

US Electric Utilities & IPPs

Sunrise in Texas

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Texas solar growing with city initiatives, mostly at utility scale

With about 211 MW of operating utility scale solar in the state, another 1.1 GW either under construction in development, and another 1.5 GW planned under city initiatives in San Antonio and Austin, Texas is currently the 5th largest state for large-scale solar and growing. In comparison, distributed rooftop solar is relatively uncompetitive against low Texas retail rates and remains a much more muted player. As an arid desert region, scarcity of water encourages the development of photovoltaic (PV) systems over tower and other hydro-intensive solar resources.

Low energy prices in ERCOT unlikely to drive many projects without PPAs

While TX has no formal RPS, we see individual utility ambitions to ramp up renewable procurement as the biggest risk, with counterparties willing to offer long-term contracts as well as above-market economics. Notably, First Solar's recent effort to run a small 18-MW merchant solar facility in Pecos (West Texas) is an initial foray in determining market feasibility, with another 26 MW expansion planned (contracts still a possibility). It's unlikely to be in-the-money on current ERCOT energy spot prices, but the move is not entirely surprising given the unusually low \$0.05/kWh PPA recently signed between developer Recurrent Energy and utility Austin Energy for a 150 MW project over 20 years (it remains to be seen whether the project ultimately comes to fruition).

San Antonio and Austin leading the way with 2/3 of TX solar build

CPS Energy, the utility serving San Antonio and surrounding areas, currently has about 140 MW of utility scale solar operating with development plans for over 300 MW more through 2016. The city and utility plan to achieve the goal of 20% renewables, or 1,500 MW, by 2020, including its existing 1,059 MW of wind and 140 MW of operating solar. Another 315 MW are either under construction or planned as part of the Alamo Solar Farm contract with OCI Solar Power to build a total of 400 MW in phases through 2016. In late August 2014, the Austin city council passed a resolution calling for a 50% renewables target by 2020 and 65% by 2025, specifically calling for the replacement of output from the 927-MW Decker Creek gas peaker with 600 MW of new utility scale solar by 2017. It also calls for increasing the goal for locally-sourced solar from 100 MW to 200 MW by 2020, with at least 100 MW from behind-the-meter distributed generation (DG). In total, we estimate both cities combined have 1.1 GW of utility-scale solar either in operation or planned through 2020, about 64% of the 1.7 GW for all of Texas. Furthermore, the Austin resolution calls for the deployment and use of distribution-level and transmission-level storage technologies with a target of at least of 200 MW of fast response storage resources by 2024. Going forward we see 400 MW of new solar being solicited in utility RFPs, with formal announcements expected in early 2015.

Solar threatens to siphon off conventional peaker revenues

Whereas high levels of wind penetration have tended to depress off-peak pricing (wind runs best at night) and baseload generation revenues, solar presents the opposite threat as it essentially shaves peak load with zero marginal cost power. Increasing levels of penetration could eventually pose an economic risk to conventional gas-fired peakers in the same way that wind has threatened nuclear revenues in the Midwest. However, we note that solar penetration only reached 0.1% of total Texas retail sales in 2013 and we estimate it will only grow to about 1.5% by 2020 based on current development plans. While solar is clearly not economic on a merchant basis, we see efforts city initiatives as a further modest negative to the market looking into 2015.

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Austin's 600-MW plan driving the interconnection queue for now

Many projects are currently hitting the ERCOT interconnection queue, primarily for two reasons: (1) Austin's call for 600 MW of utility scale solar by 2017 (similar to the earlier push driven by CPS's 400 MW Alamo project that both ED and DUK had participated in), and (2) developers squeezing projects into investment tax credit (ITC) eligibility. Our impression is that a reduction or elimination of the ITC would put the brakes on utility-scale solar almost everywhere, but with its expiration contemplated for yearend 2016, any procurement efforts are likely to be expedited in 2015, with formal announcements likely in 1Q15.

Timing for a larger RFP appears focused on 1Q15

Another chunky solar deal would could make it an investor worry

Merchant solar taking a crack at the market – but with a loss-leader

First Solar's Barilla merchant solar project currently stands at 18 MW and is more or less a research and development effort for the company as they use the plant to develop operating and scheduling procedures, learn the ERCOT integration process, and test the ability to run a solar project on realtime pricing without a PPA. Another 26 MW expansion is planned as well. The plant sits in West Texas, enjoying the most favorable solar conditions in the state given that atmospheric moisture levels (cloud cover) decline uniformly with distance from the Gulf Coast. However, even with the current low capital cost for solar around \$1.50-\$2.00/watt and the preferred location, we are doubtful that merchant solar can stay above water in the competitive low-priced ERCOT market. To illustrate, as we noted above, press reports indicated an unusually low \$0.05/kWh PPA for the 150-MW Recurrent Energy project proposed for Austin Energy. We believe at that price, it remains to be seen whether the project can actually be viable and attract the necessary financing to begin construction.

We don't expect more merchant solar yet

Figure 1: Major Texas Utility-Scale Solar Projects, Operating and Announced

Developer	Status	Project Name	City/County	Date	MWs	PPA	PPA Date
<u>San Antonio Vision 2020 goal of 1,500 MW of renewable energy by the year 2020, including 1,059 MW of existing wind.</u>							
Duke Energy Renewables	Operating	Blue Wing Solar Project	San Antonio	11/1/2010	14.0	CPS Energy (Muni)	2040
SunEdison	Operating	Centennial Solar Farms 1	San Antonio	4/1/2012	20.0	CPS Energy (Muni)	2037
SunEdison	Operating	Centennial Solar Farms 2	San Antonio	4/1/2012	10.0	CPS Energy (Muni)	2037
SunEdison	Operating	Somerset Solar Farm	Somerset	8/1/2012	11.0	CPS Energy (Muni)	2037
OCI Solar Power	Operating	Alamo Solar Farm 1	San Antonio	12/1/2013	41.0	CPS Energy (Muni)	2039
OCI Solar Power	Operating	Alamo Solar Farm 2	San Antonio	3/12/2014	4.4	CPS Energy (Muni)	2039
OCI Solar Power/ConEd	Operating	Alamo Solar Farm 4	Bracketville	8/14/2014	39.6	CPS Energy (Muni)	2039
OCI Solar Power	Under Construction	Alamo Solar Farm 3	San Antonio	2016	5.5	CPS Energy (Muni)	2039
OCI Solar Power	Under Development	Alamo Solar Farm 5	Uvalde	2016	100.0	CPS Energy (Muni)	2039
OCI Solar Power	Under Development	Alamo Solar Farm Remaining (400 MW tota	San Antonio	2016	209.5	CPS Energy (Muni)	2039
<u>Austin resolution to source 65% of power from renewables by 2025, including 600 MW of utility-scale solar by 2017</u>							
MetLife Inc./Longsol Holdings U	Operating	FRV AE Solar Plant (Webberville Solar)	Travis County	12/31/2011	30.0	Austin Energy	2036
Phono Solar	Operating	Pflugerville School District Solar Project	Austin	11/18/2014	1.9	Pflugerville	2039
RRE Austin Solar/Panasonic Eni	Under Construction	Pflugerville Solar Power Plant	Pflugerville	2014-2015	48.0	Pflugerville	2044
Recurrent Energy	Under Development	Recurrent Energy Project	Austin	2016	150.0	AE (\$50/MWh)	2036
TBD	Under Development	Remaining 600 MW commitment	Austin	2020	370.0	Austin Energy	TBD
<u>Other Texas PPAs</u>							
Chevron Energy Solutions (& Su	Operating	Acacia Solar Farm	Presidio County	9/4/2013	10.0	Bryan Texas Utilities	2038
Hannon Strong Solar LLC	Operating	Fort Bliss Solar 1	El Paso	4/1/2013	1.4	US Army	
NRG Energy	Operating	Wharton Generating Station	Houston	2010	10.0	Houston	2035
PSEG Solar Source LLC (& Juwi	Under Construction	PSEG El Paso Solar Energy Center	El Paso		13.0	El Paso Electric	2044
El Paso Electric/US Army	Under Development	Fort Bliss Solar 2	El Paso		20.0	US Army	
Element Power	Under Development	Alpine Solar Farm 1	Presidio	2016	50.0	N/A	
Element Power	Under Development	Alpine Solar Farm 2	Presidio	2016	50.0	N/A	
Lower Colorado River Authority (Under Development	RFP for 50 MW solar power	Austin, LCR		50.0	LCRA	
Georgetown Utility Systems	Under Development	RFP for up to 150 MW of solar power		2016	150.0	Georgetown Utility	
Xcel Energy (SPS)	Under Development	RFP seeking up to 200 MW of solar	Panhandle/S.Plains	2016	200.0	SPS	
<u>Merchant Solar - First merchant projects in the state; starting small to test the market and is open to selling the project at some point in the future</u>							
First Solar	Operating	Barilla Solar Project Phase 1	Pecos	9/14/2014	18.0	Merchant	
First Solar	Under Development	Barilla Solar Project Phase 2	Pecos		26.0	Merchant	
Total					1,653.3		

Source: Solar Energy Industries Association, SNL, Press reports, Company filings, UBS Estimates

Utility RFPs becoming a stronger driver going forward

Requests for proposals (RFP) of 50 MW solar for the Lower Colorado River Authority (LCRA), 150 MW for Georgetown Utility Systems, and 200 MW for XEL's Southwest Public Service should result in formal shortlistings and announcements in 1H15. This first 400-MW batch of formal RFP's represents 24% of the total 1.7 GW operating and planned utility scale solar in Texas.

Time remains of the essence with ITC expiration by year end 2015

Figure 2: Major Solar Project Capacity by State and Project Completion Status (MW)

State	Operating	Under Construction	Under Development	Grand Total
AL			8	8
AZ	1,307	388	1,844	3,539
CA	4,992	2,006	16,095	23,093
CO	109		437	546
CT	11	5	20	36
DE	29			29
FL	137	100	904	1,141
GA	69		130	199
HI	28	36	20	84
ID		20	391	411
IL	33		10	43
IN	41		10	51
KY	2			2
MA	186	14	37	237
MD	41		25	66
MN	2		12	14
MO	8		14	22
NC	394	109	3,221	3,724
NH			1	1
NJ	170	33	134	337
NM	247	2	451	700
NV	477	942	1,514	2,933
NY	46	9	20	75
OH	40		68	108
OR	10			10
PA	29		20	49
PR			30	30
RI	9			9
SC	3			3
TN	18		33	51
TX	211	67	1,376	1,653
UT	2		825	827
VT	19	2	5	26
WA			75	75
WI	1			1
Other	6		106	112
Grand Total	8,646	3,734	27,320	39,699

Source: Solar Energy Industries Association, UBSe

Figure 3: Solar PV Energy Growth (MW) and Penetration Rates in Top 25 States

State	Total Solar PV Installed 2010	Total Solar PV Installed 2013	% of Total 2012 MWhs from PV	CAGR 2010 2013
CA	1,022	5,183	2.8%	72%
AZ	110	1,563	3.2%	142%
NJ	260	1,185	1.8%	66%
NC	40	469	0.5%	127%
MA	38	445	0.9%	127%
NV	105	424	1.8%	59%
CO	121	360	0.9%	44%
HI	45	358	4.6%	100%
NM	43	257	1.7%	81%
NY	56	241	0.2%	63%
TX	35	211	0.1%	83%
PA	55	180	0.1%	49%
MD	11	175	0.3%	152%
FL	74	137	0.1%	23%
GE	2	110	0.1%	294%
OH	21	98	0.1%	68%
CT	25	77	0.3%	46%
TN	5	65	0.1%	140%
DE	6	63	0.6%	124%
OR	24	63	0.1%	38%
IN	1	49	0.1%	362%
MO	1	49	0.1%	312%
LA	0	47	0.1%	515%
IL	16	43	0.0%	41%
VT	3	42	0.8%	143%
Grand Total	8,646	3,734		

Source: Solar Energy Industries Association, UBSe

Solar will depend on mandates as ERCOT reserve margins look healthy

As we noted in our recent report "[Texas: New Supply Keeps Coming](#)", the latest CDR report from ERCOT forecasted significantly higher reserve margins vs the earlier May report, with an 18.1% margin by 2017 (vs 13.8% in the May report). We remain concerned about a continued onslaught of new build projects in the Texas market, including 1.56 GW of gas capacity. In this environment, we see solar more dependent than ever on state and city mandates, which do in fact appear to be coming. The resulting peak shaving that we expect to occur as a result of deeper solar penetration should provide even further distress to conventional peaker assets as well. *We see the threat from more gas generation as a much greater threat than solar – more solar simply adds to our concerns.*

Solar could provide a good physical hedge to scarcity events though

With non-regulated retailers having been harmed by exposure to scarcity events during periods of hot weather in Texas in recent years, we note that solar power supplies could provide a natural physical hedge that provides cheap power exactly when it's most needed. Even without any direct ownership (or a PPA), a retailer could still benefit from the effect of peak shaving throughout the system.

Calculating the Potential Economics of the 5c Texas Solar PPA

We include below a brief calculation of the potential economics of the Recurrent-Austin Energy deal (using input and model assumptions based on publicly available information, press reports and UBS estimates stemming from our industry coverage and company comparables), indicating an 11% levered return profile on a \$1,750/kW capital cost, and a 5% unlevered return (at the bottom end of current estimates of returns on this infrastructure – and confirming a continued trend in the sector). Capital cost is uncertain as it depends on module procurement (i.e. thin film and FSLR v. Chinese modules), and our \$1,750/kW assumption could yet see further compression (to as low ~\$1,500/kW). Generally speaking, the most significant variables remain interconnection cost and associated capacity factor, although interconnection is negligible for most Texas projects as they are virtually all utility-sponsored, with generation interconnection costs passed through (socialized).

Figure 4: Generic Calculation of the Potential Economics for Austin Energy – Recurrent Energy Deal

Inputs								
General			Operational			Financing		
Mega Watts (AC)	150		Rev / kWh	\$0.050		Debt	61%	
Annual GWH Produced	434		OpEx / Year	\$ 2 MM		Total \$	\$ 208 MM	
Effective Tax	35%		OpEx / kWh	\$0.005		Rate	6%	
Investor IRR	11.23%		Cap Factor	33%		Tenor	25	
System Price/W	\$1.75		Degradation factor	1%		Equity	39%	
Cash Grant	\$102.38					Total \$	\$ 133 MM	
Total Sale Price	\$ 341 MM		Levered IRR	11.12%		Debt Service Coverage Ratio Target	1.30	
Op Model								
MM \$ (except where noted otherwise)								
Year	Sum	2014	2015	2016	2017	2018	2019	2020
\$ / kWh	0.05	0.00	0.00	0.05	0.05	0.05	0.05	0.05
GWH	10,816	0.00	0.00	216.81	433.62	431.45	429.29	427.15
Revenue (operational)	541	0.00	0.00	10.84	21.68	21.57	21.46	21.36
Operational Expense	57	0.00	0.00	1.08	2.17	2.17	2.17	2.17
EBITDA	483	0.00	0.00	9.76	19.51	19.40	19.30	19.19
Depreciation	(290)	0.00	0.00	(29.01)	(29.01)	(92.82)	(55.69)	(33.42)
EBIT	193	0.00	0.00	(19.25)	(9.49)	(73.42)	(36.40)	(14.23)
Interest	(181)	0.00	(12.50)	(10.93)	(10.68)	(10.43)	(10.16)	(9.88)
EBT	(5)	0.00	(12.50)	(30.17)	(20.17)	(83.84)	(46.56)	(24.11)
Taxes Reduction (Expense)	(4)	0.00	4.38	10.56	7.06	29.34	16.29	8.44
Cash Grant	102		51.19	51.19	0.00	0.00	0.00	0.00
Debt Service	(382)	0.00	38.76	15.01	14.93	14.84	14.76	14.68
Equity Investment	(133)	0	(133)	0.00	0.00	0.00	0.00	0.00
Pre Tax Cash Flow	33	0.00	(120.48)	45.93	4.59	4.56	4.54	4.51
After Tax Cash Flow	28	0.00	(116.10)	56.50	11.65	33.91	20.83	12.95
Unlevered Tax Cash Flow			(446.35)	82.43	37.25	59.17	45.75	37.51
Unlevered After-Tax Cash Flow	5%							
Levered IRR after tax	11%							

Source: Company reports, press reports, and UBS estimates (inputs stemming from our industry coverage and company comparables)

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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Neutral	FSR is between -6% and 6% of the MRA.	42%	28%
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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.	less than 1%	less than 1%

Source: UBS. Rating allocations are as of 30 September 2014.

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Company Name	Reuters	12-month rating	Short-term rating	Price	Price date
Consolidated Edison ¹⁶	ED.N	Sell	N/A	US\$63.91	08 Dec 2014
Duke Energy ^{2, 4, 5, 6, 16}	DUK.N	Buy	N/A	US\$81.63	08 Dec 2014
First Solar Inc ^{13, 16}	FSLR.O	Neutral	N/A	US\$44.65	08 Dec 2014
Xcel Energy Inc. ^{6, 16}	XEL.N	Neutral	N/A	US\$34.89	08 Dec 2014

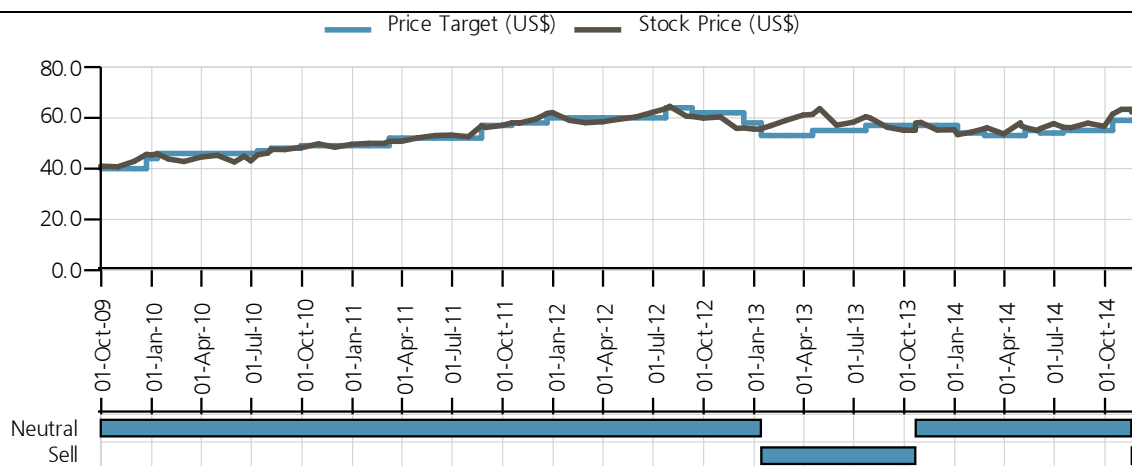
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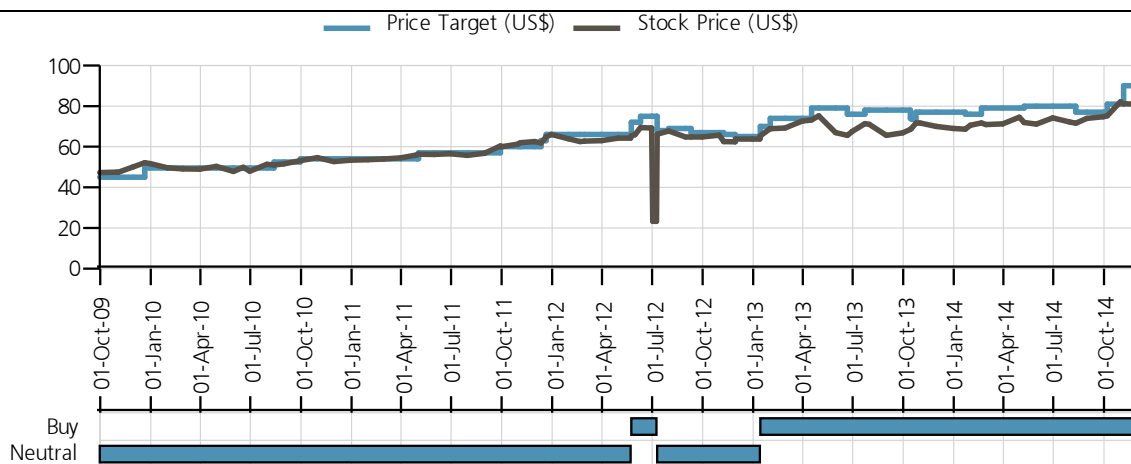
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Consolidated Edison (US\$)



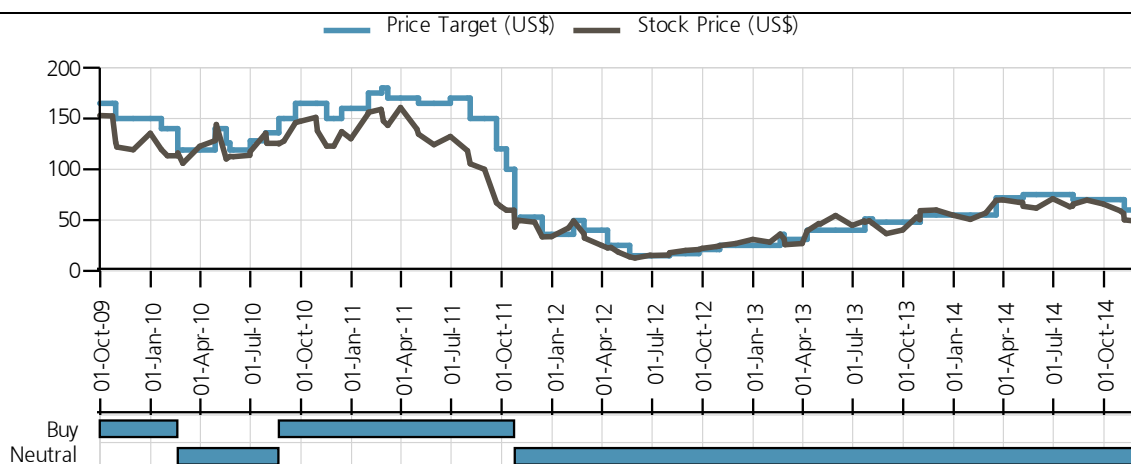
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Duke Energy (US\$)



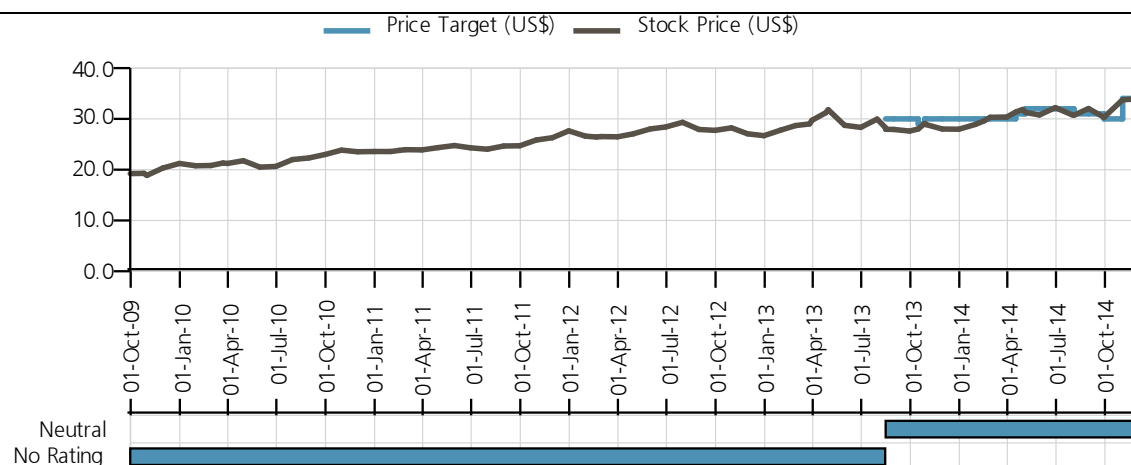
Source: UBS; as of 08 Dec 2014

First Solar Inc (US\$)



Source: UBS; as of 08 Dec 2014

Xcel Energy Inc. (US\$)



Source: UBS; as of 08 Dec 2014

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