

US Solar & Alternative Energy

What to Watch on the Solar Landscape (Incl. Call Transcript)

Equities

Americas
Electric Utilities

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Bullish on long term solar growth despite the 2017 ITC road bump

We held our latest conference call with Shayle Kann from GTM Research, to understand current trends and forecasts for both the distributed and utility-scale US solar market. Our key takeaways remain quite bullish on development outlook, with GTM eyeing upwards of 8GW in '15 and 11GW in '16 of solar, albeit falling off steeply in '17. GTM emphasizes that upwards of 1.3GW of signed contracts already in 2016 are for PPAs which take effect in 2017. There appears a growing willingness to accept a 'merchant nose' to projects in order to capitalize on the ITC benefits prior to expiration. Through this period, we expect the US to continue to shift towards more distributed resources, away from utility-scale, seeing net metering policies as the more meaningful subsidy support for the sector (particularly post the ITC step-down).

Improving costs should open up several new markets by end of this decade

GTM Research estimates California, Arizona, and Hawaii are the only three states with meaningful savings, but NV, NM, NJ, and SC provide modest savings under today's utility rates (exclusive of state subsidy schemes). GTM anticipates several other states could yet see several additional markets open up by 2016, including New Mexico, Texas and Michigan. However, with a subsequent re-entrenchment by 2017 back to the core markets mentioned previously. The question raised is whether the brief experience with residential DG expansion in many of these states with marginal economics will prove pro-active in the period 2016+ to reform net metering policies to deflect meaningful subsequent growth. Without reform, GTM estimates that assuming a ~2% annual increase in retail electricity prices, coupled with continued annual cost reduction for solar could expand the opportunity set to 36 states. Where could costs go? GTM sees solar achieving ~\$2.00/Watt for resi costs by 2020, seemingly achievable under a low customer acquisition cost in a low development cost state. Today, the best residential developers are guiding to a high \$2/Watt figure for 2015, with customer acquisition costs seemingly in the ~\$0.40/Watt range. The absolute cheapest residential solar systems appear to be trending towards ~\$2.25/Watt, in TX, where the economics are the most marginal today. For further details on the grid parity transition see Figures 4-7 below.

So where do we stand on solar? It's about expanding markets share...

... While limiting margin pressure amidst competitive pressures from a growing array of new entrants. Notably, we see greater pressures on the utility-scale, with more utilities poised to enter, particularly with barriers-to-entry coming down without tax credit impediments in '17+. As such, we see SUNE's tactical shift away from these larger utility-scale deals towards DG as an appropriate decision. The key question arising from this shift will be SUNE's ability to both maintain a reasonable tenor for its TERP drop-down backlog, alongside executional success to the scale necessary (given the smaller nature of each of the projects) to meet its targets. Execution remains key, particularly given its dependence on partner platforms to feed DG volumes.

Consolidation of the resi retail opportunity – how to scale?

M&A activity can be expected to remain vibrant, following a year in which the multi-state installers all appear to have found partners or have been bought. The further question is whether companies specializing in marketing in regions will continue to see consolidation as companies attempt to grow nationally. Additionally, with customer acquisition costs from partner channels.

Residential Market share is surprisingly concentrated already

In 2013 the top ten residential providers together accounted for 45% of the market, whereas by the end of 2014 they accounted for ~55%. The biggest market share (as of end 3Q14) were with SolarCity (33%) and Vivint (13%) – both these companies currently guide for their market shares to increase this year. Increasingly mid sized players will be required to either create a unique niche for themselves, or else we think partnerships or outright acquisitions may become prevalent in the mid-tier solar category.

Big solar players getting involved – how will this change the dynamic?

Notably, both NRG and SunEdison have committed to meaningful expansions into the Residential solar market. The question is if both can do it at a palatable cost – NRG to hit 250MWs and SUNE by 200-300MWs off a very modest base for both (~50 MWs respectively). We believe NRG will pursue much of this growth organically, whereas SUNE will pursue much of this via third-party partner acquisitions which could prove pricier. Acquisitions are unclear at this point to hit targets.

Keeping prices honest – to what extent are solar companies keeping benefits?

We see this as a classic question in a business with a continually declining cost structure: are residential companies able to price off their retail utility rate alternative and keep the differences. It is unclear. While GTM Research suggests this is indeed the case, comments from SCTY and others appear to disagree. We think the answer lays somewhere in the middle. We also emphasize that rates in existing markets could yet continue to decline passing along some of the cost savings, while new markets requiring lower cost structures to compete could continue to offer limited savings to consumers. The question of 'grid parity' is more appropriately framed with a consideration of customer saving value back to consumer (arguably, offering at least a 5-10% discount vs. existing utility rates), rather than a simple focus on cost parity.

Focusing on the loan alternative – how much of a threat?

Among the most pressing questions in the residential space du jour remains the growing penetration of solar loan alternatives to the lease options. While today, the option is still largely limited to alternatives provided by solar companies, the wider concern remains if this is ultimately farmed out to larger residential mortgage banks to provide loans – and if they can be packaged as secured liens against homes, etc bringing down the costs considerably. With ~2/3rds of new sales for SPWR and via the online platform EnergySage (versus more like a quarter for SCTY), we suspect this will remain a margin limiting trend. We suspect this *forces* prices to be more of a cost + margin equation, rather than necessarily pricing off the avoided retail rate. ~70% of all residential solar is third-party owned currently.

Fixed charges vs. minimum bills – the winds of change in utility rate design?

We continue to believe fixed charges and other fixed revenue structures will become a mainstay in the sector as utilities adjust their rate structures to *gradually* reduce net metering subsidies. We believe these shifts to be reflected in each of their forthcoming rate cases, albeit AZ could be an interesting test case to conduct rate design *outside* of a rate case (an important acceleration shift in pro-actively addressing rates). We also flag the \$50/mo. fee introduced by SRP could be a catalyst for recognition that big change is coming. While we see this as a one-off (not approved by the ACC), we suspect PNW (APS) could yet see their \$5/mo. fee increased to something closer to the \$20/mo. range. The question remains *how* to implement these changes – all customers,

just solar, or a minimum bill for all low-consumption consumers? Moreover, tiering will also gain some attention in California this year as it seeks to reverse the extreme high-priced tiers for high consumption households (initially designed to limit inflation on low-income, low usage consumers), but now the focus for solar providers. We suspect this could lead to some shaking of the least efficient solar providers in CA (who focus on the highest cost consumer tariffs only). Conversely, higher rates for lower usage tier 1 and tier 2 customers could well expand the eligible universe for the more scalable cost structures.

Commercial scale solar still limited; presents upside risk for incremental growth

According to GTM, even though the residential solar market has been growing at ~50% a year, the commercial solar market has not grown at that pace owing largely to the inability to scale small commercial solar (projects over a megawatt comprise almost half of all the volume for commercial installed, up from around 30% in 2010). This is often due to high transaction costs, credit risk of off-takers, and the difficulties in aggregating small commercial projects into a significant portfolio. However, in terms of technical potential the market remains huge; and this market may present medium to long term upside risk in terms of the solar growth.

More C&I opportunities abound as stepping up to hedge their long-term commodities

We are increasingly paying attention to growing efforts to contract directly in meaningful size for C&I customers, seeing both wind and solar as opportunities to hedge their commodity exposure. We suspect catering to this niche will prove to be a growing focus for developers of all stripes.

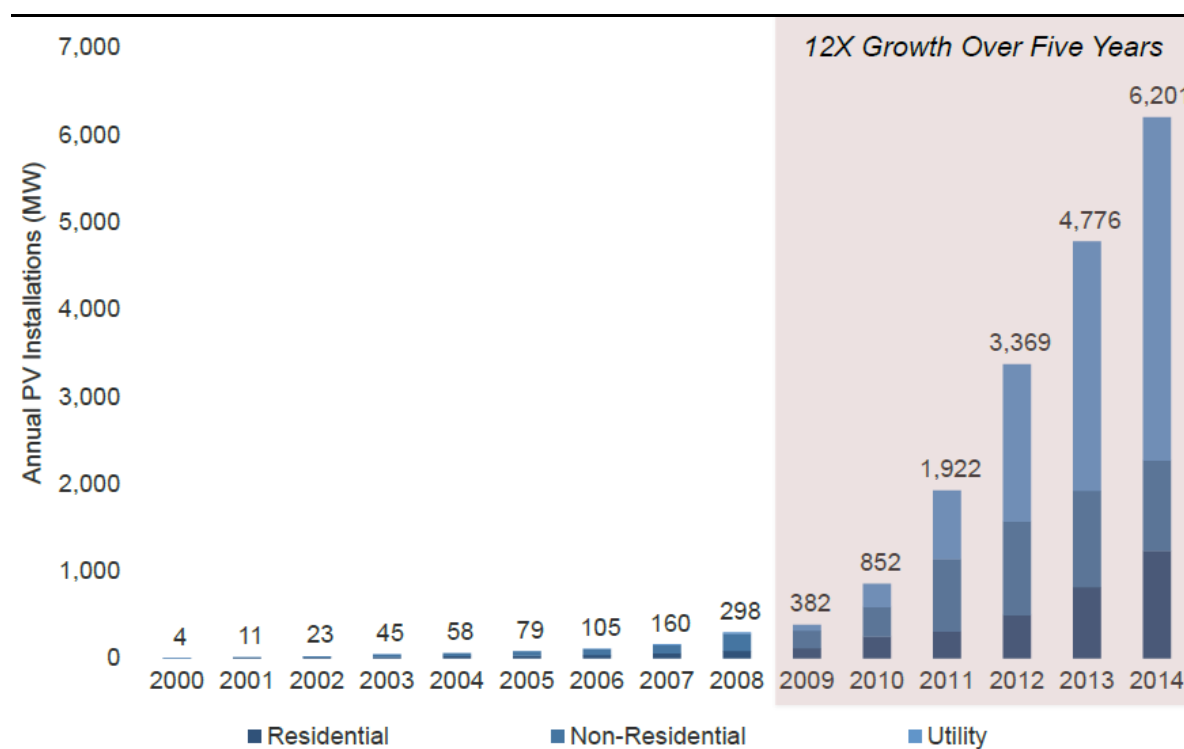
C&I remains tricky from a credit perspective without a uniform assessment

In contrast to FICO scores available for residential customers, small C&I customer have no consistent assessment methodology, making it more costly to take on each incremental customer. Following commentary suggesting efforts in this niche have been hit or miss thus far, we see this as increasingly the holy grail to capture.

~30% growth rates to continue: underpinned by policy, but increasingly by declining costs

PV solar installations in the US were up 30% YoY in 2014 (6.2GW installed) in the U.S. in 2014; matching the growth achieved over 2012-13. Expectation is for similar growth rates to be achieved over the next few years. The chart below shows historic growth in installed solar – installed MWs have increased 12x over the last five years. Utility scale has contributed the highest chunk of additions, but growth rate for residential solar has been increasing. GTM believes that 8GWs could be installed in 2015, with 11GWs installed in 2016 prior to ITC expiration.

Figure 1: Overall solar growth in the next few years is expected to maintain recent run rate



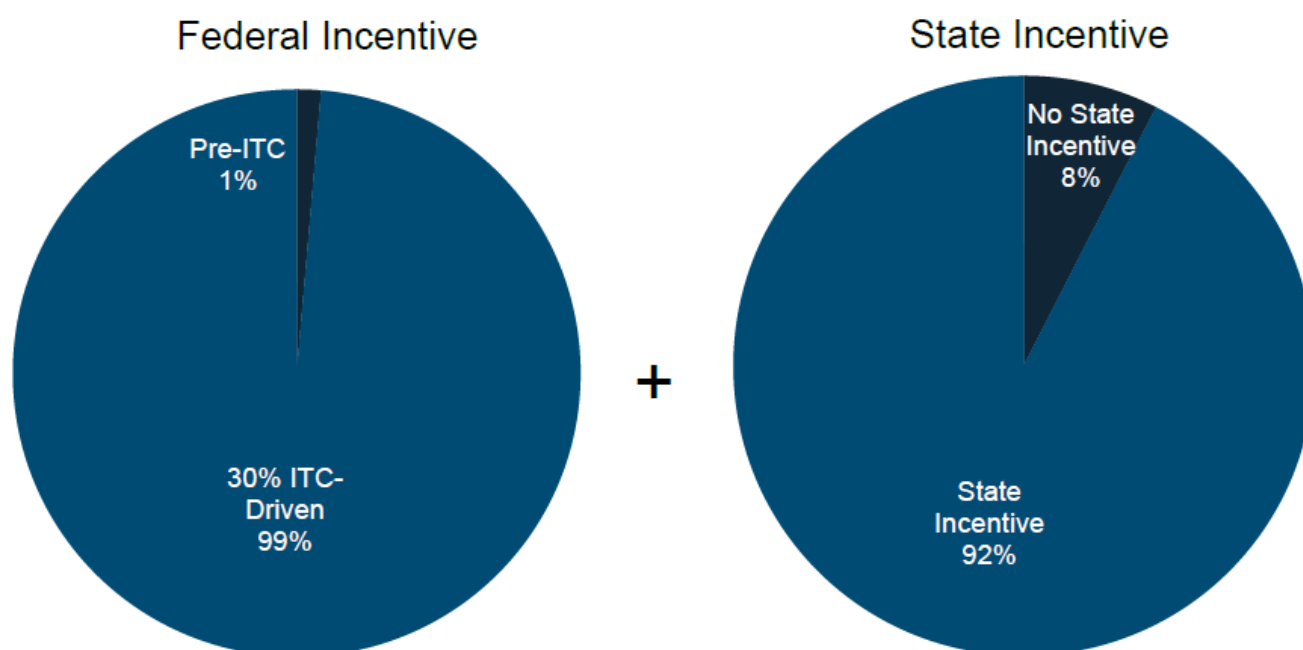
Source: Greentech Media Research presentation slides for UBS conference call

92% of solar build out has benefited from state level incentives as well

Growth in the sector has been underpinned – at least initially – by stacking a federal incentive on top of some form of a state level incentive. We caution that many investors have typically under-estimated the extent of these incentives, which in many cases are Solar Renewable Energy Credits (SRECs), which have value for a defined period of time (10-15 years), and have substantial initial year value. Most importantly, these typically introduce an element of merchant risk into projects.

In terms of the federal incentive, 99% of all solar installations that have ever been completed in the U.S. took advantage of the 30% ITC. On the state level, differential production based incentives, rebates, and RPS standards, have served to create a segmented market outlook for solar across states. Thus far, solar has failed to take off in states where state level incentives have been absent. For the first time recently, however, states where those incentives have run out have continued to depict positive growth trends – the residential and commercial solar markets in California for example continue to grow despite expiration of the California Solar Initiative. In our opinion this trend underlines a shift from a pure policy driven market to a more mature cost and efficiency driven market.

Figure 2: Federal and state incentives have been driving solar build out

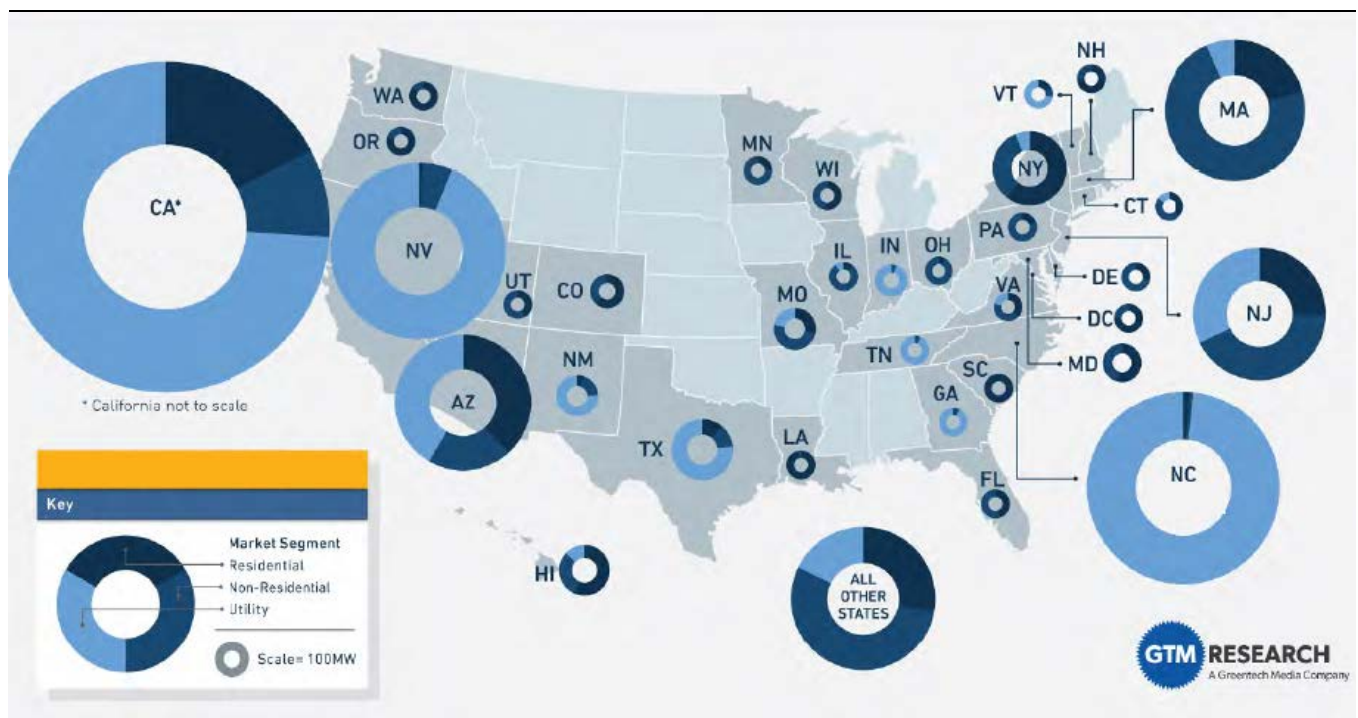


Source: Greentech Media Research presentation slides for UBS conference call

Where is DG Today?

The map below shows the solar market in 2014. This reiterates the almost perfect correlation between state level incentives and the success of regional solar markets. California remains the largest – but the state's contribution to overall US solar market has declined from ~80% in 2011 to ~50% now. But the map also shows several second tier markets that now also contribute to 100MW+ per year installations: Massachusetts, New Jersey, North Carolina, Nevada, Arizona, and even New York.

Figure 3: Regional PV market size by state



Source: Greentech Media Research presentation slides for UBS conference call

Improvements in install costs and improving economics will drive future growth

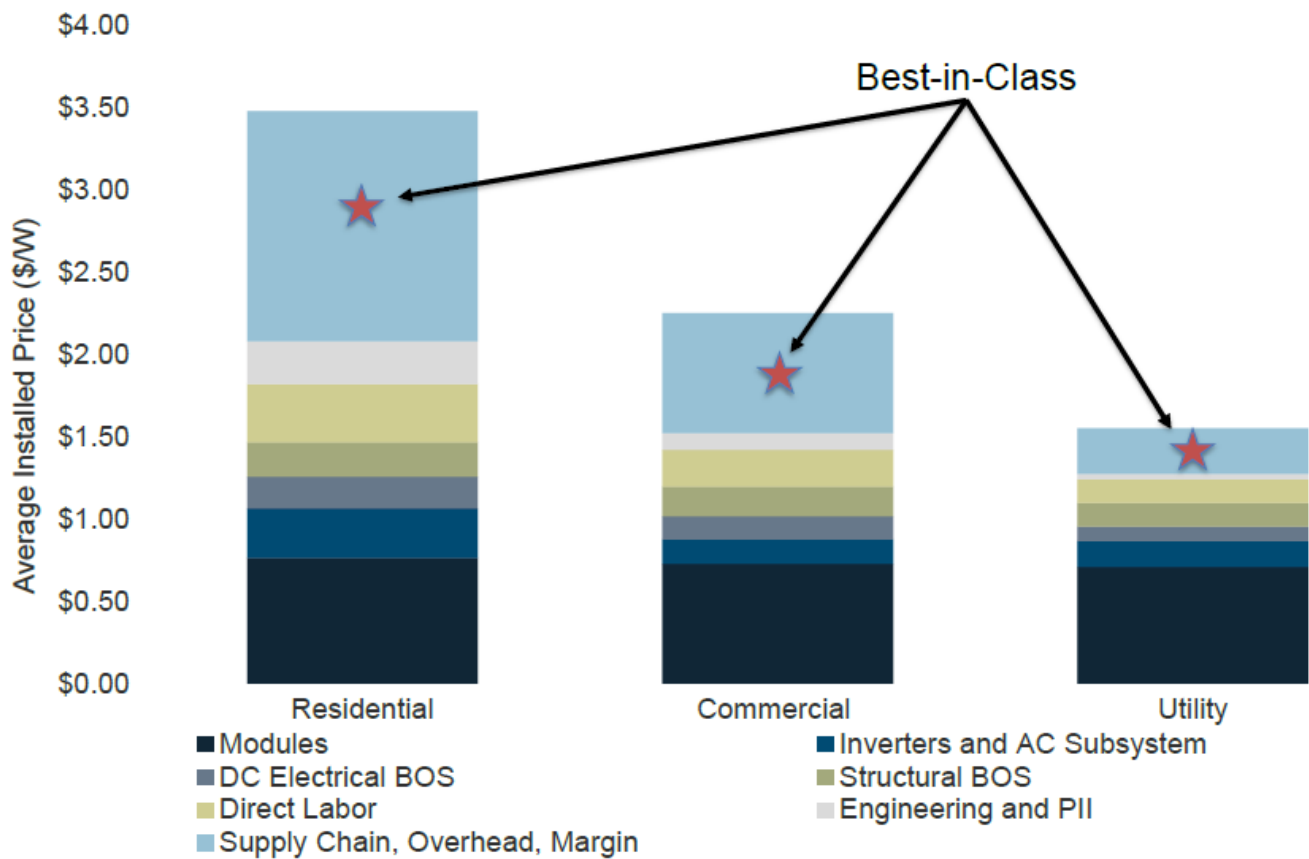
The ability for solar to grow against a backdrop of declining policy support – federal and/or state level incentives – largely depends on how costs and therefore consumer savings stack up relative to grid supplied power.

- In the figure below, we show Greentech Media Research's estimates, which show residential solar can now be installed potentially for under \$3.50 a watt; with a best in class cost even below \$3.00 a watt.
- Commercial solar can be potentially installed for under \$2.00 a watt; again, best in class can be even around ~\$1.50 range.
- Utility scale solar is already under \$1.50, according to Greentech Media, and is moving potentially towards the \$1.00 a watt mark.

The key takeaway here was Greentech's view that cost reductions have occurred despite flattish module prices (which used to be the main driver of cost reductions in the past). Instead, declining BOS costs have driven install cost down, and continue to presents avenue for further reductions.

The key question we ask ourselves is whether the cost curve declines will begin to flatten out beyond the medium-term, as known Balance of System reductions and 'market' costs for panels gradually reflected in the US. We flag that China's overall installed cost appears to have flattened out of late near the \$1.00/kW mark for the last three-years, suggesting a limit to cost reductions.

Figure 4: Solar install costs by segment

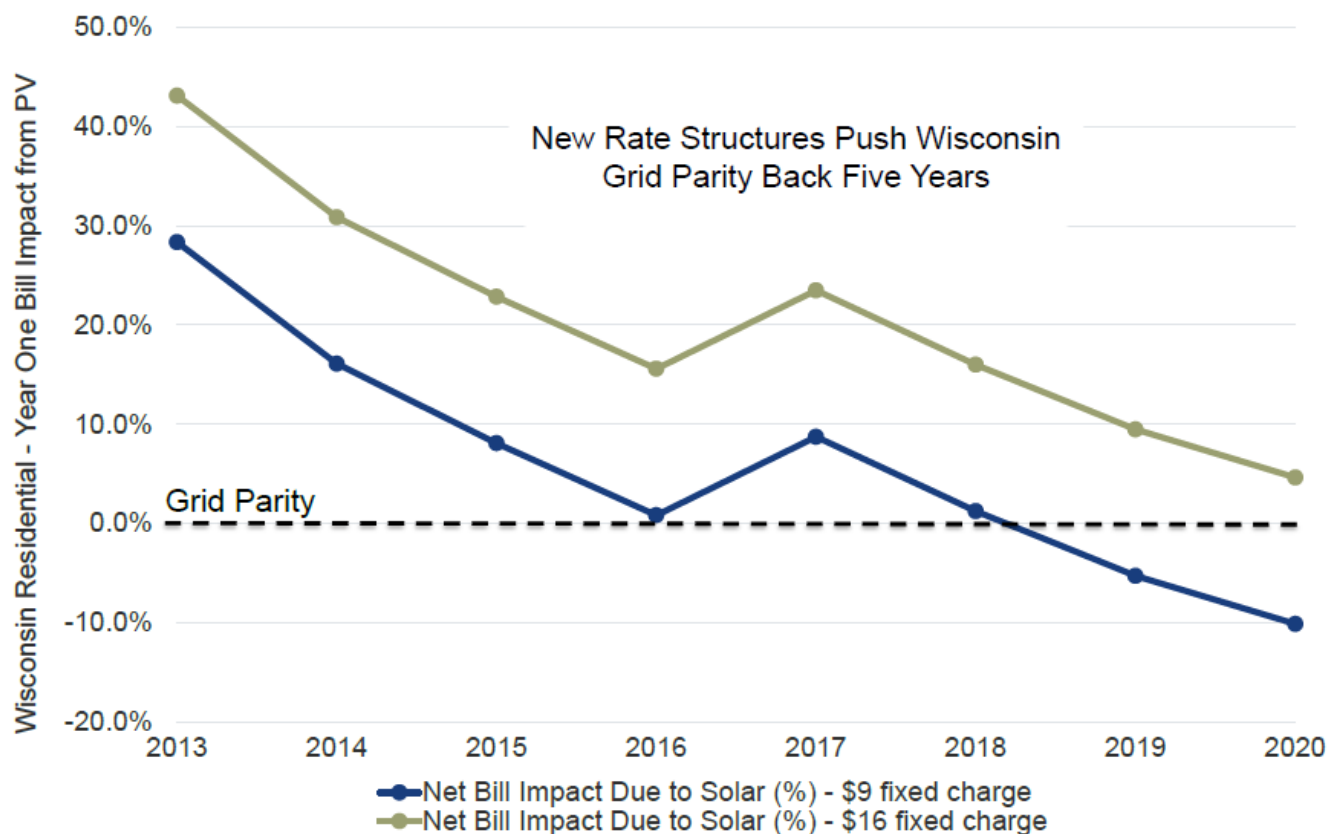


Source: Greentech Media Research presentation slides for UBS conference call

Grid Parity Deferred – Illustrating the Fixed Costs

However, rather than costs on their own, what's important is cost relative to the utility rate structure – solar penetration in the end will depend on how much savings a solar installation can provide a customer relative to their usual grid connected power tariff. Recently utilities have tried to increase the fixed tariff component of their rate structure, such as in Wisconsin. The figure below shows the impact on solar economics due to the increase in fixed charge in Wisconsin – the increase may have shifted solar grid parity in the state back by five years, according to Greentech Media Research analysis.

Figure 5: Increase in Wisconsin Fixed Charges and impact on solar economics



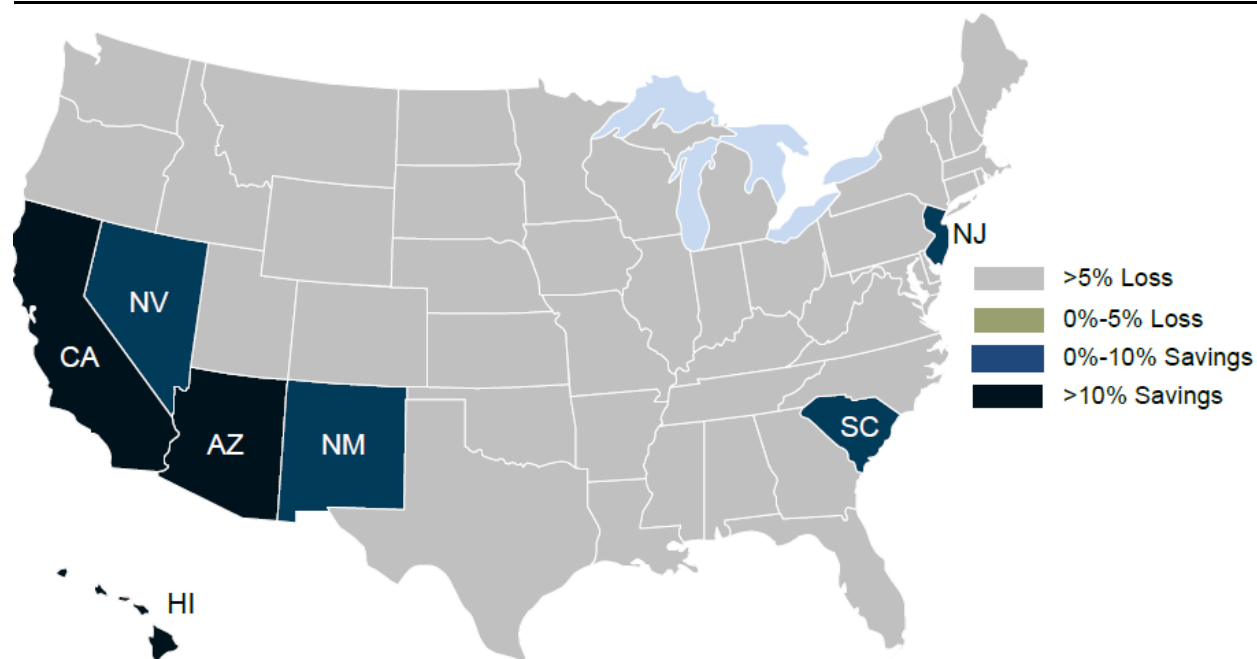
Source: Greentech Media Research presentation slides for UBS conference call

Gazing into the crystal ball: a look at how residential solar markets may open up over this decade

In the series of maps below, we show Greentech media's attempt at forecasting how different markets will open up out to 2020. Markets *without state level incentives* are highlighted here – thus the attempt is to isolate the scenario in a zero incentive scenario. Expectation is for more and more marginal markets to open up to 2016, and then again post 2017 (assuming ITC being repealed in 2017, that year is forecast to be particularly bad for the more marginal markets – but its impact not permanent, and they bounce back in the latter years of the decade). We note an extremely bullish outlook for the residential solar market in 2016, based on Greentech Media's analysis below.

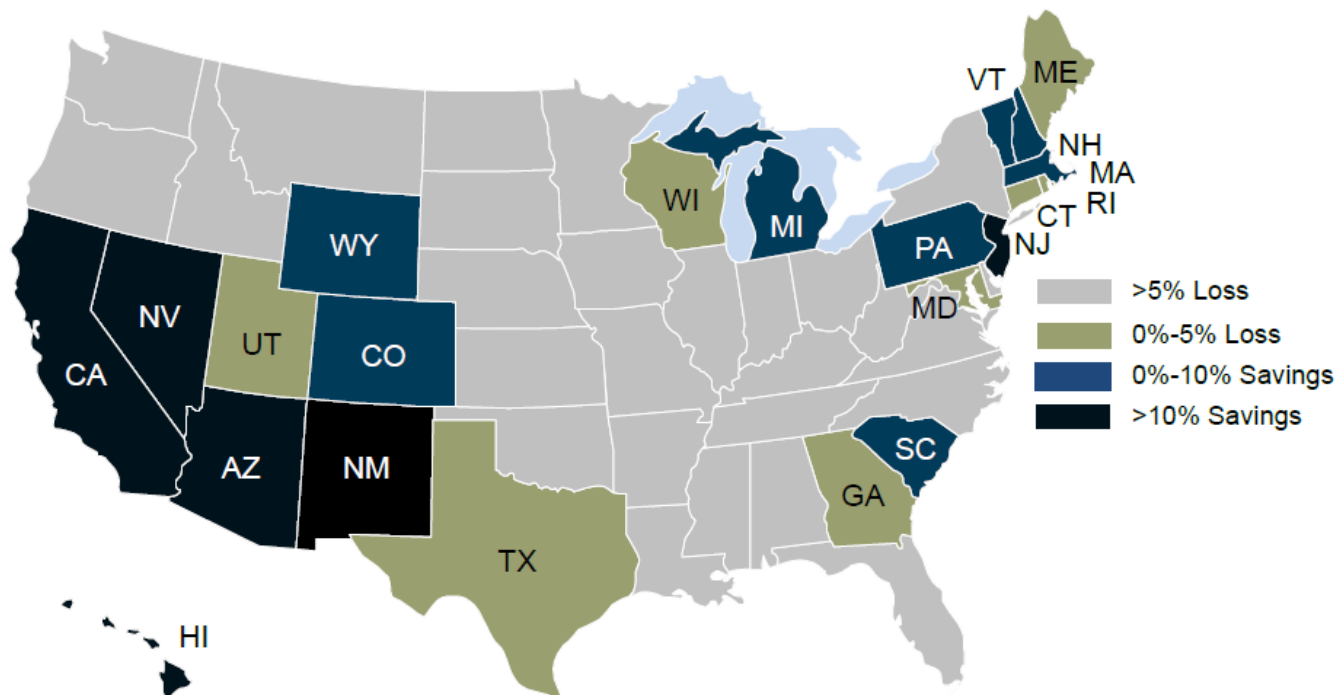
The analysis is based on the assumption that an attractive market would be able to provide a residential customer ~ 10% year-one net savings (seen relative to real rate structures in each of those markets and consumer category; rather than vs. an average rate).

Figure 6: Year-one net savings in the resi solar markets: status as of 2014



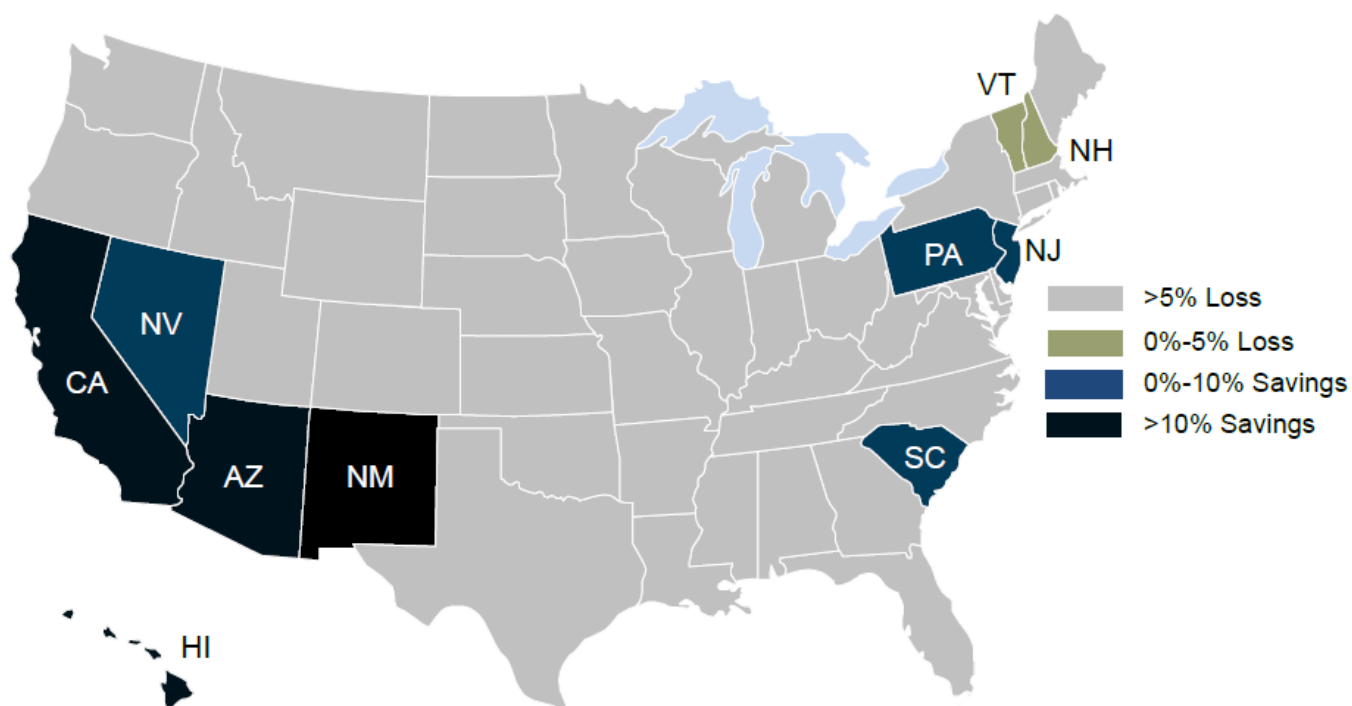
Source: Greentech Media Research presentation slides for UBS conference call

Figure 7: Year-one net savings in the resi solar markets: 2016 forecasts – more states start to open up (w/ ITC help)



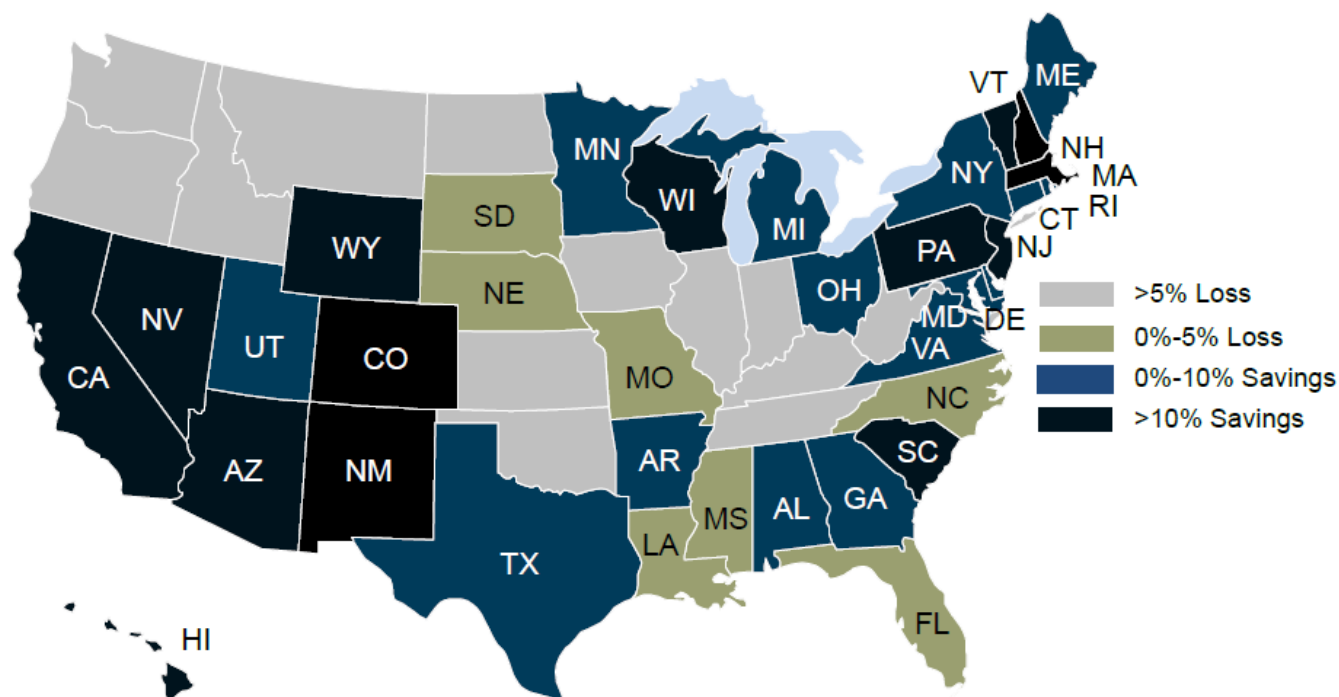
Source: Greentech Media Research presentation slides for UBS conference call

Figure 8: Year-one net savings in the resi solar markets: 2017 forecast – ITC drop impacts the marginal markets



Source: Greentech Media Research presentation slides for UBS conference call

Figure 9: Year-one net savings in the resi solar markets: 2020 forecast – attractive in many newer markets



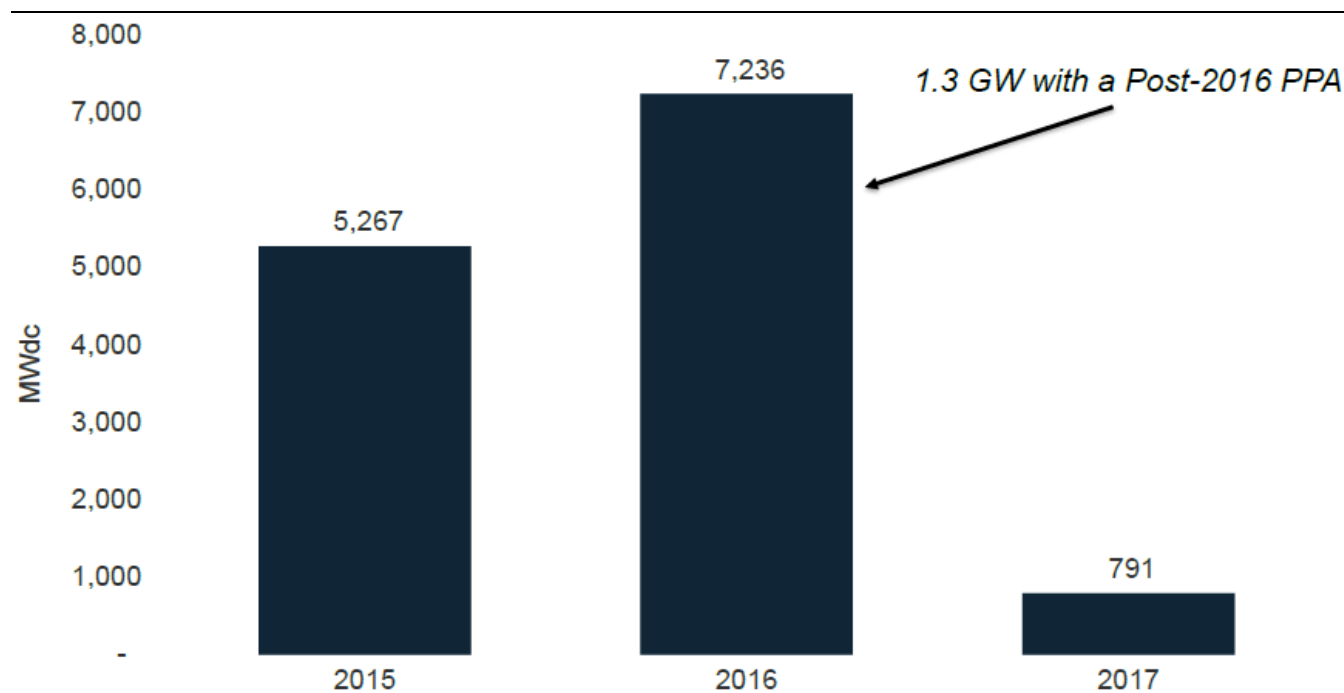
Source: Greentech Media Research presentation slides for UBS conference call

So what is the ITC risk in 2017?

The rolling back of the ITC in 2017 presents some risk for installations in that year, but the consensus seems to be A) it will impact the utility scale markets but have limited impacts on other segments; and B) the impact will be more of a near term hit, which should neutralize over the next couple of years beyond 2017.

Nonetheless, for utility scale solar, the chart below shows a significant fall in contracted utility PV pipeline in 2017:

Figure 10: 2017 ITC impact is highest for utility scale solar: Contracted Utility PV Pipeline by Planned Operation Date



Source: Greentech Media Research presentation slides for UBS conference call

Conference Call on Solar

We present below highlights from our call with Shayle Kann, Senior Vice President, Research, Greentech Media (GTM) Research where we discussed some of the latest trends in Solar.

Let us know if you would like to see slides used on the call.

Julien Dumoulin-Smith: Good afternoon and thank you all for joining us. This afternoon we're joined by Shayle Kann, Senior Vice President, Research, Greentech Media, to discuss the U.S. solar market. He is exceptionally distinguished and experienced across a broad spectrum of the solar industry; and without further ado I will now turn over the call to him - so Shayle, why don't you take it away?

Shayle Kann: Great, thanks Julien and thank you all for dialing in today. I'm looking forward to a good discussion. What I'm going to try to do over the next 30 minutes or so is take you on a whirlwind tour of solar in the U.S.

So we'll start by talking about broad market dynamics for solar right now; a little bit about where we think the market is headed generally, and what the big drivers are going to be; what the big impacts could be from changes in the incentive structures etc.

And then we'll dig a little bit more into the details of individual market segments, some of the players in the space and what's been going on in terms of consolidation, and where the market has been strong and where the market has had some weaknesses.

So let's go ahead and get started. I will refer to some slide numbers here periodically, just to give you some data reference to what I'm talking about. I'll refer to the numbers of the pages in the PDF. Ignore the slide numbers that are actually written on the slides because are often wrong. So, let's start with a quick overview of solar in the U.S. to date - and this is Slide 2.

We installed about 6.2 gigawatts of solar PV in the U.S. last year in 2014. That is up about 30% over 2013 which was up about 30% over 2012, which was up more than that over 2011.

So we're on a relatively steady clip overall of significant but not outsized growth. And if you've been paying attention to global solar markets, there's a lot of markets that have grown faster than that. But we haven't seen a market that has consistently grown at a pace anything akin to 30% a year and maintained that growth.

Instead we've had a lot of markets that grew fast like Germany, Italy, Spain, Greece, and in some cases, Czech Republic – but they then crashed because they saw a big incentive reduction. That has not happened yet in the U.S. and is unlikely to happen at the same scale.

So, 6.2 gigawatts last year, just to put that in context that was about a third of all new electricity generating capacity in the U.S. last year. So solar is still a very small share of electricity generation in the U.S., under 1% typically. But as far as new capacity that's coming on line, solar is actually a big part of that these days.

And this is just looking at solar PV, not incorporating concentrating solar power (CSP) of which there was another about 700 megawatts installed last year. So we have a growth market.

If you look at the next slide which is the map slide, we also have an increasingly diverse geographic landscape of where solar is getting installed. A bit of background on this - California used to be the vast majority of the solar market in the U.S. In 2005 which was the beginning of the current wave, the solar installations in California comprised about 80% of all solar installations in the U.S. by volume. Now it's down around 50%. So California, still by far is the most important market and the largest market for solar such that it's not even to scale in this graphic because it would be too big for everything else.

But we do have more diversity than we used to. And we now have a good, solid second tier of markets that are installing well over 100 megawatts per year in some cases. That was true last year of Massachusetts, New Jersey, North Carolina, Nevada, Arizona, and even New York.

And within that different markets have different breakdowns of where they're strong. Some markets are almost entirely utility scale. In California a lot of that capacity has been utility scale solar, but some other markets don't have so much of that. Massachusetts is a huge market for commercial solar for example.

And **one of the interesting things about the U.S. solar market is just how diverse it is, both geographically and in terms of market segmentation.** It's worth noting that it's actually hard to find consistent trends that are true of the residential market and the non-residential market and the utility market all at once.

A quick note because we get this question a lot on how we define these market segments. *The difference between non-residential and utility in our definition has to do with the project side of the meter and the power purchaser, not the size of the project.*

So anything that is selling power to a retail customer, that's a non-residential project. So it could be a four megawatt project on a Walmart rooftop. And you could have a two megawatt project that's selling power directly to a utility or into the wholesale market. That's a utility project in our book.

If you look at the next slide, Slide 4, I think the important thing to note is that of all this growth that we've seen, they've basically all happened under a single paradigm. And that paradigm is **stacking a federal incentive on top of some form of a state level incentive.**

So the federal incentive is the 30% investment tax credit for commercial installations. You could also add accelerated depreciation. So 99% of all solar installations that have ever been completed in the U.S. took advantage of a 30% ITC.

And then in addition to that, the reason that we have a consolidated geographic landscape is that the economics of solar just didn't used to work out unless you also had a state incentive. And these came in, in

many different forms. They were production based incentives, they were rebates, they were RPS standards; various ways to incentivize solar at the state level.

But in the absence of one of those incentives there just wasn't much of a solar market in these states. That is just starting to turn now. We are right now in a spot where we have the first couple of states where state incentives have run out. So all you have is the federal incentive and yet demand continues to grow.

California is the perfect example of this. The California Solar Initiative which was the primary demand driver for distributed solar in the U.S., let alone California, is basically now expired. It is entirely expired for residential and also pretty much expired for commercial. And yet the market continues to grow. So that's an obvious indicator of the increasingly attractive economics of solar but, it's not true everywhere. Right now it's true in just a few places.

And the thing is that **we are looking down the barrel of a possible significant reduction in the federal incentive**. So as of the end of 2016, assuming that there is no extension and there's some possibility of an extension, the Federal Investment Tax Credit will drop from 30% to 10% for commercial solar, and from 30% to 0% for direct-owned residential solar.

So the question is, in this landscape of relatively declining state incentives and the possibility of a big downturn in the federal incentive, will there still be a solar market? And we'll come back to that in just a moment.

The first question is, how cheap is solar right now; because the impact of the reduction of the ITC and any other incentives is really a function of how cheap is solar to install.

So if you look at the next slide, Slide 5: install costs for solar vary a lot. It's tough to come up with a single benchmark number. They vary by project type. They vary by geographic location which impacts the cost to install soft costs. It impacts labor costs and many other things.

But generally speaking these days, **residential solar can be installed turnkey for under \$3.50 a watt; while best in class can even be under \$3.00 a watt. Commercial can come at under \$2.00 a watt; again, also sometimes down to the \$1.50 range (I've even heard some bids that are lower than that). And utility scale solar for under \$1.50, inching slowly towards \$1.00 a watt, though not quite there yet.**

This is a lot cheaper than it was even a couple of years ago. And it's impressive that these cost reductions have continued to occur despite the fact that module prices which used to be the main driver of cost reductions, have basically been flat, and in some cases even up over the past couple of years. So the cost reductions that we've seen have not come from falling panel prices, they've come from everything else getting cheaper.

So in a landscape where solar is getting cheaper but we have falling incentives, how are we to think about whether solar is economic and whether the market will continue to exist? A lot of times what you end up seeing is people doing these grid parity analyses. That's a common way to do it. You look at one solar, you take the levelized cost of solar, you compare it to the retail cost of electricity, and when solar gets cheaper you say it's hitting grid parity – then you may sometimes expect the flood gates to open.

We've generally shied away from doing that for two reasons. One is that **I don't actually think that the point of grid parity is the point where a market opens up.** If you look at a company like SolarCity or Vivint or Sunrun or any residential solar company in particular, they really only enter a market when they can offer meaningful savings to a customer in year one.

So it's not that attractive to try to sell somebody solar and tell them you can match their electricity prices. You want to tell them you can save them money. So I think it's more important not to look at grid parity but a point a little bit past grid parity where you actually see say 10% savings as just an easy benchmark.

Second, the problem with a lot of grid parity analyses, almost everyone that I've ever seen is that they compare

the levelized cost of solar to the full retail price of electricity. In reality when you install solar, you're not saving the full retail price per kilowatt hour for every kilowatt hour that solar generates, because oftentimes on your electric bill you have some fixed charges. Or in the case of commercial customers you have demand charges and other things that solar doesn't reduce one for one. And so as a result, when you compare the levelized cost of solar to the full retail price of electricity, you end up looking like you're going to hit grid parity sooner than you actually do.

So those are the issues with traditional grid parity analyses. What we've started doing at GTM Research is a bit more of a nuance look at it. So we don't just look at that single point, we look at a few different buckets when we get closer and closer to attractive economics.

And second, we incorporate real rate structure, so that's a pretty complicated process. But we take an actual rate structure in each of 50 states for a representative customer and model it according to the actual voided cost of solar with incorporating a load profile as opposed to just taking average retail rates.

So given that, let me show you just a quick snapshot of some of the results from an analysis that does all of that, specifically for residential. So we're just looking at residential here.

And it's not perfect. Nothing is perfect, but I think it's an indicator of where the market might head for the next few years. We're looking for this tipping point – where we're just saying, *can you offer a residential customer 10%, year one net savings?* So call this the better version of grid parity, assuming a 20-year contract, a lease or a PPA, and assuming a small escalator on that contract like 2% per year.

So if you go to Slide 7, this is where we start in 2014. Now the important thing to note here is that we are not incorporating state level incentives at all. So you have a lot of markets here that actually do have a residential market in place that's functioning and maybe even growing right now, but don't show up on this map.

And the reason for that is that they have state level incentives. We're more interested in trying to figure out if you don't take into account state level incentives, or if you figure that they're not going to be around forever, when will various markets open up?

So given that, **without state level incentives, in 2014 there were a few states that were already in the money, California, Arizona, and Hawaii in particular.** And the proof that makes sense is that California as I said before, has no state level incentive for residential solar anymore. And the market continues to grow. Arizona lost its residential incentive and the market continued to grow last year, though there are some other headwinds in Arizona that we'll come back to in a minute. And in Hawaii you have other structural barriers to the market around interconnection in particular. But absent those barriers you would have a perfectly economic market even without a state level incentive.

So those are the states in 2014 - a few, but not too many yet. But let's draw that forward a couple of years and look at 2016, the year before the ITC expires.

So if you look at Slide 8, this show how that looks in 2016. And it's clear from just the colors on the map that a number of additional states should open up over that period. And I think you see some of this already. SolarCity entered New Mexico; SolarCity just entered Texas which is on the borderline there. I think you're going to see a couple of residential solar companies entering Michigan this year which is a market none of them play in right now.

We're getting to the point where even in states that don't have a big residential incentive, or even in states that have a residential incentive but it's capped, you can still see meaningful demand for residential solar. This is a decidedly bullish look at the residential solar market in 2016. And I think everybody will be surprised about how big that market is next year.

But let's draw that forward another year. If you look at Slide 9 on 2017, what happens when in 2017 system prices fall a little bit again, but the ITC is reduced? And

so here we're assuming at 10% ITC. It would be even a little bit worse if we assumed zero. So you get some benefit from having not as much tax equity in the deal. It's a lower cost of capital. But even with that the **economics just don't look as good in 2017 as they do in 2016.** And largely what happens here is that a lot of those marginal markets; a lot of those markets that have just been opening up in 2015 and 2016, no longer look economic.

So I think what you're going to see happen in 2017 in the residential market in particular, and this is true to an extent in commercial solar as well, is that we're going to **see this big burgeoning demand in 2015 and 2016. And then in 2017 the big companies will retrench back to the core markets that are partially attractive economically.**

California will probably remain a big residential solar market. But I do think you'll see a big loss of demand in particular states that sit on the margin. However, the market doesn't disappear after 2017. So what happens after that?

If you go to the next slide, Slide 10, we've built that forward to 2020. Now obviously assumptions built into 2020 are a lot more variable than the ones built in now.

So the two major factors here are one, what is the price of electricity? In 2020 we've assumed about a 2% annual increase in retail electricity prices. It could be less than that. We did it on a regional basis but it could change. And two, what's the cost to install solar. **We're assuming a relatively conservative but realistic average annual cost reduction for solar that gets you down to a residential install system price as close to \$2.00 a watt by 2020.** If you get there, obviously you can see on the map the colors open up a lot. I think that's what's really interesting about this market.

The next few years are going to be somewhat tumultuous because of the ITC reduction and because of changes in the market. But if you look at this, it's hard not to be a believer in residential solar over the long-term.

And if you're a believer in over the long-term and you're trying to figure out whether or not to invest, you just have to figure out which companies you think will be around to see this a boom in 2020.

Now there is one big, very important caveat to what I'm saying and an example of it is on the next slide which is Slide 11. So the one thing that **we've assumed in all this analysis is that net energy metering continues to exist in its current form in all of these places. And that residential rate structures don't change.**

So costs continue to fall. Solar continues to grow, but net energy metering remains in place and rate structures don't see big increases in fixed charges or big residential demand charges. But I'm sure all of this is a big battle ground. We have 25 states now that have seen some a regulatory battle between the solar advocates and the utilities over either net energy metering or rate structures.

And thus far if you were to tally up the wins and losses, the solar industry broadly speaking, is winning. Of those 25 cases, I think you can really point to two that have been big losses for solar.

One of them was just a couple of weeks ago in SRP territory in Arizona [*up to \$50/mo charge*]. The other one was a couple of months ago in Wisconsin. And in Wisconsin it's a pretty simple change. It's just an increase in the fixed charge on the residential bill.

But that actually has a huge impact on the economics of solar. We're just showing the proximity here to traditional grid parity under the previous fixed charge (under the blue line on slide 11). And on the green line is the new fixed charge. And basically you can push back the market entering the money by a few years with even just that a change.

So **residential solar is very subject to rate structures. And if there's anything that will be a barrier to growth in the residential market in**

particular over the next few years, it's going to be rate structure changes and changes to net energy metering. So that's something to monitor very closely if you're trying to figure out how big this market is going to be. So let's move on to some market dynamics that are looking more at individual segments and see how each market is performing right now. If you look at Slide 13, this is showing installations over the past few years by segment.

And as you can see there isn't a lot of consistency across the three individual segments. They don't actually exhibit the same trend apart from the fact that they've all grown over that period.

So just quickly addressing each of them individually, the residential solar market used to be the smallest, but it's seen as very consistent in incremental annual growth.

The **residential solar market is growing at 50% a year. It's done that three years in a row now.** And so it's now getting to the point where it's real meaningful demand, **about 1.2 gigawatts in 2014 should be closer to two gigawatts this year [per year].** Those are getting to be significant numbers - a quarter of a million installations just last year alone.

The commercial market has not nearly seen the same success. Actually the commercial market used to be the bedrock of demand for solar in the U.S. back when companies like Sun Edison invented the Commercial Power Purchase Agreement in 2005 through 2008. The commercial market grew a lot, but then basically flat lined and grew only incrementally in 2013 and actually fell a little bit year-over-year in 2014. We'll come back in a minute to some of the reasons behind that, but it's been a tough market to scale.

And there is a lot of stimulus funding that growth - basically flowed through to commercial, particularly government public sector projects that ran out last year. And when that ran out it turned out that the commercial market in some states just didn't have the legs that people expected.

And then finally we talk a lot about distributed solar. It has the potential to be disruptive. There are some good

companies in it. But **the vast majority of the megawatts that are being put on the grid in solar are utility scale.** And that's been increasingly true over the past few years and will continue to be true at least through 2016.

There is an enormous pipeline of utility scale solar that is just getting built out right now, and it will continue to dominate in terms of total capacity that's coming on line.

So Slide 14 is about residential. I'm sure everybody knows that the big trend in residential over the past few years was companies like SolarCity and Sunrun and Vivint and CPF and a number of others are offering third-party ownership; offering PPAs or leases to residential customers. That really sparked this wave of growth in the residential market.

But the overall market share of third-party ownership basically topped out at the end of 2012 and then has been more or less flat since then. So **a little over 70% of all residential solar is third-party owned right now, and that's been pretty consistent for a couple of years.**

I think that's going to change this year. I think we're going to end up with a turn back toward direct ownership because right now every single residential solar finance company with the exception of Vivint, is offering a loan product.

And Vivint has now talked a little bit about the possibility of offering a loan product. So I think within a number of months you will have every residential solar finance company able to offer a PPA or a lease or a loan. And just the fact that that's available, I think more customers will go towards it. SolarCity is certainly very bullish on their MyPower loan.

If you go to the next slide, Slide 15, another thing that I think is talked about a lot and often without sufficient data is consolidation in the residential solar market, because there has been a fair amount of M&A activity,

and you have a small number of public companies that get a lot of attention.

And indeed there has been some consolidation in residential solar. In 2013 the top ten residential installers together accounted for 45% of the market. By - through Q2/Q3 of 2014 it was about 59%. If you add in the Q4 data it was a little less than that. More like 55%. Either way, that's clearly consolidation, but it's actually not particularly rapid consolidation.

You still have an extremely long tail of residential solar installers who in aggregate, do meaningful volume. And they have access to financing solutions too, if they do it through Clean Power Finance or through SunPower. But one way or another they are continuing to be able to sell. And their business is growing. It's just not growing quite as fast as the big players.

And I think **one of the big fundamental questions about the future of residential solar is whether you're going to continue to see this trend until the point where the residential solar market is much bigger, but it's made up of a small number of large companies, as opposed to a larger number of smaller companies.**

Moving on to Slide 16, so I mentioned that the commercial market has struggled. And I think there are a bunch of different reasons for that. But one of them is that there is an enormous potential market opportunity in small commercial. Call it commercial installations under 500 kilowatts.

But we've always been bad at trying to figuring out how to scale small commercial solar, and in fact have gotten worse at it over time such that an increasingly large share of the commercial market over the last few years has been comprised of large projects. **Projects over a megawatt in particular, now comprise almost half of all the volume installed, up from around 30% in 2010.**

Small commercial is tough. You have high transaction costs. You often have non-credit worthy off-takers. You

don't necessarily have a scalable solution. Financial partners, capital providers for projects won't look at a portfolio unless it's big. But it's hard to aggregate up a big enough portfolio for small commercial.

So the problems are not small, but it's an enormous market opportunity in terms of technical potential. And there have been attempts to figure out ways to streamline the process. If any of those are successful, I think you'll see a big difference in the trajectory overall of the commercial market in the U.S.

Moving on to Slide 17, and now switching gears to the utility scale market, the utility scale has gone through a big transformation over the past couple of years. It used to be that all this utility scale solar and a lot of these multi-hundred megawatt projects that you see coming on line right now - those are mostly a function of a few states, particularly California that had very aggressive renewable portfolio standards. And for which the utilities were signing above market PPAs for big solar projects.

But throughout that period, as solar has gotten cheaper and cheaper and developers have gotten smarter and smarter, and because the cost of capital has come down, **PPA prices for utility scale solar have also been falling such that now the average PPA price for a new PPA signed right now is down around \$52 a megawatt hour.**

When you get down to that level you don't necessarily just need a RPS in order for the economics to pencil out. There have turned out to be a number of different mechanisms through which you can get these projects developed. And just a few of them include things like PURPA. We now have about a gigawatt pipeline of utility scale solar that's getting developed through PURPA.

You also have some direct access type of deals. An example is First Solar signing a 130 megawatt contract with Apple a few weeks ago.

There was also a big Kaiser Permanente deal with NextEra. This is a new market opportunity that didn't used to exist when the price of solar was a lot higher.

And then you also have some utilities that have solar winning RFPs, even outside of mandate. So you saw that with Xcel Energy in Colorado, and a few other places. So that's the positive outlook for utility scale solar. But the next slide has the negative outlook which is that as I said before, we have this **enormous pipeline: it's over 14 gigawatts now, of utility scale solar that basically has a PPA and then an expected completion date of either this year or next year.**

A lot of that will come on line. Not quite all of it. But we think a lot of it is in pretty good shape which means that you'll see this big boom in construction. But almost nobody is developing a utility scale solar project with an expected completion date of 2017.

The ITC impact, although it might be a little bit more marginal on distributed solar, will undoubtedly be huge on utility scale solar. On the same order or magnitude that PTC expiration has been on wind at the various times that you've seen that happen.

You'll have a crash in the utility scale market in 2017 [7.2GW in '16 to 791 MWs in '17 contracted estimated]. As I said before, PPA prices are low right now but they're low with the ITC. And when you get rid of the ITC they go up just enough that a lot of those opportunities that had just opened up to you suddenly close off.

And so, there are a lot of developers that have projects that have a PPA that begins in 2017 or 2018 or even a little bit later. They're still bringing those projects on line in 2016 in order to take advantage of the ITC. And then they're figuring out some way to bridge the period between which the project comes on line, and when the PPA begins. So they are using tricks like using bridge PPAs a number of different ways, but they're doing it.

But it's an indicator of the relative dearth of projects that will come on line right after the ITC expires and still be economic. So the utility market is looking down the

barrel of a tough ITC expiration, much more so than either residential or commercial will.

I guess the takeaways for me are we have a growing overall solar market in the U.S, which will continue to grow for the next few years. 2017, it will be tough if the ITC isn't extended. But I think the long-term view on solar regardless, should be bullish.

And it's also just an increasingly complex market. It's not simple in terms of the products on offer, and also what the mechanisms are to monetize solar, and what the mechanisms are to finance it. So it's getting complex but overall **it's tough to ignore how attractive the economics are becoming over time.** I think it's a market to pay close attention to. And with that I'll hand it back over to Julien for questions.

Julien Dumoulin-Smith: Thank you Shayle. I really appreciate it. I have a litany of questions here for you, arising out of what you just said.

You talked about the discounts - have you seen that discount change much? Like for example California or Hawaii where it's competitive today, are competitive dynamics actually driving a wider discount? Who is getting the benefit of the lower solar panel cost, as you think about the economics today?

Shayle Kann: If you talk to **companies like SolarCity and Vivint and Sunrun, in general they don't see a lot of price elasticity or demand beyond a point.** So I think they'll tell you that the difference between being able to offer a customer 20% savings versus 25% savings, it doesn't get you that many more customers.

So all things equal, they'd like to find a price that offers you **15 or 20% savings and then fix that. And then as costs continue to fall they'd like to keep it and take advantage of it themselves.** *The only thing that's stopping them from doing that is competitive dynamics.*

Now in the market, there are places where it is highly competitive. *You mentioned California and Hawaii, those are probably the two biggest ones.*

So you could actually see some price increases in California, particularly because retail prices are going up a lot, were it not for the fact that you have a more competitive landscape there.

I think generally speaking, what you're going to see is more or less fixed pricing, at least through next year for customers, regardless of what happens with system prices. Then the interesting question is what happens in 2017 to offerings for customers? And SolarCity has alluded to the possibility of keeping pricing fixed for customers, even in 2017 and just taking the hit from the ITC reduction on the nose.

I think it will be interesting to see whether they actually do that and the extent to which that hurts them in terms of the economics of their projects. But all things equal, they want to be able to offer a minimum of 10% and ideally more like 15% savings.

Julien Dumoulin-Smith: Got it. So 15%, that's norm that you're running?

Shayle Kann: Yes, it depends on the market. But I've seen numbers in the range of 15% a lot.

Julien Dumoulin-Smith: Got it. Excellent. So you talk about the risk of fixed tariff reform and you talk about your projections here being prior to that. What are your expectations for tariff reform - moving towards more fixed tariffs?

Shayle Kann: Right. The first dozen utilities that tried to do something to change their tariff structure that was directed at solar – they were largely trying to propose increased fixed charges on the bills. That's what happened in Wisconsin. It's also what APS proposed originally. And you've seen that happen in a lot of places.

Utilities have generally had a relatively hard time getting that through. There are arguments against high fixed charges that are not just solar specific. Low income advocates for example, really don't want to see big, fixed charges. Energy efficiency companies don't want to see big fixed charges.

So what just passed in SRP territory in Arizona included the first residential demand charge. You don't typically have a demand charge in residential solar. You have it in commercial solar. I think you'll see more utilities proposing things like that.

There's also alternatives though. There was a bill that almost passed in Massachusetts and just narrowly failed in the legislature last year that included a minimum bill instead of a fixed charge.

The minimum bill is not as attractive to the utilities certainly, but on the other hand it also doesn't have as big an impact on the economics of solar. And I know some of the solar advocates are perfectly willing to compromise on a minimum bill. Not so much on a fixed charge.

And then you have the possibility of things happening like what HECO proposed in Hawaii which is compensating net excess generation from solar when you're feeding power back into the grid at less than the retail rate - closer to the wholesale generation rate or entirely at the wholesale generation rate. And so we'll see what happens with that in Hawaii. It's also possible that the successor and net metering program in California will lean in that direction.

So I think the short answer is that you're not going to see a uniform trend across all these states. Different utilities will propose different things and get different things which is just the nature of rate design that you have to deal with on a utility by utility basis.

But it is going to make the value proposition of solar increasingly contingent on what happens in those rate structures as opposed to in the past

when you had at least a relatively fixed set of rate structures that you could plan against.

Julien Dumoulin-Smith: That's great. Thanks. What do you think about pricing trends for panels? Have they bottomed out of late?

Shayle Kann: So a couple of separate questions there. Have prices for panels bottomed out, and will we see a supply shortage? I guess let's address the pricing first. **I don't think pricing has totally bottomed out.** You're not going to see the same price reductions that you saw in the big crash in 2011, 2012, even into 2013.

But the U.S. actually, generally speaking, is a high priced market for panels right now, partially due to the imposition of tariffs on Chinese panels which has actually raised, or at best kept pricing basically flat; while you've seen price reductions in many other markets globally.

And there is room to run downward as a result of that. And it's entirely possible that that will happen this year. In fact you're already starting to see some quotes that are a little bit lower right now, down in the 60s in terms of cents per watt from the 70s last year.

And in the second half of the year – it may decline even further if the final first administrative review upholds the reductions on the original 2012 tariffs on Chinese panels. Assuming that happens, I think you'll see prices fall again. But those price reductions will be incremental in the context of system prices.

As far as the panel shortage goes, we don't see it. It's a global question. The question is, is there enough global capacity to meet global demand?

And there's been a lot of announcements of capacity expansion; manufacturing capacity expansion from suppliers over the past year. They're planning to build out a lot because they have a much healthier balance sheet now than they did a couple of years ago, and they're basically through the worst of the consolidation.

So we'll see more capacity coming on line. Meanwhile, demand will be growing but we don't see global demand growing fast enough just this year and next year, such that you'll see a big shortage.

Now that's not to say you couldn't see short-term supply shortages. That's happened many times in the past that last a few months or a quarter. But global panel suppliers have generally been pretty good about allocating more capacity to markets that are growing, especially if they're higher priced markets.

So we don't see a big panel shortage in 2016 as likely. The only thing that I think could turn that and make us change our mind is if demand picks up faster than we anticipate that it will, particularly in China - which is always a black box.

Julien Dumoulin-Smith: Got it. Okay, excellent. On the commercial side, you mentioned that that is a tougher market to penetrate; particularly after some of the stimulus funding ended. What do you see going on there?

Shayle Kann: Right. Sun Edison is the big player in commercial solar in the U.S. – so the participants in that segment are Sun Edison, SunPower, and also SolarCity, to an extent. You could step a tier down and you can get companies like Borrego Solar, and NRG and NextEra and a few others.

I think this year is going to be a much better year for commercial solar than last year was. I think we're going to see a resumption of growth in California.

Southern California Edison reopened and expanded the capacity that can sign up for a pretty solar friendly tariff structure that we've capped at 100 megawatts before and is now 400 megawatts. PG&E also have a relatively attractive rate structure that just didn't quite make sense economically before.

So I think **California** is going to grow again for commercial solar. You also have a few other states that have pretty attractive incentive programs that should spark demand this year. **New York** is going to be a pretty big one for commercial solar. **Massachusetts** will

continue to be. I think **New Jersey** is on the upswing after hitting a trough in demand.

So in the short-term there's more to be done this year. And competitively the companies that I just mentioned are the ones that are best positioned for it.

Still, none of them have cracked to the small commercial code. SolarCity actually tried. When they first started doing commercial solar they were mostly doing small commercial. And they've basically backed out from that. It will be interesting to see because Vivint has also announced they're getting into commercial solar. They've talked about doing those smaller deals as well. So maybe they can figure it out where everybody can't.

But **commercial solar is a tough business to really scale. I think you could see 20, 25% growth potentially this year, off of what was a down year last year.**

But it's hard to imagine over the next couple of years that commercial equates the growth or even the megawatts installed that you'll see in residential.

Julien Dumoulin-Smith: Excellent. In terms of the competitive landscape in the residential market, what is it that drives the outsized market share that you see for SolarCity and Vivint and the others. Is there a secret sauce in your opinion?

Shayle Kann: You could say it's their large presence – they are everywhere - and have attractive customer value propositions. But then again, so do some of these other companies that don't have as big a market share as SolarCity or Vivint.

I think the reason that they've got so much going on is their **customer acquisition**. They have very different strategies, SolarCity versus Vivint, in terms of how they acquire customers.

SolarCity basically does everything. Every mechanism that you can imagine for customer acquisition, SolarCity is doing it and they're trying to grow it and they're forming new partnerships and new channels, and they're going everywhere and they're in every major residential solar state. So they're just hyper-aggressive.

Vivint has a much more specific strategy which historically has been almost entirely doing door-to-door sales, but doing very aggressive door-to-door sales and having an extraordinarily streamlined process from customer acquisition to installation.

They're going to start expending to some other retail partnerships and even retail kiosks and things like that over the course of this year.

But they too have just been widely aggressive. You can see it when they enter a new state, all of a sudden they pop up and immediately are doing pretty meaningful volume.

So I don't know that either of them have some special sauce in terms of what they're offering the customer necessarily, relative to some of these other top tier players like Sungevity, NRG, and Sunrun. But they're really, really aggressive and are just hitting more customers.

Julien Dumoulin-Smith: Right. Well I suppose the question now is, what are you seeing from the veterans? How do you see them in light of the consolidation theme, and, market share?

Shayle Kann: Right. Yes, it's a good question. I wish I had a definitive answer. I think this year, especially if you take both of their guidance, SolarCity and Vivint will both see further growth in their market share. And so will some of these other top tier companies probably. But over the long-term, I don't know that I am convinced in either direction.

I think right now what's interesting is that what we've seen over the past couple of years is a wave of

acquisitions of the second tier. So NRG bought Roof Diagnostics. Direct Energy bought Astrum Solar. Sunrun bought the residential division of Rex Solar.

Almost all of the multistate residential installers that weren't already tied up with some one, now do have a tie up. The only real big exceptions to that would be Sungevity which is now structuring itself more around being a customer acquisition engine. And Verengo Solar which has pulled back and is focused primarily on Southern California now.

So we're already at the points where there just aren't that many big players out there. And so, I think it doesn't make a lot of sense to be a midsized player. You either are going after a really big footprint like SolarCity and all these other companies are, or you develop some local expertise in some channel that's unique and hope that you can still compete with these guys over the long-term by being partnered with a CPF or a SunPower or somebody like that.

Julien Dumoulin-Smith: That's great. Excellent. What do you guys see in terms of competitiveness from the growth prospect of CSP, maybe even against the backdrop of storage?

Shayle Kann: Yes, I think that what's happening with storage right now – it is actually maybe even **making a little bit worse for CSP because if battery storage combined with PV gets cheap enough then the one remaining really attractive value proposition for CSP is removed.**

I think the problem with CSP has been that if you look in the short-term, if you're developing a CSP project and you're comparing it up against a PV project - and say the utility is comparing two possible PPAs, **PV is going to be cheaper right now.** There's just no way around that.

The benefit of CSP is that it plays well with storage. And so depending on the technology it can be better aligned with load. But that hasn't been valued sufficiently by

utilities historically, and even today I don't think that it makes up for the price disadvantage on the PPA.

We've always viewed CSP as having a lot of long-term potential. And in fact if you look at how you can get to very high renewable penetration rates, CSP will end up being a big part of a lot of that - but it's a long-term thing.

So CSP has had this problem where the **CSP companies can't really win deals right now at meaningful volume to scale up to get to the point where the benefits of CSP can really be monetized.** So it's a tough space for those companies to be in. Can they hang around long enough where it really starts to matter? Over the short-term, I don't think you're going to see new CSP PPA signed in the U.S., at least not many of them for the next few years.

But if we're taking a really long-term view here - 10, 15, 20 years; I think you could see a resurgence.

Julien Dumoulin-Smith: Excellent. Do you see the profitability working for residential solar? Do the numbers work in terms of the cost overhead?

Shayle Kann: Yes. I'm not the expert on the economics or the financials of SolarCity in particular; but we know SolarCity is not yet profitable - they say they can get profitable but the faster they grow the less profitable they're going to be in the short-term.

I think what we look at is the all-in cost to install solar, and then what is being offered to a customer. And there is a margin there. There is money to be made in just selling solar to a customer at a rate that is attractive to the customer. And given all of your costs to install, even with overhead and I think even at scale.

So whether it works out, given a particular company's model, particularly financing model, I don't know. But I do think that there's money to be made in residential solar. Again, dependent on current or near current rate structures.

Julien Dumoulin-Smith: You talk about the fall off in '17 for certain markets. But what about the compression and the profitability for others? How much does consolidation reduce the possibility for those who are scale?

Shayle Kann: Yes, part of what's going to happen in 2017 assuming **ITC reduction does happen, is that I think it will have a disproportionately large impact on smaller companies; on smaller installers;** developers, and EPCs who have less ability to adapt their allocation of resources and capital to the markets that remain profitable and the projects that remain profitable.

So I think in some ways it makes the big get bigger and the small get smaller. In general though, if you turn a switch from December 31, 2016 to January 1, 2017, you drop the ITC from 30% to 10% or to zero, then things are just going to look worse.

Your profitability on any given project is going to be worse. So the big question is, are there still projects out there for which they meet your IRR hurdle? And I think there will be, but just not in the same volume that there were the night before.

Questioner #1: Hi, just following up on that last question. In 2017 are you assuming actually zero or 10% in your analysis?

Shayle Kann: It depends on which analysis you're talking about. If you mean the one that showed the maps in the residential solar (pages 7 to 10 on slide deck); then that assumes 10% there; assuming it's a third-party owned system. So it would look even a little bit worse in 2017 if you assume a direct-owned system.

Questioner #1: I see. Okay and to follow-up on the previous question, with regards to 2017, what happens with the crash in the utility side? That's going to be a big reduction in installs. Is that large enough to impact panel prices or is the US not meaningful enough in the global scheme of things?

Shayle Kann: Yes, let's just say you had a six gigawatt utility scale market in 2016 and a one gigawatt utility scale market in 2017, so it's a net loss of five gigawatts. Meanwhile, you have the global market growing elsewhere in other countries that don't see the same incentive reduction. And you have a market which at that time is let's just say, 60 gigawatts. It could be a little bit less or a little bit more than that. But it's a net loss of less than 10% in the overall demand globally.

It could have some marginal impact on pricing, but the U.S. just isn't a big enough portion of the global market to really turn the needle too hard on pricing.

If you had coincident with that, a crash in Japan which is possible or a crash in China which is also possible, then the two of those together could have a big impact.

Questioner #1: I see, okay. You made a comment about 2016 and 2015 being a lot bigger than people are expecting. Could you quantify that?

Shayle Kann: We think there's going to be a little over eight gigawatts overall installed this year. And more like 11 in 2016. So, it's a continuation of the growth rate over the past few years which means it's not crazy. But 11 gigawatts in 2016, that's a pretty big number. Some other forecasts are higher than that but we think those may be unrealistic.

Questioner #1: Okay, great. You mentioned that we are going to need to see some changes to see small commercial growth. What types of changes do you think are perhaps most likely to happen?

Shayle Kann: Yes, I don't know. I mean the fundamental problem with small commercial solar is that nobody has figured out a good way to scale it and finance it. So, every deal, let's just say, your transaction costs are similar for a 100 kilowatt deal versus a two megawatt deal because you're still negotiating individually with a site host.

So your transaction costs are high for a lower total amount of capital invested. You have non-credit worthy off tickers a lot of the time, so you have to figure out how to offer a financing solution to them.

And oftentimes you have tenants that don't own the building which is less true in large commercial. So they can't necessarily sign a PPA. The solutions that have been proposed in the past haven't really panned out yet; but I think some solutions have been promised which may work at least theoretically - things like screens through which you enter a bunch of information about the project and it spits out a score. And project finance providers ahead of time have agreed that anything, say, with a score above a 90 will be financeable by us.

And so it produces that transaction cost and you can create a facility to finance that that you don't necessarily need to have huge volume immediately. So it requires a finance provider who's willing to get on board at smaller volumes. And then it can maybe scale up from there, but it's tough.

Questioner #1: Okay. So basically you don't expect any big changes in the small commercial?

Shayle Kann: I don't think anybody has figured it out yet. I think there are smart people thinking about it. It's such a big market. At some point it's going to open up. But I haven't seen anything out there right now which I think is going to turn the table.

Julien Dumoulin-Smith: Well I think with that we're a couple of minutes past the hour so we should probably call it a day here. Thank you Shayle for taking the time. Also thank you all for listening and we'll talk to you soon.

Shayle Kann: Thanks for having me.

END

Statement of Risk

Risks for Utilities and Independent Power Producers (IPPs) primarily relate to volatile commodity prices for power, natural gas, and coal. Risks to IPPs also stem from load variability, and operational risk in running these facilities. Rising coal and, to a certain extent, uranium prices could pressure margins as the fuel hedges roll off Competitive Integrations. Further, IPPs face declining revenues as in the money power and gas hedges roll off. Other non-regulated risks include weather and for some, foreign currency risk, which again must be diligently accounted in the company's risk management operations. Major external factors, which affect our valuation, are environmental risks. Environmental capex could escalate if stricter emission standards are implemented. We believe a nuclear accident or a change in the Nuclear Regulatory Commission/Environment Protection Agency regulations could have a negative impact on our estimates. Risks for regulated utilities include the uncertainty around the composition of state regulatory Commissions, adverse regulatory changes, unfavorable weather conditions, variance from normal population growth, and changes in customer mix. Changes in macroeconomic factors will affect customer additions/subtractions and usage patterns.

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12-Month Rating	Definition	Coverage ¹	IB Services ²
Buy	FSR is > 6% above the MRA.	47%	37%
Neutral	FSR is between -6% and 6% of the MRA.	42%	32%
Sell	FSR is > 6% below the MRA.	11%	21%
Short-Term Rating	Definition	Coverage ³	IB Services ⁴
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	less than 1%	less than 1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	less than 1%	less than 1%

Source: UBS. Rating allocations are as of 31 December 2014.

1:Percentage of companies under coverage globally within the 12-month rating category. 2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.

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