A growing number of utilities provide funding to help industrial customers hire an on-site energy manager. For many industrial facilities, one of the largest barriers to improved energy efficiency is the shortage of staff time to focus on energy management. Providing incentives to help these customers hire an energy manager allows them to participate more fully in the utilities’ existing energy efficiency programs, leading to much greater energy savings. Well-designed energy manager funding programs are cost-effective and can lead to on-going engagement and energy savings from large customers.

ENERGY MANAGEMENT CHALLENGES AND OPPORTUNITIES

Most industrial facilities have ample opportunities for energy efficiency improvements through equipment upgrades and better operating practices. Recent studies estimate 14-22% potential energy savings in the U.S. industrial sector. However, achieving this potential requires a skilled energy manager – one who leads the process of identifying energy efficiency opportunities, negotiates for management approval to invest capital in energy efficiency equipment upgrades, and coaches or trains fellow employees to find and implement operational improvements. However, many companies fail to recognize energy as a manageable cost, and/or are unwilling to devote a trained position to energy management. Without a dedicated and trained energy manager, energy efficiency improvements occur sporadically at best, and most of the cost-effective opportunities are overlooked.

Removing this staffing barrier can lead to a significant jump in energy savings from industrial and other large utility customers. For example, the mining sector can be particularly challenging to engage in energy efficiency programs. However, BC Hydro achieved over 75 GWh of energy savings from its mining customers during the past fiscal year (April 2014 – March 2015), with 100% of these savings coming from customers with utility-funded energy managers. Without this type of incentive, mining facilities mainly focus on production and are reluctant to devote staff time to energy efficiency. The same is true of many manufacturing facilities; helping them hire an energy manager can make a huge difference.

PROGRAM DESIGN

At least five utilities or third-party energy efficiency program providers currently provide incentives for large customers to hire a full- or part-time energy manager. These utilities and program providers are listed in Table 1 along with the key elements of program design in each case. The discussion below addresses some of the key design considerations.

Responsibility and Training

Most of the programs allow flexibility in terms of the responsibilities of the energy managers being funded. The funded energy manager can work at one industrial facility or work across a number of facilities owned by the same company or public sector organization (e.g., a school district). If hiring a new energy manager, most programs expect or require some type of prior training in energy management. In addition, all of the programs in Table 1 provide coaching or training in principles of strategic energy management (SEM). This training helps the new energy manager develop the skills needed to develop and implement a plan for energy efficiency improvements within the company.

Incentive Structure

There are several options for how to structure the energy manager incentives. To make the energy manager program cost-effective, most of the programs tie the level of incentives to the amount of planned (and later verified) energy savings. (The exceptions are BC Hydro and Ontario, discussed below.) Bonneville Power Administration (BPA) and Rocky Mountain Power (RMP) provide incentives of $.025/kWh of energy savings. Both also provide up to $25,000 up-front, as a down-payment on the energy performance incentive. Providing part of the incentive up-front can make it easier for customers to hire either a new employee or a part-time contractor, thereby helping to reduce this potential barrier to participation. However, the amount of up-front incentive may not be a significant factor in program participation. RMP, for example, has recruited 15 companies since 2013 to participate in the energy manager co-funding program; 14 of those did so while choosing to

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3 Gareth Clark, BC Hydro Mining Sector Manager, personal communication, August 11, 2015.
4 For example, many programs rely on the “certified energy manager” (CEM) program through the Association of Energy Engineers (AEE).
not receive any incentive in advance.\textsuperscript{5} Puget Sound Energy's (PSE) up-front incentive is only $10,000, but its program has met all its participation targets.\textsuperscript{6}

The total amount of the incentive is typically determined at the end of the performance period (12 months for RMP; 18 months for BPA), based on the actual amount of energy savings achieved through capital projects and/or operations and maintenance (O&M) improvements.

For BPA and RMP, the energy manager incentive is in addition to incentives provided through other utility programs, including custom or prescriptive incentives for capital projects or incentives through strategic energy management (SEM) or industrial re-commissioning programs for O&M savings. (These other programs claim the energy savings; the energy manager program does not claim any savings to avoid double-counting.)

Table 1 | Energy Manager Program Incentive Details

<table>
<thead>
<tr>
<th>Utility, Program and Location</th>
<th>Threshold for Participation</th>
<th>Incentive Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BPA</strong>&lt;br&gt;Energy Project Manager&lt;br&gt;(Washington, Oregon, Idaho and western Montana)</td>
<td>Potential savings of at least 1 GWh/yr</td>
<td>$.025/kWh, up to 100% of approved energy manager salary (including overhead and benefits), with $25,000 of the total provided up-front; BPA also pays for pre-approved training.</td>
</tr>
<tr>
<td><strong>Rocky Mountain Power (RMP)</strong>&lt;br&gt;Energy Project Manager Co-Funding&lt;br&gt;(Utah and Wyoming)</td>
<td>Identified project savings of at least 1 GWh/yr</td>
<td>$.025/kWh, up to 100% of approved salary (including overhead and benefits), with $25,000 of the total provided up-front.</td>
</tr>
<tr>
<td><strong>Puget Sound Energy (PSE)</strong>&lt;br&gt;Resource Conservation Manager&lt;br&gt;(Puget Sound region of western Washington)</td>
<td>Annual consumption of at least 5 GWh or 675,000 therms</td>
<td>Start-up incentive of $10,000 with required energy plans, in addition to $.02/kWh of electricity savings, and $.15/therm of natural gas savings, up to $56,000/yr (see web site for more details). PSE also provides interval data and energy accounting software.</td>
</tr>
<tr>
<td><strong>BC Hydro</strong>&lt;br&gt;Industrial Energy Manager&lt;br&gt;(British Columbia)</td>
<td>Annual consumption of at least 10 GWh</td>
<td>Up to 75% of approved salary (up to $105k); BC Hydro also provides free energy management consulting, training, free Energy Management Assessment, SEM Planning workshop.</td>
</tr>
<tr>
<td><strong>Ontario Independent Electricity System Operator</strong>&lt;br&gt;Embedded Energy Manager&lt;br&gt;(Ontario)</td>
<td>Potential savings of about 2 GWh/yr or greater</td>
<td>Up to 80% of salary (up to $108k); Ontario also provides free training and SEM workshop.</td>
</tr>
</tbody>
</table>

BPA will co-fund a percentage of an energy manager’s salary on a sliding scale, depending on the level of energy savings estimated (and later verified). The minimum amount of energy savings is 1 million kWh per year, which qualifies a company for $25,000 towards the energy manager’s salary.

\textsuperscript{5} Clay Monroe, Rocky Mountain Power, Commercial and Industrial DSM Program Manager, personal communication (November 4, 2015).

In order to receive 100% funding for a full-time energy manager (including benefits), the customer would have to save about five million kWh per year. Initially, BPA and the customer estimate the potential energy savings. The energy manager is then required to develop a plan for achieving this level of energy savings within 12 months of the energy manager starting work. (If necessary, the customer can also request a six-month extension.) All energy savings are measured and verified before BPA provides the final payment to the customer. BPA provides incentives for (and measures) O&M savings through its High Performance Energy Management (HPEM) and Track and Tune programs. The energy manager co-funding can be suspended if the facility fails to achieve its energy savings goal.

PSE’s incentives are structured in a similar way, but with a few key differences. PSE provides a start-up incentive of only $10,000 rather than $25,000, but this is in addition to an energy savings incentive of $0.02/kWh (or $0.15/therm for natural gas) for O&M savings. (In the case of BPA and RMP, the $25,000 up-front is included within the energy savings incentive.) PSE also provides interval data and energy accounting software. And another distinguishing feature of PSE’s energy manager program is that it accounts for the O&M energy savings achieved through the program, measured by developing a baseline model (based on regression analysis) of energy consumption and then tracking savings relative to this model. Energy savings from capital (hardware-based) projects, such as equipment retrofits, are subtracted from the overall savings calculated through the model and allocated to PSE’s capital (custom or prescriptive) incentive programs.

BC Hydro has funded energy managers for its large customers since 2009 as part of its SEM program. For customers participating in the SEM program, BC Hydro will provide funding for up to 75% of the energy manager’s salary. BC Hydro has found that providing funding for energy managers has allowed many more customers to participate in the SEM program. It also provides various types of training to help energy managers achieve more energy savings.

BC Hydro has no requirement for achieving a minimum level of energy savings in order to justify the payment for the salary -- an important difference compared to BPA and RMP. It also provides incentives for capital projects in addition to the payment towards the energy manager’s salary. Not requiring an estimate of potential energy savings in advance can make it easier for some customers to participate in the energy manager program, since it can be a challenge to estimate potential savings without having an energy manager. On the other hand, this approach increases the risk to the utility of not achieving enough energy savings to make the energy manager funding worthwhile or cost-effective. To address this concern, BC Hydro includes performance objectives in the energy manager contract, including assessments of potential savings and reporting of various other activities, in addition to actual energy savings achieved (through either O&M or capital projects). BC Hydro provides the energy manager funding in quarterly payments, as contract performance targets are achieved.

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8 For more details on this approach of measuring O&M savings, see “Monitoring, Targeting and Reporting (MT&R) Reference Guide, Revision 3.0,” BPA Energy Smart Industrial, March 2012.
Ontario’s program is largely modeled after BC Hydro’s program with regard to incentive structure and complementary training in SEM offered to the energy managers. One difference is that Ontario measures O&M savings achieved through participation in the program, while BC Hydro’s program does not.

RESULTS AND COST-EFFECTIVENESS

Because providing incentives to industries for hiring energy managers may seem like a financially unsound use of energy efficiency program funds, it is important to demonstrate that these programs are worthwhile and cost-effective. Highlights of energy savings achieved and cost-effectiveness of the energy manager funding programs are provided in Table 2.

Rocky Mountain Power, BPA and BC Hydro do not directly attribute savings to the energy manager program, but they consider the program as an important enabler to achieving more savings through other programs. These utilities evaluate the energy manager programs within the suite of all of their industrial efficiency programs. As long as the overall suite remains cost-effective and the energy manager programs contribute additional energy savings, the programs are considered to be successful. BC Hydro estimates that approximately 75% of its total industrial program savings come from facilities with funded energy managers, while the energy manager program costs contribute only 10% to total industrial program expenditures.9

Table 2 | Energy Manager Program Results

<table>
<thead>
<tr>
<th>Utility</th>
<th>Energy Savings</th>
<th>Cost-effectiveness</th>
<th>Percentage of industrial EE program costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPA</td>
<td>Since 2010, total energy savings of 143 GWh (or about 36 GWh/yr)</td>
<td>Cost of saved energy of ~$0.019/kWh11</td>
<td>NA</td>
</tr>
<tr>
<td>Rocky Mountain Power</td>
<td>Since 2013, total energy savings of 12.7 GWh (or about 6.3 GWh/yr)</td>
<td>NA13</td>
<td>6%</td>
</tr>
<tr>
<td>(RMP)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puget Sound Energy (PSE)</td>
<td>14 GWh/yr avg (including O&amp;M savings only)</td>
<td>Benefit-cost ratio of 1.6</td>
<td>10%</td>
</tr>
<tr>
<td>BC Hydro</td>
<td>About 75% of BC Hydro’s total industrial energy savings each year14</td>
<td>NA15</td>
<td>&lt;10%</td>
</tr>
<tr>
<td>Ontario</td>
<td>48.6 GWh from O&amp;M savings for 2012-2014</td>
<td>NA16</td>
<td>&lt;10%</td>
</tr>
</tbody>
</table>

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9 Tamara Berger, BC Hydro Energy Manager Program manager, personal communication, September 18, 2015.
10 About 95% of the total energy savings were from capital projects; the rest were from O&M improvements.
11 This was calculated as follows: total incentives paid through the energy manager program divided by the total verified energy manager savings.
12 These savings are for six customers with verified savings so far; there are nine additional customers in the program whose savings have not yet been verified.
13 For the total suite of industrial energy efficiency programs, the benefit-cost ratio remained greater than 1.
14 Sometimes this percentage is even higher. For example, in 2014, BC Hydro’s total industrial energy savings were 220 GWh, and about 200 GWh (or 91%) were from companies with funded energy managers.
15 For the total suite of industrial energy efficiency programs, the benefit-cost ratio remained greater than 1.
PSE calculates the energy savings for customers’ O&M improvements, as described above. Ontario measures O&M savings achieved through the energy manager program in a similar way (using a baseline model and tracking overall progress, subtracting out capital project savings). In addition to the O&M savings from the funded energy managers shown in Table 2, Ontario’s funded energy managers achieved an additional 125 GWh of savings from capital projects during 2012-2014; these savings were allocated to other programs to avoid double counting.17

CONTINUOUS IMPROVEMENT

In addition to achieving substantial, cost-effective energy savings through increased participation in the utilities’ various incentive programs, another goal of energy manager programs is to influence industrial or other large customers toward adopting principles of strategic energy management (SEM).

As mentioned above, all of the energy manager programs offer training in SEM principles as a complement to the energy manager co-funding. For BC Hydro, the customer is required to enroll in the SEM program in order to be eligible for the energy manager funding. SEM training helps a new energy manager obtain management support for energy-saving goals, organize teams, develop multi-year energy plans, and measure the energy savings from both capital projects and O&M improvements.

In general, the goal of SEM is to help a customer foster an organizational culture and management systems to ensure that energy-saving efforts continue over time. Energy manager funding helps increase participation in SEM programs, and SEM training helps the energy managers instill the commitment to continuous improvement within the industrial facility. However, it is challenging (and beyond the scope of this paper) to measure to what extent a culture of continuous improvement has been established within a given facility or organization.18

One indicator of a lasting culture of continuous improvement in energy management is whether the customer would fund the energy manager on its own, after the utility funding period ends. However, all of the programs listed above will continue to fund the energy manager as long as the

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16 Ontario’s energy manager program accounts for O&M savings achieved, but a separate evaluation of the energy manager program has not yet been completed.


company can ensure savings above the threshold or meet the other requirements. This makes it harder to determine whether the customer would continue to fund the energy manager on its own.

For example, BC Hydro and Ontario have not found any examples of customers continuing the energy manager position after their funding ends, because most of their customers with funded energy managers simply continue to take advantage of the funding as long as possible. As mentioned above, PSE’s program provides an incentive of only $10,000 towards the energy manager position, with additional performance incentives for O&M savings, which the company does not necessarily have to apply to an energy manager’s salary. PSE views the $10,000 as sufficient incentive to encourage the customer to allow an existing employee to devote more time to energy management, rather than an incentive to actually hire a new employee or contractor. This approach has the potential advantage that the employee may have a greater chance of remaining devoted to energy management after the utility funding goes away. Similarly, according to Jennifer Eskil, industrial energy efficiency program manager for BPA, “The EPM co-funding has generally enabled companies to backfill the EPM’s non-energy responsibilities with another employee, freeing up the EPM to focus on energy management.”

John Wallner is a former director of industrial programs for the Northwest Energy Efficiency Alliance (NEEA), which ran a pilot energy manager funding program for BPA. According to Wallner, “Smart companies will see that the energy project manager more than pays for his salary through energy savings, and will switch that resource onto the payroll. This happened in the pilot project BPA and NEEA ran in 2008 with a company called Grays Harbor Paper. However, most manufacturers will only look at the headcount and not at the return on investment of an energy manager.”

In 2010, the U.S. Department of Energy (DOE) paid for half of the salaries for two facility energy managers for J.R. Simplot, a large, privately-held, American food and agribusiness company. After 36 months of DOE co-funding, Simplot decided to maintain the positions on its own, in order to achieve additional energy savings and to maintain the savings already achieved.

It would require more research and customer interviews to determine how many energy manager funding customers have adopted elements of SEM, or how many have created permanent energy manager positions as a result of utility energy manager funding for one or more years. However, we believe that over time, funding an energy manager and providing SEM training will have some effect on improving the company’s appetite for energy savings and continuous improvement.

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19 BC Hydro and Ontario have no minimum savings threshold, but have other requirements for renewing the energy manager funding contract. PSE allows customers to renew their participation after three years with no requirement/threshold for energy savings.

20 Jennifer Eskil, Program Manager of BPA Industrial Energy Smart, personal communication, September 11, 2015. BPA has co-funded 31 energy project managers (EPMs) since 2009, with an average period of engagement with the program of 1.7 years.


CONCLUSION

Providing funding for energy managers helps large customers overcome one of their most significant barriers to improved energy efficiency – the lack of staff time and expertise. By complementing existing prescriptive and custom incentive, technical assistance, and SEM programs, energy manager funding programs help utilities maximize the amount of cost-effective energy savings they achieve, at a very modest incremental program cost.

The five programs described above are achieving significant energy savings while remaining cost-effective. In considering cost-effectiveness, we recommend evaluating the energy manager program as part of the suite of efficiency programs for large customers. This evaluation should include the energy savings from capital incentive programs, SEM and other O&M incentive programs. As long as the overall suite of programs remains cost-effective, the energy manager program can be considered successful as an enabling activity, much like the education and training costs that are part of other energy efficiency programs. It also makes sense to separately track the measured savings achieved by funded energy managers, and to compare these energy savings with the energy manager program costs.

All the programs have participation thresholds of potential energy savings or amount of annual consumption. If choosing the former, we suggest that the process of identifying potential savings not be so rigorous that it creates a potential barrier to participate in the program.

Most of the programs provide incentives based on actual energy savings achieved, with some funding up front to encourage the customer to hire the energy manager or to free up other staff time to devote to energy management. All of the programs provide up to 100% (or a large fraction) of the energy manager’s salary as long as sufficient energy savings are achieved. Also, all of the programs will continue the funding of the energy manager indefinitely as long as energy savings continue. We recommend that other utilities replicate these proven program design features.

In addition, all of the programs offer complementary SEM training programs which help the energy managers to identify and implement O&M improvements as well as capital-based energy efficiency projects. SEM training helps customers develop systems for pursuing on-going energy efficiency improvements, contributing to continued energy savings over time.
RESOURCES

Energy Manager Program Contact Information and Websites

<table>
<thead>
<tr>
<th>Utility</th>
<th>Energy Manager Program Contact</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPA</td>
<td>Todd Amundson, <a href="mailto:tmamundson@bpa.gov">tmamundson@bpa.gov</a></td>
<td><a href="http://www.bpa.gov/EE/Sectors/Industrial/Pages/Energy-Management.aspx">http://www.bpa.gov/EE/Sectors/Industrial/Pages/Energy-Management.aspx</a></td>
</tr>
<tr>
<td>Rocky Mountain Power (RMP)</td>
<td>Clay Monroe, <a href="mailto:clay.monroe@pacificorp.com">clay.monroe@pacificorp.com</a></td>
<td><a href="https://www.rockymountainpower.net/bus/se/utah/epmc.html">https://www.rockymountainpower.net/bus/se/utah/epmc.html</a></td>
</tr>
<tr>
<td>BC Hydro</td>
<td>Tamara Berger, <a href="mailto:tamara.berger@bchydro.com">tamara.berger@bchydro.com</a></td>
<td><a href="https://www.bchydro.com/powersmart/business/programs/energy-management/iem.html">https://www.bchydro.com/powersmart/business/programs/energy-management/iem.html</a></td>
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ABOUT SWEEP

The Southwest Energy Efficiency Project is a public interest organization dedicated to advancing energy efficiency in Arizona, Colorado, Nevada, New Mexico, Utah and Wyoming. For more information, visit www.swenergy.org.

SWEEP’s Industrial Energy Efficiency Program promotes strong and effective utility industrial efficiency programs throughout the Southwest region.

Questions or comments about this report should be directed to Neil Kolwey, Senior Associate: nkolwey@swenergy.org.

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