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LISA D. NORDSTROM  
Lead Counsel  
[lnordstrom@idahopower.com](mailto:lnordstrom@idahopower.com)

November 3, 2015

**VIA HAND DELIVERY**

Jean D. Jewell, Secretary  
Idaho Public Utilities Commission  
472 West Washington Street  
Boise, Idaho 83702

RE: Case No. IPC-E-15-03 – Compliance Filing – Flex Peak Program End-of-Season Report

Dear Ms. Jewell:

In Order No. 33292, the Idaho Public Utilities Commission (“Commission”) ordered Idaho Power Company to file a Flex Peak Program end-of-season report within 80 days after the end of the season. Therefore, enclosed for filing are an original and seven (7) copies of the Flex Peak Program end-of-season report containing the information requested by the Commission in the order.

If you have any questions regarding this filing, please contact Zach Harris at 388-2305 or [zharris@idahopower.com](mailto:zharris@idahopower.com).

Very truly yours,

Lisa D. Nordstrom

LDN:kkt  
Enclosures

## CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on the 3<sup>rd</sup> day of November 2015 I served a true and correct copy the FLEX PEAK PROGRAM END-OF-SEASON REPORT upon the following named parties by the method indicated below, and addressed to the following:

### Commission Staff

Karl T. Klein  
Deputy Attorney General  
Idaho Public Utilities Commission  
472 West Washington (83702)  
P.O. Box 83720  
Boise, Idaho 83720-0074

Hand Delivered  
 U.S. Mail  
 Overnight Mail  
 FAX  
 Email [karl.klein@puc.idaho.gov](mailto:karl.klein@puc.idaho.gov)

### Industrial Customers of Idaho Power

Peter J. Richardson  
Gregory M. Adams  
RICHARDSON ADAMS, PLLC  
515 North 27<sup>th</sup> Street (83702)  
P.O. Box 7218  
Boise, Idaho 83707

Hand Delivered  
 U.S. Mail  
 Overnight Mail  
 FAX  
 Email [peter@richardsonadams.com](mailto:peter@richardsonadams.com)  
[greg@richardsonadams.com](mailto:greg@richardsonadams.com)

Dr. Don Reading  
6070 Hill Road  
Boise, Idaho 83703

Hand Delivered  
 U.S. Mail  
 Overnight Mail  
 FAX  
 Email [dreading@mindspring.com](mailto:dreading@mindspring.com)

Idaho Conservation League  
Benjamin J. Otto  
Idaho Conservation League  
710 North 6th Street (83702)  
P.O. Box 844  
Boise, Idaho 83701

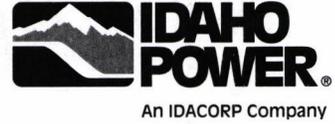
Hand Delivered  
 U.S. Mail  
 Overnight Mail  
 FAX  
 Email [botto@idahoconservation.org](mailto:botto@idahoconservation.org)

  
\_\_\_\_\_  
Kimberly Towell, Executive Assistant

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**2015 Flex Peak Program  
End-of-Season Annual Report**

**November 3, 2015**

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## Attachment

CLEAResult 2015 Impact Evaluation

## Background

The Flex Peak Program (“Program”) is a voluntary demand response (“DR”) program available to industrial and large commercial customers that are capable of reducing their electrical energy loads for short periods during summer peak days. By reducing demand on extreme system load days during summer months, the Program reduces the amount of generation and transmission resources required to serve customers. This Program, along with Idaho Power Company’s (“Idaho Power” or “Company”) other DR programs, Irrigation Peak Rewards and the Residential Air Conditioner Cycling Program, has helped to delay the need to build supply-side resources.

Idaho Power filed an application with the Idaho Public Utilities Commission (“Commission”) on February 4, 2015, in Case No. IPC-E-15-03 requesting authority to replace the existing optional FlexPeak Management DR program that was managed by a third-party contractor with an optional DR program that would be managed by the Company. The Commission issued Order No. 33292 on May 7, 2015, authorizing the Company to implement an internally managed Flex Peak Program under Schedule 82 in Idaho and continue recovery of its DR program costs in the manner it had been previously.

As part of Order No. 33292, the Commission ordered the Company to file an annual end-of-season report that should include the number of participants, number of participating sites, megawatts (“MW”) of DR under contract, MW of DR realized and incented per dispatch, percent of nominated MW achieved in each dispatch event by participant, and a detailed program cost analysis. This report addresses the annual end-of-season reporting requirements.

Page 8 of the Commission’s order also requires Idaho Power to file a separate, one-time report no later than May 7, 2016, that discusses the Company’s experience in running the Program, how the Program’s costs and benefits compare to those achieved under the prior program, how participants have performed under the structure, and whether changes might improve the Program. The Company will file the one-time report in 2016.

## Program Details

The Program pays participants a financial incentive for reducing load within their facility and is active June 15 to August 15, between the hours of 2 p.m. to 8 p.m. on non-holiday weekdays.

Customers with the ability to nominate or provide load reduction of at least 20 kilowatts (“kW”) are eligible to enroll in the Program. The 20 kW threshold allows a broad range of customers the ability to participate in the Program. Participants receive notification of a load reduction event (“event”) two hours prior to the start of the event, and events last between two to four hours. The Flex Peak Program provided approximately 28 MW at the generation level of committed load reduction based on the 2015 nomination amounts.

The parameters of the Flex Peak Program are in Schedule 82, and include the following:

- A minimum of three load reduction events would occur each Program season
- Events could occur any weekday, excluding July 4, between the hours of 2 p.m. and 8 p.m.
- Events could occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per Program season
- Idaho Power would give notification to participants two hours prior to the initiation of an event
- If prior notice of a load reduction event had been sent, Idaho Power could choose to cancel the event and notify participants of cancellation 30 minutes prior to the start of the event

## Program Incentives

The Flex Peak Program includes both a fixed and variable incentive payment. The fixed incentive is calculated by multiplying the actual kW reduction by \$3.25 for weeks when an event is called, or the weekly nominated kW amount by \$3.25 for weeks when an event is not called. The variable energy incentive is calculated by multiplying the kW reduction by the event duration hours to achieve the total kilowatt-hour (“kWh”) reduction during an event. The variable incentive payment is \$0.16 per kWh and is implemented for events that occur after the first three events.

The Program also includes an incentive adjustment of \$2.00 when participants do not achieve their nominated amount during load reduction events. This adjustment amount is used for the first three events. After the third event, the adjustment is reduced to \$0.25 per kW. Incentives are calculated using Idaho Power’s interval metering billing data and participants’ incentive checks were mailed within 30 days of the end of the Program season. Participants were mailed their incentive checks by September 15 in 2015. The incentive structure offered for the 2015 season is listed in Table 1.

**Table 1.**

<b>Fixed Capacity Payment Rate*</b>	<b>Variable Energy Payment Rate**</b>
\$3.25 per Weekly Effective kW Reduction	\$0.16 per kWh (Actual kW x Hours of Event)
<b>Adjustment for first three events</b>	<b>Adjustment after first three events</b>
\$2.00 per kW not achieved up to nomination	\$0.25 per kW not achieved up to nomination

\*To be prorated for partial weeks

\*\*Does not apply to first three Program events

## Program Results

The results throughout this report are at the generation level and system losses have been taken into account. Idaho Power called three load reduction events in 2015. The first event occurred on June 30, the second on July 21, and the third on August 4. The maximum realization rate during the season was 96.6% and the average for all three events combined was 79.6%. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was during the July 21 event at 25.6 MW.

Participants had a committed load reduction of 28.1 MW in the first week of the Program, which was the peak committed load reduction for the season. This weekly commitment, or “nomination”, was comprised of 38 participants totaling 72 sites. Out of the total number of sites, 57 sites participated in the 2014 season, and 15 sites were newly added in 2015. There were 36 sites that did not re-enroll from the 2014 season. Of the 36 sites that did not re-enroll, 17 were from one customer that chose not to participate in 2015. However, of the sites that did not re-enroll last season, Idaho Power has received information from customers that three sites will be enrolled in 2016. The committed load reduction at the end of the season was 26.37 MW, which was achieved by 71 facility sites. One site dropped out of the Program during the season due to its primary pump being taken down and replaced.

The first event was called on Tuesday, June 30. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 27.72 MW. The average load reduction was 23.6 MW. The highest hourly load reduction was 24.1 MW during hour three. The realization rate for this event was 86.7%.

The second event was called on Tuesday, July 21. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 26.4 MW. The average load reduction was 24.9 MW. The highest hourly load reduction was 25.6 during hour one. The realization rate for this event was 96.6%.

The third event was called on Tuesday, August 4. Participants were notified at 2 p.m. for a three-hour event from 4-7 p.m. The total nomination for this event was 26.2 MW. The average load reduction was 13.8 MW. The highest hourly load reduction was 14.6 MW during hour three. The realization rate for this event was 55.4%. This was primarily due to one customer with two sites that was not able to provide their typical load reduction because of production issues caused by outages from range fires. These two sites achieved a realization rate of 8% in the August 4 event, compared to an average of 113% for the first two events. Had the site's realization rate for the August 4 event been the average of its realization rates from the first two events, the realization rate for this event would have been 94.8%.

### Participation

In anticipation of the 2015 Program season, Idaho Power utilized direct customer mailings to encourage both past participants and new customers to enroll. Several communications were sent to former FlexPeak Management program participants prior

to the Commission approving Schedule 82 to advise them about the possible upcoming Program changes. The Commission granted authorization for the new Company-managed Program on May 7, 2015. Idaho Power had just over 30 days to recruit customers for the Flex Peak Program before the season began on June 15, 2015.

In May 2015, Program enrollment mailings were sent to all customers that had participated in prior seasons from 2012 to 2014. Contents of this mailing included Program details, a Program application, the Program's incentive structure, and a listing of the customer's eligible service points. Additionally, the Idaho Power Program Specialist and Customer Representatives answered specific customer questions by phone, email, and face to face contact, which helped inform participants of new Program details.

Despite changes to the Program, most past participants and sites re-enrolled. The number of sites enrolled in the Program for 2015 was 72. Of those 72 sites, 57 were previously enrolled during the 2014 season. Those 57 returning sites accounted for 79% of the 2015 enrolled service points. The Program also retained 34 of the 48 participants from the 2014 season for a 71% customer retention rate.

In 2015, the average nominated kW per site was 378 kW, while the average load reduction was 291 kW per site. The 72 enrolled sites nominated an average of 26.9 MW across the three events and included 38 unique participants. The average number of sites enrolled per participant was 3.1.

Figure 1 represents Idaho Power's service area divided into five regional areas: Western, Canyon, Capital, Southern, and Eastern.

Figure 1.

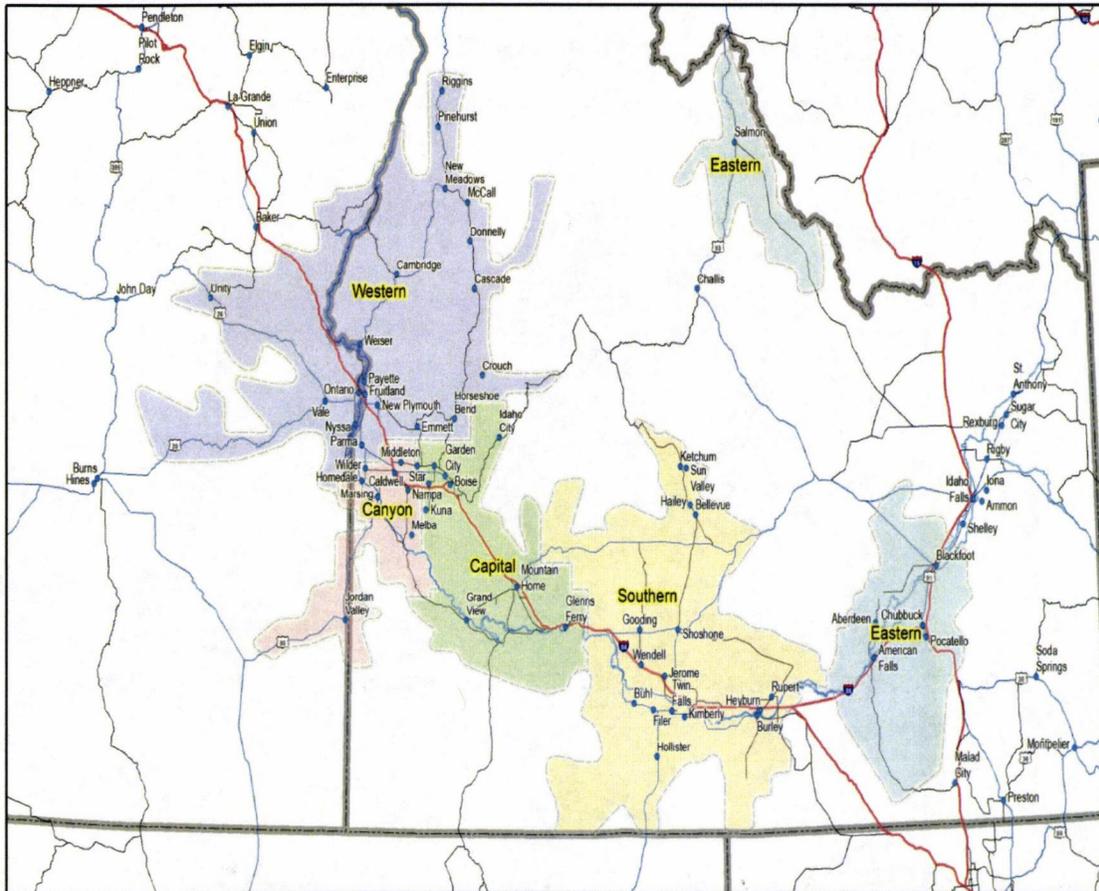


Figure 2 represents the 72 service points that enrolled in 2015 and their distribution by Idaho Power's regional service areas.

**Figure 2.**

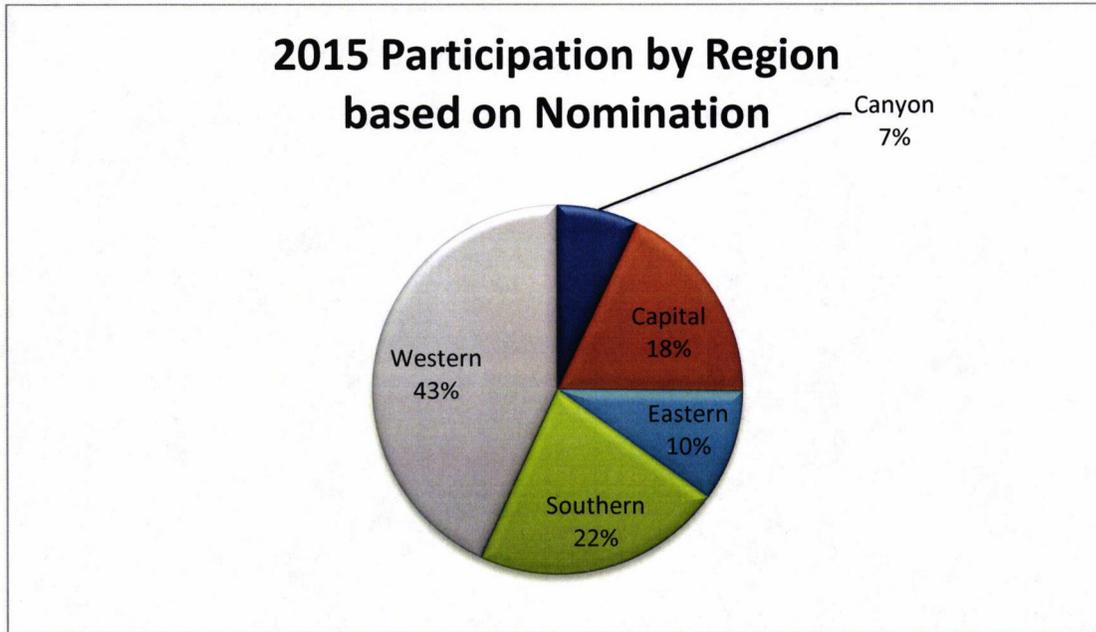
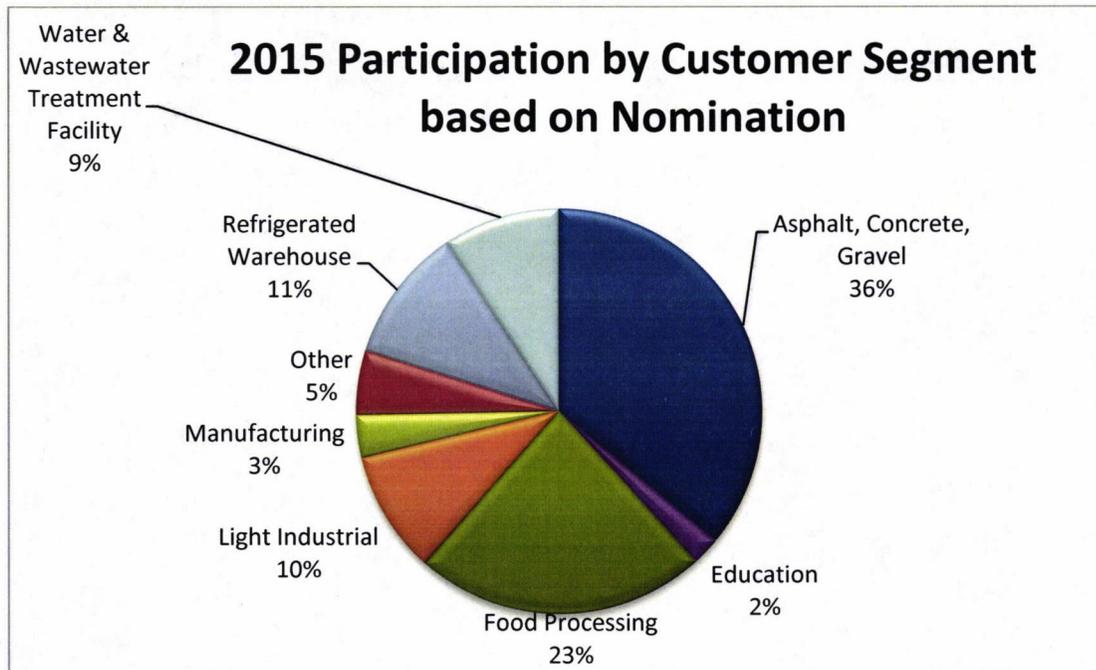


Figure 3 represents the 72 service points that enrolled in 2015 and their diversity per customer segment.

**Figure 3.**



## Operations

Interval metering data provides Idaho Power the ability to view all participants' load after events. This metering data was used to calculate the reduction achieved per site during load reduction events. Using this data, Idaho Power provided participants post-event usage reports that showed hourly baseline, actual usage, and reduction during an event. This tool assisted participants in refining their nomination for future events. This data provides information useful in determining which participating sites may have an opportunity to provide more reduction or change their reduction strategy if nomination amounts were not achieved.

Based on individual event performance, Idaho Power contacted participants if their reduction was 25% less than the nominated amount for the event. When a participant did not achieve at least 75% of their nominated amount, there were often one or more of the following factors that influenced the performance:

- Production requirements prevented the ability to curtail or fully implement all load reduction measures within facility
- Building operators and/or maintenance personnel were out of town or unavailable during event day
- Enrolled facility was offline or not in production during entire load reduction event or baseline period due to reduced hours of operation

## Load Reduction Analysis

Potential load reduction impacts in 2015 were verified by an impact evaluation performed by a third-party contractor, CLEAResult. The impact evaluation report performed by CLEAResult is included as an attachment to this report. The goals of the impact evaluation were to calculate load reduction in MW under Idaho Power's methodology, as well as the methodology that was previously used for the Program. The evaluation also analyzed and verified load reduction per site and per event.

The baseline that load reductions are measured against during load reduction events is calculated using a 10-day period. The baseline is the average kW of the highest energy usage days during the event availability time (2-8 p.m.) from the highest three days out of the last 10 non-event weekdays. Individual baselines are calculated for each facility site. Once the original baseline is calculated, there is an additional piece included in the methodology called the Day-of-Adjustment ("DOA") that is used to arrive at the adjusted baseline.

Adjustments address situations where load is lower or higher than it has historically been and the baseline does not accurately reflect the load behavior immediately prior to the event. The DOA is applied to each site's original baseline by accounting for the difference between the average baseline kW and the average curtailment day kW during hours two-three prior to the start of the event. The DOA is calculated as a flat kW and is applied to all baseline hours and capped at +/- 20% of the original baseline

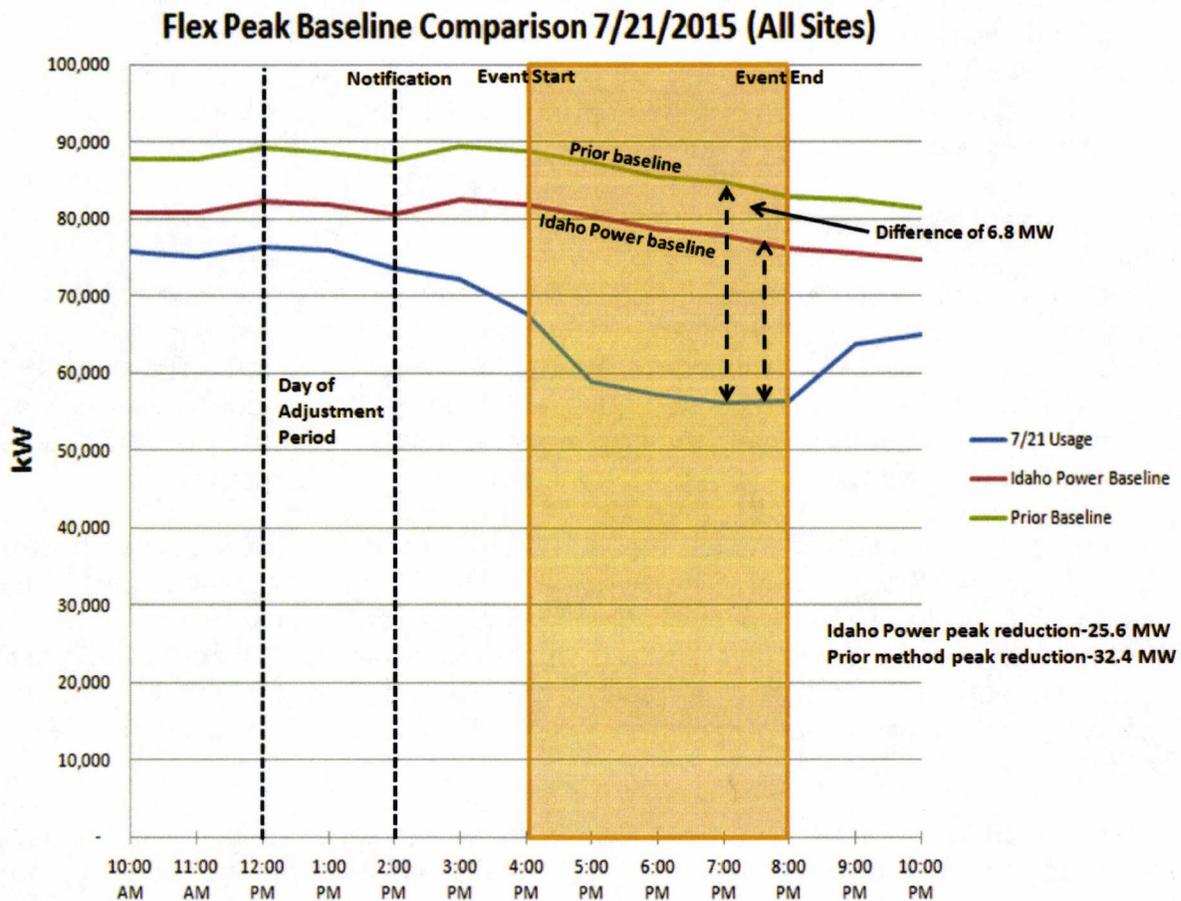
kW. The DOA is symmetrical, having either an upward or downward adjustment to the baseline, and is applied to the original baseline kW for each facility site for each hour during the Program event.

In determining the reduction amount for each event, there was variation from the previous baseline methodology compared to the current baseline methodology used in 2015 due to the DOA.

While both methods are commonly accepted throughout the industry, Idaho Power believes having a symmetrical DOA with caps is a more equitable way to calculate load reduction for both participants and the Company. The baseline and DOA methodologies will be compared in greater detail in the one-time Flex Peak Program report to be filed in 2016 per Order No. 33292.

Figure 4 represents the measured reduction from Idaho Power's baseline and DOA methodology versus the prior program baseline methodology for the second event on July 21, 2015.

**Figure 4.**



CLEAResult also analyzed the realization rate for each event with all sites aggregated together, as well as on an individual site basis.

Table 2 shows the Program realization rates for 2015 based on peak load reduction per event.

**Table 2.**

<b>Event Date</b>	<b>Idaho Power Baseline &amp; DOA</b>	<b>Previous Baseline &amp; DOA</b>
June 30, 2015	86.7%	91.3%
July 21, 2015	96.6%	121.1%
August 4, 2015	55.45%	80.2%
<b>Season Average</b>	<b>79.6%</b>	<b>97.5%</b>

Table 3 shows the realization rate per site for each participant in the Program.

**Table 3.**

<b>Participant Number</b>	<b>June 30 Event Realization</b>	<b>July 21 Event realization</b>	<b>August 4 Event Realization</b>	<b>Season Realization</b>
1	2%	2%	9%	4%
2	39%	59%	66%	55%
3	100%	129%	62%	97%
4	17%	128%	127%	91%
5	84%	206%	90%	127%
6	51%	69%	34%	51%
7	190%	14%	13%	100%
8	90%	74%	121%	95%
9	156%	70%	76%	101%
10	395%	71%	198%	221%
11	59%	38%	95%	64%
12	0%	11%	7%	6%
13	170%	168%	116%	151%
14	2%	60%	96%	53%
15	1%	92%	38%	44%
16	60%	46%	15%	40%
17	124%	106%	0%	77%
18	159%	163%	157%	160%
19	103%	71%	110%	95%
20	81%	106%	77%	88%
21	1%	61%	54%	39%
22	46%	113%	103%	87%
23	0%	19%	24%	14%
24	35%	0%	109%	48%
25	28%	0%	184%	71%
26	169%	79%	160%	136%
27	392%	277%	19%	229%
28	103%	89%	0%	64%

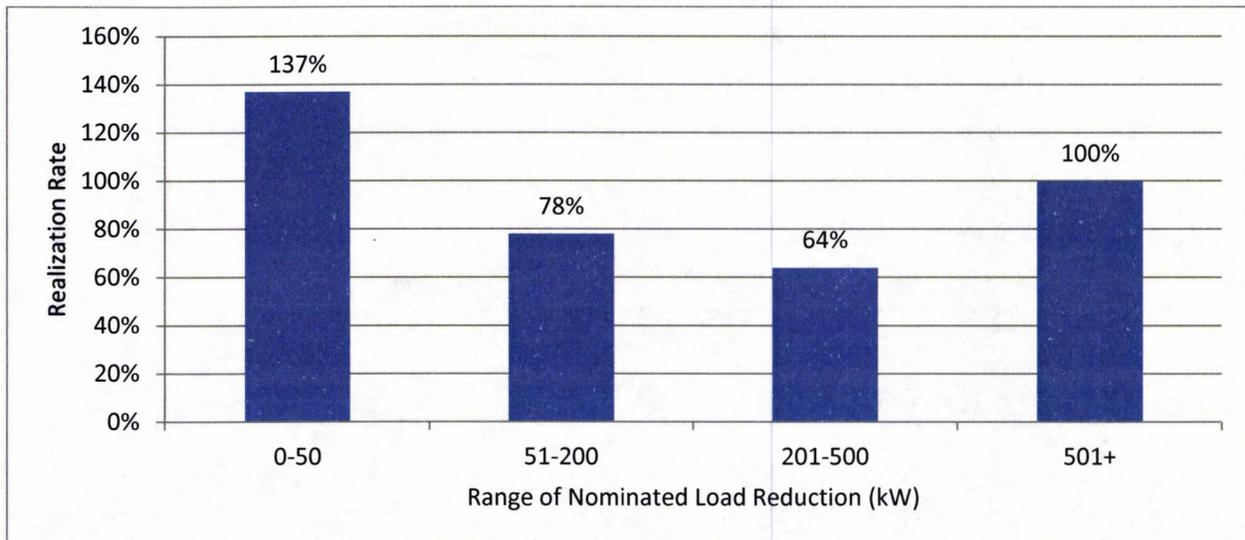
<b>29</b>	635%	80%	155%	290%
<b>30</b>	0%	0%	92%	31%
<b>31</b>	14%	62%	71%	49%
<b>32</b>	93%	76%	108%	92%
<b>33</b>	65%	42%	12%	40%
<b>34</b>	78%	80%	159%	106%
<b>35</b>	95%	76%	83%	85%
<b>36</b>	90%	77%	79%	82%
<b>37</b>	82%	102%	117%	100%
<b>38</b>	55%	74%	71%	67%

When broken out across four size classes, the sites with the smallest nominated load reduction, 0 – 50 kW, achieved the highest average realization rate across the three events: 137%. The highest realization rate among all nomination groups was the smallest at 0-50 kW, which supports that the Program change in allowing smaller participants to enroll helped increase both the Program participation and overall realization rate.

The second largest size class, 201 – 500 kW, achieved the lowest average realization rate: 64%. The 201-500 kW group had the largest portion of sites enrolled for the Program and was very diverse in size and facility type. The lower realization rates for this group were due to production requirements and key personnel being unavailable to implement the full curtailment of the sites. Idaho Power will work with this customer segment to help refine nominations to more closely align with realistic reduction opportunities which will increase the realization rate specific to this group.

Figure 5 below represents the realization rate achieved by each nomination group, averaged across all three events.

**Figure 5.**



The realization rate analysis results show that maximum load reduction was realized in the middle of the Program season. This time period is the last week of June through the middle of July, which correlates with Idaho Power's overall summer system peak.

## Program Costs

Program costs totaled \$563,292 through October 1, 2015. Incentive payments were the largest expenditure comprising 87% of total costs. The incentive payments were fixed capacity payments resulting from the three events called during the 2015 Program season. Variable energy payments were not made during the season because the variable energy payment is implemented starting with the fourth event. Total Program costs during 2014 were \$1,563,211 or \$44.66 per kW based on 35 MW. Total Program costs for 2015 were \$22.53 per kW based on 25 MW. By managing the Flex Peak Program internally the Company saved its customers nearly \$1 million compared to 2014 program costs.

Table 4 displays the 2015 Program costs through October 1, 2015, by category.

**Table 4.**

<b>Item</b>	<b>2015 Program Costs</b>
Materials & Equipment	\$984
Contract Services	\$8,138
Incentive payments	\$487,857
Marketing & Administration	\$66,313
<b>Total</b>	<b>\$563,292</b>

## Benefit-Cost Analysis

The benefit-cost analysis for the Flex Peak Program is based on a 20-year model that uses financial and demand-side management alternative cost assumptions from the *2015 Integrated Resource Plan* (“IRP”). As part of the public workshops in conjunction with Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed in a settlement agreement (“Settlement”) on a new method for valuing DR. The Settlement, as approved in Commission Order No. 32923, determined that the annual cost of operating the three DR programs for the maximum allowable 60 hours must be no more than \$16.7 million. This amount was reevaluated in the 2015 IRP, as agreed upon in the Settlement, to be \$18.5 million.

The preliminary cost estimate through October 1, 2015, of operating the three DR programs in 2015 was \$8.9 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately \$11.4 million which is still below the total annual costs agreed upon in the 2013 Settlement as revised in the 2015 IRP.

Idaho Power’s cost-effectiveness for DR programs is updated annually. A more comprehensive benefit-cost analysis will be included in the Company’s annual 2016 Demand-Side Management Report when all the data will be available.

## Customer Satisfaction Results

Idaho Power conducted a post-season survey that was sent via email to all participants enrolled in the Program. The survey focused on quantifiable questions that encouraged customer feedback that could be used to improve the Program in future years. Questions were based on a five point rating scale. Idaho Power received a response rate of 51%. The results of the survey were favorable and participants were satisfied, as shown below:

- When asked, overall the application process was easy to understand, 5 being “strongly agree,” the average response was 4.5

- When asked, how clear were the notification messages for the Flex Peak Program events, 5 being “very clear,” the average response was 4.9
- When asked, how prepared you were for each of the events called this year, 5 being “very prepared,” the average response was 4.2
- When asked, how helpful was the post-event performance data in helping you refine future nominations for the Program, 5 being “very useful,” the average response was 4.9
- When asked, how helpful was Idaho Power with any questions you had regarding the Flex Peak Program, 5 being “very helpful,” the average response was 4.6
- When asked, how satisfied are you with the timeliness of receiving your incentive payment, 5 being “very satisfied,” the average response was 4.7
- When asked, how satisfied are you with your incentive amount, 5 being “very satisfied,” the average response was 4.2
- When asked, how satisfied are you with your overall experience with the Flex Peak Program, 5 being “very satisfied,” the average response was 4.5
- When asked, how likely you would be to re-enroll in the Flex Peak Program in the future, 5 being “very likely,” the average response was 4.9

## **Program Activities for 2016**

Recruitment efforts for the 2016 season will begin in the fourth quarter of 2015 and first quarter of 2016 to encourage participation for the 2016 Program season. Idaho Power will meet with existing participants during the off-season from either their Idaho Power Customer Representative or the Program Specialist to discuss past season performance and upcoming season details. New customers will be identified mid-winter with field visits and will have a follow up communication in early spring. Several new large customers verbally committed to enrolling for the 2016 season at the end of the 2015 season as the groundwork had been laid during the active season to recruit them for the future. The Company has also published an article promoting the Flex Peak Program in the “Energy at Work” fall edition of Idaho Power’s quarterly newsletter that was sent to all commercial and industrial customers. The article was well received and customers have reached out to the Idaho Power Program Specialist to inquire if the Program is right for them.

Idaho Power plans to launch a marketing campaign early in 2016 with Customer Representatives to recruit new participants. The Company is also developing new Program literature and a new Program brochure. This marketing campaign will focus on identifying customer dynamics that make successful Program participants and will also highlight available incentive amounts based on customers’ load size. The Program will be jointly marketed along with Idaho Power’s other energy efficiency programs. In addition, the marketing campaign goals are to increase the number and size (in terms of nominated load reduction) diversity of sites enrolled. By having a larger diversity of customer sizes enrolled, the Program would be less prone to volatility in its realization rate. The Company will utilize Customer Representative support for the sites with the

largest nominated load reduction with the goal of ensuring all large sites are able to participate when load reduction events are called.

For the upcoming season, Idaho Power plans to complete an educational campaign with both enrolled participants and new customers to inform them of DR strategies with goals of increasing, refining or lowering the amount of nominated load reduction from each site to more realistically align with load reduction potential.

## Conclusions

A Company-managed program offers customers several benefits. First, there are significant annual cost savings. The total cost savings this season compared to the prior year was nearly \$1 million. These cost savings flow back to customers through the Company's Power Cost Adjustment mechanism. Second, all participants were paid within 30 days of the season ending compared to previous years where the second installment was paid nearly five months after the end of the season. Lastly, because the Program is managed by the Company, Idaho Power could cross-market energy efficiency programs and strengthen the relationship with its participants directly. In addition, the Company concluded the following:

- The Program had a total of 72 sites reducing peak demand by 25.6 MW
- The total Program costs for 2015 through October 1 were \$563,292
- There were 15 new sites recruited to enroll in the 2015 season
- The Program shows high customer satisfaction results among participants
- The cost of having this resource available was \$22.53 per kW in 2015 based on 25 MW, \$26.32 per kW based on average reduction for the season, and \$20.01 per kW based on max nomination for the season
- Despite changing to a Company-managed program, a short timeline to implement the Program, and modifications to the load reduction calculation methodology, the Flex Peak Program retained 71% of past participants (34 of 48 participants) from the 2014 season
- When analyzing the Program at the generation level, industrial and commercial customers have made noteworthy contributions to Idaho Power's DR programs. The Flex Peak Program currently contributes approximately 8-10% of the Company's overall DR portfolio and can be relied upon to provide dispatchable load reduction for the electrical grid
- Curtailment event results showed maximum load reductions of 24.1, 25.6, and 14.6 MW, respectively, for the three events, and an average of 21.4 MW. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%

**CLEARresult**



# **Flex Peak Demand Response Program 2015 Impact Evaluation**

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October 2015

**PREPARED BY** CLEARresult

**PREPARED FOR** Idaho Power Company

**REPORTING PERIOD** June 15<sup>th</sup> – August 15<sup>th</sup>, 2015

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## Executive Summary

Idaho Power Company contracted CLEAResult to complete an impact evaluation of the 2015 Flex Peak program, a voluntary demand response (DR) program that has been available to Idaho Power's commercial and industrial customers. In 2015, there were 38 customers and a total of 71 sites enrolled in the program. The goals of the impact evaluation were to determine the demand reduction (in MW) and realization rate for at least three curtailment events during the program's June 15<sup>th</sup> - August 15<sup>th</sup> season.

CLEAResult completed analyses of curtailment events held on June 30<sup>th</sup> (4-8pm), July 21<sup>st</sup> (4-8pm), and August 4<sup>th</sup> (4-7pm), 2015. The results of the curtailment event analyses showed maximum demand reductions of 21.9, 23.3, and 13.3 MW, respectively, for the three events, and an average of 19.5 MW at the meter level. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%. All three events included 71 unique sites, with the aggregate nominated load reduction averaging 24.5 MW across the three events.

The 71 sites enrolled in the program contributed a median nominated reduction of 175 kW. When broken out across four size classes, the sites with the smallest nominated load reduction, 0-50 kW, achieved the highest average realization rate across the three events at 137%. The second largest size class, 201-500 kW, achieved the lowest average realization rate at 64%.

The results of the impact evaluation show that Idaho Power's 2015 Flex Peak program functioned as intended and provided up to 23 MW to the electricity grid at the meter level. In addition, the Flex Peak program is scalable and with additional participants and more diversity among participants, could contribute more reduction as future capacity requirements dictate.

## Introduction

### Background

The Flex Peak Program is a voluntary demand response (DR) program available to Idaho Power's commercial and industrial customers. The program's objective is to reduce the demand on Idaho Power's system during periods of extreme peak electricity use. The program is designed to reduce peak load by paying a financial incentive to customers to turn off or reduce electrical system load at their facilities during called events. The program has a fixed payment amount of \$3.25/kW per week of nominated load reduction (or actual load reduction if an event was called) during the program season, and a variable payment amount of \$0.16/kWh for energy savings achieved during curtailment events after the third event.

The Flex Peak program provides customers with a notification two hours prior to the start of curtailment events via phone and email. Events can be called from June 15<sup>th</sup> - August 15<sup>th</sup> anytime from 2 - 8pm and can last from 2 - 4 hours.

### Impact Evaluation Goals

Idaho Power contracted CLEAResult to complete an impact evaluation of the 2015 Flex Peak Program. This 2015 impact evaluation has two primary goals:

1. Determine and verify the demand reduction (MW) during 2015 curtailment events
2. Determine realization rate for each event

The results contained in this report will enable Idaho Power to better define the impact of the program on the electricity grid and provide more accurate estimates of the program's load reduction in the future.

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## Methodology

The section below describes the data used to complete the impact evaluation, the sampling plan, and the methodology for gathering and processing data, determining baseline, calculating the demand reduction, and determining the curtailment event realization rates. Note that the methodology detailed below is aligned with the program's baseline and demand reduction calculation methodology. Two additional baseline methodologies were tested, with results reported in the accompanying memo "Flex Peak Demand Response Program 2015 Impact Evaluation: Alternative Methodologies."

### Data Sources

CLEAResult conducted the 2015 Flex Peak impact evaluation through the use of two primary data sources: interval data (hourly kW readings) and an event-specific participant list. The participant list included site ID, nomination kW, and the customer's aggregated option. Some interval meter data included error codes for cases where the source data was missing or estimated. See Table 1 for a list of error codes included in the data. Note that no site IDs needed to be removed from the analyses due to the presence of errors codes because error codes were not present during the curtailment event or baseline periods.

Table 1. Error Code Key

Error Code	Description
1	Power Outage
9	Missing Reading
Q	Estimated Reading

### Sampling Plan

The use of hourly interval metering data allowed the impact evaluation's sampling plan to be a census of program participants (i.e. all participants were considered in the analysis).

### Data Gathering and Processing

CLEAResult processed all data provided by Idaho Power using the analytics platform SAS®. The use of SAS® created a consistent and appropriate data format for all three curtailment events. The interval metering data was reviewed to identify the presence of error codes during the curtailment event period or in the baseline period, however no occurrences were found.

### Determine the Baseline

CLEAResult determined site-specific baselines by first identifying the three days with the greatest demand from the previous ten non-weekend/holiday and non-curtailment days (hereto called comparison days). The greatest demand was determined as the day with the highest average demand during the hours of 2pm - 8pm. CLEAResult then determined each site's unadjusted baseline demand during the event timeframe by averaging the demand for each hour across all three comparison days.

CLEAResult then calculated a day-of-adjustment (DOA) for each site. The DOA was calculated using the average of hours 12pm and 1pm (hours 3 and 4 prior to the beginning of the curtailment period) for both the comparison days and the event day. The DOA was calculated as a flat kW, and was capped at +/- 20% of the value for the

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same time period during the original baseline window. The DOA was applied to all baseline hours. This was done to avoid the baseline being affected by participant action to prepare for the curtailment event (e.g. pre-cool the building). This DOA approach was applied to each service location and summed to arrive at the program's aggregate baseline.

## Calculate Demand Reduction

CLEAResult calculated the demand reduction for each participant by subtracting its load during each hour of the curtailment event from the participant's adjusted baseline load (determined in the previous steps). The hourly demand reductions were then aggregated for all participants. The total event impact (both average and maximum reduction) was calculated by aggregating each participant's results.

## Determine Curtailment Event Realization Rate

CLEAResult determined the realization rates for each curtailment event by dividing the aggregate maximum demand reductions calculated in the previous step by the total nominated load for the all participants included in the analysis.

## Findings

The section below presents the findings of the 2015 Flex Peak program impact evaluation, beginning with a characterization of the sites enrolled in the program and ending with a presentation of the results of each curtailment event. Note that numbers presented in tables are expressed in MW at meter level, unless otherwise indicated. Idaho Power line losses are 9.7% for demand to convert from meter level to generation level load reduction.

## Participant Characterization

The 2015 Flex Peak program included 71 enrolled sites, accounting for an average of 24.5 nominated MW across the three events. The 71 sites were accounted for by 38 unique customers.

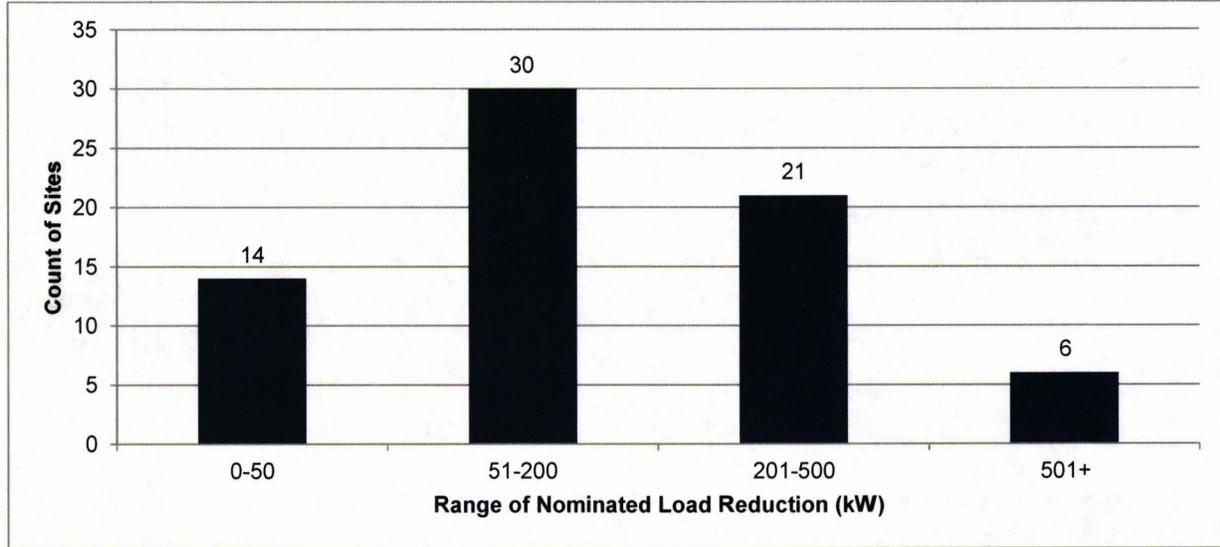
Table 2: Number of Sites by Processing Step

Curtailment Event	Nominated MW	Count of Total Sites	Count of Sites Analyzed	Percent of Total Sites Analyzed
June 30 <sup>th</sup>	25.3	71	71	100%
July 21 <sup>st</sup>	24.1	71	71	100%
August 4 <sup>th</sup>	24.0	71	71	100%
Average	24.5	71	71	100%

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When site's nominated kW was averaged across the three events, the average nominated load reduction was 344.4 kW, while the median reduction was 175 kW. As Figure 1 below depicts, the most common nominated load reduction was in the 51-200 kW range, accounting for 42% of the sites.

Figure 1. Count of Sites by Nominated Reduction Group



## Curtailment Event Results

Table 3 and Figure 3 below summarize the estimated demand reduction achieved during each of the three curtailment events and the resulting realization rate. The maximum demand reduction achieved ranged from a low of 13.3 MW for the August 4<sup>th</sup> event to a high of 23.3 MW for the July 21<sup>st</sup> event. The August 4<sup>th</sup> event's 13.3 MW reduction resulted in a realization rate of 55.4%, while the July 31<sup>st</sup> event's 23.3 MW reduction equated to a 96.6% realization rate. When considered together, the three events had an average realization rate of 79.6%.

Table 3: Summary of Demand Reduction and Resulting Realization Rate (MW)

Curtailment Event	Event Timeframe	Nominated Demand Reduction	Avg. Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate*
June 30 <sup>th</sup>	4-8pm	25.3	21.5	21.9	86.7%
July 21 <sup>st</sup>	4-8pm	24.1	22.6	23.3	96.6%
August 4 <sup>th</sup>	4-7pm	24.0	12.6	13.3	55.4%
Average		24.5	18.9	19.5	79.6%

\* Based on maximum reduction

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Figure 2: Summary of Demand Reduction (MW)

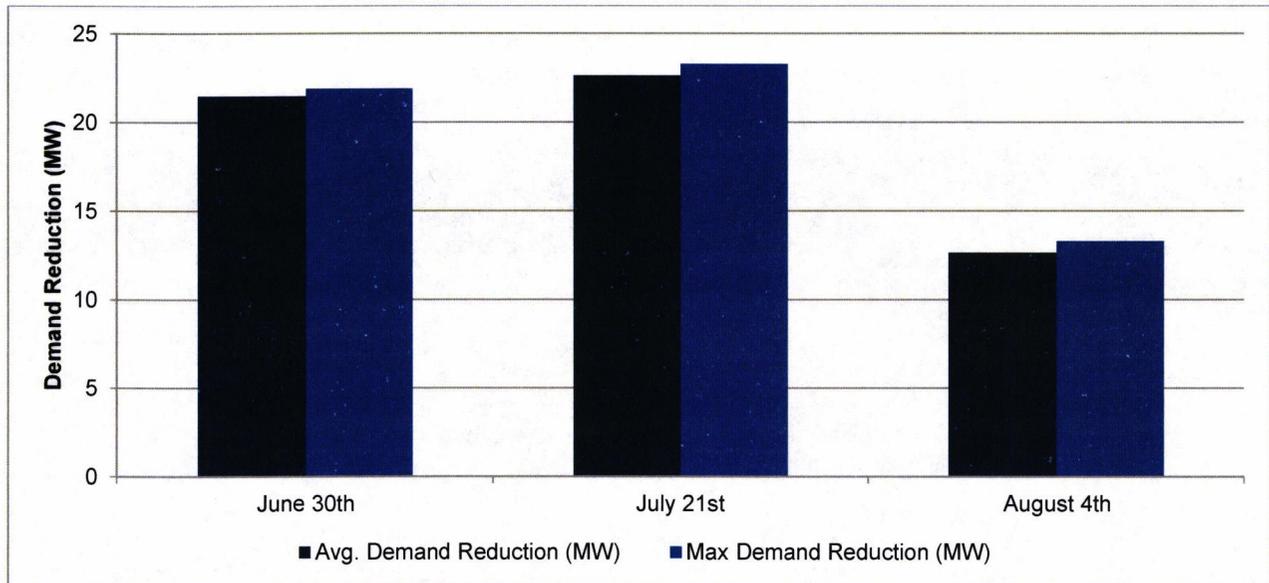
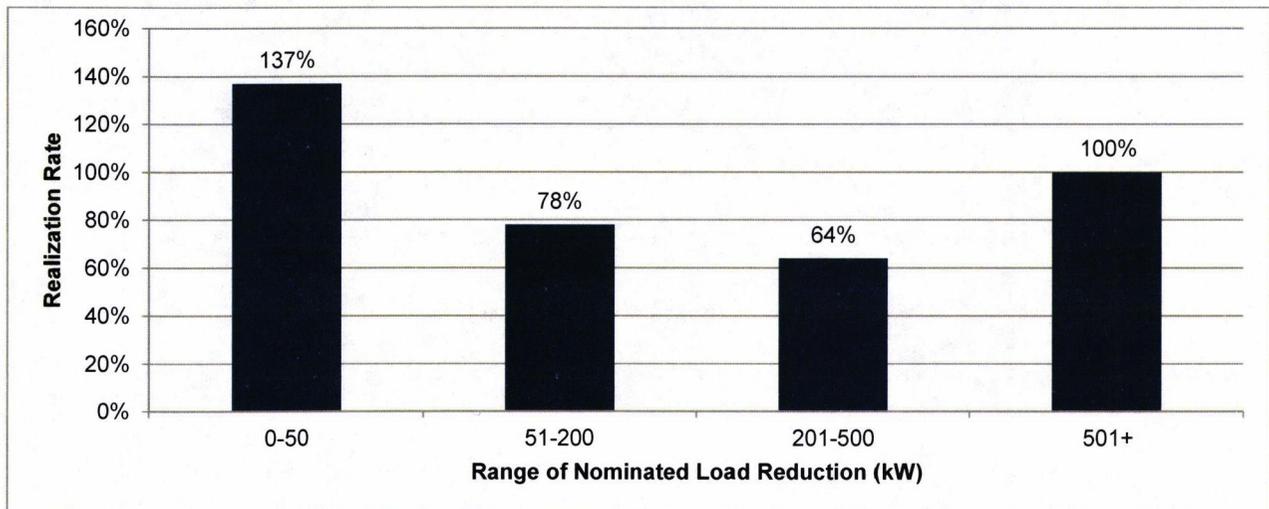


Figure 4 below presents the realization rate achieved by each site group. To calculate the results, each Site IDs average load reduction (across three events) was divided by their average nomination across the three events. Sites in the smallest group (0-50 kW of nominated load reduction) achieved the highest average realization rate (137%), while the second largest group (201-500 kW of nominated reduction) achieved the lowest average realization rate (64%).

Figure 3. Average Realization Rate by Nominated Reduction Group



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## June 30th Curtailment Event

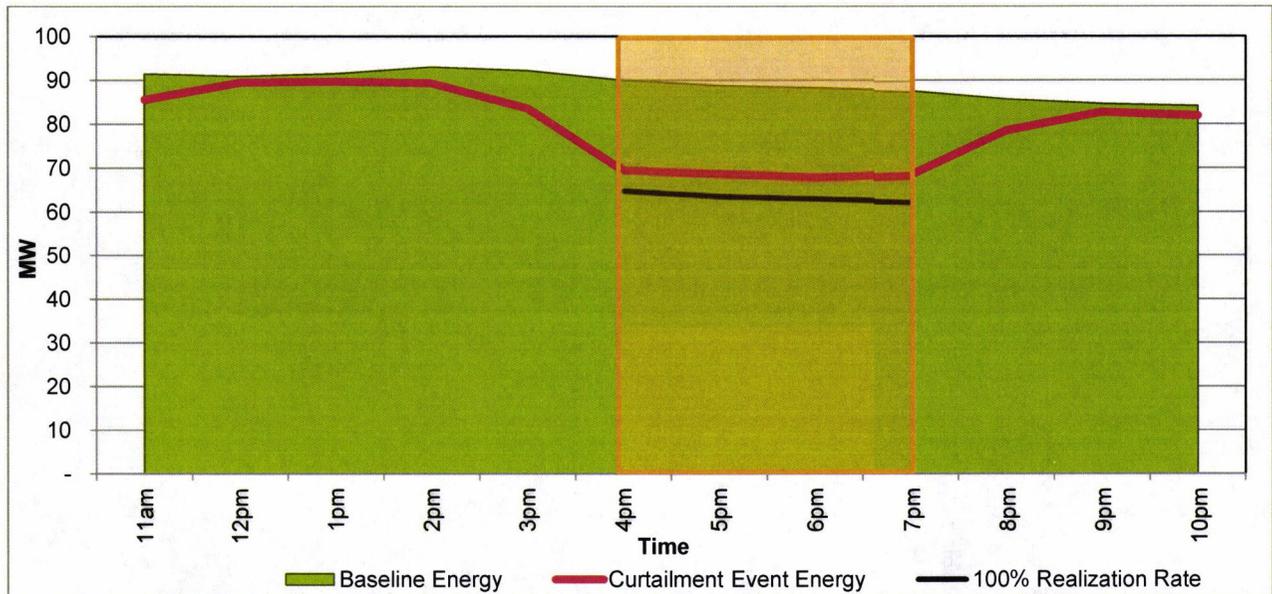
Table 5 below breaks out demand reduction for each hour of the curtailment event. The hour between 6pm and 7pm experienced the largest total reduction (21.9 MW, 86.7% of the total nominated load).

Table 4: June 30<sup>th</sup> Curtailment Event Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
June 30th	21.9	21.6	21.9	20.5	21.5	21.9

Figure 5 below presents the load profile of the June 30<sup>th</sup> curtailment event and its baseline, graphically depicting the results from Table 5 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 4. June 30<sup>th</sup> Curtailment Event Load Profile



**Notes:**

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.
- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

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## July 21st Curtailment Event

The second Flex Peak event was called in the third week of July. The July 21<sup>st</sup> event achieved the highest demand reduction results out of the three events.

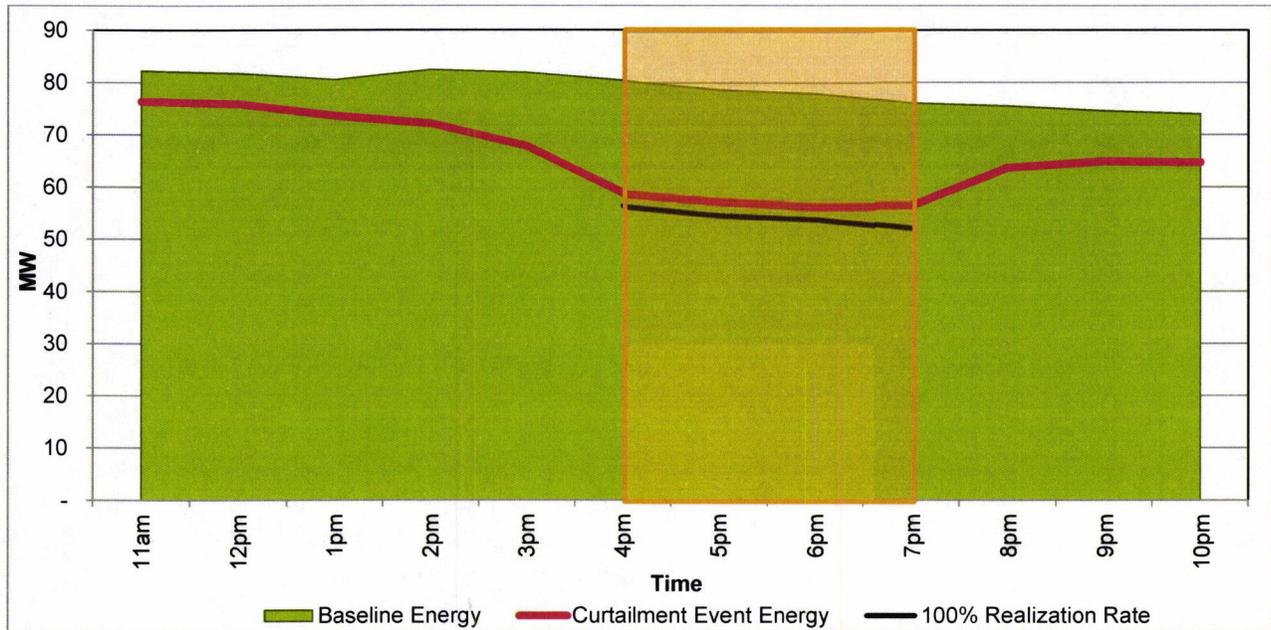
Table 7 below breaks out demand reduction for each hour of the curtailment event by dispatch group. The hour between 4pm and 5pm experienced the largest total reduction (23.3 MW, 96.6% of the total nominated load).

Table 5: July 21<sup>st</sup> Curtailment Event: Baseline Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	7-8pm	Avg. Reduction	Max. Reduction
July 21 <sup>st</sup>	23.3	22.9	22.9	21.5	22.6	23.3

Figure 6 below presents the load profile of the July 21<sup>st</sup> curtailment event and its baseline, graphically depicting the results from Table 7 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 5: July 21<sup>st</sup> Curtailment Event Load Profile



**Notes:**

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.
- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

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## August 4th Curtailment Event

The third Flex Peak event was called in the first week of August. The August 4<sup>th</sup> event saw the lowest demand reduction out of the three events.

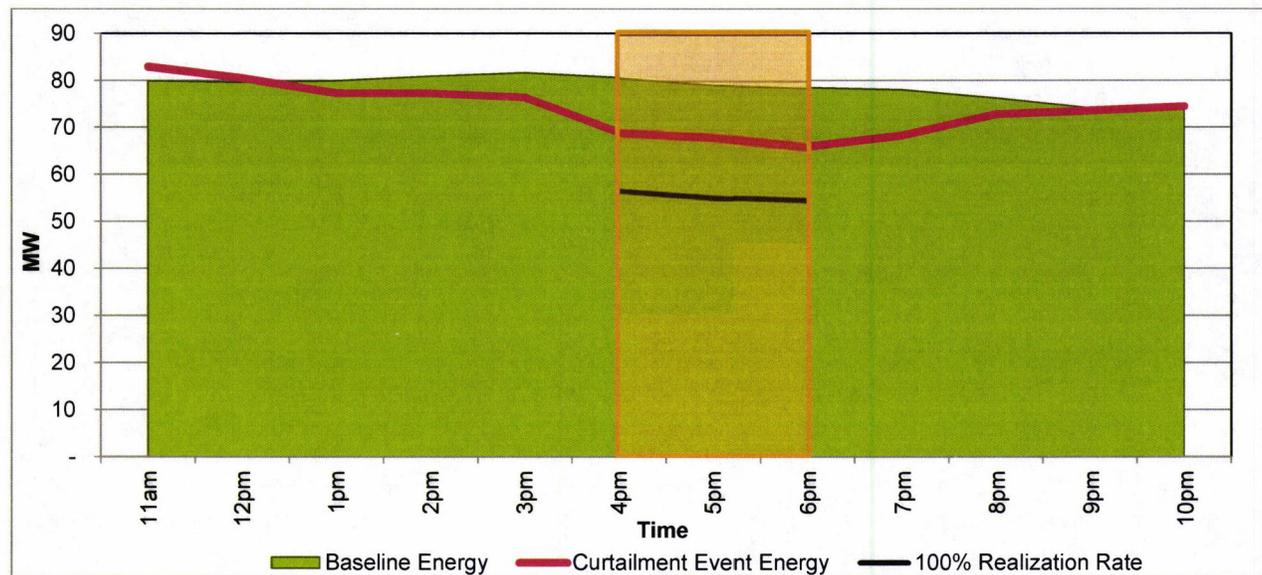
Table 9 below breaks out demand reduction for each hour of the curtailment event by dispatch group. The hour between 6pm and 7pm experienced the largest total reduction (13.3 MW).

Table 6: August 4th Curtailment Event Results by Hour (MW)

Method	4-5pm	5-6pm	6-7pm	Avg. Reduction	Max. Reduction
August 4th	12.2	12.4	13.3	12.6	13.3

Figure 7 below presents the load profile of the August 4<sup>th</sup> curtailment event and its baseline, graphically depicting the results from Table 9 above. The black line during the curtailment event period depicts the level the curtailment event energy load profile would have to reach in order to achieve a 100% realization rate.

Figure 6. August 4<sup>th</sup> Curtailment Event Load Profile



**Notes:**

- Energy usage for a given hour is reported in the time reading at the beginning of the hour. For example, energy usage from 4-5pm is depicted in the 4pm reading.
- The Baseline Energy and Curtailment Event Energy lines do not intersect at the beginning of the event due to the Day-of-Adjustment (DOA) being calculated prior to the event start time.

When considering the poor performance of the August 4<sup>th</sup> event, compared to the other two events, the reduced realization rate can be singly attributed to a lack of performance by the site with the largest nominated load

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reduction in the program. That site achieving a realization rate of 8% in the August 4<sup>th</sup> event, compared to an average of 113% across the first two events. Had the site's realization rate for the August 4<sup>th</sup> event been the average of its realization rates from the first two events, the event's realization rate would've increased by 39.4% to 94.8%.

### Conclusions

The goals of the 2015 Flex Peak impact evaluation were to determine and verify the demand reduction (MW) during curtailment events and determine the realization rate for each event.

CLEAResult completed analyses of curtailment events held on June 30<sup>th</sup> (4 – 8pm), July 21<sup>st</sup> (4 – 8pm), and August 4<sup>th</sup> (4 – 7pm). All three events included 71 unique sites, with the aggregate nominated load reduction averaging 24.5 MW across the three events. The results of the analyses showed maximum demand reductions of 21.9, 23.3, and 13.3 MW, respectively, for the three events, and an average of 19.5 MW. The events achieved realization rates of 86.7%, 96.6%, and 55.4%, respectively, averaging 79.6%.

The results of the impact evaluation show that Idaho Power's 2015 Flex Peak program functioned as intended and provided up to 23 MW to the electricity grid at the meter level. In addition, the Flex Peak program is scalable and with additional participants and more diversity among participants, could contribute more reduction as future capacity requirements dictate.