Item 6: Weather-Sensitive ERS Pilot Project

John Dumas
Director Wholesale Market Operations

Board of Directors
ERCOT Public
December 10, 2013

Background

- **ERCOT Board approved Weather Sensitive (WS) Emergency Response Service (ERS) Pilot Project in March 2013 to test an ERS product with demand reduction capability that varies based on weather.**
- **WS ERS Pilot Features:**
  - Dispatched as early as EEA Level 1
  - Fleet-wide testing of Pilot Resources – 8 tests (2 per month)
  - Maximum of 8 actual EEA deployments
  - Maximum 3-hour duration for a deployment
  - Paid based on actual performance with accelerated reductions to discourage over-offering
  - QSE allowed to increase or decrease number of sites each month within specified limits
- **Procured for June 2013 through September 2013 Contract Period**
- **Pilot cost – approximately $96k**

Pilot Purposes

1. **Evaluate the ability of weather-sensitive Loads to provide dispatchable demand response during summer system conditions**

   - **Fleet MW Reductions**
     - Fleet obligation 2.6 MW
     - Average reduction over 8 tests – 1.78 MW (Range 1.39 – 2.35 MW)
     - QSE deployment issues affected test results on all but last test
   - **QSE Payment reductions will be imposed for over-offering**

2. **Evaluate the ability of weather-sensitive Loads to provide dispatchable demand response during summer system conditions**

   - **3 Loads offered by 2 QSEs**
   - **2 Loads awarded – 1 QSE**
     - 1 residential increased from 1,238 to 2,355 sites
     - 1 non-residential increased from 29 to 64 sites

Pilot Purposes (continued)

3. **Evaluate deployment impacts on end-use customers**

   - **Survey questionnaire has been designed and is being administered by the QSE**
   - **Survey results not available at this time … results will be reported to Demand Side Working Group when complete**

4. **Identify any unforeseen challenges in procuring, deploying and evaluating the performance of weather-sensitive Loads**

   - **Participating DR Provider improved their deployment system**
   - **DR Provider access to advanced meter interval data is important to managing of these programs**
   - **Payment reductions create incentives for DR Providers to submit reasonable offers and to correct performance issues**
   - **ERCOT evaluation methodology refined**

Summary and Recommendation

- **2,355 residential sites and 64 non-residential sites provided 2.35 MW of dispatchable demand reduction capacity**
- **Due to deployment issues the QSE was deemed to have been short of its obligation**
- **Payment reduction will be imposed – pilot cost approximately $96k**
- **Improvements identified for performance evaluation and incorporated in NPRR 571**
- **For further details, see Final Report on ERCOT Weather Sensitive ERS Pilot Project**

ERCOT recommends that the Protocols be revised to allow weather-sensitive Loads to participate in ERS

Final Report
ERCOT Weather Sensitive Emergency Response Service Pilot Project
November 2013

ERCOT provides this final assessment of the Weather Sensitive Emergency Response Service (ERS) pilot project in accordance with the Governing Document for the Weather Sensitive Emergency Response Service Pilot Project ("Governing Document"), which was approved by the ERCOT Board of Directors on March 19, 2013.[1] This report summarizes ERCOT's analysis of data concerning the procurement, deployment, and performance of participating Pilot Resources.[2]

Pilot Overview

The Weather Sensitive ERS pilot project was conducted to evaluate the efficacy of allowing Loads with demonstrated weather sensitivity to participate in ERCOT's ERS program, given the difficulties these Loads face in participating in ERCOT's conventional ERS program. The pilot project ran from June 1, 2013 to September 30, 2013 and included 2.6 MW of Load. Only one QSE representing a single demand response provider participated in the pilot; the QSE represented two Loads, one consisting of residential customers and one of non-residential customers. The total cost of the pilot will be approximately $96,000.

Executive Summary

The Weather Sensitive Emergency Response Service Pilot Project has demonstrated that Loads with demand response capability that varies based on weather and Loads for which the number of sites changes over the course of a Contract Term can be accommodated in the framework of ERS. The single demand response provider that participated in the pilot had somewhat mixed performance results, but, by the end of the Contract Period, was able to resolve the issues that had negatively impacted its performance.

As a result of the pilot, ERCOT was able to identify some shortcomings in the performance evaluation methodology that was originally proposed in NPRR 505, ERS Weather-Sensitive Loads, and that was incorporated in the Governing Document for the pilot. ERCOT developed revisions to that methodology to address those shortcomings and drafted the language for NPRR 571, ERS Weather-Sensitive Loads Requirements to include those revisions.

[1] The Governing Document is available at http://www.ercot.com/mktrules/pilots/.
[2] Except where defined by the ERCOT Protocols, capitalized terms in this report are those defined in the Governing Document.

The analysis presented in this report is based on the performance methodology in NPRR 571, which corrects three shortcomings in the Governing Document's evaluation methodology that result in an overstatement of performance. Specifics on these shortcomings are provided below in the section titled **Portfolio-Level Performance Calculations.**

The Control Group baseline methodology used for the first time in the pilot proved to be both effective and accurate in quantifying load reductions achieved in large aggregations of residential customers.

Since Weather Sensitive Loads would participate in the same offer stacks as other ERS Resources, allowing their participation can increase the volume of capacity offered into ERS, increase the competition for awards and produce additional downward pressure on the cost of procuring ERS.

ERCOT findings:

1. The demand response provider in the Weather Sensitive ERS Pilot experienced performance issues during the pilot and required a major portion of the pilot Contract Term to identify and resolve those issues.
2. The revised methodology developed by ERCOT to quantify the performance of weather sensitive loads and to impose payment reductions for sub-standard performance is effective, creates appropriate incentives for participants to meet performance standards and corrects deficiencies in the methodology specified in the Governing Document.
3. Facilitating participation in ERS by weather sensitive loads can bring additional demand reduction capacity to the program.
4. ERCOT recommends modifying the Protocols to facilitate participation by weather sensitive load in ERS.

Summary of the Weather Sensitive ERS Pilot Project

As the Governing Document recognizes, the purpose of the pilot project is to:

1. Evaluate the ability of weather-sensitive Loads to provide dispatchable demand response during summer system conditions;
2. Evaluate the accuracy of Qualified Scheduling Entity (QSE) projections of demand response capabilities and Load growth;
3. Evaluate deployment impacts on end-use customers;
4. Identify any unforeseen challenges in procuring, deploying and evaluating the performance of weather-sensitive Loads.

To evaluate these measures, the Governing Document authorized ERCOT to procure Weather Sensitive ERS for three different time periods within the June 1, 2013 through September 30, 2013 pilot Contract Period: the standard ERS Time Periods of Business Hours 1 (weekdays, 13:00 – 16:00) and Business Hours 2 (weekdays, 16:00 – 20:00), and a newly defined Weekend/Holiday Peak Time Period available only to Weather Sensitive Loads (weekends and holidays, 13:00 – 20:00).

The Governing Document required ERCOT to conduct unannounced testing of Pilot Loads a minimum of one time and a maximum of two times per month for the Contract Period. This testing requirement could be offset by EEA deployment events; however, no EEA deployments occurred during the Contract Period. As a result, ERCOT conducted a total of eight test deployments (two tests in each of the four months of the Contract Period). As required by the Governing Document, six of the tests had sustained response times (the time from the end of the 30-minute ramp period following deployment to the time of the recall instruction) that included a single full interval. As further required by the Governing Document, two of the tests had sustained response times that included four full intervals.

Weather Sensitive ERS Procurement

A total of six Weather Sensitive Loads were submitted by three different QSEs during the Resource Identification phase of the pilot. Two residential Loads were rejected based on having insufficient historical data to qualify for the Default Regression Baseline as well as too few sites to be evaluated with the Control Group evaluation methodology. Three Loads—two residential and one non-residential—from two different QSEs were ultimately qualified to provide Weather Sensitive ERS; all three Loads submitted offers.

One residential Load was offered with 371 sites and the other was offered with 968 sites. Because ERCOT determined that the former Load's offer was unreasonably priced, only the latter Load was awarded. Additionally, the one non-residential Load was offered and awarded with 20 sites. The two awarded Loads were offered by the same QSE.

Both awarded Loads were offered and awarded for the same MW capacity in all three Time Periods. The residential Load offered 2.5 MW; the non-residential Load offered 0.1 MW.

The two awarded Loads also took advantage of their rights under the Governing Document to increase their Load populations over the course of the pilot project within the permissible limits. By the end of the Contract Period, the residential Load had increased to 2,355 sites, and the non-residential Load had increased to 64 sites.

Control Group Baseline Methodology

As part of the Weather Sensitive ERS pilot, ERCOT introduced the control group baseline methodology. Under this method, ERCOT randomly assigns sites to a number of groups and then designates one of the groups to be the control group that is withheld from a deployment. The average per site Load for the control group is treated as the baseline and is compared to the average per site Load of the deployed groups. The control group designation is rotated following each deployment, and the group size is determined by ERCOT and is set large enough to accurately represent the deployed sites.

The QSE for the participating residential Load selected the Control Group methodology. The primary advantages to the methodology from the QSE's perspective were:

1. The method is easy to understand and explain.
2. The method is easy to shadow.
3. The method allows new sites with advanced meters to be added to the Load irrespective of whether ERCOT has historical data for the site.

Purpose 1: Evaluate the ability of weather-sensitive Loads to provide dispatchable demand response during summer system conditions

Data from the eight fleet-wide tests demonstrated that a Weather Sensitive ERS product can provide additional demand response that is available for ERCOT dispatch. Table 1, below, summarizes the results of the deployment tests for the residential Load, and Table 2 summarizes the results of the deployment tests for the non-residential Load.

For each test, the tables list the test date, the time of the deployment instruction (VDI Start), the time of the recall instruction (VDI Stop), the amount of demand reduction in MW (MW Reduce), the number of sites actually deployed, the number of sites in the Control Group, and the amount of demand reduction per site.

For each test, two rows of results are shown. The first row reports the results for the entire Load, and the second row reports the results when the Partner sites are excluded from the test analysis. The reason for the exclusion of the Partner sites is provided below.

Residential Load - Awarded Capacity 2.5 MW								
		Date	VDI Start	VDI Stop	MW Reduce	Sites Deployed	Sites in Control Group	KW Reduce Per Site Deployed
Test 1	**All Sites**	11-Jun-13	14:57:31	15:45:47	1.521	929	309	1.637
	Exclude Partner Sites	11-Jun-13	14:57:31	15:45:47	1.535	838	309	1.832
Test 2	**All Sites**	26-Jun-13	16:55:03	17:47:41	2.147	928	310	2.314
	Exclude Partner Sites	26-Jun-13	16:55:03	17:47:41	1.926	834	310	2.309
Test 3	**All Sites**	11-Jul-13	14:01:54	15:00:48	1.461	1170	371	1.249
	Exclude Partner Sites	11-Jul-13	14:01:54	15:00:48	1.745	1002	311	1.742
Test 4	**All Sites**	30-Jul-13	16:01:19	17:01:36	1.435	1111	370	1.292
	Exclude Partner Sites	30-Jul-13	16:01:19	17:01:36	1.392	980	370	1.420
Test 5	**All Sites**	7-Aug-13	16:25:28	18:01:37	1.910	1690	338	1.130
	Exclude Partner Sites	7-Aug-13	16:25:28	18:01:37	1.920	1316	242	1.459
Test 6	**All Sites**	30-Aug-13	13:28:17	14:17:34	1.333	1690	338	0.789
	Exclude Partner Sites	30-Aug-13	13:28:17	14:17:34	1.256	1291	267	0.973
Test 7	**All Sites**	11-Sep-13	16:03:20	17:07:34	1.427	1962	393	0.727
	Exclude Partner Sites	11-Sep-13	16:03:20	17:07:34	1.358	1366	266	0.994
Test 8	**All Sites**	19-Sep-13	16:16:07	18:06:29	2.212	1963	392	1.127
	Exclude Partner Sites	19-Sep-13	16:16:07	18:06:29	1.419	1361	271	1.043
Average	**All Sites**							1.283
	Exclude Partner Sites							1.471

Table 1: Summary of Residential Test Deployments

Table 1, above, shows that the number of sites in the residential Load increased throughout the Contract Period—from 1,238 sites in June to 2,355 sites in September. The Load-level demand reduction varied from a low of 1.33 MW on the August 30 test to a high of 2.21 MW on the September 19 test. The demand reduction per site varied from 0.73 kW on the September 11 test to 2.31 kW on the June 26 test.

Non-Residential Load - Awarded Capacity 0.1 MW							
		Date	VDI Start	VDI Stop	MW Reduce	Sites Deployed	KW Reduce Per Site Deployed
Test 1	**All Sites**	11-Jun-13	14:57:31	15:45:47	0.009	29	0.310
	Exclude Partner Sites	11-Jun-13	14:57:31	15:45:47	0.013	22	0.591
Test 2	**All Sites**	26-Jun-13	16:55:03	17:47:41	0.000	29	0.000
	Exclude Partner Sites	26-Jun-13	16:55:03	17:47:41	0.000	22	0.000
Test 3	**All Sites**	11-Jul-13	14:01:54	15:00:48	0.045	37	1.216
	Exclude Partner Sites	11-Jul-13	14:01:54	15:00:48	0.052	30	1.733
Test 4	**All Sites**	30-Jul-13	16:01:19	17:01:36	0.058	37	1.568
	Exclude Partner Sites	30-Jul-13	16:01:19	17:01:36	0.072	30	2.400
Test 5	**All Sites**	7-Aug-13	16:25:28	18:01:37	0.000	63	0.000
	Exclude Partner Sites	7-Aug-13	16:25:28	18:01:37	0.000	52	0.000
Test 6	**All Sites**	30-Aug-13	13:28:17	14:17:34	0.055	64	0.859
	Exclude Partner Sites	30-Aug-13	13:28:17	14:17:34	0.056	52	1.077
Test 7	**All Sites**	11-Sep-13	16:03:20	17:07:34	0.003	64	0.047
	Exclude Partner Sites	11-Sep-13	16:03:20	17:07:34	0.008	52	0.154
Test 8	**All Sites**	19-Sep-13	16:16:07	18:06:29	0.134	64	2.094
	Exclude Partner Sites	19-Sep-13	16:16:07	18:06:29	0.117	52	2.250
Average	**All Sites**						0.762
	Exclude Partner Sites						1.026

Table 2: Summary of Non-Residential Test Deployments

Table 2, above, shows that the number of sites in the non-residential Load increased from 29 sites in June to 64 sites in August and September (no sites were added just for September). The Load-level demand reduction varied from a low of 0.00 MW on the June 26 and August 7 tests to a high of 0.13 MW on the September 19 test. The demand reduction per site varied from 0.00 kW on the June 26 and August 7 tests to 2.09 kW on the September 19 test.

For both the residential and non-residential Loads, there is no apparent relationship between the MW reduction and either the number of sites participating during the test or the temperature on the day of the test. Both of these results are contrary to expectations regarding weather-sensitive demand response.

Some of the performance variability is explained by dispatch failures discovered once test results were available later in the Contract Period. The most serious failure, as explained by the Demand Response Provider, involved a partnership with another entity it engaged to augment the marketing of the program. The partner had set up its messaging system to protect against a

'hacker' thermostat adjustment when large numbers of thermostats were being adjusted simultaneously. This system setting prevented the transmission of the curtailment signal to the thermostats controlled by that partner, and, as a result, prevented any Load reduction by those sites.

A row labeled "Exclude Partner Sites" has been added in Tables 1 and 2 to describe the apparent impact of this defect. The effect is particularly noticeable in the column showing per-site reductions. For example, on the July 11 test, the partner was responsible for 168 residential sites, so the exclusion reduced the sites deployed from 1,170 to 1,002 and increased the demand reduction per site from 1.25 kW to 1.74 kW. Note that excluding the partner sites increases the total demand reduction for the Load from 1.46 MW to 1.75 MW because the excluded sites had lower average use during the event than the remaining sites in the control group, which caused a higher calculated baseline.

The partner's system defect did not affect tests 1 and 2 because the percent of thermostats adjusted did not exceed their hacking threshold, but it did affect tests 3 to 7, resulting in 28% lower performance per site for the residential Load than otherwise would have been realized for those tests. The impact of the defect on the non-residential Load is more difficult to quantify, but appears to be present and is potentially as high as 87% per site.

The defect was corrected before test 8, in which both the residential and non-residential Loads demonstrated the highest Load reduction amounts for the Contract Period tests, and did so in spite of the relatively mild weather on that day. The residential Load had a demand reduction of 2.21 MW for Test 8 (All Sites) and the non-residential Load had a demand reduction of 0.134 MW.

The first hour-long test (Test 5) occurred on August 7 and exposed an additional dispatch system problem for the demand response provider. The Provider's deployment logic was set up to anticipate a one-hour long deployment beginning from the VDI start time. The test required one hour of sustained response time (from the end of the 30-minute ramp period to the recall time), and, as a result, the residential Load's test performance predictably degraded during the second half of the deployment. For reasons that have not yet been identified, the non-residential Load failed to perform during this test altogether.

The DR Provider modified its deployment strategy following Test 5 to account for the possibility of longer duration tests, which may, in turn, have affected the performance on the remaining tests.

Following the first test, ERCOT worked with the QSE to clear up some confusion related to identifying the control group and the deployment group. These issues are described below in the section addressing Purpose 4. In the process of addressing this issue, the QSE inadvertently excluded sites in the non-residential Load from the deployment logic for Test 2. This exclusion resulted in the Load not being deployed. Even with this exclusion and the partner site exclusion taken into consideration, the test performance of the non-residential Load was quite variable, with per-site demand reduction ranging from 0.00 KW on the August 7 test to 2.40 kW on the July 30 test.

Portfolio Contract Period Performance and Payment Reduction

During its evaluation of the performance of QSEs and Loads in the pilot project, ERCOT realized that the evaluation methodology described in the Governing Document had three flaws that had the effect of overstating the actual performance of participating Loads. These flaws—namely, the proration of load-level obligations and the weighting of interval performance factors—are described in greater detail below in the section addressing Purpose 4. NPRR 571 remedies the concerns with the methodology in the Governing Document. To provide a more accurate picture of the performance of participating Loads, the analysis used in this report is based on the methodology in NPRR 571. Actual payments for the participating QSE will be based on the language in the Governing Document.

Similar to existing ERS evaluation methodologies, NPRR 571 evaluates Weather Sensitive ERS performance at the QSE portfolio level across all tests conducted during the Contract Period. Table 3, below summarizes the QSE portfolio-level performance for each of the tests when including all sites in the calculations. When the test performance is averaged across the Contract Period with weighting as specified in NPRR 571, the QSE portfolio-level test performance factor for the Contract Period is 0.684. The QSE portfolio-level test performance factor calculated under the methodology in the Governing Document was .868.

Portfolio-Level Test Performance			
	EPF	**Obligation**	**MW Reduce**
Test 1	0.619	2.6	1.529
Test 2	0.877	2.6	2.147
Test 3	0.647	2.6	1.505
Test 4	0.633	2.6	1.491
Test 5	0.653	2.6	1.909
Test 6	0.829	2.6	1.388
Test 7	0.566	2.6	1.430
Test 8	0.732	2.6	2.346

Table 3: Summary of Portfolio-Level Test Performance

If the Portfolio-Level Contract Period test performance factor had been greater than 0.90, no accelerated payment reduction would be imposed, and the initially calculated factor would be used in settlement to calculate the payment to the QSE. Since that criterion was not met, NPRR 571 would require ERCOT to undertake an analysis at the Load level to determine whether an accelerated payment reduction should be assessed to either of the Loads.

The first consideration under NPRR 571 (as with the Governing Document) is whether the maximum number of sites in any of the Loads is less than 90% of the number of sites projected by the QSE in the offer. For the two pilot Loads, the maximum number of sites exceeded the projected number by a considerable margin: 2,355 sites versus the projected number of 1,950 sites for the residential Load, and 64 sites versus the projected number of 35 sites for the non-residential Load. Consequently, no accelerated payment reduction would be imposed based on the maximum number-of-sites criterion.

The second consideration for an accelerated payment reduction is based on a comparison of the normalized peak demand reduction per site to per-site value from the QSE's offer (offer MW divided by projected number of sites). If the normalized peak demand reduction per site is less than 90% of the QSE's projected reduction per site, ERCOT would impose an accelerated payment reduction.

ERCOT's analysis indicated that no significant relationship existed for either Load between the actual demand reduction per site and afternoon average dry-bulb temperature across the tests. As a result, ERCOT treated the normalized peak demand reduction per site as the numerical average per site reduction across the eight tests for both Loads (all sites included).

For the residential Load, the projected peak demand reduction from the QSE's offer was 1.563 kW per site and was computed by dividing the 2.5 MW obligation by 1,600 sites (1,950 less the assumed 350 sites in the control group), and 90% of this value is 1.406 kW. The average per site actual demand reduction was 1.283 kW (see Table 1, above), and an accelerated payment reduction would, under the provisions of NPRR 571, therefore be imposed.

For the non-residential Load, the projected kW peak demand reduction from the QSE's offer was 2.857 kW per site (0.1 MW divided by 35 sites), and 90% of this value is 2.571 kW. The average per-site actual demand reduction was 0.762 kW (see Table 1, above), and an accelerated payment reduction would, under the provisions of NPRR 571, be imposed for this Load as well.

The accelerated payment reduction for each Load would be calculated by lowering the baseline (and consequently the attributed demand reduction) for each test having a performance factor less than 0.90 by an amount that results in the test performance factor being equal to the

square of the factor determined by the initial baseline. Note that, since the initial event performance factor was less than one, the squaring results in a reduction in the factor. With the payment reduction process applied, the Portfolio-Level Contract Period test performance factor used in settlement would be 0.485.

The final consideration for imposing a payment reduction was whether a Load was deemed to have failed to meet the 30-minute deployment requirement. For tests that contain more than one full interval, this is determined by comparing the interval performance factor for the first full interval to the average of the interval performance factors for the remaining full intervals. Test 5 and Test 8 fell into this category; for both Loads and for both tests, the comparison indicated the 30-minute requirement was met and no payment reduction would be imposed.

Purpose 2: Evaluate the accuracy of Qualified Scheduling Entity (QSE) projections of demand response capabilities and Load growth

Over the course of the Contract Period, the QSE significantly increased the number of sites participating in the pilot. As noted above under Purpose 1, the QSE exceeded the maximum number of sites projected in its offer number by a considerable margin: 2,355 sites versus the projected number of 1,950 sites for the residential Load, and 64 sites versus the projected number of 35 sites for the non-residential Load.

On the other hand, the QSE's projection of demand response capability was not realized on either an actual or normalized peak-demand-reduction basis. As described above, in Purpose 1, the QSE experienced problems with deployments throughout most of the Contract Period. The largest portfolio Load reduction realized was 2.346 MW and was about 90% of the portfolio obligation. Both the residential and non-residential Loads fell short of meeting the Load reduction per site target, resulting in accelerated payment reduction.

If the QSE had been able to avoid the deployment issues with its partner, the residential Load would have met the Load reduction per site target (1.471 kW per site versus the target of 1.406 kW per site); whereas, the non-residential Load would still have fallen short (1.026 kW per site versus the target of 2.571 kW per site). It should be noted that the QSE would have been settled, with the prescribed accelerated payment reduction, as if they had provided just less than 50% of their obligation for the Contract Period.

Purpose 3: Evaluate deployment impacts on end-use customers

A survey of end-use customers has been initiated; results of the survey are not available at the time of this report. The survey results will be presented to DSWG when they become available to ERCOT.

Purpose 4: Identify any unforeseen challenges in procuring, deploying and evaluating the performance of weather-sensitive Loads

QSE Performance

The Weather Sensitive ERS Pilot has provided an opportunity to identify and correct problems with the testing and evaluation of the program. These corrections have been incorporated into the language of NPRR 571.

The participating QSE has become familiar with the specifics and especially the challenges of providing Weather Sensitive ERS. The QSE's customer recruiting process relied on customer-reported ESI IDs for the initial Resource Identification, offer submission, and subsequent modifications to the population of the Loads. ERCOT's review of those submissions identified a number of problems, including the following: retired ESI IDs, ESI IDs associated with vacant premises, ESI IDS that were never in ERCOT systems, and ESI IDs that still had Non-IDR metering. In a number of cases, the sites the QSE was attempting to add were disallowed because the QSE attempted to add non-residential sites to the residential Load or vice versa. In several cases, the QSE was attempting to add sites to the non-residential Load that did not meet the historical interval data requirements. In all cases, these problems were corrected in sufficient time for the submission to be accepted.

A related but more significant difficulty experienced by the QSE was the lack of third-party access to advanced meter interval data. All but one of the participating sites had advanced meters installed; the remaining site had a traditional IDR meter. Since the DR Provider's technology did not collect usage data for the A/C systems other than thermostat status and customer opt-out status, the QSE was, for the most part, 'flying blind' regarding test performance until receiving the test analysis reports from ERCOT. The test reports would provide Load-level feedback on performance but did not provide the detailed level of site information that would be helpful in diagnosing problems. To make matters worse, by the time the QSE typically would receive the test reports; one or more additional tests had already been administered. The inaccessibility of data and the lag in test reports undoubtedly had a significant impact on the QSE's ability to address performance problems during the Contract

Period. Third-party access to advanced meter data is being addressed in conjunction with the PUCT Advanced Meter project; satisfactory resolution to this issue will be critical to the future of Demand Response in ERCOT in general and for the future performance of Weather Sensitive ERS in particular.

Based on the QSE's performance in the pilot, it is clear that successful administration of a Weather Sensitive ERS product requires a solid understanding of and experience with the performance of Loads during deployments. ERCOT expects that the accelerated payment reduction method incorporated in NPRR 571 would provide sufficient incentive for participating QSEs to apply that experience to properly determining the offered capacity. To a significant degree this expectation has evolved from the ERS-30 pilot where a similar payment reduction method has been applied for numerous consecutive Contract Periods and has, at the fleet level, resulted in the expected demand reduction capacity actually being delivered.

Control Group Assignments

Another issue that was identified at an early stage in the pilot involved the way deployments were administered for the Control Group evaluation methodology. Initially, ERCOT assigned all sites to deployment groups and used the group numbers in both the XML and VDI deployment instructions. The instructions identified the group(s) to be deployed and did not include the group identification to be excluded from the deployment and to serve as the control group. After the first test, based on input from the QSE, ERCOT concluded that this deployment scheme had the potential to confuse both ERCOT and QSE operators. The decision was made to provide advance notification to the QSE of site assignments to control groups, and to reassign sites to groups each time a population modification was made. In addition, immediately following each test or deployment, ERCOT notified the QSE which control group was to be withheld from the next deployment.

Control Group Test Procedures

ERCOT and the QSE also decided to conduct tests and actual EEA deployments in the same way.

The initial intent for testing had been to deploy a single group and to withhold all remaining groups as the control group. The benefit to this approach would have been to decrease the testing frequency and the impact of numerous deployments on participating sites. For actual EEA deployments, a single group would have been withheld and the remaining groups would all be deployed, thus maximizing the demand reduction being provided.

Instead, ERCOT and the QSE agreed that running test deployments identically to actual EEA deployments would significantly decrease the likelihood of a mix-up by either party.

Test Durations

Based on the results of the first hour-long test, ERCOT and the QSE agreed that any NPRR for Weather-Sensitive ERS should provide that test and actual EEA deployments should both have the 3-hour maximum sustained response time.

The NPRR calls for tests to vary in length from one full interval to three hours of sustained response time, and for the test duration not to be revealed at the time the deployment instructions are issued. As stated above, the QSE had incorrectly understood the Governing Document to specify the maximum test duration to be one hour and designed their deployment strategies accordingly. If ERCOT could accurately anticipate the required deployment duration in an EEA and reveal it at the time of deployment, a QSE could optimize its deployment strategy based on that information. However, since ERCOT is unlikely to be able to accurately anticipate the deployment duration, the best alternative is to require the QSE to design its deployment strategy to run for a full three-hour deployment and to conduct tests to verify that this is being implemented.

Portfolio-Level Performance Calculations

The methodology specified in the Governing Document for calculating Portfolio-Level Contract Period event performance factors had three unanticipated flaws that became obvious when running the actual performance calculations for the pilot.

First, in order to reduce the burden of testing on individual sites, the Governing Document provided that test deployments could use fewer than the number of sites that would be deployed during an EEA. Loads on the control group baseline would be divided into multiple groups, only one of which would be deployed during a test. Loads on the standard default baseline, if sufficiently large, could be divided into two groups, only one of which would be deployed during a test. During the pilot, the participating QSE noted that having different deployment requirements for testing and actual EEA deployments could create confusion for ERCOT and/or QSEs, and that requiring all sites (except for those in a control group) to deploy during all tests and deployment events would be preferable. NPRR 571 proposes this change.

Secondly, the Governing Document provided for obligation proration based on the number of sites dispatched during a test. If a QSE had projected growth in the number of sites, the DR

obligation for any test or event would be reduced proportionally to reflect the number of sites actually deployed for the time of the test or event. But Proration based on the offered number of sites is inappropriate because evaluating the impact of weather-sensitivity and the presence or absence of projected Load growth requires that the actual number of sites be used. Reducing the obligation of the Load through proration overstates performance. Proration based on the offered number of sites is further inappropriate for Loads being evaluated with the control group methodology because that offer should already reflect the unavailability of the control group sites during a test or EEA deployment. For this reason, the proration of obligations was eliminated from NPRR 571.

Third, the Governing Document also specified that the averaging of interval performance factors across Loads and across test/events should be weighted based on a normalized peak demand reduction for that interval. Given the possibility of poor correlation between the demand reduction value and weather, as experienced in the pilot, ERCOT has concluded that using a more deterministic weighting method is appropriate. Based on this recommendation, the portfolio-level obligation in NPRR 571 is the sum of the obligations of deployed individual Loads weighted by the ratio of sites participating during the test/event to the number of sites projected by the QSE on its offer. Similarly, the portfolio-level interval fractions are computed as the average of the fractions across the deployed Loads weighted by prorated obligation of the Loads. This revised method of calculating Portfolio-level performance will be less subjective, easier for ERCOT to implement and easier for QSEs to understand and replicate if desired.

Comparing Cost to Incentives Paid to Load Management Programs

As part of meeting their Energy Efficiency Goals, TDSPs in the competitive choice areas in ERCOT administer Load Management Programs during roughly the same Time Period defined as BH2 and BH3 of the June-September ERS Contract Period. Even though the incentives for the TDSP programs are capped by the avoided cost, currently $80/kW/yr, the utilities typically have paid Load Management Program participants at one-half the avoided cost, or $40/kW/yr. Based on the commitment hours for the Load Management Programs (summer month weekdays from 1:00 pm to 7:00 pm), the $40/kW/yr is equivalent to $79.36/MW/hr and is substantially higher than the $50/MW/hr paid for Weather Sensitive ERS for the comparable time periods.

Pilot Costs and Benefits

The total cost of the Weather Sensitive ERS Pilot project is expected to be approximately $96,000.

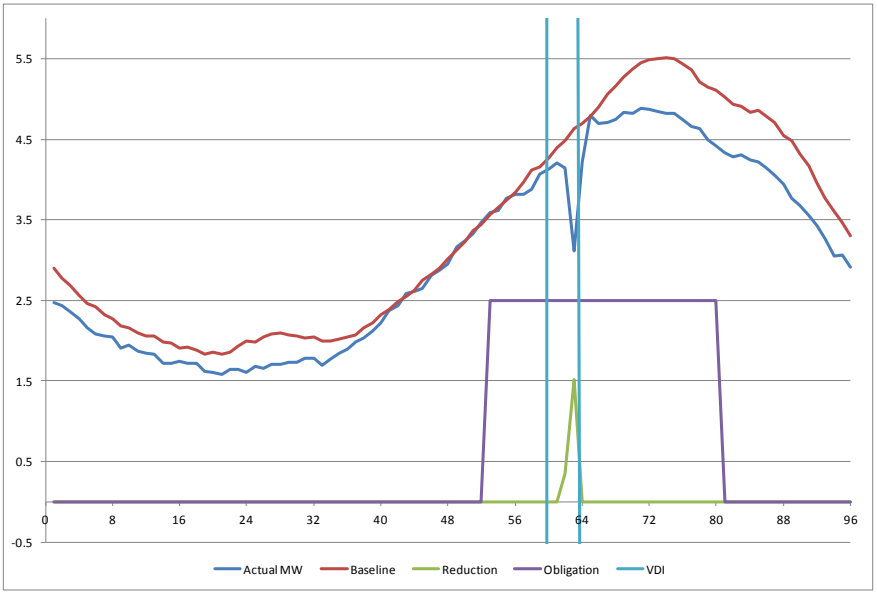
The primary benefit of Weather Sensitive ERS would be the availability of additional dispatchable capacity to be deployed during System emergencies. In addition, allowing Weather Sensitive Loads to participate in ERS could provide additional downward pressure on the cost per MW of ERS.

Pilot Conclusions

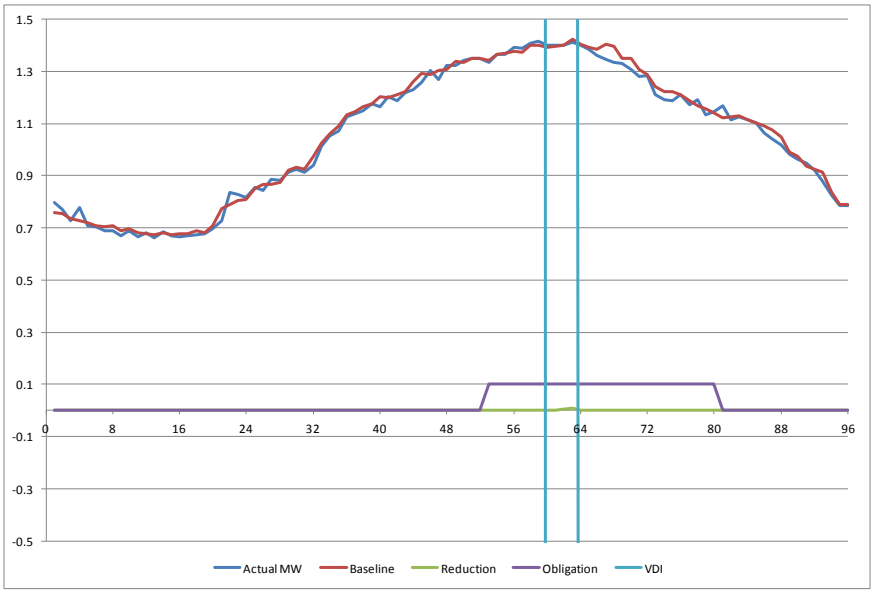
The Weather Sensitive ERS Pilot was an effective vehicle for identifying and correcting problems with integrating Weather-Sensitive Loads into ERS. The sole demand response provider participating in the pilot had several deployment problems which affected the test performance results and will result in payment reductions. The provider identified the contributing factors that led to the low performance results and implemented corrective actions. Based on the information provided by the pilot, ERCOT has provided input on NPRR 571 to help ensure incentives provide more predictable Load performance. ERCOT recommends that the Protocols be revised to allow weather-sensitive Loads to participate in ERS.

Appendix: Test Results

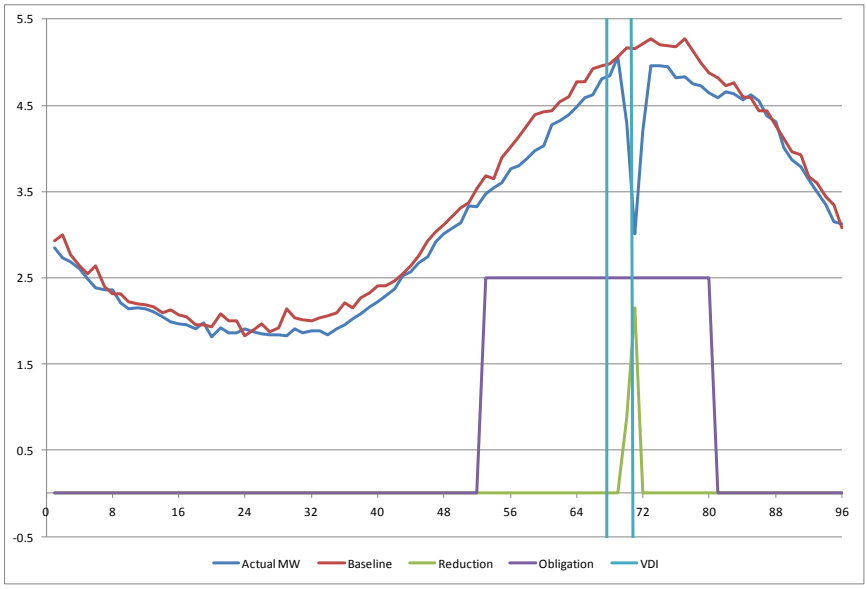
Residential Load Test Jun 13, 2013



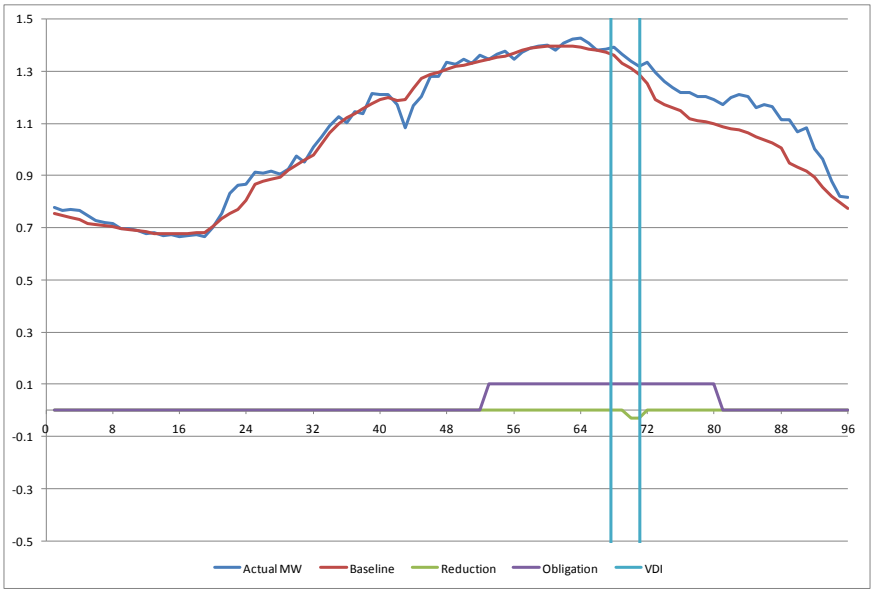
Non-Residential Load Test Jun 13, 2013



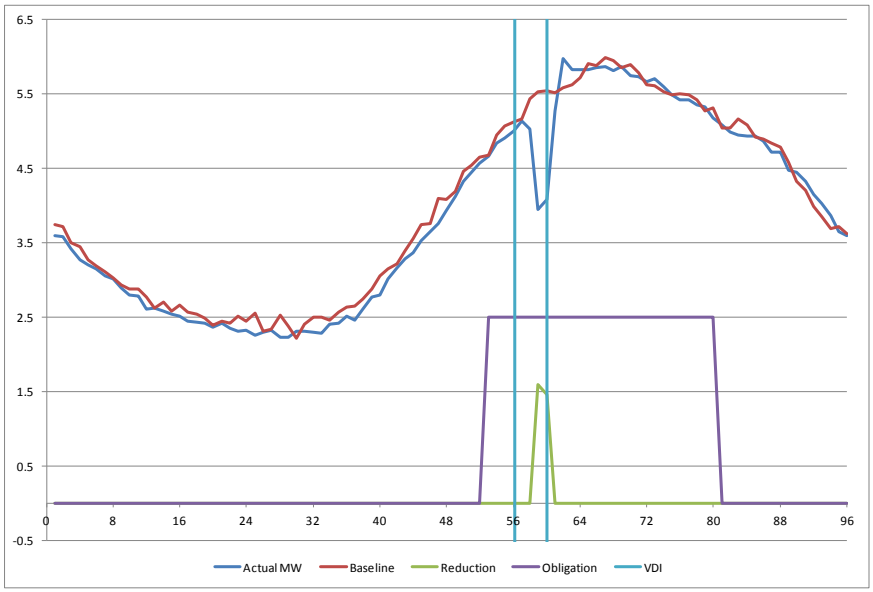
Residential Load Test Jun 26, 2013



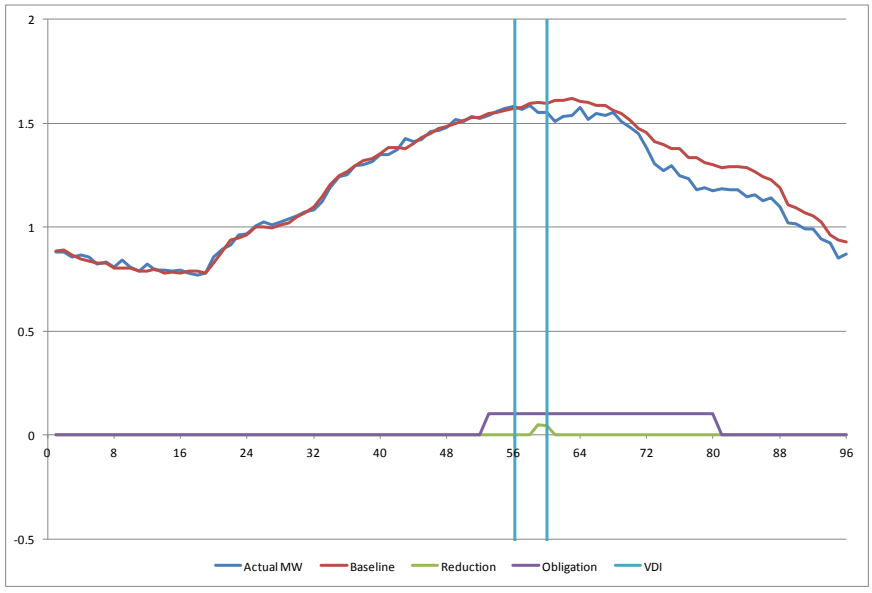
Non-Residential Load Test Jun 26, 2013



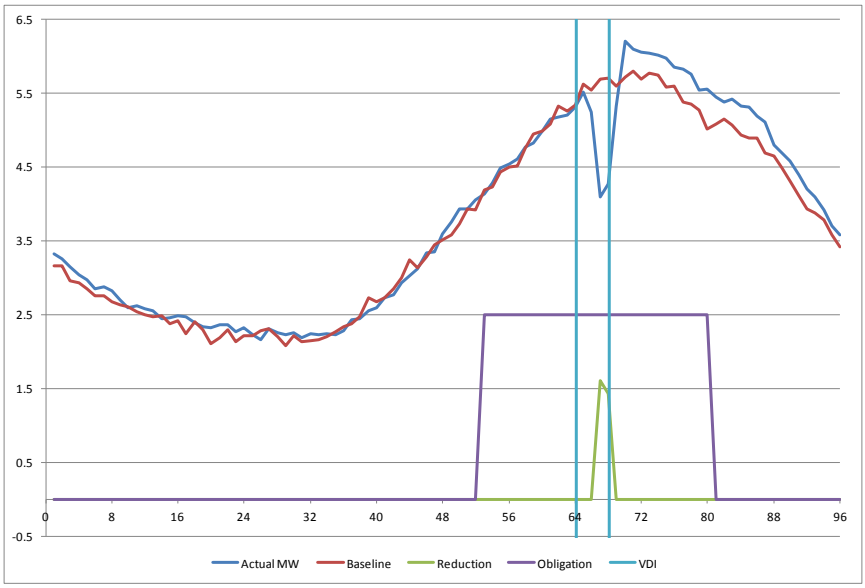
Residential Load Test Jul 11, 2013



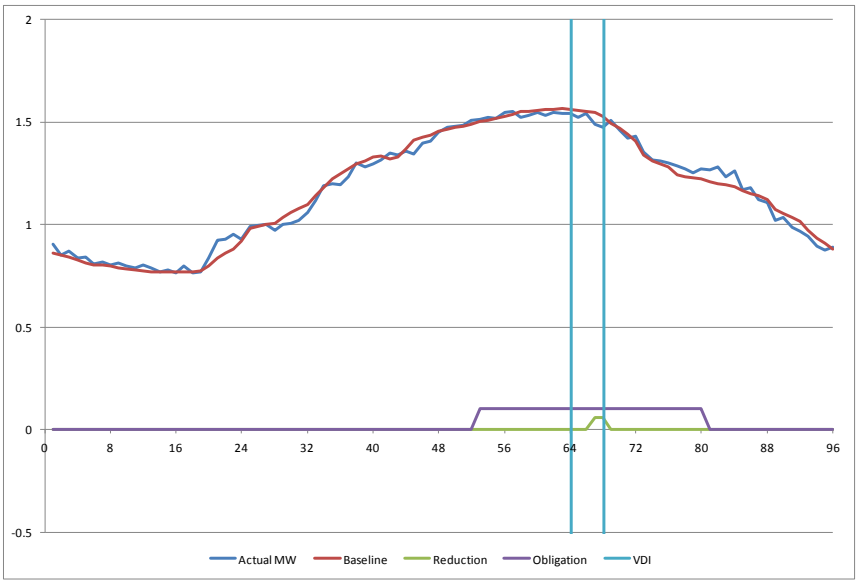
Non-Residential Load Test Jul 11, 2013



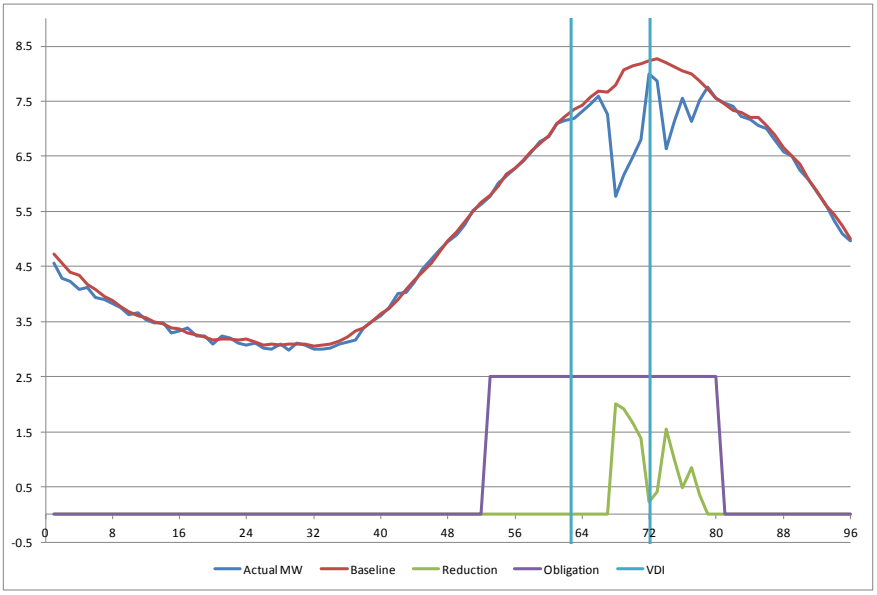
Residential Load Test Jul 30, 2013



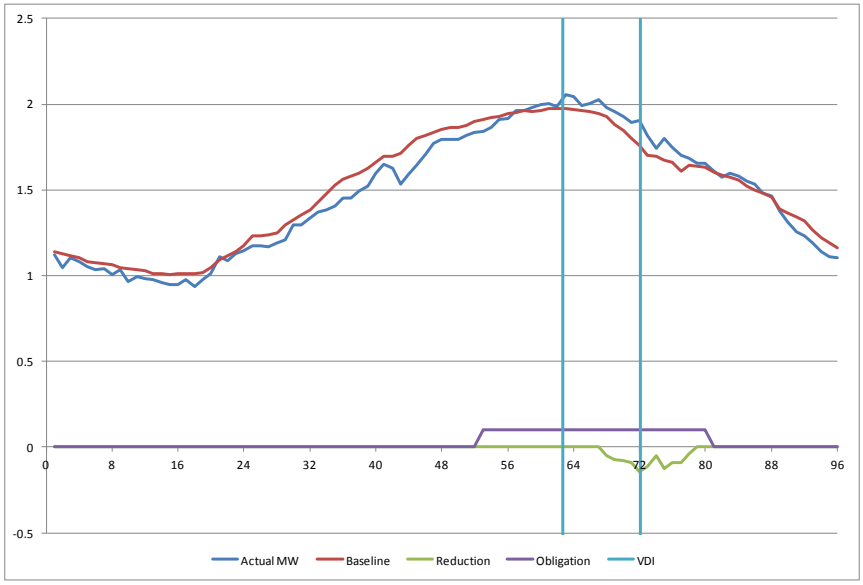
Non-Residential Load Test Jul 30, 2013



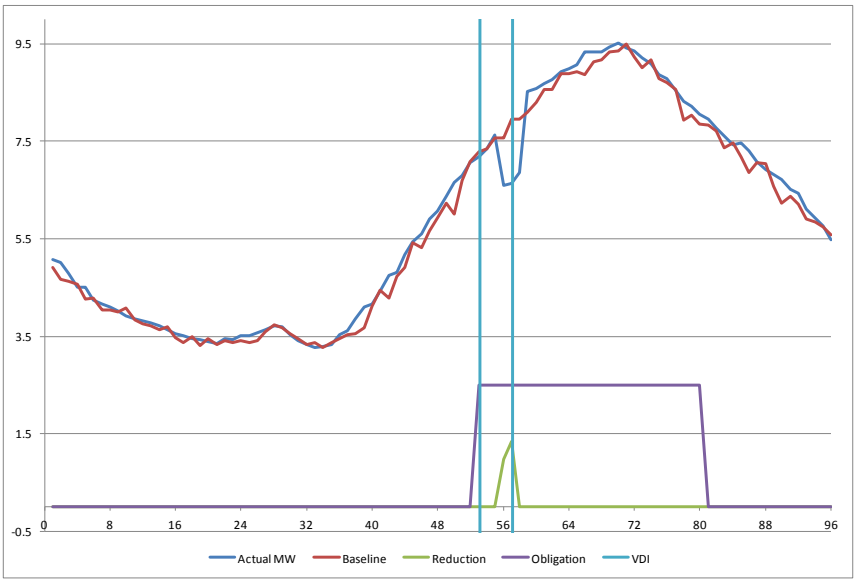
Residential Load Test Aug 7, 2013



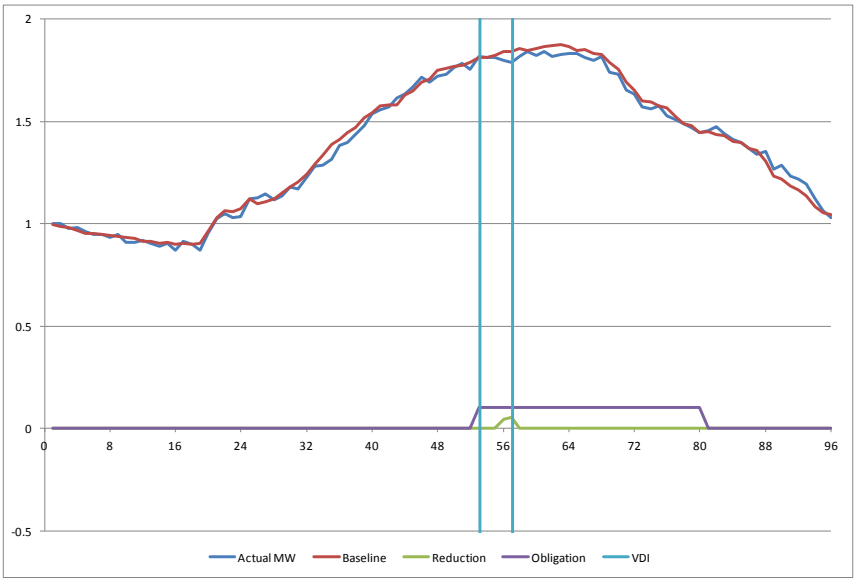
Non-Residential Load Test Aug 7, 2013



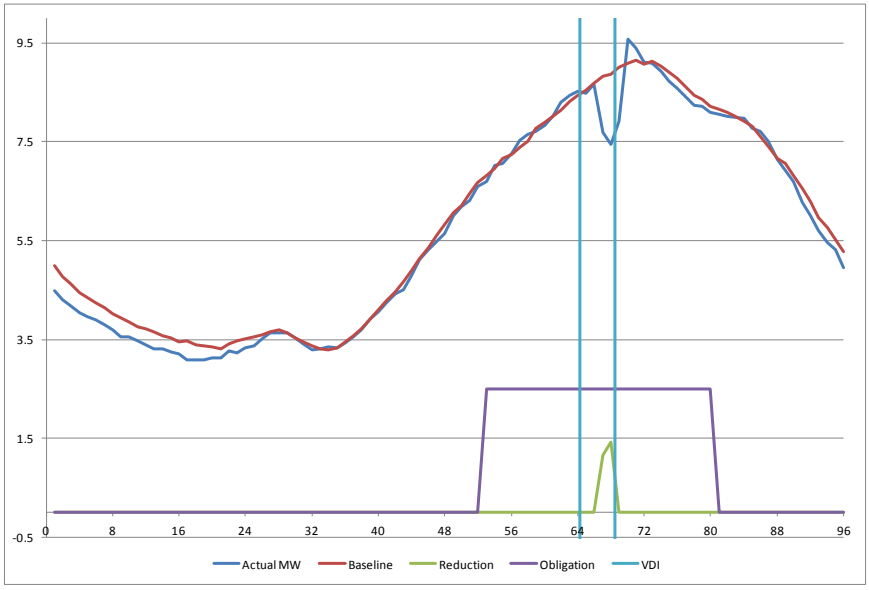
Residential Load Test Aug 30, 2013



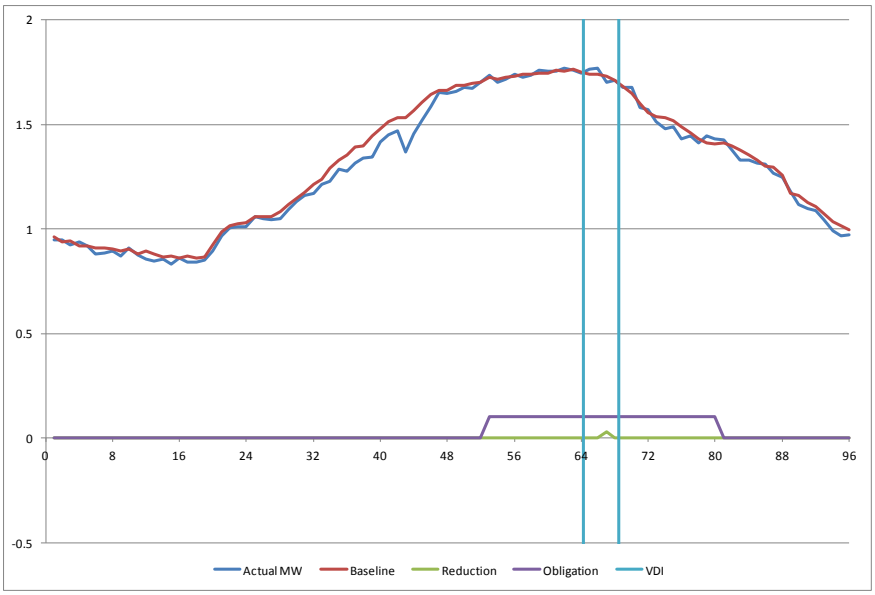
Non-Residential Load Test Aug 30, 2013



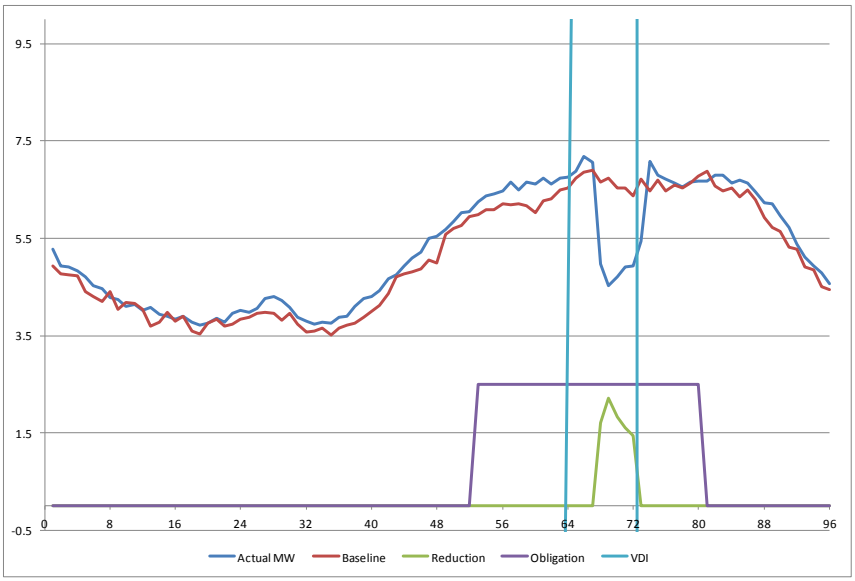
Residential Load Test Sep 11, 2013



Non-Residential Load Test Sep 11, 2013



Residential Load Test Sep 19, 2013



Non-Residential Load Test Sep 19, 2013