ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

Appendix 4

ENERNOC Irrigation Load Control Report

ENERNOC

2013 PacifiCorp Irrigation Load Control Program Report

EnerNOC, Inc
One Marina Park Dr, Ste 400
Boston, MA 02110
www.enernoc.com

Rocky Mountain Power
825 NE Multnomah St, Ste 550
Portland, OR 97232
www.pacificorp.com

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Overview of the 2013 Irrigation Load Control Program

This report provides an overview of PacifiCorp's Irrigation Load Control Program in the Rocky Mountain Power (RMP) service territory, as implemented and administered by EnerNOC. EnerNOC and RMP are pleased with all that the program accomplished in 2013, including a large-scale transition to a new business model and technology platform over a compressed timeframe. This report is intended to document program results, accomplishments, and challenges, including lessons learned and, where applicable, plans for 2014.

PacifiCorp selected EnerNOC to manage the irrigation load control (ILC) program beginning in 2013 and through 2022. EnerNOC's responsibilities include enrollment, equipment installation, dispatch management, performance calculations, and customer service. Along with program management changes, the performance measurement and incentive structure changed substantially from previous years. A new pay-for-performance structure rewards irrigators for the value they provide during program hours, versus peak monthly capacity. Importantly, under this construct PacifiCorp only pays for capacity available during program hours, as measured by EnerNOC's energy monitoring technology and adjusted through a performance factor to account for those sites which opt not to participate during specific dispatch events. In order to achieve this incentive structure, interval metering was necessary. EnerNOC's equipment solution provides 5-minute interval energy monitoring as well as remote irrigation equipment control. EnerNOC's web-based portal now provides irrigators and PacifiCorp with near real-time energy usage data.

The motivation for these program changes was to develop a sustainable program that meets the needs of irrigators, the utility and ratepayers over the long-term. In January and February 2013, RMP and EnerNOC met and collaborated with various stakeholders to explain the program changes and refine the program offering to better meet all parties' needs. The Idaho Irrigation Pumpers Association (IIPA) and Utah Farmers Bureau provided valuable feedback about program incentives and rules. Regulatory approval was achieved in Idaho and Utah in mid-March 2013.

The ILC program is currently available to Tariff Schedule 10 customer sites in the Rocky Mountain Power (RMP) Idaho and Utah service territories. In future years, participation may expand to customers in Oregon, California and Washington. Participating sites are compensated for shutting off irrigation load for specific time periods determined by RMP, and are provided day-ahead notice of dispatch events. Customers always have the opportunity to opt out of (i.e., choose not to reduce load) for dispatch events as necessary for their operations. Customer incentives are based on a site's average available load during load control program hours adjusted for the number of opt outs or non-participation. The program hours are 12 to 8pm Mountain Time (MT), Monday through Friday, and do not include holidays.

The 2013 program season ran from Monday, June 10 through Friday, August 16. Average weekly available load reduction was 120.9 MW. RMP utilized forty of the fifty-two possible program event hours. There were ten load control events, each four hours in length, which will be described in more detail below. On average the program delivered 115.6 MW of actual load reduction compared to baseline load (determined as usage on the day prior to the dispatch) of 137.0 MW. This actual load reduction is calculated according to 5-minute interval data from EnerNOC's energy monitoring equipment. As a result load not monitored is not included in EnerNOC's reported performance, and therefore EnerNOC's load reductions may differ from those RMP reports. In 2013, the average performance factor was 84%, which indicates the percentage of customer load opting out of events. EnerNOC's implementation of this ILC program was consistent with its approved agreement with RMP.

Review of 2013 enrollment and enablement

Customer outreach

After regulatory approval was obtained, EnerNOC initiated outreach to eligible irrigators. EnerNOC worked with RMP to introduce the program changes and rules via marketing collateral, including RMP's website, an FAQ, and postcard mailings. EnerNOC led "town hall style meetings" in Idaho Falls, Preston and Rexburg, Idaho. A dedicated team at EnerNOC called and met with potential participants. EnerNOC also formed a channel partnership with Spartan Energy Control Systems, who knows irrigators through normal course of business and from installing equipment during previous load control program years.

EnerNOC's 2013 enrollment efforts focused on transitioning participants from prior years, especially given the short time between regulatory approval and the program season. EnerNOC aimed to identify load that was best fit for the new program structure and would provide the greatest financial incentive to the participant. Pumps with load during program hours and weeks, as well as larger pumps, were targeted in conversations.

New participants and pumps of all sizes were eligible and welcome to participate. However, smaller pumps and pivots do not typically use enough electricity during peak periods to cover the costs of participation in the program, and thus were not prioritized for enrollment.

Provider payment structure

EnerNOC and Rocky Mountain Power established three tiers for payments in order to provide fair and consistent treatment for sites of similar size and operation. The tiers rewarded customers who made larger contributions to the program. A customer's entire portfolio of eligible sites was evaluated in aggregate to determine the average expected kW per pump and subsequent payment tier as described in Figure 1.

Figure 1: Incentive tiers for participants

Average Expected kW per Pump	Base Incentive Rate ($/kW-year)	Bonus Incentive Rate ($/kW-year)	Enablement Fee (per pump)
Over 100 kW	23	25	N/A
50-100 kW	19	21	N/A
Under 50 kW	19	21	$1500

The bonus incentive rate was designed to encourage customer sign-up by rewarding all participants if the entire enrolled portfolio size was greater than 125MW. The 2013 enrolled portfolio achieved this goal, so all participants received the bonus rate.

In order to cover the costs of participation in the program, an enablement fee was necessary when the average expected load per pump was less than 50 kW. Most customers with primarily small pumps chose not to enroll in the program in 2013 due to the enablement fee. Customers with a variety of pumps most often chose to enroll only their larger pumps to take advantage of the higher base incentive rates and to avoid the enablement fee. No customers chose to pay the enablement fee in 2013.

Enrolled customers

Between March 15, 2013 and July 10, 2013, EnerNOC enrolled 320 RMP accounts at 1,354 sites. Figure 2 shows the split of enrolled accounts and sites across the two regions. Billing kW is the 2013 RMP peak demand.

Figure 2 is a snapshot in time as of July, 10, 2013. Not all customers were able to be enrolled or enabled prior to the end of the 2013 ILC season due to timing considerations or technical challenges. Customers who enrolled prior to the end of the season but did not have the opportunity to fully participate in the program received transition year payments from RMP and EnerNOC.

Figure 2: Enrolled and participating RMP accounts and sites compared to Schedule 10 Customers, as of July, 10, 2013

	Idaho		Utah		Total	
	Count of Account/ Site	**Billing kW**	**Count of Account/ Site**	**Billing kW**	**Count of Account/ Site**	**Billing kW**
Schedule 10 Customers	1,756/ 4,863	458,258	1,692/ 2,743	136,073	**3,448/ 7,606**	**594,331**
Enrolled	258/ 1,114	220,793	62/ 240	26,679	**320/ 1,354**	**247,472**
Participating	232/ 971	196,946	54/ 207	24,118	**286/ 1,178**	**221,064**

EnerNOC site servers

By July 10, 2013, 286 RMP accounts and 1,178 RMP sites were participating in the ILC program. The majority of these sites participated using an EnerNOC site server (ESS). The ESS solution includes hardware/software for remote load control and energy monitoring at the pump panel. EnerNOC Field Operations deployed 1,323 ESS devices across 1,075 sites by mid-July. This represented the bulk of installation activity for 2013.

Due to volume of work orders and timing of enrollment, some sites were not able to be installed with an ESS prior to the program start. Installation efforts were also delayed by the following factors:

- Winter and spring weather impacted access to certain geographic regions.

- Customer availability limited access of electrical subcontractors to sites.
- Needed irrigation system repairs postponed installation.
- Pumps and irrigation systems needed to be operating under load in order to confirm the functionality of the devices. Delayed start-ups delayed the ability to verify functionality.

Legacy devices

A sub-set of participating sites in 2013 used data from legacy irrigation load control devices already in the field from previous years. These legacy devices report changes in pumps' on/off status rather than reporting the energy usage. The allowance of these devices was critical in enabling customers to participate in the 2013 program despite the aggressive program launch schedule. Moving forward in 2014, EnerNOC has been installing ESS devices at these sites so that their curtailment can be more accurately monitored. No legacy devices will be involved in a customer's participation in 2014.

Technical challenges

Some customer sites were not able to be installed in 2013 due to technical challenges as described below.

1. Sites with 2300V services were not able to participate in the 2013 season.

Issue

- These sites primarily use old submersible pumps, which are often large horsepower (on the order of 800hp) and are costly to replace. Customers expect to replace these pumps over time, only as necessary.
- Safety concerns prevented the installation of current transformers at sites with 2300V service.

Solution

- To enable this load for ILC participation in 2014 (before the customers have replaced these pumps), EnerNOC has requested the installation of utility KYZ pulses as an alternative energy data source.
- Rocky Mountain Power agreed to replace existing meters with those compatible with KYZ pulse outputs.
- EnerNOC will install an ESS system at these sites utilizing the KYZ pulse meters. Customers will participate manually, but all load will be monitored to verify performance.

2. Sites without cellular reception could not participate in 2013.

Issue

- Data communication is necessary for EnerNOC devices to enable control of pumps for event participation and to report energy usage for payment calculations per program rules.

Solution

- EnerNOC continues to explore alternative solutions for future participation; however there is no solution for 2014.

Data quality challenges

EnerNOC's device solution for ILC includes use of current transformers (CTs) to monitor the pump's curtailable load in 5-minute intervals. The specific configuration of installations was virtually identical across all sites and was designed for minimum points of error. ESS monitoring was at the pump panel level, so demand data did not necessarily correspond one-to-one with utility meter load. This added a layer of complexity to data quality verifications.

During the course of verification, EnerNOC identified several data quality issues and worked with RMP to determine the appropriate resolution and payment method for customers as needed. The key technical issues identified were as follows:

1. Sixty-one sites were identified as having a magnitude offset in the 5-minute interval data.

Root Cause

- Errors in the CT phasing or system programming caused the offset.

Solution

- These issues have been fixed through the course of on-site maintenance visits.
- EnerNOC expects to be able to accurately reprocess readings in 2014 once irrigation load resumes.
- To calculate 2013 performance, EnerNOC and RMP agreed to adjust actual electric demand.

2. Twenty-six sites had a persistent data quality issue during program hours and demonstrable participation in ILC events.

Root cause

- Incorrectly installed CTs on variable frequency drive irrigation systems resulted in erroneous readings when the pump was not running at either peak usage or not running at all.

Solution

- These installation issues have either been fixed on-site or work orders have been created for the spring of 2014.
- To calculate 2013 performance, EnerNOC and RMP agreed to adjust actual electric demand.

3. Sixty-seven sites reported no data during events, but the customers confirmed participation.

Root Cause

- Loss of power to EnerNOC's device on-site results in no data reported for those intervals.
- During events, lack of data is treated as zero load reduction; yet in these instances power was cut to EnerNOC's device and a participating pump.

Solution

- EnerNOC and RMP agreed to adjust actual electric demand to zero kW for intervals during the appropriate events upon verbal confirmation from the customer.
- For 2014 performance calculations, EnerNOC is exploring the possibility of implementing a remote "power off" signal to report when power is cut to the ESS.

Review of 2013 program performance

Impacts of pay-for-performance model

Due to the pay-for-performance program model, customers' success in and satisfaction with the ILC program for 2013 varied according to pump run-time during program hours and participation across the ten load control events called by RMP. The following four examples illustrate varying levels of availability and participation at individual irrigation pumps in 2013. Screenshots are from EnerNOC's web-based DemandSMART platform, where participants can view near real-time energy usage data. In each figure the x-axis shows time and the y-axis is actual electric demand kW, as measured by EnerNOC's devices. The shaded regions indicate weekends, which are outside of program hours. EnerNOC's equipment solution provides 5-minute interval energy monitoring, in addition to remote irrigation equipment control.

Figure 3: High availability and high participation

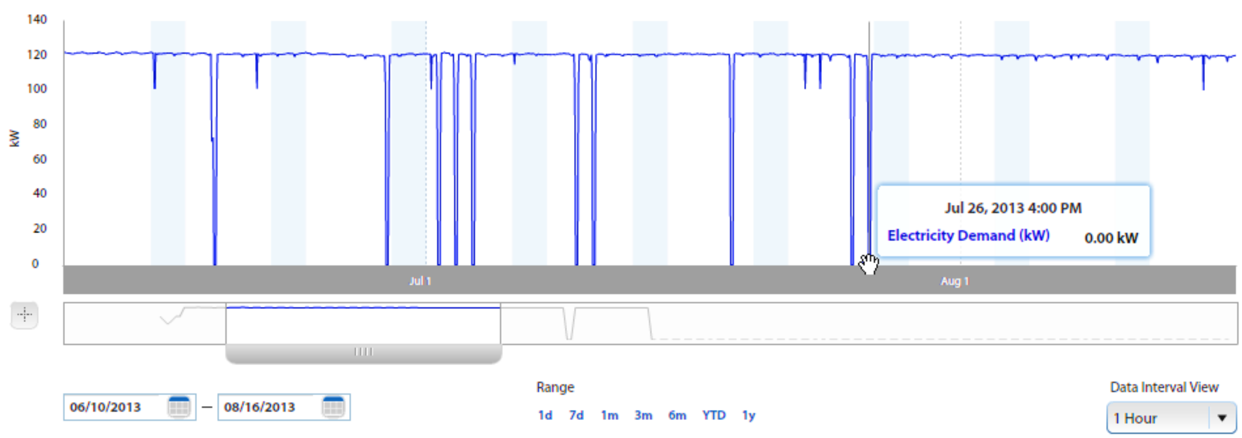


Figure 3: High availability and high participation shows electric demand (kW) for a single pump across the entire program season from June 10 through August 16. This pump participated in all events and had high availability due to potato crops. This pump ran consistently for the entire ten weeks of the program season and shut down (only) during load control events. For example on July 26, there was an ILC event from 3 to 7pm Mountain Time, and load at this site dropped to 0kW. This pump had almost 100% availability and a 100% participation factor for shutting the pump off during all ten load control events. As a result, the customer received the maximum expected compensation for this pump.

Figure 4: Average availability and high participation

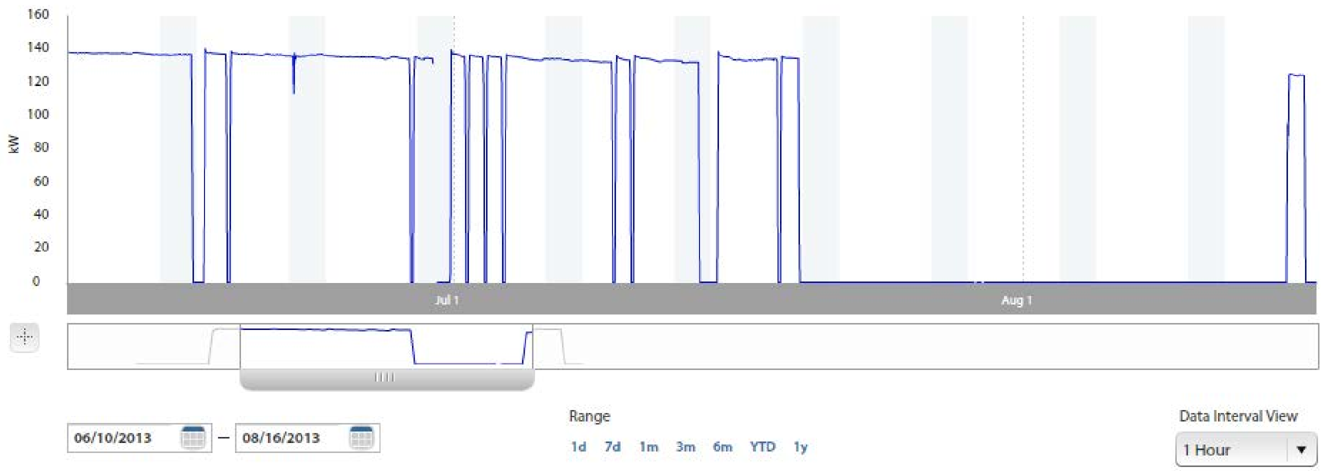


Figure 4: Average availability and high participation shows electric demand (kW) across the entire program season for a pump, which shut off for over three full weeks at the end of the program season. As a result of this wheat harvest, the site's availability was about 65%. The pump did shut off during all ten load control events, so the participation factor was 100%. The combination of high participation but average availability resulted in the customer receiving average compensation for this pump. Payment could have been higher with longer run-time.

Figure 5: Low availability during program hours

Figure 5: Low availability during program hours focuses on a two-week period during the program season in order to illustrate this pump's time of use. Note on July 2nd, the pump cycled usage regularly but was watering most often during early morning hours (e.g. 3 am), which are not covered by the program hours (12 to 8 pm). The pump ran most consistently on weekends (note the light blue columns), which are not included in program hours. As a result of alfalfa crops and running at night and on weekends, this pump had low availability during the program hours. This site participated in all events; however low availability resulted in a much lower overall payment.

Figure 6: Low participation during events

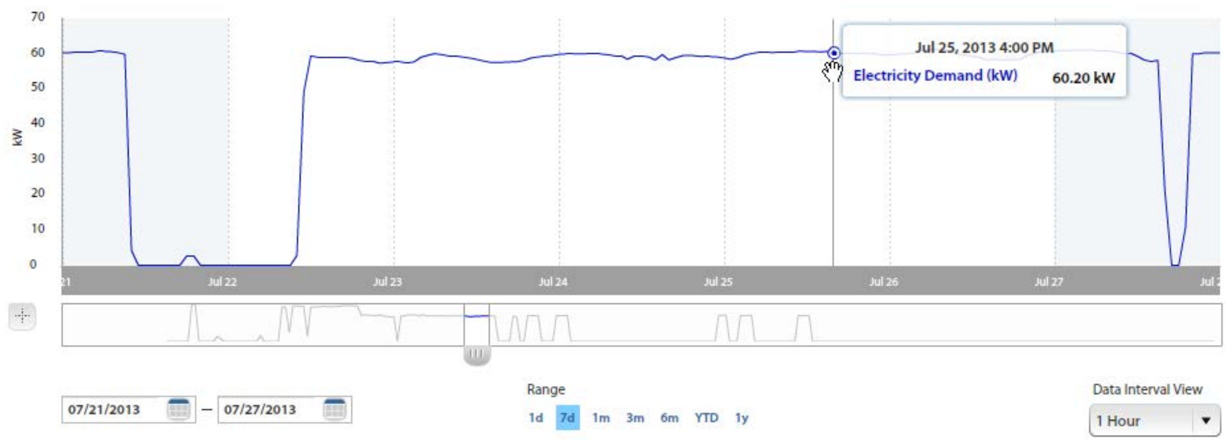


Figure 6: Low participation during events shows a single week of the program season in order to demonstrate pump run-time during a week with multiple load control events (week of June 22 to 27). This site has high availability but fell behind on watering and needed to opt out of the events on July 25 and 26. Lack of participation is apparent because the pump ran without shut-off from Monday, June 22 until the following weekend. As a result, the participation factor for this pump was lowered by 20% (two events out of ten total events in 2013) across the entire program season. Payment for this pump was lower due to the opt-outs during events, and could be raised with higher participation during events.

Impact of crop type

Crop type typically correlates with availability and can be a predictor of customer success in the ILC program. Irrigators in Idaho and Utah most commonly grow alfalfa, wheat, barley, potatoes, corn, or some combination thereof over the course of a multi-year planting schedule.

- **Alfalfa** is typically grown on a five to seven year planting cycle and is watered consistently across the season. Alfalfa can be grown across the Idaho and Utah territory. Prices are particularly high right now; so many irrigators are choosing to plant this crop. Typically alfalfa crops have the flexibility to participate in events due to a tolerance for shifts in watering schedules. However, the load profile of alfalfa is intermittent. Pumps watering alfalfa are shut off for two periods each summer for harvest. These harvest periods can last a week or more, resulting in significantly reduced availability.
- **Wheat and barley** will typically require large amounts of water early in the program season, and then pumps will be shut off once for several weeks to allow the crop to dry out for harvesting. These are tolerant crops that can withstand a couple off-schedule days to participate in load control events. However payments will be affected by availability.
- **Potatoes** are a water-intensive crop that is often rotated with wheat after a few years of harvest. Potatoes are significantly more sensitive to irrigation schedule interruptions than wheat or alfalfa. ILC participants with potato crops will have high availability but likely a reduced flexibility to participate in load control events. Potatoes will also be particularly sensitive in drought years, further impacting event participation.
- **Corn** and **fields watered for livestock pasture** have less consistent or predictable irrigation schedules, and are mostly found in Utah or on dairy farms.

Crop rotations further impact pump availability year-over-year. Over the course of the ten-year program period, most irrigators fall into one of the following four crop schedules:

- 100% alfalfa;
- 50% wheat/50% potatoes;
- free rotation between alfalfa, wheat, and potatoes; or
- 100% corn or pasture field irrigation.

A pump that waters wheat in year one with high event participation and 50% availability due to harvesting downtimes may water potatoes in year two. This crop shift would likely result in a shift to lower participation but 95% availability, making it difficult to use single year performance as a predictor for program fit across the ten-year period.

Impact of irrigation technology and water availability

While pump size is a clear determinant of total availability in the ILC program, irrigation technology and water availability also impact irrigation pump run-time and thus can affect customer success in the ILC program. Pivot irrigation systems are operationally easier to manage for load control events than a wheel line or hand line irrigation system, and thus are favored for participation in the program. It is important to note that a potential customer will never be disqualified solely based on crop type or irrigation technology. Enrollment will be judged based on customer's willingness to participate.

The majority of large – several hundred horsepower in size – irrigation pumps enrolled in the program are attached to a deep well and found in regions with low surface water availability. Growers with deep well pumps have a high level of control over their irrigation schedules and may have greater flexibility to participate in load control events, but may be more constrained by water resources.

Surface water pumps are generally found in areas with reliable water availability: Idaho Falls, south Idaho and select areas of Utah. These pumps are generally up to 100 horsepower in size and are used to move water laterally on demand from canals. Surface water pumps generally operate on a schedule arranged in advance with the canal company, which can lessen schedule flexibility to participate in load control events. Lack of coordination can result in flooding. Those growers using surface water pumps who participate in ILC often have large operations with many pumps that can manage the operational risk of a load control event.

Geographic segmentation

Based on conversations with irrigators in 2013, EnerNOC's marketing and sales team has characterized the Idaho and Utah customer territory into regions based on geography and observations of crop type and operational patterns.

In Idaho, participation, as measured by load contribution, was predominantly in four regions in 2013: Mud Lake (Hamer, Mud Lake, Terreton, Monteview, and Dubois), Idaho Falls (Idaho Falls, Firth, and Shelley), South Fork Snake River (Roberts, Rigby, Menan, Ririe) and Rexburg (Teton, Sugar City, Clementsville, Rexburg, Newdale). These areas generally have larger, deeper well pumps that are natural fits for the ILC program. Penetration, as compared to an estimate of the existing non-enrolled potential load in the region, was also high in these four regions, particularly in South Fork Snake River.

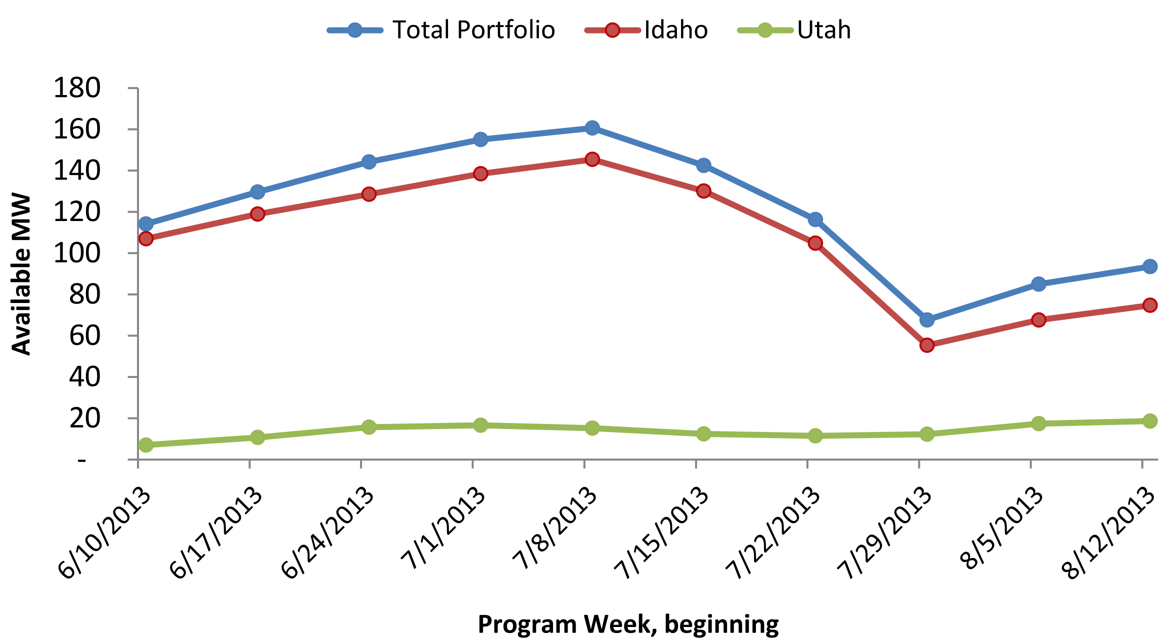
Participation, as measured by load contribution, was highest in three regions in the Utah service territory: Cedar City Parowan, Paragonah, and Cedar City), South Utah (Enterprise and Beryl Junction), and Delta (Leamington, Delta, Holden, Lynndyl, and Mccornick). In general Utah load is made up of smaller horsepower pumps than in Idaho and systems are older, making the mechanics of ILC participation more difficult.

Weekly available load reduction

The RMP ILC program is evaluated based upon average available load reduction (kW) during program hours from 12 to 8pm MT, non-holidays. In 2013, the portfolio average available load reduction was 120.86 MW with a contribution of 107.1 MW in Idaho and 13.76 MW in Utah.

Available load reduction for the total portfolio varies week over week due to irrigation use as displayed in Figure 7 below. Enrollment and registration of sites contributed to some of the ramp observed in the first three weeks of the program period. The other contributing factor was ramp in operation of irrigation systems for watering. The drastic reduction in available capacity from July 22 through August 4 was driven by the shut-off of pumps for harvest of crops, including grain and alfalfa.

Figure 7: Weekly average available load reduction



Irrigation patterns in Idaho drove total portfolio availability due to the disproportionate amount of eligible and participating load in Idaho. During the week of July 29, Idaho available load dropped to 52% of the 145.39 MW peak available load during the week of July 8. Pumping in Idaho resumed for the last two weeks of the program season (August 5 through August 16) but did not return to peak levels.

Available load in Utah also varied week over week but was slightly more consistent than in Idaho. During the week of July 22, available load dropped to 62% of the program peak in Utah. In contrast to Idaho, the last program week had the highest available load over the summer in Utah - 18.67 MW.

The concept of availability and pay-for-performance is new to customers participating in ILC. EnerNOC is taking the opportunity during discussions about payments, the enrollment process, and periodic check-ins with customers to explain and answer questions about this concept. Some customers ran entirely off peak, especially those on Utah's time of use rate, which resulted in significant differences between prior years' ILC incentives and expectations set during the 2013 enrollment process.

Load control events

In 2013, there were ten mandatory program events across Idaho and Utah. Actual load reduction was measured as the difference between actual demand during the event and baseline demand. Baseline demand was the average demand during program hours (12 to 8pm MT) on the most recent non-event, program day. Actual Load Reduction (kW), Baseline Demand (kW) and Load Reduction Performance Factor as reported here correspond to 5-minute interval energy usage measurements from EnerNOC's equipment at customers' sites. These measurements may not correspond to realized load reduction on RMP's system. Load reduced but not yet monitored is not included in EnerNOC's reported performance. This includes sites that were enrolled but not enabled with a monitoring solution, for which RMP provided a transition year payment.

The 2013 portfolio delivered 115.6 MW on average. Performance factor, the measure of actual load reduction compared to baseline demand, was 84% on average for the portfolio. Performance factor is designed to measure customers' choices to opt out, or to not participate in events, and is used to adjust availability payments because of the pay-for-performance nature of the program. Performance factor should not be confused with any notion of performance against a capacity nomination. Peak delivery of 135 MW occurred during the July 10 event. The portfolio also had maximum potential for curtailment on July 10 with a baseline demand of 156.5 MW.

Figure 8 summarizes portfolio load reduction compared to baseline. Figure 9 details the actual load reduction, baseline demand, and performance factor for each state and event. Maximum event participation was achieved during the first dispatch on June 18 with a performance factor of 93%. While Utah load only contributed to about 11% of average baseline load, Utah participants performed at 87% on average, compared to 84% in Idaho.

Figure 10 below provides a detailed list of the ten mandatory events, as well as one program test event and five canceled events. Several unexpected scenarios occurred during the 2013 event season:

- Canceled dispatches on the day-of (after day-ahead notification to EnerNOC and participants) were not expected. EnerNOC was able to notify customers of cancelation; however these instances caused confusion and complaints. EnerNOC and RMP are working to limit future cancelations to emergency scenarios only.
- Utility power outage outside of events and/or program hours affected customer's ability to participate. RMP agreed to compensate irrigators for participation in these instances as a show of good faith. EnerNOC incorporated this scenario into opt out processes in order to properly track these instances.

- A utility power outage during an event caused data gaps on EnerNOC's load control devices, and some pumps resumed normal operations during the event when power was restored. This resulted in a load increase across the portfolio during the last hour of the event on June 28. EnerNOC is working to identify a better solution to track this type of exception in the future; however all systems functioned as designed and expected.
- PacifiCorp requested to exclude a sub-set of customers from already dispatched events due to changes in system needs or vulnerabilities. EnerNOC was able to respond to such a request on July 1 by restructuring records and notifying customers. EnerNOC and RMP are working on zonal dispatch in order to better accommodate such needs in the future.
- PacifiCorp requested staggered dispatches after the July 10 event in order to minimize voltage spikes on RMP's system. EnerNOC implemented staggered dispatches by randomly grouping participating sites into ten groups with delays of one minute between remote curtailment of each group. This lead to a slower reduction in load over the course of ten to fifteen minutes (due to natural system delays).

Figure 8: Load reduction for total portfolio across Idaho and Utah, by event

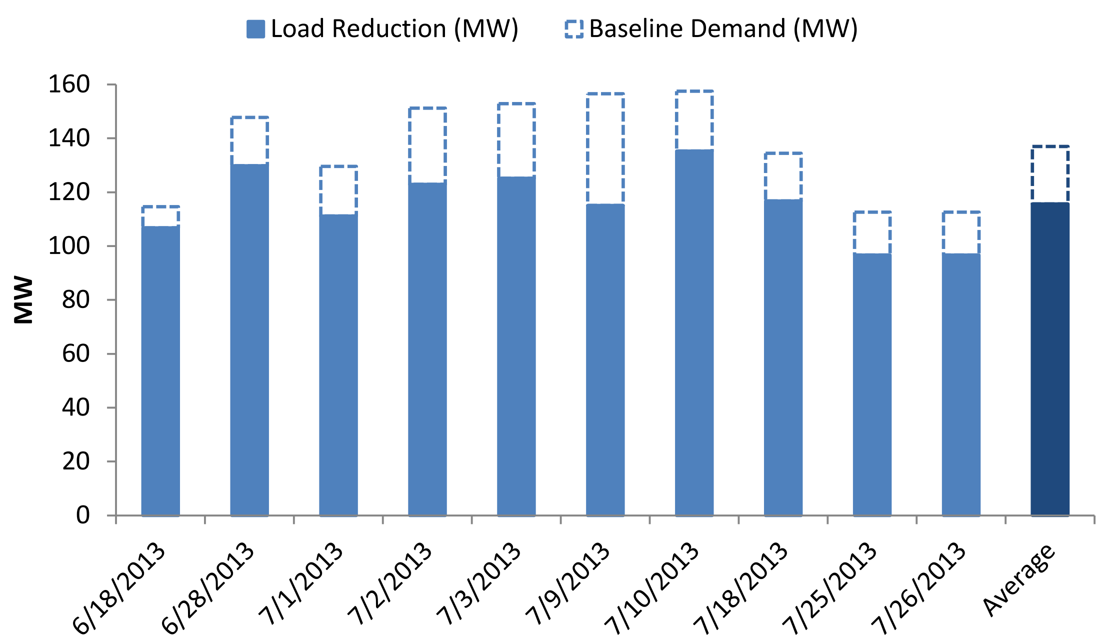


Figure 9: List of actual load reduction, baseline demand and performance factor, by event and region

Date	Region	Actual Load Reduction (kW)*	Baseline Demand (kW)*	Load Reduction Performance Factor (%)*
6/18/2013	**Total**	**106,743**	**114,556**	**93%**
	Idaho	100,335	107,421	93%
	Utah	6,407	7,135	90%
6/28/2013	**Total**	**129,758**	**147,734**	**88%**
	Idaho	116,987	132,280	88%
	Utah	12,771	15,455	83%
7/1/2013	**Total**	**111,128**	**129,606**	**86%**
	Idaho	97,850	113,845	86%
	Utah	13,277	15,761	84%
7/2/2013	**Total**	**122,903**	**151,244**	**81%**
	Idaho	109,395	134,864	81%
	Utah	13,509	16,380	82%
7/3/2013	**Total**	**125,160**	**152,853**	**82%**
	Idaho	110,009	136,109	81%
	Utah	15,151	16,744	90%
7/9/2013	**Total**	**115,104**	**156,498**	**74%**
	Idaho	102,483	141,293	73%
	Utah	12,622	15,205	83%
7/10/2013	**Total**	**135,328**	**157,460**	**86%**
	Idaho	120,806	142,151	85%
	Utah	14,522	15,309	95%
7/18/2013	**Total**	**116,790**	**134,505**	**87%**
	Idaho	106,339	122,831	87%
	Utah	10,451	11,674	90%
7/25/2013	**Total**	**96,631**	**112,630**	**86%**
	Idaho	85,644	100,949	85%
	Utah	10,987	11,681	94%
7/26/2013	**Total**	**96,667**	**112,630**	**86%**
	Idaho	86,765	100,949	86%
	Utah	9,902	11,681	85%
Average	**Total**	**115,621**	**136,972**	**84%**
	Idaho	103,661	123,269	84%
	Utah	11,960	13,703	87%

*Actual Load Reduction (kW), Baseline Demand (kW) and Load Reduction Performance Factor as reported here correspond to 5-minute interval energy usage measurements from EnerNOC's equipment at customers' sites. These measurements may not correspond to realized load reduction on RMP's system.

Figure 10: List of 2013 event activity

Event Type	Start Time (MT)	End Time (MT)	Time Canceled	Notes
Program Test	**6/5/2013 1:00pm**	6/5/2013 2:00pm	-	- Pre-season portfolio test to verify EnerNOC hardware/software and customer notifications.
Mandatory	**6/18/2013 3:00pm**	6/18/2013 7:00pm	-	- EnerNOC system issue prevented ~6 MW of load on ~40 devices from receiving the curtailment signal. EnerNOC curtailed these pumps over the first hour of the event. Customers' payments were not affected.
Canceled	**6/27/2013 3:00pm**	-	6/27/2013 1:50pm	- RMP canceled the event due to transmission returning to service and wind/other generation levels different than planned.
Mandatory	**6/28/2013 3:00pm**	6/28/2013 7:00pm	-	- RMP power outage at ~5:45pm. Some sites' power restored prior to event end time and pumps with auto-restarts resumed operations.
Mandatory	**7/1/2013 3:00pm**	7/1/2013 7:00pm	-	- RMP requested removal of participants on temporary transformer from event. - EnerNOC and RMP worked with participants affected by power outage on 6/28 to compensate appropriately.
Mandatory	**7/2/2013 3:00pm**	7/2/2013 7:00pm	-	- Participants cited high temperatures and third consecutive program day of dispatches as primary opt out reasons. - EnerNOC and RMP worked with participants affected by power outage on 6/28 to compensate appropriately.
Mandatory	**7/3/2013 3:00pm**	7/3/2013 7:00pm	-	- Participants cited high temperatures and fourth consecutive program day of dispatches as primary opt out reasons. - EnerNOC and RMP worked with participants affected by power outage on 6/28 to compensate appropriately.
Mandatory	**7/9/2013 3:00pm**	7/9/2013 7:00pm		- Localized power outage observed prior to event. - High frequency of opt outs for potato crops.
Mandatory	**7/10/2013 3:00pm**	7/10/2013 7:00pm	-	- Localized power outage observed prior to event.
Canceled	**7/11/2013 3:00pm**	-	7/11/2013 10:00am	- RMP canceled due to change in system needs.
Canceled	**7/16/2013 3:00pm**	-	7/16/2013 11:00am	- RMP canceled due to change in system needs.
Canceled	**7/17/2013 3:00pm**	-	7/17/2013 10:55am	- RMP canceled due to change in system needs.
Mandatory	**7/18/2013 3:00pm**	7/18/2013 7:00pm	-	- Implemented staggered curtailment. It took 15 minutes into the event window (3:15 pm) for all devices to receive the curtailment signal.
Canceled	**7/22/2013 3:00pm**	-	7/22/2013 11:00am	- RMP canceled event due to major load tap changer malfunction. Dispatch could have caused serious voltage issues for customers.
Mandatory	**7/25/2013 3:00pm**	7/18/2013 7:00pm	-	- Potato crops continue to opt out with high frequency. - Almost 35% of portfolio load is down for harvest.
Mandatory	**7/26/2013 3:00pm**	7/18/2013 7:00pm	-	- Potato crops continue to opt out with high frequency. - Almost 35% of portfolio load is down for harvest.

Customer satisfaction and issues

EnerNOC sent an end-of-season survey to gauge customer satisfaction via email on October 16, 2013. The survey consisted of fifteen questions and comment fields. A small sub-set of customers responded: twenty-two in Idaho and six in Utah. Eight quantitative questions were asked:

- Overall satisfaction with EnerNOC
- Likely to recommend EnerNOC
- Enrollment and contracting process
- Installation process of EnerNOC equipment
- Maintenance of EnerNOC equipment
- Ability to play your irrigation schedule and participate in ILC dispatches
- EnerNOC customer service
- Opt out process

Across these quantitative questions, average customer response was a 7 on a scale of 1-10 where 1 means “very dissatisfied” and 10 means “very satisfied”. Responses and comments indicated the following areas of customer concern:

- Loss of value compared to previous program rules, functionality and/or compensation.
- Delayed device enablement and/or rushed program start.
- Ongoing hardware issues with EnerNOC devices.
- Event cancellations were challenging for customers due to needs to plan irrigation schedule.
- EnerNOC’s call center needs to improve awareness about irrigation and agriculture.

EnerNOC is using customer feedback regarding the enrollment and enablement processes and event experience from 2013 to set expectations and shape improvements for future program years.

Key lessons learned from 2013

EnerNOC and Rocky Mountain Power identified the following lesson learned for 2013 to apply to 2014 and future years.

Enrollment and retention

1. Enrollment Timing

Summary

- Despite EnerNOC's concerted efforts to quickly finalize as many customer contracts and installations in the short time period between regulatory approval and the program season, it was not possible to enroll and enable all participating sites in time for the 2013 season.

Customer Feedback

- Customers generally assumed that if installation had not yet been fully completed at their sites, they could participate in the program manually without monitoring or remote control.
- In order to address those customers that were enrolled but not enabled with a monitoring solution, RMP decided to provide a transition year payment.

Approach for 2014

- EnerNOC will continue to enroll customers for 2014 and manage the timing of this enrollment and enablement closely. Installations and maintenance from 2013 enrollments continued post-season through November 2013, and re-started in March 2014.
- EnerNOC is communicating to new customers that sign-ups completed after April 18 are unlikely to be enabled in time for program start on June 9.
- EnerNOC is actively communicating with all customers about the status of their enrollment in order to ensure proper expectations.

2. Pay for Performance

Summary

- In 2013, the ILC program changed to a "pay for performance" compensation model where participants are compensated based on average availability during the program period. This compensation model differs from the previous ILC program model in which customers were generally compensated based on pump size and real-time metering was not a requirement.

Customer Feedback

- EnerNOC is working with customers to ensure that they understand how the calculations were completed in 2013 and to identify any potential errors.
- Many customers' perception is that their aggregate availability for the 2013 season was lower than expected.

Approach for 2014

- EnerNOC will continue to educate participants on the program model during new sales outreach and pre-season conversations with current customers.
- EnerNOC and Rocky Mountain Power are examining different approaches to calculating site availability for future program years, but do not intend to make a change for 2014 based on a single year of historic program data.

3. Site Size

Summary

- In previous years, ILC participants could enroll and receive compensation for smaller pumps. Because of the economics associated with installing new technology at each participating site, EnerNOC implemented an enablement fee for customers whose average expected load was less than 50 kW in order to help pay for installation costs.

Customer Feedback

- Customer feedback regarding pump size has been similar to discussions and reactions to the pay for performance compensation model. When customers previously received compensation for a number of smaller pumps, their overall compensation may have gone down in 2014 if those pumps were not be enrolled under the new program model.

Approach for 2014

- EnerNOC and Rocky Mountain Power continue to explore ways to maximize cost-effectiveness for small sites in the program. For 2014 account managers will continue to focus discussions with potential participants on factors that impact availability, specifically crop type, irrigation schedule, irrigation hardware, and harvesting schedule.
- Expected capacity pricing tiers will not change.

Enablement

1. Device Installation Challenges

Summary

- Errors were made during early 2013 installations related to contractor training on the new hardware.

Customer Feedback

- Some customers expressed frustration with delays to program enrollment and by the multiple contractor visits required to resolve hardware issues.

Approach for 2014

- EnerNOC has addressed these process errors and fixed the installs in question.
- Where appropriate, customers received a transition year payment to compensate for the missing period of program participation caused by the issue.

2. Maintenance Calls to Customers

Summary

- In order to verify metering connectivity and device functionality, EnerNOC sometimes called customers to ask about pumping schedules and inquire about status of EnerNOC's devices during the 2013 program season.

Customer Feedback

- Particularly for some customers with many sites participating in the program, these calls became overly burdensome.
- Some customers complained that EnerNOC staff was not always familiar with site and pump configurations or lacked an understanding of the customer's pumping operation.

Approach for 2014

- EnerNOC is re-visiting processes in order to reduce the number of maintenance calls placed to customers.
- EnerNOC is exploring the possibility of implementing a remote "power off" signal to report when power is cut to the ESS. This will provide additional information about the root cause of issues.
- EnerNOC is conducting training for customer-facing teams about irrigation operations in order to improve the quality of interactions with ILC participants.

3. Pivots Running Dry

Summary

- Remote controls on EnerNOC metering devices are designed to shut off and restart water pumps, but are not always able to also shut down or restart connected pivot irrigation systems, depending on the configuration. When pumps are shut down but pivots continue to run, these pivots are said to "walk dry", moving across fields without watering crops.
- Such an occurrence is an operational inconvenience for farm managers, who must manually reset pivots to the start position at the time of pump shut off.

Customer Feedback

- Some customers asked whether EnerNOC's ILC equipment could provide functionality to include pivot shutdown and restart.

Approach for 2014

- EnerNOC is investigating technical solutions. Such requests are being addressed on a case-by-case basis in order to determine the scope and cost of each individual project to determine suitability for the RMP program.

4. Load not being captured on enrolled meters.

Summary

- EnerNOC is monitoring load at the pump panel, and therefore does not always capture smaller pump or pivot load attached to the same utility meter but not directly connected to the primary pump.
- In some cases, these loads were curtailed during 2013 events but not included in availability for compensation due to lack of metering data.

Customer Feedback

- Customers who experienced these unmeasured load reductions would prefer to receive compensation for all devices that shut down during events, whether measured and metered or not.

Approach for 2014

- EnerNOC is adjusting training for new installations in 2014 in order to capture as much of this additional load as possible. Contractors will place CTs prior to the starter on all new installs and at existing sites when they are visiting the area for maintenance.
- EnerNOC is also currently field testing other CT models which will provide additional flexibility to enroll sites where previously there were physical limitations to CT size.

Dispatch management

1. Event Frequency

Summary

- In 2013, Rocky Mountain Power exercised ten of twenty available events (50%) and forty of fifty-two available event hours (77%), which amounted to event dispatch during 10% of all program hours.

Customer Feedback

- Feedback from ILC participants suggests a perception that this utilization rate is high even though there is an understanding of the program rules and variability year over year.

Approach for 2014

- EnerNOC has communicated customer's concerns to RMP.
- RMP plans to train the PacifiCorp Front Desk staff about the impacts of events on irrigators.

2. Back-to-Back Event Pattern

Summary

- When multiple events were called in a program week, the event days were always back-to-back. In addition, there was a string of consecutive events days from Friday, June 28 through Wednesday, July 3.

Customer Feedback

- A back-to-back event pattern is particularly difficult for irrigation DR participants. After two days of deferred irrigation, it becomes more difficult to catch up on watering and achieve the same crop yields.

Approach for 2014

- EnerNOC has brought this feedback to RMP to help ensure that PacifiCorp's Front Desk understands the impact of back-to-back dispatches on irrigators.

3. Day-Of Event Cancellations

Summary

- Event cancellations were a primary source of concern for participants in 2013. There were five events cancelled, each within five hours of the scheduled event start time.

Customer Feedback

- Cancellations are most challenging for irrigators who make decisions early in the morning about their operations and staff resources. Additionally, due to a business model that compensates participants for availability, if irrigators who had already planned to be shut down for the event day did not resume normal operations upon receiving the cancellation notification, their availability and payments were negatively impacted.
- This problem also impacts the day-ahead baseline when an event is called for the day following a cancellation.
- Several participants have communicated that they would like cancellations to count towards event maximum limitations. If this were the case in 2013, the program would have been called in excess of the prescribed fifty-two event dispatch hours.

Approach for 2014

- RMP recognized that day-of cancellations or reserving the program day-ahead is not the intended use of the program.
- RMP is working to avoid event cancelations unless in the case of a true system emergency.

4. Event Notifications

Summary

- As part of EnerNOC's standard process, participants received day-ahead notifications of event start and end time, a reminder notification approximately four hours prior to event start, and event end notifications from EnerNOC. Notifications were delivered via phone call, email, and SMS.
- In cases of back-to-back event days and/or cancellations, the volume and cadence of notifications in 2013 was higher than expected for some customers.

Customer Feedback

- While EnerNOC received a feedback from participants about the utility and timing of event notifications via phone, email and SMS, much of it was conflicting. For example, some providers did not want to receive the restore/event end notifications, while others appreciated these messages.

Approach for 2014

- EnerNOC is working to improve its notification system in order to provide greater flexibility in 2014. EnerNOC expects to be able to provide more explicit communication about which pumps are involved in a dispatch via email and to condense multiple notices into one message delivery.

5. Opt Out and Control of Pumps

Summary

- In 2013, customers were required to call EnerNOC's support center to opt out of events.
- In previous years, customers could use the legacy system to log in remotely and opt out.

Customer Feedback

- Overall, feedback suggested that the 2013 opt out process worked well for customers and the event management team.
- After the first two events, EnerNOC organized the process around RMP's Site ID which helped to ensure effective and accurate communication with customers.
- A handful of current and potential participants requested that this functionality be provided in EnerNOC's portal for future program years.

Approach for 2014

- EnerNOC is not able to provide web-service opt out functionality for 2014 but will continue to explore the needs and development of this functionality for future years.

6. Pre-Season Portfolio Test

Summary

- A one-hour portfolio test was held prior to the mandatory program season start on June 4, 2013 for one hour (1:00 to 2:00 pm MDT). Only three sites opted out of the test, two of which were under construction and the third because the primary contact was out of town.

Customer Feedback

- The pre-season portfolio test was a common pain point for 2013 ILC participants. Program participants complained that the pre-season portfolio test was inconvenient and not worthwhile as they did not receive direct compensation for participation in this test.

Approach for 2014

- While a test was necessary in 2013 due to the new technology platform and business model, EnerNOC and RMP do not intend to conduct a portfolio-wide test prior to the 2014 season start. Equipment for existing customers will be tested on an as-needed basis to ensure pre-season readiness.
- Newly-enabled sites will continue to undergo an acceptance test to verify equipment functionality after installation.