US Solar & Alternative Energy

Breaking Down the Post ITC Economics

Equities

North America
Electric Utilities

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Resi market will take a greater hit on economics resulting from ITC drop

Continuing our solar PV analysis following our report, How Economic Is Residential Solar?, we evaluate the influence the Investment Tax Credit (ITC) step-down will have on resi and utility-scale project returns, emphasizing that utility-scale returns are substantially less impacted. We estimate the ITC as worth ~2c/KWh to typical utility-scale contracts, or more than >5% of equivalent levered returns. That said, while still quite material, the pace of declining cost structure, fundamental demand for solar via RPS/111(d), and interest rate environment all seemingly remain more relevant drivers in sector's overall trajectory. We include full models on both resi and non-resi comparisons below on pre and post-ITC. Overall, we're more comfortable with ITC roll off, particularly for utility-scale, but still see a boom-bust cycle forming irrespective. Timeline for recommencing utility-scale procurement post-bust is likely more in ~2019, particularly with EPA's 111(d) carbon scheme considerations taking shape by then.

Question remains how much can solar cost structure offset? Looks like good bit

The question appears not if, but when cost reductions will offset the decline in the cost structure. As the ITC is roughly equivalent to ~$0.30/W of cost inflation (20%). This is roughly inline with FSLR's '14 Analyst Day guidance around cost structure, seeing costs declining to ~$1/Watt for system by yearend '17, implying fully developed projects could yet approach $1.20/Watt. We see tangible clues to suggest most of this reduction is achievable given both projected declines in panels and anticipated changes to lighter-weighted balance of system design, beyond wider SG&A savings. Bottom line, the realized cost of solar should be back to current levels by 2018.

So if ITC does impact resi economics, what does this mean? It's about periphery

We emphasize that the peripheral states will remain the primary focus for a re-entrenchment as those with the weakest margin profiles will disappear first. We emphasize that CA remains firmly in the money after ITC upon many higher tiered customers. Additionally, we suspect many markets in the northeast will see SREC values increase to offset this impact. Rather, the 'growth' trajectory of DG will clearly 'reset' downwards as tangential markets evaporate. Resi economics remain primarily dictated by economics of net metering and state specific subsidies than the federal ITCs.

Total utility-scale MW build will still be more impacted by ITC expiration

Off a higher base, we suspect utility-scale projects will still suffer the bulk of the YoY swing in new projects into 2017 vs. 2016, with both resi and utility-scale potentially in the range of 2-4GW. The real ambiguity remains in how much both the resi and utility-scale industries will succeed in scaling back costs (marketing costs should presumably decline on avg. for instance) as well as resi customers recognizing the need to 'act now' to benefit from ITC expiration.

Does ITC going away change the competitive landscape?

With tax equity becoming less relevant in a post-ITC stepdown world, we see an argument for greater utility involvement. We see several utilities indicating their interest in recent months for direct ownership in ratebase in a post-2017 world; moreover, traditional IPPs such as Calpine and other-small developers which previously did not have the scale or desire to tap tax-equity markets could well enter. The secondary impact on the solar market will be removing tax 'barriers to entry'— Rather than shaking out competitors as conventionally viewed, we believe ITC expiration will actually invite new players.

UBS Punchline on Solar

We see ITC expiration as a meaningful change to economics, but see underlying improvements in cost structure as largely offsetting impact to utility-scale. A boom-bust cycle will happen irrespective as project orders are accelerated. That said, we believe bigger drivers around fundamental demand for solar via RPS and under carbon remain much more meaningful drivers on timing of when recovery in solar will begin following the end of 2016 bust. Maintain constructive view on solar sector.

Why is Resi more impacted than utility-scale economics?

Resi is tied to the fully stepped up Fair Market Value (FMV) of solar development, which we assume $4.50/W in this instance relative to the 30% ITC value being applied only to the $1.50/W value today on utility-scale deals. We also flag the uplift in MACRS depreciation benefits as well as the availability of the 10% ITC rebate (for non-resi applications vs. the true resi economics, albeit caution that solar leasing remains the method of choice and is unimpacted by the complete falloff of the resi ITC in 2017).

Future cost decreases are expected to occur outside of modules

As module costs, and reductions in poly prices in particular, have driven installation costs down, future drops will be required to take place at different levels of the value chain. Particularly, we see SG&A costs compressing as many major installers have been ramping up sales teams recently to deal with increased demand. Additionally, as the PV market continues to become more mature, customer acquisition could finally see a decline on average (following a potential inflationary run-up), accounting for upwards of ~$0.50/W of existing resi costs today.

Increased pressure to drop costs will be placed on resi installers in 2017

Surviving in a post-ITC world for residential developers/ installers will require them to decrease total installation costs continuously over the next ~1.5 years. Additionally, the growth of resi solar in the US will be predicated on the installers' abilities to continue dropping costs post-2017. The leading resi installer, SolarCity (SCTY) is projecting their costs will decrease by 12% to $2.50/W by 2017 (-$0.36/W vs. 1Q15 disclosures), which is a much more sustainable level than the cost decreases seen between 2009 and 2014. We suspect that declining balance-of-system (BoS), modestly lower panel costs, and even some marketing expense savings will contribute to this overall trajectory.

But what's the likelihood of an extension? Commence Construction worth tracking

While we continue to see a drop-down to the 10% ITC level for non-resi installations as still likely, we see a clear angle around instituting 'commence construction' language which has previously instituted for the wind industry as a 'de-facto' extension for 24-months, effectively allowing projects to meet a min capex (~5-10%) threshold by the end of 2016 in order to qualify rather than reaching project completion.

Solar REITs: the alternative approach?

Another angle to the industry remains whether further IRS clarification on eligibility of various REIT structures later this year will enable yet another 'subsidy' angle for the industry, much the way the oil & gas industry benefits from its MLP status. We see this as a politically expedient avenue without an extension. That said, with so many tax credits and accelerated depreciation offered to the industry today, it is unlikely to have much in prospective tax appetite for the time being, particularly given legacy NOLs from manufacturing efforts.

Irrespective of extension, solar appears set for boom and bust

Even if we get an extension, economics of solar appear set to see a boom and bust, as projects are accelerated to take advantage of the economics. Moreover, while we provide a scenario of the estimated economics today, by year-end 2016, economics should clearly continue to improve throughout the period, such that the delta in cost structure today may appear to be offset (but certainly not by the end of the period). The best question remains how much of a further improvement can the industry achieve? How far forward are projects being pulled? While it's still unclear (most are still opting to expedite development than make this decision), we see California as providing a glimpse of when development may re-appear with the market already set in motion for in-service in 2018, and more notably 2019. We see states like GA as already contemplating continued ratable procurement of utility-scale projects including in 2017. Lastly we emphasize projects are already being pursued for eventual delivery under 2019 PPAs, however, accelerated to capitalize on the ITC, creating a 'merchant nose' for projects which is typically hedged with interim (2-3 year PPA offtakes with third-parties and/or fixed-floating swaps on corresponding power/RECs).

The real question remains from where is demand driven?

Looking through the ITC, the question remains from where is even pre-ITC demand driven? It's principally around states pursuing Renewable Portfolio Standards (RPS), and even within this, to achieve carve-outs for solar. <u>We emphasize the more critical element seemingly coinciding with the end of the ITC appears to be the timeline and magnitude of carbon targets implemented under the carbon 111(d) scheme.</u> Depending on the stringency and timeline of underlying carbon mandates, as well as distribution between more solar-intensive vs. wind-intensive states remains the critical angle around long-term procurement. We see the near-term as still 'tied' to RPS and quasi-'economic' procurement.

DG will drive the 'baseline' solar development pace in the US

We expect substantial net-metering subsidies provided on a state-by-state basis will only gradually be reduced (likely in tandem with declining cost structure) in the resi and C&I markets. While the rate of growth will slow organically with more installed systems, we see a smoother trajectory for the distributed industry, in contrast to utility-scale efforts. In contrast to their premium cost, we see DG projects as firming the 'baseline' of the growth in the solar industry.

<u>*Please see below for links to our recent Alternative Energy Reports*</u>

A New Take on Resi Solar: Community Solar Conf Call

<u>How Economic Is Residential Solar?</u>

<u>Sector: Residential Solar: Broaching the Yield Question</u>

Model Overview

For this analysis, we compare resi and utility projects in CA in order to determine the magnitude of the ITC drop-down's impact by sector. While we compare results initially against the drop-down itself, we also examine this against a number of other scenarios, including most notably a $0.30/W decline in the cost structure combined with 10% and 0% ITCs.

Resi Assumptions Walkthrough

For the resi and utility models, system cost assumptions differ between the pre and post ITC drop-down scenarios in order to attempt to portray the most accurate metrics during the different time periods. In the resi model, the main changes are the installation costs, energy rates, and reduction in the ITC from 30% to 0%. The energy rate increase assumes a 1.4% annual inflator, while the installation cost takes into account a $0.30/W reduction. Lastly, we assume inverter costs will decrease by 10% by 2017. As seen below, prior to the ITC drop we assume a FMV installation cost of $4.50/W for the ITC, developer installation cost of $2.86/W, and an energy rate of 16.2 c/kWh in CA. We compare that against 3 scenarios post ITC drop, (1) Utility ITC: 10%, Resi ITC: 0%, (2) Utility ITC: 10%, Resi ITC: 10%, and (3) Utility ITC: 0%, Resi ITC: 0%.

Uplift in MACRS benefits will assist utility sector to manage drop

The remainder of the 10% ITC as well as uplift in MACRS benefits should not be underestimated when it comes to managing the ITC drop in 2017. As a result, more pressure will be put on resi installers to drop costs than on utility project developers.

Please refer to our main resi assumptions below:

Figure 1: Resi: Pre ITC Drop Economics

	Pre-ITC Drop
Installation Cost ($/W)	*2.86*
Rate (c/kWh)	*16.2*

Source: Company Filings, SEIA, GTM, UBSe

Utility Assumptions Walkthrough

In the utility model we test a PPA rate of 5c/kWh. Other major assumptions are a project size of 150 MW and an installation cost of $1.50/W.

Please refer to our main utility assumptions below:

Figure 2: Utility: Pre ITC Drop Economics

	Pre-ITC Drop
Installation Cost ($/W)	*1.50*
PPA Rate (c/kWh)	*5.0*

Source: Company Filings, SEIA, GTM, UBSe

Additionally, our full assumptions lists for both resi and utility can be seen below:

Figure 3: Resi: Assumptions List, Pre & Post ITC Metrics

Assumptions	
State-Level	
State	**CA**
PV Output (kWh/yr)	1,633
System Cost	
FMV System Cost ($/W)	$4.50
Installation Cost ($/W)	$2.86
O&M Cost ($/kW)	$20
O&M Cost Inflator	0%
Reduction in Installation Cost	$0.30
Inverter Replacement	970
Inverter Replacement Labor	300
Inverter Cost Decrease	10%
Output	
System Capacity (kW)	5
Output Degredation	0.5%
PPA	
PPA Rate, Pre ITC Drop (c/kWh)	16.2
PPA Rate, Post ITC Drop (c/kWh)	16.2
Increase in PPA	2.8%
PPA Rate Inflator	1.4%

Source: Company Filings, SEIA, GTM, UBSe

Figure 4: Utility: Assumptions List, Pre & Post ITC Metrics

Assumptions	
State-Level	
State	**CA**
PV Output (kWh/yr)	2,440
System Cost	
MACRS Installation Cost ($/W)	$1.17
Installation Cost ($/W)	$1.50
O&M Cost ($/kW)	$10
O&M Cost Inflator	0%
Reduction in Installation Cost	$0.30
Output	
System Capacity (kW)	150,000
Output Degredation	0.5%
PPA	
PPA Rate, Pre ITC Drop (c/kWh)	5.0
PPA Rate, Post ITC Drop (c/kWh)	5.0
PPA Rate Inflator	0.0%

Source: Company Filings, SEIA, GTM, UBSe

Base Case: Impact of ITC Roll Off

Below we analyze a scenario where the utility ITC drops to 10% and resi drops to 0%, **with no changes to the installation costs.**

Resi Results

As seen below, the IRR is projected to decrease ~8% between the pre-ITC scenario in the chart on the left, and the post ITC case in the chart on the right. As for break-even years, we see that increasing by 5.6 years.

Figure 5: Resi: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*2.86*
Rate (c/kWh)	*16.2*
Break-Even Yrs	7.0
IRR	16.3%

Source: Company Filings, SEIA, GTM, UBSe

Figure 6: Resi: Post-ITC Drop Results (ITC: 0%)

Installation Cost ($/W)	*2.86*
Rate (c/kWh)	*16.7*
Break-Even Yrs	12.6
IRR	7.9%

Source: Company Filings, SEIA, GTM, UBSe

Figure 7: Resi: Post vs. Pre ITC Change

	Pre/Post
Break-Even Yrs	5.6
IRR	-8.4%

Source: Company Filings, SEIA, GTM, UBSe

Utility Results

Between pre and post ITC drop scenarios, the IRR decreases around ~4%, with the break-even years increasing by 2.4 years. We emphasize this is *prior* to any decline in cost structure.

Figure 8: Utility: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*1.50*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	7.4
IRR	12.9%

Source: Company Filings, SEIA, GTM, UBSe

Figure 9: Utility: Post-ITC Drop Results (ITC: 10%)

Installation Cost ($/W)	*1.50*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	9.7
IRR	9.2%

Source: Company Filings, SEIA, GTM, UBSe

Figure 10: Utility: Post vs. Pre ITC Change

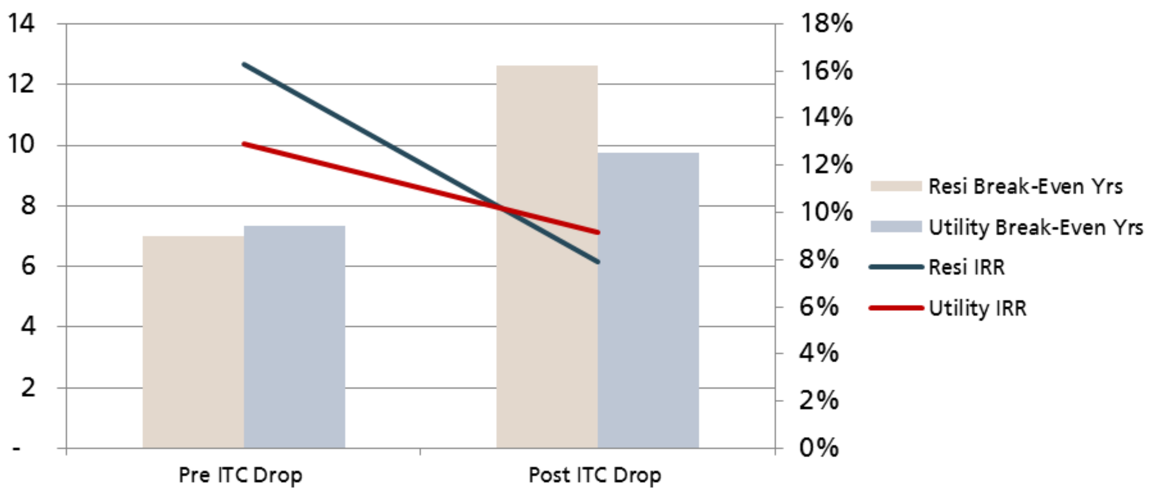
	Pre/Post
Break-Even Yrs	2.4
IRR	-3.8%

Source: Company Filings, SEIA, GTM, UBSe

Results Comparison

Below, we display the degree by which the resi metrics changed in relation to utility. The results indicate that the magnitude of the ITC drop in this scenario is less for utility-scale projects vs. resi.

Figure 11: IRR/ Break-Even Comparison, Resi & Utility



Source: Company Filings, SEIA, GTM, UBSe

But what about declining costs?

Below we analyze a scenario where the utility ITC drops to 10% and resi drops to 0%, with $0.30/W changes to the installation costs.

In our second scenario we project a decline in the costs by $0.30/W, reaching the $1.20/kW range for utility, reflecting FirstSolar's guidance for fully-loaded utility-costs in the best examples from their 2014 Analyst Day. Correspondingly, we reflect a $0.30/W decline in the residential structure. The key question in this latest example is how the determined 'Fair Market Value' basis of the ITC will be calculated under a declining cost structure (will it be *more* than the $0.30/W that we project?)

The question in our view is not *if* the cost structure declines, but rather by *when* the cost structure declines adequately to offset the impact of the ITC. If not by year-end 2017, we this as a realistic offset by ~2019. The question remains how much of the currently contemplated procurement is driven by the ITC?

Utility-scale: *Almost* holding the scale intact?

We calculate that utility-scale economics are largely held intact at the $0.30/Watt cost structure decline predicted by FirstSolar. We emphasize that this $1.20/W projection by FSLR excludes any 'non-standard' considerations for higher-cost states like California, etc.

Figure 12: Utility: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*1.50*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	7.4
IRR	12.9%

Source: Company Filings, SEIA, GTM, UBSe

Figure 13: Utility: Post-ITC Drop Results (ITC: 10%)

Installation Cost ($/W)	*1.20*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	8.0
IRR	12.0%

Source: Company Filings, SEIA, GTM, UBSe

Figure 14: Utility: Post vs. Pre ITC Change

	Pre/Post
Break-Even Yrs	0.6
IRR	-0.9%

Source: Company Filings, SEIA, GTM, UBSe

Making It Even Clearer

We include the rough comparison below between the lower cost relative to the declining all-in cost structure of the program.

Figure 15: What kind of decline in costs does it take?

Contrasting the ITC Economics	
Total System Cost ($/Watt)	$1.50
Stepdown in ITC Assumed (%)	20%
Stepdown in ITC Value ($/Watt)	**0.30**
New System Cost ($/Watt)	$1.20
Stepdown in ITC Value ($/Watt)	**$0.30**
Delta in Project Costs ($/Watt)	**$0.00**

Source: Company reports and UBS estimates

Resi Economics still suffer meaningfully

We include a table below illustrating the still meaningful decline in the overall cost structure of residential.

Figure 16: Resi: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*2.86*
Rate (c/kWh)	*16.2*
Break-Even Yrs	7.0
IRR	16.3%

Source: Company Filings, SEIA, GTM, UBSe

Figure 17: Resi: Post-ITC Drop Results (ITC: 0%)

Installation Cost ($/W)	*2.56*
Rate (c/kWh)	*16.7*
Break-Even Yrs	10.7
IRR	9.2%

Source: Company Filings, SEIA, GTM, UBSe

Figure 18: Resi: Post vs. Pre ITC Change

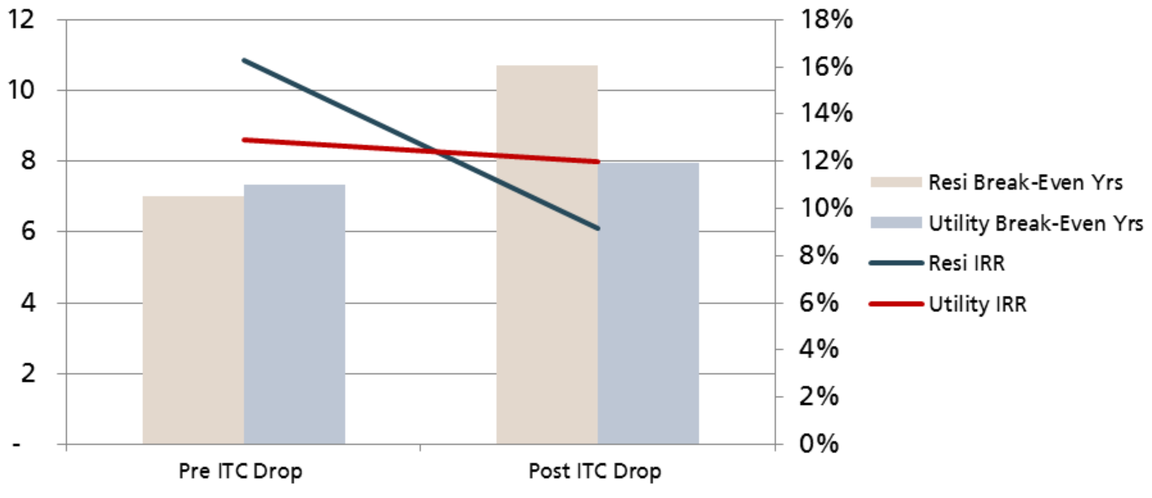
	Pre/Post
Break-Even Yrs	3.7
IRR	-7.1%

Source: Company Filings, SEIA, GTM, UBSe

Results Comparison

Below, we display the degree in which the resi metrics changed in relation to utility. The results indicate that the magnitude of the ITC drop's impact in this scenario is less for utility-scale projects than resi. As installation costs decrease, the resi IRR delta between pre and post-ITC drop expands at a higher rate than utility.

Figure 19: IRR/ Break-Even Comparison, Resi & Utility



Source: Company Filings, SEIA, GTM, UBSe

Assuming Resi at the 10% ITC Level

<u>Below we analyze a scenario where the utility ITC drops to 10% and resi drops to 10%, with $0.30/W changes to the installation costs.</u>

As seen below, with the ITC dropping to 10% for resi-owned projects, IRRs are ~2% higher than resi IRRs in the 0% ITC example.

We emphasize that the residential model will remain dominated by the solar leasing structure, particularly in a post ITC drop world. We see few home owners as likely to attempt to pursue their own structures.

We suspect the solar leasing model will gain market share as pure resi is disadvantaged with 0% ITC

Figure 20: Resi: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*2.86*
Rate (c/kWh)	*16.2*
Break-Even Yrs	7.0
IRR	16.3%

Source: Company Filings, SEIA, GTM, UBSe

Figure 21: Resi: Post-ITC Drop Results (ITC: 10%)

Installation Cost ($/W)	*2.56*
Rate (c/kWh)	*16.7*
Break-Even Yrs	9.2
IRR	11.3%

Source: Company Filings, SEIA, GTM, UBSe

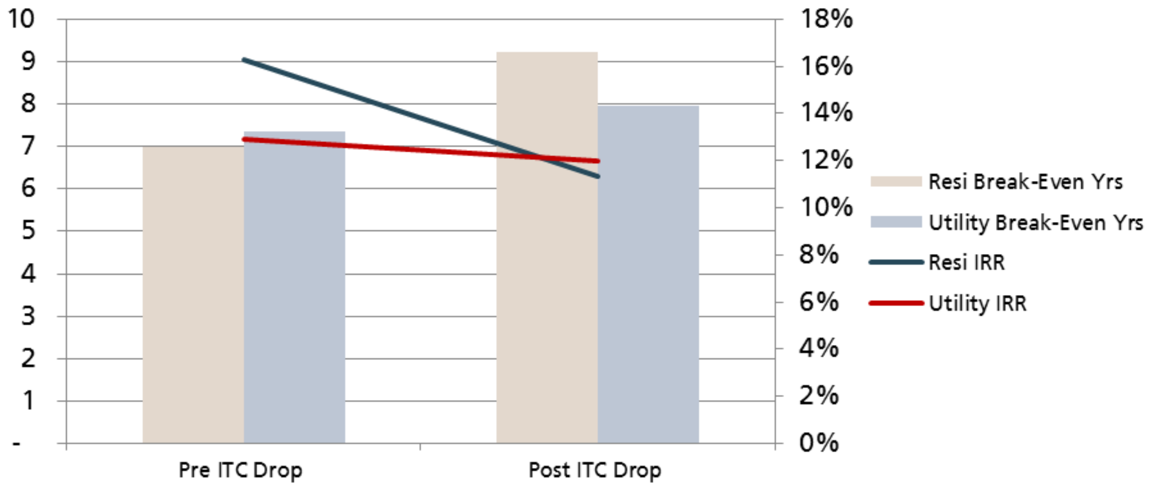
Figure 22: Resi: Post vs. Pre ITC Change

	Pre/Post
Break-Even Yrs	2.2
IRR	-4.9%

Source: Company Filings, SEIA, GTM, UBSe

Results Comparison With Utility at 10% ITC

Figure 23: IRR/ Break-Even Comparison, Resi & Utility



Source: Company Filings, SEIA, GTM, UBSe

What About No ITC Benefits for Resi & Utility?

<u>Below we analyze a scenario where the utility ITC drops to 0% and resi drops to 0%, with $0.30/W changes to the installation costs.</u>

Lastly, we look at a scenario, in which the ITC is effectively removed without any further corresponding offsets to understand the full magnitude of the ITC in isolation. While we understand this is not really a 'realistic' scenario under the current outlook, we emphasize this is a hypothetical exercise more likely under the context of meaningful further reductions in cost (emphasizing subsidies for the technology will likely continue to be scaled down over time as costs decline).

Utility Impact from Zero ITC

Without an expiration date for the current ITC benefit for solar, we see this as an extremely low probability event.

Figure 24: Utility: Pre-ITC Drop Results (ITC: 30%)

Installation Cost ($/W)	*1.50*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	7.4
IRR	12.9%

Source: Company Filings, SEIA, GTM, UBSe

Figure 25: Utility: Post-ITC Drop Results (ITC: 0%)

Installation Cost ($/W)	*1.20*
PPA Rate (c/kWh)	*5.0*
Break-Even Yrs	8.9
IRR	10.4%

Source: Company Filings, SEIA, GTM, UBSe

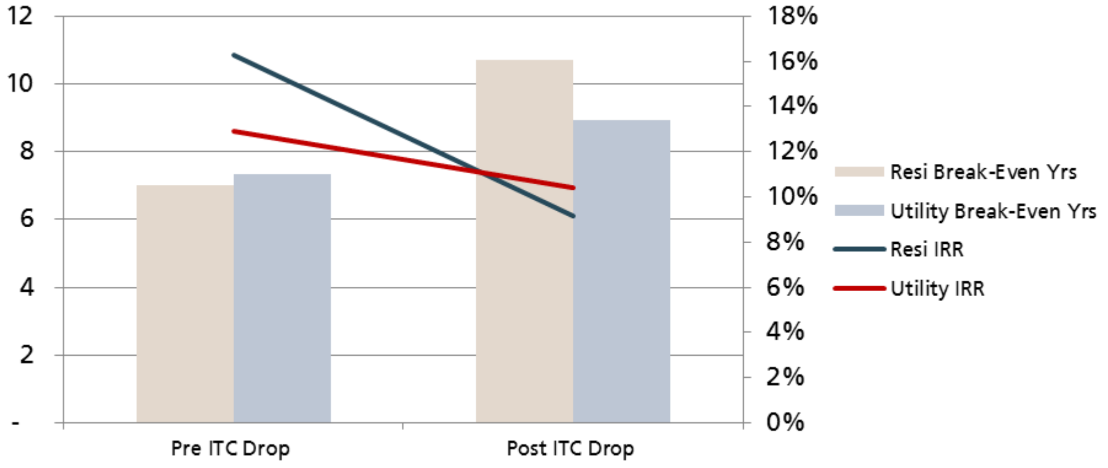
Figure 26: Utility: Post vs. Pre ITC Change

	Pre/Post
Break-Even Yrs	1.6
IRR	-2.5%

Source: Company Filings, SEIA, GTM, UBSe

Results Comparison With Resi at 0% ITCs

Figure 27: IRR/ Break-Even Comparison, Resi & Utility



Source: Company Filings, SEIA, GTM, UBSe

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Buy	FSR is > 6% above the MRA.	45%	37%
Neutral	FSR is between -6% and 6% of the MRA.	43%	33%
Sell	FSR is > 6% below the MRA.	12%	20%
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 March 2015.
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.
3:Percentage of companies under coverage globally within the Short-Term rating category. 4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

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