AUSTIN ENERGY'S TARIFF PACKAGE:	**§**	
2015 COST OF SERVICE STUDY	**§**	**BEFORE THE CITY OF AUSTIN**
AND PROPOSAL TO CHANGE BASE	**§**	**IMPARTIAL HEARING EXAMINER**
ELECTRIC RATES	**§**	

PUBLIC CITIZEN's AND SIERRA CLUB's RESPONSE TO AUSTIN ENERGY'S SECOND REQUEST FOR INFORMATION

Public Citizen and Sierra Club file this Response to Austin Energy's Second Request for Information submitted on May 17, 2016. Pursuant to the March 10, 2016 Revised Procedural Schedule, this Response is timely filed.

Respectfully submitted,

Carol S Birch
Texas Bar No. 02328375
Attorney for Public Citizen and Sierra Club

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of this pleading has been served on all parties and the Impartial Hearing Examiner on the 23rd day of May, 2016.

Carol S. Birch

AE RFI 2-1 For each witness you sponsor, please provide in native format all calculations, exhibits, models, studies, and workpapers supporting the testimony and positions taken therein.

RESPONSE:

Most of this information is contained in public documents not required to be produced, but links to which have been provided in the original and corrected versions of these presentations. To the extent production of public documents is sought by this Request, it is objected to. Additional spreadsheets and other documentation responsive to this request are attached to this Response.

Tiered Rate Comparisons -- Inside versus Outside customers

Block	December 2014, Inside City	December 2014, Outside City	March 2015, Inside City	March 2015, Outside City	August 2015, Inside City	August 2015, Outside City
0-500 kWh	174,987	12,362	154,617	11,094	54,416	3,540
501-1000 kWh	122,747	17,639	122,209	16,015	99,767	6,288
1001-1500 kWh	32,674	10,431	44,288	9,542	96,011	10,538
1501-2500 kWh	11,220	9,245	21,043	11,205	84,219	18,715
>2,500 kWh	2,513	4,170	3,863	6,500	20,602	16,464
Total	344,139	53,847	346,020	54,356	355,015	55,545

Block	December 2014, Inside City	December 2014, Outside City	March 2015, Inside City	March 2015, Outside City	August 2015, Inside City	August 2015, Outside City
0-500 kWh	50.85%	22.96%	44.68%	20.41%	15.33%	6.37%
501-1000 kWh	35.67%	32.76%	35.32%	29.46%	28.10%	11.32%
1001-1500 kWh	9.49%	19.37%	12.80%	17.55%	27.04%	18.97%
1501-2500 kWh	3.26%	17.17%	6.08%	20.61%	23.72%	33.69%
>2,500 kWh	0.73%	7.74%	1.12%	11.96%	5.80%	29.64%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

33825663	Year	Month	57.3	Maximum Hourly Peak Price	
	2011	**1**	66.9	$2,237	
	2011	**2**	65.9	$3,001	
	2011	**3**		$3,001	
	2011	**4**		$1,080	
	2011	**5**		$2,964	
	2011	**6**		$3,001	
	2011	**7**	20822209	$2,038	$2,370
	2011	**8**	23721135	$3,001	2136
	2011	**9**	24659298	$1,438	
	2011	**10**		$797	
	2011	**11**		$2,991	
	2011	**12**		$1,017	
	2012	**1**		$387.10	
	2012	**2**		$120.60	
	2012	**3**		$2,999.99	
	2012	**4**		$1,047.86	
	2012	**5**		$1,024.51	
	2012	**6**	$1,819.26	$2,988.46	
	2012	**7**	$964.49	$1,940.62	
	2012	**8**	0.002925	$767.38	
	2012	**9**	0.002895	$1,580.58	
	2012	**10**		$896.90	
	2012	**11**		$738.04	
	2012	**12**		$500.91	
	2013	**1**		$1,050.80	
	2013	**2**		$591.53	
	2013	**3**		$1,045.08	
	2013	**4**		$3,231.04	
	2013	**5**		$843.98	
	2013	**6**	$1,776.99	$440.79	
	2013	**7**	$1,266.22	$1,149.88	
	2013	**8**		$617.28	
	2013	**9**		$4,900	
	2013	**10**		$1,193.26	
	2013	**11**		$1,379.99	
	2013	**12**		$794.09	
	2014	**1**		$5,441.92	
	2014	**2**		$1,273.95	
	2014	**3**		$5,280.85	
	2014	**4**		$926.43	
	2014	**5**		$612.17	
	2014	**6**	$511.45	$359.78	
	2014	**7**	$2,095.75	$703.33	
	2014	**8**		$629.25	
	2014	**9**		$353.42	
	2014	**10**		$568.36	
	2014	**11**		$1,770.91	
	2014	**12**		$538.01	
	2015	**1**		$495.37	
	2015	**2**		$1,538.66	
	2015	**3**		$681.47	
	2015	**4**		$607.26	
	2015	**5**		$708.32	
	2015	**6**	$661.19	$52.81	
	2015	**7**	$526.84	$1,247.92	
	2015	**8**		$294.87	
	2015	**9**		$1,049.17	
	2015	**10**		$36.56	
	2015	**11**		$34.07	
	2015	**12**		$112.98	

AVERAGE MAX PEAK -- SUMMER VS. WINTER

			% DIFFERENCE
2011	$2,370	$2,136	9.87%
2012	$1,819	$964	47.00%
2013	$1,776.99	$1,266.22	28.74%
2014	$511.45	$2,095.75	-309.77%
2015	$661.19	$526.84	20.32%
OVERALL	$48.44	$33.96	29.89%
	$1,428	$1,398	2.10%

Average Load Zone Prices, Summer Vs. Winter

Year	Month	SPP Average	On-Peak Average	Off-Peak Average
2011	**1**	**$34.22**	**$40.72**	**$28.84**
2011	**2**	**$56.77**	**$81.81**	**$34.00**
2011	**3**	**$27.75**	**$33.17**	**$22.43**
2011	**4**	**$31.27**	**$34.83**	**$28.15**
2011	**5**	**$33.13**	**$37.58**	**$29.46**
2011	**6**	**$42.29**	**$53.62**	**$31.45**
2011	**7**	**$41.82**	**$51.08**	**$34.84**
2011	**8**	**$126.26**	**$209.68**	**$44.62**
2011	**9**	**$38.14**	**$49.36**	**$28.31**
2011	**10**	**$28.35**	**$32.33**	**$25.08**
2011	**11**	**$27.77**	**$28.07**	**$27.50**
2011	**12**	**$26.42**	**$29.91**	**$23.54**
2012	**1**	$22.30	$23.87	$19.59
2012	**2**	$19.65	$20.92	$17.48
2012	**3**	$27.89	$34.34	$16.79
2012	**4**	$21.71	$25.36	$15.47
2012	**5**	$22.82	$27.14	$15.42
2012	**6**	$30.12	$37.41	$17.63
2012	**7**	$26.62	$31.15	$18.88
2012	**8**	$28.91	$34.53	$19.28
2012	**9**	$25.07	$28.43	$19.33
2012	**10**	$27.09	$30.34	$21.53
2012	**11**	$26.66	$29.51	$21.78
2012	**12**	$24.64	$26.09	$22.12
2013	**1**	$24.89	$25.23	$24.30
2013	**2**	$24.37	$25.31	$22.77
2013	**3**	$29.82	$31.09	$27.63
2013	**4**	$34.44	$36.65	$30.66
2013	**5**	$31.17	$34.36	$25.73
2013	**6**	$34.61	$41.01	$23.65
2013	**7**	$39.43	$48.86	$23.27
2013	**8**	$31.61	$37.12	$22.18
2013	**9**	$37.18	$44.81	$24.10
2013	**10**	$34.88	$40.75	$24.88
2013	**11**	$30.73	$33.95	$25.21
2013	**12**	$34.87	$35.16	$34.37
2014	**1**	$49.42	$42.64	$61.05
2014	**2**	$55.96	$64.65	$41.07
2014	**3**	$50.71	$52.65	$47.37
2014	**4**	$39.24	$42.27	$34.04
2014	**5**	$36.06	$41.19	$27.29
2014	**6**	$36.08	$40.43	$28.62
2014	**7**	$36.39	$42.68	$25.61
2014	**8**	$37.61	$44.62	$25.59
2014	**9**	$34.25	$38.71	$26.47
2014	**10**	$32.92	$37.30	$28.63
2014	**11**	$32.45	$41.40	$25.86
2014	**12**	$25.35	$27.58	$23.35
2015	**1**	$23.45	$26.06	$21.30
2015	**2**	$26.48	$25.63	$27.25
2015	**3**	$27.07	$28.80	$25.52
2015	**4**	$26.49	$32.30	$20.92
2015	**5**	$28.40	$32.17	$28.40
2015	**6**	$25.17	$30.61	$25.17
2015	**7**	$26.97	$31.55	$22.50
2015	**8**	$33.03	$46.23	$22.16
2015	**9**	$22.96	$26.82	$19.59
2015	**10**	$20.04	$22.91	$17.46
2015	**11**	$19.06	$21.98	$16.74
2015	**12**	**$17.02**	$20.46	$13.94

265.68	318.42	39.8025	
62.1275	90.935		
$192.76	$217.57	$27.20	
$27.68	$32.88	summer	
$245.17	$262.50	$32.81	
$35.71	$42.95	summer	
$36.08	$41.61		
$322.11	$349.68	$43.71	
	$188.01	$210.31	$26.29
	$27.03	$33.80	

$62.12	$33.21	46.54%
$27.68	$24.10	12.93%
$35.71	$30.65	14.17%
$36.08	$40.26	-11.59%
$27.03	$23.50	13.06%
$37.72	$30.34	19.56%

$90.94	$39.80	56.23%
$32.88	$27.20	17.27%
$42.95	$32.81	23.61%
$41.61	$43.71	-5.05%
$33.80	$26.29	22.22%
$48.44	$33.96	29.88%

Source: SNL Database

Generation by Source, AE, 2014

	2014 Number of MWhs	Total Retail MWhs	% of Total
gas	1480262	12572414	11.77%
coal	3624919		28.83%
nuclear	3047892		24.24%
renewables	**2,841,262**		22.60%
Total Generated by AE owned or contract	10994335		87.45%
Market Purchases (Total - Generation)		12572414	12.55%

Source: AE, Annual Performance Report, 2014

EES Rates, As Proposed BY SC/PC

Total Electric Use	Current EES Rate	Total $s Generated	What AE Reported	Proposed Rate	Total Generated	SC-PC Proposal	SC-PC Total Generated
4,205,282,364	0.004	16821129.46	$17,283,174	0.00246	$10,344,994.62	0.0028	$11,774,790.62
253,697,904	0.00466	1182232.233	$1,419,284	0.00246	$624,096.84	0.0028	$710,354.13
2,675,656,172	0.00522	13966925.22	$4,565,093	0.00246	$6,582,114.18	0.0028	$7,491,837.28
2,602,512,233	0.00274	7130883.518	$10,922,906	0.00246	$6,402,180.09	0.0028	$7,287,034.25
541,975,584	0.00349	1891494.788	$943,556	0.0024	$1,300,741.40	0.00273	$1,479,593.34
672,977,971	0.00068	457625.0203	$0	0.0024	$1,615,147.13	0.00273	$1,837,229.86
1,305,420,431	0	0	$48,853	None	$0.00	0.00273	$3,563,797.78
22,982,900	0.00202	46425.458	$27,013	0.00237	$54,469.47	0.0027	$62,053.83
228,127,372	0	0	None	None	$0.00	0.0027	$615,943.90
		41496715.69	$35,495,263		$26,923,743.74		$34,822,635.00

Optimal ENERGY Integrated Energy Resources

Assessing Austin Energy's Energy Efficiency and Demand Response Potential Through 2024

Prepared for

Sierra Club's Beyond Coal Campaign

by:

Optimal Energy, Inc.

October 2014

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SUMMARY OF FINDINGS

In Texas, Austin Energy has been a leader in reducing overall energy use and peak load through its energy efficiency, demand response, and building energy code and rating programs. The utility believes it is on course to meet a City Council-mandated goal to reduce overall peak load by a cumulative 800 MW between 2007 and 2020. However, Austin Energy has publicly stated that going beyond the 800 MW goal—either by increasing the 2020 goal or continuing to acquire additional savings through 2024—would be difficult without substantial increases in yearly budgets. This report finds that while Austin Energy may have some legitimate concerns based upon recent studies about going beyond the 800 MW goal, their concerns are likely over-stated. Our report finds:

- Austin Energy and its consultants have assumed future acquisition costs that are substantially higher than Austin Energy's own experience running its programs thus far
- Other utilities and jurisdictions with similar energy efficiency programs are continuing to enjoy and project future energy and peak demand reductions without cost increases of the scale projected by Austin Energy
- Austin Energy and its consultants have undercounted the impact that future code and rating programs and future federal lighting standards will have on meeting the current or expanded goals
- Austin Energy and its consultants–while recognizing the potential for additional residential demand response–have not looked at the role that additional commercial demand response could play in meeting expanded goals

Based upon our analysis, we believe that Austin Energy could meet a 1,000 MW or 1,200 MW DSM goal by the end of the 2024, with at least 200 MW of demand response as a subset of that goal. We agree that a 1,200 MW goal would be more challenging than a 1,000 MW goal, but believe both can be achieved cost-effectively, given that Austin Energy would have an additional four years to achieve it. Ultimately, it is the City Council that must decide whether to maintain the 800 MW goal of 2020, or raise it to 1,000 MW or 1,200 MW by the end of 2024, but we believe both – or some number in-between – are achievable based upon the available information. Table 1, below, summarizes the components of these alternate scenarios.

Table 1: Summary of Alternate DSM Scenarios

	Base Case (MW)	Extended Case (MW)
Savings to date (2007-2014)	340	340
Future code program savings	154	154
Remaining from DNV GL revised estimate through 2020	232	269
Additional savings 2021-2024	155	179
Total Efficiency Saving through 2024	**881**	**943**
plus Demand Response	212	292
Total 2024 Peak Savings	**1,093**	**1,235**

TERMS AND CONVENTIONS USED IN THIS REPORT

Electricity use is measured in two units. The measure of the instantaneous power being consumed at any time is given in kilowatts (kW) or megawatts (MW). In describing electric utilities and electric systems, this is often referred to as demand or capacity. Austin Energy's share in the Fayette Power Plant is 602 MW. The demand for power changes over the course of the day and throughout the year. The highest demand in any given year typically occurs on a hot weekday afternoon in the summer, when use of electricity for cooling is at its peak. Electric systems must have the ability to supply this "peak load" even though it only occurs for a relatively small percentage of the total hours in the year. The total amount of energy consumed over time is measured in kilowatt-hours (kWh) or megawatt-hours (MWh). This is the basis by which most electric consumers are billed. In 2013, Austin Energy sold approximatley 13 million MWh.

Demand-side management (DSM) refers to efforts to reduce customers' capacity needs, energy consumption, or both. DSM is usually divided into two major categories. Energy efficiency (EE) refers to actions that reduce the amount of energy required to provide customers with their desired energy services. This can be the result of more efficient equipment (e.g., high efficiency appliances) or improved operations. Demand response (DR) refers to actions to specifically reduce demand during times of peak load. This may be accomplished by reducing total energy consumption or by shifting consumption to other periods.

AUSTIN ENERGY'S SAVINGS TO DATE

Austin Energy has been engaged in energy efficiency programs for many years. From FY2006 through FY2012, Austin Energy's programs saved between 0.7% and 1.1% of sales from EE each year. These savings have been generating from spending that has been fairly consistent, between $11.9 and $13.7 million annually in residential and commercial incentives and rebates from FY2009 through FY2013 inclusive. This represents about 1% of Austin Energy's annual budget. In addition, Austin Energy also spends additional monies to administer these programs and to run Austin Energy's highly successful GreenBuilding programs, which are not reflected in these budgeted amounts. One metric used to compare EE programs is cost of net savings, which is simply annual spending divided by the annual program savings resulting from that spending. Austin Energy's recent results translate to a cost of between 11 and 15 cents per first-year kWh. Because the energy savings from efficiency measures last for many years, the average cost per "lifetime" kWh is much lower than this, likely on the order of 1 cent per kWh, far cheaper than the cost of either power market purchases or self-generation.

Savings come from a variety of programs across the residential, commercial, and industrial sectors. The largest contributors to savings are the building energy rating and codes programs, which together (across both residential and commercial sectors) account for 39% of savings in FY2013. The ratings programs count energy savings from new construction buildings for which a rating is conducted that finds energy performance above applicable energy code. The code savings are claimed from ALL new construction by Austin Energy's customers, as a result of Austin Energy's efforts to support an energy code more stringent than would otherwise be in place and to assist with trainings and technical support for purposes of compliance and enforcement. Recently, the ratings program for the multifamily sector has seen a dramatic increase in savings, achieving three times the savings in FY2013 as from the previous four years combined.

Austin Energy also engages in DR programs. Performance of these has been less consistent than for EE, falling steadily from 17 MW in FY2007 to 8 MW in FY2012, then jumping back to nearly 18 MW in FY2013. This increase was due to the "Load Cooperative" program, a voluntary program for demand rate commercial customers. Together with the EE savings, these reductions are helping Austin make progress towards its goal of reducting load by 800 MW by 2020, first adopted in the 2007 Austin Climate Protection Plan and reaffirmed in the 2010 Generation Resource and Climate Protection Plan.

A few notes about Austin Energy's reported savings. First, the savings reported are "gross savings," with no adjustments made for free-riders or spill-over; no net-to-gross ratio has been applied.[1] Second, in tracking accumulated savings towards their 2020 goal, Austin Energy does not remove savings from measures that have reached the end of the expected lifetime. Consider a CFL installed in 2007, which would have an expected lifetime of between 5 and 8 years. As of sometime between 2012 and 2015, the CFL would cease to operate. Unless its replacement also results in energy savings, the savings from the original CFL would typically be removed from reported cumulative program savings. To facilitate comparisons with Austin Energy's goals, we will adhere to their convention and not consider measure life.

AUSTIN ENERGY PLANNED DSM SAVINGS

As mentioned above, Austin Energy has committed to reducing their peak load by 800 MW by 2020. This goal is for all DSM, both EE and DR, and has only been expressed in terms of peak load, not energy consumption. A September 2014 presentation by Austin Energy stated that EE is "on track" to meet this goal.[2] To do so, Austin Energy needs an additional 424 MW in the

[1] A "free-rider" A program participant who would have invested in an energy efficiency measure even without the intervention of the program. Free riders add to program costs but do not contribute to net energy savings. Spill-over accounts for the opposite effect, where program spending results in efficiency savings not directly tied to compensation. The term "net-to-gross" refers to the overall effect of these two effects plus other effects whose details are not relevant here.

[2] Financial Analysis of Generation Task Force Report and Resolution 20140828-157. 24 September 2014.

seven years from 2014 to 2020 inclusive, or slightly less than 61 MW per year. This is more than they have achieved in any individual year since 2009, although 2007 and 2008 were both slightly more than that.

As reported in a potential study published in 2012 (see further info below), getting to 800 MW breaks out as 269 MW through program efforts from 2007 through 2011 (both EE and DR), 236 MW from 2012 through 2020 from load management and building codes, and 295 MW from 2012 through 2020 from EE.

DEVELOPING AN ALTERNATIVE DSM SCENARIO FOR AUSTIN ENERGY

To develop an alternative DSM scenario for Austin Energy, we begin by looking to estimates of DSM potential, both specific to Austin Energy and from elsewhere. Demand-side Management providers and stakeholders often wish to understand and predict the amount of energy savings that could be saved as a result of supporting programs and policies. Analyses that address this need are often referred to as "potential studies" or "market potential studies," because they estimate the potential for energy savings. This section reports on potential studies relevant to Austin Energy's service territory and programs.[3]

KEMA 2012 Market Potential Assessment

Austin Energy commissioned a study by KEMA (now DNV GL) to assess the potential for energy efficiency savings to contribute to the 800 MW by 2020 goal.[4] The study found that continuing Austin Energy's EE programs in a "business-as-usual" manner would achieve 231 MW between 2012 and 2020, compared to 295 MW needed to reach the 800 MW goal. The study also assessed scenarios with higher program incentive levels (and therefore budgets), finding that increasing customer incentives to 75% of measure costs would achieve 366 MW, while 100% incentives would achieve 492 MW.

Notable features of the KEMA potential study include the fact that it did not explicitly model savings from building energy rating or energy codes, despite the fact that Austin currently claims substantial savings from both of these sources. The study did include savings from high-efficiency new construction; this may cover savings that Austin Energy is capturing with its building rating programs. The potential study likely does not account for the code savings, which represent 17% of Austin's reported savings from FY2009 through FY2013. To the extent that Austin Energy continues to count savings from energy code efforts, the KEMA study may not have captured this potential.

One additional point bears mentioning with respect to this estimate. As noted earlier, both capacity and energy savings are relevant metrics for efficiency programs. Looking at the detailed data in the potential assessment, the ratio between these two values for the maximum achievable potential is 4,014 MWh/MW (see Tables 5-2 and 5-3). This ratio is a common metric in considering the performance and likely outcomes of efficiency measures and programs.

[3] In addition to these studies, Itron conducted a statewide Texas potential study in 2008 for the Texas Public Utility Commission. Changes in efficiency technology, energy prices, and policy factors since that time make those findings of limited relevance today.

[4] *Austin Energy DSM Market Potential Assessment.* Prepared for Austin Energy by DNV KEMA, 25 June 2012.

Austin Energy's reported savings for efficiency for the past several years indicate a different ratio, between 2,500 and 3,000 MWh/MW depending on the year. One interpretation of this is that Austin's current programs are more successful at acquiring savings from efficiency measures that generate greater on-peak savings, such as commercial cooling, residential pool pumps, etc. This difference will be addressed in discussion of the alternate scenario.

DNV GL Update

Recently, DNV GL revisited the 2012 potental study and provided information on likely changes to the assessed potential resulting form changes in technology and market conditions over the past few years. This "update" was not a complete revision of the 2012 study, but a revision to a few key parameters of the analysis and an assessment of the resulting changes in outputs. Most significantly, a reassessment of the avoided costs used to determine cost-effectiveness resulted in a 168 MW reduction in the maximum savings potential (i.e., under the 100% incentives scenario). The update also added 28 MW of potential as a result of faster-than-anticipated improvements in LED lighting technologies. Last, the study identified 60 MW of additional residential DR potential beyond current levels by 2020. The net result of these changes is a reduction of 75 MW in total potential by 2020.

The update also assesses the cost of achieving the estimated efficiency potential, with considerable attention paid to the projected rapid increases in cost of savings over the analysis period. This increase is attributed to two factors. First, based on the assumption that greater savings require higher incentive levels, "when the program offers a higher incentive level, it typically must offer that incentive level to everyone, including customers that would have been willing to participate at lower levels of incentives." Second, the assumption that nearly all of the opportunities for retrofit measures will be exhausted within the analysis window, based in turn on assumptions regarding maximum market adoption. We address these issues in more detail as part of the presentation of an alternative DSM scenario, below.

Other Relevant Estimates

We also looked to estimates of efficiency potential and demonstrated savings results from other jurisdictions to provide points of reference for the Austin-specific potential estimates. One challenge in doing so is that potential studies frequently report results in terms of energy savings rather than peak demand reduction. Where feasible, we have presented data in terms of peak demand reduction as well as energy reductions.

Potential Studies from Other Jurisdictions

We reviewed the literature for other relevant potential studies that may be applicable to or informative of the potential in Austin Energy's service territory. Often, analysts wishing to estimate efficiency potential without conducting a detailed, location-specific study look to results from nearby geographic regions, as climatic, economic, and building stock conditions are often similar in these areas.

The leading organization devoted to studying levels of energy efficiency is the American Council on an Energy Efficiency Economy (ACEEE). In recent years, ACEEE conducted statewide potential studies for Louisiana (2013) and Arkansas (2011).[5] The Louisiana study found that an achievable, gradual increase in program activity from 2014 through 2020 would reach cumulative energy savings of 4%, with an additional 1% savings from building codes. Looking farther into the future, ACEEE estimated cumulative program potential by 2030 (corresponding to 16 years of program delivery) of 16%. The Louisiana study does not report peak demand savings. In Arkansas, ACEEE found energy savings potential of 15% and peak savings of 20% over a 12 to 15 year period. As statewide analyses, neither of these studies are completely transferrable as estimates for the potential in Austin Energy's territory, for several reasons. First, ACEEE assess the potential for utility programs, building codes, industrial initiatives, and savings from public sector buildings in different "buckets" that do not necessarily align with Austin Energy's current or future delivery strategy. Second, ACEEE assesses cost-effectiveness from the customer's perspective, rather than from the utility or total societal perspective. This may lead to differences in potential estimates, but assessing the direction and magnitude of any resulting bias is beyond the scope of this report. Nevertheless, these studies demonstrate that energy savings potential on the order of 1% per year for several years is feasible in the region, as Austin Energy itself has demonstrated with it's recent results.

Realized Savings in Leading Jurisdictions

In addition to assessing energy efficiency potential in specific states, ACEEE prepares an annual report that ranks all states' achievement in energy efficiency. As part of this ranking, ACEEE calculates the annual energy savings as a percentage of usage. According to the most recent report, some 16 states are already achieving energy efficiency savings of at least 0.95% per year, which is roughly equal to what Austin Energy achieved in 2013. Of these 16 states, 6 are saving at least 1.5% per year.[6]

Furthermore, these levels of savings are not transient. For example, electric program savings in Massachusetts have increased from 1.3% of sales in 2010 to 2.3% in 2013, with planned 2014 savings of 2.6%. As discussed below, these savings have been accomplished with only minor increases in cost over the same period.

Summary of Potential Estimates

The table below summarizes the information presented above regarding potential estimates, expressed in terms of annual energy savings as a percent of sales. Austin Energy's savings have been comparable to leading programs. Importantly, as will be discussed in the next section, these levels of savings have been and are projected to remain feasible and achievable at reasonable costs. Potential studies represent a static view of markets and investments that are in fact continually changing along with changes in technology, customer preferences, and the economics of utility energy supply. More often than not, this results in new opportunities for efficiency. For example, a New York State potential study conducted in 1989 found an achievable potential of approximately 30% over 20 years. A follow-up to that study in 2003

[5] ACEEE also conducted an estimate of savings potential in Texas in 2007, but changes in efficiency technology, energy prices, and policy factors since that time make those findings of limited relevance today.

[6] *The 2014 State Energy Efficiency Scorecard*. ACEEE Report U1408. October 2014.

found a similar level of potential despite several years of efficiency efforts, changes in building code and equipment standards, and technology change.

Table 2: Annual Efficiency Program Savings (% of energy sales/year)

ACEEE Top 6 States	>1.5%
ACEEE Top 16 States	>0.95%
LA & AR Potential Studies	~1%
Austin Energy 2007-2013	0.7% - 1.1%

An Alternative DSM Scenario for Austin Energy

To facilitate discussion regarding the potential expansion of Austin Energy's EE and DR goals beyond 800 MW and beyond the year 2020, we considered the available data and analysis summarized above. Table 1 (repeated below) summarized the components of the analysis. The "extended case" refers to savings projections using an alternative assumption for future EE and DR program, as explained further in the sections that follow.

Table 3: Summary of Alternate DSM Scenarios

	Base Case (MW)	Extended Case (MW)
Savings to date (2007-2014)	340	340
Future code program savings	154	154
Remaining from DNV GL revised estimate through 2020	232	269
Additional savings 2021-2024	155	179
Total Efficiency Saving through 2024	**881**	**943**
plus Demand Response	212	292
Total 2024 Peak Savings	**1,093**	**1,235**

Savings to Date (2007-2014)

Savings through 2014 are as reported by Austin Energy through 2013 and estimated achievement in 2014[7]. As noted above, this estimate does not account for measure decay.

Future Code Savings (2015-2020)

Projected future savings from Austin Energy's code programs are included separately, because they are not included in the potential estimate. See Table 5-4 of the 2012 Market Potential Estimate.

Remaining from DNV GL Update (2015-2020)

The original estimate from the 2012 study for efficiency only, excluding building code programs, was 492 MW. The updated analysis reduced this to 357 MW. The original analysis

[7] Customer Energy Solutions Program Progress Report 2013-2014, Appendix Table 2.

also covered the period 2012 through 2020. Therefore, subtracting actual and projected savings from 2012 through 2013 (125 MW) leaves 232 MW of the revised potential estimate to be acquired over the 6 years from 2015 through 2020, or approximately 39 MW per year. This is taken as the base case. We also estimate an "extended" potential scenario that assumes that future efficiency savings in the KEMA potential study are achieved with a peak reduction emphasis more similar to Austin Energy's actual results to date. As noted earlier, the 2012 potential study estimates a higher ratio of energy to capacity savings (or, put another way, a lower ratio of capacity to energy savings) than Austin Energy's actual results. Our "extended case" estimate assumes that future efficiency programs achieve peak demand savings at a ratio mid-way between the potential study and the actual results of the last three program years.

Additional Savings (2021-2024)

To extend the alternative potential estimate for an additional four years, we start with the assumption that savings could continue to be achieved at the rate of the remaining savings in the DNV GL update (i.e., 39 MW per year). One likely source of at least part of these savings is coming 2020 standard for residential lighting efficiency specified in the Energy Independence and Security Act of 2007 (EISA). These savings were not included in either the 2012 potential estimate or the recent update, as they will occur beyond the 2020 time horizon of those analyses. Although these savings are not attributable to Austin Energy efficiency programs, EISA will result in load reductions in its service territory and therefore contribute to load reduction that affects generation planning. To the extent that Austin Energy's forecast and planning have not yet accounted for the EISA load reduction after 2020, they represent additional savings towards an expanded 2024 target. Regardless of the source of additional savings from 2021 through 2024, we estimate both a base case using DNV GL's results and an extended case with a lower MWh/MW ratio, as described above for the remaining potential from the DNV GL update.

Demand Response

We also conducted a separate analysis of the potential for demand response to continue contributing to the overall load reduction target. The table below summarizes this analysis. As with efficiency, we begin with the total reported savings to date. To this we add the recent estimate of additional DR potential from residential programs through 2020. We then developed a range of estimates of both residential and commercial DR from a variety of sources, including a national study conducted by the Federal Energy Regulatory Commission (FERC), information on Austin Energy's load-duration curve, and results from existing and pilot programs in Texas. These ranged from a low of 133 MW to a high of 292 MW. Using the mid-point of these estimates as the base case and subtracting out the achievement to date and the 60 MW of future residential DR already included from the DNV GL update leaves 57 MW of additional savings in the base case. Using the upper end of the DR estimate range brings the total additional savings to 136 MW.

Table 4: Alternative Demand Response Scenarios

	Base Case (MW)	Extended Case (MW)
Savings to date (2007-2014)	96	96
DNV GL new Res through 2020	60	60
Additional Res and C&I savings 2015-2024	57	136
Total 2024 Peak Reduction	**212**	**292**

Acquisition Costs of the Alternate Portfolio

Austin Energy's Current Acquisition Costs

The most recent Customer Energy Solutions report from Austin Energy reports the cost of 2013 energy efficiency in terms of both life cycle cost (i.e., cost divided by lifetime kWh saved) and the cost per peak kW reduced ($/kW) (Appendix, Table 1). The table presents the overall cost as $353 per kW saved, but this is the average cost over the entire portfolio, and therefore includes DR, which has a much lower cost per kW than does EE. Because the alternative portfolio puts greater emphasis on EE, we are interested in cost estimates for EE and DR separately. In attempting to assess Austin Energy's cost just for EE, we noted that the $/kW costs presented in Table 1 are substantially higher than the values that result from calculating these costs using the individual values for costs and savings presented in that same table. It is not clear why this is so, but it may be that the reported cost per kW includes some additional administrative or other costs that are not explicitly shown. To address this issue, we use the data presented and assume a proportional increase in costs over that which is calculated from the data presented. The result is an estimate of of $450/kW for residential and commercial EE together in 2013, compared with $137/kW for DR.

Future Acquisition Costs

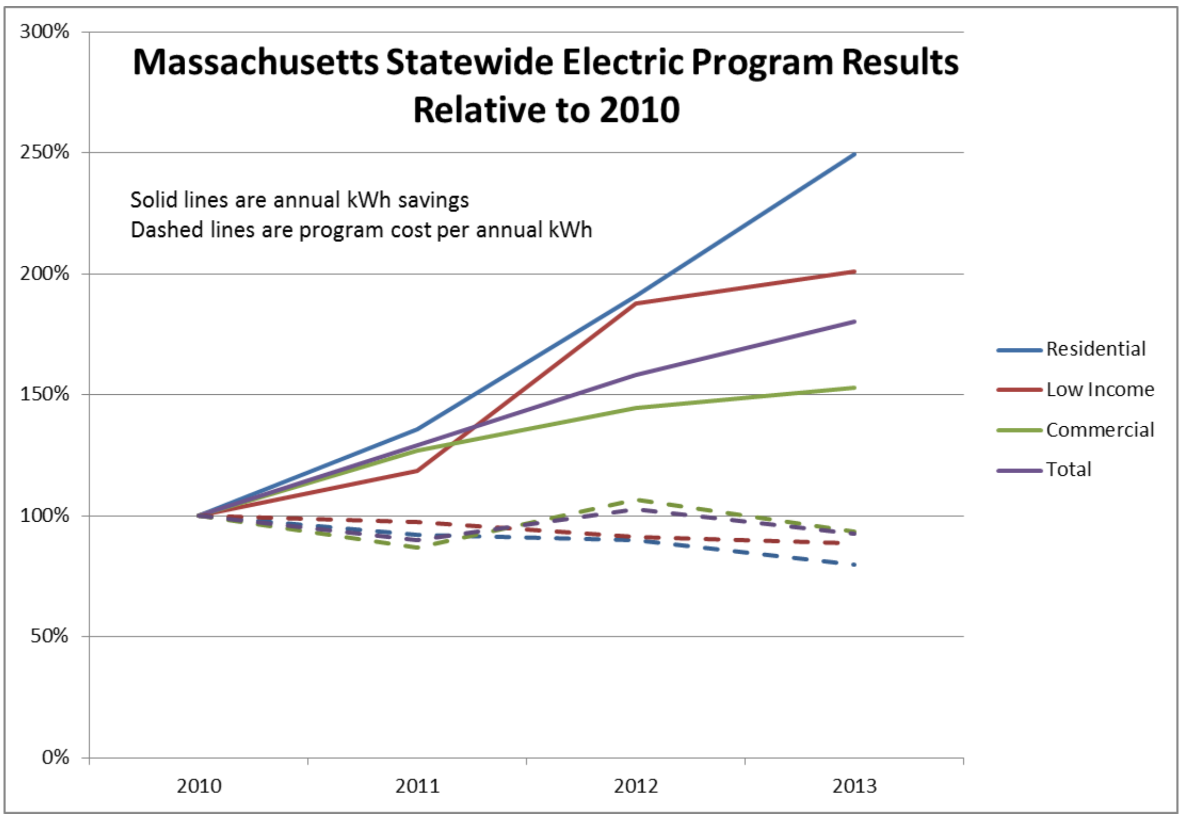
Looking to the estimated costs of future DSM savings, the DNV GL update assumes substantial increases, as described earlier. Based upon their analysis, Austin Energy assumed that each additional kW of DSM would cost $630/kW beginning in 2015, with a further 3.2% increase in cost each year thereafter. This is substantially higher than Austin Energy's realized costs for efficiency to date, and approaches the cost of newgas-fired generation.[8] In addition, the Resource Planning scenarios recently presented to City Council by Austin Energy assumed this cost (i.e., $630/kW) for savings beginning in 2015, and further than any kW saved beyond the 800 MW goal would cost substantially more, up to many thousands of dollars.[9] In fact, according to recent information provided by Austin Energy regarding their modeling, they assumed that any kilowatt saved beyond the 800 MW goal would cost more than $3,000 per kilowatt. Thus, Austin Energy's own scenarios assume any additional energy efficiency beyond the current goal would cost as much as a new coal plant. More importantly, such dramatic cost

[8] See "Investing in a Clean Future: Austin Energy's Resource, Generation and Climate Protection Plan to 2020 Updates," dated 9 October 2014.

[9] DNV GL Update, p. 6

increases have not been borne out in practice by leading efficiency programs. The figure below shows the most recent four years of results from Massachusetts' efficiency programs. It clearly shows that as savings have more than doubled in some sectors and increased by 50% overall, acquisition costs have actually decreased slightly. Furthermore, these results come after many years of substantial savings. As far back as 2007, Massachusetts acquired nearly 0.9% savings annually. Other research has found some small increases in program costs as programs mature. A regression analysis of dozens of years of program data found that each year of program maturity increases cost per annual kWh by 0.7 cents, at which rate it would take 13 years to double Austin Energy's acquisition costs, rather than just the one assumed by Austin Energy and its consultants.[10]

Figure 1: Relative Change in EE Program Costs and Savings over Time



We also note that Austin Energy's analysis fails to treat demand response programs – which tend to be less expensive a per-kilowatt basis – and energy efficiency programs differently, making expanded goals seem more expensive than they otherwise would be if achieved with a mix of both EE and DR.

[10] Plunkett, J., T. Love & F. Wyatt, "An Empirical Model for Predicting Electric Energy Efficiency Resource Acquisitions Costs in North America: Analysis and Application." *2012 ACEEE Summer Study on Energy Efficiency in Buildings.*

As noted earlier, part of the reason for the higher cost projections is the assumption that to continue capturing potential over time, higher incentives will be needed to induce more and more customers to participate. These higher incentives are assumed to be paid to all customers, regardless of their willingness to invest in efficiency measures. In reality, leading efficiency programs do not treat every customer the same, nor do they provide identical incentives for every project, particularly for commercial and industrial customers. In these programs, several strategies are used to match incentive payments to customer requirements, including custom negotiated incentives, standard offer programs, and upstream buy-downs. Furthermore, incentives can be raised or lowered over time in response to changing market conditions. Last, customers face many barriers to energy efficiency beyond the first-cost or financial hurdle. Aggressive efficiency programs include many components to address these barriers that go beyond providing financial incentives. Austin Energy is already implementing strategies of this type by engaging with the building industry to address code compliance and promote above-code construction. Together, these strategies can help programs reach substantial penetrations in the market without the need for dramatically increasing incentive payments.

Taken all together, the evidence above suggests that an expanded goal of between 1,000 and 1,200 MW of DSM by 2024 – with the assumption that at least 200 MW from Demand Response -- can be achieved at costs proportional to current acquisition costs, rather than at double, triple or several times these rates. It is also important to note that a substantial fraction of Austin Energy' s savings come from two programs lower per-kW costs than traditional energy efficiency programs: green building/building code programs and demand response. We recommend that generation plan scenarios be run with separate cost assumptions for energy efficiency programs, green building/building code programs, and demand response. By doing so, Austin Energy should be able to develop demand side management scenarios with more accurate cost estimates as part of future energy generation scenarios.