US Alternative Energy

Compelling Analogy: Hitting the Merchant Uplift?

Equities

Americas
Electric Utilities

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Can solar see the same upswing in Texas that wind has seen? It's coming
Amidst a cloudy backdrop through the medium-term for solar, we see prospects for a merchant driven recovery in solar in the later part of the decade in the Texas market. We emphasize that it is Texas, with its robust wind resource, amenable transmission interconnection policies that really drove the largest single-state growth in Wind of any region. To date, wind has proven the most successful in the state during period of higher power prices and with improving technologies.

What does this mean for Texas? The cycle is capped by solar in two dimensions
We see the power cycle as capped not just in terms of upside to peak power prices (presently at $33.9/MWh in ERCOT-West) but also in terms of when the next power cycle will occur in the state as solar costs continue to decline. We emphasize the total build cost for solar appears to continue to compress towards ~$0.80-90/W by 2020 on a utility-scale basis.

What else is driving wind today? Corporate buyers: solar will benefit too
While difficult to aggregate the day, wind developers estimate ~50% of the wind built to date is under corporate contracts; while informal, we estimate the bulk of this has been done in Texas with the virtual delivery of RECs rather than physical. We suspect this preference for 'economical' wind projects could well shift to solar. We see the ~5-10-year hedges provided to wind developers could well prove the baseline off which to finance low-cost solar. The stability afforded by corporate offtake is likely the 'missing element' ignored by the market in the wind boom ongoing (seemingly unabated in 2015 in Texas despite lower prices).

What does this mean for Power? Still expect boom, but now eventual bust too
We maintain our expectation for conventional capacity to yet exit the ERCOT market through the next 24-month period as assets continue to realize negative FCF. We emphasize robust demand was indeed realized this latest year without corresponding price spikes. We suspect On-Peak power prices are likely capped at ~10% upside as this could accelerate the timeline for new merchant solar entry. We note our latest conf call on the Power outlook flagged off-peak as having the greatest risk due to the continued build out of wind through the medium-term.

Seeing the start of resi solar today too? More ERCOT retailers trying
We flag nascent efforts to kick start solar in the state. We suspect solar is appealing to customers at above-market rates (likely comparable to those who have yet to shop from either large incumbent TXU Energy or Reliant). Further, we suspect the paucity of economics for resi solar to 'work' in Texas is complemented by a desire to enter into a protracted above-market retail contract to serve grid needs and demand response services. We flag SCTY's effort with MP2 Energy as a notable datapoint to this end.

When are the boom years for solar? We expect ~2019/2020 merchant build

We flag the latest PPAs in NV have been signed at $33.99/MWh with a levelized cost of $40/MWh with a 32% capacity factor for delivery in 4Q18. While this project benefits from a 25-year PPA, we see this indicative of real prospects for solar to turn a corner. We estimate even a project with a shorter PPA and reasonable assumptions with low enough build cost (under $1/w) could achieve IRR's in the high single or low double digits *with a tax appetite*. We emphasize even at these low cost levels, $25-30 power pricing on solar can make the economics work – we see sub $1/w utility scale cost for solar as largely achievable in the late 2018/2019 timeframe which should enable more pronounced economic buildout. We make broadband assumptions below, which could indeed prove conservative

Figure 1: Q4'18+ Economics of New Solar (at sub $1/w)

General		Operational		Financing (Initial)		Final Cap Structur	
Total Capacity (MW)	100	PPA Price ($/MWh)	$34	Debt	65%		
Generation (GWh)	280	PPA Duration (Years)	25	Equity	35%		
		PPA Inflator	2%				
		Wholesale Power ($/MV	$25	Debt ($M)	$62	Net Debt	$62
		Opex ($/kW-yr)	$30			Equity	$33
Cost per kW ($/kW)	$950	Capacity Factor	32.0%	($M)	$33		
Construction Cost ($M)	95	Degradation factor	1%	Cost of Debt	7%		
Effective Tax	35%			Debt Tenor	25		
EV/EBITDA	14.5x			FCF Cash Sv	46%	Equity / Ca	35%
						Debt / Ca	65%

Returns	10 Year IRR %	20 Year IRR %	30 Year IRR %
Unlevered IRR	**4.1%**	**10.7%**	**11.9%**
Levered Pre-tax IRR	**-13.6%**	**0.8%**	**4.7%**
Levered After-tax IRR	**8.5%**	**12.5%**	**14.1%**

Source: UBSe

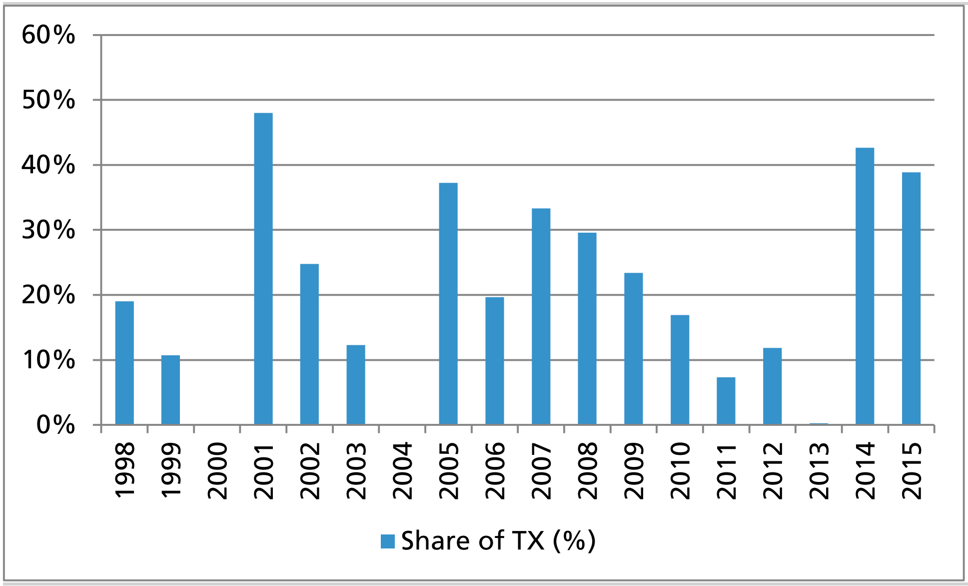
Just how big could this opportunity be?
We see potential for Texas to become the largest (incremental installation) solar state

Just as occurred with wind during its 'boom' year periods (2007-2008 with higher gas) and of late (2014-15 with PTC extension), once this combination of merchant economics is achieved, this could enable the addition of potentially at least ~2GWs of capacity per annum. We suspect this could make Texas the single largest potential development prospect for utility-scale solar. Given the cautious story of greenfield merchant development in the state and limited tax equity appetite for this scale of development, the question is how much of a premium rate of return will developers demand?

How Has Wind Faired in Texas?

In short: incredibly well on a volume basis. We include the per annum growth in Wind in the 2007-2008 boom year below, where its deployment substantially improved due to the gas rally of 2007. The latest peak in 2012, but really in 2014-2015 is driven by continued technology improvement alongside a scaling in corporate procurement activities. Actual Texan installs in a number of years was above 20% pf the market, while more recent data suggests ongoing dominance of Texas wind on an industry-wide basis.

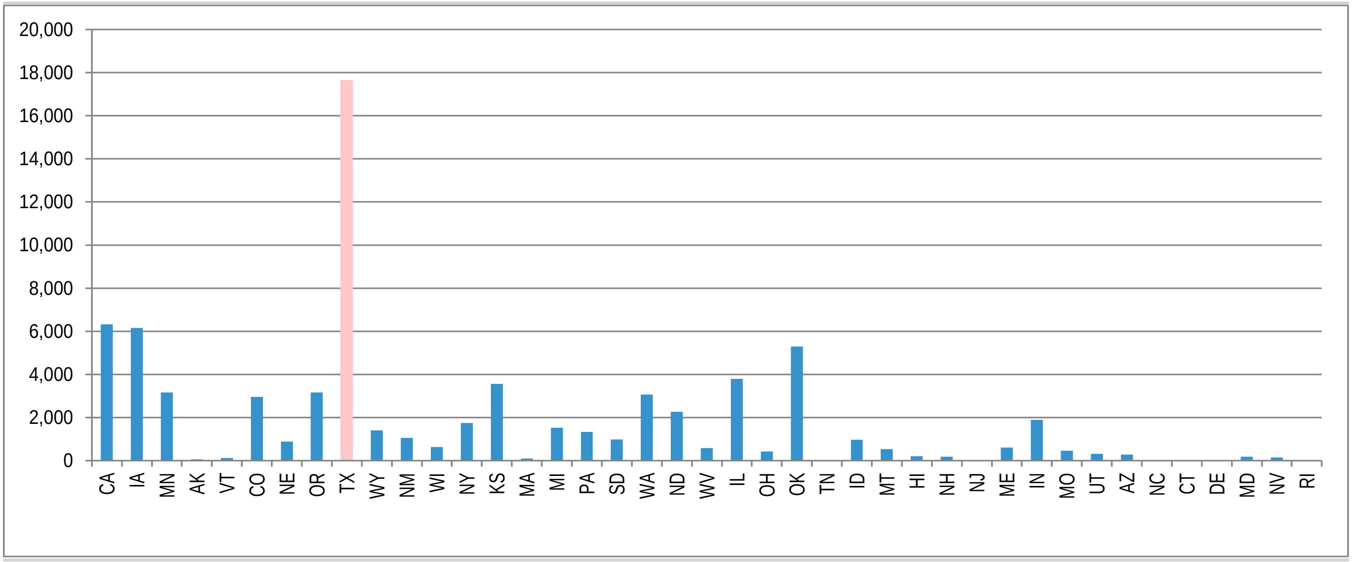
Figure 2: Texas' share of Wind capacity installed (%) since 1998, per annum



Source: SNL

Indeed, this is borne out in the data shown below. Texas remains well above all other states in terms of wind installs, yet we not significant disconnect on the solar side: Texas is ranked as the 10th highest solar capacity state, with only 534MW installed as of Dec 2015 according to the Solar Energy Industry Association (SEIA).

Figure 3: Texas Wind Rules the Roost: Cumulative Installs as of 2015

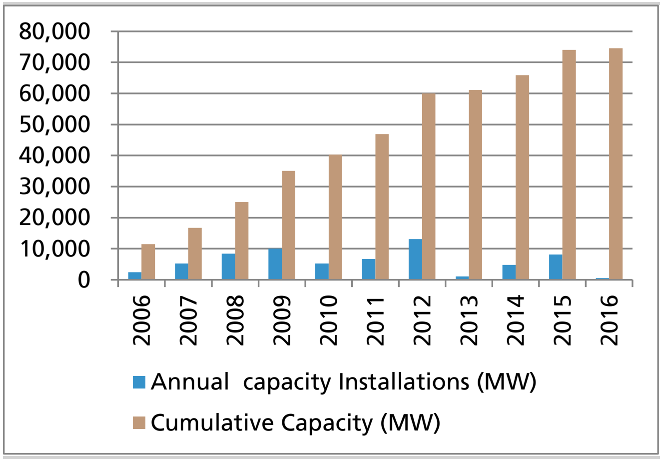


Source: SNL

Looking at Wind in the Aggregate

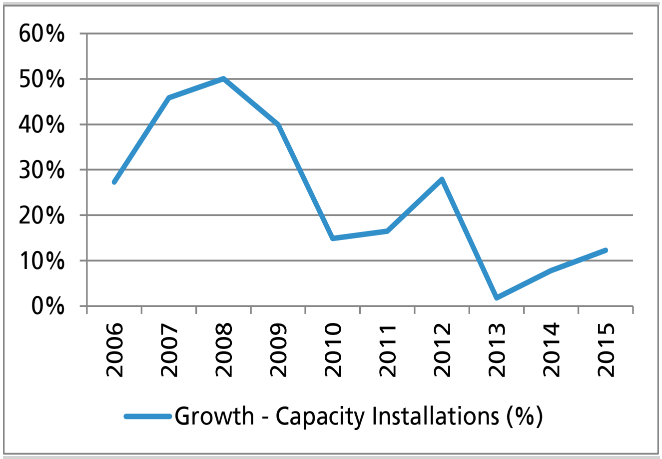
As cumulative wind installations balloon well past the 70GW mark, Texas remains dominant with 20-30% overall market share.

Figure 4: Wind Capacity installation (MW)



Source: AWEA

Figure 5: Wind Capacity Installation growth (%)

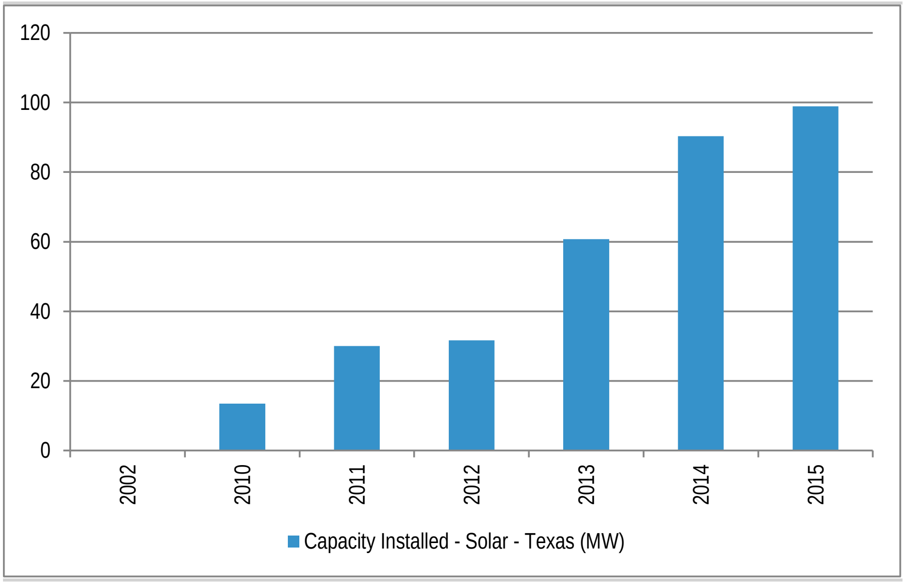


Source: AWEA

By contrast – how has solar faired?

There has been a negligible build out of Solar in ERCOT thus far but is poised to substantially expand in 2016 and 2017 already based on contracts signed with the states' munis/coops (principally CPS, LCRA, and Austin Energy). We suspect 2016 and 2017 build could bring Texas to ~2GW of total capacity. We expect a falloff in the 2018 into 2019, as the uplift from a merchant build is likely biased towards the 2020 timeframe.

Figure 6: Texas Solar installs have grown slowly but steadily



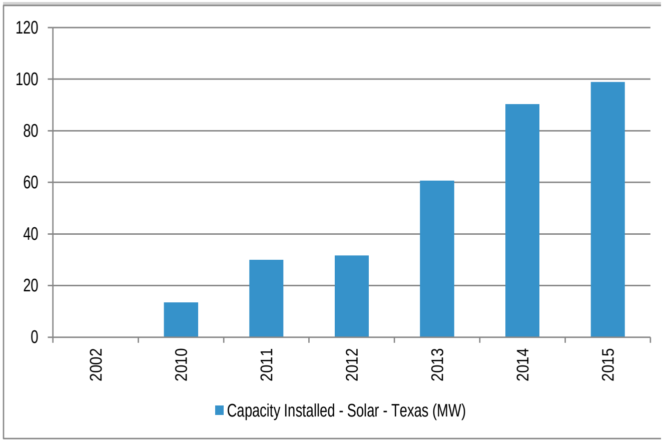
Source: SNL

Figure 7: Texas Solar - capacity installed (MW) – Year Wise

Year	Capacity Installed - Solar - Texas (MW)
2002	0.06
2010	13.5
2011	30
2012	31.7
2013	60.7
2014	90.3
2015	98.9
Total	325.16

Source: SNL

Figure 8: Texas Solar - capacity installed (MW) – Year Wise

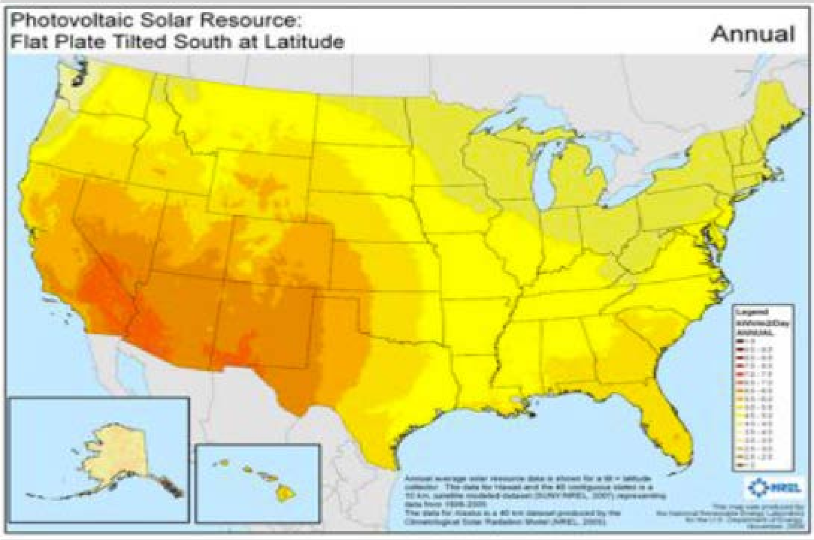


Source: SNL

Solar well suited to pick up day time peak in Texas

Environment concerns via the haze rules and the broader clean power mandates adds to the attractiveness of what is already a naturally well-endowed solar state – it has solar resources both in intensity and in aggregate across the entire state particularly out in West Texas. Most of the peak power demand in Texas arises from residential air-conditioning demand; at a time of the day when solar is well suited to ramp up supply.

Figure 9: US Solar Resource: Abundant supply in Texas



Source: Texas Solar Power Association; slides used on UBS conference call

How will Solar Fair? Picking up Volume from Coal

Coal retirements in ERCOT could drive enough power price recovery that solar + corporate PPA's drive significant growth in the ~2020 timeframe

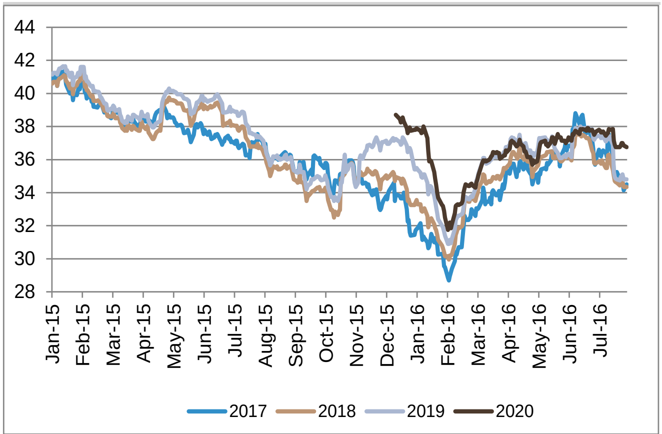
We suspect ERCOT could yet rapidly evolve in the coming year as air quality emission regulations are finalized. Specifically Regional Haze (among others) are poised to be implemented and force a variety of generators to retire (likely even prior to rule implementation as economics remain minimal). We suspect the retirements and the improved sentiment in the market around these events could yet spur the subsequent new entry into the market. As coal units retire, potential power price recovery could in fact be somewhat offset by incremental solar units coming online, particularly in light of 'mini PPA's' with corporate buyers, which could give developers the certainty needed to build projects even in a relatively competitive market like Texas.

Where are on-peak ERCOT power prices?

We emphasize on-peak prices in the key markets of both ERCOT-West as well as closer to urban markets in ERCOT-North remain near the LCOE levels recently signed in Nevada and elsewhere for future delivery. On the other hand, this on-peak price is substantially biased towards scarcity hours in July/August, making them incredibly difficult to predict.

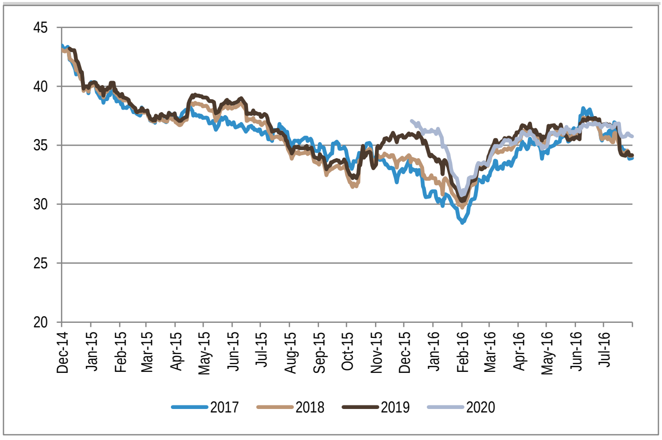
As a further caveat we note that ERCOT On-Peak prices are not directly comparable due to the fact that solar is actually a super-peak product likely garnering premium prices at least for the time being. Akin to wind, risk of overbuild suggests correlations on dispatch could depress realized LMP prices – and create hedging mismatches.

Figure 10: ERCOT North On Peak Power prices ($/MWh)



Source: Platts

Figure 11: ERCOT West On Peak Power prices ($/MWh)



Source: Platts

Could solar be a de-risking product for retailers?

How correlated are scarcity events to high solar intensity?

Among the key questions asked by retailers and industrial buyers alike is how aligned solar dispatch is with the probability for scarcity events in ERCOT. We note the desire to hedge such hours has seemingly proven a key driving factor behind the willingness for NRG and Luminant to maintain otherwise cash flow negative gas steam peaking assets; we suspect paying a 'premium' to hedge this risk beyond the formal on-peak forward could be a further perk. We note in a variety of other markets, renewable penetration has largely decreased peak generation potential, and solar is largely well suited to peak shaving through most of the day, particularly for commercial and industrial users.

With wind generation as a countervailing intermittent source, wind+solar as a total portfolio solution could act as an effective hedge for retailers

While significant solar penetration could well prove problematic in the 'duck curve' sense as seen in California, we note the existing asset base of significant wind resources actually could help to shave peak load during non-solar times and vice versa, so a total portfolio approach to renewable ownership in Texas paired with retail businesses could prove to be an effective hedge.

Will this happen in West Texas? Transmission unclear.

While ERCOT has generally accommodative policies around generator interconnection cost allocation that has generally made rural development of resources readily achievable, we caution that with the filling of the Competitive Renewable Energy Zones (CREZ) in West Texas, solar development could well be stymied in this region despite offering the best capacity factors and better peak-load alignment (as peak coincidence occurs slightly later than in the Eastern portion of the state). We note Texas has capacity factors in the far eastern portion of the state akin to the Desert Southwest. However, a 'CREZ 2' or similar project could well prove palatable if solar is able to reach cost structures supportive of $20-25/MWh energy production from solar.

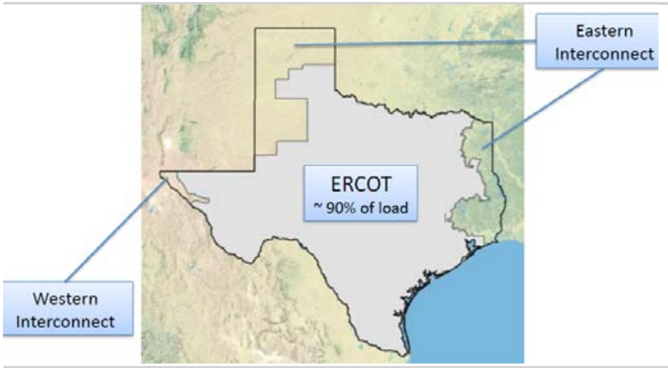
Market driven growth rather than policy driven so far

Critical here from a future growth perspective is that Texas does not have state level policy that is dictating growth - there's no solar renewable portfolio standard, no statewide incentives; growth has not been premised on a top-down policy approach, rather prospects for development remain primarily related to market- and customer driven demand. While much of the existing development has come from the muni-and coop community tied to the Austin and San Antonio (CPS), we suspect future development will shift. There is also innovation in both the competitive choice area and the municipal coop area - in the CPS area the rebate program has been extended and are also exploring a new rooftop ownership program where CPS Energy will own customer sided rooftop residential installations and essentially lease rooftop space from customers (a new development for Texas). On the competitive choice area TXU Energy has partnered with SunPower and MP2 and some other retail providers are starting to compete for solar customers. The TXU Solar will come with a solar buyback tariff that provides an opportunity to sell excess generation back, emulating net metering.

Texas – several markets in one

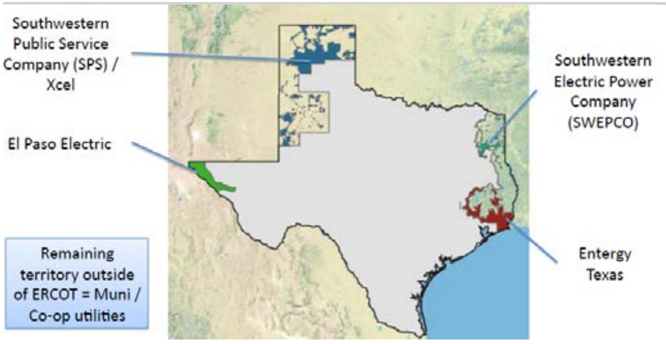
A key point is that from an analytical perspective Texas is broken down into several smaller markets given several non-homogenous variables: on the broadest level there is the ERCOT and outside-of-ERCOT with the grid interconnections. Even within ERCOT there are both municipal and co-ops in the vertically integrated space; and there are the competitive choice areas as well. Breaking that down even further within the public power space there are 70 plus muni utilities, 70 plus coop utilities that are still vertically integrated and the competitive retail area where retail providers (TXU, Reliant, Direct Energy, MP2 and others) competitively serve retail load. And then breaking that area down even further there are the transmission and distribution utilities - Oncor in the Dallas area, CenterPoint in the Houston area and several others.

Figure 12: ERCOT Interconnects



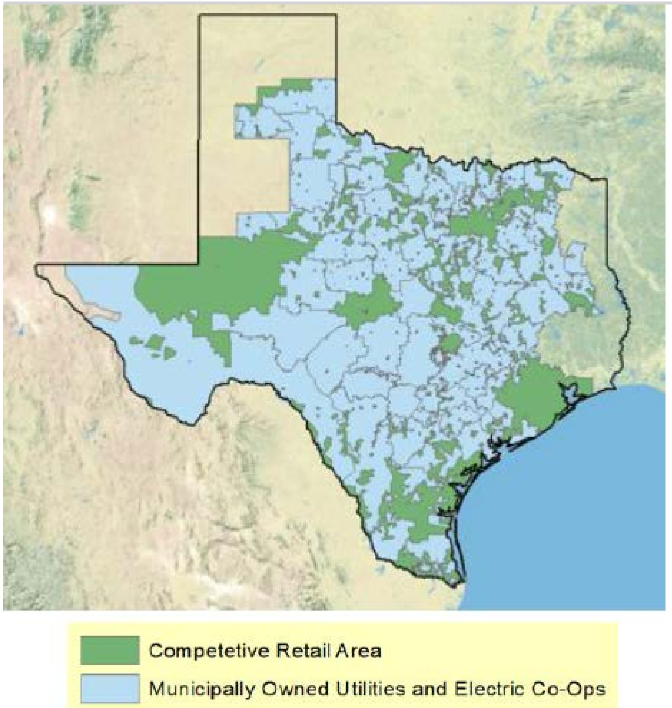
Source: Texas Solar Power Association; slides used on UBS conference call

Figure 13: Utilities outside of ERCOT



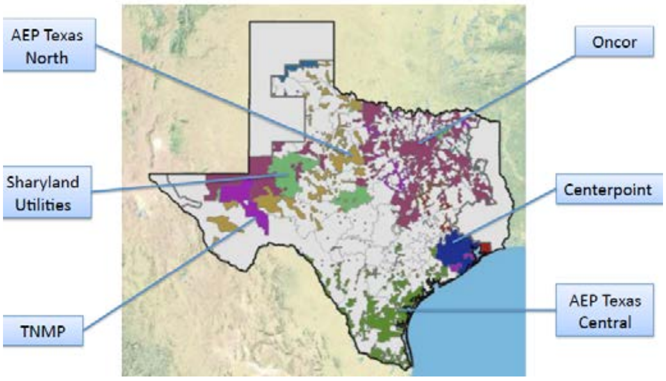
Source: Texas Solar Power Association; slides used on UBS conference call

Figure 14: Competitive retail areas inside ERCOT



Source: Texas Solar Power Association; slides used on UBS conference call

Figure 15: Competitive Retail Area: T&D providers



Source: Texas Solar Power Association; slides used on UBS conference call

We highlight further Solar + Texas Notes below

Sun Shine in Texas (Call Transcript)

Merchant Solar Arrives in Texas

Sun Shine in Texas

ERCOT: A Solar Eclipse?

Valuation Method and Risk Statement

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 Integrateds. 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.

Solar sector risks include : 1)Solar panel and other input pricing is subject to ongoing price deflation, which affects economics of downstream projects and margins of upstream producers. 2) Government incentives being added or removed have had a disproportionate effect on demand in the past, and may continue to 3) reliance on power purchase agreements in electricity markets could make future contracts more difficult to sign 4) solar power is directly competing with other traditional generators as well as other renewables like wind, which creates uncertainty as wholesale power markets shift 5)Headline risk and policy risk continue to shift economics in countries as trade policies and changes to other key policies affect solar economics.

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Sell	FSR is > 6% below the MRA.	15%	21%
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Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

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