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Commercial Real Estate Program 2012 Impact Analysis- Add On Analysis

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Date: October 28, 2013

To: Rita Siong and Sarah Hall- NEEA

From: Collin Elliot and Jean Shelton

Subject Commercial Real Estate Program 2012 Impact Analysis
Add-On Analysis

This memorandum provides the results for additional analysis conducted following completion of the 2012 estimation of electricity savings for NEEA's Commercial Real Estate (CRE) Initiative. The memorandum titled "Commercial Real Estate Program 2012 Impact Analysis" contains a report on the original estimates of CRE impacts.

The add-on analysis consisted of two main tasks:

1. Update of 2012 results: Because many CRE participants did not have complete data for 2012 at the time of the original analysis, the results only included monthly impacts through October of 2012. This task called for incorporating new data for the end of 2012 and re-estimating the models for both Market Partner Program (MPP) and Competition participants.
2. Estimate impacts on an expanded set of MPP participants: There were many participants in the MPP channel of the CRE that were not included in the submitted set of buildings for the original 2012 impact estimates. This task involved adding those buildings to the MPP population and estimating impacts for this larger set of participants. Additionally, this task included reporting of the impacts associated with 2010 and 2011.

Before presenting the detailed results from these additional tasks, Table 1 shows a comparison of the aMW¹ savings for 2012 from the original analysis with the savings associated with the two add-on tasks. To be clear, the differences between the savings from the original report (second

¹ "aMW" stands for average megawatts, which is the megawatt hour (MWh) savings divided by 8,760.

column) and the revised analysis on the original set of buildings (third column) is due primarily to the inclusion of savings from November and December. The additional data had only minimal effects on the results of the statistical modeling. The difference in savings for the expanded set of buildings (fourth column) is due to both the additional MPP buildings, but the new buildings were also different enough from the original set of buildings to result in differences in the statistical modeling. There were not any additional competition buildings, so those results are the same.

Table 1: Comparison of Original Results with Results from Add-On Analysis

Program Channel	2012 aMW Savings Original Report	2012 aMW Savings Revised With Original Set of Buildings	2012 aMW Savings With Expanded MPP Buildings
Competitions	0.5279	0.6851	0.6851
MPP	0.1378	0.2292	0.5135
Combined	0.6657	0.9143	1.1986

The remainder of this memorandum is dedicated to presenting the detailed results from the additional tasks. Note, however, that this memorandum is intended as a supplement to original memorandum. Beyond the additional MPP participant buildings and billing data, there have been no substantive changes to the approach used to estimate the impacts². If necessary, the reader can refer back to the original memorandum preceding this addendum, which has detailed information on the program background, data sources, and methodology, but the focus of this memorandum is on the results.

Updated 2012 Analysis

The primary motive for this additional task was to produce a complete set of impacts for 2012 for both Competition and MPP buildings. The additional months of data represented a small fraction of the total energy and were unlikely to alter the model results, so the analysis called for applying the previous model to the new data without any effort to test alternate model specifications.

As expected, the results of the model were highly similar to the original evaluation. With respect to the overall model fit, the Competitions and MPP models had R squared values of 0.8821 and

² One aspect of the CRE program that was not clearly defined is the evolution of the deployment of Strategic Energy Management (SEM) from 2010 to 2012. For neither MPP or Competition channels was SEM fully deployed until 2012. Furthermore, the Competitions buildings are not considered to be full SEM implementation but rather work to embed foundational elements of SEM.

0.9137, respectively³. The parameter estimates for weather and impact parameters for the two models are presented in Table 2. Note that while the parameters for HDD are not statistically significant – not surprising given the predominance of gas heating -- all other parameters, including the variables intended to capture the program impacts, were statistically significant.

Table 2: Key Model Parameters for Updated 2012 Models

Channel	Variable	Parameter Estimate	T Value	Prob. T
Competitions	CDD, Base 60	0.001623	5.55	<.0001
	HDD, Base 60	-0.00014	-0.83	0.4091
	Impact-CDD Interaction	-0.00024	-6.68	<.0001
	Impact-HDD Interaction	-0.00027	-2.81	0.0051
Market Partners	CDD, Base 60	0.000907	7.67	<.0001
	HDD, Base 60	-0.00014	-1.63	0.1027
	Impact Dummy	-0.10793	-6.90	<.0001

With respect to how these regression statistics translate into program impacts, Table 3 and Table 4 show the baseline aMW, the actual aMW, and the estimated 2012 aMW savings by month and overall for the Competitions and MPP channels, respectively. The baseline aMW represents the energy consumption that would have occurred in the absence of the program and is calculated by adding the estimated savings back into the actual observed consumption. Given the similarity in the model results, the main difference in these results is the inclusion of the impacts for November and December. For the Competition results, which accounted for degree day interaction in the impact parameters, the inclusion of these two cold months logically adds substantial savings to the 2012 total. The total 2012 Competition savings represent 5.9% of the baseline aMW, compared to 5.5% for the previous analysis.

³ The original set of impacts had R squared values of 0.8788 for the competitions and 0.9212 for MPP.

Table 3: 2012 Estimated Impacts for Competition Participants for Updated 2012 Models

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings
JAN2012	1.103	0.999	0.1033	9.4%
FEB2012	1.058	0.967	0.0913	8.6%
MAR2012	1.023	0.940	0.0822	8.0%
APR2012	0.929	0.883	0.0461	5.0%
MAY2012	0.896	0.869	0.0271	3.0%
JUN2012	0.881	0.859	0.0223	2.5%
JUL2012	0.938	0.896	0.0414	4.4%
AUG2012	1.001	0.944	0.0566	5.7%
SEP2012	0.923	0.892	0.0307	3.3%
OCT2012	0.832	0.802	0.0295	3.6%
NOV2012	0.979	0.915	0.0642	6.6%
DEC2012	1.033	0.942	0.0903	8.7%
Total	11.595	10.910	0.6851	5.9%

For the results in Table 4, the implementation of MPP recommendations (measures and/or operational improvements) increased throughout 2012, so the observed impacts – and percent savings – increase over time. The inclusion of the full year means that three additional buildings with impacts from late 2012 are included in the results. With these additional buildings, the 2012 savings represent 5.2% of baseline, compared to 3.6% for the previous set of results.

Table 4: Estimated Impacts for MPP Participants for Updated 2012 Models

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings	Buildings with Implemented Actions
JAN2012	0.363	0.353	0.0098	2.7%	7
FEB2012	0.368	0.358	0.0103	2.8%	8
MAR2012	0.351	0.336	0.0149	4.2%	11
APR2012	0.345	0.327	0.0176	5.1%	15
MAY2012	0.342	0.324	0.0180	5.2%	16
JUN2012	0.364	0.343	0.0208	5.7%	19
JUL2012	0.395	0.373	0.0219	5.5%	20
AUG2012	0.398	0.376	0.0219	5.5%	20
SEP2012	0.371	0.349	0.0219	5.9%	20
OCT2012	0.353	0.330	0.0232	6.6%	21
NOV2012	0.360	0.335	0.0245	6.8%	24
DEC2012	0.380	0.355	0.0245	6.4%	24
Total	4.389	4.160	0.2292	5.2%	

Table 5 shows the CRE Initiative combined savings for the updated model. Overall, the 2012 savings are a combined .9143 aMW, compared to .6657 for the previous results. It is important to note that the difference is due almost exclusively to the inclusion of November and December in the summary. The total savings as a percentage of baseline is 5.7% compared to 5.1% for the previous results.

Table 5: Combined CRE Initiative 2012 Estimated Impacts for Updated 2012 Models

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings
JAN2012	1.466	1.353	0.1131	7.7%
FEB2012	1.427	1.325	0.1016	7.1%
MAR2012	1.373	1.276	0.0971	7.1%
APR2012	1.274	1.210	0.0637	5.0%
MAY2012	1.239	1.194	0.0451	3.6%
JUN2012	1.245	1.201	0.0431	3.5%
JUL2012	1.333	1.270	0.0633	4.7%
AUG2012	1.398	1.320	0.0786	5.6%
SEP2012	1.294	1.241	0.0526	4.1%
OCT2012	1.185	1.132	0.0528	4.5%
NOV2012	1.339	1.250	0.0886	6.6%
DEC2012	1.412	1.298	0.1148	8.1%
Total	15.984	15.070	0.9143	5.7%

Estimate of Impacts for Expanded MPP Population

The expanded population of MPP participants included 11 new buildings with data suitable for analysis added to the original 24 buildings. Table 6 shows the number of buildings and total square feet by location for new buildings, those from the previous analysis, and overall. Ten of the 11 new buildings are from Seattle and are much larger on average than the buildings from the original analysis. Different participants and larger buildings could exhibit different savings for a number of reasons. Given that the square footage from new buildings represents 65% of the total, the set of buildings is potentially quite different from the original analysis and could produce substantially different results.

Table 6: Buildings, Square Feet, for MPP Buildings in Expanded Population

City	From Previous Model				All	
	No		Yes			
	Buildings	Total SQFT	Buildings	Total SQFT	Buildings	Total SQFT
Boise	0	0	8	369,944	8	369,944
Portland	0	0	2	190,830	2	190,830
Seattle	10	3,553,671	4	496,408	14	4,050,079
Spokane	1	211,044	10	928,571	11	1,139,615
All	11	3,764,715	24	1,985,753	35	5,750,468

Given that the new buildings are so different from the original modeled participants, it would not have been appropriate to apply the previous model specification without looking at alternatives⁴. After testing a variety of model specifications on the expanded set of MPP buildings, the final model included impacts based on interaction with degree days. This means the model specification is the same as that used for the Competition participants, except that the program impacts are not isolated to a single calendar year. It is generally preferable to model the impacts this way because it helps to capture any seasonality and regional differences associated with the savings. This model specification resulted in both an inferior model fit and inconsistent impact parameters when used in the original analysis. However, the expanded set of MPP buildings had more months of post-participation data, which meant that there was more data to represent the seasonality.

The overall model fit for the expanded MPP model was good, with an R squared of .9275. The parameter estimates for the weather and impact variables are presented in Table 7. The parameter estimates are the correct sign and statistically significant with the exception of the HDD. The HDD result is likely due to the high share of non-electric heating.

Table 7: Key Model Parameters for Expanded MPP Model

Variable	Parameter Estimate	T Value	Prob. T
CDD, Base 60	0.00100049	9.64	<.0001
HDD, Base 60	0.00011054	1.75	0.0812
Impact-CDD Interaction	-0.00021617	-7.24	<.0001
Impact-HDD Interaction	-0.00018505	-2.49	0.0131

⁴ While details are in the original memorandum, the model specification for the first 2012 analysis used simple dummy variables to capture the program impacts and did not interact them with weather.

The units for the two impact parameters are kWh per square foot for the respective monthly degree days. Total impacts require multiplying the parameters by the monthly degree days and the participant square footage. After converting the total impacts to aMW, Table 8 presents a summary of the savings along with the number of participant buildings and square footage.

Table 8: Buildings, Square Feet, and Savings by Month and Year for Expanded MPP Model

Month	Year								
	2010			2011			2012		
	Participant Buildings	Participant SQFT	Total aMW Savings	Participant Buildings	Participant SQFT	Total aMW Savings	Participant Buildings	Participant SQFT	Total aMW Savings
Jan	0	0	0.0000	6	2,537,298	0.0341	18	4,562,546	0.0685
Feb	0	0	0.0000	6	2,537,298	0.0362	19	4,600,326	0.0633
Mar	1	278,426	0.0023	8	2,834,744	0.0333	22	4,970,763	0.0615
Apr	1	278,426	0.0018	11	3,326,142	0.0326	26	5,190,983	0.0384
May	2	648,426	0.0025	11	3,326,142	0.0176	27	5,222,977	0.0216
Jun	2	648,426	0.0016	15	4,045,702	0.0097	30	5,453,229	0.0156
Jul	3	904,426	0.0034	16	4,389,002	0.0129	31	5,543,257	0.0264
Aug	3	904,426	0.0037	17	4,467,161	0.0199	31	5,543,257	0.0297
Sep	3	904,426	0.0021	18	4,562,546	0.0170	31	5,543,257	0.0161
Oct	3	904,426	0.0041	18	4,562,546	0.0286	32	5,649,257	0.0307
Nov	3	904,426	0.0096	18	4,562,546	0.0600	35	5,750,468	0.0614
Dec	5	2,404,020	0.0309	18	4,562,546	0.0712	35	5,750,468	0.0802
Total	5	2,404,020	0.0621	18	4,562,546	0.3730	35	5,750,468	0.5135

Table 9 presents the annual savings again, but also includes the baseline (actual consumption without impacts), actual consumption, percent savings, and the average number of participant buildings and square feet.

Table 9: Annual Summary with Percent Savings for MPP Model

Year	aMW without Program	Actual aMW	aMW Savings	Percent Savings	Average Participant Buildings	Average Participant SQFT
2010	1.592	1.530	0.0621	3.9%	2.2	731,655
2011	8.236	7.863	0.3730	4.5%	13.5	3,809,473
2012	11.286	10.773	0.5135	4.6%	28.1	5,315,066

Finally, Table 10 combines the results from the updated Competition buildings with those from the expanded MPP analysis. This summary represents the total estimated 2012 CRE savings, which represent 5.2% of the baseline consumption. These estimated savings are based on analysis of the best data available, but it was impossible to account for all factors that could have hypothetically accounted for the savings. Therefore, it is important to stress that while these results provide evidence of savings resulting from NEEA's activities, there was not sufficient information available to cite these results indicative of the effectiveness of the program.



April 26, 2013

Commercial Real Estate Program 2012 Impact Analysis

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Date: June 14, 2013

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Subject Commercial Real Estate Program 2012 Impact Analysis

This memorandum serves as a report on analysis that Itron performed to estimate 2012 electricity savings for participants in the NEEA's Commercial Real Estate (CRE) Initiative. This report identifies the data sources used in the analysis, describes the methodology used to estimate program impacts, and summarizes the results of the analysis.

NEEA's CRE Initiative started in 2007 and engages the Northwest's commercial office real estate market to adopt Strategic Energy Management (SEM) practices, demonstrating energy efficiency as a powerful competitive advantage. NEEA accomplishes adoption of SEM within this target market by working with real estate firms and professionals engaged in the development, management, and operations of commercial office buildings. The CRE Initiative deploys its SEM through two main channels. The first is the Market Partners Program (MPP), which works with leading real estate firms as a coaching process with the goal of making SEM a standard practice. The second is through office efficiency competitions (Competitions), in which the CRE Initiative works with firms, managers, and building operators to adopt components of SEM. The Competitions are called "Kilowatt Crackdown" (KWCD) and "CarbonFourSquare" (C4S).

This analysis focused on two groups of buildings. The first group was buildings that are part of the MPP that implemented a number of both operational and capital improvements as a result of their participation in the program. The second group was a set of buildings that participated in the 2011 Competitions and that implemented a number of additional capital and operational improvements following their participation. That is, they took actions that went beyond what they did as part of their participation in the Competitions.

The analysis conducted for this study relied on multiple data sources, including:

Billing Records: These data consisted of up to four years of monthly energy usage for all meters associated with each CRE Initiative participant building and included all fuels. The analysis also used these data to identify which of the buildings had natural gas. These data were “calendarized”¹ and summarized by month for each building.

Building Information: The program relies in part on the Energy Star Portfolio manager, which has information on building occupancy, size, shares heated/cooled, etc. Lacking a longitudinal component, most of these data were not useful for the billing analysis. The analysis primarily used these data for building square footage, location (for merging with weather data), and identifying which channel of the program the building was associated with.

Program Participation: There were two sources of participation data. The first was a set of workbooks maintained by the Market Partners, which record the various capital and operational improvements that the program recommends, as well as their implementation dates (if adopted). The second was the results of a “Quick Survey” by NEEA’s implementers for Competitions participants, which showed the additional actions followed by buildings involved in the 2011 KWCD and C4S Competitions.

Weather: Historical daily temperature averages, minimums, and maximums for the primary locations of CRE Initiative participants (Portland, Oregon; Boise, Idaho; Seattle, Washington; and Spokane, Washington). The analysis used these data to calculate monthly heating- and cooling-degree days (CDD and HDD) at multiple base temperatures.

The analysis relied on data for a total of 53 CRE participant buildings. Twenty of these are associated with the 2011 Competitions and the rest are involved in the MPP channel. The analysis excluded six of the MPP buildings for two reasons. First, three had long-term substantial vacancies that would bias the results. Second, three had an insufficient amount of pre-impact data,² which would not allow for establishing baseline consumption patterns.

¹ “Calendarization” refers to a process of taking billing data that are on uneven billing intervals and transforming them so that all buildings have energy use standardized to the same calendar year and month.

² An additional six MPP buildings had implementation dates that came after the last full month of billing data. The analysis used these in estimating the models, but Itron removed them in the later summaries of impacts so as to not distort the percentage savings per building.

Table 1 shows the number of buildings (modeled, excluded from the model, and overall), total square feet, and percent with gas broken out by channel and location.

Table 1: Buildings, Square Feet, and Percent with Gas for Population and Modeled Subset

Channel/City		CRE Participant, Modeled			CRE Participant, Not Modeled			All		
		N	Total SQFT	Percent with Gas	N	Total SQFT	Percent with Gas	N	Total SQFT	Percent with Gas
Competitions	Portland	15	4,028,412	66.7%	na	na	na	15	4,028,412	66.7%
	Seattle	5	2,456,291	60.0%	na	na	na	5	2,456,291	60.0%
MPP	Boise	10	819,274	90.0%	3	98,722	100.0%	13	917,996	92.3%
	Portland	2	190,830	100.0%	na	na	Na	2	190,830	100.0%
	Seattle	4	496,408	75.0%	2	123,000	50.0%	6	619,408	66.7%
	Spokane	11	990,346	100.0%	1	211,044	100.0%	12	1,201,390	100.0%
All		47	8,981,561	80.9%	6	432,766	83.3%	53	9,414,327	81.1%

Impact Estimation Methodology

For several reasons, the analysis estimated impacts for the 2012 CRE Initiative participants separately for buildings in the two different program channels (MPP and Competitions). First, the nature of the effects and availability of data make it necessary to model the impacts differently. For the MPP buildings, the impacts are based on the documented implementation dates of different capital and operational improvements that took place gradually over an extended period of time. In contrast, impacts for the Competitions buildings are based on actions/improvements assumed to apply to all of 2012. While there might be an implementation timeline, it is not as extended and there are not the data to support it in the same way as the MPP sites. Second, the MPP participation is more varied in terms of geography, with a good share of buildings in Boise and Spokane, which have substantially different climates from Portland and Seattle.³ Finally, the varying historical participation patterns of Competitions participants make it difficult to establish a pure baseline with no program effects, so the analysis can only examine the incremental savings relative to 2011 participation.

³ Further disaggregation for the modeling by geography, however, would have resulted in too few sites to conduct a reliable analysis. For example, to break out the Competitions building by city would have left Portland with only five buildings.

The estimation of impacts used a regression analysis that models energy usage (EUI, or kWh per square foot) as a function of weather, calendar variables, and participation in the program. With both time (month and year) and cross-sectional dimensions, the data lend themselves to analysis approaches developed for panel data. In this case, the analysis was performed with SAS software, using the PANEL procedure, which is specifically designed to estimate a number of linear models associated with this particular data structure. The model applied for this analysis is called a one-way fixed-effects model. In the model nomenclature, “one-way” means that only cross-sectional effects were modeled and “fixed effects” means that there are unmeasured differences among sites that the analysis accounts for with site-specific parameters.

The analysis for both Competitions and MPP buildings considered dozens of different sets of independent variables, primarily varying the CDD and HDD base temperatures and the type of variables used to represent program impacts. The analysis assessed the model results for goodness of fit as well as the statistical significance and interpretability of parameters. While the results showed a general consistency across the many combinations of independent variables, the final model specifications for the Competitions and MPP models are shown in Equation 1 and 2, respectively.

Equation 1: Final Model for Competitions Building Impacts

$$EUI_{it} = \alpha_i + \beta^{CDD} \times CDD_{it} + \beta^{HDD} \times HDD_{it} + \sum_{m=1}^{11} (\beta^m \times m) + \beta^{ProgHDD} \times ProgHDD_{it} + \beta^{ProgCDD} \times ProgCDD_{it} + \varepsilon_{it}$$

Where...

- EUI_{it} = energy use intensity (kWh per square foot) for site i at time t
- α_i = site intercept
- β^{HDD} = parameter estimate for heating degree days (base 60)
- β^{CDD} = parameter for cooling degree days (base 60)
- β^m = parameters for series of monthly dummy variables for January through November
- $\beta^{ProgHDD}$ = parameter for program and HDD interaction
- $\beta^{ProgCDD}$ = parameter for program and CDD interaction
- ε_{it} = error for site i at time t

Equation 2: Final Model for MPP Building Impacts

$$EUI_{it} = \alpha_i + \beta^{CDD} \times CDD_{it} + \beta^{HDD} \times HDD_{it} + \sum_{m=1}^{11} (\beta^m \times m) + \beta^{Prog} \times Prog_{it} + \varepsilon_{it}$$

Where...

- EUI_{it} = energy use intensity (kWh per square foot) for site i at time t
- α_i = site intercept
- β^{HDD} = parameter estimate for heating degree days (base 60)
- β^{CDD} = parameter for cooling degree days (base 60)
- β^m = parameters for series of monthly dummy variables for January through November
- β^{Prog} = parameter for program implementation
- ε_{it} = error for site i at time t

In both final model specifications, the base monthly EUI^4 is a function of HDD and CDD and monthly effects. For the Competitions buildings, the effect variables cross a dummy variable for 2012 (the year in which the additional activities are expected to produce savings) with the monthly HDD and CDD. For the MPP buildings, the effect of the program is simply a binary variable that is set to one starting at the date of implementation. For the Competitions buildings, Itron made the decision to model the program impacts in terms of weather because the specific actions in some cases could be more relevant to heating or cooling end uses, so this approach allowed for the model to capture any seasonal variation associated with the program. For the MPP buildings, Itron used a simple binary variable because many buildings had well under a full year of data following implementation, so there was not enough information for the model to capture any underlying seasonality to the savings.

Impact Estimation Modeling Results

The first result of interest is the overall model fit based on the model R squared, which indicates the percentage of variability in the dependent variable explained by the model. The Competitions and MPP models had R squared values of 0.8788 and 0.9212, respectively. These are both high R squared values for this type of impact estimation, which suggests that the results of both models are generally reliable.

⁴ Itron made the decision to use the EUI as the dependent variable primarily because it puts all sites on the same scale, which helps to minimize heteroskedasticity in the model residuals.

Having confirmed that the models fit the data well, the next set of statistics is the parameters for the independent variables in the model. While there are dozens of variables in the model, the statistics for those of most interest are presented in

Table 2.⁵ The impact variables for both Competitions and MPP models are negative – indicating that the programs are reducing energy consumption – and statistically significant.⁶ This is both the hypothetical and desirable result. One less desirable result is that the HDD has a negative sign. One would generally expect cold temperatures to result in an increase in consumption. Nevertheless, the HDD parameters for both models are not statistically significant, and given the large share of gas associated with the buildings (see Table 1), it is not surprising that there is not enough electric heating to result in a positive and statistically significant HDD parameter.

Table 2: Key Model Parameters

Channel	Variable	Parameter Estimate	T Value	Prob. T
Competitions	CDD, Base 60	0.00163	5.48	<0.0001
	HDD, Base 60	-0.00018	-1.05	0.2956
	Impact-CDD Interaction	-0.00024	-5.77	<0.0001
	Impact-HDD Interaction	-0.00027	-2.85	0.0046
MPP	CDD, Base 60	0.000855	7.21	<0.0001
	HDD, Base 60	-0.00012	-1.17	0.2416
	Impact Dummy	-0.08248	-4.90	<0.0001

Because the model specification is based on EUIs, determining total program savings requires some translation of the parameters. First, Itron needed to multiply the parameters related to weather by HDD and CDD in each month to get the total EUI in each month. Next, Itron multiplied the EUIs by the square footage for each building to get the total energy consumption and savings. Itron then summarized these across all buildings to determine the total savings for both Competitions and MPP buildings and the overall CRE Initiative.

⁵ The parameters for the individual sites and monthly dummy variables are important because they account for variability in energy consumption, but unlike the variables in

Table 2, they are not expected to be of a particular sign and their statistical significance is not as important in assessing the validity of the model.

⁶ In Table 2, the “T Value” is the test statistic used to determine whether the observed parameter is statistically significant. The “Prob. T” is the probability that the T value could have occurred by chance. Any value smaller than 0.05 – indicating that the parameter would appear randomly fewer than 5 times out of 100 – is considered to be statistically significant.

Table 3 and Table 4 show the baseline aMW⁷, the actual aMW, and the estimated 2012 aMW savings by month and overall for the Competitions and MPP channels, respectively. The baseline aMW, which represents the estimate of what would have happened in the absence of the program, is calculated by taking the actual aMW and adding in the estimated aMW savings. Note that the tables only present the results through October 2012. This is because at the time of the analysis, complete data through 2012 were not available for all buildings, so the inclusion of November and December would be incomplete and misleading in terms of the total consumption and impacts.

Table 3: 2012 Estimated Impacts for Competition Participants

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings
JAN2012	1.102	0.999	0.1023	9.3%
FEB2012	1.057	0.967	0.0904	8.5%
MAR2012	1.022	0.940	0.0815	8.0%
APR2012	0.929	0.883	0.0457	4.9%
MAY2012	0.896	0.869	0.0269	3.0%
JUN2012	0.881	0.859	0.0223	2.5%
JUL2012	0.938	0.896	0.0416	4.4%
AUG2012	1.001	0.944	0.0570	5.7%
SEP2012	0.923	0.892	0.0309	3.3%
OCT2012	0.832	0.802	0.0293	3.5%
Total	9.580	9.052	0.5279	5.5%

⁷ “aMW” stands for average megawatts, which is the MWh divided by 8,760.

For the results in Table 4, it is important to remember that the implementation of MPP recommendations increased throughout 2012, so the observed impacts – and percent savings – increased over the year. To help make this clear, the table includes the cumulative number of buildings that had implemented recommendations by that calendar month. While the overall 2012 savings represent 3.6% of what would have happened without the program, in October, when all the buildings had implemented their recommendations, the percent savings is 5.2%.

Table 4: Estimated Impacts for MPP Participants

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings	Buildings with Implemented Actions
NOV2011	0.360	0.352	0.0075	2.1%	7
DEC2011	0.367	0.359	0.0075	2.0%	7
JAN2012	0.354	0.347	0.0075	2.1%	7
FEB2012	0.359	0.351	0.0079	2.2%	8
MAR2012	0.341	0.329	0.0114	3.3%	11
APR2012	0.334	0.320	0.0134	4.0%	15
MAY2012	0.331	0.318	0.0137	4.1%	16
JUN2012	0.351	0.335	0.0159	4.5%	19
JUL2012	0.381	0.364	0.0167	4.4%	20
AUG2012	0.383	0.367	0.0167	4.4%	20
SEP2012	0.357	0.341	0.0167	4.7%	20
OCT2012	0.340	0.322	0.0177	5.2%	21
Total	4.259	4.106	0.1528	3.6%	21

Table 5 shows the CRE Initiative combined savings. There are two characteristics to this table that require some discussion. The first is the inclusion of November and December 2011. These two months include savings for the MPP program only, and Itron included them so that the impacts for this component of the program would cover a full year. The second characteristic is the inclusion of two total rows (in bold italics). The first total row is for 2012 only, and is the sum of both MPP and Competitions savings from January through October of 2012. The second total row is the total for November 2011 through October 2012, which includes the estimated savings from 2011 for the MPP component.

Table 5: Combined CRE Initiative 2012 Estimated Impacts

Month	Baseline aMW	Actual aMW	aMW Savings	Percent Savings
NOV2011*	0.360	0.352	0.0075	2.1%
DEC2011*	0.367	0.359	0.0075	2.0%
JAN2012	1.456	1.346	0.1098	7.5%
FEB2012	1.417	1.318	0.0983	6.9%
MAR2012	1.362	1.270	0.0928	6.8%
APR2012	1.263	1.204	0.0592	4.7%
MAY2012	1.227	1.187	0.0407	3.3%
JUN2012	1.232	1.194	0.0382	3.1%
JUL2012	1.319	1.260	0.0584	4.4%
AUG2012	1.384	1.311	0.0738	5.3%
SEP2012	1.280	1.233	0.0476	3.7%
OCT2012	1.172	1.125	0.0471	4.0%
<i>2012 Total</i>	<i>13.112</i>	<i>12.447</i>	<i>0.6657</i>	<i>5.1%</i>
<i>Total</i>	<i>13.839</i>	<i>13.158</i>	<i>0.6807</i>	<i>4.9%</i>

*These two months include savings for the MPP program only.

Table 10: Combined 2012 CRE Savings with Updated Competition and Expanded MPP Buildings

Month	Participant Buildings	Participant SQFT	Baseline aMW	aMW Savings	Percent Savings
Jan	38	11,047,249	1.953	0.1718	8.8%
Feb	39	11,085,029	1.933	0.1546	8.0%
Mar	42	11,455,466	1.891	0.1437	7.6%
Apr	46	11,675,686	1.789	0.0846	4.7%
May	47	11,707,680	1.734	0.0487	2.8%
Jun	50	11,937,932	1.804	0.0380	2.1%
Jul	51	12,027,960	1.926	0.0678	3.5%
Aug	51	12,027,960	1.981	0.0863	4.4%
Sep	51	12,027,960	1.874	0.0468	2.5%
Oct	52	12,133,960	1.796	0.0603	3.4%
Nov	55	12,235,171	2.044	0.1256	6.1%
Dec	55	12,235,171	2.156	0.1705	7.9%
Total	55	12,235,171	22.881	1.1986	5.2%