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