Options Going Forward on Additional Solar for Austin Energy

A Brief Report on Proposed Solar Contract

August 2015

On December 11th, 2014, the Austin City Council approved the Austin Energy Generation Resource Plan for 2025. The Generation Plan sets ambitious goals and procedures for getting to more than 55% renewable energy, as well as specific goals for solar energy, energy storage, demand response and energy efficiency and a phase-out of the use of coal. In particular, the Generation Plan set a goal of obtaining 750 MWs of utility-scale non-local solar by 2025. Since Austin Energy has already contracted for 150 MWs of solar through a contract with Recurrent Energy – approved by the previous City Council -- one of the first steps in the Generation Plan was to seek out current utility-scale solar prices and offers by issuing an RFP for solar for up to 600 MWs of additional solar.

While the generation plan commits Austin Energy to getting an additional 600 MWs of utility-scale solar, the plan does not commit Austin Energy to procuring all of this additional power at once; Austin Energy has discretion on timing contingent upon affordability and availability. Essentially, the plan says if it is affordable and available then get it by 2017, but if is not available and affordable, phase in its procurement over the next ten years.

To gauge solar's affordability and availability, City Council directed Austin Energy to issue a solar RFP in April of this year. The results are impressive. AE received bids totaling some 8,000 MWs of solar capacity being offered in May of this year, much of it at attractive prices. Indeed, some 1295 MWs were offered at prices below the historic agreement with Recurrent Energy of roughly $50 dollars per MWh or below – historically low prices for utility-scale solar. Indeed, Austin Energy is showing that much of the prices came in at levels below $40 per MWh. Considering that Austin's existing contract for 150 MWs of solar will cost roughly $48-$50 per MWh, the $10 per MWh lower price is on the order of a 20% decline in prices in the span of roughly 18 months.

Austin Energy – and by extension City Council –have the opportunity to decide how much of our 600 MWs goal to secure through the current RFP. In particular, the Electric Utility Commission is scheduled to consider approving a resolution urging City Council to direct Austin Energy to go ahead and obtain all 600 MWs sooner rather than later. Whether or not the EUC and/or the Resource Management Commission recommends such an action, some basic questions remain.

- Is it best to get all 600 MWs at historically low prices and attractive federal tax credits that may well be reduced from 30 percent to 10 percent after 2016?
- Would it be better to get some amount now – such as 200 MWs -- and get the rest later when solar prices might well go even lower? This choice would hedge against the risk of locking in contractual prices which could fall significantly in the future, as they have been prone to do.
- Is it best to do a combination – contract and lock in a significant amount now such as 400 MWs and phase in construction as market prices rise -- but leave the potential for actual ownership or future contracts later on?

While Sierra Club has not taken a position on the best approach, we thought it might make sense to lay out the risks and rewards of different options. In addition, other perspectives on how best to measure the risks and rewards of a large solar purchase should be explored, including the EUC, RMC, Austin Energy, and Navigant, the third-party firm contracted to assess the wisdom of our generation plan.

Methodological Issues

There is debate about what is the best methodology for figuring the costs and revenues of a solar Power Purchase Agreement.

There is a more simplified methodology which is the one Austin Energy utilizes because the utility believes it is more reflective of the ERCOT market, and a more comprehensive methodology endorsed by the Generation Resource Planning Task Force in 2014, which attempts to consider what other changes might occur in the way Austin Energy runs its generation resources as it adds solar as well as the differences between the prices where the solar power is produced and the price we pay at the load zone here in Austin. The first methodology is perhaps limited but easier to predict; the second may be more accurate, but is harder to predict.

The first more simplified methodology simply looks at the revenues gained by a solar PPA at the node in which the energy is generated – that is the LMP –minus the cost of paying the PPA to the solar developer. A positive number of a month or year earns money for Austin Energy customers, while a negative number costs Austin Energy customers. It is important to state that that is the way we calculate the annual Power Supply Adjustment – revenues minus costs for all of our renewable contracts. It is also important to note that such a methodology makes no assumptions about how adding the resource would influence how other plants would be run by Austin Energy as a result. Thus, it assumes that for example the gas plants would run exactly the same way even with the additional solar generation.

A more complex methodology looks not only at the market LMP price and the contract price, but also the load zone price that Austin Energy must pay for the power used, as well as to what Austin Energy (and its customers) would have paid to run others plants or bought power off of the market in the absence of relying on the solar power plants. In other words, comparing the cost of providing power with the solar PPA versus providing the power through other means such as running our own power plants more or buying off the market. Essentially, this methodology argues the power you produce from solar in West Texas you buy back at the retrieval price in Austin Energy's load zone, and that difference between the LMP in West Texas and the load zone price in Austin is what is most important, along with the PPA price and what you would have paid to run a plant locally, such as the Decker plants.

What makes this methodology complex however, of course, is it hard to predict exactly how Austin Energy would have changed its generation decisions absent such a power purchase. Still, it is worth considering the benefits of gas and or coal savings from increasing the amount of solar generation.

In this analysis in this white paper we have relied mainly on the simpler methodology that is more reflective of how Austin Energy calculates the Power Supply Adjustment that most Austin Energy electric consumers pay, while acknowledging it most likely undervalues the true benefits of the solar PPA. Still, we have tried to point out that most likely, a large solar purchase would lower the need to run the gas plants, or lower purchases off the market, leading to some significant savings in fuel and operations costs.

This is not to say that Austin Energy would not utilize its gas plants at all, or still might not to consider additional gas as it begins to phase out the use of our coal resource, which continues to be our single largest generation source. Thus, we should be clear that a decision to go big on solar does not immediately eliminate the need for gas (or coal) in our generation portfolio, but it does indicate that the more inefficient gas plants in Austin Energy's portfolio might be less likely to run if a large solar PPA were providing power at peak times.

Getting it all now: What are the risks and rewards of getting all 600 MWs of solar by the end of 2016?

Austin Energy reports that it received more than 1200 MWs of solar for a price of less than $50 per MWh. While the exact prices are not available, assuming that Austin Energy could obtain all 600 MWs contemplated at a price of $38 per MWh – similar to a recent contract signed by Nevada Power with First Solar -- and assuming an annual capacity figure of the solar plant of roughly 32.5 percent, securing the capacity of the 600 MWs of solar would cost roughly $65 million per year.

Would this be a good deal for Austin? It depends. Using again the more simplified methodology, and the one Austin Energy uses to figure the impact of the solar PPA on the Power Supply Adjustment, it depends on market price at the node in which the solar is inserted into the grid. If the market price is above $38 per MWh when the solar plant is producing in West Texas than it is a good deal for Austin ratepayers. If average market prices are below $38 per MWh then the solar plant would "cost" ratepayers. Austin Energy ratepayers pay for renewable contracts through the PSA – Power Supply Adjustment – but are also credited any revenue generated by those renewable contracts, so market prices ultimately determine whether a PPA will cost or benefit ratepayers.

Because the solar plant will operate for at least 20 years, securing power for 20 years at a price that is roughly equivalent to recent market prices should be a good long-term deal for Austin Energy and its ratepayers regardless of how much we contract. There are other benefits as well – essentially the solar contract has little risk since we only pay for energy produced and that price stays constant, whether or not inflation or gas prices would normally send prices higher. Essentially, the solar RFP is a good hedge against rising prices. Most analysts agree that long-term energy prices will rise, and that gas prices – which largely determine average power prices in ERCOT – will as well. Thus, investments in solar for a vertically-integrated utility like Austin Energy with a growing population, are a good idea.

Short-term it may not be as clear.

Predicting future prices in ERCOT is not easy. ERCOT does not publish or predict future prices except through its long-term study, which is essentially scenario planning. ERCOT is currently revising its Long-Term Study Forecast prices, but those prices will not be available until late this year. However, even its long-term study prices only consider an overall ERCOT wholesale price, and do not differentiate by geographic area, even though prices in ERCOT can vary widely by location, as well as by time of day and month.

Some energy analysts do provide predictions of shorter term prices. Thus, UBS is predicting that ERCOT prices will remain stable for several years and will not see major changes. Another analyst, SNL, is an industry consultant and analyst that performs shorter-term predictions of prices in ERCOT. Based upon the most recent analysis, over the next five years, the solar price secured by the solar RFP – while a historical low – would generally be above average wholesale market prices for West Texas in most months. There would be times during peak summer periods when the solar plant would make money for Austin Energy, but in general, over the five year period between July of 2015 and June of 2022, the solar plant could cost Austin ratepayers a slight increase in the PSA.

Table 1 shows this simplified experiment. Again, however, it is important to note that this analysis assumes no savings from running our gas (or coal) plants less, and no difference between what we pay in the load zone versus the money generated by the solar

plant. In addition, assuming average peak prices some 71 percent of the time most likely underestimates the higher peak prices earned in certain hours. Thus, information provided by Austin Energy indicates that a solar plant in West Texas would run at its highest capacity between 1 PM and 6 PM, precisely when prices tend to be highest. Thus, in Table 1, we have assumed that a solar plant would only earn the average peak price during the weekdays and the off-peak price during the weekend. In Table 3, we "corrected" this by adding a solar bump-up of 17.5 percent to better represent the more valuable hours even within the peak time when a solar plant would operate more. Austin Energy has analyzed recent prices in West Texas and found that on average the solar profile of a West Texas plant earns 33 percent more than average prices, and about 17 percent more than average peak prices. This makes the solar plant on average a slight winner for Austin ratepayers, even at these low nodal prices. Thus, Table 3 attempts to represent the higher value at peak times that a solar plant would actually run shows that in most years a solar plant of 600 MWs would earn money for Austin ratepayers.

Table 1. Expected Costs and Revenues of a 600 MW Solar Plant at $38 per MWh in West Texas Assuming Average Peak and Non-Peak Prices

Term	**SNL On-Peak West**	***SNL Off-Peak West***	**Average Price: 71.4% On-Peak and 28.6% Off-Peak**	**Solar MWhs from 600 MWs**	**Total Revenue**	**Total Cost at $38 per MWh**	**Total Cost/Benefit**	**Annual Cost**
Jul-15	35.41	22.78	31.79782	142848	$4,542,254.99	$5,428,224.00	-$885,969.01	
Aug-15	44.02	22.32	37.8138	156240	$5,908,028.11	$5,937,120.00	-$29,091.89	
Sep-15	30.10	21.18	27.54888	138240	$3,808,357.17	$5,253,120.00	-$1,444,762.83	
Oct-15	27.79	20.69	25.7594	142848	$3,679,678.77	$5,428,224.00	-$1,748,545.23	
Nov-15	27.04	21.30	25.39836	133920	$3,401,348.37	$5,088,960.00	-$1,687,611.63	
Dec-15	27.47	21.14	25.65962	133920	$3,436,336.31	$5,088,960.00	-$1,652,623.69	
Jan-16	30.07	24.73	28.54276	138384	$3,949,861.30	$5,258,592.00	-$1,308,730.70	
Feb-16	30.47	24.83	28.85696	129024	$3,723,240.41	$4,902,912.00	-$1,179,671.59	
Mar-16	29.36	21.39	27.08058	160704	$4,351,957.53	$6,106,752.00	-$1,754,794.47	
Apr-16	30.56	21.76	28.0432	155520	$4,361,278.46	$5,909,760.00	-$1,548,481.54	
May-16	28.12	20.87	26.0465	142560	$3,713,189.04	$5,417,280.00	-$1,704,090.96	
Jun-16	34.48	23.03	31.2053	138240	$4,313,820.67	$5,253,120.00	-$939,299.33	-$15,883,672.86

Jul-16	39.81	27.16	36.1921	142848	$5,169,969.10	$5,428,224.00	-$258,254.90	
Aug-16	55.26	26.93	47.15762	156240	$7,367,906.55	$5,937,120.00	$1,430,786.55	
Sep-16	33.23	22.68	30.2127	138240	$4,176,603.65	$5,253,120.00	-$1,076,516.35	
Oct-16	29.76	21.28	27.33472	142848	$3,904,710.08	$5,428,224.00	-$1,523,513.92	
Nov-16	29.69	21.48	27.34194	133920	$3,661,632.60	$5,088,960.00	-$1,427,327.40	
Dec-16	30.10	21.58	27.66328	133920	$3,704,666.46	$5,088,960.00	-$1,384,293.54	
Jan-17	32.45	25.55	30.4766	138384	$4,217,473.81	$5,258,592.00	-$1,041,118.19	
Feb-17	32.83	25.57	30.75364	129024	$3,967,957.65	$4,902,912.00	-$934,954.35	
Mar-17	32.52	22.21	29.57134	160704	$4,752,232.62	$6,106,752.00	-$1,354,519.38	
Apr-17	32.40	21.85	29.3827	155520	$4,569,597.50	$5,909,760.00	-$1,340,162.50	
May-17	31.90	21.05	28.7969	142560	$4,105,286.06	$5,417,280.00	-$1,311,993.94	
Jun-17	39.62	24.17	35.2013	138240	$4,866,227.71	$5,253,120.00	-$386,892.29	-$10,608,760.19
Jul-17	47.76	24.17	41.01326	142848	$5,858,662.16	$5,428,224.00	$430,438.16	
Aug-17	57.88	29.32	49.71184	156240	$7,766,977.88	$5,937,120.00	$1,829,857.88	
Sep-17	36.40	22.97	32.55902	138240	$4,500,958.92	$5,253,120.00	-$752,161.08	
Oct-17	29.09	21.69	26.9736	142848	$3,853,124.81	$5,428,224.00	-$1,575,099.19	
Nov-17	30.44	21.76	27.95752	133920	$3,744,071.08	$5,088,960.00	-$1,344,888.92	
Dec-17	31.74	21.93	28.93434	133920	$3,874,886.81	$5,088,960.00	-$1,214,073.19	
Jan-18	34.46	25.82	31.98896	138384	$4,426,760.24	$5,258,592.00	-$831,831.76	
Feb-18	34.75	25.74	32.17314	129024	$4,151,107.22	$4,902,912.00	-$751,804.78	
Mar-18	34.37	22.35	30.93228	160704	$4,970,941.13	$6,106,752.00	-$1,135,810.87	
Apr-18	33.53	21.54	30.10086	155520	$4,681,285.75	$5,909,760.00	-$1,228,474.25	
May-18	33.04	20.76	29.52792	142560	$4,209,500.28	$5,417,280.00	-$1,207,779.72	
Jun-18	41.02	23.84	36.10652	138240	$4,991,365.32	$5,253,120.00	-$261,754.68	-$8,043,382.40
Jul-18	49.40	26.34	42.80484	142848	$6,114,585.78	$5,428,224.00	$686,361.78	
Aug-18	59.88	26.35	50.29042	156240	$7,857,375.22	$5,937,120.00	$1,920,255.22	
Sep-18	37.68	22.63	33.3757	138240	$4,613,856.77	$5,253,120.00	-$639,263.23	
Oct-18	33.01	21.38	29.68382	142848	$4,240,274.32	$5,428,224.00	-$1,187,949.68	
Nov-18	32.78	21.44	29.53676	133920	$3,955,562.90	$5,088,960.00	-$1,133,397.10	
Dec-18	33.17	21.59	29.85812	133920	$3,998,599.43	$5,088,960.00	-$1,090,360.57	

Jan-19	34.81	25.74	32.21598	138384	$4,458,176.18	$5,258,592.00	-$800,415.82	
Feb-19	35.10	25.67	32.40302	129024	$4,180,767.25	$4,902,912.00	-$722,144.75	
Mar-19	34.73	22.28	31.1693	160704	$5,009,031.19	$6,106,752.00	-$1,097,720.81	
Apr-19	33.95	21.53	30.39788	155520	$4,727,478.30	$5,909,760.00	-$1,182,281.70	
May-19	33.48	20.77	29.84494	142560	$4,254,694.65	$5,417,280.00	-$1,162,585.35	
Jun-19	41.55	23.83	36.48208	138240	$5,043,282.74	$5,253,120.00	-$209,837.26	-$6,619,339.28
Jul-19	50.00	26.31	43.22466	142848	$6,174,556.23	$5,428,224.00	$746,332.23	
Aug-19	60.70	26.36	50.87876	156240	$7,949,297.46	$5,937,120.00	$2,012,177.46	
Sep-19	38.20	26.30	34.7966	138240	$4,810,281.98	$5,253,120.00	-$442,838.02	
Oct-19	33.47	21.40	30.01798	142848	$4,288,008.41	$5,428,224.00	-$1,140,215.59	
Nov-19	33.27	21.47	29.8952	133920	$4,003,565.18	$5,088,960.00	-$1,085,394.82	
Dec-19	33.77	21.70	30.31798	133920	$4,060,183.88	$5,088,960.00	-$1,028,776.12	
Jan-20	34.79	25.10	32.01866	138384	$4,430,870.25	$5,258,592.00	-$827,721.75	
Feb-20	35.10	25.03	32.21998	129024	$4,157,150.70	$4,902,912.00	-$745,761.30	
Mar-20	34.74	21.75	31.02486	160704	$4,985,819.10	$6,106,752.00	-$1,120,932.90	
Apr-20	34.04	21.07	30.33058	155520	$4,717,011.80	$5,909,760.00	-$1,192,748.20	
May-20	33.55	20.30	29.7605	142560	$4,242,656.88	$5,417,280.00	-$1,174,623.12	
Jun-20	41.57	23.26	36.33334	138240	$5,022,720.92	$5,253,120.00	-$230,399.08	-$6,230,901.20
Jul-20	49.94	25.64	42.9902	142848	$6,141,064.09	$5,428,224.00	$712,840.09	
Aug-20	60.76	25.74	50.74428	156240	$7,928,286.31	$5,937,120.00	$1,991,166.31	
Sep-20	38.30	25.71	34.69926	138240	$4,796,825.70	$5,253,120.00	-$456,294.30	
Oct-20	33.60	20.95	29.9821	142848	$4,282,883.02	$5,428,224.00	-$1,145,340.98	
Nov-20	33.41	21.04	29.87218	133920	$4,000,482.35	$5,088,960.00	-$1,088,477.65	
Dec-20	33.88	21.24	30.26496	133920	$4,053,083.44	$5,088,960.00	-$1,035,876.56	
Jan-21	34.53	24.45	31.64712	138384	$4,379,455.05	$5,258,592.00	-$879,136.95	
Feb-21	34.81	24.37	31.82416	129024	$4,106,080.42	$4,902,912.00	-$796,831.58	
Mar-21	34.46	21.17	30.65906	160704	$4,927,033.58	$6,106,752.00	-$1,179,718.42	
Apr-21	33.83	20.54	30.02906	155520	$4,670,119.41	$5,909,760.00	-$1,239,640.59	
May-21	33.33	19.80	29.46042	142560	$4,199,877.48	$5,417,280.00	-$1,217,402.52	
Jun-21	41.29	22.68	35.96754	138240	$4,972,152.73	$5,253,120.00	-$280,967.27	-$6,615,680.42

Jul-21	49.67	25.03	42.62296	142848	$6,088,604.59	$5,428,224.00	$660,380.59	
Aug-21	60.50	25.16	50.39276	156240	$7,873,364.82	$5,937,120.00	$1,936,244.82	
Sep-21	38.14	25.14	34.422	138240	$4,758,497.28	$5,253,120.00	-$494,622.72	
Oct-21	33.51	20.52	29.79486	142848	$4,256,136.16	$5,428,224.00	-$1,172,087.84	
Nov-21	33.32	20.60	29.68208	133920	$3,975,024.15	$5,088,960.00	-$1,113,935.85	
Dec-21	33.75	20.76	30.03486	133920	$4,022,268.45	$5,088,960.00	-$1,066,691.55	
Jan-22	34.15	24.63	31.42728	138384	$4,349,032.72	$5,258,592.00	-$909,559.28	
Feb-22	34.43	24.57	31.61004	129024	$4,078,453.80	$4,902,912.00	-$824,458.20	
Mar-22	34.10	21.35	30.4535	160704	$4,893,999.26	$6,106,752.00	-$1,212,752.74	
Apr-22	33.62	20.81	29.95634	155520	$4,658,810.00	$5,909,760.00	-$1,250,950.00	
May-22	33.06	20.01	29.3277	142560	$4,180,956.91	$5,417,280.00	-$1,236,323.09	
Jun-22	40.93	22.92	35.77914	138240	$4,946,108.31	$5,253,120.00	-$307,011.69	-$6,991,767.54

To put these prices in perspective, Table 2 indicates a 600 MW solar RFP at $38 per MWh would cost roughly $6 to $16 million per year in terms of the PSA. Each $5 million increase in the PSA is equivalent to about a 1 percent increase in the PSA. Because the PSA makes up about 35 percent of the total average bill, a 2% increase in the PSA is equivalent to about 0.7 percent overall increase. If we include the 150 MW contract as well at the listed prices, the solar RFPs could cause rates to rise between one and two percent per year based on the scenario above (Table 2). However, as mentioned, when considering the "extra" value solar profiles provide at peak power prices, and adding an additional "bump-up" to account for these solar production values, the 600 MW solar plant might actually lower rates, and when adding the impacts of the higher priced solar resources of 150 MWs already contracted by Austin Energy might have a slight negative impact on the PSA of less than one percent, with a minimal impact on rates (Table 3).

Table 2. Impact of Solar RFP on PSA and Residential Rates if Solar Plants were Operational Today

Category	Annual Rate Impact of 600 MWs at $38 per MWh (in $s Million)	Annual Rate Impact of 150 MWs at $49 per MWh (in $s Million)	PSA Impact of All 750 MWs Solar if Contracted Immediately (in $s Million)	% Increase on PSA, assuming $450 Million PSA	% Increase on Residential Rates, assuming PSA 35% of bill
2015-16 July-June	$15.88	$8.68	$24.56	5.46%	1.91%
2016-17, July-June	$10.61	$7.36	$17.97	3.99%	1.40%

2017-18, July-June	$8.04	$6.72	$14.76	3.28%	1.15%
2018-19, July-June	$6.62	$6.36	$12.98	2.88%	1.01%
2019-20, July-June	$6.23	$6.27	$12.50	2.78%	0.97%
2020-21, July-June	$6.62	$6.36	$12.98	2.88%	1.01%
2021-22, July-June	$6.99	$6.46	$13.45	2.99%	1.05%
Average	$8.71	$6.89	$15.60	3.47%	1.21%

Table 3. Impact of Solar RFP on PSA and Residential Rates if Solar Plants were Operational Today, Assuming Solar Profile Bump-Up of 17.5%

Category	Annual Rate Impact of 600 MWs at $38 per MWh (in $s Million)	Annual Rate Impact of 150 MWs at $49 per MWh (in $s Million)	PSA Impact of All 750 MWs Solar if Contracted Immediately (in $s Million)	% Increase on PSA, assuming $450 Million PSA	% Increase on Residential Rates, assuming PSA 35% of bill
2015-16 July-June	7.52	6.53	14.05	3.12%	1.09%
2016-17, July-June	1.35	4.98	6.33	1.41%	0.49%
2017-18, July-June	-1.65	4.22	2.57	0.57%	0.20%
2018-19, July-June	-3.32	3.81	0.49	0.11%	0.04%
2019-20, July-June	-3.77	3.69	-0.08	-0.02%	-0.01%
2020-21, July-June	-3.32	3.8	0.48	0.11%	0.04%
2021-22, July-June	-2.88	3.91	1.03	0.23%	0.08%
Average	-0.87	4.42	3.55	0.79%	0.28%

Longer-term price predictions – such as ERCOT's long-term study and a recent study by Brattle for the Clean Energy Coalition– however, would suggest that prices will rise higher than these short-term predictions, making the solar RFP a good deal. Thus, predictions by Brattle of prices rising to $50 per MWh and by ERCOT of prices rising to nearly $70 per MWh by the end of the next decade, suggest such a solar contract could make Austin ratepayers significant money. Thus, long-term solar plants are a good deal

for Austin ratepayers beyond 2020 if these recent ERCOT and Brattle studies, which assume some rise in gas prices post-2020, are accurate.

Table 4. Long-range revenues look good for solar

	ERCOT Long-Term Study Price	Brattle Report Expected ERCOT Price	MWhs - Solar	Cost - $38/MWh	Revenue-ERCOT LTSA Price	Revenue - Brattle Price	Benefit-Cost ERCOT LTSA	Revenue – Brattle
2021	$55.40	$42.00	1712448	65073024	$94,869,619.20	$71,922,816.00	$29,796,595.20	$6,849,792.00
2022	$58.74	$42.00	1712448	65073024	$100,589,195.52	$71,922,816.00	$35,516,171.52	$6,849,792.00
2028	$69.61	$47.00	1712448	65073024	$119,203,505.28	$80,485,056.00	$54,130,481.28	$15,412,032.00

Specific Nodal Prices: Location, Location, Location

Actually, any solar built would bid into a specific "node" every five minutes and be settled every fifteen minutes through the Real Time Market. Sierra Club analyzed numbers from the nodal real-time market at four West Texas nodes – Hovey Unit I, KEO_KEO_SM1, LGD_Langford and PB2SES_CT1. The locations of these nodes can be found on the graphics on page 9 and Table 4 on page 10. The numbers from the previous four years suggest a slightly better outcome since local prices were often better than the wholesale West Zone load averages. Indeed, for 2011 in particular, the plants would have made money and faired slightly better than the "future" analysis would suggest. It is also worth noting that putting all 600 MWs in one nodal location might not be advisable. Thus, one might want to build several plants at different locations since prices can vary slightly from one location to another. The Table shows for example that a plant at PB2SES would have actually made significant money, while any of the other three West Texas nodes would have lost money over the four year period, although in certain years they would have made money, particularly related to high prices in the summer of 2011.

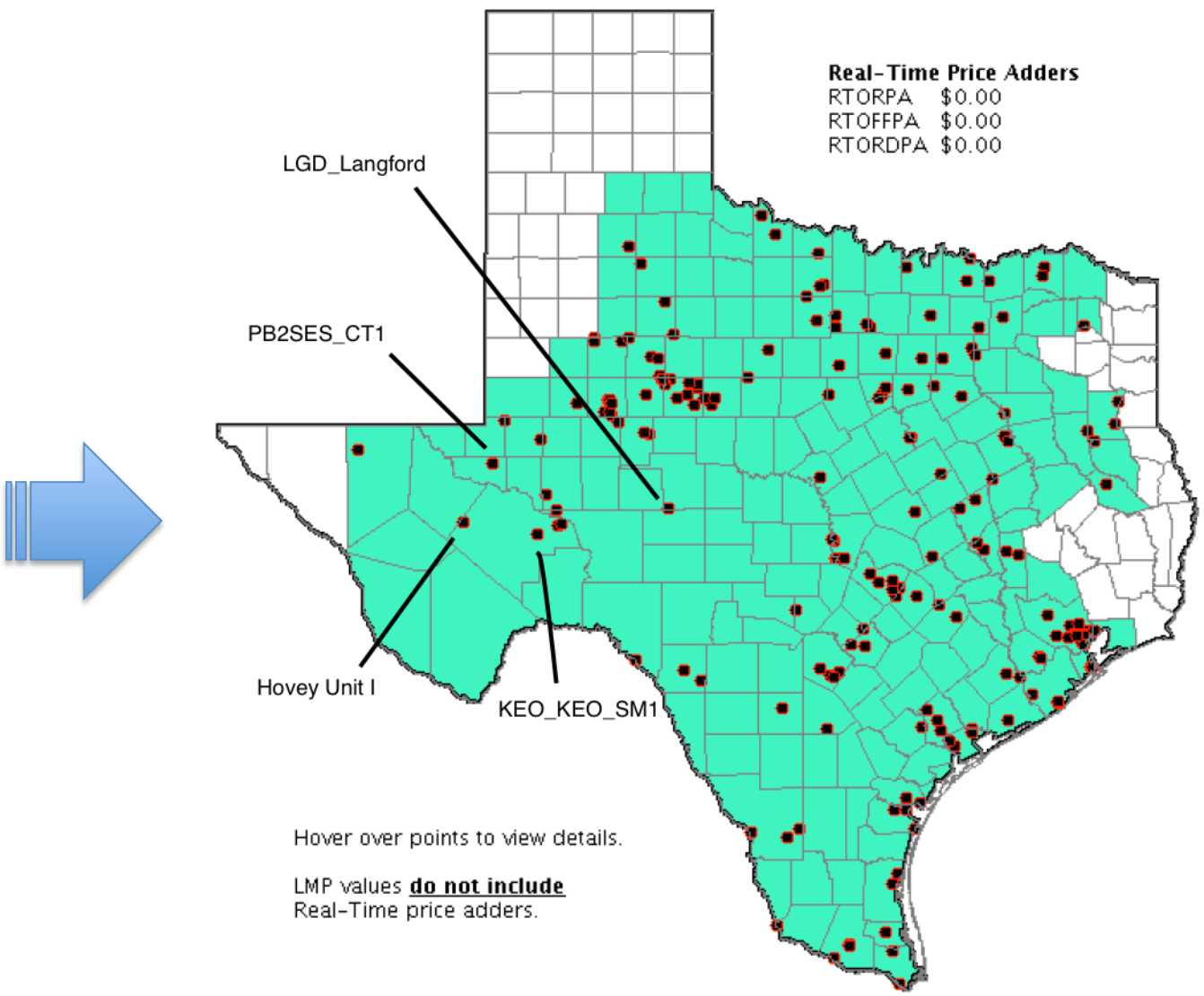
Real-Time Price Adders
RTORPA $0.00
RTOFFPA $0.00
RTORDPA $0.00
LGD_Langford
PB2SES_CT1
Hovey Unit I
KEO_KEO_SM1
Hover over points to view details.
LMP values do not include
Real-Time price adders.

Table 5. What would have the 600 MW Solar Plant Earned or Lost at Different Nodes in West Texas?

	Average LMP Price – Hovey Unit	Solar Revenues-Costs	Average LMP Price – KEO_KEO	Solar Revenues-Costs	LGD-Lanford – Average Price	Solar Revenues-Costs	PB2SES LMP Average Price	Solar Revenues-Costs
July 2011-June 2012	Node Not in Operation		$36.56	$847,487	$38.96	$3,106,572	$46.53	$12,072,703
July 2012-June 2013	Node not in Operation		$30.26	($10,816,479)	$27.16	($13,117,613)	$44.06	$11,969,119
July 2013-June 2014	$36.42	($2,148,701)	$39.08	$2,004,339	$37.77	$697,487	$50.49	$22,308,678
July 2014-June 2015	$29.51	($14,520,315)	$28.45	($16,304,476)	$27.34	($17,535,874)	$29.90	($13,869,677)
Average Year	$32.96	($8,334,508)	$33.02	($6,067,282)	$32.08	($6,712,357)	$41.34	$8,120,206

Again, however, these annual peak prices probably underestimate the amount of money that solar would have generated since the plants would tend to have higher capacity at precisely the hours when energy is most valuable. Again, adding in an "adder" of 17.5% to take account of the solar profile would have in some cases reversed the losses and led to slight gains (see Table 6).

Table 6. What would have the 600 MW Solar Plant Earned or Lost at Different Nodes in West Texas Assuming Solar Bump-Up?

	Average Solar Profile Price – Hovey Unit	Solar Revenues-Costs	Average Solar Profile Price – KEO_KEO	Solar Revenues-Costs	LGD-Lanford – Average Solar Profile Price	Solar Revenues-Costs	PB2SES AverageSolar Profile Price – Average Price	Solar Revenues-Costs
July 2011-June 2012	Node Not in Operation		$42.96	$12,383,576	$44.39	$15,038,001	$54.67	$25,573,205
July 2012-June 2013	Node not in Operation		$35.56	($1,321,584)	$32.50	($4,025,416)	$51.77	$25,451,494
July 2013-June 2014	$42.92	$543,287	$45.92	$13,742,877	$45.07	$12,207,327	$59.33	$37,600,476
July 2014-June 2015	$34.68	($5,673,591)	$33.43	($7,769,980)	$32.55	($9,216,873)	$35.13	($4,909,092)
Average Year	$38.80	($2,565,152)	$39.45	$4,258,722	$38.69	$2,800,616	$49.21	$20,929,021

More recently, Austin Energy itself provided some "average" prices at different West Texas settlement points, and created a "solar profile weighted average" that suggested that in six of the 10 nodes, Austin Energy would have made money for its customers between 2012 and 2014. Thus, in those years, had Austin Energy operated a 600 MW solar plant, most of the locations would have led to lower bills for Austinites, even without considering differences in price between our load zone and the prices in West Texas, or without considering the potential that we would lower our use of our gas resources. In fact, averaging the 10 nodes considered, a solar plant would have lowered the PSA by $19 million over the period between 2012 and 2014. Still, some caution must be taken since prices in 2015 and the next few years may be considerably lower than in previous years.

Table 7. 2012-2014 Real Time Prices in West Texas, including "Solar Profile Weighted Average"

Node or Settlement Point	County	Average Nodal Price (Includes Peak and Non-Peak Hours)	Solar Weighted Average Price	Solar "Bump-Up" in Average Nodal Price	Solar Revenues from 600 MW Plant	Solar Cost at $38 per MWh	Total Benefit or Cost to PSA
MWF_NWF1	Winkler	50.19	76.08	51.58%	$130,283,043.84	$65,073,024.00	$65,210,019.84
BULLCRK_1_2	Lynn	50.05	80.17	60.18%	$137,286,956.16	$65,073,024.00	$72,213,932.16
SWEC_G!	Martin	33.12	43.55	31.49%	$74,577,110.40	$65,073,024.00	$9,504,086.40
STWF-T1	Nolan	32.71	42.42	29.69%	$72,642,044.16	$65,073,024.00	$7,569,020.16
KEO-KEO-SM1	Pecos	32.07	41.75	30.18%	$71,494,704.00	$65,073,024.00	$6,421,680.00
MGSES-CT123	Mitchell	30.85	37.82	22.59%	$64,764,783.36	$65,073,024.00	-$308,240.64
LNCRK-ALL	Callahan	29.47	34.47	16.97%	$59,028,082.56	$65,073,024.00	-$6,044,941.44
CAPRIDG4	Sterling	29.35	34.22	16.59%	$58,599,970.56	$65,073,024.00	-$6,473,053.44
QALSW-CC2	Ector	28.61	32.86	14.85%	$56,271,041.28	$65,073,024.00	-$8,801,982.72
CSC-CSECGI-2	Scurry	46.11	73.13	58.60%	$125,231,322.24	$65,073,024.00	$60,158,298.24
Average for 10 Nodes		36.253	49.647	33.27%	$85,017,905.86	$65,073,024.00	$19,944,881.86
HB-WEST ZONE		$29.77	$35.03	31.44%	$59,987,053.44	$65,073,024.00	-$5,085,970.56
Load Zone – Austin	Travis	32.04	37.39	28.57%	$64,028,430.72	$65,073,024.00	-$1,044,593.28

What about a more moderate scenario?

Another potential road would be to make a modest investment in solar this year of 200 MWs of capacity to take advantage of the solar pricing, but leave future investments for later, making the assumption that solar prices will continue to decline even as market prices rise. For example, City Council could direct Austin Energy to "only" contract 200 MWs of solar now, and let the solar market

grow over the next several years before looking for another contract. This would also allow the utility and its ratepayers time to assess market prices over the next several years.

Table 7 indicates that based upon the previous expected prices, a 200 MW commitment should cost between $2 and $5 million per year, meaning such a contract would be well within the affordability metric. A $5 million increase in the PSA would only represent a 1% increase in the PSA, the equivalent of about one-third of a one-percent increase short-term. Even if adding it to the previous solar buy, the total impact on overall rates would be less than one percent for the years we looked at. If market prices rose, the benefits would be less to ratepayers, but again, assuming more solar were purchased, owned or contracted later on, it would be a way to better manage potential cost risk.

Table 8. Potential Costs and Benefits of A 200 MW Solar Contract at $38 per MWh

Term	SNL On-Peak West Load Zone Price	*SNL Off-Peak West*	Solar Average -- Assuming 71% On-Peak	Solar MWhs from 200 MWs	Total Revenue	Total Cost at $38 per MWh	Total Cost/Benefit	Annual Cost
Jul-15	35.41	22.78	31.79782	47616	$1,514,085.00	$1,809,408.00	-$295,323.00	
Aug-15	44.02	22.32	37.8138	52080	$1,969,342.70	$1,979,040.00	-$9,697.30	
Sep-15	30.10	21.18	27.54888	46080	$1,269,452.39	$1,751,040.00	-$481,587.61	
Oct-15	27.79	20.69	25.7594	47616	$1,226,559.59	$1,809,408.00	-$582,848.41	
Nov-15	27.04	21.30	25.39836	44640	$1,133,782.79	$1,696,320.00	-$562,537.21	
Dec-15	27.47	21.14	25.65962	44640	$1,145,445.44	$1,696,320.00	-$550,874.56	
Jan-16	30.07	24.73	28.54276	46128	$1,316,620.43	$1,752,864.00	-$436,243.57	
Feb-16	30.47	24.83	28.85696	43008	$1,241,080.14	$1,634,304.00	-$393,223.86	
Mar-16	29.36	21.39	27.08058	53568	$1,450,652.51	$2,035,584.00	-$584,931.49	
Apr-16	30.56	21.76	28.0432	51840	$1,453,759.49	$1,969,920.00	-$516,160.51	
May-16	28.12	20.87	26.0465	47520	$1,237,729.68	$1,805,760.00	-$568,030.32	
Jun-16	34.48	23.03	31.2053	46080	$1,437,940.22	$1,751,040.00	-$313,099.78	-$5,294,557.62
Jul-16	39.81	27.16	36.1921	47616	$1,723,323.03	$1,809,408.00	-$86,084.97	
Aug-16	55.26	26.93	47.15762	52080	$2,455,968.85	$1,979,040.00	$476,928.85	
Sep-16	33.23	22.68	30.2127	46080	$1,392,201.22	$1,751,040.00	-$358,838.78	

Oct-16	29.76	21.28	27.33472	47616	$1,301,570.03	$1,809,408.00	-$507,837.97	
Nov-16	29.69	21.48	27.34194	44640	$1,220,544.20	$1,696,320.00	-$475,775.80	
Dec-16	30.10	21.58	27.66328	44640	$1,234,888.82	$1,696,320.00	-$461,431.18	
Jan-17	32.45	25.55	30.4766	46128	$1,405,824.60	$1,752,864.00	-$347,039.40	
Feb-17	32.83	25.57	30.75364	43008	$1,322,652.55	$1,634,304.00	-$311,651.45	
Mar-17	32.52	22.21	29.57134	53568	$1,584,077.54	$2,035,584.00	-$451,506.46	
Apr-17	32.40	21.85	29.3827	51840	$1,523,199.17	$1,969,920.00	-$446,720.83	
May-17	31.90	21.05	28.7969	47520	$1,368,428.69	$1,805,760.00	-$437,331.31	
Jun-17	39.62	24.17	35.2013	46080	$1,622,075.90	$1,751,040.00	-$128,964.10	-$3,536,253.40
Jul-17	47.76	24.17	41.01326	47616	$1,952,887.39	$1,809,408.00	$143,479.39	
Aug-17	57.88	29.32	49.71184	52080	$2,588,992.63	$1,979,040.00	$609,952.63	
Sep-17	36.40	22.97	32.55902	46080	$1,500,319.64	$1,751,040.00	-$250,720.36	
Oct-17	29.09	21.69	26.9736	47616	$1,284,374.94	$1,809,408.00	-$525,033.06	
Nov-17	30.44	21.76	27.95752	44640	$1,248,023.69	$1,696,320.00	-$448,296.31	
Dec-17	31.74	21.93	28.93434	44640	$1,291,628.94	$1,696,320.00	-$404,691.06	
Jan-18	34.46	25.82	31.98896	46128	$1,475,586.75	$1,752,864.00	-$277,277.25	
Feb-18	34.75	25.74	32.17314	43008	$1,383,702.41	$1,634,304.00	-$250,601.59	
Mar-18	34.37	22.35	30.93228	53568	$1,656,980.38	$2,035,584.00	-$378,603.62	
Apr-18	33.53	21.54	30.10086	51840	$1,560,428.58	$1,969,920.00	-$409,491.42	
May-18	33.04	20.76	29.52792	47520	$1,403,166.76	$1,805,760.00	-$402,593.24	
Jun-18	41.02	23.84	36.10652	46080	$1,663,788.44	$1,751,040.00	-$87,251.56	-$2,681,127.47
Jul-18	49.40	26.34	42.80484	47616	$2,038,195.26	$1,809,408.00	$228,787.26	
Aug-18	59.88	26.35	50.29042	52080	$2,619,125.07	$1,979,040.00	$640,085.07	
Sep-18	37.68	22.63	33.3757	46080	$1,537,952.26	$1,751,040.00	-$213,087.74	
Oct-18	33.01	21.38	29.68382	47616	$1,413,424.77	$1,809,408.00	-$395,983.23	
Nov-18	32.78	21.44	29.53676	44640	$1,318,520.97	$1,696,320.00	-$377,799.03	
Dec-18	33.17	21.59	29.85812	44640	$1,332,866.48	$1,696,320.00	-$363,453.52	
Jan-19	34.81	25.74	32.21598	46128	$1,486,058.73	$1,752,864.00	-$266,805.27	
Feb-19	35.10	25.67	32.40302	43008	$1,393,589.08	$1,634,304.00	-$240,714.92	
Mar-19	34.73	22.28	31.1693	53568	$1,669,677.06	$2,035,584.00	-$365,906.94	

Apr-19	33.95	21.53	30.39788	51840	$1,575,826.10	$1,969,920.00	-$394,093.90	
May-19	33.48	20.77	29.84494	47520	$1,418,231.55	$1,805,760.00	-$387,528.45	
Jun-19	41.55	23.83	36.48208	46080	$1,681,094.25	$1,751,040.00	-$69,945.75	-$2,206,446.43
Jul-19	50.00	26.31	43.22466	47616	$2,058,185.41	$1,809,408.00	$248,777.41	
Aug-19	60.70	26.36	50.87876	52080	$2,649,765.82	$1,979,040.00	$670,725.82	
Sep-19	38.20	26.30	34.7966	46080	$1,603,427.33	$1,751,040.00	-$147,612.67	
Oct-19	33.47	21.40	30.01798	47616	$1,429,336.14	$1,809,408.00	-$380,071.86	
Nov-19	33.27	21.47	29.8952	44640	$1,334,521.73	$1,696,320.00	-$361,798.27	
Dec-19	33.77	21.70	30.31798	44640	$1,353,394.63	$1,696,320.00	-$342,925.37	
Jan-20	34.79	25.10	32.01866	46128	$1,476,956.75	$1,752,864.00	-$275,907.25	
Feb-20	35.10	25.03	32.21998	43008	$1,385,716.90	$1,634,304.00	-$248,587.10	
Mar-20	34.74	21.75	31.02486	53568	$1,661,939.70	$2,035,584.00	-$373,644.30	
Apr-20	34.04	21.07	30.33058	51840	$1,572,337.27	$1,969,920.00	-$397,582.73	
May-20	33.55	20.30	29.7605	47520	$1,414,218.96	$1,805,760.00	-$391,541.04	-$2,076,967.07
Jun-20	41.57	23.26	36.33334	46080	$1,674,240.31	$1,751,040.00	-$76,799.69	
Jul-20	49.94	25.64	42.9902	47616	$2,047,021.36	$1,809,408.00	$237,613.36	
Aug-20	60.76	25.74	50.74428	52080	$2,642,762.10	$1,979,040.00	$663,722.10	
Sep-20	38.30	25.71	34.69926	46080	$1,598,941.90	$1,751,040.00	-$152,098.10	
Oct-20	33.60	20.95	29.9821	47616	$1,427,627.67	$1,809,408.00	-$381,780.33	
Nov-20	33.41	21.04	29.87218	44640	$1,333,494.12	$1,696,320.00	-$362,825.88	
Dec-20	33.88	21.24	30.26496	44640	$1,351,027.81	$1,696,320.00	-$345,292.19	
Jan-21	34.53	24.45	31.64712	46128	$1,459,818.35	$1,752,864.00	-$293,045.65	
Feb-21	34.81	24.37	31.82416	43008	$1,368,693.47	$1,634,304.00	-$265,610.53	
Mar-21	34.46	21.17	30.65906	53568	$1,642,344.53	$2,035,584.00	-$393,239.47	
Apr-21	33.83	20.54	30.02906	51840	$1,556,706.47	$1,969,920.00	-$413,213.53	
May-21	33.33	19.80	29.46042	47520	$1,399,959.16	$1,805,760.00	-$405,800.84	
Jun-21	41.29	22.68	35.96754	46080	$1,657,384.24	$1,751,040.00	-$93,655.76	-$2,282,026.50
Jul-21	49.67	25.03	42.62296	47616	$2,029,534.86	$1,809,408.00	$220,126.86	
Aug-21	60.50	25.16	50.39276	52080	$2,624,454.94	$1,979,040.00	$645,414.94	

Sep-21	38.14	25.14	34.422	46080	$1,586,165.76	$1,751,040.00	-$164,874.24	
Oct-21	33.51	20.52	29.79486	47616	$1,418,712.05	$1,809,408.00	-$390,695.95	
Nov-21	33.32	20.60	29.68208	44640	$1,325,008.05	$1,696,320.00	-$371,311.95	
Dec-21	33.75	20.76	30.03486	44640	$1,340,756.15	$1,696,320.00	-$355,563.85	
Jan-22	34.15	24.63	31.42728	46128	$1,449,677.57	$1,752,864.00	-$303,186.43	
Feb-22	34.43	24.57	31.61004	43008	$1,359,484.60	$1,634,304.00	-$274,819.40	
Mar-22	34.10	21.35	30.4535	53568	$1,631,333.09	$2,035,584.00	-$404,250.91	
Apr-22	33.62	20.81	29.95634	51840	$1,552,936.67	$1,969,920.00	-$416,983.33	
May-22	33.06	20.01	29.3277	47520	$1,393,652.30	$1,805,760.00	-$412,107.70	
Jun-22	40.93	22.92	35.77914	46080	$1,648,702.77	$1,751,040.00	-$102,337.23	-$2,330,589.18

Thus, again assuming the West zone wholesale prices are captured by the five-year predictions of the energy consultant, a 200 MW buy would have less risk in terms of rates (Table 9).

Table 9. Impact of Solar RFP on PSA and Residential Rates if 350 MWs of Solar Plants were Operational Today

Category	Annual PSA Impact of 200 MWs at $38 per MWh ($s Millions)	Annual PSA Impact of 150 MWs at $49 per MWh ($s Millions)	PSA Impact of All 350 MWs Solar if Contracted Immediately ($s Millions)	% Increase on PSA, assuming $450 Million PSA	% Increase on Residential Rates, assuming PSA 35% of bill
2015-16 July-June	$5.29	$8.68	$13.97	3.10%	1.09%
2016-17, July-June	$3.54	$7.36	$10.90	2.42%	0.85%
2017-18, July-June	$2.68	$6.72	$9.40	2.09%	0.73%
2018-19, July-June	$2.21	$6.36	$8.57	1.90%	0.67%
2019-20, July-June	$2.08	$6.27	$8.35	1.86%	0.65%
2020-21, July-June	$2.28	$6.36	$8.64	1.92%	0.67%
2021-22, July-June	$2.33	$6.46	$8.79	1.95%	0.68%
Average	$2.92	$6.89	$9.81	2.18%	0.76%

Again, however, the above tables probably underestimate the value of the solar resource producing at peak prices. Adjusting by adding a solar profile price means there would be little to no impact on rates by the purchase of a contracted solar power plant of 200 MWs. Overall, the average impact on rates from the solar contracts would be less than one percent on the PSA, and less than one-third of one percent on overall rates. Again, this does not even consider the potential savings from other benefits like relying less on inefficient gas plants.

Table 10. Impact of Solar RFP on PSA and Residential Rates if 350 MWs of Solar Plants were Operational Today, Assuming Solar Profile "Bump-Up" in Pricing

Category	Annual PSA Impact of 200 MWs at $38 per MWh ($s Millions)	Annual PSA Impact of 150 MWs at $49 per MWh ($s Millions)	PSA Impact of All 350 MWs Solar if Contracted Immediately ($s Millions)	% Increase on PSA, assuming $450 Million PSA	% Increase on Residential Rates, assuming PSA 35% of bill
2015-16 July-June	$2.42	6.53	$8.95	1.99%	0.70%
2016-17, July-June	$0.35	4.98	$5.33	1.18%	0.41%
2017-18, July-June	($0.64)	4.22	$3.58	0.80%	0.28%
2018-19, July-June	($1.20)	3.81	$2.61	0.58%	0.20%
2019-20, July-June	($1.35)	3.69	$2.34	0.52%	0.18%
2020-21, July-June	($1.20)	3.8	$2.60	0.58%	0.20%
2021-22, July-June	($1.06)	3.91	$2.85	0.63%	0.22%
Average	($0.38)	4.42	$4.04	0.90%	0.31%

A third option might be to contract 200 now for build-out in 2016, and contract another 200 MWs as well, but not begin construction for several years, so that Austin Energy and its ratepayers would not be responsible for paying the PPA for several years, again when market prices improve. Thus, one could contract one 200 MWs for construction in 2016 or 2017, and another 200 MWs for construction in 2019 or 2020, meaning the relatively low prices expected in 2017 through 2019 would not cost "ratepayers." By the time the second plants were built it would immediately begin making money if market prices rise as expected. This is similar to the "deal" made by CPS Energy with OCI Solar, which is building a series of plants that total 400 MWs over several years in different locations to take advantage of prices. Table 11 shows such what a proposed option might look like in terms of costs

and shows without even considering any potential savings in fuel costs from running older gas units, or any difference in prices at the local load zone, there would be essentially no impact on rates.

Table 11. Impact of Solar RFP on PSA and Residential Rates if 350 MWs of Solar Plants were Operational Today, and 550 MWs by 2019, Assuming Solar Profile "Bump-Up" in Pricing

Category	Annual PSA Impact of 200 MWs at $38 per MWh ($s Millions)	Annual PSA Impact of 150 MWs at $49 per MWh ($s Millions)	PSA Impact of All 350 MWs Solar if Contracted Immediately ($s Millions)	% Increase on PSA, assuming $450 Million PSA	% Increase on Residential Rates, assuming PSA 35% of bill
2015-16 July-June	$2.42	6.53	$8.95	1.99%	0.70%
2016-17, July-June	$0.35	4.98	$5.33	1.18%	0.41%
2017-18, July-June	($0.64)	4.22	$3.58	0.80%	0.28%
2018-19, July-June	($1.20)	3.81	$2.61	0.58%	0.20%
2019-20, July-June	($2.70)	3.69	$0.99	0.22%	0.08%
2020-21, July-June	($2.40)	3.8	$1.40	0.31%	0.11%
2021-22, July-June	($2.12)	3.91	$1.79	0.40%	0.14%
Average	($0.90)	$4.42	$3.52	$0.01	$0.00

A fourth issue or option to consider is how potential ownership of a solar plant might help ratepayers – and Austin Energy. Thus, currently a PPA with a third-party is attractive because a private owner can take advantage of the 30% ITC tax credit to be phased down to 10% in 2017. After 2016, however, it might be beneficial for Austin Energy to own and operate a solar plant, meaning it could spread the upfront cost through municipal bond financing. Rather than paying a per MWh cost to a third-party, Austin Energy would pay back any debt owed on the plant, but the revenue from selling the solar energy into the market would directly benefit ratepayers and lower the PSA. The debt payments would be covered through base rates so there would be no "cost" to the PSA. Instead, the solar plant would be treated much as Austin Energy treats its gas or coal plants, using them for ancillary services, as well as energy, and putting the operations and maintenance and debt payments into their base rates.

Other Benefits of the Solar Plant – Reduced Need for Existing Gas Plants?

Though there is debate about how contracting the additional solar resource would impact the way in which Austin Energy operates its existing gas plants, it is probably reasonable to assume that adding the solar resource would most likely lower the use of the gas plants in general, and more specifically, the Decker steam units. In fact, the original recommendation by the Generation Resource Planning Task Force to issue an RFP to look at securing an additional 600 MWs of solar was based on replacing the existing 735 MWs of older steam units with solar. Thus, because the 300 MW Sand Hill Combined Cycle plant is more efficient and cheaper to run than the Decker steam units it probably would continue to be used, while the single cycle plants at Decker and Sand Hill are used more to react to short term needs for power, and as a financial instrument to impact prices locally. The local steam units, however, are large – 735 MWs in all – and used infrequently, in part because they have a poor heat rate and are costly to run. Thus, an additional advantage not considered in the previous analysis is how running these plants less frequently or not at all might actually be a further cost benefit to Austin ratepayers. While, this is difficult to analyze, there is little doubt that the plants are used infrequently, and in general they are a money-loser to ratepayers. Thus, in 2014, the Decker Steam units only ran about five percent of the time, and only provided about 340,000 MWhs of energy. Lowering or eliminating the use of Decker should lower costs for Austin ratepayers, though a fuller analysis is needed.

Overall, in 2014, Austin Energy used its various gas units to generate 1,602,625 MWhs of generation, with the combined cycle plant providing about 975,341 MWhs of that total. In all the gas units generated $92.7 million in revenue, but cost $104.2 million to run, meaning a slight cost to ratepayers overall. The total cost to run the plants was $65.00 per MWh – about two-thirds which was due to fuel use -- well above the cost of the solar plants at $38.00 per MWh. And the Decker Steam Units are among the least efficient. Thus, replacing the cost of fuel – the cost of buying gas -- of roughly $40 per MWh with solar at $38.00 per MWh is overall likely a positive development for ratepayers, in addition to other benefits like lower levels of ozone pollution, lower carbon pollution and lower water use. Indeed if we made the assumption that all the solar generated in West Texas would replace our use of local gas – again not realistic since the gas plants are run at times due to congestion, high prices, and sudden demand shifts in the summer and shoulder months – the PSA could have been reduced by some two percent in 2014.

Still, care must be taken in assuming that every MWh of solar generation would magically replace a MWh that would have been generated by an Austin Energy-owned gas unit. The exact mix will depend on local market prices, congestion and transmission issues, ancillary service needs, local demand, and other factors impacting the ERCOT market.

Table 12. Gas Units, Costs and Revenues in Austin Energy's fleet

Year	Total Generation of All Gas Units, MWh	Fuel Cost (in Milions)	Non-Fuel Costs (in Millions)	Total Cost ($/MWh)	Total Revenue ($s/MWh)	Net Revenue/Cost ($s/MWh
2011	1,760,176	$116.3	$28.6	$82.3	$137.9	$55.59
2012	1,388,101	$75.0	$31.8	$76.9	$67.5	($8.97)
2013	1,935,862	$68.8	$26.8	$49.4	$45.5	($3.92)
2014	1,602,625	$66.5	$37.6	$65.0	$57.9	($7.13)
Total	6,686,764	$326.6	$124.8	$67.51	$77.44	$9.9

Source: Austin Energy, Production/Cost Revenue for All Gas Units, June 15, 2015, Provided to Electric Utility Commission

What if we just bought the power off the market?

Another way to look at the contract of solar is to instead buy power of the market. Thus, rather than contracting the power from the solar plant, Austin Energy could buy power of the market from third parties either through a longer-term contract or with short-term contracts as needs arise. While it is difficult to again surmise the exact costs or benefits of such an approach, again a value of $38 per MWh would have been a good investment in 2014. Recently, the Independent Market Monitor of ERCOT reported that in 2014, the average wholesale price of energy ERCOT-wide was $42 per MWh. Again there were wide variations by geographic energy, time of day and month, but at least superficially, it suggests that a stable price of $38 per MWh minus any revenues generated by the solar plant is a good economic deal for the city and its ratepayers and would be in fact superior to straight market purchases.

Conclusion

Long-term, no matter which option City Council chooses, solar is a good option for Austin Energy and its customers. The prices being offered for purchase are already competitive with on-peak wholesale power prices at both the local load zone and in West Texas and the contraction of additional solar could likely lower the need to run the most inefficient gas plants – the Decker steam units.

Nonetheless, there may be short-term costs that could bump up against the affordability metrics if all 600 MWs of solar are contracted today, which would add to the cost of the current solar contract of 150 MWs. This initial analysis indicates the total impacts on rates would be minor – probably less than one percent in the short-term – less in fact than future ERCOT administrative fees, and other AE programs likely to increase in costs in the coming years. In fact, if we assume there will be some savings from running our existing gas plants less and having to rely on purchase of electricity from the market, the solar contract might have a positive impact on the PSA. City Council should carefully review any proposed contracts before going forward and assure that such a contract will not impact our affordability goals nor burden our most vulnerable ratepayers. More measured options – such as a staged-in approach where Austin Energy is given flexibility to build out solar over several years, or alternatively, waits for the additional 400 MWs through future contracts, are choices worthy of study.

If City Council does decide to go forward with a contract for all 600 MWs, we would suggest that Austin Energy be given flexibility to consider:

- Options for right-to-own after contracting with a private solar developer for a certain number of years;
- Geographic flexibility, such that all 600 MWs are not contracted in one node;
- Considering going ahead and building our own plant at the land we own in West Texas as part of the 600 MWs;
- Potential for staged construction, where some amount is contracted immediately to take advantage of the tax credit, with another “batch” constructed a year to two years later, assuming that favorable pricing can be contracted.